

HEALTH AND SAFETY PLAN

**SUNRISE POWERLINK – LINK 4
ALPINE UNDERGROUND SECTION
ALPINE, CALIFORNIA**

NOVEMBER 2010

OBJECTIVE

This Health and Safety Plan has been prepared to support the implementation of the Soil Management Plan for the Sunrise Powerlink prepared by Geosyntec Consultants, dated June 2010. The objective of this Health and Safety Plan is to provide guidance for site workers, upon discovery of contamination, during trenching through areas suspected to contain petroleum hydrocarbon-impacted soil and/or groundwater, and to provide safety guidance for sampling personnel if soil characterization during trenching is required in accordance with the Soil Management Plan. This Health and Safety Plan is not intended to be utilized as a project-wide safety guideline. Furthermore, each subcontractor will be required to develop and follow their own Health and Safety Plan specific to their scopes of work.

Instructions for Injury Response

If SERIOUS and/or LIFE THREATENING

Seek immediate medical attention at the hospital/facility that provides emergency care shown on **FIGURE 1A**.

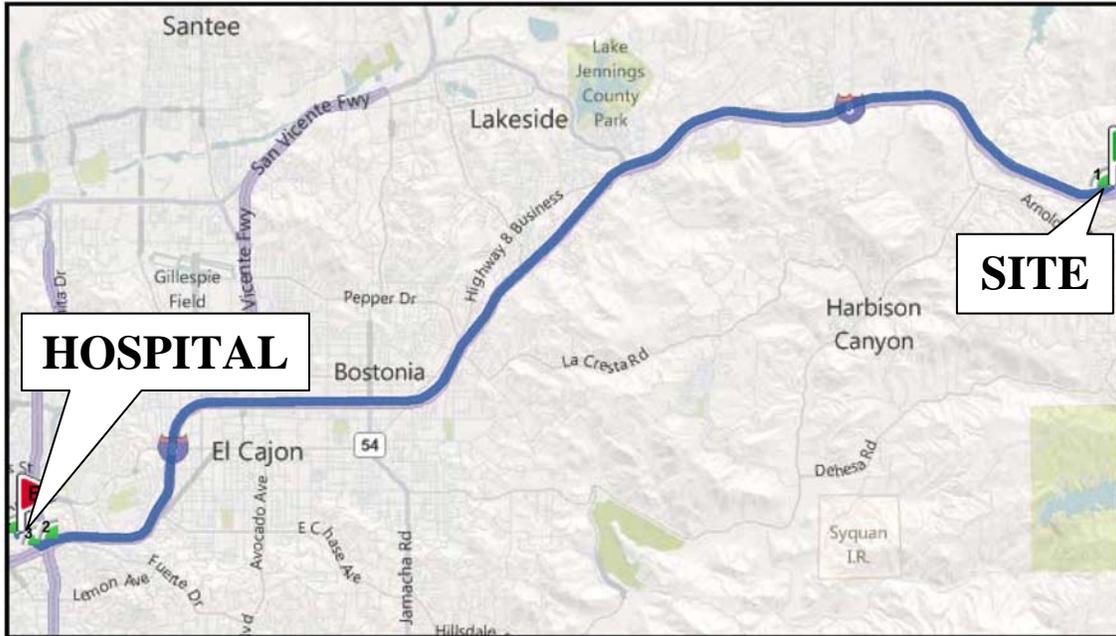
- **Once the emergency situation has stabilized, follow the “Instructions for Incident Reporting” included in this HASP.**

If NON-Life Threatening

Manager/Supervisor calls the Sunrise Base, 619-717-8118, or Bruce Taylor at 858-740-7812 to discuss appropriate medical attention (even if he/she thinks medical attention is not required). If professional care is needed, seek medical attention at the URGENT CARE facility shown on **FIGURE 1B**.

- **Present the medical care provider with the TEAR-OUT FORMS (“Instructions to Medical Provider” and “Physical Status for Return to Work”) included in this HASP.**
- **Follow the “Instructions for Incident Reporting” included in this HASP within one hour.**

**FIGURE 1A
ROUTE TO HOSPITAL**



16.6 miles, approximately 15 minutes

SHARP GROSSMONT HOSPITAL

(619) 740-6000

5555 Grossmont Center Drive

La Mesa, CA 91941

Written Directions to Hospital from Site:

- | | |
|--|---------|
| 1. Depart ramp for I-8 West | 16.0 mi |
| 2. Take ramp right for Grossmont Center Dr toward La Mesa Blvd | 0.2 mi |
| 3. Bear right onto Grossmont Center Dr | 0.3 mi |
| 4. Arrive at 5555 Grossmont Center Dr, La Mesa, CA
<i>The last intersection is Healthcare Dr</i> | |

**FIGURE 1B
ROUTE TO URGENT CARE FACILITY**



10.3 miles, approximately 10 minutes

URGENT CARE OF EAST COUNTY

(619) 442-9896

1625 Main Street, Suite 100

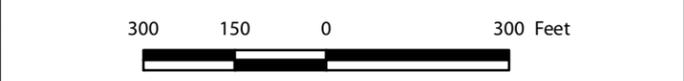
El Cajon, California

Written Directions to Urgent Care Facility from Site:

- | | |
|--|----------|
| 1. Depart Tavern Rd toward Victoria Park Terrace | 0.3 mi |
| 2. Take ramp left for I-8 West toward San Diego
<i>CHEVRON on the corner</i> | 9.4 mi |
| 3. At exit 20B , take ramp right and follow signs for Greenfield Dr | 0.3 mi |
| 4. Turn right onto Greenfield Dr | < 0.1 mi |
| 5. Turn left onto E Main St
<i>EXXON on the corner</i> | 0.3 mi |
| 6. Arrive at 1625 E Main St Ste 100, El Cajon, CA
<i>The last intersection is Greenfield Dr
If you reach Broadway, you've gone too far</i> | |



Legend	
	Environmentally Superior Southern Route
	Zone 1 Stations 172+00 through 169+00
	Zone 2 Stations 158+00 through 158+50
	Zone 3 Stations 130+00 through 127+00



Potentially Impacted Zone Detail		
Health and Safety Plan Sunrise Powerlink Alpine, California		
 Geosyntec consultants		Figure
San Diego	November 2010	2

EMERGENCY RESPONSE PROCEDURES

- The Site Health and Safety Officer (SHSO), or designated alternate, should be immediately notified via the on-site communication system. The SHSO assumes control of the emergency response.
- If applicable, the SHSO must immediately notify off-site emergency responders (i.e., fire department, hospital, police department, etc.) and must inform the response team of the nature and location of the emergency on site.
- If applicable, the SHSO calls for evacuation of the site. Site workers should move to their respective refuge stations using the evacuation routes provided on the Site Map (Figure 2).
- For small fires, flames should be extinguished using the fire extinguisher. Large fires should be handled by the local fire department. All fires must be reported to Sunrise Base, 619-717-8118, regardless of the size.
- If a worker is injured, the procedures presented in “Instructions for Injury Response”, located in the front of this HASP, must be implemented immediately.
- After an incident has stabilized, the procedures presented in “Instructions for Incident Reporting”, located in the front of this HASP, must be followed.

EMERGENCY RESPONSE CONTACT INFORMATION

<i>Contact</i>	<i>Telephone Numbers</i>	
	<i>Office</i>	<i>Alternate (Type)</i>
Alpine Fire Protection District	(619) 445-2635-	911
Sheriff's Department	(619) 659-2600	911
Hospital – Sharp Grossmont Hospital	(619) 740-6000	911
Sunrise Base	(619) 717-8118	(619) 717-8118
Sunrise Powerlink Fire Marshal – Acree Shreve (SDG&E)	(858) 503-5122	(858) 401-3327
Safety Compliance Manager – Tim Knowd (SDG&E)	(858) 637-7930	(619) 921-7384
Site Health and Safety Officer -- Bruce Taylor (SDG&E)	(858) 654-1201	(858) 740-7812
Environmental Link Lead, Ken Katsuda (Burns & McDonnell)	(805) 405-1813	(805) 405-1813
Utility Emergencies	811	-
Project Manager - Jose Lopez (SDG&E)	(858) 636-5583	(619) 571-6350
Project Manager - Serge Theroux (PAR)	(619) 655-3341	(619) 672-0819
Safety Coordinator – Michael Johnson (PAR)	(619) 672-4361	(619) 672-4361
Geosyntec Project Manager – Doug Baumwirt	858.716.2922	619.992.7743
Subcontractor Project Manager -		
Other -		

Instructions for Incident Reporting



Once an emergency situation has been stabilized, or within one hour of a non-emergency incident:

- Manager/Supervisor contacts Sunrise Base with additional details of the incident and for instruction on incident reporting.
 - Within 24 hours, the Manager/Supervisor completes a draft of the “Manager’s Report of Incident”, located in this HASP, and sends to Sunrise Base.
- Contractors are responsible for compliance with their internal safety procedures regarding Incident Reporting.

Contact Information

Sunrise Base Dispatch:

1010 Tavern Road, Alpine, California
(619) 717-8118

MANAGER'S REPORT OF INCIDENT

EMPLOYEE INFORMATION

Name: _____ Position: _____
Department #: _____ Employee #: _____ Phone #: _____
Supervisor Name: _____

FACTS OF INCIDENT

Injury Illness General Liability Near Miss Date and Time of Incident: _____

Date and Time Accident Reported: _____ To Whom: _____

Where did the incident occur (location name and street address)? _____

City: _____ State/Province _____ Zip/Postal Code: _____

County _____ Country: _____

What was the employee doing when the incident occurred? Name the tools, equipment or material the employee was handling and what he was doing with them. _____

Explain how the incident occurred. List events leading up to incident, what happened, how it happened and name objects and how they were involved (use a separate sheet if necessary). _____

NATURE OF INCIDENT

Describe incident and indicate body part affected if injury (e.g. cut on middle left finger). _____

Name object or substance that injured the employee. _____

Has any prior, related injury to affected area of body occurred Yes No

MEDICAL ATTENTION GIVEN (check all that apply)

First Aid given by _____ Date/Time _____ Phone _____

Doctor's Name _____ Date/Time _____ Phone _____

Address _____

Hospital Name _____ Date/Time _____ Phone _____

Address _____

Released Admitted Length of Stay: _____

Did the employee go to an Emergency Room? Yes No

EMPLOYEE'S DESCRIPTION OF THE INCIDENT (IN OWN WORDS)

Describe incident and indicate body part affected (e.g. cut on middle left finger) and what you were doing when the incident occurred (be specific) _____

Explain how the incident occurred. List events leading up to incident, what happened, how it happened and name objects and how they were involved (use a separate sheet if necessary). _____

Employee's Signature _____ **Date** _____

ADDITIONAL INFORMATION (TO BE COMPLETED BY THE MANAGER)

Witnesses

Name: _____ Phone: _____

Name: _____ Phone: _____

What do you believe could be done to help prevent incidents of this type (be specific)? _____

Any additional Comments _____

Manager's Signature _____ **Date** _____ **Phone #:** _____

HR/EHS

OSHA Recordable?: Yes No Pending WC? Yes No

Days away from work: _____ Days of restricted work activity: _____ Date returned to work _____

HR Manager's Signature _____ **Date** _____

Comments: _____

EHS Manager's Signature _____ **Date** _____

Comments: _____

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- Figure 1B: Route to an Urgent Care Facility (inside cover)
- Figure 2: Site Map

Objective

- Emergency Response Procedures
- Emergency Response Contact Information
- Instructions for Incident Reporting
- Manager's Report of Incident Form (Tear-Out Form)

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- Table 1: Key Personnel and Health & Safety Responsibilities
- Table 2: General Safe Work Practices

- Appendix A: HASP Amendments
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- Appendix D: Constituents of Concern (COCs) and COC Fact Sheets
- Appendix E: Air Monitoring Equipment, Frequency of Readings, and Action Guidelines per Task
- Appendix F: Personal Protective Equipment per Task
- Appendix G: Material Safety Data Sheets

1. SIGNATURES

1.1 Preparers and Reviewers

This HASP, which must be maintained on site when field work is being performed, addresses the health and safety hazards of each phase of site operation, including the procedures and equipment required for worker protection. Only the Site Health and Safety Officer (SHSO) can change or amend this document, in agreement with the Safety Compliance Manager, and Project Manager. The SHSO must initial any change made to the HASP at the relevant section. Major amendments (e.g., changes in personal protective equipment, addition of tasks, etc.) must be documented in Section 3 and in Appendix A.

Prepared by: _____
SHSO Date

Approved by: _____
Project Manager Date

This HASP has been given to the following subcontractor(s) in accordance with the Occupational Safety and Health Administration (OSHA) HAZWOPER Standard, per Chapter 29 of Code of Federal Regulations (CFR), Subsection 1910.120.

Subcontractor: _____ Representative: _____ Date: _____

Subcontractor: _____ Representative: _____ Date: _____

Subcontractor: _____ Representative: _____ Date: _____

1.2 Site Workers

After discovery of contamination and before beginning work in Zones 1, 2 or 3, a pre-entry briefing conducted by the SHSO must be held prior to initiating the field work of this project. All sections of this HASP must be reviewed during this briefing. Any worker not in attendance at the initial meeting must be trained by the SHSO on the information covered in the pre-entry briefing. Tailgate meetings must be held at the beginning of each day by the SHSO to discuss important health and safety issues concerning tasks to be performed during that shift. Topics discussed in the tailgate meetings must be documented in a daily field log.

2. HASP AMENDMENTS

Over the course of this project, it is possible that the project-specific details and working conditions will change. This HASP shall be reviewed and amended as necessary to effectively describe the changing working conditions and to mitigate the potential health and safety issues that may arise during the project. Amendments to the HASP should be briefly described in the following spaces provided. The full text of the amendments should be provided in Appendix A.

AMENDMENT 1:

Date: _____ Project Manager: _____ EHSC: _____

Brief description of amendment:

AMENDMENT 2:

Date: _____ Project Manager: _____ EHSC: _____

Brief description of amendment:

AMENDMENT 3:

Date: _____ Project Manager: _____ EHSC: _____

Brief description of amendment:

3. SITE/TASK DESCRIPTION

The following is a brief description of the site, including information as to the location, approximate size, previous usage, and current usage. A description of the tasks to be performed is also presented.

- Site Location: Alpine Boulevard (approx. mile post 92.9 to 99.0)
- Approximate Size of Site: 6.2 miles long by 100 feet wide
- Previous Site Usage: Area is currently a paved road
- Current Site Usage: Boulevard – traffic thoroughfare
- Description of Surrounding Property/Population:

Alpine Boulevard traverses through areas developed for residential, commercial, and light industrial use.

- Summary of previous site investigations (if available/applicable):

A Phase I environmental site assessment (ESA) identified the potential for petroleum-impacted soil in 3 zones along the underground portion of the alignment as reported in the Soil Management Plan for the Sunrise Powerlink Project, dated June 2010.

- Task Descriptions:

Task 1: Trenching and Excavation

Trenching/excavation will be performed along Alpine Boulevard to facilitate installation of twin 230-kilovolt (kV) underground electrical transmission cables. Site workers may encounter petroleum-hydrocarbon impacted soil and/or groundwater as part of proposed construction activities. This task will be considered “in progress” while trenching within the 3 identified zones in the SMP, or for other areas suspected to be impacted.

Task 2: Soil sample collection

If impacted soil is encountered, soil grab samples may be collected in accordance with the Soil Management Plan.

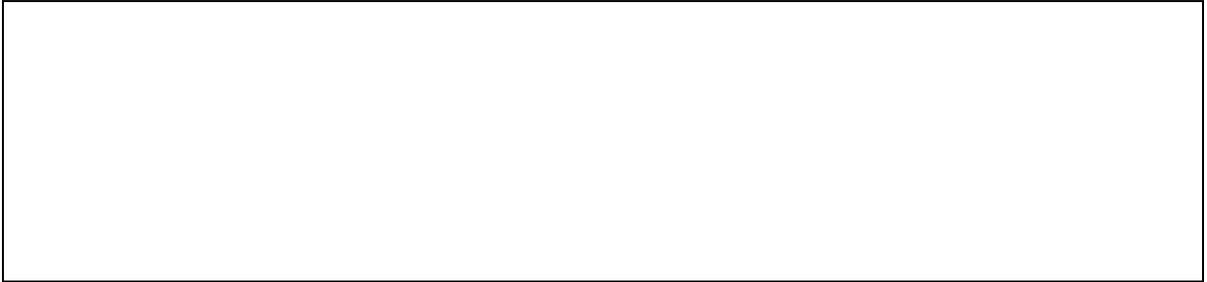
Task 3:

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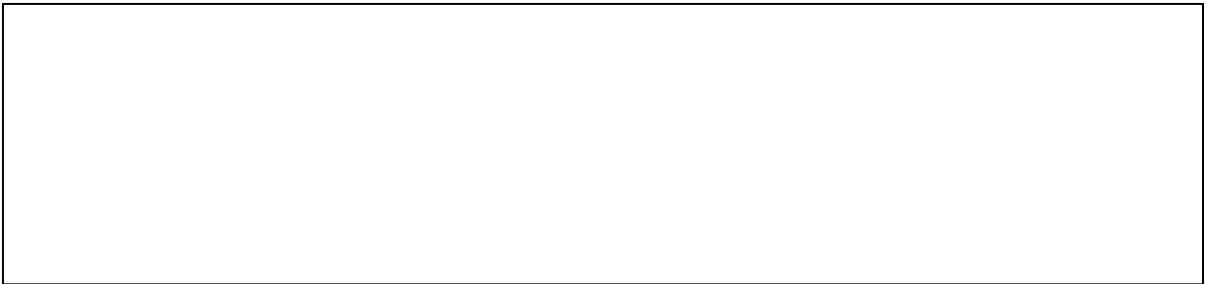
Task 4:

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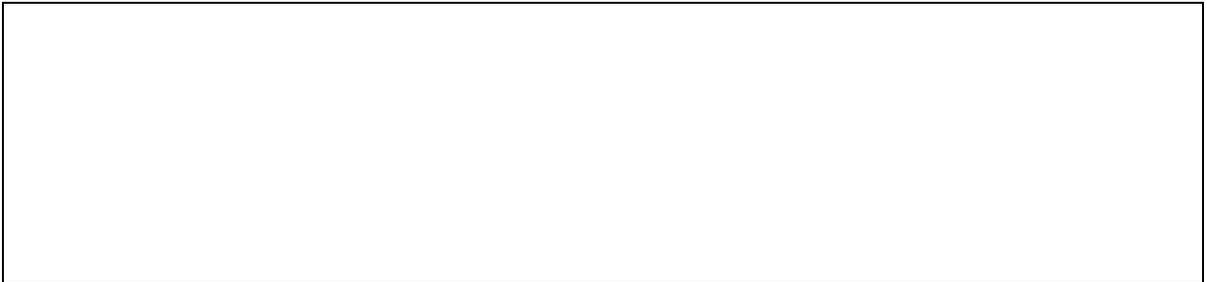
Task 5:

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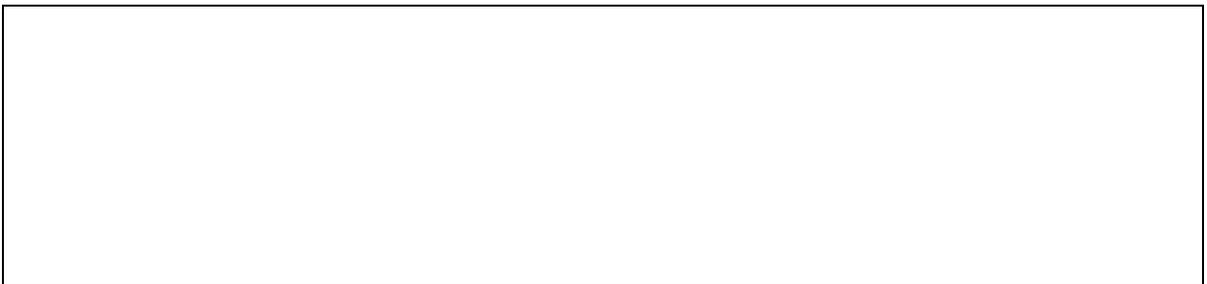
Task 6:

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Task 7:

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Task 8:

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4. KEY PERSONNEL AND HEALTH AND SAFETY RESPONSIBILITIES

Table 1 lists project personnel and their responsibilities in regard to health and safety concerns on this project.

5. WORKER TRAINING

A hazardous material and waste specialist with appropriate certifications for Hazardous Waste Operations and Emergency Response (HAZWOPER), CPR, and First Aid, will be assigned. Certificates documenting training shall be available for review. Pre-entry briefings and daily tailgate meetings shall also be conducted to facilitate site-specific training.

6. MAPS AND SITE CONTROL

6.1 Routes to Hospital and Urgent Care Facility

A hospital and an urgent care facility near the site have been identified. Figure 1A presents the route to the hospital, for emergency care. Figure 1B presents the route to an urgent care facility, for non-emergency care. Both figures also include the facility name, phone number, and written directions from the site. The figures are included at the front of this HASP.

6.2 Site Map

A site map is presented on Figure 2, located inside the cover of this HASP. The site map is intended to show the location of the work zone(s), to provide on-site orientation, and to delineate evacuation routes. Changes may be made to the site map by the SHSO based on changing site conditions. The site map should be accessible in the work area.

6.3 Buddy System

Upon discovery of contamination, the buddy system will be required for all tasks. The buddy system includes maintaining regular contact with onsite personnel, clients, and/or contractors to periodically check on the condition of site workers. In situations when only one employee is performing field work, on-site personnel must have appropriate communication devices on his/her persons at all times and shall maintain contact with off-site personnel. The field worker must communicate with off-site personnel, at a minimum, of three times daily: (1) upon arriving at the site; (2) midway through the work day; and (3) upon departing from site.

6.4 Controlled Work Zones

APPLIES TO TASK: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ Not Applicable

At the discretion of the SHSO and upon discovery of contamination, controlled work zones may need to be established. Three controlled work zones, including an Exclusion Zone, a Contaminant Reduction Zone (CRZ), and a Support Zone, are required for the task(s) indicated above. The Exclusion Zone is defined as the area on site where contamination is suspected and tasks are to be performed. The CRZ is defined as the area where equipment and workers are to be decontaminated as they leave the Exclusion Zone. The Support Zone is defined as the command area and may serve as a staging and storage area for supplies. The location and extent of the work zones may be modified as necessary as site investigation information becomes available. For sites that do not require the three controlled work zones, the area(s) where work is to be performed shall be called the Work Zone.

The boundaries of the Exclusion Zone, CRZ, and Support Zone or the Work Zone shall be marked using the following methods:

- | | |
|---------------------------------------|---|
| <input type="checkbox"/> Warning tape | <input checked="" type="checkbox"/> Traffic cones |
| <input type="checkbox"/> Signs | <input type="checkbox"/> Fence |
| <input type="checkbox"/> Other: _____ | |

6.5 Site Access

Access to the site must be controlled using the following method:

- | | |
|--|--|
| <input type="checkbox"/> Sign in/Sign out log | <input type="checkbox"/> Guard |
| <input type="checkbox"/> Identification badges | <input checked="" type="checkbox"/> Check in with SHSO |
| <input type="checkbox"/> Other: _____ | |

6.6 Visitors

Visitors to the site may need to be continually escorted for safety purposes. Employees must not be allowed into the CRZ or Exclusion Zone or the Work Zone until they have received the proper personal protective equipment (PPE) and they have read, understand, and meet the requirements outlined in this HASP.

6.7 Safe Work Practices

General Safe Work Practices that must be implemented during work activities at this site are listed in Table 2.

6.8 Inspections

For projects with field components lasting longer than one week, the SHSO must conduct periodic health and safety inspections. The inspections must be documented using the Health & Safety Inspection Checklist, presented in Appendix B. The Health & Safety Inspection Checklist records should be kept on file at the project site.

The requirement for periodic inspections is:

- Not Applicable
- Applicable, and the frequency shall be:
 - Weekly
 - Bi-Weekly
 - Monthly

7. **HAZARD ANALYSIS AND MITIGATORS**

Site specific hazards have been identified through a hazard analysis. Hazard analysis included a review of chemical, physical, and biological hazards. The analysis also identified health and safety hazard mitigators needed to protect workers, which are presented in Appendix C.

7.1 Chemical Hazards

Potential exposure pathways to chemical health hazard agents include inhalation, dermal exposure, and/or ingestion. To effectively manage risk to exposure, constituents of concern (COCs) have been identified. Potential exposure to these COCs will be mitigated through engineering, administrative, and/or PPE controls. The COCs are documented and/or suspected materials present based on previous operations/activities. The identified COCs for this project are listed in Appendix D with appropriate hazard information, including signs of exposure. Hazard Mitigators, which include control measures and methods to minimize exposure, are presented in Appendix C. Also, airborne levels of COCs may be estimated or measured to evaluate levels of PPE that will be required for individual tasks. The type(s) of air monitoring to be performed are discussed in Section 9.

7.2 Physical Hazards

Physical hazards due to the tasks to be performed (e.g., electrocution due to excavation, etc.) and due to the site setting and condition (e.g., active traffic thoroughfare, etc.) were analyzed. Hazard mitigators for each physical hazard identified are presented in Appendix C. These hazard mitigators must be implemented for each task in which they are applicable, as summarized in the table in Appendix C.

7.3 Biological Hazards

Biological hazards (e.g., allergic reactions to poisonous plants or insects indigenous to the area, etc.) associated with tasks to be performed were analyzed. Hazard mitigators for each biological hazard identified are presented in Appendix C. These hazard mitigators must be implemented for each task in which they are applicable, as summarized in the table in Appendix C.

8. **AIR MONITORING**

APPLIES TO TASK: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ Not Applicable

Air monitoring will be performed to evaluate airborne exposure levels associated with the COCs on site within the breathing zone of site workers. Hazardous conditions may include concentrations that may cause acute or chronic illness, potential oxygen deficient environments, or potential explosive environments. Air monitoring may also be performed to evaluate the adequacy of engineering, administrative, and/or PPE controls. Air monitoring may be “real-time” (e.g., the instrument provides immediate results at the project), using multi-gas meters, photoionization detectors (PIDs), or colorimetric tubes. “Non-real-time” monitoring may also be performed by collecting samples and forwarding to a laboratory for analysis and quantification.

The type(s) of air monitoring equipment required to evaluate COCs is outlined in Appendix E. Monitoring equipment must be calibrated based on the manufacturer’s requirements. Calibration results and air monitoring measurements must be documented. Based on the results noted and site activities or scope of work changes, the frequency of air monitoring may be adjusted on site by the SHSO with the consent of the Project Manager and communication with the EHSC.

9. PERSONAL PROTECTIVE EQUIPMENT

The levels of PPE required for each task are presented in Appendix F. Required equipment and types of protective clothing materials, as well as an indication of the initial level of protection to be utilized, are listed. The level of protection may be upgraded or downgraded by the SHSO according to mitigation measures required in Appendix C or according to action guidelines provided in Appendix E. The PPE levels that are implemented must be documented in a daily field log.

If respirators are worn, workers must abide by the company's Respiratory Protection Program in accordance with 29 CFR §1910.134. Table 2 provides a record of the last fit test for each site worker that may be required to wear a respirator. Fit tests are valid for a period of one year. Persons with facial hair that may interfere with the respirator seal may not wear respirators.

10. DECONTAMINATION

The SHSO and Project Manager will determine the type and level of decontamination procedures for both personnel and equipment based on evaluation of specific work activities in the controlled work zones. In an emergency, the primary concern is to prevent the loss of life or serious injury to personnel. Medical treatment will take precedence over decontamination in the event of a life threatening and/or serious injury/illness. Personnel will perform decontamination in designated and identified areas upon leaving "hot zones" where the potential exists for exposure to hazardous chemical, biological, or environmental conditions.

11. EMERGENCY PREPAREDNESS AND RESPONSE

A table presenting a list of contacts and telephone numbers for the applicable local off-site emergency responders is provided inside the front cover of this HASP (after figures). If the nature of the site work and COCs requires that off-site responders be notified before work begins on this project, the date that the pre-notification was made is presented in the table.

The following emergency response equipment is required for this project:

- First Aid Kit
- Fire Extinguisher (Type ABC)
- Eyewash bottle
- Other: _____

In the event of an injury to an employee, the Instructions for Injury Response, located in the front of this HASP, must be implemented immediately. 'Tear-out' forms are located after the Instructions for Injury Response. If professional medical attention is required, these forms must be provided to the medical provider at the time the medical attention is administered. Injury reporting is required per the procedures presented on the Instructions for Incident Reporting, also located in the front of this HASP.

In the event that an emergency develops, the procedures delineated in the Emergency Response Procedures, located in the front of this HASP, are to be followed immediately. (Note that an emergency does not necessarily include an injury.) After the emergency is resolved, post-incident reporting is required per the procedures presented on the Instructions for Incident Reporting, also located in the front of this HASP.

12. CONFINED SPACE ENTRY

APPLICABLE NOT APPLICABLE

The task(s) for this project involve confined-space entry. Workers must abide by the company's Confined Space Entry Program [1910.120(b)(4)(ii)(I)].

13. SPILL CONTAINMENT

APPLICABLE NOT APPLICABLE

The task(s) for this project involve handling of drums and/or containers that contain stored chemicals and/or wastes associated with sampling, excavation, transportation, etc. Workers must implement the hazard mitigating procedures for drum/container handling presented in Appendix C.

14. CHEMICAL HAZARD COMMUNICATION LABELING

APPLICABLE NOT APPLICABLE

The following procedures must be followed for chemicals brought onto the site (i.e., decontamination solution, sampling preservatives, etc.) while performing the tasks of this project:

- Labels on primary chemical containers must not be defaced.
- Chemical containers must be stored in appropriate storage containers.

- Secondary containers and storage cabinets must be correctly and clearly labeled using the Hazardous Materials Identification System (HMIS).
- Chemicals incompatible with each other must not be stored together.
- Workers must receive training on the chemical hazards.
- Material Safety Data Sheets (MSDSs) for the chemical must be added to Appendix G.

Table 1

Key Personnel and Health & Safety Responsibilities

<p><i>Project Manager (PM)</i> Jose Lopez</p>	<p><i>Site Health & Safety Officer (SHSO)</i> Bruce Taylor</p>	<p><i>Project Personnel</i></p>
<ul style="list-style-type: none"> • Verify that elements of this HASP are implemented. Monitor the field logbooks for health and safety work practices employed. • Coordinate with SHSO so that emergency response procedures are implemented. • Verify that corrective actions are implemented. • Verify and document that personnel have reviewed this plan and are aware of its provisions and potential hazards associated with site operations, and that they are instructed in safe work practices and familiar with emergency response procedures. • Provide for appropriate monitoring, personal protective equipment, and decontamination materials. 	<ul style="list-style-type: none"> • Prepare and implement project HASP and amendments, if any, and report to the Project Manager for action if any deviations from the anticipated conditions exist and authorize the cessation of work if necessary. • Verify that site personnel meet the training and medical requirements. • Conduct a pre-entry briefing. Verify that all monitoring equipment and personal protective equipment is operating correctly according to manufacturer's instructions and such equipment is utilized by on-site personnel. Calibrate or verify calibration of all monitoring equipment and record results. • Verify that decontamination procedures are being implemented. • Implement site emergency response and follow-up procedures. • Notify the EHSC in the event an emergency occurs. • 	<ul style="list-style-type: none"> • Provide verification of required health and safety training and medical surveillance prior to arriving at the site. • Notify the SHSO of any special medical conditions (e.g., allergies). • Attend pre-entry briefings and daily tailgate safety meetings. • Immediately report any accidents and/or unsafe conditions to the SHSO. • Be familiar with and abide by the HASP. • Be ultimately responsible for his or her own safety.

Table 2

General Safe Work Practices

- Minimize contact with impacted materials. Do not place equipment on the ground. Do not sit or kneel on potentially contaminated surfaces.
- Smoking, eating, or drinking after entering the work zone and before decontamination is not allowed. Employees who are suspected of being under the influence of illegal drugs or alcohol will be removed from the site. Workers taking prescribed medication that may cause drowsiness shall not operate heavy equipment and are prohibited from performing tasks where Level C or B personal protective equipment is required.
- Practice good housekeeping. Keep everything orderly and out of potentially harmful situations.
- Use of contact lenses may not be allowed under certain hazardous working conditions.
- The following conditions must be observed when operating a motor vehicle.
 - Wearing of seat belts is mandatory
 - The use of headlights is mandatory during periods of rain, fog, or other adverse weather conditions
 - A backup warning system or use of vehicle horn is mandatory when the vehicle is engaged in a backward motion
 - All posted traffic signs and directions from flagmen must be observed
 - Equipment and/or samples transported in vehicles must be secured from movement
 - The use of company vehicles by non-company personnel is prohibited
- In an unknown situation, always assume the worst reasonable conditions
- Be observant of your immediate surroundings and the surroundings of others. It is a team effort to notice and warn of dangerous situations. Withdrawal from a hazardous situation to reassess procedures is the preferred course of action.
- Conflicting situations may arise concerning safety requirements and working conditions. These must be addressed and resolved rapidly by the SHSO and PM to relieve any motivations or pressures to circumvent established safety policies.
- Unauthorized breaches of specified safety protocol must not be allowed. Workers unwilling or unable to comply with the established procedures must be discharged.

Appendix B

Health & Safety Inspection Checklist

Project: _____ Date: _____	
Inspected by: _____	
<i>Category</i>	<i>Observations/Corrective Actions (N/A, if Not Applicable)</i>
Pre-entry briefing records are current	
Tailgate meeting records are current	
Training/medical surveillance/respiratory protection records are current	
Site map is posted	
Buddy system is implemented	
Work zones are identified	
Site access is controlled	
Visitors are being escorted	
On-site/off-site communications are in working order	
Safe work practices are being implemented	
Any additional hazards incurred?	
Air monitoring equipment is in working condition	
Air monitoring records are being recorded in field logbook	
Air monitoring calibration records are being recorded in field logbook	
PPE storage area is neat and organized	
Standard operating procedures are being implemented	
Housekeeping at decontamination zone is appropriate	
Decontamination procedures are being implemented	
Emergency response equipment is in working condition	
Route to hospital is posted	
Confined space entry program is being implemented	
Spill containment equipment is available	
Chemical inventory is up to date	
Material safety data sheets are available	
Primary and secondary containers are properly labeled	
Housekeeping at the chemical storage area is appropriate	

Appendix C

Hazard Analysis and Hazard Mitigators

TASKS	
① Trenching in Alpine Boulevard	⑤
② Soil sample collection	⑥
③	⑦
④	⑧

TASK #	①	②	③	④	⑤	⑥	⑦	⑧
I. Chemical Hazards								
Fire	X	X						
Permanganate Handling								
Reactivity								
Skin absorption	X	X						
II. Physical Hazards								
Bioaugmentation Culture Handling								
Boating								
Chainsaw								
Cold Stress	X	X						
Compressed Gas Cylinder	X	X						
Downhole Logging								
Drilling (including Indoor)	X	X						
Drum and Container Handling								
Electrocution	X	X						
Excavation/Trenching	X	X						
Eye Injury	X	X						
Fall Protection	X	X						
Flash Flood								
Hand/Foot Injury	X	X						
Heat Stress	X	X						
Heavy Equipment	X	X						
Helicopter								
Knives / Blades								

TASK #	①	②	③	④	⑤	⑥	⑦	⑧
Lifting Heavy Loads	X	X						
Lockout/Tagout								
Loud Noise	X	X						
Nuclear Gauge Radiation Exposure								
Portable Power/Hand Tool								
Slips, Trips, and Falls	X	X						
Thoroughfares	X	X						
Truck Crane	X	X						
Urban Environments								
Utility Protection	X	X						
Welding and Cutting	X	X						
Other:								
III. Biological Hazards								
Allergic Reaction to Poisonous Plants	X	X						
Alligators								
Dogs	X	X						
Stinging Insects / Vermin / Snakes	X	X						
Medical Waste								
Mountain Lions	X	X						
Other:								

An X in a box indicates that the listed hazard is applicable to the respective task. The appropriate Hazard Mitigators are presented in this Appendix.

FIRE

- Know fire prevention procedures, fire-fighting techniques and essential precautions to prevent injury.
- Do not stop to get anything out of a building or area if evacuation is required. **JUST GET OUT** - and assemble in the predetermined evacuation assembly points.
- There are 3 elements to starting a fire: a fuel source, an oxygen source and a point of ignition.
- Know how and when to use different types of fire extinguishers.
- Keep all fire extinguishers in workable condition and accessible at all times. Access to or visibility of extinguishers shall not be obstructed.
- Control static electricity (e.g., ground equipment)
- Remove only the minimum required supply of paints, solvents, or other flammables from storage. At no time shall the quantity removed exceed one day's working supply.
- Do not allow combustible products of rubbish, waste or other residues to accumulate. Oil soaked rags and material subject to spontaneous combustion shall only be stored in non-combustible containers with self-closing lids.
- Do not store gasoline, flammable solvents, and liquids inside a building unless the structure has been approved for flammable storage containers. Only OSHA-approved storage cabinets shall be used for all flammable liquids, paints or solvents.
- Flammable liquids shall be stored in locations that will not interfere with evacuation of the area in case of a fire.
- Do not permit smoking, striking of matches, or other sources of ignition outside of designated "SMOKING" areas.
- Discard cigarette butts, matches or other similar materials in non-combustible containers.

SKIN ABSORPTION

- Be aware of chemicals of concern that can directly injure (corrode, burn, dehydrate) the skin or that can be absorbed into the bloodstream and subsequently transported to other organs from dust, liquid or vapor sources.
- Know that skin absorption is enhanced by abrasions, cuts, heat, and moisture.
- Do not wear contact lenses in contaminated atmospheres (since they may trap chemicals against the eye surface). The eye is particularly vulnerable because airborne chemicals can dissolve in its moist surface and be carried to the rest of the body through the bloodstream (capillaries are very close to the surface of the eye).
- Keep hands away from face.
- Minimize contact with liquid and solid chemicals.
- Wear protective clothing (e.g., suits and gloves) as specified by the Site Specific Health and Safety Plan.

COLD STRESS

- Work in pairs to keep an eye on each other and watch for signs of cold stress.
- Wear layers of loose fitting clothing, including insulated coveralls, head covering, gloves and boots.
- Minimize wind chill effects by wearing a wind resistant outer shell.
- Minimize lengthy periods of outdoor activity. This may require additional shifts and taking frequent breaks to warm up.
- Provide warm shelter.
- Remain hydrated. There is a tendency not to drink as many fluids when temperature is cold.
- Be aware of the symptoms of cold stress and appropriate first aid measures. Because of the considerable danger to personnel, outdoor work should be suspended if the ambient temperature drops below 0°F or if the wind chill factor drops below -29°F.

Signs and symptoms:

Mild hypothermia

Shivering, lack of coordination, stumbling, fumbling hands, slurred speech, memory loss, pale and cold skin.

Moderate hypothermia

Shivering stops, unable to walk or stand, confused and irrational.

Severe hypothermia

Severe muscle stiffness, very sleepy or unconscious, ice cold skin.

Treatment:

Mild hypothermia

Move to warm area, stay active, remove wet clothes and replace with dry clothes or blankets, cover the head, drink warm (not hot) sugary drink.

Moderate hypothermia

Call Sunrise Base, (619) 717-8118 for an ambulance, cover all extremities completely, Place very warm objects, such as hot packs or water bottles on the victim's head, neck, chest and groin and follow treatments for mild hypothermia.

Severe hypothermia

Call Sunrise Base, (619) 717-8118, for an ambulance, treat the victim very gently, cover all extremities completely.

COMPRESSED GAS CYLINDER

- Keep cylinder valve caps screwed on at all times when regulators and gauges are not attached to the cylinder and when the cylinder is being moved.
- Do not use force to remove valve cap if stuck.
- Protect cylinders from cuts and abrasions.
- Use extreme care not to drop cylinders.
- Secure cylinders in an upright position using chains or other approved restraints.
- Do not use cylinders for rollers or support.
- Do not tamper with cylinder valves or safety devices.
- Do not lift cylinders using the protective valve caps.
- Do not substitute oxygen for compressed air.
- Store all oxygen cylinders at least 20 feet from all fuel gas cylinders and gasoline or diesel storage tanks.
- Keep cylinders away from exposure to open flame.
- Do not use oil or grease on oxygen cylinders or regulator connections to avoid an explosion.
- All cylinders must be labeled and indicate when they have been emptied.
- Check all valves and fittings on a cylinder for leaks with each use. If leakage is found, place a tag on the cylinder indicting the defect, and report it to the SHSO.
- Leak test all connections using soap solution where possible.
- Be certain that the second stage of the regulator is closed, after attaching the regulator to the cylinder, but before opening the cylinder valve.
- Stand to one side of the regulator gauge while you slowly open the cylinder valve 1/4 of a turn.
- Keep wrench on the valve stem of an acetylene cylinder when in use.
- Close the cylinder valve and bleed the pressure off hoses on cylinders when not in use.
- Use a cylinder cart to transport cylinders distances greater than 2 feet.

DRILLING (Including Indoor)

- All members of the drilling crews shall be trained in the standard operating safety features and procedures to be utilized during operation, inspection, and maintenance of the equipment.
- Wear hard hats, steel toed boots, hearing protection and safety glasses at all times when performing drilling operations.
- Conduct a survey, prior to bringing drilling equipment to the job site, to identify overhead electrical hazards, potential subsurface hazards, and terrain hazard. Once on site, before drilling equipment is moved, the travel route shall again be visually surveyed for overhead and terrain hazards. Document possible hazards and communicate them to the drilling crew.
- Use only drilling equipment equipped with two easily-accessible emergency shutdown devices, one for the operator and one for the helper. Shutdown devices should be tested at the beginning of each day.
- Do not transport drilling equipment with the mast in the upward position.
- Extend outriggers per the manufacturer's specifications.
- Monitor weather conditions. Operations shall cease during electrical storms or when electrical storms are imminent.
- Wearing of loose clothing (e.g., open shirts, hooded sweatshirts, etc) is not permitted.
- When appropriate use auger guides on hard surfaces.
- Verbally alert employees and visually ensure employees are clear from dangerous parts of equipment prior to starting or engaging equipment.
- Channel the discharge of drilling fluids away from the work area to prevent the ponding of water.
- Use hoists only for their designed intent. Hoists shall not be loaded beyond their rated capacity. Steps shall be taken to prevent two-blocking of hoists (the condition when the lower load block or hook assembly comes in contact with the upper load block, or when the load block comes in contact with the boom tip). Follow the equipment manufacturer's procedures if ropes become caught in, or objects are pulled into a cathead.
- Do not run or rotate drill rods through rod slipping devices. No more than 5 feet of drill rod column shall be hoisted above the top of the drill mast. Drill rod tool joints shall not be made up, tightened, or loosened while the rod column is supported by a rod slipping device.
- Control dust using dust suppression techniques.
- Clean augers, drill casing, or drill rod only when the rotating mechanism is in neutral and the pipe is stationary is stopped.

- Cap and flag open boreholes; open excavations shall be barricaded.
- Keep all hand tools used during drilling operations clean and in good working condition.
- Check fire extinguishers and notify all onsite personnel to their whereabouts.
- Check cables for frays and hydraulic hoses for leaks daily.
- In situations where ambient water level may be above top of well screen, during well construction, ensure that well casing is vented to prevent air pressure build-up in blank casing above screen.

Indoor Drilling

- Conduct a survey, prior to bringing drilling equipment to the job site, to identify ceiling height, overhead hazards, potential subsurface hazards, terrain hazard, and building stability particularly during drilling activities. Identify sources of ventilation (including open doorways for cross ventilation and fans to assist in air flow). Once on site, before drilling equipment is moved, the travel route shall again be visually surveyed for overhead and terrain hazards and avenues of ventilation will be opened or turned on.
- Notify and/or evacuate all building occupants prior to start of drilling activities.
- All drilling rig exhaust will be redirected outdoors by tubing. The perimeter of the outdoor exhaust area shall be roped off a suitable distance to allow proper ventilation of exhaust.
- Monitor ambient oxygen percentage and carbon monoxide concentrations in the work zone, as well as entire indoor area, to prevent low oxygen or high carbon monoxide environments. Operations shall cease and the building will be evacuated if levels become dangerous.

ELECTROCUTION

- Install adequate warning signs and barriers (in plain sight) in all areas where hazardous electrical facilities exist.
- Use only heavy duty electrical cords that are not subjected to excessive bending, stretching, or kicking. All cords and wires shall be frequently inspected for signs of defects. Damaged or frayed electrical wires, cords, and plugs shall be immediately replaced by a qualified electrician or other properly trained personnel.
- Equip all portable extension cords with a non-conducting plug and/or another socket shell. All electrical cords shall be equipped with three-blade grounding type plugs.
- Do not permit overloading of electrical circuits at anytime. The replacement of fuses or circuit breakers with makeshift materials or over-capacity fuses is strictly prohibited.
- A minimum clearance of 20 feet (radius) will be maintained between heavy equipment (i.e., drill rig) and any overhead power lines, regardless of voltage.
- Before subsurface work, a utilities search for underground lines will occur and will be documented (if within 3 feet of marked underground utility, hand digging is required).
- Installation and maintenance of electrical facilities or equipment must only be performed by qualified and properly authorized personnel or electrical subcontractors. Apprentice personnel permitted to work on electrical equipment shall be under the supervision of a fully qualified electrician.
- Follow the company Lock-out/Tag-out procedures when applicable. Electrical equipment and lines shall always be considered “energized” until proven “de-energized”. Before beginning work, each electrical circuit shall be inspected, tested, and where possible, isolated from the power source. Extreme care shall be exercised as wires designed to operate at ground potential may become energized by faulty or inadequate connections.
- Do not wear rings, watches or metallic objects that could act as conductors when working with electrical circuits.
- Do not use metal ladders and un-insulated tools while working with electrical circuits and equipment.
- Protect electrical wires with suitable protective conduits or devices where they are exposed to possible damage.
- Connect grounding devices to a ground before contacting any conductor of a circuit. When grounding devices are removed, they shall be disconnected from the circuit before being disconnected from ground.
- The type of circuit shall determine the type of protective equipment required. Rubber gloves, sleeves, blankets, mats, and insulated platforms shall be used as required. Questions regarding PPE should be directed to the SHSO.

The task(s) for which these Hazard Mitigators apply are presented in the Appendix C Directory

- Inspect all insulated protective equipment continuously for defects or damages. Any defective equipment shall be replaced before using.
- Establish and enforce testing schedules for insulation qualities for protective equipment. All users shall verify that equipment has been satisfactorily tested prior to use.
- Electricians shall be familiar with the National Electrical Code; state and local electric codes; OSHA standards, including 29 CFR 1926, Subpart K; and applicable sections of the National Fire Protection Association Codes.
- When working on energized circuits of 440 volts or higher, at least one qualified electrician and one other employee shall be present.
- Use only NEC approved grounding equipment as a ground for electrical equipment. Metal frames on electricity-powered equipment, electrical facilities, and transmission equipment shall be connected to the grounding system. Alternative grounding systems complying with applicable electrical codes may be used for temporary portable equipment.

EXCAVATION/TRENCHING

Prior to Excavation

- Confirm that an OSHA competent person is available. An OSHA competent person is someone with enough training to identify soil types and other excavation hazards and authority to take prompt corrective actions.
- Check for the presence of underground and aboveground utilities before conducting any intrusive work. Support, protect or remove utility lines as appropriate.
- Implement a Confined Space Entry program if employees are to enter excavations or trenches of 4 feet deep or deeper (regardless of width).
- Remove or brace trees, boulders, etc., adjacent to the work area that could fall into the work area before intrusive begins.
- Underpin all nearby existing structures to ensure their stability before excavating below the level of the base of the footing of any foundation or retaining wall.

During Excavation

- Wear hard hats, safety boots and reflective vests.
- Use flagmen or warning devices for all mobile equipment using reverse and forward motion
- Adequately slope or shore all sides of excavations/trenches 5 feet or more in depth (depending on local regulations) before allowing anyone to enter them (see below).
- Store and retain all equipment/material and excavated soil/rock/waste (spoil(s)) at least 2 feet or more from the edge of the excavation/trench.
- Use diversion ditches or dikes to prevent water from entering an excavation, and to provide adequate drainage of the area adjacent to the excavation. Prevent water from accumulating in an excavation.
- Install substantial stop logs or barricades when mobile equipment is used or allowed adjacent to excavations.
- Provide a walkway or bridge with standard guardrails where employees or equipment are required or permitted to cross over excavations.
- Ladders used for ingress/egress should extend a minimum of 3' above ground surface, be secured, and be located so as to require no more than 25 feet of lateral travel for workers in the trench or excavation.
- Avoid standing on top of trench/excavation while personnel are below, in the trench.
- Examine all excavation work areas and faces for unsafe conditions at least at the beginning of each shift and especially after blasting, a rain, a freeze or a thaw. If unsafe conditions are found, all work in that immediate area shall cease until the necessary

The task(s) for which these Hazard Mitigators apply are presented in the Appendix C Directory

- If it is necessary to place or operate trucks, materials or other heavy objects on a level above and near an excavation, pile, shore, and/or brace sides of excavations to resist the extra pressure due to such superimposed loads.

Shoring an Excavation

- Place cross braces or trench jacks in a true horizontal position, space vertically and secure to prevent sliding, falling or kickouts.
- Use portable trench boxes or sliding trench shields, if needed, in place of a shoring system or sloping.
- Support systems shall be planned and designed by a qualified professional engineer when the excavation is in excess of 20 feet in depth, adjacent to structures or improvement, or subject to vibration or ground water.
- Removal and backfilling of trench supports must slowly progress together from the bottom of the trench. Jacks or braces shall be released slowly and in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.
- Stability of an excavation left open for a long period of time(i.e. more than a few days) should be evaluated by a professional engineer to assess if slopes, bracing measures, etc. need to be modified.
- Start backfilling trench before removing braces in case of Type C soils.
- Put up barricades – flagging tape, fencing to prevent falls into the excavation.
- Cover or secure trench/excavation if left open overnight.

Sloping an excavation

- Excavate to at least the OSHA minimum required angle ratio according to soil classification identified except for areas where solid rock allows for line drilling or pre-splitting.
- Flatten the angle of repose when an excavation has water conditions, silty materials, loose boulders, and areas where erosion, deep frost action and slide planes appear.

The task(s) for which these Hazard Mitigators apply are presented in the Appendix C Directory

Soil Classification	Soil Classification Description	OSHA Minimum Requirements For Side Slopes
Soil Type A	Most stable: clay, silty clay and hardpan (resists penetration)	.75:1 (for one foot vertical rise, the trench wall must be cut back ¾')
Soil Type B	Medium stability: silt, sandy loam, medium clay and unstable dry rock	1:1 (each step has an equal horizontal and vertical rise; only cohesive Type B soils may be benched)
Soil Type C	Least stable: gravel, loamy sand, soft clay, submerged soil or dense, heavy unstable rock	1.5:1 (trench wall must be cut back 1-1/2' for 1' vertical rise; type C soil is not benched)

EYE INJURY

- Wear appropriate eye protection according to the task at hand.

HAZARD	TYPE OF PROTECTION
Impact	Safety glasses with side shield or vented safety goggles
Heat (Sparks)	Vented safety goggles or safety glasses with a face shield
Chemical	Hooded vented safety goggles or full-face respirator (if mild chemicals then safety glasses with side shield is acceptable)
Light Radiation	Tinted/reflective safety glasses or tinted/reflective face shield
Dust	Hooded vented safety goggles

- Apply anti-fog product to lens not previously treated.
- Minimize the amount of vapor or particulate matter generated, if possible.
- Avoid touching the face and eyes.
- Flush eyes with water for at least 15 minutes if chemicals do get into the eyes. If condition persists, seek medical attention.
- If dust or foreign objects are in your eyes, do not rub your eyes.
- If an object becomes embedded in the eye, do not attempt to remove. Lightly bandage your eyes, or both eyes, if possible and immediately seek medical attention.
- Do not wear contact lenses if chemical or dust hazard is present (e.g. decontamination or preservation chemicals used during sampling).
- Provide on-site training to workers before tasks at hand.
- If visitors enter area, stop work until they are properly protected.

FALL PROTECTION

Each worksite and all activities shall be evaluated prior to the start of the job to identify the hazards of falling from any elevation. Site specific fall protection programs shall identify the areas/activities requiring fall protection, the manner in which fall protection will be accomplished, a listing of qualified individuals for fall protection and a roster of personnel authorized to utilize specific fall protection equipment. As part of this evaluation, all applicable requirements of 29 CFR 1926 Subpart M shall be addressed.

- All Geosyntec employees and contracted employees on walking/working surfaces 6 feet or more above the immediate lower level shall be protected from falling by a guardrail system, safety net system, or personal fall-arrest system 100% of the time. This includes working near edges of excavations and trenches and wells and caissons greater than 20” in diameter.
- All elevated work, regardless of the height, shall incorporate job planning to anticipate and mitigate the consequences of a fall. Job planning should include rescue after a fall.
- First consideration shall be given to the elimination of fall hazards. If a fall hazard cannot be practically eliminated, second consideration shall be implementing effective permanent or temporary means of fall prevention.
- Before using any equipment, pipelines, or trusses for elevated work, it must be determined by the project manager if they are suitable for climbing or walking. Not all pipelines, trusses, and hanger systems are designed to support individuals doing elevated work.
- Weather must be a safety consideration whenever outdoor elevated work is to be done. The weather hazard must be addressed prior to and during the work.
- When fall protection is required, a personal fall arrest system must be utilized that complies with 29 CFR 1926.502(d) (full body harness with a fall arrest system)
- Look where you walk to make certain your pathway is clear of hazards.
- Practice safe walking skills.
- Scaffolds/ladders: Both require pre-use inspection for integrity, with particular attention given to scaffold planking (secure and strong), levelness of erection, avoidance of power lines, and bolted pipe connections.

HAND/FOOT INJURY

- Wear protective gloves as required in the Health and Safety Plan. Gloves should be chosen to suit the work being performed (e.g., chemical resistant gloves will be worn when handling chemicals or sampling for suspected chemicals).
- Steel-toed/steel-shanked safety boots must be worn whenever working around heavy objects (or as required by the HASP). Insulated and/or waterproof boots may also be warranted depending on weather conditions. Boots should be inspected periodically for signs of wear (e.g., cracks in rubber or along soles) and replaced as required.
- Durable footwear which provides adequate ankle support should be worn when working in rugged terrain.
- Use proper lifting techniques to avoid dropping heavy loads on hands and feet (refer to lifting heavy loads hazard mitigator)
- Be aware of moving machinery and heavy equipment in the work area and tuck away any loose clothing.

HEAT STRESS

Prevention:

- Drink plenty of hydrating fluids, such as Gatorade® or water. In high heat, a minimum of one gallon per day should be consumed. Fluid should be consumed frequently. Don't wait until thirsty.
- Provide cooling devices, when necessary, to aid natural body heat exchange during prolonged work or severe heat exposure. Devices include field showers, hose-down areas, shade umbrellas/tents, wide-brim hats, and cooling jackets, vests, or suits.
- If amenable to work conditions, wear light-colored, loose fitting, "breathable" clothing.
- Avoid prolonged periods of exposure. Take breaks as necessary. Higher heat exposure requires more frequent breaks.
- Be able to recognize the signs, symptoms and how to treat for heat stress. Signs, symptoms and treatment are listed below.

Signs and Symptoms:

- Mild heat stress - Decreased energy, slight loss of appetite, nausea, lightheadedness.
- Moderate heat stress - heavy sweating, thirst, faintness, headache, confusion.
- Severe heat stress (heat stroke) - Throbbing headache, confusion, irritability, rapid heartbeat, difficulty breathing, dry skin (no sweating), vomiting, diarrhea.

Treatment:

- Mild and Moderate heat stress - Take to cool place, drink cool (not cold) fluids, remove excess clothing, rest.
- Severe heat stress - Call Sunrise Base, (619) 717-8118, for an ambulance and get to a cool place, remove excess clothing and rest.
- Adjust work and rest schedules as needed. Establish a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- Provide shelter or shaded areas (77°F is best) to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels to ensure that the cardiovascular system functions adequately. Daily fluid intake must equal the approximate amount of water lost in sweat. Workers are encouraged to drink more than the amount required to satisfy thirst (recommend water and sport drinks, not coffee or soda), because thirst is not an adequate indicator of adequate salt and fluid replacement.
- Remove impermeable protective garments during rest periods.
- Do not assign other tasks to personnel during rest periods.

HEAVY EQUIPMENT

Working around Heavy Equipment

- Yield to heavy equipment.
- Listen for warning signals on heavy equipment.
- Perform a visual inspection and walk around parked heavy equipment before moving to assure that equipment is in good condition and that there are no personnel on the ground that could be injured or objects that could be damaged by vehicle movement.
- Wear hearing protection if required.
- Wear traffic vests for increased visibility.
- Maintain eye contact with the heavy equipment operator when working near equipment.
- Be aware of changes in sound of equipment which may indicate a change in direction.

Heavy Equipment Operators

- Use hand rails and footholds when mounting and dismounting equipment,
- Brakes, steering, clutches and controls shall be tested.
- Pay attention to workers on the ground who may be in the path and provide warning prior to moving the equipment.
- Permit no one to ride on, or in, heavy equipment. This includes any portion of a backhoe, bulldozer, forklift or the back of a pickup truck, except in locations specifically designed for passenger use and approved by the SHSO.
- Keep haulage vehicles under positive control at all times while operating. Vehicles shall be kept in gear when descending grades.
- Do not use heavy equipment on slopes with steepness exceeding 3H:1V unless operations are consistent with manufacturer's recommendations (if the Owner's Manual is not with the equipment or does not specify slope operating procedures, see the SHSO).
- Operate equipment with booms, blades, buckets, beds, etc., lowered or in a stable position while on slopes. Safety cables tethered to appropriate anchors shall be used for equipment working on steep slopes, where appropriate.
- Suspend in slings or support by hoists or jacks heavy equipment in need of repair. The equipment must also be blocked or cribbed before working underneath.
- Shut off motors, do not allow smoking, and use proper dispensing equipment when refueling gasoline-operated equipment to prevent fire hazards.
- Lower hydraulic systems (e.g., blades, etc.) to the ground, set brakes, and shut down equipment if malfunction occurs.
- Use rollover protection and seat belts.

LIFTING HEAVY LOADS

- Proper lifting techniques include:
 - *Feet* - Feet should be parted, with one foot alongside the object being lifted and one behind. Feet should be comfortably spread to give greater stability. The rear foot should be in position for the upward thrust of the lift.
 - *Back* - Use the sit-down position and keep the back straight, but remember that “straight” does not mean “vertical”. A straight back keeps the spine, back muscles, and organs of the body in correct alignment. It minimizes the compression of the abdomen that can cause a hernia.
 - *Arms and Elbows* - The load should be drawn close to the body, and the arms and elbows should be tucked in. When the arms are held away from the body, they lose much of their strength and power. Keeping the arms tucked in also helps keep body weight centered.
 - *Palm* - The palm grip is one of the most important elements of lifting. The fingers and the hand are extended around the object to be lifted. Use the full palm; fingers alone have very little power.
 - *Chin* - Tuck in the chin so the neck and head continue the straight back line. Keep the spine straight and firm.
 - *Body Weight* - Position the body so its weight is centered over the feet. This provides a more powerful line of thrust and assures better balance. Start the lift with a thrust of the rear foot. Shift hand positions so the object can be boosted after knees are bent. Straighten knees as object is lifted or shifted to the shoulders. To change direction, lift the object to a carrying position, and turn the entire body, including the feet. Do not twist your body. In repetitive work, both the person and the material should be positioned so that the worker will not have to twist his body when moving the material. If the object is too heavy to be handled by one person, get help.
- Limit continuous lifting of weights to 50 pounds or the maximum allowed by the client whichever is less. Lifts of heavier weights are permitted on an interim basis. Help shall be obtained for lifting of loads greater than 50 pounds or the maximum allowed by the client whichever is less. Mechanical equipment should be used on heavy materials when possible. If mechanical assistance is not available, adequate manpower to maintain the 50-pound limit per employee will be required.
- Do not lift more weight than can be handled comfortably, regardless of load weight. If necessary, help should be requested to lift a load so that the lifting is comfortable.
- Use drum dollies when moving drums or barrels.

- Inspect objects for grease or slippery substances before they are lifted to ensure that the object will not slip.
- Do not carry long, bulky or heavy objects without first verifying that the way is clear and that vision is unobstructed. This ensures that other persons or objects will not be struck by the load.
- Do not carry loads that cannot be seen over or around.
- Exercise caution when lifting above the chest level.
- Make sure workers are physically suited for the job before assigning jobs requiring heavy and/or frequent lifting. A person's lifting ability is not necessarily indicated by his height or weight.
- Before lifting an object, consideration should be given to how the object will be set down without pinching or crushing hands or fingers. For example, to place an object on a bench or table, the object should be set on the edge and pushed far enough onto the support so it will not fall. The object can then be released gradually as it is set down, and pushed in place with the hands and body from in front of the object.
- When two or more people are handling the same object, one should "call the signals". All the persons on the lift should know who this person is and should warn him if anyone in the crew is about to relax his grip.

LOUD NOISE

- Wear hearing protection in areas with constant or loud noise.
- Know the effects of noise, including:
 - Workers being startled, annoyed, or distracted.
 - Physical damage to the ear, pain, and temporary and/or permanent hearing loss.
 - Communication interference that may increase potential hazards due to the inability to warn of danger and proper safety precautions to be taken.
- Implement the company Hearing Conservation Program when noise exposures equal or exceed an 8-hour, time-weighted average (TWA) sound level of 85 decibels on the A-weighted scale (dB).
- Utilize feasible administrative or engineering controls if workers are subjected to noise exceeding an 8-hour TWA sound level of 90 dB.

SLIPS, TRIPS, AND FALLS

- Wear the proper foot wear and clothing for the task at hand.
- Pay attention to the work environment and become aware of all equipment and vehicles active onsite and use caution when moving about.
- Use caution when walking on sloped areas (especially geosynthetics), particularly when moisture is present. Use caution when walking on soft or uneven surfaces; e.g., marsh areas. Watch for icy conditions in cold weather.
- Follow the established designated safe paths for travel and keep these areas free from debris. Avoid steep or slippery slopes and paths near operation vehicles and equipment.
- Follow good housekeeping procedures. Never assume that someone else will clean up a spill or put away an object.
- Remove or clearly mark objects that pose tripping hazards.
- Prevent water accumulation where practicable.
- Cables and/or wiring should be taped down, when possible. Locate cables and/or wiring out of the commonly used areas.
- Mark or repair any opening or hole in the floor.
- Carry objects in a manner that allows you to see in the area you are moving in. Do not carry objects that are too large or bulky. Do not carry more weight than you can balance and keep stable. Understand that PPE can reduce or limit your field of vision and mobility.
- Use the proper ladder for the task at hand and do not exceed the recommended height. Do not use the top two rungs of a ladder. Ensure a flat and stable footing for the placement of a ladder. Utilize the buddy system to help secure the ladder. When working over 6 ft., utilize fall prevention measures. Obey height and weight guidelines and/or rules.
- Use the handrail when using stairs. Be aware of stairway blockages.
- If conditions even slightly resemble an unsafe environment, do not make any assumptions that the integrity of a workplace is intact.
- Never jump over or into a trench or excavation.
- Walk, do not run.
- Maintain proper lighting so obstacles are clearly visible

THOROUGHFARES

- Obtain necessary permits to use/block public thoroughfares.
- All care should be taken to ensure the integrity of walking and working surfaces, including the use of barriers, toe-kicks, etc. to warn personnel and the public of the potential fall and tripping hazards. Guardrails or barrier walls should be constructed surrounding open pits and trenches as appropriate.
- Traffic control plans will be produced and followed when required by the permitting agency or when working on or adjacent to a highway or a busy street. The traffic control plan shall be brought to the site and shall delineate the locations of applicable signs, signals and barricades; describe the necessity for flaggers; and provide other traffic control information..
- Signaling equipment and directions by flaggers shall conform to the latest edition of the U.S. Department of Transportation – Federal Highway Administration, Manual on Uniform Traffic Control Devices for Streets and Highways (<http://mutcd.fhwa.dot.gov>).
- Flaggers shall be provided with and shall wear fluorescent orange-red or fluorescent yellow-green garments while flagging. Warning garments worn at night shall be made of reflective material. The garments should meet the requirements of ISEA, American National Standard for High-Visibility Apparel.
- Barricades for protection of employees shall conform to the portions of the latest edition of the U.S. Department of Transportation – Federal Highway Administration,, Manual on Uniform Traffic Control Devices for Street and Highways (<http://mutcd.fhwa.dot.gov>), relating to barricades.

TRUCK CRANES

Working with Cargo Bed Mounted Truck Crane

- Make sure vehicle is in park with the parking brake on.
- Truck should be parked on as level of a surface as possible.
- Make sure the control unit connectors are plugged into their proper plug locations.
- Check the crane for proper support pin placements and that the crane unit is secured properly.
- When lowering or raising the cable, make sure hands and clothing are away from the pulleys and winch mechanism.
- Maintain eye contact with the crane operator when working near equipment.
- Be aware of changes in sound of equipment which may indicate a change in direction or fatigue with equipment.
- Hand signals may be needed to communicate with crane operator in areas with loud noise.

Lifting Loads with Cargo Bed Mounted Truck Crane

- Respect the load capabilities of the unit at all times. Capacity is 500 Lbs for trucks with GVWR of 8800 pounds or less and 750 Lbs for trucks with GVWR of 8800 pounds or greater. (GVWR specifications of trucks can be found on sticker located on the driver side door jam).
- Make sure the load is secured correctly to the crane cable.
- Make sure the load that will be lifted is not secured, bolted down, or attached in anyway before lifting.
- Equipment used to secure load to the truck crane should be properly rated for the load being lifted.
- Know the weight of the load being lifted, and make sure it falls under the maximum lift load of the crane.
- Do not put any part of body under the crane boom or lifted loads at any time.
- Load lifting should be as close to vertical (plumb) as possible. Be aware of swinging loads once lifted.
- Lift and drop load at a safe rate of speed.
- When rotating the load, make sure that the pathway way is clear of equipment and personnel.
- Do not stand between crane cable and truck at any time.

UTILITY PROTECTION

The occurrence of above and below-ground utilities should be anticipated at every site. The traditional method of using existing “as built” plans and maps (if available) and probing in the field (i.e., “hunt and hope”) is not sufficient to provide adequate assurance that utilities are not impacted during site activities. The objective of the Utility Protection Hazard Mitigator is to describe the process necessary to investigate, and to the extent practical, identify utilities in work areas for the purpose of avoiding the utilities, protecting utilities and site personnel, and mitigating impacts to site operations.

Approximate location of subsurface installation means a strip of land not more than 24-inches on either side of the exterior surface of the subsurface installation.

Excavation means any operation in which earth, rock, or other material in the ground is moved, removed, or otherwise displaced by means of tools, equipment, or explosives in any of the following ways: grading, trenching, digging, ditching, drilling, auguring, tunneling, scraping, cable or pipe plowing and driving, or any other way.

High priority subsurface installation means high-pressure natural gas pipelines with normal operating pressures greater than 415 kPa gauge (60 psig) or greater than six inches nominal pipe diameter, petroleum pipelines, pressurized sewage pipelines, high-voltage electric supply lines, conductors, or cables that have a potential to ground of greater than or equal to 60 kilovolt (kV), or hazardous materials pipelines that are potentially hazardous to workers or the public if damaged.

The Mitigator process is summarized below:

- Identify the location of the planned intrusive activities.
- Mark the planned work area with white water based marking paint. If work area is not visible from the street either because of obstruction or distance, provide distance from street to work area (i.e., 150 feet north).
- Contact DigAlert or dial 811 (nationwide) to identify utilities in your work area. <http://www.digalert.org/> (811) provides a link to the local state operated “Call-Before-You-Dig” service.
- Review existing utility maps with facility personnel and determine the approximate numbers and types of utilities within the project area. This is inclusive of below-ground utilities that may be encountered during intrusive operations as well as overhead utilities that may be encountered during operations (i.e., drilling mast and overhead power lines).
- Most “Call-Before-You-Dig” services will only mark below-ground utilities leading to the site utility meter. With the exception of high priority utilities (as defined above), utilities present after passing through the site meter may be left without adequate inspection. In such cases, the use of a private utility location firm may be prudent to ensure thorough identification of utilities.
- Retain the services of a private utility locating company that can identify metallic utilities and anomalies in the vicinity of the work area. Private utility location firms use a variety of location techniques. The suspected types of utilities should be discussed

The task(s) for which these Hazard Mitigators apply are presented in the Appendix C Directory

with the private utility location firm to ensure that proper techniques are used. Improper techniques may result in missed or improperly identified utilities.

- DigAlert must be called at least 48 hours prior to the start of work to complete a utility inspection. (For example, if you notify DigAlert on Tuesday at 9:43 a.m. no work can begin until Thursday at 9:43 a.m.)
- Record the inspection confirmation number. Confirm that the inspection was conducted prior to the start of work. The inspection confirmation number is critical in the event that an unmarked utility is encountered, or if a utility identified during the inspection request did not mark the site for the presence or absence of the utility (no-show). If a no-show occurs with it may be possible that the utility operator sent a facsimile care of the project manager (identified during utility inspection request) indicating that there are no conflicts in the planned work area. However, if there is any question, contact DigAlert immediately and request that the missing utility please call to confirm presence or absence of utility in work area or schedule a meeting time at the site.
- After below-ground utilities are identified, the utilities should be marked. The most common marking method is paint or pin flags. The following marking colors are generally widely accepted to demarcate specific types of utilities, but should be confirmed.

RED	ELECTRIC
YELLOW	GAS, OIL, STEAM
ORANGE	COMMUNICATIONS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER
GREEN	SEWER / DRAINAGE
PINK	SURVEY MARKS
WHITE	PROPOSED EXCAVATION

- Above-ground utilities should be visually identified. Warning signs may be placed in work areas to remind workers of the above-ground utilities. Other techniques such as shielding or utility relocation may be necessary to make the work safe. Proper set back and approach distances must be maintained at all times.
- Be observant of above-ground features at a site that may be indicative of an underground utility line. An example of this would be noticing two fire hydrants and noting that there is likely a buried water line between them, signs of trenching activities, asphalt or concrete patches, or linear depressions in the ground surface.
- Following the completion of the utility marking, the work area should be inspected by all members of the project team (client, engineer, and contractor) to inspect and discuss the finding. Adjustments to site operations, if necessary, should be discussed and agreed

The task(s) for which these Hazard Mitigators apply are presented in the Appendix C Directory

upon by the project team prior to initiation of site work. If possible, work areas should be re-located away from utilities.

- Depending on the proximity of utilities to the work area, low impact soil removal techniques (potholing) may be necessary to either confirm the presence of utilities or to provide protection of utilities before invasive activities. In such cases, hand excavation, hand auguring, vacuum excavation, water jet removal, or other low impact removal techniques may be necessary to a depth of 3 to 5 feet (or other depth as determined by project-specific conditions). In cases where a high priority utility is located within 10 feet of the work area, documentation from the utility owner must be obtained allowing potholing before any work can be conducted. If the utility is not found after potholing is conducted, contact DigAlert and the utility owner immediately to request additional information as to the location of the utility. It is necessary to conduct potholing activities before any work can be conducted in the vicinity (within 10 feet) of the high priority utility.
- If utility location markings are lost, damaged, or faded, a new utility location survey should be conducted to replace the missing or damaged markings. Please note that some municipalities require that all utility markings be removed after work is completed. Black spray paint may be used to cover up utility markings in the street but must be removed from sidewalks.
- In all cases, State, local, utility-specific requirements, facility-specific controls, permits, and operations should be considered and incorporated into the Utility Protection Hazard Mitigator.
- Utility protection should be addressed during each tailgate or job briefing in order to reinforce below-ground utility location and the avoidance of above-ground utilities.

WELDING AND CUTTING

- Reduce exposure to all welding emissions using engineering controls (ventilation) and safe work practices.
- All persons who weld or cut must be properly trained. Associated hazards include:
 - Thermal
 - Chemical fumes
 - Physical injury
 - Volatile combination of heat and gas
 - Radiation from unfiltered ultraviolet light
 - Electrical circuit
 - Gas leakage
 - Excessive noise
 - Poisoning
- Preventative fire measures include use of a welding blanket, removal or covering of flammable materials, and working a safe distance from flammable materials.
- Wear hearing protection, as required.
- Ensure that there is adequate lighting in the work area.
- Utilize the proper protective clothing and equipment (PPE), including:
 - Shield or helmet with filtered lens
 - Fire-resistant gloves
 - Leather apron
 - Overalls
 - Boots
 - Leather spats
 - Felt skullcap or beret
 - Hand shields
- Read the MSDS sheets for all hazardous substances with which you may come into contact prior to starting work.
- Never cut off the tops of drums that have contained flammable liquids or gases. Vapors left inside the drum may explode! If a drum that has held toxic or flammable substances must be cut, it should be filled with water, or thoroughly cleaned of such substances by a specialist cleaning company, then ventilated and tested.
- Do not apply heat to drums that have held chemicals because it may cause them to produce poisonous gas.
- Never weld or grind near an empty drum. A single spark inside an empty drum can trigger an explosion. Keep torches, flames and sparks away from grinding and welding equipment.
- Under no circumstances should fittings of oxyacetylene equipment be allowed to become contaminated with grease or oil, which can ignite in the presence of pure oxygen.
- Have flashback arrestors fitted to all oxyacetylene equipment to overcome the danger of flashback.
- Store oxygen and gas separately. Store acetylene cylinders upright to prevent explosion. Always chain stored cylinders.

ALLERGIC REACTION TO POISONOUS PLANTS

- Be able to recognize and identify poisonous plants indigenous to the site location (e.g., poison ivy, poison oak, poison sumac). For example, poison Ivy plants have three leaves arranged at the end of each stem. Two secondary leaves are attached opposite one another and directly to the stem at their base. The primary leaf is attached to the end of the stem. The leaves often, but NOT ALWAYS, have a shiny appearance. See photos below.



- Poison Ivy often appears as ground cover at the edge of wooded areas and along trails within fields and woods. It may also appear growing from a vine wrapped around trees.
- Avoid or remove poisonous plants where practicable. Wear appropriate protective clothing (e.g., gloves, long-sleeved shirts) as required.
- One can become sensitized (like a latex allergy) though immune for several years at the beginning.
- If you come in contact with the plant, the plant's oil will be transferred onto your skin and clothing. The best way to manage the oil is to wash skin with cool water and soap (preferably 5% tincture of green soap available at CVS). If soap and water is unavailable, thorough (2-3 minutes) rinsing with cold water may help (not warm...want to keep those pores closed!)
- The lag time between exposure and symptoms can be quite long like several days.
- If you are in the field, blot the area with an alcohol patch and follow by washing as soon as possible. Calamine lotion, Tecnu, yellow laundry soap, or Colloidal oatmeal (Aveeno[®]) baths provide relief from itching and rashes. More information about Tecnu can be found at <http://www.teclabsinc.com/>.
- If you have to pass through heavy ivy growth, be sure to carefully handle your field cloths when you return. Your shoe laces will always get you if you are not careful. The oil can last on clothing for a few weeks, so wash frequently.
- For additional information, please see <http://poisonivy.aesir.com/>

DOGS

- Never approach a stray dog.
- If a stray dog is at your site, stay in your vehicle.
- If a stray dog approaches, back away slowly and proceed to your vehicle or the closest secure building.
- If a vehicle or secure building is not close by when a stray dog approaches, stay calm. Do not run and do not yell. If you must say anything at all, use a calm, firm voice and avoid eye contact. Back away slowly from the dog or stand still until it turns away. Keep your hands firmly by your side.
- If a dog jumps, raise your knee to protect yourself.
- If a dog attacks, curl into a ball with your hands over your head and neck, and protect your face.
- Be aware of unusual dog behavior. Stray dogs may have rabies, which is exemplified by the following signs:
 - Constant growling and barking
 - Dilated pupils, disorientation
 - Erratic behavior
 - Facial expression showing anxiety and hyper-alertness
 - Inability to swallow, leading to drooling and foaming of saliva (i.e., "foaming at the mouth")
- If bitten or scratched by a dog, seek medical attention immediately.

STINGING INSECTS / VERMIN / SNAKES

- Be able to recognize stinging insects/vermin/snakes indigenous to the site location and habitats. Learn the indigenous dangerous species (e.g., spiders, snakes, ticks) prior to entering the field and know the first aid treatments.
- Poisonous venomous snakes swim on top of the water, non-poisonous venomous snakes swim with only their heads above water.
- Advise the SHSO if you have allergies to any insects prior to engaging in any field activities.
- Include the following preventative measures as necessary: wear light-colored clothing, keep clothing buttoned, tuck pant legs into socks, keep shirt tails tucked in, boots, hoods, netting, gloves, masks, insect repellants or other personal protection.
- Snake bite kits are commercially available and should be carried by field personnel when working where poisonous snakes exist. In the case of a snake bite, keep the patient calm, restrict activity and immobilize the bite area (do not elevate), and immediately obtain medical attention.
- Report any bites or stings to the SHSO and seek medical attention immediately.
- Be aware of potential hive/nest locations, which may include culverts, drainage pipes, junk piles, or dense shrubbery.
- Advise the SHSO if you are allergic to stinging insects prior to engaging in any field activities.
- Include the following controls:
 - Do not agitate stinging insects or disrupt their hive/nest.
 - Wear light-colored clothes.
 - Avoid wearing perfumes, hair spray, or scented lotions in the wilderness.
- If attacked:
 - Do not scream or wave arms.
 - Cover your face with your hands.
 - Run for shelter in a building or vehicle. Do not seek shelter in water.
 - Remove stingers as quickly as possible to lessen the amount of venom entering the body. Remove the stinger by raking your fingernail across it. Don't pinch or pull the stinger out. Put ice on the sting to reduce the swelling.

Report any stings to the SHSO and seek first aid or emergency medical care immediately if stung several times.

MOUNTAIN LIONS

- Report any sighting of mountain lions to the Sunrise Base, (619) 717-8118.
- Do not hike alone. At least two field personnel should be in constant visual and verbal contact when in areas with mountain lions.
- If a mountain lion is encountered:
 - Do not approach the lion. Most mountain lions will try to avoid a confrontation.
 - Do not run from a mountain lion, stand and face it, make eye contact.
 - Do not crouch down, squat, or bend over, remain standing.
 - Try to appear larger by raising and waving arms, opening a jacket, speak firmly in a loud voice.
 - If necessary throw stones, branches, or whatever may be reachable without crouching or bending over.
- If attacked, face animal and fight back with sticks, jackets, tools or whatever may be available without turning away from the animal.
- Report any encounters or attacks to the SHSO and seek first aid immediately if necessary.

Appendix D

Constituents of Concern (COCs)

<i>Constituent</i> ¹	<i>Medium</i> ²	<i>Maximum Concentration</i> ³
Total Petroleum Hydrocarbons	Soil and/or water	Unknown

Footnotes:

- 1 Constituents that are included on this list have either been detected at the site at concentrations that may cause potential dermal, ingestion, or inhalation hazards, or the constituent is suspected to potentially be present at elevated concentrations but no analytical data are available.
- 2 Type of medium (i.e. soil, water, sludge, etc.).
- 3 Maximum concentration previously detected for the constituent based on historic data (if available). Liquid concentrations are presented in micrograms of constituent per liter of solution (ug/L). Solids concentrations are presented in milligrams of constituent per kilogram of soil (mg/kg). Soil gas and/or vapor concentrations are reported in milligrams of constituent per cubic meter of gas/vapor (mg/m³).

Appendix E

Air Monitoring Equipment, Frequency of Readings, and Action Guidelines per Task

Applies to Task: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

<input type="checkbox"/> <i>Explosimeter</i> Brand/Model No.: _____ _____ Monitoring Frequency: _____ _____	<input type="checkbox"/> <i>Oxygen Meter</i> Brand/Model No.: _____ _____ Monitoring Frequency: _____ _____	<input checked="" type="checkbox"/> <i>Photoionization Detector</i> Brand/Model No.: _____ _____ Monitoring Frequency: <u>Continuous</u>																																				
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Source (% LEL)</th> <th style="text-align: left;">Reading</th> <th style="text-align: left;">Action</th> </tr> </thead> <tbody> <tr> <td>1 to 10</td> <td></td> <td>Continue with caution.</td> </tr> <tr> <td>Greater than 10</td> <td></td> <td>Stop work. Evacuate the area. If upon return, if concentration still exceeds 10% LEL, ventilate until concentration is back to <10% LEL.</td> </tr> </tbody> </table> Note: _____	Source (% LEL)	Reading	Action	1 to 10		Continue with caution.	Greater than 10		Stop work. Evacuate the area. If upon return, if concentration still exceeds 10% LEL, ventilate until concentration is back to <10% LEL.	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Reading (%)</th> <th style="text-align: left;">Action</th> </tr> </thead> <tbody> <tr> <td>Less than 19.5</td> <td>Stop work. Evacuate the area.</td> </tr> <tr> <td>19.5 to 23.5</td> <td>Continue to work with caution.</td> </tr> <tr> <td>Greater than 23.5</td> <td>Stop work. Evacuate the area.</td> </tr> </tbody> </table> Note: _____	Reading (%)	Action	Less than 19.5	Stop work. Evacuate the area.	19.5 to 23.5	Continue to work with caution.	Greater than 23.5	Stop work. Evacuate the area.	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Breathing Reading (ppm)</th> <th style="text-align: left;">Zone</th> <th style="text-align: left;">Action</th> </tr> </thead> <tbody> <tr> <td>0 to 25</td> <td></td> <td>Level D PPE</td> </tr> <tr> <td>Greater than 25</td> <td></td> <td>Stop work. Evacuate the area. If upon return, levels still exceed 25, stop work and implement engineering controls.</td> </tr> </tbody> </table> Note: _____	Breathing Reading (ppm)	Zone	Action	0 to 25		Level D PPE	Greater than 25		Stop work. Evacuate the area. If upon return, levels still exceed 25, stop work and implement engineering controls.										
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Appendix F

Personal Protective Equipment per Task

	Task ①	Task ②	Task ③	Task ④	Task ⑤	Task ⑥	Task ⑦	Task ⑧
Potential PPE Level per Task:	<input checked="" type="checkbox"/> D	<input checked="" type="checkbox"/> D	<input type="checkbox"/> D	<input type="checkbox"/> D	<input type="checkbox"/> D	<input type="checkbox"/> D	<input type="checkbox"/> D	<input type="checkbox"/> D
	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C
<i>Modified Level D*</i>				<i>Level C*</i>				
<i>Equipment</i>	<i>Material/Type</i>			<i>Equipment</i>	<i>Material/Type</i>			
<input type="checkbox"/> Protective clothing				<input type="checkbox"/> Full-face air-purifying respirator	Cartridge Type:			
<input checked="" type="checkbox"/> Outer gloves	Nitrile			<input type="checkbox"/> Half-mask air-purifying respirator	Cartridge Type:			
<input type="checkbox"/> Outer boots				<input type="checkbox"/> Protective clothing				
<input checked="" type="checkbox"/> Hard hat	ANSI certified			<input type="checkbox"/> Outer gloves				
<input checked="" type="checkbox"/> Safety glasses	ANSI certified			<input type="checkbox"/> Inner gloves				
<input checked="" type="checkbox"/> Hard-toed boots	ANSI certified			<input type="checkbox"/> Outer boots				
<input type="checkbox"/> Hearing protection				<input type="checkbox"/> Hard hat				
<input type="checkbox"/> Other: reflective vests				<input type="checkbox"/> Safety glasses				
				<input type="checkbox"/> Hard-toed boots				
				<input type="checkbox"/> Hearing protection				
				<input type="checkbox"/> Other:				

* If checked, indicates initial level of PPE. Other completed columns indicate information to upgrade/downgrade.

Appendix G

Material Safety Data Sheets

<i>Included in HASP</i>	<i>Chemical</i>
<input type="checkbox"/>	Acetone
<input type="checkbox"/>	Alconox
<input type="checkbox"/>	Ammonia
<input type="checkbox"/>	Bentonite
<input checked="" type="checkbox"/>	Diesel Fuel Oil No. 2-D
<input checked="" type="checkbox"/>	Gasoline
<input type="checkbox"/>	Helium
<input type="checkbox"/>	<i>n</i> -Hexane
<input type="checkbox"/>	Hydrochloric Acid
<input type="checkbox"/>	Hydrogen
<input checked="" type="checkbox"/>	Isobutylene Calibration Gas
<input type="checkbox"/>	Isopropyl Alcohol
<input type="checkbox"/>	KB-1
<input type="checkbox"/>	Methane Calibration Gas
<input type="checkbox"/>	Nitric Acid
<input type="checkbox"/>	Permanganate
<input type="checkbox"/>	Portland Cement
<input type="checkbox"/>	Sulfuric Acid
<input type="checkbox"/>	Other: _____

M A T E R I A L S A F E T Y D A T A S H E E T

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Company: AccuStandard, Inc.
 125 Market Street
 New Haven, CT 06513

Date MSDS Printed: 1/31/2008
 Preparation Date: 1/31/2008
 Information Phone Number: 203-786-5290
 Emergency Phone Number: 203-786-5290
 Hours: Mon. to Fri. 8am-5pm EDT

Catalog Number: **FU-009-D-40X**

Product Name: Diesel Fuel

Synonyms: N/A

Formula: N/A

Molecular Weight: N/A

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

Component(s)	(1)	CAS #	Appr. %	ACGIH-TLV (mg/m3)		OSHA-PEL (mg/m3)	
				TWA	STEL skin	TWA	STEL skin
#2 Diesel Fuel		68334-30-5	2.0				
Dichloromethane		75-09-2	98.00	174			

SECTION 3 - HAZARDS IDENTIFICATION

Health and Environmental Hazards/Symptoms of Exposure:

Exposure can cause headache, nausea, confusion, drowsiness, dizziness and/or vomiting. Causes depression of central nervous system. Effects may be delayed. Lachrymator. Suspect cancer hazard.

HMIS® III	*	2	1	0	
NFPA		2	1	0	

Potential Health Effects:

- May be irritating to eyes.
- May cause eye damage.
- Irritating to skin.
- May be harmful if absorbed through the skin.
- May be irritating to mucous membrane and upper respiratory system.
- May be harmful if inhaled.
- Harmful if swallowed.

Routes of Entry:

Inhalation, ingestion or skin contact.

Carcinogenicity:

This product is or contains a component that is classified (ACGIH, IARC, NTP, OSHA) as a possible cancer hazard.

SECTION 4 - FIRST AID MEASURES

Emergency First Aid:

- Get medical assistance for all cases of overexposure.
- Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.
- Eye contact: Immediately flush with plenty of water. After initial flushing, remove contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.
- Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.
- Ingestion: Do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

SECTION 5 - FIRE FIGHTING MEASURES

Flammable Properties:

Flash Point: >230°F
Flammable Limits LEL (%): 12
Flammable Limits UEL (%): 23
Autoignition Temperature: 556°C

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Containers can build up pressure if exposed to heat.

Extinguishing Media:

Use alcohol foam, carbon dioxide, dry chemical, or water spray when fighting fires involving this material.

Fire Fighting Procedures:

As in any fire, wear self-contained breathing apparatus pressure demand, MSHA/NIOSH (approved or equivalent) and full protective

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spill Response:

Wear a self-contained breathing apparatus and appropriate personal protection. Stop leak if you can do so without risk. Ventilate area. Neutralize spill with soda ash or lime. Take up and containerize for proper disposal. Flush spill area with water. Keep combustibles away from spilled material. Comply with Federal, State, and local regulations.

SECTION 7 - HANDLING AND STORAGE

Store in a tightly closed container.
Store in a cool dry, well-ventilated area away from ignition sources.
Avoid breathing vapors or mists.
Use with adequate ventilation.
Do not get in eyes, on skin or clothing.
Avoid prolonged or repeated exposure.
This product should only be used by persons trained in the safe handling of hazardous chemicals.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls and Personal Protection Equipment (PPE):

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.
Material must be handled or transferred in an approved fume hood or with equivalent ventilation.
Protective gloves must be worn to prevent skin contact.
(Polyethylene, polyvinyl chloride (PVC) or equivalent)
Safety glasses with side shields must be worn at all times.

General Hygiene Considerations:

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear liquid
Odor: Ether-like odor
pH: N/A
Vapor Pressure: 353 mmHg (20 °C)
Vapor Density (Air = 1): 2.93 g/L
Boiling Point: 40 °C
Melting Point: -97 °C
Solubility in Water (%): Slight (1.3%)

M A T E R I A L S A F E T Y D A T A S H E E T

Specific Gravity (H₂O = 1): 1.326 g/cm³
Flash Point: >230°F
Explosion Limits (%): 12 to 23
Autoignition Temperature: 556°C
Percent Volatile: 99+
Evaporation Rate (BuAc = 1): 27.5
Molecular Weight: N/A
Molecular Formula: N/A

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable

Conditions To Avoid: Contact with ignition sources

Materials To Avoid: Bases
Oxidizers
Alkali metals; Aluminum, magnesium, sodium, potassium and lithium

Hazardous Decomposition: Hydrogen chloride gas (HCl); Phosgene; Chlorine

Hazardous Polymerization: Will not occur

SECTION 11 - TOXICOLOGICAL INFORMATION

See section 3 for specific toxicological information for the ingredients of this product.

SECTION 12 - ECOLOGICAL INFORMATION

By complying with sections 6 and 7 there will be no release to the environment.

SECTION 13 - DISPOSAL CONSIDERATIONS

Recycle or incinerate at any EPA approved facility or dispose in compliance with Federal, State and local regulations. Empty containers must be triple-rinsed prior to disposal.

SECTION 14 - TRANSPORT INFORMATION

DOT UN Number: UN1593 Shipping Class: 6.1 Packing Group: III POISON

SECTION 15 - REGULATORY INFORMATION

In addition to Federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

All components are listed on the TSCA Inventory. **For laboratory, research and development use only. Not for manufacturing or commercial purposes.**

WARNING: This product contains chemical(s) known to the state of California to cause cancer.

SECTION 16 - OTHER INFORMATION

This document has been designed to meet the requirements of OSHA, ANSI and CHIPs regulations.

The statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. It is intended for use only by persons having the necessary technical skill and at their own discretion and risk. Since conditions and manner of use are outside our control, we make

M A T E R I A L S A F E T Y D A T A S H E E T

NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE.

Legend : N/A = Not Available ND = Not Determined NR = Not Regulated

* * * End of Document * * *

MATERIAL SAFETY DATA SHEET

SECTION 1

PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: GASOLINE, UNLEADED AUTOMOTIVE

Product Description: Hydrocarbons and Additives

Product Code: 123455-20, 9700, 977032, 977217, 977306, 977360, 977371, 977381, 977445, 977562, 977767, 977920, 979533, 97A039, 97A065, 97A078, 97A087, 97A102, 97A108, 97A146, 97A147, 97A152, 97A193, 97A200, 97A240, 97A266, 97A273, 97A290, 97A305, 97A316, 97A317, 97A328, 97A347, 97A380, 97A404, 97A424, 97A431, 97A441, 97A514, 97A556, 97A557, 97A613, 97A634, 97A653, 97A655, 97A659, 97A686, 97A696, 97A703, 97A712, 97A726, 97A736, 97A746, 97A767, 97A794, 97A798, 97A827, 97A848, 97A851, 97A876, 97A883, 97A907, 97A934, 97A948, 97A949, 97A960, 97A983, 97A989, 97AV99, 97AW00, 97AW01, 97AW38, 97AZ87, 97AZ88, 97AZ89, 97AZ90, 97AZ91, 97AZ92, 97AZ93, 97AZ94, 97AZ95, 97AZ96, 97AZ97, 97AZ98, 97AZ99, 97BA11, 97BA12, 97BA13, 97BA14, 97BA15, 97BA16, 97BA67, 97BA68, 97BA69, 97BA70, 97BE24, 97BE25, 97BE26, 97BE27, 97BE28, 97BE29, 97BE30, 97BE31, 97BE32, 97BE33, 97BE34, 97BE35, 97BE36, 97BE37, 97BE38, 97BE39, 97BN13, 97BN50, 97C070, 97C072, 97C075, 97C110, 97C112, 97C113, 97C118, 97C127, 97C140, 97C148, 97C166, 97C417, 97C558, 97C576, 97C632, 97C702, 97C731, 97C759, 97C770, 97C782, 97C794, 97C870, 97C917, 97D130, 97D228, 97E002, 97E010, 97E041, 97E065, 97E087, 97E103, 97E104, 97E11, 97E112, 97E113, 97E170, 97E171, 97E196, 97E197, 97E259, 97E260, 97E304, 97E305, 97E347, 97E42, 97E532, 97E564, 97E581, 97E595, 97E606, 97E611, 97E619, 97E649, 97E655, 97E66, 97E682, 97E749, 97E860, 97E88, 97E999, 97F005, 97F020, 97F030, 97F054, 97F312, 97F344, 97F952, 97M190, 97M191, 97M192, 97M193, 97M194, 97M195, 97M229, 97M230, 97M232, 97N832, 97N844, 97N848, 97N861, 97N873, 97N877, 97N879, 97N891, 97N895, 97N913, 97N917, 97N921, 97N941, 97N942, 97N954, 97Q303, 97Q763, 97Q781, 97Q782, 97R368, 97S760, 97U927, 97V321, 97V323, 97V325, 97V326, 97X861, EMGF20

Intended Use: Fuel, Gasoline

COMPANY IDENTIFICATION

Supplier: EXXON MOBIL CORPORATION
 3225 GALLOWES RD.
 FAIRFAX, VA. 22037 USA

24 Hour Health Emergency 609-737-4411
Transportation Emergency Phone 800-424-9300
ExxonMobil Transportation No. 281-834-3296
Product Technical Information 800-662-4525, 800-947-9147
MSDS Internet Address <http://www.exxon.com>, <http://www.mobil.com>

SECTION 2

COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
ETHYL ALCOHOL	64-17-5	< 11%
Gasoline	86290-81-5	89 - 100%

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*
BENZENE	71-43-2	0.1 - 5%
ETHYL BENZENE	100-41-4	1 - 5%

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N-HEXANE	110-54-3	1 - 5%
NAPHTHALENE	91-20-3	<1%
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1 - 5%
Toluene	108-88-3	5 - 10%
TRIMETHYL BENZENE	25551-13-7	1 - 5%
XYLENES	1330-20-7	5 - 10%

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

NOTE: The concentration of the components shown above may vary substantially. In certain countries, benzene content may be limited to lower levels. Oxygenates such as tertiary-amyl-methyl ether, ethanol, di-isopropyl ether, and ethyl-tertiary-butyl ether may be present. Because of volatility considerations, gasoline vapor may have concentrations of components very different from those of liquid gasoline. The major components of gasoline vapor are: butane, isobutane, pentane, and isopentane. The reportable component percentages, shown in the composition/information on ingredients section, are based on API's evaluation of a typical gasoline mixture.

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Extremely flammable. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

POTENTIAL HEALTH EFFECTS

Irritating to skin. If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression. High-pressure injection under skin may cause serious damage. Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).

Target Organs: Lung | Skin |

ENVIRONMENTAL HAZARDS

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID: Health: 1 Flammability: 3 Reactivity: 0

HMIS Hazard ID: Health: 1* Flammability: 3 Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

Inhalation

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

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SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

Ingestion

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Benzene- Individuals with liver disease may be more susceptible to toxic effects.

SECTION 5	FIRE FIGHTING MEASURES
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EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Extremely Flammable. Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Sulfur Oxides, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: <-40C (-40F) [ASTM D-56]

Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6

Autoignition Temperature: >250°C (482°F)

SECTION 6	ACCIDENTAL RELEASE MEASURES
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Notification Procedures

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the

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applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces. Recover by pumping or with suitable absorbent.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7

HANDLING AND STORAGE

HANDLING

Avoid breathing mists or vapors. Avoid contact with skin. Use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Use proper bonding and/or grounding procedures. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put fuel into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapors and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices, etc.) in or around any fueling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source).

Static Accumulator: This material is a static accumulator.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. Keep container

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closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be grounded and bonded. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8	EXPOSURE CONTROLS / PERSONAL PROTECTION
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EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Source	Form	Limit / Standard			NOTE	Source
BENZENE		OSHA Action level	0.5 ppm		N/A	OSHA Sp.Reg.
BENZENE		STEL	5 ppm		N/A	OSHA Sp.Reg.
BENZENE		TWA	1 ppm		N/A	OSHA Sp.Reg.
BENZENE		STEL	2.5 ppm		Skin	ACGIH
BENZENE		TWA	0.5 ppm		Skin	ACGIH
ETHYL ALCOHOL		TWA	1900 mg/m ³	1000 ppm	N/A	OSHA Z1
ETHYL ALCOHOL		STEL	1000 ppm		N/A	ACGIH
ETHYL BENZENE		TWA	435 mg/m ³	100 ppm	N/A	OSHA Z1
ETHYL BENZENE		STEL	125 ppm		N/A	ACGIH
ETHYL BENZENE		TWA	100 ppm		N/A	ACGIH
Gasoline		STEL	200 ppm		N/A	ExxonMobil
Gasoline		TWA	100 ppm		N/A	ExxonMobil
Gasoline		STEL	500 ppm		N/A	ACGIH
Gasoline		TWA	300 ppm		N/A	ACGIH
N-HEXANE		TWA	1800 mg/m ³	500 ppm	N/A	OSHA Z1
N-HEXANE		TWA	50 ppm		Skin	ACGIH
NAPHTHALENE		TWA	50 mg/m ³	10 ppm	N/A	OSHA Z1
NAPHTHALENE		STEL	15 ppm		Skin	ACGIH
NAPHTHALENE		TWA	10 ppm		Skin	ACGIH
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)		TWA	25 ppm		N/A	ACGIH
Toluene		Ceiling	300 ppm		N/A	OSHA Z2
Toluene		Maximum concentration	500 ppm		N/A	OSHA Z2
Toluene		TWA	200 ppm		N/A	OSHA Z2
Toluene		TWA	20 ppm		N/A	ACGIH
TRIMETHYL BENZENE		TWA	25 ppm		N/A	ACGIH
XYLENES		TWA	435 mg/m ³	100 ppm	N/A	OSHA Z1
XYLENES		STEL	150 ppm		N/A	ACGIH
XYLENES		TWA	100 ppm		N/A	ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

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ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

Personal Protection

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

If prolonged or repeated contact is likely, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9

PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

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Physical State: Liquid
Color: Clear (May Be Dyed)
Odor: Petroleum/Solvent
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.74
Flash Point [Method]: <-40C (-40F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6
Autoignition Temperature: >250°C (482°F)
Boiling Point / Range: > 20C (68F)
Vapor Density (Air = 1): 3 at 101 kPa
Vapor Pressure: > 26.6 kPa (200 mm Hg) at 20 C
Evaporation Rate (N-Butyl Acetate = 1): > 10
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3
Solubility in Water: Negligible
Viscosity: <1 cSt (1 mm²/sec) at 40 C
Oxidizing Properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A

SECTION 10	STABILITY AND REACTIVITY
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STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Halogens, Strong Acids, Alkalies, Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
-------------------	----------------------------------

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m ³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar

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	materials.
Irritation: No end point data.	Moderately irritating to skin with prolonged exposure. Based on test data for structurally similar materials.
Eye	
Irritation: Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Laboratory animal studies have shown that prolonged and repeated inhalation exposure to light hydrocarbon vapors in the same boiling range as this product can produce adverse kidney effects in male rats. However, these effects were not observed in similar studies with female rats, male and female mice, or in limited studies with other animal species. Additionally, in a number of human studies, there was no clinical evidence of such effects at normal occupational levels. In 1991, The U.S. EPA determined that the male rat kidney is not useful for assessing human risk.

Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Gasoline unleaded: Caused cancer in animal tests. Chronic inhalation studies resulted in liver tumors in female mice and kidney tumors in male rats. Neither result considered significant for human health risk assessment by the United States EPA and others. Did not cause mutations In Vitro or In Vivo. Negative in inhalation developmental studies and reproductive tox studies. Inhalation of high concentrations in animals resulted in reversible central nervous system depression, but no persistent toxic effect on the nervous system. Non-sensitizing in test animals. Caused nerve damage in humans from abusive use (sniffing).

Contains:

BENZENE: Caused cancer (leukemia), damage to the blood-producing system, and serious blood disorders from prolonged, high exposure based on human epidemiology studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus in laboratory animal studies.

ETHANOL: Prolonged or repeated exposure to high concentrations of ethanol vapor or overexposure by ingestion may produce adverse effects to brain, kidney, liver, and reproductive organs, birth defects in offspring, and developmental toxicity in offspring.

NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.

N-HEXANE: Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown.

TOLUENE : Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal developmental effects.

TRIMETHYLBENZENE: Long-term inhalation exposure of trimethylbenzene caused effects to the blood in laboratory animals.

ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

Additional information is available by request.

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The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 3, 6
ETHYL BENZENE	100-41-4	5
Gasoline	86290-81-5	5
NAPHTHALENE	91-20-3	2, 5

--REGULATORY LISTS SEARCHED--

1 = NTP CARC

2 = NTP SUS

3 = IARC 1

4 = IARC 2A

5 = IARC 2B

6 = OSHA CARC

SECTION 12	ECOLOGICAL INFORMATION
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The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land.

Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Majority of components -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13	DISPOSAL CONSIDERATIONS
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Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

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RCRA Information: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). Potential RCRA characteristics: IGNITABILITY. TCLP (BENZENE)

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT)

Proper Shipping Name: Gasoline

Hazard Class & Division: 3

ID Number: 1203

Packing Group: II

Marine Pollutant: MP: 100 %weight PP: 0 %weight

ERG Number: 128

Label(s): 3

Transport Document Name: UN1203, GASOLINE, 3, PG II, MARINE POLLUTANT

LAND (TDG)

Proper Shipping Name: Gasoline

Hazard Class & Division: 3

UN Number: 1203

Packing Group: II

Special Provisions: 17

SEA (IMDG)

Proper Shipping Name: MOTOR SPIRIT or GASOLINE or PETROL

Hazard Class & Division: 3

EMS Number: F-E, S-E

UN Number: 1203

Packing Group: II

Marine Pollutant: Yes

Label(s): 3

Transport Document Name: UN1203, MOTOR SPIRIT or GASOLINE or PETROL, 3, PG II, (-40°C c.c.), MARINE POLLUTANT

AIR (IATA)

Proper Shipping Name: Gasoline

Hazard Class & Division: 3

UN Number: 1203

Packing Group: II

Label(s) / Mark(s): 3

Transport Document Name: UN1203, GASOLINE, 3, PG II

SECTION 15 REGULATORY INFORMATION

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OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

CERCLA: This material is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Contact local authorities to determine if other reporting requirements apply.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. Immediate Health. Delayed Health.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
ETHYL BENZENE	100-41-4	1 - 5%
N-HEXANE	110-54-3	1 - 5%
NAPHTHALENE	91-20-3	<1%
Toluene	108-88-3	5 - 10%
XYLENES	1330-20-7	5 - 10%
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1 - 5%
BENZENE	71-43-2	0.1 - 5%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 2, 4, 10, 11, 13, 15, 16, 17, 18, 19
ETHYL ALCOHOL	64-17-5	1, 4, 13, 17, 18, 19
ETHYL BENZENE	100-41-4	1, 4, 10, 13, 16, 17, 18, 19
Gasoline	86290-81-5	1, 17, 18
N-HEXANE	110-54-3	1, 4, 13, 16, 17, 18, 19
NAPHTHALENE	91-20-3	1, 4, 5, 9, 10
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1, 13, 16, 17, 18, 19
Toluene	108-88-3	1, 4, 11, 13, 15, 16, 17, 18, 19
TRIMETHYL BENZENE	25551-13-7	1, 13, 16, 17, 18, 19
XYLENES	1330-20-7	1, 4, 5, 9, 13, 15, 17, 18, 19

--REGULATORY LISTS SEARCHED--

- | | | | |
|---------------|------------------|-------------------|-------------|
| 1 = ACGIH ALL | 6 = TSCA 5a2 | 11 = CA P65 REPRO | 16 = MN RTK |
| 2 = ACGIH A1 | 7 = TSCA 5e | 12 = CA RTK | 17 = NJ RTK |
| 3 = ACGIH A2 | 8 = TSCA 6 | 13 = IL RTK | 18 = PA RTK |
| 4 = OSHA Z | 9 = TSCA 12b | 14 = LA RTK | 19 = RI RTK |
| 5 = TSCA 4 | 10 = CA P65 CARC | 15 = MI 293 | |

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Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16	OTHER INFORMATION
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N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:

- Section 04: First Aid Inhalation - Header was modified.
- Section 04: First Aid Ingestion - Header was modified.
- Section 06: Notification Procedures - Header was modified.
- Section 01: Product Code was modified.
- Section 10 Stability and Reactivity - Header was modified.
- Section 13: Disposal Recommendations - Note was modified.
- Section 09: Evaporation Rate - Header was modified.
- Section 08: Personal Protection - Header was modified.
- Section 08: Personal Protection was modified.
- Section 11: Inhalation Lethality Test Data was modified.
- Section 05: Hazardous Combustion Products was modified.
- Section 09: Relative Density - Header was modified.
- Section 09: Viscosity was modified.
- Section 14: Transport Document Name was modified.
- Section 14: Proper Shipping Name was modified.
- Section 14: Label(s) - Header was modified.
- Section 14: Proper Shipping Name was modified.
- Section 14: Proper Shipping Name was modified.
- Section 14: Transport Document Name was modified.
- Composition: Component Table was modified.
- Section 15: List Citations Table was modified.
- Section 11: Tox List Cited Table was modified.
- Section 15: List Citation Table - Header was modified.
- Section 15: SARA (313) TOXIC RELEASE INVENTORY - Table was modified.
- Section 16: Materials Covered was modified.
- Composition: Component Table was modified.
- Section 16: Precautions - Header was modified.
- Section 16: NA Contains was modified.
- Section 08: Exposure Limits Table was modified.
- Section 08: OEL Table - Notation Column - Header was modified.
- Section 08: Exposure Limit Values - Header was modified.
- Section 14: Marine Pollutant - Header was added.
- Section 14: Marine Pollutant was added.
- Section 14: Marine Pollutant - Header was added.
- Section 14: Marine Pollutant was added.
- Section 08: Exposure limits/standards was deleted.

THIS MSDS COVERS THE FOLLOWING MATERIALS: ESSO EXTRA MIDGRADE UNLEADED | ESSO MIDGRADE UNLEADED | ESSO PREMIUM UNLEADED | ESSO REGULAR UNLEADED | ESSO SUPER PREMIUM UNLEADED | EXXON MIDGRADE UNLEADED | EXXON PREMIUM UNLEADED | EXXON REGULAR UNLEADED | Gasoline | INDOLENE GASOLINE | MIDGRADE UNLEADED | MOBIL EXTRA UNLEADED | MOBIL REGULAR UNLEADED | MOBIL SPECIAL UNLEADED | MOBIL SUPER UNLEADED | PREMIUM UNLEADED | REGULAR UNLEADED | UNLEADED GASOLINE

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PRECAUTIONARY LABEL TEXT:

Contains: BENZENE, Gasoline

DANGER!

HEALTH HAZARDS

Irritating to skin. If swallowed, may be aspirated and cause lung damage. Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).

Target Organs: Lung | Skin |

PHYSICAL HAZARDS

Extremely flammable. Material can accumulate static charges which may cause an incendiary electrical discharge. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

Precautions

Avoid breathing mists or vapors. Avoid contact with skin. Use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Use proper bonding and/or grounding procedures.

FIRST AID

Inhalation: Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Eye: Flush thoroughly with water. If irritation occurs, get medical assistance.

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

FIRE FIGHTING MEDIA

Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

SPILL/LEAK

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Recover by pumping or with suitable absorbent.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm. Chemicals known to the State of California to cause cancer, birth defects, or other



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reproductive harm are created by the combustion of this product.

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Internal Use Only

MHC: 1A, 0, 0, 0, 3, 1

PPEC: CF

DGN: 2000316XUS (1011203)

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This product contains isobutylene, oxygen and nitrogen, substances subject to the Pennsylvania Worker and Community Right-To-Know Act.

PRODUCT IDENTITY

LABEL IDENTITY - MSA P/N 10028038 Calibration Check Gas, 100 ppm Isobutylene in Air
CHEMICAL NAME - Isobutylene, Oxygen, Nitrogen Mixture
ADDITIONAL IDENTITIES - MSA P/N 10028038 Calibration Gas
FORMULA - C₄H₈ in Air

APPLICABLE CHEMICAL CONTENTS

	<u>ppm</u>	<u>TWA</u>
Isobutylene (CAS 115-11-7)	100	None
Air	Balance	None

NOTE: Gas under pressure, 1000 PSIG at 70°F, Approx. 100 Liters gas at atmospheric pressure

PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR - Colorless odorless gas.
BOILING POINT - N/A
VAPOR PRESSURE - N/A
VAPOR DENSITY (AIR = 1) - > 1
SOLUBILITY IN WATER - Isobutylene - Insoluble
Oxygen - 3.2 cm³/100 ml (25°C)
Nitrogen - 2.3 cm³/100 ml (0°C)
SPECIFIC GRAVITY (H₂O = 1) - N/A
PERCENT VOLATILE BY VOLUME - N/A

N/A - Not Applicable

PHYSICAL HAZARD INFORMATION

PHYSICAL HAZARD - Compressed gas, 1000 PSIG at 70°F
CONDITIONS OR MATERIALS TO AVOID - None
FLASH POINT - N/A LEL - N/A UEL - N/A
EXTINGUISHING MEDIA - This calibration gas mixture is not flammable. Use extinguishing media appropriate to surrounding fire.
SPECIAL FIRE FIGHTING PROCEDURES - See Next Item
UNUSUAL FIRE AND EXPLOSION HAZARDS - Gas under pressure, 1000 PSIG at 70°F. Do not exceed 120°F.

HEALTH HAZARDS

HEALTH HAZARDS - None Known for 100 ppm Isobutylene in Air. Isobutylene Inhalation Rat LC50: 620 Gm/M³/4H. Isobutylene Inhalation Mouse LC50: 415 gm/M³/2H.

SIGNS AND SYMPTOMS OF EXPOSURE - N/A to this gas mixture.

PRIMARY ROUTES OF ENTRY - Inhalation

TARGET ORGANS - Isobutylene is an asphyxiant, which displaces oxygen in the environment..

MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE - No information

EXPOSURE LIMITS - None (ACGIH 2009)

CARCINOGENICITY DATA - Component gases are not listed by NIOSH RTECS, OSHA, NTP or IARC.

EMERGENCY AND FIRST AID PROCEDURES - None

SAFE HANDLING AND USE

HYGIENIC PRACTICES - Avoid breathing gas.

PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT - N/A

PROCEDURES FOR SPILL OR LEAK CLEANUP - Ventilate area

WASTE DISPOSAL - Do not puncture or incinerate cylinder. Before discarding cylinder, slowly release contents to a safe exhaust. Dispose of cylinder in accordance with local, state and federal regulations

STORAGE - Store in a cool, dry, well-ventilated area. Do not exceed 120°F.

CONTROL MEASURES

PERSONAL PROTECTIVE EQUIPMENT - Due to the limited amount of gas in the cylinder, and the low release rate employed in instrument calibration, respiratory protection is not indicated under conditions of intended use.

ENGINEERING CONTROLS - Mechanical ventilation is suitable.

WORK PRACTICES - Avoid breathing gas. Use in well-ventilated areas. Follow the calibration procedure detailed in the MSA instruction manual provided with the instrument under calibration.

DATE OF PREPARATION - Rev. 2, April 2009

WARNING: This is a hazardous chemical product. By following the directions and warnings provided with this product, the hazards associated with the use of this product can be greatly reduced but never entirely eliminated. Mine Safety Appliances Company makes no warranties, expressed or implied, with respect to this product and EXPRESSLY DISCLAIMS THE WARRANTY OF MERCHANTABILITY AND ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. Users assume all risks in handling, using or storing this product.