

SITE HEALTH AND SAFETY PLAN

**GM Components Holdings, LLC Lockport Facility
200 Upper Mountain Road, Lockport, NY 14094**

GZA GeoEnvironmental of New York

Date: April 20, 2010

Revision No: 2

BASED ON TEMPLATE DATED APRIL 2003

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SITE HEALTH AND SAFETY PLAN

This Health and Safety Plan (HASP) is designed to be used in conjunction with applicable General Motors Health and Safety Operating Guidelines (HSOGs). The HASP and HSOGs must be available on site when this plan is in use. The guidelines contained herein were based upon the best available information at the time of the HASP's preparation. Specific requirements will be revised when new information is received or site conditions change. A written amendment will document all changes made to the HASP and will be included as an attachment.

This HASP template is designed to assist the developer to meet the minimum requirements of a HASP in a modular format. As stated above, this HASP should be used in conjunction with the applicable HSOGs. Below is a list of HSOGs that are currently developed and available to all Participants. Participants may electronically include the information provided within or may adopt the entire HSOG for reference.

<i>HSOG No.</i>	<i>Health and Safety Operating Guideline</i>
1.1	Action Levels for Direct Reading Instrumentation
2.1	General Site Rules
2.2	Confined Space Entry
2.3	Drum Handling
2.4	Lockout/Tagout
2.5	Cold Stress
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2.7	Hot Work Permits
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3.7	Hazard Communication/WHMIS
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4.2	Severe Weather
4.3	Notification and Injury Reporting

Fill in the blanks and attach supporting documents as necessary.

Reference. No.: _____ Written by (signature): Christopher Boron
Office Location: Buffalo, NY Date: January 8, 2010
Anticipated Start Date: 1/11/10 Participant PM Name: Christopher Boron
Project Duration: 6 months Reviewed By (Signature): _____
Date: _____

Are the following mandatory documents complete and available?

- ☒ Amendments In The Field Made - See Appendix 4.
- ☒ GM Job-Site Safety Plan Completed and Attached.
- ☒ Task-Specific Health and Safety Risk Assessment (TSHSRA) completed.
- ☒ All HSOs attached and available in Appendix 1.
- ☒ Contractor Spill Cleanup Plan.

A. WORK LOCATION DESCRIPTION (Attach Site History to Appendix)

1. Site Name: GM Components Holdings, LLC Lockport Facility
2. Location Address: 200 Upper Mountain Road, Lockport, New York
3. Site Type: ☒ HW Site ☐ Construction ☐ Spill ☐ Municipal
☒ Industrial ☐ Commercial ☐ Sanitary Landfill ☐ Residential
4. Surrounding Land Use: ☒ Residential ☒ Industrial ☐ N/A
☒ Commercial ☐ Park Land ☐ Other _____
5. Current Site Status: ☒ Active ☐ Inactive
6. Type of Work to be Conducted: ☐ Investigation ☐ Phase I Audit ☐ Construction
☐ Design ☒ Monitoring ☐ Other _____
7. Size of Site: 342.25 acres
8. Site Contaminants: Chlorinated solvent and petroleum contamination
9. Brief Description of Activities Covered by this Plan: Monitored Natural Attenuation (MNA) Groundwater Monitoring (TCE Release Area), Soil Vapor Extraction (SVE) System Monitoring (Building 10), Remedial Investigation Activities for Buildings 7, 8, 9 and 10.
10. Surrounding Population that can be Affected by Activities: None
11. Protection of Neighboring Properties if Required: None
12. Site Topography: ☒ Flat ☐ Hills ☐ Treed ☐ Other _____
13. Anticipated Weather (temperature, etc.): Range from 10 to 80 degrees Fahrenheit

14. Unusual Features (such as near water, manholes, etc.):¹ A small stream is located within the TCE Release Area

B. ACTIVITIES COVERED UNDER THIS PLAN

Task No.	Description	Preliminary Schedule (Date)
1.	MNA Groundwater Monitoring	Annually in Fall (October/November) plus additional events as needed.
2.	SVE System Monitoring	Bimonthly Checks and Maintenance as needed.
3.	Remedial Investigations for Buildings 7, 8, 9, & 10	May 2010 through August 2010
4.		
5.		

C. HAZARD DESCRIPTION

1. Site PPE Hazard Level: ☐ C ☐ Modified C ☒ D ☐ Unknown

Who determined the hazard level? How?

GZA GeoEnvironmental determined the hazard level based on previous experience with the MNA, SVE System Monitoring and subsurface activities at the Facility. Completion of these tasks in Level D and following the protocols identified in this Health and Safety Plan will eliminate the potential for exposure the contaminants of concern.

2. Types of Hazards: (check all applicable)

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> Chemicals | <input checked="" type="checkbox"/> Physical | <input type="checkbox"/> Other <u></u> |
| <input checked="" type="checkbox"/> Underground Utilities | <input checked="" type="checkbox"/> Overhead Utilities | <input type="checkbox"/> Excavations greater than 5 feet |
| <input checked="" type="checkbox"/> Heavy Equipment | <input checked="" type="checkbox"/> Drilling | <input checked="" type="checkbox"/> Traffic Hazards |
| <input type="checkbox"/> High Risk Fire Hazard | <input type="checkbox"/> Use of Boats | <input type="checkbox"/> Lockout/Tagout |
| <input type="checkbox"/> Poisonous Insects | <input type="checkbox"/> Water Hazards | <input type="checkbox"/> Heavy Lifting |
| <input checked="" type="checkbox"/> Extreme Weather | <input type="checkbox"/> Rough Terrain | <input type="checkbox"/> Buried Drums |
| <input checked="" type="checkbox"/> Inhalation | <input checked="" type="checkbox"/> Heat | <input type="checkbox"/> Biological |
| <input checked="" type="checkbox"/> Ingestion | <input checked="" type="checkbox"/> Cold | <input type="checkbox"/> Oxygen Deficient |
| <input checked="" type="checkbox"/> Skin Adsorption | <input type="checkbox"/> Radiation | <input type="checkbox"/> Explosive |
| | <input checked="" type="checkbox"/> Noise | <input type="checkbox"/> Confined Space |

Describe: Groundwater Monitoring will involve purging and handling groundwater from monitoring wells located outside at the facility. Groundwater is contaminated with chlorinated solvents with contaminant levels ranging from low part per billion to 600 parts per million.

SVE System Monitoring will involve collecting air samples and adjusting the flow rates of the SVE system located inside Building 10. SVE system is extracting air from the ground contaminated with chlorinated solvents. Total volatile organic compound concentrations are

¹ Add additional data to the Appendix, if necessary.

in the 20 to 30 parts per million range.

Remedial investigation for Buildings 7, 8, 9 and 10 will involve test borings, monitoring well installation, soil probes, and throughout various areas of the facility. Groundwater throughout the investigation area impacted with chlorinated solvents and petroleum contaminants. Concentrations to be encountered range from 20 part per million to low part per billion.

3. Source of Hazard: (check the anticipated level of hazard for only those applicable)

Air:	<input type="checkbox"/> High	Describe:	Air stream treated by the SVE system has a total volatile organic compound concentration ranging from 20 to 30 parts per million. Potential exposure to the contaminated air stream exists during air sample collection in a well ventilated area.
	<input type="checkbox"/> Medium		Soil may be contaminated with chlorinated solvents and/or petroleum products. Latex gloves are to be worn while conducting the soil sampling, minimizing the potential exposure to contaminated soil.
	<input checked="" type="checkbox"/> Low		
Soil:	<input type="checkbox"/> High	Describe:	
	<input type="checkbox"/> Medium		
	<input checked="" type="checkbox"/> Low		
Surface Water:	<input type="checkbox"/> High	Describe:	
	<input type="checkbox"/> Medium		
	<input type="checkbox"/> Low		
Groundwater:	<input type="checkbox"/> High	Describe:	Groundwater is contaminated with chlorinated solvents. Latex gloves are to be worn while conducting the groundwater purge and sampling, minimizing the potential exposure to contaminated groundwater.
	<input type="checkbox"/> Medium		
	<input checked="" type="checkbox"/> Low		
Other:	Describe: _____		

4. Chemical and Physical Hazards of Concern

(Complete a Task-Specific Health and Safety Risk Assessment (TSHSRA) and include results in Appendix 5.)

a) Summary of TSHSRA

Physical and/or hazards identified or reasonably anticipated to be associated with site work tasks include slips, trips & falls, cold stress, noise, vehicle traffic and chemical exposure. Work tasks are to be completed in Level D. Copies of applicable HSOGs are included in Appendix 1.

Material Safety Data Sheets (MSDSs) for materials brought to the site by GZA are located in Appendix 6.

- b) The following table lists the chemical hazard(s) of concern for this site based on the best available data to GZA at the time of preparing this HASP.

<i>Compound</i>	<i>Ionization Potential (eV)</i>	<i>Odor Threshold</i>	<i>OSHA PEL/TLV</i>	<i>IDLH</i>	<i>Flash Point</i>
Tetrachloroethene	9.32	1 ppm	100ppm/25ppm	150 ppm	NA
Trichloroethene	9.45	28 ppm	100ppm/50ppm	1,000ppm	NA
1,2-dichloroethene	9.65	17 ppm	200ppm/200ppm	1,000ppm	36–39F
Vinyl chloride	9.99	3,000 ppm	1 ppm/ 1 ppm	NI	108.4F
Benzene	9.24 eV	1.5 ppm	1 ppm/0.5 ppm	500 ppm	12F
Ethylbenzene	8.76 eV	2.3 ppm	100 ppm/100 ppm	800 ppm	55F
Toluene	8.82 eV	2.9 ppm	300 ppm/50 ppm	500 ppm	40F
p-Xylenes	8.44 eV	1 ppm	100 ppm/100 ppm	900 ppm	81F
Methylene Chloride	11.32 eV	250 ppm	25 ppm/12.5ppm	5,000 ppm	NA

NI - No Information Available.

NA - Not Applicable.

Ionization Potential - This is the level that must be reached for full ionization of the material to take place (i.e., a material with a 12.2 eV IP cannot be monitored by a PID with a 10.6 eV lamp because the IP is too high, thus giving a false reading).

Odor Threshold - This is the lowest concentration at which you may begin to smell the contaminant.

OSHA PEL - Permissible Exposure Limit (8-hour day).

TLV - Threshold Limit Value (8-hour day).

IDLH - Immediately Dangerous to Life and Health (30-minute escape).

Flash Point - This is the temperature that the material begins to give off flammable vapors.

- c) Physical Hazards (These are examples of basic hazards that may be identified at a site. More detailed description of the hazard and hazard control measures are required. The use of HSOGs are located in Appendix 1 and may satisfy this requirement.)

Slip, Trip, Falls - Good housekeeping shall be maintained at all work sites. Trip hazards shall be removed, marked, or guarded. Extreme caution shall be used when working on or around slippery surfaces, and fall protection shall be worn at elevations greater than 3 feet. All necessary precautions shall be taken to prevent personnel from injuries caused by slick surfaces.

Back Strain - Proper lifting techniques shall be used when handling heavy or bulky loads, such as sampling equipment or sample coolers. Personnel shall lift with legs, keeping backs straight, and loads close to their bodies. Avoid twisting at the waist during lifting. Personnel shall receive help from others when loads appear to be too heavy. Mechanical means of lifting is the preferred method and shall be used whenever possible.

Buried Utilities - All buried utilities shall be identified prior to any intrusive work in the work area. Buried utilities shall never be located by mechanically powered excavating equipment. Buried utilities shall be located by hand excavation. A Property Access/Utility Clearance Data Sheet shall be completed and distributed as indicated.

Overhead Utilities - All overhead utilities must be identified and proper clearance maintained. The safe distance is dependent upon the voltage of the line.

Electrical - Only qualified personnel are authorized to work on electrical circuits. General Motors Lockout/Tagout HSOG, or similar company-specific SOP, shall be used before any maintenance on electrical circuits or equipment takes place. Extension cords shall be inspected daily. Damaged extension

cords shall be taken out of service immediately. Electrical cords not specifically made for water submersion shall be kept out of wet areas. Ground fault circuit interrupters (GFCI) shall be used on all temporary electrical circuits (including generators), unless an assured ground fault inspection program has been conducted and properly recorded.

Small Quantity Flammable/Combustible Materials - Small quantities of flammable/combustible materials shall be stored in "safety" cans with appropriate flame arrestors, self-closing lids, and labeled according to their contents.

Confined Space - In the event that there are confined spaces present at the job site to be entered, specific procedures covering air monitoring, training, permitting, rescue, and PPE as recognized by REALM/ENCORE HSOG must be reviewed and followed. At no time shall any personnel be allowed to enter a confined space until all criteria, as stated in the General Motors HSOG, are met.

Overhead Hazards - Investigation of a work area must be conducted before any work is to begin. Proper clearances must be maintained at all times. Equipment shall not deviate from established roadways or work areas where clearances are unknown or insufficient. Hard hats shall be worn on all construction sites where there is any potential of overhead hazard or if heavy machinery is in use.

Heat/Cold Stress - General Motors personnel have the potential to be exposed to climatic extremes of both heat and cold. Because of these conditions, HSOGs were developed so that the hazards associated with these temperature extremes on the body can be recognized and avoided. During extreme weather, the HSOGs for heat and cold stress must be followed.

Animal/Insect/Vegetation - Rodents, snakes, stray animals, stinging insects, poison ivy, sumac, and oak are all environmental hazards that may be encountered during daily site operations. Site investigation to identify the hazards prior to work related activities is essential. The information obtained can then be passed on to site personnel. Site-specific procedures shall be instituted should there be a reasonable potential for these hazards.

D. PERSONAL PROTECTIVE EQUIPMENT

1. Level of Protection

<i>Site Activity/Task</i>	<i>Level of Protection*</i>	<i>Contingency Level²</i>
1. Groundwater Sampling	Level D	NA
2. SVE System Monitoring	Level D	Level D
3. Test Boring & Well Installation	Level D	Level D
4. Soil & Air Sampling	Level D	Level D
5.		

Required PPE

	<i>Task 1</i>	<i>Task 2</i>	<i>Task 3</i>	<i>Task 4</i>	<i>Task 5</i>
Hard hat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safety glasses w/side shields	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Steel-toe footwear	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

² Refer to Appendix for individual level of protection requirements.

Required PPE	Task 1	Task 2	Task 3	Task 4	Task 5
Hearing protection (plugs, muffs)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tyvek™ coveralls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PE-coated Tyvek™ coveralls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Saranex suit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boots, chemical resistant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boot covers, disposable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leather work gloves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inner gloves – Latex or Nitrile	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Outer gloves - [Enter material here]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tape all wrist/ankle interfaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Half-face respirator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Full-face respirator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organic vapor cartridges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Acid gas cartridges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other cartridges: [Enter type here]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-100 (HEPA) filters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Face shield	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Level of protection required [C or D]:	Level D	Level D	Level D	Level D	

2. Protective Equipment

A GZA contractor first aid kit must be present at this site. Client-supplied first aid supplies or eye wash are not being used. Eye wash not required for current tasks identified. If client-supplied, indicate location:

Site personnel shall wear the required personal protective equipment as appropriate whenever entering or working in the Exclusion Zone or Contaminant Reduction Zone.

Used disposable outerwear shall not be reused if deemed unsuitable to provide the necessary protection or are single use items. When removed, PPE shall be placed inside disposable containers provided for that purpose.

Smoking, eating, and drinking will be allowed in designated areas only.

Check all additional health and safety items that are required to be on site.

- | | | |
|---|--|---|
| <input type="checkbox"/> CSE Rescue Equipment | <input type="checkbox"/> Ventilation | <input type="checkbox"/> Dust Suppression |
| <input type="checkbox"/> Rescue Tripod | <input type="checkbox"/> Reflector Safety Vest | <input type="checkbox"/> Two-Way Radios |
| <input type="checkbox"/> Fire Extinguisher | <input checked="" type="checkbox"/> First Aid Kit | <input type="checkbox"/> Flashlight |
| <input type="checkbox"/> Air Horn/Signaling Device | <input checked="" type="checkbox"/> Cellular Phone | <input type="checkbox"/> Duct Tape |
| <input type="checkbox"/> Ladder | <input type="checkbox"/> Barricade Tape | <input type="checkbox"/> Drum Dolly |
| <input type="checkbox"/> Personal Flotation Devices | <input type="checkbox"/> Safety Cones | <input type="checkbox"/> Harness/Lanyard |
| <input type="checkbox"/> Other, specify: _____ | | |

E. AIR MONITORING

Air monitoring may be conducted to evaluate employee exposure to airborne constituents. The monitoring results will dictate work procedures and the selection of PPE. Air monitoring may also be conducted to evaluate fire and explosion hazards during excavation, drilling, and other intrusive activity.

The monitoring devices typically used are a particulate monitor and a photoionization detector (PID) capable of detecting total vapors. A combustible gas/oxygen meter may be needed to evaluate fire and explosion hazards.

Air monitoring should be conducted continuously with the LEL and oxygen meter during excavation or drilling in areas where flammable vapors or gases are suspected. All work activity must stop where tests indicate that the concentration of flammable vapors exceeds 10% of the LEL at a location with a potential ignition source. Such an area must be ventilated to reduce the concentration to an acceptable level.

In areas where inhalation exposure is suspected, direct-reading instruments (PID) may be used to measure levels in the breathing zone of the workers. Depending on the thoroughness of the Initial Site Survey and the hazard levels resulting from the survey, supplemental breathing zone air monitoring beyond that specified in the table below, may be necessary to protect the health of site workers and verify the level of protection employees are utilizing. Applicability of this section is subject to Industrial Hygiene or other safety professional review. At a minimum, General Motors HSOG 1.1 - USE OF DIRECT READING INSTRUMENTATION shall be followed.

SUPPLEMENTAL PERSONAL AIR MONITORING NECESSARY ☐³
SUPPLEMENTAL PERSONAL AIR MONITORING NOT NECESSARY ☒

<i>Equipment</i>	<i>Measurement Frequency and Duration</i>	<i>Action Levels</i>
PID	PID readings will be taken at each monitoring well the first time the well accessed prior to the start of sampling. Measurement duration will be 30 seconds.	>5 ppm sustained reading
	Soil sample retrieved from test borings and soil probes will be monitored for contaminant levels as part of the field screening procedures.	>5 ppm sustained reading
	The breathing zone will be periodically monitored during subsurface activities. Measurement duration will be 1 minute.	
Combustible Gas Indicator		
Oxygen Monitor		
Colorimetric Tubes		
(state type and brand)		

³ Attach employee air sampling requirements to Appendix.

<i>Equipment</i>	<i>Measurement Frequency and Duration</i>	<i>Action Levels</i>
Other		
Other		

☐ See Appendix for additional notes/requirements.

F. ENVIRONMENTAL MONITORING REQUIREMENTS

Supplemental environmental site monitoring, beyond that in the table, above, may or may not be necessary during the course of this investigation depending on the complexity of the site and the nearest residents (e.g., perimeter monitoring).

SUPPLEMENTAL ENVIRONMENTAL MONITORING NECESSARY ☐⁴
 SUPPLEMENTAL ENVIRONMENTAL MONITORING NOT NECESSARY ☒

G. DECONTAMINATION

Personnel Decontamination (Formal Decon) ☐ Required ☒ Not required⁵
 Equipment Decontamination ☒ Required ☐ Not required
 Is a layout of the Contamination Reduction Zone required, ☐ Required ☒ Not required
 and if so is it attached in an Appendix?

Personnel Decontamination

If applicable, describe steps:

1. _____
2. _____
3. _____
4. _____
5. _____

Location of Decontamination Station: Buckets used to collect purged groundwater will be used to collect decontamination water associated with soil and groundwater sampling equipment at test boring, soil probes and monitoring well locations.

⁴ Attach perimeter air sampling requirements to Appendix.

⁵ Personnel shall always wash hands and face before eating and drinking. Used PPE and decontamination materials should be left on site and not returned to the office if approved by the site.

Disposal of Contaminated PPE: As solid waste in solid waste dumpster at facility.

Equipment Decontamination

Check all equipment and materials needed for decontamination of tools and other equipment:

- | | | |
|---|---|--|
| <input type="checkbox"/> Acetone | <input checked="" type="checkbox"/> Distilled Water | <input type="checkbox"/> Poly Sheeting |
| <input checked="" type="checkbox"/> Alconox Soap | <input checked="" type="checkbox"/> Drums for Water | <input type="checkbox"/> Steam Cleaner |
| <input type="checkbox"/> Brushes | <input type="checkbox"/> Hexane | <input type="checkbox"/> Tap Water |
| <input checked="" type="checkbox"/> Disposal Bags | <input type="checkbox"/> Methanol | <input type="checkbox"/> Washtubs |
| <input type="checkbox"/> Other, specify: _____ | | |

Outline the equipment decontamination procedures for this project:

1. Soil and groundwater monitoring equipment will be washed with Alconox Soap and distilled water over buckets.
2. Equipment will be rinsed with distilled water over buckets.
3. Equipment will be wiped dry with paper towels.
4. Drill Rigs will utilize the decontamination pad outside Building 8 to steam clean equipment.
5. _____

Disposal methods for contaminated decontamination materials (e.g., wash water, rags, brushes, poly sheeting) will consist of:

Decontamination water will be placed in the drums provided for groundwater well development water and the paper towels will be disposed of as solid waste.

H. CONTINGENCY CONTACTS

<i>Agency</i>	<i>Contact</i>	<i>Phone No.</i>
Site Security – EMERGENCY	Security Dispatcher	716-439-3333
Site Security – Non-Emergency	Security Dispatcher	716-439-2237
Fire Department	Local FD Dispatcher	911
Police Department	Local PD Dispatcher	911
Local Hospital	Lockport Memorial Hospital	716-434-9111
Poison Control Center	Poison Control Center	716-878-7654
Ambulance	Local EMS Dispatcher	911
On-Site Coordinator (Site Safety Supervisor)	Billie Banks	716-439-3247
Site Telephone	Cell Phone On-Site	
Nearest Telephone	GZA Employee Vehicle	
Underground Utilities Locator	Dig Safely New York	800-962-7962

<i>Agency</i>	<i>Contact</i>	<i>Phone No.</i>
GM Project Manager/Health and Safety Coordinator (HSCo)	Jim Hartnett	315-463-2391
Participant Project Manager	Chris Boron	716-844-7046
Participant Health and Safety Officer (HSO)	Todd Schara	716-570-7030
GM Facility Contact	Cathy Ver	716-439-2942

I. CONTINGENCY PLANS

Attach additional information as required.

ALL EMERGENCY ACTIONS SHALL BE REPORTED TO SITE SECURITY AT 716-439-2237 (NON-EMERGENCY NUMBER) OR 716-439-3333 (EMERGENCY NUMBER), GENERAL MOTORS PM AND THE PARTICIPANT PM AS SOON AS POSSIBLE.

Medical Emergency

Name of Hospital: Lockport Memorial Hospital

Address: 521 East Avenue, Lockport, NY

Telephone No.: 716-434-9111

Directions to Hospital or attach a map to the HASP*⁶

Map is attached.

Travel Time from Site: 13 minutes

Distance to Hospital: 3.6 miles

Name/Number 24-Hour Ambulance Service: 911

Route Validated By: Chris Boron

Date: 1/7/10

J. SITE CONTROL

Designated work areas will be set up as appropriate inside the fence during the site field activities, as required. A temporary fence may be installed to prevent unauthorized access to the project work areas. At a minimum, all work activities shall have a barricade erected such as wood or barricade tape.

It is the Participants' collaborative responsibility to maintain a work zone free from unauthorized personnel.

The purpose of these procedures is to limit access to areas with potentially elevated chemical presence, and prevent the migration of potentially hazardous materials into adjacent clean areas. These areas are described in the following:

⁶ This route must be field validated before site work commences.

1. The Exclusion Zone (EZ) is the area immediately surrounding the active work area. Sufficient area will be provided for efficient movement of personnel and equipment as well as chemical control. Boundaries are modifiable depending on operational requirements. **The HSO will be responsible for maintaining the boundaries of this area.** Personnel entering this area are required to wear the PPE as defined previously. A wind direction indication device (i.e., flagging, windsock, etc.) will be mounted in the area of any EZ during site activities.

All personnel (including visitors) entering the EZ or CRZ using respiratory protection must have successfully passed a respirator fit test in accordance with OSHA 29 CFR 1910.134. Documentation of fit testing is the responsibility of each employer.

In the event that unauthorized personnel enter the EZ, work will stop. Work will not resume until the unauthorized personnel have been removed from the EZ or have been moved to an acceptable on-site area. A log of all visitors to the site, including those entering the EZ, will be maintained.

2. The Contaminant Reduction Zone (CRZ) will provide a location for removal of PPE which has contacted material with elevated chemical presence and final removal and decontamination of personnel and equipment. Supplemental safety equipment, such as fire extinguishers, portable eyewash, and extra quantities of PPE may be stored in this area.
3. The Support Zone (SZ) is situated in clean areas where there is a minimal or no risk of encountering hazardous materials or conditions. PPE beyond standard construction safety equipment is therefore not required.

On-site personnel must use the "buddy system" as required by operations. Use of the "buddy system" is required during all operations. Workers must observe each other for signs of chemical exposure and heat or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration.
- Changes in coordination.
- Changes in demeanor.
- Excessive salivation and pupillary response.
- Changes in speech pattern.

Workers must also be aware of the potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures.

Field personnel must inform their partners or fellow crew workers of non-visible effects of exposure to toxic materials that they may be experiencing. The symptoms of such exposure may include, but are not limited to:

- Headaches.
- Dizziness.
- Nausea.
- Blurred vision.
- Cramps.
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, pre-arranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

K. TRAINING AND MEDICAL SURVEILLANCE

TRAINING

Initial Health and Safety Training

Personnel will not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility. Employees of GZA who have the potential to be exposed to contaminated materials or physical hazards must complete the training described in the following sections. Prior to working in or entering an EZ environment, all personnel will be required to provide documentation to the HSO indicating successful completion of the training requirements of 29 CFR 1926.65.

40-Hour Health and Safety Training

This basic course provides instruction on the nature of hazardous waste work, protective measures, proper use of personal protective equipment, recognition of signs and symptoms which might indicate exposure to hazardous substances, and decontamination procedures. It is required for all personnel working on site, such as equipment operators, general laborers, and supervisors, who may be potentially exposed to hazardous substances, health hazards, or safety hazards, consistent with 29 CFR 1926.65.

8-Hour Annual Refresher Training

Personnel required to complete the 40-hour health and safety training are subsequently required to attend an annual 8-hour refresher course to remain current in their training. All site personnel must show attendance at an 8-hour refresher training course within the past 12 months.

8-Hour Supervisor Training

On-site managers and supervisors directly responsible for, or who supervise, staff members engaged in hazardous waste operations should have an additional 8 hours of Supervisor training in accordance with 29 CFR 1926.65. This course includes, but is not limited to, elements appropriate to supervising hazardous waste related projects (e.g., accident reporting/investigation, regulatory compliance, work practice observations, auditing, emergency response procedures, etc.).

Additional Training for Specific Projects

Participants will ensure their personnel have received additional training on specific instrumentation, equipment, confined space entry, construction hazards, etc., as necessary to perform their duties. This specialized training will be provided to personnel before engaging in the specific work activities such as competent persons for excavation, qualified electrical personnel, asbestos abatement, etc. This type of training covers all of Federal and State OSHA requirements and relevant licensing for work performed on this project.

Documentation of Training

The Participant PM will be responsible for maintaining and providing to the client/site manager documentation of Participant employee compliance with required training. The GM PM and Facility Safety Representative will only allow properly trained and qualified personnel to perform work at the site.

MEDICAL SURVEILLANCE

All personnel who are potentially exposed to site contaminants must participate in a medical surveillance program as defined by OSHA at 29 CFR 1910.120(f).

Pre-Placement Medical Examination

All potentially exposed personnel must have completed a comprehensive medical examination prior to assignment and periodically thereafter, as defined by applicable regulations. Typically this will mean wore a respirator more than 30 times per year, or all employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.

The pre-placement and periodic medical examinations typically include the following elements:

- Medical and occupational history questionnaire.
- Physical examination.
- Complete blood count, with differential.
- Liver enzyme profile.
- Chest x-ray, at a frequency determined by the physician.
- Pulmonary function test.
- Audiogram.
- Electrocardiogram for persons older than 45 years of age, or if indicated during the physical examination.
- Drug and alcohol screening, as required by job assignment.
- Visual acuity.
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director.

The examining physician must provide the employee with a letter summarizing his or her findings and recommendations, confirming the worker's fitness for work and ability to wear a respirator. Documentation of medical clearance will be available for each employee during all project site work.

Other Medical Examinations

In addition to pre-employment, annual, and exit physicals, personnel may be examined:

1. At employee's request after known or suspected exposure to toxic or hazardous materials.
2. At the discretion of the HSS, HSO, or occupational physician in anticipation of, or after known or suspected exposure to, toxic or hazardous materials.

Periodic Exam

Following the placement examination, all employees must undergo a periodic examination similar in scope to the placement examination. For employees potentially exposed more than 30 days per year, the frequency of periodic examinations will be annual. For employees potentially exposed less than 30 days per year, a physician will determine the frequency for periodic examinations.

Medical Restriction

When the examining physician identifies a need to restrict work activity, the employee's supervisor must communicate the restriction to the employee and the HSS. The terms of the restriction will be discussed with the employee and the supervisor.

L. HEALTH AND SAFETY PLAN REVIEW AND DOCUMENTATION

Plan Preparation and Review:

<i>Date</i>	<i>Printed Name</i>	<i>Signature</i>	<i>Position/Responsibility</i>	<i>Organization</i>
1/7/10	Chris Boron		Plan Preparation	GZA GeoEnvironmental
1/8/10	Todd Schara		Plan Review	GZA GeoEnvironmental
	Jim Hartnett		GM PM/HSCo	General Motors
1/7/10	Chris Boron		Participant PM	GZA GeoEnvironmental

I have read and understand the HASP. I have been informed who to contact if I have any questions and know where to report any additional health and safety hazards. I agree to work to the HASP guidelines and understand that failure to do so could result in removal from the site and/or termination.

<i>Date</i>	<i>Printed Name</i>	<i>Signature</i>	<i>Position/Responsibility</i>	<i>Organization</i>
			Health and Safety Coordinator (HSCo)	
1/11/10	Jennifer Davide		On-Site Health and Safety Officer (HSO)	GZA GeoEnvironmental

Each of the groups denoted below will provide their own HASP which complements this plan specifically.

SITE CONTRACTORS AND SUBCONTRACTORS

APPENDICES/DOCUMENTS TO THE PROJECT HEALTH AND SAFETY PLAN

REQUIRED APPENDICES

APPENDIX 1	<input checked="" type="checkbox"/>	APPLICABLE HEALTH AND SAFETY HSOGs
APPENDIX 2	<input checked="" type="checkbox"/>	PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS
APPENDIX 3	<input checked="" type="checkbox"/>	SITE/PROJECT HISTORY
APPENDIX 4	<input checked="" type="checkbox"/>	AMENDMENTS
APPENDIX 5	<input checked="" type="checkbox"/>	TASK-SPECIFIC HEALTH AND SAFETY RISK ASSESSMENT
APPENDIX 6	<input checked="" type="checkbox"/>	MATERIAL SAFETY DATA SHEETS

ADD AS APPROPRIATE

APPENDIX 7	<input type="checkbox"/>	PROTECTION OF NEIGHBORING PROPERTIES
APPENDIX 8	<input type="checkbox"/>	HAZARD LEVEL C OR D JUSTIFICATION
APPENDIX 9	<input type="checkbox"/>	PERSONAL AIR SAMPLING PROGRAM
APPENDIX 10	<input type="checkbox"/>	DECONTAMINATION SAMPLING PROGRAM
APPENDIX 11	<input type="checkbox"/>	DECONTAMINATION PROCEDURES/ZONE MAP
APPENDIX 12	<input type="checkbox"/>	ADDITIONAL CONTINGENCY PLANS
APPENDIX 13	<input type="checkbox"/>	SITE CONTROL MEASURES
APPENDIX 14	<input checked="" type="checkbox"/>	OTHER – MAP TO HOSPITAL

REQUIRED DOCUMENTS FOR ACTIVE GM FACILITIES

GM DOCUMENT	<input checked="" type="checkbox"/>	GM JOB-SITE SAFETY PLAN (PART D)
	<input checked="" type="checkbox"/>	SPILL RESPONSE PROCEDURES (PART G)
	<input type="checkbox"/>	OTHER

APPENDIX 1

APPLICABLE HEALTH AND SAFETY OPERATING GUIDELINES (HSOGs)

REMEDATION SECTION	HSOG 1.1: TABLE OF CONTENTS
WORLDWIDE FACILITIES GROUP	EFFECTIVE DATE: NOVEMBER 20, 2001
GENERAL MOTORS LLC	
REVISION NO.: 1	REVISION DATE: MAY 8, 2003

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6.0 HYDROGEN SULFIDE (H ₂ S).....	4
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REMEDATION SECTION	HSOG 1.1:	ACTION LEVELS FOR DIRECT READING INSTRUMENTS
WORLDWIDE FACILITIES GROUP		
GENERAL MOTORS LLC	EFFECTIVE DATE:	NOVEMBER 20, 2001
REVISION NO.: 1	REVISION DATE:	MAY 8, 2003

1.0 INTRODUCTION

These guidelines for setting action levels for direct reading instruments have been developed to assist the user in preparing a site-specific air monitoring program. The specific site conditions must be evaluated by an Industrial Hygienist (IH) to develop the final site-specific program. General Motors Project Manager/Health and Safety Coordinator (GM PM/HSCo) or a designated representative should be consulted when establishing site-specific action levels.

2.0 ORGANIC VAPORS

Action levels for organic vapors are based on direct instrument readings made in the breathing zone using organic vapor analyzers such as a photoionization detector (PID) or flame ionization detector (FID). These are relative, not absolute readings. It is important to note that the readings, while given in ppm, do not actually provide the concentration in ppm of any individual compound unless the instrument has been calibrated for that specific compound.

When the environment being sampled consists of chemical constituents, the following action levels are recommended for VOCs during short-term investigative activities such as sample collection:

2.1 UNKNOWN VOCs - ACTION LEVELS

Sustained Instrument Reading¹

Level of Protection

≤Background

Level D

<5 meter units above background

Level C

≥5 meter units above background

Cease operations and move to a safe area. Confer with HSO. Reevaluate work plan. Abandon location or upgrade to Level B and continue.

If the chemical constituents are known, the following action levels can be used, provided the constituents have adequate warning properties:

¹ Sustained = Maintained for at least 15 minutes.

2.2 KNOWN VOCs - ACTION LEVELS

Instrument Reading

≤10 x TLV
>10 to <50 x TLV
>50 x TLV

Level of Protection

Level C with half mask^{2,3}
Level C with full face piece^{1,2}
Level B with supplied air⁴

In situations where multiple, known substances exist, use the TLV for the material with the lowest allowable level (e.g., if benzene (TLV = 10 ppm) and toluene (TLV = 100 ppm) are present, use benzene's TLV for protection calculation).

3.0 COMBUSTIBLE GASES

Action levels are based on the readings from a combustible gas meter. The readings indicate a percentage of the lower explosive limit (% LEL) and are collected in the work area or near ignition sources. An atmospheric oxygen level of less than 19.5% may affect the readings from a combustible gas meter and give lower than actual levels. Test oxygen content first as some instruments do not function properly in low oxygen environments.

3.1 NON-CONFINED SPACE READINGS, GENERAL AREA

Instrument Reading

0-5% LEL
5-10% LEL
>10% LEL

Action to be Taken

Continue working and monitoring atmosphere for combustible gases. Inform personnel working in the area whenever readings are >5% LEL.

Continue working with caution. Inform personnel working in area of readings. Be prepared to cease operations.

Cease operations and move to a safe place. Reevaluate work plan. Engineering controls such as forced ventilation and use of non-sparking tools are to be implemented if operations are to continue. **DO NOT CONTINUE WORKING UNTIL CONDITIONS ARE CONSISTENTLY BELOW 10% LEL.**

² As long as the material in question can be filtered by an APR and has good warning properties and normal oxygen content.

³ Is below the IDLH level.

⁴ With emergency escape bottle of SCBA.

HOT WORK is only to be conducted at 0% LEL.

For field work being conducted that is not within a waste disposal site, the following action levels can be used for combustible gas readings taken at or near the borehole versus in the general area:

3.2 BOREHOLE READING

Instrument Reading

Action to be Taken

<10% LEL	Continue working and monitoring atmosphere for combustible gases. Inform personnel working in the area whenever readings are >10% LEL.
10-20% LEL	Continue working with caution. Inform personnel in area of readings. Be prepared to cease operations.
>20% LEL	Cease operations and move to a safe area. Reevaluate work plan. Engineering controls such as forced ventilation and use of non-sparking tools are to be implemented if operations are to continue. DO NOT CONTINUE WORKING UNTIL CONDITIONS ARE CONSISTENTLY BELOW 20% LEL. Supplied air or SCBA respiratory protection may be necessary.

3.3 COMBUSTIBLE GASES AT LANDFILL SITES

Refer to Field Method Guideline 2.2 for drilling in refuse.

Because drilling at landfill sites poses a separate set of hazards with combustible gas levels approaching 100% LEL, the following guidelines are to be utilized:

<i>Monitoring Frequency</i>	<i>Instrument Reading</i>	<i>Action to be Taken</i>
Continuous at point of drilling with a direct reading four gas monitor	>10% LEL (Alarm Point)	Monitor around potential sources of ignition to ensure that the LEL does not exceed 10%. Continue working with caution, be prepared to cease operation.
Monitor constantly around sources of ignition when the ambient reading is >5% LEL	>20% LEL	Cease operation and move to a safe area. De-energize sources of ignition. Engineering controls such as forced ventilation may be needed.

4.0 OXYGEN

A direct reading oxygen meter is used to determine the percent of oxygen in the atmosphere.

Instrument Reading

Action to be Taken

<19.5% or >23.5%

Cease operations and move to a safe area. Reevaluate work plan. Engineering controls such as forced ventilation and use of non sparking tools are to be implemented if operations continue. **DO NOT CONTINUE WORKING UNTIL OXYGEN LEVELS ARE BETWEEN 19.5 AND 23.5%.** When oxygen levels are outside this range, combustible gas meter readings are not reliable. Supplied air or SCBA respiratory protection may be necessary.

5.0 HYDROGEN CYANIDE (HCN)

Whenever an alarm sounds on a direct-reading HCN meter, cease work activity immediately, move to a safe area and contact the HSO. The ceiling concentration for HCN is 10 ppm. If the unit is equipped with an alarm, it should be set just under 10 ppm.

If approval is given by the HSO, verification of the presence of HCN is to be made using colorimetric tubes which are specific for HCN detection. Note: There is no air-purifying cartridge approved for use in an atmosphere containing HCN.

If the presence of HCN is confirmed, cease activities until the HSO gives instructions or confer with GZA's Manager of Health and Safety or a designated representative. If the colorimetric tubes do not indicate the presence of HCN, check the function and calibration of the direct reading meter and continue with site activities cautiously continuing to monitor for HCN with the direct reading meter.

6.0 HYDROGEN SULFIDE (H₂S)

Whenever readings approach 10 ppm on a direct-reading H₂S meter, cease work immediately, move to a safe area and contact the HSO. H₂S has a TLV level of 10 ppm.

If approval is given by the HSO, verification of the presence of H_2S is to be made using colorimetric detector tubes. Note: There is no air-purifying cartridge approved for use in an atmosphere containing H_2S .

If the presence of H_2S is confirmed, cease activities and wait for directions from the site HSO or confer with GZA's Manager of Health and Safety or a designated representative. If the colorimetric tubes do not indicate the presence of H_2S , continue with site activities cautiously and continue to monitor after checking the function and calibration of the direct reading meter. Note: H_2S fatigues the sense of smell so odor is not a safe indicator of the presence or concentration of H_2S .

7.0 CARBON MONOXIDE (CO)

Whenever a direct-reading CO meter reads in excess of 20 ppm, cease work immediately, move to a safe area and contact the site HSO.

If approval is given by the HSO, verification of the presence of CO is to be made with colorimetric tubes which can detect CO. Note: There is no air-purifying cartridge approved for use in an atmosphere containing CO.

If the presence of CO is confirmed, cease activities and wait for directions from the HSO or confer with GZA's Manager of Health and Safety or a designated representative. If the colorimetric tubes do not indicate the presence of CO, continue with site activities cautiously and continue to monitor after verifying the function and calibration of the direct reading meter.

8.0 AIRBORNE PARTICULATES

The TLV for nuisance dust is 10 mg/m^3 . When other toxic materials are present, an adjustment is necessary to this number to make it a valid real-time indicator. Typically, an action level of 5 mg/m^3 total dust (50 percent of the nuisance dust TLV) will be more conservative than an action level determined for specific particulate compounds.

To determine if 5 mg/m^3 total dust is protective enough for the chemical of concern, follow the procedure provided below:

1. Multiply the known fraction of the chemical in the soil by the action level for total dust to determine what the airborne concentration of the chemical would be at the dust action level. Compare with 50 percent of the TLV, PEL, or STEL

(whichever is lowest). If the airborne concentration is lower, the action limit should remain 5 mg/m³ total dust.

Example:

The PEL for lead is 0.05 mg/m³ and the OSHA action level is 0.025 mg/m³. Fifty percent of the PEL is 0.025 mg/m³. If the concentration of the lead in the soil is 1,000 mg/kg (or ppm), then:

$$\frac{1,000 \text{ mg Pb}}{10^6 \text{ mg soil}} \times \frac{5 \text{ mg soil}}{\text{m}^3 \text{ air}} = \frac{0.005 \text{ mg Pb}}{\text{m}^3 \text{ air}}$$

A comparison of 0.005 mg/m³ airborne lead at the dust action level with the action level for lead (0.025 mg/m³) shows that the dust action level is protective enough for lead monitoring.

2. Alternatively, to determine a soil concentration of concern (i.e., the concentration corresponding with the chemical's action level), divide the chemical action level by the dust action level to determine the concentration of chemical required in the soil to reach the action level.

Example:

$$\frac{0.025 \text{ mg Pb}}{\text{m}^3 \text{ air}} \times \frac{\text{m}^3 \text{ air}}{5 \text{ mg soil}} = \frac{0.025 \text{ mg Pb}}{5 \text{ mg soil}} = \frac{5,000 \text{ mg Pb}}{\text{kg soil}}$$

In this case, soil with 5,000 mg/kg lead would be at the OSHA action level when total dust is also at the action level of 5 mg/m³.

9.0 INSTRUMENT CALIBRATION AND MAINTENANCE

All direct-reading instrumentation calibrations should be conducted under the approximate environmental conditions that the instrument will be used. Instruments must be calibrated before and after use, noting the reading(s) and any adjustments made.

All air monitoring equipment calibrations, including the standard used for calibration, must be documented on a calibration log or in the field notebook. Completed air monitoring documentation should be reviewed by the HSO.

Air monitoring equipment should be maintained and calibrated in accordance with the specific manufacturer's procedures. Preventive maintenance and repairs should be conducted in accordance with the respective manufacturer's procedures. When applicable, only manufacturer-trained and/or authorized personnel will be allowed to perform instrument repairs or preventive maintenance.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the HSO is responsible to immediately remove the instrument from service and obtain a replacement unit. If the instrument is essential for safe operation during a specific activity, that activity must cease until an appropriate replacement unit is obtained.

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REMEDATION SECTION	HSOG 2.1: GENERAL SITE RULES
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1.0 GENERAL SITE HEALTH AND SAFETY RULES

GZA site personnel are required to comply with all applicable federal, state, provincial, or other regulatory agency standards and regulations as well as the following health and safety rules at all times.

- When arriving on a new site/location to perform work, employees should assess the need for emergency services and locate these services. Hospital routes, availability of 911 in the community, etc. should be verified and noted before beginning work. This activity may have to be coordinated with existing location personnel, if applicable.
- No smoking on sites except in designated areas.
- No food, beverages, tobacco, or cosmetic products are to be used, consumed, or brought into the exclusion or decontamination zones or any other potentially contaminated areas so designated by the Health and Safety Officer (HSO).
- A respirator shall not be worn when beards or any other facial hair interferes with the face-to-respirator seal. Individuals with such facial hair are not allowed to work in any level of protection that requires respiratory protection (see HSOG 3.6 - Respiratory Protection).
- The "buddy system" is to be enforced at all times unless the HSO specifically exempts the work from this requirement based on the review of site conditions and hazards. When working under the "buddy system", personnel are to:
 - never work alone;
 - provide their partner with assistance;
 - observe partner for signs of over-exposure/temperature stress;
 - check integrity of partner's protective clothing; and
 - notify others if emergency help is needed.
- Personnel on site must use the buddy system when wearing respiratory protective equipment. Visual contact must be maintained between pairs on site and safety personnel. Entry team members are to remain close together to assist each other during emergencies.

- Necessary emergency, audio, visual, and hand signals are to be determined by the HSO. The HSO is to familiarize all site personnel with these signals during the indoctrination entry briefing.
- Field personnel are not to enter confined spaces (see HSOG 2.2 - Confined Space Entry) such as pits, trenches, tanks, or manholes, unless confined space entry procedures are specifically included in the site Health and Safety Plan (HASP) and are fully implemented or other arrangements have been made with the HSO.
- Drums or tanks found on site are not to be opened or moved unless specific drum/tank remediation tasks are specifically included in the HASP and are fully implemented.
- Site personnel are to notify the HSO of any unsafe acts or conditions.
- Site personnel are to notify the HSO at the first indication that they are experiencing temperature stress or any signs or symptoms that may be due to exposure to chemicals.
- Excavations are to be backfilled or barricaded at the end of the workday (see HSOG 2.8 - Trenching/Excavation).
- Any scrap, waste, debris, or other materials generated by site activities are to be properly contained, stored, and labeled.
- Field personnel can upgrade the level of protection at any time but can downgrade only with the approval of the HSO for that specific task and condition.
- All electrical equipment used outdoors shall be used in conjunction with Ground Fault Circuit Interrupters (GFCI) or be part of the assured Ground Fault Protection program (see HSOG 2.9 - Electrical Safety).
- Appropriate fall protective measures will be utilized when working more than 6 feet above another surface (see HSOG 2.13 - Fall Protection).

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1.0 DRUM HANDLING

Cleanup operations involving drums and containers must be carried out safely. This means that the handling, sampling, testing, staging, transport, decontamination, evacuation, excavation, and bulking of drums and containers must be carried out with minimal risk. When new containers are used, they must meet minimum standards according to Department of Transportation (DOT), Occupational Safety and Health Act (OSHA), Transport Canada and United States Environmental Protection Agency (USEPA) regulations.

1.1 SITE PREPARATION

Before commencing site activities involving the handling of drummed waste, the area must be prepared to facilitate operations and eliminate obvious physical hazards. Roadways, work areas, and storage areas should be constructed to provide ease of access and a sound roadbed for heavy equipment and vehicles. Security fences or barricades should be erected. Work areas should be cleared and physical hazards should be eliminated as much as possible. Physical hazards to consider include:

- Ignition sources in flammable areas such as drum opening and bulking areas.
- Exposed and/or underground electrical wiring and low overhead wires which may be cut or entangled in equipment resulting in electrical shock, short circuits, and possible fires.
- Sharp, protruding edges such as torn metal, glass, nails, and other objects which can puncture or tear protective clothing or equipment.
- Unsecured railings, loose steps or flooring, holes, slippery surfaces, debris, and other obstacles that can cause slips, trips, and falls.
- Protruding objects which can cause slips, trips, and falls.
- Weeds and debris which obstruct visibility.

Weeds and debris can be removed, walking surfaces can be cleared and repaired, skid resistant strips can be installed on slippery surfaces, railings can be repaired or installed, stairs and ladders can be secured, electrical wiring can be repaired or relocated, and sharp

objects and protruding edges which cannot be removed can be covered or properly guarded. Staging areas can be constructed to facilitate safe and effective operations.

1.2 GENERAL RULES

- Drums and containers used must meet minimum DOT or Transport Canada regulations.
- If practical, drums and containers will be inspected to insure their integrity prior to being moved. If drums or containers are stored or stacked so that inspection is impossible, they should be moved to an accessible location for inspection prior to further handling.
- Unlabeled drums and containers will be assumed to contain hazardous substances and treated accordingly until contents are positively characterized.
- Site operations shall be organized so as to minimize the amount of drum or container movement required.
- All employees exposed to transfer operations shall be warned of potential hazards associated with contents of any drums or containers involved.
- DOT specified salvage drums or containers and suitable sorbent materials shall be available in areas where spills may occur.
- Where major spills are possible, a spill containment program shall be implemented as part of the site Health and Safety Plan (HASP). The spill containment program shall allow for the containment and isolation of the entire volume being transferred.
- Drums and containers that can not be moved without rupture or leakage will be emptied into a sound container.
- Some type of detection system (such as ground-penetrating radar) shall be used to estimate the location and depth of buried drums or containers.
- Buried drums shall be excavated carefully to prevent rupture.
- Suitable fire extinguishing equipment will be kept on hand and ready for use.

2.0 OPENING DRUMS AND CONTAINERS

These procedures are to be followed in areas where drums or containers are being opened:

- The buddy system is to be utilized at all times during drum opening operations.
- Level B is mandatory if the drum contents are unknown.

- If airline respirators are used, air cylinder connections must be protected from contamination and the entire system shall be protected from physical damage.
- Employees who must work near drums or containers being opened must be provided protective shielding in case of explosion.
- Employees not directly involved in the opening procedures will be kept at a safe distance.
- Controls for opening equipment, monitoring equipment, and fire suppression equipment shall be located behind the shield.
- Non-sparking tools and equipment will be used when flammable atmospheres are a reasonable possibility.
- Drums and containers shall be opened so as to safely relieve excess pressure. Either relieve the pressure from a remote location or place appropriate shielding between the employee and the drums or containers.
- Employees shall not stand on or work from drums or containers.

2.1 MATERIAL HANDLING EQUIPMENT

Material handling equipment shall be selected, located, and operated so as to prevent ignition of vapors released during opening procedures. There are hazards associated with gas or electrically powered units.

2.2 RADIOACTIVE WASTES

If a drum exhibits radiation levels above background (approximately >2 mrem/hr), immediately contact the Health and Safety Officer (HSO). Do not handle any drums that are determined to be radioactive. A special contractor will be brought in to further characterize and process the drum(s).

2.3 SHOCK-SENSITIVE, AIR REACTIVE, OR WATER REACTIVE WASTE

When handling drums containing or suspected of containing shock-sensitive or reactive wastes, the following special precautions should be followed:

- All non-essential employees shall be removed from the area of transfer.
- Material handling equipment shall be fitted with explosion containment devices or protective shields to protect operators.
- An alarm system will be used to signal the beginning and end of the procedure.

- Continuous communications will be maintained between the employee in charge of the operation and the HSO during the operation.
- Pressurized drums shall not be moved until the cause of the excessive pressure is determined and appropriate measures are implemented.
- All drums and containers containing packaged laboratory wastes lab packs shall be considered shock-sensitive until proven otherwise.
- Work will proceed in clear, dry weather.

2.4 LAB PACKS

Laboratory packs (i.e., drums containing individual containers of laboratory materials) can be an ignition source for fires. They may contain shock-sensitive or explosive materials. Prior to handling or transporting packs, move all non-essential personnel to a safe distance. Use a grappler unit constructed for explosive containment for handling. A qualified person must inspect, classify, and segregate the containers in the lab pack. Pack the segregated containers with sufficient cushioning and adsorption materials to prevent excessive movement. If crystalline material is noted at the opening of any container, handle it as a shock-sensitive waste.

3.0 SHIPPING AND TRANSPORT

Drums and containers shall be identified and classified prior to packaging for shipment. Staging areas shall be kept to the minimum number necessary and shall be provided adequate entrance and exit routes. Bulking of wastes shall be permitted only after a thorough characterization has been completed.

3.1 CONTAINER HANDLING

Waste containers of various types on a site may need to be handled during sampling, characterization, or preparation of material for disposal, in addition to other reasons.

3.2 VISUAL INSPECTION

Prior to handling, visually inspect the containers for the following to determine if the containers might show whether the materials may be radioactive, explosive, corrosive, toxic, flammable, or lab-packed:

- Symbols, words, or markings.
- Signs of deterioration such as corrosion, rust, or leaks.

- Indications the container is under pressure, such as swelling or bulging.
- Drum type.
- Configuration of drumhead.
- Conditions in the immediate vicinity of the container. Crystalline material on or around the containers could indicate shock-sensitive material. In addition, there may be other material leaked or spilled from the containers onto the ground which might give a clue as to what may be in the drum.

4.0 MONITORING

Before any moving or opening of containers takes place, direct reading instruments should be used to detect the presence of organic vapors, combustible gases, or above-background levels of radiation.

4.1 SUBSURFACE INVESTIGATION

If there is any reason to suspect the presence of buried containers, some type of non-destructive ground penetrating system should be used to determine the approximate location and depth of such containers.

4.2 PRELIMINARY CLASSIFICATION

As a precautionary measure, any unlabeled containers should be assumed hazardous until it is learned otherwise. Using the information gathered by visual inspection, monitoring and subsurface investigations, preliminarily classify any containers thought to be radioactive, leaking/deteriorated, under pressure, explosive/shock-sensitive, lab packs, or buried.

4.3 PLANNING

Based on inspection and preliminary classification, decide if any hazards are present and the appropriate response activity. Determine which drums need to be moved in order to be opened and/or sampled. A preliminary handling plan should be developed dealing with the extent of any necessary container moving or handling and the most appropriate procedures based on the particular hazards revealed during preliminary inspection. The handling plan should be revised as new information comes to light during site operations.

5.0 OPENING CONTAINERS

If supplied air respiratory protection is used, place a bank of air cylinders outside the work area and supply air to the operators via airlines and escape SCBAs. Keep personnel at a safe distance from the drums being opened. If possible, monitor for radiation, combustibles, and toxics during opening. Use the buddy system.

5.1 REMOTELY CONTROLLED OPENING DEVICES

If possible, use remotely controlled devices for opening drums. This procedure must be explored first, prior to deciding to open drums manually.

5.2 BACKHOE SPIKE

The backhoe spike is a metal (bronze) spike attached or welded to a backhoe bucket. It is efficient and advisable for large-scale operations. The drums should be in rows with adequate aisle space to allow ease of backhoe movement. Once in rows, drums can be quickly opened by punching holes in the drum tops with the spike. To prevent cross contamination, the spike should be decontaminated after each drum is opened.

5.3 HYDRAULIC DRUM PIERCER

A hydraulically operated drum piercer consists of a manually operated pump which pressurizes oil through a hydraulic line. A piercing device with a spark-proof metal point is attached to the end of the line and pushed into the drum by the hydraulic pressure. The piercing device can be attached so that the hole is made in the side or top of the drum.

5.4 PNEUMATIC BUNG REMOVER

Operates by means of compressed air delivered through a high-pressure airline to a pneumatic drill which is adapted to turn a bung fitting. An adjustable bracket has to be attached to the drum before the drill can be operated and must be removed before the sample can be taken.

5.5 MANUALLY OPERATED OPENING DEVICES

The risks are greater when manually opening drums than when using remotely operated means. When using manual devices, the drums must be positioned to allow easy worker access to the drums.

5.6 BUNG WRENCH

A bung wrench and other hand tools must be of the non-sparking kind and should be marked as such. Although a non-sparking wrench will prevent sparking between the wrench and drum, it will not prevent sparking between the bung and the threads on the drum. The bung should be turned very slowly to allow pressure to dissipate and reduce the chance of sparking. The small bung should be opened first, as a pressure release. Avoid leaning on the drum while opening.

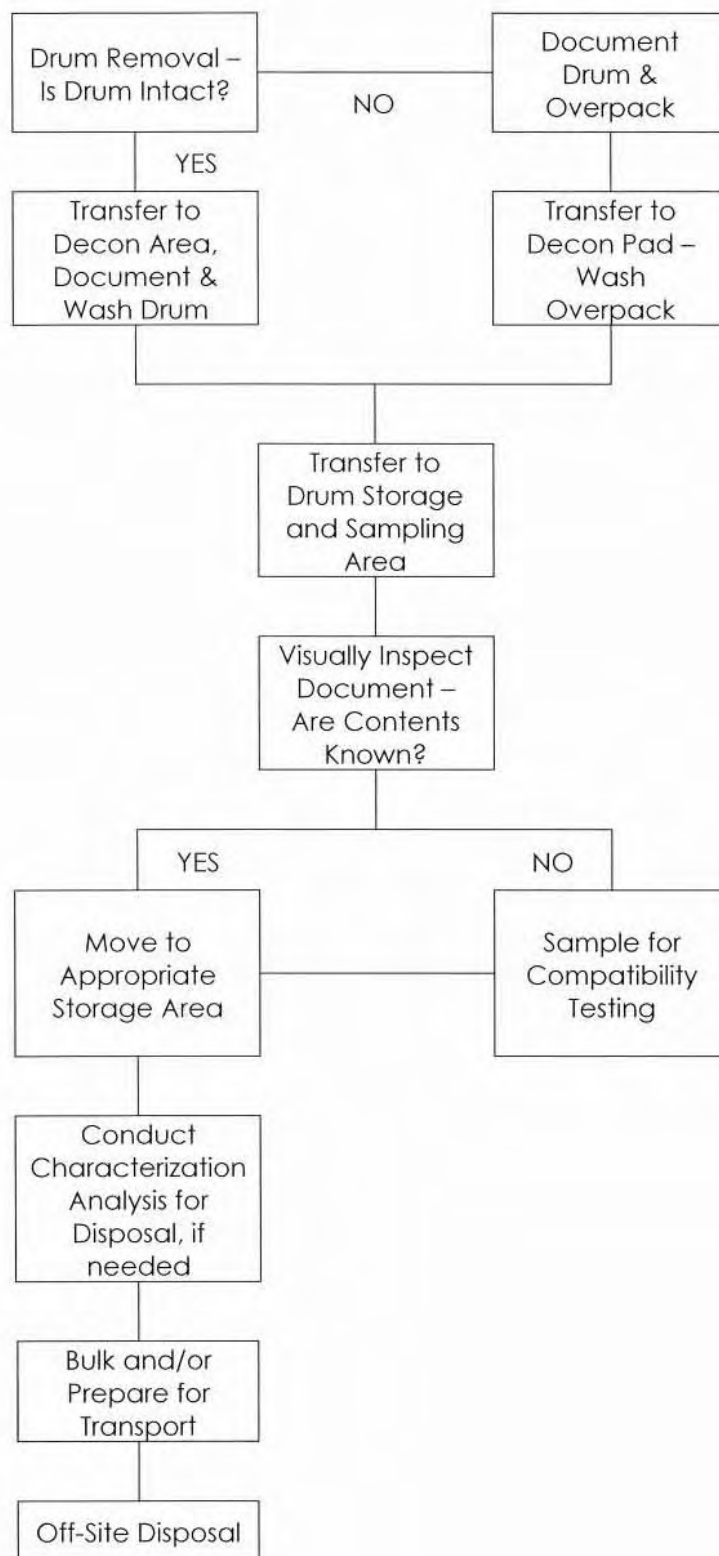
5.7 DRUM DEHEADER

A drum deheader can be used when the bung is not removable with a bung wrench. It can be used only with closed-head drums, not on open-top drums. It is used by first positioning the cutting edge just inside the top chime and then tightening the adjustment screw so the deheader is held against the side of the drum.

5.8 HAND PICKS, PICKAXES, AND SPIKES

Hand picks, pickaxes, and spikes are not recommended for opening drums because the drum must be struck with too much force, creating great potential for spraying and splashing. Also, drums cannot be opened slowly enough with this method, so any over-pressure can be dangerous. In addition, there is a great hazard using this method on drums with shock-sensitive materials. Use of chisels and firearms as an opening tool is prohibited.

DRUM REMOVAL AND SAMPLING FLOW CHART



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1.0 OVERVIEW

Fatal exposures to cold have been reported in employees failing to escape from low environmental air temperatures or from immersion in low temperature water. Hypothermia, a condition in which the body's deep core temperature falls significantly below 98.6°F (37°C), can be life threatening. A drop in core temperature to 95°F (35°C) or lower must be prevented.

Air temperature is not sufficient to determine the cold hazard of the work environment. The wind-chill must be considered as it contributes to the effective temperature and insulating capabilities of clothing. An equivalent chill temperature chart relating actual dry bulb air temperature and the wind velocity is presented in Table 2.5-1. The equivalent chill temperature should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the body's core temperature.

The body's physiologic defense against cold includes constriction of the blood vessels, inhibition of the sweat glands to prevent loss of heat via evaporation, glucose production, and involuntary shivering to produce heat by rapid muscle contraction.

The frequency of accidents increases with cold temperature exposures as the body's nerve impulses slow down, individuals react sluggishly and numb extremities make for increased clumsiness. Additional safety hazards include ice, snow blindness, reflections from snow, and possible skin burns from contact with cold metal.

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 95°F (35°C). This must be taken as a sign of danger to the employees on site, and cold exposures should be immediately terminated for any employee when severe shivering becomes evident. Useful physical or mental work is limited when severe shivering occurs.

There are certain predisposing factors that make an individual more susceptible to cold stress. It is the responsibility of the project team members to inform the Health and Safety Officer to monitor an individual, if necessary, or use other means of

preventing/reducing the individual's likelihood of experiencing a cold related illness or disorder.

2.0 PREDISPOSING FACTORS

Predisposing factors that will increase an individual's susceptibility to cold stress are listed below:

- Dehydration: The use of diuretics and/or alcohol, or diarrhea can cause dehydration. Dehydration reduces blood circulation to the extremities.
- Fatigue During Physical Activity: Exhaustion reduces the body's ability to constrict blood vessels. This results in the blood circulation occurring closer to the surface of the skin and the rapid loss of body heat.
- Age: Some older and very young individuals may have an impaired ability to sense cold.
- Alcohol Consumption: Alcohol dilates the blood vessels near the skin surface resulting in excessive body heat loss.
- Sedative Drugs: Sedatives may interfere with the transmission of impulses to the brain, thereby interfering with the body's physiological defense against cold. Some prescription drugs may react the same way.
- Poor Circulation: Vasoconstriction of peripheral vessels reduces blood flow to the skin surface.
- Heavy Work Load: Heavy work loads generate metabolic heat and make an individual perspire even in extremely cold environments. If perspiration is absorbed by the individual's clothing and is in contact with the skin, cooling of the body will occur.
- The Use of PPE: PPE usage which traps sweat inside the PPE may increase an individual's susceptibility to cold stress.
- Lack of Acclimatization: Acclimatization, the gradual introduction of workers into a cold environment, allows the body to physiologically adjust to cold working conditions.
- History of Cold Injury: Previous injury from cold exposures may result in increased cold sensitivity.

3.0 PREVENTION OF COLD STRESS

There are a variety of measures that can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders. These include acclimatization, fluid and electrolyte replenishment, eating a well balanced diet, wearing warm clothing, the provision of shelter from the cold, thermal insulation of metal surfaces, adjusting work schedules, and employee education.

- Acclimatization: Acclimatization is the gradual introduction of workers into the cold environment to allow their bodies to physiologically adjust to cold working conditions. However, the physiologic changes are usually minor and require repeated uncomfortably cold exposures to induce them.
- Fluid and Electrolyte Replenishment: Cold, dry air can cause employees to lose significant amounts of water through the skin and lungs. Dehydration affects the flow of blood to the extremities and increases the risk of cold injury. Warm, sweet, caffeine-free, non-alcoholic drinks and soup are good sources to replenish body fluids.
- Eating a Well Balanced Diet: Restricted diets including low salt diets can deprive the body of elements needed to withstand cold stress. Eat high energy foods throughout the day.
- Warm Clothing: It is beneficial to maintain air space between the body and outer layers of clothing in order to retain body heat. However, the insulating effect provided by such air spaces is lost when the skin or clothing is wet.

The parts of the body most important to keep warm are the feet, hands, head, and face. As much as 40 percent of body heat can be lost when the head is exposed.

Recommended clothing includes:

- Inner layers (t-shirts, shorts, socks) should be of a thin, thermal insulating material.
- Wool or thermal trousers. Denim is not a good protective fabric.
- Felt-lined, rubber-bottomed, leather-upper boots with a removable felt insole is preferred. Change socks when wet.
- Wool shirts/sweaters should be worn over inner layer.
- A wool cap is good head protection. Use a liner under a hard hat.
- Mittens are better insulators than gloves.
- Face masks or scarves are good protection against wind.

- Tyvek/poly-coated Tyvek provides good wind protection.
- Wear loose fitting clothing, especially footwear.
- Carry extra clothing in your vehicle.
- Shelters with heaters should be provided for the employees' rest periods if possible. Sitting in a heated vehicle is a viable option. Care should be taken that the exhaust is not blocked and that windows are partially open to provide ventilation.
- At temperatures of 30°F (-1°C) or lower, cover metal tool handles with thermal insulating material if possible.
- Schedule work during the warmest part of the day if possible, rotate personnel and adjust the work/rest schedule to enable employees to recover from the effects of cold stress.

3.1 EMPLOYEE EDUCATION

Employees have already been trained to recognize and treat the effects of cold stress during their 40-hour training. Signs, symptoms, and treatment of cold stress should be reviewed in project safety meetings where applicable. The buddy system will help in preventing cold stress once the employees are trained to recognize the signs and symptoms of cold stress.

3.2 COLD STRESS PREVENTION GUIDELINES

It may not be practically feasible to implement all the above prevention measures. Follow the guidelines given below when the ambient air temperature is below 0°F (-18°C):

- Dress warmly.
- Replenish fluids and electrolytes at regular intervals.
- Provide shelter from the cold.
- Adjust work/rest schedules.

3.3 ADJUST WORK-REST SCHEDULES IN SEVERELY COLD ENVIRONMENTS

Follow the work/rest schedule in Table 2.5-2. It is based on the cooling power of air which is a function of wind speed and ambient air temperature.

4.0 FIRST AID TREATMENT GUIDELINES

The following describes symptoms of different stages in cold stress and the related first aid treatment guidelines.

4.1 FROSTBITE

Stages

Incipient (frost nip)	May be painless. Tips of ears, nose, cheeks, fingers, toes, chin affected. Skin blanched white.
Superficial	Affects skin/tissue just beneath skin; turns purple as it thaws. Skin is firm, waxy; tissue beneath is soft, numb.
Deep	Tissue beneath skin is solid, waxy, white with purplish tinge. Entire tissue depth is affected.

First Aid

Incipient	Warm by applying firm pressure - blow warm breath on spot or submerge in warm water (102°F to 110°F) (39°C to 43°C). Do not rub the area.
Superficial	Provide dry coverage, steady warmth; submerge in warm water.
Deep	Hospital care is needed. Do not thaw frostbitten part if needed to walk on. Do not thaw if there is danger of refreezing. Apply dry clothing over frostbite. Submerge in water; do not rub.

4.2 GENERAL HYPOTHERMIA

Stages

- Shivering.
- Indifference.
- Decreased consciousness.
- Unconsciousness.
- Death.

Symptoms

- Muscle tension.
- Uncontrollable shivering.
- Glassy stare.
- Decreased muscle function.
- Speech distortion.
- Blue, puffy skin.
- Slow pulse.
- Shallow breathing.
- Coordination loss.
- Stumbling.
- Forgetfulness.
- Freezing extremities.
- Dilated pupils.
- Fatigue.

Emergency Response

- Keep person dry; replace wet clothing.
- Apply external heat to both sides of patient using available heat sources, including other bodies.
- Give warm liquids - not coffee or alcohol - after shivering stops and if conscious.
- Handle gently.
- Transport to medical facility as soon as possible.
- If more than 30 minutes from a medical facility, warm person with other bodies.

TABLE 2.5-1
WIND CHILL CHART

Wind speed	50°F	40°F	30°F	20°F	10°F	0°F	-10°F	-20°F	-30°F
5 mph	48°F	37°F	27°F	16°F	6°F	-5°F	-15°F	-26°F	-36°F
10 mph	40°F	28°F	16°F	4°F	-9°F	-24°F	-33°F	-46°F	-58°F
15 mph	36°F	22°F	9°F	-5°F	-18°F	-32°F	-45°F	-58°F	-72°F
20 mph	32°F	18°F	4°F	-10°F	-25°F	-39°F	-53°F	-67°F	-82°F
25 mph	30°F	16°F	0°F	-15°F	-29°F	-44°F	-59°F	-74°F	-88°F
30 mph	28°F	13°F	-2°F	-18°F	-33°F	-48°F	-63°F	-79°F	-94°F
35 mph	27°F	11°F	-4°F	-21°F	-35°F	-51°F	-67°F	-82°F	-98°F
40 mph	26°F	10°F	-6°F	-21°F	-37°F	-53°F	-69°F	-85°F	-100°F
over 40 mph adds little to the effect		LITTLE DANGER (properly clothed)			DANGER OF FREEZING OF EXPOSED FLESH			GREAT DANGER	
* TRENCH FOOT & IMMERSION FOOT can occur at any point on the chart!									

ADVERSE EFFECTS OF THE COLD

TRENCH FOOT: Caused by a combination of cold wet conditions at 50 and below. The symptoms include redness, swelling, numbness, blistering, bleeding or having swelling in severe cases.

IMMERSION FOOT: Caused by the restriction of blood circulation in the presence of moisture and cold starting at 50 and below. The symptoms are little or no pain, cold feeling, gradual paling, numbness, and the feet feel like blocks of wood.

CARBON MONOXIDE POISONING: Occurs when exhaust fumes from fuel burning equipment such as vehicles, oil heaters, etc., enter a closed space such as the inside of a vehicle or tent. The symptoms are extreme weakness and drowsiness. Death will result unless individual is moved to fresh air.

FROSTBITE: Is the crystallization of tissue fluid caused by exposure to cold below freezing. Most common areas of frostbite are the face, nose, ears, hands, and feet. The symptoms include redness and pain in the early stages, followed by a waxy white appearance, numbness and the skin may feel stiff and even brittle.

PREVENTION OF COLD INJURY

To Stay Warm Remember The Word C-O-L-D

C - Cleanliness and Care: Feet, socks, and clothing are warmer when clean. Constant foot care is imperative.

O - Overheating: Prevent overheating by adjusting your clothing to the job being performed.

L - Loose and Layered: Loose-fitting clothing insures good circulation and insulation. Clothing in layers assures air spaces which hold body heat. Again, allows an individual to adjust the number of layers to the temperature and activity being performed.

D - Dampness: Any wet garment is a cold garment, just as tight-fitting garments are cold producing garments. Wear a field jacket as a wind breaker and for its water-repellency. Keep clothing dry.

* Use the Buddy system, this is the best way to prevent cold injury. If you start feeling cold do some exercises until you start feeling warm again.

FIRST AID FOR COLD INJURIES

1. Get individual off their feet.
2. Get individual into warm dry clothing.
3. Get individual warm fluids to drink (NO ALCOHOLIC BEVERAGES)
4. Do not smoke.
5. Keep the effected area clean, warm and dry. Do not allow to REFREEZE. If you cannot keep area warm, leave it frozen.
6. Do not rub effected area.
7. Evacuate through medical channels ASAP.

HYPOTHERMIA

The condition of low internal body heat dropping steadily from a healthy 98.6, and if not reversed, can bring fatal consequences. Hypothermia can develop without much warning. Dress for the weather and avoid getting wet or damp.

TABLE 2.5-2

**WORK/REST SCHEDULE
FOR A 4-HOUR WORK SHIFT**

<i>Air Temperature with Sunny Sky</i>		<i>Work/Break Schedule (Minutes)</i>				
<i>°F</i>	<i>°C</i>	<i>No Wind</i>	<i>5 mph Wind</i>	<i>10 mph Wind</i>	<i>15 mph Wind</i>	<i>20 mph Wind</i>
-05 to -09	-20 to -23	Normal	Normal	Normal	55/10	40/10
-10 to -14	-23 to -26	Normal	Normal	Normal	40/10	20/10
-15 to -19	-26 to -28	Normal	Normal	40/10	20/10	10/10
-20 to -24	-29 to -31	Normal	40/10	20/10	Stop	Stop
-25 to -29	-32 to -34	40/10	20/10	10/10	Stop	Stop
-30 to -34	-35 to -37	20/10	Stop	Stop	Stop	Stop
-35 and Below	-38 and Below	Stop	Stop	Stop	Stop	Stop

Notes:

Schedule applies only to employees in dry clothing. Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up periods of 10 minutes in a warm location and with an extended break (e.g., lunch) in a warm location. For light-to-moderate work: apply schedule one step lower. For example, at -25°F with no noticeable wind, there should be a maximum work period of 20 minutes and then a 10-minute break.

This table addresses the health hazards related to cold weather work. The practicality of working under a work/rest schedule, together with the ability of the necessary equipment to function properly in cold weather, may be more restrictive than the health hazards and also need to be considered.

The cold stress schedule applies to light or sedentary work activities. Light to moderate work activities can be moved down one level, moderate to heavy work activities can be moved down two levels if workers are acclimated, have proper protective clothing, and show no signs of cold stress.

The following is suggested as a guide for wind velocity if accurate information is not available.

5 mph Wind:	Light flag moves.
10 mph Wind:	Light flag fully extended.
15 mph Wind:	Raises newspaper sheet.
20 mph Wind:	Blowing and drifting snow.

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1.0 OVERVIEW

Heat induced occupational illnesses, injuries, and reduced productivity occur in situations in which the total heat load (environmental plus metabolic) exceeds the body's capacities to maintain normal body functions without excessive strain. Heat stress is the sum of the heat generated in the body plus the heat gained from the environment minus the heat lost from the body to the environment. The body's response to heat stress is called heat strain. The level of heat stress at which excessive heat strain will result depends on the heat tolerance of the individual. Certain predisposing factors may reduce an individual's ability to tolerate heat stress.

Using personal protective equipment (PPE) may put a hazardous waste worker at an increased risk of developing heat stress. Health effects may range from heat rash or heat fatigue to serious illness or death. Heat stress is caused by a number of interacting factors, including environmental conditions such as temperature and relative humidity, protective clothing which limits natural heat loss through perspiration, workload, and the individual characteristics of the worker.

It is the responsibility of the project team members to inform the Health and Safety Officer (HSO) or GZA's Manager of Health and Safety, if any of the predisposing factors listed below apply to them. This enables the HSO to monitor the individual if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a heat related illness or disorder.

2.0 PREDISPOSING FACTORS

Predisposing factors that will increase the individual's susceptibility to heat stress are listed below:

- Lack of Physical Fitness: Such individuals experience more physiological strain including a higher heart rate, a higher body temperature, less efficient sweating, and slightly higher oxygen consumption as compared to fit individuals.
- Obesity: Overweight individuals produce more heat per unit surface area than thin individuals and have a lowered ability to dissipate heat.

- Age: Older individuals may have a decreased ability to cope with heat stress.
- Dehydration: Dehydrated individuals will have a decreased ability to cool the body by sweating. Diarrhea can cause dehydration.
- Alcohol, Medications, and Drug Use: Alcohol consumption may dehydrate individuals and certain medications/drugs may act as diuretics. Hence, the individual may have a decreased ability to lose heat by sweating.
- Infection, Sunburn, Illness, and Certain Chronic Diseases: These factors may interfere with the body's normal mechanisms to lose heat.
- Heart Conditions or Circulatory Problems: Heat stress may place an additional strain on the heart and circulatory system that could harm the individual as well as decrease the individual's physiologic response.
- Low Salt Diet: Could affect the individual's electrolyte balance.
- Pregnancy
- Previous History of Heat Stroke or Heat Exhaustion: May increase the individual's susceptibility to heat stress.
- Heavy Workload: Will generate metabolic heat thereby increasing the heat stress placed on the individual.
- The Use of PPE Over Light Summer Clothing: This will decrease the ability of an individual to lose heat by sweating as evaporative cooling can no longer occur.
- Lack of Acclimatization: Acclimatization is the gradual introduction of workers into a hot environment to allow their bodies to physiologically adjust to hot working conditions. Acclimatized individuals generally have lower heart rates and lower body temperatures. In addition, they sweat sooner and more profusely and even have more dilute sweat (thereby losing less electrolytes) than non-acclimatized individuals.

3.0 PREVENTION OF HEAT STRESS

There are a variety of measures that can be implemented to prevent or reduce the likelihood of employees developing heat stress related disorders. These include fluid and electrolyte replenishment, the provision of shelter from the sun and heat, work schedule adjustment, the use of cooling devices, acclimatization, heat stress monitoring, and employee education, as discussed below:

- Fluid and Electrolyte Replenishment: Personnel should drink about 16 ounces of water before starting work and drink water at every break. To encourage water consumption, cool water and disposable cups should be made available. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to

replace lost sweat. When heavy sweating occurs, personnel should be encouraged to drink more. Replacing body fluids with Gatorade is an option. It is advisable to have Gatorade on site if the air temperature is 70°F (21°C) or more and the workers are performing tasks with a moderate to heavy work load in chemical resistant clothing.

- Shelter From the Sun and Heat: Air-conditioned (if possible) or shaded areas should be made available for rest periods. Sitting in an air-conditioned truck is an acceptable option.
- Work Schedule Adjustment: Scheduling work for early mornings and/or late afternoons will avoid the hottest parts of the day and reduce the heat stress placed on personnel. Rotation of personnel will help reduce overexertion of workers and adjusting the work-rest schedule will help personnel recover from the effects of heat stress periodically.
- Use of Cooling Devices: The use of cooling devices like field showers, hose-down areas, or cooling vests should be considered for project tasks that involve heavy work loads in chemical resistant clothing.
- Acclimatization: Acclimatization is the gradual introduction of workers into a hot environment to allow their body to physiologically adjust to hot working conditions. Acclimatized individuals generally have lower heart rates and lower body temperatures. In addition, they sweat sooner and more profusely and even have more dilute sweat (thereby losing less electrolytes) than non-acclimatized individuals.
- Heat Stress Monitoring: Monitoring hot environments for potential heat stress should be initiated when the ambient air temperature is in excess of 70°F. There are several ways to monitor heat stress: measuring heart rate, oral temperature, loss of body weight, and the Wet Bulb Globe Temperature using a Reuter-Stokes or Quest Electronics heat stress monitor. GZA employees are advised to measure their heart rates as a primary means of heat stress monitoring following the guidelines in Section 3.2.
- Employee Education: Workers have already been trained to recognize and treat the effects of heat stress during the 40-hour training course. Signs, symptoms, and treatment of heat stress should be discussed in site safety meetings. The buddy system will help in preventing heat stress once the employees are trained to recognize the signs and symptoms of heat stress.

3.1 PREVENTION PRACTICES

It may not be practically feasible to implement all of the above prevention measures. The following has been developed as a field guide for use in actual field situations.

Ambient air temperature is 70°F (21°C) or more:

- Replenish fluids and electrolytes. Drink cool (50°F to 60°F/10°C to 15°C) fluids hourly. The fluids should be caffeine-free and non-alcoholic. Do not wait until you are thirsty. Your normal thirst mechanism is not sufficient to overcome the effects of dehydration. If you feel thirsty, you are already becoming dehydrated.
- Provide shelter from the sun and heat.

Ambient air temperature is 70°F (21°C) or more and chemical resistant clothing is being used:

- Same as above.
- Adjust work schedules if feasible.
- Initiate heat stress monitoring and/or the use of cooling devices.

3.2 HEAT STRESS MONITORING

Heat stress monitoring may be performed by monitoring the heart rate. Heart rate should be measured at the beginning of the work shift, at regular intervals and at the start of each rest period.

- 1) If the heart rate is <110 beats per minute (bpm), personnel may continue the current work/rest schedule.
- 2) If the heart rate is >110 bpm, take a 10-minute break. Monitor heart rate at the end of the rest period. If not <110 bpm, rest until the heart rate is <110 bpm. Reduce the current work time between breaks by approximately 1 hour. If the next scheduled monitoring session shows a heart rate of >110 bpm, once again reduce the work time between breaks by 1 hour.

4.0 HEAT STRESS FIRST AID

4.1 HEAT CRAMPS

Cause: Excessive water loss/electrolyte imbalance.

Symptoms

Muscular pain in arms, legs, abdomen

Faintness, dizziness, exhaustion

Normal temp, cool moist skin

First Aid Guidelines

Administer sips of Gatorade (1/2 glass every 15 minutes)

Do not massage cramping muscles

Relax person

4.2 HEAT EXHAUSTION

Cause: Large amount of water loss; blood circulation diminishes.

Symptoms

Moist, clammy, skin, usually pale

Dilated pupils

Weak, dizzy, nauseous, headache

Normal or low body temperature

First Aid Guidelines

Move to a cool place

Apply cold, wet compresses to skin

Raise feet 8 to 12 inches

Administer sips of Gatorade (1/2 glass every 15 minutes)

Get medical attention

4.3 HEAT STROKE

Cause: Body overheats; temperature rises; no sweating occurs.

Symptoms

No sweating occurs

Dry, hot skin, usually red

Constricted pupils

Hot body temperature
(105°F to 110°F/40.5°C to 43.5°C)

Strong, rapid pulse

Unconsciousness may occur

Muscular twitching

First Aid Guidelines

Get emergency medical assistance ASAP

Remove from sunlight

Wet down body with cool water or rubbing alcohol

Elevate head/shoulders

Wrap in wet, cold wrapping

Once cooled to 102°F (38.9°C), stop cooling measures

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LIST OF APPENDICES

APPENDIX 2.7.A HOT WORK PERMIT

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1.0 INTRODUCTION

This procedure provides the minimum requirements for safe work practices for employees during hot work activities such as burning, welding, cutting, and grinding. This procedure is intended to assure compliance with the requirements of the Occupational Safety and Health Administration (OSHA) standards for these activities (29 CFR 1910, Subpart Q).

This procedure applies to all project personnel performing operations that can produce ignition sources such as sparks, hot surfaces, or open flames. Subcontractors working for our companies must also adhere to this procedure unless they have their own standard operating procedure that complies with the OSHA regulations and is at least as protective as this procedure.

1.1 DEFINITIONS

Hot Work: Burning, welding, cutting, brazing, grinding, or other activities capable of producing ignition sources.

Hazardous Area: Locations where flammable or combustible materials are handled, stored, may evolve as a result of the activities in the area, or confined spaces.

2.0 RESPONSIBILITIES

2.1 RESPONSIBILITIES OF THE SITE SUPERVISOR AND SITE HEALTH AND SAFETY OFFICER (HSO)

The Site Supervisor and HSO are responsible for assuring that safe work practices are used in performing hot work activities including completion of the attached Hot Work Permit. Clients may have their own requirements for Hot Work on their premises and their permit may have to be followed.

2.2 FIELD TECHNICIAN

Field Technicians are responsible for complying with this procedure and for notifying the Site Supervisor or HSO of any questions or unsafe situations involving hot work activities. Field Technicians are prohibited from performing hot work or operating welding equipment without documented training and work experience in these activities.

3.0 EQUIPMENT

Equipment chosen to perform hot work activities must be chosen for safe application to the intended work. This equipment may include:

- i) compressed gases, welding rods, filler metals, and electrodes;
- ii) minimum 20-pound ABC-type fire extinguisher;
- iii) first-aid kit;
- iv) welding screens for welding operations;
- v) welder's helmet or face shield with an appropriate eye shade;
- vi) leather or heavy duty cloth gloves and coveralls or long-sleeve shirt and pants to prevent skin exposure;
- vii) steel toe safety shoes;
- viii) hearing protection; and
- ix) respiratory protection as defined by the Health and Safety Plan (HASP).

4.0 HOT WORK PERMITS

A Hot Work Permit must be completed and signed before beginning any hot work in a hazardous area as defined in this HSOG (Appendix 2.7.A). The only exception to this requirement is for hot work performed in isolated areas, specifically set up for this purpose, where no hazardous conditions are present. Such areas would include maintenance shops with designated burning and welding areas.

The Site Supervisor or HSO will issue and sign off on the Hot Work Permits. Hot Work Permits are good for one shift only. If hot work activities are interrupted for more than 1 hour, a new permit is required before work resumes.

5.0 OPERATIONAL PROCEDURES

5.1 FIRE PREVENTION

1. The immediate area must be cleared of all flammable and combustible materials before hot work begins. This includes moving weeds, trash, and debris. Materials that cannot be removed must be protected with fire resistant covers.
2. At least one ABC-type fire extinguisher must be present in the area before hot work begins.
3. Where there is a potential for accumulating flammable or combustible atmospheres, a combination oxygen/combustible gas indicator will be used to perform continuous monitoring during hot work activities.
4. A fire watch must be posted to look for smoldering fires that may be caused by the operation. The fire watch must remain in the immediate area of the hot work for at least 30 minutes after the activity stops to ensure no smoldering fires are present.
5. Where floor openings or cracks exist near hot work activities, these openings must be closed to prevent sparks and hot metal from falling to lower levels which creates additional hazards. Where closure is impractical, fire resistant covers must be used and a fire watch must be posted to look for problems on the lower level.
6. Welding screens or other fire resistant barriers must be placed around all welding and cutting operations to prevent exposure of nearby personnel to sparks, hot metal, and ultraviolet radiation.

5.2 PROHIBITED ACTIVITIES

1. Hot work is prohibited in the presence of flammable or explosive atmospheres and in areas where combustible materials are stored.
2. Hot work is prohibited on containers and tanks of any kind until and unless they have been appropriately locked out, isolated, tagged, and thoroughly cleaned of flammable and combustible materials.
3. Use of electrical equipment is prohibited when personnel must stand or work in puddles or other wet areas.

5.3 COMPRESSED GAS CYLINDERS (CGCs)

1. Smoking is prohibited within 75 feet of CGCs.
2. CGCs will be labeled.
3. CGCs must be shut off as soon as welding, burning, or cutting activities are finished. CGCs must be transported on cylinder carts, whenever possible. Cylinders must be chained to the cart during movement.
4. CGCs must be kept upright and tied to a stationary object when they are stored or in use.
5. Oxygen regulators must be oil and grease-free. Regulators should be removed and cylinder caps installed as soon as compressed gas use is finished. DO NOT transport cylinders with the regulator attached.
6. Oxygen and fuel gas cylinders must be stored at least 20 feet apart unless they are separated by a non-combustible barrier at least 5 feet high with a minimum fire-resistance rating of 30 minutes.
7. Material Safety Data Sheets (MSDSs) for each type of gas and welding rod must be present on site during hot work activities.
8. All equipment used for hot work must be inspected for damage and defects before each use. Damaged or defective equipment must not be used.

5.4 PERSONAL PROTECTIVE EQUIPMENT

1. Forced air or local exhaust ventilation will be used whenever possible to control toxic or flammable atmospheres generated by hot work activities.
2. Shaded safety glasses or goggles with side shields are required for personnel performing hot work to guard against ultraviolet radiation and flying metal. Other personnel near the hot work area must also wear welder's eye shades unless they are protected by welding screens.
3. Oil soaked clothing shall not be worn during hot work activities. Synthetic clothing is also prohibited due to its tendency to melt or cause flash fires when sparks or hot metal come in contact with it. Chemical-resistant clothing such as Tyvek®, polycoated Tyvek®, and Saranex® will be removed prior to hot work activities as these materials pose the same fire hazards as other synthetic clothing.

APPENDIX 2.7.A

HOT WORK PERMIT

APPENDIX 2.7.A

HOT WORK PERMIT

Site: _____ Project No.: _____
Issued to: _____ Date: _____
Location: _____

Hot Work Activity (Check Appropriate Box)

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	Welding (electric or gas)
<input type="checkbox"/>	<input type="checkbox"/>	Oxygen/Acetylene Torch
<input type="checkbox"/>	<input type="checkbox"/>	Abrasive Grinding
<input type="checkbox"/>	<input type="checkbox"/>	Heat Treatment
<input type="checkbox"/>	<input type="checkbox"/>	Cutting
<input type="checkbox"/>	<input type="checkbox"/>	Other

Safety Checklist (Check Appropriate Box)

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	Material to be worked on has been evaluated for hazardous emissions
<input type="checkbox"/>	<input type="checkbox"/>	Work area free of flammable or combustible materials
<input type="checkbox"/>	<input type="checkbox"/>	Fire extinguishers on hand and full
<input type="checkbox"/>	<input type="checkbox"/>	Fire watch posted. Name: _____
<input type="checkbox"/>	<input type="checkbox"/>	Emergency exit routes clear
<input type="checkbox"/>	<input type="checkbox"/>	Ventilation provided (if confined area or poor natural ventilation)
<input type="checkbox"/>	<input type="checkbox"/>	Worker has appropriate eye protection, face shield, clothing, and respirator
<input type="checkbox"/>	<input type="checkbox"/>	Compressed gas cylinders are secure
<input type="checkbox"/>	<input type="checkbox"/>	Equipment has been inspected and free of defects
<input type="checkbox"/>	<input type="checkbox"/>	Welding cutting work performed behind shielding (where practical)
<input type="checkbox"/>	<input type="checkbox"/>	Others in work area have been notified about hot work
<input type="checkbox"/>	<input type="checkbox"/>	Potential hazardous atmosphere checked

_____ % LEL _____ % Oxygen

I have verified that all requirements of the hot work procedure and permit have been met and therefore issue this permit.

Issued by: _____

Title: _____

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REMEDATION SECTION	HSOG 2.10: POWER TOOL OPERATIONS
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1.0 INTRODUCTION

This procedure outlines the minimum guidelines for safe work practices during the operation of power tools. Additionally, this program will aid in complying with various Occupational Safety and Health Administration (OSHA) regulations relative to power tools, specifically 29 CFR 1926.300, 1926.302, 1926.303, and 1926.304.

2.0 SCOPE

This procedure applies to all GZA personnel, and their subcontractors when utilizing power tools.

3.0 RESPONSIBILITIES

3.1 PROJECT MANAGER/PROJECT COORDINATOR

The Project Management is ultimately responsible for compliance, implementation, and enforcement of this Policy/Program at the project/site level.

3.2 SITE SUPERINTENDENT

The Site Superintendent (SS) directs work on site and is responsible for enforcing this procedure on site.

3.3 HEALTH AND SAFETY OFFICER

The on-site Health and Safety Officer (HSO) is responsible for administering this procedure. The HSO will audit to ensure compliance and provide training and/or other assistance as needed.

3.4 SITE PERSONNEL

GZA personnel and subcontractor personnel are responsible for complying with this procedure when working with power tools along with any additional instructions given by their respective supervisor.

4.0 PROCEDURES/REQUIREMENTS

4.1 GENERAL

1. Follow all of the manufacturer's instructions regarding the safe storage, operation, and maintenance of power tools.
2. Do not use a power tool unless you have been instructed on its proper usage. Prove that you have been trained on its proper usage.
3. All guards must be in place before beginning power tool operations.
4. Appropriate eye, face, and ear protection must be worn when operating or working near power tools.
5. Do not wear loose fitting clothing or jewelry during power tool operations.
6. Disconnect the power tool before cleaning or changing attachments (blades, bits, etc.) Do not pull on the cord to disengage from the receptacle.
7. Remove chuck keys, etc. before using the tool.
8. Ensure that all power tools are either double insulated or have a grounded three-prong plug, with grounded extension cords and receptacles.
9. Flexible cords and cables shall be protected from damage, and repaired if damaged. Repairs will not exceed one time per extension cord.
10. Extension cords shall be of three-wire type and be designated as "heavy duty" or "contractor grade" (12-3 or heavier).
11. The use of a Ground Fault Circuit Interrupters (GFCIs) is required on all construction sites except for double insulated (2 Prong Manufacturing Co.).
12. Do not use a power tool with a frayed or damaged cord or plug.
13. Secure small pieces of material with a clamp or vice.
14. Keep the work area clear of slip/trip/fall hazards.
15. Use a brush to clean off equipment – Do not use compressed air.

4.2 SAWS (GENERAL)

1. Do not jam or force saws into the work.
2. Portable saws shall have a spring-loaded start/stop switch.
3. Start and stop the saw outside the piece of work.

4.3 CIRCULAR SAWS

1. Do not retract the lower guard while the blade is turning.
2. Use the retracting handle or safety lift lever to move the lower guard.
3. Do not clamp or tie the guard open.
4. Keep your hands away from the blade while using the saw.
5. Keep the power cord clear of the blade.
6. Do not operate the saw unless the guard is functioning properly and is properly adjusted.

4.4 RECIPROCATING SAWS

1. Do not lock the trigger if the saw will need to be stopped immediately.
2. Do not use the saw unless the insulating boot is in place.
3. Keep hands away from the blade while in operation.

4.5 DRILLS

1. Do not use dull or chipped bits.
2. Let the bit cool down before changing or adjusting, with the power disconnected.
3. Do not force the bit into the work.
4. Use light oil to keep the bit lubricated and cool during use.
5. Do not use gloves or loose fitting clothes around drill operations.

4.6 PNEUMATIC TOOLS

1. Pneumatic tools must be securely attached to the compressed air source.
Note: When using Chicago type fittings ensure that the pins are being used.
2. Do not make any adjustments until the pressure has been released and no air is being supplied to the hose or tool.
3. Do not hoist, lower, or carry tool by the hose.

4. Pneumatic power tools must have retainers or safety clips to retain the tool bits.
5. Follow the manufacturer's guidelines for safe operating procedures.
6. Air hoses are to be situated to prevent tripping hazards.
7. Never attach a hose to an oxygen line for air supply.

4.7 GRINDERS (BENCH)

1. Grinding wheels will be covered by a safety guard.
2. Tool rests are to be well supported and be no more than 1/8 inch from the wheel and 1/4-inch adjustment on the torque guard.
3. Never adjust the tool rest while the wheel is in motion.
4. Do not grind with the side of the wheel, unless it is so designed.
5. Work area around grinder must be clear before beginning operation.
6. Set up bench grinders in a non-traffic area.

4.8 PORTABLE BAND SAWS

1. Do not use dull or damaged blades.
2. Ensure that saw is disconnected from the power source prior to performing maintenance or adjustment for safety.
3. Properly dispose of used blade.

4.9 CORE DRILLS

1. Ensure that the base is secured prior to operation. Anchor bolts or suction can be used.
2. Ensure that the drill is properly aligned before starting a cut.
3. Use water to control dust and to cool and lubricate the bit.
4. If hand-held core drills are in use, operation must conform to manufacturer's safety requirements.

4.10 PORTABLE HANDHELD GRINDERS

1. A full-face shield is required to be worn over safety glasses.
2. Tuck in loose clothing when operating portable grinders.
3. Wearing gloves and long sleeves is recommended when using a wire wheel on a grinder.

4. Do not use a portable grinder for bench grinder applications. Hold the grinder with both hands.

4.11 POWDER ACTUATED TOOLS

1. License required to show safety training.
2. Safety of misfires.
3. Storage and notification of use is required.
4. MSDS must be included with the Health and Safety Plan.
5. Operation must conform to manufacturer's safety requirements.

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1.0 INTRODUCTION

This Health and Safety Operating Guideline (HSOG) is intended to assist Participants in recognizing safe operations during environmental site investigations that involve drilling of soil borings, installation of groundwater monitoring wells, collection of subsurface soil samples, and related drilling activities.

2.0 DISCUSSION

Participant employees who work on or around drilling rigs could be injured while performing tasks unique to these operations. While Participant employees may not operate drilling equipment, they may work in close proximity to operating drilling equipment and may be exposed to many of the same hazards as the drilling subcontractor. Therefore, Participant employees should be familiar with basic drilling safety operations to help prevent drilling-related accidents.

Familiarity with basic drilling safety is an essential component of all drilling projects. Participants may be responsible to regulatory agencies and others for personal injuries or property damage as a result of drilling related accidents.

3.0 APPLICATION

The following procedures apply to all projects that include mechanical drilling activities where portable drilling rigs are used for soil boring advancement, subsurface soil sample collection, or groundwater monitoring well installation.

4.0 DEFINITIONS

Air Drilling	A method of rotary drilling that uses compressed air as its circulation medium to remove cuttings from the borehole.
Bit	The cutting or boring element used in drilling wells. Most bits used in rotary drilling are roller-cone bits. The bit consists of the cutting elements and the circulating element. The circulating element permits

the passage of drilling fluid and utilizes the hydraulic force of the fluid stream to improve drilling rates.

Casing	Steel or PVC pipe placed in a well during the drilling process to prevent the wall of the hole from caving in during drilling and after installation.
Cuttings	The fragments of rock and soil dislodged by the bit and brought to the surface in the drilling mud.
Direct Push	A drilling technique which utilizes a percussion hammer to "push" or "hammer" various sample tooling into the subsurface. Continuous soil sampling, in situ groundwater sampling, or small diameter well installation can be performed with these units.
Drill Stem	All members in the assembly used for drilling by the rotary method from the swivel to the bit, including the kelly, drill pipe and tool joints, drill collars, stabilizers, and various subsequent items.
Driller	The employee of the drilling company directly in charge of a drilling rig and crew. His/her main duty is operation of the drilling rig and hoisting equipment, but he/she is also responsible for the downhole condition of the well, operation of downhole tools, and pipe measurements.
Drilling Fluid	Circulating fluid, one function of which is to force cuttings out of the borehole and to the surface. While a mixture of clay, water, and other chemical additives is the most common drilling fluid, boreholes can also be drilled using air, gas, or water as the drilling fluid.
Grouting	To fill the annulus between the casing and borehole with liquid slurry of grout (cement or bentonite) and water to support the casing and prevent fluid migration between permeable zones.
Mast	A portable derrick capable of being erected as a unit, as distinguished from a standard derrick, which cannot be raised to a working position as a unit.
Mud	A liquid fluid that may be used to circulate through the borehole during rotary drilling and workover operations. It functions to bring cuttings to the surface, to cool and lubricate the bit and drill stem, to protect against blowouts by holding back subsurface pressures, and to deposit a mud cake on the wall of the borehole to prevent loss of fluids to the formation. The mud used in modern drilling operations is a complex, three-phase mixture of liquids, reactive solids, and inert solids. The

liquid phase may be freshwater, diesel, oil, or crude oil and may contain one or more conditioners.

Rig	The mast, drawworks, and attendant surface equipment of a drilling unit.
Rotary Drilling	A drilling method in which a hole is drilled by a rotating bit to which a downward force is applied. The bit is fastened to and rotated by the drill stem, which also provides a passageway through which the drilling fluid is circulated. Additional joints of drill pipe are added as drilling progresses.
Borehole	The hole drilled by the bit. A borehole may have casing in it or may be open (i.e., uncased), or a portion of it may be cased and a portion of it may be open.
Well Head	The equipment installed at the surface of the borehole when a well is installed in the borehole. A well head may include such equipment as the casing head and tubing head.

5.0 PROCEDURES

5.1 UNDERGROUND HAZARDS

Prior to site entry, Participant employees will ensure that permission has been gained from the facility to access the property. Before marking any proposed exploration or drilling location, it is critical that all readily available information on underground utilities and structures be obtained. The estimated location of utility installations, such as sewer, telephone, fuel, electric, water, or any other underground installation that may be expected to be encountered during drilling work, will be identified with the appropriate authority. Appropriate authorities include client representatives, utility companies, nonprofit organizations (e.g., "Dig-Safe"), and others.

Note: It is important to note that not all utilities participate in the "one-call" agency or process. As such, inquiries must be made with the "one-call" agency to determine which entities do not participate, so they can be contacted independently.

Also, most stake-outs or markings have a limited time period for which they remain valid, typically 2 to 3 weeks. It is critical that this time period be taken into account to prevent expiration of clearance prior to completion of the invasive activities. If the utility clearance period expires before completion, the clearance process must be repeated.

Utility companies or owners of underground installations shall be contacted within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of drilling.

Completion of the utility stake out is not a guarantee that the underground facilities will not be encountered in the boreholes; in fact, very few, if any, guarantee their work nor do they accept the liability for damage or losses if one may occur. Accordingly, Participant employees are expected to use extreme caution in the upper 4 to 5 feet in the event the clearance has failed to identify an existing utility. This may necessitate hand-excavation or probing to confirm the location of shallow utilities.

When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, geophysical techniques, such as ground penetrating radar and/or magnetometry can be utilized to locate the potential underground hazards. Using any information that can be obtained, the site should be viewed in detail for physical evidence of buried lines or structures. Evidence of surface elements of buried utilities should be documented, such as manholes, gas or water valves, catch basins, etc.

No subsurface drilling activities will be allowed until "all" utilities have been properly located and marked. The utility clearance procedure for General Motors sites is fully described within Field Method Guideline (FMG) 1.3 - Utility Clearance. Forms to document the utility clearance findings are presented within FMG 1.3.

Proposed boring locations can be marked using spray paint on the ground, stakes, or other similar method. All markings of proposed locations shall be made in white, in accordance with the generally accepted universal color code for facilities identification (AWMA 4/99).

White:	Proposed excavation or drilling location.
Pink:	Temporary Survey Markings.
Red:	Electrical, Power Lines, Cables, Conduit, and Lightning Cables.
Yellow:	Gas, Oil, Steam, Petroleum, and Gaseous Materials.
Orange:	Communications, Alarm, or Signal Lines, Cables, and Conduits.
Blue:	Potable Water.
Purple:	Reclaimed Water, Irrigation, and Slurry Lines.
Green:	Sewers and Drain Lines.

The public and private utility entities generally only mark the locations of their respective underground facilities within public rights-of-way. Determination of utility locations on private property is the responsibility of the property owner. It is incumbent on Participants and the drilling subcontractor to exercise caution and use good judgment when faced with uncertainty.

5.2 DRILLER SAFETY REQUIREMENTS

Note: When working around drilling operations, the Participant field personnel should have a general sense and understanding of the hazards that may exist with safe operations of drilling rigs. The elements of Section 5.2 are not the responsibility of the GZA field personnel but are considered "general awareness" items that should be observed by the driller.

5.2.1 POWER LINES

The driller shall conduct locating overhead power lines and other overhead electrical sources. Drilling must not occur near these areas unless precautions are taken to prevent contact. Under no circumstances is the drilling rig to be moved with the mast raised. The drilling rig mast must maintain at least 10 feet of clearance from all energized power lines. A spotter must be present when a mast or other equipment is within 20 feet from energized lines. Power lines may be deenergized in order to raise the mast within the 10-foot clearance distance. Contact the client or the utility company to assure that each power line in question is deenergized prior to raising the mast within the 10-foot clearance minimum. All operations around power lines must follow the OSHA Construction standards.

5.2.2 LIGHTNING

Because of the high potential for lightning strike on the mast of a drilling rig, drilling must cease when thunder and lightning storms approach and workers should take shelter away from the rig. If possible, the mast should be lowered prior to the advancement of thunder and lightning storms. This decision should be a joint decision between the Participants field representative and the drilling subcontractor.

5.2.3 SETTING UP AND BLOCKING THE DRILLING RIG

It is the drilling rig operator's responsibility to ensure that the rig is properly set up. The stability of the drilling rig is critical to assure safe drilling operations. Whenever possible, the operator shall choose a dry, level, and reasonably smooth drilling site. The

operator shall make sure the rig's emergency brake is engaged and that the wheels which will remain on the ground are choked. Blocking the rig will help to provide a more stable drilling structure by distributing the weight of the rig evenly. If the rig is equipped with jacks or outriggers, they will be extended from the rig to the ground, raising the rig partially or entirely off the ground. Proper blocking of the rig will prevent differential settling which could result in the rig toppling sideways. Blocks should be placed between the jack swivel and the ground to provide more support area under the pad.

5.2.4 OPERATION OF THE DRILLING RIG

Participant employees must never operate a subcontractor's drilling rig. Only employees of the drilling subcontractor shall operate the drilling rig or handle equipment associated with drilling operations, including augers, drive rods, ropes, and cables. Drillers and field personnel must be aware of the location and operation of this device, and the device must be in safe working condition prior to the start of the project and thereafter.

The driller should never leave the controls of the drilling rig while the tools are rotating unless all employees are clear of rotating equipment.

5.2.5 PRECAUTIONS DURING DRILLING

All employees who will work in the vicinity of the drilling rig should secure all loose clothing to prevent them from becoming caught in the drilling mechanism. Only employees necessary to run the rig are allowed in close proximity, except during essential sampling and other activities. Personnel will not reach into or near the borehole or the rotating equipment, unless the drilling rig has been shut down. For the same reasons, a long handled shovel or other similar device should be used to clear the drill cuttings away from the borehole and from rotating tools. Hands and/or feet should not be to clear cuttings.

5.2.6 WORK ON THE MAST

Drill rig operators shall not climb the mast to effect repairs if the mast can be lowered. If the mast cannot be lowered to effect repairs, workers may utilize a ladder or may climb the mast if proper fall protection, such as a harness and attached lanyard, is available. Fall protection devices, in the form of a harness and lanyard, will be used where workers are 6 feet or greater in height (if a ladder or personal lift is not available). No one should climb the mast to effect repairs while the drilling rig is operating.

5.2.7 WIRE ROPE SAFETY

Worn or misused wire rope is potentially one of the most dangerous pieces of equipment on the drilling rig. When a wire rope breaks, it is typically under significant tension and therefore has a tendency to snap back, like a rubber band. Be constantly aware of the condition of wire rope, which is used to hoist drill pipe or other heavy object. Wire rope used for such purposes which has begun to fray or unravel, or which has a number of breaks in the same strand, should be removed from service and replaced by the driller. This also applies to hemp rope, which is used to hoist the hammer during split-spoon sampling.

5.2.8 EQUIPMENT SAFETY INSPECTIONS

Drilling subcontractors are responsible for ensuring rigs are properly inspected. All drilling rigs and related support equipment and vehicles shall be scheduled for a periodic safety inspection. The inspections shall be the responsibility of the owner/operator of the equipment. The inspections shall include, but are not limited to, all hydraulic lines and fittings for wear and damage, all cable systems and pull ropes for damage and proper installation, exhaust systems, brake systems, drill controls, etc. The "kill" switches must be operable from various locations on the rig.

The driller in charge shall inspect the rig on a regular basis covering all major systems. If potentially hazardous deficiencies are found during the inspections, the rig shall be shut down until the deficiencies are corrected and potential hazards are eliminated. If Participants field staff believe that equipment is unsafe, the project shall be stopped until the owner/operator can confirm that the rig is safe to operate. It would be acceptable to ask for proof of inspection for the rig of concern.

5.2.9 GENERAL HOUSEKEEPING

Items such as hand tools, rakes, shovels, etc. shall not be left lying on the ground to pose a trip hazard.

Excess pipe, augers, connections, etc., should be stored in a rack or on the rig and not left lying around the rig. Remove and dispose of empty bags or other containers, which have held drilling mud, cement or other dust producing materials.

5.3 ENCORE/REALM PARTICIPANT SAFETY REQUIREMENTS

5.3.1 BASIC PERSONAL PROTECTIVE EQUIPMENT (PPE)

Certain personal protective equipment (PPE) must be worn because of the physical hazards posed by the drilling operation. As a minimum on Participants field projects, hard hats, steel-toed work shoes, and safety eyewear must be worn at all times within the vicinity of the mast of the drilling rig. Hearing protection devices such as ear plugs and ear muffs shall be worn as required when the noise exposure is 85 dB(A) or greater over an 8-hour workday. Although noise levels vary with the type of drilling equipment utilized, potentially hazardous noise levels are likely to be generated during split-spoon sampling and air drilling. Typically, speech at normal conversational levels becomes difficult at 2 to 3 feet when noise levels are in excess of 85 dB(A). Be aware of client personal protective equipment requirements for subcontractors. Though Participants are not responsible for issuing subcontractor PPE or the use of it, we must be diligent of the facilities requirements and work closely with the drillers to ensure conformance with the site requirements. All protective equipment shall be provided by respective employer(s).

5.3.2 SPECIAL PRECAUTIONS FOR DRILLING IN LANDFILLS

In addition to the usual physical hazards of drilling, employees drilling in landfills may experience an increased hazard from methane gas. Methane, a decomposition product of organic materials is a very flammable gas, which may accumulate in the borehole or in the general work area. To help reduce the hazards due to the presence of methane while drilling in landfills, the following procedures should be implemented:

- No-one shall smoke within 75 feet from the drilling area.
- The drilling rig should be diesel powered and equipped with a spark-arresting muffler.
- All ignition sources shall be placed at least 75 feet from the borehole and, if possible the rig should be located upwind of the borehole.
- Methane concentrations shall be monitored as frequently as possible using a Combustible Gas Indicator (CGI). The frequency of monitoring must be established on the health and safety plan (HASP). The meter should be kept near the rig. Results of the monitoring data should be entered into the field log.
- The General Motors HSOG require that all work stop if gases are detected at 10 percent or greater of the lower explosive limit (LEL) in the hole being drilled. Under such circumstances it may become necessary to inert, ventilate, or flood the borehole with water during drilling to reduce the risk of downhole explosions.

5.3.3 OTHER FIRE AND EXPLOSION HAZARDS

Flammable and/or combustible materials are typically present at drilling sites. These materials include gasoline, diesel fuel, polyethylene, wood, weeds, and others. To help prevent these materials from igniting, Participants employees should first and foremost ensure that all sources of ignition (e.g., matches, lighters, etc.) have been identified and maintained at a safe distance from flammable and combustible materials.

Smoking, open flames or spark-producing equipment are not permitted within 75 feet of drilling rigs, open wells, gasoline-driven pumps, or fuel storage areas. Flammable liquids (includes empty/full cans) shall not be stored or left within 50 feet of drilling rigs, pumps, or other related machinery. A fire extinguisher shall be located on, or within 10 feet, of any operating drilling rig. Equipment engines shall be shut off during fueling. Containers used for fuel shall be bonded and grounded during dispensing to prevent the discharge of static electricity. Safety fuel cans shall be returned to a designated safe storage area after fueling is completed.

5.3.4 SPECIAL PRECAUTIONS FOR DRILLING IN CONTAMINATED SOILS

A Site-specific Health and Safety Plan must be developed for all drilling operations when environmental contamination is reasonably expected. Follow the requirements of the HASP to safely manage exposure to contaminated soils.

All contaminated equipment shall be properly decontaminated prior to leaving the general location of the drilling activities. Subcontractors are expected to ensure that there will be no cross-contamination of the property and other off-site locations as a result of the sampling event.

5.3.5 LIGHTING

Lighting around a drilling operation should be sufficient to provide illumination at all times of at least:

- An average of 5-foot candle (fc) power in the immediate drilling area, with no less than 3 fc power at any point.
- A minimum of 3 fc power on all other walking and working surfaces.

Note The above are minimum OSHA requirements. Many circumstances, including weather, may warrant higher lighting values.

5.3.6 TRAINING

Employees working in the proximity of an operating drilling rig and the support equipment required to complete wells shall be thoroughly familiar with the operational hazards involved. The GZA employees shall have read and agreed with the provisions of the HASP by signing. Drilling subcontractors shall have the same level of training and a HASP when required. Heavy equipment operators in most states must be certified or licensed, if at any time there may be a question about competency in regards to safe operations, the Project Manager, should request training records.

5.3.7 PERSONAL HYGIENE REQUIREMENTS

To help limit the potential for ingestion of contaminants, eating, drinking, chewing, or smoking is not allowed when working in the immediate vicinity of the drilling rig or in any restricted work areas (i.e., exclusion and decontamination zones). A break area outside the restricted work areas shall be established with a hand and face washing facility. Before eating, drinking, or smoking, all employees shall thoroughly wash their hands and face. Potable water and soap shall be supplied for this purpose.

5.3.8 PRECAUTIONS DURING DRILLING

All employees who will work in the vicinity of the drilling rig should secure all loose clothing to prevent them from becoming caught in the drilling mechanism. If at all possible avoid the immediate work area. Do not attempt to operate or handle the subcontractor's equipment. The Participant employees should become familiar with emergency shutoff of the equipment in the event activation is required.

6.0 RESPONSIBILITIES

6.1 PARTICIPANT PROJECT MANAGER

The GZA Project Manager (PM) or designee is responsible for:

- Assuring that all provisions specified in this HSOG are followed by GZA employees and that the drilling subcontractor understand the provisions of the HSOG.
- Assuring that a HASP is developed for the project if it involves drilling in potentially contaminated soils or significant safety hazards.

- Assuring that GZA employees do not operate or handle the drilling subcontractor's equipment and that they remain clear of the drilling rig when their presence is not necessary.
- Assuring that all required personal protective equipment, for example hard hats, steel-toed shoes, and/or safety glasses, are worn within the restricted work areas during the drilling operation. Hearing protection may be required in some instances.
- Confirming that the utility owner and/or property owner has located overhead and underground utilities/hazards.

6.2 DRILLING SUBCONTRACTOR

The drilling subcontractor is responsible for:

- Identifying overhead and underground utilities/hazards prior to the start of drilling activities and, if necessary, arranging to have electrical lines de-energized prior to the start of drilling.
- Safely operating the drilling rig and handling all equipment associated with the drilling operation.
- Maintaining the drilling rig and equipment in accordance with standard industry practices and safety standards.
- Limiting contamination to the area of concern.
- Responding to the Participants employee (or site safety officer) requests to correct deficiencies related to unsafe conditions or practices in the workplace.

6.3 EMPLOYEES (INCLUDING SITE SAFETY OFFICER)

On-site Participant employees are responsible for:

- Complying with the provisions of this HSOG.
- Working in a safe manner.
- Notifying subcontractors/contractors of potentially unsafe conditions.
- Notifying the GZA PM of any unsafe acts or conditions in the workplace.
- Notifying the PM of any work-related injuries or illnesses that incur during work at the site.

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APPENDIX 3.1-A CERTIFICATE OF CONTAMINATION

REMEDATION SECTION	HSOG 3.1: DECONTAMINATION
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1.0 INTRODUCTION

1.1 SCOPE

Personal protective equipment (PPE) and monitoring equipment must either be decontaminated or properly discarded upon exiting from the exclusion zone. This practice prevents cross-contamination to clean areas. All GZA employees must enter and exit the exclusion zone through the contaminant reduction zone and decontamination area. The configuration of these zones will vary from site to site and will be defined in the site-specific Health and Safety Plan (HASP).

2.0 DECONTAMINATION METHODS

Decontamination methods shall involve physically removing contaminants, neutralizing contaminants, or removing contaminants through a combination of both physical and chemical means. The types, locations, physical states, and concentrations of contamination present will determine the appropriate method of decontamination.

2.1 PROCEDURES

This Health and Safety Operating Guideline (HSOG) contains personnel decontamination procedures for Levels A, B, C, and D. The site Health and Safety Officer (HSO) is responsible to monitor these procedures and may modify them to suit the site conditions and specific levels in use. General standard operating procedures to be followed are:

- minimize contact with contaminants in order to minimize the need for extensive decontamination;
- gloves, boot covers, and disposable outer clothing shall be rolled down with the insides out;
- sampling/monitoring equipment, when feasible, shall be enclosed in plastic bags to prevent cross-contamination; and
- decontamination solutions of soap and water or trisodium phosphate (TSP) detergent and water shall be used as a minimum requirement.

2.2 EQUIPMENT DECONTAMINATION

Monitoring equipment will be decontaminated before leaving the site by wiping with a damp cloth or by removing and properly disposing of a protective covering. Construction equipment will typically be manually scraped then steam cleaned or pressure washed. The HSO is responsible to verify that this has been done satisfactorily. A certificate of decontamination (Appendix 3.1-A) will be completed and signed

3.0 WASTE DISPOSAL

GZA project management will determine a disposal method based on an approval plan for each specific site.

3.1 MANAGEMENT AND DISPOSAL OF DECONTAMINATION SOLUTIONS

Decontamination solutions must be treated or properly disposed of. In determining if a particular management disposal option is appropriate, the following should be considered:

- the contaminants, their concentrations, and the total volume of decontamination solution;
- media potentially affected (e.g., groundwater, soil) under management options;
- location of the nearest population(s) and the likelihood and/or degree of site access;
- potential exposure to workers; and
- potential for environmental impacts.

All wastes belong to clients and are to be left on site. GZA will notify the client what has been left on site and offer to help in arranging proper disposal/treatment.

4.0 SHOWERS AND CHANGE ROOMS

Showers and/or change rooms may be provided for GZA employees when the duration of project activities extends for a long period of time or will be provided when site conditions warrant the need for a separate change area. Showering requirements vary from site to site and are defined in the site-specific HASP based on site-specific conditions. Showering requirements vary from site to site and are defined in the site-specific HASP based on site-specific conditions and the potential for exposure.

5.0 DECONTAMINATION LEVELS

5.1 LEVEL A - ROUTINE DECONTAMINATION

Step 1 - Segregated Equipment Drop

- Deposit equipment used on site (tools, sampling devices and containers, monitoring equipment, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross-contamination.

Step 2 - Boot Cover and Glove Wash

- Scrub outer boot covers and gloves with decontamination solution or detergent/water.

Step 3 - Boot Cover and Glove Rinse

- Rinse off decontamination solution from Step 2 using copious amounts of water.
- Repeat as many times as necessary.

Step 4 - Tape Removal

- Remove tape around boots and gloves and deposit in container with plastic liner.

Step 5 - Boot Cover Removal

- Remove boot covers and deposit in container with plastic liner.

Step 6 - Outer Glove Removal

- Remove outer gloves and deposit in container with plastic liner.

Step 7 - Suit/Safety Boot Wash

- Thoroughly wash fully encapsulating suit and boots. Scrub suit and boots with long-handle, soft-bristle scrub brush, and copious amounts of decontamination solution or detergent/water. Repeat as many times as necessary.

Step 8 - Suit/Safety Boot Rinse

- Rinse off decontamination solution or detergent/water using copious amounts of water. Repeat as many times as necessary.

Step 9 - Tank Change

- If worker leaves the exclusion zone to change air tank, this is the last step in the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boot covers donned, and joints taped. Worker then returns to duty.

Step 10 - Safety Boot Removal

- Remove safety boots and deposit in container with plastic liner.

Step 11 - Fully Encapsulating Suit and Hard Hat Removal

- With assistance of helper, remove fully encapsulating suit (and hard hat). Hang suits on rack or lay out on drop cloths.

Step 12 - SCBA Backpack Removal

- While still wearing facepiece, remove backpack and place on table. Disconnect hose from regulator valve and proceed to next step.

Step 13 - Inner Glove Wash

- Wash with decontamination solution or detergent/water that will not harm skin. Repeat as many times as necessary.

Step 14 - Inner Glove Rinse

- Rinse with water. Repeat as many times as necessary.

Step 15 - Facepiece Removal

- Remove facepiece. Deposit in container with plastic liner. Avoid touching face with fingers.

Step 16 - Inner Glove Removal

- Remove inner gloves and deposit in container with plastic liner.

Step 17 - Inner Clothing Removal

- Remove clothing soaked with perspiration. Place in container with plastic liner. Inner clothing should be removed as soon as possible since there is a possibility that small amounts of contaminants might have been transferred in removing fully encapsulating suit.

Step 18 - Field Wash

- Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.

Step 19 - Redress

- Put on clean clothes. A dressing trailer is needed in inclement weather.

5.2 LEVEL B - ROUTINE DECONTAMINATION

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from the exclusion zone.

Step 2 - Outer Boot/Glove Wash and Rinse

- Scrub outer boots/gloves with decontamination solution.
- Rinse using water.

Step 3 - Outer Boot/Glove Removal

- Remove outer boots/gloves.
- If outer boots/gloves are disposable, deposit in container with plastic liner.
- If outer boots/gloves are non-disposable, store in a clean, dry location.

Step 4 - Outer Garment Removal

- If using self-contained breathing apparatus (SCBA), remove SCBA backpack and keep the facepiece on until garments are removed. Remove chemical protective outer garments and deposit in appropriate container.

Step 5 - Respiratory Protection Removal

- Remove hard hat and face piece, and place them on a clean surface.
- Wash and rinse face piece.
- Wipe off and store face piece in a clean, dry location.

Step 6 - Inner Glove Removal

- Remove inner gloves.

- Deposit in container for disposal.

Step 7 - Field Wash

- Thoroughly wash hands and face with soap and water.
- Shower as soon as possible.

For Air Tank Exchange Only, Complete the Following Steps:

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from the exclusion zone.

Step 2 - Glove Removal

- Remove gloves.
- If gloves are disposable, deposit in container with plastic liner
- If gloves are non-disposable, store in a clean, dry location.

Step 3 - Tank Change

- Exchange air tank.
- Don new gloves.
- Tape joints and return to the exclusion zone.

5.3 LEVEL C - ROUTINE DECONTAMINATION

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from the exclusion zone.

Step 2 - Outer Boot/Glove Wash and Rinse

- Scrub outer boots/gloves and/or splash suit with decontamination solution.
- Rinse using water.

Step 3 - Outer Boot/Glove Removal

- Remove outer boots/gloves.
- If outer boots/gloves are disposable, deposit in container with plastic liner.
- If outer boots/gloves are non-disposable, store in a clean, dry place.

Step 4 - Outer Garment Removal

- Remove chemical protective outer garments and deposit in appropriate container.

Step 5 - Respiratory Protection Removal

- Remove hard hat and respirator and deposit on a clean surface.
- Discard respirator cartridges in appropriate container.
- Wash and rinse respirator.
- Wipe off and store respirator in a clean, dry location.

Step 6 - Inner Glove Removal

- Remove inner gloves.
- Deposit in container for disposal.

Step 7 - Field Wash

- Thoroughly wash hands and face with soap and water.
- Shower as soon as possible.

For Cartridge Exchange Only, Complete the Following Steps:

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from the exclusion zone.

Step 2 - Glove Wash and Rinse

- Scrub gloves and/or splash suit with decontamination solution.
- Rinse using water.

Step 3 - Glove Removal

- Remove gloves.
- If gloves are disposable, deposit in container with plastic liner.
- If gloves are non-disposable, store in a clean, dry place.

Step 4 - Respirator Cartridge Change

- Exchange respirator cartridges.
- Don new outer boots/gloves.
- Tape joints and return to the exclusion zone.

5.4 LEVEL D - MODIFIED ROUTINE DECONTAMINATION

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from the exclusion zone.

Step 2 - Outer Boot/Glove Wash and Rinse

(Optional, include if necessary for gross decontamination).

- Scrub outer boots/gloves and/or splash suit with decontamination solution.
- Rinse using water.

Step 3 - Outer Boot/Glove Removal

- Remove outer boots/gloves.
- If outer boots/gloves are disposable, deposit in container with plastic liner.
- If outer boots/gloves are non-disposable, store in a clean, dry place.

Step 4 - Outer Garment Removal

- Remove chemical protective outer garments and deposit in an appropriate container.
- Remove hard hat and safety glasses. Decontaminate as necessary. Deposit on a clean surface.

Step 5 - Inner Glove Removal

- Remove inner gloves.
- Deposit in a container for disposal.

Step 6 - Field Wash

- Thoroughly wash hands and face with soap and water.
- Shower as soon as possible.

Certificate of Decontamination

EQUIPMENT:

EQUIPMENT NUMBER:

DATE DECONTAMINATED:

PROCEDURE USED:

(Site Safety Officer)

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APPENDIX 3.2.A ACCIDENT/INCIDENT REPORTING FORM

REMEDATION SECTION	HSOG 3.2:	FIRST AID
WORLDWIDE FACILITIES GROUP	EFFECTIVE DATE:	NOVEMBER 20, 2001
GENERAL MOTORS LLC		
REVISION NO.: 1	REVISION DATE:	MARCH 31, 2003

1.0 INTRODUCTION

GZA employees are not required to render first aid as a requirement of their job. First aid is given on a voluntary basis and only by those who are trained and hold a current certification from the Red Cross or other certifying body. These general guidelines are for reference use and do not cover all situations possibly encountered in the field. Any serious first aid case must be referred to the local emergency medical center.

All GZA employee injuries must be reported to GZA's Manager of Health and Safety and/or a designated representative as soon as possible. The attached accident form (Appendix 3.2.A) must also be completed and faxed in to the main office(s).

2.0 GENERAL SEQUENCE FOR TREATMENT OF EXPOSURES TO UNKNOWN CHEMICALS

- Call for help.
- Assess the situation.
- Quickly protect yourself from exposure before attempting to rescue the victim.
- Decontaminate the victim and terminate exposure.
- Treat cessation of breathing first.
- If the heart is not beating, perform CPR.
- Treat eye injuries next.
- Treat skin contact.
- Treat shock.

2.1 PRELIMINARY ASSESSMENT

- Make a quick assessment of the likely routes of exposure by examining the eyes, mouth, nose, and skin of the victim for signs of the chemical itself or damage it has caused such as swelling, redness, bleeding, burns, discharge of fluid or mucous, or pallor.

- Drooling, difficult swallowing, a distended and painful or hard, rigid abdomen all indicate possible ingestion of a corrosive or caustic substance.
- If respiration is rapid, shallow, noisy, or labored, suspect inhalation.
- If the face has been splashed with chemical, eye contact is likely.

2.2 POISONING BY INHALATION

- Call for help.
- Assess the situation.
- Remove the victim from exposure while protecting yourself from exposure.
- If breathing has stopped, administer artificial respiration using a bag-valve mask. **DO NOT** use mouth-to-mouth respiration if the nature of the chemical exposure is unknown. If a bag-valve mask is not available, use the chest pressure-arm lift technique.
- Maintain an open airway.
- Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.

2.3 POISONING BY INGESTION

- Call for help.
- Assess the situation.
- Remove the victim from exposure while protecting yourself from exposure.
- Call a poison control center, emergency room, or physician for advice. (Emergency facility must be forewarned of activities and potential hazards before commencing site activities.)
- Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.
- Consult the MSDS to determine whether to offer victim water to drink or to induce vomiting and by what means.
- If the victim is conscious:
 - Have the victim rinse out mouth with water.
 - Give the victim one or two cups of water or milk to drink as per MSDS or advised by a physician or poison control center. If the victim becomes nauseated or can not swallow, **STOP**.

- **DO NOT** induce vomiting if the victim has abdominal pain, a distended abdomen or a rigid, hard abdomen.
- **DO NOT** induce vomiting if the victim has burns in or around the mouth or if the victim can not swallow.
- If there are no signs of burns, swallowing difficulty or abdominal problems **and** if so advised by a physician or poison control center:
 - Induce vomiting. Follow with at least one cup of water. **DO NOT** use milk. If you do not have syrup of ipecac, induce vomiting by asking the victim to touch the back of the throat with a finger, spoon handle, or blunt instrument.
 - Have the victim sit up or lean forward while vomiting.
 - Save the vomitus and give it to the emergency medical service personnel to take to the medical facility for analysis.
 - Give the victim one to two cups of water to drink after vomiting has ceased.
 - Keep talking to the victim to prevent sleepiness.
- If the victim is unconscious:
 - Lay the victim down on the victim's side.
 - Maintain an open airway.
 - Arrange for transport to the nearest medical facility.
 - Stand by to administer artificial respiration and CPR if needed. Be sure to wipe or rinse all traces of chemical from in and around the victim's mouth before giving artificial respiration. **DO NOT** use mouth-to-mouth respiration if the nature of the chemical exposure is unknown. Alternatively, use a bag-valve mask.
 - If the victim vomits, save the vomitus and send it to the medical facility for analysis.
 - If the victim shows signs of shock (a weak, rapid pulse; pale clammy skin; cold hands and feet), rotate the victim to his back, elevate the victim's feet 8 to 12 inches, and cover the victim with a blanket.
 - **DO NOT** give an unconscious person anything to drink.
 - **DO NOT** give someone who is convulsing anything to drink.

2.4 **POISONING BY SKIN CONTACT**

- Call for help.
- Assess the situation.
- Remove the victim from the exposure while protecting yourself from exposure.

- Remove the victim's clothing, shoes, and jewelry from the affected areas, cutting them off if necessary. Do this under a shower or while flushing with water. Continue to flush with water until all trace of the chemical is gone and any slippery feeling has disappeared also. Rinse for at least 15 minutes.
- Cover the victim with a blanket or dry clothing.
- Notify a physician, emergency room, or poison control center of the accident and obtain advice.
- In case of inflammation, burns, blisters, or pain:
 - Loosely apply a dry sterile dressing, if available, or use a clean dry cloth.
 - Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.
- If the victim is in a state of shock:
 - Lay the victim down on the victim's side and cover the victim with a blanket.
 - Elevate the victim's feet 8 to 12 inches.
 - Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.
 - **DO NOT** break open blisters or remove skin. If clothing is stuck to the skin after flushing with water, do not remove it.
 - **DO NOT** rub or apply pressure to the affected area.
 - **DO NOT** apply any oily substance to the affected skin.
 - **DO NOT** use hot water.

2.5 POISONING BY EYE CONTACT

- Act quickly. Seconds count.
- Assess the situation.
- Remove the victim from the exposure while protecting yourself from exposure.
- Flush the victim's eye(s) with clean tepid water for at least 15 minutes.
- Have the victim lie or sit down and tilt head back.
- Hold eyelid(s) open and pour water slowly over the eyeball(s) starting at the inner corners by the nose and letting the water run out of the outer corners. The victim may be in great pain and want to keep eyes closed or rub them but you must rinse the chemical out of the eye(s) in order to prevent possible permanent damage.
- Ask the victim to look up, downward, and side to side as you rinse.

- Call an emergency medical service and arrange for transport to the nearest facility for examination and treatment as soon as possible. Even if there is no pain and vision is good, a physician should examine the eye(s) since delayed damage may occur.
- If the eye(s) is painful:
 - Cover loosely with gauze or a clean, dry cloth.
 - Maintain verbal and physical contact with the victim.

ACCIDENT/INCIDENT REPORTING FORM

The information collected by this form will be an aid to improving our internal Accident Prevention Programs and for WCB purposes.

For an accident, fill in all boxes; For an incident, fill in shaded areas only!!

An accident is defined as a situation that results in property damage and/or personal injury.

An incident is defined as a situation that COULD HAVE resulted in property damage and/or personal injury.

Attach additional sheets as required.

A. Employee Identification

Employee #	Last Name	First Name	Middle Name/Initial
Area Code ()	Telephone Number		

B. Details of Accident/Incident

Date and Hour of Accident/Incident Day Month Year a.m. p.m.	Date and Hour Reported to Employer Day Month Year a.m. p.m.	Date and Hour Last Worked Day Month Year a.m. p.m.	Normal Work Hours on Last Day Worked from to
Date and Hour Returned to Work Day Month Year a.m. p.m.	If a Motor Vehicle Accident, Driver's License Number		Province/State Where License Issued
1. What happened to cause the injury/disease? Describe injury, part of body involved, and specify left or right side.			
2. Give exact location, include address, of the accident/incident. Describe accident/incident scene, provide diagram on reverse, include location of all workers.			
3. Who was the injury/disease reported to? If injury/disease was not reported immediately, provide reason for delay.			
4. Describe the employee's activities at the time of the accident/incident. Include details of equip./materials used and size and weights of objects being handled.			
5. Object or Substance that directly injured employee, e.g., the machine employee struck against or which struck him/her; the vapor or poison inhaled or swallowed, the chemical that irritated his/her skin. In cases of stains, the thing (s)he was lifting, pulling, etc.			
6. Is there anyone else who may have witnessed or who may know about the injury/onset of the disease? If so, provide details below. Name(s) Addresses and phone number(s) if not GZA employees			

OVER

C. Health Care

Treatment ("X" all that apply)

<input type="checkbox"/> First Aid	Name of Provider (First, Mi, Last)	What type of First Aid was Administered?	
<input type="checkbox"/> Hospital	Name, Address (Street, City, Province/State & Postal/Zip Code)	Treatment	Length of Stay
<input type="checkbox"/> Physician	Name, Address (Street, City, Province/State & Postal Zip Code), Phone #	Treatment	Specialty

D. Property Damage

Identify Property Damaged (include owner of property, nature, and source of damage, model and serial number if appropriate)	Approximate Cost of Damage
---	----------------------------

E. Project Information (Project Related Incidents Only)

Project #	Project Manager	Resident Engineer	Site Telephone Number ()	Client advised, if so who
Were Safeguards or a HASP provided <input type="checkbox"/> Yes <input type="checkbox"/> No		Description of Safeguards, HASP and relationship with accident/incident. Include whether the safeguards or the HASP were in use.		

F. Follow-Up

Describe the obvious causes of the accident/incident	Had training or instruction been given relating to the accident or incident. If so, describe.
Indicate any actions or measures that could prevent this type of accident/incident from occurring in the future.	

G. Administration

Report Date Day Month Year	Report Prepared by: (please print)	Report Prepared by: (signature)
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Accident/Incident Diagram. If insufficient space, attach separate page.

Fax, then mail to GZA Manager of Health and Safety, immediately upon completion.

Fax #: GZA Office - (781) 278-5701

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1.0 INTRODUCTION

All GZA employees with 40-hour training participate in a medical surveillance program that meets the requirements of 29 CFR 1910.120(f). Employees are provided with a confidential medical exam and receive feedback from the examining physician. The physician's written opinion is kept on file with GZA's Manager of Health and Safety in Norwood, Massachusetts for GZA employees. This documentation is available to an employee upon request.

All GZA employees involved in field activities have been trained in the recognition of signs and symptoms that might indicate over-exposure to physical or chemical hazards during their initial 40-hour training, during annual 8-hour refresher training, and at site-specific locations, as necessary.

2.0 BASELINE (NEW HIRE) MEDICAL SURVEILLANCE

Baseline medical evaluations are provided to all employees without cost at the time of their 40-hour training or prior to working on sites which require pre-entry medical exams. The baseline evaluation includes a medical and work history with special emphasis on symptoms related to the handling of hazardous substances and health hazards. Special emphasis is placed on fitness for duty, including the ability to wear any required personal protective equipment under conditions that may be expected at a work site. The baseline medical surveillance exam may consist of: medical history; vital signs; vision screening; hands on exam; blood profile including complete blood count and blood chemistry; urinalysis with a microbiological screen; pulmonary function testing consisting of FVC, FEV, FEV1, and resting EKG if deemed necessary by the attending physician; two-view chest x-ray; and audiometry. Tetanus and Hepatitis shots may be given if needed. All results are reviewed by a GZA contracted physician or physicians group.

3.0 PERIODIC MEDICAL SURVEILLANCE

Periodic medical surveillance is conducted annually for all employees who may be requested to conduct frequent field activities. Employees who do not work in the field on

a regular basis and are not exposed above published action levels for 30 or more days per year, e.g., project managers, coordinators, shareholders, and senior engineers will be placed on a biennial physical exam program unless deemed otherwise by the physician or corporate industrial hygiene manager. The same testing protocol should be used as the baseline at the attending physician's discretion.

4.0 SITE-SPECIFIC MEDICAL MONITORING

In the event that GZA employees will be working on a site that has specific medical monitoring requirements not found in the annual or baseline testing (i.e., polychlorinated biphenyl (PCB), lead, or pesticide monitoring), these medical evaluations will be performed on an individual basis to be determined by the attending physician. If the physician determines that the medical evaluation frequency or exam parameters should be changed, these changes will be effective immediately.

5.0 EXPOSURE/INJURY/MEDICAL SUPPORT

In the event that an employee has possibly been overexposed to hazardous substances or health hazards above the permissible exposure level (PEL) or threshold limit value (TLV), or has been injured or developed signs or symptoms indicating possible overexposure, an additional medical evaluation will be performed as soon as possible. The context of this exam will be determined by the attending physician who will be advised of the possible exposure.

6.0 TERMINATION MEDICAL EVALUATION

Upon termination of employment with GZA, or upon reassignment to work within the company that does not involve working on or near hazardous substances, a medical evaluation will be offered to the employee if one has not been completed within the past 6 months. This exam is similar to the baseline surveillance exam with other parameters the physician deems necessary.

A termination medical evaluation will be completed if the employee is available (i.e., does not disappear) and is agreed to by employee (i.e., employee can refuse evaluation).

7.0 INFORMATION PROVIDED TO THE PHYSICIAN

GZA has provided Occupational Medicine Consultants with a copy of the Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) and its appendices. Job descriptions for GZA employees, measured and anticipated exposure levels, personal protective equipment used, and information from previous medical examinations are provided as necessary.

8.0 RECORDKEEPING

GZA receives a written statement for all medical evaluations from the examining physician, documenting that the employee is qualified to work on or near hazardous waste operations and to wear respiratory protection. The employee receives a confidential letter from the physician and test results if requested. All medical records are confidentially maintained at the offices of the attending physician and are made available to employees or their designee upon written request. The physician's written opinion indicating an employee's suitability to work in hazardous waste operations and their physical ability to wear respiratory protection is maintained by GZA's Manager of Health and Safety at GZA's Norwood, Massachusetts offices.

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REMEDATION SECTION	HSOG 3.5: PERSONAL PROTECTIVE EQUIPMENT PROGRAM
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1.0 INTRODUCTION

The objective of the personal protective equipment (PPE) program is to protect GZA employees from the risk of injury by creating a barrier against workplace hazards. Personal protective equipment is not a substitute for good engineering or administrative controls or good work practices, but should be used in conjunction with these controls to ensure the safety and health of employees. Personal protective equipment will be provided, used, and maintained when it has been determined that its use is required and that such use will lessen the likelihood of occupational injury and/or illness.

This program addresses eye, face, head, foot, and hand protection. A separate program exists for respiratory protection since the need for participation in that program is established through industrial hygiene monitoring and has its own complex set of rules.

The GZA PPE includes:

- responsibilities of Health and Safety Officer (HSO), project managers, employees, and GZA's Health and Safety Coordinator (HSCo);
- hazard assessment and PPE selection;
- employee training; and
- recordkeeping requirements.

2.0 RESPONSIBILITIES

2.1 HEALTH AND SAFETY OFFICER (HSO)

HSOs and Project Managers have the primary responsibility for implementation of the PPE program in their work area and on their sites. This involves:

- providing appropriate PPE and making it available to employees;
- ensuring employees are trained on the proper use, care, and cleaning of PPE;
- supervising staff to ensure that the PPE Program elements are followed and that employees properly use and care for PPE;

- seeking assistance from GZA's HSCo or a designated representative to evaluate hazards;
- notifying GZA's HSCo when new hazards are introduced or when processes are added or changed which may have a bearing on PPE usage; and
- ensuring defective or damaged equipment is immediately replaced.

2.2 EMPLOYEES

The PPE user is responsible for following the requirements of the PPE program. This involves:

- wearing the correct PPE, as required;
- attending required training sessions;
- caring for, cleaning, and maintaining PPE, as required; and
- informing the supervisor, HSO, or GZA's HSCo of the need to repair or replace PPE.

2.3 INDUSTRIAL HYGIENE AND SAFETY GROUP

The Participant's HSO is responsible for the development, implementation, and administration of the PPE program. This involves:

- conducting workplace hazard assessments to determine the presence of hazards which necessitate the use of PPE;
- review and approval of Health and Safety Plans (HASPs) which define PPE field usage requirements;
- conducting periodic workplace reassessments as requested and/or as determined by General Motors HSCo;
- maintaining records on hazard assessments, where appropriate;
- providing training and technical assistance to supervisors on the proper use, care, and cleaning of approved PPE;
- providing for the selection and procurement of approved PPE;
- periodically reevaluating the suitability of previously selected PPE; and
- reviewing, updating, and evaluating the overall effectiveness of the PPE program.

3.0 PROGRAM COMPONENTS

3.1 HAZARD ASSESSMENT AND EQUIPMENT SELECTION

OSHA/OHSA requires employers to conduct inspections of all workplaces to determine the need for PPE and to help in selecting the proper PPE for each task performed. For each work site, a HASP must be completed which lists the specific protective equipment needed. These duties will be distributed between the GZA's HSO and supervisors/project managers.

For fixed work sites without HASPs, such as laboratories and some treatment plants, GZA's HSO, in conjunction with supervisors/project managers, will conduct a walk-through survey of each work area, as necessary, to identify sources of hazards, including impact, penetration, compression, chemical, heat, dust, electrical sources, material handling, and light radiation. Each survey will be documented using the Hazard Assessment Certification Form (Appendix A), which identifies the workplace surveyed, the person conducting the survey, findings of potential hazards, and date of the survey.

Once the hazards of a workplace have been identified, GZA's HSO will determine the suitability of the PPE presently available and, as necessary, select new or additional equipment which ensures a level of protection greater than the minimum required to protect the employees from the hazards. Care will be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards will be provided or recommended for purchase.

3.2 WORK TASK DURATION

In selecting PPE, the estimated duration of job tasks and project duration must be considered. Protective equipment should be chosen which will provide protection for a full work shift or for the duration of the task to be accomplished. If site conditions are such that protective equipment cannot provide adequate protection for the duration of the task, several factors should be considered to determine appropriate work task duration, including:

- clothing/glove permeation and penetration rates for chemicals;
- respirator/filter cartridge capacity and breakthrough times;
- ambient temperature and weather conditions; and
- integrity of the Tyvek, boot covers, and gloves.

These factors are incorporated into the selection of PPE and will be addressed as appropriate in a site HASP. In addition, as soon as the integrity of any PPE is compromised, the work task shall stop until the PPE can be replaced.

3.3 MAINTENANCE AND STORAGE

Non-disposable protective equipment such as hard hats, boots, safety glasses and respirators will be decontaminated daily or more frequently if necessary and stored in an appropriate clean area. Most disposable clothing is to be discarded at the end of the work shift or more frequently as necessary. If, after inspection and decontamination, it has been determined that reusable PPE is damaged, it will be disposed of promptly. Disposal methods will be specified in the site HASP as methods vary from site to site.

3.4 DRESSING/REMOVAL PROCEDURES FOR PPE

Clothing required for protection from exposure to hazardous substances will be put on at the site before entry into the exclusion zone. If protective outer garments are necessary, the suit will be put on first, followed by boots, boot covers, and gloves. Hems on the legs of protective clothing shall be worn outside of chemical resistant boots and taped with duct tape at the ankle. If boot covers are used, the hems shall be tucked into the boot cover and taped below the knee. Hems on the sleeves of protective clothing should be worn outside of gloves and taped at the wrist, if necessary. Respirators will be donned following the guidelines in the respirator HSOG.

GZA employees leaving the exclusion zone will remove and decontaminate their equipment and protective clothing at designated decontamination zones as described in the site HASP.

3.5 PPE INSPECTION

GZA employees are required to periodically check the integrity of PPE through self inspection, both before and during use. The frequency and degree of inspection depends on the specific article and its frequency of use. A primary inspection will be done by the user before each use. Inspections must be performed in accordance with the manufacturer's recommendations. Inspection guidelines are presented in the following sections.

Protective Clothing Inspection

- Visually inspect for tears, non-uniform coatings, imperfect seams, malfunctioning closures.
- Hold up to the light to check for pinholes.
- Flex product to check for cracks and deterioration.

In-Use Inspection

PPE should be periodically inspected for signs of ripping/tearing or heavy contamination of PPE. In the event of torn/ripped or heavily contaminated PPE, GZA employees must proceed immediately to the decontamination zone to remove and replace the PPE.

3.6 PPE LIMITATIONS

Selection of chemical-resistant clothing should be performed by personnel trained in evaluation of the clothing and its limitations. Consideration of the following factors and limitations is generally considered in the selection of PPE described in site HASPs.

- Not all materials protect against all chemicals and chemical combinations, and not all materials provide a barrier for prolonged exposure periods. Since most contaminated soils/water are mixtures of hazardous substances, there is limited permeation data available for those mixtures. Selection should be made for clothing offering the widest range of protection against the chemicals expected to be on site.
- Protective clothing is generally nonporous and is designed to prevent skin exposure to hazardous substances. Consequently, the nonporous nature does not allow for sufficient cooling of the body through sweating and other heat release functions. Temperature extremes will be considered in the site HASP when selection of PPE is made, and suggestions will be made on duration of use of PPE, and recommended break schedule as appropriate to weather conditions.
- In cold weather, the polymer coating on some disposable clothing may become inflexible and tear more easily.

Other limitations to consider are:

- The ability of material to withstand the physical stress of the task (e.g., boot covers torn by walking on sharp objects).

- The degree to which protective clothing may interfere with a worker's ability to perform tasks (e.g., full facepiece respirator interferes with ability to read, heavy gloves reducing note-taking ability).

4.0 PROTECTIVE DEVICES

All personal protective clothing and equipment will be of safe design and construction for the work to be performed and shall be maintained in a sanitary and reliable condition or disposed of. Only those items of protective clothing and equipment that meet NIOSH or ANSI (American National Standards Institute) standards will be procured or accepted for use. Newly purchased PPE must conform to the updated ANSI standards, which have been incorporated into the OSHA/OHSA PPE regulations, as follows:

- Eye and Face Protection - ANSI Z87.1-1989.
- Head Protection - ANSI Z89.1-1986.
- Foot Protection - ANSI Z41.1-1991.
- Hand Protection - There are no ANSI standards for gloves, however, selection must be based on the performance characteristics of the glove in relation to the tasks to be performed.

Careful consideration will be given to comfort and fit of PPE in order to ensure that it will be used. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected. Appendix 3.5.B presents general guidelines for choosing PPE.

4.1 EYE AND FACE PROTECTION

Prevention of eye injuries requires that all persons who may be in eye hazard areas wear protective eyewear. This includes employees, visitors, researchers, contractors, or others passing through an identified eye hazard area. To provide protection for these personnel, supervisors of such areas shall procure a sufficient quantity of goggles and/or plastic eye protectors which afford the maximum amount of protection possible. If these personnel wear personal glasses, they shall be provided with a suitable eye protector to wear over them.

Suitable protectors shall be used when employees are exposed to hazards from flying particles, molten metal, acids or caustic liquids, chemical liquids, gases, or vapors, bioaerosols, or potentially injurious light radiation.

Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. Generally, contact lenses are banned whenever chemicals are involved.

Side shields for safety glasses are mandatory.

Goggles and face shields shall be used when there is a hazard from chemical splash.

Face shields shall only be worn over primary eye protection (safety glasses or goggles).

For employees who wear prescription lenses, eye protectors shall either incorporate the prescription in the design or fit properly over the prescription lenses.

Respirator prescription inserts shall be of a proper design and not interfere with the seal of the respirator.

Protectors shall be marked to identify the manufacturer.

Equipment fitted with appropriate filter lenses shall be used to protect against light radiation. Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.

4.1.1 PRESCRIPTION SAFETY EYEWEAR

Regulations require that each affected employee who wears prescription lenses while engaged in operations that involve eye hazards shall wear eye protection that incorporates the prescription in its design, or shall wear eye protection that can be worn over the prescription lenses (goggles, faceshields) without disturbing the proper position of the prescription lenses or the protective lenses. Personnel requiring prescription safety glasses must contact the Participant's HSO to have their request for prescription safety glasses processed.

4.1.2 EMERGENCY EYEWASH FACILITIES

Emergency eyewash facilities meeting the requirements of ANSI Z358.1 will be provided in all work areas. This includes laboratories, construction sites and treatment plants. All such emergency facilities will be located where they are easily accessible in an emergency. Eyewash facilities will be inspected frequently by location or site personnel to verify the availability and working condition.

4.2 HEAD PROTECTION

Head protection will be furnished to, and used by, all employees and contractors engaged in construction and other miscellaneous work where an overhead hazard exists or may exist. Head protection is also required to be worn by engineers, inspectors, and visitors at construction sites when hazards from falling or fixed objects, or electrical shock are present.

4.3 FOOT PROTECTION

Safety shoes shall be worn on all construction sites, in shops, warehouses, and other areas as determined by the Participant's HSO. All safety footwear shall comply with ANSI Z41-1991, "American National Standard for Personal Protection - Protective Footwear."

Safety shoes or boots with impact protection are required to be worn in work areas where carrying or handling materials such as heavy packages, objects, parts, or tools which could be dropped; and for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection are required for work activities involving skid trucks (manual materials handling cars) or other activities in which materials or equipment could potentially roll over an employee's feet. Safety shoes or boots with puncture protection are required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal, etc. could be stepped on by employees causing a foot injury.

Chemical resistive overboots are required on all contaminated sites where leather safety shoes/boots may become contaminated themselves. Overboots may be disposable or capable of being decontaminated. Decontamination should be in accordance with the site HASP prior to removing overboots from the site.

4.4 HAND PROTECTION

Suitable gloves shall be worn when hazards from chemicals, cuts, lacerations, abrasions, punctures, burns, biologicals, and harmful temperature extremes are present. Glove selection shall be based on performance characteristics of the gloves, conditions, duration of use, and hazards present. One type of glove will not work in all situations.

The first consideration in the selection of gloves for use against chemicals is to determine, if possible, the exact nature of the substances to be encountered. Read instructions and warnings on chemical container labels and MSDSs before working with

any chemical. Recommended glove types are often listed in the section for personal protective equipment.

All glove materials are eventually permeated by chemicals. However, they can be used safely for limited time periods if specific use and other characteristics (i.e., thickness and permeation rate and time) are known. the Participant's HSO can assist in determining the specific type of glove material that should be worn for a particular chemical. HASPs must define the type of glove material to be used for site work.

4.5 BODY PROTECTION

4.5.1 COTTON COVERALLS/WORK CLOTHES

Cotton coveralls may be used to protect skin and work clothes from non toxic particulates such as dust, dirt, and mud. Required when activities are restricted to outside of the exclusion zone. Work in an exclusion zone will usually require an upgrade to a different level of protection.

4.5.2 TYVEK¹

Tyvek is a disposable, non-porous material. It may be used to provide protection from toxic particulates such as lead dust and asbestos, and may be used for wind protection in the winter. Required when tasks may involve bodily contact with potentially contaminated materials. This would involve collecting samples and other activities where minor splashing or soiling of clothing is likely.

4.5.3 POLY-COATED TYVEK

Poly-coated Tyvek is a disposable, polyethylene-coated material. It may be used as protection from potential chemical liquid splash. Required when bodily contact may occur with heavily contaminated materials, coal tar contaminated materials or PCB contaminated materials. Also required when the degree of contamination is unknown and activities may encounter bodily contact with these substances or when investigation/remediation activities generates a splash potential.

¹ Tyvek is being used generically to describe disposable, chemical-resistant clothing.

4.5.4 SARANEX TYVEK

Saranex Tyvek is a saran-coated Tyvek material which is impermeable to most chemicals and may be used when a higher level of skin protection than offered by poly-coated Tyvek is required.

4.5.5 ACID SUIT

An acid suit is a PVC-coated polyester that is disposable. It may be used as protection from potential caustic liquid materials. Required when bodily contact may occur with caustic contaminated materials. Also required when the degree of contamination is unknown and activities may encounter bodily contact with these substances or when investigation/remediation activities generates a splash potential.

4.5.6 HOT WORK COVERALLS

Hot work coveralls may be constructed of leather, Nomex, or a heavy cotton material. These types of coveralls are used for hot work such as welding or torching.

5.0 SELECTION OF USE OF PPE IN LABORATORIES

PPE may be required to reduce the risk of exposure of an employee by contact, inhalation or ingestion of an infectious agent, toxic substances, or radioactive materials. For biological agents, the GZA's HSO, in conjunction with the Laboratory Supervisor will determine the Biosafety Level for the laboratory and the appropriate type of PPE required to be worn while working in the laboratory.

5.1 LABORATORY COATS AND GOWNS

The laboratory coat can be used to protect street clothing against biological or chemical spills, as well as to provide some additional body protection. The specific hazard(s) and the degree of protection required must be known before selecting coats for laboratory personnel.

5.2 FOOT PROTECTION

Safety shoes should be worn in any area where there is a significant risk of dropping heavy objects on the foot. For general laboratory use, comfortable shoes such as tennis shoes or nurses shoes are used extensively. Sandals and other types of open-toed shoes

are not permitted in labs using biohazards or chemicals, due to the potential exposure to infectious agents or toxic materials as well as physical injuries associated with the work.

5.3 FACESHIELDS AND EYE PROTECTION

Faceshields and goggles should be worn whenever procedures with a high potential for creating aerosols or accidental splashes are conducted.

5.4 GLOVES

Gloves are worn in laboratories when handling waste materials and when skin contact with toxic substances is unavoidable.

5.5 CLEANING AND MAINTENANCE

It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision. PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection. Personal protective equipment shall not be shared between employees until it has been properly cleaned and sanitized. PPE will be distributed for individual use whenever possible.

It is also important to ensure that contaminated PPE, which cannot be decontaminated, is disposed of in a manner that protects employees from exposure to hazards.

6.0 SELECTION AND USE OF PPE ON CONTAMINATED SITES

Levels of personal protection vary according to the activities being conducted and the hazards that may be encountered on site. PPE selection is made on the basis of site-specific chemical and physical hazards. The USEPA terminology for protective equipment used on site falls into one of the following categories. There are also variations of each category which will be specified under each site-specific HASP.

6.1 LEVEL D

Level D protection shall be worn when a hazardous atmosphere is not present nor is expected to be present based on planned work activities. Level D protection is designed to offer basic skin and body protection. Level D does not provide protection from

inhalation exposure to hazardous substances. Modifications to Level D adjust the level of skin and body protection to the appropriate site conditions.

Required PPE

- Chemical-resistant or leather boots with safety toe and steel shank;
- Short or long sleeved shirt and pants or coveralls; and
- Safety glasses with side shields or splash goggles.

Optional PPE

- Hard hat;
- Face shield; and
- Hearing protection.

6.2 LEVEL C

Level C protection is designed to offer air purifying respiratory protection in addition to body protection. Level C will be used when:

- the types of air contaminants have been identified, an air purifying respirator (APR) that can remove the contaminants is available, the air contaminants have adequate warning properties and the criteria for the use of an APR have been met;
- concentrations of unidentified airborne organic compounds in the breathing zone are greater than background for a period of 15 minutes with a ceiling of 5 ppm above background; or
- concentrations of airborne particulates in the breathing zone (for 15 or more minutes) are greater than established action levels for particulates.

Required PPE

- Chemical-resistant or leather boots with safety toe and steel shank.
- Chemical-resistant clothing.
- Chemical-resistant outer gloves.
- APR with half or full-facepiece and appropriate cartridge.
- Safety glasses with side shields if wearing a half mask respirator.

Optional PPE

- Hard hat.
- Face shield.
- Chemical-resistant inner gloves.
- Disposable boot covers.
- Hearing protection.
- Emergency escape mask.

6.3 LEVEL B

Level B protection is designed to offer enhanced skin protection and supplied air respiratory protection in the form of an SCBA or air line respirator with a 5-minute escape bottle. Level B is used when:

- concentrations of unidentified airborne organic compounds in the breathing zone are greater than 5 ppm for a period of 15 minutes; or
- concentrations of chemicals in the air are immediately dangerous to life and health (IDLH) or above maximum use limits of a full-face APR; or
- oxygen deficient or potentially oxygen deficient atmospheres (less than 19.5% O₂) are possible;
- handling, investigation and/or sampling of unknown drummed waste; or
- confined space entry requires Level B protection.

Required PPE

- Chemical-resistant or leather boots with safety toe and steel shank and overboots.
- Chemical-resistant clothing.
- Chemical-resistant inner gloves.
- Chemical-resistant outer gloves.
- Positive-pressure/pressure-demand SCBA or airline respirator with escape bottle.

Optional PPE

- Hard hat.
- Disposable boot covers.

- Hearing protection.
- Cooling vest.
- Two-way radio.

6.4 LEVEL A

Level A protection is designed to offer the greatest level of skin, respiratory, and eye protection. Level A is used when:

- concentrations of unidentified airborne contamination exceed 500 to 1,000 ppm above background; or
- the materials are an extreme skin adsorption hazard.

Required PPE

- Positive-pressure, full-facepiece, self-contained breathing apparatus.
- Totally encapsulating chemical-protective suit.
- Chemical-resistant outer gloves.
- Chemical-resistant inner gloves.
- Chemical-resistant boots with safety toe and steel shank.
- Chemical-resistant disposable protective suit.

Optional PPE

- Hard hat (under suit).
- Hearing protection.
- Cooling vest.
- Two-way radio.

7.0 TRAINING

Any worker required to wear PPE shall receive training in the proper use and care of PPE. Periodic retraining shall be offered by the GZA's HSO to both the employees and the supervisors, as needed. The training shall include, but not necessarily be limited to, the following subjects:

- when PPE is necessary to be worn;
- what PPE is necessary;
- how to properly don, doff, adjust, and wear PPE;
- the limitations of the PPE; and
- the proper care, maintenance, useful life, and disposal of the PPE.

After the training, the employees shall demonstrate that they understand the components of the PPE Program and how to use PPE properly, or they shall be retrained.

8.0 TRAINING RECORDS

Written records shall be kept of the names of persons trained, the type of training provided, and the dates when training occurred. GZA shall maintain their employees' training records for at least 3 years and maintain the Hazard Assessment Certification Form for each work site evaluated for at least 3 years. HASPs are maintained in specific project files in each office.

9.0 REFERENCES

American National Standards Institute, American National Standard ANSI Z41-1991, "Personnel Protection - Protective Footwear".

American National Standards Institute, American National Standard ANSI Z87.1-1989, "Practice for Occupational and Educational Eye and Face Protection".

American National Standards Institute, American National Standard ANSI Z89.1-1986, "Safety Requirements for Industrial Head Protection".

OSHA Standard 29 CFR 1910.132, "General Requirements".

OSHA Standard 29 CFR 1910.133, "Eye and Face Protection".

OSHA Standard 29 CFR 1910.135, "Head Protection".

OSHA Standard 29 CFR 1910.136, "Occupational Foot Protection".

OSHA Standard 29 CFR 1910.138, "Hand Protection".

APPENDIX 3.5.A

CERTIFIED HAZARD ASSESSMENT AND SELECTION OF PERSONAL PROTECTIVE EQUIPMENT

APPENDIX 3.5.A

CERTIFIED HAZARD ASSESSMENT AND SELECTION OF PERSONAL PROTECTIVE EQUIPMENT

Facility Name:

Location:

Job Task:

I. Overhead Hazards

EXAMPLES

- Suspended hazards that could fall
- Overhead beams or leads that could fall
- Setting tent poles
- Employees working above, could drop objects onto others
- Sharp objects or corners at head level

Head Hazards Identified:

Head Protection Requirements:

Hard Hat:

Yes ☐

No ☒

If Yes, type:

☐☐☐

Type A (impact and penetration resistance, plus low-voltage electrical insulation)

Type B (impact and penetration resistance, plus high-voltage electrical insulation)

Type C (impact and penetration resistance)

II. Eye and Face Hazards

EXAMPLES

- Chemical splashes
- Dust
- Smoke and fumes
- Welding operations
- Debris when tree trimming, chainsaw work
- Splashes of blood or body fluids
- Projectiles; e.g., when mowing

Eye and Face Hazards Identified:

Splashes from contaminated groundwater.

Eye and Face Protection Requirements:

Safety glasses or goggles:

Yes ☒

No ☐

Face Shield:

Yes ☐

No ☒

III. Hand Hazards

EXAMPLES

- Chemical exposures
- Sharp edges, splinters, etc.
- Temperature extremes
- Biological agents
- Abrasion; e.g., concrete work, abrasive blasting
- Sharp tools, machine parts
- Material handling

Hand Hazards Identified:

Potential exposure to contaminated groundwater.

Hand Protection Requirements:

Chemical resistance:

Yes ☒

No ☐

Temperature resistance:

Yes ☐

No ☒

Abrasion resistance:

Yes ☐

No ☒

Biohazard:

Yes ☐

No ☒

☐ Other (explain):

IV. Foot Hazards

EXAMPLES

- Heavy materials handled by employees; e.g., caskets, markers, concrete
- Sharp edges or points (puncture risk)
- Mowing, weed eaters
- Slippery/wet conditions
- Construction/demolition
- Heat/sparks/molten metal

Food Hazards Identified:

Potential for slips, trips and falls while working at the site.

Foot protection requirements:

Toe protection:

Yes ☐

No ☒

Puncture resistance:

Yes ☐

No ☒

Metatarsal protection:

Yes ☐

No ☒

Electrical insulation:

Yes ☐

No ☒

Electrical conductivity:

Yes ☐

No ☒

☐ Other (explain):

V. Other Identified Safety and/or Health Hazards:

Hazard	Recommended Protection
1. Back injuries from lifting/moving	Back belts may be used if desired and trained to do so. Use correct lifting techniques.
2.	
3.	

Respiratory protection and noise exposure are not covered under this assessment.

I certify that the above evaluation was performed to the best of my knowledge and ability, based on the hazards observed from previously performing these activities.

Signature

APPENDIX 3.5.B

GENERAL GUIDELINE FOR CHOOSING PERSONAL PROTECTIVE EQUIPMENT

APPENDIX 3.5.B

GENERAL GUIDELINES FOR CHOOSING PERSONAL PROTECTIVE EQUIPMENT

1. Description and Use of Eye/Face Protectors

Safety Glasses. Protective eyeglasses are made with safety frames, tempered glass or plastic lenses, temples and side shields which provide eye protection from moderate impact and particles encountered in job tasks such as carpentry, woodworking, grinding, scaling, etc. Safety glasses are also available in prescription form for those persons who need corrective lenses.

Single Lens Goggles. Vinyl framed goggles of soft pliable body design provide adequate eye protection from many hazards. These goggles are available with clear or tinted lenses, perforated, port vented, or non-vented frames. Single lens goggles provide similar protection to spectacles and may be worn in combination with spectacles or corrective lenses to insure protection along with proper vision.

Welders/Chippers Goggles. These goggles are available in rigid and soft frames to accommodate single or two eyepiece lenses.

Welders goggles provide protection from sparking, scaling, or splashing metals and harmful light rays. Lenses are impact resistant and are available in graduated shades of filtration.

Chippers/grinders goggles provide eye protection from flying particles. The dual protective eye cups house impact resistant clear lenses with individual cover plates.

Face Shields. These normally consist of an adjustable headgear and face shield of tinted/transparent acetate or polycarbonate materials, or wire screen. Face shields are available in various sizes, tensile strength, impact/heat resistance, and light ray filtering capacity. Face shields will be used in operations when the entire face needs protection and should be worn to protect eyes and face against flying particles, metal sparks, and chemical splash.

Welding Shields. These shield assemblies consist of vulcanized fiber or glass fiber body, a ratchet/button type adjustable headgear or cap attachment and a filter and cover plate holder. These shields will be provided to protect workers' eyes and face from

infrared or radiant light burns, flying sparks, metal spatter, and slag chips encountered during welding, brazing, soldering, resistance welding, bare or shielded electric arc welding, and oxyacetylene welding and cutting operations.

<i>Source</i>	<i>Assessment of Hazard</i>	<i>Protection</i>
Impact - Chipping, grinding, machining, drilling, chiseling, riveting, sanding, etc.	Flying fragments, objects, large chips, particles, sand, dirt, etc.	Spectacles with side protection, goggles, face shields. For severe exposure, use face shield over primary eye protection.
Chemicals - Acid and chemicals handling	Splash Irritating mists	Goggles, eyecup and cover types. For severe exposure, use face shield over primary eye protection. Special-purpose goggles.
Dust - Woodworking, buffing, general dusty conditions	Nuisance dust	Goggles, eyecup and cover types.
Light and/or Radiation Welding - Electric Arc	Optical radiation	Welding helmets or welding shields. Typical shades: 10-14
Welding - Gas	Optical radiation	Welding goggles or welding face shield. Typical shades: gas welding 4-8, cutting 3-6, brazing 3-4
Cutting, Torch Brazing, Torch Soldering	Optical radiation	Spectacles or welding face shield. Typical shades: 1.5-3
Glare	Poor Vision	Spectacles with shaded or special-purpose lenses, as suitable.

2. **Head Protection**

Head injuries are caused by falling or flying objects, or by bumping the head against a fixed object. Head protectors, in the form of protective hats, must resist penetration and absorb the shock of a blow. The shell of the protective hat is hard enough to resist the blow and the headband and crown straps keep the shell away from the wearer's skull. Protective hats can also protect against electrical shock.

Protective hats are made in the following types and classes:

- Type 1 - Helmets with a full brim.
- Type 2 - Brimless helmets with a peak extending forward from the crown.

- Class A - General service, limited voltage. Intended for protection against impact hazards. Used in mining, construction, and manufacturing.
- Class B - Utility service, high voltage. Used by electrical workers.
- Class C - Special service, no voltage protection. Designed for lightweight comfort and impact protection. Used in certain construction, manufacturing, refineries, and where there is a possibility of bumping the head against a fixed object.

3. **Foot Protection**

There are many types and styles of protective footwear and it is important to realize that a particular job may require additional protection other than listed here. Footwear that meets established safety standards will have an American National Standards Institute (ANSI) label inside each shoe.

Steel Reinforced Safety Shoes. These shoes are designed to protect feet from common machinery hazards such as falling or rolling objects, cuts, and punctures. The entire toe box and insole are reinforced with steel, and the instep is protected by steel, aluminum, or plastic materials. Safety shoes are also designed to insulate against temperature extremes and may be equipped with special soles to guard against slip, chemicals, and/or electrical hazards.

Safety Boots. Safety boots offer more protection when splash or spark hazards (chemicals, molten materials) are present:

- When working with corrosives, caustics, cutting oils, and petroleum products, neoprene or nitrile boots are often required to prevent penetration.
- Foundry or "Gaiter" style boots feature quick-release fasteners or elasticized insets to allow speedy removal should any hazardous substances get into the boot itself.
- When working with electricity, special electrical hazard boots are available and are designed with no conductive materials other than the steel toe (which is properly insulated).

4. **Hand Protection**

Skin contact is a potential source of exposure to toxic materials; it is important that the proper steps be taken to prevent such contact. Most accidents involving hands and arms can be classified under four main hazard categories: chemicals, abrasions, cutting, and heat. There are gloves available that can protect workers from any of these individual hazards or any combination thereof.

Gloves should be replaced periodically, depending on frequency of use and permeability to the substance(s) handled. Gloves overtly contaminated should be rinsed and then carefully removed after use.

Gloves should also be worn whenever it is necessary to handle rough or sharp-edged objects, and very hot or very cold materials. The type of glove materials to be used in these situations include leather, welder's gloves, aluminum-backed gloves, and other types of insulated glove materials.

Careful attention must be given to protecting your hands when working with tools and machinery. Power tools and machinery must have guards installed or incorporated into their design that prevent the hands from contacting the point of operation, power train, or other moving parts. To protect hands from injury due to contact with moving parts, it is important to:

- ensure that guards are always in place and used.
- always lock-out machines or tools and disconnect the power before making repairs.
- treat a machine without a guard as inoperative; and
- do not wear gloves around moving machinery such as drill presses, mills, lathes, and grinders.

The following is a guide to the most common types of protective work gloves and the types of hazards they can guard against:

Disposable Gloves. Disposable gloves, usually made of light-weight plastics and rubber compositions, can help guard against mild irritants.

Fabric Gloves. Made of cotton or fabric blends, are generally used to improve grip when handling slippery objects. They also help insulate hands from mild heat or cold. They are not to be used where exposure to toxic substances is anticipated.

Leather Gloves. These gloves are used to guard against injuries from sparks or scraping against rough surfaces. They are also used in combination with an insulated liner when working with electricity. If these gloves become contaminated, they must be discarded as decontamination is impossible.

Metal Mesh Gloves. These gloves are used to protect hands from accidental cuts and scratches. They are used most commonly by persons working with cutting tools or other sharp instruments.

Aluminized Gloves. Gloves made of aluminized fabric are designed to insulate hands from intense heat. These gloves are most commonly used by persons working with molten materials.

Chemical Resistance Gloves. These gloves may be made of rubber, neoprene, polyvinyl alcohol, or vinyl, etc. The gloves protect hands from corrosives, oils, and solvents. The following table is provided as a guide to the different types of glove materials and the chemicals they can be used against. When selecting chemical resistance gloves, be sure to consult the manufacturer's recommendations, especially if the gloved hand will be immersed in the chemical.

<i>Type</i>	<i>Advantages</i>	<i>Disadvantages</i>	<i>Use Against</i>
Natural Rubber	Low cost, good physical properties, dexterity.	Poor vs. oils, greases, organics. Frequently imported; may be poor quality.	Bases, alcohols, dilute water solutions; fair vs. aldehydes, ketones.
Natural Rubber Blends	Low cost, dexterity, better chemical resistance than natural rubber vs. some chemicals.	Physical properties frequently inferior to natural rubber.	Same as natural rubber.
Polyvinyl Chloride (PVC)	Low cost, very good physical properties, medium cost, medium chemical resistance.	Plasticizers can be stripped; frequently imported, may be poor quality.	Strong acids and bases, salts, other water solutions, alcohols.
Neoprene	Medium cost, medium chemical resistance, medium physical properties.	NA	Oxidizing acids, anilines, phenol, glycol ethers.
Nitrile	Low cost, excellent physical properties, dexterity.	Poor vs. benzene, methylene chloride, trichloroethylene, many ketones.	Oils, greases, aliphatic chemicals, xylene, perchloroethylene, trichloroethane; fair vs. toluene.

<i>Type</i>	<i>Advantages</i>	<i>Disadvantages</i>	<i>Use Against</i>
Butyl	Specialty glove, polar organics.	Expensive, poor vs. hydrocarbons, chlorinated solvents.	Glycol ethers, ketones, esters.
Polyvinyl Alcohol (PVA)	Specialty glove, resists a very broad range of organics, good physical properties.	Very expensive, water sensitive, poor vs. light alcohols.	Aliphatics, aromatics, chlorinated solvents, ketones (except acetone), esters, ethers.
Fluoroelastomer (Viton)	Specialty glove, organic solvents.	Extremely expensive, poor physical properties, poor vs. some ketones, esters, amines.	Aromatics, chlorinated solvents, also aliphatics and alcohols.
Norfoil (Silver Shield)	Excellent chemical resistance.	Poor fit, easily punctures, poor grip, stiff.	Use for Hazmat work.

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WORLDWIDE FACILITIES GROUP	EFFECTIVE DATE: NOVEMBER 20, 2001
GENERAL MOTORS LLC	
REVISION NO.: 1	REVISION DATE: MAY 8, 2003

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APPENDIX 4.1.A ACCIDENT/INCIDENT REPORTING FORM

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WORLDWIDE FACILITIES GROUP	EFFECTIVE DATE:	NOVEMBER 20, 2001
GENERAL MOTORS LLC		
REVISION NO.: 1	REVISION DATE:	MAY 8, 2003

1.0 SCOPE

Prior to starting any project, an emergency response plan must be developed. Based on the type of hazards that develop on site, the Health and Safety Officer (HSO) is to determine if the site-specific emergency response plan is to be modified as it appears in the HASP. A list of emergency telephone numbers and hospital routes must be posted in the site trailer and/or by site telephones and vehicles.

The following are general guidelines to be used by GZA personnel. The level of authority exerted by GZA personnel varies depending on the responsibilities GZA has on the site. If GZA is acting in the HSO role, then most of the following applies. If a contractor employee is injured, remember that the employer has primary responsibility to his/her own employees.

2.0 NOTIFICATION REQUIREMENTS

Depending on the severity and type of emergency, various notification requirements may be necessary. All injuries must be reported as soon as possible to Human Resources and the General Motors Project Manager (GMPM) and Participant Project Manager (PPM). An accident reporting form can be found in Appendix 4.1.A.

2.1 MEDICAL EMERGENCY (LIFE THREATENING)

In case of a life threatening medical emergency, emergency personnel (i.e., fire department, police department, rescue squad) and the HSO are to immediately be contacted. Clearly identify the site location, the nature of injury, the exact location on the site where the injured person is located, and the name of the person. Administer first aid as necessary. Once emergency personnel arrive and have been fully briefed on the situation, determine where the victim will be taken and how to get there.

Call the PPM or GMPM and inform them of what has happened, including:

- your name;
- number and name(s) of injured parties;

- what happened;
- your description of injuries;
- when and where injury happened; and
- where the victim(s) is/are being taken.

Identify that you are going to the hospital or clinic and that you will call again when you know more. Unless you are told otherwise, the PPM or GMPM will be responsible for making the other necessary notifications (i.e., regulatory agencies, next of kin, subcontractor's company, Occupational Safety and Health Act (OSHA), the client).

2.2 MEDICAL EMERGENCY (NOT LIFE THREATENING)

Assess the situation prior to acting. For example, a sprained ankle requires different measures than a broken leg. Contact the HSO and emergency personnel if warranted, and administer first aid as necessary. If emergency personnel are contacted, clearly describe the nature of the accident or injury including:

- your name;
- number and name(s) of injured parties;
- what happened;
- your description of injury;
- when and where injury happened;
- first aid you administered;
- treatment given to victim(s) by emergency personnel;
- whether the victim(s) was/were taken to a hospital or clinic; and
- where the victim(s) was/were taken.

Once the victim is stabilized and under the care of medical personnel, contact the PPM or GMPM.

The PPM or GMPM will be responsible for making further contacts.

3.0 SPILLS OR RELEASES (MINOR)

Attempt to identify the spilled material, then contain the spill. After the spill is contained, contact the PPM or, in the PPM's absence, the GMPM to report the spill and determine the followup and additional reporting requirements.

3.1 SPILLS OR RELEASES (MAJOR)

Immediately contact local spill coordinators (fire department, police department, emergency government coordinator, local emergency planning commission, state patrol). Be prepared to tell them:

- who you are;
- what was spilled;
- estimate of the amount spilled;
- when the spill occurred;
- what media did the release occur into (i.e., air, water, land);
- the address and location of the release;
- was anyone injured and how badly;
- environmentally sensitive areas likely to be affected by the release (i.e., wetlands, lakes, rivers);
- whether evacuation is necessary; and
- what you will be doing after you hang up and where they can find you or reach you.

Next, contact the PPM or, in the PPM's absence, the GMPM. Supply them with the above information and obtain a telephone number where they can be reached. Do not leave a message with a secretary.

In the event of a major spill event, contact the National Response Center (800/424-8802 or 202/426-2675, in Ontario, 800/268-6060) after medical needs are met. Be prepared to tell them:

- who you are;
- what was spilled;
- estimate of the amount spilled;
- when the spill occurred;

- what media did the release occur into (i.e., air, water, land);
- the address, city, county, and state in which the release occurred;
- was anyone injured and how badly;
- environmentally sensitive areas likely to be affected by the release (i.e., wetlands, lakes, rivers);
- whether evacuation is necessary; and
- what you will be doing after you hang up the phone and where they can find you or reach you.

If injuries have occurred as a result of a spill, contact emergency medical personnel first. After that, the local agency responsible for spills should be contacted (police department, fire department, emergency government director, State Emergency Response Commission, local Emergency Planning Committee, State/Province Patrol). Inform them of the same information as above. Finally, contact the PPM or, in the PPM's absence, the GMPM and inform them of the same information as above. Obtain a phone number at which they can again be reached. Do not leave a message with a secretary.

4.0 FIRE (SMALL)

Any fire that is not put out in 30 seconds is not a small fire. In the case of a small fire, immediately extinguish the blaze if conditions are safe. Next, notify the client if the client's property is in close proximity to the fire (if not, notify the fire department). Assess the need with the client to contact the fire department. If the fire department is contacted, be prepared to tell them:

- who you are;
- your location;
- type of fire (i.e., electrical, chemical, combustible solids, vapor);
- is the fire extinguished;
- the need for medical assistance;
- other potential hazards in the area (e.g., proximity to bulk tanks, downed electrical lines, poor access); and
- what you will be doing after you hang up the phone and where they can find you or reach you.

Upon arrival of the local fire department, brief them of the incident. Contact the PPM or, in the PPM's absence, the GMPM.

4.1 FIRE (LARGE) OR EXPLOSION

If other people are in the area, immediately notify them and evacuate the area. Call the local fire department. Be prepared to identify:

- who you are;
- your location;
- type of fire (i.e., electrical, chemical, combustible solids, vapor);
- is the fire extinguished;
- the need for medical assistance;
- other potential hazards in the area (e.g., proximity to bulk tanks, downed electrical lines, poor access); and
- what you will be doing after you hang up the phone and where they can find you or reach you.

Upon arrival of the fire department, turn over command to them and supply as much information as possible. After the initial contact with the fire department, contact the PPM or, in the PPM's absence, the GMPM.

5.0 EVACUATION PROCEDURES

5.1 ON-SITE PERSONNEL ONLY

Prior to beginning work, the HSO should brief all GZA employees on what the evacuation signal should be. It may be nothing more than a verbal command or it may be some audible alarm such as a bell or horn. If working at a client's site, familiarize yourself with their warning system.

Prior to work, the HSO should determine a meeting place if evacuation is necessary. Preferably, the meeting place should be upwind of the work activities and at a safe distance. All GZA employees should be informed of the meeting location.

If evacuation is necessary, everyone should go directly to the meeting area. The HSO should ensure all personnel are accounted for. This will mean checking the sign-off documentation on the site HASP or, on larger jobs, the daily sign-in roster. The local

on-scene commander or HSO should immediately be notified of any missing personnel as well as their last known whereabouts.

5.2 OFF-SITE PERSONNEL REQUIRED

If an incident is large enough, off-site personnel may also need to be evacuated. GZA personnel should not attempt to evacuate off-site personnel but should leave that task to the local authorities. All GZA employees should follow the evacuation directions given by the local authorities. The HSO should offer to remain at the command post to supply information. If told to leave, the HSO should leave.

Local authorities will have present an on-scene commander. The on-scene commander will direct emergency operations and will have at his assistance the local fire department, police department, and other emergency government functions.

After evacuating to a safe area, the PPM and GMPM should be notified of the incident.

5.3 DISCUSSION OF INCIDENT

GZA employees should not discuss the incident with members of the media. Politely refuse to discuss the situation and, instead, direct all inquiries to the local authorities or client's representative. Contact the PPM and GMPM immediately to pre-warn them.

GZA employees should always provide whatever useful information they can to response personnel. Stick to helpful facts and avoid placing blame or judgment. That will be sorted out later. Politely refuse to find fault or place blame.

At a safe place and at the appropriate time, prepare an incident report which shall include:

- How did it happen?
- Who was doing what?
- What did I see?
- What did I hear?

All these types of things may be important later when the incident is evaluated.

APPENDIX 4.1.A

ACCIDENT/INCIDENT REPORTING FORM

ACCIDENT/INCIDENT REPORTING FORM

The information collected by this form will be an aid to improving our internal Accident Prevention Programs.

For an accident, fill in all boxes; For an incident, fill in shaded areas only!!

An accident is defined as a situation that results in property damage and/or personal injury.

An incident is defined as a situation that COULD HAVE resulted in property damage and/or personal injury.

Attach additional sheets as required.

A. Employee Identification

Employee #	Last Name	First Name	Middle Name/Initial
Area Code ()	Telephone Number		

B. Details of Accident/Incident

Date and Hour of Accident/Incident Day Month Year a.m. / p.m.	Date and Hour Reported to Employer Day Month Year a.m. / p.m.	Date and Hour Last Worked Day Month Year a.m. / p.m.	Normal Work Hours on Last Day Worked from to
Date and Hour Returned to Work Day Month Year a.m. / p.m.	If a Motor Vehicle Accident, Driver's License Number		Province/State Where License Issued
1. What happened to cause the injury/disease? Describe injury, part of body involved and specify left or right side.			
2. Give exact location, include address, of the accident/incident. Describe accident/incident scene, provide diagram on reverse, include location of all workers.			
3. Who was the injury/disease reported to? If injury/disease was not reported immediately, provide reason for delay.			
4. Describe the employee's activities at the time of the accident/incident. Include details of equip./materials used and size and weights of objects being handled.			
5. Object or Substance that directly injured employee, e.g., the machine employee struck against or which struck him/her; the vapor or poison inhaled or swallowed, the chemical that irritated his/her skin. In cases of stains, the thing (s)he was lifting, pulling, etc.			
6. Is there anyone else who may have witnessed or who may know about the injury/onset of the disease? If so, provide details below. <div style="display: flex; justify-content: space-between;"> Name(s) Addresses and phone number(s) if not GZA employees </div>			

OVER

C. Health Care

Treatment ("X" all that apply)

<input type="checkbox"/> First Aid	Name of Provider (First, Mi, Last)	What type of First Aid was Administered?	
<input type="checkbox"/> Hospital	Name, Address (Street, City, Province/State, and Postal/Zip Code)	Treatment	Length of Stay
<input type="checkbox"/> Physician	Name, Address (Street, City, Province/State, and Postal Zip Code), Phone #	Treatment	Specialty

D. Property Damage

Identify Property Damaged (include owner of property, nature & source of damage, model and serial number if appropriate)	Approximate Cost of Damage
--	----------------------------

E. Project Information (Project Related Incidents Only)

Project #	Project Manager	Resident Engineer	Site Telephone Number ()	Client advised, if so who
Were Safeguards or a HASP provided <input type="checkbox"/> Yes <input type="checkbox"/> No		Description of Safeguards, HASP, and relationship with accident/incident. Include whether the safeguards or the HASP were in use.		

F. Follow-Up

Describe the obvious causes of the accident/incident	Had training or instruction been given relating to the accident or incident. If so, describe.
Indicate any actions or measures that could prevent this type of accident/incident from occurring in the future.	

G. Administration

Report Date Day Month Year	Report Prepared by: (please print)	Report Prepared by: (signature)
-------------------------------	------------------------------------	---------------------------------

Accident/Incident Diagram. If insufficient space, attach separate page.

Fax, then mail to the GZA Manager of Health and Safety, immediately upon completion.

Fax # (781) 278-5701

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WORLDWIDE FACILITIES GROUP	EFFECTIVE DATE: NOVEMBER 20, 2001
GENERAL MOTORS LLC	
REVISION NO.: 1	REVISION DATE: APRIL 2, 2003

1.0 SCOPE

As most projects are conducted outside, the potential for severe weather must be considered. Thunderstorms, tornadoes, and winter storms can develop quickly, jeopardizing worker safety. The following emergency procedures are to be followed in the event of severe weather.

2.0 THUNDERSTORMS AND LIGHTNING

Monitor weather conditions at all times while working. Monitor for a sign of an impending storm such as increased cloudiness, darkened skies, and increased wind. If any of these signs are observed, listen to a radio for the latest weather information or contact a local weather reporting service.

When a thunderstorm accompanied by lightning is in the project area, cease work immediately. All powered equipment, such as drill rigs, are to be shut down. If time permits, lower the mast of the drilling rig. A determination must be made in conjunction with the contractor and consultants as to when to cease work. As a rule of thumb, follow these simple guidelines:

- Always pay attention to the weather conditions. You are responsible for your own safety. Use common sense and do not feel pressure to continue to work if you feel there is a threat and others don't, such as contractors and co-workers.
- If you are using conductive tools and equipment, separate yourself from them as far as practical.
- If you are near a drilling rig, lower the mast and move away from the rig.
- Rule of thumb - wait until 30 minutes after the last observed lightning strike or thunderclap before resuming your outdoor activities, warns the National Lightning Safety Institute.
- Protect yourself by taking cover in the best shelter you can find.
- If you are in or near the water, go to land immediately and find shelter. Take extra precaution when on the water and in a boat.
- If choosing between a building and a car, choose the building.

- If choosing between a hardtop and a convertible, choose the hardtop.
- If you're in a car, keep the windows closed.
- If there is no shelter, find a low-lying, open place that is a safe distance from trees, poles, or metal objects that can conduct electricity. Make sure it is not likely to flood. Assume a tucked position. Squat low to the ground. Place your hands on your knees with your head tucked between them. Try to touch as little of your body to the ground as possible.
- Do not lie flat on the ground, as your fully extended body will provide a larger surface to conduct electricity. Stay in a tuck position well after the storm passes.
- Watch for local flooding you may have to move if water begins to accumulate.
- If you feel your hair stand on end in a storm, drop into the tuck position immediately. This sensation means electric charges are already rushing up your body from the ground toward an electrically charged cloud. Minimize your contact with the ground to minimize your injury.

Seek shelter inside nearby buildings or trailers. If there are no buildings nearby, seek shelter inside your vehicle.

If you are caught outside, do not stand beneath tall, isolated trees, drilling rigs, or telephone poles. Avoid areas projecting above the landscape such as hill tops. In open areas, go to a low place such as a ravine or valley. Stay away from open water, metal equipment, wire fences, and metal pipes. If you are in a group of people in the open, spread out, staying several yards apart.

If you are caught in a level field or open area far from shelter and you feel your hair stand on end, lightning may be about to strike you. Drop to your knees and bend forward, putting your hands on your knees. **DO NOT LIE FLAT ON THE GROUND.**

If someone has been struck by lightning, send for help, monitor life signs, and, if properly trained and retain current certification, begin administering mouth-to-mouth resuscitation or cardiopulmonary resuscitation (CPR) as needed. Check conscious victims for burns, especially at the fingers and toes and next to buckles and jewelry. Administer first aid for shock. Do not let the victim walk around. Always seek professional medical attention after the initial emergency medical attention has been provided. Do not allow the worker to resume work until they have been medically cleared by a medical doctor.

3.0 TORNADOES

Tornadoes usually develop from thunderstorms and normally occur at the trailing edge of the storm. Most tornadoes occur in the months of April, May, June, and July in the late afternoon and early evening hours.

When storms are predicted for the project area, monitor weather conditions on a radio. A tornado watch is issued when favorable conditions exist for the development of a tornado. A tornado warning is issued by the local weather service office whenever a tornado has actually been sighted or is strongly indicated by radar.

If a tornado warning is issued, seek shelter immediately. If there are permanent buildings located on site, go there immediately, moving toward interior hallways or small rooms on the lowest floor. Stay away from glass windows and doors.

If a tornado warning is issued and you are in a vehicle or a site trailer, leave and go to the nearest building. If there are no buildings nearby, go to the nearest ditch, ravine, or culvert, with your hands shielding your head.

If a tornado is sighted or a warning issued while you are in open and flat terrain, lie flat in a ditch or depression. Hold onto something anchored to the ground, such as a bush or wooden fence post, if possible.

Once a tornado has passed the site, site personnel are to assemble at the designated assembly area to determine if anyone is missing. Administer first aid and seek medical attention as needed. An accident/investigation is required to be completed.

4.0 WINTER STORMS

When snow or ice storms are predicted for the project area, site personnel should monitor weather conditions on a radio. A winter storm watch is issued when a storm has formed and is approaching the area. A winter storm warning is issued when a storm is imminent and immediate action is required.

When a storm watch is issued, monitor weather conditions and prepare to halt site activities. Notify the project manager of the situation. Determine whether work should resume. Consideration should be made on whether the employees will be able to safely return to their residences. If conditions become worse than anticipated while work is

being performed, seek shelter at a nearby building or, if safe, leave the site and seek warm shelter. If you are caught in a severe winter storm while traveling, seek warm shelter if road conditions prevent safe travel.

In icy conditions be aware of ice buildup in areas where you may need to walk. Avoid walking on exposed ice that may cause a slip to avoid injury. If possible use some type of material, such as salt, to melt the ice. Sand or vermiculite are other materials that can be used to reduce slipping on ice.

If you are stranded in a car or truck during blizzard conditions, consider the following suggestions:

- If you have a cellular phone, try to initially contact a reliable source. Try to contact a person that you would expect to be home or available. Do not leave the phone on and wait for calls. Turn the phone off and you make the calls. By allowing the phone to stay on, the batteries will drain much quicker.
- Stay in the vehicle!
- Run the motor about 10 minutes each hour. Open the windows a little for fresh air to avoid carbon monoxide poisoning. Make sure the exhaust pipe is not blocked.
- Make yourself visible to rescuers.
- Turn on the dome light at night when running the engine.
- Use whatever method necessary to get help, but do not leave the vehicle.
- If there is food in the car, ration the food amongst the passengers over a period of time.

REMEDATION SECTION	HSOG 4.3:	TABLE OF CONTENTS
WORLDWIDE FACILITIES GROUP	EFFECTIVE DATE:	NOVEMBER 20, 2001
GENERAL MOTORS LLC		
REVISION NO.: 1	REVISION DATE:	FEBRUARY 20, 2003

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LIST OF APPENDICES

APPENDIX 4.3.A ACCIDENT/INCIDENT REPORTING FORM

APPENDIX 4.3.B VEHICLE ACCIDENT REPORTING FORM

REMEDATION SECTION	HSOG 4.3: REPORTING
WORLDWIDE FACILITIES GROUP	EFFECTIVE DATE: NOVEMBER 20, 2001
GENERAL MOTORS LLC	
REVISION NO.: 1	REVISION DATE: FEBRUARY 20, 2003

1.0 OSHA INSPECTIONS

The following procedures discuss response during Occupational Safety and Health Administration (OSHA) inspections when:

- 1) GZA is prime contractor; and
- 2) when another party including the owner serves as prime contractor.

1.1 PROCEDURES TO BE FOLLOWED WHEN GZA IS PRIME CONTRACTOR

The procedures listed below are to be followed in the event that an OSHA inspector visits the site and GZA is the prime contractor. The requirements are consistent with General Motors rights and the requirements for OSHA's performance of an inspection.

There are four parts of an OSHA inspection:

- Presentation of Inspector Credentials.
- Opening Conference.
- Inspection Walkaround.
- Closing Conference.

Listed below are basic guidelines that the field representative should follow during the initial OSHA inspector site visit.

- a) Introduce yourself with your name and title. Titles to choose from include field geologist, field engineer, field observer, resident engineer, site supervisor, etc. In the first minutes of orientation, be cooperative and discuss the reason of the inspection with the OSHA representative. Try to avoid answering any detailed or specific questions until you have contacted the General Motors Manager (PM), Participant Project Manager (PPM), or your company's Health and Safety Management Representative.

- b) Ask the OSHA Inspector to show you his/her credentials. Review the Inspector's credentials for authenticity. The credentials should have a picture of the inspector. It may be possible to procure a business card from the inspector.
- c) Ask the OSHA Inspector what is the purpose of his/her site visit.
 - What type of inspection is this? Complaint? Followup? General schedule inspection? Special emphasis inspections?
 - What areas of the site has he/she come to inspect?
 - If there was a complaint, ask for a written copy of the complaint.
 - Ask the Inspector if he/she would wait or delay the inspection until a General Motors Project Manager, Participant Project Manager, or your company's Health and Safety Management Representative can attend.
- d) If the Inspector intends to enter the exclusion zone (EZ), ask for his/her certification of 40- or 24-hour training and the most recent 8-hour refresher, if applicable. The OSHA inspector may not enter the EZ or contaminant reduction zone (CRZ) without this training. In addition, the OSHA Inspector is required to have the appropriate PPE, as specified in the HASP. The proper PPE must be worn or he/she may not enter the EZ. Certification of participation in a medical surveillance program is optional because their total annual time on sites may not require physicals (physicals are required if they are going to don a respirator, however).
- e) Inform the OSHA Inspector that you do not have the authority to either grant or limit the inspection. If GZA is the prime contractor, ask the OSHA Inspector not to take any pictures while you are in the process of contacting management.
- f) Call the General Motors PM, Participant PM, and/or your company's Health and Safety Representative and inform them with as much detail as you can in regards to the intent and purpose of the inspection. Try to avoid having this discussion in the presence of the OSHA Inspector.

Since GZA is the prime contractor in this case, the PM should inform you to ask the Inspector to wait off site until the Principal, PM, or Health and Safety Representative arrive. Until that time, inform him/her that you cannot give permission to begin the inspection, take pictures, or interview General Motors employees.

- g) The PM should try to locate a health and safety management member to discuss what General Motors response to this inspection should be. Additionally, as soon as possible, the PM will inform the site owner and, if different, the client.
- h) If OSHA will not wait for the arrival of the PM or Health and Safety Representative call either and/or both and explain the situation. A conference call

should be set up at this time for the Opening Conference. The Opening Conference is the first stage of an OSHA inspection. At this point, all questions should be answered factually with no additional information. Be cooperative and honest. Do not be nervous and do the best you can. Do not make assumptions at any time. It is expected of any employee to respond with "I do not know", if that is the case.

- i) Continue site operations. It is not necessary to shut down operations; however, all site personnel should be informed that an OSHA inspection is in progress. If a person is asked to be interviewed, obviously stop work to allow the dialogue to occur.
- j) Be courteous, answer the Inspector's questions, and take copious notes. The person escorting the OSHA Inspector should also take the exact same pictures as the OSHA Inspector.
- k) In the event that the inspection is being performed on an active site and there is a GM Facility Safety Representative, it is encouraged that they be informed of all OSHA activity on site. If there is not a safety representative, a site contact such as the Plant or Area Manager should be contacted.

1.2 PROCEDURES TO BE FOLLOWED WHEN OTHER PARTIES ARE THE PRIME CONTRACTOR

- a) If another party has responsibility for site control such as the owner or the owner or client's contractor, call the General Motors PM and your Health and Safety Representative and explain that an inspection is in progress. The guidelines above still apply except for item d), since site control concerns such as allowing appropriately trained persons on site is the responsibility of the prime contractor. There are usually several concurrent inspections conducted by OSHA on a construction site. The OSHA Inspector can wait before starting the inspection of General Motors activities until the PM and Manager of Health and Safety determines the appropriate course of action. Remember, contractually and in reality, the contractor is responsible for safety and health on our work sites, even though we are in an oversight role representing the owner. GZA is responsible for its own employees at all times.
- b) It is recommended that all Participants involved in the investigation provide some type of management representation during the walkthrough. Each employer has that legal right. If it is not feasible for representation at the site due to logistics or location, try to set up a conference call for the Opening and Closing Conferences. It is also a courtesy of Participants to share copies of photographs taken, if a member is involved and another is unable.

2.0 ACCIDENT/INCIDENT REPORTING PROCEDURE

2.1 PURPOSE

The purpose of the following procedure is threefold: it provides GZA employees and Participants with a method to report accidents and incidents; to continually work toward an accident/incident free work environment; and to document corrective actions which were implemented due to the accident/incident as required by regulatory agencies.

2.2 SCOPE

The accident/incident reporting procedure will be used by both office and field staff. The longer-term intent of this procedure is the prevention of accidents, occupational illnesses, and injuries. In addition, accident and incident reporting, with proper distribution, ensures that all responsible parties are knowledgeable of activities occurring on site and can take prompt corrective actions. Reviewing reported accidents and incidents can reduce the frequency of the reoccurrence of similar injuries, assist in assessing the effectiveness of the current operating standards and employee training, and document corrective actions taken by GZA.

2.3 DEFINITIONS

Accident	An unplanned event that causes harm to people or damage to property.
Incident	An unusual occurrence that could have resulted in harm to people or property if the circumstances had been slightly different.
Critical Injury ¹	An injury of serious nature that (Ontario employees only): <ul style="list-style-type: none">a) places life in jeopardy;b) produces unconsciousness;c) results in substantial loss of blood;d) involves the fracture of a leg or arm but not a finger or toe;e) involves the amputation of a leg, arm, hand, or foot but not finger or toe;

¹ This definition is applicable to Ontario employees only.

- f) consists of burns to any major part of the body; or
- g) causes the loss of sight in an eye.

OSHA Recordable

Any serious injury as defined by the OSHA Recordkeeping rules outlined in 29 CFR 1904.

2.4 **RESPONSIBILITIES**

Project Manager

Participant Project Managers must ensure that proper medical attention is provided to the injured employee. Assist in the accident investigation and take appropriate corrective actions. Ensure that the injured employee submits an accident/incident reporting form to the Participants PM and General Motors PMs are required to ensure that the appropriate documentation has been developed and forwarded to General Motors Senior Management. In addition, they also have the ultimate responsibility of ensuring that corrective actions have been performed to prevent re-occurrence. Corrective action is the responsibility of the Participant.

Injured employee

Be responsible for the completion of the accident/incident reporting form. Provide as much information as possible regarding the incident so that corrective action can be properly taken. Communicate to your PM on all aspects of the reporting process.

Witness

Provide information relevant to the reporting process for incidents. Assist in the completion of the accident/incident reporting form when applicable. Report accidents and incidents to the PM.

Participant Safety
Representative

Review completed accident/incident report forms. Assist in determining root or underlying causes for the accident/incident. Author a file memo summarizing the event. Provide feedback to the Health and Safety Subcommittee (HSC) which may result in revision of HSOGs and SOPs and/or work plans to assist in prevention of similar accidents.

Certified Joint Health
and Safety Committee
Representative (Canada)

Assist in the completion of accident/incident form for critical or fatal injuries, for Ontario employees.

2.5 ACCIDENT REPORTING PROCEDURES

When an accident has occurred, the injured employee shall:

- Seek the appropriate immediate medical attention and call the Participant and General Motors PM as soon as possible. At a minimum, the Participant and General Motors PMs must have all details of the incident within 1 business day.
- The Participant PM will contact their Safety Management Representative upon receipt of the information. If critical injury or fatality of an Ontario employee call a Certified Joint Health and Safety Committee representative.
- Injured employee with the assistance of their PM and other relevant site personnel, such as witnesses, will complete an "Accident/Incident Report Form(A/I Report Form)" located in Appendix 4.3.A. When completing the form, it may be necessary to involve any witnesses, the PM, Safety Management Representative, HSC, and the Certified Joint Health and Safety Committee member. If that person cannot be determined or is unavailable, the PM or Supervisor of the workplace involved in the accident/incident shall complete the A/I Report Form and ensure the appropriate parties receive a copy.
- In addition, it may be necessary to conduct a more formal investigation which may involve the same personnel as listed above. General Motors management may request the Participant(s) to conduct a formal investigation. In addition, it may be the Participant's internal policy to conduct an internal investigation. If a fatality or serious injury does occur, it would be encouraged to use the Health and Safety Committee member(s) (HSC) to participate in the formal investigation. This may reduce bias and provide additional professional assistance in the investigation process.
- The employee, or designee, will send a copy of the completed form to the Participant PM who in turn will forward to the General Motors PM. The Participant PM must review for accuracy and completeness. The General Motors PM will distribute a completed copy of the A/I Report Form to the appropriate Senior Management within General Motors and, for Ontario employee injuries, a revised copy of the A/I Form will be provided to the Joint Health and Safety Committee, which does not contain confidential information.
- Each party that receives a copy of the form shall review it to ensure it is accurate and to ensure corrective measures are implemented so that similar accidents are unlikely to reoccur.
- In the event that an injury occurs on an active site. It may be that site's policy to forward a report to the GM Facility Safety Representative. If there is not a safety

representative, a site contact such as the Plant or Area Manager should receive a copy of the report if it is the sites policy.

2.6 AUTOMOBILE ACCIDENTS

Every automotive accident, that occurs at the site, involving a company-owned or leased vehicle (including rental cars and vehicles), no matter how seemingly minor, must be reported immediately by telephone to the Participant PM and General Motors PM. If employees are injured during an automobile accident refer to Section 2.5 for reporting procedures. Accidents involving personally owned vehicles being used for company business must, likewise, be reported. Even if property damage or personal injury is not apparent immediately, it is imperative that the Participant PM be notified so that any claim(s), which may arise, can be adequately documented.

In addition to prompt verbal notification by telephone, a Vehicle Accident Report must be completed and submitted to the Participant PM and the PM for General Motors within 24 hours of the accident. Employees assigned to field offices should first telefax and then mail the written, signed report within the 48-hour period.

The automobile accident form is attached as Appendix 4.3.B.

Employees of GZA should follow their own company's reporting procedures for automobile accidents. If an injury occurs and it was on the project or property, an injury report must be filled out as outlined in Section 2.5.

2.7 NEAR-MISS REPORTING PROCEDURE

When a near-miss incident has occurred, involved personnel shall:

- Contact the General Motors PM and your PM as soon as possible.
- Investigate near-miss incidents by completing a A/I Report Form as soon as possible. When investigating the incident, it may be necessary to involve any witnesses, the Participant PM, Safety Management Representative, HSC, and the Certified Joint Health and Safety Committee member.
- Send copies of the completed A/I Report Form to the General Motors and Joint Health and Safety Committee.
- Each party that receives a copy of the A/I Report Form shall review it to ensure it is accurate and to ensure corrective measures are implemented so those similar near-miss incidents are unlikely to reoccur.

2.8 RECORDKEEPING²

All records will be maintained in accordance with OSHA Recordkeeping Requirements, 29 CFR 1904. For General Motors employees, they are required to follow internal recording requirements. Participants are expected to properly record all OSHA Recordables that occur on their projects. Records of accidents/incidents and Workmen's Compensation Claims will be maintained by each participant. This log should be kept at each of the company office locations. Each office location will also maintain an OSHA 300 Log, as required by the Regulations. The General Motors representatives and members of the HSC will coordinate and audit each field location for compliance with this procedure.

² This section only applies to United States employees.

APPENDIX 4.3.A

ACCIDENT/INCIDENT REPORTING FORM

ACCIDENT/INCIDENT REPORTING FORM

The information collected by this form will be an aid to improving our internal Accident Prevention Programs.

For an accident, fill in all boxes; For an incident, fill in shaded areas only!!

An accident is defined as a situation that results in property damage and/or personal injury.

An incident is defined as a situation that COULD HAVE resulted in property damage and/or personal injury.

Attach additional sheets as required.

A. Employee Identification

Employee #	Last Name	First Name	Middle Name/Initial
Area Code ()	Telephone Number		

B. Details of Accident/Incident

Date and Hour of Accident/Incident				Date and Hour Reported to Employer				Date and Hour Last Worked				Normal Work Hours			
Day	Month	Year	a.m. p.m.	Day	Month	Year	a.m. p.m.	Day	Month	Year	a.m. p.m.	on Last Day Worked from to			
Date and Hour Returned to Work				If a Motor Vehicle Accident, Driver's License Number								Province/State Where License Issued			
Day	Month	Year	a.m. p.m.												
1. What happened to cause the injury/disease? Describe injury, part of body involved, and specify left or right side.															
2. Give exact location, include address, of the accident/incident. Describe accident/incident scene, provide diagram on reverse, include location of all workers.															
3. Who was the injury/disease reported to? If injury/disease was not reported immediately, provide reason for delay.															
4. Describe the employee's activities at the time of the accident/incident. Include details of equip./materials used and size and weights of objects being handled.															
5. Object or Substance that directly injured employee, e.g., the machine employee struck against or which struck him/her; the vapor or poison inhaled or swallowed, the chemical that irritated his/her skin. In cases of stains, the thing (s)he was lifting, pulling, etc.															
6. Is there anyone else who may have witnessed or who may know about the injury/onset of the disease? If so, provide details below.															
Name(s)								Addresses and phone number(s) if not GZA employees							

OVER

C. Health Care

Treatment ("X" all that apply)

<input type="checkbox"/> First Aid	Name of Provider (First, Mi, Last)	What type of First Aid was Administered?	
<input type="checkbox"/> Hospital	Name, Address (Street, City, Province/State, and Postal/Zip Code)	Treatment	Length of Stay
<input type="checkbox"/> Physician	Name, Address (Street, City, Province/State, and Postal Zip Code), Phone #	Treatment	Specialty

D. Property Damage

Identify Property Damaged (include owner of property, nature and source of damage, model and serial number if appropriate)	Approximate Cost of Damage
--	----------------------------

E. Project Information (Project Related Incidents Only)

Project #	Project Manager	Resident Engineer	Site Telephone Number ()	Client advised, if so who
Were Safeguards or a HASP provided <input type="checkbox"/> Yes <input type="checkbox"/> No		Description of Safeguards, HASP, and relationship with accident/incident. Include whether the safeguards or the HASP were in use.		

F. Follow-Up

Describe the obvious causes of the accident/incident	Had training or instruction been given relating to the accident or incident. If so, describe
Indicate any actions or measures that could prevent this type of accident/incident from occurring in the future	

G. Administration

Report Date Day Month Year	Report Prepared by: (please print)	Report Prepared by: (signature)
-------------------------------	------------------------------------	---------------------------------

Accident/Incident Diagram. If insufficient space, attach separate page.

Fax, then mail to the Manager of Health and Safety, immediately upon completion.

Fax # (781) 278-5701

APPENDIX 4.3.B

VEHICLE ACCIDENT REPORTING FORM

VEHICLE ACCIDENT REPORTING FORM

Accidents involving any vehicle must be reported immediately to the Finance Manager.

Accidents involving rented vehicles, must also be reported to the rental company.

A. Employee Identification

Employee #	Last Name	First Name	Middle Name/Initial
Area Code ()	Telephone Number (Site/Office/Hotel/Home)		

B. Details of Accident

Date and Hour of Accident		Drivers License Number	Prov./State where License Issued
Day	Month Year	a.m. p.m.	
Vehicle Involved		License Plate Number	
GZA	<input type="checkbox"/> Make		
Rental	<input type="checkbox"/> Model		
Personal	<input type="checkbox"/> Year	Prov./State	

Other Vehicles Involved

Drivers Name	Drivers License Number	Prov./State where License Issued	Insurance Company
Vehicle Make	Vehicle Model	Vehicle Year	Insurance Policy #
Drivers Name	Drivers License Number	Prov./State where License Issued	Insurance Company
Vehicle Make	Vehicle Model	Vehicle Year	Insurance Policy #
Police Report #	Officer Name	Badge Number	Office Jurisdiction

In your own words please describe details of accident:
--

OVER

Describe damage to your vehicle (include diagram)
Damage to other vehicle(s)
Describe any injuries to yourself and/or other persons involved

C. Health Care

Treatment ("X" all that apply)

Name of Provider (First, Mi., Last) <input type="checkbox"/> First Aid	What type of First Aid was Administered?	
Name, Address (Street, City, Province/State, and Postal/Zip Code) <input type="checkbox"/> Hospital/Clinic	Treatment	Length of Stay
Name, Address (Street, City, Province/State, and Postal/Zip Code) <input type="checkbox"/> Physician	Treatment	Length of Stay

D. Administration

Report Date	Report Prepared By: (please print)	Report Prepared By: (signature)
Day Month Year		

Fax to Attn. of Manager of Health and Safety. Fax # (781) 278-5701 immediately upon completion.
Include copy of Police Report and Rental information (if applicable).

APPENDIX 2

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

APPENDIX 2

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS LEVEL D/MODIFIED LEVEL D

RESPIRATORY

- ☐ Full-Face Respirator
Cartridge - MSA GME-H (GME-P100) or equivalent
- ☐ Halfmask
Cartridge - MSA GME-H (GME-P100) or equivalent
- ☐ Escape
Type: _____
- ☐ Other

- ☐ Other

CLOTHING

- ☐ Chemical Resistant Splash Suit
- ☐ Tyvek Coverall, Standard⁽¹⁾
- ☐ Tyvek Coverall, Polyethylene⁽²⁾
- ☐ Tyvek Coverall, Saranex⁽³⁾
- ☐ Coverall, other
Specify: _____
- ☐ Other

- ☐ Other

HEAD, EYE, EAR PROTECTION

- ☒ Hard Hat
- ☐ Goggles
- ☐ Safety Glasses with Sideshields
- ☐ Face Shield
- ☐ Chemical Goggles
- ☒ Ear Muffs or Plugs
- ☐ Other

HAND PROTECTION

- ☐ Undergloves
Type: _____
- ☐ Gloves
Type: Latex or Nitrile
- ☐ Overgloves
Type: _____
- ☐ Other

FOOT PROTECTION

- ☒ Safety Shoes
- ☐ Disposable Overboots
- ☐ Other

Note:

Modified Level D includes all of the above except the respirator and _____

(1) Same as Kappler Temprow
(2) Same as Kappler CPF I
(3) Same as Kappler CPF II

APPENDIX 2

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS LEVEL D

RESPIRATORY ☒ N/A

CLOTHING ☒ N/A

☐ Tyvek Coverall, Standard⁽¹⁾

☐ Tyvek Coverall, Polyethylene⁽²⁾

☐ Tyvek Coverall, Saranex⁽³⁾

☐ Coverall, other

Specify: _____

☐ Other

☐ Other

HEAD, EYE, EAR PROTECTION ☐ N/A

☒ Hard Hat

☐ Goggles

☐ Safety Glasses with Sideshields

☐ Face Shield

☐ Chemical Goggles

☒ Ear Muffs or Plugs

☐ Other

HAND PROTECTION ☐ N/A

☐ Undergloves

Type: _____

☒ Gloves

Type: Latex or Nitrile

☐ Overgloves

Type: _____

☐ Other

FOOT PROTECTION ☐ N/A

☒ Safety Shoes

☐ Disposable Overboots

☐ Other

Note:

Gloves shall be worn during all activities involving direct contact with potentially contaminated materials.

⁽¹⁾ Same as Kappler Temprow

⁽²⁾ Same as Kappler CPF I

⁽³⁾ Same as Kappler CPF II

APPENDIX 3
SITE PROJECT HISTORY

GM Components Holdings, LLC (GMCH) owns and operates an automotive component manufacturing complex at 200 Upper Mountain Road in Lockport, New York. Building 7, Building 8 and Building 9 within the complex are used for manufacturing and engineering. Building 6 has been leased to Delphi Properties Management, LLC for vehicle component engineering and testing. Building 10 has been converted to house new manufacturing operations staffed by non-GMCH personnel in the northern portion, with the southern portion being used by GMCH as a warehouse.

TCE RELEASE AREA & GROUNDWATER MONITORING

Trichloroethene (TCE) releases occurred from a former aboveground storage tank in an area near Building No. 8 in the north-central portion of the complex prior to May 1994. This tank was located within a concrete containment dike with a concrete bottom. Four fire protection lines exist beneath the former TCE storage tank area at a depth of about 6 feet below ground surface (bgs). One of the pipes ruptured and flooded the area in October 1994. During excavation to repair the rupture, personnel working in the AOC noted a solvent odor. Subsequently, soils from an approximate 27 by 22-foot area were excavated to a depth of about 7.5 feet bgs (top of bedrock) and disposed of as a hazardous waste. Four soil samples were collected from the bottom of the excavation. TCE was measured at concentrations ranging between 0.38 mg/kg and 1800 mg/kg in the soil samples collected. The excavation was then backfilled with a manufactured crushed stone product. New York State Department of Environmental Conservation (NYSDEC) was notified of the release and assigned the incident Spill Number, #9410972.

Subsurface investigations were conducted throughout the TCE release area from 1994 through 2002. A Focused Remedial Investigation (FRI) and Focused Feasibility Study (FFS) were completed in April 2002 and December 2003, respectively. Based on the FRI/FFS, NYSDEC issued a Record of Decision dated March 2005, which identified Monitored Natural Attenuation as the remedy for the TCE contamination identified within the TCE Release Area. Groundwater monitoring required as part of the MNA remedy has been ongoing since 2005.

BUILDING 10 SOIL VAPOR EXTRACTION SYSTEM MONITORING & REMEDIAL INVESTIGATION

In 2006, a site-wide Current Conditions Summary and Field Investigation Report (Study) was completed by Environmental Resources Management (ERM) in order to identify areas of soil and/or groundwater contamination throughout the Lockport Complex. Elevated levels of chlorinated solvents, tetrachloroethene (PCE), were detected in soils at concentrations above New York State regulations; specifically, Part 375-6.8(b) commercial soil cleanup objectives at two sample locations near Col. WK45 in Building 10. To accommodate potential future uses, an assessment of soil/groundwater contamination and vapor intrusion was performed in the northern portion of Building 10 in July 2007.

As part of the Building 10 investigation, air, soil and groundwater samples were collected. The findings of the investigation identified PCE and TCE concentrations in indoor air and sub-slab air samples above NYSDOH guidance for evaluating soil vapor intrusion. PCE was also

detected in soil above the Part 375 Industrial Soil Cleanup Objective (SCO) and 14 VOCs were detected above their respective Class GA groundwater criteria in a groundwater sample collected (PCE was detected at a concentration of 114 ppm).

In July 2007, GZA completed additional investigations to further delineate the soil beneath Building 10 with PCE soil contamination greater than the NYSDEC Part 375 Industrial SCO of 300 ppm. In October 2007, GZA performed a Soil Vapor Extraction (SVE) system pilot study to develop the design of the SVE system. SVE pilot study was done in two locations within the limits of soil with PCE concentrations greater than 300 ppm, identified for SVE treatment. Field activities associated with the pilot study included the installation of two, 4-inch diameter PVC SVE wells, installation of eight vacuum monitoring points via soil probes, mobilization and set up of a mobile extraction system to perform the testing, and two days of pilot testing to collect vacuum and flow rate readings, organic vapor measurements and analytical air samples.

Based on the findings of the additional soil investigation and SVE pilot study, a SVE Pilot Test Summary and SVE System Design Report was prepared (November 2007) and submitted to NYSDEC for review and comment. In late 2008 and early 2009, the extraction wells and piping trenches were installed and the SVE system was designed and purchased. In March 2009, the SVE system was installed and went into operation (see Attachment 4 for the SVE Installation Report). Monitoring of the SVE system is conducted to measure total volatile organic compounds being extracted by the system. Adjustments to the system (i.e., balance flow rates from the 17 extraction wells) are also made to help enhance the system performance.

BUILDING 7 REMEDIAL INVESTIGATION

Ten (10) AOIs identified by the CCS, are located within the Building 7 BCP Site footprint and investigated as part of the field investigations in 2006. Approximately 58 soil probes were completed to assess the 10 AOIs. At each AOI, samples were analyzed for VOCs, SVOCs, PCBs, and metals.

AOI-8 was a former PCE tank farm area located outside of Building 7 in the southwestern alleyway between Building 7 and Building 10.

AOI-9 was a former hexavalent chromium operation in the central portion of Building 7.

AOI-10 was historic coal pile area located outside of Building 7 in the northeastern corner of the Building 7 BCP Site.

AOI-12 was the eleven (11) former degreasing operation locations throughout Building 7.

AOI-13 was a former underground storage tank (UST) located outside of Building 7 in the northeastern corner.

AOI-14 is a waste oil storage area located outside of Building 7 in the northeastern corner.

AOI-15 was a liquid flux storage room in the southern portion of Building 7.

AOI-16 was a historical PCB area located in the northeastern corner of Building 7.

AOI-17 was a historic train well and truck dock in the northwestern corner of Building 7.

AOI-38 was a former gasoline and kerosene USTs located near Garage Building 15 in the northeastern corner of the Building 7 BCP Site footprint.

The field investigations identified elevated levels of chlorinated solvent in soils beneath several former degreaser areas (AOI-12), as well as chlorinated solvents and semi-volatile organic compounds (SVOCs) in groundwater immediately upgradient (west) of the building. The chlorinated solvents detected were generally below the Part 375 Industrial Soil Cleanup Objectives (ISCO). However, tetrachloroethene (PCE) was detected in three soil samples tested (7-G-3-B, 6 to 8 ft bgs; 7-G-8-B, 8 to 10 ft bgs; 7-G-8-C, 8 to 10.5 ft bgs) at concentrations above the PCE Part 375 industrial SCO of 300 ppm (see Figure 3). Additionally, some semi-volatile organic compounds were detected in soil samples from AOI-10, AOI-14 and AOI-16. SVOCs detected in samples from AOI-14 and AOI-16 exceed their respective ISCOs and SVOCs detected in the samples from AOI-10 exceed their respective Part 375 Commercial Soil Cleanup Objectives (CSCOs).

BUILDING 8 REMEDIAL INVESTIGATION

Three AOIs identified by the CCS are located within the footprint of the Building 8 BCP site and were investigated as part of the field investigations in 2006. Thirty-two (32) soil probes were completed to assess the AOIs (see Figure 3). At each AOI, samples were analyzed for VOCs, SVOCs, PCBs, and metals. These AOIs are as follows.

- AOI-18 was a former chromium sump area in the central portion of the building.
- AOI-22 was six (6) former degreasing locations located throughout the building.
- AOI-23 was a historic press operations area in the northeastern portion of the building.

The investigation identified elevated levels of chlorinated solvents in soils beneath one former degreaser area (AOI-22) in the southeastern interior of Building 8, as well as chlorinated solvents in groundwater south of the building. Arsenic and benzo(a)pyrene were also detected at elevated levels at AOI-18 and AOI-23, respectively.

Boring 8-001-G was one of nine borings completed within AOI-18. Results of the soil samples from 8-001-G indicated that arsenic was detected at a concentration of 65.8 parts per million (ppm) in a sample collected from 2 to 4 feet below the building slab. This detection of arsenic is above its NYSDEC Part 375 Industrial Soil Cleanup Objective (ISCO) of 16 ppm. No other compounds were detected above their respective Industrial SCO in the samples collected to address AOI-18. This detection is not considered to be significant as arsenic is not mobile in soil, its detection was limited to one location at a depth of 2 to 4 feet, which is above the groundwater table in this area of the site.

Boring 8-006-F was one of seven borings completed to address AOI-23. Benzo(a)pyrene was detected at a concentration of 1.4 ppm in a sample collected from 8-006-F; 0 to 1.5 feet below the building slab. This detection of benzo(a)pyrene is above its NYSDEC Part 375 ISCO of 1.1 ppm. This detection is not considered to be significant as SVOCs are not mobile in soil, its detection was limited to one location at a depth of 0 to 1.5 feet, which is above the groundwater table in this area of the site. No other compounds were detected above their respective Industrial SCO in the samples collected to address AOI-23.

Boring 8-005-3C was one of 16 borings completed to address AOI-22, the six (6) former degreaser locations. Trichloroethene (TCE) was detected at a concentration of 1,000 ppm in a sample collected from 8-005-3C; 8 to 10 feet below the building slab. This detection of TCE is above its NYSDEC Part 375 Industrial Soil Cleanup Objective of 400 ppm. No other compounds were detected above their respective Industrial SCO in the samples collected to address AOI-22.

BUILDING 9 SPILL INVESTIGATION

In 2006, former Site owner Delphi Automotive (Delphi) completed a site-wide Current Conditions Summary and Field Investigation Report (Study) to identify areas of soil and/or groundwater contamination. Polyaromatic hydrocarbons (PAHs) were detected in two areas within Building 9, at concentrations that exceed the NYSDEC Part 375-6.8(b) Industrial Soil Cleanup Objectives (SCOs), and light non-aqueous phase liquid (LNAPL) was identified as a potential issue in Building 9.

Initial delineation of the extent of contamination was completed in July 2008. Two bedrock monitoring wells (designated as MW-9-4 and MW-9-12) were installed and seven soil probes (SP-9-1, SP-9-2, SP-9-3, SP-9-5, SP-9-9, SP-9-10 and SP-9-11) were completed as part of the PAH delineation work in Building 9 (see Figure 2).

Overburden groundwater was encountered at approximately 5 to 6 feet below the building slab at the MW-9-4 location on the western side of Building 9, and at about 9 to 10 feet bgs at the MW-9-12 location on the southeastern side of the building. LNAPL was encountered at MW-9-4 at a measured thickness that ranged from 18 to 22 inches during the initial investigation. NYSDEC was contacted and Spill # 0890721 was assigned.

Five semi-volatile organic compounds (SVOCs) were detected at concentrations above method detection limits (MDLs) in one (SP-9-5, 1 to 3.5 feet) of the nine soil samples sent for laboratory analysis from the two test borings and seven soil probes completed. None of the five SVOCs were detected at concentrations above their respective Residential SCOs. No SVOCs were detected above MDLs in the soil samples submitted for chemical analysis from the other eight locations.

SVOCs were detected at concentrations above MDLs in one of the two groundwater samples sent for laboratory analysis from the two monitoring wells installed in association with the work at Building 9. Fluoranthene (7.99 ppm) and phenanthrene (7.97 ppm) were the two compounds

detected above MDLs in the groundwater sample from MW-9-4. Both compounds were detected at concentrations above their respective Class GA groundwater criteria of 50 parts per billion (0.050 ppm). No SVOCs were detected in the groundwater sample submitted for analysis from MW-9-12.

LNAPL was detected in monitoring well, MW-9-4. Polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), SVOC fingerprint, specific gravity and viscosity analysis were performed on the LNAPL sample collected. No PCBs or VOCs were detected above method detection limits. The SVOC fingerprint scan analysis was consistent with the SVOC fingerprint scan Delphi had done on product encountered during an excavation for the installation of a foundation for a piece of equipment that was installed within 10 feet of MW-9-4 in 2003. The free product encountered in 2003 was reported to the NYSDEC and documented as Spill #0375398, which was listed as closed on July 14, 2004.

APPENDIX 4

SITE HEALTH AND SAFETY PLAN AMENDMENT FORM

APPENDIX 4

SITE HEALTH AND SAFETY PLAN AMENDMENT FORM

Amendment No.:

Site Name:

Work Assignment No.:

Date:

Type of Amendment:

Reason for Amendment:

Alternate Safeguard Procedures:

Required Changes in PPE:

Project Manager Notified

☐

Site Health and Safety Officer

Date

This original form must remain on site and a copy placed in the office file HASP.
Check amendment box on first page.

APPENDIX 5

TASK-SPECIFIC HEALTH AND SAFETY RISK ASSESSMENT (TSHSRA)

HAZARD EVALUATION

HAZARD ANALYSIS OF SITE WORK TASKS

Task Name: Groundwater Monitoring Well Sampling

Potential Hazards: (Check all that apply to either existing conditions or are a result of site operations)

- | | | |
|---|---|--|
| <input type="checkbox"/> Rotating machinery | <input type="checkbox"/> Projectiles | <input type="checkbox"/> Confined space |
| <input checked="" type="checkbox"/> Heat stress | <input type="checkbox"/> Physical exertion | <input checked="" type="checkbox"/> Biological (plants, rodent viruses, marine species, soil- or waterborne fungi/bacteria, insects, arachnids, snakes, wild animals) [†] |
| <input type="checkbox"/> Work over water (lagoons, streambeds, ravines, bay, ocean) | <input checked="" type="checkbox"/> Uneven terrain | |
| <input checked="" type="checkbox"/> Slips, trips, falls | <input type="checkbox"/> Trench/excavation collapse | <input type="checkbox"/> Electrical (utilities) |
| <input type="checkbox"/> Cold stress | <input type="checkbox"/> Noise (>85 dBA) | <input checked="" type="checkbox"/> Chemical exposure |
| <input type="checkbox"/> Heavy equipment | <input type="checkbox"/> Vehicle traffic | <input type="checkbox"/> Explosive ordnance |
| <input type="checkbox"/> Intrusive activities [‡] (underline) | <input type="checkbox"/> Fire/explosion (underline) | |
| <input type="checkbox"/> Other (list) | | |
| • Excavating | • Flammable materials | _____ |
| • Sampling | • Low-lying areas | _____ |
| • Vibracoring | • Fuel lines | _____ |

[‡] Determine if underground utilities are present by using all relevant maps and building plans. Call Underground Service Alert (USA) 1-800-422-4133.

* If sampling for the purpose of determining the presence or absence of hazardous materials, a site-specific HSP in accordance with 29 CFR 1910.120 is required by law. Consult the SHE Coordinator.

[†] Insects such as bees and wasps. Arachnids such as ticks, scorpions, and spiders. Marine species may include jellyfish, stingrays, sea urchins, rock fish, stone fish, sharks, and coral. Consult with the Corporate SHE Director or regional SHE Manager for protective measures against viruses or fungi.

Control or Protective Measures: (Check all that apply)

- | | | |
|--|---|---|
| <input type="checkbox"/> Tailgate meetings | <input checked="" type="checkbox"/> PPE | <input checked="" type="checkbox"/> Safe work practices |
| <input type="checkbox"/> Operator training | <input type="checkbox"/> Site control | |
| <input type="checkbox"/> Engineering controls: _____ | | |
| <input type="checkbox"/> SOPs: _____ | | |
| <input type="checkbox"/> Other: _____ | | |

PERSONAL PROTECTIVE EQUIPMENT

Initial levels of protection have been assigned per work task. Levels may be upgraded or downgraded depending on site conditions, as determined by the SHSC.

RESPIRATOR: ☐ Air-purifying Respirator (medical monitoring required) ☐ Other _____

PROTECTIVE CLOTHING: ☐ Tyvek® ☐ PE Tyvek® ☐ Wetsuit ☐ Drysuit ☐ Other _____

HEAD/EYE/EAR: ☐ Hard Hat ☒ Safety Glasses ☐ Goggles ☐ Earplugs/Muffs ☐ Other _____

GLOVES: ☐ Leather Work Gloves ☐ Neoprene ☐ PVC ☐ Vinyl ☒ Other Nitrile and/or Latex _____

FOOTWEAR: ☒ Safety-toe Leather ☐ Safety-toe Rubber ☐ Overboots ☐ Snakeguards ☐ Other _____

Modifications Permitted: _____

HAZARD EVALUATION

HAZARD ANALYSIS OF SITE WORK TASKS

Task Name: SVE System Monitoring

Potential Hazards: (Check all that apply to either existing conditions or are a result of site operations)

- | | | |
|---|---|---|
| <input type="checkbox"/> Rotating machinery | <input type="checkbox"/> Projectiles | <input type="checkbox"/> Confined space |
| <input checked="" type="checkbox"/> Heat stress | <input type="checkbox"/> Physical exertion | <input type="checkbox"/> Biological (plants, rodent viruses, marine species, soil- or waterborne fungi/bacteria, insects, arachnids, snakes, wild animals)† |
| <input type="checkbox"/> Work over water (lagoons, streambeds, ravines, bay, ocean) | <input type="checkbox"/> Uneven terrain | |
| <input checked="" type="checkbox"/> Slips, trips, falls | <input type="checkbox"/> Trench/excavation collapse | <input type="checkbox"/> Electrical (utilities) |
| <input type="checkbox"/> Cold stress | <input checked="" type="checkbox"/> Noise (>85 dBA) | <input checked="" type="checkbox"/> Chemical exposure |
| <input type="checkbox"/> Heavy equipment | <input type="checkbox"/> Vehicle traffic | <input type="checkbox"/> Explosive ordnance |
| <input type="checkbox"/> Intrusive activities‡ (underline) | <input type="checkbox"/> Fire/explosion (underline) | |
| <input type="checkbox"/> Other (list) | | |
| • Excavating | • Flammable materials | _____ |
| • <u>Sampling</u> | • Low-lying areas | _____ |
| • Vibracoring | • Fuel lines | _____ |

‡ Determine if underground utilities are present by using all relevant maps and building plans. Call Underground Service Alert (USA) 1-800-422-4133.

* If sampling for the purpose of determining the presence or absence of hazardous materials, a site-specific HSP in accordance with 29 CFR 1910.120 is required by law. Consult the SHE Coordinator.

† Insects such as bees and wasps. Arachnids such as ticks, scorpions, and spiders. Marine species may include jellyfish, stingrays, sea urchins, rock fish, stone fish, sharks, and coral. Consult with the Corporate SHE Director or regional SHE Manager for protective measures against viruses or fungi.

Control or Protective Measures: (Check all that apply)

- | | | |
|---|---|---|
| <input checked="" type="checkbox"/> Tailgate meetings | <input checked="" type="checkbox"/> PPE | <input checked="" type="checkbox"/> Safe work practices |
| <input checked="" type="checkbox"/> Operator training | <input type="checkbox"/> Site control | |
| <input type="checkbox"/> Engineering controls: _____ | | |
| <input type="checkbox"/> SOPs: _____ | | |
| <input type="checkbox"/> Other: _____ | | |

PERSONAL PROTECTIVE EQUIPMENT

Initial levels of protection have been assigned per work task. Levels may be upgraded or downgraded depending on site conditions, as determined by the SHSC.

RESPIRATOR: ☐ Air-purifying Respirator (medical monitoring required) ☐ Other _____

PROTECTIVE CLOTHING: ☐ Tyvek® ☐ PE Tyvek® ☐ Wetsuit ☐ Drysuit ☐ Other _____

HEAD/EYE/EAR: ☐ Hard Hat ☒ Safety Glasses ☐ Goggles ☒ Earplugs/Muffs ☐ Other _____

GLOVES: ☐ Leather Work Gloves ☐ Neoprene ☐ PVC ☐ Vinyl ☒ Other Nitrile or Latex Inner

FOOTWEAR: ☒ Safety-toe Leather ☐ Safety-toe Rubber ☐ Overboots ☐ Snakeguards ☐ Other _____

Modifications Permitted: _____

HAZARD EVALUATION

HAZARD ANALYSIS OF SITE WORK TASKS

Task Name: Test Boring, Soil Probes & Well Installation

Potential Hazards: (Check all that apply to either existing conditions or are a result of site operations)

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> Rotating machinery | <input type="checkbox"/> Projectiles | <input type="checkbox"/> Confined space |
| <input checked="" type="checkbox"/> Heat stress | <input type="checkbox"/> Physical exertion | <input type="checkbox"/> Biological (plants, rodent viruses, marine species, soil- or waterborne fungi/bacteria, insects, arachnids, snakes, wild animals)† |
| <input type="checkbox"/> Work over water (lagoons, streambeds, ravines, bay, ocean) | <input type="checkbox"/> Uneven terrain | |
| <input checked="" type="checkbox"/> Slips, trips, falls | <input type="checkbox"/> Trench/excavation collapse | <input checked="" type="checkbox"/> Electrical (utilities) |
| <input type="checkbox"/> Cold stress | <input checked="" type="checkbox"/> Noise (>85 dBA) | <input checked="" type="checkbox"/> Chemical exposure |
| <input checked="" type="checkbox"/> Heavy equipment | <input checked="" type="checkbox"/> Vehicle traffic | <input type="checkbox"/> Explosive ordnance |
| <input checked="" type="checkbox"/> Intrusive activities‡ (underline) | <input checked="" type="checkbox"/> Fire/explosion (underline) | |
| <input type="checkbox"/> Other (list) | | |
| • Excavating | • Flammable materials | <u>Rotary Drilling</u> |
| • <u>Sampling</u> | • Low-lying areas | _____ |
| • Vibracoring | • Fuel lines | _____ |

‡ Determine if underground utilities are present by using all relevant maps and building plans. Call Underground Service Alert (USA) 1-800-422-4133.

* If sampling for the purpose of determining the presence or absence of hazardous materials, a site-specific HSP in accordance with 29 CFR 1910.120 is required by law. Consult the SHE Coordinator.

† Insects such as bees and wasps. Arachnids such as ticks, scorpions, and spiders. Marine species may include jellyfish, stingrays, sea urchins, rock fish, stone fish, sharks, and coral. Consult with the Corporate SHE Director or regional SHE Manager for protective measures against viruses or fungi.

Control or Protective Measures: (Check all that apply)

- | | | |
|---|---|---|
| <input checked="" type="checkbox"/> Tailgate meetings | <input checked="" type="checkbox"/> PPE | <input checked="" type="checkbox"/> Safe work practices |
| <input checked="" type="checkbox"/> Operator training | <input type="checkbox"/> Site control | |
| <input type="checkbox"/> Engineering controls: _____ | | |
| <input type="checkbox"/> SOPs: _____ | | |
| <input type="checkbox"/> Other: _____ | | |

PERSONAL PROTECTIVE EQUIPMENT

Initial levels of protection have been assigned per work task. Levels may be upgraded or downgraded depending on site conditions, as determined by the SHSC.

RESPIRATOR: ☐ Air-purifying Respirator (medical monitoring required) ☐ Other _____

PROTECTIVE CLOTHING: ☐ Tyvek® ☐ PE Tyvek® ☐ Wetsuit ☐ Drysuit ☐ Other _____

HEAD/EYE/EAR: ☒ Hard Hat ☒ Safety Glasses ☐ Goggles ☒ Earplugs/Muffs ☐ Other _____

GLOVES: ☐ Leather Work Gloves ☐ Neoprene ☐ PVC ☐ Vinyl ☒ Other Nitrile or Latex Inner

FOOTWEAR: ☒ Safety-toe Leather ☐ Safety-toe Rubber ☐ Overboots ☐ Snakeguards ☐ Other _____

Modifications Permitted: _____

APPENDIX 6

MATERIAL SAFETY DATA SHEETS
OF MATERIALS BROUGHT TO SITE BY GZA



Material Safety Data Sheet

January 29, 2003

YSI Incorporated
1725 Brannum Lane
Yellow Springs, OH 45387
USA

Information and Emergency Phone: (937) 767-7241

Page 1 of 2

SECTION 1 - MATERIAL IDENTIFICATION

PRODUCT NAME: **YSI 3169 Conductivity Calibrator 50,000 micromho/cm** FORMULA: n/ap

Chemical Type: Dilute water solution of the listed ingredients.

CAS No. n/ap

SECTION 2 - HAZARDOUS / IMPORTANT INGREDIENTS

Chemical / Synonym	CAS No.	PERCENT	PEL/TLV	CARCINOGEN (OSHA, NTP, IARC)
Potassium Chloride	7447-40-7	<1.0	none	no

Water (balance)

SECTION 3 - CHEMICAL AND PHYSICAL PROPERTIES

Appearance: <u>clear bluish tinted liquid</u>	Boiling Point: <u>212°F (100°C)</u>
Odor: <u>slt. acrid</u>	Melting Point: <u>32 °F (0°C)</u>
pH: <u>neutral</u>	Specific Gravity: <u>1.00</u>
Water Solubility: <u>infinite</u>	Vapor Pressure: <u>= water</u>
Evaporation Rate: <u>= water</u>	Vapor Density: <u>= water vapor</u>

SECTION 4 - FIRE AND EXPLOSION HAZARDS

Flash Point: none Explosive Limits: none
Extinguishing Media: n/ap
Material is basically water, and is not combustible nor does it emit flammable vapors.

SECTION 5 - REACTIVITY INFORMATION

Stable: X Unstable: _____ Precautions: none
Hazardous Polymerization: Occurs: _____ Does Not Occur: X
Incompatibility: Extensive contact may cause reaction with aluminum, steel, zinc, magnesium.
Hazardous Decomposition Products: none from water solution

SECTION 6 - HEALTH HAZARDS / PROTECTIVE MEASURES / FIRST AIDInhalation:

Use a NIOSH approved respirator for liquid mists and/or splashes. Get supplier recommendations. Provide adequate ventilation. Avoid conditions that cause misting or splashing.

Remove to fresh air. Give artificial respiration and get medical attention as needed.

Skin:

May cause irritation with repeated exposure.

Wear water-resistant gloves as needed.

Wash exposed areas with soap and water for 15 minutes. Remove contaminated clothing, and wash before re-using.

Eyes:

Can cause irritation and potential eye damage with repeated exposure.

Wear splash-proof water resistant goggles. Have convenient eye-wash stations.

Flush with water for 15 minutes.

Ingestion:

Can cause irritation of mouth, throat, and an upset stomach.

Wear a mouth cover or face shield when there is splashing.

Do not swallow. Rinse mouth. If swallowed, do not induce vomiting. Get prompt medical attention.

(No chronic effects reported)

IN ALL CASES: GET MEDICAL ATTENTION IF EFFECTS PERSIST.

Most likely routes of entry: skin, eyes, ingestion.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

Spills and Leaks: Flush to sewer or ground with lots of water.

Storage and Handling: Keep containers closed, and do not heat over about 125°F. Discard any material that may be contaminated, or which otherwise may have changed composition. Use personal protection as described in Section 6.

Waste Disposal: In accordance with applicable regulations for liquid wastes. Is not a RCRA hazardous waste as of this date.

Empty Containers: Rinse. Dispose as appropriate for glass and plastic containers.

SECTION 8 - REGULATORY INFORMATION

DOT: Not regulated.

SARA Title III, S.313, Form R: Nothing reportable.

The information contained herein is based on data available at this time and is believed to be accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Since information contained herein may be applied under conditions beyond our control, and with which we may be unfamiliar, no responsibility is assumed for the results of its use. The person receiving this information shall make his own determination of the suitability of the material for his particular use.

A96007C

MATERIAL SAFETY DATA SHEET

NCL of Wisconsin, Inc.
P.O. Box 8
Birnamwood, WI 54414
Emergency Telephone No: 715-449-2673

Date of this revision: 8/01/2001

PRODUCT IDENTIFICATION:

Product name: YSI 6073 Turbidity Standard, 100 NTU
Synonyms: None. Molecular weight: NA
Chemical Name: NA Chemical Family: NA
Product CAS#: NA Formula: NA

INGREDIENTS:

1. AMCO Turbidity Std, 1000 NTU CAS# 9003-70-7
Percent: 10 SARA: Not listed
TLV: Not Established PEL: Not Established
Hazard: None
2. Demineralized water CAS# 7732-18-5
Percent: 90 SARA: Not listed
TLV: Not applicable PEL: Not applicable
Hazard: None

PRECAUTIONARY MEASURES

Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Minimal contact, as with all chemicals, is a good policy to follow. In our opinion, the toxicological effects of this product have not been fully investigated.

EMERGENCY/FIRST AID

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. If swallowed, induce vomiting by giving two glasses of water and sticking finger down throat. Never give anything by mouth to an unconscious person. In all cases call a physician.

DOT Hazard Class: Not Regulated.

Physical Data SECTION ONE

Appearance: Cloudy white solution.

Odor: Odorless.

Solubility: Infinitely soluble in water.

Boiling Point: 100 C (212 F)

Melting Point: 0 C (32 F)

Specific Gravity: 1.0

Vapor Density (Air=1): Essentially the same as water.

Vapor Pressure (mm Hg): Essentially the same as water.

Evaporation Rate: Essentially the same as water.

Fire and Explosion SECTION TWO
Information

Fire: Not considered to be a fire hazard.

Explosion: Not considered to be an explosion hazard.

Fire Extinguishing Media: Use any suitable means for extinguishing surrounding fire.

Reactivity Data SECTION THREE

Stability: Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products: None known.

Hazardous Polymerization: This substance does not polymerize.

Incompatibilities: Organic compounds.

Leak/Spill/Disposal SECTION FOUR
Information

Flush to sewer with large amounts of water.

Ensure compliance with Federal, State, and local regulations.

Reportable Quantity: Not established.

Health Hazard Information SECTION FIVE

A. Exposure/Health Effects

Inhalation: No information found.

Ingestion: No information found.

Skin Contact: No information found.

Eye Contact: No information found.

Chronic Exposure: No information found.

Cancer information: No information found for any ingredient.

Aggravation of Pre-existing conditions: No information found.

B. FIRST AID

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion: If swallowed induce vomiting by giving two glasses of water and sticking finger down throat. Never give anything to an unconscious person. Get medical attention immediately.

Skin Exposure: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing. Get medical attention if irritation develops or persists.

Eye Exposure: Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention if irritation develops.

Occupational Control SECTION SIX

Measures

Ventilation System: In general, dilution ventilation is a satisfactory health hazard control for this material. However, if conditions of use create discomfort to a worker, a local exhaust should be considered.

Personal Respirators (NIOSH Approved): For conditions of use where exposure to mist exists, a dust/mist respirator may be worn. For emergencies, a self-contained breathing apparatus may be necessary.

Skin Protection: Rubber gloves and lab coat, apron or overalls.

Eye Protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Contact lenses should not be worn when working with this material.

Maintain eye-wash fountain and quick-drench facilities in work area.

Storage and Special Information SECTION SEVEN

Keep in a tightly closed container. Protect container from physical damage. Protect from freezing and contamination.

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, NCL of Wisconsin, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, NCL of Wisconsin, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. NO REPRESENTATIONS, OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR TO THE PRODUCT TO WHICH THE INFORMATION REFERS.

END OF MATERIAL SAFETY DATA SHEET

Material Safety Data Sheet

Product Name: AMCO CLEAR® Turbidity Standard	Manufacturer: APS Analytical Standards Address: 123 Saginaw Drive Redwood City, CA 94063
MSDS Number: A002-01	Phone Number: (650) 366-2626
CAS Number: 9003-70-7	Fax Number: (650) 368-4470
Date Prepared: 10/04/93	
Date Revised: 01/02/01	
Prepared By: Safety Manager	Note: Blank spaces are not permitted. If any item is not applicable, the space must be marked to indicate that.

Section 1 - MATERIAL IDENTIFICATION AND INFORMATION

Components - Chemical Name & Common Names	%
Styrene Divinyl Benzene Copolymer Bead	<1%
Deionized/Reverse Osmosis Water	>99%
Total	100%

Section 2 - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point	100° Celsius	Specific Gravity (H ₂ O = 1.0)	1.0
Vapor Pressure	760 mm Hg	Melting Point	N/A
Vapor Density (Air=1)	N/A	Evaporation Rate	N/A
Solubility in Water	N/A	Water Reactive	1.0
Appearance/Odor	Clear to Opaque Liquid/No Odor	pH	6.7

Section 3 - FIRE AND EXPLOSION DATA

Flash Point and Method Used	N/A	Auto Ignition Temperature	N/A
Flammability Limits in Air % by Volume	N/A	Extinguisher Media	N/A
Special Fire Fighting Procedures	N/A	Unusual Fire Explosion Hazards	None

Section 4 - REACTIVITY HAZARD DATA

Stability:	Stable	Hazardous Decomposition Products:	None
Conditions to avoid:	None	Hazardous Polymerization:	Will not occur
Incompatibility:	Organics		

Section 5 -HEALTH HAZARD DATA

Primary Routes of Entry:	Ingestion	Carcinogen Listed In:	Not Listed
Health Hazards:	None	Signs and Symptoms of Exposure:	N/A
Medical Conditions Generally Aggravated by Exposure:	None		

Emergency First Aid Procedures - Seek medical assistance for further treatment, observation and support if necessary.

Eye Contact:	Flush with water several times	Inhalation:	N/A
Skin Contact:	Wash hands / use moisturizer if dryness develops	Ingestion:	Not Hazardous

Section 6 - CONTROL AND PROTECTIVE MEASURES

Respiratory Protection:	N/A	Protective Gloves:	N/A	Eye Protection:	N/A
Ventilation to be used:	Regular Ventilation	Other Protective Equipment:	N/A		
Hygienic Work Practices:	N/A				

Section 7 - PRECAUTIONS FOR SAFE HANDLING / LEAK PROCEDURES

Steps to be taken if material is spilled:	Use absorbent towel(s) / wash residual into drain.
Waste Disposal Methods:	Standard non-toxic disposal methods (trash, wash into drain).
Precautions to be taken in handling and storage:	Prevent from freezing and Contamination
Other Precautions and/or Special Hazards:	N/A

NFPA Rating: Health_0_ Flammability_0_ Reactivity_0_ Special_0_
HMIS Rating: Health_0_ Flammability_0_ Reactivity_0_ Personal Protection_0_

Material Safety Data Sheet

NCL of Wisconsin, Inc.
PO Box 8
Birnamwood, WI 54414
Emergency Telephone No: 800-424-9300 (Chemtrec)

Date of this revision: 11-02-2004

Product Identification

Product Name: YSI 3822 Buffer Solution, pH = 7.00
Synonyms: None. Molecular Weight: NA
Chemical Name: NA Chemical Family: NA
Product CAS#: NA Formula: NA

Ingredients

1. Potassium Phosphate Monobasic CAS# 7778-77-0
Percent: <1 SARA: Not Listed.
TLV: Not established. PEL: Not Established
Hazard: Moderately toxic - May cause Irritation.
2. Sodium Hydroxide CAS# 1310-73-2.
Percent: <1 SARA: Not listed
TLV: 2 mg/m³ PEL: 2 mg/m³
3. Yellow Food Coloring CAS# Not listed.
Percent: <0.02 SARA: Not listed.
TLV: Not established. PEL: Not established.
Hazard: None Known.
4. Deionized Water CAS# 7732-18-5
Percent: >98 SARA: Not listed.
TLV: Not applicable PEL: Not applicable
Hazard: None.

Precautionary Measures

Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Minimal contact, as with all chemicals, is a good policy to follow.

Emergency/First Aid

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. If swallowed, give two glasses of water or milk to dilute. Call a physician.

DOT Hazard Class: Not Regulated

Physical Data

Section One

Appearance: Clear yellow solution
Odor: Odorless
Solubility: Infinitely soluble in water.
Boiling Point: 100° C (212° F)
Melting Point: 0° C (32° F)
Specific Gravity: 1.0

Vapor Density (Air=1): Essentially the same as water.
Vapor Pressure (mm Hg): Essentially the same as water.
Evaporation Rate: Essentially the same as water.

Fire and Explosion
Information

Section Two

Fire: Not considered to be a fire hazard.
Explosion: Not considered to be an explosion hazard
Fire Extinguishing Media: Use any suitable means for extinguishing surrounding fire.

Reactivity Data

Section Three

Stability: Stable under ordinary conditions of use and storage
Hazardous Decomposition Products: None known.
Hazardous Polymerization: This substance does not polymerize.
Incompatibilities: None known.

Leak/Spill/Disposal
Information

Section Four

Flush to sewer with large amounts of water.
Ensure compliance with Federal, State, and local regulations
Reportable Quantity: 5000 lbs.

Health Hazard Information

Section Five

A. Exposure/Health Effects

Inhalation: No information found.
Ingestion: Large doses may cause diarrhea.
Skin Contact: Prolonged contact may cause irritation.
Eye Contact: May cause irritation and damage.
Chronic Exposure: Potassium phosphate, one of the ingredients, may sequester calcium and cause calcium phosphate deposits in the kidneys.
Cancer information: No information found for any ingredient
Aggravation of Pre-existing Conditions: No information found

B. First Aid

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion: If swallowed, give two glasses of water to dilute. Give medical attention immediately.
Skin Exposure: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing. Get medical attention if irritation develops or persists.
Eye Exposure: Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Occupational Control
Measures

Section Six

Ventilation System: In general, dilution ventilation is a satisfactory health hazard control for this material. However, if conditions of use create discomfort to a worker, a local exhaust should be considered.

Personal Respirators (NIOSH Approved): For conditions of use where exposure to mist exists, a dust/mist respirator may be worn. For emergencies, a self-contained breathing apparatus may be necessary.

Skin Protection: Rubber gloves and lab coat, apron or overalls.

Eye Protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Contact lenses should not be worn when working with this material.

Maintain eye-wash fountain and quick-drench facilities in work areas.

Storage and Special
Information

Section Seven

Keep in a tightly closed container. Protect container from physical damage.

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END OF MATERIAL SAFETY DATA SHEET

Material Safety Data Sheet

NCL of Wisconsin, Inc.
PO Box 8
Birnamwood, WI 54414
Emergency Telephone No: 800-424-9300 (Chemtrec)

Date of this revision: 11-02-2004

Product Identification

Product Name: YSI 3821 Buffer Solution, PH = 4.0
Synonyms: None. Molecular Weight: NA
Chemical Name: NA Chemical Family: NA
Product CAS#: NA Formula: NA

Ingredients

1. Potassium Acid Phthalate CAS# 877-24-7
Percent: <2 SARA: Not Listed.
TLV: Not established. PEL: Not Established
Hazard: May cause eye and respiratory tract irritation.
2. Red Food Coloring CAS# Not listed.
Percent: <0.02 SARA: Not listed
TLV: Not established. PEL: Not established
Hazard: None known.
3. Deionized Water CAS# 7732-18-5
Percent: >98 SARA: Not listed.
TLV: Not applicable PEL: Not applicable
Hazard: None.

Precautionary Measures

Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Minimal contact, as with all chemicals, is a good policy to follow.

Emergency/First Aid

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. If swallowed, give two glasses of water or milk to dilute. Call a physician.

DOT Hazard Class: Not Regulated

Physical Data

Section One

Appearance: Clear Pink solution
Odor: Odorless
Solubility: Infinitely soluble in water.
Boiling Point: 100° C (212° F)
Melting Point: 0° C (32° F)
Specific Gravity: 1.0
Vapor Density (Air=1): Essentially the same as water.
Vapor Pressure (mm Hg): Essentially the same as water.
Evaporation Rate: Essentially the same as water.

Fire and Explosion
Information

Section Two

Fire: Not considered to be a fire hazard.

Explosion: Not considered to be an explosion hazard

Fire Extinguishing Media: Use any suitable means for extinguishing surrounding fire.

Reactivity Data

Section Three

Stability: Stable under ordinary conditions of use and storage

Hazardous Decomposition Products: May emit toxic fumes of carbon monoxide, carbon dioxide, and potassium oxide if involved in a fire.

Hazardous Polymerization: This substance does not polymerize.

Incompatibilities: Strong solutions of nitric acid.

Leak/Spill/Disposal
Information

Section Four

Flush to sewer with large amounts of water.

Ensure compliance with Federal, State, and local regulations

Reportable Quantity: 5000 lbs.

Health Hazard Information

Section Five

A. Exposure/Health Effects

Inhalation: May cause irritation to mucous membranes due to slight acidity.

Ingestion: Large doses may cause nausea, vomiting and abnormal sensations in hands and feet. Because of slight acidity, may cause irritation to mucous membranes.

Skin Contact: May cause irritation, redness, and pain.

Eye Contact: May cause irritation and damage.

Chronic Exposure: No information found.

Cancer information: No information found for any ingredient

Aggravation of Pre-existing Conditions: No information found

B. First Aid

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion: If swallowed, give two glasses of water to dilute. Give medical attention immediately.

Skin Exposure: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing. Get medical attention if irritation develops or persists.

Eye Exposure: Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Occupational Control
Measures

Section Six

Ventilation System: In general, dilution ventilation is a satisfactory health hazard control for this material. However, if conditions of use create discomfort to a worker, a local exhaust should be considered.

Personal Respirators (NIOSH Approved): For conditions of use where exposure to mist exists, a dust/mist respirator may be worn. For emergencies, a self-contained breathing apparatus may be necessary.

Skin Protection: Rubber gloves and lab coat, apron or overalls.

Eye Protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Contact lenses should not be worn when working with this material.

Maintain eye-wash fountain and quick-drench facilities in work areas.

Storage and Special
Information

Section Seven

Keep in a tightly closed container. Protect container from physical damage.

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END OF MATERIAL SAFETY DATA SHEET

Material Safety Data Sheet

NCL of Wisconsin, Inc.
PO Box 8
Birnamwood, WI 54414
Emergency Telephone No: 800-424-9300 (Chemtrec)

Date of this revision: 11-02-2004

Product Identification

Product Name: YSI 3823 Buffer Solution, PH = 10.00
Synonyms: None. Molecular Weight: NA
Chemical Name: NA Chemical Family: NA
Product CAS#: NA Formula: NA

Ingredients

1. Disodium EDTA dehydrate CAS# 6381-92-6
Percent: 1 SARA: Not Listed.
TLV: Not established. PEL: Not Established
Hazard: Slight. May cause irritation. Moderately toxic by ingestion.
2. Potassium Carbonate CAS# 584-08-7
Percent: <1 SARA: Not listed
TLV: Not established. PEL: Not established
Hazard: Slight. Causes irritation.
3. Potassium Borate CAS# 12228-88-5.
Percent: <1 SARA: Not listed.
TLV: Not established. PEL: Not established.
Hazard: Unknown
4. Potassium Hydroxide CAS# 1310-58-3
Percent: <1 SARA: Listed.
TLV: 2 mg/m³ PEL: 2 mg/m³
Hazard: Moderate. May cause burns.
5. Blue Food Coloring CAS# Not listed.
Percent: <0.02 SARA: Not listed.
TLV: Not established. PEL: Not established.
Hazard: None known.
6. Deionized water CAS# 7732-18-5
Percent: >98 SARA: Not listed
TLV: Not applicable. PEL: Not applicable.
Hazard: None.

Precautionary Measures

Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Minimal contact, as with all chemicals, is a good policy to follow.

Emergency/First Aid

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. If swallowed, give two glasses of water or milk to dilute. Call a physician.

DOT Hazard Class: Not Regulated

Physical Data

Section One

Appearance: Clear blue solution.
Odor: Odorless
Solubility: Infinitely soluble in water.
Boiling Point: 100° C (212° F)
Melting Point: 0° C (32° F)
Specific Gravity: 1.0
Vapor Density (Air=1): Essentially the same as water.
Vapor Pressure (mm Hg): Essentially the same as water.
Evaporation Rate: Essentially the same as water.

Fire and Explosion
Information

Section Two

Fire: Not considered to be a fire hazard.
Explosion: Not considered to be an explosion hazard
Fire Extinguishing Media: Use any suitable means for extinguishing surrounding fire.

Reactivity Data

Section Three

Stability: Stable under ordinary conditions of use and storage
Hazardous Decomposition Products: None known.
Hazardous Polymerization: This substance does not polymerize.
Incompatibilities: None known.

Leak/Spill/Disposal
Information

Section Four

Flush to sewer with large amounts of water.
Ensure compliance with Federal, State, and local regulations
Reportable Quantity: 5000 lbs.

Health Hazard Information

Section Five

A. Exposure/Health Effects

Inhalation: May cause sore throat and irritation to mucous membranes.
Ingestion: If sufficient amounts are ingested, systemic poisoning may occur.
Skin Contact: Prolonged contact may cause irritation.
Eye Contact: May cause irritation.
Chronic Exposure: No information found for any ingredient.
Cancer information: No information found for any ingredient
Aggravation of Pre-existing Conditions: No information found

B. First Aid

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion: If swallowed, give two glasses of water to dilute. Give medical attention immediately.
Skin Exposure: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing. Get medical attention if irritation develops or persists.
Eye Exposure: Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Ventilation System: In general, dilution ventilation is a satisfactory health hazard control for this material. However, if conditions of use create discomfort to a worker, a local exhaust should be considered.

Personal Respirators (NIOSH Approved): For conditions of use where exposure to mist exists, a dust/mist respirator may be worn. For emergencies, a self-contained breathing apparatus may be necessary.

Skin Protection: Rubber gloves and lab coat, apron or overalls.

Eye Protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Contact lenses should not be worn when working with this material.

Maintain eye-wash fountain and quick-drench facilities in work areas.

Keep in a tightly closed container. Protect container from physical damage.

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END OF MATERIAL SAFETY DATA SHEET



MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: NON-FLAMMABLE GAS MIXTURE

Containing One or More of the Following Components in a Nitrogen Balance Gas:
Oxygen 0-23.5%; Isobutylene, 0.0005-0.9%

SYNONYMS: Not Applicable

CHEMICAL FAMILY NAME: Not Applicable

FORMULA: Not Applicable

Document Number: 50054

Note: The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

PRODUCT USE:	Calibration of Monitoring and Research Equipment
SUPPLIER/MANUFACTURER'S NAME:	AIR LIQUIDE AMERICA CORPORATION
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
BUSINESS PHONE:	1-410-228-6400
	General MSDS Information 1-713/868-0440
	Fax on Demand: 1-800/231-1366

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	
Oxygen	7782-44-7	0 - 23.5%	There are no specific exposure limits for Oxygen.					
Isobutylene	115-11-7	0.0005 - 0.9%	There are no specific exposure limits for Isobutylene.					
Nitrogen	7727-37-9	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established.

C = Ceiling Limit.

See Section 16 for Definitions of Terms Used.

NOTE : All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a colorless, odorless gas. Releases of this product may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated. Isobutylene, a component of this gas mixture, may cause drowsiness and other central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for this product is by inhalation.

INHALATION: Due to the small size of an individual cylinder of this product, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. The chief health hazard associated with this gas mixture is when this product contains less than 19.5% Oxygen and is released in a small, poorly-ventilated area (i.e. an enclosed or confined space). Under this circumstance, an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN

OBSERVED EFFECT

12-16% Oxygen:

Breathing and pulse rate increase, muscular coordination slightly disturbed.

10-14% Oxygen:

Emotional upset, abnormal fatigue, disturbed respiration.

6-10% Oxygen:

Nausea, vomiting, collapse, or loss of consciousness.

Below 6%:

Convulsive movements, possible respiratory collapse, and death.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Over-exposure to this gas mixture may cause the following health effects:

ACUTE: Due to the small size of the individual cylinder of this product, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. The most significant hazard associated with this gas mixture when it contains less than 19.5% oxygen is the potential for exposure to oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, unconsciousness, and death. The skin of a victim of over-exposure may have a blue color. Additionally, Isobutylene, a component of this gas mixture, may cause drowsiness or central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

CHRONIC: There are currently no known adverse health effects associated with chronic exposure to this gas mixture.

TARGET ORGANS: Respiratory system.

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH		(BLUE)	1
FLAMMABILITY		(RED)	0
REACTIVITY		(YELLOW)	0
PROTECTIVE EQUIPMENT			B
EYES	RESPIRATORY	HANDS	BODY
See Section 8			
For routine industrial applications			

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn.

No unusual health effects are anticipated after exposure to this product, due to the small cylinder size. If any adverse symptom develops after over-exposure to this product, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary.

4. FIRST-AID MEASURES (Continued)

Victim(s) who experience any adverse effect after over-exposure to this product must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

5. FIRE-FIGHTING MEASURES

FLASH POINT, (method): Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

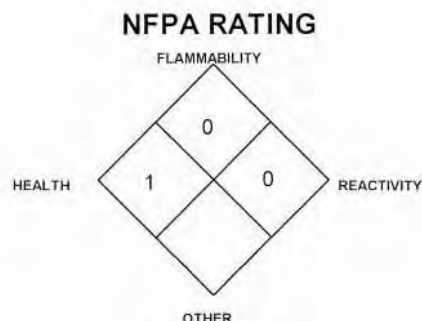
FIRE EXTINGUISHING MATERIALS: Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.



6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Due to the small size and content of the cylinder, an accidental release of this product presents significantly less risk of an oxygen deficient environment and other safety hazards than a similar release from a larger cylinder. However, as with any chemical release, extreme caution must be used during emergency response procedures. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel.

Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for oxygen. Oxygen levels must be above 19.5% before non-emergency personnel are allowed to re-enter area.

If leaking incidentally from the cylinder, contact your supplier.

7. HANDLING and USE

WORK PRACTICES AND HYGIENE PRACTICES: Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly-ventilated area; exposures to fatal concentrations of this product could occur without any significant warning symptoms, due to oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify cylinders containing this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

STORAGE AND HANDLING PRACTICES: Cylinders should be firmly secured to prevent falling or being knocked-over. Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C; 70°F). Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage.

Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. These cylinders are not refillable. **WARNING! Do not refill DOT 39 cylinders. To do so may cause personal injury or property damage.**

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: **WARNING!** Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: No special ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this product in well-ventilated areas. If this product is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of oxygen.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if oxygen levels are below 19.5% or unknown during emergency response to a release of this product. If respiratory protection is required for emergency response to this product, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134) or equivalent State standards.

EYE PROTECTION: Safety glasses.

HAND PROTECTION: No special protection is needed under normal circumstances of use.

BODY PROTECTION: No special protection is needed under normal circumstances of use.

9. PHYSICAL and CHEMICAL PROPERTIES

Unless otherwise specified, the following information is for Nitrogen, the main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.072 lbs/ ft³ (1.153 kg/m³)

BOILING POINT: -195.8°C (-320.4 °F)

FREEZING/MELTING POINT @ 10 psig -210°C (-345.8°F)

SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906

pH: Not applicable.

SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023

MOLECULAR WEIGHT: 28.01

EVAPORATION RATE (nBuAc = 1): Not applicable.

EXPANSION RATIO: Not applicable.

ODOR THRESHOLD: Not applicable.

SPECIFIC VOLUME (ft³/lb): 13.8

VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for this gas mixture.

APPEARANCE AND COLOR: This product is a colorless, odorless gas.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this product.

10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state.

DECOMPOSITION PRODUCTS: The thermal decomposition products of Isobutylene include carbon oxides. The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Titanium will burn in Nitrogen (the main component of this product). Lithium reacts slowly with Nitrogen at ambient temperatures. A component of this product (Isobutylene) are also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen difluoride, and nitrogen trifluoride).

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are available for the components of this product:

NITROGEN: There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

ISOBUTYLENE:
LC₅₀ (inhalation, rat) = 620,000 mg/kg/4 hours
LC₅₀ (inhalation, mouse) = 415,000 mg/kg

11. TOXICOLOGICAL INFORMATION (Continued)

SUSPECTED CANCER AGENT: The components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: Not applicable.

SENSITIZATION TO THE PRODUCT: This gas mixture is not known to cause sensitization in humans.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: No mutagenicity effects have been described for this gas mixture.

Embryotoxicity: No embryotoxic effects have been described for this gas mixture.

Teratogenicity: No teratogenicity effects have been described for this gas mixture.

Reproductive Toxicity: No reproductive toxicity effects have been described for gas mixture.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to the components of this product.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary; treat symptoms; eliminate exposure.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for the components of this gas mixture.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of this gas mixture occur naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this product.

OXYGEN: Water Solubility = 1 volume Oxygen/32 volumes water at 20°C. Log K_{ow} = -0.65

NITROGEN: Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0°C. 1.6 volumes Nitrogen/100 volumes water at 20°C.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on this product's effects on plant and animal life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects on aquatic life.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information).

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. (Nitrogen, Oxygen)

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not applicable.

DOT LABEL(S) REQUIRED: Non-Flammable Gas

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 126

MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).

14. TRANSPORTATION INFORMATION (Continued)

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

Note: DOT 39 Cylinders ship in a strong outer carton (overpack). Pertinent shipping information goes on the outside of the overpack. DOT 39 Cylinders do not have transportation information on the cylinder itself.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: This product is subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

COMPONENT	SARA 302	SARA 304	SARA 313
Oxygen	NO	NO	NO
Nitrogen	NO	NO	NO
Isobutylene	NO	NO	NO

SARA THRESHOLD PLANNING QUANTITY: Not applicable.

TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.

CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

OTHER U.S. FEDERAL REGULATIONS:

- No component of this product is subject to the requirements of CFR 29 1910.1000 (under the 1989 PELs).
- Isobutylene is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for this gas is 10,000 pounds.
- The regulations of the Process Safety Management of Highly Hazardous Chemicals are not applicable (29 CFR 1910.119).
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR Part 82).
- Nitrogen and Oxygen are not listed as Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Isobutylene is listed under this regulation in Table 3 as Regulated Substances (Flammable Substances), in quantities of 10,000 lbs (4,553 kg) or greater.

OTHER CANADIAN REGULATIONS: This gas mixture is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: No.

California - Permissible Exposure Limits for Chemical Contaminants: Nitrogen.

Florida - Substance List: Oxygen, Isobutylene.

Illinois - Toxic Substance List: No.

Kansas - Section 302/313 List: No.

Massachusetts - Substance List: Oxygen, Isobutylene.

Michigan - Critical Materials Register: No.

Minnesota - List of Hazardous Substances: No.

Missouri - Employer Information/Toxic Substance List: No.

New Jersey - Right to Know Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.

North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.

Pennsylvania - Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.

Rhode Island - Hazardous Substance List: Oxygen, Nitrogen.

Texas - Hazardous Substance List: No.

West Virginia - Hazardous Substance List: No.

Wisconsin - Toxic and Hazardous Substances: : No.

CALIFORNIA PROPOSITION 65: No component of this product is on the California Proposition 65 lists.

16. OTHER INFORMATION

INFORMATION ABOUT DOT-39 NRC (Non-Refillable Cylinder) PRODUCTS

DOT 39 cylinders ship as hazardous materials when full. Once the cylinders are relieved of pressure (empty) they are not considered hazardous material or waste. Residual gas in this type of cylinder is not an issue because toxic gas mixtures are prohibited. Calibration gas mixtures typically packaged in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packaged in DOT 39 cylinders are flammable or oxidizing gas mixtures.

For disposal of used DOT-39 cylinders, it is acceptable to place them in a landfill if local laws permit. Their disposal is no different than that employed with other DOT containers such as spray paint cans, household aerosols, or disposable cylinders of propane (for camping, torch etc.). When feasible, we recommended recycling for scrap metal content. Air Liquide America will do this for any customer that wishes to return cylinders to us prepaid. All that is required is a phone call to make arrangements so we may anticipate arrival. Scrapping cylinders involves some preparation before the metal dealer may accept them. We perform this operation as a service to valued customers who want to participate.

MIXTURES: When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about the handling of compressed gases can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703) 412-0900.

P-1	"Safe Handling of Compressed Gases in Containers"
AV-1	"Safe Handling and Storage of Compressed Gases"
	"Handbook of Compressed Gases"

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
619/565-0302
Fax on Demand: 1-800/231-1366



This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide America Corporation's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

PART D

GMCH JOB-SITE SAFETY PLAN

Safety Procedure

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CONTRACTOR SAFETY

PURPOSE:

Delphi has developed rules that are intended to provide their employees, suppliers, visitors and contractors with a safe, and secure work environment.

All contractors including their equipment, procedures, and employees must comply with all applicable OSHA Safety and Health Standards: (i.e. Construction, General Industry, and Hazard Communication Standards) and Delphi has specific programs, including but not limited to Confined Space, Aerial Lift, Lockout, and Fall Prevention.

In situations not specifically covered by OSHA regulations or Delphi safety procedures, contractor must consult with the Health & Safety organization to determine the safety operation plan.

DEFINITION OF TERMS:

CONTRACTOR – **INCLUDES ANY OUTSIDE VENDOR** on Delphi premises that is contracted to perform work onsite. This would include construction crews, equipment installers, repair persons, etc.

DELPHI HOST – would include, but not limited to, the following: engineering, superintendents, supervisors, etc. The Host provides a liaison between Delphi and the contractor and should be limited to one “contact” person and is responsible to notify Security, Engineering and Safety prior to job start.

ACCIDENT – all personal injuries requiring medical treatment as well as incidents involving property damage.

MEDICAL TREATMENT – includes treatment (other than first aid) administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment (one-time treatment and subsequent observation or minor scratches, cuts burns, splinters, and so forth, which do not ordinarily require medical care) even though provided by a physician or registered professional personnel.

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GENERAL SAFETY RULES:

For the protection of people, property and the environment, all personnel entering or working in a Delphi facility for any contractual work shall be cognizant of and conform to the following rules:

1. GENERAL:

- A. The contractor will be held responsible for the safety performance of their employees and sub-contractor employees. Compliance will be maintained with this document and with the requirements contained in safety standards of the State of New York, EPA, Department of Labor and all requirements of the Occupational Safety and Health Act of 1970 (latest revision).
- B. All subcontractors are required to attend a pre-job safety conference prior to working on-site.

If there is any conflict with applicable Delphi rules, Federal, State or local laws, the more stringent will apply.

2. ACCIDENTS:

- A. The contractor shall report all accidents to the Delphi Host. The contractor must follow up all accidents in writing.
- B. All serious injuries, accidents, and/or safety violations must be reported immediately to Delphi Security at x-3333. Notify Security at x-2237 for non-emergencies.
- C. The contractor shall ensure that injured personnel receive prompt and proper medical treatment. The Lockport Medical Department is located in Building 7A.

3. CONDUCT:

The contractor is responsible for the conduct of its employees. Contractor employees must follow Delphi Safety and Shop rules and are prohibited from engaging in any unsafe or illegal activities.

4. PRE-JOB SAFETY CONFERENCE:

- A. Prior to starting on-site work, the Delphi Host **will** schedule a pre-job safety conference. Required attendees:
 - Contractor supervisors
 - Delphi project supervisors/host
 - Delphi Salaried and UAW Safety Representatives
 - Delphi Maintenance and Tools representative, as needed

Any change in a contractor's scope of work will require another pre-job safety conference, unless the job is routine in nature [VME notification only required], or an emergency [i.e., asbestos abatement].

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At this meeting, the Delphi project supervisor/host, and safety representatives will review general conditions, emergency procedures and systems, protective equipment, and permits. Also to be reviewed will be any specific requirements of the work area in which the job is to be performed. Approval for all chemicals/hazardous materials used on Delphi property will be reviewed by the Hazardous Material Control Committee (HMCC) and be approved before the job begins. Contractors must maintain copies of the Material Safety Data Sheets at the job site.

NOTE: Upon completion of all asbestos handling projects, copies of all records pertaining to the project will be forwarded to the Delphi Plant Engineering Department, building 7A.

- B. The contractor shall communicate and document all Delphi safety procedures information obtained at the pre-job safety meeting to all personnel and sub-contractors.

5. PROTECTIVE EQUIPMENT AND CLOTHING:

- A. The contractor shall provide, and the contractor employees shall use, personal protective equipment and clothing, where required.
- B. Industrial safety glasses (meeting ANSI Z87.1-A68 requirements) must be worn in the plant at all times. Where posted, hearing protection must be worn at all times.
- C. Safety glasses, goggles, face-shields, etc., must be worn when the task being performed presents a hazard from flying objects, glare or splashing liquid. (Examples: cutting, buffing, grinding, etc.)
- D. OSHA-approved head protection is required for all overhead work.
- E. Lifelines, harnesses, and lanyards will be used by contractor's employees when entering a hazardous space (trench, pit, tanks, etc.) which contain bulk or loose material that could engulf employee, and for above ground work over 6' where an unguarded work surface exists, as required by OSHA and Delphi regulations. Contractors will inspect equipment prior to use.
- F. All contractor personnel shall wear clothing and footwear appropriate for the work performed. The wearing of high heels, or open toe/open heel shoes in our facilities is prohibited. Also, workers must wear a shirt.
- G. Delphi Host and contractors must follow local agreement restriction for exhausting equipment, such as backhoes, compressors, etc. In addition, certain jobs, such as air hammering, spray painting, floor scraping, etc., should be scheduled with protection of Delphi personnel in mind. Jobs generating noise, fumes, or exhaust must be communicated to affected employees prior to start of work.

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6. DRIVING / PARKING / TRAFFIC RULES / RAIL SAFETY:

- A. All vehicles shall be driven at speeds not to exceed the posted speed limits.
- B. All traffic signs must be observed.
- C. All personal vehicles must be parked outside of the security fence, or in a location defined by Security. If Security is not available, a location will be identified by the Delphi Host.
- D. Accidents involving motor vehicles must be reported to Plant Security office immediately.
- E. When working on or over railroad tracks, contractors must adhere to SP 329.

Failure to follow the above noted driving rules will result in the contract employee losing driving privileges on Delphi property.

7. FIRE PREVENTION:

- A. Before starting a project, contact Plant Security. Cutting and welding operations shall be performed in strict accordance with the procedures of the Delphi location for which the work is being done. Plant Security must authorize a written permit for each cutting and welding job prior to the commencement of the work.
- B. Accumulation of trash, oily rags, combustible materials and similar fire hazards of any nature will not be permitted. Daily disposal is required. Excellent housekeeping is the only acceptable standard for all job sites. Questions regarding the disposal of these items should be directed to Environmental Engineering – Waste Engineer.
- C. The contractor shall provide and maintain appropriate protection equipment in the construction area at all times; i.e., fire extinguishers, spark catchers. In addition the contractor must provide and use adequate shields or enclosures to protect all employees from exposure to electric arc welding operations.
- D. Smoking is allowed in designated areas only; no smoking is allowed inside the plant.
- E. All openings through roofs or walls requiring burning or welding require two (2) fire watches. Contractors shall be responsible for notifying Delphi Plant Engineering or appropriate designate via Delphi Host when this is required on project. Twenty-four (24) hour notice is to be given to Plant Engineer or designate when a fire watch is required.
- F. All contractors performing any type of torch operations (i.e. melt-down roofing, drying to repair or install roofing, burning or cutting, etc.) must not leave job till adequate time has passed after job completion to assure fire protection.

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8. FLAMMABLE AND COMBUSTIBLES LIQUIDS:

- A. Containers shall have proper labeling with contents and hazards.
- B. Only original shipping containers or UL approved safety cans shall be used for storage and handling.
- C. Containers shall be tightly closed when not in use.
- D. Container storage shall be 250 gallons or less in any one-storage area.
- E. Explosives or any explosive powered tools, of any type, are not allowed on plant property without Safety approval.
- F. No open flame or spark producing equipment shall be used within 35 feet of a storage or dispensing area.
- G. Storage and refueling areas shall be posted with signs NO SMOKING or OPEN FLAME.
- H. Gasoline containers shall not be permitted inside of an enclosed building.
- I. All compressed gas cylinders must be transported and stored upright and secured by either chain or mechanical means. They shall not be stored or used in a laying position and the tie valve wrenches shall be removed when such equipment is not in use.

9. TOOLS:

- A. The use of Delphi heavy equipment, tools, ladders, or other similar equipment by contractor personnel is prohibited unless approved in advance by Delphi Maintenance Manager or one of the Delphi Maintenance General Supervisors. In any event, their use will be strictly prohibited where work violating the Delphi/UAW agreement would occur.
- B. All ladders must be non-conductive and equipped with safety feet. Extension ladders must be lashed to fixed building framework etc. Defective ladders must never be used. Wooden extension ladders are not permitted on site.

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10. EXCAVATION – BARRIERS, DEVICES TO PENETRATE THE FLOOR and/or EARTH:

- A. When excavations and penetrations of the earth, or breakthrough of walls, floors, or ceilings need to be performed by the contractor, the Delphi project engineer via using current-to-date underground and/or utility reference drawings must obtain an excavation permit. The Delphi project supervisor shall check each detail of the drawing before the Safety Department approves the excavation permit and work starts. (EMS WI 014, "Excavation Permit").
- B. Excavations shall be properly shored in accordance with OSHA standards. The contractor shall guard any pits or piles of materials on the ground by rope guard, rails or barricades, and lanterns or flares shall be provided at night, except when area is inside a well-lit facility. When working overhead in areas that may be used by plant employees, such areas shall be roped off, barricaded, and warning signs will be posted.

11. ELECTRICAL:

- A. It is the contractor's responsibility to ensure that all electrical work performed complies with applicable National Electrical Code (incorporated in OSHA Standard 1910.309) requirements, local authority, and Delphi Electrical Safe Work Practices Standards.

12. GENERAL SAFETY RULES:

- A. The contractor shall actively promote safe work habits on the part of their employees. This includes recognition and avoidance of unsafe work practices or conditions necessary to prevent industrial injury or illness. Tools, equipment and methods declared unsafe by Delphi Safety shall not be used.
- B. All rigging of equipment shall be done in such a manner as to prevent falling or tipping.
- C. Adequate precautions shall be taken to protect all employees and company properties from injury or damage from falling objects or molten metals.
- D. The contractor's employees will not operate any valves, switches, or plant equipment without the specific permission and approval of the Delphi plant supervision or Delphi Host.
- E. The Delphi project engineer will review the area with the contractor, and highlight any concerns associated with a particular department. The contractor's personnel shall confine themselves to this area while performing their work in the plant. The project supervisor will point out to the contractor the cafeteria, and rest room facilities available to the contractor.
- F. The contractor shall provide, use and keep in good repair fences, temporary sidewalks, temporary floor opening or excavation guard rails, roofed passage ways, guards, warning lights, signs, signals and any other safeguard necessary for the protection and convenience of employees and the public.

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- G. Construction materials, tools and equipment shall be stored in a manner which will contribute to safety and good housekeeping in the area and according to the directions of the supervision of the area where the work is being used.
- H. All contractor's offices, work sheds, or other temporary buildings which are moved onto the site will have their locations approved by the Delphi Host. These structures shall be located at least 50 feet outside of any building under construction. The space between structures shall be kept open. Utility connections and the general appearance of such structures will be clean or orderly. The contractor will furnish fire protection (extinguishers) for their offices, work sheds and equipment.
- I. Intervention by Delphi supervision, Safety representative(s) or Plant Security, will be made when employee safety is threatened by contractor work or when Delphi can possibly incur liability. Delphi supervision and safety representative(s) or Plant Security will directly contact the contractor and request correction of the unsafe condition in an "emergency" or "life threatening" situation. In all cases, the Delphi Host will be notified. A log of contractor(s) infractions will be maintained and will be reviewed as needed by Delphi Safety Department and the project Host.
- J. It shall be the responsibility of the contractor to:
 - Take all steps necessary to perform the contracted work safely.
 - Provide for the safety of contractor employees, employees of all subcontractors & material suppliers & all third party persons linked to the project through the contractor.

[Section 13 was revised on 6-25-09]

Prior to working on Delphi property, contractors must submit copies of their confined space entry procedure and rescue plan for review by Delphi staff.

13. CONFINED SPACE PERMITS:

- A. A Confined Space Permit must be obtained when work is to be performed within a confined space. Confined Space Permits will be issued by Security directly to the contractor, with the approval of the Delphi Host.
- B. The Delphi Host must insure that the contractor's rescue plan meets or exceeds the site's Confined Space Entry Procedure (SP 314).
- C. The contractor shall review the scope of work, hazards, and written rescue plan [including the names of the Entrants and Attendants] with the Delphi Host, and the LJHSC at the pre-job safety conference.
- D. The contractor shall insure that the permit, hazards, and written rescue plan are discussed with affected Attendants/Entrants prior to entry.
- E. A permit for entry into confined space is required when the following exists:
 - 1. Any pit, manhole or excavation 4' or deeper

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2. Any open surface tank deeper than 4'
3. Any limited entry/exit spaces
4. Any spaces limited in size & not normally inhabited
5. Any unfavorable natural atmosphere that could contain or produce dangerous air contaminants. Examples: tanks, vessels, degreasers, silos, boilers, etc. **If in doubt contact Safety department.**
6. Any equipment, area, space or article that contains a Confined Space Warning sign, or is listed in the Confined Space Log.

F. Continuous monitoring of confined space is required.

G. Additional permits are required for welding and cutting in confined spaces and for other hazardous work requiring special preparation, equipment, or supervision.

14. SECURITY:

- A. All contractor tools and equipment should be labeled so that ownership can be easily identified.
- B. Other than regular working hours i.e. after hours, Saturday, Sundays, and holidays, the movement of contractor material leaving the plant is discouraged. Under emergency conditions, contact Plant Security.
- C. Tools and/or equipment shall be secured after working hours. Report lost or stolen tools, material or equipment to Plant Security.

15. HAZARD MATERIAL CONTROL COMMITTEE (HMCC):

Use of any chemicals is restricted to those approved by the Delphi Hazard Material Control Committee (HMCC). No contractor is allowed to bring in any chemicals/hazardous materials specified in the contract agreement or otherwise deemed necessary by the contractor to comply with their job at the Delphi worksite without prior approval of the HMCC. The contractor shall provide MSDSs to the Delphi host for HMCC approval.

16. INFORMING CONTRACTORS OF POTENTIAL CHEMICAL HAZARDS:

Contractors shall be informed of any potentially hazardous chemicals to which their employees may be exposed. Before the contractor begins work the Delphi Host will ensure that information covering potential work site chemical hazards is provided to the contractor. The information provided to the contractor should be consistent with the information used at the specific plant location. It is the contractor's obligation to ensure that their employees are provided with the required information, training and personal protective equipment.

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| 17. ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS):

- A. The facility has an Environmental Management System in place. Contractors and their employees are required to know the environmental policy and how they may impact the environment in the course of their work onsite.
- B. The Contractor must review with the Delphi Project supervisor/manager/engineer/host any environmental concerns before work begins.
- C. Any job that may have environmental impact must be reviewed by Delphi's Environmental Department.

18. CONTRACTOR ROOF ACCESS PERMIT

PURPOSE: To reduce the risk of injury associated with job assignments on Delphi roofs through the control and restriction of authorized personnel.

SCOPE: All facility/plant outside roof areas and penthouses (including substations whose access is from roof areas).

- A. A Roof Access Permit must be completed prior to roof work commencing. See attached
- B. A roof access log will be maintained by Security.
- C. Appropriate fall prevention and protection must be utilized during all work performed.

RULE: Within 6 feet of an unguarded roof edge or an unguarded roof opening fall prevention/protection is required.

- D. Before moving equipment, machinery, heavy loads, etc., across roof areas, the load capacity and appropriate safe procedure (i.e. planking) should be discussed with Plant Engineering personnel.

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Delphi Contract Work Permit

Purpose:

The purpose of the Contract Work Permit Procedure is to assure that contractors work safely on Delphi property.

The contractor must maintain a copy of the work permit for presentation to Delphi safety or Management personnel at all times.

General Requirements:

The Delphi Host will review safety requirements that will be expected of the contractor and their employees while working for Delphi via a Pre-Job Safety Conference (refer to Section #4 of this document).

The Delphi Host will initiate the contractor work permit form attached.

The Delphi Host must sign this form and the contractor's representative after all requirements set forth in this document are met.

All contract employees that enter Delphi **must** view the visitor safety protocol video. **It is of the utmost importance that contract employees know the emergency alarms, procedures, and emergency phone # 3333. No work can begin till this task is accomplished.** The Delphi Host and the contractor's representative are responsible to make sure this task is completed.

It is the responsibility of the Delphi Host:

- 1. Retain copy of Work Permit for one year.**
- 2. Return original signed and approved Work Permit to Safety.**
- 3. Forward copy to Security**

Permits will be retained for one year.

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Delphi Contractor Work Permit

P.O. # Various Start Date: 1/11/10 Completion Date: 12/31/10
Contractor Name GZA Geo Environmental of New York Delphi Host Cathy Ver
Job Description/Location Site Wide
Plant _____ Dept. _____ Col # _____ Emergency Job _____ Normal Job X

Prior to any work beginning the following form must be completed and signed by the contractor and Delphi Host. **Delphi safety or management personnel reserves the right to stop all jobs deemed to be unsafe.**

Supervisor of Contract Employees:

1. Have all your employees completed Delphi Visitor Protocol? Yes X No
2. Will subcontractors be utilized for any portion of this project? Yes X No
If yes, has subcontractor attend a pre-job safety conference? Yes X No
3. Have you been given, read and understand Delphi SP 345? Yes X No
4. Have you visited the job site with Delphi supervisor/manager/engineer/host? Yes X No
5. Are all your tools and equipment labeled and in safe operating condition? Yes X No
6. Have all the necessary MSDS forms been processed and approved? Yes X No
7. Do all employees know the environmental policy and possible site impacts? Yes X No
8. Have you received all necessary information to perform the job correctly/safely? Yes X No
9. Will confined space entry be required? Yes No X
If yes, has the rescue plan been reviewed and approved? (Attach rescue plan) Yes No

Any violations of the above affirmative answers will be cause, without penalty to Delphi, for either the removal of an individual contract employee or termination of the work in process.

Contractor Supervisor Signature: [Signature]

(The contractor must maintain a copy for presentation to Delphi safety or management personnel at all times.)

Delphi Host:

1. Have you inspected the job site for possible safety hazards? Yes No
2. Are you completely familiar with the scope of work assigned to the contractor? Yes No
3. Have you reviewed with the contract supervisor Delphi shop & safety rules? Yes No
4. Have you issued all the necessary permits prior to work being started? Yes No
5. Have you reviewed the environmental policy and appropriate EMS procedures? Yes No
6. Have all affected departments been notified to work commencing? (Prod/Maint/Safety) Yes No

The Delphi Host is responsible for: coordination of contractor activities, the quality of the work performed and compliance to Delphi safety rules.

Delphi Host: _____

Additional Signatures (For notification purposes only):

1. Maintenance _____
2. Safety _____
3. Environmental (if environmental impact): _____

Forward original to Safety and copy to Security

Not APPLICABLE

Delphi Lockport

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Contractor Roof Access Permit [forward original to Safety and copy to Security]

Contractor's Name _____ Start Date: _____ Completion Date: _____

Time: _____ Roof Location _____ Duration of Permit: _____
(Projects over 30 days require Safety Dept. approval)

Personnel Assigned:

Description of Work: _____

Equipment and Materials: _____

Load Capacity of Roof Areas Involved: _____

Roof Access/Egress Locations: _____

Emergency Rescue Plan in place?

Yes ___ No ___

Evacuation plan in place?

Yes ___ No ___

Weather Conditions: _____

Safety Precautions/Procedures: _____

Personal Protective Equipment: _____

Hazard Analysis:

Will work be performed within six feet of an unguarded roof edge?

Yes ___...Fall protection required

No ___

Will work be performed within six feet of an unguarded roof opening measuring 12 inches or more in its least dimension?

Yes ___...Fall protection required

No ___

Will an opening be cut or exposed in the roof surface?

Yes ___...Install barrier guards, signs, covers

No ___

Will employee work above the roof surface, i.e., scaffolds, ladders, etc.?

Yes ___...Radius of elevation must not exceed to a point within 6 feet of the roof edge

No ___

Will loads in excess of 500 lbs. Be moved across the roof surface?

Yes ___...Engineering study required

No ___

Has employee received proper class of training to correspond to the job to be performed?

Yes ___

No ___...Employee to receive training prior to assignment

Delphi Host: Name(print) _____ Signature _____

Revised May 22, 2007

Section 13 revised June 25, 2009

On Site Emergency Phone # 3333

12

Delphi Lockport

No: 345

Safety Procedure

Uncontrolled Document when printed

Subcontractors

List any subcontractors that will be working directly under the primary Contractor.

Unknown at this time

PART G

CONTRACTOR SPILL RESPONSE PROCEDURES

**GM Components Holdings, LLC Lockport Facility
200 Upper Mountain Road, Lockport, NY 14094**

**GZA GeoEnvironmental of New York
Date: January 12, 2010
Revision No: 1
BASED ON TEMPLATE DATED MARCH 2003**

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LIST OF APPENDICES

APPENDIX A	NOTIFICATION REPORT FORM
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(Check Applicable Box)

- ☒ The response procedures will be in accordance with the Lockport Facility, Spill Prevention, Control, and Countermeasure (SPCC) Plan. It summarizes the immediate actions required of a contractor and its employees in the event of a spill or release on GM property.
- ☐ The following information was developed and based on the (Plant Name), Spill Prevention, Control, and Countermeasure (SPCC) Plan. It summarizes the immediate actions required of a contractor and its employees in the event of a spill or release on GM property.
- ☐ The response procedures are based on both the SPCC and the site-specific plans.

1.0 GENERAL

Any release that occurs during on-site remedial activities of hazardous or non-hazardous material will be immediately cleaned up. The first action to be taken in the event of a release or the observation of spillage is to notify supervision of the location and nature of the release. The next step is to prevent the material from spreading or contaminating any additional area(s). Actions will be taken to confine the released material.

All chemicals that contractors may bring on site are to be identified and quantified with MSDS attached to the HASP. If a chemical is deemed to be either especially dangerous or at high risk for a release, it must be specifically identified and reported.

Following are general instruction to confine spills:

- Only properly trained personnel are to participate in the confinement, containment, mitigation, and/or remediation of releases.
- Refer to MSDS, analytical, and/or any other information available for the proper containment, PPE, and mitigation of materials.
- Use clay absorbent, dirt, or any other relatively impervious materials to dam the release to prevent further contamination.
- Should a release occur which may result in contamination of a waterway (i.e., river, stream, or storm drain) either directly or indirectly, use any available means to confine the spill.
- Should a release reach a waterway for any floating materials, use sorbent or any boom arrangement to confine the release.

- For soluble materials use any means possible to prevent entering waterway or further spread of contaminant.
- Ensure that basic spill response materials such as sorbent socks, pillows, mats, and/or wipes, as applicable to the potential spilled materials, will be available for use on site.

2.0 NOTIFICATION

Contact the Participant PM or, in the PM's absence, General Motors's Health and Safety Coordinator to report the spill and determine the follow-up and additional reporting requirements. If injuries have occurred as a result of a spill, contact emergency medical personnel first. The information that shall be provided at the time of initial notification of a spill by the reporting personnel includes:

- Name and contact information of individual making report.
- Company and/or project name.
- Estimated of quantity of material released, or threatened to be released.
- Type of material involved in the incident.
- Source or cause of incident.
- Date and time of incident.
- Location of the incident.
- What media did the release occur into (i.e., air, water, land).
- Environmentally sensitive areas likely to be affected by the release (i.e., wetlands, lakes, rivers).
- Weather conditions, current and immediate forecast, at the scene of the incident,
- Containment or recovery actions already taken, and those planned to be taken by the person (s) on scene.
- Condition of the equipment at the time the incident is reported.
- Estimated change in the status of the condition of the equipment.
- Nature and extent of any injuries or fatalities.
- Whether evacuation is necessary.
- Has any media (newspaper, TV) arrived on site.
- Date and time of next report (if required).

In the event of a major spill event, contact the:

- Primary and/or secondary Spill Response Contractor.
- National Response Center (NRC) at 800-424-8802 or 202-426-2675, in Ontario, 800-268-6060.
- Local or regional fire department.
- Local United States Coast Guard (USCG) Marine Safety Office (if spill is waterways).
- Local department of water and sewer department (if spill is waterways).
- As required by any local government regulations.

3.0 ADDITIONAL ACTIONS

After containment of the spilled material, it shall be collected in appropriate containers for proper disposal, characterized, and handled in accordance with sound environmental management practices in compliance with all federal and state regulations.

4.0 DOCUMENTATION

For any incident a Notification Report Form, Appendix A, will be prepared and forwarded to the Participant PM and General Motors Health and Safety Coordinator.

5.0 CONTACTS

These contacts are to be established prior to the commencement of any operations.

<i>Contact</i>	<i>Name of Agency</i>	<i>Emergency/ 24-Hour No.</i>	<i>Contact Name</i>
Security	Site Security	716-439-3333	Dispatch Office
Primary Spill Contractor	National Vacuum	716-773-1167	Tony Dibesco
Alternate Spill Contractor			
Local Fire Department	Local FD Dispatch	911	FP Dispatch
Local W&S Department	Lockport WWTP	716-433-1612	Victoria Haenle
Other			
Other			

6.0 CONTRACTOR CERTIFICATION

I have reviewed the remedial spill response procedures. The measures will be followed as herein described.

<i>Name</i>	<i>Title</i>	<i>Date</i>
Chris Boron	Sr. Project Manager, GZA	1/11/10
Jennifer Davide	Environmental Scientist	1/11/10

APPENDIX 14
MAP TO HOSPITAL

Directions to 521 East Ave, Lockport, NY 14094-3201

Total Time: 13 mins, Total Distance: 3.56 mi

	Distance
A 1. Start at 200 UPPER MOUNTAIN RD, LOCKPORT going toward UPPER MOUNTAIN RD	go 0.14 mi
2. Turn R on UPPER MOUNTAIN RD(CR-5)	go 0.48 mi
3. Turn L on SAUNDERS SETTLEMENT RD(RT-31 E)	go 0.17 mi
4. Continue to follow RT-31 E	go 1.09 mi
5. Bear L on WEST AVE	go 0.27 mi
6. Continue on W MAIN ST	go 276 ft
7. Continue on LOCKS PLZ	go 420 ft
8. Continue on MAIN ST	go 0.3 mi
9. Continue on EAST AVE	go 0.97 mi
B 10. Arrive at 521 EAST AVE, LOCKPORT, on the L	

Time: 13 mins, Distance: 3.56 mi



When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.