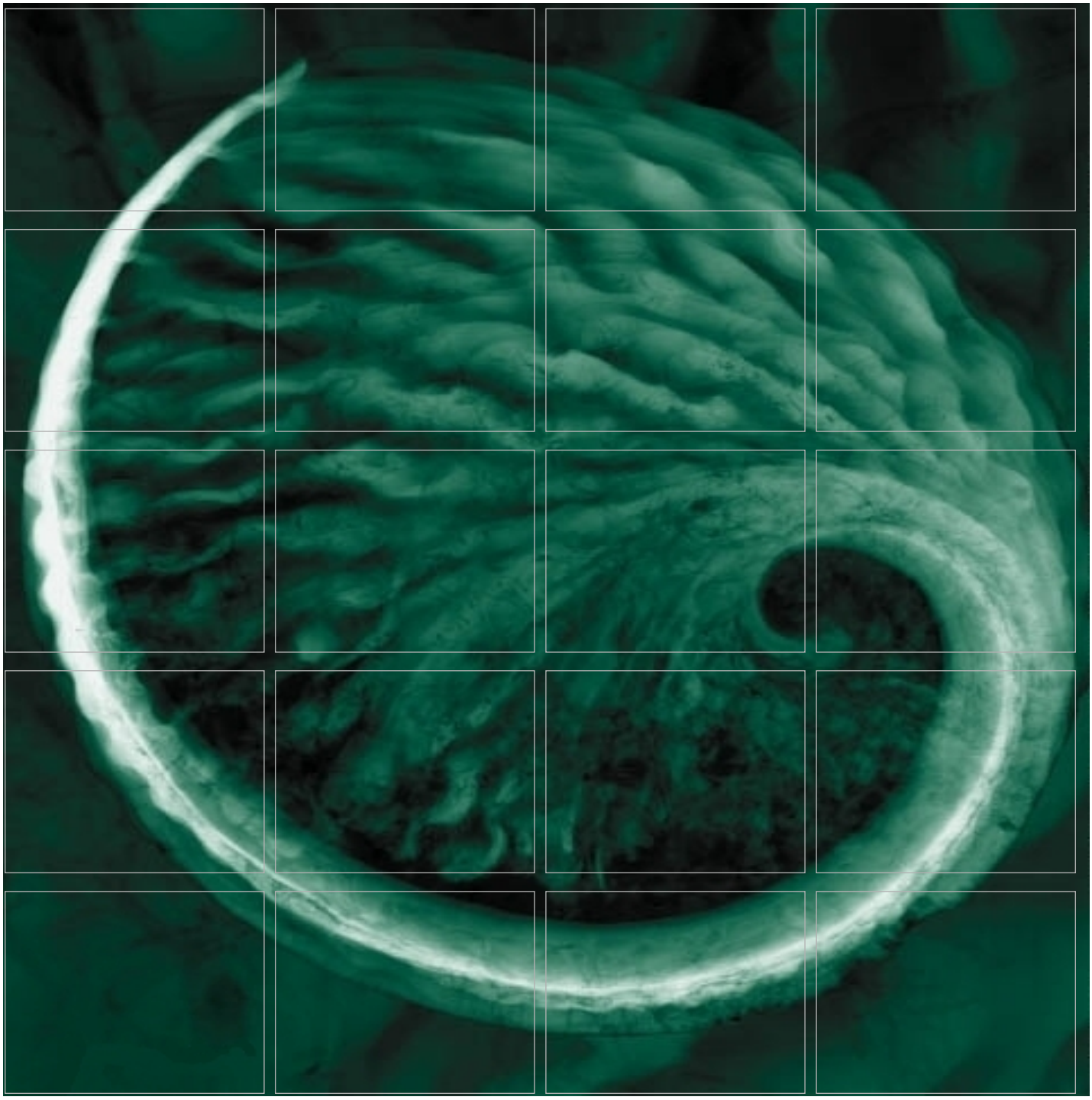

Operable Unit 1
Health & Safety Contingency Plan

Fulton Avenue Superfund Site
150 Fulton Avenue
Garden City Park, Nassau County, New York

October 2011

www.erm.com

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Project No. 0097881

Jim Perazzo, PG

Partner-in-Charge

Chris W. Wenczel

Principal Consultant/Project Manager

Justin Bunton, ASP

Project H&S Consultant

ERM
40 Marcus Drive, Suite 200
Melville, NY 11747
631-756-8900

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SITE-SPECIFIC HEALTH AND SAFETY PLAN

ERM developed the following Health and Safety Contingency Plan (HASCP) for use by ERM personnel and by ERM contractors (individually, an "ERM Contractor" and collectively, "ERM Contractors"). ERM personnel must adhere to the practices and procedures specified in the HASCP. Each ERM Contractor must review the HASCP and agree to accept and abide by the HASCP, subject to any modifications to the HASCP (to address the ERM Contractor's more stringent practices and procedures) agreed upon in writing by ERM and the ERM Contractor. The ERM Contractor shall indicate such acceptance by signing this document prior to commencing work at the Site. However, if any ERM Contractor commences work at the Site, the ERM Contractor shall be deemed to have accepted the HASCP and the terms hereof and the failure to execute and return to ERM a copy of this notice shall not be relevant to such interpretation.

If a contractor or a person other than the Client, ERM employees and ERM Contractors (individually, a "Third Party" and collectively, "Third Parties") receives a copy of the HASCP, such Third Party should not assume that the HASCP is appropriate for the activities being conducted by the Third Party.

NO THIRD PARTY HAS THE RIGHT TO RELY ON THE HASCP. EACH THIRD PARTY SHOULD ABIDE BY ITS OWN SITE-SPECIFIC HEALTH AND SAFETY PLAN IN ACCORDANCE WITH ITS OWN PROFESSIONAL JUDGMENT AND ESTABLISHED PRACTICES.

ERM shall not be responsible for the implementation of any Third Party safety program(s), except to the extent otherwise expressly agreed upon by ERM and a Third Party in writing. The services performed by ERM for the Client and any right of the client and/or an ERM Contractor to rely on the HASCP shall in no way inure to the benefit of any Third Party, including, but not limited to, employees, agents, or consultants and subcontractors of ERM Contractors, so as to give rise to any cause of action by such Third Party against ERM.

The HASCP generated by ERM in connection with the Project is for use on a specific site and in connection with a specific project. ERM makes no representation or warranty as to the suitability of the HASCP for reuse on another site or as to the suitability of the HASCP for reuse on another project or for modifications made by the Client or a Third Party to the HASCP.

All entrants to portions of the jobsite controlled by ERM must sign the HASCP. Signing below certifies understanding and willingness to comply with the contents of this HASCP. ERM has prepared this plan solely for the purpose of protecting the health and safety of ERM employees. Subcontractors, visitors, and others at the site are required to follow provisions in this document at a minimum, but must refer to their organization's health and safety program for their protection.

Printed Name	Signature	Company	Date

1.0 PROJECT AND SITE INFORMATION

1.1 GENERAL PROJECT INFORMATION

ERM developed this HASCP for use on the Fulton Avenue Superfund Site Operable Unit 1 (OU1) Remedial Design (RD) and Remedial Action (RA) project.

The OU1 Remedy consists of two key components to actively address groundwater impacts directly attributable to the Avenue Superfund Site: 1) In-situ chemical oxidation (ISCO) treatment of the shallower groundwater at and near the 150 Fulton Avenue Property, and 2) extraction and treatment of PCE-impacted groundwater from the deeper Magothy aquifer at locations upgradient of impacted supply wells operated by the Garden City Water District (Well Nos. 13 & 14) followed by subsequent recharge of the treated groundwater to the Upper Glacial aquifer. Subsequent short-term performance and long-term effectiveness groundwater monitoring will be required

1.2 SITE DESCRIPTION & HISTORY

The property located at 150 Fulton Avenue, Garden City Park, Nassau County, New York (hereinafter, "the Fulton Avenue Property") is owned by Gordon Atlantic Corporation. It is located within the Garden City Park Industrial Area (GCPIA), Village of Garden City Park, Town of North Hempstead (TNH), Nassau County, New York. Figure 1 of the OU1 RD Work Plan shows the location of the 150 Fulton Avenue Property.

The Fulton Avenue Property has been identified as a contributing source of Tetrachloroethene (PCE) contamination of groundwater beneath the Site creating PCE-dominant contamination in the Upper Glacial and Magothy aquifers which extends to the southwest, impacting certain public supply wells owned by the Incorporated Village of Garden City (Garden City).

The Fulton Avenue Property is listed on the Registry of Inactive Hazardous Waste Disposal Sites in New York State (Registry) as Site Number 130073. The United States Environmental Protection Agency (USEPA) also included the Fulton Avenue Property on the National Priorities List (NPL) of Federal Superfund Sites as part of USEPA's Fulton Avenue Superfund Site in April 1998.

The New York State Department of Environmental Conservation (NYSDEC) defines the "Site" as the 0.8-acre Fulton Avenue Property and environmental conditions, including groundwater contamination that has migrated beyond the property boundary (the "NYSDEC Site").

In contrast, the USEPA 28 September 2007 Record of Decision (ROD) states:

> "*The Fulton Avenue Superfund Site (the Site) includes a 0.8-acre property located at 150 Fulton Avenue, Garden City Park, Nassau County, New York (hereinafter, the Fulton Property), all contamination emanating from the Fulton Property, as well all other contamination impacting the groundwater in the vicinity of the Fulton Property including an overlapping trichloroethene (TCE)-*

dominant plume in the Upper Glacial and Magothy aquifers, whose origin is currently unknown, and all sources of this contamination."

For clarity, it should be noted that USEPA views the VOC impacts in groundwater at Garden City public supply wells Nos. 9, 13 & 14 as the result of one regional plume containing contamination from multiple sources, some known and some unknown as reported in the 2005 Remedial Investigation Report. Hereafter, this OU1 Construction HASCP will refer to TCE- or PCE-dominant *portions of the* plume.

Between 1966 and 1977, several businesses conducted dry cleaning operations at the Site, and at some unknown time during this period, tetrachloroethene (a.k.a. perchloroethene or {PCE}) was apparently discharged to an on-Site storm water drywell. Studies indicate that groundwater beneath and downgradient of the GCPIA was found to be primarily impacted by the following chlorinated volatile organic compounds (VOCs):, PCE, trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE) and 1,1,1-trichloroethane (1,1,1-TCA).

The source of the PCE contamination at the Fulton Property was identified as a former drywell which was subject to an interim remedial measure (IRM) that involved soil/sediment removal, air sparging (AS) and soil vapor extraction (SVE). The former dry well was closed as part of the IRM. The IRM removed an estimated 10,000 lbs of PCE during its period of operation (1999 – 2001). A sub-slab depressurization system was installed beneath the building at the conclusion of the Soil IRM to mitigate the potential for intrusion of soil vapor containing residual PCE into the existing building.

Between 1999 – 2006, a Remedial Investigation (RI), Exposure Pathways Analysis, Baseline Risk Assessment, and a Feasibility Study (FS) (collectively an "RI/FS") was performed under a NYSDEC Administrative Order on Consent (AOC), Index # W1-0707-94-08. The RI/FS focused on environmental conditions at the Fulton Avenue Property and contamination that has migrated beyond the property boundary.

The RI and FS Reports were reviewed by NYSDEC and USEPA, and approved under the AOC. At that point in time, lead-agency status changed from NYSDEC to USEPA. USEPA subsequently developed a Proposed Remedial Action Plan (PRAP) for OU1 which, following a public comment period, was finalized and presented a selected remedy in a Record of Decision (ROD) issued on 28 September 2007. The ROD defines OU1 as follows, "…includes a 0.8-acre property located at 150 Fulton Avenue, Garden City Park, Nassau County, New York (hereinafter, the Fulton Property), all contamination emanating from the Fulton Property, as well all other contamination impacting the groundwater in the vicinity of the Fulton Property including an overlapping TCE-dominant plume in the Upper Glacial and Magothy aquifers, whose origin is currently unknown, and all sources of this contamination."

During 2007 – 2009, USEPA issued a Statement of Work (SOW) for the OU1 RA and commenced negotiation with a number of potentially responsible parties (PRPs) to implement the RA set forth in the OU1 ROD. One of the identified

PRPs, Genesco Inc. (Respondent) agreed to implement the OU1 RA and entered into a Consent Judgment (CJ) with USEPA.

The CJ (USEPA CJ No. CV–09–3917) and attached SOW were lodged with the United States District Court for the Eastern District of New York on 10 September 2009. Notice of the same inviting public comment was published in the Federal Register / Vol. 74, No. 179, 17 September 2009. On 18 November 2009, USEPA issued notice to proceed initiating the OU1 RD and subsequent implementation of the OU1 RA.

This OU1 Health and Safety Contingency Plan (HASCP) is an integral part of the OU1 Remedial Design (RD) Work Plan. The HASCP establishes ERM's occupational health and safety requirements, responsibilities and procedures to protect workers during the OU1 RD pre-design and design studies, groundwater monitoring and OU1 RA construction activities. The HASCP is a dynamic document that will be subject to revision as the OU1 RD/RA progresses. Revisions will likely be required to address changes in regulatory requirements or field conditions to ensure the protection of Site workers and the public.

1.2 CLIENT-SPECIFIC HEALTH & SAFETY REQUIREMENTS

There are no client-specific requirements for the work governed by this HASCP, other than those described in subsequent sections below.

2.0 KEY PROJECT PERSONNEL AND RESPONSIBILITIES

Table 2-1 includes the roles, names, contact information, and responsibilities of ERM personnel, ERM Contractors, and other individuals associated with the health and safety leadership of this project. This page must be posted on-site.

TABLE 2-1: Key Project Health & Safety Personnel

Role	*Person*	*Contact Information*	*Responsibilities*
Partner-In-Charge (PIC)	Jim Perazzo	Office: 631-756-8900 Mobile: 516-353-8849 E-mail: jim.perazzo@erm.com	Final authority in approving the HASCP and ensuring that the project team is supplied with the training, equipment and materials necessary for a safe work environment.
Project Manager (PM) or Construction Manager (CM)	Chris Wenczel	Office: 631-756-8900 Mobile: 516-315-8221 E-mail: chris.wenczel@erm.com	Implementing the requirements of the ERM Health & Safety Program on this project and maintaining management awareness of the project's health and safety status. Provide H&S leadership during project performance.
Field Safety Officer (FSO)	Justin Bunton (or designee)	Office: 860-466-8500 Mobile: 860-508-3239 E-mail: justin.bunton@erm.com	Assist the PM/CM by implementing HASCP on a day-to-day basis. Recognize significant H&S hazards and utilize STOP WORK authority when appropriate.
Subject Matter Expert	John Kuhn	Office: 716-633-3460 Mobile: 585-820-3957 E-mail: john.kuhn@erm.com	Assist in the recognition, evaluation, and control of hazards associated with the site.
ERM Employees	Listed on Signature Page	N/A	ERM employees will fully participate in the implementation of the HASCP by obtaining necessary training, attending site safety meetings, wearing designated PPE, complying with site H&S rules, and advising the FSO of H&S concerns at the site.
Client Contact	Roger Sisson, Esq.	Office: 615-367-7000	
Subcontractor Safety Contact	TBD before Mobilization	Office: Mobile: E-mail:	
Emergency Spill Response Contractor	TBD before Mobilization	Office:	
Local First Responders	Local Fire/Police	Office: 911	
Local Hospital (attach map)	Winthrop-University Hospital	Office: 516-663-0333	
Work Care/ Accident Intervention		1-888-449-7787	

3.0 EMPLOYEE TRAINING AND MEDICAL SURVEILLANCE REQUIREMENTS

All ERM and ERM Contractor personnel working on-site (including their on-site supervisors) who may be exposed to hazardous substances, health hazards, or safety hazards will not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility, and medically qualified to perform the work. Prior to mobilization, all site workers are required to have the following training and medical surveillance:

- Training meeting the requirements of 29 CFR 1910.120 or 29 CFR 1926.65 (as applicable), *Hazardous Waste Operations and Emergency Response (HAZWOPER)*;
- Site-specific permanganate safety training;
- Site-specific compressed gas safety training.

The PM/CM and FSO must possess additional training, as described below:

- ERM FSO training

The PM/CM will verify that site personnel have received all appropriate training as required by this HASCP prior to their arriving on-site by reviewing written training documentation. Copies of the written training documentation will be retained in the project file. ERM Contractor personnel will not be allowed to work at the site unless said training documentation is available.

4.0 FIELD ACTIVITIES

4.1 MAJOR PROJECT TASKS

Major tasks to be performed by ERM personnel include the following:

- Oversight of ISCO system installation;
- Perform ISCO injections;
- Oversight of trenching and excavation;
- Oversight of groundwater extraction, treatment and recharge systems installation;
- Oversight of extraction well vault installation;
- Oversight of extraction well installations;
- Oversight of treatment facilities construction; and
- Groundwater sampling.

Major tasks to be performed by ERM contractor personnel include the following:

- ISCO system installation;
- Trenching and excavation activities;
- Groundwater extraction, treatment and recharge systems installation;
- Extraction well installations;
- Well vault installation; and
- Treatment facilities construction.

Each of the tasks above has a Safe Work Practice (SWP) associated with it, or Job Hazard Analysis (JHA) prepared for it. SWPs and JHAs are further described below.

4.2 SITE PERSONNEL JOB TASKS & CERTIFICATION REQUIREMENTS

Workers with the following job descriptions will be engaged in activities conducted at the site.

Excavator Operator - The excavator operator operates the excavator from within the boundaries of each impoundment. The work is performed approximately eight hours per working day

Truck Driver - The truck driver operates the vehicle from the cab. Trucks are utilized for hauling excavated materials. The work is performed approximately eight hours per working day.

Laborers – Field laborers will be utilized during completion of all work activities. In addition to providing assistance where needed for those activities listed in Section 4.1, other work duties will include, but are not limited to, construction of site structures (decontamination pad, trailer set up/renovation), welding, saw

cutting, operation of stormwater pumps, equipment decontamination, and general site and equipment upkeep and maintenance.

Excavation/Trenching Competent Person(s)- One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Other visitors to the site not directly involved in proposed work activities (i.e., various Terminal employees and contractors) will be considered in the HASCP as technical personnel listed above.

5.0 HAZARD IDENTIFICATION AND CONTROL

5.1 JOB HAZARD ANALYSES

Prior to initiating any new project activity not covered by a Safe Work Practice, or when there is a change in site conditions, the FSO will assist project team members in completing a Job Hazard Analysis (JHA). The JHA will list the hazards associated with the project activity as well as associated control strategies. JHAs for the tasks listed in Section 4.1, as well as a blank copy of the JHA form, are located in Appendix B.

5.2 SAFE WORK PRACTICES

ERM has established Safe Work Practices (SWP) which define minimum requirements for controlling hazards related to the work and surroundings for specific work tasks commonly by ERM employees. As such, jobsite tasks whose hazards are identified and controlled by use of a SWP do not require JHAs to be developed for them. Copies of the SWPs that have been identified as pertinent to the hazards inherent in the work for this project are identified in the table of contents and have been included in the Attachments section of this document.

5.3 SITE INSPECTIONS

The FSO or designee will inspect the job site at least once per day using the Site Walk Checklist in Appendix D as a guide. Completed checklists will be retained in the site safety file.

5.4 BEHAVIOR-BASED SAFETY

Everyone on-site as part of this project will make a commitment to work safely and to look out for others on the job site. A tool will be used to help ERM personnel and ERM Contractors to think about the safety related aspects of the work at hand, as described in applicable JHAs.

Prior to the start of each work day, workers will complete a Personal Safety Contract (PSC). By completing their PSCs each day, site workers agree to make a daily commitment to their own safety and the safety of those around them. The PSC helps workers think about proper work techniques, appropriate PPE, and ambient site conditions immediately prior to beginning a work task. The PSC for a particular task is based on the JHA developed for that task. A copy of the PSC is located in Appendix E. All PSCs must be turned in to the FSO at the end of the work day or shift.

5.5 STOP WORK AUTHORITY

It is ERM policy that all site personnel have the authority, without fear of reprimand or retaliation to:

- **Immediately** stop any work activity that presents a danger to the site team or the public; and

- Get involved, question, and rectify any situation or work activity that is identified as not being in compliance with the HASCP or with broader ERM health & safety policies.

All site personnel are empowered to identify and correct Unsafe Acts, Unsafe Conditions and Near Misses before they can cause an Incident (see Section 13). After all:

You see it, you own it!

If someone utilizes their Stop Work Authority, then work can only be restarted by the FSO, in concert with the CM/PM, PIC and ERM Coordinator.

5.6 CHEMICAL HAZARDS

Chemicals may be introduced into the body by ingestion, inhalation, or absorption through the skin. Since not all chemicals have the same level of toxicity, the length of time for the exposure and the concentration of the chemical are important in determining the risk. Inhalation and skin contact are the most common routes of entry. Chemicals can be introduced into the body by ingestion when chemicals present on the hands are transferred to food or cigarettes.

Based on historical soil and groundwater sampling, the following constituents of concern listed in Table 5-1, as well as chemicals brought to the site by ERM or contractors listed in Table 5-2 may be encountered at the site. Material Safety Data Sheets for the constituents of concern are located in Appendix G.

TABLE 5-1: Constituents of Concern

PCE
TCE
1,2 DCE
1,1,1 TCA

Table 5-2 shows chemicals that are routinely used by ERM at the site as part of the project. The MSDS for these chemicals are located in Appendix G.

TABLE 5-2: Chemicals Used for Project Execution

- Isopropyl Alcohol
- Liquinox
- Gasoline
- Diesel
- Hydrogen Peroxide (35% solution)
- Sodium Thiosulfate
- PVC Cement
- Isobutylene Balance Air (calibration gas)
- Potassium Permanganate
- Sodium Permanganate
- Acetic Acid (household vinegar)
- Compressed Nitrogen Gas

5.7 AMBIENT AIR MONITORING

Ambient air monitoring should be conducted by the FSO when there is a question of employee exposure to hazardous concentrations of substances to assure the proper selection of engineering controls, work practices, and PPE.

Additional monitoring should be conducted under any of the following circumstances.

- Work begins on a different portion of the site;
- Change in job tasks;
- Change in weather;
- Change in ambient levels of hazardous constituents as indicated by the sense of smell or changes in the physical appearance of the soil or groundwater;
- When new hazardous substances are encountered; and
- During high-risk operations (e.g. drum opening, or handling of leaking drums, or when working in areas with obvious liquid contamination).

Ambient air monitoring will be conducted using direct-reading, real-time instruments as indicated in Table 5-3. If more that one instrument is listed, either instrument may be chosen. Not all work at the site will require ambient air monitoring for all contaminants. During the mobilization phase of a particular project task or activity, either the PM or the FSO will determine what contaminants may be encountered in order to have the appropriate instrumentation on-site. The Project Health and Safety Consultant is available to assist the PM or the FSO in determining the appropriate instrumentation.

TABLE 5-3: Ambient Air Monitoring Instruments

Constituent	***Instrument***
Organics	OVM Model 580B with 10.6 eV lamp or MiniRae 2000 with 10.6 eV lamp or equivalent – if you are unsure what kind of organic vapor monitor to use based on the contaminants of concern, contact your OpCo H&S representative. Remember, straight chain hydrocarbons do not register well on PID units and a FID may be required.

Direct reading instrumentation will be calibrated daily per manufacturer's instructions. Cylinders of the appropriate calibration gas will be required for fieldwork lasting longer than one day.

Under stable site conditions, ambient air monitoring will be conducted at least once every two hours in the workers' breathing zone and at other locations based on the professional judgment of the FSO or the Subject Matter Expert. Ambient air monitoring results will be recorded on the Ambient Air Monitoring Form found in Appendix H. If site conditions become unstable or change dramatically, ambient air monitoring will be conducted more frequently based on the professional judgment of the FSO or the Subject Matter Expert.

Table 5-4 outlines the steps to be taken by the FSO when the action levels of the various contaminants are exceeded. Respiratory protection is selected based on occupational exposure limits of the constituents at the site and the potential for exposure to vapors and dust from site activities.

TABLE 5-4: Action Levels and Response Actions Requirements

Chemical	*Action Level*	*Response Actions*
Organics	PID reads 25 ppm sustained in the breathing zone for 1 minute	Stop work and workers leave immediate area • FSO evaluates need for Tyvek coveralls, dons half-face respirator with organic vapor cartridges and monitors again after allowing vapors to dissipate. • If readings are less than 25 ppm, resume work. • If readings are 25 ppm or greater, contact project PIC, PM and H&S Officer to evaluate control options
	PID reads 50 ppm sustained in the breathing zone for 1 minute	• Stop work and workers leave immediate area. • Contact PM and Subject Matter Expert. • Evaluation work practices and assess engineering controls to reduce airborne concentrations. • FSO waits 15 minutes, evaluates need for Tyvek covers, dons half-face respirator with organic vapor cartridges, approaches work area slowly, if PID reaches 50 ppm, back out and wait an additional 15 minutes before repeating monitoring.

6.0 PERSONAL PROTECTIVE EQUIPMENT

The level of PPE selected for a task is based on the following:

- Type and measured concentration of the chemical substance in the ambient atmosphere and its toxicity;
- Potential for exposure to substances in air, splashes of liquids, or other direct contact with material due to work being done; and
- Knowledge of chemicals on-site along with properties such as toxicity, route of exposure, and contaminant matrix.

In situations where the type of chemical, concentration, and possibilities of contact are not known, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be better identified.

In addition to summarizing the general PPE requirements for tasks performed at the site, Table 6-1 also serves as the written certification that the PPE Hazard Assessment has been conducted. The signature page containing the client's name, project name and number, date and signatures of the parties responsible for the development of the HASCP also serve as part of the written certification.

6.1 RESPIRATORY PROTECTION

The type of respiratory protection required will be based on the results of ambient air monitoring, the results of any models used to predict ambient air concentrations, and the professional judgment of either the FSO or the Project Health and Safety Consultant. Respiratory protection requirements are outlined on Table 5-4, above.

TABLE 6-1: Personal Protection Equipment Requirements

PPE Level	*Ensemble Components*	*Tasks Requiring Use*
Level D Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.	• Long pants and shirt with sleeves. • Safety-toed footwear. • Safety glasses with molded side shields. • Hard hat. • General purpose work gloves if task does not involve water or wet materials. • Hearing protection. • High visibility traffic vest. • Nitrile Gloves	ISCO system installation Trenching and excavation activities Pump and Treat system installation Recovery well installation Groundwater sampling
Modified Level D	Level D and the following (as appropriate): • Disposal Tyvek coveralls. • Safety-toed rubber boots or disposable boot covers over shoes. • Thin nitrile gloves.	ISCO Injection Well vault installation

	• Green nitrile gloves over thin nitrile gloves when primary gloves may tear or puncture. • Splash protective goggles • Face shields • Heat protective leather gloves and aprons • Welding shields or goggles	
Level C Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin prot1ection is needed.	Level D or Modified Level D and the following: • Air purifying respirator with combination organic vapor/high efficiency particular air (HEPA) cartridges.	Tasks requiring Level C PPE are not anticipated during this project. If Level C PPE is needed, as determined by the FSO and/or the Project Health and Safety Consultant, the HASCP will be revised.
Level B Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection is needed.	Not anticipated to be required	Tasks requiring Level B PPE are not anticipated during this project. If Level B PPE is needed, as determined by the FSO and/or the Project Health and Safety Consultant, the HASCP will be revised.
Level A Should be worn when the highest level of respiratory, skin, and eye protection is needed.	Not authorized for this project	Tasks requiring Level A PPE are not authorized during this project. If Level A PPE is needed, as determined by the FSO and/or the Project Health and Safety Consultant, contact the North America H&S Leader for assistance.

7.0 MEDICAL SUPPORT REQUIREMENTS

First aid supplies will be made available to all personnel on-site. A list of first-aid supplies on-hand at the project site include:

- Construction bulk first-aid kit (for up to 10 people at minimum).
- Temporary eyewash station will be set up on site and maintained as needed.

For the duration of the project, at least one individual currently certified to render emergency first aid and/or CPR will be present during all work activities. Additional medical surveillance will be provided for employees who are injured, become ill, or develop signs or symptoms due to possible exposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

8.0 SITE INFRASTRUCTURE, CONTROL, AND GENERAL RULES

8.1 INFRASTRUCTURE

8.1.1 Smoking and Eating Areas

Smoking will only be allowed in designated areas. Upon mobilization at the site, the FSO will establish smoking areas per site-specific or client-specific requirements. Individuals caught smoking outside the designated smoking areas will be subject to disciplinary action.

Upon mobilization at the site, the FSO will establish eating and break areas per site-specific or client-specific requirements. Eating will only be allowed in the designated areas and the areas will be maintained in a clean and sanitary condition. Employees will wash their hands before entering eating areas.

8.1.2 Sanitation and Potable Water

Containers used for drinking water will be equipped with a tap and capable of being tightly closed. In addition, the container will be labeled as "Drinking Water" or "Potable Water." Disposal cups will be stored in a sanitary condition and a receptacle for disposing of the cups will be near-by.

Potable and non-potable water containers and portable toilets (if used) will comply with OSHA 29 CFR 1910.141 requirements.

8.1.3 Temporary Facilities

Temporary sanitary facilities will be made available in each work area upon site mobilization.

Trailers and other temporary structures used as field offices or for storage will be anchored with rods and cables or by steel straps to ground anchors. The anchor system will be designed to withstand winds and must meet applicable state or local regulations for the anchoring of mobile trailer homes.

All temporary facilities will be maintained in a clean and sanitary condition to discourage the entrance of rodents or vermin. If rodents or vermin become an issue, the FSO will be responsible for implementing an extermination program per site-specific or client-specific guidelines.

8.1.4 Safety Equipment

A first aid kit containing first aid items for minor incidents only, a fire extinguisher, and air horn are all maintained on each ERM site. ERM will ensure at least one member of the on site field staff is trained in First Aid and CPR.

The FSO will be responsible for ensuring that all fire extinguishers are inspected monthly as required by 29 CFR 1910.157 *Portable Fire Extinguishers*. The monthly inspections will be documented on a tag attached to each extinguisher or a master list of fire extinguishers and their location. If the duration of the project

exceeds one year, the FSO will contract with an outside vendor to perform the annual maintenance on all fire extinguishers.

Eye wash stations will be located at the following designated locations:

- Temporary eyewash stations will be set up where necessary during the ISCO injection phase of the project.

8.1.5 Communications

Cell Phones will be used as the primary means of communication between the project team members, contractors, and the client.

8.2 SITE CONTROL

Access to site activities is limited to authorized personnel (i.e., ERM, Subcontractors, Client Representatives, and Regulatory Agents). The names of ERM employees, Subcontractors, Client Representatives, and Regulatory Agents working at or visiting any work site shall be recorded in the field logbook.

Residents often wander into work area. Coning or taping off work areas will help to keep unauthorized personnel out of these areas. All ERM employees working in this area should have cell phones on their person, turned on, and the project team should have each other's numbers to facilitate communication.

During the ISCO portion of the project in order to minimize both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, work areas where intrusive site activities are conducted will be appropriately and clearly identified. The FSO will be responsible for establishing the following zones:

- The Exclusion Zone or "Hot" zone (EZ);
- Contamination Reduction Zone (CRZ); and
- The Support Zone.

Areas used for staging, storage, and mixing will be clearly identified to prohibit untrained personnel from entering those areas.

Eating, drinking, and smoking are prohibited in the EZ and CRZ with the exception of consuming fluids for rehydration purposes in the CRZ. When providing fluids for rehydration, single use disposable cups should be used to prevent contaminating "clean areas".

All open excavations or trenches will barricaded in a manner to keep unauthorized personnel away from the area. Open trenches and excavations left overnight must be fenced or barricaded to prevent access to the area.

Any work to be performed in the public roadway will be done with assistance of the Garden City Police (GCP) who will provide traffic control. Anyone working in or crossing into the public roadway must don a reflective traffic vest and cross

with extreme caution, following any applicable traffic laws or instructions from the GPC.

Appropriate signage describing possible hazards and PPE requirements for each area of the site must be posted. Areas requiring signage include:

- ISCO chemical storage;
- ISCO treatment area;
- Treatment system housing;
- Site Entrance
- CRZ, EZ, SZ (during ISCO)

Refer ***ALL*** questions from interested persons such as residents, business owners, etc. to Chris Wenczel of ERM-Melville (631) 756-8900.

If, during the course of work, you are approached by individuals and a threat or confrontation is perceived, telephone the Garden City Police Department and request immediate assistance.

8.3 GENERAL SITE RULES

The following general rules will be adhered to at all times:

- All personnel entering the site must check in with the FSO.
- All personnel must sign in on the Daily Sign In sheet.
- All personnel entering the site must review the project HASCP and sign the HASCP acknowledgement page.
- All individuals entering the site must demonstrate to the FSO that they have been adequately trained as defined in Section 3.
- All individuals must be familiar with emergency communication methods and how to summon emergency assistance.
- Use of alcoholic beverages before, during operations, or immediately after hours is absolutely forbidden. Alcohol can reduce the ability to detoxify compounds absorbed into the body as the result of minor exposures and may have negative effects with exposure to other chemicals. In addition, alcoholic beverages will dehydrate the body and intensify the effects of heat stress.
- Horseplay of any type is forbidden.
- All unsafe conditions will be immediately reported to the FSO, who will document such conditions in the field log. The FSO will be responsible for ensuring that the unsafe condition is correctly as quickly as possible.
- No smoking, eating, chewing gum or tobacco, taking medication, or applying cosmetics in the Contamination Reduction Zone or the Exclusion Zone. Wash hands and face thoroughly prior to conducting the activities in the Support Zone.

- Smoking, matches, and lighters are only allowed in the designated smoking area.
- Avoid contact with potentially contaminated substances. Avoid, whenever possible, kneeling on the ground, or leaning or sitting on trucks, equipment, or the ground. Do not place equipment on potentially contaminated surfaces.
- If PPE becomes torn or saturated with contaminated material, immediately leave the Exclusion Zone, go through the decontamination steps, and replace the affected PPE. Additionally, wash any exposed skin thoroughly with soap and water.
- The FSO will be responsible for determining what site work can be performed safely in the rain and at what point work will cease due to either quality or safety issues. In the event of thunder and/or lightning, all work will be suspended until 15 minutes have elapsed from the last clap of thunder or flash of lightning. During rain, lightning and/or thunder events, site workers should seek shelter in either a building or vehicle. In the event of a tornado, site workers should seek shelter in a building, expect trailers, or in a low-lying area.

9.0 DECONTAMINATION PROCEDURES

Decontamination involves the orderly controlled removal of contaminants from both personnel and equipment. The purpose of decontamination procedures is to prevent the spreading of contaminated materials into uncontaminated areas. All site personnel should limit contact with contaminated soil, groundwater or equipment in order to reduce the need for extensive decontamination.

Equipment and materials used in the decontamination process may include the following:

- High pressure/hot water cleaning using only potable water/fire water;
- Phosphate-free detergent;
- Five-gallon bucket;
- Potable water;
- Distilled water;
- Paper towels; and
- Brushes.

9.1 PERSONNEL DECONTAMINATION

The following procedures will be utilized for personnel decontamination:

- Remove all PPE and dispose of the PPE in the designated drums or trash bags; and
- Wash hands and any skin that may have come in contact with affected soil or groundwater with moistened disposable towels, such as baby wipes, or soap and water.

9.2 EQUIPMENT DECONTAMINATION

The following will be required for equipment and tool decontamination:

- A decontamination area will be designated for cleaning all equipment that has been in contact with the site materials before leaving the site. All decontamination will be conducted on a pad with an impermeable synthetic liner and fluid-containment boom. Equipment will be placed on the pad and rinsed, brushed and/or steam cleaned to remove any contamination.
- Disposal of fluids generated from the decontamination process will be in accordance with approved work plans.
- Disposal of all solids collected within the decontamination pad and the pad liner will be in accordance with approved work plans.
- For major equipment, utilize a soap and/or water rinse and steam cleaning with temperature between 160 degrees to 180 degrees Fahrenheit with a pressure at or greater than 1,200 pounds per square inch (psi) will be the minimum required procedure.

10.0 SPILL CONTAINMENT PROGRAM

The spill contamination program for this project will involve the use of preventative measures in order to reduce the potential for environmental releases. These preventative measures will include the following:

- Equipment inspection;
- Staging equipment on containment pads;
- Secondary containment for fuel storage tanks; and
- General housekeeping practices.

If project activities involve the use of drums or other containers, the drums or containers will meet the appropriate DOT regulations and will be inspected and their integrity assured prior to being moved. Operations will be organized so as to minimize drum or container movement. Drums or containers that cannot be moved without failure will be over-packed into an appropriate container.

Further spill containment procedures are described below under ISCO Injection Section 11.1

11.0 PROJECT SPECIFIC TASKS

11.1 IN-SITU CHEMICAL OXIDATION (ISCO)

ISCO will be conducted in the Upper Glacial aquifer within the PCE-dominant portion of the plume. Approximately 10 chemical injection wells will be placed at and near the Fulton Property based on the results of the pre-remedial ISCO characterization activities. ISCO technology will be applied as an initial enhancement in the area at, and near the Fulton Property and two rounds of chemical injection are currently planned.

The purpose of ISCO would be to reduce the chemical mass in the PCE-dominant portion of the plume in the Upper Glacial aquifer. ISCO application at or near the Fulton Avenue Property would reduce or eliminate a secondary source (i.e., elevated PCE concentrations in shallow groundwater) before it is able to migrate into deeper portions of the aquifer.

ISCO provides an effective method for the destruction of organic compounds and is commonly used for treatment of chlorinated ethenes such as PCE, and TCE, (the target constituents). Permanganate directly mineralizes the above chlorinated solvents to chloride and carbon dioxide as illustrated in the following reaction for PCE and TCE.

Either potassium or sodium permanganate would be injected. Potassium permanganate could be applied as either a solid or solution and sodium permanganate could be applied as a solution. Design studies will be conducted in order to determine the most appropriate and affective oxidant to use.

11.1.1 Site Preparation

1. Conduct a Site briefing amongst all Site personnel to review procedures, hazards, personal protective equipment, emergency contacts and notification, team responsibilities and general logistics required for this application program;

2. Define and demark work zone with caution tape, cones and/or physical barriers to limit access to only approved and trained Site personnel who may enter the work area;

3. Set up spill supplies as needed - secure neutralization solution, setup equipment storage and lay-down areas;

4. Ensure the neutralization solutions for spill response are present in the immediate work area(s), with additional supplies provided as needed in remote locations;

5. Inspect all well head, plumbing and piping and injection gallery connections to ensure presence of gate valve, pressure gauge, flow meter and check valve;

6. Designate appropriate work areas for personnel access, egress and equipment decontamination areas;

7. Record all starting flow meter readings;

8. Ensure the completion of a clean water test prior to the charging of any lines with oxidant;

9. Ensure necessary PPE is available tyvek suits, booties, chemical resistant gloves, goggle and face shields; and

10. Eyewash stations are in place and operational.

11.1.2 Line Leak Testing Procedure (Clean Water Test)

The following describes the procedure to test all lines before any oxidant is placed into the lines. This "clean water" test will be used to ensure that leaks or unsecured connections are located and repaired prior to starting any permanganate dispensing.

1. Review the procedures, hazards, and personal protective equipment required for this task;

2. Replenish safety supplies as needed;

3. Don the proper PPE (safety glasses, splash shield, Tyvek suit, and over boots or equivalent);

4. Evaluate the potential for heat/cold stress;

5. Evaluate plumbing and connections; visually inspect to ensure that all pipes are properly connected, and that the flow direction is labeled; inspect valves to ensure operation and proper positioning for the leak test;

6. Close all the injection valves;

7. Fill the system with water and pressurize by running the transfer pumps, recycling effluent water back to holding tank;

8. Visually inspect piping/equipment connections for leaks, and repair as needed; do not proceed with operation until any identified leaks are resolved. Inspect each piping run to the final distribution manifold, as appropriate;

9. Drain the water from the system; and

10. Close all valves and document leak test results.

11.1.3 Emergency Response and Contingency Plan

ERM has prepared this Emergency Response and Contingency Plan (ERCP) in support of implementation of the sodium/potassium permanganate injection activities at the Fulton Avenue Superfund Site. This ERCP documents the procedures for chemical handling, storage and contingency planning for the use of sodium/potassium permanganate and for the cleanup activities. These documents establish emergency response procedures required to minimize potential health and safety risks to site personnel, the general public and the

environment, and also comply with OSHA 29 CFR 1910.120(q), EPA 40 CFR 264 Subpart D, and applicable State regulations.

ERM will conduct monitoring activities during the addition and post addition of the sodium/potassium permanganate. ERM, or its designees, will be prepared to respond to unanticipated releases of permanganate at the Site and offsite locations as detailed herein. A Site Supervisor will be on the Site at all times during the permanganate addition to provide continual support to the field staff and immediate communication with the office and additional support staff.

11.1.4 Permanganate Use & Storage

Chemical and Description	Amount Stored	Location (s) Stored	Notes
Sodium or Potassium Permanganate • $NaMnO_4$ or $KMnO_4$ dark purple liquid, non odorous • CAS No. 10101-50-5 • 40% dark purple solution	• Maximum 2,000 gallons 40% solution (stored for < 1 month)	• Up to 20 steel 55-gallon shipping drums • Two 3,000 gallon conical bottom poly tanks • Temporary piping between containers and addition points	• Purpose: injected subsurface to destroy VOCs • RQ – 100 pounds * • DOT Label – Oxidizer 5.1
Permanganate Neutralization and Stain Removal			
Hydrogen Peroxide •CAS No. 7722-84-1 •35% solution •3% USP solution **Acetic Acid (Vinegar)** •CAS No. 7732-18-5 •Household grade (white or cider)	• Maximum of 150 gallons • Maximum of 50 gallons • Maximum of 5 gallons	• 15 gallon plastic containers stored in containment area • Small sprayers in work area for dilute solutions	• Purpose: used for personal stain removal and neutralization** • RQ – not applicable • DOT – not regulated
Permanganate Neutralization			
Sodium Thiosulfate • $Na_2S_2O_3$ solid • CAS No. 7772-98-7 • 10% solution	• Maximum 150 pounds or 100 gallons mixed solution	• Two sacks stored in the garage area (solutions made up as, and if, needed) • Spray bottles in field locations	• Purpose: neutralize spills of sodium permanganate • DOT Label – none

Notes:

RQ = Reportable Quantity

DOT = Department of Transportation

* = *Value is the Emergency Planning and Community Right to Know Action of 1986 (EPCRA) reporting value for potassium permanganate from the (Section 313 storage reporting requirements). An RQ for sodium permanganate is not included on this list. As a matter of practice, ERM considers any spills at more than 10 gallons to constitute a potentially reportable event*

** = *Hydrogen peroxide (3% USP grade from local stores) is mixed with vinegar (household from local store) and water to make a solution used for stain removal. This mixture ("salad dressing") also provides personal decontamination and neutralization. The "salad dressing":*

- *30 parts water*
- *40 parts white vinegar*
- *30 parts 3% hydrogen peroxide*

11.1.5 Spill Prevention

Spillage of the oxidant material should be avoided. ERM will implement the following precautions:

- Bulk delivery of permanganate will be supervised by ERM;
- Bulk shipping containers will be provided to a secure location as approved by site personnel;
- Bulk shipping containers to be chocked, adequately supported and secured by shipper upon delivery;
- Bulk container tanks will be demarked by cones to limit untrained personnel from the area;
- At each subsurface addition location, absorbent material and "pig mats" will be provided sufficient to contain any spillage in the vicinity of the application during injection activities;
- Any spill will be immediately contained with adsorbent to preclude overland flow and discharge to surface water bodies;
- All additions will be conducted under constant supervision and vigilance of all site personnel to ensure that added materials are emplaced with no discharge to the surface.

Monitoring will be conducted throughout the applications to confirm that the addition does not result in adverse effects to the environment. Designated monitoring locations will be checked daily through the measurement of physical parameters (e.g. conductivity, dissolved oxygen, ORP) and visual inspection (e.g., discoloration, staining, presence of oxidized metals (e.g. iron or manganese) or other conditions that may indicate the presence of oxidant).

11.1.6 Spill Response and Follow Up

Prior commencement of the injection, local Emergency Response and HAZMAT units should be contacted by ERM and made aware of the activities going on at the site. A briefing should be delivered on the chemicals being used, the injection process, spill prevention measures and the immediate dangers of a release. Briefing local first responders on the site actives will quicken response time and help avoid confusion on site in case of an emergency situation.

Site personnel should immediately call 911 to initiate emergency response if:

- An uncontrolled release of a chemical occurs;
- A serious injury or illness requiring medical attention occurs;
- In the event of a fire, or
- If other conditions warrant.

After contacting emergency response services, field personnel should immediately provide notice to designated site representative that emergency response services have been activated. After notifying site, field personnel should immediately contact the ERM Project Manager (or Project Manager alternate), who will complete any additional notification. If site conditions warrant, the Emergency Response Contractor for the Site should be contacted and mobilized to the Site. Please see **Table 2.1** for specific agency contacts for this project.

Small spills or leaks of sodium permanganate that are less than 10 gallons (30 gallons of diluted solution) *and* can be contained (i.e. not in drains or streams) will be handled by field personnel by dilution and neutralization. Larger and uncontrolled releases will require notification and activation of the designated Emergency Response Contractor.

A description of the hazard and dilution process is summarized below.

Emergency Response Procedures for Controlled Small Spills of Sodium/Potassium Permanganate

Neutralizing Solution - Sodium Thiosulfate ($Na_2S_2O_3$) Sodium thiosulfate chemical is a colorless powder. A 10% by weight solution of $Na_2S2_2O_3$ will be prepared for emergency response and/or system clearing. NEVER ADD CONCENTRATED SODIUM THIOSULFATE SOLIDS OR SOLUTIONS DIRECTLY TO CHEMICAL SOLUTIONS**. A VIOLENT REACTION MAY OCCUR RESULTING IN INJURY.**

1. Clear personnel from the spill area to prevent exposures and to avoid expanding the affected area.
2. Suspend additions in immediate area to focus on response activities. Notify Project Manager. Coordinate activities with site staff.
3. Don protective face shield, safety glasses, and chemical-resistant clothing (coated Tyvek coveralls, rubber boots and neoprene gloves).
4. Contain spill with non-combustible materials (pigs, hogs, soil, etc.). Dilute spill with water to a concentration less than 10 g/L concentration – Do not neutralize concentrated solutions for safety reasons. Collect sample and determine the concentration using on-site analysis by Hach spectrophotometer. Hold diluted solution for neutralization. A 1 gallon spill of 23% sodium permanganate must be diluted with water 4:1 prior to being neutralized, creating 5 gallons of purple water. This 5 gallons of fluid can then be reacted with ~ 1 gallons of the neutralizer until clear. A spill of 1-gallon oxidizer thus creates 6 gallons of clear fluid.
5. Neutralize the diluted $NaMnO_4$ solution with a 10% solution of sodium bisulfite ($Na_2S_2O_3$). Add the $Na_2S_2O_3$ solution until the solution turns brown indicating neutralization is complete. Each 50 pound sack of sodium thiosulfate can be diluted into 60 gallons of neutralizer solution (~10% concentration). Each 50 gallon drum therefore can treat 10 gallons of 40% sodium permanganate solution. Do not, under any circumstances neutralize sodium permanganate prior to dilution; the neutralization reaction is highly exothermic. One drum of diluted sodium bisulfite will be maintained in storage, and will be replenished as needed.
6. Rinse area with large amounts of water, except if runoff will enter a storm drain or

water body.

7. If personnel are exposed to sodium permanganate, consult MSDS for first aid procedures. Rinse the exposed area with large amounts of water using the eye wash station and deluge shower.

Monitoring will be conducted throughout the applications to confirm that the addition does not result in adverse effects to the environment. In addition, procedures outlined in the previous section will be followed to reduce any spills or leaks. However, if evidence of breakout of permanganate is observed, ERM will *immediately* conduct the following activities:

- If active permanganate addition is being conducted in the area, it shall be immediately terminated;
- The incident will be reported to the parties involved at the Site (or their designees), refer to Table 2.1;
- ERM and the client will immediately determine if any Federal, State or Local reporting is required; and
- If site conditions warrant, the Emergency Response contractor for the site will be contacted and mobilized to the Site.

Sodium/potassium permanganate is a strong oxidizer and must be handled in a manner to avoid, to the maximum extent possible, unintended contact with the environment.

11.1.7 Emergency Response Equipment (at the Site)

ERM will maintain emergency equipment at the Site for potential use. Specific equipment includes:

- Personal protection equipment (goggle, face shields, gloves, tyvek, overboots);
- Spill kit on site truck (or at addition point);
- Hand tools including flat blade spade, broom with plastic (NOT straw) bristles;
- Notification capabilities via cell phone/radio devices;
- Neutralization liquids; and
- Additional ancillary support equipment (e.g., emergency response personnel, 24-hour emergency response subcontractor) necessary to support operations.

If necessary, additional equipment will be mobilized to the Site as necessary (e.g., temporary water storage tanks).

11.2 CONFINED SPACE ENTRY PROCEDURES

Entry into permit-required confined spaces is not anticipated and thus prohibited. If a project task or activity would involve entry into a permit-

required confined space or if there is a question as to whether or not a job task or activity involves a permit-required confined space, the PM or FSO will contact the North America H&S Leader for assistance prior to entering the confined space.

11.3 SUBSURFACE CLEARANCE (SSC)

Before any groundbreaking activities can be conducted on site the PM will be responsible for ensuring the ERM SSC guidelines are followed, including verifying that the following issues have been adequately addressed and completing the ERM SSC Checklist. The ERM SSC requirements include at a minimum:

- Contacting the New York State Call Before You Dig (CBYD) or equivalent service to identify public underground utilities;
- Contacting site personnel with knowledge of the site utilities;
- Reviewing site maps and figures showing underground utilities;
- Marking out all known underground utilities in the field.

As part of the SSC investigation it may be necessary to use other available subsurface investigation resources such as Ground Penetrating Radar (GPR)

The following ground disturbance activities planned for this project include:

- Excavation
- Trenching
- Drilling

The ERM SSC requirements and SSC checklist can be found in Appendix C.

11.4 EXCAVATION AND TRENCHING

Any personnel entering in an excavation or trench deeper than 5 feet must be protected from cave-ins by an adequate OSHA safe protective system designed in accordance with the requirements of the Occupational Health and Safety Administration's (OSHA) construction standard for excavations and trenches, CFR 1926 Subpart P. Protective systems for excavations or trenches deeper than 5 feet include:

- Sidewall sloping;
- Benching systems;
- Shoring systems;
- Use of a trench box.

The ERM subcontractor will be required to provide an excavation and trenching Competent Person, who must be on-site at all times during all excavation activities. The Competent Person must be familiar with the above protective systems and capable of identifying possible hazards or dangers to employees that are associated with any excavating or trenching activities.

All open excavations or trenches must be indentified using warning tape or cones in order to indentify the work area and keep unauthorized personnel away from the area. Open trenches and excavations left overnight must be fenced or barricaded to prevent unauthorized access to the area while work is not being performed.

11.5 EXTRACTION WELL AND WELL VAULT INSTALLATION

Groundwater will be extracted, treated and recharged at downgradient locations within the PCE-dominant portion of the plume. The extraction wells will be installed in the Magothy Aquifer.

Up to two groundwater extraction wells will be placed within the PCE-dominant portion of the plume upgradient of GCWD Well Nos. 13 and 14. These wells would intercept the PCE-dominant plume. The locations, configurations, pumping rates, and specific groundwater discharge alternatives will be evaluated using the existing data set, data obtained from the pre-design studies including the comprehensive pre-design groundwater water level measurement and sampling event, vertical profiling, the comprehensive groundwater sampling event, the public supply well pumping hydraulic evaluation, and the 3D groundwater flow model.

The extracted groundwater will either be pumped by subsurface pipes to a treatment system housed in a building constructed on vacant property adjacent to Nassau County Recharge Basin 232 or be treated and recharged at the point of extraction. The preferable treatment option will be evaluated during the OU1 RD. The groundwater treatment systems will consist of shallow-tray air stripping units, or comparable systems. If off-gasses from the air stripping units exceed regulatory thresholds the emissions will be treated prior to discharge.

The amount of groundwater extraction will be moderated to minimize, to the extent practical, any reduction in water volume to the public supply wells. Hence, a portion of the PCE-dominant portion of the plume that has passed the extraction wells and is beyond the capture zone would continue to be treated via the treatment systems at GCWD Well Nos. 13 and 14. The conceptual combined treatment approach using ISCO and the conceptual extraction well layout showing estimated capture fields is depicted in Figure 6 of the OU1 RD Work Plan. (Note, this figure only shows centralized collection, treatment and recharge of extracted groundwater. The RD will evaluate alternatives for treatment and recharge locations).

Regardless of exact location, each well will require the construction of a concrete vault that will need to be installed in the street. Any work that will be conducted on either of the public roadways will need to be done in coordination with the Garden City Police (GCP). The use of drilling and excavation equipment can mask the sound of oncoming traffic which posses a serious danger to personnel working in the area. ERM will work with the GCP to coordinate traffic management while the work is being performed. All ERM and subcontractor personnel working on or near the public road will be required to wear a high visibility traffic vest at all times. Any personnel wishing to cross into the public roadway may do so only if following local traffic laws or signaled to by a GCP officer. Further more, where possible work zones in the public roads will be

fenced or barricaded to prevent personnel from unknowingly cross into traffic lanes.

11.6 TREATMENT SYSTEM BUILDING CONSTRUCTION

As noted above, the groundwater treatment system may require the construction of a building to house the groundwater treatment systems. If a treatment building is to be constructed on vacant property adjacent to Nassau County Recharge Basin 232 (located on a small parcel of land about ¼ mile from the extraction wells), groundwater will be pumped from the wells to the treatment system through subsurface pipes. The total distance the pipes would run is approximately 2,200 feet.

The installation of the piping from the extraction wells to the treatment system will require the ERM subcontractor to dig large sections of trenching. All trenching must be done in a manner that conforms with the requirements of the OSHA construction standard for excavations and trenches, CFR 1926 Subpart P and the requirements stated above in section 11.4.

11.7 COMPRESSED GAS

Compressed Nitrogen will be used during various groundwater sampling activities where bladder pumps or waterloo pumps are used. Any personnel performing these sampling tasks must be properly trained in the use and safe handling of compressed gas cylinders in accordance with the OSHA compressed gasses standard, 29 CFR 1910.101.

11.8 HEAVY EQUIPMENT

The use of heavy equipment will be necessary during the life of the project. Subcontractors will be required to provide a competent person to operate any machinery needed to complete the task. All site personnel will be informed of the use of heavy equipment and the associated hazards before work begins each day. Site personnel are expected to be aware of heavy equipment on site and follow safety precautions outlined by the FSO.

11.9 HAND AND POWER TOOLS

Several project tasks will require the use of hand and power tools. Personnel using the tools are expected to wear the proper PPE, inspect the equipment before using it, and use the tools in accordance with their design specifications

12.0 EMERGENCY RESPONSE PLAN

This section describes possible contingencies and emergency procedures to be implemented at the site.

12.1 PERSONNEL ROLES AND LINES OF AUTHORITY

The FSO has primary responsibility handling emergency situations. This includes taking appropriate measures to ensure the health and safety of site personnel and the public. The FSO will be responsible for evacuating any person and providing decontamination, and arranging for medical treatment or first aid for any person injured or requiring medical attention.

Possible actions may involve the evacuation of personnel from the site area and ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. If the FSO is not available, the CM or other ERM field staff will assume the FSO's responsibilities. All site personnel will assist as directed by the FSO in case of an emergency.

12.2 EMERGENCY ALARMS

The emergency alarm for the site will consists of three blows of the air horn. Air horns will be kept with the site first aid kit and fire extinguisher at a location to be determined by the FSO. All personnel on site are authorized to sound the air horn in the event of an emergency that requires immediate action or posses imminent danger.

12.3 EVACUATION PROCEDURES AND ROUTES

In the event of an emergency requiring evacuation to an Assembly Point, the FSO will be responsible to account for the presence of all project team members and subcontractors on-site at the time of the emergency. When evacuating, it is important to be aware of the prevailing wind direction and evacuate upwind or crosswind.

Assembly point will be determined by the FSO upon site mobilization.

12.4 RESPONDING TO EMERGENCIES

In the event an actual or suspected incident where personal injury or illness occurs, the FSO should take the following actions sequentially as listed:

- Call 911 for emergency assistance;
- Sound air horn;
- Don appropriate PPE;
- Remove the exposed or injured person(s) from immediate danger;
- Decontaminate affected personnel as appropriate;
- Obtain ambulance transport to the local hospital in the event of any injury or illness deemed to require medical surveillance or treatment; and

- Evacuate other personnel until it is safe for work to resume.

NOTE: No ERM or subcontractor personnel are expected to carry out any emergency actions of which they have not been appropriately trained or feel comfortable performing.

12.5 REPORTING EMERGENCIES

At the earliest time practicable following the occurrence of the emergency situation, the FSO will contact the PM and ERM Coordinator to advise them of the situation. The PM will then be responsible for promptly informing the following parties about the emergency.

- Injured/involved personnel's supervisor;
- Partner-In-Charge; and
- Client Contact.

In the case of an Incident, the FSO, with the cooperation of the H&S Contact, will promptly begin formal documentation of and investigation into the root cases of the Incident following the occurrence of the incident. This process is defined in Section 13, below.

12.6 RESTARTING WORK FOLLOWING AN EMERGENCY

The FSO will determine when it is safe to resume work at the site following an emergency. Note that if there is any doubt regarding the safe condition of the area, work will not recommence until all safety issues are resolved.

12.7 EMERGENCY DRILLS

In accordance with the HAZWOPER Standard emergency response plans will be rehearsed regularly as part of the overall training program for site operations. The frequency of this drill (rehearsal) is outlined on Table 12-1. All drills will be documented on the Emergency Drill Evaluation Form found in Appendix I. Drills do not need to be elaborate. A table-top scenario during the daily safety meeting is an adequate drill.

TABLE 12-1: Emergency Drill Frequency

Project Duration	*Drill Frequency*
Less than 30 days	None, cover during review/sign-off of HASCP
Greater than one month but less than one year	Once
Greater than one year	Annually

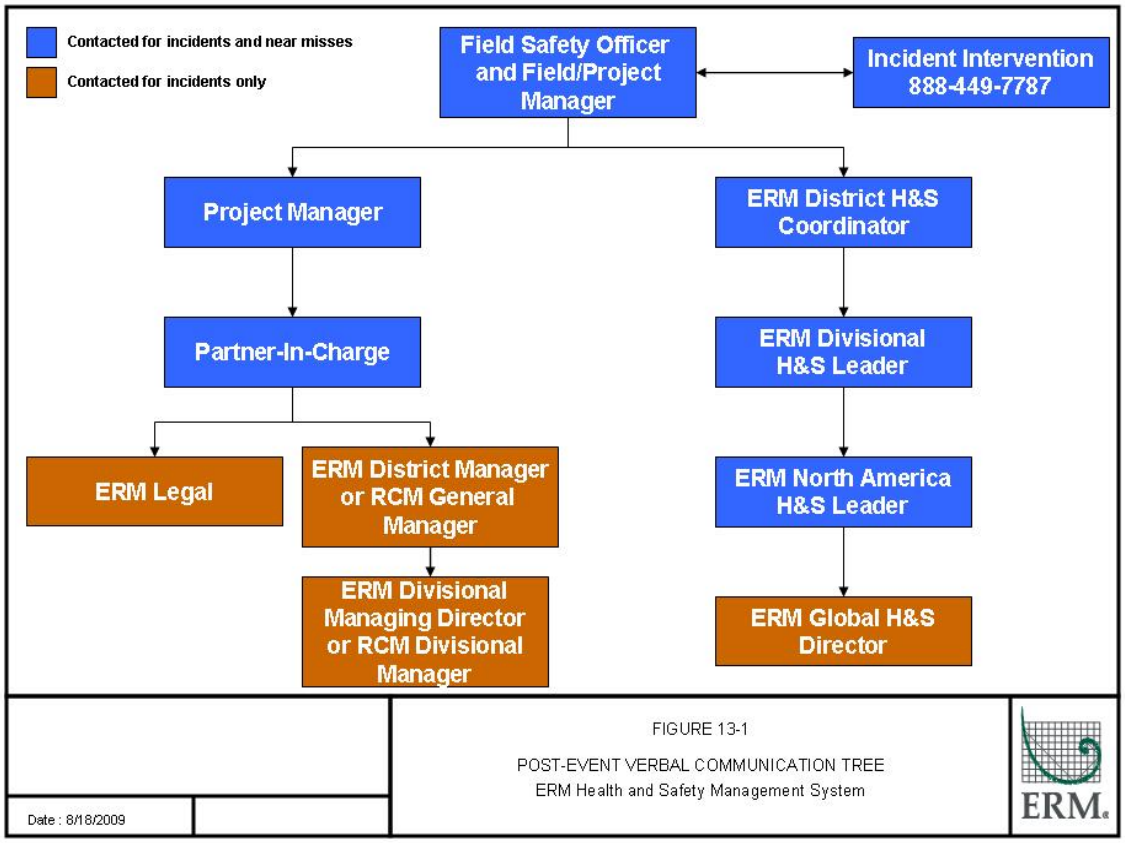
13.0 REPORTING OF SAFETY EVENTS

Safety events are occurrences or conditions that may contribute to or result in an injury, occupational illness or property damage. ERM seeks to learn from the investigation of the following types of safety events:

- Unsafe acts and unsafe conditions;
- Near misses; and
- Incidents (injury, illness, property damage, fire, or chemical spill).

All safety events must be reported promptly. Immediate verbal notification is required, as well as completion of an ERM Incident Report Form (Appendix J), which must be forwarded to the ERM Divisional Safety Leader within 24 hours of the safety event occurring.

The FSO will initiate verbal communications regarding the occurrence of the safety event to the parties shown below, who will continue communications as appropriate.



13.1 STANDARD INCIDENT INVESTIGATION

For most incidents, the FSO will also begin documentation of the Incident using the ERM Incident Report & Investigation Form found in Appendix J. The form consists of two parts:

- Part I, in which the facts of the Incident are gathered; and
- Part II, in which the root causes of the Incident are identified and actions are assigned to address those root causes.

The FSO will complete a draft version of the Part I Investigation and will forward it to the PM and H&S Coordinator within 24 hours of the occurrence of the Incident. The FSO, PM, and H&S Coordinator will schedule Part II of the investigation and include project supervision (ERM, ERM Contractors, and the Client), the injured/involved employee(s) and the Subject Matter Expert. Root cause analysis will be performed to assess the apparent cause and identify corrective measures to be implemented to prevent re-occurrence. Part II of the investigation will be completed within three working days of the occurrence of the Major Incident. The FSO will track to completion the corrective measures identified during the investigation.

14.0 SITE SAFETY BRIEFINGS

14.1 COMMUNICATION AND REVIEW OF THE HASCP

An initial review of the site-specific HASCP will be held either prior to mobilization or after mobilization but prior to commencing work at the site to communicate HASCP details and answer questions to individuals working at the site. The following topics will be addressed during the briefing:

- Names of the FSO and any designated alternate;
- Hazardous chemicals that may be encountered during on-site activities;
- Physical hazards that may be encountered on-site;
- Special training requirements and Safe Work Practices;
- Work tasks;
- Emergency communication signals, codes, and location of emergency contact information;
- Emergency procedures for safety events, fires, and hazardous material incidents; and
- Emergency evacuation routes.

14.2 DAILY SAFETY MEETING

A daily safety meeting will be conducted each morning. The daily safety meeting will include a discussion of the following health & safety-related topics, among others:

- Who is doing what, where and how;
- The potential for overlapping site operations;
- Changes to the HASCP or JHAs;
- Discussion of recent Incidents or safety observations; and
- Comments from the project personnel.

The meetings will be documented on the Daily Safety Meeting form found in Appendix K.

15.0 AUDITING AND HASCP REVISIONS

Selected project field activities and project files shall be audited periodically. A full site audit for conformance with the HASCP will occur at least once per year for projects with fieldwork duration of 1 year or longer. Full site audits may also be conducted for shorter duration projects. Project documentation audits may be conducted periodically for shorter term projects.

Revisions made to the site HASCP in response to audit feedback, lessons learned from Incidents, or other reasons will be explained to all site personnel at the first daily safety meeting following the institution of the HASCP revision.

Attachments
ERM Safe Work Practices

ATTACHMENTS

☐	*SWP-01*	*HAZARD COMMUNICATION*
☐	*SWP-03*	*MEDICAL SERVICES AND FIRST AID*
☐	*SWP-04*	*AIRBORNE CONTAMINANTS*
☐	*SWP-05*	*HEAT STRESS*
☐	*SWP-06*	*COLD STRESS*
☐	*SWP-07*	*NATURAL HAZARDS*
☐	*SWP-08*	*PERSONAL PROTECTIVE EQUIPMENT*
☐	*SWP-09*	*RESPIRATORY PROTECTION*
☐	*SWP-10*	*CONFINED SPACE ENTRY*
☐	*SWP-13*	*EXCAVATIONS*
☐	*SWP-14*	*FALL PREVENTION AND FALL PROTECTION*
☐	*SWP-16*	*FORKLIFT AND TRUCK OPERATIONS*
☐	*SWP-17*	*HAND TOOLS*
☐	*SWP-19*	*HEAVY AND MATERIAL HANDLING EQUIPMENT*
☐	*SWP-20*	*LADDER SAFETY*
☐	*SWP-21*	*LINE BREAKING AND BLANKING*
☐	*SWP-22*	*LOCKOUT TAGOUT*
☐	*SWP-29*	*WALL FLOOR PENETRATION*

RCM ERM Remediation & Construction Management	STANDARD OPERATING PROCEDURE	
	SOP #:	1
	Title:	Hazard Communication (HazCom)
	Last Rev.:	12/31/07
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SCOPE

This procedure provides guidance on meeting regulatory requirements and ensuring that the information necessary for the safe use, handling and storage of hazardous chemicals is provided and made available to employees.

DEFINITIONS

- **Hazardous Chemical –** Any chemical which is a physical hazard or a health hazard.

- **Hazard Warning –** Any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the specific physical and health hazard(s), including target organ effects, of the chemical(s) in the container(s).

- **Health Hazard –** A chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals that are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes.

- **Physical Hazard –** A chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

PROCEDURE

A. RCM Health and Safety Coordinator will develop a chemical inventory of all known chemicals to be used or present as a potential contaminant at the job site.

B. RCM Health & Safety Coordinator will ensure that all containers (drums, bottles, etc.) are labeled with the identity of the known hazardous chemical contained and any appropriate hazard warnings. Containers that are not labeled or where labels have faded or been removed will be relabeled immediately.

C. RCM Health & Safety Coordinator will include NIOSH Universal Chemical Safety Data Cards for chemicals present as site constituents of concern and Material Safety Data Sheets (MSDSs) for chemicals brought to the site for the job. For assistance, contact the RCM Health and Safety Coordinator.

D. The Site Safety Officer will ensure employees have been trained on site-specific HazCom, including:

1. Methods that may be used to detect a release of hazardous chemical(s) in the workplace;
2. Physical and health hazards associated with chemicals;
3. Protective measures to be taken;
4. Safe work practices, emergency responses and use of personal protective equipment (PPE); and
5. Information on the Hazard Communication Standard including:
   a. Labeling and warning systems, and
   b. An explanation of Material Safety Data Sheets.

E. RCM Health & Safety Coordinator will identify PPE based on the task involved and the chemical properties.

F. The Site Safety Officer will inform employees of any non-routine tasks and the chemical hazards associated with the tasks. Review the safe work practices and use of required PPE prior to the start of such tasks.

G. The Site Safety Officer will provide information on hazardous chemicals known to be present to subcontractors and other employers on the site. Employers are responsible for providing necessary information to their employees. Ensure other onsite employers are provided with the applicable HazCom information.

H. All site personnel are required to report any incident of a chemical over-exposure or of a chemical spill to the Site Safety Officer. Follow the emergency response/spill response procedures described in the HASP.

REFERENCES

Regulatory References

- 29 CFR 1910.1200, Hazard Communication

Technical References

NIOSH Universal Chemical Safety Data Cards

Procedural References

- SOP – 9, Personal Protective Equipment
- RCM Health and Safety Program, Appendix B, Section 3

REVISION LOG

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RCM ERM Remediation & Construction Management	STANDARD OPERATING PROCEDURE	
	SOP #:	3
	Title:	Medical Services / First Aid
	Last Rev.:	12/31/07
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SCOPE

This procedure describes the requirements for providing medical services and first aid at the job site.

DEFINITIONS

None.

PROCEDURE

A. RCM Health & Safety Coordinator will identify the mode by which medical services and first aid will be administered and document in the Health and Safety Plan (HASP). This will generally be recorded by identifying the nearest medical facility to the job site and providing a map with the location identified.

B. In the absence of reasonably accessible medical services (i.e., within 5 minutes by ambulance), the Site Safety Officer or a person certified in first aid will be available at the site to render first aid.

C. At jobsites where the eyes or body of any employee may be exposed to corrosive or otherwise hazardous chemicals, quick-drenching/eye washing facilities must be provided.

D. First aid supplies must be easily accessible at a job site, when required. The contents of the kit must be checked by the Site Safety Officer before being sent out on each job and weekly during the job, to ensure that items used are replaced.

E. Field first aid kits should contain the following items:

Band aids 3/4" x 3"	Antiseptic wipes
Non-stick pads, medium	Burn cream, 8 oz.
Kling rolled bandage 2"	Foil packs
Triangular bandage 51"	Amoply, ammonia inhalants 0.33 ml.
Hypo-allergenic first aid cream	Tylenol, extra strength
Adhesive Tape ½" x 5 yd	Oval eye pads
Scissors	Examination gloves
Butterfly bandages	

REFERENCES

Regulatory References

- 29 CFR 1926.50, Medical Services and First Aid

Technical References

- ANSI Z308.1-1978, Minimum Requirements for Industrial Unit-Type First-aid Kits

Procedural References

- RCM Health & Safety Program, Appendix B, Section 2

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SCOPE

This procedure provides guidance on meeting regulatory requirements when airborne contaminants may be present at the job site. This procedure applies to all types of airborne contaminants which may cause adverse health effects. These contaminants may be in the form of dusts, mists, gases, vapors or fumes.

DEFINITIONS

None.

PROCEDURE

A. RCM Health & Safety Coordinator will develop an Air Monitoring Plan (AMP) for chemical constituents identified at the job site. The AMP must include the types of samples to be collected, such as real-time measurements, personal breathing zone and area samples, as well as identify the contaminants which will be monitored for.

B. Additional regulatory requirements may be triggered if a potential site contaminant is covered by an Occupational Safety and Health Administration (OSHA) substance-specific standard. The following list of contaminants have such regulations:

Asbestos	Coke Oven Emissions
13 Carcinogens	1,2-Dibromo-3-Chloropropane
Vinyl Chloride	Acrylonitrile
Inorganic Arsenic	Ethylene Oxide
Lead	Formaldehyde
Hexavalent Chromium	Methylenedianiline
Cadmium	1,3-Butadiene
Benzene	Methylene Chloride

REFERENCES

Regulatory References

- 29 CFR 1910.1000, Air Contaminants
- 29 CFR 1910.1001, Asbestos
- 29 CFR 1910.1003, 13 Carcinogens
- 29 CFR 1910.1017, Vinyl Chloride
- 29 CFR 1910.1018, Inorganic Arsenic
- 29 CFR 1910.1025, Lead
- 29 CFR 1910.1026, Hexavalent Chromium
- 29 CFR 1910.1027, Cadmium
- 29 CFR 1910.1028, Benzene
- 29 CFR 1910.1029, Coke Oven Emissions
- 29 CFR 1910.1044, 1,2-Dibromo-3-Chloropropane

- 29 CFR 1910.1045, Acrylonitrile
- 29 CFR 1910.1047, Ethylene Oxide
- 29 CFR 1910.1048, Formaldehyde
- 29 CFR 1910.1050, Methylenedianiline
- 29 CFR 1910.1051, 1,3-Butadiene
- 29 CFR 1910.1052, Methylene Chloride

Technical References

- ACGIH Threshold Limit Values
- NIOSH Pocket Guide to Chemical Hazards

Procedural References

- SOP – 10, Respiratory Protection
- SOP – 11, Confined Space Entry
- SOP – 22, Line Breaking/Blanking

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SCOPE

This procedure provides work practices to minimize the impact of heat stress caused by exposure to hot environments or working conditions.

DEFINITIONS

- **Acclimatization –** The ability to adjust to hot working conditions. This adjustment to heat, under normal circumstances, usually takes about 5 to 7 days, during which time the body will undergo a series of changes that will make continued exposure to heat more endurable.

- **Heat Index –** An accurate measure of how hot it really feels when relative humidity (RH) is added to the actual air temperature.

PROCEDURE

A. The Site Safety Officer will implement techniques for preventing heat stress-related health issues. Prevention techniques include:
   1. Provide shaded areas with cross-ventilation, if possible, for lunch and breaks.
   2. Schedule physically demanding and strenuous tasks, or tasks requiring full-body chemical protection, for early in the day, if possible.
   3. Drink at least 6-8 ounces of cool water every 60 minutes.
   4. Use the buddy system and look for signs of heat stress. Any employee with signs of heat stress must immediately proceed to the break area. Signs and symptoms for various heat stress disorders and recommended first aid are listed in the following table.

Disorder	*Symptoms*	*Cause*	*Prevention/First Aid*
Heat Rash or Prickly Heat	♦ Rash ♦ Itching	♦ Hot, humid conditions ♦ Sweat doesn't evaporate easily ♦ Sweat ducts become clogged	♦ Ointments ♦ Keep skin clean and dry ♦ Good daily personal hygiene
Heat Cramps	♦ Sudden onset of muscle cramps usually in legs or arms ♦ Hot, moist skin ♦ Normal pulse ♦ Normal or slightly elevated temperature	♦ Loss of water (sweating) ♦ Loss of electrolytes ♦ Replacing water but not electrolytes	♦ Move into shade ♦ Loosen clothing ♦ Drink tepid electrolyte drinks or water ♦ Seek medical assistance if conditions persist
Heat Exhaustion	♦ Pale, clammy skin ♦ Profuse perspiration ♦ Thirst from dehydration ♦ Weakness ♦ Headache ♦ Nausea ♦ Loss of coordination	♦ Overexertion ♦ Excessive loss of water and electrolytes	♦ Move into shade ♦ Remove PPE ♦ Loosen street clothing ♦ Cool by applying damp cool compresses or ice packs ♦ Drink tepid electrolyte drinks or water ♦ Summon medical assistance
Heat Stroke	♦ Elevated temperature (>103F) ♦ Flushed, hot, dry skin ♦ Absence of sweating ♦ Delirious ♦ Rapid pulse ♦ Nausea ♦ Headache ♦ Dizziness ♦ Unconsciousness	♦ Failure of body's cooling (sweating) mechanism	♦ Summon medical assistance ♦ Move to shade ♦ Remove PPE ♦ Loosen street clothing ♦ Cool by fanning or applying damp compress or ice packs

5. The Site Safety Officer must verify that a work-rest cycle based on the heat index is implemented for site workers as applicable. Refer to the following three tables. To use the chart, read the temperature at the left and humidity across the top, the heat index is where the two intersect. For example, with a temperature of 96 and a humidity of 50%, the Heat Index is 108. Determine what the associated risk level is, based on the heat index. Use the risk level and heat index to determine the appropriate work-rest cycle.

Heat Index Chart

Relative Humidity (%)													
Temperature (F)	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**	**95**	**100**
110	136												
108	130	137											
106	124	130	137										
104	119	124	131	137									
102	114	119	124	130	137								
100	109	114	118	124	129	136							
98	105	109	113	117	123	128	134						
96	101	104	108	112	116	121	126	132					
94	97	100	102	106	110	114	119	124	129	136			
92	94	96	99	101	105	108	112	116	121	126	131		
90	91	93	95	97	100	103	106	109	113	117	122	127	132
88	88	89	91	93	95	98	100	103	106	110	113	117	121
86	85	87	88	89	91	93	95	97	100	102	106	108	112
84	83	84	85	86	88	89	90	92	94	96	98	100	103
82	81	82	83	84	84	85	86	88	89	90	91	93	95
80	80	80	81	81	82	82	83	84	84	85	86	86	87

Heat Index Risk Level and Associated Health Effects

Heat Index	***Associated Risk***
>130	*Extreme Danger* Heat stroke highly likely with continued exposure
105-130	*Danger* Heat exhaustion and heat cramps likely and heat stroke possible with prolonged exposure and/or physical activity
90-105	*Extreme Caution* Heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity
80-90	*Caution* Fatigue possible with prolonged exposure and/or physical activity

NOTES:

- Heat Index values were devised for shady, light wind conditions. Exposure to full sun may increase these values by up to 15^{o}.
- Heat Index values were devised for the general public wearing typical lightweight summer clothing. Acclimatized workers may be able to work under conditions with a slightly higher Heat Index.
- The use of personal protective equipment, including clothing increases the heat stress load on the body.

The work-rest cycle outlined below should be implemented based on the professional judgment of the Site Safety Officer and/or the Project Health and Safety Consultant. Workers must drink 8 ounces of cool water at each break.

Heat Index	*Risk Level*	*Work-Rest Cycle*
> 130	Extreme Danger	15 minute break every 30 minutes
105-130	Danger	15 minute break every 60 minutes
90-105	Extreme Caution	15 minute break every 90 minutes
80-90	Caution	15 minute break every 120 minutes

B. The Site Safety Officer and the Construction Manager will observe workers to verify compliance with and effectiveness of prevention techniques.

C. The Site Safety Officer should provide first aid treatment for heat stress related health issues.

D. In the event a heat stress related incident occurs, the Site Safety Officer will report the incident following guidelines in the HASP.

REFERENCES

Regulatory References
None

Technical References
- NOAA – National Weather Service, Heat Index, Measure of How Hot it Feels

Procedural References
None

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12/31/07	0	ELG	Issued for use

RCM ERM Remediation & Construction Management	STANDARD OPERATING PROCEDURE	
	SOP #:	6
	Title:	Cold Stress
	Last Rev.:	12/31/07
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SCOPE

This procedure provides work practices to minimize the impact of cold stress caused by exposure to cold environments or working conditions.

DEFINITIONS

- **Frostbite –** Occurs when the extremities do not get sufficient heat from the central body stores. The fluids around the cells of the body tissues freeze from exposure to low temperatures. This condition can result in damage to, and loss of, tissue. The most vulnerable areas are the nose, cheeks, ears, fingers, and toes.

- **Hypothermia –** This is the most severe form of cold stress and results from a drop in the body's core temperature. Hypothermia can occur in relatively mild temperatures if there is a wind and the person's clothing becomes wet. The signs or symptoms of hypothermia are:
  - First, uncontrollable shivering and the sensation of the cold;
  - Heartbeat slows and may become irregular;
  - Pulse weakens and blood pressure changes;
  - As the body's core temperature drops, other signs may include cool skin, slow irregular breathing, and apparent exhaustion;
  - When core temperatures are in the mid-range, the victim may become listless, confused, exhibit severe shivering, or develop severe pain in the extremities; and
  - Final signs are a significant drop in blood pressure, fatigue, and shallow respiration.

PROCEDURE

A. The Site Safety Officer will implement techniques for preventing cold stress-related health issues. Prevention techniques include:

1. Require the use of additional protective clothing.
2. Allow workers to change clothes that have become wet.
3. Provide thermal insulating materials on metal handles of tools and equipment.
4. In snowy or icy conditions, require the use of UV eye protection, as well as from blowing crystals.
5. Provide a warm and sheltered area for changing clothes and taking breaks.
6. Provide hot liquids, such as soups, warm drinks, etc. in the break area.

7. Use the buddy system and look for signs of cold stress. Any employee observed with signs of cold stress shall immediately proceed to the break area.

B. The Site Safety Officer and the Construction Manager will observe to verify compliance with and effectiveness of prevention techniques.

C. The Site Safety Officer will provide first aid treatment for cold stress related health issues include moving to warm area. Seek medical attention if signs or symptoms of hypothermia or frostbite are present.

REFERENCES

Regulatory References
None.

Technical References
None.

Procedural References
None.

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SCOPE

This procedure provides guidance for determining appropriate means for handling natural hazards that may be encountered while conducting fieldwork.

DEFINITIONS

None.

PROCEDURE

Potential exposure natural hazards during performance of this project is believed to be minimal. However since the work is performed outside some precautions should be taken to guard against the following hazards. Keep in mind that the hazards may vary depending on the time of year or geographical region. Infrequent hard freezes may allow insects and snakes to be active all year round in some parts of the United States. Refer to Attachments 1 through 3 for photos and more thorough descriptions of the more common natural hazards, which might be encountered.

A. Identify type of natural hazard present.

B. When a natural hazard (such as poisonous plants, feral animals, insects and snakes) is encountered, back away and evaluate the situation.

C. Develop a plan which may include any of the following:

1. Remove the natural hazard if it can be done safely.
2. Avoid the natural hazard if it cannot be removed. Additionally, use appropriate PPE or outer clothing for protection from the hazard. Refer to SOP – 8, Personal Protective Equipment.
3. Get assistance in removing or working around the natural hazard. In some instances, this may require professional help from animal control or an insect expert.

D. In the event there is contact with the natural hazard, if it appears to be a life threatening situation, such as anaphylactic shock or a snake bite, seek medical attention immediately.

- OR -

A. POISONOUS PLANTS

1. Poison ivy is in the form of a vine, while oak and sumac are bush-like.
2. All produce a delayed allergic hypersensitivity.
3. The plant tissues have an oleoresin, which is active in live, dead, and dried parts and may be carried through dust, contaminated articles, and the hair of animals.
4. Symptoms usually occur 24 to 48 hours after exposure resulting in burning or stinging, and weeping and/or crusted blisters.
5. The best antidote for poisonous plants is recognition and avoidance.
6. Should exposure to any of these plants occur, notify the Site Safety Officer and wash the affected area with a mild soap and water, but do not scrub the area.

B. TICKS

1. Ticks attach to their host's skin and intravenously feed on its blood creating an opportunity for disease transmission.
2. Covering exposed areas of the body and the use of tick repellent are two ways to prevent tick bites.
3. Periodically during the workday employees should inspect themselves for the presence of ticks.
4. Notify the Site Safety Officer of any tick bites as soon as possible, medical attention may be required.

C. SPIDERS

1. Black Widow
   a. The black widow is a common venomous spider found in vacant rodent burrows, under stones, logs and long grass, and in hollow stumps and brush piles.
   b. If disturbed, they typically will retreat to a corner of their web but can be induced to bite only if pressed against the skin.
   c. Notify the Site Safety Officer if bitten, because neurotoxins are injected, it is important to seek immediate medical attention.
2. Brown Recluse
   a. The brown recluse or Fiddle Back Spider is another common venomous spider.

b. It hides in dark niches and corners, where it may spin a poorly organized, irregular web.

c. It is shy and will try to run from a threatening situation but will bite if cornered.

d. Check boots and protective clothing for spiders prior to putting them.

e. The bite of the brown recluse is usually painless until 3 to 8 hours later when it may become red, swollen, and tender. Notify the Site Safety Officer if bitten.

f. Prompt medical attention can reduce the extent of ulceration and alleviate other complications that may develop.

D. FIRE ANTS

1. One sure sign of the presence of fire ants is their conical mounds, which are a result of the digging of their chambers.

2. The sting of a fire ant results in localized reddening of the bite area, accompanied by sharp burning sensations.

3. The first ant sting releases a chemical substance that triggers other ants of the colony to sting.

4. Anyone seeing fire ant mounds present at the work site should notify the Site Safety Officer, who will then notify the rest of the crew so the mounds may be avoided if possible.

E. CHIGGERS

1. Chiggers, also known as "red-bugs" or "harvest mites", are the immature stages of a tiny red mite.

2. They inhabit areas of tall grass, associated with low, wet spots, ponds and stream banks, wild berry patches, and forest underbrush.

3. The larvae attach themselves to the clothing of people or to the fur of passing animals.

4. Wear loose-fitting clothing (if possible) when working outdoors. Apply a repellent containing DEET (N,N-diethyl-meta-toluamide), to shoes, socks, and trousers before entering chigger-infested areas. Caution: some individuals may be sensitive to DEET – always read and follow label directions

5. Vehicles should be frequently vacuumed to reduce the number of chiggers that may have been deposited.

6. Flowers of sulfur is another repellant of chiggers. Sulfur may be more benign to use than DEET on some body parts. Avoid breathing dust during application.

F. FLYING INSECTS

1. Flying insects such as mosquitoes, wasps, hornets, and bees may be encountered while site activities occur.
2. Wear long-sleeved clothes and long pants treated with repellent. Do not treat unexposed skin. Use the repellent according to the manufacturer's recommendations provided on the container.
3. Personnel should report flu-like symptoms to the Site Safety Officer, medical attention may be needed.

G. SNAKES

1. The most effective way to prevent snakebites is to avoid snakes.
2. Personnel should avoid walking in high grass and underbrush.
3. Visual inspection of work areas should be performed prior to activities taking place.
4. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg.
5. No attempts at killing snakes should be made; many people are bitten in such an attempt.
6. If a snake bites someone, Notify the Site Safety Officer and seek medical services.

H. ALLIGATORS

1. Never approach an alligator. Always stay at least 30 yards away. Never wade or swim in areas that could contain large alligators.
2. Do not dump food or scraps into or near the water. This can attract alligators.
3. Always be aware of your surroundings and use caution and common sense.
4. If at any time personnel observe alligators at the site they will immediately inform the Site Safety Officer or Construction Manager, who will then notify the rest of the employees and local wildlife personnel.

I. FERAL ANIMALS

1. Feral animals such as rats or other wildlife may be encountered during fieldwork.
2. If an animal is diseased, injured or tending a nest, they may become aggressive.
3. Notify the Site Safety Officer or Construction Manager if feral animals are at the site, who will then notify the rest of the employees and local wildlife personnel.

ATTACHMENTS

Attachment 1, Poisonous Plants
Attachment 2, Insects
Attachment 3, Snakes
Attachment 4, Other Natural Hazards

REFERENCES

Regulatory References

None

Technical References

None

Procedural References

SOP – 8, Personal Protective Equipment

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Attachment 1

Poisonous Plants

Most species of poison ivy, oak, and sumac have three leaflets; hence, the saying, "Leaves of three, let it be." These plants vary significantly in appearance in different regions of the country, but in most species the flower and fruit structures arise in the angle between the leaf and the twig, the flowers are greenish in spring, and the plant's mature fruit is off-white or pale yellow-green.

Several varieties, including two species each of poison ivy, poison oak, and poison sumac and six subspecies of poison ivy (*Toxicodendron radicans*), are found in the United States. Poison ivy (see figure A below) generally grows east of the Rocky Mountains and poison oak in the West. Both poison ivy and poison sumac are found along the Gulf Coast. Poison oak prefers swampy areas in the Southeast.

Figures A1, A2: Courtesy of Lisa A. Gamer, MD; figure A3: staff photo; figure A4: Janet Robidoux

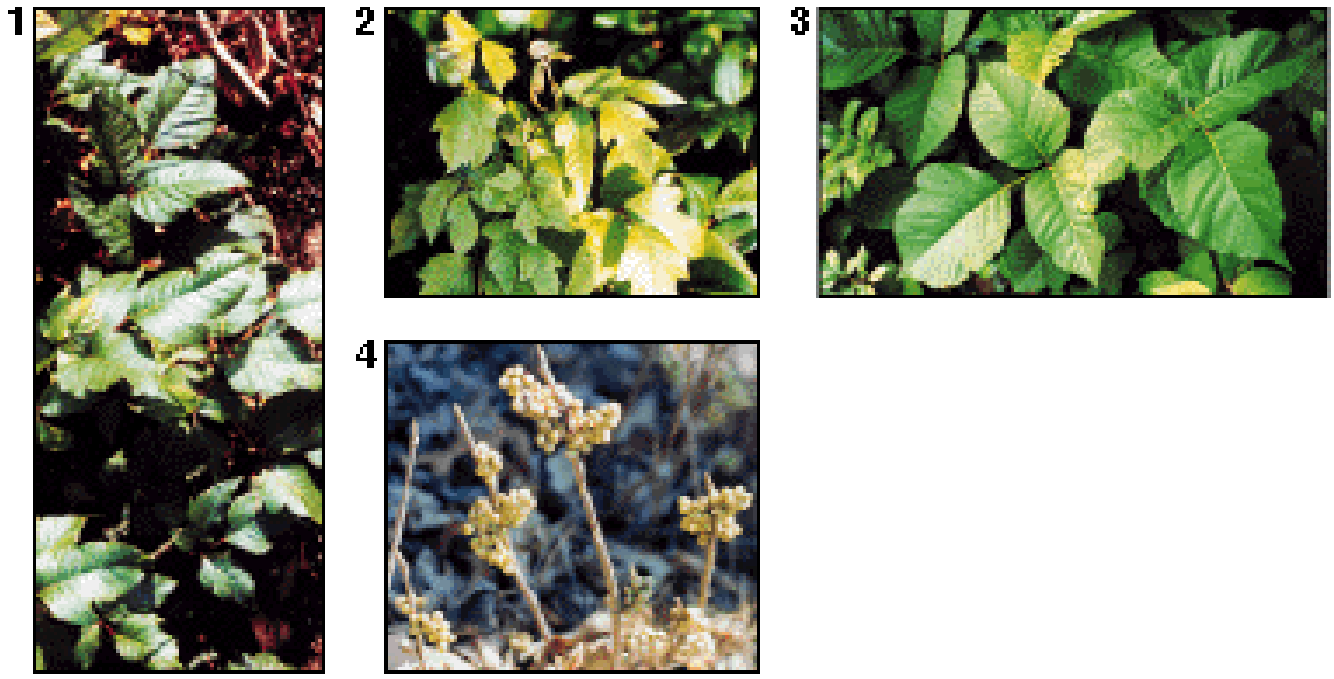

Figure A. Poison ivy (Toxicodendron radicans) can grow as a shrub or vine, but all varieties are characterized by glossy leaves that grow in clusters of three leaflets. The varieties shown here are found in Texas (1,2) and Minnesota (3). The off-white or pale yellow-green berries of poison ivy (4) often remain on the plant through the winter.

Poison Ivy

A climbing vine with three serrated-edge, pointed leaves grows in the East, Midwest and South. In the northern and western states, poison ivy grows as a non-climbing shrub.

The appearance of these plants is variable. Leaves are alternate and normally consist of three leaflets with the stalk of the central leaflet being longer than those of the other two are but can be found with five or even seven leaflets. The leaflets are two to four inches long, dull or glossy green with pointed tips. The middle leaflet is generally larger than the two laterals. The edges of the leaflets may be toothed, lobed, or smooth. Virginia Creeper (*Parthenocissus quinquefolia*) is non-poisonous vine with five leaflets that is often mistaken for poison ivy.

Poison ivy can be a shrub or a woody vine. Yellowish-green flowers occur in compact clusters in leaf axils, in June or July followed by waxy, gray-white berries about three-sixteenths of an inch in diameter in late summer.


Virginia Creeper
Parthenocissus quinquefolia
Poison Ivy
Toxicodendron radicans
Photo by Jack Arnott


Poison Ivy
Note leaf shape, often called poison oak
Photo by Jack Arnott

Poison Oak

Poison oak also has three leaves. It grows in the sandy soil of the Southeast as a small shrub. In the western United States poison oak is a very large plant that grows as a standing shrub or climbing vine. Eastern poison oak has the most "oak-looking" leaves of any of the species. It usually has multi-lobed leaves, no aerial roots on the stems, and fuzzy fruits and leaves. It loves sandy soils. Western poison oak is found only along the Pacific coast and into the mountains and it usually has aerial roots extending from the main stem.

Poison Sumac

A shrub or bush with two rows of 7-13 leaflets, most common in the peat bogs of the Northern United States and in swampy Southern regions of the country. A water loving swamp shrub (dendritic) or bush with two rows of 7-13 leaflets; growing from 6 to 20 feet in height, the Poison Sumac is found in the east from Quebec to Florida and westward along the coast to far west Texas between Shelby and Hardin counties.

Listed below are recommended actions to take to reduce the potential exposure to poisonous plant:

- Determine what types of poisonous plants may be present at the specific site.
- Use repellant sprays and coatings.
- Use netting or long sleeves with cuffs and long pants.
- Regularly inspect skin.
- Maintain a first aid kit on hand.

Attachment 2
Insects

Chiggers

Chiggers, also known as "red-bugs" or "harvest mites", are the immature stages of a tiny red mite. They inhabit areas of tall grass, associated with low, wet spots, ponds and stream banks, wild berry patches, and forest underbrush. The larvae attach themselves to the clothing of people or to the fur of passing animals. Before settling down to feed, chiggers move to a constriction, such as sock tops, waistbands, or armpits. Feeding chiggers inject a salivary fluid, which dissolves the host's cells, and then they suck up the liquefied tissue. Within a few hours, small, reddish, intensely itching welts appear. These bites may continue to itch for several days up to two weeks after the chigger is dislodged. Following are suggestions that should provide some protection from chiggers:

- Stay out of areas where chiggers are likely to be present including wood lots, pastures, roadside ditches, or other areas with tall grasses and weeds. Chiggers are especially common in moist low-lying areas.
- Wear loose-fitting clothing (if possible) when working outdoors. Vehicles should be frequently vacuumed to reduce the number of chiggers that may have been deposited.
- Apply a repellent containing DEET to shoes, socks, and trousers before entering chigger-infested areas. Caution: some individuals may be sensitive to DEET – always read and follow label directions.
- Another repellant of chiggers is flowers of sulfur. Flowers of sulfur is powdered elemental sulfur available at a drug store or pharmacy as an over-the-counter preparation. It has a slight, rotten egg smell. Areas on the body that have tight clothing up against them such as socks, waistbands, etc. may be dusted with sulfur powder. Surveyors and other field personnel state that they fill a sock with sulfur and are able to dust these areas efficiently.

Sulfur may be more benign to use than DEET on some body parts. Avoid breathing dust during application.

- Immediately after possible exposure to chiggers, take a bath, thoroughly scrubbing the body with hot soapy water. This will kill or dislodge many of the chiggers. The clothes that were worn when the bite(s) occurred should be placed in a plastic bag for temporary storage until they can be laundered.
- When bites begin to itch, one course of treatment is to apply rubbing alcohol, followed by one of the nonprescription local anesthetics. A baking soda paste, calamine lotion, or product such as "After-Bite" also will help reduce discomfort. Avoid scratching bites since this only increases irritation and may lead to a secondary infection of the bite.

Ticks

Ticks are vectors of many different diseases including Rocky Mountain spotted fever, Q fever, tularemia, Colorado tick fever, and Lyme disease. They attach to their host's skin and intravenously feed on its blood creating an opportunity for disease transmission. Covering exposed areas of the body and the use of tick repellent are two ways to prevent tick bites. Periodically during the workday employees will inspect themselves for the presence of ticks. If a tick is discovered, the following procedure should be used to remove it:

- Do not try to detach a tick with your bare fingers; bacteria from a crushed tick may be able to penetrate even unbroken skin. Fine-tipped tweezers should be used.
- Grip the tick as close to your skin as possible and gently pull it straight away from you until it releases its hold.
- Do not twist the tick as you pull and do not squeeze its bloated body. That may actually inject bacteria into your skin.
- Thoroughly wash your hands and the bite area with soap and water. Then apply an antiseptic to the bite area.
- Save the tick in a small container with the date, the body location of the bite, and where you think the tick came from.
- Notify the SSO of any tick bites as soon as possible.

Recently, Lyme disease has been the most prevalent type of disease transmitted by ticks in the United States.

Spiders

A common venomous spider is the Black Widow. The adult female is glossy black with short, almost microscopic hairs and a crimson hourglass marking on the underside of the abdomen. They are found in dark corners of barns, stables, garages and piles of boxes and crates. They have also been known to reside in vacant rodent burrows, under stones, logs and long grass, and in hollow stumps and brush piles. Generally, Black Widows are not aggressive and usually can be induced to bite only if pressed against the skin. If disturbed, they typically will retreat to a corner of their web. However, these spiders are more aggressive if they are protecting an egg sac. After a bite, a dull numbing pain in the affected extremity occurs. In addition, pain and some muscular rigidity in the abdomen or the shoulder, back, and chest may occur. The bite may also produce headache, dizziness, skin rash, nausea, vomiting, anxiety and weakness, and increased skin temperature over the affected area may be observed. Ice may be placed over the bite to reduce the pain. Bites are rarely fatal to adults, but because the black widow spider injects neurotoxins, it is important to seek immediate medical attention.

Another venomous spider common in the southern United States is the Brown Recluse or Fiddle Back Spider. The Brown Recluse is about 1/4 to 1/2 inches in body length (most adults are about the size of a United States dime to a US quarter with legs extended). Coloration ranges from tan to dark brown, with the abdomen often darker than the rest of the body. The feature that most distinguishes the brown recluse from many other harmless spiders is a

somewhat darker violin-shaped marking on top of the leg-bearing section of the body. The neck of the violin "silhouette" points towards the rear (abdomen) of the spider. The brown recluse roams at night seeking its prey. During the day, it hides in dark niches and corners, where it may spin a poorly organized, irregular web. Eggs are deposited in 1/2 inch long off-white silken egg sacs, often appearing flattened beneath and convex above. It is shy and will try to run from a threatening situation but will bite if cornered. People are sometimes bitten while they are asleep because they roll onto a brown recluse spider while it is hunting in the bed. More often the victim is bitten while putting on a shoe or piece of clothing that a spider has selected for its daytime hiding place. The bite of the brown recluse is usually painless until 3 to 8 hours later when it may become red, swollen, and tender. Later the area around the bite site may develop into an ulcerous sore from 1/2 to 10 inches in diameter. Healing often requires a month or longer, and the victim may be left with a deep scar. Prompt medical attention can reduce the extent of ulceration and alleviate other complications that may develop. It should be noted that not all brown recluse bites result in ulcerations or scarring.[1]

Fire Ants

Fire ants are approximately 1/4-inch long and live in underground chambers that typically contain over 1,000 ants. One sure sign of the presence of fire ants is their conical mounds, which are a result of the digging of their chambers. The sting of a fire ant results in localized reddening of the bite area, accompanied by sharp burning sensations. The first ant sting releases a chemical substance that triggers other ants of the colony to sting. Anyone seeing fire ant mounds present at the work site should notify the SSHO, who will then notify the rest of the crew so the mounds may be avoided if possible.

Flying Insects

Flying insects such as mosquitoes, wasps, hornets, and bees may be encountered while site activities occur. Section 3.4.4 discusses problems associated with them. Mosquitoes can be the vectors for diseases such as the West Nile Virus and Saint Louis Encephalitis, reports of which appear in the media periodically. Avoiding mosquito bites is the best way to avoid potential exposure to mosquito-borne disease. Apply insect repellant containing DEET (N,N-diethyl-meta-toluamide), wear long-sleeved clothes and long pants treated with repellent and stay indoors during peak mosquito feeding hours (dusk until dawn) to further reduce your risk.

There is currently no vaccine to protect humans against Saint Louis Encephalitis or West Nile Virus. Individuals at project sites can reduce their risk from being infected with West Nile Virus by taking the following actions to protect against mosquito bites:

- Review the hazards of West Nile Virus periodically in morning safety meetings.
- Increase protective measures when working at dawn, dusk, and in the early evening.
- Reduce the area of exposed skin when working outdoors. Long-sleeved shirts with sleeves rolled down are recommended. Understand that mosquitoes may bite through thin clothing, so personnel should evaluate the actual Level D clothing worn, for example, heavy, long

sleeve work shirts and heavy dungarees/jeans may be indicated. Activity at projects where disposable coverall use (i.e., Tyvek®) is specified, further reduces the risk of mosquito bites.

- For activities where only Level D PPE is specified, consider using disposable coveralls when working in wooded, highly vegetated, or swampy areas.
- Use an insect repellent containing approximately 30 percent DEET. In concentrations greater than 35 percent, DEET provides no additional protection. Use the repellent according to the manufacturer's directions provided on the container. Use just enough repellent to cover exposed skin and clothing. Do not treat unexposed skin. Frequent reapplication or saturation is unnecessary for effectiveness. Avoid prolonged and excessive use of DEET.
- When additional protection against mosquitoes is necessary, commercially prepared "clothing and gear" insect repellants containing 0.5 percent permethrin may be used. These repellants, such as Repel Permanone™ are available in the sporting goods departments at major retailers. Clothing and gear insect repellants are not for use on skin. Use the repellent according to the manufacturer's recommendations provided on the container.
- After returning from outdoor field activities, wash treated skin with soap and water.
- Personnel should report flu-like symptoms to the SSO.

West Nile Virus

The Centers for Disease Control and Prevention report that human illness from West Nile virus is rare, even in areas where the virus has been reported. The chance that any one person is going to become ill from a mosquito bite is low. West Nile virus is spread by the bite of an infected mosquito, and can infect people, horses, many types of birds, and some other animals. Most people who become infected with West Nile virus will have either no symptoms or only mild ones. On rare occasions, West Nile virus infection can result in a severe and sometimes fatal illness known as West Nile encephalitis (an inflammation of the brain). The risk of severe disease is higher for persons 50 years of age and older. There is no evidence to suggest that West Nile virus can be spread from person to person or from animal to person.

Saint Louis Encephalitis

The Centers for Disease Control and Prevention report mild infections occur without apparent symptoms other than fever with headache. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially in infants) and spastic paralysis. There is no evidence to suggest that Saint Louis encephalitis can be spread from person to person or from animal to person.

Table 1

Flying Insect Information

Organism	Description	Habitat	Problem	Severity	Protection
Hornet	One inch long with some body hair. Abdomen is mostly black.	Round, paper like nest hanging from trees, shrubs, or under eaves of buildings.	One nest may contain up to 100,000 hornets that will attack in force at the slightest provocation.	Severe pain, allergic reactions similar to bees.	Do not come near or disturb nest. If a hornet investigates you, do not move.
Mosquito	Small, dark, fragile body with transparent wings. From 1/8 to 1/4 inch long.	Where water is available for breeding.	Bites and sucks blood. Itching and swelling result.	Can transmit encephalitis and other diseases. Scratching causes secondary infections.	Use plenty of insect repellant and wear gloves. Stay in windy areas.
Wasp	Very thin waist. Color can be black, yellow or orange with stripes.	Underground nest. Paper-like honeycomb nest in abandoned buildings hollow trees, etc.	Stings. Some species will attack if you get too close to the nest.	Severe pain, allergic reactions similar to bees. Can be fatal.	Avoid Nest. Do not swat at them.
Bee	Generally have yellow and black stripes and two pair of wings.	Hollow logs, underground nest, old buildings,	Stings when annoyed. Leaves venom sac in victim.	If person is allergic, nausea, shock, constriction of the airway can result. Death may result.	Be careful and watch where you walk. Cover exposed skin. Avoid areas where bees are swarming. Avoid wearing sweet fragrances and bright clothing. Move slowly or stand still when bees are swarming about you.

Attachment 3
Snakes

Copperhead


Coral

Cottonmouth


Diamondback Rattlesnake


Water Moccasin

The most effective way to prevent snakebites is to avoid snakes in the first place. Personnel should avoid walking at night or in high grass and underbrush. Visual inspection of work areas should be performed prior to activities taking place. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg. No attempts at killing snakes should be made; many people are bitten in such an attempt.

If a snake bites someone, the following treatment should be initiated:

- Keep patient calm

- Notify emergency medical services
- Wash the wound and keep the affected body part still
- Apply direct pressure to site of bite if bleeding is extreme
- Keep the affected area lower than the heart
- Carry a victim who must be transported, or have him/her walk slowly
- Transport to closest medical facility

Attachment 4
Other Natural Hazards

Alligators

Alligators live in nearly all Louisiana parishes but are most common in the major river drainage basins and large lakes in the southern portion of the state. Most attacks involve animals over six feet long. Alligators become more active in the beginning of March, peaking in May, which is their mating season. Females will nest in June - July, and the eggs will hatch in August and September. Even a small amount of impounded water may contain a large alligator. Twilight and night are prime times for alligator attacks. Never approach an alligator. Always stay at least 30 yards away. Never wade or swim in areas that could contain large alligators. Do not dump food or scraps into or near the water. This can attract alligators. Always be aware of your surroundings and use caution and common sense. If at any time personnel observe alligators at the site they will immediately inform the SSO, who will then notify the rest of the crew and local wildlife personnel.

Feral Animals

Feral animals such as rats or other wildlife may be encountered during fieldwork. Typically, feral animals are as afraid or more afraid of humans and when encountered will run away from human contact. However, if an animal is diseased, injured or tending a nest, they may become aggressive. The most common disease encountered with feral animals is rabies. Signs of a rabies-infected animal include:

- Changes in an animal's behavior;
- General sickness;
- Difficulty swallowing;
- An increase in drool or saliva;
- Wild animals that appear abnormally tame or sick;
- Animals that may bite at everything if excited;
- Difficulty moving or paralysis; and
- Death.

Animals in the early stage of rabies may not have any signs, although they can still infect you if they bite you. The incubation period is the time from the animal bite to when signs appear. In rabies, it is usually 1-3 months. However, it can last as long as several years. Once the virus reaches the brain or spinal cord, signs of the disease appear. **In the event**

an animal is encountered on the site, do not approach it. If it exhibits one or more of the signs listed above, call local wildlife personnel to get as

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SCOPE

This procedure provides guidance for determining appropriate Personal Protective Equipment (PPE) to be worn at the job site, based on new tasks and chemical or physical agents identified in the field. The initial determination for proper PPE is completed as part of development of the HASP.

DEFINITIONS

None.

PROCEDURE

A. The Site Safety Officer will complete a hazard assessment of the tasks involved and identify the appropriate PPE based on the task and the chemical or physical agents involved. The written hazard assessment certification must be documented in the HASP.

B. The Site Safety Officer will communicate to employees the PPE requirements for the tasks involved.

C. The Site Safety Officer will provide PPE that properly fits the employee(s).

D. The site Safety Officer will conduct daily site walks to verify appropriate use of PPE.

E. RCM Health & Safety Coordinator or the Site Safety Officer will provide training to the employees which includes at least the following:

1. When PPE is necessary;
2. What PPE is necessary;
3. How to properly don, doff, adjust and wear PPE;
4. The limitations of the PPE; and
5. The proper care, maintenance, useful life and disposal of the PPE.

F. Re-training by the Site Safety Officer may be required if:

1. Changes at the job site make previous training obsolete.
2. Changes in the types of PPE make previous training obsolete.
3. Inadequacies in an affected employee's knowledge or use of PPE indicate the employee requires additional training.

G. Types of PPE include the following:

1. Eye and Face Protection

a. All eye and face protection must comply with ANSI Z87.1-1989.
b. Safety glasses
   - Side shields must be worn when there is a hazard of flying objects.
   - Prescription glasses must meet the ANSI Z87.1-1989 requirements or must have eye protection over them meeting the ANSI standard requirements.
c. Chemical goggles
d. Face shield

2. Head Protection
   a. All head protection (hard hats) must comply with ANSI Z89.1-1989.

3. Foot Protection

   All foot protection must comply with ANSI Z41-1991.
   a. Safety-toed shoes
   b. Rubber boots or rubber safety-toed boots

4. Hand Protection

   Hand protection must be selected based on the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use and the hazards and potential hazards identified. The RCM Health and Safety Coordinator must verify and document selection of appropriate chemical resistant gloves.
   a. Work gloves, such as leather or cotton
   b. Chemical gloves, such as nitrile, neoprene, Viton, butyl rubber
   c. Cut-resistant gloves, such as Kevlar

5. Hearing Protection
   a. Ear plugs
   b. Ear muffs

6. Respiratory Protection (Refer to SOP – 9)

7. Other PPE
   a. Disposable Coveralls
   b. Fire Resistant Clothing

REFERENCES

Regulatory References

- 29 CFR 1910.132, Personal Protective Equipment, General Requirements
- 29 CFR 1910.133, Eye and Face Protection
- 29 CFR 1910.135, Head Protection

- 29 CFR 1910.136, Foot Protection
- 29 CFR 1910.138, Hand Protection

Technical References

- ANSI Z87.1-1989, American National Standard Practice for Occupational and Educational Eye and Face Protection
- ANSI Z89.1-1989, American National Standard for Personal Protection – Protective headwear for Industrial Workers – Requirements
- ANSI Z41-1991, American National Standard for Personal Protection – Protective Footwear

Procedural References

- SOP – 9, Respiratory Protection

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SCOPE

This procedure identifies the work practices and regulatory requirements with regard to respiratory protection.

DEFINITIONS

- **Escape Respirators** – Respiratory devices providing protection only during escape from hazardous atmospheres.

- **Hazardous Atmosphere** - (1) Any atmosphere containing a toxic or disease-producing gas, vapor, dust, fume, or mist, either immediately or not immediately dangerous to life or health; or (2) Any oxygen-deficient atmosphere.

- **Immediately Dangerous to Life or Health (IDLH)** – A condition that poses a threat of exposure to airborne contaminants when that exposure is likely to cause death or immediate, or delayed, permanent adverse healths effects, or prevent escape from such an environment.

- **Oxygen Deficient Atmosphere** – An atmosphere containing less than 19.5 percent oxygen by volume.

PROCEDURE

A. The Site Safety Officer must verify that all employees required to wear respiratory protection at the jobsite are qualified (i.e., have completed a medical evaluation, been fit-tested and are trained.)

B. The RCM Health and Safety Coordinator will select respiratory protection based on the hazards at the jobsite. Selection of respiratory protection will be completed as part of the hazard assessment when completing the HASP. If unanticipated conditions are encountered at the jobsite requiring a change in respiratory protection, follow the respiratory protection upgrade process defined Section 5 of in the site specific HASP. Additionally , the Site Safety Officer should contact the RCM Health and Safety Coordinator to re-evaluate PPE requirements

C. Inspection

1. All workers must inspect all non-emergency respirators before each use and during cleaning.
2. The Site Safety Officer must inspect respirators used for emergency use, at least monthly and in accordance with the manufacturer's recommendations, and must check for proper function before and after each use. See Section G of this SOP for situations requiring emergency use respirators.

3. Respirator inspection shall include:
   - Check for tightness of connections.
   - Check condition of inlet coverings, head harness, valves, connecting tubes, harness assembly, hoses, filter, cartridges, canisters, end-of-service-life indicator, electrical components, and shelf-life date(s).
   - Check all rubber and elastomeric parts.
   - Check all air cylinders for proper charge.
   - For respirators maintained for emergency use, the inspection must be documented with the date of the inspection, the name of the inspector, the findings, remedial action taken, and a serial number or other means if identifying the respirator. A tag or label must be affixed to the storage compartment and replaced with a subsequent inspection tag/label.
4. Any respirator that does not pass inspection shall be immediately removed from service to be repaired or replaced.

D. Use

1. No facial hair is allowed which could come between the sealing surface of the face piece and the face, or interfere with the valve function.
2. Eye protection must be worn such that it does not interfere with the face piece seal.
3. Conduct a seal-check (positive and negative pressure) every time the respirator is donned.
4. The Site Safety Officer must evaluate continuing respirator effectiveness
   - Maintain surveillance of work area to assess jobsite conditions and respirator wearer(s) exposure or stress levels have not changed;
   - Direct respirator wearers to leave the work area:
     - to wash their faces and face pieces to prevent eye or face irritation associated with respirator use;
     - if a respirator wearer detects vapor or gas breakthrough, changes in breathing resistance or leakage of the face piece;
     - to replace the respirator filter, cartridge or canister elements.
   - If a respirator wearer detects breakthrough, changes in breathing resistance or leakage, they must replace or repair the respirator before returning to the work area. Change schedules for substances other than particulates will be addressed in the HASP or Job Hazard Analysis.

E. Maintenance

1. Clean and sanitize respirator after each use.
2. If respirators are not assigned, each respirator must be cleaned and sanitized before being used by a different employee.

3. Respirators being used for emergency use shall be cleaned after being used. These respirators must contain a tag or label on them telling the last date they were inspected and who inspected them.
4. Each respirator shall be cleaned in warm water (not exceeding 110^0F or 43^0C) with sanitizers that effectively clean the respirator and contain an antibacterial agent. For additional cleaning procedures, refer to 29 CFR 1910.134, Appendix B-2, Respirator Cleaning Procedures (Mandatory).
5. Replacement of parts or repairs may be done only by persons trained in proper respirator maintenance and assembly.
6. Replacement parts used shall be only those designated specifically for the respirator being repaired.
7. Any respiratory equipment not repairable, must be destroyed and discarded.

F. Site workers must store respirators to protect them from:

1. physical damage including face piece or valve deformation;
2. contamination;
3. dust;
4. sunlight;
5. extreme temperatures;
6. excessive moisture; and
7. damaging chemicals.

G. Special Circumstances (including but not limited to Immediately Dangerous to Life and Health (IDLH) or unknown concentrations)

If the Site Safety Officer or Construction Manager encounters special circumstances in the field which were not anticipated in the HASP, such as an IDLH atmosphere or an atmosphere with unknown concentrations or unknown constituents, contact your RCM Health and Safety Coordinator for assistance. Conditions requiring Self-Contained Breathing Apparatus (SCBA) or airline respiratory protection may require additional medical evaluation, fit-test of a different face piece and additional training. Additionally, when using supplied air, additional criteria apply regarding breathing air quality, quantity and flow. For additional information, refer to 29 CFR 1910.134(i).

REFERENCES

Regulatory References

- 29 CFR 1910.134, Respiratory Protection

Technical References

None

Procedural References

- RCM Health and Safety Program, Appendix B, Section 1

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SCOPE

This procedure provides work practices to meet regulatory requirements for working in confined spaces and to ensure that proper planning has occurred as part of development of the HASP. There are two types of confined spaces covered by this procedure: a permit-required confined space and a non-permit confined space.

DEFINITIONS

- **Confined Space –** An area which:
  - Has adequate size and configuration for employee entry;
  - Has limited means of access or egress; and
  - Is not designed for continuous employee occupancy.

- **Entry into a Confined Space –** The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

- **Non-permit Confined Space** - A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

- **Permit-Required Confined Space –** A confined space that has one or more of the following characteristics:
  - Contains or has a potential to contain a hazardous atmosphere;
  - Contains a material that has the potential for engulfing an entrant;
  - Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
  - Contains any other recognized serious safety or health hazard.

PROCEDURE

A. It is RCM's standard policy and practice to never enter into a confined space, as defined above. However, there may be situations which require entry into a confined space. In those situations, a detailed written Confined Space Entry Program must be developed for the specific site and specific conditions anticipated to be encountered. Under these circumstances, he RCM Health and Safety Coordinator will develop the Confined Space Entry Program as part of the site specific HASP.

B. Additionally, specific training must be completed for any individual(s) involved in

confined space entry.

REFERENCES

Regulatory References

- 29 CFR 1910.146, Permit-Required Confined Spaces

Technical References

None

Procedural References

- ERM Corporate Health and Safety Program, Tanks, Vaults and Manholes

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SCOPE

This procedure provides requirements and safe work practices for personnel involved in excavation work. Please review the Excavation Safety Checklist (Attachment 1) in verifying that this procedure is being followed.

DEFINITION

- **Accepted Engineering Practices** – those requirements, which are compatible with standards of practice required by a registered professional engineer.
- **Benching (Bench System)** – a method of protecting employees from cave-ins by excavating the sides of an excavation from one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
- **Cave-in** –the separation of a mass of soil or rock from the sides of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity to entrap, bury, or otherwise injure and immobilize a person.
- **Competent Person** - one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them
- **Excavation** - any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.
- **Face or Sides** – the vertical or inclined earth surfaces formed as a result of excavation work.
- **Hazardous Atmosphere** – an atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.
- **Protective System** –a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective Systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.
- **Registered Professional Engineer** – a person who is registered as a professional engineer in the state where the work is to be performed.
- **Shield (Shield System)** –a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect workers with in the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses.

- **Shoring (Shoring System)** – a structure such as a metal hydraulic lift, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.
- **Sloping (Sloping System)** –a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation. The angle of incline required to prevent a cave-in varies with differences in factors such as the soil type, environmental conditions of exposure, and application of surcharge loads.
- **Support System** – means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

PROCEDURE

A. Prior to the start of excavation, the Construction Manager must complete the ERM subsurface clearance procedure to verify clearance of subsurface hazards at the excavation site. Subcontractor Contact should identify the location of utility installations (e.g., sewer, telephone, electric, water lines, etc.) that may be expected to be encountered during excavation.

1. Contact the utility company (-ies) and advise of proposed work requesting them to establish the location of the underground installations.
2. Underground installations must be protected, supported, or removed as necessary to safeguard employees.

B. When equipment is operated adjacent to an excavation or is required to approach the edge of an excavation, a warning system, such as barricades, hand or mechanical signals, or stop logs must be utilized. The system should be inspected:

1. Prior to the start of work and as needed throughout the shift.
2. After every rainstorm or other site condition change that could increase the instability of the excavation.

C. To prevent exposure to harmful levels of atmospheric contaminants or oxygen deficiency (atmospheres containing less than 19.5% oxygen), the following requirements apply:

1. The atmospheres in the excavation must be tested before employees enter excavations greater than 4 feet in depth per SOP 10 Confined Space Entry
2. The proper respiratory protection should be provided per SOP – 9 Respiratory Protection.

3. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing must be conducted as often as necessary to verify that the atmosphere remains safe.

D. Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, must be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. The equipment should be attended when in use.

E. Employees should not work in excavations where water has accumulated or is accumulating, unless protective measures such as special support or shield systems to protect from cave-ins have been implemented to protect the employees against the hazards posed by water accumulation.

1. If water is controlled or prevented from accumulating by the use of water removal equipment, a competent person must monitor the water removal equipment and operations.

2. Diversion ditches, dikes, or other suitable means must be used to prevent surface water from entering the excavation and to provide drainage of the area adjacent to the excavation.

3. Excavations subject to runoff from heavy rains require an inspection by a competent person.

I. Stability of other structures endangered by excavation operations must be stabilized by support systems such as shoring, bracing, or underpinning for the protection of employees. A registered professional engineer should be consulted for determination of stability of structures that may be affected during the excavation work.

K. Subcontractor Contact should verify materials and equipment are free from damage or defects that might impair their proper function.

L. Daily inspections of excavations, the adjacent areas, and protective systems must be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. A helpful excavation safety checklist is provided as Attachment 1.

ATTACHMENT

- Excavation Safety Checklist

REFERENCES

Regulatory References

- 29 CFR 1926.650 Scope,Application, and Definitions Aapplicable to this Subpart (Subpart P).
- 29 CFR 1926.651 Specific Excavation Requirements.
- 29 CFR 1926.652 Requirements for Portective Systems.

Technical References

None

Procedural References

ERM's Subsurface Clearance Procedure

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ATTACHMENT 1: EXCAVATION SAFETY CHECKLIST

Job Site	Yes	No	NA	Excavation	Yes	No	NA
Prior to starting the job, were utilities notified and underground services located?	☐	☐	☐	Have the supervisors and workers been trained in excavation safety laws and procedures?	☐	☐	☐
Were overhead transmission lines noted and precautions taken to ensure that equipment does not come in contact with them?	☐	☐	☐	Have building, utility poles, trees and any other surface encumbrances or destabilizing forces been taken into consideration?	☐	☐	☐
Have adequate signs been posted and barricades provided?	☐	☐	☐	Has soil classification been done?	☐	☐	☐
Are the workers wearing reflective vests, if necessary?	☐	☐	☐	Has the appropriate means of safeguarding the excavation by OSHA requirements been determined by a Competent Person?	☐	☐	☐
Are vehicles, equipment, and spoil piles correctly placed to allow for the safe passage of traffic and the progress of the construction?	☐	☐	☐	For excavations 4 feet (1.2 meters) deep or more, are ladders, steps or ramps available within25 feet (7.6 meters) of lateral travel?	☐	☐	☐
Has traffic control (fire depts., etc.) been notified?	☐	☐	☐	Are all open pits or shafts either covered or barricaded?	☐	☐	☐

Job Site	Yes	No	NA	Excavation	Yes	No	NA
Is the appropriate safety gear on site?	☐	☐	☐	Are spoil piles at least 2 feet from the edge of the excavation and properly sloped?	☐	☐	☐
Have undermined structures been shored, braced or underpinned, or has a registered Prof. Engineer determined that such measures are not necessary?	☐	☐	☐	Have confined-space atmospheric hazards been considered?	☐	☐	☐
Are utilities crossing the excavation supported from above and does protection from falling materials exist?	☐	☐	☐	Do bridges and walkways have standard guardrails?	☐	☐	☐
				Have means been provided to remove water from the excavation?	☐	☐	☐
				Competent person available on site at all times.	☐	☐	☐

NOTE: Shoring and shielding must be removed in a manner that ensures the safety of workers, and excavations must be back filled as soon as work is completed.

SCOPE

This procedure provides work practices to meet regulatory requirements regarding fall prevention/fall protection for all employees working 6 feet or more above a lower level.

DEFINITIONS

None.

PROCEDURE

A. Fall prevention/protection is required when there is an unprotected side or edge which is 6 feet or more above a lower level. Example situations include but are not limited to:

1. Horizontal walking/working surfaces;
2. Leading edges;
3. Holes in flooring or walls;
4. Formwork and reinforcing steel;
5. Ramps, runways and other walkways;
6. Excavations;
7. Roof work;
8. Precast concrete erection; and
9. Walking/working surfaces not otherwise addressed.

B. In addition, protection from falling objects must also be provided to employees working below, by requiring the use of head protection as well as one of the following methods:

1. Erect toeboards, screens or guardrail systems to prevent objects from falling from higher levels; or
2. Erect a canopy structure and keep potential objects far enough from the edge so they would not go over if they were accidentally misplaced; or
3. Barricade the area into which the objects could fall and prohibit employees from entering into the barricaded area.

C. Where fall prevention, in the form of a physical barrier, is not feasible, and a fall hazard exists, fall protection is mandatory. Fall protection can take on many forms depending on the job task being performed, i.e., permanent and temporary vertical and horizontal lifeline systems, full body harness, shock absorbing lanyards, nets, retractable devices, etc. These are some of the most common methods of fall protection available.

D. In the event work is to be conducted at a height greater than 6 feet, fall prevention and/or fall protection requirements must be incorporated into the HASP. The RCM Health and Safety Coordinator must develop a fall prevention/protection plan which

will incorporate the use of physical barriers, administrative controls or fall protection equipment.

E. Additionally, training must be completed for any individual who will be using fall prevention / fall protection equipment. The Site Safety officer must verify all workers have received the appropriate training relative to fall prevention / fall protection.

REFERENCES

Regulatory References

- 29 CFR 1926.501, Duty to Have Fall Protection
- 29 CFR 1926.502, Fall Protection Systems Criteria and Practices

Technical References

None

Procedural References

None

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RCM ERM Remediation & Construction Management	STANDARD OPERATING PROCEDURE	
	SOP #:	16
	Title:	Forklift /Truck Operations
	Last Rev.:	12/31/07
	Page:	1 of 2

SCOPE

This procedure provides guidance on meeting regulatory requirements and provides expectations for the safe use, and handling of forklift/ trucks.

DEFINITIONS

None.

PROCEDURE

A. TRAINING

1. The Construction Manager should verify that each forklift/ truck operator is trained and certified to operate a fork lift /truck per the requirements of 29 CFR 1910.178 Powered Industrial Trucks .
2. Refresher training in relevant topics shall be provided when the operator:
   a. Is assigned to drive a different type of truck
   b. Operates the forklift in an unsafe manner
   c. Experience an incident
3. Operators shall be required to be re-evaluated at least once every three years.

B. INSPECTIONS

1. Prior to operating a forklift, the operator shall examine the unit for conditions that adversely affect the safety of the vehicle.
2. A lift truck found to be unsafe to operate shall have the ignition key removed and a "OUT OF SERVICE" tag attached to the steering wheel, noting the unsafe condition or reason it has been taken out of service.
3. Any truck found with a tag must be repaired before being used.

C. OPERATION

1. Forklift/ truck shall be operated in accordance with the manufacturer's operating procedures and regulatory requirements.
2. The lifting capacity of the forklift/ truck should not be exceeded. Capacities are located on a plate attached to the truck.
3. An unstable load should never be lifted.
4. Obey all signs and warnings.
5. Lifting personnel for repairs or maintenance shall be done only in approved cages or platforms.
6. Forklifts have a high center of gravity and should be driven slowly around turns and curves to prevent rollover.
7. Spread the forks out as far as they will go when picking up material. Also, if the forks are longer than the load, be careful not to disturb what is behind the load.
8. Never allow anyone to stand or walk under a raised load.

9. Before moving the truck, check to make sure that there are no obstacles in your way.
10. Always turn your head when backing up. Mirrors are to see what is behind you while moving forward.
11. Come to a complete stop before changing directions.
12. Drive extra slow on wet and slippery surfaces.
13. The seatbelt must be worn at all times.
14. Never dismount the forklift while it is running.
15. Never leave a load raised.
16. Never drive on a slope with a raised load.
17. Always drive perpendicular to a slope
18. Always verify the ability of surfaces to support the equipment before operating the forklift/truck non non-paved surfaces

REFERENCES

Regulatory References

- 29 CFR 1910.178 Powered Industrial Trucks

Technical References

None

Procedural References

None

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SCOPE

This procedure defines minimum expectationse for the safe use and maintanence of tools and equipment, including tools and equipment which may be furnished by employees.

DEFINITIONS

Torque: The circular or rotating motion in tools such as drills, impact wrenches, saws, etc. which results in a strong twisting force

PROCEDURE

A. HAND TOOLS

1. Every tool was designed to do a certain job and employees should use tools only for their intended purpose.
2. Maintain hand tools in good condition - sharp, clean, oiled. .
3. Do not force tools beyond their capacity or use "cheaters" to increase their capacity. Do not use tools for pry bars.

B. PORTABLE POWER TOOLS

1. GUARDING

Guards or shields must be installed on all power tools before issue. Do not use improper tools or tools without guards in place.

C. OPERATING PRACTICES

1. Loose clothing, rings, and other jewelry must not be worn around operating machines. Keep sleeves buttoned or rolled up.
2. Keep fingers away from moving parts. Shut off machines to remove waste. Use a brush to clean up and debur. Be sure machine is fully stopped and not coasting.
3. Inspect at least daily before start-up. Look for loose or damaged parts and inadequate lighting.
4. Use clamps or vise to hold work.
5. Many machines have Safety Interlocking devices. Verify their operation prior to use , and NEVER BYPASS SAFETY INTINTERLOCK DEVICES.
6. Examine each power tool before using it. Look for damaged parts, loose fittings, frayed or cut electric cords. Tag and return defective tools for repairs.

7. Some machines use both pneumatic and electric power. Both must be shut off to make repairs or to adjust moving parts. Bleed down tool to remove any stored energy left in the system.
8. Be prepared in case of jamming**.** Maintain good footing; and use two hands, Circular saws, chain saws and percussion tools shall not be equipped with a locking switch or trigger
9. Flying objects **c**an result from operating almost any power tool. Be aware of others working around you and use proper eye protection.
10. Keep moving parts directed away from your body. Never touch a powered part unless power source is disconnected (such as drill chucks, blades, and bits).
11. Ground Fault Circuit Interrupters (GFCI**) a**re required when using electrical power tools.

REFERENCES

Regulatory References

- 29 CFR 1910.241 Definitions.
- 29 CFR 1910.242 Hand and Portable Powered Tools and Equipment, General.
- 29 CFR 1910.243 Guarding of Portable Power Tools.
- 29 CFR 1910.244 Other Portable Tools and Equipment.
- 29 CFR 1926.300 General Requirements.
- 29 CFR 1926.301 Hand Tools.
- 29 CFR 1926.302 Power-operated Hand Tools.

Technical References

None

Procedural References

SOP 08 Personnel Protective Equipment

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SCOPE

This procedure defines requirements for safe operation of heavy equipment operation. Heavy equipment includes backhoes, cranes, derricks, dozers, loaders, skid steers, and trucks.

DEFINITIONS

- **Crane** - means a mechanical device, intended for lifting or lowering a load and moving it horizontally, in which the hoisting mechanism is an integral part of the machine. A crane may be a fixed or mobile machine.
- **Derrick** - A "derrick" is an apparatus consisting of a mast or equivalent member held at the head by guys or braces, with or without a boom, for use with a hoisting mechanism and operating ropes.

PROCEDURE

A. TRAINING

1. Equipment operators must demonstrate training and experience with each piece of equipment before receiving authorization to begin work.

B. INSPECTION

1. All heavy equipment must meet applicable design standards (i.e., ANSI, etc.).
2. The equipment must have a copy of the most recent annual and periodic inspections onboard.
3. The Subcontractor Contact or a designated qualified person must inspect all heavy equipment prior to operation (See Crane and Derrick Inspection Checklist), to verify proper working condition.
4. A copy of the manufacturer's operating manual must be carried on all heavy equipments. The manual must include a load-rating chart that indicates safe loads in various configurations, wire and cable minimums and maximums, and any special operating considerations.

C. OPERATION

1. The Subcontractor must have a standard operating procedure that is implemented for heavy equipment operation.
2. Equipment must be operated in accordance with the manufacturer's instructions and recommendations.

3. Before starting equipment, the equipment operator must make sure no one is working on or near the machinery. If equipment must be operated in close proximity to other operations, a spotter will be required to work with the equipment operator. The spotter and equipment operator must be in radio communication
4. Equipment operators must wear seatbelts and operate equipment in accordance with safe operating speeds and loading
5. When working on slopes, the equipment should be positioned perpendicular to the slope with the center of gravity of the equipment on the lower edge of the slope.
6. Dump trucks must lower their beds **PRIOR** to moving from the dump site
7. All employees should wear appropriate personal protective equipment in accordance with SOP – 8 Personal Protective Equipment.
8. Equipment operators should not get on or off a moving machine.

Note: If heavy equipment is located near overhead power lines, refer to SOP – 12 Electrical Safety to determine safe working distances.

ATTACHMENTS

- Crane and Derrick Inspection Checklist

REFERENCES

Regulatory References

- 29 CFR 1910.181 Derricks.
- 29 CFR 1926.550 Cranes and Derricks.
- 29 CFR 1926.600 Equipment.
- 29 CFR 1926.601 Motor Vehicles.
- 29 CFR 1926.602 Material Handling Equipment.

Technical References

None

Procedural References

RCM SOP – 8 Personal Protective Equipment
RCM SOP – 12 Electrical Safety

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ATTACHMENT 1

CRANE AND DERRICK INSPECTION CHECKLIST

Prior to operation each day, inspect:

1. All control mechanisms for maladjustment interfering with proper operation.

2. All control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter.

3. All operator aids, motion and load limiting devices, and other safety devices for malfunction and inaccuracy of settings.

4. All chords and lacing.

5. All hydraulic and pneumatic systems - with particular emphasis given to those which flex in normal operation of the crane.

6. Hooks and latches for deformation, chemical damage, cracks, and wear.

7. Rope for proper spooling onto the drum(s) and sheave(s) and rope reeving for compliance with crane manufacturer's specifications.

8. Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, and moisture accumulation.

9. Hydraulic system for proper oil level.

10. Tires for recommended inflation pressure (mobile cranes).

11. Wedges and supports for looseness or dislocation (climbing tower cranes).

12. Braces and guys supporting crane masts; anchor bolt base connections for looseness or loss of preload (tower cranes and derricks).

13. Derrick mast fittings and connections for compliance with manufacturer's recommendations.

14. Barge or pontoon ballast compartments for proper ballast; deck loads for proper securing; chain lockers, storage, fuel compartments, and battening of hatches; fire fighting and lifesaving equipment in place and functional; hull void compartments sounded for leakage (floating cranes and derricks).

SCOPE

This procedure defines inspection, uses, handling, repair/disposal of defective ladders, and the type of ladders to be purchased.

DEFINITIONS

- **Ladders** - A ladder is an appliance usually consisting of two side rails joined at regular intervals by crosspieces called steps, rungs, or cleats, on which a person may step in ascending or descending.

- **Extension ladder** - An extension ladder is a non-self-supporting portable ladder adjustable in length. It consists of two or more sections traveling in guides or brackets so arranged as to permit length adjustment. Its size is designated by the sum of the lengths of the sections measured along the side rails.

- **Step ladder** - A stepladder is a self-supporting portable ladder, nonadjustable in length, having flat steps and a hinged back. Its size is designated by the overall length of the ladder measured along the front edge of the side rails.

- **Special-purpose ladder** - A special-purpose ladder is a portable ladder, which represents either a modification or a combination of design or construction features in one of the general-purpose types of ladders previously defined, in order to adapt the ladder to special or specific uses.

PROCEDURE

A. The following rules apply to *all ladders:*

1. Maintain ladders free of oil, grease and other slipping hazards.
2. Do not load ladders beyond their maximum intended load nor beyond their manufacturer's rated capacity.
3. Use ladders only for their designed purpose.
4. Use ladders only on stable and level surfaces unless secured to prevent accidental movement.
5. Do not use ladders on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Do not use slip-resistant feet as a substitute for exercising care when placing, lashing, or holding a ladder upon slippery surfaces.
6. Secure ladders placed in areas such as passageways, doorways, or driveways, or where they can be displaced by workplace activities or traffic to prevent

accidental movement. Alternatively, use a barricade to keep traffic or activity away from the ladder.

7. Keep areas clear around the top and bottom of ladders.
8. Do not move, shift, or extend ladders while in use.
9. Use ladders equipped with nonconductive side rails if the worker or the ladder could contact exposed energized electrical equipment.
10. Face the ladder when moving up or down.
11. Use at least one hand to grasp the ladder when climbing.
12. Do not carry objects or loads that could cause loss of balance and falling.
13. All ladders shall be inspected prior to use.
    a. Side rails, rungs, and steps.
    b. Safety feet of extension and straight ladders.
    c. Hardware guides, pawls and spreaders of stepladders.
    d. Extension rope and/or tie off rope.
14. It is the user's responsibility to check the ladder each time you use it! Any defective ladder that is repairable will be tagged with a "Dangerous, Do Not Use" tag and taken out of service until repairs are made.
15. When working off a ladder - (Many Sites have policies more stringent than ours. We must always follow the most stringent).
    a. Face the ladder when ascending or descending.
    b. Only one person at a time on the ladder.
    c. Be sure the ladder is stable.
    d. Keep both feet on the ladder rungs. Do not place one foot on a line or piece of equipment and the other on the ladder to keep within reach of the work.
    e. Check overhead for power lines and other obstructions.
    f. Fall protection is required if you must stand backwards on the ladder, and under certain other hazardous conditions.
    g. Protect other persons in the area by barricading/roping off the area.
    h. A person must be tied off to an adequate overhead structure when working the same distance or less from an edge or elevation as the height of the ladder. Example: Working 8' from an edge while working off an 8' or higher ladder.

B. The following rules apply to straight and extension ladders.

1. Use help when raising or lowering a ladder. One person should walk the ladder up or down while the second person foots the base of the ladder.
2. Ladders shall not be used in a horizontal position as platforms, runways, or scaffolds.

3. Where portable straight ladders are used, they shall be of sufficient length to extend three feet (36 inches) above the upper landing surface, and be positively secured or held against shifting or slipping.
4. Hand lines shall be used to raise and lower tools and material that cannot be carried in tool belts.
5. Straight and Extension Ladders shall be pitched to assure the ladder base is one-quarter the overall working height of the ladder.
6. Use a safety harness and tie off when you are on the seventh (7) rung or of a ladder or are six (6) feet or more off the ground. Tying off is required when working backwards or when other critical or hazardous work is being performed.
7. All ladders shall be tied off adequately at the top. The only exception is when the ladder is only to be used for inspection or other one-trip activity not involving actual work. If a ladder is climbed without, being tied off, it must be "footed" and held at the base by a ground person.
8. When performing work from a ladder that requires a person to be tied off, the person can be tied off to the rail of the ladder itself. This method may only be used only if there is no other adequate tie off and the ladder is properly tied off.
9. Do Not tie to the rung of the ladder, if the rung breaks, you will fall to the ground. If tying to the ladder, only tie to the rail of the ladder.

C. The following rules apply to step ladders.

1. The top step of any stepladder, 3 feet and over shall not be used to stand on.
2. Stepladders are not to be used as straight ladders.
3. Step ladders 10 feet or higher must be tied off.
4. A person is required to be tied off when working on the seventh (7) step of a stepladder.
5. A person is required to be tied off, when working under (6) foot, when:
   a. The task is critical or hazardous.
   b. The person is standing backwards on the ladder.
   c. Site regulations require tying off.
6. You may step off a stepladder to a suitable safety platform or work area. Good, SAFE, common sense must be utilized. Stepping off is not allowed if:
   a. Site regulations prohibit this practice.
   b. It is necessary to step off the top or next to the top step of the ladder.
   c. The ladder is not stable and firm. Whenever possible, the top of the ladder should be tied off or held by a second person to enhance stability.
   d. The ladder cannot be secured directly to the platform that the employee is stepping onto.

REFERENCES

Regulatory References

- 29 CFR 1910.25 Portable Wood Ladders
- 29 CFR 1910.26 Portable Metal Ladders
- 29 CFR 1910.27 Fixed Ladders
- 29 CFR 1926.1053 Ladders

Technical References

None

Procedural References

None

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SCOPE

This procedure defines requirements for employees on acquiring a permit prior to line breaking and the process for installing and removing a blank. Refer to Attachment 1 Line Breaking and Blanking Checklist to verify the procedure is being followed.

DEFINITIONS

- **Blanking or Blinding** -the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.
- **Double Block and Bleed** - the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.
- **Line Breaking** -the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

PROCEDURE

A. PERSONAL PROTECTIVE EQUIPMENT

The appropriate type of personal protective equipment (PPE) employed in a given line breaking situation will vary with the hazards associated with the material, equipment, location and ability to verify that the equipment/line is clear.

1. The minimum protective equipment in any line-breaking situation that must be worn is:
   a. Hardhat
   b. Appropriate chemical resistant gloves
   c. Face shield
   d. Goggles
   e. Appropriate chemical protective clothing.
2. Additional PPE, including respiratory protection, should be used as needed per SOP-08 Personnel Protective Equipment and SOP-09 Respiratory Protection.
   a. When the lines, nozzles, fittings, tanks or vessel contains, or has ever contained, hot liquids, hazardous materials, acid at any strength, caustic or poisonous substances.
   b. Where the activity in working on the line is an emergency one resulting from

from a leak or other abnormal situation such as the build-up of pressure.

B. LINE BRAKING OPERATIONS

1. The Subcontractor Contact responsible for the team members making the break must check to assure the break location is physically marked(i.e. Painted, Tagged) prior to the break and verified by the Construction Manager that the break site is correct.

Special Hazard: A competent person must attend at the point of the actual line break whenever a hazardous condition is found or known to exist.

a. The portion of the line being worked on shall be isolated from those preceding and following it in the most effective way. This will usually consist of blanking or shutting valves and locking and tagging them per Lockout / Tagout SOP - 22.

b. Coordination between the Construction Manager and the Subcontractor Contact shall be such that each knows the line is being worked on. No other process work, maintenance or sampling is to be done on the line at the same time without mutual agreement that such work represents no danger to the men working on the line.

2. The Subcontractor should have a permitting process that applies to jobs requiring opening of or working on any process line; permanent or temporary, connected fittings, valve, pump or vessel, including blockages which have ever contained acid, caustic, flammable or other hazardous liquid or gas, no matter how long ago; or presently contains hot materials such as steam.

Examples of such lines are:

a. Acid
b. Caustic
c. Chlorine
d. Anhydrous Ammonia
e. Sulphur
f. Natural Gas and Steam
g. Instrument Air

3. All openings made during the course of the job should be documented and checked for closure before completion of the job and released for resumption of normal use.

4. A qualified gas tester must do a line clearance test, and testing should continue throughout the procedure.

5. Burning off old flange bolts is to be considered the last resort, and should be done only if all other alternative methods have been exhausted, such as splitting nuts with a nut buster, sawing all the way through or partial cutting then wringing off. Using spark proof tools and/or beryllium wrenches is the preferred method.

C. BLANKING OR BLINDING OPERATIONS

1. Blanking can only be performed by qualified and trained personnel.
2. All blank material must be compatible with the parent metal being blanked.
3. All gaskets must be compatible with the product (i.e., acid, caustics, water, etc.).
4. Installation or removal of any blank should follow the Subcontractor's permit process.
5. All product in the line must be retained in a catch basin or pumped to a compatible container. – Draining lines to the ground is prohibited except for potable water lines.
6. When relieving pressure on air or gas line blanks, earplugs must be worn because screaming often occurs due to pressure.
7. When the product in the line has pressure, make sure you are aware of the direction of the bleed-off. The area must be barricaded. Only personnel directly involved in the line breaking should be in the area.
8. The Construction Manager and Subcontractor Contact must be aware of any blanking activity, and must be present on all first breaks.

ATTACHMENT

- Line Breaking and Blanking Checklist

REFERENCES

Regulatory References

- 29 CFR 1910.146 Permit – Required Confined Spaces.

Technical References

None

Procedural References

- SOP – 08 Personnel Protective Equipment
- SOP – 09 Respiratory Protection
- SOP – 10 Confined Space Entry
- SOP – 22 Lockout / Tagout

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ATTACHMENT 1

LINE BREAKING AND BLANKING CHECKLIST

Complete this section before signing, by checking off all of the appropriate boxes. Be prepared to discuss and/or answer any questions pertaining to this Line break, before requesting the permit.

YES	NO	N/A		
___	___	___	1.	Does this Line break involve acid, caustic, hazardous material or gas?
___	___	___	2.	Is it necessary to wear an acid suit, acid hood, boots and gloves as required by the blanking and line breaking conditions?
___	___	___	3.	Does the line, tank, vessel, etc., require obtaining a hot work permit, an explosive gas test, or any other type of permit?
___	___	___	4.	Will the opening of this line break cause a change in the area conditions and/or atmospheric conditions?
___	___	___	5.	Is it necessary to steam, purge, or flush out?
___	___	___	6.	Is respiratory protection required? If so, what type must be worn?
___	___	___	7.	Is there an adequate water supply with the adequate pressure at the line break location?
___	___	___	8.	If the hose is valved off, is there a possibility of freezing?
___	___	___	9.	Has the steam tracing been shut off and bled down and locked out?
___	___	___	10.	Is the area roped off and/or barricaded?
___	___	___	11.	Do you have the proper type fire extinguisher nearby?
___	___	___	12.	Have you planned an escape route in the event of an emergency?
___	___	___	13.	Is there a possibility of a spray, do you need to shield?
___	___	___	14.	Has the line, tank, vessel, etc., been properly drained into a suitable container for safe handling and environmental control?
___	___	___	15.	Have all of the vents been opened to prevent the possibility of an air lock?
___	___	___	16.	Does this line break involve a radiation hazard?
___	___	___	17.	Has the proper type scaffolding been erected, including a proper ladder for access and egress?

___ ___ ___ 18. Have all of the valves been properly positioned, (whether opened or closed as required) locked, tagged, and tried as per SOP – 22 Lockout / Tagout?

___ ___ ___ 19. Have all pumps, starters, hydraulic, electric or other forms of energy been brought to a zero state of energy, then locked, tagged, or blocked?

___ ___ ___ 20. Do you have all of the necessary equipment such as tools, blanks, bolts, gaskets, etc. on hand before the actual break begins?

	STANDARD OPERATING PROCEDURE	
ERM	SOP #:	22
	Title:	Lockout/Tagout
	Last Rev.:	12/31/07
	Page:	1 of 3

SCOPE

This procedure provides guidance on the control hazardous of energy to prevent injury to employees due to unexpected start-up or release of stored energy.

DEFINITIONS

- **Affected Employee**

  Any employee whose job requires them to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout/tagout or whose job requires them to work in an area in which such servicing or maintenance is being performed.

- **Authorized Employee**

  Any employee who locks out or initiates a tagout procedure on machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this procedure.

- **Circuit Breaker**

  Switch (housed in a distribution panel) controlling the flow of electricity (on/off) to the electrical equipment.

- **Control Switch**

  The switch controlling the flow or electricity between the disconnect switch source and the electrical equipment. Also called:

  a. Start-Stop button.
  b. Butterfly switch.
  c. Control station.

- **Disconnect Switch**

  Switch (normally housed in an electrical control room) controlling the flow of electricity (on/off) to the equipment and its control switch. This switch is also called:

  a. Combination starter switch.
  b. Switch and starter.

- **Zero Mechanical or Energy State**

  That state of a machine in which every power source that can produce machine member movement has been locked out. This includes blocking, controlling or isolation of electric, kinetic or potential energy sources

- **Multi-Lockout Devices**

  A multi-lockout hasp mechanism which can be used so more than one lock can be attached during a lockout. Lock boxes are another alternative for using multiple locks.

- **Personal Lock**

  A safety lock used by authorized personnel that is durable and capable of withstanding excessive force. Any authorized employee uses it to lock out equipment. All locks will be on a "One Lock, One Key, One Employee" system.

- **Tags**

  A standard tag signed and dated shall be attached to the individual's lock. The tag shall be attached by passing the grommet through the lock shackle. The legend on the tag shall read, "DANGER, DO NOT OPERATE". Tags shall be capable of withstanding the environment to which they are exposed for a maximum period of time that exposure is expected.

PROCEDURE

1. The Construction Manager shall inform the affected party responsible for the machinery or equipment being repaired or serviced that the equipment needs to be shut down so it can be locked out, tagged out and tried (electrical only).
2. The authorized party shall be responsible for the de-energizing switches, circuit breakers, pneumatic valves, or hydraulic valves, which control the operations of machinery or equipment that contains or ever contained hazardous energy.
3. Prior to the start of any work, all machines and equipment must be brought to a "zero mechanical/energy state. The Authorized Employee conducting the lockout should attempt to activate ("Try") the equipment with the starting device, to verify the equipment does not show any sign of stored energy.
4. Each authorized employee shall remove their personal lock and tag when they have completed their job and are no longer required to perform any other task on the equipment.
5. When work continues beyond the shift, an individual's lock and tag may remain in place if the Site allows. However, when returning to continue the work, each individual shall check their own lock and tag prior to starting work. Each individual must re-date their tag daily through out the duration of the job. The re-dating will confirm that the individual checked their personal lock, assuring the equipment remains locked out.
6. Shift change and new crews coming in requires the change-out of locks and tags.

A. GROUP LOCKOUT

1. When it is impractical because of the magnitude or complexity of large jobs such as major facility shutdown or overhaul, group lockout can be utilized.

   a. The Construction Manager shall be responsible for arranging the shutdown for energized equipment to be locked and tagged out.
   b. The Subject Matter Expert shall apply locks and tags to all disconnect switches to be worked on.
   c. The keys shall be placed in a group lockbox or comparable mechanism. It shall have a hasp and keeper, which will permit application of a "Lockout Device" so it can accommodate more than one lock.
   d. Each authorized employee shall affix their personal locks and tag with their name and date to the "Lockout Device" on the "Group Lockbox".
   e. Each authorized employee is to test by "Trying" the control switch to assure the equipment has been electrically de-energized before starting work.

REFERENCES

Regulatory References

- 29 CFR 1910.147 The Control of Hazardous Energy (Lockout/Tagout).

Technical References

None

Procedural References

None

REVISION LOG

DATE	REV. #	APV'D	COMMENTS
12/31/07	0	ELG	Issued for use

SCOPE

This procedure provides guidance on the minimum safety requirements for wall / floor penetrations. Potential hazards that may exist when wall / floor openings are made (in addition to fall hazards) include but are not limited to, concealed pipes, existing electrical wiring, telephone lines and fire alarms.

PROCEDURE

Prior to cutting into walls/floors, visually survey the area of penetration to see if there are any pipes or electrical services that my present an obstacle. If blueprints are available, the Subcontractor should review the prints to determine if any services are present that may be hidden in the wall/floor. Hidden hazards should be expected. Services may be supplied from adjacent floors, rooms or concealed in floors.

Prior to cutting / penetrating walls / floors:

1. Determine if the wall is bearing or nonbearing.
2. For interior walls, remove the ceiling tiles to help determine what services may be hidden in the wall.
3. Cutting both faces of the wall at the same time is prohibited.
4. Barricade both sides of the wall or floor.
5. When it has been determined that utilities are in the wall or floor, and may present a hazard / interference, SOP 22 "Lockout/Tagout Procedure" must be implemented.
6. All floor or wall openings must comply with OSHA 29 CFR 1910.23 "Guarding Floor and Wall Openings and Holes".
7. Before any power saws are used on masonry walls or floors, a visual inspection of both sides of the surface must be made for all utilities.
8. On hollow core walls, exploratory openings shall be made prior to creating an enlarged opening utilizing power tools.
9. The Subsurface Clearance Process must be followed for poured floors requiring core boring.

REFERENCES

Regulatory References

- 29 CFR 1910.23 Guarding Floor and Wall Openings.

Technical References

None

Procedural References

ERM Subsurface Clearance Procedures

REVISION LOG

DATE	REV. #	APV'D	COMMENTS
12/31/07	0	ELG	Issued for use

MANDATORY APPENDICES

A	*SITE LOCATION MAP AND MAP TO HOSPITAL*
B	*JOB HAZARD ANALYSES*
C	*SUBSURFACE CLEARANCE REQUIREMENTS*
D	*SITE INSPECTION CHECKLIST*
E	*PERSONAL SAFETY CONTRACT CARDS*
F	*WORK PERMIT FORMS*
G	*PROJECT MATERIAL SAFETY DATA SHEETS*
H	*AIR MONITORING DOCUMENTATION FORM*
I	*EMERGENCY DRILL EVALUATION FORM*
J	*INCIDENT REPORTING & INVESTIGATION FORM*
K	*DAILY SAFETY MEETING DOCUMENTATION FORM*

Appendix A
Map To Hospital & Site Map

150 Fulton Ave, Garden City Park, NY 11040

1.	Head **east** on **Fulton Ave** toward **Armstrong Rd**	go 0.1 mi total 0.1 mi
2.	Turn **left** at **Armstrong Rd**	go 259 ft total 0.2 mi
3.	Take the 1st **right** onto **Broadway**	go 0.1 mi total 0.3 mi
4.	Turn **right** at **Herricks Rd**	go 184 ft total 0.3 mi
5.	Take the 1st **left** onto **1st St** About 2 mins	go 0.6 mi total 0.9 mi

Winthrop-University Hospital
259 1st Street, Mineola, NY 11501-3987 - (516) 663-0333

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

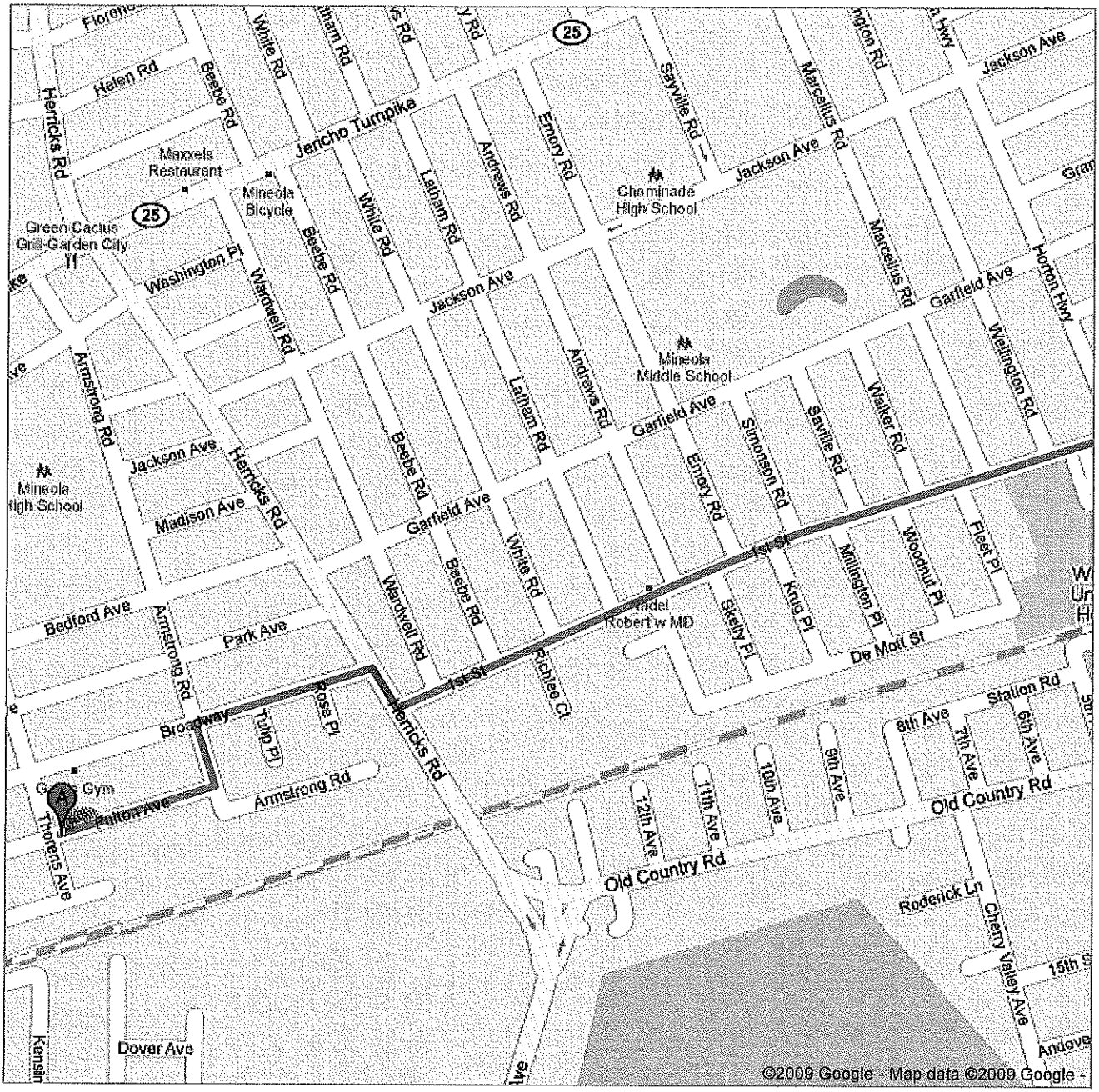
Map data ©2009 , Google

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

Google maps

Directions to Winthrop-University Hospital
259 1st Street, Mineola, NY 11501-3987 - (516) 663-0333
0.9 mi – about **4 mins**

Save trees. Go green!
Download Google Maps on your phone at **google.com/gmm**



Appendix B
Job Hazard Analyses

North America Job Hazard Analysis
Heavy Equipment Operations

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 1	

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.
Project Manager	Retain copy in the office health & safety file, amend to HASP as necessary.

Instructions:	**This JHA has been developed and approved by the North America Safety Team. Prior to conducting fieldwork. site-specific hazards related to this task must be incorporated by the project team. Once completed, the JHA should be reviewed regularly with site personnel who will be performing this task.**

Task Description:

Guidelines for working around heavy equipment during excavation and trenching activities.

Hazard Analysis:

Task Step	Hazard	Control Measures
Offsite Preparation	Untrained workers operating heavy equipment pose potential life-threatening hazards to employees.	ERM policy and practice is that our employees do not operate heavy equipment except in unusual circumstances. If ERM personnel are to operate heavy equipment, this must be stated in the health and safety plan for the project. Only employees with training and/or demonstrated experience operating heavy equipment may do so. Subcontractor personnel operating heavy equipment must be trained and/or have demonstrated experience operating such equipment. ERM must be in possession of evidence of training and/or experience prior to Subcontractor personnel operating such equipment. All heavy equipment must meet applicable design standards (ANSI, etc.). A copy of the operating manual must be carried on all heavy equipment, including a load-rating chart and any special operating considerations.

North America Job Hazard Analysis
Heavy Equipment Operations

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 1	

Task Step	Hazard	Control Measures
Heavy Equipment Operation	Injury to operator and those in immediate vicinity.	Before starting operations, operators must ensure no one is working on or near machinery. If equipment is to be operated in close proximity to other workers, a spotter must be working in tandem with the operator. All heavy equipment must be inspected daily to ensure good working order. Critical safety items, such as brakes, backup alarms, horns, etc. must be in working order. Machinery with critical safety items in disrepair may not be used until they are fixed. Operators must operate equipment while wearing seatbelts, if provided, and at reasonable speeds. Mounting/dismounting a moving machine is prohibited. Do not transport personnel or equipment in machinery not designed for this purpose. Overhead obstructions must be assessed before operating machinery. If equipment is to be operated in close proximity to overhead obstructions, a spotter must be working in tandem with the operator. Safe working distances must be specified in the health and safety plan or JHA supplied by the subcontractor.
Ending Heavy Equipment Operations	Leaving equipment in a non-neutral position poses contact hazards.	All heavy equipment must be placed in a neutral position when not in operation. Dump truck beds must be lowered, buckets must be at ground level, forklift tines must be at ground level, etc. Keys must be removed from all heavy equipment when not in use4.

North America Job Hazard Analysis
Heavy Equipment Operations

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 1	

Task Step	Hazard	Control Measures
	Vehicle and Pedestrian Traffic	The equipment operator must be aware of pedestrian and vehicle traffic at all times. When operating equipment in the public roadway the operator must keep the equipment within the work area. The operator may not move the equipment into the vehicle travel area unless signaled to by the Garden City Police officer.

Personal Protective Equipment Required for this Task:

Type	Description
High-visibility safety vest	Vest worn by equipment operators and those working in the area impacted by moving machinery
Hardhat	All personnel in the area must wear a hardhat whenever there is a possibility of flying or falling debris. The FSO may make the determination that hardhats are not required based on site conditions at the time.
Safety Glasses	All personnel in the area must wear safety glasses whenever there is a possibility of flying or falling debris. The FSO may make the determination that safety glasses are not required based on site conditions at the time.
Hearing Protection	The FSO will determine the need for hearing protection based on the equipment being used.

Training Required for this Task:

Type	Description
Heavy Equipment Operation	Operators must be trained and/or have demonstrated experience for each type of heavy equipment they will operate.

Forms Associated with this Task:

Type	Description
Heavy Equipment Inspection	Form for documenting daily heavy equipment inspections

North America Job Hazard Analysis
Heavy Equipment Operations

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 1	

form	

Site-Specific Job Hazard Analysis Completed by:

Name	Date
Justin Bunton	1/11/10

North America Job Hazard Analysis
Natural Hazards

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	All Outdoor Tasks
JHA No.: 10	

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.
Project Manager	Retain copy in the office health & safety file, amend to HASP as necessary.

Instructions:	**This JHA has been developed and approved by the North America Safety Team. Prior to conducting fieldwork. site-specific hazards related to this task must be incorporated by the project team. Once completed, the JHA should be reviewed regularly with site personnel who will be performing this task.**

Task Description:

Guidelines for mitigating natural hazards such as poisonous animals and plants, and terrain-related hazards.

Hazard Analysis:

Task Step	Hazard	Control Measures
Performing fieldwork in the presence of various natural hazards	Exposure to natural hazards can lead to injuries such as twisted ankles or to more complex medical emergencies such as poisonous plant or insect encounters.	Identify the expected types of natural hazards during the safety planning/HASP-writing stage of a project and verify conditions once onsite. If conditions differ, put protective steps in-place to mitigate the natural hazard if possible. Mitigation of natural hazards may involve removal of the hazard prior to work beginning, or avoiding the hazard during work.
Working around poisonous plants	Poisonous plant exposure	Poison ivy, oak, and sumac are common in North America and should be avoided. For sites with these hazards present, have a poison ivy wash available for employees on-site. If exposure occurs and no poison ivy wash is available, employees should wash in cool water and use soap.

North America Job Hazard Analysis
Natural Hazards

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	All Outdoor Tasks
JHA No.: 10	

Task Step	Hazard	Control Measures
Working around poisonous insects	Danger to health from bites, stings, and/or disease transmission	Liberally use insect repellant containing DEET at all times on the jobsite. Periodically throughout the day and at the end of the day, perform a thorough "tick-check" to ensure ticks or other insects are found and removed promptly. Avoid obvious conical mounds of dirt that may indicate ants, wasps, or other flying insects. Before reaching into dark or damp spaces such as monitoring well-heads, inspect the area thoroughly to ensure spiders are not present. Always take a shower as soon as possible after leaving a jobsite for the day to remove any insects, such as chiggers.
Working around snakes	Snake bites and potential poisoning	Visually inspect the work are prior to beginning any work to located areas with high grass and underbrush. Do not walk through these areas if at all possible to avoid snakes. Wear leather steel-toe boots and snake chaps in areas where snakes are suspected or confirmed to be present. Do not attempt to kill snakes, as people are commonly bitten attempting this.
Working around feral animals	Animal bites and possible transmission of disease	High rat populations within an enclosed space present a hazard of Hanta virus. Spray such areas with bleach solution prior to performing any work in the area (10 parts water to 1 part household bleach). Feral dogs may become aggressive, especially if guarding their young or if they become very hungry. If dogs or other animals are spotted that are acting strangely, do not approach them. Contact the local animal control center for assistance.

North America Job Hazard Analysis
Natural Hazards

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	All Outdoor Tasks
JHA No.: 10	

Task Step	Hazard	Control Measures
Working on uneven terrain	Slip, trip, and fall injuries may occur when working on uneven terrain or terrain with holes	At a minimum, wear ankle-height steel-toed boots when working on project sites. Keep work areas free from clutter so that ground surfaces can be easily seen by employees. Do not read phone emails or text while walking. Identify all scattered materials presenting a slip, trip, or fall hazard with high visibility paint markings if possible, or cordon the area off with caution tape. Keep all heavy equipment as low to the ground as possible when being stored, such as forklift tines, excavator buckets, etc. Place ladder bases on even, non-slippery ground. If this is not possible obtain help when going up or down the ladder.

Personal Protective Equipment Required for this Task:

Type	Description
Ankle-height boots	ERM standard steel-toe boot requirement specified ankle-height, chemical-resistant boots.
Long sleeves and pants	Protects exposed areas of skin from contact with insects, animals and poisonous plants

Site-Specific Job Hazard Analysis Completed by:

Name	Date
Justin Bunton	1/12/2010

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 2	

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.
Project Manager	Retain copy in the office health & safety file, amend to HASP as necessary.

Instructions:	**This JHA has been developed and approved by the North America Safety Team. Prior to conducting fieldwork. site-specific hazards related to this task must be incorporated by the project team. Once completed, the JHA should be reviewed regularly with site personnel who will be performing this task.**

Task Description:

General guidelines for working safely when performing any ground penetrating activities (excluding surface soil sampling) and ERM personnel activities during overseeing drilling.

Hazard Analysis:

Task Step	Hazard	Control Measures
Identify a Client Contact Person	Client contacts that are not familiar with the site layout could cause critical information to be missed during safety planning.	Determine degree of knowledge of our client contact by evaluating their current job duties at the site, length of time they have worked at the site, and time in their current job. If the ERM team does not feel comfortable with the level of experience of our client contact, take additional measures to ensure all pertinent subsurface utilities and services information is gathered.
Engage Subcontractors	Subcontractors who have not been evaluated against ERM minimum safety standards or who do not meet minimum safety standards may pose more risk.	Use only ERM subcontractors who are identified as having met our minimum safety standards. In cases where using an already-qualified subcontractor is not possible, ensure extra precautions are taken to provide safety oversight to the work.
Appoint an ERM Subsurface Clearance "Experienced Person" to the project	ERM employees who are not experienced with SSC issues may not recognize critical zones or clues to other site utilities/services.	Ensure a "SSC Experienced Person" is assigned to the project to provide oversight of ground penetrations and to mentor less experienced ERM employees.

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 2	

Task Step	Hazard	Control Measures
Gather site-specific subsurface information	Incomplete or inaccurate site utility/service drawings may lead the ERM project team to incorrect conclusions regarding what utilities/services are onsite.	Obtain the most recent "as-built" drawings and additional site information such as easements, rights-of-way, historical plot plans, etc. to assist making decisions about other actions that will be required at the site.
Develop the HASP	Using incorrect documents in safety planning may lead to not considering all pertinent information.	A Level 2 WARN HASP for Intrusive Work (minimum) must be used when performing any ground penetrations, with the exception of surface soil sampling. The Level 2 HASP contains a "Site Services Model" that ERM uses to evaluate SSC hazards.
Develop the Site Services Model	Critical zones and a whole-site view of utilities and services at the site are more difficult to do if not put into the Site Services Model.	Use the Site Services Model to identify gaps in knowledge from all drawings and other verbal information from our client contact. Identify locations of key isolation and shutoffs closest to the work area for each type of utility/service.
Make Preliminary Determinations	Not recognizing or identifying critical zones poses great hazard to ERM employees in the field from contact with electricity or other utilities.	Establish critical zones and excavation buffers (if needed) for the work. Initial critical zone determinations may change in the field but are a good starting point in hazard identification.
Identify Preliminary Ground Disturbance Locations	Planning ground disturbance locations inside critical zones poses great hazard to ERM employees in the field from contact with electricity or other utilities.	Ensure critical zones have been identified using the Site Services Model and then identify locations outside those critical zones up-front, if possible. If a ground disturbance inside a critical zone is absolutely necessary, notify the site PIC and obtain guidance from him/her before proceeding.
Public and/or Private Utility Markout	Not having utilities marked may lead to a subsurface clearance strike.	Contact public and private utility markout services giving them enough time to respond. A minimum of 24-hour notification to utility locators is required in most states, and may vary higher in some states.

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 2	

Task Step	Hazard	Control Measures
Conduct the Site Walk	Inexperienced people conducting the site walk may miss pertinent information regarding utilities and/or services. Vehicle Traffic	The "SSC Experienced Person" must lead the site walk and should be accompanied by our client contact. Each ground disturbance location should be approved by our client contact (written approval preferred, verbal approval acceptable). Excavation and trenching locations are located in a public roadway. Coordinate with Garden City Police to provide traffic control.
Inspect Each Ground Disturbance Location	Inexperienced people conducting inspection may miss pertinent information regarding utilities and/or services.	The "SSC Experienced Person" must lead inspection of each Ground Disturbance Location. Any visual clues of subsurface obstruction/utilities should be documented. Critical zones may have to be reassessed at this point. Use the SSC Checklist to document this inspection for each point inside a critical zone, at a minimum.
Finalize Critical Zone Determinations	Not performing this verification step in the field may lead to a SSC strike.	Use information gathered during pre-planning, utility markout, and site walk/inspection to verify critical zones that have been previously established. Revise critical zones as necessary. Use the SSC Checklist to document points inside critical zones. If points are confirmed inside critical zones, either step out and relocate the ground disturbance location, or contact the PIC for additional guidance.

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 2	

Task Step	Hazard	Control Measures
Oversee setup of drilling equipment	Overhead electrical/other lines may come in contact with drill rigs.	Ensure drill rigs are set up in areas where they will not contact overhead lines when being positioned. The minimum distance for drill rig clearance is 25 feet unless special permission is granted by the utility company. When a drill rig must be maneuvered in tight quarters, the presence of a second person is required to ensure adequate clearance. If backing-up is required, two ground guides will be used: one in the direction the rig is moving and the other in the operator's normal field of vision.
	Materials stored in the vicinity of drill rigs may pose various hazards to employees.	Move tools, materials, cords, hoses, and debris to prevent trip hazards and contact with moving drill rig parts. Secure tools and equipment subject to displacement or falling. Store any flammable materials away from ignition sources and in approved containers.
Physically Clear all Ground Disturbance Locations	Employees performing physical clearance could contact underground utility/service lines.	Use cable avoidance tools at each location that must be physically cleared (OSHA requirement). If using a hand-auger, ensure insulated handles are in-place before their use.
	Drill rig could damage electrical/utility/service lines if not physically cleared first.	Mechanical ground penetration should not commence until a ground disturbance location is physically cleared. In certain situations drilling may occur without physical clearance – consult with the project PIC prior to making this determination.

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 2	

Task Step	Hazard	Control Measures
Commence Drilling Operations	Rotating equipment could pull employees into equipment.	Do not wear loose or frayed clothing, loose long hair, or loose jewelry while working around rotating equipment. Tuck shirt-tails into pants. Never walk directly behind or beside drill rigs without the drill rig operator's knowledge. Keep all non-essential personnel out of the drill rig work area.
	Poorly functioning drill-rig equipment could expose employees to hazardous conditions.	Ensure drill rigs and other machinery used is inspected daily by competent, qualified individuals. Instruct drill rig operators to report any abnormalities such as equipment failure, oozing liquids or unusual odors so they can be dealt with before proceeding with work. Do not eat, drink, or smoke near the drill rig.
	Noisy environments may make it difficult to communicate by vocal means.	Wear hearing protection at all times when in the vicinity of the drill rig, or when you must raise your voice to be heard by co-workers. Maintain visual contact with the drill rig operator at all times and establish hand-signal communications for use when verbal communication is difficult.
	Vehicle Traffic	Mark off work areas using cones and fences to keep personnel from entering into traffic areas. ERM must coordinate with Garden City Police to provide traffic control before excavating or trenching operations can proceed.
Complete Drilling Operations	Equipment allowed to remain running poses pinch-point and potential explosion hazards to employees.	Shut down drill rigs before repairing or lubricating parts (except those that must be in motion for lubrication). Shut down mechanical equipment prior to and during fueling operations. When refueling or transferring fuel, containers and equipment must be bonded to prevent the buildup of static electricity.

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 2	

Personal Protective Equipment Required for this Task:

Type	Description
Insulated hand-augers	Hand-augers fitted with rubber handles, or other non-conductive material.
High Visibility Traffic Vest	Drilling will take place in a public roadway, all personnel are required to wear a traffic vest at all times
Hardhat	All personnel in the area must wear a hardhat whenever there is a possibility of flying or falling debris. The FSO may make the determination that hardhats are not required based on site conditions at the time.
Safety Glasses	All personnel in the area must wear safety glasses whenever there is a possibility of flying or falling debris. The FSO may make the determination that safety glasses are not required based on site conditions at the time.
Hearing Protection	The FSO will determine the need for hearing protection based on the equipment being used.

Training Required for this Task:

Type	Description
SSC Classroom Training	Initial classroom training detailing the ERM subsurface clearance process, tools, and forms.
SSC Experienced Person	At least one must be present on all sites involving SSC. The Experienced Person will both give SSC expertise in project execution and mentor less experienced employees.

Forms Associated with this Task:

Type	Description
SSC Checklist	Checklist detailing the ERM SSC process, and providing tools to ensure critical zones and excavation buffers are properly identified and validated in the field.

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation and Trenching
JHA No.: 2	

SSC Mentorship Card	The SSC Mentorship Card provides Experienced Persons with topics to be covered with less experienced employees on SSC sites, and also documents mentoring of the less experienced employees.
Daily Drill Rig Inspection Form	Form required to be used by ERM subcontractors to document daily inspection of drill rigs. This form should be provided by the drill rig operating company. Completed forms should be kept with the HASP and filed in project files.

Site-Specific Job Hazard Analysis Completed by:

Name	Date
Justin Bunton	1/11/2010

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Recovery Well Installation
JHA No.: 3	

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.
Project Manager	Retain copy in the office health & safety file, amend to HASP as necessary.

Instructions:	**This JHA has been developed and approved by the North America Safety Team. Prior to conducting fieldwork. site-specific hazards related to this task must be incorporated by the project team. Once completed, the JHA should be reviewed regularly with site personnel who will be performing this task.**

Task Description:

General guidelines for working safely when performing any ground penetrating activities (excluding surface soil sampling) and ERM personnel activities during overseeing drilling.

Hazard Analysis:

Task Step	Hazard	Control Measures
Identify a Client Contact Person	Client contacts that are not familiar with the site layout could cause critical information to be missed during safety planning.	Determine degree of knowledge of our client contact by evaluating their current job duties at the site, length of time they have worked at the site, and time in their current job. If the ERM team does not feel comfortable with the level of experience of our client contact, take additional measures to ensure all pertinent subsurface utilities and services information is gathered.
Engage Subcontractors	Subcontractors who have not been evaluated against ERM minimum safety standards or who do not meet minimum safety standards may pose more risk.	Use only ERM subcontractors who are identified as having met our minimum safety standards. In cases where using an already-qualified subcontractor is not possible, ensure extra precautions are taken to provide safety oversight to the work.
Appoint an ERM Subsurface Clearance "Experienced Person" to the project	ERM employees who are not experienced with SSC issues may not recognize critical zones or clues to other site utilities/services.	Ensure a "SSC Experienced Person" is assigned to the project to provide oversight of ground penetrations and to mentor less experienced ERM employees.

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Recovery Well Installation
JHA No.: 3	

Task Step	Hazard	Control Measures
Gather site-specific subsurface information	Incomplete or inaccurate site utility/service drawings may lead the ERM project team to incorrect conclusions regarding what utilities/services are onsite.	Obtain the most recent "as-built" drawings and additional site information such as easements, rights-of-way, historical plot plans, etc. to assist making decisions about other actions that will be required at the site.
Develop the HASP	Using incorrect documents in safety planning may lead to not considering all pertinent information.	A Level 2 WARN HASP for Intrusive Work (minimum) must be used when performing any ground penetrations, with the exception of surface soil sampling. The Level 2 HASP contains a "Site Services Model" that ERM uses to evaluate SSC hazards.
Develop the Site Services Model	Critical zones and a whole-site view of utilities and services at the site are more difficult to do if not put into the Site Services Model.	Use the Site Services Model to identify gaps in knowledge from all drawings and other verbal information from our client contact. Identify locations of key isolation and shutoffs closest to the work area for each type of utility/service.
Make Preliminary Determinations	Not recognizing or identifying critical zones poses great hazard to ERM employees in the field from contact with electricity or other utilities.	Establish critical zones and excavation buffers (if needed) for the work. Initial critical zone determinations may change in the field but are a good starting point in hazard identification.
Identify Preliminary Ground Disturbance Locations	Planning ground disturbance locations inside critical zones poses great hazard to ERM employees in the field from contact with electricity or other utilities.	Ensure critical zones have been identified using the Site Services Model and then identify locations outside those critical zones up-front, if possible. If a ground disturbance inside a critical zone is absolutely necessary, notify the site PIC and obtain guidance from him/her before proceeding.
Public and/or Private Utility Markout	Not having utilities marked may lead to a subsurface clearance strike.	Contact public and private utility markout services giving them enough time to respond. A minimum of 24-hour notification to utility locators is required in most states, and may vary higher in some states.

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Recovery Well Installation
JHA No.: 3	

Task Step	Hazard	Control Measures
Conduct the Site Walk	Inexperienced people conducting the site walk may miss pertinent information regarding utilities and/or services. Vehicle Traffic	The "SSC Experienced Person" must lead the site walk and should be accompanied by our client contact. Each ground disturbance location should be approved by our client contact (written approval preferred, verbal approval acceptable). Drilling locations are located in a public roadway. coordinate with Garden City Police to provide traffic control.
Inspect Each Ground Disturbance Location	Inexperienced people conducting inspection may miss pertinent information regarding utilities and/or services.	The "SSC Experienced Person" must lead inspection of each Ground Disturbance Location. Any visual clues of subsurface obstruction/utilities should be documented. Critical zones may have to be reassessed at this point. Use the SSC Checklist to document this inspection for each point inside a critical zone, at a minimum.
Finalize Critical Zone Determinations	Not performing this verification step in the field may lead to a SSC strike.	Use information gathered during pre-planning, utility markout, and site walk/inspection to verify critical zones that have been previously established. Revise critical zones as necessary. Use the SSC Checklist to document points inside critical zones. If points are confirmed inside critical zones, either step out and relocate the ground disturbance location, or contact the PIC for additional guidance.

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Recovery Well Installation
JHA No.: 3	

Task Step	Hazard	Control Measures
Oversee setup of drilling equipment	Overhead electrical/other lines may come in contact with drill rigs.	Ensure drill rigs are set up in areas where they will not contact overhead lines when being positioned. The minimum distance for drill rig clearance is 25 feet unless special permission is granted by the utility company. When a drill rig must be maneuvered in tight quarters, the presence of a second person is required to ensure adequate clearance. If backing-up is required, two ground guides will be used: one in the direction the rig is moving and the other in the operator's normal field of vision.
	Materials stored in the vicinity of drill rigs may pose various hazards to employees.	Move tools, materials, cords, hoses, and debris to prevent trip hazards and contact with moving drill rig parts. Secure tools and equipment subject to displacement or falling. Store any flammable materials away from ignition sources and in approved containers.
Physically Clear all Ground Disturbance Locations	Employees performing physical clearance could contact underground utility/service lines.	Use cable avoidance tools at each location that must be physically cleared (OSHA requirement). If using a hand-auger, ensure insulated handles are in-place before their use.
	Drill rig could damage electrical/utility/service lines if not physically cleared first.	Mechanical ground penetration should not commence until a ground disturbance location is physically cleared. In certain situations drilling may occur without physical clearance – consult with the project PIC prior to making this determination.

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Recovery Well Installation
JHA No.: 3	

Task Step	Hazard	Control Measures
Commence Drilling Operations	Rotating equipment could pull employees into equipment.	Do not wear loose or frayed clothing, loose long hair, or loose jewelry while working around rotating equipment. Tuck shirt-tails into pants. Never walk directly behind or beside drill rigs without the drill rig operator's knowledge. Keep all non-essential personnel out of the drill rig work area.
	Poorly functioning drill-rig equipment could expose employees to hazardous conditions.	Ensure drill rigs and other machinery used is inspected daily by competent, qualified individuals. Instruct drill rig operators to report any abnormalities such as equipment failure, oozing liquids or unusual odors so they can be dealt with before proceeding with work. Do not eat, drink, or smoke near the drill rig.
	Noisy environments may make it difficult to communicate by vocal means.	Wear hearing protection at all times when in the vicinity of the drill rig, or when you must raise your voice to be heard by co-workers. Maintain visual contact with the drill rig operator at all times and establish hand-signal communications for use when verbal communication is difficult.
	Vehicle Traffic	Mark off work areas using cones and fences to keep personnel from entering into traffic areas. ERM must coordinate with Garden City Police to provide traffic control before drilling operations can proceed.
Complete Drilling Operations	Equipment allowed to remain running poses pinch-point and potential explosion hazards to employees.	Shut down drill rigs before repairing or lubricating parts (except those that must be in motion for lubrication). Shut down mechanical equipment prior to and during fueling operations. When refueling or transferring fuel, containers and equipment must be bonded to prevent the buildup of static electricity.

North America Job Hazard Analysis
ERM Actions During Subsurface Clearance and Drilling

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Recovery Well Installation
JHA No.: 3	

Personal Protective Equipment Required for this Task:

Type	Description
Insulated hand-augers	Hand-augers fitted with rubber handles, or other non-conductive material.
High Visibility Traffic Vest	Drilling will take place in a public roadway, all personnel are required to wear a traffic vest at all times
Hardhat	All personnel in the area must wear a hardhat whenever there is a possibility of flying or falling debris. The FSO may make the determination that hardhats are not required based on site conditions at the time.
Safety Glasses	All personnel in the area must wear safety glasses whenever there is a possibility of flying or falling debris. The FSO may make the determination that safety glasses are not required based on site conditions at the time.
Hearing Protection	The FSO will determine the need for hearing protection based on the equipment being used.

Training Required for this Task:

Type	Description
SSC Classroom Training	Initial classroom training detailing the ERM subsurface clearance process, tools, and forms.
SSC Experienced Person	At least one must be present on all sites involving SSC. The Experienced Person will both give SSC expertise in project execution and mentor less experienced employees.

Forms Associated with this Task:

Type	Description
SSC Checklist	Checklist detailing the ERM SSC process, and providing tools to ensure critical zones and excavation buffers are properly identified and validated in the field.

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Recovery Well Installation
JHA No.: 3	

SSC Mentorship Card	The SSC Mentorship Card provides Experienced Persons with topics to be covered with less experienced employees on SSC sites, and also documents mentoring of the less experienced employees.
Daily Drill Rig Inspection Form	Form required to be used by ERM subcontractors to document daily inspection of drill rigs. This form should be provided by the drill rig operating company. Completed forms should be kept with the HASP and filed in project files.

Site-Specific Job Hazard Analysis Completed by:

Name	Date
Justin Bunton	1/11/2010

North America Job Hazard Analysis
Hazard Communication

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	ISCO Injection
JHA No.: 4	

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.
Project Manager	Retain copy in the office health & safety file, amend to HASP as necessary.

Instructions:	**This JHA has been developed and approved by the North America Safety Team. Prior to conducting fieldwork. site-specific hazards related to this task must be incorporated by the project team. Once completed, the JHA should be reviewed regularly with site personnel who will be performing this task.**

Task Description:

Guidelines for communicating hazards posed by the storage and/or use of chemicals.

Hazard Analysis:

Task Step	Hazard	Control Measures
Storing Chemicals in the Office Setting	Chemicals stored in ERM offices or Field Project Offices may lead to employee chemical exposure, chemical spills, or fires from flammable materials.	If at all possible, do not store chemicals in the office environment. For each chemical product used by ERM employees or stored in an ERM field or office location, a MSDS sheet must be obtained and kept on-file. A chemical inventory list must be prepared and updated as new or different chemicals are procured. Chemical containers must be labeled in accordance with OSHA regulations. Train all employees who will use or be present in the general vicinity of chemicals annually about hazard communication. If new or updated chemicals are procured, hazard communication training must be given to affected employees prior to using or storing the chemical.

North America Job Hazard Analysis
Hazard Communication

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	ISCO Injection
JHA No.: 4	

Task Step	Hazard	Control Measures
Using Chemicals	Employees may be exposed to chemical hazards via skin contact, ingestion, inhalation, or punctures in the skin.	Before using any chemical, make sure a jobsite WARN Health and Safety Plan (HASP) has been prepared and taken the chemical being used into account. Wear protective equipment as specified in the HASP. If chemicals are being used by subcontractors, ensure all employees on the jobsite have been told about the chemical in-use and are protected. If chemical exposure occurs, even if medical symptoms are not present, inform the Field Safety Office or Office H&S Contact.
Large Chemical Spills	Large chemicals spills may expose employees to significant health hazards. Permanganate Spills	For large chemical spills (generally anything larger than 1 gallon in size), HAZWOPER training is required to perform any action other than retreating from the area and contacting appropriately-trained personnel to mitigate the spill. Do not attempt to stop or clean-up a spill without current HAZWOPER training, current medical clearance, current respirator training, and a current respirator fit-test. ERM and subcontractor personnel will be prepared at all times to respond to a spill or release of permanganate. Absorbent spill pads, disposal bins or buckets and neutralization spray will be maintained in various locations on site and available at all times.

North America Job Hazard Analysis
Hazard Communication

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	ISCO Injection
JHA No.: 4	

Personal Protective Equipment Required for this Task:

Type	Description
Nitrile gloves, Tyvek suit and booties, goggles or splash shield	All must be worn whenever directly handling and permanganate, cleaning up spills, or adjusting valves while during injection activities.

Training Required for this Task:

Type	Description
Hazard Communication	An annually-required training discussing general chemical hazards, MSDS sheets, and how to respond to general chemical emergency situations.
Site specific permanganate safety	Before injection begins all on site must be made aware of the hazards associated with permanganate, safe handling and spill response procedures.
Site Specific Compressed Gas Safety	Will provide general safe handling and use of compressed gases that will be used on site.

Forms Associated with this Task:

Type	Description
Material Safety Data Sheet (MSDS)	An informational document containing information about chemical composition, hazardous properties, and steps to take in emergency situations involving chemicals. MSDS's for all chemicals that will be used, brought to, or may be encountered at the site will be readily available at all times.

Site-Specific Job Hazard Analysis Completed by:

Name	Date

North America Job Hazard Analysis
Hazard Communication

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	ISCO Injection
JHA No.: 4	

Justin Bunton	1/12/2010

North America Job Hazard Analysis
Personal Protective Equipment

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation, Trenching, System Construction and ISCO Injection
JHA No.: 5	

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.
Project Manager	Retain copy in the office health & safety file, amend to HASP as necessary.

Instructions:	**This JHA has been developed and approved by the North America Safety Team. Prior to conducting fieldwork. site-specific hazards related to this task must be incorporated by the project team. Once completed, the JHA should be reviewed regularly with site personnel who will be performing this task.**

Task Description:

Guidelines for selection and use of personal protective equipment (PPE).

Hazard Analysis:

Task Step	Hazard	Control Measures
Excavation and Trenching	Slips/Trips, Contact with moving equipment, hand and power tool use.	Stay clear of moving equipment, use hand and power tools according to manufactures specifications, don proper PPE at all times. . Maintain clear walking paths, be aware when moving throughout work area.
System Construction	Slips/Trips, Contact with moving equipment, hand and power tool use, ladder use	Stay clear of moving equipment, use hand and power tools according to manufactures specifications, don proper PPE at all times. Maintain clear walking paths, be aware when moving throughout work area.
ISCO Injection	Slips/Trips, Chemical Exposure	Follow established chemical handling and clean up procedures, don proper PPE at all times. . Maintain clear walking paths, be aware when moving throughout work area.
Recovery Well Install	Compressed gas use, welding, torch cutting, ignition sources	Safe handling of compressed gas, don proper PPE at all times, fire watch, removal of combustibles

North America Job Hazard Analysis
Personal Protective Equipment

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation, Trenching, System Construction and ISCO Injection
JHA No.: 5	

Personal Protective Equipment Required for this Task:

Type	Description
High-visibility safety vest	Vest worn by equipment operators and those working in the area impacted by moving machinery
Hardhat	All personnel in the area must wear a hardhat whenever there is a possibility of flying or falling debris. The FSO may make the determination that hardhats are not required based on site conditions at the time.
Safety Glasses	All personnel in the area must wear safety glasses whenever there is a possibility of flying or falling debris. The FSO may make the determination that safety glasses are not required based on site conditions at the time.
Hearing Protection	The FSO will determine the need for hearing protection based on the equipment being used.
Nitrile gloves, Tyvek suit and booties, goggles or splash shield	All must be worn whenever directly handling and permanganate, cleaning up spills, or adjusting valves while during injection activities.
Heat retardant leather gloves, leather chaps or apron, welders mask or goggles.	Proper PPE must be donned at all times during any welding, cutting or brazing activities.

Training Required for this Task:

Type	Description
Heavy Equipment Operation	Operators must be trained and/or have demonstrated experience for each type of heavy equipment they will operate.
Hazard Communication	An annually-required training discussing general chemical hazards, MSDS sheets, and how to respond to general chemical emergency situations.

North America Job Hazard Analysis
Personal Protective Equipment

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Excavation, Trenching, System Construction and ISCO Injection
JHA No.: 5	

Site specific permanganate safety	Before injection begins all on site must be made aware of the hazards associated with permanganate, safe handling and spill response procedures.
Site Specific Compressed Gas Safety	Will provide general safe handling and use of compressed gases that will be used on site

Forms Associated with this Task:

Type	Description
Material Safety Data Sheet (MSDS)	Provide PPE requirements for chemicals present on site.

Site-Specific Job Hazard Analysis Completed by:

Name	Date
Justin Bunton	1/12/2010

North America Job Hazard Analysis
Hot Work

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Recovery Well Install, System Construction
JHA No.: 6	

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.
Project Manager	Retain copy in the office health & safety file, amend to HASP as necessary.

Instructions:	**This JHA has been developed and approved by the North America Safety Team. Prior to conducting fieldwork. site-specific hazards related to this task must be incorporated by the project team. Once completed, the JHA should be reviewed regularly with site personnel who will be performing this task.**

Task Description:

Guidelines for working on jobsites where ERM subcontractors are performing welding, cutting, or brazing operations.

Hazard Analysis:

Task Step	Hazard	Control Measures
Recovery Well Install	Compressed gas use, welding, torch cutting, ignition sources	Safe handling of compressed gas, don proper PPE at all times, fire watch, removal of combustibles, use of hot work permit system

Personal Protective Equipment Required for this Task:

Type	Description
Heat retardant leather gloves, leather chaps or apron, welders mask or goggles.	Proper PPE must be donned at all times during any welding, cutting or brazing activities.

North America Job Hazard Analysis
Hot Work

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	Recovery Well Install, System Construction
JHA No.: 6	

Training Required for this Task:

Type	Description
Site specific compressed gas safety	Safe handling, storage and use of compressed gasses while on site.
Hot work safety	Contractor must have a hot work safety program and hot work permit system that will be followed

Forms Associated with this Task:

Type	Description
None	

Site-Specific Job Hazard Analysis Completed by:

Name	Date
Justin Bunton	1/12/2010

North America Job Hazard Analysis
Work in Cold Environments

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	All Project Tasks
JHA No.: 7	

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.
Project Manager	Retain copy in the office health & safety file, amend to HASP as necessary.

Instructions:	**This JHA has been developed and approved by the North America Safety Team. Prior to conducting fieldwork. site-specific hazards related to this task must be incorporated by the project team. Once completed, the JHA should be reviewed regularly with site personnel who will be performing this task.**

Task Description:

Guidelines for working in areas where cold stress may occur.

Hazard Analysis:

Task Step	Hazard	Control Measures
All Project Steps	Exposure to extreme cold and weather, icy or snowy conditions, hazardous travel, frostbite, hypothermia	Monitor weather reports, dress appropriately for the days conditions, if possible avoid outside activities and travel during extreme weather, have a warm place out of the elements to take work breaks

Personal Protective Equipment Required for this Task:

Type	Description
Warm layered clothing, warm gloves, winter hats	Dress appropriately for the conditions present, wear several layers to allow better air flow of body heat, wear gloves and hats to minimize exposed areas of skin.
Chemical Warmers	Chemical packets that produce heat and can be kept in gloves, pockets, or sleeves

North America Job Hazard Analysis
Work in Cold Environments

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	All Project Tasks
JHA No.: 7	

Training Required for this Task:

Type	Description
Cold stress recognition	Uncontrolled shivering, bluish/purple finger tips, fatigue
Frostbite	• Frostbite will first appear as blanching or whitening of the skin. Areas will become bright red as the tissue warms. • Slowly warm affected areas in warm clothing or water. Warming areas too fast can cause skin and tissue damage. • Don not rub affected areas, rubbing can cause skin and tissue damage.
Hypothermia	• Happens when body temperature drops below 95°F, person will become drowsy, start to shiver uncontrollably and skin color will turn a slight blue color. • To treat move the person to a warm dry area, remove any wet clothing and call for emergency help. If person is alert, give them warm, sweet drinks. Do not give the person caffeine or alcohol. • Have spare clothing available; do not wear wet clothing when working in cold or freezing temperatures.

Site-Specific Job Hazard Analysis Completed by:

Name	Date
Justin Bunton	1/12/2010

North America Job Hazard Analysis
Work in Hot Environments

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	All Project Tasks
JHA No.: 8	

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.
Project Manager	Retain copy in the office health & safety file, amend to HASP as necessary.

Instructions:	**This JHA has been developed and approved by the North America Safety Team. Prior to conducting fieldwork. site-specific hazards related to this task must be incorporated by the project team. Once completed, the JHA should be reviewed regularly with site personnel who will be performing this task.**

Task Description:

Guidelines for working in areas where heat stress may occur.

Hazard Analysis:

Task Step	Hazard	Control Measures
All Project Tasks	Heat exhaustion, heat stress/stroke, dehydration	Drink plenty of fluids take several breaks through out the day, have a cool dry place out of the sun to rest.

Personal Protective Equipment Required for this Task:

Type	Description
None	• Keep plenty of fluids on hand (water or 50/50 water/Gatorade mix) • Have a cool place out of the sun for rest breaks • Stay away from caffeine, alcohol and drinks high in sugar that will further dehydrate your body • Keep in mind the physical intensity of the work, the harder the work the more rest time that will be needed throughout the day

North America Job Hazard Analysis
Work in Hot Environments

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	All Project Tasks
JHA No.: 8	

Training Required for this Task:

Type	Description
Heat Illness recognition	Recognize the signs of heat related illnesses. • pale skin color • nausea and Headaches • disorientation and slurred speech • rapid pulse • flushed, dry ,red skin • unconsciousness

Forms Associated with this Task:

Type	Description
None	

Site-Specific Job Hazard Analysis Completed by:

Name	Date
Justin Bunton	1/12/2010

North America Job Hazard Analysis
Portable Hand and Power Tools

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	System Construction, Excavation and Trenching
JHA No.: 9	

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.
Project Manager	Retain copy in the office health & safety file, amend to HASP as necessary.

Instructions:	**This JHA has been developed and approved by the North America Safety Team. Prior to conducting fieldwork. site-specific hazards related to this task must be incorporated by the project team. Once completed, the JHA should be reviewed regularly with site personnel who will be performing this task.**

Task Description:

Guidelines for working with portable hand and power tools.

Hazard Analysis:

Task Step	Hazard	Control Measures
Gather tools to take to jobsite	An improper tool available at jobsites encourages unsafe behaviors and could lead to injury.	Ensure tools taken to jobsites are kept in optimal condition (sharp, clean, oiled, etc.) to ensure efficient operation. Tools must only be used for their intended purposes – tools should not be used as pry-bars. Ensure power cords attached to powered-equipment are not damaged. Any damaged tool or electrical cord must be tagged and taken out of service.
Using cutting tools	Major and/or minor cuts to personnel	Fixed open-blade knives (such as pocket knives) may not be used on ERM jobsites, with few exceptions. If their use is required, cut-resistant gloves must be worn while using them and the PM or FSO must be informed prior to their use. Employees performing significant amounts of cutting tool use should must high-visibility gloves to encourage awareness of where hands are being placed.

North America Job Hazard Analysis
Portable Hand and Power Tools

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	System Construction, Excavation and Trenching
JHA No.: 9	

Task Step	Hazard	Control Measures
Using screwdrivers	Puncture injuries	Do not hold objects in the palm of your hand and press a screwdriver into it – these objects should be placed on a flat surface. Do not use screwdrivers as hammers, or use screwdrivers with broken handles. Use insulated screwdrivers for work on electrical equipment.
Using hammers	Creation of sparks Particles may lodge in employee's eyes Loose handles may create a projectile hazard	Use of brass hammers in areas where creating sparks would pose ignition hazards Always use safety glasses when striking any object with a hammer. If hammer-head shows signs of mushrooming, replace it immediately. Replace any hammer with a loose handle so the hammer-head does not detach and cause injuries.
Using Saws	Creation of sparks Particles may lodge in employee's eyes Saw Blades	Use of saws in areas where creating sparks would pose ignition hazards Always use safety glasses when cutting any object with a saw. Always wear cut protective gloves. Ensure blades are secure and you have a good grip on the saw before you begin cutting.
Using Shovels	Back Strain Striking others in the area	Don not overexert when shoveling materials, take work rests when needed. Be aware of others working around you at all times. Do not swing or wave tools widely at any time.

North America Job Hazard Analysis
Portable Hand and Power Tools

Project Name:	150 Fulton Ave
Project Number:	0097881
Job / Task Name:	System Construction, Excavation and Trenching
JHA No.: 9	

Personal Protective Equipment Required for this Task:

Type	Description
Cut-resistant glove	Limited protection is afforded by leather gloves from cuts. Kevlar gloves provide more protection when significant cut/puncture hazards exist.
Safety Glasses	Provides eye and some face protection from projectiles and other flying objects

Training Required for this Task:

Type	Description
None	

Forms Associated with this Task:

Type	Description
None	

Site-Specific Job Hazard Analysis Completed by:

Name	Date
Justin Bunton	1/12/2010

Subsurface Clearance Location Disturbance Permit

Disturbance Location Designation: _____

ERM Project No.: _____

SSC Exp. Person: _____

Contact Person Approval of Ground Disturbance Locations (indicate verbal approval by printing "Verbal" in the signature space)

Name (Print)	Company	Name (Sign)	Date / Time

Critical Zone Determination and Clearance Depth (It is not preferred to initiate Ground Disturbance Activities within a Critical Zone)

If the Disturbance Location is known or suspected to fall within a Critical Zone, then a sketch (see reverse) or other map **must be** used to confirm proximal Critical Zones.

This Location Is:

☐ Inside a Critical Zone. Partner-in-Charge is aware & approved disturbance at this location. Physical Clearance will proceed to the deeper of: **0.6m / 2 feet below the frost line, 2.3m / 7 feet below ground level, or 20% deeper than the expected invert elevation of the service**

☐ Outside a Critical Zone.
Physical Clearance will proceed to the deeper of: **0.6m / 2 feet below the frost line or 1.2m / 4 feet below ground level.**

Physical Clearance Technique at This Location

☐ Cleared using the following technique: _____

☐ None. Waived by PIC. (Ensure documentation in the HASP.)

Reason: _____ Date / Time: _____

Physical Clearance Executed & Observed By:

Company	Representative(s)	Date / Time Complete	Notes

Was any Subsurface Structure discovered (damaged or undamaged) during Clearance?

☐ No (Proceed) ☐ Yes If Yes: Discussed with PIC (Date / Time): _____

Agreed Action: _____

SSC Process Complete

Name of SSC Experienced Person (Print)	Name (Sign)	Date / Time

(Optional) Critical Zone Determination Sketch

Instructions:

1. Create a sketch of the disturbance (in the space to left or attach) that contains the following information:
   a. The disturbance location
   b. Surface landmarks and overhead obstructions (buildings, roads, overhead lines, etc.)
   c. Critical landmarks and Subsurface Structures (tanks, transformers, wells, racks, etc.)
   d. Underground services:
      i. Identified in the HASP Site Service Model
      ii. Marked by Public or Private utility markouts
      iii. As relayed by the Contact Person
      iv. Nearest shutoff / isolation mechanism for each
   e. Any surface clues as to potential underground services (junction boxes, drains, disturbed concrete, signage, etc.)
   f. The site property boundary
2. Use your sketch to mark Critical Zones (3m or 10 feet) around critical landmarks and underground structures / services.
3. For Excavations, use your sketch to mark Excavation Buffers (0.6m or 2 feet) from Subsurface Structures.
4. If the disturbance location falls inside the Critical Zone, the preferred course of action is step out to a safe location outside a Critical Zone.
5. Disturbance within a Critical Zone can only proceed with PIC approval.

Appendix C
Subsurface Clearance Requirements

Subsurface Clearance Field Process Checklist

Site Name: _____

Client: _____

ERM Project No.: _____

SSC Exp. Person: _____

Project Basics	Yes	No	N/A	Comments
Contact Person requested and identified				
Subcontractors meet ERM's minimum safety criteria				
Subcontractors understand their role in the SSC Process				
SSC Experienced Person with current SSC training assigned				
Project staff with current SSC training assigned				
UXO / MEC risks assessed: UXO / MEC IS NOT present				

General Field Activity & Site Walk	Yes	No	N/A	Comments
HASP read, understood and signed by project team				
Site walk Visual Clues / site features (below) integrated into Site Services Model				

Identified Visual Clue	Yes	No		Identified Visual Clue	Yes	No
Lights				Pipeline markers		
Signage				Fire hydrants		
Sewer drains / cleanouts				Sprinkler systems		
Cable markers				Water meters		
Utility poles with conduit leading to the ground				Natural gas meters		
Utility boxes				UST fill ports and vent pipes		
Manholes				Steam lines		
Pavement scarring				Remote buildings with no visible utilities		

Comments / Others:

Contact Person Approval of Ground Disturbance Locations (indicate verbal approval by printing "Verbal" in the signature space)

Name (Print)	Company	Name (Sign)	Date / Time

Pre-Clearance	Yes	No	N/A	Comments
Public Utility Markout completed				
Private Utility Markout completed				
Final Critical Zone determinations made by the SSC Experienced Person				

Critical Zones

Are there any ground disturbance locations known or suspected to be inside Critical Zones?

☐ **Yes.** PIC must approve work within the Critical Zone. The SSC Location Disturbance Permit or equivalent is required for those locations.

☐ **No.** Physical Clearance will proceed to the deeper of: 0.6m / 2 feet below the frost line or 1.2m / 4 feet below ground level, whichever is deeper.

Clearance for Point Disturbances	Yes	No	N/A	Comments
Adequate overhead clearance at ground disturbance locations				
There are disturbance locations known or suspected to be inside Critical Zones				
Physical Clearance successfully completed at all locations				

Clearance for Excavations	Yes	No	N/A	Comments
Adequate overhead clearance at ground disturbance locations				
Communicate excavation plan and Excavation Buffer location(s) to subcontractor				
There are disturbance locations known or suspected to be inside Critical Zones				
De-energize below ground services prior to beginning excavation				

SSC Process Completed By (SSC Experienced Person)

Name (Print)	Name (Sign)	Date / Time

SUBSURFACE CLEARANCE PROCEDURE **FIELD** CHECKLIST

(Use this sheet to document basic field elements of SSC, and keep with project information)

Site Name/Project No.: _____

Walkover Date: _____

By (ERM/Client Names): _____

(ERM-MANAGED SUBSURFACE CLEARANCE ACTIVITIES)	**Yes**	**No**	**N/A**	Comments
Preparation Tasks	Observed?			
1. The potential for unexploded ordnance (UXO) has been assessed and a UXO survey performed	☐	☐	☐	
2. A site walk-over was conducted and above-ground indicators of underground utilities noted or mapped.	☐	☐	☐	
• Telephone Lines	☐	☐	☐	
• Data lines/cable trench	☐	☐	☐	
• Gas pipes/storage tanks	☐	☐	☐	
• Potable water pipes/fire water (sprinklers) pipes and hydrant lines	☐	☐	☐	
• Sewer lines (storm water/process water)	☐	☐	☐	
• Steam lines (district) and heating lines	☐	☐	☐	
• Fuel oil lines/storage tanks (UST), incl. tankfield fill ports, observation wells, vent stacks	☐	☐	☐	
• Lighting (street and traffic)	☐	☐	☐	
• Other underground utilities	☐	☐	☐	
• Hydrants	☐	☐	☐	
• Non-native soil	☐	☐	☐	
• Warning Tape	☐	☐	☐	
• Manholes	☐	☐	☐	
3. "Critical zone" decisions	☐	☐	☐	
• A mark has been placed on the map to limit surface disturbance within 10 feet of:	☐	☐	☐	
o Tanks, dispenser islands	☐	☐	☐	
o Piping manifolds	☐	☐	☐	
o Pumps/pump galleries	☐	☐	☐	
o Loading racks	☐	☐	☐	
o Process equipment	☐	☐	☐	
o On- or below-grade transformers	☐	☐	☐	
o Compressors				
o Underground chemical lines and high voltage utilities	☐	☐	☐	

Form completed by: _____ _____

Name Date

Appendix D
Site Inspection Checklist

Site Inspection Checklist

Project Name: Project Number: Inspector/Project Role: Date/Time:

Document Routing	
FSO	Retain copy in site health & safety file, amend to HASP as necessary.

Instructions: Complete the checklist below. Record any observed Unsafe Acts or Unsafe Conditions using a separate form for each. For additional comments use the back of these pages. Start all comments by identify applicable section for reference.

Personnel Administrative

Observation	Yes	No	N/A	Comments
Did all site workers attend site orientation and HASP?				
Are workers attending and signing daily toolbox safety meeting?				
Are workers reporting unsafe acts and conditions?				

Site

Observation	Yes	No	N/A	Comments
Are MSDS'S available for each chemical at the site?				
Are flammable liquids stored away from ignition sources and in a secure place when not in use?				
Are spill kits readily available?				
Are fire extinguishers inspections current and strategically located?				
Are adequate hygiene facilities available for site workers?				
Have smoking and eating areas been established?				
Are JHAs completed and reviewed by workers in accordance with the HASP				
Do workers comply with site speed limits and traffic rules?				
Do workers comply with site cell phone policy?				

Housekeeping

Observation	Yes	No	N/A	Comments
Is site kept clean, neat and orderly?				

Site Inspection Checklist

Project Name: Project Number: Inspector/Project Role: Date/Time:

Are worker hygiene facilities, toilets, hand-wash stations, lunch area maintained and adequately stocked?				
Are warning signs legible?				
Are tools properly stored?				
Is trash picked up regularly and properly disposed?				
Is used PPE properly disposed?				
Are all containers properly labeled?				
Is there accumulated snow or ice over footpaths or roadways?				

Emergency Preparedness

Observation	Yes	No	N/A	Comments
Have workers been informed of the site emergency response procedures?				
Do workers know the nearest assembly point for their work area?				
Do workers know the location/s of the nearest eyewash/shower?				
Do workers know the location of the nearest first-aid kit				
Is there at least one first aid trained person on site at all times?				
Do workers know how to report an emergency?				
Do workers know the type of alarm used to identify an emergency or evacuation at the site?				
Has a site emergency evacuation drill been conducted?				

Site Inspection Checklist

Project Name: Project Number: Inspector/Project Role: Date/Time:

Work Zones

Observation	Yes	No	N/A	Comments
Are exclusion, decontamination and safe zones clearly identified and maintained?				
Are workers following proper decontamination procedures?				
Is equipment decontamination procedures followed?				
Is the decontamination station adequately stocked?				
Is the "Buddy System" adhered to?				

Ambient Work Conditions

Observation	Yes	No	N/A	Comments
Is sufficient lighting available to safely do the work?				
If the temperature is above 85 F (29 C), are there liquids available such as Gatorade / water?				
Is there proper ventilation at the job site?				

General PPE Matters

Observation	Yes	No	N/A	Comments
Are hardhats being worn?				
Are workers utilizing appropriate eye protection for the?				
Are workers utilizing the appropriate foot protection for the task?				
Is hearing protection required and utilized?				
Are workers using and wearing the appropriate hand protection for the task?				

Site Inspection Checklist

Project Name: Project Number: Inspector/Project Role: Date/Time:

Hand and Foot Protection

Observation	Yes	No	N/A	Comments
Are the appropriate gloves being worn by site workers as identified by the HASP or JHA?				
Is the appropriate footwear worn by site workers as identified by the HASP or JHA?				
Are disposable gloves and footwear disposed of properly?				

Respiratory Protection

Observation	Yes	No	N/A	Comments
Are copies of employee respiratory training records, fit test and fit to work statements current and available on site?				
Are workers following respirator cartridge change out schedule?				
Are workers following proper respirator donning procedures?				
Are respirators cleaned and stored properly when not in use?				

Condition of Protective Clothing

Observation	Yes	No	N/A	Comments
Is protective clothing worn by workers in good condition? (no rips or tears)				
Is the type of protective clothing selected appropriate for the task? (see HASP or JHA'S)				
Are workers correctly wearing the protective clothing? (e.g., Zippers zipped, proper taping of sleeves)				
Is contaminated clothing properly disposed?				

Site Inspection Checklist

Project Name: Project Number: Inspector/Project Role: Date/Time:

Ground Disturbance and Excavations

Observation	Yes	No	N/A	Comments
Has the sub-surface checklist been completed and signed off by all appropriate parties?				
Are all sub-surface processes or utility lines clearly identified?				
Is there at least one competent excavation person on site at all times?				
Is a copy of the competent excavation person training records available for review?				
Are excavations properly sloped shored or benched?				
Are excavations properly protected by hard or soft barricade?				

Hand and Powered Hand Tools

Observation	Yes	No	N/A	Comments
Are all hand tools in good working order and appropriate for the task?				
Are electrical cords in good repair and inspected prior to use?				
Are external GFCI'S used and routinely inspected?				
Are guards and other safety devises present and in good working order?				
Are workers wearing hearing protection when using high noise producing tools?				
Are workers wearing appropriate PPE when using electrical or pneumatic tools?				
Are pneumatic hoses in good condition?				
Is/are fire extinguishers located nearby portable compressors or generators?				
Are generators or compressors shut down prior to fueling?				
Are malfunctioning tools tagged and taken out of service?				

Site Inspection Checklist

Project Name: Project Number: Inspector/Project Role: Date/Time:

Heavy Equipment

Observation	Yes	No	N/A	Comments
Are daily equipment inspection checklists completed?				
Are safety deficiencies immediately repaired or has the equipment been taken out of service?				
Do the back-up alarms work?				
Does the operator use three-points of contact when getting on/off equipment?				
Is heavy equipment operated within its design capacity?				
Is equipment operated at safe speeds for site conditions?				
Are fire extinguishers present and in good working order on all equipment?				
Are keys or control panels removed when equipment is not in use?				
Are workers working with or near heavy equipment operations wearing high visibility clothing (i.e. traffic vest?				

Appendix E
Personal Safety Contract (PSC) Cards

Date: _____

Name: _____

PPE Requirements
- ☐ Hardhat
- ☐ Safety glasses
- ☐ Steel toed shoes/boots
- ☐ Hearing protection
- ☐ Gloves
- ☐ Tyvek/Protective clothing
- ☐ Respirator
- ☐ Traffic vest/orange shirt
- ☐ Other _____

Emergency Preparedness

1) Location of nearest fire extinguisher?

2) Location of nearest eyewash station?

3) Location of nearest first-aid kit?

4) Who is the Site Safety Officer?

Task Assigned

List the Hazards & Mitigations Associated with the Assigned Task

Hazard	Mitigation

Date: _____

Name: _____

PPE Requirements
- ☐ Hardhat
- ☐ Safety glasses
- ☐ Steel toed shoes/boots
- ☐ Hearing protection
- ☐ Gloves
- ☐ Tyvek/Protective clothing
- ☐ Respirator
- ☐ Traffic vest/orange shirt
- ☐ Other _____

Emergency Preparedness

1) Location of nearest fire extinguisher?

2) Location of nearest eyewash station?

3) Location of nearest first-aid kit?

4) Who is the Site Safety Officer?

Task Assigned

List the Hazards & Mitigations Associated with the Assigned Task

Hazard	Mitigation

Date: _____

Name: _____

PPE Requirements
- ☐ Hardhat
- ☐ Safety glasses
- ☐ Steel toed shoes/boots
- ☐ Hearing protection
- ☐ Gloves
- ☐ Tyvek/Protective clothing
- ☐ Respirator
- ☐ Traffic vest/orange shirt
- ☐ Other _____

Emergency Preparedness

1) Location of nearest fire extinguisher?

2) Location of nearest eyewash station?

3) Location of nearest first-aid kit?

4) Who is the Site Safety Officer?

Task Assigned

List the Hazards & Mitigations Associated with the Assigned Task

Hazard	Mitigation

Date: _____

Name: _____

PPE Requirements
- ☐ Hardhat
- ☐ Safety glasses
- ☐ Steel toed shoes/boots
- ☐ Hearing protection
- ☐ Gloves
- ☐ Tyvek/Protective clothing
- ☐ Respirator
- ☐ Traffic vest/orange shirt
- ☐ Other _____

Emergency Preparedness

1) Location of nearest fire extinguisher?

2) Location of nearest eyewash station?

3) Location of nearest first-aid kit?

4) Who is the Site Safety Officer?

Task Assigned

List the Hazards & Mitigations Associated with the Assigned Task

Hazard	Mitigation

Daily Safety Observations/Notes

RCM
ERM Remediation & Construction Management

Personal Safety Contract (PSC) Card

- *A PSC Card must be completed for each assigned task*
- *Keep this PSC Card on your person for the duration of the workday*
- *Turn in all PSC Cards to your supervisor at the end of each day*

You see it, You own it!

Rev.: 05-08

Daily Safety Observations/Notes

RCM
ERM Remediation & Construction Management

Personal Safety Contract (PSC) Card

- *A PSC Card must be completed for each assigned task*
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Rev.: 05-08

Daily Safety Observations/Notes

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- *A PSC Card must be completed for each assigned task*
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You see it, You own it!

Rev.: 05-08

Daily Safety Observations/Notes

RCM
ERM Remediation & Construction Management

Personal Safety Contract (PSC) Card

- *A PSC Card must be completed for each assigned task*
- *Keep this PSC Card on your person for the duration of the workday*
- *Turn in all PSC Cards to your supervisor at the end of each day*

You see it, You own it!

Rev.: 05-08

RCM Personal Safety Contract Card Template
Revision: 04-08

Instructions:

- Print the first two sides front and back on the same sheet of paper.
- Cut along the bold dashed lines
- Fold along the normal dashed lines with the RCM logo on the outside
- One printing makes four PSC Cards

Appendix F
Work Permit Forms

SAFE WORK PERMIT

☐ Confined Space Entry ☐ Hot Work ☐ Line Breaking

Location: _____ WO Number _____

Scope of Work: _____

Issued To: _____ Issued By: _____

Date & Time Issued _____ Date & Time Expires _____

Section I General Information (Complete for all permits)

1. Job Specific Hazards

☐ Worksite Chemicals	☐ Atmospheric Hazards	☐ Thermal Burns	☐ Chemical Burns
☐ Corrosives	☐ Flammable Liquids	☐ Reactive Liquids	☐ Toxic Substances
☐ Ignition Sources	☐ Electrical Hazards	☐ Electrical Cords	☐ Falls above 4'
☐ Steam	☐ Vehicle Traffic	☐ Adjacent Work	☐ Heat Stress/Cold Injuries
☐ High Pressure	☐ Radiation	☐ Noise	☐ Pinch Points
☐ Other _____			

2. PPE/Equipment

☐ Inner Gloves	☐ Half-faced Respirator	☐ Welding Shield	☐ Tripod w/ lifting device
☐ Outer Gloves	☐ Full-Faced Respirator	☐ Spark Proof Tools	☐ Harness
☐ Chemical Suit	☐ Line Air Respirator	☐ Fire Extinguisher(s)	☐ Ventilation
☐ Poly Coated Suit	☐ SCBA	☐ Decon Materials	☐ Work lights
☐ Hearing Protection	☐ Chemical Goggles	☐ First Aid Kit	☐ GFCI
☐ Safety Shoes/Boots	☐ Face Shield	☐ Eyewash Station	☐ Two-way Radio
☐ Safety Glasses w/ Side Shield	☐ Hard Hat	☐ Spill Response Equipment	☐ Barricades/Warning Signals
☐ Other _____			

3. Rescue and Emergency Services

Service Name: _____ Contact Name: _____

Telephone Number: _____

Section II Confined Space Entry

1. Space to be Entered: _____
2. Purpose of Entry: _____
3. Describe how the hazards identified in Section I have been addresses/isolated: _____
4. Describe Communication Procedures used by Entrant and Attendant during entry: _____

Section III Hot Work

1. Equipment to be worked on: _____
2. Precautions:

☐ Fire hazards removed from area	☐ Floor/wall openings covered	☐ Area inspected by Supervisor
☐ Welding equipment inspected	☐ Fire extinguishers at location	☐ Atmospheric tests complete
☐ Spark and heat guards in place	☐ Fire watch posted (> 30 min)	☐ Adequate ventilation

3. Name of Fire Watch: _____ Fire watch start time: _____ Fire watch end time: _____

Section IV Line Breaking		
1. Line/Equipment positively identified?	☐ Yes	☐ NA
2. Line/Equipment properly drained/depressurized/purged/blanked?	☐ Yes	☐ NA
3. Line/Equipment cleaned of residual material?	☐ Yes	☐ NA
4. Bonding and grounding required?	☐ Yes	☐ NA
5. Non-sparking tools required?	☐ Yes	☐ NA
6. Atmospheric monitoring required?	☐ Yes	☐ NA
7. Containment/spill control required?	☐ Yes	☐ NA

Section V Atmospheric Monitoring (Complete for Confined Space Entry and Hot Work)

Parameters	Initial Results	Periodic Results	Periodic Results	Periodic Results	Periodic Results	Periodic Results	Periodic Results	Periodic Results
Time Monitored								
Tester's Initials/Signature								
Oxygen (19.5%-23.5%)								
Flammability (< 10% LEL)								
Other								
Other								

Section VI Personnel Accountability (Complete for all permits)

Issuing Supervisor	_____	Signature:	_____	Time:	_____
H&S Lead	_____	Signature:	_____	Time:	_____
Entrant	_____	Signature:	_____	Time:	_____
Entrant	_____	Signature:	_____	Time:	_____
Entrant	_____	Signature:	_____	Time:	_____
Attendant	_____	Signature:	_____	Time:	_____
Attendant	_____	Signature:	_____	Time:	_____
Attendant	_____	Signature:	_____	Time:	_____
Employee	_____	Signature:	_____	Time:	_____
Employee	_____	Signature:	_____	Time:	_____
Employee	_____	Signature:	_____	Time:	_____
Employee	_____	Signature:	_____	Time:	_____

Section VII Special Instructions (Complete as necessary)

_____

_____

_____

Section VIII Contractors (Complete as necessary)

The following aspects of the permitted work activities have been discussed and coordinated with the contractor:

1. Roles and Responsibilities	☐ Yes	☐ No	☐ NA
2. Job Specific Hazards	☐ Yes	☐ No	☐ NA
3. PPE Requirements	☐ Yes	☐ No	☐ NA
4. Rescue Activities and Emergency Response	☐ Yes	☐ No	☐ NA

Section IX Canceling the Permit (Complete for all permits)

1. Has the job, defined in the scope above been completed?	☐ Yes	☐ No	☐ NA
2. Have affected personnel been informed the job is complete?	☐ Yes	☐ No	☐ NA
3. Has equipment been returned to service?	☐ Yes	☐ No	☐ NA
4. Have safety devices been reinstalled?	☐ Yes	☐ No	☐ NA
5. Have housekeeping/environmental issues been addressed?	☐ Yes	☐ No	☐ NA

Closeout Signature: _____ Time: _____ Date: _____

Appendix G
Project Material Safety Data Sheets

Material Safety Data Sheet

24-Hour Emergency Telephone Numbers
HEALTH : Chevron Emergency Information Center (800) 231-0623 or (510) 231-0623
TRANSPORTATION : CHEMTREC (800) 424-9300 or (703) 527-3887
Emergency Information Centers are located in the U.S.A. International collect calls accepted.

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

TEXACO Havoline DEX-COOL Extended Life Anti-Freeze/Coolant

Product Number(s): CPS227994

Company Identification
ChevronTexaco Global Lubricants
6001 Bollinger Canyon Road
San Ramon, CA 94583

Product Information
Product Information: 800-LUBE-TEK
email : lubemsds@chevron.com

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Ethylene Glycol	107-21-1	80 - 96.99 %weight
Diethylene glycol	111-46-6	1 - 4.99 %weight
Potassium 2-ethylhexanoate	3164-85-0	1 - 4.99 %weight
Water	7732-18-5	1 - 2.99 %weight

SECTION 3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

Orange liquid. Mild odor.

- HARMFUL OR FATAL IF SWALLOWED
- CAUSES EYE IRRITATION
- MAY CAUSE ADVERSE REPRODUCTIVE EFFECTS BASED ON ANIMAL DATA
- POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL THAT MAY CAUSE BIRTH DEFECTS BASED ON ANIMAL DATA
- MAY CAUSE DAMAGE TO:
- KIDNEY

****

IMMEDIATE HEALTH EFFECTS
Eye: Contact with the eyes causes irritation. Symptoms may include pain, tearing, reddening, swelling and impaired vision.
Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin.
Ingestion: Toxic; may be harmful or fatal if swallowed.
Inhalation: The vapor or fumes from this material may cause respiratory irritation. Symptoms of

respiratory irritation may include coughing and difficulty breathing.

DELAYED OR OTHER HEALTH EFFECTS:
Reproduction and Birth Defects: May cause adverse reproductive effects based on animal data. Contains material that may be harmful to the developing fetus based on animal data.

Target Organs: Repeated ingestion of this material may cause damage to the following organ(s) based on animal data. Kidney

See Section 11 for additional information. Risk depends on duration and level of exposure.

SECTION 4 FIRST AID MEASURES

Eye: Flush eyes with water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get medical attention if irritation persists.
Skin: To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: If swallowed, get immediate medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.
Inhalation: Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.

SECTION 5 FIRE FIGHTING MEASURES

FIRE CLASSIFICATION:
OSHA Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

NFPA RATINGS: Health: 2 Flammability: 1 Reactivity: 0

FLAMMABLE PROPERTIES:
Flashpoint: (Pensky-Martens Closed Cup) 260 °F (127 °C)
Autoignition: 752 °F (400 °C)
Flammability (Explosive) Limits (% by volume in air): Lower: 3.2 Upper:

EXTINGUISHING MEDIA: Dry Chemical, CO2, AFFF Foam or alcohol resistant foam.

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion. Combustion may form oxides of: Potassium .

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove

contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: Wash thoroughly after handling. Do not get in eyes. Do not breathe vapor or fumes.
General Handling Information: Do not taste or swallow antifreeze or solution. Keep out of the reach of children and animals.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.
General Storage Information: Do not store in open or unlabeled containers.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, 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. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:
Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: Wear eye protection such as safety glasses, chemical goggles, or faceshields if engineering controls or work practices are not adequate to prevent eye contact.
Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances. Suggested materials for protective gloves include: Natural rubber, Neoprene, Nitrile Rubber, Polyvinyl Chloride (PVC or Vinyl).
Respiratory Protection: Determine if airborne concentrations are below the recommended exposure limits. If not, wear an approved respirator that provides adequate protection from measured concentrations of this material, such as: Air-Purifying Respirator for Organic Vapors, Dusts and Mists. Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not

provide adequate protection.

Occupational Exposure Limits:

Component	Limit	TWA	STEL	Ceiling	Notation
Ethylene Glycol	ACGIH_TLV			100 mg/m3	
Ethylene Glycol	OSHA_PEL			125 mg/m3	

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Orange liquid. Mild odor.
pH: 8 - 8.6
Vapor Pressure: <0.01 mmHg @ 20 °C
Vapor Density (Air = 1): 2.1
Boiling Point: 228 °F (109 C) (Typical)
Solubility: Miscible
Freezing Point: -34 °F (-37 C)
Melting Point: NDA
Specific Gravity: 1.12 @ 15.6 °C / 15.6 °C
Viscosity: 8 cSt @ 40 °C

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous Decomposition Products: Aldehydes (Elevated temperatures)
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS
Eye Irritation: The eye irritation hazard is based on evaluation of data for similar materials or product components.
Skin Irritation: The skin irritation hazard is based on evaluation of data for similar materials or product components.
Skin Sensitization: No product toxicology data available.
Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

ADDITIONAL TOXICOLOGY INFORMATION:
This product contains ethylene glycol (EG). The toxicity of EG via inhalation or skin contact is expected to be slight at room temperature. The estimated oral lethal dose is about 100 cc (3.3 oz.) for an adult human. Ethylene glycol is oxidized to oxalic acid which results in the deposition of calcium oxalate crystals mainly in the brain and kidneys. Early signs and symptoms of EG poisoning may resemble those of alcohol intoxication. Later, the victim may experience nausea, vomiting, weakness, abdominal and muscle pain, difficulty in breathing and decreased urine output. When EG was heated above the boiling point of water, vapors formed which reportedly caused unconsciousness, increased lymphocyte count,

and a rapid, jerky movement of the eyes in persons chronically exposed. When EG was administered orally to pregnant rats and mice, there was an increase in fetal deaths and birth defects. Some of these effects occurred at doses that had no toxic effects on the mothers. We are not aware of any reports that EG causes reproductive toxicity in human beings.

This product contains diethylene glycol (DEG). The estimated oral lethal dose is about 50 cc (1.6 oz) for an adult human. DEG has caused the following effects in laboratory animals: liver abnormalities, kidney damage and blood abnormalities. It has been suggested as a cause of the following effects in humans: liver abnormalities, kidney damage, lung damage and central nervous system damage.

2-Ethylhexanoic acid (2-EXA) caused an increase in liver size and enzyme levels when repeatedly administered to rats via the diet. When administered to pregnant rats by gavage or in drinking water, 2-EXA caused teratogenicity (birth defects) and delayed postnatal development of the pups. Additionally, 2-EXA impaired female fertility in rats. Birth defects were seen in the offspring of mice who were administered sodium 2-ethylhexanoate via intraperitoneal injection during pregnancy.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
The toxicity of this material to aquatic organisms has not been evaluated. Consequently, this material should be kept out of sewage and drainage systems and all bodies of water.

ENVIRONMENTAL FATE
This material is expected to be readily biodegradable.

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Name: NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR
DOT Hazard Class: NOT APPLICABLE
DOT Identification Number: NOT APPLICABLE
DOT Packing Group: NOT APPLICABLE

SECTION 15 REGULATORY INFORMATION

SARA 311/312 CATEGORIES:

1.	Immediate (Acute) Health Effects:	YES
2.	Delayed (Chronic) Health Effects:	YES
3.	Fire Hazard:	NO
4.	Sudden Release of Pressure Hazard:	NO
5.	Reactivity Hazard:	NO

REGULATORY LISTS SEARCHED:

4_I1=IARC Group 1	12=TSCA Section 8(a) PAIR	21=TSCA Section 5(a)
4_I2A=IARC Group 2A	13=TSCA Section 8(d)	25=CAA Section 112 HAPs
4_I2B=IARC Group 2B	15=SARA Section 313	26=CWA Section 311
05=NTP Carcinogen	16=CA Proposition 65	28=CWA Section 307
06=OSHA Carcinogen	17=MA RTK	30=RCRA Waste P-List
09=TSCA 12(b)	18=NJ RTK	31=RCRA Waste U-List
10=TSCA Section 4	19=DOT Marine Pollutant	32=RCRA Appendix VIII
11=TSCA Section 8(a) CAIR	20=PA RTK	

The following components of this material are found on the regulatory lists indicated.

Diethylene glycol	25
Ethylene Glycol	15, 17, 18, 20, 25

CERCLA REPORTABLE QUANTITIES(RQ)/SARA 302 THRESHOLD PLANNING QUANTITIES(TPQ):

Component	Component RQ	Component TPQ	Product RQ
Ethylene Glycol	5000 lbs	None	5440 lbs

CHEMICAL INVENTORIES:

AUSTRALIA: All the components of this material are listed on the Australian Inventory of Chemical Substances (AICS).

PEOPLE'S REPUBLIC OF CHINA: All the components of this product are listed on the draft Inventory of Existing Chemical Substances in China.

EUROPEAN UNION: All the components of this material are in compliance with the EU Seventh Amendment Directive 92/32/EEC.

KOREA: All the components of this product are on the Existing Chemicals List (ECL) in Korea.

PHILIPPINES: All the components of this product are listed on the Philippine Inventory of Chemicals and Chemical Substances (PICCS).

UNITED STATES: All of the components of this material are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

NEW JERSEY RTK CLASSIFICATION:

Refer to components listed in Section 2.

WHMIS CLASSIFICATION:

Class D, Division 1, Subdivision B: Toxic Material -
Acute Lethality
Class D, Division 2, Subdivision A: Very Toxic Material -
Chronic Toxic Effects
Reproductive Toxicity
Teratogenicity and Embryotoxicity
Class D, Division 2, Subdivision B: Toxic Material -
Skin or Eye Irritation

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 2 Flammability: 1 Reactivity: 0
HMIS RATINGS: Health: 2* Flammability: 1 Reactivity: 0

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

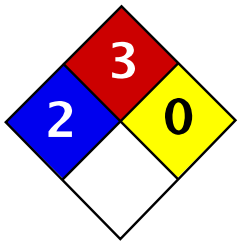
REVISION STATEMENT: This revision updates Section 1 (Product Identification), Section 2 (Composition/Ingredient Information), Section 5 (Fire Fighting Measures), Section 11 (Toxicological Information), and Section 15 (Regulatory Information).

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV	-	Threshold Limit Value	TWA	-	Time Weighted Average
STEL	-	Short-term Exposure Limit	PEL	-	Permissible Exposure Limit
			CAS	-	Chemical Abstract Service Number
NDA	-	No Data Available	NA	-	Not Applicable
<=	-	Less Than or Equal To	>=	-	Greater Than or Equal To

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1).

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
1,2-Dichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,2-Dichloroethane

Catalog Codes: SLD2521, SLD3721

CAS#: 107-06-2

RTECS: KH9800000

TSCA: TSCA 8(b) inventory: 1,2-Dichloroethane

CI#: Not available.

Synonym: Ethylene dichloride

Chemical Formula: C2H4CL2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{1,2-}Dichloroethane	107-06-2	100

Toxicological Data on Ingredients: 1,2-Dichloroethane: ORAL (LD50): Acute: 670 mg/kg [Rat]. 413 mg/kg [Mouse]. DERMAL (LD50): Acute: 2800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 1414.2 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Extremely hazardous in case of ingestion. Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant). Corrosive to skin and eyes on contact. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
Very hazardous in case of ingestion, of inhalation.
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified 2 (Reasonably anticipated.) by NTP.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.

The substance is toxic to lungs, the nervous system, liver, mucous membranes.
Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 413°C (775.4°F)

Flash Points: CLOSED CUP: 13°C (55.4°F). OPEN CUP: 18°C (64.4°F).

Flammable Limits: LOWER: 6.2% UPPER: 15.6%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks.
Slightly flammable to flammable in presence of oxidizing materials.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Slightly explosive to explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Corrosive liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep container dry. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 CEIL: 75 (ppm) from ACGIH (TLV)
TWA: 40 CEIL: 300 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 98.96 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 83.5°C (182.3°F)

Melting Point: -35.3°C (-31.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.2351 (Water = 1)

Vapor Pressure: 61 mm of Hg (@ 20°C)

Vapor Density: 3.42 (Air = 1)

Volatility: Not available.

Odor Threshold: 26 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, n-octanol, acetone.

Solubility:
Easily soluble in methanol, diethyl ether, n-octanol, acetone.
Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 413 mg/kg [Mouse].
Acute dermal toxicity (LD50): 2800 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 1414.2 ppm 4 hour(s) [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified 2 (Reasonably anticipated.) by NTP.
The substance is toxic to lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:
Extremely hazardous in case of ingestion.
Very hazardous in case of inhalation.
Hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in animal. Excreted in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Ethylene dichloride : UN1184 PG: II

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: 1,2-Dichloroethane
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: 1,2-Dichloroethane
Pennsylvania RTK: 1,2-Dichloroethane

Massachusetts RTK: 1,2-Dichloroethane
TSCA 8(b) inventory: 1,2-Dichloroethane
CERCLA: Hazardous substances.: 1,2-Dichloroethane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
CLASS E: Corrosive liquid.

DSCL (EEC):
R11- Highly flammable.
R20/22- Harmful by inhalation and if swallowed.
R38- Irritating to skin.
R41- Risk of serious damage to eyes.
R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:17 PM

Last Updated: 11/06/2008 12:00 PM

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SCOTT SPECIALTY GASES -- ISOBUTYLENE IN AIR, (SEE SUPPL.) -- 6665-01-449-8454

========== Product Identification ==========

Product ID:ISOBUTYLENE IN AIR, (SEE SUPPL.)
MSDS Date:11/20/1997
FSC:6665
NIIN:01-449-8454
Status Code:A
Kit Part:Y
MSDS Number: CLFCR
=== Responsible Party ===
Company Name:SCOTT SPECIALTY GASES
Address:2330 HAMILTON BLVD
City:SOUTH PLAINFIELD
State:NJ
ZIP:07080
Country:US
Info Phone Num:908-754-7700
Emergency Phone Num:908-754-7700
Resp. Party Other MSDS Num.:M-704/E-1
CAGE:54262
=== Contractor Identification ===
Company Name:PHOTOVAC INTL INC/DBA PHOTOVAC MONITORING INSTRUMENTS
Address:UNK
Box:UNK
City:DEER PARK
State:NY
ZIP:11729
Country:US
Phone:000-000-0000
CAGE:70123
Company Name:PINE ENVIRONMENTAL SERVICES INC
Address:379 PRINCETON-HIGHTSTOWN RD
Box:City:CRANBURY
State:NJ
ZIP:08512
Country:US
Phone:609-371-9663
Contract Num:SP0200-99-M-T071
CAGE:1JSC4
Company Name:SCOTT SPECIALTY GASES
Address:2330 HAMILTON BLVD
Box:City:SOUTH PLAINFIELD
State:NJ
ZIP:07080
Country:US
Phone:908-754-7700
CAGE:54262

========== Composition/Information on Ingredients ==========

Ingred Name:ISOBUTYLENE
CAS:115-11-7
RTECS #:UD0890000
Fraction by Wt: 1-1500% PPM

Ingred Name:AIR
CAS:132259-10-0

Fraction by Wt: BALANCE

========== Hazards Identification ==========

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE EFFECTS: NONE. CHRONIC EFFECTS: NONE KNOWN.
Explanation of Carcinogenicity:CARCINOGENICITY (U.S. ONLY): NTP - NO; IARC MONOGRAPHS - NO; OSHA REGULATED - NO.
Effects of Overexposure:NONE.
Medical Cond Aggravated by Exposure:NONE KNOWN.

========== First Aid Measures ==========

First Aid:IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN. INHALATION: IMMEDIATELY REMOVE VICTIM TO FRESH AIR. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. EYE CONTAC T: NONE. SKIN CONTACT: NONE. INGESTION: NONE.

========== Fire Fighting Measures ==========

Flash Point:NONFLAMMABLE
Extinguishing Media:USE WHAT IS APPROPRIATE FOR SURROUNDING FIRE.
Fire Fighting Procedures:WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECIVE CLOTHING. KEEP FIRE EXPOSED CYLINDERS COOL WITH WATER SPRAY. IF POSSIBLE, STOP THE PRODUCT FLOW.
Unusual Fire/Explosion Hazard:CYLINDER RUPTURE MAY OCCUR UNDER FIRE CONDITIONS. COMPRESSED AIR AT HIGH PRESSURE WILL ACCELERATE THE COMBUSTION OF FLAMMABLE MATERIALS.

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE AND VENTILATE AREA. REMOVE LEAKING CYLINDER TO EXHAUST HOOD OR SAFE OUTDOOR AREA. SHUT OFF SOURCE IF POSSIBLE AND REMOVE SOURCE OF HEAT.

========== Handling and Storage ==========

Handling and Storage Precautions:HANDLING: SECURE CYLINDER WHEN USING TO PROTECT FROM FALLING. USE SUITABLE HAND TRUCK TO MOVE CYLINDERS. STORAGE: STORE IN WELL VENTILATED AREAS. KEEP VALVE PROTECTION CAP ON CYLINDERS WHEN NOT IN USE .
Other Precautions:PROTECT CONTAINERS FROM PHYSICAL DAMAGE. DO NOT DEFACE CYLINDERS OR LABELS. CYLINDERS SHOULD BE REFILLED BY QUALIFIED PRODUCERS OF COMPRESSED GAS. SHIPMENT OF A COMPRESSED GAS CYLINDER WHICH HAS NOT B EEN FILLED BY THE OWNER OR WITH HIS WRITTEN CONSENT IS A VIOLATION OF FEDERAL LAW (49 CFR)

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:IN CASE OF LEAKAGE, USE SELF-CONTAINED BREATHING APPARATUS.
Ventilation:PROVIDE ADEQUATE GENERAL AND LOCAL EXHAUST VENTILATION.
Protective Gloves:NONE
Eye Protection:SAFETY GLASSES.
Other Protective Equipment:SAFETY SHOES WHEN HANDLING CYLINDERS.
Supplemental Safety and Health
VENDOR (CAGE 70123) PART NUMBER: 350005. THIS ENTRY DESCRIBES ONE PART, SERIAL NUMBER XXXXX, ISOBUTYLENE IN AIR, OF A FIELD KIT. SEE THIS SAME NSN, SERIAL NUMBER XXXXX, A 10 HOUR RECHARGEABLE BATTERY

PACK, FOR DATA ON SECOND PART OF KIT.

========== Physical/Chemical Properties ==========

HCC:G3
Vapor Density:.991(AIR=1
Spec Gravity:GAS
Evaporation Rate & Reference:GAS
Solubility in Water:18.68CM3/1@20C
Appearance and Odor:COLORLESS, ODORLESS GAS

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS.
Stability Condition to Avoid:STABLE UNDER NORMAL STORAGE CONDITIONS. AVOID STORAGE IN POORLY VENTILATED AREAS AND STORAGE NEAR A HEAT SOURCE.
Hazardous Decomposition Products:NONE.
Conditions to Avoid Polymerization:WILL NOT OCCUR.

========== Toxicological Information ==========

Toxicological Information:LETHAL CONCENTRATION (LC50): NONE ESTABLISHED. LETHAL DOSE 50 (LD50): NOT APPLICABLE. TERATOGENICITY : N/A. REPRODUCTIVE EFFECTS:N/A. MUTGENICITY: N/AP.

========== Ecological Information ==========

Ecological:NO ADVERSE ECOLOGICAL EFFECTS ARE EXPECTED.

========== Disposal Considerations ==========

Waste Disposal Methods:DISPOSE OF NON-REFILLABLE CYLINDERS IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. ALLOW GAS TO VENT SLOWLY TO ATMOSPHERE IN AN UNCONFINED AREA OR EXHAUST HOOD. IF THE CYLINDERS ARE THE REF ILLABLE TYPE, RETURN CYLINDERS TO SUPPLIER WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PRO TECTION CAPS IN PLACE.

========== MSDS Transport Information ==========

Transport Information:CONCENTRATION: 1 - 1500 PPM. DOT DESCRIPTION (US ONLY): PROPER SHIPPING NAME: COMPRESSED GASSES, N.O.S.; HAZARD CLASS: 2.2 (NONFLAMMABLE); UN 1956; REPORTABLE QUANTITIES: NONE. LABELING: NONFLAMMABLE GAS. ADR/RID (EU ONLY): CLASS 2, 1A. SPECIAL PRECAUTIONS: CYLINDERS SHOULD BE TRANSPORTATED IN A SECURE UPRIGHT POSITION IN A WELL VENTILATED TRUCK.

========== Regulatory Information ==========

SARA Title III Information:THE THRESHOLD PLANNING QUANTIRY FOR THES MIXTURE IS 10,000 LBS.
Federal Regulatory Information:OSHA: PROCESS SAFETY MANAGEMENT: MINOR COMPONENT IS NOT LISTED IN APPENDIX A OF 29 CFR 1910.119 AS A HIGHLY HAZARDOUS CHEMICAL. TSCA: MIXTURE IS NOT LISTED IN TSCA INVENTORY. EU NUMBER: N/A. NUMBER IN ANNES 1 OF DIR 67/548: MIXTURE IS NOT LISTED IN ANNES 1. EU CLASSIFICATION: N/AP. R: 20; S: 9.

Disclaimer (provided with this information by the compiling agencies):
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MSDS Number: **I8840** * * * * * *Effective Date:* ***05/04/07*** * * * * * *Supercedes:* ***08/27/04***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ISOPROPYL ALCOHOL (90 - 100%)

1. Product Identification

Synonyms: 2-Propanol; sec-propyl alcohol; isopropanol; sec-propanol; dimethylcarbinol
CAS No.: 67-63-0
Molecular Weight: 60.10
Chemical Formula: (CH3)2 CHOH
Product Codes:
J.T. Baker: 0562, 5082, 9037, 9080, U298
Mallinckrodt: 0562, 3027, 3031, 3032, 3035, 3037, 3043, 4359, 6569, H604, H982, V555, V566, V681

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Isopropyl Alcohol	67-63-0	90 - 100%	Yes
Water	7732-18-5	0 - 10%	No

3. Hazards Identification

Emergency Overview

WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION TO SKIN.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors irritates the respiratory tract. Exposure to high concentrations has a narcotic effect, producing symptoms of dizziness, drowsiness, headache, staggering, unconsciousness and possibly death.
Ingestion:
Can cause drowsiness, unconsciousness, and death. Gastrointestinal pain, cramps, nausea, vomiting, and diarrhea may also result. The single lethal dose for a human adult = about 250 mls (8 ounces).
Skin Contact:
May cause irritation with redness and pain. May be absorbed through the skin with possible systemic effects.
Eye Contact:
Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.
Chronic Exposure:
Chronic exposure may cause skin effects.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired liver, kidney, or pulmonary function may be more susceptible to the effects of this agent.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes. Call a physician if irritation develops.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Flash point: 12C (54F) CC
Autoignition temperature: 399C (750F)
Flammable limits in air % by volume:
lel: 2.0; uel: 12.7
Listed fire data is for Pure Isopropyl Alcohol.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire or explosion. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.
Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Small quantities of peroxides can form on prolonged storage. Exposure to light and/or air significantly increases the rate of peroxide formation. If evaporated to a residue, the mixture of peroxides and isopropanol may explode when exposed to heat or shock.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For Isopropyl Alcohol (2-Propanol):
-OSHA Permissible Exposure Limit (PEL):
400 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):
200 ppm (TWA), 400 ppm (STEL), A4 - not classifiable as a human carcinogen.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a full facepiece respirator with organic vapor cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene and nitrile rubber are recommended materials.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Rubbing alcohol.
Solubility:
Miscible in water.
Specific Gravity:
0.79 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
82C (180F)
Melting Point:
-89C (-128F)
Vapor Density (Air=1):
2.1
Vapor Pressure (mm Hg):
44 @ 25C (77F)
Evaporation Rate (BuAc=1):
2.83

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Heat and sunlight can contribute to instability.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Heat, flame, strong oxidizers, acetaldehyde, acids, chlorine, ethylene oxide, hydrogen-palladium combination, hydrogen peroxide-sulfuric acid combination, potassium tert-butoxide, hypochlorous acid, isocyanates, nitroform, phosgene, aluminum, oleum and perchloric acid.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

---

11. Toxicological Information

Oral rat LD50: 5045 mg/kg; skin rabbit LD50: 12.8 gm/kg; inhalation rat LC50: 16,000 ppm/8-hour; investigated as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Isopropyl Alcohol (67-63-0)	No	No	3
Water (7732-18-5)	No	No	None

---

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to quickly evaporate. When released into the soil, this material may leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. When released into the water, this material is expected to have a half-life between 1 and 10 days. When released into water, this material may biodegrade to a moderate extent. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.
Environmental Toxicity:
The LC50/96-hour values for fish are over 100 mg/l. This material is not expected to be toxic to aquatic life.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: ISOPROPANOL
Hazard Class: 3
UN/NA: UN1219
Packing Group: II
Information reported for product/size: 200L

International (Water, I.M.O.)

Proper Shipping Name: ISOPROPANOL
Hazard Class: 3
UN/NA: UN1219
Packing Group: II
Information reported for product/size: 200L

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Isopropyl Alcohol (67-63-0)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Isopropyl Alcohol (67-63-0)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Isopropyl Alcohol (67-63-0)	No	No	Yes	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Isopropyl Alcohol (67-63-0)	No	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 2[S]2
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **1** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION TO SKIN.
Label Precautions:
Keep away from heat, sparks and flame.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid breathing vapor or mist.
Avoid contact with eyes, skin and clothing.
Label First Aid:
If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****
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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

LIQUOX®

Sodium Permanganate

CAS No. 10101-50-5

Fact Sheet

LIQUOX® sodium permanganate is a liquid oxidant recommended for applications that require a concentrated permanganate solution.

Product Specifications

Assay	40% minimum as $NaMnO_4$
Insolubles	≤ 0.005%
pH	6.0 - 8.0
Specific Gravity	1.36 - 1.39
Solubility in Water	Miscible with water in all proportions.

Chemical/Physical Data

Formula	$NaMnO_4$
Appearance	Dark Purple Solution
Potassium	1000 - 2200 ppm
Stability	> 18 Months

Applications

- Printed Circuit Board Desmearing
- Fine Chemical Synthesis
- Soil & Groundwater Remediation
- Metal Cleaning Formulations
- Acid Mine Drainage
- Hydrogen Sulfide Odor Control
  - Remote Locations
  - Unheated Locations

Benefits

- Concentrated liquid oxidant is easily stored and handled. Feed equipment is simplified (no need to transfer and dissolve crystalline product).
- Dust problems associated with handling dry oxidants are eliminated.
- High solubility at room temperature. Reactions requiring a concentrated permanganate solution can be conducted without having to raise the temperature.
- Can be used instead of potassium permanganate whenever the potassium ion cannot be tolerated, or if dusting is a critical issue.

Shipping Containers

5 gallon (18.9L) Tight Head HDPE Jerrican
(UN Specification: 3H1) made of High Density Polyethylene (HDPE), weighs 3.5 lb (1.6 kg). The net weight is 57 lb (25.7 kg). The jerrican stands approximately 15.33 in. tall, 10.2 in. wide and 11.4 in. long (38.94 cm tall, 25.91 cm wide, 28.96 cm long).

5 gallon (18.9L) Tight Head Steel Drum
(UN Specification: 1A1) made of 12 gauge, mild steel, weighs 5 lb (2.3 kg). The net weight is 57 lb (25.7 kg). The drum stands approximately 13.75 in. tall and is 11.5 in. in diameter. (34.93 cm tall, 29.21 cm diameter)

55 gallon (208.2L) Closed Head Steel Drum
(UN Specification: 1A1) made of 16 gauge, mild steel, weighs 53.7 lb (24.4 kg). The net weight is 550 lb (249.5 kg). The drum stands approximately 34.6 in. tall, has an outside diameter of 23.5 in., and an inside diameter of 22.5 in. (87.88 cm tall, OD 59.69 cm, ID 57.15 cm).

Handling and Storage

Like any potent oxidant, LIQUOX® sodium permanganate should be handled with care. Protective equipment during handling should include face shields and/or goggles, rubber or plastic gloves, rubber or plastic apron. If clothing becomes spotted, wash off immediately; spontaneous ignition can occur with cloth or paper. In cases where significant exposure exists, use of the appropriate NIOSH-MSHA dust or mist respirator or an air supplied respirator is advised.

The product should be stored in a cool, dry area in closed containers. Concrete floors are preferred. Avoid wooden decks. Spillage should be collected and disposed of properly. Contain and dilute spillage to approximately 6% with water and reduce with sodium thiosulfate, a bisulfite, or ferrous salt. The bisulfite or ferrous salt may require dilute sulfuric acid to promote reduction. Neutralize any acid used with sodium bicarbonate. Deposit sludge in an approved landfill or, where permitted, drain into sewer with large quantities of water.

As an oxidant, the product itself is non-combustible, but will accelerate the burning of combustible materials. Therefore, contact with all combustible materials and/or chemicals must be avoided. These include, but are not limited to: wood, cloth, organic chemicals, and charcoal. Avoid contact with acids, peroxides, sulfites, oxalates, and all other oxidizable inorganic chemicals. With hydrochloric acid, chlorine is liberated.

Shipping

LIQUOX® sodium permanganate is classified as an oxidizer. Sodium permanganate is shipped domestically as Class 70 and has a Harmonized Code for export of 2841.69.0000.

Proper Shipping Name:	Permanganates, Inorganic, Aqueous solution, n.o.s. (Contains Sodium Permanganate)
Hazard Class:	5.1
Identification Number:	UN 3214
Packaging Group:	II
Label Requirements:	Oxidizer, 5.1
Special Provisions:	T8-Intermodal transportation in IM 101 portable tanks
Packaging Requirement:	49 CFR Parts 171 to 180 Sections: 173.152, 173.202, 173.242
Quantity Limitations:	1 liter net for passenger aircraft or railcar. 5 liters net for cargo aircraft.
Vessel Stowage:	D-material must be stowed "ondeck" on a cargo vessel, but is prohibited on a passenger vessel. Other provisions, stow "separated from" ammonium compounds, hydrogen peroxide, peroxides and superperoxides, cyanide compounds, and powdered metal.

Repackaging

When LIQUOX® sodium permanganate is repackaged, the packaging, markings, labels, and shipping conditions must meet applicable federal regulations. See Code of Federal Regulations-49, Transportation, parts 171-180, and the Federal Hazardous Materials Transportation Act (HMTA).

Corrosive Properties

LIQUOX® sodium permanganate is compatible with many metals and synthetic materials. Natural rubbers and fibers are often incompatible. Solution pH and temperature are also important factors. The material selected for use with sodium permanganate must also be compatible with any acid or alkali being used.

In neutral and alkaline solutions, sodium permanganate is not corrosive to carbon steel and 316 stainless steel. However, chloride corrosion of metals may be accelerated when an oxidant such as sodium permanganate is present in solution. Plastics such as teflon, polypropylene, HDPE and EDPM are also compatible with sodium permanganate.

Aluminum, zinc, copper, lead, and alloys containing these metals may be slightly affected by sodium permanganate solutions. Actual corrosion or compatibility studies should be made under the conditions in which the permanganate will be used prior to use.

Carus Value Added

LABORATORY SUPPORT

Carus Chemical Company has technical assistance available to its potential and current customers to answer questions or perform laboratory and field testing including:

*Feasibility Studies * Toxicity Evaluations *Treatability Studies *Analytical Services *Field Trials

CARUS CHEMICAL COMPANY

During its more than 80-year history, Carus' ongoing reliance on research and development, as well as its emphasis on technical support and customer service, have enabled the company to become the world leader in permanganate, manganese, oxidation, and catalyst technologies.

CARUS

Responsible Care®
Good Chemistry at Work

Carus Chemical Company
315 Fifth Street
P. O. Box 599
Peru, IL 61354
Tel. (815) 223-1500
Fax (815) 224-6697
Web: www.caruschem.com
E-Mail: salesmkt@caruschem.com

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AMERADA HESS CORPORATION

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD

NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION (rev. Jan-04)

Amerada Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732)750-6000
MSDS Internet Website www.hess.com/about/environ.html

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS * (rev. Jan-04)

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME). Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION (rev. Dec-97)

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES (rev. Dec-97)

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES (rev. Dec-97)

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 ^{o}F (-43^{o}C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 ^{o}F (>280 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 “Low Expansion Foam - 1994 Edition.”

FIRE FIGHTING INSTRUCTIONS

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES (rev. Dec-97)

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product

vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE (rev. Dec-97)

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION (rev. Jan-04)

EXPOSURE LIMITS

Component (CAS No.)	Exposure Limits			
	Source	TWA (ppm)	STEL (ppm)	Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	800	--	2003 NOIC: 1000 ppm (TWA) Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3

Component (CAS No.)	Exposure Limits			
	Source	TWA (ppm)	STEL (ppm)	Note
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	50	--	A4 (skin)
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES (rev. Jan-04)

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR

A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 ^{o}F (39 to 200 ^{o}C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 ^{o}F (38 ^{o}C) (275-475 mm Hg @ 68 ^{o}F (20 ^{o}C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %

SOLUBILITY (H_2O): Non-oxygenated gasoline - negligible (< 0.1% @ 77 ^oF). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 ^oF); ethanol is readily soluble in water

10. STABILITY and REACTIVITY (rev. Dec-94)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS

Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES (rev. Dec-97)

ACUTE TOXICITY

Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY

Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION (rev. Jan-04)

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS (rev. Dec-97)

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION (rev. Jan-04)

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:

15. REGULATORY INFORMATION (rev. Jan-04)

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the U.S. Coast Guard with follow-up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION (rev. Jan-04)

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
	* CHRONIC		

SUPERSEDES MSDS DATED: 12/30/97

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

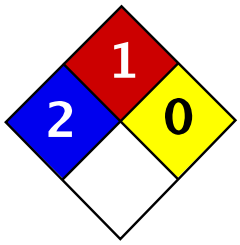
ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute (212)642-4900
API	American Petroleum Institute (202)682-8000
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation [General Info: (800)467-4922]
EPA	U.S. Environmental Protection Agency
HMIS	Hazardous Materials Information System
IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.



Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
1,1,1-Trichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,1,1-Trichloroethane

Catalog Codes: SLT4180, SLT2167, SLT3460

CAS#: 71-55-6

RTECS: KJ2975000

TSCA: TSCA 8(b) inventory: 1,1,1-Trichloroethane

CI#: Not available.

Synonym:

Chemical Formula: CH3CCl3

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{1,1,1-}Trichloroethane	71-55-6	100

Toxicological Data on Ingredients: 1,1,1-Trichloroethane: ORAL (LD50): Acute: 9600 mg/kg [Rat]. 6000 mg/kg [Mouse]. DERMAL (LD50): Acute: 15800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 18000 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of ingestion. Hazardous in case of skin contact (irritant, permeator), of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to lungs, the nervous system, liver, mucous membranes.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 537°C (998.6°F)

Flash Points: Not available.

Flammable Limits: LOWER: 7.5% UPPER: 12.5%

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of oxidizing materials, of acids, of alkalis.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Slightly explosive to explosive in presence of oxidizing materials, of acids, of alkalis.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 350 STEL: 440 CEIL: 440 (ppm) from ACGIH (TLV) [1995]
TWA: 1900 STEL: 2460 CEIL: 2380 (mg/m3) from ACGIH [1995]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 133.41 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 74.1°C (165.4°F)

Melting Point: -32.5°C (-26.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.3376 (Water = 1)

Vapor Pressure: 100 mm of Hg (@ 20°C)

Vapor Density: 4.6 (Air = 1)

Volatility: Not available.

Odor Threshold: 400 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 6000 mg/kg [Mouse].
Acute dermal toxicity (LD50): 15800 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 18000 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion.
Hazardous in case of skin contact (irritant, permeator), of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : 1,1,1-Trichloroethane : UN2831 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: 1,1,1-Trichloroethane
Massachusetts RTK: 1,1,1-Trichloroethane
TSCA 8(b) inventory: 1,1,1-Trichloroethane
SARA 313 toxic chemical notification and release reporting: 1,1,1-Trichloroethane
CERCLA: Hazardous substances.: 1,1,1-Trichloroethane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC):
R38- Irritating to skin.
R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:31 PM

Last Updated: 11/06/2008 12:00 PM

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MSDS SUMMARY SHEET

Manufacturer:
Name: PHILLIPS PETROLEUM COMPANY
Address 1:
Address 2:
Address 3:
CSZ: BARTLESVILLE **State:** OK **Zipcode:** 74004
Emergency phone: (800) 424-9300
Business phone: 800-762-0942

Product:

Ferndale MSDS#: 1354 **Version # :** 6
Manufacturer MSDS#: 0041
Current? : 2002
Name:

NO. 2 DIESEL FUEL

Synonyms:

CARB **Diesel** TF3
CARB **Diesel**
CARB **Diesel** 10%
Diesel Fuel Oil
EPA Low Sulfur **Diesel** Fuel
EPA Low Sulfur **Diesel** Fuel – Dyed
EPA Off Road High Sulfur **Diesel –** Dyed
Fuel Oil No. 2 – CAS # 68476-30-2
No. 2 **Diesel** Fuel Oil
No. 2 Fuel Oil – Non Hiway – Dyed
No. 2 High Sulfur **Diesel** – Dyed
No. 2 Low Sulfur **Diesel** - Dyed
No. 2 Low Sulfur **Diesel** - Undyed
Crude column 3rd IR
Crude column 3rd side cut
Atmospheric tower 3rd side cut
Ultra Low Sulfur **Diesel** No. 2
Finished **Diesel**
DHT Reactor Feed
Straight Run **Diesel**
Diesel
Middle Distillate

Product/Catalog Numbers:
MSDS Date: 01/01/2002 **(received:** 01/14/2002**)**

NFPA codes:
Health: 0 **Flammability:** 2 **Reactivity:** 0

MATERIAL SAFETY DATA SHEET
No. 2 Diesel Fuel

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: No. 2 Diesel Fuel
Product Code: Multiple
SAP Code:
Synonyms: 1354
CARB Diesel TF3
CARB Diesel
CARB Diesel 10%
Diesel Fuel Oil
EPA Low Sulfur Diesel Fuel
EPA Low Sulfur Diesel Fuel – Dyed
EPA Off Road High Sulfur Diesel – Dyed
Fuel Oil No. 2 – CAS # 68476-30-2
No. 2 Diesel Fuel Oil
No. 2 Fuel Oil – Non Hiway – Dyed
No. 2 High Sulfur Diesel – Dyed
No. 2 Low Sulfur Diesel - Dyed
No. 2 Low Sulfur Diesel – Undyed
No. 2 Ultra Low Sulfur Diesel – Dyed
No. 2 Ultra Low Sulfur Diesel - Undyed
Intended Use: Fuel
Chemical Family:
Responsible Party: Phillip's Petroleum Company
Bartlesville, Oklahoma 74004
For Additional MSDSs: 800-762-0942
Technical Information:

The intended use of this product is indicated above. If any additional use is known, please contact us at the Technical Information number listed.

EMERGENCY OVERVIEW

24 Hour Emergency Telephone Numbers:
Spill, Leak, Fire or Accident
Call CHEMTREC
North America: (800) 424-9300
Others: (703) 527-3887 (collect)

California Poison Control System: 800-356-3120

Health Hazards/Precautionary Measures: Causes severe skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Do not taste or swallow. Wash thoroughly after handling.

Physical Hazards/Precautionary Measures: Flammable liquid and vapor. Keep away from heat, sparks, flames, static electricity or other sources of ignition.

Appearance: Straw-colored to dyed red
Physical Form: Liquid
Odor: Characteristic petroleum

HFPA Hazard Class:
Health: 0 (Least)
Flammability: 2 (Moderate)
Reactivity: 0 (Least)

HMIS Hazard Class
Not Evaluated

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	% VOLUME	EXPOSURE GUIDELINE		
		Limits	Agency	Type
Diesel Fuel No. 2 CAS# 68476-34-6	100	100* mg/m3	ACGIH	TWA-SKIN
Naphthalene CAS# 91-20-3	<1	10ppm	ACGIH	TWA
		15ppm	ACGIH	STEL
		10ppm	OSHA	TWA
		250ppm	NIOSH	IDLH

All components are listed on the TSCA inventory

Tosco Low Sulfur No. 2 Diesel meets the specifications of 40 CFR 60.41 for low sulfur diesel fuel.

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

*Proposed ACGIH (1999)

3. HAZARDS IDENTIFICATION

Potential Health Effects:

Eye: Contact may cause mild eye irritation including stinging, watering, and redness.

Skin: Severe skin irritant. Contact may cause redness, itching, burning, and severe skin damage. Prolonged or repeated contact can worsen irritation by causing drying and cracking of the skin, leading to dermatitis (inflammation). Not actually toxic by skin absorption, but prolonged or repeated skin contact may be harmful (see Section 11).

Inhalation (Breathing): No information available. Studies by other exposure routes suggest a low degree of toxicity by inhalation.

Ingestion (Swallowing): Low degree of toxicity by ingestion. ASPIRATION HAZARD – This material can enter lungs during swallowing or vomiting and cause lung inflammation and damage.

Signs and Symptoms: Effects of overexposure may include irritation of the nose and throat, irritation of the digestive tract, nausea, diarrhea and transient excitation followed by signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue).

Cancer: Possible skin cancer hazard (see Sections 11 and 14).

Target Organs: There is limited evidence from animal studies that overexposure may cause injury to the kidney (see Section 11).

Developmental: Inadequate data available for this material.

Pre-Existing Medical Conditions: Conditions aggravated by exposure may include skin disorders and kidney disorders.

4. FIRST AID MEASURES

Eye: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: Immediately remove contaminated shoes, clothing, and constrictive jewelry and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek immediate medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops, seek immediate medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard; Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

5. FIRE FIGHTING MEASURES

Flammable Properties:

Flash Point: >125°F/>52°
OSHA Flammability Class: Combustible liquid
LEL %: 0.3 / UEL %; 10.0
Autoignition Temperature: 500°F/260°C

Unusual Fire & Explosion Hazards: This material is flammable and can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, or mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Flammable. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended.

Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors (see Section 5). Spilled material may be absorbed into an appropriate material.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling: Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharged. The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-704 and/or API RP 2003 for specific bonding/grounding requirements.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames. Use good personal hygiene practices.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing or high pressure hydraulic oil equipment.

“Empty” containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. “Empty” drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSIZ49.1 and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Post area “No Smoking or Open Flame.” Store only in approved containers. Keep away from incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentration below the established exposure limits (see Section 2), additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

Personal Protective Equipment (PPE):

Respiratory: A NIOSH certified air purifying respirator with an organic vapor cartridge maybe used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrants a respirator's use.

Skin: The use of gloves impervious to the specific material handled is advised to prevent skin contact, possible irritation and skin damage (see glove manufacturer literature for information on permeability). Depending on conditions of use, apron and/or arm covers may be necessary.

Eyes/Face: Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse. It is recommended that impervious clothing be worn when skin contact is possible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1atm).

Appearance: Straw-colored to dyed red
Physical State: Liquid
Odor: Characteristic petroleum
pH: unavailable
Vapor Pressure (mm Hg): 0.40
Vapor Densisty (air=1):>3
Boiling Point/Range: 320-700°F /160-371°C
Freezing/Melting Point: No Data
Solubility in Water: Negligible
Specific Gravity: 0.81-0.88 @ 60°F
Percent Volatile: Negligible
Evaporation Rate (nBuAc=1): <1
Viscosity: 32.6-40.0 SUS @ 100°F
Bulk Density: 7.08 lbs/gal
Flash Point: >125°F / >52°C
Flammable/Expolsive Limits (%): LEL: 0.3 / UEL: 10.0

10. STABILITY AND REACTIVITY

Stability: Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. Flammable liquid and vapor. Vapor can cause flash fire.

Conditions To Avoid: Avoid all possible sources of ignition (see Sections 5 and 7).

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite, calcium hypochlorite, etc.

Hazardous Decomposition Products: The use of hydrocarbon fuels in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels. ACGIH has included a TLV of 0.05 mg/m3 TWA for diesel exhaust particulate on its 1999 Notice of Intended Changes. See Section 11 for additional information on hazards of engine exhaust.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Diesel Fuel No. 2 (CAS# 68476-34-6)

Carcinogenicity: Chronic dermal application of certain middle distillate streams contained in diesel fuel No. 2 resulted in an increased incidence of skin tumors in mice. This material has not been identified as carcinogen by NTP, IARC, or OSHA. Diesel exhaust is a probable cancer hazard based on tests with laboratory animals.

Target Organ(s): Limited evidence of renal impairment has been noted from a few case reports involving excessive exposure to diesel fuel No. 2.

Naphthalene (CAS# 91-20-3)

Carcinogenicity: Naphthalene has been evaluated in two year inhalation studies in both rats and mice. The National Toxicology Program (NTP) concluded that there is clear evidence of carcinogenicity in male and female rats based on increased incidences of respiratory epithelial adenomas and olfactory epithelial neuroblastomas of the nose. NTP found some evidence of carcinogenicity in female mice (alveolar adenomas) and no evidence of carcinogenicity in male mice. Naphthalene has not been identified as a carcinogen by IARC or OSHA.

12. ECOLOGICAL INFORMATION

Not evaluated at this time

13. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, would be a RCRA “characteristic” hazardous waste due to the characteristic(s) of ignitability (D001) and benzene (D018). If the material is spilled to soil or water, characteristic testing of the contaminated materials is recommended. Further, this material, once it becomes a waste, is subject to the land disposal restrictions in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and local regulations to determine whether they are more stringent then the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Container ?insate? could be considered a RCRA hazardous waste and must be disposed of with care and in compliance with federal, state and local regulations. Large empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller containers, consult with state and local regulations and disposal authorities.

14. TRANSPORT INFORMATION

DOT Shipping Description: Diesel Fuel, NA1983
Non-Bulk Package Marking: Diesel Fuel, 3, NA 1993, III

15. REGULATORY INFORMATION

EPA SARA 311/312 (Title III Hazard Categories):

Acute Health:	Yes
Chronic Health:	Yes
Fire Hazard:	Yes
Pressure Hazard:	No
Reactive Hazard:	No

SARA 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Component	CAS Number	Weight %
-- None known --		

California Proposition 65:

Warning: This material contains the following chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Effect
Benzene	Cancer, Developmental and Reproductive Toxicant
Toluene	Developmental Toxicant

Diesel engine exhaust, while not a component of this material, is on the Proposition 65 list of chemicals known to the State of California to cause cancer.

Carcinogen Identification:

This material has not been identified as a carcinogen by NTP, IARC, or OSHA. See Section 11 for carcinogenicity information of individual components, if any. Diesel exhaust is a probable cancer hazard based on tests in laboratory animals. It has been identified as carcinogen by IARC.

EPA (CERCLA Reportable Quantity: None

16. OTHER INFORMATION

Issue Date: 01/01/02
Previous Issue Date: 05/15/01
Product Code: Multiple
Revised Sections: None
Previous Product Code: Multiple
MSDS Number: 0041

Disclaimer of Expressed and Implied Warranties:

The information presented in this Material Data Safety Sheet is based on data believed to be accurate as of the date this Material Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THE PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Tosco Refining Company ***Ferndale Refinery***

UltraLow Sulfur Diesel Product Specification

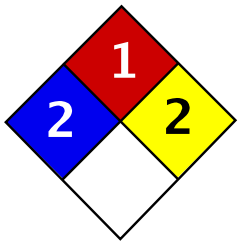
Ferndale Product Code:34380xx (5) Product Code: ULSD2

(COMETS)

Specification	Unit	Limit	Test Procedure	Typical
Appearance				
Water & Sediment	Vol %	0.05 Max	D 2709	
Color	Number	3.0 Max	D 1500	
Haze Rating	Rating	2 Max	D 4176	
Composition				
Carbon Residue (Ramsbottom)	Wt %	0.35 Max	D 524, D 189	
Volatility				
90% Recovered	Deg; F	540 Min	D 86	
	Deg; F	640 Min	D 86	
Flash Point	Deg; F	125 Min (1)	D 93	130 F
Gravity	API	30 Min	D 287, D4052	
Fluidity				
Pour Point	Deg; F	See Season Table (6)	D 97	
Cloud Point	Deg; F	See Season Table (6)	D 2500	10 F
Viscosity @ 104F	cSt	1.9 Min	D 445	
	cSt	4.1 Max	D 445	
Lubricity, SLBOCLE	grams	3100 Min	D 6078	3300gm
Lubricity, HFRR	mm	.45	D 6079	
Combustion				
Cetane Index or Cetane Number (3,4)	Number	40.0 Min	D 976, D613	47.0
Corrosion				
Copper Strip, 3hr @ 50 deg C	Number	3 Max (2)	D 130	
Aromatics (4)	Vol %	35 Max	D 1319	25 %
Contaminants				
Total Sulfur	PPM	30 Max	D 2622, D4294	15-20ppm
Water & Sediment	Vol %	0.05 Max	D 1796	
Ash	Wt %	0.01 Max	D 482	
Additives				
Cetane Improver	Lb/MBbl	675 Max		
Dye		Undyed		

1. Minimum release specification is 125 deg. F. The refinery should target 135 deg. F.
2. Test result reported as a number and letter (e.g. 1a). Any letter is allowable as long as the number meets the spec shown.
3. Either specification must be met.
4. Either cetane index minimum or aromatics maximum must be met.
5. Winter cloud and pour specifications may be relaxed to the summer specifications by agreement with the customer.
6. Season Table

Month	Product Code	Pour Point	Cloud Point
Jan, Feb, Nov, Dec	WI	0 max (5)	14 max (5)
Mar - Oct	SU	15 max	24 max



Health	2
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet
Sodium permanganate monohydrate MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium permanganate monohydrate

Catalog Codes: SLS4345

CAS#: 10101-50-5

RTECS: SD6650000

TSCA: TSCA 8(b) inventory: Sodium permanganate monohydrate

CI#: Not applicable.

Synonym: Permanganic acid, sodium salt

Chemical Name: Sodium permanganate monohydrate

Chemical Formula: NaMnO4.H2O

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium permanganate monohydrate	10101-50-5	100

Toxicological Data on Ingredients: Sodium permanganate monohydrate: ORAL (LD50): Acute: 9000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant). Hazardous in case of skin contact (permeator), of ingestion, of inhalation. Prolonged exposure may result in skin burns and ulcerations.
Over-exposure by inhalation may cause respiratory irritation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of combustible materials.
Flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Oxidizing material.
Do not use water jet. Use flooding quantities of water. Avoid contact with organic materials.

Special Remarks on Fire Hazards: When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Oxidizing material.
Stop leak if without risk. Avoid contact with a combustible material (wood, paper, oil, clothing...). Keep substance damp using water spray. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Keep away from combustible material Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as reducing agents, organic materials, metals, acids, moisture.

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Oxidizing materials should be stored in a separate safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 5 (mg/m3) from ACGIH (TLV) [1995]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Powdered solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 159.94 g/mole

Color: Red.

pH (1% soln/water): 7 [Neutral.]

Boiling Point: Not available.

Melting Point: Decomposes.

Critical Temperature: Not available.

Specific Gravity: 2.47 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances:
Highly reactive with reducing agents, organic materials, metals, acids.
Reactive with moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 9000 mg/kg [Rat].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant).
Hazardous in case of skin contact (permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Exposure can cause nausea, headache and vomiting. Material is corrosive to the mucous membranes.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 5.1: Oxidizing material.

Identification: : Sodium permanganate : UN1503 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Sodium permanganate monohydrate
Massachusetts RTK: Sodium permanganate monohydrate
TSCA 8(b) inventory: Sodium permanganate monohydrate
SARA 313 toxic chemical notification and release reporting: Sodium permanganate monohydrate

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS C: Oxidizing material.
CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R38- Irritating to skin.
R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

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

Health: 2

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
-Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec.
-SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
-Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 06:34 PM

Last Updated: 11/06/2008 12:00 PM

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AIR PRODUCTS

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT IDENTIFICATION

PRODUCT NAME: **Nitrogen, compressed**
CHEMICAL NAME: Nitrogen
FORMULA: N_2
SYNONYMS: Nitrogen gas, Gaseous Nitrogen, GAN

MANUFACTURER: **Air Products and Chemicals, Inc.**
7201 Hamilton Boulevard
Allentown, PA 18195 - 1501
PRODUCT INFORMATION: 1-800-752-1597
MSDS NUMBER: 1011 **REVISION:** 5
REVISION DATE: March 1994 **REVIEW DATE:**
August 1997

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

Nitrogen is sold as pure product > 99%.
CAS NUMBER: 7727-37-9
EXPOSURE LIMITS:
OSHA: Not established **ACGIH:** Simple asphyxiant **NIOSH:** Not established

SECTION 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Nitrogen is a nontoxic, odorless, colorless, nonflammable compressed gas stored in cylinders at high pressure. It can cause rapid suffocation when concentrations are sufficient to reduce oxygen levels below 19.5%. Self Contained Breathing Apparatus (SCBA) may be required.

EMERGENCY TELEPHONE NUMBERS
800-523-9374 Continental U.S. , Canada and Puerto Rico
610-481-7711 other locations

POTENTIAL HEALTH EFFECTS INFORMATION:

INHALATION: Simple asphyxiant. Nitrogen is nontoxic, but may cause suffocation by displacing the oxygen in air. Lack of sufficient oxygen can cause serious injury or death.

EYE CONTACT: No adverse effect.

SKIN CONTACT: No adverse effect.

EXPOSURE INFORMATION:

ROUTE OF ENTRY: Inhalation

TARGET ORGANS: None

EFFECT: Asphyxiation (suffocation)

SYMPTOMS: Exposure to an oxygen deficient atmosphere (<19.5%) may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness and death. Exposure to atmospheres containing 8-10% or less oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help themselves.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None

CARCINOGENIC POTENTIAL: Nitrogen is not listed as a carcinogen or potential carcinogen by NTP, IARC, or OSHA .

SECTION 4. FIRST AID

INHALATION: Persons suffering from lack of oxygen should be moved to fresh air. If victim is not breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Obtain prompt medical attention.

EYE CONTACT: Not applicable.

SKIN CONTACT: Not applicable.

SECTION 5. FIRE AND EXPLOSION

FLASH POINT:	AUTOIGNITION:	FLAMMABLE LIMITS:
Not applicable	Nonflammable	Nonflammable

EXTINGUISHING MEDIA: Nitrogen is nonflammable and does not support combustion. Use extinguishing media appropriate for the surrounding fire.

HAZARDOUS COMBUSTION PRODUCTS: None

SPECIAL FIRE FIGHTING INSTRUCTIONS: Nitrogen is a simple asphyxiant. If possible, remove nitrogen cylinders from fire area or cool with water. SCBA may be required by rescue workers.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Upon exposure to intense heat or flame cylinder may vent rapidly and/or rupture violently. Most cylinders are designed to vent contents when exposed to elevated temperatures. Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Evacuate all personnel from affected area. Increase ventilation to release area and monitor oxygen level. Use appropriate protective equipment (SCBA). If leak is from container or its valve, call the Air Products emergency telephone number. If leak is in user's system close cylinder valve and vent pressure before attempting repairs.

SECTION 7. HANDLING AND STORAGE

STORAGE: Cylinders should be stored upright in a well-ventilated, secure area, protected from the weather. Storage area temperatures should not exceed 125 °F (52 °C) and area should be free of combustible materials. Storage should be away from heavily traveled areas and emergency exits. Avoid areas where salt or other corrosive materials are present. Valve protection caps and valve outlet seals should remain on cylinders not connected for use. Separate full from empty cylinders. Avoid excessive inventory and storage time. Use a first-in first-out system. Keep good inventory records.

HANDLING: Do not drag, roll, or slide cylinder. Use a suitable handtruck designed for cylinder movement. Never attempt to lift a cylinder by its cap. Secure cylinders at all times while in use. Use a pressure reducing regulator or separate control valve to safely discharge gas from cylinder. Use a check valve to prevent reverse flow into cylinder. Do not overheat cylinder to increase pressure or discharge rate. If user experiences any difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may

damage valve causing a leak to occur. Use a special cap wrench or adjustable strap-wrench to remove over-tight or rusted caps.

Nitrogen is compatible with all common materials of construction. Pressure requirements should be considered when selecting materials and designing systems.

SPECIAL REQUIREMENTS: Always store and handle compressed gases in accordance with Compressed Gas Association, Inc. (ph. 703-412-0900) pamphlet CGA P-1, ***Safe Handling of Compressed Gases in Containers.*** Local regulations may require specific equipment for storage or use.

CAUTION: Users of nitrogen must be aware of the hazards caused by the accumulation of high concentrations, especially in confined spaces. Compliance with OSHA regulations, especially 29 CFR 1910.146 (confined space entry), is essential

SECTION 8. PERSONAL PROTECTION / EXPOSURE CONTROL

ENGINEERING CONTROLS: Provide good ventilation and/or local exhaust to prevent accumulation of high concentrations of gas. Oxygen levels in work area should be monitored to ensure they do not fall below 19.5%.

RESPIRATORY PROTECTION:

GENERAL USE: None required.

EMERGENCY: Use SCBA or positive pressure air line with mask and escape pack in areas where oxygen concentration is less than 19.5%. Air purifying respirators will not provide protection.

OTHER PROTECTIVE EQUIPMENT: Safety glasses. Safety shoes and leather work gloves are recommended when handling cylinders.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless gas

ODOR: Odorless

MOLECULAR WEIGHT: 28.01

BOILING POINT (1 Atm): -320.4 °F (-195.8 °C)

SPECIFIC GRAVITY (Air =1): 0.967

SPECIFIC VOLUME (at 70 °F (21.1 °C) and 1 atm): 13.81 ft^3/lb (0.867m^3/kg)

FREEZING POINT/MELTING POINT: -345.8 °F (-209.9 °C)

VAPOR PRESSURE: Not applicable at 70 °F

GAS DENSITY (at 70 °F (21.1 °C) and 1 atm): 0.072 lb/ft^3 (1.153 kg/m^3)

SOLUBILITY IN WATER (Vol./Vol. at 32°F (0°C)): 0.023

SECTION 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

CONDITIONS TO AVOID: None

INCOMPATIBILITY: None

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

Nitrogen is a simple asphyxiant.

SECTION 12. ECOLOGICAL INFORMATION

The atmosphere contains approximately 78% nitrogen. No adverse ecological effects are expected. Nitrogen does not contain any Class I or Class II ozone depleting chemicals. Nitrogen is not listed as a marine pollutant by DOT (49 CFR 171).

SECTION 13. DISPOSAL

UNUSED PRODUCT / EMPTY CONTAINER: Return cylinder and unused product to supplier. Do not attempt to dispose of residual or unused quantities.

DISPOSAL: For emergency disposal, secure the cylinder and slowly discharge gas to the atmosphere in a well ventilated area or outdoors.

SECTION 14. TRANSPORT INFORMATION

DOT HAZARD CLASS: 2.2

DOT SHIPPING LABEL: Nonflammable Gas

DOT SHIPPING NAME: Nitrogen, Compressed

IDENTIFICATION NUMBER: UN1066

REPORTABLE QUANTITY (RQ): None

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure upright position in a well ventilated truck. Never transport in passenger compartment of a vehicle.

Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with the owner's written consent is a violation of federal law.

SECTION 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

ENVIRONMENTAL PROTECTION AGENCY (EPA):

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 requires notification to the National Response Center of a release of quantities of hazardous substances equal to or greater than their reportable quantities (RQ's) in 40 CFR 302.4.

CERCLA Reportable Quantity: None.

SARA TITLE III: Superfund Amendment and Reauthorization Act of 1986

SECTION 302/304: Requires emergency planning on threshold planning quantities (TPQ) and release reporting based on reportable quantities (RQ) of EPA's extremely hazardous substances (40 CFR 355).

Nitrogen is not listed as an extremely hazardous substance.

Threshold Planning Quantity (TPQ): None

SECTIONS 311/312: Require submission of material safety data sheets (MSDSs) and chemical inventory reporting with identification of EPA defined hazard classes. The hazard classes for this product are:

IMMEDIATE HEALTH: No

DELAYED HEALTH: No

PRESSURE: Yes

REACTIVITY: No

FIRE: No

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR 372.

Nitrogen does not require reporting under Section 313.

40 CFR Part 68 - Risk Management for Chemical Accident Release Prevention: Requires the development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Nitrogen is not listed as a regulated substance.

TSCA - TOXIC SUBSTANCES CONTROL ACT: Nitrogen is listed on the TSCA inventory.

OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119 - Process Safety Management of Highly Hazardous Chemicals: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Nitrogen is not listed in Appendix A as a highly hazardous chemical.

STATE REGULATIONS

CALIFORNIA:

Proposition 65: This product does NOT contain any listed substances which the State of California requires warning under this statute.

SCAQMD Rule: VOC = Not applicable

SECTION 16. OTHER INFORMATION

NFPA RATINGS:		HMIS RATINGS:	
HEALTH:	0	HEALTH:	0
FLAMMABILITY:	0	FLAMMABILITY:	0
REACTIVITY:	0	REACTIVITY:	0
SPECIAL:	SA*		

*Compressed Gas Association recommendation to designate simple asphyxiant.

***** Documents with Review Dates August 1997 and Revision Date March 1994 are identical in content and either may be used.***

MATERIAL SAFETY DATA SHEET

W A Butler Company
5600 Blazer Parkway
Dublin, Ohio 43017

EMERGENCY PHONE #': 1-800-424-9300
NON-EMERGENCY PHONE #: 1-800-650-4899 **Date Prepared:** January 7, 2004

SECTION I:

CHEMICAL NAME AND SYNONYMS: Hydrogen Peroxide

TRADE NAME: **HYDROGEN PEROXIDE 3%**

CHEMICAL FAMILY: Mixture

FORMULA: NA

CAS REGISTRY#: 7722-84-1

SECTION II: HAZARDOUS INGREDIENTS

The hazard communication standard requires that such mixtures be assumed to present the same health hazard as do components that constitute at least 1% of the mixture (0.1 % for carcinogens) although OSHA has noted that the hazards of individual components may be altered by including them in a mixture. Some of the ingredients of this mixture are a trade secret.

NAME	CAS NO.'S	OSHA PEL/ACGIH TLV - TWA	PERCENT
Hydrogen Peroxide	7722-84-1		3.0

SECTION III: PHYSICAL DATA

BOILING POINT (ºF): 226 º F 108ºcC

SPECIFIC GRAVITY: 1.03 @ 20º F 4ºC

VAPOR PRESSURE (MM Hg): 23mmHg at 30º C

PERCENT, VIOLATILE by VOLUME (%): 100%

VAPOR DENSITY (Air=1): Not available

EVAPORATION RATE: (Butyl Acetate = 1) Above 1

SOLUBILITY IN WATER: Soluble

APPEARANCE & ODOR: Clear colorless liquid, odorless

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used): Non-combustible

ESTIMATED FLAMMABLE LIMITS IN AIR: Non-combustible

EXTINGUISHING MEDIA: Preferably water or water fog. Carbon dioxide and dry chemical may also be used.

SPECIAL FIRE FIGHTING PROCEDURES: Any tank or container surrounded by fire should be flooded with water for cooling. Wear full protective clothing and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Product is non-combustible. On decomposition H2O2 releases oxygen, which may intensify fire.

SECTION V: HEALTH HAZARD DATA:

EFFECTS OF OVEREXPOSURE:

EYES: Corrosive to eyes. May cause irreversible tissue damage to the eyes including blindness.

SKIN: May cause mild irritation to skin.

INHALATION: Inhalation of mist or vapor could cause irritation lungs, nose and throat, usually subsides after exposure ceases.

INGESTION: Do not ingest. Corrosive to gastrointestinal tract.

EMERGENCY AND FIRST AID MEASURES:

EYE CONTACT: Immediately flush with large amounts of water for at least 15 minutes. Lifting upper and lower lids intermittently. See a physician or ophthalmologist.

SKIN CONTACT: Wash with large amounts of water. If irritation persists, obtain medical attention.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs, call a physician.

INGESTION: If swallowed, drink plenty of water immediately to dilute. Do not induce vomiting or give anything by mouth to an unconscious person. See a physician. Note to Physician: Hydrogen Peroxide at these concentrations is a strong oxidant.

NA = NOT APPLICABLE
NE = NOT ESTABLISHED
NL = NOT LISTED
NIF = NO INFORMATION FOUND

Direct contact with the eye is likely to cause corneal damage especially if not washed immediately. Careful ophthalmologic evaluation is recommended and the possibility of local corticosteroid therapy should be considered. Because of likelihood of system effect, attempts at evacuating the stomach via emesis induction or gastric lavage should be avoided.

SECTION VI: REACTIVITY DATA

STABILITY: Stable
CONDITIONS TO AVOID: None known
INCOMPATIBILITIES: Strong oxidizing agents, strong alkalizes and strong mineral acids
HAZARDOUS DECOMPOSITION BY PRODUCTS: Oxidizer. Contact with combustibles may cause fire.
HAZARDOUS POLYMERIZATION: Will not occur.

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL/RELEASE MEASURES: Dilute with large volume of water and hold in a pond or dike area until H2O2 decomposes.

WASTE DISPOSAL: An acceptable method of disposal is to dilute with a large amount of water and allow the hydrogen peroxide to decompose followed by discharge into a suitable treatment system in accordance with all regulatory agencies. Because acceptable methods of disposal may vary by location and because regulatory requirements may change, the appropriate regulatory agency should be contacted prior to disposal.

SECTION VIII: SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: If concentrations in excess of 10ppm are expected use approved self-contained breathing apparatus. Do not use oxidizable absorbants such as activated carbon.
VENTILATION: Ventilation should be provided to minimize the release of H2O2 vapors and mist into the work environment.

SKIN PROTECTION: Rubber or neoprene gloves.

EYE PROTECTION: Wear cup type chemical goggles and/or full-face mask.

OTHER PROTECTIVE EQUIPMENT: Use only suitable protective clothing, e.g., rubber, neoprene or synthetic fibers. Avoid cotton, wool or leather. Wear rubber or neoprene footwear.

SECTION IX: SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store drums in cool areas out of direct sunlight and away from combustibles. For bulk storage refer to FMC technical bulletins. Decomposition and generation of oxygen gas, which could result in high pressures and possible container rupture, Hydrogen peroxide should be stored only in vented containers and should only be transferred in a prescribed manner. Empty drums should be triple rinsed with water before discarding. Utensils used for handling hydrogen peroxide should me made only of glass, stainless steel, aluminum or plastic.

The above information had been provided by the W.A. Butler Company in good faith; but no warranty, expressed or implied is made with regard to the accuracy of such data or it's suitability for a given application or purpose.

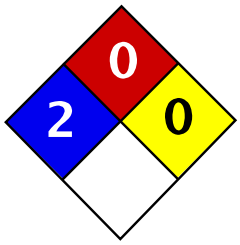
First Priority, Inc. of Elgin, Illinois, manufactures this product for The W.A. Butler Company. The emergency telephone number at the beginning of this MSDS is for First Priority.

Prepared By: George W. Miller III, Regulatory Affairs Manager, W.A. Butler Company using information provided by First Priority in a MSDS dated May 27, 1997.

Date: January 7, 2004

Butler Item Number for the product covered under this MSDS is:
002521 – Hydrogen Peroxide USP 3% WAB 16 oz
002522 – Hydrogen Peroxide USP 3% WAB Gallon

NA = NOT APPLICABLE
NE = NOT ESTABLISHED
NL = NOT LISTED
NIF = NO INFORMATION FOUND



Health	2
Fire	0
Reactivity	0
Personal Protection	J

Material Safety Data Sheet
Potassium Permanganate Solution MSDS

Section 1: Chemical Product and Company Identification

Product Name: Potassium Permanganate Solution

Catalog Codes: SLP3259

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Potassium permanganateReagent; Water

CI#: Not available.

Synonym:

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Potassium permanganate	7722-64-7	0.09
Water	7732-18-5	99.9

Toxicological Data on Ingredients:

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
Spontaneously flammable on contact with ethylene glycol.
Potassium Permanganate being conveyed through propylene tube ignited the tube.
When solid hydroxylamine is brought into contact with solid potassium permanganate, there is produced immediately a with flame.
Potassium permanganate decomposes hydrogen trisulfide so rapidly that sufficient heat is liberated to ignite the trisulfide.
When Antimony or arsenic and solid potassium permanganate are ground together, the metals ignite.
(Potassium Permanganate crystal)

Special Remarks on Explosion Hazards:
Take care in handling as explosions may occur if it is brought in contact with organic or other readily oxidizable substances, either in solution or in dry state.
Explosive in contact with sulfuric acid or hydrogen peroxide.
Potassium permanganate + acetic acid or acetic anhydride can explode if permanganate is not kept cold.
Explosions can occur when permanganates come on contact with benzene, carbon disulfide, diethyl ether, ethyl

alcohol, petroleum, or oganic matter.
Contact with glycerol may produce explosion.
Crystals of potassium permanganate explode vigorously when ground with phosphorous.
A mixture of .5% potassium permanganate + ammonium nitrate explosive caused an explosion 7 hrs. later.
Addition of Potassium permanganate + dimethylformamide to give a 20% solution led to an explosion after 5 min.
During a preparation of chlorine by addition of the concentrated acid (Hydrochloric acid) to solid potassium permanganate, a sharp explosion occurred on one occasion.
(Potassium permanganate crystal)

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:
Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection: Splash goggles. Lab coat. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: Not applicable.

Color: Purple. (Dark.)

pH (1% soln/water): Neutral.

Boiling Point: The lowest known value is 100°C (212°F) (Water).

Melting Point: Not available.

Critical Temperature: Not available.

Specific Gravity: The only known value is 1 (Water = 1) (Water).

Vapor Pressure: The highest known value is 2.3 kPa (@ 20°C) (Water).

Vapor Density: The highest known value is 0.62 (Air = 1) (Water).

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, acetone.

Solubility: Easily soluble in cold water, hot water, methanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Not available.

Corrosivity: Not available.

Special Remarks on Reactivity:
It is a powerful oxidizing agent.
Incompatible with reducing agents, acids, formaldehyde, ammonium nitrate, dimethylformamide, glycerol, combustible materials, alcohols, arsenites, bromides, iodides, charcoal, organic substances, ferrous or mercurous salts, hypophosphites, hyposulfites, sulfites, peroxides, oxalates, ethylene glycol,
Manganese salts in air oxidize the toxic sulfur dioxide to more toxic sulfur trioxide.
Can react violently with most metal powders, ammonia, ammonium salts, phosphorous, many finely divided organic compounds (materials), flammable liquids, acids, sulfur.
(Potassium permanganate crystal)

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact.

Toxicity to Animals:
LD50: Not available.
LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant).
Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (Male and Female fertility) based on animal data.
May affect genetic material (mutagenetic) based on animal data. (Potassium permanganate)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Causes skin irritation.
Eyes: Causes eye irritation.
Inhalation: Inhalation of mist or vapor may cause respiratory tract irritation.
Ingestion: May cause digestive/gastrointestinal tract irritation with nausea, vomiting. This solution contains Potassium Permanganate which may affect respiration (hypoxia, dyspnea), cardiovascular system (hypertension, hypotension, tachycardia), liver (hepatits, jaundice, hepatocellular necrosis), blood (methemoglobinemia), urinary system (renal failure, albuminuria, hematuria, proteinuria), behavior/central nervous system(somnolence, headache, dizziness, tremor, paresthesia, fatigue)
Chronic Acute Potential Health Effects:
Ingestion: It may affect the central nervous system. It may also affect the liver and kidneys.
Skin: Repeated prolonged contact may cause dermatitis

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut carcinogen reporting list.: Potassium permanganate
Illinois toxic substances disclosure to employee act: Potassium permanganate
Illinois chemical safety act: Potassium permanganate

New York release reporting list: Potassium permanganate
Rhode Island RTK hazardous substances: Potassium permanganate
Pennsylvania RTK: Potassium permanganate
Massachusetts RTK: Potassium permanganate
Massachusetts spill list: Potassium permanganate
New Jersey: Potassium permanganate
New Jersey spill list: Potassium permanganate
Louisiana spill reporting: Potassium permanganate
California Director's List of Hazardous Substances: Potassium Permanganate
TSCA 8(b) inventory: Potassium permanganate; Water
CERCLA: Hazardous substances.: Potassium permanganate: 100 lbs. (45.36 kg);

Other Regulations: Not available.

Other Classifications:

WHMIS (Canada): CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: j

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

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Wear appropriate respirator when
ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 11:48 AM

Last Updated: 10/10/2005 11:48 AM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the

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RO[ ]": SODIUM THIOSULFATE

ORDER NO: 179380
PROD NO : 503245

ERM
171 FORBES BLVD
SUITE # 5000

MANSFIELD ,MA 02048 ,

NIVAR USA INC. (425)889-3400
100 CARILLON POINT , KIRKLAND , WA 98033

---------- EMERGENCY ASSISTANCE ----------

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

'RODUCT NAME: SODIUM THIOSULFATE

MSDS NUMBER: MZSS230

:FFECTIVE DATE: 5/22/02

SUPERSEDES: 11/21/2001

:SSUED BY: 008614

L. PRODUCT IDENTIFICATION

SYNONYMS: SODIUM THIOSULFATE, PENTAHYDRATE; THIOSULFURIC ACID,
DISODIUM SALT, PENTAHYDRATE
CAS NO: 7772-98-7 (ANHYDROUS) 10102-17-7 (PENTAHYDRATE)
MOLECULAR WEIGHT: 248.17
CHEMICAL FORMULA: NA2S2O3.5H2O

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT	CAS NO	PERCENT	HAZARDOUS
SOD..., THIOSULFATE	7772-98-7	100%	YES

RODUCT: SODIUM THIOSULFATE

ORDER NO: 179380
PROD NO : 503245

. HAZARDS IDENTIFICATION

MERGENCY OVERVIEW

AUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO
KIN, EYES, AND RESPIRATORY TRACT.

OTENTIAL HEALTH EFFECTS

NHALATION:
AY CAUSE IRRITATION TO THE RESPIRATORY TRACT. SYMPTOMS MAY INCLUDE
OUGHING AND SHORTNESS OF BREATH.

NGESTION:
OW LEVEL OF TOXICITY BY INGESTION. DIARRHEA MAY OCCUR BY INGESTION OF
ARGE QUANTITIES.

KI.. .ONTACT:
RRITATION MAY OCCUR FROM PROLONGED SKIN CONTACT.

YE CONTACT:
ONTACT MAY CAUSE MECHANICAL IRRITATION.

HRONIC EXPOSURE:
HRONIC EXPOSURE MAY CAUSE SKIN EFFECTS.

GGRAVATION OF PRE-EXISTING CONDITIONS:
O INFORMATION FOUND.

. FIRST AID MEASURES

NHALATION:
EMOVE TO FRESH AIR. GET MEDICAL ATTENTION FOR ANY BREATHING DIFFICULTY.

NGESTION:
NDUCE VOMITING IMMEDIATELY AS DIRECTED BY MEDICAL PERSONNEL. NEVER GIVE
NYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION.

KIN CONTACT:
ASH EXPOSED AREA WITH SOAP AND WATER. GET MEDICAL ADVICE IF IRRITATION
EVELOPS.

YE CONTACT:
ASH THOROUGHLY WITH RUNNING WATER. GET MEDICAL ADVICE IF IRRITATION

RODUCT: SODIUM THIOSULFATE

ORDER NO: 179380
PROD NO : 503245

EVELOPS.

. FIRE FIGHTING MEASURES

IRE:
OT CONSIDERED TO BE A FIRE HAZARD.

XPLOSION:
OT CONSIDERED TO BE AN EXPLOSION HAZARD.

IRE EXTINGUISHING MEDIA:
SE ANY MEANS SUITABLE FOR EXTINGUISHING SURROUNDING FIRE.

PECIAL INFORMATION:
SE PROTECTIVE CLOTHING AND BREATHING EQUIPMENT APPROPRIATE FOR THE
URROUNDING FIRE.

. ('IDENTAL RELEASE MEASURES

ENTILATE AREA OF LEAK OR SPILL. WEAR APPROPRIATE PERSONAL PROTECTIVE
QUIPMENT AS SPECIFIED IN SECTION 8. SPILLS: SWEEP UP AND CONTAINERIZE FOR
ECLAMATION OR DISPOSAL. VACUUMING OR WET SWEEPING MAY BE USED TO AVOID
UST DISPERSAL.

'. HANDLING AND STORAGE

EEP IN A TIGHTLY CLOSED CONTAINER, STORED IN A COOL, DRY, VENTILATED AREA.
'ROTECT AGAINST PHYSICAL DAMAGE. ISOLATE FROM INCOMPATIBLE SUBSTANCES.
ONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTY SINCE THEY RETAIN
'RODUCT RESIDUES (DUST, SOLIDS); OBSERVE ALL WARNINGS AND PRECAUTIONS
.ISTED FOR THE PRODUCT.

). EXPOSURE CONTROLS/PERSONAL PROTECTION

.IRBORNE EXPOSURE LIMITS:
ONE ESTABLISHED.

ENTILATION SYSTEM:
N GENERAL, DILUTION VENTILATION IS A SA(1SFACTORY HEALTH HAZARD CONTROL
OR THIS SUBSTANCE. HOWEVER, IF CONDITIONS OF USE CREATE DISCOMFORT TO THE
ORK"", A LOCAL EXHAUST SYSTEM SHOULD BE CONSIDERED.

'ERSONAL RESPIRATORS (NIOSH APPROVED):
OR CONDITIONS OF USE WHERE EXPOSURE TO DUST OR MIST IS APPARENT AND

RODUCT: SODIUM THIOSULFATE

ORDER NO: 179390
PROD NO : 503245

NGINEERING CONTROLS ARE NOT FEASIBLE, A PARTICULATE RESPIRATOR (NIOSH TYPE
95 OR BETTER FILTERS) MAY BE WORN. IF OIL PARTICLES (E.G. LUBRICANTS,
UTTING FLUIDS, GLYCERINE, ETC.) ARE PRESENT, USE A NIOSH TYPE R OR P
ILTER. FOR EMERGENCIES OR INSTANCES WHERE THE EXPOSURE LEVELS ARE NOT
NOWN, USE A FULL-FACE POSITIVE-PRESSURE, AIR-SUPPLIED RESPIRATOR.
ARNING: AIR-PURIFYING RESPIRATORS DO NOT PROTECT WORKERS IN
XYGEN-DEFICIENT ATMOSPHERES.

KIN PROTECTION:
EAR PROTECTIVE GLOVES AND CLEAN BODY-COVERING CLOTHING.

YE PROTECTION:
AFETY GLASSES. MAINTAIN EYE WASH FOUNTAIN AND QUICK-DRENCH FACILITIES IN
ORK AREA.

. PHYSICAL AND CHEMICAL PROPERTIES

PPEARANCE:
OW NIC, COLORLESS CRYSTALS.

ODOR:MELTING POINT:
ODORLESS.

48C (119F) LOSES WATER @ 100C (212F)

OLUBILITY:
9G/100 ML WATER @ 4C (39F)

BOILING POINT:
> 100C () 212F)

VAPOR DENSITY (AIR=1):
NO INFORMATION FOUND.

ENSITY:
.75 NO INFORMATION FOUND.

VAPOR PRESSURE (MM HG):

H: EVAPORATION RATE (BUAC=1):
O INFORMATION FOUND.

NO INFORMATION FOUND.

VOLATILES BY VOLUME @ 21C (70F):
)

0. STABILITY AND REACTIVITY

STABILITY:
STABLE UNDER ORDINARY CONDITIONS OF USE AND STORAGE. STABILITY LIMITED IN
OLUTION.

HAZARDOUS DECOMPOSITION PRODUCTS:
OXI OF SULFUR AND HYDROGEN SULFIDE.

HAZARDOUS POLYMERIZATION:
ILL NOT OCCUR.

RODUCT: SODIUM THIOSULFATE

ORDER NO: 179380
PROD NO : 503245

NCOMPATIBILITIES:
ODIUM NITRATE, HALOGENS, AND OXIDIZING AGENTS. REACTS WITH ACIDS TO
ELEASE SULFUR DIOXIDE.

ONDITIONS TO AVOID:
NCOMPATIBLES.

1. TOXICOLOGICAL INFORMATION

O LD50/LC50 INFORMATION FOUND RELATING TO NORMAL ROUTES OF OCCUPATIONAL
XPOSURE.

--------/CANCER LISTS/----------

--NTP CARCINOGEN---			
NGREDIENT	KNOWN	ANTICIPATED	IARC CATEGOR
ODIUM THIOSULFATE (7772-98-7)	NO	NO	NONE

2. ECOLOGICAL INFORMATION

NVIRONMENTAL FATE:
O INFORMATION FOUND.

NVIRONMENTAL TOXICITY:
O INFORMATION FOUND.

3. DISPOSAL CONSIDERATIONS

HATEVER CANNOT BE SAVED FOR RECOVERY OR RECYCLING SHOULD BE MANAGED IN AN
PPROPRIATE AND APPROVED WASTE DISPOSAL FACILITY. PROCESSING, USE OR
ONTAMINATION OF THIS PRODUCT MAY CHANGE THE WASTE MANAGEMENT OPTIONS.
TATE AND LOCAL DISPOSAL REGULATIONS MAY DIFFER FROM FEDERAL DISPOSAL
EGULATIONS.

ISPOSE OF CONTAINER AND UNUSED CONTENTS IN ACCORDANCE WITH FEDERAL, STATE
ND LOCAL REQUIREMENTS.

4. TRANSPORT INFORMATION

OT REGULATED.

5. REGULATORY INFORMATION

RODUCT: SODIUM THIOSULFATE

ORDER NO: 179380
PROD NO : 503245

--------/CHEMICAL INVENTORY STATUS - PART 1/----------

NGREDIENT	TSCA	EC	JAPAN	AUSTRALIA
ODIUM THIOSULFATE (7772-98-7)	YES	YES	YES	YES

--------/CHEMICAL INVENTORY STATUS - PART 2/----------

-CANADA-- NGREDIENT	KOREA	DSL	NDSL	PHIL.
ODIUM THIOSULFATE (7772-98-7)	YES	YES	NO	YES

-------/FEDERAL, STATE & INTERNATIONAL REGULATIONS - PART 1/---------

SARA 302- ------SARA 313----- NGREDIENT	RQ	TPQ	LIST	CHEMICAL CATG
ODIUM THIOSULFATE (7772-98-7)	NO	NO	NO	NO

--------/FEDERAL, STATE & INTERNATIONAL REGULATIONS - PART 2/---------

		-RCRA-	-TSCA-
NG IENT	CERCLA	261.33	8(D)
ODIUM THIOSULFATE (7772-98-7)	NO	NO	NO

HEMICAL WEAPONS CONVENTION: NO TSCA 12(B): NO CDTA: NO
ARA 311/312: ACUTE: YES CHRONIC: NO FIRE: NO PRESSURE: NO
EACTIVITY: NO (PURE / SOLID)

USTRALIAN HAZCHEM CODE: NONE ALLOCATED.
OISON SCHEDULE: NONE ALLOCATED.

MMIS: THIS MSDS HAS BEEN PREPARED ACCORDING TO THE HAZARD CRITERIA OF
HE CONTROLLED PRODUCTS REGULATIONS (CPR) AND THE MSDS CONTAINS
LL OF THE INFORMATION REQUIRED BY THE CPR.

6. OTHER INFORMATION

FPA RATINGS:
EALTH: 1 FLAMMABILITY: 0 REACTIVITY: 0

EVISION INFORMATION:
SDS SECTION(S) CHANGED SINCE LAST REVISION OF DOCUMENT INCLUDE: 3.

ODUCT: SODIUM THIOSULFATE

ORDER NO: 179380
PROD NO : 503245

FOR ADDITIONAL INFORMATION

CONTACT: MSDS COORDINATOR UNIVAR USA INC.
DURING BUSINESS HOURS, PACIFIC TIME (425)889-3400

05/11/04 15:05 PRODUCT: 503245 CUST NO: 537358 ORDER NO: 179380

NOTICE

******** UNIVAR USA INC("UNIVAR"), EXPRESSLY DISCLAIMS

LL EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A

ARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED

ER" ", AND SHALL UNDER NO CIRCUMSTANCES BE LIABLE FOR INCIDENTAL OR

ONSEQUENTIAL DAMGAGES. **

DO NOT USE INGREDIENT INFORMATION AND/OR PERCENTAGES IN THIS MSDS AS A PRODUCT SPECIFICATION. FOR PRODUCT SPECIFICATION INFORMATION REFER TO A PRODUCT SPECIFICATION SHEET AND/OR A CERTIFICATE OF ANALYSIS. THESE CAN BE OBTAINED FROM YOUR LOCAL UNIVAR SALES OFFICE.

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*** E N D O F M S D S ***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TRICHLOROETHYLENE

MSDS Number: T4940 --- *Effective Date: 09/14/00*

1. Product Identification

Synonyms: Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride
CAS No.: 79-01-6
Molecular Weight: 131.39
Chemical Formula: C2HCl3
Product Codes:
J.T. Baker: 5376, 9454, 9458, 9464, 9473, 9474
Mallinckrodt: 8598, 8600, 8633

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Trichloroethylene	79-01-6	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN

IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:
Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.

Ingestion:
Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.

Skin Contact:
Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.

Eye Contact:
Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage.

Chronic Exposure:
Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

---

5. Fire Fighting Measures

Fire:
Autoignition temperature: 420C (788F)
Flammable limits in air % by volume:
lel: 8; uel: 12.5
Explosion:
A strong ignition source, e. g., a welding torch, can produce ignition. Sealed containers may rupture when heated.
Fire Extinguishing Media:
Use water spray to keep fire exposed containers cool. If substance does ignite, use CO2, dry chemical or foam.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting

spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Trichloroethylene:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA), 200 ppm (Ceiling),
300 ppm/5min/2hr (Max)

-ACGIH Threshold Limit Value (TLV):
50 ppm (TWA) 100 ppm (STEL);
listed as A5, not suspected as a human carcinogen.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Chloroform-like odor.
Solubility:
Practically insoluble in water. Readily miscible in organic solvents.
Specific Gravity:
1.47 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
87C (189F)
Melting Point:
-73C (-99F)
Vapor Density (Air=1):
4.5
Vapor Pressure (mm Hg):
57.8 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.
Hazardous Decomposition Products:
May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.
Conditions to Avoid:
Heat, flame, ignition sources, light, moisture, incompatibles

---

11. Toxicological Information

Toxicological Data:
Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
This material has been linked to mutagenic effects in humans.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Trichloroethylene (79-01-6)	No	Yes	2A

12. Ecological Information

Environmental Fate:
When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.
Environmental Toxicity:
The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710

Packing Group: III
Information reported for product/size: 5GL

International (Water, I.M.O.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III
Information reported for product/size: 5GL

International (Air, I.C.A.O.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III
Information reported for product/size: 5GL

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Trichloroethylene (79-01-6)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
Trichloroethylene (79-01-6)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
Trichloroethylene (79-01-6)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)
Trichloroethylene (79-01-6)	100	U228	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: No information found.
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep away from heat and flame.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 8, 11.
Disclaimer:
****

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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

H J HEINZ -- DISTILLED WHITE VINEGAR

MATERIAL SAFETY DATA SHEET

NSN: 895000N048492

Manufacturer's CAGE: 73137

Part No. Indicator: A

Part Number/Trade Name: **DISTILLED WHITE VINEGAR**

General Information

Company's Name: H.J. HEINZ CO.

Company's Street: 1062 PROGRESS ST.

Company's City: PITTSBURGH

Company's State: PA

Company's Country: US

Company's Zip Code: 15212-5990

Company's Emerg Ph #: 412-237-5118

Company's Info Ph #: 412-237-5119

Record No. For Safety Entry: 001

Tot Safety Entries This Stk#: 001

Status: SMJ

Date MSDS Prepared: 13NOV92

Safety Data Review Date: 11FEB94

MSDS Serial Number: BVCGS

Hazard Characteristic Code: NK

Ingredients/Identity Information

Proprietary: NO

Ingredient: DILUTE ACETIC ACID (CH*3 COOH)

Ingredient Sequence Number: 01

NIOSH (RTECS) Number: 1010888AA

CAS Number: 8028-52-2

OSHA PEL: N/K (FP N)

ACGIH TLV: N/K (FP N)

Physical/Chemical Characteristics

Appearance And Odor: CLEAR LIQUID, ODOR OF VINEGAR

Boiling Point: 244F,118C

Vapor Pressure (MM Hg/70 F): 11 MM

Vapor Density (Air=1): 2.1

Specific Gravity: 1.01

Evaporation Rate And Ref: NOT KNOWN

Solubility In Water: COMPLETE

pH: SUPDAT

Fire and Explosion Hazard Data

Extinguishing Media: MEDIA SUITABLE FOR SURROUNDING FIRE (FP N).

Special Fire Fighting Proc: USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).

Unusual Fire And Expl Hazrds: NONE SPECIFIED BY MANUFACTURER.

Reactivity Data

Stability: YES

Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.

Materials To Avoid: NONE SPECIFIED BY MANUFACTURER.

Hazardous Decomp Products: NONE SPECIFIED BY MANUFACTURER.

Hazardous Poly Occur: NO

Conditions To Avoid (Poly): NOT RELEVANT.

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: PROLONGED INHALATION OF VAPORS CAN CAUSE IRRITATION TO RESPIRATORY TRACT. EYES:WILL CAUSE EYE IRRITATION - SMARTING AND REDDENING OF THE EYE.

Carcinogenicity - NTP: NO

Carcinogenicity - IARC: NO

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: NOT RELEVANT.

Signs/Symptoms Of Overexp: SEE HEALTH HAZARDS.

Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.

Emergency/First Aid Proc: INHAL:REMOVE TO FRESH AIR. SUPPORT BREATHING (GIVE O*2/ARTF RESP) (FP N). SKIN:FLUSH W/COPIOUS AMOUNTS OF WATER. CALL MD (FP N). EYE:FLUSH IMMEDIATELY AND THOROUGHLY WITH WATER FOR AT LEAST 15-20 MINUTES (TIMED BY A CLOCK). CALL A PHYSICIAN. INGEST:LARGE AMOUNTS, WATER

SHOULD BE CONSUMED TO DILUTE. DO NOT INDUCE VOMITING. DO NOT GIVE EMETICS OR BAKING SODA. CALL A PHYSICIAN.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: IF VINEGAR IS SPILLED, WATER MAY BE USED TO DILUTE.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Method: DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL REGULATIONS (FP N).

Precautions-Handling/Storing: NONE SPECIFIED BY MANUFACTURER.

Other Precautions: NONE SPECIFIED BY MANUFACTURER.

Control Measures

Respiratory Protection: NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).

Ventilation: NONE SPECIFIED BY MANUFACTURER.

Protective Gloves: NONE SPECIFIED BY MANUFACTURER.

Eye Protection: NONE SPECIFIED BY MANUFACTURER.

Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER.

Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.

Suppl. Safety & Health Data: PH:2.2 @ 100 GRAIN.

Transportation Data

Disposal Data

Label Data

Label Required: YES

Technical Review Date: 11FEB94

Label Date: 11FEB94

Label Status: G

Common Name: DISTILLED WHITE VINEGAR

Chronic Hazard: NO

Signal Word: CAUTION!

Acute Health Hazard-Slight: X

Contact Hazard-Slight: X

Fire Hazard-None: X

Reactivity Hazard-None: X

Special Hazard Precautions: ACUTE:INHAL/EYES:IRRITATION. CHRONIC:NONE SPECIFIED BY MANUFACTURER.

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: H.J. HEINZ CO.

Label Street: 1062 PROGRESS ST.

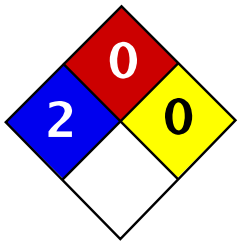
Label City: PITTSBURGH

Label State: PA

Label Zip Code: 15212-5990

Label Country: US

Label Emergency Number: 412-237-5118



Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet
Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolvel; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C2-Cl4

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP.
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS).
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:
Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 25 (ppm) from OSHA (PEL) [United States]
TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States]
TWA: 170 (mg/m3) from OSHA (PEL) [United States]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Miscible with alcohol, ether, chloroform, benzene, hexane.
It dissolves in most of the fixed and volatile oils.
Solubility in water: 0.015 g/100 ml @ 25 deg. C
It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Oxidized by strong oxidizing agents.
Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium , barium.
Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 2629 mg/kg [Rat].
Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP.
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.
May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract,

skin, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of inhalation.
Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:
Lowest Publishe Lethal Dose/Conc:
LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg
LDL [Dog] - Route: Oral; Dose: 4000 mg/kg
LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects(teratogenic).
May affect genetic material (mutagenic).
May cause cancer.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Causes skin irritation with possible dermal blistering or burns. Symtoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.
Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain.
Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorentiation, seizures, enotional instability, stupor, coma). It may cause pulmonary edema
Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation.
Chronic Potential Health Effects:
Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation.
Ingestion/Inhalation: Chronic exposure can affect the liver(hepatitis,fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/central nervous system/peripheral nervous system (impaired memory, numbness of extremeties, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fatthead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene
Connecticut hazardous material survey.: Tetrachloroethylene
Illinois toxic substances disclosure to employee act: Tetrachloroethylene
Illinois chemical safety act: Tetrachloroethylene
New York release reporting list: Tetrachloroethylene
Rhode Island RTK hazardous substances: Tetrachloroethylene
Pennsylvania RTK: Tetrachloroethylene
Minnesota: Tetrachloroethylene
Michigan critical material: Tetrachloroethylene
Massachusetts RTK: Tetrachloroethylene
Massachusetts spill list: Tetrachloroethylene
New Jersey: Tetrachloroethylene
New Jersey spill list: Tetrachloroethylene
Louisiana spill reporting: Tetrachloroethylene
California Director's List of Hazardous Substances: Tetrachloroethylene
TSCA 8(b) inventory: Tetrachloroethylene
TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97
SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene
CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R40- Possible risks of irreversible effects.
R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S23- Do not breathe gas/fumes/vapour/spray
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S37- Wear suitable gloves.
S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: g

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

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:29 PM

Last Updated: 11/06/2008 12:00 PM

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Appendix H
Air Monitoring Documentation Form

Ambient Air Monitoring Form

Project Name: Project Number: Date:

Document Routing	
FSO	Retain copy in site health & safety file.

1. Work Information

ERM Representative:	
Work Crew Members & Employers:	

2. Monitoring Details

Time	Ambient Air Monitoring Location	Results

3. Completion

Name: _____

Signature: _____

Appendix I
Emergency Drill Evaluation Form

Emergency Drill Evaluation Form

Project Name: Project Number:

Document Routing	
FSO	Retain copy in site health & safety file.

1. Basic Information

Date of the Drill: _____

Drill Facilitator: _____

Name *Signature*

2. Describe the Drill Scenario below

3. Post-drill Review

Evaluation Date: _____

a. List the Positive Attributes of the Drill below

b. List the Opportunities for Improvement below

c. List the corrective actions taken and their completion date below

Corrective Action	Assigned to…	Completion Date

Appendix J
Incident Reporting &
Investigation Form

Incident Report & Investigation Form

FOR ERM & ERM RCM MANAGEMENT INTERNAL USE ONLY
CONFIDENTIAL - WITHOUT PREJUDICE REPORT

Project Name: Project Number: Report Number:

Document Routing	
FSO	After completion to site health & safety file
Project Manager	After completion to office health & safety file

PART I: INCIDENT DATA AND SUMMARY

Instructions: FSO to complete this form within 24 hours after the occurrence of the Incident and deliver to Division H&S Leader.

FSO to verbally notify Project Manager and Division H&S Leader as soon as practicable following occurrence of the Incident. Continue verbal communication per ERM Health & Safety Management System guidance or per applicable client requirements.

If a piece of information does not apply, put N/A in the block.

1. Where did the Incident occur?

Site Name:
Site Address:
Location Within the Site:

2. When did the Incident occur?

Date: _____ Time of Day: _____

3. What were the weather conditions at the time?

Light Conditions at Incident Location	If Outdoor: ☐ Sunny ☐ Cloudy ☐ Night / Artificial Light ☐ Dawn / Dusk		If Indoor: ☐ Low Light ☐ Normal Light
Precipitation	☐ None ☐ Sleet	☐ Drizzle ☐ Snow	☐ Rain

Temperature (F) _____ Relative Humidity (%) _____ Wind Speed (mph) _____

Incident Report & Investigation Form

FOR ERM & ERM RCM MANAGEMENT INTERNAL USE ONLY
CONFIDENTIAL - WITHOUT PREJUDICE REPORT

Project Name: Project Number: Report Number:

4. Which event categories apply?

☐ Traffic-related	☐ Travel-related	☐ Falls from height	☐ Slips or trips
☐ Bodily Reaction and Exertion	☐ Equipment-operation related	☐ Aggressive and Violent Acts	☐ Fires or Explosions
☐ Impact or contact with objects or equipment	☐ Exposure to the release of chemicals, substances or environments	☐ Vandalism, theft or site control breach	☐ Electrocution

☐ Other (specify): _____

5. What type of Incident occurred?

☐ Injury	☐ Illness	☐ Property Damage

6. Who reported and witnessed the Incident?

	Name	Employer
Reported By:		
Witnessed By:		

7. Who was involved in the Incident? What happened to those individuals?

Injured	Suffered Illness	Damaged Property	Name	Employer	Date of Hire	Time Workday Began

Project Name: Project Number: Report Number:

8. What activity/task was taking place just prior to the Incident? (Describe the activity/task as well as tools, equipment and material involved that set the stage for the incident. What was the worker doing?)

9. What changed about the situation or task to cause the Incident? How did the incident happen?

10. What was the outcome of the Incident? (e.g., "Injury: 2 cm long cut to left ring finger", "Property Damage: Snapped overhead telephone cable")

11. What object or substance directly harmed the employee? (e.g., Concrete floor, chlorine, H2S, manhole cover. If this question does not apply to the incident, write N/A.)

12. What immediate actions were taken by whom in response to the Incident?

Action Taken	By…	Employer

Project Name: Project Number: Report Number:

13. If medical treatment was given away from worksite, state name and mailing address of both the facility and treating health care professional.

	Facility	Professional
Name:		
Address:		

14. If outside medical treatment was received, provide the following details:

Name	Employer	Received prescription for medication?	Treated in an emergency room?	Was employee hospitalized overnight as an in-patient?

15. If there were fatalities resulting from this Incident, provide names and the date of death.

Project Name: Project Number: Report Number:

16. Attach the report of any external investigations conducted into this Incident. Also attach any photographs or sketches that help to describe the Incident. Describe attachments below.

Completed by…

Name: _____

Signature: _____

Project Role: _____

Date: _____

Project Name: Project Number: Report Number:

PART II: CAUSES AND PLANS TO PREVENT RECURRENCE

Instructions: Division H&S Leader to lead effort to complete Part II of this form with cooperation of Field Safety Officer, Project Manager, and appropriate site personnel

17. Actions leading to Incident. Check all that apply and explain.

☐ Failure to observe warning	☐ Failure to use PPE	☐ Failure to warn
☐ Delayed discovery	☐ Procedure not followed	☐ Abuse / misuse of equip.
☐ Lack of site awareness		
☐ Other: _____		

Explanation:

18. Conditions leading to Incident. Check all that apply and explain.

☐ Temperature / weather	☐ Inadequate maintenance	☐ Nature (animals, plants)
☐ Time pressure / constraints	☐ Improper design / engin.	☐ Construction deficiencies
☐ Other: _____		

Explanation:

19. Job factors leading to Incident. Check all that apply and explain.

☐ Leadership / supervision	☐ Lack of / inadequate PPE	☐ Inadequate inspections
☐ Inadequate communication	☐ Inadequate training	☐ Improper / defective tools / equip.
☐ Inadequate work procedures / practices		
☐ Other: _____		

Explanation:

Project Name: Project Number: Report Number:

20. Personnel factors leading to Incident. Check all that apply and explain.

☐ Physical capability	☐ Physical stress / fatigue	☐ Mental stress
☐ Knowledge of task	☐ Employee skills	☐ Attention to details
☐ Other: _____		

Explanation:

21. Event Principal(s)

☐ ERM or RCM	☐ Subcontractor	☐ Third Party

22. What were the corrective actions taken, by whom, and when were they completed?

Corrective Action	Assigned to…	Completion Date

23. Was this Incident recordable/reportable under any governmental requirement?

☐ Yes Determined By: _____

☐ No Project Role: _____

Part II Completed by…

Name: _____

Signature: _____

Project Role: _____

Date: _____

Appendix K
Daily Safety Meeting
Documentation Form

Daily Safety Meeting Documentation Form

Project Name: Project Number: Meeting Date & Time: Meeting Leader:

Document Routing	
FSO	Retain copy in site health & safety file.

What work will be conducted on site today and by whom?

Work Task	Conducted By

What overlapping operations/simultaneous operations will occur today?

Any follow-up from previous Major Incidents, Near Misses, Unsafe Acts or Unsafe Conditions discussed today?

List any new / short-service personnel on site today?

Safety Meeting Core Topics – All Site Workers *and* Visitors

- ☐ What PPE is required in order to enter the work zone?
- ☐ What are the potential hazards associated with today's work. How will they be managed?
- ☐ What are the potential impacts of planned activities to: Visitors? Nearby workers? Public?
- ☐ Is everyone aware that they are empowered to stop work if something is questionable or unsafe?
- ☐ What happens and who do you contact if there is an injury or emergency? If working at an active facility, how will you be alerted of an emergency and what will you do?
- ☐ Who do you contact if you have questions, or before deviating from written procedures?
- ☐ Where is fire extinguisher, first aid kit, eyewash, safety shower located?
- ☐ Are any work permits required? Are permits completed and posted in plain view of workers?
- ☐ Have all excavation / borehole locations been cleared of underground utilities/structures, in accordance with ERM and client-specific subsurface clearance procedures?
- ☐ Have all tools / equipment / vehicles been inspected today to ensure safe operating condition?
- ☐ Will a follow-up safety meeting be conducted after lunch?
- ☐ Has anything unexpected or out-of-the-ordinary occurred on this job recently to share?
- ☐ What is the worst that could happen if something goes wrong today?

Daily Safety Meeting Documentation Form

Project Name:
Project Number:
Meeting Date & Time:
Meeting Leader:

Who attended the safety meeting today (employees, subcontractors, visitors)?

Name	Company	Signature	Sign-In Initials*	Sign-Out Initials**

* Employee initials in this space verify that the employee is fit for performing work.
**Employee initials in this space verify that the employee was uninjured during the workday.

Who visited the site today but was not involved in work activities?

Name	Company	Arrival Time

Meeting documented by…

Name: _____

Signature: _____