

**HEALTH AND SAFETY PLAN
CORRECTIVE MEASURE IMPLEMENTATION**

**PARTS AND REPAIR SERVICE CENTER
GENERAL ELECTRIC INTERNATIONAL, INC.
TONAWANDA, NEW YORK**

Job No.: 38395113

Prepared by: Don Porterfield

Preparation Date: September 25, 2012

**HEALTH AND SAFETY PLAN
CORRECTIVE MEASURE IMPLEMENTATION**

**GE INSPECTION AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK**

		<u>PHONE</u>
Project Number:	38395113	
Project Manager:	Karen Peppin (Clifton Park, NY)	518-688-0015
Site Manager:	John Boyd	716-207-4093
Site Safety Officer:	John Boyd	716-207-4093
Plan Prepared By:	Don Porterfield (Clifton Park, NY)	518-688-0015
Preparation Date:	September 25, 2012	
Plan Updated:	n/a	

APPROVALS

Health and Safety Representative:



Sheldon Nozik

70/1/12

(DATE)

Regional Manager, Health, Safety and Environment:

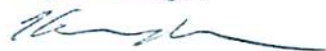


9/29/12

Ben Bertolotti CIH

(DATE)

Project Manager:



9/25/12

Karen Peppin

(DATE)

This Health and Safety Plan is valid only for this specific project as described in Section 3.0. It is not to be used for other projects or subsequent phases of this project without the written approval of the Regional Manager, Health, Safety and Environment. A copy of this plan is to be maintained at the site at all times.

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GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS

°C	degrees centigrade
°F	degrees Fahrenheit
ACGIH analyzer atm	American Conference of Governmental Industrial Hygienists field instrument described in Section 6.1 atmosphere
C	ceiling
Carcinogen	a substance that can cause cancer
cc	cubic centimeter
CGI	combustible gas indicator
CNS	central nervous system
CSP	Certified Safety Professional
CRZ	contaminant reduction zone
DERA	Designated Emergency Response Authority
DOT	Department of Transportation
ESLI	End-of-Service-Life Indicator
eV	electron volts
EZ	Exclusion Zone
FID	flame ionization detector
HEPA	high-efficiency particulate absolute
HSM	Health and Safety Manager
HSP	Health and Safety Plan
kg	kilogram
LEL	lower explosive limit
Lpm	liters per minute
m	meter
mg	milligram
mg/M ³	milligrams per cubic meter
ml	milliliter
mm	millimeter
MSDS	Material Safety Data Sheet
ND	not detected
NIOSH	National Institute for Occupational Safety and Health

**GLOSSARY OF TERMS,
ACRONYMS, AND ABBREVIATIONS (Continued)**

O ₂	oxygen
OBZ	operator's breathing zone
OEL	occupational exposure limit
OHM	Oil and Hazardous Material
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
OVM	organic vapor monitor
PEL	permissible exposure limit
PID	photoionization detector
PM	project manager
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
REL	recommended exposure limit
RSO	Radiation Safety Officer
RMHSE	Regional Manager, Health, Safety, and Environment
SMS	Safety Management Standard
SSO	Site Safety Officer
SSR	Subcontractor's Safety Representative
STEL	short term exposure limit
TLV	threshold limit value
TWA	time-weighted average
UEL	upper explosive limit
URS	URS Corporation and subsidiaries
VOC	volatile organic compound

**GE INSPECTION AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK**

1.0 PLAN-AT-A-GLANCE

HEALTH AND SAFETY PLAN SUMMARY SHEET

THIS SUMMARY SHEET IS PROVIDED AS A QUICK-REFERENCE/OVERVIEW ONLY. THE REMAINDER OF THIS SITE-SPECIFIC HEALTH AND SAFETY PLAN (HSP) IS INTEGRAL TO THE SAFE CONDUCT OF SITE OPERATIONS AND MUST BE APPLIED IN ITS ENTIRETY.

EMERGENCY INFORMATION

Ambulance: 911
Fire: 911 716-875-8564 (Non-Emergency Number)
Police: 911 716-874-8965 (Non-Emergency Number)
Hospital: 716-879-6100 (Kenmore Mercy Hospital at 2950 Elmwood Avenue, Buffalo, NY)
Occupational Clinic: 716-447-6474 (Health Works WNY, 2075 Sheridan Dr., Buffalo, NY)

Project Manager:	Karen Peppin	518-688-0015 (o) 518-409-0655 (m)
Health and Safety Representative:	Sheldon Nozik	716-923-1160 (o)
Regional Manager, Health, Safety, and Environment:	Ben Bertolotti	973-777-3003 (o) 973-572-3916 (m)
Alternates:	Sheldon Nozik	716-923-1160 (o) 716-998-7626 (m)
National Response Center:		800-424-8802

CLINIC DIRECTIONS:

To reach the occupational clinic from the service center, exit the site by turning left onto Milens Road (south); continue to end; turn left onto Ensminger Road (east); take the first right onto Military Road (south); turn left onto Sheridan Drive (Rt. 324) (east). The clinic is on the right side of the street.

HOSPITAL DIRECTIONS:

To reach the hospital from the service center, exit the site by turning left onto Milens Road; continue to end (south); turn left onto Ensminger Road (east); take the first right onto Military Road (south); turn left onto Sheridan Drive (Rt. 324) (east); make first right onto Elmwood Avenue (south). The hospital is on the right side of the street.

Note that persons without serious or life-threatening injuries should be escorted to an occupational health clinic or urgent care facility instead of a hospital. See Section 12.5

Additional information concerning emergency procedures is located in Section 12.0, and the hospital route map is located in Attachment A. A copy of the hospital route map must be readily available in each site vehicle that may be used to transport accident victims to the hospital.

CONSTITUENTS OF CONCERN

1. Polychlorinated Biphenyls (PCBs)
2. Volatile Organic Compounds (VOCs), such as chlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene

Additional information regarding site history, constituents of concern, and scope of work activities is located in sections 2.0 and 5.0.

ACTION LEVELS

Analyzer Reading	Location	Duration	Action	Personal Protective Equipment
< 5 ppm	Operator's Breathing Zone (OBZ)	-----	Continue periodic monitoring.	Minimum Site Ensemble (See Page 4)
> 5 ppm	OBZ	>1 minute	Provide respiratory protection; establish decontamination area, and contact the PM.	Minimum site ensemble, plus coveralls, nitrile inner and outer gloves, and half-face air purifying respirators with organic vapor cartridges. Cartridges will be changed on a daily basis.
> 10 ppm	OBZ	>1 minute	Provide respiratory protection; establish decontamination area, and contact the PM.	Minimum site ensemble, plus coveralls, nitrile inner and outer gloves, and full-face air purifying respirators with organic vapor cartridges. Cartridges will be changed on a daily basis.
> 20 ppm Or > 75 ppm	OBZ	>1 minute Or Instantaneously	Stop work; move upwind while vapors dissipate. If elevated levels remain for more than 5 minutes, the source will be covered with clean soil, plastic sheeting, or foam, and the PM will be notified.	As specified by PM and RMHSE.

In the event of an emergency, workers must wear appropriate levels of protection for that activity. The appropriate level of protection would be determined by the SSM at the time of the emergency. Site work will be shut down during these activities.

PROJECT HAZARD ANALYSIS

Task	Chemical Hzds.	Heat/ Cold Stress	Noise	Slip/Trip/ Fall	Lifting Hzds.	Mechanical Hzds.	Electro-cution	Explosion	Exca-vation
1. Collection of soil, concrete, and asphalt samples	Med	Med	Low	Med	Med	Med	Low	Low	N/A
2. Gauging the thickness and collecting samples of water and sediment in sewer structures (may include confined space entry)	Med	Med	Low	Med	High	High	Low	Low	N/A
3. Oversight of removal of surface soil, asphalt, and concrete.	Med	Med	Med	Med	Low	Med	Low	Low	Med
4. Oversight of removal of subsurface soil.	Med	Med	Med	Med	Low	Med	Low	Low	Med
5. Oversight of sewer cleaning, replacement, and/or lining.	Med	Med	Med	Med	Low	Med	Low	Low	Med
6. Oversight of backfilling of excavations.	Low	Med	Med	Med	Low	Med	Low	Low	Med
7. Collection of waste characterization samples.	Med	Med	Low	Med	Med	Low	Low	Low	N/A
8. Collection of post-excavation samples.	Med	Med	Med	Med	Med	Med	Low	Low	Med
9. Oversight of restoration of asphalt and concrete.	Low	Med	Med	Med	Low	Med	Low	Low	N/A
10. Installation of groundwater monitoring wells.	Med	Med	Med	Med	Med	Med	Low	Low	N/A
11. Gauging water levels in monitoring wells and collecting groundwater samples.	Med	Med	Low	Med	Med	Low	Low	Low	N/A

High - Exposure likely more than 50% of the time
 Low - Exposure likely less than 10% of the time

Med - Exposure likely 10 to 50% of the time
 n/a – Exposure not anticipated

Additional information concerning project hazards and their control can be found in Section 5.0.

Task	Minimum Protective Clothing/Equipment Requirements
1.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
2.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, leather gloves when removing manhole covers, traffic vest, barricades, and surgical nitrile gloves for handling samples. Coated tyvek, rubber boots, outer nitrile arm-length gloves and taped ankles and wrists if entering a sanitary sewer. All entrants must also wear full body harness.
3.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
4.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
5.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
6.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, surgical nitrile gloves for handling samples , traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
7.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
8.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
9.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
10.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, surgical nitrile gloves for handling samples , traffic vest, if working near heavy equipment or drill rig and hearing protection near heavy equipment.
11.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.

PROTECTIVE CLOTHING (FIRST ACTION LEVEL)

Chemical Protective Clothing

Outer Coveralls:

When splash hazard exists *

Outer Gloves:

Nitrile or leather gloves (by task)

Inner Gloves:

Surgical Nitriles

Chemical protective steel-toed boots or chemical-resistant boot covers over steel-toed boots

*** Substitute poly-Coated Tyvek[®] if there is a potential for contact with liquids (sewer fluids, etc.)**

The HSP Preparer has conducted a Hazard Assessment for this project based on information provided by the Project Manager, in accordance with 29 CFR 1910.132(d).

For more information on Personal Protective Equipment (PPE) and respiratory protection requirements, see the Action Levels table (Page 2) and Sections 7.0 and 8.0.

ENGINEERING CONTROLS TO BE USED (AS APPLICABLE)

- Allow manhole to vent after opening
- Natural wind forces to reduce exposure to airborne contaminants

For more information, see Section 5.0.

INSTRUMENTATION TO BE USED

- Organic Vapor Monitor (OVM), PID w/ 11.7 eV lamp OR EQUIVALENT PID
- Photovac Microtip PID w/ __ eV lamp
- MiniRAE PID w/ ___ eV lamp
- Combustible Gas/O₂ Indicator
- Foxboro Organic Vapor Analyzer (OVA) Flame Ionization Detector (FID)
- Miniram Real-time Dust Monitor
- Other __ four-gas meter (O2/LEL/CO/H2S) for Confined Space entry_____

For more information, see Section 6.0

PERSONAL EXPOSURE SAMPLING

- Will be conducted
- Will be conducted if PID readings require the use of respiratory protection as described in the Action Level Table (page 4) and in Section 6.1.1
- Is not anticipated

For more information on monitoring, see Section 6.0.

HAZ-COM MATERIALS INVENTORY

- TSP or Alconox (decontamination)
- Isobutylene (calibration gas for PID)
- 4-gas meter calibration gas

HEALTH AND SAFETY EQUIPMENT LIST

Required	Not Required	
√		URS SMSs (relevant to project - see next page)
	√	Occupational Safety and Health Administration (OSHA) "Safety on the Job" Posters
√		Hardhats
√		Safety glasses
√		Ear plugs or muffs
	√	Cotton coveralls
√		Traffic safety vest (if working in high traffic areas)
	√	Tyvek [®] coveralls
√		Polycoated Tyvek [®] Q-23 coveralls
√		Steel-toed boots
√		Chemical-resistant steel-toed boots or chemical-resistant boot covers
√		Work gloves
√		Nitrile outer gloves
√		Surgical nitrile inner gloves
√		Plastic sheeting (visqueen)
√		55-gallon 17-H drums (for contaminated solids)
√		55-gallon 17-E drums (for liquids)
√		Drum liners
√		Barricade tape and barricades (for open manholes)
√		Wash tubs and scrub brushes
√		Decontamination solution (i.e., TSP)
	√	Folding chairs
	√	5- or 10-gallon portable eyewash
√		Respirator sanitizing equipment
√		First aid kit
√		Infection control kit
√		Drinking water
√		Gatorade or similar drink
√		Type ABC fire extinguishers
	√	Half-face respirators approved by National Institute for Occupational Safety and Health (NIOSH)
√		Full-face respirators (NIOSH-approved)
√		Respirator cartridges [organic vapor/P100 combo]
√		PID w/11.7 eV lamp and calibration kit
√		Combustible gas indicator (CGI) and calibration kit
	√	Garden sprayer
	√	Compressed gas horn
√		Duct tape
√		Paper towels and hand soap
	√	Spill sorbent
√		Plastic garbage bags
	√	Broom and/or shovel

SAFETY MANAGEMENT STANDARDS REFERENCED BY THIS HSP

SMS	TOPIC	HSP SECTION
046	Subcontractor Health and Safety Requirements	4.5
017	Hazardous Waste Operations	5.1.1
002	Worker Right to Know	5.1.2
010	Confined Space Entries	5.2.1
018	Heat Stress	5.2.2/7.1
059	Cold Stress	5.2.3
026	Noise and Hearing Conservation	5.2.4
021	Housekeeping	5.2.5
069	Manual Material Handling	5.2.6
013	Excavation Safety	5.2.7
019	Heavy Equipment Operations	5.2.7
056	Drilling Safety Guidelines	5.2.8
034	Utility Clearances	5.2.9
032	Traffic Control	5.2.10
047	Biological Hazards	5.3.1/5.3.2
051	Bloodborne Pathogens	5.3.1
043	Industrial Hygiene Monitoring	6.1.1
029	Personal Protective Equipment	7.0
042	Respiratory Protection	8.3/8.9
030	Sanitation	10.1
014	Fire Prevention	12.2
049	Incident Reporting	12.6/14.0

These SMSs are available on the URS Health and Safety Web site. Access the Web site from the SoURSe or through the Internet (www.urshse.com). User name, urshse; password, hardhat.

Copies of the SMSs referenced by this HSP are to be maintained on site. Project Managers (PMs) are responsible to see that other SMSs relevant to field activities, but not directly referenced by this HSP, also are available on site.

2.0 FACILITY BACKGROUND/WORK PLAN

2.1 SITE HISTORY

The General Electric International, Inc. (GE) Parts and Repair Service Center is at 175 Milens Road, Tonawanda, New York. GE has operated the service center since the late 1960s. The property comprises approximately 5.8 acres. The service center is an operating facility.

A RCRA Facility Assessment, a RCRA Facility Investigation, and several supplemental investigations have been performed at the site since 1988. These investigations documented the presence of PCBs and volatile organic compound contaminants in soil on the site. PCB impacts in soil are widespread along the eastern and southern sides of the shop building, and are within the concrete building slab. PCBs have been detected in soil at concentrations up to 240 mg/kg. VOC impacts are limited to the vicinity of the rinse tank excavation pit. The VOCs detected in soil are primarily chlorobenzenes at concentrations up to 34 mg/kg. The extent of impacts to site soil and groundwater has been limited by the clay underlying the site. PCBs have been detected in groundwater at concentrations up to 142 ug/L. The VOCs detected in groundwater are primarily chlorobenzenes at concentrations up to 540 ug/L. Impacts are generally shallow, except in locations of fill, such as pipe bedding material and the filled pit that formerly held a rinse tank. Sediment in the onsite storms sewers was found to contain concentrations of PCBs up 41,300 mg/kg, and was removed during interim corrective actions. Offsite storm sewers have also been impacted by PCBs at significantly lower concentrations. Sludge removed from the sanitary sewers in late 2011 contained PCBs at concentrations of 208 ppm. PCBs continue to be intermittently present in the sanitary sewer effluent after cleaning of the sewers in late 2011.

The facility recently received a permit from NYSDEC for Corrective Measure Implementation (CMI). The areas at and near the site where the permit requires corrective measures include:

- Former rinse water tank excavation
- Old oil/water separator
- Floor drains
- Sewers (storm and sanitary)
- Rail spur
- Truck bay
- Depressed dock
- Transportation corridor
- Two Mile Creek (work in this area is not included in the this plan)

The scope of the CMI program will include:

- Pre-design investigations of conditions at the site. These investigations will include collection of surface and subsurface soil samples. The investigations may also include groundwater sampling, collection of chip and core samples of asphalt and concrete, and collection of water and sediment samples from the sewer systems.
- Completion of design for the corrective measures at the site.
- Removal and off-site disposal of surface soil, asphalt, and concrete structures.
- Excavation and off-site disposal of subsurface soil.
- Collection of waste characterization samples and confirmatory samples from excavations.
- Dewatering and management (treatment or off-site disposal) of impacted perched groundwater.

- Replacement or cleaning and lining of subsurface sewer lines.
- Backfilling excavations.
- Restoring asphalt and concrete structures.
- Installation and sampling of groundwater monitoring wells.
- Long-term monitoring, maintenance, and repair of surface coverings.

2.2 PURPOSE AND SCOPE OF WORK

The elements of the scope of work covered by this Health and Safety Plan and the potential for URS or contractor personnel to handle materials containing PCBs or VOCs during each of the elements are:

Work Element	Potential to Handle PCB-Containing Materials	Potential to Handle VOC-Containing Materials
Collection of soil, concrete, and asphalt samples	High	Moderate
Gauging the thickness and collecting samples of water and sediment in sewer structures*	High	Low
Oversight of removal of surface soil, asphalt, and concrete by client's contractor	Moderate	Moderate
Oversight of excavation of subsurface soil by client's contractor	Moderate	High
Oversight of sewer replacement or cleaning and lining by client's contractor	Moderate	Moderate
Oversight of backfilling of excavations by client's contractor	Low	Low
Collection of waste characterization samples	High	Moderate
Collection of post-excavation samples	Moderate	Low
Oversight of restoration of asphalt and concrete by client's contractor	Low	Low
Installation of groundwater monitoring wells	Moderate	Low
Gauging water levels in monitoring wells and collecting groundwater samples from the wells	Moderate	Low

*Tasks conducted in or near the sanitary sewers pose a moderate risk of exposure to biological hazards that may be present in the sewage.

This Health and Safety Plan will be amended if additional work elements are needed to complete the Corrective Measure Implementation.

3.0 APPLICABILITY

The purpose of this HSP, which was developed specifically for operations at the **GE Tonawanda** site in **Tonawanda, New York** is to assign responsibilities, establish personal protection standards and mandatory safety procedures, and provide for contingencies that may arise while operations are being conducted at the site. This HSP complies with, but does not replace, Federal Health and Safety Regulations, as set forth in 29 CFR 1910 and 1926, and applicable state regulations. This HSP is to be used by URS personnel as a supplement to these rules, regulations, and guidance. This HSP is to be augmented by the URS Health and Safety Program and Management System; relevant standards from that program and system are required to be available on site during all activities.

The provisions of the HSP are mandatory for all onsite URS employees engaged in hazardous material management activities associated with this project, which may involve health and safety hazards.

Changing and/or unanticipated site conditions may require modification of this HSP to maintain a safe and healthful work environment. Any proposed changes to this plan will be reviewed with a URS health and safety professional prior to their implementation. If this is not feasible, the Site/Project Manager may modify the plan and record all changes in the field log book; under no circumstances will modifications to this plan conflict with federal, state, or other governmental health and safety regulations.

URS is providing a copy of this HSP to each site subcontractor to fulfill its obligation under 29 CFR 1910.120(b) to inform subcontractors of site hazards. In turn, each subcontractor will provide documentation to URS that describes their plan for addressing applicable the health and safety requirements for activities that are unique to their scope of services (for example: drill rig operation, excavation safety, electrical safety, etc.).

4.0 RESPONSIBILITIES

URS will have site safety and health oversight and coordination responsibilities for URS personnel; each subcontractor will be held accountable for the safe and healthful performance of work by each of its employees, subcontractors, or support personnel who may enter the site.

URS will adhere strictly to the provisions of this HSP, along with applicable regulations issued by governmental entities. URS will coordinate work with facility personnel.

4.1 PROJECT MANAGER (URS)

The PM will direct URS onsite operations. The PM may delegate all or part of these duties to a properly qualified URS employee who is designated as the Site Manager. At the site, the PM, assisted by the Site Safety Officer (SSO), has primary responsibility for the following.

- Seeing that appropriate PPE and monitoring equipment are available and properly used by all onsite URS employees.
- Establishing that URS personnel are aware of the provisions of this HSP, are instructed in the work practices necessary to ensure safety, and are familiar with planned procedures for dealing with emergencies.
- Establishing that all URS onsite personnel have completed a minimum of 40 hours of health and safety training, have appropriate medical clearance, as required by 29 CFR 1910.120, and have been fit tested for the appropriate respirators.
- Seeing that URS personnel are aware of the potential hazards associated with site operations.
- Monitoring the safety performance of all URS personnel to see that required work practices are employed.
- Correcting any URS work practices or conditions that may result in injury or exposure to hazardous substances.
- Preparing any accident/incident reports for URS activities (see Section 12.6).
- Seeing to the completion of Safety Plan Compliance Agreements by URS personnel (See Attachment B).
- Halting URS site operations, if necessary, in the event of an emergency or to correct unsafe work practices.
- Seeing that utility clearances are obtained prior to the commencement of work (see Section 5.2.7).
- Seeing that the appropriate SMSs are appended to this HSP and are available on site (see "Plan-at-a-Glance").
- Reviewing and approving this project HSP.

4.2 SITE SAFETY OFFICER (URS)

The SSO's duties may be carried out by the PM or another qualified URS Site Manager. The SSO is responsible for the following.

- Implementing the project HSP and reporting any deviations from the anticipated conditions described in that plan to the PM and, if necessary, the RHSM.
- Determining that monitoring equipment is used properly by URS personnel and calibrated in accordance with manufacturer's instructions or other standards and that the results are properly recorded and filed.
- Checking with a URS health and safety representative to assure URS personnel have current medical clearance and training.
- Assuming any other duties as directed by the PM or RHSM.
- Coordinating with a URS health and safety professional to identify URS personnel on site for whom special PPE, exposure monitoring, or work restrictions may be required.
- Conducting safety meetings for all site personnel in accordance with Section 13 of this HSP.
- Conducting daily site inspections prior to the start of each shift. All inspections must be documented (preferably in a bound field logbook).
- Providing ongoing review of protection level needs as project work is performed and informing the PM of the need to upgrade/downgrade protection levels, as appropriate.
- **Contacting the RHSM to perform personal industrial hygiene monitoring for aromatic hydrocarbons if the second action level is reached (>5 ppm in the OBZ), as described in the Action Level Table (page 4) and Section 6.1.1.**
- Seeing that decontamination procedures described in Section 10.0 are followed by URS personnel.
- Establishing monitoring of URS personnel and recording the results of exposure evaluations.
- Halting URS site operations, if necessary, in the event of an emergency or to correct unsafe work practices.
- Maintaining the visitor log.
- Posting OSHA "Safety of the Job" and other required posters at the site.

4.3 REGIONAL MANAGER, HEALTH, SAFETY, AND ENVIRONMENT (URS)

The RMHSEE is responsible for:

- Determining the need for periodic audits of the operation to evaluate compliance with this plan; and
- Providing health and safety support as requested by the SSO and PM.

4.4 PROJECT PERSONNEL (URS)

Project personnel involved in onsite investigations and operations are responsible for:

- Taking all reasonable precautions to prevent injury to themselves and to their fellow employees;
- Performing only those tasks that they believe they can do safely and immediately reporting any accidents and/or unsafe conditions to the SSO or PM;
- Implementing the procedures set forth in the HSP and reporting any deviations from the procedures described in that HSP to the SSO or PM for action;
- Notifying the PM and SSO of any special medical problems (i.e., allergies) and seeing that all onsite URS personnel are aware of such problems; and
- Reviewing the project HSP and signing the Safety Plan Compliance Agreement.

4.5 SUBCONTRACTOR'S SAFETY REPRESENTATIVE

Subcontractors are requested to designate an on-site employee (preferably a manager) who will serve as the Safety Representative (SSR) for their company. In this capacity, the SSR is responsible for providing health and safety oversight of their personnel participating on the project team. In addition, the SSR will perform routine work area inspections, conduct safety meetings, provide safety orientations for new employees and investigate incidents involving their employees. The SSR will attend periodic safety meetings with the URS SSO. Additional information regarding Subcontractor health and safety requirements can be found in SMS 046 in Attachment D

5.0 JOB HAZARD ANALYSIS

In addition to the chemical, physical, and biological hazards described below, the service center is an active facility. Communication and coordination with the on-site GE Environmental Health and Safety coordinator will be necessary to minimize potential hazards stemming from a shared work site.

5.1 CHEMICAL HAZARDS

Two categories of chemical hazards are associated with site activities:

- Site constituents; and
- Chemicals used to conduct the site work.

Site constituents are those that exist at the site and are the cause for conducting site activities. The chemicals that are brought on site to conduct the work may be hazardous and subject to regulation under OSHA's Hazard Communication Standard (29 CFR 1910.1200). Additional requirements for activities at sites where hazardous waste may be present can be found in SMS 017 in Attachment D.

5.1.1 Site Constituents

From an occupational health standpoint, given that any potential exposure to site personnel will be only for a *short period of time (intermittent for several days)*, the levels of contaminants that have been, or could be, encountered during site activities *should not represent a significant concern* if the provisions of this HSP are appropriately implemented. However, *given that the site is still under investigation*, the potential for exposure to elevated levels of these contaminants may exist. Exposure to elevated levels of these contaminants may pose hazards. Overviews of these hazards are presented here in terms of the following types of occupational exposure limits:

- PEL Permissible Exposure Limit (OSHA Standard)
- TLV Threshold Limit Value (American Conference of Governmental Industrial Hygienists [ACGIH] Guidance)
- STEL Short Term Exposure Limit
- C Ceiling

OSHA PELs and ACGIH TLVs are time-weighted averages (TWAs), which are defined as concentrations for a normal 8-hour work day and 40-hour work week to which almost all workers can be exposed repeatedly without suffering adverse health effects. [NIOSH is deleted because it is merely recommended, and is based on a 10 hr workday]

STEL is defined as the concentration to which workers can be exposed for short time periods without irritation, tissue damage, or narcosis sufficient to be likely to cause impairment of self-rescue or to precipitate accidental injury. The STEL is a 15-minute TWA that will not be exceeded at any time during the workday. STELs are used by OSHA and ACGIH for chemical exposure criteria.

A ceiling value (C) is a concentration that will not be exceeded at any time in any workday. Ceiling limits are used by OSHA and ACGIH for chemical exposure criteria.

Summaries on the site constituents of concern follow.

Chemical Name	OSHA PEL	Routes of Exposure	Health Hazard/Target Organ	Symptoms of Overexposure
PCBs (42% Chlorine)	1 mg/m3 "skin"	Inhalation, skin absorption, ingestion, skin and/or eye contact	Skin, eyes, liver, reproductive system	Irritation of eyes, chloroacne, liver damage, potential carcinogen
PCBs (54% Chlorine)	0.5 mg/m3 "skin"	Inhalation, skin absorption, ingestion, skin and/or eye contact	Skin, eyes, liver, reproductive system	Irritation of eyes, chloroacne, liver damage, potential carcinogen
Chlorobenzene	75 ppm	Inhalation, skin and/or eye contact	CNS and eyes	Irritation of skin, eyes, and upper respiratory tract
1,4-Dichlorobenzene	75 ppm	Inhalation, ingestion, skin and/or eye contact	Eye and skin irritant, respiratory system, kidneys	Irritation of eyes, headache, nausea, weight loss, liver damage, and potential carcinogen

Skin contact with potentially contaminated materials will be minimized by the use of personal protective clothing (as described in Sections 1.0 and 7.0). Inhalation of vapors or particulates during site activities will be minimized by the use of engineering controls. Ingestion of contaminated materials will be minimized by the use of appropriate personal hygiene procedures during decontamination (i.e., thoroughly washing face and hands with soap and water after leaving the work area and prior to eating or drinking).

5.1.2 Hazard Communication Materials

Materials that are considered hazardous materials under the OSHA Hazard Communication Standard (29 CFR 1910.1200) may be used during this project. In accordance with the URS Hazard Communication Program, the Material Safety Data Sheets (MSDSs) for the hazardous materials listed in Section 1.0 are included in Attachment C. The SSO will make copies of these MSDSs available to any URS subcontractors (i.e., drillers, excavators) on this project.

URS' written Hazard Communication Program is located in SMS 002, a copy of which is to be maintained on site.

5.2 PHYSICAL HAZARDS

Physical hazards at this work site include:

- Performing work at an operating facility;
- Confined spaces;
- Heat stress and cold stress;
- Noise from the operation of site equipment;

- Slip-trip-fall types of accidents;
- Back injuries resulting from improper lifting;
- Being caught in or struck by drilling or construction equipment; and
- Underground and aboveground utilities.

5.2.1 Confined Spaces

A Confined space, as defined in OSHA Standard 29 CFR 1910.146, is:

- Large enough for personnel entry;
- Has limited or restricted means for entry and exit; and
- Is not designed for continuous occupancy.

All confined spaces will be considered to be **permit-required spaces** until further investigation reveals the nature and extent of hazards. A permit-required confined space is a confined space that may present one of more potential hazards, such as hazardous atmospheres, fire/explosion, engulfment, entrapment, electrical, mechanical, or any other serious hazard.

Since some of the hazards described above may be encountered with an entry to the sewer manholes at the GE Tonawanda facility, therefore the manholes will be considered permit-required confined spaces.

Responsibilities

All URS confined space personnel will be trained to OSHA's level of Hazardous Materials Technician in accordance to 29 CFR 1910.120 – Hazardous Waste Operations. All URS personnel involved in the confined space work (attendants, entrants, and supervisors) shall be trained in confined space pursuant to OSHA 29 CFR 1910.146.

Entry Supervisor

The Entry Supervisor will be responsible for the acceptable entry conditions prior to entry and follow URS' Safety Management Standard 10 – Confine Space Entry. The Entry Supervisor will be responsible for ensuring that a Back-Up Rescuer is available at the time of entry.

Also, the Entry Supervisor has the authority to stop work and take corrective actions when conditions change.

Attendant

The Attendant's responsibility is to maintain contact with the Entrant at all times, which maybe through hand signals, radios, or verbal contact. The Attendant will also notify the Entry Supervisor of any conditions that may arise within the manhole, compromised equipment or that the Entrant expresses concern of the safety within. The Attendant will follow URS' Safety Management Standard 10 – Permit Required Confine Spaces.

Entrant

The Entrant's responsibility is performing tasks described above. The Entrant will be provided with the appropriate PPE ensemble to ensure his/her safety and also, have the authority to request extraction from the manhole if any safety issues arise. This Entrant will follow URS' Safety Management Standard 10 – Permit Required Confine Spaces.

Back-Up Rescuer

The Back-Up Rescuer's responsibility is to be trained to level acceptable to OSHA's Final Rule pertaining to Confine Spaces. He / She will be proficient at the following rescue positions; attendant, rescuer, rigger and air monitoring, and will have previously demonstrated confidence in all positions.

Site Control

The perimeter around the designated confined space will be marked with barrier tape and fluorescent orange pillars and cones. A sign will be visible stating "Danger Confine Space – Do Not Enter" or equivalent wording.

It is believed that traffic control will not be a concern on this project. However, upon arriving at the site, traffic concerns become an issue, measures will be implemented to reduce and control traffic, such as parking vehicle(s) to serve as an extra barrier.

Confined Space Preparation

As described in URS' SMS 010, the confined space will be prepared through space isolation, atmospheric testing, ventilation, and final authorization of the Permit.

Atmospheric testing will consist of oxygen levels, combustibles, carbon monoxide and hydrogen sulfide. Acceptable atmospheric levels for entry will consist of:

- Oxygen 19.5% – 23.3%
- Combustibles <10% LEL
- Carbon Monoxide < 35 ppm
- Hydrogen Sulfide < 2 ppm

To ensure acceptable atmospheric levels, in accordance to URS' SMS 010, ventilation will be continuous during entry. However, any atmospheric levels above or below the acceptable standards before or during entry will halt entry and applicable mechanical measures will be conducted to remove the limiting factor.

Personal Protective Equipment

The minimum required PPE ensemble for entry varies upon each duty being performed. The description of minimum PPE, for each position being performed, ensemble is as follows:

Entry Supervisor – Hard-hat, safety glasses, steel-toe boots (

Attendant – Tyvek suit, hard-hat, safety glasses, steel-toe boots, rubber over-boots, full-body harness, nitrile gloves and nitrile over-gloves.

Entrant – Tyvek suit, hard-hat, safety goggles, steel-toe boots, rubber over-boots, full-body harness, nitrile gloves and nitrile over-gloves.

Used PPE will be bagged at the entry site and then placed in a drum. The drum will be labeled in accordance to Federal and State regulations.

Decontamination

Decontamination of personnel and equipment will be in accordance to OSHA's Rule 29 CFR 1910.120 – Hazardous Waste Operations. Any applicable decon solution required on-site will also require a MSDS sheet filed in the project file.

Termination of Entry

Upon completion of work or a "Stop Work" order has been given the permit must obtain a signature from the Entry Supervisor. This should be accomplished after the space is resealed and signs and barricades removed.

Rescue Provisions

The manhole will be entered using a non-entry rescue technique, which will require the use of a tripod, winch, lanyard and full body harness. In the event that the primary system (tripod with winch) has failed, back-up rescue provisions will be utilized. For this project, the Back-Up Rescuer will be facility (GE) personnel, if trained personnel are available at the time of the work. Otherwise, local emergency personnel will be utilized.

A two-tier emergency level response will be determined by the type of emergency that is encountered during the project.

Tier 1 – Depending on the emergency or unsafe conditions, it is the discrepancy of the Entry Supervisor to determine the need of additional resources (fire, police, and/or emergency medical services).

Tier 2 – Emergency personnel will automatically be dispatched to the site.

A copy of emergency phone numbers will also be kept at the confine space location if unseen variables arise and further resources are needed.

5.2.2 Heat Stress Recognition and Control

Heat stress monitoring will commence when personnel are wearing PPE, including Tyvek®-type coveralls, and the ambient temperature exceeds 70°F. If standard work garments (cotton coveralls) are worn, monitoring will commence at 85°F. Heat stress monitoring and control guidance can be found in SMS 018 (Attachment D), a copy of which is to be maintained on site.

5.2.3 Cold Stress Recognition and Control

Protection against cold stress will be initiated when temperatures drop below 45°F. Cold stress guidance is provided below and in SMS 059 (Attachment D).

Exposure to cold working conditions can result in cold stress (hypothermia) and/or injury (frostbite) to hands, feet, and head. Hypothermia can result when the core body temperature drops below 36°C (96.8°F). Lower body temperature will be likely to result in dizziness, drowsiness, disorientation, slurred speech, or loss of consciousness, with possible fatal consequences. Pain in the extremities may be the first warning of danger from cold stress. Shivering develops when the body temperature falls to 35°C (95°F).

Hypothermia can be brought on by exposure to cold air, immersion in cold water, or a combination of both. The wind chill factor, which is the cooling power of moving air, is a critical factor in cold stress.

Workers must wear adequate insulating clothing if work is performed in temperatures below 4°C (40°F). At temperatures of 2°C (35.6°F or less), workers whose clothing becomes wet will be provided immediately with a change of clothing and, if necessary, treated for hypothermia. Treatment includes warming the victim (with skin-to-skin contact or by providing warm blankets or other coverings) and providing warm liquids for the victim to drink. Skin exposure will not be permitted at temperatures of -32°C (-25°F) or below.

If fine work is to be performed with bare hands for more than 10 to 20 minutes at temperatures below 16°C (60°F), provisions will be made for keeping the workers' hands warm. If equivalent chill temperatures fall below 40°F, and fine manual dexterity is not required, gloves will be worn. Metal handles of tools will be covered with insulating material at air temperatures below -1°C (30°F).

If work is to be performed continuously in the cold when the wind chill factor is at or below -7°C (19°F), heated warming shelters (tents, trailers, vehicle cabs) will be made available nearby.

5.2.4 Noise Hazards

Previous surveys indicate that heavy equipment, such as *drilling or construction* equipment may produce continuous and impact noise at or above the action level of 85 dBA. All URS personnel within 25 feet of operating equipment or near an operation that creates noise levels high enough to impair conversation will wear hearing protective devices (either muffs or plugs). URS personnel who are in the Medical Surveillance Program are automatically enrolled in the URS Hearing Conservation Program and have had baseline and, where appropriate, annual audiograms. Personnel will wash their hands with soap and water prior to inserting earplugs to avoid initiating ear infections. Additional information regarding the URS Hearing Conservation Program is located in SMS 026, a copy of which is to be maintained on site.

5.2.5 Slip/Trip/Fall Hazards

Workers should exercise caution when walking around the site to avoid fall and trip hazards. If there are holes or uneven terrain in the work area that could cause site personnel to fall or trip, they must be covered, flagged, or marked to warn workers. Workers should exercise caution around open manholes or excavations, such as test pits, and avoid getting closer than 2 feet to the edge of an unsloped excavation unless guardrails or fall protection is provided. If conditions become slippery, workers should take small steps with their feet pointed slightly outward to decrease the probability of slipping. Gravel or sand will be spread in muddy areas to reduce slipperiness. Workers should watch where they are walking and walk only in areas of good stability. URS SMS 021 (Attachment D) will be used to aid in the identification and elimination of slip/trip/fall hazards.

5.2.6 Lifting Hazards

The following guidelines will be followed whenever lifting equipment such as portable generators, coolers filled with samples, handling manhole covers, and any other objects that are of odd size or shape or that weigh over 50 pounds. Safe lifting procedures are described in SMS 069 (see attachment D), a copy of which is to be available on site. The procedures include the following.

- Get help when lifting heavy loads. Lift portable generators using a two-person lift.
- When moving heavy objects, such as drums or containers, use a dolly or other means of assistance.

- Plan the lift. If lifting a heavy object, plan the route and where to place the object. In addition, plan communication signals to be used (i.e., “1, 2, 3, lift,” etc.)
- Wear sturdy shoes that are in good condition and supply traction when performing lifts.
- Keep your back straight and head aligned during the lift, and use your legs to lift the load – do not twist or bend from the waist. Keep the load in front of you – do not lift or carry objects from the side.
- Keep the heavy part of the load close to your body to help maintain your balance.

5.2.7 Heavy Equipment

Operation of heavy equipment during excavation and other site activities presents potential physical hazards to personnel. Issues associated with excavations and heavy equipment operations are addressed in SMS 013 and 019, respectively. Copies of these SMS shall be maintained on site.

The following precautions must be observed whenever heavy equipment is in use:

- Wear PPE, such as steel-toed shoes, safety glasses or goggles, and hard hats, whenever such equipment is present.
- At all times, be aware of the location and operation of heavy equipment, and take precautions to avoid getting in the way of its operation. Never assume that the equipment operator sees you. Make eye contact and use hand signals to inform the operator of your intent, particularly if you intend to work near or approach the equipment.
- Traffic safety vests **ARE REQUIRED** for URS personnel working near mobile heavy equipment, such as backhoes and other excavators.
- Never walk directly in back of or to the side of heavy equipment without the operator’s acknowledgment.
- When an equipment operator must operate in tight quarters, the equipment subcontractor will provide a person to assist in guiding the operator’s movements.
- Keep all non-essential personnel out of the work area.
- Any heavy equipment that is used in the exclusion zone (EZ) will remain in that zone until its task is completed. The equipment subcontractor will completely decontaminate such equipment in the designated equipment decontamination area as required prior to moving the equipment outside of the EZ/Contamination Reduction Zone (CRZ).

5.2.8 Drilling and Well Installation

The drill rig operator has superior knowledge regarding drill rig maintenance, operation, and safety. The following information provides general guidelines for safe practices onsite. See SMS 056, which is in Attachment D, for a summary of drilling safety guidelines.

Movement of Drill Rigs (Includes Geoprobe Equipment)

The following safety guidelines relate to off-road movement of drill rigs:

- Before moving a drill rig, first walk the route of travel, inspecting for depressions, slumps, gullies, ruts, and similar obstacles.

- Use a spotter or guide when moving a drill rig anywhere on site.
- Always lower the mast prior to drill rig movement.
- Always check the brakes of a drill rig carrier before traveling, particularly on rough, uneven, or hilly ground.
- Discharge all passengers before moving a drill rig on rough or hilly terrain.
- Engage the front axle of 4x4 or 6x6 vehicles or carriers when traveling off the highway on a hilly terrain.
- Use caution when traveling on a hillside. Conservatively evaluate the hillside capability of drill rigs, because the addition of drilling tools may raise the center of mass. When possible, travel directly uphill or downhill.
- Attempt to cross obstacles such as small logs, small erosion channels or ditches squarely, not at an angle.
- When lateral or overhead clearance is close, use the assistance of someone on the ground as a guide.

Underground utilities are as dangerous as overhead lines. Be aware and always suspect the existence of underground utilities such as electrical power, gas, petroleum, telephone, sewer, and water. Ask for assistance:

- If a sign warning of underground utilities is located on a site boundary, do not assume that underground utilities are located on or near the boundary or property line under the sign; telephone the utility company and check it out. The underground utilities may be a considerable distance away from the warning sign.
- Always contact the owners of the utility lines or the nearest underground utility location service before drilling. The utility personnel should determine the location of underground lines and should mark and flag these locations. Determine, with the utility personnel, what specific precautions must be taken to assure safety.

Housekeeping On and Around the Drill Rig

To complete the first requirement for safe field operations, the safety supervisor of the drilling crew must understand and fulfill his responsibility for maintenance and "housekeeping" on and around the drill rig. Suitable storage locations should be provided for all tools, materials, and supplies. The locations should allow for the convenient handling of tools, materials or supplies without danger that these could fall on or hit a member of the drill crew or a visitor.

Avoid storing or transporting tools, materials, or supplies within or on the mast (derrick) of the drill rig. Pipe, drill rods, bits, casing, augers, and similar drilling tools should be stacked in an orderly manner on racks or sills to prevent spreading, rolling, or sliding.

Penetration hammers or other types of driving hammers should be placed at a safe location on the ground or secured to prevent movement when not in use. Work areas, platforms, walkways, scaffolding, and other access ways should be kept free of materials, obstructions, and substances such as ice, excess

grease, or oil that could cause a surface to become slick or otherwise hazardous. Keep all controls, control linkages, and warning and operation lights and lenses free of oil, grease, and/or ice.

Do not store gasoline in any portable container other than a non-sparking, red container with a flame arrestor in the fill spout. The word "gasoline" must be clearly visible on the container.

Use of Hand Tools

There are many kinds of hand tools that can be used on or around a drill rig. The most important rule is "use the tool for its intended purpose." The following are a few specific and general suggestions that apply to the safe use of several hand tools often used on and around drill rigs.

- When a tool becomes damaged, either repair it before using it again or discard it.
- When using a hammer for any purpose, wear safety glasses and require all others around you to do the same.
- When using a chisel for any purpose, wear safety glasses and require all others around you to do the same.
- Keep all tools cleaned and stored in an orderly manner when not in use.
- Replace hook and heel jaws when they become visibly worn.
- When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be caught between the wrench handle and the ground or the platform should the wrench slip or the joint suddenly let go.

Use of Augers

The following general procedures should be used when advancing a boring with continuous flight or hollow-stem augers:

- Prepare to start an auger boring with the drill rig level, the clutch or hydraulic rotation control disengaged, the transmission in low gear, and the engine running at a low RPM.
- The operator and tool handler should establish a system of responsibility for the series of various activities required for auger drilling, such as connecting and disconnecting auger sections, and inserting and removing the auger fork. The operator must be sure that the tool handler is well away from the auger column and that the auger fork has been removed before starting rotation.
- Only use the manufacturer's recommended method of securing the auger to the power coupling. Do not touch the coupling or the auger with your hands, a wrench, or any other tool during rotation.
- Whenever possible, use tool hoists to handle auger sections.
- Never place your hands or fingers under the bottom of an auger section when hoisting the auger over the top of the auger section in the ground or other hard surfaces such as the drill rig platform.
- Never allow your feet to get under the auger section that is being hoisted.

- Stay clear of any rotating components of the drill rig. Never reach behind or around a rotating auger for any reason.
- Never use your hands or feet to remove cuttings away from auger.
- Augers should be cleaned only when the drill rig is in neutral, and the augers have stopped rotating.

Start-Up Procedures

All drill rig personnel and visitors should be instructed to "stand clear" of the drill rig immediately prior to and during and starting of an engine. Before starting a drill rig engine, make sure that all of the gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers are in the correct non-actuating positions, and the cathead rope is not on the cathead.

Drill Rig Operation

Safety requires the attention and cooperation of every worker and site visitor. The following procedures are related to safety during drilling operations:

- Do not drive the drill rig from hole to hole with the mast in the raised position. Before raising the mast, look up to check for overhead obstructions.
- Before raising the mast, clear all drill rig personnel (with the exception of the operator) and visitors from the areas immediately to the rear and the sides of the mast. In addition, inform them that the mast is being raised.
- Before the mast of a drill rig is raised and drilling is commenced, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. The drill rig should be re-leveled if it settles after the initial set up. Lower the mast only when leveling jacks are down, and do not raise the leveling jack pads until the mast is completely lowered. Before starting drilling operations, secure and/or lock the mast, if required by the drill manufacturer's recommendations.
- The drill rig operator should operate a drill rig only from the position of the controls. The operator should shut down the drill engine before leaving the vicinity of the drill. "Horsing around" within the vicinity of the drill rig and tool and supply storage areas is strictly prohibited, even when the drill rig is shut down. Watch for slippery ground when mounting/dismounting the platform.
- Drilling operations should be terminated during an electrical storm.
- Consuming alcoholic beverages, depressants, stimulants, or any other chemical substance while on the job is strictly prohibited.
- All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors or animals from stepping or falling into the hole. All open boreholes will be covered, protected or backfilled adequately according to local or state regulations when the project is completed.

5.2.9 Underground and Aboveground Utilities

The Site Manager or SSO is responsible for locating underground utilities before the commencement of any subsurface (> 0.3 meter [1 ft.]) activities. Resources include site plans, utility companies, and

regional utility locating services. The proper utility company personnel will certify in writing to the Site Manager or SSO that underground utilities have been deactivated, and the certification will be retained in the project files.

Procedures for activities conducted proximate to utility locations are located in SMS 034, a copy of which is to be maintained on site.

Excavation, drilling, crane work, or similar operations adjacent to overhead lines will not be initiated until operations are coordinated with utility officials. Operations adjacent to overhead lines are prohibited unless one of the following conditions is satisfied.

Power has been shut off and positive means (e.g., lockout/tagout) have been taken to prevent lines from being energized. Wherever possible, the URS SSO will observe power shut off and place a lock and tag on the switch. In all cases, utility company personnel will certify in writing to the Site Manager or SSO that the overhead utilities have been deactivated, and the certification will be retained in the project files. The Site Manager or SSO must also attempt to verify power shut off by checking that power is no longer available to the affected building or equipment.

Equipment, or any part of the equipment, cannot come within the following minimum clearance from energized overhead lines:

<u>Power Lines Nominal System (kv)</u>	<u>Minimum Required Clearance</u>
0-50	10 feet
51- 200	15 feet
201-300	20 feet
301-500	25 feet
501-750	35 feet
751-1000	45 feet

5.2.10 Work Area Protection

Project operations may be undertaken in a roadway or parking lot, causing motor vehicles to pose a hazard. Guidance on properly coning and flagging the work area is provided in Attachment D (SMS 032). Consideration should be given to parking work vehicles within the coned area between the work area and oncoming traffic. Procedures for work zone traffic control are provided in SMS 032, a copy of which is to be maintained on site.

5.3 BIOLOGICAL HAZARDS

Possible biological hazards at this work site include:

- Sewage;
- Ticks;
- Poisonous Plants (i.e. Poison Ivy); and
- Mosquitoes.

5.3.1 Sewage

Sewage work does not typically involve exposure to bloodborne pathogens as covered under the OSHA standard, even though other biological hazards may be present. Water-borne pathogens that may be present in sewage include E. coli, and sewage should be treated as potentially infectious. To protect against water-borne biological hazards personnel must use protection such as impervious coveralls (poly coated tyvek), disposable gloves, boots, face shields, etc. Personnel must protect any areas of broken skin, eyes, nose and mouth from contact with potentially infectious materials, and practice good personal hygiene before eating, drinking, etc. Work should be performed in a manner that prevents splashing. SMS 047 and 051 provide additional information regarding biological hazards and bloodborne pathogens.

5.3.2 Ticks

Tick bites can result in possible Lyme Disease, Rocky Mountain Spotted Fever, Babesiosis, and Ehrlichiosis. To protect against these illnesses, avoid areas that are likely infested with ticks especially in spring and summer; wear light colored clothing, long sleeves and pants and tuck pants into socks; and apply repellants. Always check your clothes and body for ticks at the end of the day and remove according to SMS 047 (Attachment D).

5.3.3 Poisonous Plants

Poison ivy, poison oak, and poison sumac are the most common cause of allergic contact dermatitis. Avoiding these plants is the best defense. Long sleeves and pants should also be worn if avoidance is not possible.

5.3.4 Mosquitoes

Mosquito borne diseases can be quite serious and all precautions should be taken to avoid getting bitten by a mosquito. Arboviral encephalitis is the most common disease found in mosquitos in the northeast. Insect repellent, long sleeves and pants, and mosquito netting should be used to avoid mosquito bites.

6.0 EXPOSURE MONITORING PLAN

Hazardous atmospheric conditions, heat stress, noise, and chemical exposures may be encountered during work at this site. Hazardous atmospheric conditions that potentially be encountered during confined space entry are addressed in Section 5.2.1. Heat stress monitoring and prevention is addressed in Section 5.2.2. Noise levels will not be monitored; URS personnel will wear hearing protection as described in Section 5.2.4.

6.1 CHEMICAL EXPOSURE MONITORING

The field instrumentation described in this HSP has been specifically selected for the contaminants that may be reasonably anticipated to be encountered during the course of this project. Selection factors include anticipated airborne concentrations, potential interference, ionization potentials, instrument sensitivity, and occupational exposure limits. The action levels specified in Section 1.0 were established with the expectation that specific instruments will be used. **DO NOT SUBSTITUTE INSTRUMENTS WITHOUT THE CONSENT OF THE HSP PREPARER OR THE REGIONAL HEALTH AND SAFETY MANAGER.**

The monitoring equipment specified in Section 1.0 will be used on a regular basis to evaluate the potential for exposure to airborne contaminants, typically every five to ten minutes. Monitoring will be conducted in the immediate vicinity of the contaminant source point or work area (e.g., at the borehole and cuttings adjacent to the borehole). If readings exceed the first action level (5 ppm > one minute), monitoring will start immediately in the OBZ of the person working nearest the point of operations/contaminant source, and site personnel will don protective clothing.

A reading in the OBZ above the second action level (5 ppm > one minute) will require the use of half-face respirators with appropriate cartridges. If we do not stock suitable half-face respirators, personnel will upgrade to full-face units. An OBZ reading above the third action level (10 ppm > one minute) will require the use of full-face respirators with appropriate cartridges. If the monitoring instrument reads more than the fourth action level (20 ppm > one minute or 75 ppm instantaneously), work will stop, and workers will move upwind while the airborne contaminants dissipate. If elevated levels remain for more than five minutes, the source of the airborne contamination will be covered with clean soil, plastic sheeting, or foam (or be controlled in an appropriate manner), and the Health and Safety Representative or PM will be contacted for further guidance.

6.2 BACKGROUND READINGS

All direct-reading instrument readings will be evaluated relative to background readings, not “meter zero.” Prior to the start of work at each shift, and whenever there is a significant shift in wind direction, instrument readings will be obtained upwind of the site work zone to determine the level of “background” readings from such things as local vehicle traffic or emissions from nearby operations unrelated to the site. Site readings will be evaluated against these background readings (i.e., if an action level is listed as 20 parts per million [ppm], it is evaluated as 20 ppm above background). The SSO will consult with the industrial hygienist regarding the potential health hazards associated with background readings above 5 ppm.

6.3 DATA LOGGING

All monitoring data, including background readings, will be logged in the field logbook. The results of daily instrument calibrations can be logged either on the form provided in Attachment E or in the field logbook. All monitoring instruments will be calibrated in accordance with the manufacturers' instructions prior to the start of each shift. Calibration also will be performed when inconsistent or erratic readings are obtained. **IF AN INSTRUMENT CANNOT BE CALIBRATED TO SPECIFICATION OR BECOMES OTHERWISE INOPERABLE, ALL INVASIVE SITE WORK (I.E., DRILLING, EXCAVATING) WILL CEASE UNTIL THE INSTRUMENT IS APPROPRIATELY REPAIRED OR REPLACED,** and the PM or RHSM will be contacted for further guidance.

6.4 DUST CONTROL

High winds and site operations can cause airborne dust hazards. If site operations generate sustained visible dust, a water mist will be applied to reduce dust generation. If the mist is not effective in reducing dust generation, personnel will don respirators (half-face or full-face, as appropriate for analyzer readings) with combination organic vapor/high efficiency particulate absolute (P100) cartridges (such as MSA's GMC-H cartridges).

Sand and Portland cement that may be used in groundwater monitoring well construction may contain free silica (quartz). Airborne exposure to silica dust may occur during the handling of these materials. Half- or full-face respirators with P100 cartridges will be worn for operations that pose a reasonable possibility of exposure to sustained airborne dust from the pouring and mixing of dry sand or cement.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The minimum Personal Protective Equipment (PPE) for site personnel includes:

- Hardhat;
- Safety glasses with side shields (or impact-resistant goggles);
- Steel-toed boots or chemical-resistant steel-toed boots;
- Ear protection in the vicinity of noisy equipment;
- Work gloves and/or chemical-resistant gloves; and
- Traffic safety vest in the vicinity of heavy equipment.

As the various monitoring action levels are reached, additional PPE is required. Section 1.0 describes the incremental PPE requirements relative to specific action levels and the specific kinds of PPE to be used. Procedures for the use and selection of PPE are provided in SMS 029, a copy of which is to be maintained on site.

7.1 LIMITATIONS OF PROTECTIVE CLOTHING

The protective equipment ensembles selected for this project are anticipated to provide protection against the types and concentrations of hazardous materials that may be encountered during field operations. However, no protective garment, glove, or boot is resistant to all chemicals at any concentration; in fact, chemicals may continue to permeate or degrade a garment even after the source of the contamination is removed.

To obtain optimal usage from PPE, the following procedures are to be followed by all URS personnel.

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift.
- Inspect all clothing, gloves and boots both prior to and during use for:
 - Imperfect seams;
 - Non-uniform coatings;
 - Tears; and
 - Poorly functioning closures.
- Inspect reusable garments, boots, and gloves prior to and during use for:
 - Visible signs of chemical permeation, such as swelling, discoloration, stiffness, or brittleness; and
 - Cracks or any signs of puncture or abrasion.

Reusable garments exhibiting any of these characteristics will be discarded.

7.2 DURATION OF WORK TASKS

The SSO will establish the duration of work tasks in which personnel use PPE ensembles that include chemical protective clothing (including uncoated Tyvek®). Variables to be considered include ambient temperature and other weather conditions, the capacity of individual personnel to work in the required level of PPE in heat and cold, and the limitations of specific PPE ensembles. Recommended rest breaks are as follows:

- Fifteen minutes midway between shift startup and lunch;
- Lunch break (30 to 60 minutes); and
- Fifteen minutes midway between lunch and shift end.

Rest breaks are to be taken in the support zone or other clean area after personnel have completed the decontamination process, including washing the hands and face with soap and water. *[Additional rest breaks will be scheduled according to heat stress monitoring protocols as described in SMS 018.]*

8.0 RESPIRATORY PROTECTION

8.1 RESPIRATOR SELECTION

Engineering controls and safe work practices (e.g., elimination of the source of contamination, ventilation equipment, working upwind, limiting exposure time, etc.) always must be the primary control for air contaminants. Respirators will be used if engineering or work practice controls are not feasible for controlling airborne exposures below acceptable concentrations and as an interim control measure while engineering or work practice controls are implemented.

Once the need for respirators has been established, the respirators will be selected on the basis of the hazards to which the worker is exposed. Only NIOSH-approved respirators will be issued. Selection criteria established in 29 CFR 1910.134 have been used by the Preparer of this HSP in determining respirator requirements for this project.

CAUTION: Full-face piece or half-face piece air-purifying respirators are not to be used where there is an oxygen deficiency. Only air-supplied respirators with an emergency escape cylinder or self-contained breathing apparatus will be worn when an oxygen deficiency exists.

CAUTION: A respirator does not protect against excessive heat or against a hazardous substance that can attack the body through the skin.

Airborne contaminants have been evaluated based on the suspected contaminants of concern. The concentration of the airborne chemical hazard will be evaluated using direct-reading instruments to determine what type of respirator will be used. Airborne readings will be compared to the action levels in the table in Section 1.0. See action level/respirator requirements in Section 6.1.

8.2 MEDICAL SCREENING

Project employees are enrolled in the URS Medical Surveillance Program and are medically evaluated in compliance with the requirements of 29 CFR 1910.134(a)(10). Employees not medically cleared to wear respirators will not be assigned to this project.

The medical status of each employee is reviewed annually and as may be deemed necessary by the examining physician if the physical status of the employee changes.

8.3 FIT TESTING

A person wearing a respirator must be clean-shaven in the area of the face-piece seal. Long hair, sideburns, and skullcaps that extend under the seal are not allowed. Glasses with temple pieces extending under the seal are not allowed for full-face respirators. Persons with facial conditions that prevent a proper seal are not allowed to wear a respirator until the condition is corrected. Facial conditions that may cause a seal problem include missing dentures, scars, severe acne, etc. Contact lenses may be worn with respiratory protection.

No individual will enter an area where the use of respiratory protective equipment is required unless the person has been fit tested within the last year. Fit testing will be performed in accordance with accepted fit test procedures defined in SMS 042, a copy of which is to be maintained at the site.

Records of fit testing will be maintained on site or by the employee's office and/or corporate medical surveillance program.

Respirator wearers will perform a user seal check each time they put on the respirator. For air-purifying respirators, the positive user seal check is performed by removing the exhalation valve cover, placing the palm over the respirator exhalation valve, and exhaling gently. The respirator mask should puff out without noticeable leakage. The negative user seal check is performed by placing the palms over both of the respirator cartridges, inhaling gently, and holding the breath for 10 seconds. The respirator mask should remain collapsed on the face without noticeable leakage.

8.4 RESPIRATOR USE INSTRUCTIONS

Only those employees who have been properly trained and qualified on the specific type of respirator to be worn may use respirators. No individual will enter an area where the use of respiratory protective equipment is required unless the person has been trained.

All employees whose job assignments require the use of respirators are trained in accordance with 29 CFR 1910.134 during an initial 40-hour and annual refresher training for hazardous waste operations.

Hands-on training in inspecting and donning a respirator, including user seal checks, also is provided at the time of fit testing. Retraining is performed annually on each type of respirator worn by the individual. In addition, site-specific respirator training is provided during site safety briefings conducted by the SSO. Training records are kept in the employee's training file.

A particulate respirator cartridge will be changed out when the wearer has difficulty breathing through the cartridge. Chemical gas or vapor respirator cartridges will be ***changed out at least daily.***

The fit of a chemical gas or vapor respirator will be rechecked, and the cartridges will be changed, if the wearer detects chemical odor or feels chemical irritation on the skin, both of which are indicators of leakage or cartridge breakthrough. Where available, an End-of-Service Life Indicator (ESLI) will be used on chemical respirator cartridges. Cartridges will be changed as soon as the ESLI indicates that the cartridge is saturated and no longer effective in absorbing airborne chemicals.

8.5 RESPIRATOR INSPECTION

The user will inspect respirators before and after each day's use. The inspection procedure for air-purifying respirators (full-face piece and half-face piece cartridge respirators) follows.

Examine the face piece for:

- Excessive dirt;
- Cracks, tears, holes, or distortion from improper storage;
- Inflexibility;
- Cracked or badly scratched lenses (full-face only);
- Incorrectly mounted eyeglass lenses or broken or missing mounting clips (full-face only); and

- Cracked or broken air-purifying element holder, badly worn threads, or missing gaskets.

Examine the head straps or head harness for:

- Breaks or cracks;
- Broken or malfunctioning buckles; and
- Excessively worn serration on the headstraps, which may permit slippage.

Examine the two inhalation valves and the exhalation valve for:

- Foreign material (e.g., hairs, particles, etc.);
- Improper insertion of the valve body in the face piece;
- Cracks, tears, or chips in the valve body, particularly in the sealing surface; and
- Missing or defective exhalation valve covers.

Examine the air-purifying cartridge for:

- Missing or worn cartridge-holder gasket;
- Incorrect cartridge/canister for the hazard;
- Incorrect cartridge installation, loose connections, or cross threading in the holder; and
- Cracks or dents in the outside case or threads of the filter or cartridge/canister.

8.6 CLEANING OF RESPIRATORS

Respirators assigned and worn by one individual must be dismantled and thoroughly cleaned and disinfected after each day's use. Visitors' respirators or respirators assigned to several individuals must be cleaned and disinfected after each use. A disinfectant spray or wipe is approved as a disinfectant between uses during the day but not for cleaning and sanitizing after each day's use. Care must be taken to prevent damage from rough handling during the cleaning procedure. After cleaning, respirators must be reassembled. The procedures for cleaning respirators follow.

- **Washing:** Disassemble and wash with a mild liquid detergent in warm water (not to exceed 110°F). A stiff bristle (not wire) brush may be used.
- **Rinsing:** Rinse in clean water (110°F maximum) to remove all traces of detergent. This is important to prevent dermatitis.
- **Disinfecting:** Thoroughly rinse or immerse in a sanitizer provided by the manufacturer. Alternatively, a weak chlorine bleach solution (1 milliliter of liquid bleach per liter of water) may be used.
- **Final Rinsing:** Rinse thoroughly in clean water (110°F maximum) to remove all traces of disinfectant. This is important to prevent dermatitis.
- **Drying:** Drain and dry by hanging by the straps from racks (take care to prevent damage) or by towel drying with clean, soft cloths or paper towels.

8.7 MAINTENANCE OF RESPIRATORS

Routine respirator maintenance, such as replacing missing valves, gaskets, and nose cups, must only be performed by trained respirator users or a respirator manufacturer's representative. Only approved replacement parts must be used. The substitution of parts from a different brand or type of respirator is generally not possible, invalidates the technical approval of the respirator, and is not permitted. Any respirator suspected of being defective must be removed from service and replaced.

8.8 STORAGE OF RESPIRATORS

When not in use, respirators must be stored to protect them from dust, sunlight, heat, extreme cold, excessive moisture, damaging chemicals, and physical damage. Respirators must be stored in sealable (e.g., Ziplock[®] or twist-tie) reusable plastic bags between shifts.

The respirator storage environment must be clean, dry, and away from direct sunlight. Onsite cabinets or cases are suggested. Storing bagged respirators in vehicles is discouraged because of the potential for damage from other material or equipment.

8.9 ADDITIONAL INFORMATION

Additional information on the URS Respiratory Protection Program is located in SMS 042, a copy of which is to be available on site.

9.0 SITE CONTROL

9.1 GENERAL

Barricade tape and/or barricades will be used to delineate a work zone for safety purposes around the work area. The barriers will be set in a 25-foot radius (as practical) around the work area to provide sufficient maneuvering space for personnel and equipment. A short piece of barricade tape can be affixed to a secure upright (e.g., a drill rig mast or a vehicle antenna) to serve as a wind direction telltale. A 5-foot opening in the barricades at the support zone (upwind of the work area) will serve as the personnel and equipment entry and exit point. The personnel decontamination station will be established at this point if formal decontamination procedures are required (see Section 10.0). All entry and exit from the work area will be made at this opening to control potential sources of contamination and leave contaminated soil and debris in the work area.

At the end of the shift, all boring/sampling holes and excavations must be covered or otherwise secured. All cuttings and decontamination fluids are to be handled in accordance with relevant regulations and instructions from the PM.

The PM or SSO (*with the assistance of the facility representative*) will determine an upwind evacuation area prior to each shift, and all personnel will be notified of its location. A horn or other signaling device will be used to signal an evacuation in the event of an emergency. Three blasts of the horn will be the signal to immediately stop work and proceed to the evacuation area.

The SSO will coordinate project work with the on-site GE Environmental Health and Safety coordinator.

The SSO will verify that all site visitors sign the visitors' log. In addition, all URS personnel and site visitors entering the work area must present evidence of their participation in a medical surveillance program and completion of health and safety training programs that fulfill the requirements of this HSP.

The SSO will provide site hazard and emergency action information to all site visitors before they enter the site. This can be done by providing a copy of this HSP to the visitor.

9.2 WORK ZONES

If monitoring instrument readings exceed the first action level (5 ppm > one minute), requiring the use of chemical protective equipment, work zones must be established as described below.

- EZ – A 25-foot circle (as practical) around the work area will be defined before work starts. The encircled area will constitute the EZ. This zone is where potentially hazardous contaminants and physical hazards to the workers will be contained. Appropriate personal protection, as described in Section 1.0, will be required in this area. Plastic sheeting (visqueen) and/or tarps may be used as necessary to control contaminated materials spilled to the ground during site operations. The size of the EZ may be altered to accommodate site conditions and to ensure contaminant containment.
- CRZ – A corridor leading from the EZ will be defined; it will lead from the work area to a break area. All decontamination activities will occur in the CRZ. A waste container will be placed at the end of the corridor so that contaminated disposable equipment can be placed inside and covered. Surface/soil contamination in this area will be controlled using plastic sheeting. No one will be permitted into the CRZ or EZ unless he/she is in full compliance with the requirements of this HSP.

- Support Zone – A Support Zone, the outermost part of the site, must be defined for each field activity. Support equipment is located in this uncontaminated or clean area. Normal work clothes are appropriate within this zone. The location of this zone depends on factors such as accessibility, wind direction (upwind of work area), and resources (i.e., roads, shelter, utilities).

10.0 DECONTAMINATION PROCEDURES

If the monitoring instrument readings indicate respirator use (the second action level [5 ppm > one minute]) in the OBZ, the following steps will be followed whenever personnel leave the EZ/work area.

- Remove all equipment, sample containers, and notes to the CRZ. Obtain decontamination solutions and decontaminate the tools (shovels, auger flights, etc.) by brushing them under a water rinse. A high-pressure steam cleaner also may be used for decontamination. All waste and spent decontamination solutions will be properly contained.
- Scrub boots with a stiff bristle brush and water. Washtubs and chairs will be provided.
- Remove outer gloves (and boot covers, if used).
- Remove Tyvek[®] coveralls; discard in provided container.
- Remove hardhat and eye protection.
- Remove respirator.
- Remove inner gloves.
- Wash hands and face.

The decontamination area will be covered with plastic sheeting that will be replaced when torn or heavily soiled and at the end of each shift.

Each worker will be responsible for cleaning, sanitizing, and storing his/her own respirator in accordance with the manufacturer's guidance (i.e., washing in warm water and detergent or sanitizing solution, air drying, and storing in a plastic storage bag; see Sections 8.6 - 8.8). Cartridges will be changed in accordance with the procedures described in Section 8.4.

All spent decontamination fluids (rinse waters, etc.) will be handled as directed by the PM and in accordance with relevant regulations.

10.1 SANITATION

Potable water will be made available at the site, either from a pressurized source or as commercially available bottled water. Drinking cups will be supplied; personnel will not drink directly from the source of water or share drinking cups. Sources of non-potable water will be labeled clearly.

Unless toilet facilities are available on site, or transportation is readily available (within five minutes) to transport personnel to nearby toilet facilities.

Washing facilities will be provided on site and be located in the decontamination area or in the support area. Soap, clean water, wash basins, and single-use towels will be available for personnel use. Employees will wash hands with soap and water after any exposure to sewage.

URS procedures for site sanitation are located in SMS 030, a copy of which is to be maintained on site.

10.2 DECONTAMINATION – MEDICAL EMERGENCIES

In the event of physical injury or other serious medical concerns, immediate first aid is to be administered in lieu of further decontamination efforts.

See the Emergency Decontamination chart for a decision tree for emergency decontamination.

10.3 DECONTAMINATION OF TOOLS

When all work activities have been completed, contaminated tools used by URS personnel will be appropriately decontaminated or properly disposed of as hazardous waste.

Contact with PCB-contaminated media is not considered to be high. It is expected that all tools will be constructed of non-porous, non-absorbent materials. This will aid the decontamination process. Any tool or part of a tool that is made of a porous/absorbent material will be discarded and disposed of as a PCB waste if it cannot be properly decontaminated.

Tools will be placed on a decontamination pad or into a bucket and thoroughly washed using a non-phosphate wash, tap water rinse, distilled water rinse,alconox rinse, air drying, and a second distilled water rinse. All visible particles are to be removed before the tool is considered clean.

11.0 SAFE WORK PRACTICES

11.1 GENERAL SITE RULES

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited in the contaminated or potentially contaminated area or where the possibility for the transfer of contamination exists.
- Alcohol consumption is prohibited during work hours. Excessive drinking is strongly discouraged at all times while the team is in the field. Use of prescription medications that impair judgment or affect motor skill and all illegal drugs are also prohibited. For additional information, please review the URS Substance Abuse Policy. Behavior that could endanger the health or safety of any individual of the field team will not be tolerated. Any individual violating these requirements will be subject to disciplinary action that may include termination.
- All personnel will enter designated work areas only through the CRZ. All personnel leaving an EZ/work zone must exit through the CRZ and pass through the decontamination station, as described in Section 10.0.
- Personnel will wash their hands and faces thoroughly with soap and water prior to eating, drinking, or smoking.
- Personnel will avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling, leaning, or sitting on contaminated surfaces. Do not place monitoring equipment on potentially contaminated surfaces (i.e., the ground, etc.)
- All field crew members should remain alert to potentially dangerous situations in which they should not become involved (i.e., note the presence of strong, irritating, or nauseating odors, etc.).
- Only those vehicles and the equipment required to complete work tasks should be permitted within the EZ/work zone (drill rigs, excavators, and similar items). All non-essential vehicles should remain within the support zone.
- Containers, such as drums, will be moved only with the proper equipment and will be secured to prevent dropping or the loss of control during transport.
- Field survey instruments, such as PIDs, will be covered with plastic or similar coverings to minimize the potential for contamination.
- No matches or lighters are permitted in the work area/EZ or CRZ.
- Contaminated protective equipment, such as respirators, hoses, boots, and disposable protective clothing, will not be removed from the work area/EZ or decontamination area until it has been cleaned or properly packaged and labeled.
- Spills should be prevented, to the extent possible. Should a spill occur, any liquid should be contained, if possible.
- Splashing of contaminated materials should be prevented.
- Field crew members should be familiar with the physical characteristics of the site operations including:

- Wind direction in relation to the contaminated area;
 - Accessibility to equipment and vehicles;
 - Areas of known or suspected contamination;
 - Site access; and
 - Nearest water sources.
- The number of personnel and equipment in the EZ should be minimized, but only to the extent consistent with workforce requirements for safe site operations.
 - All wastes generated by URS activities at the site will be disposed of as directed by the PM.
 - All personal protective equipment will be used as specified and required.
 - The buddy system will be used at all times when sampling for hazardous material, when the first action level criterion has been exceeded, or when working in remote areas.
 - Personnel are to immediately notify the SSO or Site Manager if any indications of potential explosions or unusual conditions are observed.

11.2 SAMPLING PRACTICES

For all sampling activities, the following standard safety procedures will be employed:

- All sampling equipment will be cleaned before proceeding to the site.
- At the sampling site, sampling equipment will be cleaned after each use.
- Work in “cleaner” areas will be conducted first, where practical.
- All unauthorized personnel will remain outside the EZ at all times.

11.3 SAMPLE SHIPMENT/HAZARDOUS MATERIALS SHIPMENT

If samples to be collected during the course of this project fall under criteria that define them as hazardous materials under Department of Transportation (DOT) regulations 49 CFR Parts 171-177 (see URS guidelines for determination), then they must be shipped in accordance with those regulations by an individual who is certified as having been “function-specific” trained, as required under the DOT regulations.

Shipping of samples that may contain PCBs cannot be shipped via FedEx air services unless strict packaging requirements are followed. Furthermore, the liability imposed by UPS for shipping samples that may contain PCBs also prohibits URS from using UPS. Samples that may contain PCBs may be shipped via FedEx ground services as long as holding times are not exceeded. It is recommended that a laboratory or qualified independent courier services is used to transport the samples to the laboratory for analysis.

12.0 EMERGENCY RESPONSE PLAN

It is URS policy to evacuate personnel from areas of hazardous material emergencies and to summon outside assistance from agencies with personnel trained to respond to the specific emergency. This section outlines the procedures to be followed by URS personnel in the event of a site emergency. These procedures are to be reviewed during the onsite safety briefings conducted by the SSO.

In the event of a fire or medical emergency, the emergency numbers identified in Section 1.0 (page 1) can be called for assistance.

12.1 PLACES OF REFUGE

In the event of a site emergency requiring evacuation, all personnel will evacuate to a pre-designated area a safe distance from any health or safety hazard (typically, the URS field office, unless conditions dictate otherwise). The SSO (*in cooperation with a facility representative*) will designate a primary assembly area prior to the start of work each day. The assembly area may have to be re-designated by the SSO in the event that the area of influence of an emergency affects the primary assembly area. Once personnel are assembled, the SSO will do a head count. The SSO will evaluate the assembly area to determine whether it is outside of the influence of the situation; if it is not, the SSO will redirect the group to a new assembly area where a new head count will be taken.

During any site evacuation, all employees will be instructed to observe wind direction indicators. During evacuation, employees will be instructed to travel upwind or crosswind of the area of influence. The SSO will provide site personnel with specific evacuation instructions via the site emergency radio, if necessary, specifying the actual site conditions.

12.2 FIRE

Fire prevention procedures are described in SMS 014, a copy of which is to be maintained on site. To protect against fires, the following special precautions must be taken.

- Before any flame-producing devices (i.e., cutting torches or welding irons) are used in the EZ, the SSO must be contacted. In some cases, the client may require to be contacted as well, to determine whether a hot work permit is required. A detailed inspection of the work area will be conducted to determine whether potential fire sources exist; if they do, they must be removed to at least 35 feet away before work can commence.
- Two 2A10B:C fire extinguishers must be located at the work area when cutting or welding is being conducted, and a fire watch will be posted.
- Upon completion of the cutting/welding activities, the area will be inspected for hot metal, slag, etc. The fire watch will remain at its station for at least 15 minutes after the hot work is completed.

Type ABC fire extinguishers will be available on site to contain and extinguish small fires. The local or facility fire department will be summoned in the event of any fire on site.

12.3 COMMUNICATION

A communication network must be set up to alert site personnel of emergencies and to summon outside emergency assistance. Where voice communication is not feasible, an alarm system (i.e., sirens, horns, etc.) will be set up to alert employees of emergencies. Radio communication also may be used to communicate with personnel in the EZ. Where phone service is not readily available, radios or portable telephones will be used to communicate with outside agencies. Site personnel will be trained on the use of the site emergency communication network. Emergency phone numbers will be posted at the phone or radio used for outside communication. The SSO is responsible for establishing the communication network prior to the start of work and for explaining it to all site personnel during the site safety briefing.

In the event of an emergency, personnel will use the following hand signals where voice communications are not feasible:

Signal	Definition
Hands clutching throat	Out of air/can't breathe
Hands on top of head	Need assistance
Thumbs up	OK/I'm all right/I understand
Thumbs down	No/negative
Arms waving upright	Send backup support
Grip partner's wrist	Exit area immediately

12.4 EMERGENCY RESPONSE PROCEDURES

The emergency response team will consist of employees who assume the following roles:

- Emergency care provider(s)
- Provide first aid/CPR as needed
- Communicator

The role of the communicator is to maintain contact with appropriate emergency services and to provide as much information as possible, such as the number injured, the type and extent of injuries, and the exact location of the accident scene. The communicator will be located as close to the scene as possible to transmit to the emergency care providers any additional instructions that may be given by emergency services personnel in route.

- Site Supervisor

The site supervisor (usually the SSO) will survey and assess existing and potential hazards, evacuate personnel as needed, and contain the hazard. Follow up responsibilities include replacing or repairing damaged equipment, documenting the incident, and notifying appropriate personnel/agencies described under Incident Reporting. Responsibilities also include reviewing and revising site safety and contingency plans as necessary.

In the event of an emergency, follow the procedures outlined in Figure 12-1. Notify site personnel of the situation, survey the scene to determine whether the situation is safe, to determine what happened, and to search for other victims. The Emergency Response Checklist provided on the next page can be used to help remember the things to do in an emergency.

EMERGENCY RESPONSE CHECKLIST

In an Emergency	Yes	No
Confirm the reported incident	_____	_____
Evacuate and secure the area	_____	_____
Render first aid/emergency medical care	_____	_____
Notify promptly:		
Project Manager	_____	_____
Fire Department	_____	_____
Police Department	_____	_____
Nearest Hospital or Medical Care Facility	_____	_____
Start Documentation	_____	_____
If spill or leak occurs:		
Don the proper PPE	_____	_____
Stop the source	_____	_____
Contain the spill	_____	_____
Clean up the spill	_____	_____
Upon evacuating, take attendance at the assembly area	_____	_____
Authority given:		
Leave the site	_____	_____
Restart the operations	_____	_____
Debrief and document the incident	_____	_____
A copy of the document submitted to the HSM	_____	_____

12.5 MEDICAL EMERGENCY RESPONSE PLAN

If a medical emergency exists, personnel should:

- Consult the emergency phone number list and request an ambulance immediately;
- Perform First Aid/CPR as necessary;
- Stabilize the injured; decontaminate if necessary, and extricate *only* if the environment the injured/ill person is in is dangerous or unsafe and **ONLY** if the rescuers are appropriately protected from potential hazards that might be encountered during the rescue.
- When emergency services personnel arrive, communicate all first aid activities that have occurred.
- Transfer responsibility for the care of the injured/ill to the emergency services personnel.

The following items and emergency response equipment will be located within easy access at all times:

- First aid kit and infection control kit;
- Eyewash – A 15 minute eyewash (required if corrosives are present), or an appropriate amount of portable sterile eyewash bottles, will be available on site for flushing foreign particles or contaminants out of eyes. The SSO will demonstrate the proper operation of the unit(s) prior to the start of work;
- Emergency telephone numbers list; and
- Portable radios for emergency communications in remote areas.

Drugs, inhalants, or medications will not be included in the first aid kit.

Supplies should be reordered as they are used. A monthly inventory must be done on the first aid kit and infection control kit contents, and supplies that have been used must be reordered.

12.6 INCIDENT REPORT

ALL site injuries and illnesses must be reported to the SSO and PM immediately following first-aid treatment. The SSO will notify the Office Health and Safety Representative (716-998-7626) or the RHSM (973-572-3916). Work is to be stopped until the PM or SSO have determined the cause of the incident and have taken the appropriate action to prevent a recurrence. Any injury or illness, regardless of severity, is to be reported (see SMS 049). Site injuries and illnesses will also be reported to the on-site GE Environmental Health and Safety coordinator by the SSO.

12.7 OPERATION SHUTDOWN

In certain extremely hazardous situations, the SSO or SSR may request that site operations be temporarily suspended while the underlying hazard is corrected or controlled. During operations shutdowns, all personnel will be required to stand upwind to prevent exposure to fugitive emissions. The SSO, with concurrence from the RHSM, will have ultimate authority for operations shutdown and restart. The SSO will promptly notify the on-site GE Environmental Health and Safety coordinator of all situations that may impact GE personnel.

12.8 SPILL OR HAZARDOUS MATERIALS RELEASE

Small spills are immediately reported to the SSO and are dealt with according to the chemical manufacturer's recommended procedures, which are found on the MSDS. Steps will be taken to contain and/or collect small spills for approved storage and disposal. The SSO will notify the on-site GE Environmental Health and Safety coordinator of spill or release of hazardous materials.

In the unlikely event of a larger release of hazardous materials as a result of site activities, site personnel will evacuate to the predestinated assembly area. The local Designated Emergency Response Authority (DERA) will be notified by the SSO immediately, and appropriate actions will be taken to protect public health and mitigate the contaminant release. The DERA can be reached through the local police or fire department. The Site Manager will make the following emergency contacts:

Regional Health and Safety Manager	Ben Bertolotti 973-777-3003
Health and Safety Representative	Sheldon Nozik 716-923-1160
Project Manager	Karen Peppin 518-688-0015
EPA Response Center (if reportable quantity is exceeded)	(800) 424-8802
NYSDEC Spill Response	(800) 457-7362

13.0 TRAINING, MEDICAL SURVEILLANCE, SITE INSPECTIONS

13.1 TRAINING AND MEDICAL SURVEILLANCE

All URS site personnel will have met the requirements of 29 CFR 1910.120(e), including:

- Forty hours of initial off-site training or its recognized equivalent
- Eight hours of annual refresher training for all personnel (as required);
- Eight hours of supervisor training for personnel serving as SSOs; and
- Three days of work activity under the supervision of a trained and experienced supervisor.

All URS personnel performing confined space entry work (entrant supervisor, attendant, and entrant) will have met the training requirements of 29 CFR 1919.146.

All URS site personnel are participating in medical surveillance programs that meet the requirements of 29 CFR 1910.120(f). Current copies of training certificates and statements of medical program participation for all URS personnel are maintained by the local office.

In addition, all URS site personnel will review this HSP and sign a copy of the Safety Plan Compliance Agreement provided in Attachment B. The PM will maintain these agreements at the site and place them in the project file at the conclusion of the operation.

Prior to the start of operations at the site, the SSO will conduct a site safety briefing, which will include all personnel involved in site operations. At this meeting, the SSO will discuss:

- Contents of this HSP;
- Types of hazards at the site and means for minimizing exposure to them;
- The type of monitoring that will be performed;
- Action levels for upgrade and downgrade of PPE;
- PPE that will be used;
- Site-specific respiratory protection requirements;
- Decontamination protocol;
- Site control measures, including safe operating practices and communication;
- Location and use of emergency equipment; and
- Evacuation signals and procedures.

All site personnel, including subcontractor personnel, are to attend the briefings and sign the briefing form.

Subsequent site safety briefings will be conducted at least weekly, or whenever there is a change in task or significant change in task location. Briefings also will be conducted whenever new personnel report to the site.

13.2 SITE INSPECTIONS

The URS Site Manager or SSO is to conduct a daily site inspection prior to the start of each shift. It is the responsibility of the PM or Site Manager to resolve discrepancies immediately, contacting the RHSM if necessary for assistance. Inspections are to be documented and maintained on site until the completion of the project, at which time they are placed in the project files.

14.0 RECORDKEEPING

The PM and SSO are responsible for site recordkeeping. Prior to the start of work, they will review this HSP; if no changes are needed, they will sign the approval form (PM) or acceptance form (SSO) and forward a copy to the RHSM.

All URS personnel will review the HSP and sign the Safety Plan Compliance Agreement in Attachment B; copies of these forms will be maintained in the project file as noted in Section 12.

The SSO will conduct a Site Safety Briefing in accordance with Section 13 and have all attendees sign the form in Attachment B; copies will be maintained in the project file.

All permit required confined space permit forms and monitoring data forms will be kept in the project folder.

Any incident or exposure incident will be investigated and the Incident Report form (SMS 049) will be completed and forwarded to the Office Human Resources Representative and the RHSM. GE may require that incident report form also be filled out.

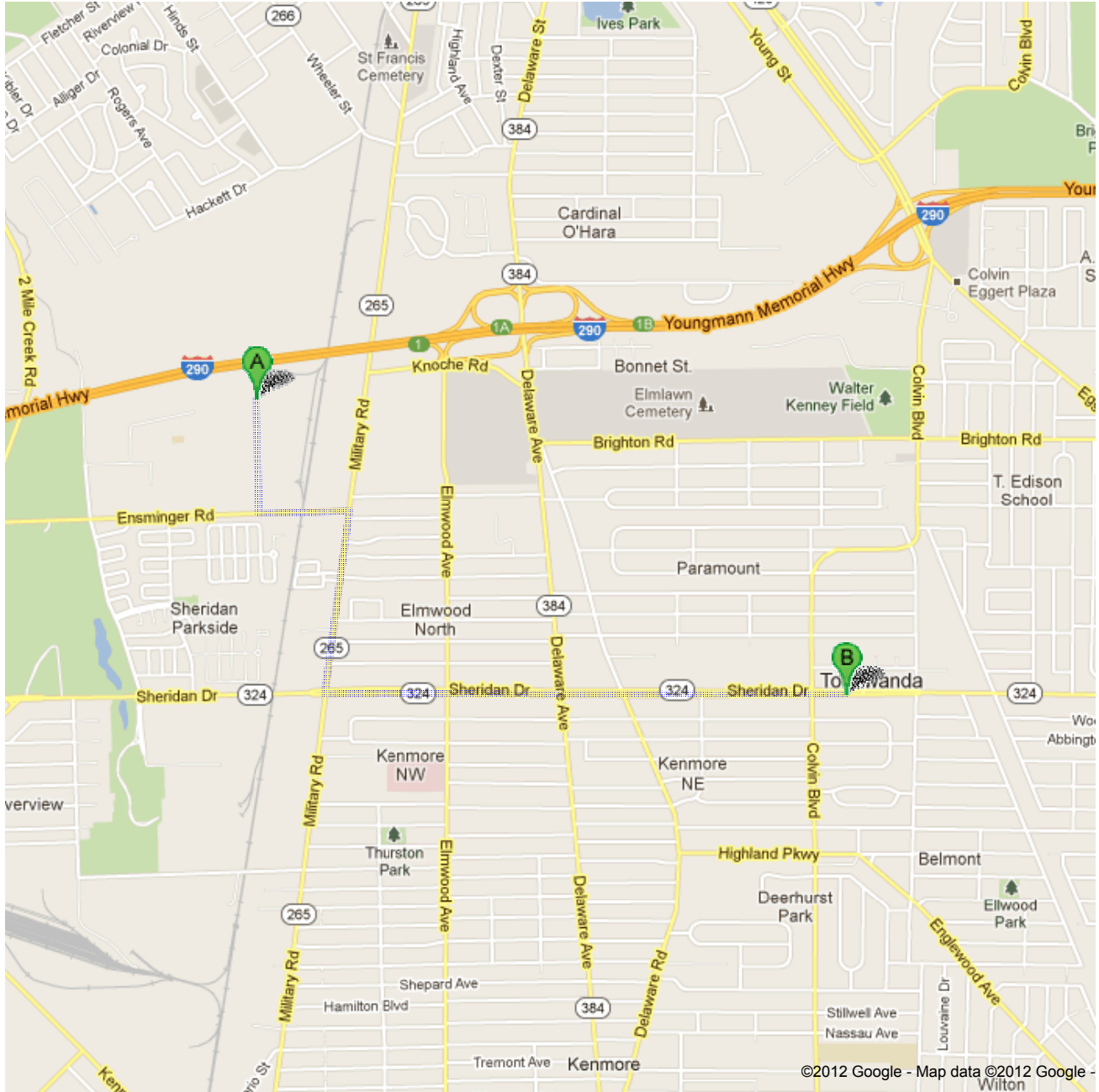
All instrument readings and calibrations, PPE use and changes, health and safety-related issues, and deviations from or problems with this HSP will be recorded in the field log.


ATTACHMENT A




HOSPITAL ROUTE MAP




Directions to 2075 Sheridan Dr, Buffalo, NY 14223
2.5 mi – about 7 mins
Healthy Works WNY, LLC
Dr. Mark Costanza
(716) 447-6474



 175 Milens Rd, Tonawanda, NY 14150

-
- | | |
|---|--------------|
| 1. Head south on Milens Rd toward Ensminger Rd | go 0.3 mi |
| About 46 secs | total 0.3 mi |
|  2. Turn left onto Ensminger Rd | go 0.2 mi |
| About 1 min | total 0.6 mi |
|  3. Turn right onto Military Rd | go 0.5 mi |
| About 1 min | total 1.1 mi |
|  4. Turn left onto Sheridan Dr | go 1.4 mi |
| Destination will be on the right | total 2.5 mi |
| About 4 mins | |

 2075 Sheridan Dr, Buffalo, NY 14223

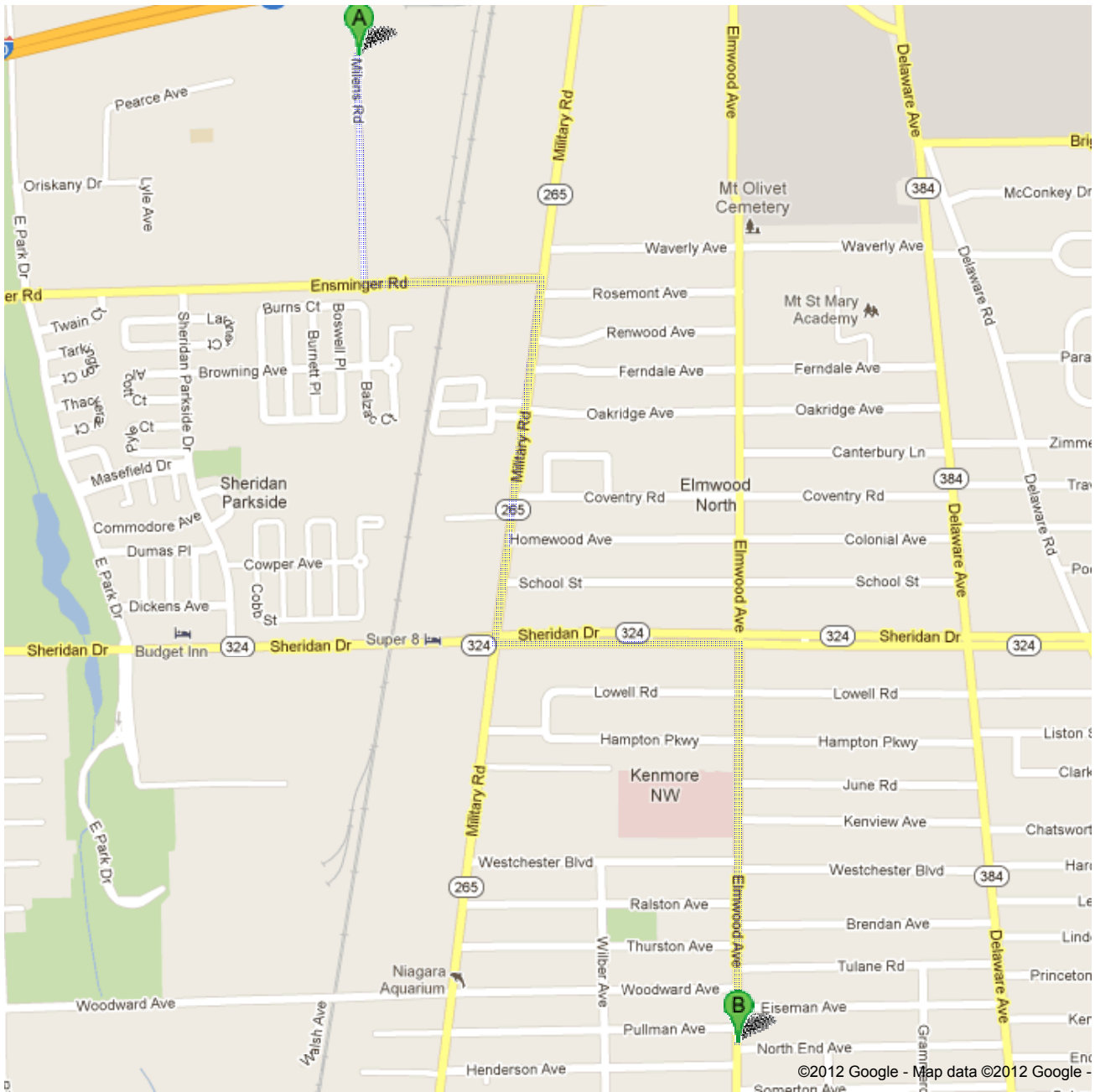
These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.


Map data ©2012 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.




Directions to 2950 Elmwood Ave, Kenmore, NY 14217
2.0 mi – about 6 mins
Kenmore Mercy Hospital
(716) 447-6100



 175 Milens Rd, Tonawanda, NY 14150

-
- | | |
|---|--------------|
| 1. Head south on Milens Rd toward Ensminger Rd | go 0.3 mi |
| About 46 secs | total 0.3 mi |
|  2. Turn left onto Ensminger Rd | go 0.2 mi |
| About 1 min | total 0.6 mi |
|  3. Turn right onto Military Rd | go 0.5 mi |
| About 1 min | total 1.1 mi |
|  4. Turn left onto Sheridan Dr | go 0.3 mi |
| About 1 min | total 1.4 mi |
|  5. Take the 1st right onto Elmwood Ave | go 0.6 mi |
| Destination will be on the right | total 2.0 mi |
| About 1 min | |

 2950 Elmwood Ave, Kenmore, NY 14217

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

Map data ©2012 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

ATTACHMENT B
SAFETY PLAN COMPLIANCE AGREEMENT AND
MEDICAL EMERGENCY CONTACT SHEET

I, _____, have received a copy of the Health and Safety Plan for this Project. I have reviewed the plan, understand it, and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the health and safety requirements specified in the plan.

SIGNED: _____
Signature Date

Firm: URS Corp.

This brief Medical Emergency Contact Sheet will be kept in the Support Zone during site operations. It is in no way a substitute for the Medical Surveillance Program requirements of the URS Health and Safety Program. This data sheet will accompany injured personnel when medical assistance or transport to hospital facilities is necessary.

Emergency Contact: _____ Phone #: _____

Relationship: _____

Do you wear contact lenses? _____

ATTACHMENT C

MATERIAL SAFETY DATA SHEETS

ALCONOX MSDS

Section 1 : MANUFACTURER INFORMATION

Product name: Alconox

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2009/04/20

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A : ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Solid
Appearance & odor: Almost odourless.
White granular powder.
Odor threshold (ppm): Not available.
Vapour pressure (mmHg): Not applicable.
Vapour density (air=1): Not applicable.
By weight: Not available.
Evaporation rate (butyl acetate = 1): Not applicable.
Boiling point (°C): Not applicable.
Freezing point (°C): Not applicable.
pH: (1% aqueous solution).
9.5
Specific gravity @ 20 °C: (water = 1).
0.85 - 1.10
Solubility in water (%): 100 - > 10% w/w
Coefficient of water\oil dist.: Not available.
VOC: None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability: Not flammable.
Conditions of flammability: Surrounding fire.
Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.
Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.
Auto-ignition temperature: Not available.
Flash point (°C), method: None
Lower flammability limit (% vol): Not applicable.
Upper flammability limit (% vol): Not applicable.
Not available.
Sensitivity to mechanical impact: Not applicable.
Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.
Rate of burning: Not available.
Explosive power: None

Section 5 : REACTIVITY DATA

- Chemical stability:** Stable under normal conditions.
- Conditions of instability:** None known.
- Hazardous polymerization:** Will not occur.
- Incompatible substances:** Strong acids.
Strong oxidizers.
- Hazardous decomposition products:** See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

- Route of entry:** Skin contact, eye contact, inhalation and ingestion.
- Effects of Acute Exposure**
- Eye contact:** May cause irritation.
- Skin contact:** Prolonged contact may cause irritation.
- Inhalation:** Airborne particles may cause irritation.
- Ingestion:** May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.
- Effects of chronic exposure:** Contains an ingredient which may be corrosive.
- LD50 of product, species & route:** > 5000 mg/kg rat oral.
- LC50 of product, species & route:** Not available for mixture, see the ingredients section.
- Exposure limit of material:** Not available for mixture, see the ingredients section.
- Sensitization to product:** Not available.
- Carcinogenic effects:** Not listed as a carcinogen.
- Reproductive effects:** Not available.
- Teratogenicity:** Not available.
- Mutagenicity:** Not available.
- Synergistic materials:** Not available.
- Medical conditions aggravated by exposure:** Not available.
- First Aid**
- Skin contact:** Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.
- Eye contact:** Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.
- Inhalation:** Remove victim to fresh air.
Seek medical attention if symptoms persist.
- Ingestion:** Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak/Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Waste disposal: In accordance with municipal, provincial and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves/Type:



Neoprene or rubber gloves.

Respiratory/Type:



If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye/Type:



Safety glasses with side-shields.

Footwear/Type: Safety shoes per local regulations.

Clothing/Type: As required to prevent skin contact.

Other/Type: Eye wash capability should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.



AIR LIQUIDE

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: NONFLAMMABLE 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 (936 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
U.S. SUPPLIER/MANUFACTURER'S NAME:	CALGAZ
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
BUSINESS PHONE:	1-410-228-6400 (8 a.m. to 5 p.m. U.S. EST)
General MSDS Information:	1-713-868-0440
Fax on Demand:	1-800-231-1366
EMERGENCY PHONE:	
Chemtrec: United States/Canada/Puerto Rico:	1-800-424-9300 [24-hours]
Chemtrec International:	1-703-527-3887 [24-hours]

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH IDLH ppm	OTHER ppm
			TWA ppm	STEL ppm	TWA ppm	STEL ppm		
Isobutylene	115-11-7	0.0005-0.9%	There are no specific exposure limits for Isobutylene.					
Oxygen	7782-44-7	0-23.5%	There are no specific exposure limits for Oxygen.					
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.

See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This gas mixture has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This is a colorless, odorless gas mixture. Releases of this gas mixture 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 gas mixture is by inhalation.

INHALATION: Due to the small size of an individual cylinder of this gas mixture, 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 gas mixture 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

12-16% Oxygen:

10-14% Oxygen:

6-10% Oxygen:

Below 6%:

OBSERVED EFFECT

Breathing and pulse rate increase, muscular coordination slightly disturbed.

Emotional upset, abnormal fatigue, disturbed respiration.

Nausea, vomiting, collapse, or loss of consciousness. 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 gas mixture, 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: Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

TARGET ORGANS: ACUTE: Respiratory system, eyes. CHRONIC: Heart, cardiovascular system, central nervous system.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	1
---------------	--------	---

FLAMMABILITY HAZARD	(RED)	0
---------------------	-------	---

PHYSICAL HAZARD	(YELLOW)	0
-----------------	----------	---

PROTECTIVE EQUIPMENT			
----------------------	--	--	--

EYES	RESPIRATORY	HANDS	BODY
See Section 8			

For Routine Industrial Use and Handling Applications

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE 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 gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary. Victim(s) who experience any adverse effect after over-exposure to this gas mixture 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).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to this gas mixture.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary; treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: 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.

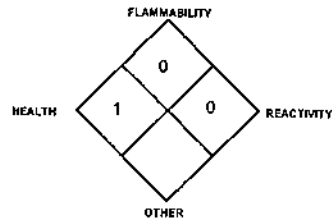
UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

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.

NFPA RATING



6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Due to the small size and content of the cylinder, an accidental release of this gas mixture 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; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify the 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 gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of Nitrous Oxide and Oxygen.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection when oxygen levels are below 19.5%, or during emergency response to a release of this gas mixture. During an emergency situation, before entering the area, check the concentration of Methane and Oxygen. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Wear leather gloves when handling cylinders. Chemically resistant gloves should be worn when using this gas mixture. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Nitrogen, a 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)

SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906

SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023

EVAPORATION RATE (nBuAc = 1): Not applicable.

ODOR THRESHOLD: Not applicable.

VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.

The following information is for Oxygen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.083 lb/cu ft (1.326 kg/m³)

FREEZING/MELTING POINT @ 10 psig: -218.8°C (-361.8°F)

SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 1.105

SOLUBILITY IN WATER vol/vol at 32°F (0°C) and 1 atm: 0.04.91

EVAPORATION RATE (nBuAc = 1): Not applicable.

ODOR THRESHOLD: Not applicable.

VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.

The following information is for the gas mixture.

APPEARANCE AND COLOR: This is a colorless, odorless gas mixture.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this gas mixture. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

FREEZING/MELTING POINT @ 10 psig: -210°C (-345.8°F)

pH: Not applicable.

MOLECULAR WEIGHT: 28.01

EXPANSION RATIO: Not applicable.

SPECIFIC VOLUME (ft³/lb): 13.8

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

BOILING POINT: -183.0°C (-297.4°F)

pH: Not applicable.

MOLECULAR WEIGHT: 32.00

EXPANSION RATIO: Not applicable.

VOLUME (ft³/lb): 12.1

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

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 the Nitrogen component of this gas mixture. Lithium reacts slowly with Nitrogen at ambient temperatures. The Isobutylene component of this gas mixture is 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 gas mixture:

ISOBUTYLENE:

LC₅₀ (inhalation, rat) = 620,000 mg/kg/4 hours

LC₅₀ (inhalation, mouse) = 415,000 mg/kg

NITROGEN:

There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

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: Contact with rapidly expanding gases can be irritating to exposed skin and eyes.

SENSITIZATION TO THE PRODUCT: The components of this gas mixture are not known to cause human skin or respiratory sensitization.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture and its components on the human reproductive system.

Mutagenicity: No mutagenicity effects have been described for the components in this gas mixture.

Embryotoxicity: No embryotoxic effects have been described for the components in this gas mixture.

Teratogenicity: No teratogenicity effects have been described for the components in this gas mixture.

Reproductive Toxicity: No reproductive toxicity effects have been described for the components in 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.

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 gas mixture.

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 the effects of this gas mixture on plant and animal life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on the effects of this gas mixture on aquatic life.

13. DISPOSAL CONSIDERATIONS

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 GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. ("Oxygen, Nitrogen") or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not applicable.

DOT LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 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).

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 (outer package). Pertinent shipping information goes on the outside of the outer package. DOT 39 Cylinders do not have transportation information on the cylinder itself.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas is considered as Dangerous Goods, per regulations of Transport Canada.

PROPER SHIPPING NAME: Compressed gases, n.o.s. ("Oxygen, Nitrogen") or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not Applicable

HAZARD LABEL: Class 2.2 (Non-Flammable Gas)

SPECIAL PROVISIONS: None

EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX: 0.12

ERAP INDEX: None

PASSENGER CARRYING SHIP INDEX: None

PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX: 75

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

NOTE: Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this gas mixture. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

OTHER U.S. FEDERAL REGULATIONS:

- No component of this gas mixture 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).

15. REGULATORY INFORMATION (continued)

- 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 (4,554 kg) or greater.

U.S. 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 SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this gas mixture is on the California Proposition 65 lists.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDL INVENTORY STATUS: The components of this gas mixture are listed on the DSL Inventory.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this gas mixture are not on the CEPA Priorities Substances Lists.

CANADIAN WHMIS REGULATIONS: This gas mixture is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

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 1955. 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. CALGAZ 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"



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 gas mixture. To the best of CALGAZ 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 gas mixture 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.

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, 0.0015-23.5%; Methane, 0.0005-2.5%; Carbon Monoxide, 0.0005-1.0%; Hydrogen Sulfide, 0.001-0.025%

SYNONYMS: Not Applicable

CHEMICAL FAMILY NAME: Not Applicable

FORMULA: Not Applicable

Document Number: 50018

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:	CALGAZ
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
BUSINESS PHONE:	1-410-228-8400
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		NIOSH	OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	ppm
Oxygen	7782-44-7	0.0015 - 23.5%	There are no specific exposure limits for Oxygen. Oxygen levels should be maintained above 19.5%.					
Methane	74-82-8	0.0005 - 2.5%	There are no specific exposure limits for Methane. Methane is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Hydrogen Sulfide	7783-06-4	0.001-0.025 %	10 (NIC = 5)	15	10 (Vacated 1989 PEL)	20 (ceiling); 50 (ceiling, 10 min. peak once per 8- hour shift 15 (vacated 1989 PEL)	100	NIOSH REL: STEL = 10 (ceiling); 10 minutes DFG-MAKs: TWA = 10 PEAK = 2*MAK, 10 min., momentary value
Carbon Monoxide	630-08-0	0.0005 - 1.0%	25	NE	50 35 (Vacated 1989 PEL)	200 (ceiling) (Vacated 1989 PEL)	1200	NIOSH RELS: TWA = 35 STEL = 200 (ceiling) DFG MAKs: TWA = 30 PEAK = 2*MAK, 15 min., average value DFG MAK Pregnancy Risk Classification: B
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.

NIC = Notice of Intended Change

See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This gas mixture has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This gas mixture is a colorless gas which has a rotten-egg odor (due to the presence of Hydrogen Sulfide). The odor cannot be relied on as an adequate warning of the presence of this gas mixture, because olfactory fatigue occurs after over-exposure to Hydrogen Sulfide. Hydrogen Sulfide and Carbon Monoxide (another component of this gas mixture) are toxic to humans in relatively low concentrations. Over-exposure to this gas mixture can cause skin or eye irritation, nausea, dizziness, headaches, collapse, unconsciousness, coma, and death. Additionally, releases of this gas mixture may produce oxygen-deficient atmospheres (especially in small confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for this gas mixture is by inhalation.

INHALATION: Due to the small size of an individual cylinder of this gas mixture, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. A potential health hazard associated with this gas mixture is the potential of inhalation of Hydrogen Sulfide, a component of this gas mixture. Such over-exposures may occur if this gas mixture is used in a confined space or other poorly-ventilated area. Over-exposures to Hydrogen Sulfide can cause dizziness, headache, and nausea. Over-exposure to this gas could result in respiratory arrest, coma, or unconsciousness, due to the presence of Hydrogen Sulfide. Continuous inhalation of low concentrations of Hydrogen Sulfide may cause olfactory fatigue, so that the odor is no longer an effective warning of the presence of this gas. A summary of exposure concentrations and observed effects are as follows:

**CONCENTRATION OF
HYDROGEN SULFIDE**

0.3-30 ppm
50 ppm
Slightly higher than 50 ppm
100-150 ppm
200-250 ppm

300-500
500 ppm

> 600 ppm
> 1000 ppm

NOTE:

here are presented to delineate the complete health effects which have been observed for humans after exposure to Hydrogen Sulfide.

OBSERVED EFFECT

Odor is unpleasant.
Eye irritation. Dryness and irritation of nose, throat.
Irritation of the respiratory system.
Temporary loss of smell.
Headache, vomiting, nausea. Prolonged exposure may lead to lung damage. Exposures of 4-8 hours can be fatal.
Swifter onset of symptoms. Death occurs in 1-4 hours.
Headache, excitement, staggering, and stomach ache after brief exposure. Death occurs within 0.5 - 1 hour of exposure.
Rapid onset of unconsciousness, coma, death.
Immediate respiratory arrest.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	3
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FLAMMABILITY HAZARD	(RED)	0
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PHYSICAL HAZARD	(YELLOW)	0
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PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
See Section 8			

For Routine Industrial Use and Handling Applications

3. HAZARD IDENTIFICATION (continued)

Inhalation over-exposures to atmospheres containing more than the Threshold Limit Value of Carbon Monoxide (25 ppm), another component of this gas mixture, can result in serious health consequences. Carbon Monoxide is classified as a chemical asphyxiant, producing a toxic action by combining with the hemoglobin of the blood and replacing the available oxygen. Through this replacement, the body is deprived of the required oxygen, and asphyxiation occurs. Since the affinity of Carbon Monoxide for hemoglobin is about 200-300 times that of oxygen, only a small amount of Carbon Monoxide will cause a toxic reaction to occur. Carbon Monoxide exposures in excess of 50 ppm will produce symptoms of poisoning if breathed for a sufficiently long time. If this gas mixture is released in a small, poorly ventilated area (i.e. an enclosed or confined space), symptoms which may develop include the following:

CONCENTRATION OF CARBON MONOXIDE

All exposure levels:

200 ppm:
400 ppm:
1,000 -2000 ppm:

200-2500 ppm:

>2500 ppm:

Additionally, if mixtures of this gas mixture contain less than 19.5% Oxygen and are released in a small, poorly ventilated area (i.e. an enclosed or confined space), 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 following effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN

12-16% Oxygen:

10-14% Oxygen:

6-10% Oxygen:

Below 6%:

SKIN AND EYE CONTACT: Hydrogen Sulfide, a component of this gas mixture, may be irritating to the skin. Inflammation and irritation of the eyes can occur at very low airborne concentration of Hydrogen Sulfide (less than 10 ppm). Exposure over several hours may result in "gas eyes" or "sore eyes" with symptoms of scratchiness, irritation, tearing and burning. Above 50 ppm of Hydrogen Sulfide, there is an intense tearing, blurring of vision, and pain when looking at light. Over-exposed individuals may see rings around bright lights. Most symptoms disappear when exposure ceases. However, in serious cases, the eye can be permanently damaged.

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 gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. However the Hydrogen Sulfide and Carbon Monoxide components of this gas mixture are toxic to humans. Over-exposure to this gas mixture can cause nausea, dizziness, headaches, collapse, unconsciousness, coma, and death. Due to the presence of Hydrogen Sulfide, over-exposures to this gas mixture can also irritate the skin and eyes; severe eye contamination can result in blindness.

CHRONIC: Severe over-exposures to the Hydrogen Sulfide component of this gas mixture, which do not result in death, may cause long-term symptoms such as memory loss, paralysis of facial muscles, or nerve tissue damage. In serious cases of over-exposure, the eyes can be permanently damaged. Skin disorders and respiratory conditions may be aggravated by repeated over-exposures to this gas product. Refer to Section 11 (Toxicology Information) for additional information on the components of this gas mixture. Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

TARGET ORGANS: ACUTE: Respiratory system, blood system, central nervous system effects, cardiovascular system, skin, eyes. CHRONIC: Neurological system, reproductive system, eyes.

OBSERVED EFFECT

Over-exposure to Carbon Monoxide can be indicated by the lips and fingernails turning bright red.

Slight symptoms (i.e. headache) after several hours of exposure.

Headache and discomfort experienced within 2-3 hours of exposure.

Within 30 minutes, slight palpitations of the heart occurs. Within 1.5 hours, there is a tendency to stagger.

Within 2 hours, there is mental confusion, headaches, and nausea. Unconsciousness within 30 minutes.

Potential for collapse and death before warning symptoms.

OBSERVED EFFECT

Breathing and pulse rate increased, muscular coordination slightly disturbed.

Emotional upset, abnormal fatigue, disturbed respiration.

Nausea, vomiting, collapse, or loss of consciousness.

Convulsive movements, possible respiratory collapse, and death.

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after over-exposure to this gas mixture 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).

No unusual health effects are anticipated after exposure to this gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary.

SKIN EXPOSURE: If irritation of the skin develops after exposure to this gas mixture, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention.

EYE EXPOSURE: If irritation of the eye develops after exposure to this gas mixture, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Seek medical assistance immediately, preferably an ophthalmologist.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing respiratory conditions may be aggravated by over-exposure to this gas mixture. Carbon Monoxide, a component of this gas mixture, can aggravate some diseases of the cardiovascular system, such as coronary artery disease and angina pectoris. Because of the presence of Hydrogen Sulfide, eye disorders or skin problems may be aggravated by over-exposure to this gas mixture.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate over-exposure. Hyperbaric oxygen is the most efficient antidote to Carbon Monoxide poisoning, the optimum range being 2-2.5 atm. A special mask, or, preferably, a compression chamber to utilize oxygen at these pressures is required. Avoid administering stimulant drugs. Be observant for initial signs of pulmonary edema in the event of severe inhalation over-exposures.

5. FIRE-FIGHTING MEASURES

FLASH POINT: 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.

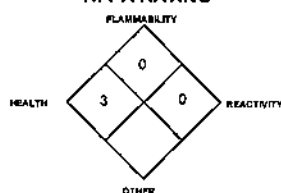
UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture contains toxic gases, Hydrogen Sulfide and Carbon Monoxide, and presents an health hazard to firefighters. This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

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.

NFPA RATING



6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk of over-exposure to Hydrogen Sulfide and Carbon Monoxide, the toxic components of this gas mixture, and other safety hazards related to the remaining components of this gas mixture, 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. For emergency disposal.

6. ACCIDENTAL RELEASE MEASURES (continued)

secure the cylinder and slowly discharge the gas to the atmosphere in a well-ventilated area or outdoors. Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for Hydrogen Sulfide, Carbon Monoxide, and Oxygen. Hydrogen Sulfide and Carbon Monoxide level must be below exposure level listed in Section 2 (Composition and Information on Ingredients) and 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 gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify cylinders containing a gas mixture with Hydrogen Sulfide or Carbon Monoxide. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Eye wash stations/safety showers should be near areas where this gas mixture is used or stored. All work operations should be monitored in such a way that emergency personnel can be immediately contacted in the event of a release. All work practices should minimize releases of Hydrogen Sulfide and Carbon Monoxide-containing gas mixtures.

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 gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of Oxygen, Hydrogen Sulfide, and Carbon Monoxide.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if the levels of components exceeds exposure limits presented in Section 2 (Composition and Information of Ingredients) and Oxygen levels are below 19.5%, or unknown, during emergency response to a release of this gas mixture. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.1633% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). The following NIOSH respiratory protection recommendations for Hydrogen Sulfide and Carbon Monoxide are provided for further information.

NIOSH/OSHA RECOMMENDATIONS FOR HYDROGEN SULFIDE CONCENTRATIONS IN AIR:

Up to 100 ppm: Powered air-purifying respirator with cartridge(s) to protect against hydrogen sulfide; gas mask with canister to protect against hydrogen sulfide; or SAR; or full-facepiece SCBA.
Emergency or Planned Entry into Unknown Concentration or IDLH Conditions: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
Escape: Gas mask with canister to protect against hydrogen sulfide; or escape-type SCBA.
NOTE: The IDLH concentration for Hydrogen Sulfide is 100 ppm.

NIOSH/OSHA RECOMMENDATIONS FOR CARBON MONOXIDE CONCENTRATIONS IN AIR:

Up to 350 ppm: Supplied Air Respirator (SAR)
Up to 875 ppm: Supplied Air Respirator (SAR) operated in a continuous flow mode.
Up to 1200 ppm: Gas mask with canister to protect against carbon monoxide; or full-facepiece SCBA; or full-facepiece Supplied Air Respirator (SAR).
Emergency or Planned Entry into Unknown Concentration or IDLH Conditions: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece Supplied Air Respirator (SAR) with an auxiliary positive pressure SCBA.
Escape: Gas mask with canister to protect against carbon monoxide; or escape-type SCBA.
NOTE: End of Service Life Indicator (ESLI) required for gas masks.
NOTE: The IDLH concentration for Carbon Monoxide is 1200 ppm.

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Wear leather gloves when handling cylinders. Chemically resistant gloves should be worn when using this gas mixture. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Nitrogen, the main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: .072 lbs/ft ³ (1.153 kg/m ³)	BOILING POINT: -320.4°F (-195.8°C)
FREEZING/MELTING POINT @ 10 psig: -345.8°F (-210°C)	pH: Not applicable.
SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906	MOLECULAR WEIGHT: 28.01
SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023	EXPANSION RATIO: Not applicable.
EVAPORATION RATE (nBuAc = 1): 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.

ODOR THRESHOLD: 0.13 ppm (Hydrogen Sulfide)

APPEARANCE AND COLOR: This gas mixture is a colorless gas which has an rotten egg-like odor, due to the presence of Hydrogen Sulfide.

HOW TO DETECT THIS SUBSTANCE (warning properties): Continuous inhalation of low concentrations of this gas mixture may cause olfactory fatigue, due to the presence of Hydrogen Sulfide, so the odor is not a good warning property of a release of this gas mixture. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation. Wet lead acetate paper can be used for leak detection. The paper turns black in the presence of Hydrogen Sulfide. Cadmium chloride solutions can also be used. Cadmium solutions will turn yellow upon contact with Hydrogen Sulfide.

10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state.

DECOMPOSITION PRODUCTS: The thermal decomposition products of Methane include carbon oxides. The decomposition products of Hydrogen Sulfide include water and sulfur 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 gas mixture). Lithium reacts slowly with Nitrogen at ambient temperatures. Components of this gas mixture (Hydrogen Sulfide, Methane) are also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride). Carbon Monoxide is mildly corrosive to nickel and iron (especially at high temperatures and pressures). Hydrogen Sulfide is corrosive to most metals, because it reacts with these substances to form metal sulfides.

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 gas mixture:

NITROGEN:

There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

METHANE:

There are no specific toxicology data for Methane. Methane is a simple asphyxiant, which acts to displace oxygen in the environment.

CARBON MONOXIDE:

LC₅₀ (Inhalation-Rat) 1807 ppm/4 hours
 LC₅₀ (Inhalation-Mouse) 2444 ppm/4 hours
 LC₅₀ (Inhalation-Guinea Pig) 5718 ppm/4 hours
 LC₅₀ (Inhalation-wild bird species) 1334 ppm
 LCLo (Inhalation-Human) 4 mg/m³/12 hours:
 Behavioral: coma; Vascular: BP lowering not characterized in autonomic section; Blood: methemoglobinemia-carboxyhemoglobin
 LCLo (Inhalation-Man) 4000 ppm/30 minutes
 LCLo (Inhalation-Human) 5000 ppm/5 minutes
 LCLo (Inhalation-Dog) 4000 ppm/46 minutes
 LCLo (Inhalation-Rabbit) 4000 ppm
 LCLo (Inhalation-Mammal-species unspecified) 5000 ppm/5 minutes
 TCLo (Inhalation-Human) 600 mg/m³/10 minutes:
 Behavioral: headache
 TCLo (Inhalation-Man) 650 ppm/45 minutes: Blood: methemoglobinemia-carboxyhemoglobin;
 Behavioral: changes in psychophysiological tests
 TCLo (Inhalation-Rat) 1800 ppm/1 hour/14 days-intermittent: Cardiac: other changes
 TCLo (Inhalation-Rat) 30 mg/m³/8 hours/10 weeks-Intermittent: Brain and Coverings: other degenerative changes; Behavioral: muscle contraction or spasticity
 TCLo (Inhalation-Rat) 96 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes
 TCLo (Inhalation-Rat) 250 ppm/5 hours/20 days-intermittent: Blood: pigmented or nucleated red blood cells, changes in other cell count (unspecified), changes in erythrocyte (RBC) count
 TDLo (Subcutaneous-Rat) 5983 mg/kg/18 weeks-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol)
 TCLo (Inhalation-Monkey) 200 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes
 TCLo (Inhalation-Rabbit) 200 mg/m³/73 hours/13 weeks-intermittent: Brain and Coverings: other degenerative changes; Cardiac: other changes; Blood: hemorrhage
 TCLo (Inhalation-Guinea Pig) 200 mg/m³/5 hours/30 weeks-continuous: Cardiac: arrhythmias (including changes in conduction), EKG changes not diagnostic of specified effects, pulse rate increase, without fall in BP

CARBON MONOXIDE (continued):

TCLo (Inhalation-Mouse) 50 ppm/30 days-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi
 TCLo (Inhalation-Guinea Pig) 200 mg/m³/5 hours/4 weeks-intermittent: Endocrine: hyperglycemia
 TCLo (Inhalation-Guinea Pig) 200 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes
 TCLo (Inhalation-Rat) 75 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Maternal Effects: other effects; Effects on Newborn: behavioral
 TCLo (Inhalation-Rat) 150 ppm/24 hours: female 1-22 day(s) after conception: Reproductive: Specific Developmental Abnormalities: cardiovascular (circulatory) system
 TCLo (Inhalation-Rat) 150 ppm/24 hours: female 1-22 day(s) after conception: Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain), behavioral
 TCLo (Inhalation-Rat) 1 mg/m³/24 hours: female 72 day(s) pre-mating: Reproductive: Maternal Effects: menstrual cycle changes or disorders, parturition; Fertility: female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated)
 TCLo (Inhalation-Rat) 150 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Effects on Newborn: behavioral
 TCLo (Inhalation-Rat) 75 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Specific Developmental Abnormalities: Immune and reticuloendothelial system
 TCLo (Inhalation-Mouse) 65 ppm/24 hours: female 7-18 day(s) after conception: Reproductive: Effects on Newborn: behavioral
 TCLo (Inhalation-Mouse) 250 ppm/7 hours: female 6-15 day(s) after conception: Reproductive: Fertility: postimplantation mortality (e.g. dead and/or resorbed implants per total number of implants); Specific Developmental Abnormalities: musculoskeletal system
 TCLo (Inhalation-Mouse) 125 ppm/24 hours: female 7-18 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)
 TCLo (Inhalation-Mouse) 8 ppt/1 hour: female 8 day(s) after conception: Reproductive: Fertility: litter size (e.g. # fetuses per litter; measured before birth); Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), fetal death

CARBON MONOXIDE (continued):

TCLo (Inhalation-Rabbit) 50 ppm/24 hours/8 weeks-continuous: Blood: changes in platelet count
 TCLo (Inhalation-Mouse) 8 ppt/1 hour: female 8 day(s) after conception: Reproductive: Specific Developmental Abnormalities: Central Nervous System
 TCLo (Inhalation-Rabbit) 180 ppm/24 hours: female 1-30 day(s) after conception: Reproductive: Effects on Newborn: stillbirth, viability index (e.g., # alive at day 4 per # born alive)
 Micronucleus Test (Inhalation-Mouse) 1500 ppm/10 minutes
 Sister Chromatid Exchange (Inhalation-Mouse) 2500 ppm/10 minutes
HYDROGEN SULFIDE:
 LC₅₀ (Inhalation-Rat) 444 ppm: Lungs, Thorax, or Respiration: other changes; Gastrointestinal: hypermotility, diarrhea; Kidney, Ureter, Bladder: urine volume increased
 LC₅₀ (Inhalation-Mouse) 634 ppm/1 hour
 LCLo (Inhalation-Human) 600 ppm/30 minutes
 LCLo (Inhalation-Man) 5700 µg/kg: Behavioral: coma; Lungs, Thorax, or Respiration: chronic pulmonary edema
 LCLo (Inhalation-Human) 800 ppm/5 minutes
 LCLo (Inhalation-Mammal-species unspecified) 800 ppm/5 minutes
 TCLo (Inhalation-Rat) 30 ppm/6 hours/10 weeks-Intermittent: Sense Organs and Special Senses (Olfaction): olfactory nerve change, effect, not otherwise specified
 TCLo (Inhalation-Rat) 1200 mg/m³/2 hours/5 days-intermittent: Brain and Coverings: other degenerative changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase
 TCLo (Inhalation-Rat) 100 ppm/6 hours/5 weeks-intermittent: Brain and Coverings: other degenerative changes; Lungs, Thorax, or Respiration: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: cytochrome oxidases (including oxidative phosphorylation)
 TCLo (Inhalation-Rat) 80 ppm/6 hours/90 days-intermittent: Brain and Coverings: changes in brain weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain
 TCLo (Inhalation-Rat) 20 ppm: female 6-22 day(s) after conception lactating female 21 day(s) post-birth: Reproductive: Effects on Newborn: physical
 TCLo (Inhalation-Mouse) 80 ppm/6 hours/90 days-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain: Related to Chronic Data: death
 TCLo (Inhalation-Rabbit) 40 mg/m³/5 hours/30 weeks-intermittent: Sense Organs and Special Senses (Eye): conjunctive irritation

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: This gas mixture is irritating to the eyes, and may be irritating to the skin.

SENSITIZATION OF PRODUCT: The components of this gas mixture are not known to be skin or respiratory sensitizers.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture on the human reproductive system.

Mutagenicity: The components of this gas mixture are not reported to cause mutagenic effects in humans.

REPRODUCTIVE TOXICITY INFORMATION (continued):

Embryotoxicity: This gas mixture contains components that may cause embryotoxic effects in humans; however, due to the small total amount of the components, embryotoxic effects are not expected to occur.

Teratogenicity: This gas mixture is not expected to cause teratogenic effects in humans due to the small cylinder size and small total amount of all components. The Carbon Monoxide component of this gas mixture which exists up to 1%, can cause teratogenic effects in humans. Severe exposure to Carbon Monoxide during pregnancy has caused adverse effects and the death of the fetus. In general, maternal symptoms are an indicator of the potential risk to the fetus since Carbon Monoxide is toxic to the mother before it is toxic to the fetus.

Reproductive Toxicity: The components of this gas mixture are not reported to cause adverse reproductive effects in humans.

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.

BIOLOGICAL EXPOSURE INDICES (BEIs): Biological Exposure Indices (BEIs) have been determined for components of this gas mixture, as follows:

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
CARBON MONOXIDE • Carboxyhemoglobin in blood • Carbon monoxide in end-exhaled air	• End of shift • End of shift	• 3.5% of hemoglobin • 20 ppm

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this gas mixture.

CARBON MONOXIDE:

Atmospheric Fate: A photochemical model was used to quantify the sensitivity of the tropospheric oxidants ozone (O₃) and OH to changes in methane (CH₄), Carbon Monoxide (CO), and NO emissions and to perturbations in climate and stratospheric chemistry. In most cases, increased CH₄ and CO emissions will suppress OH (negative coefficients) in increased O₃ (positive coefficients) except in areas where NO and O₃ influenced by pollution are sufficient to increased OH. In most regions, NO, CO, and CH₄ emission increased will suppress OH and increased O₃, but these trends may be opposed by stratospheric O₃ depletion and climate change.

HYDROGEN SULFIDE:

Water Solubility = 1 g/242 mL at 20°C.

Plant toxicity: Continuous fumigation of plants with 300 or 3000 ppb Hydrogen Sulfide caused leaf lesions, defoliation, and reduced growth with severity of injury correlated to dose. At higher (3.25 and 5.03 ppm) Hydrogen Sulfide, significant reductions in leaf CO₂ and water vapor exchanges occurred, and stomatal openings were depressed. When Hydrogen Sulfide gas was applied to 29 species of green plants for 5 hours, young, rapidly elongating tissues were more sensitive to injury than older tissues. Symptoms included scorching of young shoots and

12. ECOLOGICAL INFORMATION(continued)

leaves, basal and marginal scorching of older leaves. Mature leaves were unaffected. Seeds exposed to Hydrogen Sulfide gas showed delay in germination.

Persistence: Converts to elemental sulfur upon standing in water.

Major Species Threatened: Aquatic and animal life plants may be injured if exposed to 5 ppm in air over 24 hours.

Biodegradation: Microorganisms in soil and water are involved in oxidation-reduction reactions that oxidize hydrogen sulfide to elemental sulfur. Members of the genera Beggiatoa, Thioploca, and Thiotrix function in transition zones between aerobic and anaerobic conditions where both molecular oxygen and hydrogen sulfide are found. Also, some photosynthetic bacteria oxidize hydrogen sulfide to elemental sulfur. Members of the families Chlorobiaceae and Chromatiaceae (purple sulfur bacteria) are obligate aerobes and are phototropic, and are found in waters with high H₂S concentrations. The interactions of these organisms form part of the global sulfur cycle.

Bioconcentration: Does not have bioaccumulation or food chain contamination potential.

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 gas mixture's effects on plant and animal life. Hydrogen Sulfide and Carbon Monoxide, components of this gas mixture, can be deadly to exposed animal life, producing symptoms similar to those experienced by humans. This gas mixture may also be harmful to plant life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this gas mixture's effects on aquatic life. The presence of more than a trace of the Carbon Monoxide component of this gas mixture is a hazard to fish. The following aquatic toxicity data are available for the Hydrogen Sulfide component of this gas mixture:

HYDROGEN SULFIDE:

LC₅₀ (*Aesopus* arthropods) 96 hours = 0.111 mg/L

LC₅₀ (*Crangon* arthropods) 96 hours = 1.07 mg/L

LC₅₀ (*Gammarus* arthropods) 96 hours = 0.84 mg/L

LC₅₀ (Ephemera) 96 hours = 0.316 mg/L

LC₅₀ (Inhalation-Flies) > 960 minutes = 380 mg/m³

LC₅₀ (Inhalation-Flies) 7 minutes = 1,500 mg/m³

LC₅₀,F (bluegill, eggs) 72 hours = 0.0190 mg/L

HYDROGEN SULFIDE (continued):

LC₅₀,F (bluegill, 35-day-old fry) 96 hours = 0.0131 mg/L

LC₅₀,F (bluegill, juveniles) 96 hours = 0.0478 mg/L

LC₅₀,F (bluegill, adults) 96 hours = 0.0448 mg/L

LC₅₀,F (fathead minnows) 96 hours = 0.0071-0.55 mg/L

LC₅₀,F (bluegill) 96 hours = 0.0090-0.0140 mg/L

LC₅₀,F (brook trout) 96 hours = 0.0216-0.0308 mg/L

Toxic (goldfish) = 100 mg/L

HYDROGEN SULFIDE (continued):

Lethal (goldfish) 96 hours = 10 mg/L

Toxic (carp) 24 hours = 3.3 mg/L

Toxic (goldfish) 24 hours = 4.3 mg/L

Toxic (sunfish) 1 hour = 4.9 to 5.3 mg/L

Toxic (goldfish) 200 hours = 5 mg/L

Toxic (minnows) 24 hours = 5-6 mg/L

Toxic (carp) 24 hours = 6-25 mg/L

Toxic (trout) 15 minutes = 10 mg/L

Toxic (goldfish) 24 hours = 25 mg/L

Toxic (tench) 3 hours = 100 mg/L

MATC,F (fathead minnows) 0.0037 mg/L

MATC,F (bluegill) 0.0004 mg/L

MATC,F (brook trout) 0.055 mg/L

13. DISPOSAL CONSIDERATIONS

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 GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. ("Oxygen, Nitrogen") or the gas component with the next highest concentration next to Nitrogen.

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 (2000): 126

U.S. DEPARTMENT OF TRANSPORTATION INFORMATION (continued):

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).

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 gas mixture is considered as Dangerous Goods, per regulations of Transport Canada.

PROPER SHIPPING NAME: Compressed gases, n.o.s. ("Oxygen, Nitrogen") or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not Applicable

HAZARD LABEL: Class 2.2 (Non-Flammable Gas)

SPECIAL PROVISIONS: None

EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX: 0.12

ERAP INDEX: 3000

PASSENGER CARRYING SHIP INDEX: Forbidden

PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX: Forbidden

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

NOTE: Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: This gas mixture is subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Hydrogen Sulfide	YES	YES	YES

U.S. SARA THRESHOLD PLANNING QUANTITY: Hydrogen Sulfide = 500 lb (227 kg)

U.S. TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Hydrogen Sulfide = 100 lb (45 kg)

OTHER U.S. FEDERAL REGULATIONS:

- Hydrogen Sulfide and Carbon Monoxide are subject to the reporting requirements of CFR 29 1910.1000.
- Hydrogen Sulfide and Methane are subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for each of these gases is 10,000 pounds and so this mixture will not be affected by the regulation.
- Depending on specific operations involving the use of this gas mixture, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119). Hydrogen Sulfide is listed in Appendix A of this regulation. The Threshold Quantity for Hydrogen Sulfide under this regulation is 1500 lbs (and so one cylinder of this gas mixture will not be affected by this regulation).
- 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 Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Hydrogen Sulfide is listed under this regulation in Table 1 as a Regulated Substance (Toxic Substance), in quantities of 10,000 lbs (4,553 kg) or greater.

15. REGULATORY INFORMATION(continued)

Carbon Monoxide and Methane are listed under this regulation in Table 3, as Regulated Substances (Flammable), in quantities of 10,000 lbs (4,553 kg) or greater, and so this mixture will not be affected by the regulation.

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: Carbon Monoxide, Hydrogen Sulfide, Methane.	Michigan - Critical Materials Register: No.	Pennsylvania - Hazardous Substance List: Oxygen, Carbon Monoxide, Nitrogen, Hydrogen Sulfide, Methane.
California - Permissible Exposure Limits for Chemical Contaminants: Carbon Monoxide, Nitrogen, Hydrogen Sulfide, Methane.	Minnesota - List of Hazardous Substances: Carbon Monoxide, Hydrogen Sulfide, Methane.	Rhode Island - Hazardous Substance List: Oxygen, Carbon Monoxide, Nitrogen, Hydrogen Sulfide, Methane.
Florida - Substance List: Oxygen, Carbon Monoxide, Hydrogen Sulfide	Missouri - Employer Information/Toxic Substance List: Hydrogen Sulfide, Methane.	Texas - Hazardous Substance List: Hydrogen Sulfide.
Illinois - Toxic Substance List: Carbon Monoxide, Methane, Hydrogen Sulfide.	New Jersey - Right to Know Hazardous Substance List: Oxygen, Carbon Monoxide, Nitrogen, Methane.	West Virginia - Hazardous Substance List: Hydrogen Sulfide.
Kansas - Section 302/313 List: No.	North Dakota - List of Hazardous Chemicals, Reportable Quantities: Hydrogen Sulfide.	Wisconsin - Toxic and Hazardous Substances: Hydrogen Sulfide
Massachusetts - Substance List: Oxygen, Carbon Monoxide, Hydrogen Sulfide, Methane.		

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The Carbon Monoxide component of this gas mixture is on the California Proposition 65 lists. **WARNING!** This gas mixture contains a compound known to the State of California to cause birth defects or other reproductive harm.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDL INVENTORY STATUS: The components of this gas mixture are listed on the DSL Inventory.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this gas mixture are not on the CEPA Priorities Substances Lists.

CANADIAN WHMIS CLASSIFICATION: This gas mixture is categorized as a Controlled Product, Hazard Classes A and D2A, as per the Controlled Product Regulations.

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. CALGAZ 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.
PO Box 3519, La Mesa, CA 91944-3519
619/670-0609

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 gas mixture. To the best of CALGAZ 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 gas mixture 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.

ATTACHMENT D

**SAFETY MANAGEMENT
STANDARDS**

(Field Copy Only)

ATTACHMENT E

FORMS



Health, Safety and Environment
CONFINED SPACE ENTRY PERMIT

Attachment 010-1 NA

Issue Date: October 2000
Revision 7: December 2009

Testing	Result	Result	Result	Result	Result	Result	Result
Time (Indicate am/pm)	_____	_____	_____	_____	_____	_____	_____
Oxygen (%)	_____	_____	_____	_____	_____	_____	_____
Flammability (%)	_____	_____	_____	_____	_____	_____	_____
H ₂ S (ppm)	_____	_____	_____	_____	_____	_____	_____
Toxic-(Specify)	_____	_____	_____	_____	_____	_____	_____
Cl ₂ (ppm)	_____	_____	_____	_____	_____	_____	_____
CO (ppm)	_____	_____	_____	_____	_____	_____	_____
SO ₂ (ppm)	_____	_____	_____	_____	_____	_____	_____
Temperature 'F/'C	_____	_____	_____	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____	_____	_____
Tester Initials	_____	_____	_____	_____	_____	_____	_____

AUTHORIZATION BY ENTRY SUPERVISORS

I verify review of this permit and verify that all necessary precautions have been taken to provide for a safe entry into and work in this confined space.

Printed Name _____	Signature _____	Date _____	Time _____
Printed Name _____	Signature _____	Date _____	Time _____
Printed Name _____	Signature _____	Date _____	Time _____
Printed Name _____	Signature _____	Date _____	Time _____

THIS PERMIT MUST BE POSTED AT THE CONFINED SPACE.
THIS PERMIT EXPIRES AT THE END OF THE SHIFT ON WHICH IT WAS ISSUED.
A NEW PERMIT MUST BE ISSUED FOR WORK THAT CONTINUES INTO THE NEXT SHIFT.



Health, Safety and Environment
**NON-PERMIT REQUIRED
CONFINED SPACE WORK FORM**

Attachment 010-2 NA
Issue Date: October 2000
Revision 7: December 2009

Space to be entered: _____ Location/Description: _____

Purpose of entry: _____ Permit Valid for (Date): _____

Supervisor Authorizing Work: _____
Print Name Signature

Individuals Authorized To Perform Work (Signatures):

I have evaluated the hazards of the above confined space and have determined that there are no hazards present. I have also made the required safety equipment available and instructed the authorized individuals accordingly.

Hazard Evaluator: _____ Date of Evaluation: _____

ATMOSPHERIC TESTING

Oxygen Deficiency/Enrichment	<input type="checkbox"/> Yes <input type="checkbox"/> No	Results _____ %
H ₂ S Vapors	<input type="checkbox"/> Yes <input type="checkbox"/> No	Results _____ ppm
Hazardous Vapors/Gases	<input type="checkbox"/> Yes <input type="checkbox"/> No	Results _____ ppm
CO Level Within Limits	<input type="checkbox"/> Yes <input type="checkbox"/> No	Results _____ ppm
Explosive Atmosphere	<input type="checkbox"/> Yes <input type="checkbox"/> No	Results _____ %

The proposed work requires the following:

Safety belt, lanyard and separate lifeline: Yes No
Lockout/tagout of mechanical equipment: Yes No
Other personal protective equipment: Yes No

If Yes, list

Fire protection (if hot work conducted): Yes No
Attendant: Yes No
Other requirements:



Health, Safety and Environment
**ALTERNATE ENTRY CONFINED
SPACE WORK FORM**

Attachment 010-3 NA
Issue Date: October 2000
Revision 7: December 2009

Space to be entered: _____ Location/Description: _____

Purpose of entry: _____ Permit Valid for (Date): _____

Supervisor Authorizing Work: _____
Print Name Signature

Individuals Authorized To Perform Work (Signatures):

I have evaluated the hazards of the above confined space and have determined that the only hazards present are atmospheric hazards that can be controlled by the ventilation method given below.

Hazard Evaluator: _____ Date of Evaluation: _____

Ventilation Required to Control Atmospheric Hazard:

ATMOSPHERIC TESTING

Oxygen Deficiency/Enrichment	<input type="checkbox"/> Yes <input type="checkbox"/> No	Results _____ %
H ₂ S Vapors	<input type="checkbox"/> Yes <input type="checkbox"/> No	Results _____ ppm
Hazardous Vapors/Gases	<input type="checkbox"/> Yes <input type="checkbox"/> No	Results _____ ppm
CO Level Within Limits	<input type="checkbox"/> Yes <input type="checkbox"/> No	Results _____ ppm
Explosive Atmosphere	<input type="checkbox"/> Yes <input type="checkbox"/> No	Results _____ %

Comments:



EXCAVATION / TRENCHING PERMIT

Issue Date: July 2000
Revision 6: March 2012

Authorization No.: _____ Date and Time Permit Valid: _____
Competent Person: _____ Date and Time Permit Expires: _____
Project Name: _____ Excavation/Trench Location: _____

Description or Job Special Procedures:

ESTIMATED DIMENSIONS: DEPTH = TOP = W L BOTTOM = W L
SOIL TYPE: Stable Rock Type A Type B Type C Avg. Compression Strength tsf Compressed Strength Data
SOIL ANALYSIS METHOD(S) USED: Visual Manual Tabulated Data
SOIL CHARACTERISTICS: Cemented Cohesive Layered Fissured Granular Plastic Dry Moist Saturated Submerged
MANUAL TEST USED: Plasticity Dry Strength Ribbon Thumb Penetration Pocket Penetrometer Dry Testing Other
PROTECTIVE SYSTEMS: Protective systems for excavations/trenches deeper than 20 feet (6.1 meters) must be designed and approved by a registered professional engineer.
UTILITIES: One Call Service Notified Utilities Marked by Public Utilities Property Owner Contacted Utility Drawings Reviewed Private Utility Locator Utilized
SLOPING/BENCHING: Vertical (90) 3/4 :1 (53) 1:1 (45) 1 1/2 :1 (34) 2:1 (26) Other
SHORING: Timber Aluminum Hydraulic Trench Shield/Trench Box
LIST OF KNOWN OBSTRUCTIONS: Electrical Telephone Water Sewer Steam Alarm Drain Process Footings Piling Concrete Encasement Other
OTHER: Means of Egress Required Confined Space Permit Required
SPECIAL INSTRUCTIONS and WORK INSTRUCTIONS



EXCAVATION / TRENCHING PERMIT

All unsafe conditions must be corrected prior to excavation entry. If any hazardous conditions are observed, the excavation must be evacuated immediately, and no one is allowed to re-enter until corrective action has been taken.

Signature and Dates

	Print Name	Signature	Date
Excavation Competent Person	_____	_____	_____
Client Representative (if applicable)	_____	_____	_____
Site Supervisor	_____	_____	_____
HSE Representative	_____	_____	_____
Registered Professional Engineer (if applicable)	_____	_____	_____
Project Manager	_____	_____	_____
Subcontractor Rep	_____	_____	_____
Equipment Superintendent	_____	_____	_____
Field Engineer	_____	_____	_____
Other	_____	_____	_____



HEAT STRESS MONITORING RECORD

Date: _____ Safety Representative: _____

Worker's Name: _____ Subcontractor: _____

Work Activity/Equipment: _____

Time	Work-Rest Cycle	Aural Temp (°F/°C)	Pulse (BPM)			Comments
			P ₁	P ₂	P ₁ -P ₂	



Health, Safety and Environment
**DAILY HEAVY EQUIPMENT
SAFETY INSPECTION CHECKLIST**

Attachment 019-1 NA
Issue Date: June 1999
Revision 7: September 2011

Equipment ID No: _____ Inspector's Name: _____
Equipment Name: _____ Employee No.: _____
Beg. Hours: _____ End Hours: _____ Date: _____

INSTRUCTIONS: Each shift must inspect all applicable items indicated. If an unsatisfactory condition is observed, suspend operation of the equipment and report the unsatisfactory condition to the site supervisor immediately.

ITEM INSPECTED	CHECK IF SATISFACTORY	COMMENTS	CORRECTED BY	DATE
Equipment Operating Manuals Available	<input type="checkbox"/>			
Falling Object Protective Structure (FOP)	<input type="checkbox"/>			
Roll-Over Protection Structure (ROP)	<input type="checkbox"/>			
Seat Belts	<input type="checkbox"/>			
Operator Seat Bar(s)	<input type="checkbox"/>			
Side Shields, Screens, or Cab	<input type="checkbox"/>			
Lift-Arm Device	<input type="checkbox"/>			
Grab Handles	<input type="checkbox"/>			
Back-up Alarm – Working	<input type="checkbox"/>			
Lights	<input type="checkbox"/>			
Guards	<input type="checkbox"/>			
Horn	<input type="checkbox"/>			
Windshield Wipers	<input type="checkbox"/>			
Glass, Mirrors	<input type="checkbox"/>			
Anti-Skid Tread Clear of Mud	<input type="checkbox"/>			
Safety Signs (i.e., counterbalance swing area)	<input type="checkbox"/>			
Fire Extinguisher	<input type="checkbox"/>			
General Condition	<input type="checkbox"/>			
Fuel Connection	<input type="checkbox"/>			
Oil (fuel and no leaks)	<input type="checkbox"/>			
Clear of Extra Materials	<input type="checkbox"/>			
Controls Function Properly	<input type="checkbox"/>			
Hydraulic System (full and no leaks)	<input type="checkbox"/>			
Parking Brake	<input type="checkbox"/>			
Lift Arm and Bucket	<input type="checkbox"/>			
Tires/Tracks	<input type="checkbox"/>			
Steering	<input type="checkbox"/>			
Breathing Air System	<input type="checkbox"/>			
Blast Shields	<input type="checkbox"/>			
Flammable Atmosphere Protective Equipment	<input type="checkbox"/>			
Quantity of Fuel Added	<input type="checkbox"/>			
Quantity of Oil Added	<input type="checkbox"/>			

Operator Signature _____



HOUSEKEEPING INSPECTION SHEET

Building or Location: _____

Inspection Conducted by: _____ **Date:** _____

Check Yes, No, or NA for Not Applicable.

General Site Housekeeping

- 1. Do not block exits or emergency equipment. Yes No NA
- 2. Do not leave equipment or materials lying on the ground. Yes No NA
- 3. Keep storage areas free from the accumulation of materials that constitute trip hazards. Yes No NA
- 4. Remove scrap materials and other debris from work area. Yes No NA
- 5. Remove combustible scrap and debris by safe means at regular intervals. Yes No NA
- 6. Store oily rags in metal cans with tight fitting lids. Remove oily rags at the end of the day. Yes No NA

Visibility

- 7. Ensure that halls, stairways and walkways are well lit. Yes No NA
- 8. Ensure that well designed light switches are present in areas where walkways are not always lighted. Yes No NA
- 9. Ensure that dust, smoke or steam does not create poor visibility. Yes No NA
- 10. Ensure that glare from floodlights or windows does not create poor visibility in work areas. Yes No NA

Stairs

- 11. Ensure that handrails are tight and at the proper level. Yes No NA
- 12. Ensure that handrails extend past the top and bottom step. Yes No NA
- 13. Ensure that white or yellow strips are painted on the first and last step for better visibility. (Not an OSHA requirement – recommendation only). Yes No NA
- 14. Ensure that steps are not rough or defective. Yes No NA
- 15. Ensure that stair treads are wide enough and risers consistently spaced. Yes No NA
- 16. Ensure that stairs are free of obstructions. Yes No NA

Floor Conditions

- 17. Ensure that floors of every workroom are clean, and so far as possible, in a dry condition. Yes No NA
- 18. Ensure that floors are not oily, overly waxed, or polished. Yes No NA
- 19. Where wet floors or processes are present, provide proper drainage and false floors, mats, or other dry standing places. Yes No NA
- 20. Finish floor surfaces with non-slip coatings where spills are likely. Yes No NA
- 21. Ensure that floors and passageways are free from protruding nails, splinters, holes, or loose boards. Yes No NA
- 22. Ensure that floors are free of holes and depressions. Yes No NA
- 23. Ensure that aisles or pathways are wide enough for easy passage and for carrying objects (48 inches is recommended). Yes No NA



HOUSEKEEPING INSPECTION SHEET

- 24. Ensure that ramps are covered with non-slip surfaces or matting. Yes No NA
- 25. Keep carpets or rugs free from loose or frayed edges that may catch boots or shoes. Yes No NA
- 26. Keep walkways free from extension cords, air hoses and cables. Yes No NA
- 27. Keep pathways free from boxes, containers, machine parts, or other tripping hazards. Yes No NA

Ground Conditions

- 28. Ensure that trip hazards are not present. Yes No NA
- 29. Ensure that fall hazards are not present. Yes No NA
- 30. Ensure that holes or changes in ground elevation are either filled or guarded. Yes No NA
- 31. Ensure that muddy walkways are filled with gravel to reduce slipping. Yes No NA
- 32. Ensure that all employees who work in wet or greasy conditions wear slip resistant footwear. Yes No NA

Equipment

- 33. Ensure that vehicle steps are of adequate size, surface placement for safe dismounting. Yes No NA
- 34. Ensure that hand grips or ladders are adequate for getting into and out of equipment. Yes No NA
- 35. Ensure that ladders have been checked for damage and removed from service if found unsafe. Yes No NA

Chemicals

- 36. Ensure that chemicals are properly stored to minimize a potential spill. Yes No NA
- 37. Ensure that spill cleanup materials are available and appropriate for the type of potential spill. Yes No NA

Identify areas that need attention and describe the corrective actions to be implemented:

I certify that the above inspection was performed to the best of my knowledge and ability, based on the conditions present.

Signature

Date



Health, Safety and Environment
SOUND LEVEL SURVEY

Attachment 026-1 NA

Issue Date: July 2000
Revision 7: March 2012

Location: _____ Date: _____

Conducted By: _____

Sound Level Meter: _____ Serial #: _____

Calibrator Model: _____ Serial # _____ Class: 1 2

Battery Check Completed: Date of Factory Calibration: _____

Test No.	Description Location/Equipment	Distance	dBA	Hearing Protection Required?		Comments
				Yes	No	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
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				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	



Health, Safety and Environment

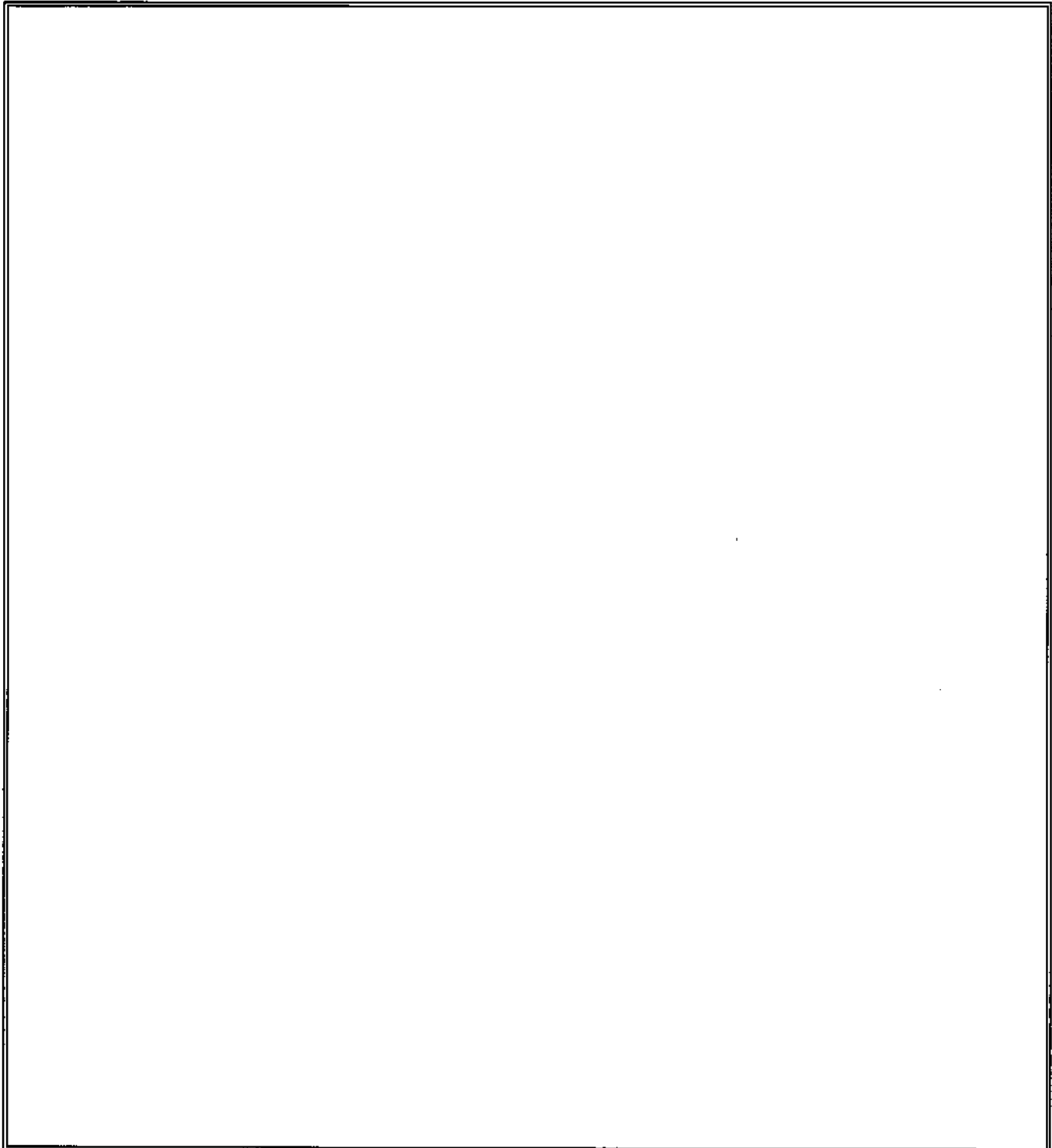
Attachment 026-1 NA

SOUND LEVEL SURVEY

Issue Date: July 2000
Revision 7: March 2012

Drawing of Equipment or Work Layout

Reference Numbers refer to the Test Numbers on Page 1





**NOISE DOSIMETRY
FIELD SHEET**

Sample Identification

Sample #: _____ Date: _____
Employee Monitored: _____ Employee #: _____
Job: _____ Location: _____

Dosimeter Information

Model: _____ Serial # _____
Criterion Level (in dBA): _____ Threshold (in dBA): _____ Exchange Rate (in dBA): _____
Calibration (in dBA): Initial _____ Final _____
Weighting: Fast Slow

Calibrator Information

Model: _____ Serial #: _____ Class 1 2
Battery Check Completed: Date of Factory Calibration: _____

Sample Information

Time On: _____ Time Off: _____ Total Run Time (in min): _____
Time Weighted Average (in dBA): _____ %Dose: _____ Est. %Dose: _____
Average Sound Level (L_{avg}): _____ Peak Sound Level (L_{pk}): _____
Maximum Sound Level (L_{max}): _____ Minimum Sound Level (L_{min}): _____

Workplace Conditions

Scheduled Hours per Shift: _____ Operations: Normal? Abnormal?
Explain: _____

Hearing Protection: Type _____ % of Time Worn _____

Work Description/Comments

Sampled By: _____



Health, Safety and Environment
**HAZARD ASSESSMENT
CERTIFICATION FORM**

Attachment 029-1 NA

Issue Date: July 2000
Revision 9: March 2012

Location: _____ Job No.: _____

Date: _____ Assessment conducted by: _____

Specific tasks performed at this location: _____

If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.

Overhead Hazards

- | | | |
|---|--|---|
| 1. Suspended/elevated loads, beams, or objects that could fall or strike head | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANSI Z89, Class G, E or C |
| 2. Flying objects that could strike head | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANSI Z89, Class G, E or C |
| 3. Energized wires or equipment that could strike head | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANZI Z89, Class G or E (dependent on potential voltage) |
| 4. Sharp objects or corners at head level | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANSI Z89, Class G, E or C |

Eye Hazards

- | | | |
|--|--|--|
| 5. Chemical splashes or irritating mists | <input type="checkbox"/> Yes <input type="checkbox"/> No | See Supplemental Information A for additional information |
| 6. Excessive dust | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety glasses or goggles |
| 7. Smoke and/or fumes | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles |
| 8. Welding operations | <input type="checkbox"/> Yes <input type="checkbox"/> No | Welding goggles; See Supplemental Information A and B for additional information |
| 9. Lasers/optical radiation | <input type="checkbox"/> Yes <input type="checkbox"/> No | Have URS HSE Representative assist you in proper selection |
| 10. Projectiles | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles plus face shield |
| 11. Sawing, cutting, chipping, and/or grinding | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles plus face shield; See Supplemental Information A for additional information |

Face Hazards

- | | | |
|---|--|---|
| 12. Chemical splashes or irritating mists | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles; See Supplemental Information A for more information; add face shield if irritating or corrosive |
| 13. Welding operations | <input type="checkbox"/> Yes <input type="checkbox"/> No | Welding goggles or welding helmet; see Supplemental Information A and B for additional information |
| 14. Projectiles | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles plus face shield |

Hand Hazards

- | | | |
|----------------------------------|--|--|
| 15. Chemical exposure | <input type="checkbox"/> Yes <input type="checkbox"/> No | Use chemical-resistant gloves specific to hazard; consult MSDS, chemical hazard guide, or HSE Representative |
| 16. Sharp edges, splinters, etc. | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather or Kevlar gloves |
| 17. Temperature extremes – heat | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather gloves, welder's gloves, hot mill gloves |



Health, Safety and Environment
**HAZARD ASSESSMENT
CERTIFICATION FORM**

Attachment 029-1 NA

Issue Date: July 2000
Revision 9: March 2012

If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.

- | | | |
|--|--|---|
| 18. Temperature extremes – cold | <input type="checkbox"/> Yes <input type="checkbox"/> No | Insulated gloves |
| 19. Blood, fungus, biological agents | <input type="checkbox"/> Yes <input type="checkbox"/> No | Nitrile gloves |
| 20. Exposure to live electrical currents | <input type="checkbox"/> Yes <input type="checkbox"/> No | Electrical gloves; consult HSE representative |
| 21. Sharp tools, machine parts, etc. | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather or Kevlar gloves |
| 22. Material handling | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather gloves |

Foot Hazards

- | | | |
|---|--|--|
| 23. Heavy materials (greater than 50 pounds) handled by employees | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots |
| 24. Potential to crush whole foot | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots with metatarsal guard |
| 25. Sharp edges or points (puncture risk) | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots |
| 26. Exposure to electrical hazards | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots with:

Conductive - Protects the wearer in an environment where the accumulation of static electricity on the body is a hazard.

Static dissipative - Reduces the accumulation of excess static electricity by conducting body charge to ground while maintaining a sufficiently high level of resistance.

Electrical hazard - Provides a secondary source of protection against accidental contact with live electrical circuits, electrically energized conductors, parts or apparatus, and is manufactured with non-conductive electrical shock resistant soles and heels. |
| 27. Slippery conditions | <input type="checkbox"/> Yes <input type="checkbox"/> No | Rubber-soled boots or grips |
| 28. Chemical contamination | <input type="checkbox"/> Yes <input type="checkbox"/> No | Rubber, PVC, or polyurethane boots or boot covers with puncture and protective toe if task required |
| 29. Wet conditions | <input type="checkbox"/> Yes <input type="checkbox"/> No | Rubber boots or boot covers |
| 30. Construction/demolition | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety boots with metatarsal guard if foot-crushing hazard exists |

Fall Hazards

- | | | |
|---|--|---------------------------------------|
| 31. Elevations above 4 feet (general industry) or 6 feet (construction) without guardrails | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |
| 32. Suspended scaffolds, boatswain's chairs, float scaffolds, or suspended staging | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |
| 33. Working in trees | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |
| 34. Working in vehicle-mounted elevating work platforms (e.g., bucket trucks, aerial lifts) | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |



Health, Safety and Environment
**HAZARD ASSESSMENT
CERTIFICATION FORM**

Attachment 029-1 NA

Issue Date: July 2000
Revision 9: March 2012

Water Hazards

35. Working on or above water where a risk of drowning exist Yes No U.S. Coast Guard approved personal floatation device; Type I, II, or III

Excessive Heat or Flame

36. Full body chemical protective clothing in temperatures greater than 80 °F Yes No Cooling vest
37. Work around molten metal or flame Yes No Nomex or heat reflective clothing
38. Welding activities Yes No Welding leathers for those areas that are exposed to flame, spark, or molten metal

Respiratory Hazards

39. Airborne particulates, gases, vapors, or mists in excess of established exposure limits Yes No Refer to SMS 042 or URS HSE Representative for respirator selection guidance

Excessive Noise

40. Exposure to noise Yes No Ear plugs, muffs or both

Body and Leg Protection

41. Chemical exposure Yes No Contact URS HSE Representative for assistance in proper selection
42. Using chainsaw, cutting brush Yes No Chainsaw chaps
43. Exposure to snakes Yes No Snake chaps
44. Exposure to vehicle traffic or heavy equipment Yes No See SMS 032 and SMS 029 NA – Supplemental Information C for additional guidance

I certify that the above inspection was performed to the best of my knowledge and ability, based on the hazards present on: _____

Name _____ Signature _____



Health, Safety and Environment
**PERSONAL PROTECTIVE EQUIPMENT
INSPECTION SHEET**

Attachment 029-2 NA

Issue Date: July 2000
Revision 9: March 2012

Name of Inspector _____ Date Inspected _____

Hard Hats	
1. The brim or shell does not show signs of exposure and excessive wear, loss of surface gloss, chalking, or flaking.	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Suspension system in hard hat does not show signs of deterioration, including cracking, tearing, or fraying.	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. The brim or shell is not cracked, perforated, or deformed.	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Employees use hard hats in marked areas.	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Areas requiring hard hat usage are marked.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Shoes	
6. Safety shoes used by employees do not show signs of excessive wear.	<input type="checkbox"/> Yes <input type="checkbox"/> No
7. Areas requiring safety shoes are marked.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Work Gloves	
8. Gloves are available and worn when needed.	<input type="checkbox"/> Yes <input type="checkbox"/> No
9. Gloves are appropriate for the task.	<input type="checkbox"/> Yes <input type="checkbox"/> No
10. Gloves do not show signs of excessive wear such as cracks, scrapes, or lacerations, thinning or discoloration, or break-through to the skin.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Protective Clothing	
11. Protective clothing (including traffic control apparel) is worn by employees when required.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Hearing Protection	
12. Noise hazard areas are posted.	<input type="checkbox"/> Yes <input type="checkbox"/> No
13. Employees are using earplugs or muffs when using noise producing equipment or working in posted noise hazard areas.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses/Goggles	
14. Eye hazard areas are marked or posted.	<input type="checkbox"/> Yes <input type="checkbox"/> No
15. Employees use safety glasses/goggles when working in eye hazard areas or working with equipment that produces an eye hazard.	<input type="checkbox"/> Yes <input type="checkbox"/> No
16. Face shields are used when required and worn over safety goggles.	<input type="checkbox"/> Yes <input type="checkbox"/> No

REMARKS (All "No" answers indicate a hazard which needs to be fixed.)



Health, Safety and Environment
SANITATION INSPECTION SHEET

Attachment 030-1 NA
Issue Date: June 1999
Revision 4: September 2011

Location: _____ Job No: _____

Date Inspected: _____ Name of Inspector: _____

Toilets

1. Are there an adequate number of toilets on site? Yes No NA
1 to 15 employees = 1 toilet
16 to 35 employees = 2 toilets
36 to 55 employees = 3 toilets
56 to 80 employees = 4 toilets
81 to 110 employees = 5 toilets
2. Toilets are in clean condition. Yes No NA
3. Toilet paper is provided. Yes No NA
4. Toilet areas are clean and sanitary. Yes No NA

Hand Washing Facilities

5. Hand washing facilities are provided near toilets. Yes No NA
6. Paper towels and soap are provided. Yes No NA

Drinking Water

7. Drinking water is provided on site. Yes No NA
8. Disposable cups are provided or fountain-type dispenser is provided. Yes No NA
9. Drinking water containers are kept clean and tightly closed or covered. Yes No NA

Break Rooms

10. Break rooms or eating areas are kept clean. Yes No NA
11. Microwaves are used for food only. Yes No NA
12. Microwave ovens are kept clean. Yes No NA
13. Refrigerators are kept clean. Yes No NA
14. Refrigerators are used to store food only. Yes No NA

Vermin

15. Rats, mice, and other vermin are not living within buildings. Yes No NA
16. Cockroaches and fleas are not thriving within buildings. Yes No NA

Employee Compliance

17. Employees only eat/drink in areas free from contamination. Yes No NA
18. Employees wash hands/face prior to eating, drinking, smoking. Yes No NA

REMARKS:



Health, Safety, and Environment
**TRAFFIC CONTROL DEVICE
INSPECTION CHECKLIST**

Attachment 032-1 NA

Issue Date: June 1999
Revision 3: December 2009

Project Name: _____

Project Number: _____

Location Inspected: _____

1. **Are any devices missing?** Yes No

Do any devices need repair? Yes No

Were all replaced or repaired? Yes No

Notes:

2. **Are any lights (flashers, etc.) not functioning?** Yes No

Were they all replaced or repaired? Yes No

Notes:

3. **Are any devices improperly placed?** Yes No

Were all positions corrected? Yes No

Notes:

4. **Do any devices need cleaning?** Yes No

Were all devices cleaned? Yes No

Notes:

5. **Are flaggers certified and flagging appropriately?** Yes No

Notes:

Additional Comments:

The above check was completed by: _____

Date: _____ Time: _____



Health, Safety and Environment
UTILITY CLEARANCE CHECKLIST

Attachment 034-1 NA

Issue Date: June 1999
Revision 6: September 2011

Project Name:	Project Number:
Project Location:	Client Name:
URS Project Manager Name:	Date Completed:

For any item answered 'No', Project Manager approval required before work can proceed.

Within the last 10 days, and not less than 72 hours from the initiation of the task, contacts were notified that the public utility locate service (One Call) was made.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Available records have been referenced and a plot plan indicating the location of all underground utilities have been provided and are available for reference at the work site.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Completed Site Walk Over With Site Personnel (site manager, property owner or tenant representative)

Site Personnel Name:	Site Personnel Signature:
Does Site Personnel have any additional information regarding site utilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
Building Utility Service Line Connections Identified: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Cleared: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Field Observations – Any ** responses must be explained in box below.

Field walk completed and utilities identified on page 2 of this form are cleared?	<input type="checkbox"/> Yes <input type="checkbox"/> No**
Apparent saw cuts or patches in concrete/pavement?	<input type="checkbox"/> Yes** <input type="checkbox"/> No
Piping along building exterior? Identify purposed and layout.	<input type="checkbox"/> Yes** <input type="checkbox"/> No <input type="checkbox"/> N/A
Manholes, vault covers, drains, pipes present?	<input type="checkbox"/> Yes** <input type="checkbox"/> No
Piping inside of manholes correlate to utility markings?	<input type="checkbox"/> Yes <input type="checkbox"/> No** <input type="checkbox"/> N/A
Clear line-of-sight (equipment/vehicles/snow not blocking view or potential utilities)?	<input type="checkbox"/> Yes <input type="checkbox"/> No**
Work between potential utilities or manholes?	<input type="checkbox"/> Yes** <input type="checkbox"/> No
Work areas clear of overhead utilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No**
All known utilities located on plot/site map for personnel to review?	<input type="checkbox"/> Yes <input type="checkbox"/> No**
Explanations:	

Public Utility Locate (OneCall)

Date Called:	Called By:
Ticket Number:	Valid Until:
Area Requested To Be Cleared:	

Private Utility Locate

Company Performing Locate:	Date Completed:
Area(s) Requested To Be Cleared (including distance around marked locations):	
Method(s) Used (e.g., GPR, EM):	
Confirm Area(s) Cleared:	



UTILITY CLEARANCE CHECKLIST

OneCall Utilities			Field Observation
Utility	Notified by	Comments	Marked (mains and services)
Electric [Redacted]	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Gas/Petroleum Pipeline (Yellow)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No
Sewer/Drainage (Green)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No
Water (Blue)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No
Communications (Orange)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Other	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above

Utilities Not Identified By OneCall (Includes both Public and Private along with Regional and Site Utilities)			Field Observation
Utility (Colors may vary)	Owner / Contact / Phone #	Notified	Marked
Communications: (Orange) TV, computer, phone, cell towers, site communication, cameras, security, etc.		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Electricity: [Redacted] Mains / Supplies / Interior / Exterior (signs, fuel pumps, low voltage security perimeters, gates, property light posts, equipment, substations, etc.)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Gas: (Yellow) Mains / Supplies / Equipment / Pipelines (Natural, Process, Oil, Crude, Refined (Gas, Diesel, Jet), etc.)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Steam (Yellow)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Structures: Possible horizontally installed facilities, vaults, basements, tunnels, sub-grade structures, foundations, overhead obstructions, etc.		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
UST Systems (Tanks / piping / electric)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Sewer: (Green) Sanitary, storm, combined, septic, drainage (parking, buildings, fields), irrigation		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Water: (Blue) Process, Plant, potable, well, cooling, return/makeup, fire, sprinkler, landscape irrigation, reclaim (Purple) other		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Other: Abandoned Lines, invisible dog fences, shopping cart perimeter monitoring, traffic lights		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above

If subsurface work is within five feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure, nondestructive clearing techniques (e.g., air knife, vacuum excavation, hand auger) must be completed to visually locate and expose the utility.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Precautions have been taken to prevent contact with overhead or underground utilities.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Printed Name of Person Completing Checklist: _____ Signature: _____



Health, Safety and Environment
**IDENTIFYING WHEN A RESPIRATOR
IS NEEDED**

Attachment 042-1 NA

Issue Date: July 2000
Revision 6: March 2012

Site Location: _____ Date: _____

Name of Person Performing Evaluation: _____

Project: _____

Answer the questions below for the jobs you are to perform on site. If a 'Yes' response is checked, consult with an HSE Manager or a URS Certified Industrial Hygienist (CIH) to determine if a respirator is truly needed for the job; and if so, the type of respirator needed.

It is important to be aware of the respiratory protection requirements for any chemicals you are exposed to; these can be found on the Material Safety Data Sheets or chemical labels.

Material Used or Process to be Performed	Notes
Abrasive Blasting <ul style="list-style-type: none">Abrasive blasting (with any type of grit or material) will be performed <input type="checkbox"/> Yes <input type="checkbox"/> No _____Employee will fill abrasive blasting pots or perform clean-up activities <input type="checkbox"/> Yes <input type="checkbox"/> No _____Employee will be in a contained area where abrasive blasting is taking place <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Acids <ul style="list-style-type: none">Liquid or powder acids will be used in a situation where acid vapors, mists, or dust may be breathed <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Adhesives <ul style="list-style-type: none">Aerosols-propelled adhesives are to be used in areas where there is insufficient or no local exhaust ventilation <input type="checkbox"/> Yes <input type="checkbox"/> No _____Two-part adhesives (mix part one with two, let set, then use) are to be used in areas where there is limited ventilation <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Alkalis/Bases/Caustics <ul style="list-style-type: none">Powdered alkalis will be used in a situation where an airborne dust may be breathed <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Asbestos Abatement <ul style="list-style-type: none">Asbestos will be removed, repaired, or sampled <input type="checkbox"/> Yes <input type="checkbox"/> No _____Employees will be inspecting or overseeing areas where asbestos will be removed or disturbed <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Cleaning Compounds <ul style="list-style-type: none">Degreasers or carbon removers will be used in areas where local exhaust ventilation is not provided <input type="checkbox"/> Yes <input type="checkbox"/> No _____Aerosol-propelled cleaning compounds will be used in areas where there is no local exhaust ventilation <input type="checkbox"/> Yes <input type="checkbox"/> No _____Entry into a vault, tank, silo, sewer, or other confined space that has been used for chemical storage, recently painted, or where inert gases may have been used without ventilation <input type="checkbox"/> Yes <input type="checkbox"/> No _____Degreasers or carbon removers will be used in voids, tanks, or other confined spaces <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Corrosion-Preventive Compounds <ul style="list-style-type: none">Corrosion-prevention compounds, including chemical conversion compounds and corrosion inhibitors, will be used in areas where there is no local exhaust ventilation <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Detergents/Soaps <ul style="list-style-type: none">Ammonia-based detergents will be used in large quantities (more than 5 gallons) in areas where local exhaust ventilation cannot be provided <input type="checkbox"/> Yes <input type="checkbox"/> No _____	



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**IDENTIFYING WHEN A RESPIRATOR
IS NEEDED**

Attachment 042-1 NA

Issue Date: July 2000
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Material Used or Process to be Performed	Notes
<ul style="list-style-type: none">Large quantities (5- or 55-gallon containers) of high pH powder detergent/soap will be used in a situation where dust may be breathed	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
Fuels (including regular or unleaded gasoline, kerosene, diesel fuel, JP-5)	
<ul style="list-style-type: none">Employees will be inside unventilated fuel cells or other confined spaces containing fuels	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
Grinding, Cutting, Sanding	
<ul style="list-style-type: none">Cutting, grinding, or sanding surfaces that have coatings containing beryllium, cadmium, chromium, lead, or zinc	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<ul style="list-style-type: none">Cutting, grinding, or sanding surfaces that are concrete or glass without use of ventilation or water	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
Hazardous Waste Sites	
<ul style="list-style-type: none">Employees will be performing tasks on a hazardous waste site that requires the use of respirator (as indicated in the site health and safety plan)	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<ul style="list-style-type: none">Employees will be performing site assessments on potential hazardous waste sites	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
Hydraulic Fluids (including petroleum-based fluids, synthetic fire-resistant fluids, and water-based fire-resistant fluids)	
<ul style="list-style-type: none">Hydraulic fluids and the vapors generated will not be exhausted using local exhaust ventilation	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<ul style="list-style-type: none">Synthetic fire-resistant fluids or water-based fire-resistant fluids will be used in an area where the air is contaminated with visible mist or spray from hydraulic fluids	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
Inspection Penetrants (including Fluoro-finder, water-indicating pastes, and penetrant removers)	
<ul style="list-style-type: none">An aerosol-propelled inspection penetrant will be used in an area where local exhaust ventilation cannot be provided, or in a situation where the solvent vapors can be breathed	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
Lead Abatement Activities	
<ul style="list-style-type: none">Lead-containing materials will be disturbed, removed, or sampled	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<ul style="list-style-type: none">Employees will be inspecting or overseeing areas where lead will be removed or disturbed	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
Lubricants/Oils	
<ul style="list-style-type: none">Aerosol lubricants or oils will be sprayed with no immediate exhaust ventilation	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
Oxidizers (materials that give off oxygen, including chlorine laundry bleach, calcium hypochlorite, calcium oxide, oxygen candles, lithium hydroxide, hydrogen peroxide, and sodium dichromate)	
<ul style="list-style-type: none">Oxidizers containing organic chlorine will be used in a situation where the dusts or vapors may be breathed	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<ul style="list-style-type: none">Powdered oxidizers will be used in a situation where airborne dust may be breathed	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
Paint Materials (including paints, primers, thinners, enamels, lacquers, strippers, coatings, and varnishes)	
<ul style="list-style-type: none">Paint materials will be spray-applied in areas where there is no local exhaust ventilation	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<ul style="list-style-type: none">Two-part (mix part a with part b, let set, then apply) polyurethane or epoxy polyamide paints will be brush- or spray-applied	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<ul style="list-style-type: none">Paints containing beryllium, cadmium, chromium, lead, or zinc (refer to the MSDS)	<input type="checkbox"/> Yes <input type="checkbox"/> No _____



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Material Used or Process to be Performed	Notes
<ul style="list-style-type: none">• Paint materials will be applied in confined spaces <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Solvents (including hydrocarbon solvents such as acetone, methyl ethyl ketone, toluene, xylene, and alcohols, as well as mixed solutions like antifreeze, heat-transfer fluid, turpentine, pipe-dope, and naphtha thinner) <ul style="list-style-type: none">• Local exhaust ventilation will not be provided and work will involve breathing solvent vapors <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Solvents will be used within confined spaces <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Solvents will be applied using aerosols <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Thermal Insulation (including asbestos and non-asbestos materials like pipe lagging, fiberglass insulation, boiler insulation, packing materials, and floor or ceiling tiles) <ul style="list-style-type: none">• Insulation will be disturbed, removed, or sampled <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Water-Treatment Chemicals (includes corrosive chemicals such as tri-sodium phosphate, hardness buffer, titrating solution, morpholine, caustic soda, citric acid, and nitric acid, as well as toxic chemicals such as mercuric nitrate, hydrazine, EDTA, and sodium nitrate) <ul style="list-style-type: none">• Morpholine, EDTA, or harness buffer/titrating solution is to be used in poorly ventilated spaces <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Powdered water-treatment chemicals will be used in a situation where chemical dusts may be breathed <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Welding/Brazing/Cutting <ul style="list-style-type: none">• Welding will be performed in confined spaces <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Welding galvanized metal or stainless steel <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Brazing with cadmium or lead <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Torch-cutting on coated/painted materials <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
For Any of the Above-Listed Activities <ul style="list-style-type: none">• An employee will be in the immediate area – within 10 feet of the job or operation; or <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Employee will be inside confined space where activities are taking place; or <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Employee will be inside a "controlled area" such as found in asbestos abatement, lead abatement, radiation control area, or a hazardous waste site <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Other <ul style="list-style-type: none">• A chemical process procedure (e.g., hydrogen sulfide in refineries, ammonia as a refrigerant, chlorine in water disinfection, inert gas systems) required the use of a respirator or emergency escape respirator <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Mine operations require issuance of an emergency escape respirator <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Emergency response plan requires issuance of respirators to first responders <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Radiological controls require use of a respirator <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Laboratory Chemical Hygiene plan requires issuance of respirators <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Exposure to airborne mold <input type="checkbox"/> Yes <input type="checkbox"/> No _____	



Health, Safety and Environment
VOLUNTARY USE OF RESPIRATORS

Attachment 042-2 NA

Issue Date: July 2000
Revision 6: March 2012

Instructions: Have the employee that is opting to use a respirator for non-overexposure conditions read this page, and then sign on the bottom of the page. Maintain a copy in the employee's training file.

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for employees. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the employee.

Sometimes employees may wear respirators to avoid exposures to hazards, even if the amount of the hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your own voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not pose a hazard.

1. Read and follow all instructions provided by the manufacture on use, maintenance, cleaning, and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH (the National Institute for Occupational Safety and Health) certifies respirators in the U.S. A label or statement of certification should appear on the respirator or respirator packaging; it will tell you what the respirator is designed for and how it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants against which your respirator is not designed to protect. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, fumes, smoke, or very small solid particles.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
5. If you have any health conditions (asthma; high blood pressure; emphysema; heart disease) that could be aggravated by using a respirator, you should check with your doctor before using one.

I have read and understand this information: Date: _____

Employee's Name (Please Print):

Employee's Signature:



FIT TEST RECORD

Employee Name _____ Employee Number _____

Office/Project _____ Last Medical Exam _____

Fit Test Date _____ Corrective Lenses Needed Yes No

Medically qualified to wear respirator? Yes No

Briefed on fundamental principles of respiratory protection, use, selection, inspection, cleaning, maintenance, and storage of equipment? Yes No

Test agent recognition: Yes No N/A

RESPIRATOR 1

RESPIRATOR 2

RESPIRATOR 3

Equipment Type _____

Manufacturer's Name _____

Model _____

Size _____

Facepiece Composition (Rubber/Silicone) _____

TEST PERFORMED

RESPIRATOR 1

RESPIRATOR 2

RESPIRATOR 3

Negative Pressure Test: Pass Fail Pass Fail Pass Fail

Positive Pressure Test: Pass Fail Pass Fail Pass Fail

Isoamyl Acetate Test: Pass Fail Pass Fail Pass Fail

Irritant Smoke Test: Pass Fail Pass Fail Pass Fail

Bitrex: Pass Fail Pass Fail Pass Fail

Saccharin: Pass Fail Pass Fail Pass Fail

Generated Aerosol Quantitative Fit: P F Fit Factor _____ P F Fit Factor _____ P F Fit Factor _____

Ambient Aerosol Quantitative Fit: P F Fit Factor _____ P F Fit Factor _____ P F Fit Factor _____

Controlled Negative Pressure Quantitative Fit: P F Fit Factor _____ P F Fit Factor _____ P F Fit Factor _____

Examiner's Name (Please Print)

Examiner's Signature

Date

Employee's Signature

Date



Health, Safety and Environment
**RESPIRATOR STANDARD
OPERATING PROCEDURE**

Attachment 042-4 NA

Issue Date: July 2000
Revision 6: March 2012

Job Task Reviewed: _____

Date Reviewed: _____

Task Review by: _____

ADMINISTRATIVE PROCEDURES

1. All respirator users must be medically qualified to use respirators.
2. Respirator users must be trained annually in respirator use, and must be fit-tested annually.
3. The respirator will be used only by the person to whom it was issued.
4. Persons using glasses who are required to use a full-face respirator may use contact lenses or eyeglass inserts designed for the respirator.

GUIDANCE FOR SELECTION OF RESPIRATOR AND CARTRIDGES/FILTERS

1. Respirators are currently being issued and used for the following job activities:

2. The respirator will be equipped with the following cartridges/filters:

3. Filters are to be changed when the breathing resistance increases.
4. Cartridges are to be changed _____ (frequency), or when the contaminant you are protecting yourself from can be smelled or tasted.

FIT TESTING & FIT CHECKING

1. Fit testing is required annually. To arrange for fit testing, call your local, project, or regional safety representative or qualified industrial hygienist.
2. Respirator users will "fit check" the respirator every time the respirator is put on:
 - **Negative Check** – Cover filters/cartridges with palms of hands and breathe in: leakage should not be detected around the face seal of the respirator. Do not use if leakage is detected.
 - **Positive Check** – Cover the exhalation valve cover with palm of hand and blow out slightly: leakage should not be detected around the respirator seal.
 - **For Air Supply Respirators** – Kink or close off air supply hose and breathe in: leakage should not be detected around the face seal of the respirator.

CLEANING AND MAINTENANCE OF RESPIRATOR

1. Clean and disinfect respirator after every use.
2. Inspect respirator at the end of work every day in use to ensure parts are not missing. Replace missing parts from stock supply.
3. Store clean respirator in labeled plastic bag out of direct sunlight.
4. Do not alter respirator in any way.



**INDUSTRIAL HYGIENE
SAMPLE FIELD SHEET**

Sample ID _____

Date: _____

Material of Interest (MOI) in Dust: _____

Site: _____ **Sample I.D. No.** _____

Person Sampled or Area: _____ **Employee No.** _____

Job/Area: _____

Sample Type

Personal: **Area:** **Resp. Dust:** **Total Dust:** **Other:** _____

Pump Type: _____ **Pump No** _____ **Time On:** _____ **Time Off:** _____

Total Time (min): _____ **Cassette No:** _____ **Initial Flow:** _____ **Final Flow:** _____

Average Flow: _____ **Volume:** _____ **Calibrator Model:** _____ **Calibrator Serial No:** _____

Workplace Conditions

Operations: **Normal** **Abnormal** **Explain** _____

Respirator Use: **Type** _____ **% of Time Worn** _____

Ventilation: **Type** _____

Normal **Abnormal** **Explain** _____

Weather Conditions

Approximate Temperature: _____ °F _____ °C

Sky: **Precipitation** **Cloudy** **Partly Cloudy** **Clear**

Wind: **Calm** **Light** **Medium** **High**

Work Description/Comments: _____ **Scheduled Hours per Shift:** _____

Sampled By: _____



Health, Safety and Environment
SUBCONTRACTOR SAFETY
EVALUATION FORM

Attachment 046-1 NA

Issue Date: July 1999
Revision 8: September 2011

It is the policy of URS to provide a safe and healthful environment for all of its employees through the prevention of occupational injuries and illnesses. As such, URS considers safety as paramount and requests the following information of all subcontractors.

Company Name: _____	Date: _____
Address: _____	Contact Name: _____
_____	Title: _____
City: _____	Telephone: _____
State/Province: _____	Fax: _____
Zip/Postal Code: _____	Email: _____

Type of services performed: _____

Has your company previously performed work as a subcontractor to URS? Yes No

If "Yes" explain the nature of the work, project location, and project date, and URS Project Manager and telephone number.

How many years has your organization been in business under your firm's name? _____

If applicable, what was your organization's previous name(s)? _____

1. WORKERS' COMPENSATION EXPERIENCE INFORMATION

(United States Only)

Insurance Carrier(s): _____

Contact for Insurance Information: _____

Title: _____ Telephone: _____ Fax: _____

A. For U.S. operations - List your firm's Interstate Worker Compensation Experience Modification Rate (EMR) for the three most recent years: (Information is available from your workers compensation insurance carrier.)

For international operations - List the applicable performance rating (e.g., NEER Performance Index in Canada) for your company.



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<u>Year</u>	<u>EMR Interstate (or international equivalent)</u>
_____	_____
_____	_____
_____	_____

- B. We require verification of your EMR (or international equivalent). Please attach the endorsement page from your policy listing your rating, or have your insurance carrier or broker provide this information on their letterhead.
- C. If your rating exceeds 1.0 for any one or more years above, please explain:

Comments: _____

2. SAFETY PERFORMANCE

- A. Please consolidate your firm's injury and illness data for the last 3 years and complete the table below. The information provided must be for your company as a whole, not an individual office location. **For U.S. operations, provide copies of your OSHA 300 and 300A logs for the last 3 years.**

	YEAR	YEAR	YEAR
A. Average Number of Employees			
B. Number of Fatalities			
C. Number of cases that involved days away from work, or cases with job transfer or restriction, or both			
D. Other Recordable Cases – Medical Only (Number of cases without lost or restricted workdays)			
E. Total Recordable Cases			
F. Total hours worked			
G. Total Recordable Incident Rate $\frac{\text{(E above)} \times 200,000}{\text{Employee Hours Worked (Given Year)}}$			
H. Lost Workday Case Incident Rate $\frac{\text{(C above)} \times 200,000}{\text{Employee Hours Worked (Given Year)}}$			

- B. For each fatality, please attach a description of the accident, including cause, lessons learned, actions taken resulting from that fatality, actions taken to prevent future fatalities, and corporate management summary of their actions and attitudes.



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- C. Has your company been issued any health and safety related citations/orders from any federal, state, province, or local regulatory agency during the past 3 years? Yes No

If "Yes", please explain the nature of the citation/order, classification, and final fine (if applicable) in an attachment to your evaluation form submittal.

3. RISK MANAGEMENT / INSURANCE DATA

- A. Are you able to provide URS with insurance certificates naming URS, and if requested, URS' client as an additional insured? Yes No
- B. Please provide proof of current Workers' Compensation and Employer's Liability Insurance coverage or proof of exemption. (For U.S. operations, *attach certificate naming URS as Additional Insured*).

4. HEALTH AND SAFETY PROGRAM

- A. Does your company maintain a written Health and Safety program? Yes No
If "Yes," please include a copy of the Table of Contents.
- B. Is your company capable of preparing safety procedures specific to the work proposed for this project? Yes No
- C. Does your firm have a safety officer? Yes No
If "Yes," please provide name and telephone number.

Name: _____ Telephone: _____

- D. Do you hold jobsite safety meetings?
1. How Often?
- Daily Weekly Bi-Weekly Monthly Less Often, As needed
2. Are the health and safety meetings documented? Yes No
- E. Does your firm have the following policies/procedures? *If "Yes," please provide copies of the policies/procedures.*
1. Stop Work? Yes No
2. Short Service Employee? Yes No
3. Fitness for Duty? Yes No
- F. Is a program in place for the reporting and correction of workplace hazards? Yes No
- G. Are workers encouraged to intervene when unsafe conditions are observed? Yes No



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H. Have the safety and health hazards associated with your job activities been identified? Yes No

1. Has a risk assessment been performed on these hazards? Yes No

5. ACCIDENT/INCIDENT REPORTING, INVESTIGATION, AND INJURY MANAGEMENT

A. Does your company have a process in place for immediate reporting, investigation, and follow-up of incidents, near-misses and occupational injuries? Yes No

If "Yes," who receives copies of the report? (Job Title) _____

(Job Title) _____

(Job Title) _____

B. Who is responsible for investigation and completion of your incident report forms? (Job Title) _____

Please provide your company's incident reporting procedures.

Please provide a copy of an investigation report conducted within the last year.

C. Does your company have an injury management procedure? Yes No
If "Yes," provide a copy of the injury management procedure.

D. Does your injury management procedure include the use of occupational clinics (for non-critical injuries) as a preferred method of medical care? Yes No

E. Does your company have a nurse or doctor on staff? Yes No

F. Does your company use a third party to provide medical advice to injured employees? Yes No

If "Yes," which third-party company is used? _____

6. HEALTH AND SAFETY TRAINING

A. Do you have or provide company paid safety/health training to your employees? Yes No

B. Does your company have a formal safety orientation program for new employees? *If "Yes," submit a copy for evaluation.* Yes No

Are records kept? Yes No

If "Yes," who conducts the orientation? (Job Title) _____



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If "No," how are new employees informed of safety policies and procedures and expectations?

C. Do you have additional safety and health training for newly hired or promoted foremen/superintendents? Yes No

Topics Covered:

D. Do you maintain a record of all employees' training? Yes No

E. Are your employees enrolled in a Defensive Driving Training Program? Yes No

If "Yes," describe the training, including the training provider, who receives the training, and course length.

Please provide a copy of training records from a recent HSE training course.

7. MEDICAL / DRUG TESTING

A. Does your company have a Drug/Alcohol policy or program? Yes No

If "Yes," does your drug and alcohol program include the following:

- Pre-employment testing Yes No
- Testing for Cause Yes No
- Post-accident testing Yes No
- Random testing Yes No

B. Does your company have an ongoing medical surveillance program as required by applicable governmental regulations? Yes No

Do you conduct medical examinations for:

Pre-employment Yes No



**SUBCONTRACTOR SAFETY
EVALUATION FORM**

Pre-placement Job Capability

Yes No

Hearing Function (Audiograms)

Yes No

Pulmonary

Yes No

Respiratory

Yes No

8. COMPLIANCE ASSURANCE

A. Does your company conduct job site safety inspections?

Yes No

1. How often?

2. Who conducts the inspection? (Job Title)

3. Who receives the reports? (Job Title)

4. Are inspections documented? *If "Yes," provide an example.*

Yes No

Comment on any other areas of your company's safety program and policies that you think will be appropriate in our evaluation.



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EVALUATION FORM**

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VERIFICATION OF DATA

Please have an officer of the Company sign below certifying that the information provided in this document is current and correct. Misrepresentation of data requested is grounds for immediate termination of contracts and disqualification from future consideration.

Name

Title

Signature

Date

REQUIRED INFORMATION SUBMITTAL

Please provide copies of the following documents with the completed evaluation form. **If the following information is not included, provide a written reason for the failure to do so.**

- EMR documentation, or international equivalent, from your insurance carrier
- U.S. Only - OSHA 300 and 300A Logs (Past 3 Years) – *Employee names must be removed.*
- Description for any fatalities (if applicable)
- Insurance Certificate(s) – *Naming URS as Additional Insured*
- Safety, Health, and Environmental Program (Table of Contents)
- Stop Work, Short Service Employee, Fitness for Duty Policies/Procedures
- Accident/Incident Reporting Procedure
- Example of an Investigation Report conducted within the past year
- Injury Management Procedure
- Safety, Health & Environmental Orientation for New Hires (Outline)
- Example of Safety, Health and Environmental Training Records
- Example of Job Site Safety Inspection conducted within the past year

THIS PAGE IS TO BE COMPLETED BY URS CORPORATION.

Subcontractor Name: _____

Project or Site Manager Evaluation:

- Pass Subcontractor meets the criteria established in Attachment 046-2 NA, and no further action is required.
- Fail Subcontractor does not meet the criteria established in Attachment 046-2 NA. If a unique business need exists, then a subcontractor variance must be initiated using Attachment 046-3 NA. The variance must be submitted to a Corporate, Regional, or Strategic Business Unit (SBU) HSE Manager for evaluation.

Project or Site Manager Name: _____

Signature: _____

Date: _____



Health, Safety and Environment
SUBCONTRACTOR VARIANCE FORM

Attachment 046-3 NA
Issue Date: July 1999
Revision 8: September 2011

Subcontractor Name: _____

Project or Site Location: _____

Description of Work to be Performed:

Explain any of the following conditions that apply to the subcontractor:

- EMR greater than 1.0
- TRIR greater than 4.0
- Fatalities within the past 3 years
- Willful, serious, or repeat OSHA citations

Why should we use this subcontractor?



Health, Safety and Environment
SUBCONTRACTOR VARIANCE FORM

Attachment 046-3 NA
Issue Date: July 1999
Revision 8: September 2011

Have other similar subcontractors been evaluated? If so, please explain.

Mitigations by URS to manage the risks.

Review:

Project or Site Manager Requesting Variance

HSE Manager Approval

Name: _____

Date: _____

Signature: _____



**INFRASTRUCTURE & ENVIRONMENT
INCIDENT REPORT FORM**

Issue Date: May 2001
Revision 11: March 2012

ADMINISTRATIVE INFORMATION

Database Office ID:

Group: East West International

Region:

Client Sector:

NOTIFICATION / LOCATION DATA

Site or Office:

Customer/Client Name:

Date of Event:

Time of Event:

Time Employee Started Work:

Date Supervisor

Time Supervisor

Name of Employee

Notified:

Notified:

Submitting Report:

Client Notification Completed (if required)? Yes No

Project/Order Number:

TYPE OF EVENT (Check all applicable items)

Illness (Check one)

- Employee
- Subcontractor
- Other

Injury (Check one)

- Employee
- Subcontractor
- Other

NAME of Injured/Ill Employee:

Property Damage (Check one)

- Company (owned, leased, rented)
- Client/Customer
- Other

Vehicular Accident (Check one)

- Company (owned, leased, rented)
- Client/Customer
- Other

- Fire
- Explosion
- Flash
- Other (describe): _____

EVENT SUMMARY

Briefly state the facts contributing to the event. Attach additional pages and supporting information, as necessary. Avoid use of employees' names. *If this is an injury or illness, supply additional information as required on Page 2.*

ROOT CAUSE DETERMINATION

Root Cause (State the root or primary cause, then select the most appropriate cause category from Page 4):

CONTRIBUTING FACTORS

Contributing Causes (Describe any contributing causes, then select the applicable cause categories from Page 4):

CORRECTIVE ACTIONS

List methods of preventing/avoiding this type of incident in the future. There must be one or more corrective actions for each root cause.



Health, Safety and Environment
INFRASTRUCTURE & ENVIRONMENT
INCIDENT REPORT FORM

Attachment 049-1 NA IE

Issue Date: May 2001
Revision 11: March 2012

FOR INJURIES/ILLNESS ONLY

Employee Information

What was the employee's location when the injury/illness occurred (include city and state)?

What was the employee doing when the injury/illness occurred? Describe the activity as well as the tools, equipment, or material you were using.

What happened? Describe how the injury/illness occurred.

What was the injury or illness? Describe the part of the body that was affected and how it was affected. Use the Incident Pick List on Page 4 to aid in your description.

What level of medical treatment was received? First Aid Clinic/Physician Emergency Room Refused/None

List witnesses and/or other employees involved. Attach statements where applicable.

Do you feel URS provided you with the proper safety instructions (including PPE usage) for the task you were performing at the time of the incident? Yes No (Explain below)

How do you think this type of incident could be prevented or avoided in the future?

Mark all PPE being used when the incident occurred:

- | | | | |
|---|---|--|--|
| <input type="checkbox"/> Safety Glasses | <input type="checkbox"/> Safety Goggles | <input type="checkbox"/> Face Shield | <input type="checkbox"/> Safety Shoes |
| <input type="checkbox"/> Half-face Respirator | <input type="checkbox"/> Full-face Respirator | <input type="checkbox"/> Protective Gloves | <input type="checkbox"/> Chemical Gloves |
| <input type="checkbox"/> Hard Hat | <input type="checkbox"/> Hearing Protection | <input type="checkbox"/> Other (describe): | |

Injured/Ill Employee Signature: _____ Date: _____

Name of Injured/Ill Employee (Please print clearly): _____

Employee Number: _____ Contact Phone Number: _____

Additional Sheets Attached? Yes No (Include photos, maps, and/or diagrams when possible.)



Health, Safety and Environment
INFRASTRUCTURE & ENVIRONMENT
INCIDENT REPORT FORM

Attachment 049-1 NA IE

Issue Date: May 2001
Revision 11: March 2012

Supervisor Information

Describe any additional/different details other than those provided on the previous page. Avoid use of employees' names, where possible. Attach additional sheets, drawings, or photos, as needed.

Were the required tools available at the time of the injury? Yes No (Explain below)

At the time of the injury, was the employee using the correct tools for the task? Yes No (Explain below)

Was the employee sent for substance screening? Yes No (Explain below)

How do you think this type of incident could be prevented or avoided in the future?

Supervisor Signature: _____ Date: _____

Supervisor Name (Please print clearly): _____

Project Manager Comments

Signature: _____ Date: _____

Project Manager Name (Please print clearly): _____

HSE Representative Comments

Signature: _____ Date: _____

HSE Representative Name (Please print clearly): _____

Site/Office Manager Comments

Signature: _____ Date: _____

Site/Office Manager Name (Please print clearly): _____

ROOT CAUSE CATEGORIES

Check all cause categories that apply to the incident, then choose the root cause (or causes) category from the boxes checked. Enter where indicated on Page 1.

PHYSICAL/ENVIRONMENT

- Extreme cold/ice
- Extreme heat
- Working/walking surface unfavorable
- Inadequate lighting
- Excessive noise
- Chemical exposure
- Biological hazards (animal/plant)
- Other weather
- Other

SYSTEMS

- Inadequate training/instruction
- Inadequate management system
- Missing or incorrect procedures or planning
- Inadequate management emphasis on safety
- Corporate/operations procedures not communicated
- Other

PHYSICAL/EQUIPMENT, TOOLS, and PPE

- Failure due to improper maintenance
- Failure due to improper design
- Other

HUMAN

- Failure to adequately recognize hazards
- Failure to follow procedures
- Failure to recognize condition change
- Impaired state (drug, alcohol, other)
- Physical/psychological limitation for task
- Inadequate communications (i.e., supervisor/employee)
- Carelessness by affected person(s)
- Carelessness by other person(s)
- Improper selection of equipment/tool/PPE
- Improper use of equipment/tool/PPE
- Other

INCIDENT PICK LIST

NATURE OF INJURY/ILLNESS

- Amputation
- Burn
- Concussion
- Contusion/Abrasion
- Corneal Abrasion
- Dental
- Dermatitis
- Fatality
- Fracture
- Hearing Loss
- Heat-Related Illness
- Hernia
- Insect Bite
- Laceration/Puncture
- Other
- Respiratory Disorder
- Sprain/Strain

BODY PART

- Ankle/Foot
- Arm/Elbow
- Back
- Eyes
- Head
- Hip/Groin
- Internal Organs/Blood
- Leg/Knee
- Multiple Body Parts
- Neck/Cervical
- Respiratory
- Shoulder
- Trunk
- Wrist/Hand

DIRECT CAUSE

- Animal/Insect Contact
- Biological Agent
- Caught Between
- Ergonomics/Repetitive Trauma
- Exposure To
- Miscellaneous
- Motor Vehicle Wreck
- Overexertion
- Poisonous Plant
- Slips/Trips/Falls
- Struck Against
- Struck By

DISTRIBUTION

NOTE: The preferred method of distribution of this report is by e-mail attachment either in Word, or scanned to PDF. Forward URS incident reports to the OHM at incidentreport@urs.com. Alternatively, reports may be faxed to 512.419.6413. Initial reports must be submitted to the OHM within 24 hours of incident. More detailed follow-up reports may be submitted later.

Additional Distribution: Program/Client Sector Manager Regional HSE Manager Office HSE Representative



STATEMENT FORM

Name of Injured Employee:		Name of Individual Providing Statement:	
Date of Injury:		Approximate Time of Injury:	
Body Part(s) Injured:		This is a statement from:	<input type="checkbox"/> Injured Employee <input type="checkbox"/> Supervisor <input type="checkbox"/> Witness

Describe the incident in as much detail as possible (attach additional pages if needed).

Signature of Individual Providing Statement:		Printed Name of Individual Providing Statement:	
Date:		Contact Phone Number:	

DISTRIBUTION

E-mail to incidentreport@urs.com or fax to 512.419.6413.



Health, Safety and Environment

JOB SAFETY ANALYSIS

SMS 086NA
Supplemental Information C

Issue Date: August 2010

Job Safety Analysis

For those major tasks identified in the Scope of Work, complete the Job Safety Analysis below. Use additional sheets, as necessary.

Site: _____

Date: _____

Prepared By: _____

Approved By: _____

Work Activity:

Key Hazard (s)	Training Requirements	Protective Equipment Use
Equipment Required	Other Hazard Control Measures	

Work Activity:

Key Hazard (s)	Training Requirements	Protective Equipment Use
Equipment Required	Other Hazard Control Measures	



Work Activity:

Key Hazard (s)	Training Requirements	Protective Equipment Use
Equipment Required	Other Hazard Control Measures	

Work Activity:

Key Hazard (s)	Training Requirements	Protective Equipment Use
Equipment Required	Other Hazard Control Measures	



Health, Safety and Environment
Daily Tailgate Meeting Form #2

SMS 086 NA
Supplemental Information I
Issue Date: January 2011

Date:	Time:	Job number:
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Client:

Site location:

Task:

SAFETY TOPICS PRESENTED

Safety observations / lessons learned from previous day:

Physical hazards and controls:

Chemical hazards and controls:

Biological hazards and controls:

Job safety analysis review:

Other topics:

Emergency procedures review:

Remember that all employees have the responsibility to stop work if safety risks are identified.
Report all safety observations and near miss events.
Practice 4sight (What am I about to do; What can go wrong; What can be done to make is safer; and What have I done to communicate the hazard(s) to others?).

ATTENDEES

Printed Name	Signature	Company/Office

Meeting Conducted By:

Signature: