ConocoPhillips

76 Broadway
Sacramento, California 95818

November 3, 2005

Mr. Don Hwang
Alameda County Health Agency
1131 Harbor Bay Parkway
Alameda, California 94502

Re: **Report Transmittal**
Additional Groundwater Investigation Work Plan - Revised
76 Service Station# 4625
3070 Fruitvale Avenue
Oakland, CA

Dear Mr. Hwang:

I declare under penalty of perjury that to the best of my knowledge the information and/or recommendations contained in the attached report is/are true and correct.

If you have any questions or need additional information, please contact

Shelby S. Lathrop (Contractor)
ConocoPhillips
Risk Management & Remediation
76 Broadway
Sacramento, CA 95818
Phone: 916-558-7609
Fax: 916-558-7639

Sincerely,

Thomas Kosel
Risk Management & Remediation

Attachment

TRC

Customer-Focused Solutions

November 3, 2005 TRC Project No. 42-0145-02

Mr. Don Hwang
Hazardous Materials Specialist
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

SITE: 76 STATION NO. 4625
3070 FRUITVALE AVENUE
OAKLAND, CALIFORNIA

RE: ADDITIONAL GROUNDWATER INVESTIGATION WORK PLAN - REVISED

Dear Mr. Hwang:

On behalf of ConocoPhillips Company (ConocoPhillips), TRC submits this revised work plan for additional groundwater investigation at 76 Station No. 4625, located at 3070 Fruitvale Avenue in Oakland, California (Figure 1). This work is being performed pursuant to a request by the Alameda County Health Care Services (ACHCS) to ConocoPhillips, in a letter dated February 9, 2005 and has been modified based on comments received from the ACHCS during an October 19, 2005 meeting.

1.0 PROJECT OBJECTIVES AND SCOPE OF WORK

The objectives of this assessment are: 1) to further characterize the downgradient extent of dissolved-phase hydrocarbons in the shallow water-bearing zone offsite; and 2) to assess the potential impacts to deeper water-bearing zones beneath the site, if present.

The scope of work for this assessment includes the following:

- Advance two onsite deep exploratory borings to evaluate the presence of deeper water-bearing zones and collect depth-discrete grab groundwater samples using a Cone Penetrometer Testing (CPT) rig equipped with a hydropunch sampling device.
- Advance seven offsite exploratory borings to determine the lateral distribution of dissolved-phase hydrocarbons in the shallow water-bearing zone and to collect depth-discrete grab groundwater samples from any deeper water-bearing zone identified in the two onsite borings.
- Collection of depth-discrete grab groundwater samples for analysis at a state-certified laboratory on a 24-hour turn around time.
- Installation of up to three offsite monitoring wells along the west side of Fruitvale Avenue and, if necessary, up to two onsite groundwater monitoring wells.

1590 Solano Way, Suite A • Concord, California 94520
Telephone 925-688-1200 • Fax 925-688-0388

The exact location and screen interval for each monitoring well will be based on analytical results from the depth-discrete groundwater data collected during the hydropunch investigation and those locations and well construction will be confirmed with the ACHCS prior to rig mobilization. Results of this phase of drilling may indicate additional work is required to fully delineate the lateral and vertical extent of the dissolved gasoline plume. Subsequent work will be discussed with the ACHCS in the framework of a Site Conceptual Model.

- Collection of groundwater samples from the newly installed monitoring wells for analysis at a state-certified laboratory.
- Preparation of a final technical report documenting soil boring and well installation and development activities, groundwater sampling procedures, laboratory results, waste characterization, and disposal.

2.0 SITE DESCRIPTION

The site is an operating service station located on the southeast corner of Fruitvale Avenue and School Street in Oakland, California (Figure 2). The current site facilities include a station building with two automotive service bays equipped with hydraulic lifts, four dispenser islands and two canopies, two 12,000-gallon double-wall fiberglass gasoline underground storage tanks (USTs), and one above ground waste-oil tank. Six groundwater monitoring wells and one UST observation well are present at the site.

2.1 Geology and Hydrogeology

The site is located on the western flank of the Oakland Hills in an area underlain by Holocene age alluvium. The alluvial deposits are composed of unconsolidated, moderately sorted, permeable silt with coarse sand and gravel. The northwest trending Hayward fault is located approximately 1,500 feet northeast of the site (Helley, 1979). The nearest surface waters are Sausal Creek, located approximately 500 feet west of the site, and Peralta Creek, located 2,300 feet southeast of the site. Additionally, East Bay Municipal Utility District's Central Reservoir is located approximately 1,300 feet west of the site.

In general, subsurface soils are composed of clay and silt to depths of approximately 9 to 19 feet below ground surface (fbg), underlain by gravel with varying amounts of clay and sand to depths of approximately 18 to 22 fbg, which in turn is underlain by clay and silt to 25 fbg, the maximum depth explored. The exception was well boring MW-1, in which only clay was encountered to 25 fbg (Gettler-Ryan Inc., 2003).

3.0 SITE BACKGROUND

The site is currently an active service station located on the southeast corner of Fruitvale Avenue and School Street in Oakland, California.

April/May 1998: The gasoline underground storage tanks (USTs), product piping and dispensers were removed and replaced. Concentrations of total petroleum hydrocarbons as gasoline (TPH-g), benzene, and methyl tertiary butyl ether (MTBE) ranged from non-detect to moderate.

May 1998: A waste oil UST and associated piping was removed. Concentrations of TPH-g, benzene, total petroleum hydrocarbons as diesel (TPH-d), total oil and grease (TOG), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals ranged from non-detect to moderate.

A total of approximately 1,166 tons of soil were over excavated and transported from the site to Allied Waste's Forward Landfill in Manteca, California. Additionally, 40,000 gallons of groundwater were pumped from the UST pit and transported to the Tosco Refinery in Rodeo, California for disposal. A conductor casing was installed in the backfill during installation of the replacement gasoline USTs. The waste oil tank was replaced with an aboveground tank.

April 2000: Four monitoring wells were installed at the site.

May 2003: Two monitoring wells were installed to a depth of 25 feet below grade (fbg) and two exploratory borings were advanced to approximately 15 fbg. Soil samples contained concentrations of benzene, MTBE, and tertiary butyl alcohol (TBA), and TPH-g. Grab groundwater samples collected from the two soil borings were reported to contain elevated concentrations of petroleum hydrocarbons in both samples.

October 2003: Site environmental consulting responsibilities were transferred to TRC.

4.0 SITE ASSESSMENT ACTIVITIES

TRC proposes to advance two onsite borings and seven offsite borings to evaluate the lateral and vertical extent of the dissolved-phase hydrocarbon plume onsite.

Two deep exploratory borings will be advanced onsite to evaluate the presence of deeper water-bearing zones and collect depth-discrete grab groundwater samples using a CPT rig equipped with a hydropunch sampling device. The hydropunch will be advanced so as to ensure that depth-discrete, representative samples are collected, without any cross-contamination from shallower depths. Proposed depth of drilling will be to 50 feet below grade. If this sampling depth does not identify the base of the dissolved gasoline plume, additional borings may be proposed to greater depths to further assess the vertical extent of the plume. Based on the analytical results from the depth-discrete groundwater samples collected from the two deep exploratory borings, discrete-screen-interval monitoring wells may be proposed during this phase and subsequent phases of drilling to provide long-term data on intermediate-depth and base of plume groundwater conditions.

Seven offsite exploratory borings will be advanced to determine the lateral distribution of dissolved-phase hydrocarbons in the shallow water-bearing zone and to collect depth-discrete

grab groundwater samples from any deeper water-bearing zone identified in the two onsite borings. Sampling methodology will be the same as that proposed for the two deep onsite borings. The proposed boring locations are shown in Figure 2. The west-southwest groundwater flow direction is based on historical groundwater elevation data collected since the beginning of 2002 and is shown graphically on Figure 3.

Upon receipt of analytical data form the hydropunch survey, TRC will determine appropriate well locations and construction details and present the proposed wells with analytical results to the ACHCS for review and approval prior to mobilization to the field.

4.1 Preferential pathways

In July 2000, Alameda County conducted a ½ mile radius well search in the site vicinity. The well search did not identify any municipal, industrial, or domestic water wells in the search area. One irrigation well was identified approximately 1,700 feet south-southeast of the site. It is unknown whether the irrigation well is currently active (Gettler-Ryan Inc., 2001).

Groundwater flow and plume migration is most likely to occur in the most conductive zone. The most conductive zone at the site is the gravel layer with varying amounts of clay and sand which lies at varying depths of between 9 to approximately 18 to 22 fbg.

Underground utilities at the site include sewer/storm water, product piping, and water pipes. Product and water pipes are located in the down gradient groundwater flow direction only. Product piping is confined to the site and is an unlikely conduit for hydrocarbon migration. Water pipes extend offsite and trend in the down gradient direction. Depth to groundwater at the site during quarterly monitoring activities has historically approximated around 10 fbg. Since underground utilities are typically buried within the first five feet, there is a low probability of underground utilities acting as preferential pathways.

4.2 Pre-Field Activities

Prior to commencing boring and well installation activities, drilling and encroachment permits will be acquired from the Alameda County Public Works Agency and City of Oakland.

Underground Service Alert (USA) will be notified at least two days prior to field activities to mark underground utilities at the proposed boring locations and around the property boundaries. In addition, a private utility locator will be contracted to confirm the absence of buried utilities at each proposed boring/well location. Prior to advancing each boring, a pilot hole will be cleared with an air knife to approximately 5 fbg to verify the absence of buried utilities.

A site and job specific health and safety plan that promotes personnel safety and preparedness during the planned activities has been developed and is included in Appendix A. On the morning of the day that the field activities are to commence, a "tailgate" meeting will be conducted with all exclusion zone workers to discuss the health and safety issues and concerns

related to the specific work.

4.3 Hydropunch Survey

A hydropunch survey will be conducted to determine the lateral and vertical distribution of dissolved-phase hydrocarbons in groundwater both onsite and downgradient of the site, along the west side of Fruitvale Avenue. Two onsite borings (CPT-1 and CPT-2) and seven offsite borings (CPT-3 through CPT-9) will be advanced to sufficient depth to determine if a deeper water-bearing zone exists below the shallow zone currently monitored in onsite wells.

The borings will be advanced using a CPT rig. The locations of the proposed borings are shown on Figure 2. The proposed locations may be adjusted based on offsite access considerations and the location of buried utilities and overhead power lines. In order to obtain depth-discrete groundwater samples, each boring location will have at least two separate co-located borings.

The first boring at each location will be advanced to total depth to determine soil behavior type using the integrated electronic cone system of the CPT rig. Data obtained from the initial logging run will then be used to identify potential water-bearing horizons for subsequent hydropunch groundwater sampling. Subsequent co-located borings will be advanced to the desired depths determined from analysis of the stratigraphic soil behavior logs.

A depth-discrete grab groundwater sample will be collected from each of the two onsite borings. The hydropunch sample will be collected from any deeper water-bearing zone identified during the initial logging run. If no deeper water-bearing zone is encountered, the borings will be terminated at a total depth of 50 fbg and an attempt will be made to collect a hydropunch sample at total depth by waiting a maximum of one hour for recharge to occur.

Depth-discrete grab groundwater samples will be collected using a hydropunch sampling device. The hydropunch consists of a stainless steel probe, which is advanced into the water-yielding zone then withdrawn to expose an internal screen. Groundwater will be collected from inside the screen using a clean new disposable bailer and placed in appropriate sample bottles. The groundwater and soil samples will be placed in an ice-chilled cooler and transported to a state-certified analytical laboratory under proper chain-of-custody protocol. The laboratory will analyze the samples for total purgeable petroleum hydrocarbons (TPPH), BTEX, and fuel oxygenates including MTBE and ethanol by Method 8260B on a 24-hour turn around time.

After sampling is completed, all borings will be properly sealed with neat cement grout. A tremie pipe will be used to place the grout from the bottom of the boring to grade level in one continuous pour.

4.4 Monitoring Wells

Based on the analytical results from the hydropunch survey, TRC may recommend installation of two onsite wells (MW-7 and MW-8) and up to three offsite groundwater-monitoring wells (MW-9,

MW-10, and MW-11) using a hollow-stem auger drilling rig. The offsite wells will be located along the west side of Fruitvale Avenue, and the onsite wells, if installed, will be located as shown in the Figures. The depth and screen interval for each well will be based on the results of the hydropunch survey and will be confirmed by the ACHCS prior to rig mobilization.

Continuous soil logging will be conducted during the well installations to confirm lithologic interpretations from the integrated electronic cone system of the CPT rig. The additional lithologic data will provide a detailed identification of the subsurface lithology and hydrostratigraphy and will be used to determine the appropriate screen intervals for the three monitoring wells. No soil samples will be submitted for analysis unless obvious evidence of hydrocarbon impacts in the vadose zone is observed.

The proposed monitoring wells will be constructed of 2-inch diameter polyvinyl chloride (PVC) blank (riser) and slotted screen (0.020). The well screen interval will be determined from lithologic data collected from the exploratory borings. The screen formation annulus will be filled with an appropriate filter pack material. The riser formation annulus will be properly sealed with hydrated bentonite chips and cement grout. The wellhead will be sealed with a watertight, lockable well cap. A flush-mounted, watertight, traffic-rated well box will be installed over the wellhead.

After a minimum of 72 hours from the time of the well installation, the well will be developed (surged and bailed) to improve hydraulic communication between the geologic formation and the well. A wellhead reference point, typically a notch cut into the top of the well casing, will be surveyed relative to the surrounding site wells and the nearest benchmark. Future depth to groundwater measurements will be made from the wellhead reference point. Additional monitoring well installation procedures that will be followed are included in Appendix B.

4.5 Groundwater Monitoring and Sampling

Fluid level measurements and groundwater sampling will be conducted no sooner than 48 hours after development of the wells. Fluid levels will be measured relative to the top of the casing with a precision of 0.01 feet. The presence and thickness of free phase product will also be assessed in each well during groundwater monitoring and sampling.

Following fluid level gauging, the wells will be purged and sampled. A groundwater sample will be collected from the wells using a clean new disposable PVC bailer following standard sampling procedures outlined in Appendix B. The groundwater samples will be appropriately preserved and submitted to a state-certified laboratory for analysis. Chain-of-Custody protocol will be followed, providing a continuous record of sample possession prior to analysis. The laboratory will analyze the groundwater samples for TPPH, BTEX, fuel oxygenates including MTBE, ethanol, and lead scavengers by EPA Method 8260B.

4.6 Waste Disposal

Soil cuttings and water generated during site assessment activities will be temporally stored onsite in Department of Transportation (DOT)-approved 55-gallon drums pending disposal to an approved disposal/recycling facility. Waste manifests will be prepared for proper transport and disposal of the waste.

4.7 Site Assessment Report

Upon completion of the site assessment activities, a final report will be prepared which will include the CPT logs, boring logs and well construction details, laboratory analytical results, findings, and conclusions. The report will be submitted to the ACHCS within six weeks of the completion of the field activities.

5.0 WORK SCHEDULE

Planned activities will be performed according to the following estimated completion schedule:

- Agency approval of work plan expected within four weeks of submittal.
- Conduct hydropunch survey within four weeks of receipt of the offsite encroachment permits.
- Submit analytical results of the hydropunch survey and a site plan showing final proposed monitoring well locations to the ACHCS for review prior to their installation.
- Agency review of revised proposed well locations expected within one week of submittal.
- Install monitoring wells within two weeks of obtaining agency approval of proposed well locations.
- Submit technical report within six weeks of completion of field activities.

6.0 REFERENCES

Gettler-Ryan Inc., 2001, Site Information Summary and Request For Closure for 76 Service Station No. 4625, 3070 Fruitvale Avenue, Oakland, California. August 21, 2001.

Gettler-Ryan Inc., 2003, Work Plan for Limited Subsurface Investigation, 76 Service Station No. 4625, 3070 Fruitvale Avenue, Oakland, California. July 23, 2003.

Helley, E. J. and K. R. Lajoie, 1979, Flatland Deposits of the San Francisco Bay Region, California - Their Geology and Engineering Properties, and Their Importance to Comprehensive Planning: U.S. Geological Survey Professional Paper 943.

7.0 LIST OF ATTACHMENTS

Figure 1: Vicinity Map
Figure 2: Site Plan Showing Proposed Boring and Well Locations
Figure 3: Historical Groundwater Flow Directions

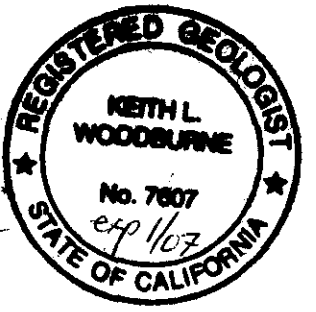
Appendix A: Site Health and Safety Plan
Appendix B: General Field Procedures

If you have any questions regarding this work plan, please call Keith Woodburne at (925) 688-2488.

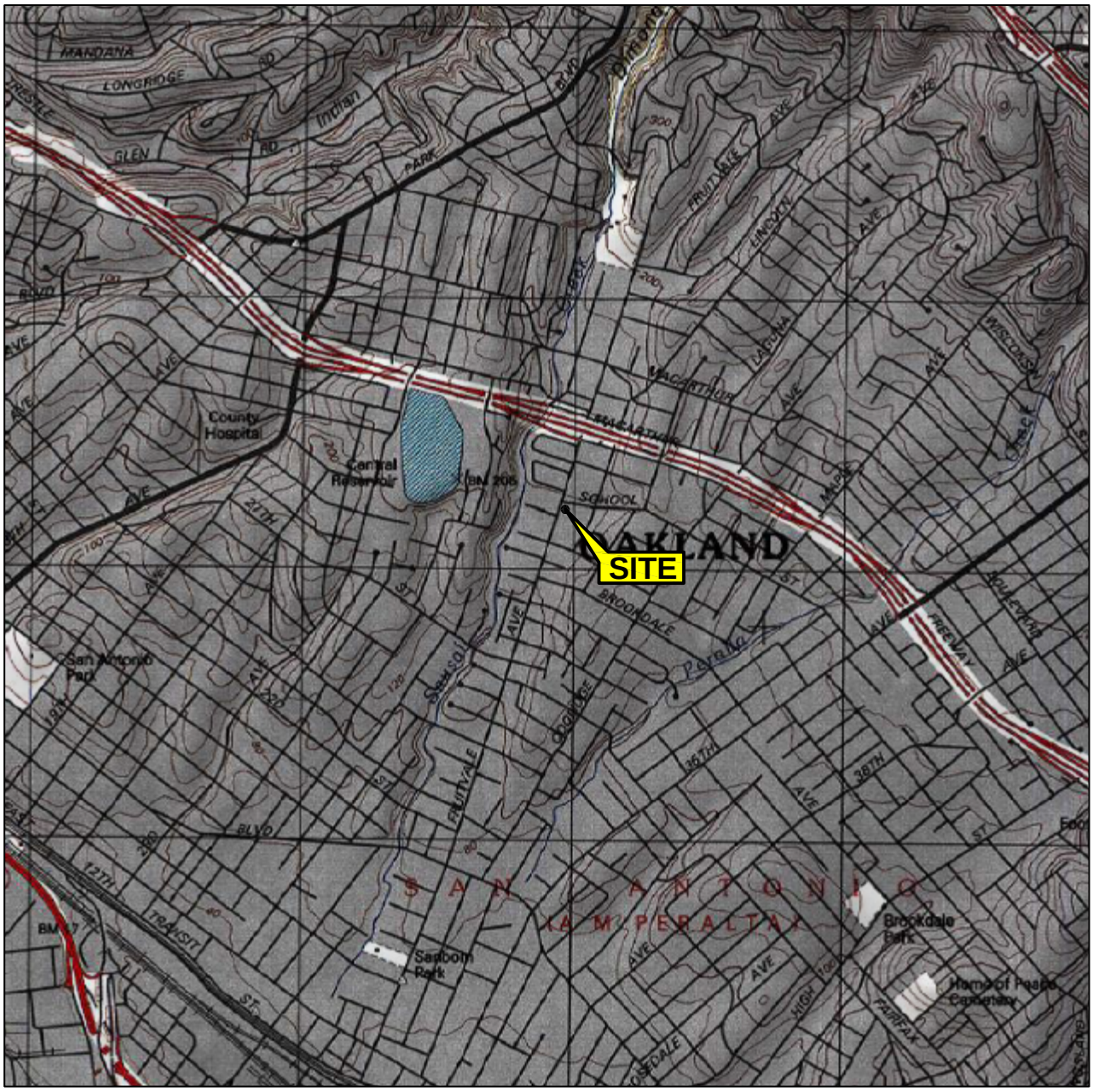
Sincerely,
TRC

Rachelle Dunn
Staff Geologist

Keith Woodburne, P.G.
Senior Project Geologist



cc: Shelby Lathrop, ConocoPhillips (electronic upload only)



1 MILE 3/4 1/2 1/4 0 1 MILE

SCALE 1 : 24,000

N

SOURCE:

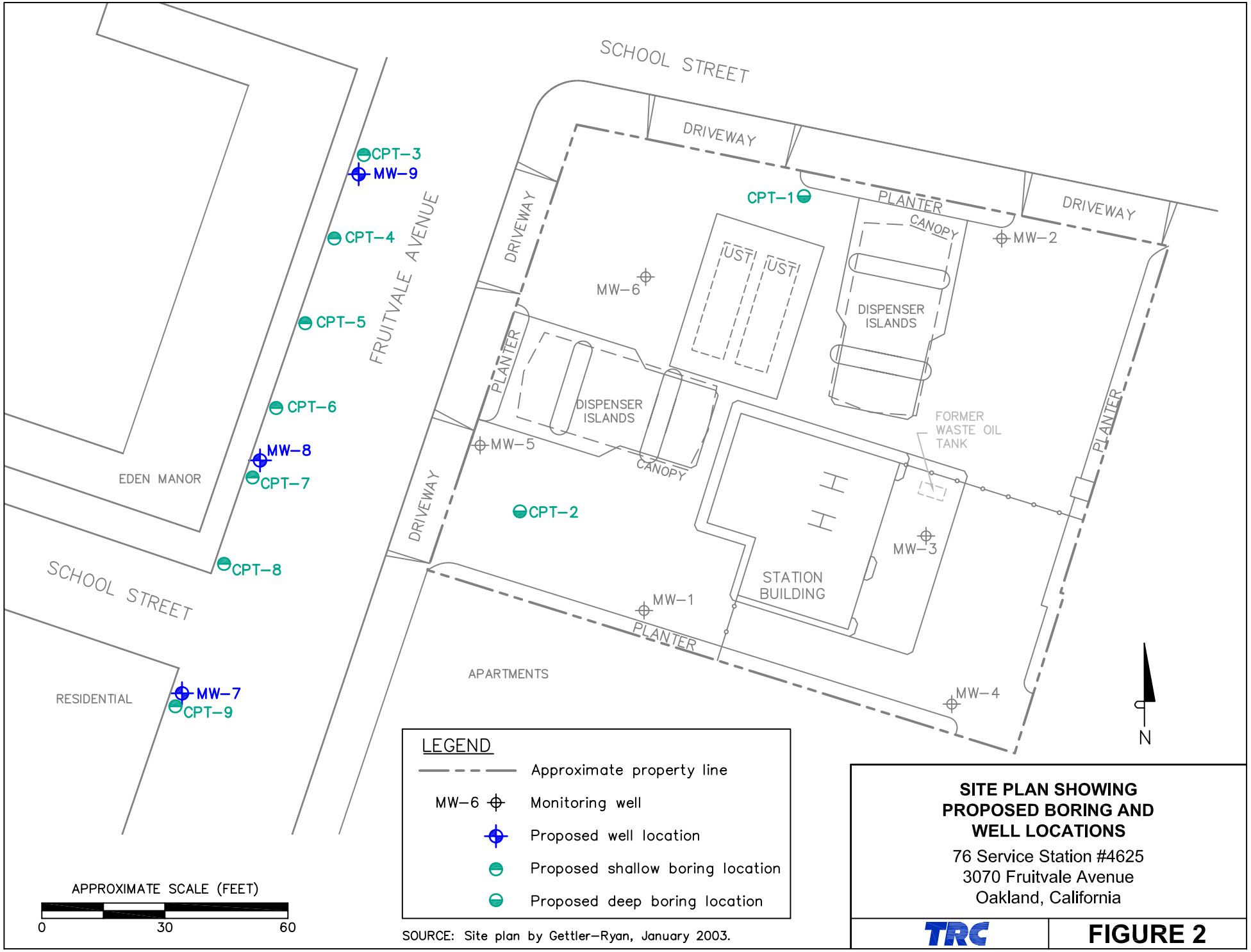
United States Geological Survey
7.5 Minute Topographic Maps:
Oakland East Quadrangle
California

VICINITY MAP

76 Service Station #4625
3070 Fruitvale Avenue
Oakland, California

TRC

FIGURE 1



SOURCE: Site plan by Gettler–Ryan, January 2003.

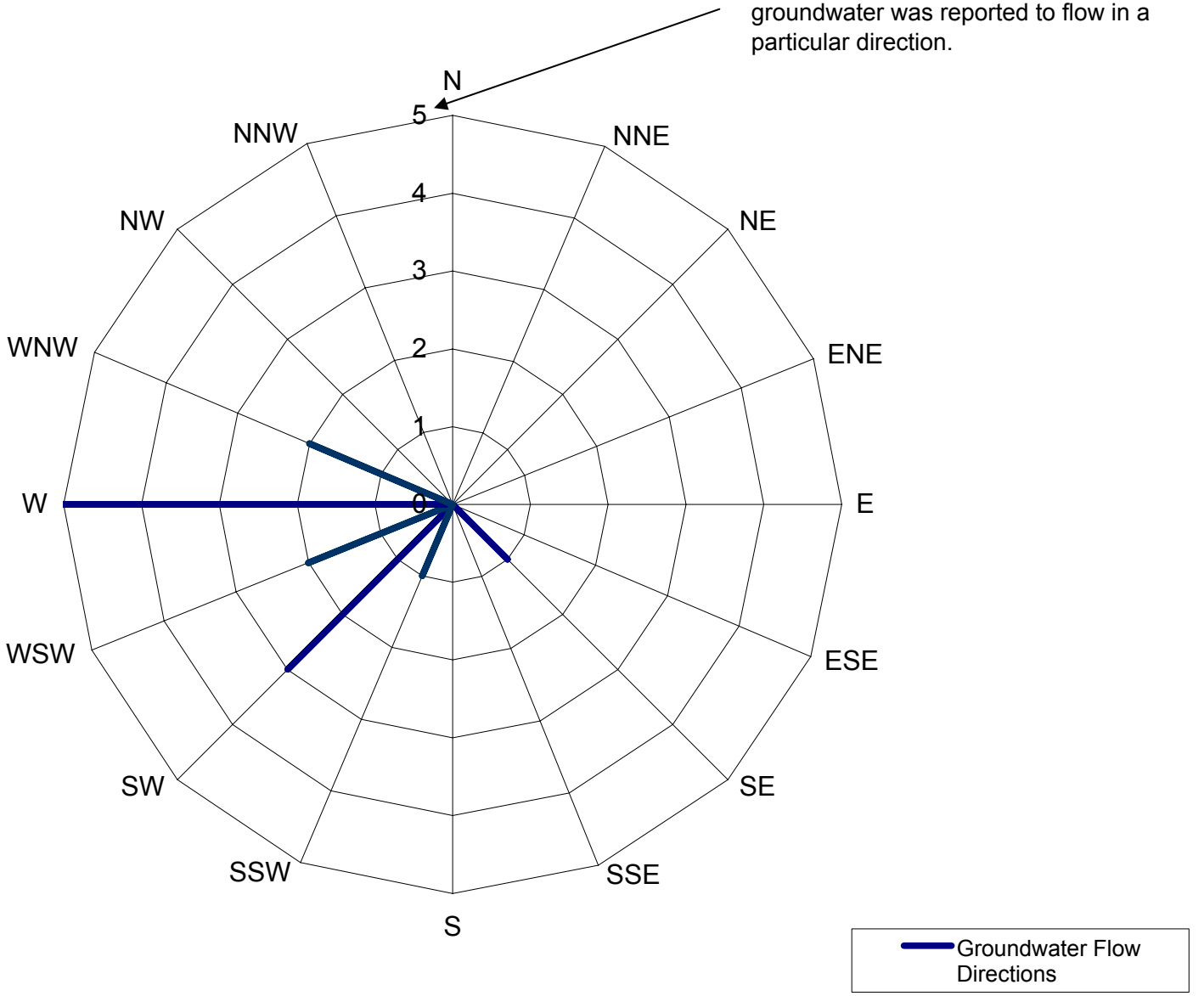
SITE PLAN SHOWING PROPOSED BORING AND WELL LOCATIONS

76 Service Station #4625
3070 Fruitvale Avenue
Oakland, California

TRC

FIGURE 2

Historical Groundwater Flow Directions
for 76 Service Station No. 4625
Data from 2002 through 2004



TRC

FIGURE 3

SITE SPECIFIC
HEALTH & SAFETY PLAN

76 SERVICE STATION #4625
3070 Fruitvale Avenue
Oakland, California

Site Specific Health & Safety Plan (HSP)
Project Name/Site Number: 76 Service Station # 4625
Date of HSP Initial Preparation / Revision : 10/26/05

TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

TABLES

TABLE OF CONTENTS (cont.)

ATTACHMENTS

Site Specific Health & Safety Plan (HSP)
Project Name/Site Number: 76 Service Station # 4625
Date of HSP Initial Preparation / Revision : 10/26/05

SITE SPECIFIC HEALTH AND SAFETY PLAN (HSP)

76 Service Station #4625
3070 Fruitvale Avenue
Oakland, California

1.0 INTRODUCTION

The purpose of this Health & Safety Plan (HSP) is to establish responsibilities, procedures and contingencies for the protection of TRC employees, contractors, visitors and the public while performing activities at the 76 Service Station #4625 site. This site-specific HSP is to be implemented in conjunction with TRC Solutions, Inc (TRC) Health and Safety Programs, including the Injury and Illness Prevention Program (IIPP) and Hazard Communication Program.

The use of proper health and safety procedures in accordance with applicable OSHA regulations shall be required during site work. The procedures presented in this HSP are intended to serve as guidelines. They are not a substitute for sound judgment by site personnel.

1.1 KEY COMPANIES INVOLVED IN PROJECT

CUSTOMER OR CLIENT:	ConocoPhillips
DESIGN ENGINEER:	TRC
CONTRACTOR:	TRC ☐ NA
SUBCONTRACTOR:	Gregg Drilling, Woodward Drilling ☐ NA

TRC, Gregg drilling, and Woodward Drilling have also prepared an HSP(s) for the Drilling activities. Their HSP(s) supplements TRC's HSP. A copy of their HSP(s) is/are included in **Attachment G**.

1.2 SCOPE OF WORK

The proposed work will be performed by TRC, Gregg drilling, and Woodward Drilling and will include but may not be limited to the following activities:

- *Hand clear all boring locations to 5 feet to ensure not to hit underground utilities using an air or water knife.*
- *After borings have been hand cleared, drill nine bore holes using a CPT rig to total approximate depths varying from 25 feet below grade (fbg) to 50 fbg.*
- *Collect groundwater and soil samples.*

- *Seal sample boings with grout.*
- *After borings have been hand cleared, drill three bore holes using a drill rig to total approximate depths of 25 fbg.*
- *Install monitoring wells using drill rig, sand dolly, mixer, and pump.*
- *Well development using a development rig.*
- *Site clean-up.*

2.0 SITE INFORMATION

This HSP considers the physical, chemical, and biological hazards that may be encountered during work activities at the site. Operations associated with this HSP will be conducted in accordance with the scope of work and approved design drawings/specifications.

Summary information for this project is provided in the following table:

Table 1: Site Information

Anticipated Work Period: Site description (see Attachment A for site map):	Unknown Active automobile service station
Approximate depth to groundwater:	5-10 feet
Contaminants of concern (see Attachment B):	Gasoline, BTEX, and MTBE in Soil and Groundwater.

3.0 ROLES & RESPONSIBILITIES

Contact information and names of key project personnel are listed below. A description of their responsibilities follows.

Table 2: Key Project Personnel and Contact Information

Role	Name	Contact Information
TRC Personnel		
TRC Project Manager/Supervisor	Keith Woodburne	Office: (925) 688-2488 Cell: (925) 260-1373
TRC Site Safety Officer (SSO)	Rachelle Dunn	Office: (925) 688-2464 Cell: (925) 260-6722
TRC Assistant Site Safety Officer (Assistant SSO)	Mike Sellwood	Office: 9925) 688-2468 Cell: (925) 260-3654
Contractor/Subcontractor Personnel		☐ NA
☐ Contractor / ☒ Subcontractor Company Name: Gregg Drilling		
Site Safety Officer (SSO)	XX	Office: Cell:
Assistant Site Safety Officer (SSO)	XX	Office: Cell:
☐ Contractor / ☒ Subcontractor Company Name: Woodward Drilling		
Site Safety Officer (SSO)	XX	Office: Cell:
Assistant Site Safety Officer (SSO)	XX	Office: Cell:

TRC Site Safety Officer or Assistant Safety Officer must report all site incidents immediately to the TRC Project Manager

TRC PM/Supervisor must report all incidents INVOLVING PERSONAL INJURY immediately to:		
TRC Human Resources Manager	Jenny Rue	(949) 341-7436 – office (949) 337-2625 - cell
TRC PM/Supervisor must report all incidents NOT INVOLVING PERSONAL INJURY within 24 hours to:		
TRC EHS Supervisor	Greg Burket	(949) 341-7403 – office (949) 283-4313 - cell

3.1 TRC Project Manager/Supervisor

- Overall responsibility for development of a complete and accurate HSP. The HSP shall account for all foreseeable hazards.
- Responsible for the management and technical direction of all aspects of the project.
- Ensure the completion of periodic site inspections.
- Conduct incident investigations.
- Delegate responsibility for field implementation of the HSP to TRC Site Safety Officer.

3.2 Site Safety Officers (SSO) – TRC & Contractor Personnel

- Responsible for the daily implementation of the HSP.
- Ensures HSP is available onsite and that the plan is understood and signed by all personnel entering the site. (See **Attachment F** "Safety Compliance Agreement").
- Conducts (or coordinates the completion of) Tailgate Safety Meetings and ensures documentation of these meeting is available for review.
- Uses JSAs to emphasize hazards and protective measures discussed in the HSP.
- Communicates any revisions to the scope of work or HSP to affected personnel and Project Manager/Supervisor.
- Implements emergency response procedures.

3.3 Assistant Site Safety Officer (Asst SSO) – TRC & Contractor Personnel

- In the event the SSO is not on site, the Assistant SSO will assume the responsibilities of the SSO.
- It is TRC's intent to have a TRC SSO or Assistant SSO available onsite during work activities. On the occasion neither person are physically onsite, they will be available by phone or pager. See "Table 2: Key Project Personnel and Contact Information".

3.4 TRC Employees

- Responsible for understanding and complying with this HSP, including the JSAs.
- Are required to participate in Tailgate Safety Meetings prior to commencement of site work.
- Must acknowledge an understanding of the HSP by signing the "Safety Compliance Agreement" (See **Attachment F**).

3.5 Contractors & Subcontractors

A copy of the HSP will be made available to each designated Contractor/Subcontractor (from now on to be referred to "Contractors") Site Health and Safety Officer (SSO) prior to coming to the site. Upon review or briefing of the HSP, each contractor and their personnel working at the

site will be required to sign the "Safety Compliance Agreement" (See Appendix F) to verify their understanding and willingness to comply with the HSP.

TRC hires Contractors to apply their technical expertise to specific work tasks (i.e. construction, drilling, grading and heavy equipment operation/maintenance). Although TRC has a certain level of knowledge in these areas, the contractor is most knowledgeable of the hazards within their particular area of expertise and is in the best position to implement and monitor an effective H&S program. Contractors are required to follow and operate within their company's health and safety program and policies. TRC will exercise reasonable care to prevent and detect safety violations on the site. However, direct supervision of contractor employee safety is the responsibility of the contractor.

Contractors are to designate a company representative as their own Site Safety Officer and, if applicable, Assistant Safety Officer. This individual shall monitor the contractor's employees and ensure that safe working procedures are being followed. The Site Safety Officer and, if applicable, Assistant Safety Officer shall be identified to the TRC in writing, either by email, letter or by having the individual sign and provide contact information on "Safety Compliance Agreement" (See **Attachment F**).

Contractors are to:

- Provide a copy of their HSP to the TRC SSO or Project Manager/Supervisor before work commences.
- Provide safety equipment and personal protective equipment for their employees.
- Ensure their equipment is in proper working order and their employees are trained and medically fit to complete the work assigned to them.
- Upon request, provide evidence that personnel working at the site have received the necessary training, certifications and, if applicable, medical surveillance.

The Contractor must inform the TRC SSO if the risks associated with a particular task exceeds day-to-day safety requirements and necessitate additional safety precautions to protect the employees performing the particular task. In such cases, TRC may dictate that additional safety precautions be implemented. In the event a discrepancy arises between contractor safety procedures and those of TRC, the more stringent is to be implemented.

3.6 Visitors / Regulatory Agents

- Visitors / regulatory agents will be provided an overview of the basic site safety information. A copy of this HSP will be made available for review.
- All visitors / regulatory agents are required to sign-in on "Safety Compliance Agreement" (See **Attachment F**) each time they enter the project site.
- Visitors / regulatory agents should be escorted by a TRC or designated contractor employee and should not be allowed to move about the site alone.

4.0 COMMUNICATION

Communication is an important aspect of project safety and this HSP. There are several processes incorporated in this HSP to ensure communication of health and safety hazards.

- Pre-job Project Planning meetings to discuss the scope of work and potential hazards
- Site walkdowns with the TRC workgroup, subcontractors and the customer/client.
- Development of site-specific HSP and JSAs.
- Communication and acknowledgement of understanding of HSP & JSAs by signing the "Safety Compliance Agreement" (See **Attachment F**)
- Tailgate meetings emphasizing that hazard assessment is a continuous process, and any potentially unsafe actions or condition are to be communicated immediately to the SSO.
- Communicating results of field observations/audits. Visual observations are to be conducted daily by the SSO. Periodic field observations will also be recorded on the TRC Field Observation Form (TRC IIPP, Appendix H). Results from either observation will be communicated during Tailgate Safety Meetings.

5.0 REVISIONS TO HSP

If a situation arises where the HSP requires revision, the following option are available:

- Except in the case of emergency situations, no deviations from the HSP may be implemented without the prior notification and approval of the TRC Site Safety Officer (SSO).
- If HSP revisions are minor (i.e. not involving significant changes to the scope of work, associated hazards or PPE requirements), the TRC Site Safety Officer (SSO) can make hand-written revisions to the HSP in the field. HSP Revisions must then be communicated to affected personnel and the Project Manager/Supervisor.
- If HSP revisions are substantial (i.e. not involving significant changes to the scope of work, associated hazards or PPE requirements), the TRC Site Safety Officer (SSO) must consult with the Project Manager/Supervisor before making revisions. The TRC Site Safety Officer (SSO) can make hand-written revisions to the HSP in the field. HSP Revisions must then be communicated to affected personnel and the Project Manager/Supervisor. It is up to the discretion of the Project Manager/Supervisor whether a revised HSP will be reissued to replace the original HSP on the work site.

6.0 HAZARD ASSESSMENT

Hazard assessment is essential for establishing hazard prevention measures. Below is a list of potential physical, chemical and biological hazards associated with various TRC project sites. Not all hazards apply to this site-specific HSP. In addition, the list is not all-inclusive and may require additional hazards associated with a particular project/site to be added.

Please check, or add applicable hazards or hazardous tasks, hazards associated with the scope of work described in this HSP (Section 1.2). A JSA shall be developed to address each of the indicated hazards or hazardous tasks. JSAs are included in **Attachment E** of this HSP.

6.1 Physical Hazards

☐ Excavation & Trenching (where personnel will be entering the excavation)
☐ Heavy Equipment (not drilling related)
☒ Drilling
☒ Overhead lines
☒ Underground utilities
☐ Energy Control – Lock out / Tag out
☐ Flammable Atmospheres (> 10% LEL)
☒ Traffic - vehicular and pedestrian
☒ Trips, Slips & Falls
☒ Head, foot, eye, and back injuries
☒ Falling objects
☐ Working from elevated surface (> 6ft); Fall Protection / Fall Arrest
☐ Ladders Use
☒ Sharp objects

Equipment

(JSAs are to be created to address hazards associated with each specific piece of equipment).

☐ Electrical equipment (including powered hand tools)
☒ Hydraulic equipment
☒ Pnuematic equipment

Non-Powered Hand Tool

☒ Cutting equipement
☐ Welding hazards
☐ Confined Spaces

6.2 Chemical Hazards

MSDS are to be included with the HSP whenever a hazardous material (not waste) is stored or utilized at the work site. MSDSs can be found in **Attachment B** after the Occupational Health Guidelines and Toxicological Information Table.

☒ Refined Petroleum products / waste oil
☐ Asbestos
☐ Surpentine Soils
☐ PCE, TCE
☐ Ozone
☐ Hydrogen Sulfide
☐ Landfill Gases
☒ Environmental samples, soil cuttings, decontamination water, dust (nuisance, silica)

6.3 Biological Hazards

☒ Noise Exposure
☐ Heat Stress
☐ Cold Stress
☒ Weather - heat, cold, rain, fog
☐ Poisonous Plants
☐ Animals/Insects
☐ Misc Pathogens

7.0 GENERAL SAFETY RULES

This section presents general safety rules for all persons working at the project site. Failure to follow safety protocols and/or continued negligence of health and safety policies will result in expulsion of a worker or firm from the site and may result in termination of employment.

1. Horseplay, fighting, gambling or the possession of firearms are not permitted.
2. Work shall be well planned and supervised to prevent injuries. Supervisors shall assure that employees observe and obey safety rules and regulations.
3. An employee reporting for work who, in the opinion of his supervisor, is unable to perform his assigned duties in a safe and reasonable manner shall not be allowed on the job.
4. No employee shall be assigned a task without first having been instructed on proper methods, including safety training, of carrying out the task. Any employee who feels they

have not received proper instruction shall notify their supervisor prior to carrying out the task.

5. Injuries and accidents shall be reported immediately to the immediate supervisor, who will then report it to the SSO.
6. There shall be no consumption of food or drink in operational areas of the site. Hands should be thoroughly cleansed prior to eating.
7. Smoking is not permitted on the site.
8. When personnel are conducting hazardous operations, there shall be at least one other person (buddy system) on duty in the immediate area as a backup in case of emergency.
9. Wear required personal protective equipment (PPE) in the workplace when appropriate and/or when specified in the site specific health & safety plan. Loose clothing and jewelry should not be worn when operating machinery.
10. Do not operate any machinery if you are not authorized or qualified to do so. If unsure how to operate a machine or perform any assigned task, ask the Project Manager/Supervisor before proceeding.
11. Do not operate motorized equipment until proper training and certification has been provided (e.g. forklifts, etc.)
12. No one shall knowingly be permitted or required to work while the employee's ability or alertness is so impaired by fatigue, illness or other causes that it might unnecessarily expose the employee or others to injury.
13. Alcohol and drugs are strictly prohibited on any TRC premises, customer property, and/or in Company vehicles. Employees shall not report to work under the influence of drugs or alcohol. Employees are prohibited from possessing, using, manufacturing, distributing, dispensing, selling or purchasing illegal drugs or other controlled substances (as defined under federal and state law).

8.0 PERSONAL PROTECTIVE EQUIPMENT

TRC and Contractor personnel are required to wear PPE appropriate for the task and potential physical, chemical and biological exposures. Selection of PPE is based on hazard assessment (i.e. JSAs) and air monitoring.

8.1 PPE Required by All Personnel at <u>All Times</u> on the work site

☒ Hard Hat
☒ Safety Shoes/Boots
☒ Safety Vest
☒ Eye Protection - ☒ glasses ☐ goggles ☐ face shield

☐ Hand Protection - ☐ leather ☐ nitrile ☐ other _____
☐ Hearing Protection
☐ Respiratory Protection - ☐ APR Particulate ☐ APR Chemical cartridge ☐ other _____
☐ Protective Clothing - ☐ Tyvex ☐ Nomex ☐ Coveralls ☐ other _____

8.2 PPE which should be <u>available</u> at all times on the work site

☐ Hard Hat
☐ Safety Shoes/Boots
☐ Safety Vest
☐ Eye Protection - ☐ glasses ☐ goggles ☐ face shield
☒ Hand Protection - ☒ leather ☒ nitrile ☐ other _____
☒ Hearing Protection
☐ Respiratory Protection - ☐ APR Particulate ☐ APR Chemical cartridge ☐ other _____
☐ Protective Clothing - ☐ Tyvex ☐ Nomex ☐ Coveralls ☐ other _____

8.3 PPE Required by a <u>Specific Task</u>

Task: <u>Hole Clearance</u>_____

☒ Hard Hat
☒ Safety Shoes/Boots
☒ Safety Vest
☒ Eye Protection - ☒ glasses ☐ goggles ☐ face shield
☒ Hand Protection - ☐ leather ☒ nitrile ☐ other _____
☒ Hearing Protection
☐ Respiratory Protection - ☐ APR Particulate ☐ APR Chemical cartridge ☐ other _____
☐ Protective Clothing - ☐ Tyvex ☐ Nomex ☐ Coveralls ☐ other _____

Task: <u>Drilling</u>_____

☒ Hard Hat
☒ Safety Shoes/Boots
☒ Safety Vest
☒ Eye Protection - ☒ glasses ☐ goggles ☐ face shield
☐ Hand Protection - ☐ leather ☐ nitrile ☐ other _____
☐ Hearing Protection
☐ Respiratory Protection - ☐ APR Particulate ☐ APR Chemical cartridge ☐ other _____
☐ Protective Clothing - ☐ Tyvex ☐ Nomex ☐ Coveralls ☐ other _____

9.0 RESPIRATORY PROTECTION

For operations that require the use of a respirator, the TRC and Contractor SSOs must verify that Field Personnel are medically approved to use respiratory equipment, fit tested, and trained in the proper use of respirators. Only respirators that are NIOSH/MSHA approved are to be used.

Respiratory protection is mandatory if workers are required to complete tasks within a hazardous atmosphere. According to OSHA, a hazardous atmosphere is defined as:

- Flammable gas, vapor, or mist in excess of 10% of LEL.
- Atmospheric oxygen is below 19.5% or above 23.5%.
- When concentration of a known contaminant is greater than the permissible exposure limit (PEL).
- Airborne combustible dust exceeds its LEL (approximated when dust obscures vision at a distance of 5 feet or less).

If conditions warrant, air monitoring may be required to verify the presence or absence of a hazardous atmosphere. Air monitoring is to be conducted whenever a situation or condition arises that could reasonably result in a hazardous atmosphere.

9.1 Air-Purifying Particulate Respirators

Employees involved in construction and earthmoving operations that result in nuisance dust and particulates may use air-purifying respirators. These are commonly referred to as “dust masks” and do not require fit testing. Particulate respirators can to be used in situations where dust and particulates are the only contaminants posing an inhalation hazard. Particulate respirators are not to be used in oxygen deficient atmosphere or if hazardous levels of gas/vapor contaminants are also present.

A high efficiency particulate air (HEPA), P100 respirator should be used in place of commercially available “dust masks”.

9.2 Air-Purifying Gas/Vapor Respirators

TRC employees and Contractors are required to wear half-face, air-purifying respirators with the appropriate chemical cartridge under the following circumstances:

- When concentration of a known contaminant continuously exceeds permissible exposure limit (PEL) time-weighted average or the threshold limit value(TLV) time-weighted average.
- When volatile organic compound (VOC) vapors in the work area continuously exceed the threshold limit value- time-weighted average (TLV-TWA) for gasoline (300 parts per million [ppm]).
- When, at any time, VOC vapors in the work area exceed the threshold limit value - short-term exposure limit (TLV-STEL) for gasoline (500 ppm).

See **ATTACHMENT B** for additional information and regulatory exposure limits for chemicals of concern at this site.

Air purifying respirators (APRs) with chemical cartridges can be used under the following conditions:

- If the oxygen concentration is between 19.5% and 23.5%.
- If chemical contaminants have been identified.
- The toxic concentrations are known and the respirator cartridges are effective in removing the contaminants.
- The respirator and cartridges are NIOSH/MSHA approved.
- The contaminants have noticeable warning qualities such as odor and visibility characteristics including color.

In the event workers are required to wear air purifying respirators (APRs) with chemical cartridges, the following requirements must be met:

- The TRC or Contractor SSO must verify that workers are:
  - Medically approved (within one year) to use respiratory protection.
  - Fit-tested for the specific respirator to be used.
  - Trained in the proper use and limitations of the respirator to be used.
- Contractors must provide proof of the above to the TRC SSO, upon request.
- If an employee or contractor has not cleared by the SSO to use a respirator, they will not be assigned tasks that may potentially expose them to contaminants.
- Personnel with interfering facial hair are not permitted to wear respirators and shall not be permitted in areas where respiratory protection is required.

9.3 Air-Supplied Respirators

Air-supplied respirators, such as SCBA or airline, full-face respiratory protection, are not anticipated to be required at the site. This level of respiratory protection is utilized in oxygen deficient atmospheres or atmospheres considered to be at or above immediately dangerous to life and health (IDLH) levels. These conditions will only occur in rare, if any, circumstances such as confined space entry or emergency situations. The use of air-supplied respiratory protection is not permitted without approval and guidance from the Project Manager.

10.0 AIR MONITORING

Air monitoring is required to verify the presence or absence of a hazardous gas/vapor atmosphere whenever a situation or condition arises that could reasonably result in a hazardous atmosphere.

Based on OSHA's definition of a hazardous atmosphere, there are 4 different hazards that require monitoring. The table below describes the type of hazard, what air monitoring equipment to use and what levels constitute a hazard. The information provided in the table does not take into consideration all the possible variations of hazardous atmosphere, however it will provide guidance when determining the presence of a hazardous atmosphere. Any questions or concerns should be directed to the SSO before work begins.

Table 3: Air Monitoring Guidance

Hazard	Appropriate Air Monitoring Equipment	Hazardous Levels	Comments
Flammability	Combustible gas indicators (CGI) are direct-reading instruments; measures % LEL and oxygen.	>25% of the LEL during cold work >10% of the LEL during hot work	Since many flammable vapors are heavier than air, be sure to take readings at ground level. Work be suspended if CGI readings exceed 10% of LEL.
Oxygen deficiency or abundance	Same as above or an Oxygen Meter	<19.5% and >23.5%	Concentrations >23.5% may present an increased flammability hazard.
Exceeding the permissible exposure limit (PEL)	Photoionization detector (PID) can detect organic and inorganic vapors/gases	Varies depending on chemical. See **Attachment B** for hazardous levels of common chemicals	It is impossible to differentiate the different chemicals using a PID meter. However, the PID will indicate whether chemicals are present and at what levels. Measurements taken within worker's breathing zone will be used to determine respiratory protection requirements.

Airborne combustible dust is not anticipated at the work site.

When conducting, air monitoring the following actions should be considered:

- Be familiar with the proper use and limitations of the air monitoring equipment to be used.
- Ensure air-monitoring equipment (TRC's or otherwise) is in working order and has been properly calibrated. The TRC SSO is to document verification of calibration (i.e. in a field log book).
- Clearly document the results of air monitoring, including:
  - Equipment name / type and calibration data
  - Date, time and site location of air monitoring (use a site map to clarify the locations of readings.
  - Indication of what is being measured (LEL, oxygen, or ppm)
  - Results of the air monitoring
- Measurements for volatile organics should be taken at low point where vapors could accumulate.

- Measurements taken to determine the need for respiratory protection should be take within the worker's "breathing zone", keeping in mind the worker's closest proximity to the hazard source.
- An individual should never enter a confined area or excavation in order to conduct initial air monitoring. Instead, actions should be taken to lower the air monitoring equipment into the area to indicate the presence (or absence) of a hazardous atmosphere. Most air monitoring equipment has audible alarms.
- In the event that CGI readings on the site exceed 10 percent of the LEL, work will be suspended until the source can be eliminated or controlled.

11.0 SITE CONTROL

The primary objective of site control is to minimize the exposure to potentially hazardous substances and/or situations. Supervision and controlling access to the work site is necessary to protect site personnel, visitors and the public.

For this site, the following areas will be designated as hot, warm and cold zones:

Hot Zone: An area around each of boring locations large enough to accommodate the rig, support truck, and have a buffer zone around the work area of 20 feet.
Warm Zone: ☒ NA
Cold Zone: Area immediately outside each hot zone where supplies and unused equipment may be staged during the work day.
.

For the purposes of this HSP, site control will be discussed under two circumstances: (1) work involving Physical Hazards and (2) work involving Chemical Hazards.

In either case, site control areas are to be clearly identified and communicated by the SSO. The hot zone must be clearly identified and should be isolated with cones, barricades, or high visibility caution tape. In addition, sufficient area also must be available to conduct operations while providing a protective buffer for persons and property outside the controlled areas.

Check which is applicable:

☒ Work involving Physical Hazards

Work does *not* involve direct contact with hazardous substances. However, if the scope of work primarily involves physical hazards (i.e. vehicular traffic, heavy equipment operation, etc.), the establishment of a warm zone may is not necessary. Instead, a hot zone must be established to surround all the physical hazards. The hot zone area shall provide enough room and buffer to

protect both workers and the public. A cold zone is established outside the hot zone to allow "support" activities to be conducted in a safe location.

☐ Work involving Chemical Hazards

The concept of site control and the establishment of hot/warm/cold work zones are intended for work involving the exposure (or potential exposure) to hazardous chemical concentrations. Under these circumstances, the purpose of work zones is two-fold: 1) minimize the exposure to potentially hazardous substances and 2) minimize the spread of hazardous substances outside the immediate work area through decontamination procedures.

A brief overview of site control work zones is provided below:

Hot Zone

- Where personnel may be subject to chemical or physical hazards.
- Where known or suspected contamination exists and may also be where equipment operation and/or environmental sampling will take place.
- To be clearly identified and should be isolated with cones, barricades, or high visibility caution tape.
- Large enough to provide sufficient room and buffer to protect both workers and the public.

Warm Zone

- Located between the hot and cold zones; beginning at the edge of the hot zone and extends to the cold zone.
- Utilized as a control point or corridor for persons entering or exiting the hot zone.
- Where personnel and equipment are decontaminated.

Cold Zone

- Located outside the hot zone where administrative and other support functions are located.
- Where adverse exposure to contaminants and physical hazards are unlikely.

11.1 Decontamination

The purpose of decontamination is to: (1) remove chemical containments from personnel and/or equipment and (2) significantly reduce the spread of chemical contaminants beyond the hot/warm zone.

Decontamination is intended to occur within the warm zone. Depending on the project, there may be a need to decontaminate both personnel and equipment. The decontamination process should be appropriate to the chemical hazards present. For example refined petroleum contaminated soil on work boots/shoes may only require physical removal of the soil with a sturdy brush. However, decontamination of equipment (i.e. drilling augers) may require additional steps to ensure contaminants are not spread beyond the hot/warm zones. Heavy equipment (i.e. excavators, trucks used for waste transportation, etc.) may require a combination of steps, including the placement of gravel at the entrance/exit of the site.

11.1.1 Personnel Decontamination Procedures ☐ NA

Remove contaminated PPE in an inside out manner within designated area. Contaminated garments are to be placed in designated plastic bags or drums prior to disposal or transfer offsite. Labels in compliance with the hazard communication standard will be affixed to containers of contaminated debris and clothing.

11.1.2 Equipment Decontamination Procedures ☐ NA

The augurs and tools will be decontaminated prior to starting work and before each new boring is commenced using a stem cleaner. Prior to use, the sampler and sampling tubes are brush-scrubbed in a Liquinox and potable water solution and rinsed twice in clean potable water. Sampling equipment and tubes are also decontaminated before each sample is collected to avoid cross-contamination between borings. Decontamination water will be transferred from the driller's decontamination trailer to a drum via five gallon buckets, properly labeled, and stored onsite, in appropriate storage area, pending disposal to an approved disposal/recycling facility.

11.2 Site Security

Appropriate security measures will be established in coordination with the site owner/operator and communicated to site personnel. The objective of these measures is to (1) protect the public from potential exposure to physical/chemical hazards; (2) avoid public interference with personnel and safe work practices; and (3) prevent theft or vandalism of equipment at the site.

Site specific security measures include: ☐ NA

- Proper security precautions will be taken, including locking any unattended vehicles and/or equipment, using caution tape and cones around the work area and any open holes, and properly covering any open holes that maybe left overnight.

12.0 PERSONNEL TRAINING

TRC and Contractor personnel are required to acknowledge their understanding and willingness to comply with this HSP before admission to the site by signing the "Safety Compliance Agreement" (See **Attachment F**).

Site specific training requirements are indicated below:

☒ Personnel shall meet the training requirements specified in the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard [29 CFR 1910.120(e) and CCR Title 8 Section 5192(e)].

☐ Kinder Morgan Contractor Safety Video.

☒ ConocoPhillips (specify type of training)

☐ ExxonMobil (specify type of training)

☐ Refinery Training: Specify Refinery and required training.

☐ Railroad Training:
- ☐ UPPR Contractor Orientation
- ☐ BNSF Contractor Orientation
- ☐ Cal Train Contractor Orientation
- ☐ "FRA Roadway Worker"Training (works within 25' of track)

☐ Other Training Requirements:
- ☐ XX
- ☐ XX

13.0 MEDICAL PROGRAM

TRC has established a medical surveillance program to assess, monitor, and help protect the health of employees, in particular, employees who may be exposed to potentially hazardous substances during site work. Personnel undergo medical examinations as follows:

- **Initial:** Pre-employment / prior to any assignment involving work in a hazardous or potentially hazardous environment. The initial examination is used to establish a baseline picture of health against which future changes can be measured, and to identify any underlying illnesses or conditions that might be aggravated by chemical exposures or job activities. This exam also certifies whether an employee is medically fit to wear a respirator.

- **Periodic:** At least once every 12 to 24 months (depending on the employees involvement in field activities) to measure changes in health status. This exam certifies whether an employee is still medically fit to wear a respirator.
- **Upon notification:** As soon as possible upon notification by an employee that they have developed signs or symptoms indicating possible overexposure to hazardous substances, or in response to an injury or exposure during an emergency situation.
- **Exit**: At termination of employment.

14.0 EMERGENCY RESPONSE PLAN

The TRC SSO (depending on which is present) will have controlling authority during an emergency. In the SSO's absence, the Alternate SSO will be in charge.

14.1 Evacuation Protocol

Evacuation protocol, routes and assembly areas from the site will be established by the SSO, and communicated to Field Personnel during the Tailgate Safety Meeting(s) prior to initiating work. In the event of an evacuation, personnel will meet at a pre-established assembly areas and the TRC SSO conduct a "head count" to see that everyone is accounted for. Contractor SSO is responsible for being able to provide an accurate head-count of contractor personnel.

Primary assembly area = Front of the station building

Secondary assembly area= Southwest corner of School Street and Fruitvale Avenue

14.2 First Aid & CPR

TRC employees and Contractors with current First Aid and CPR certification and who are willing to provide First Aid and CPR will be asked to identify themselves at Tailgate Safety Meetings. Their names will be documented on the Tailgate Meeting Checklist (**Attachment F**).

14.3 Emergency Medical Assistance

A list of emergency medical assistance sources has been established as part of this HSP. ATTACHMENT C lists the names, locations, and telephone numbers of emergency response organizations in the vicinity of the project site, and a map to the nearest hospital(s) with an *emergency room*.

A vehicle shall be available onsite during work activities to transport injured personnel to the identified emergency medical facilities, if necessary. Company vehicles are to be equipped with a fire extinguisher and first aid kit.

14.4 Emergency Procedures

In the event of an accident, injury, or other emergency, remember to:

- **Stop work and REMAIN CALM.**
- **Move personnel to a safe location (evacuation plan).**
- **Call 911 or notify other emergency facilities, as necessary.**
- **Address medical emergencies and apply first aid, if necessary.**
  - Move injured or exposed person(s) from immediate area only if it is safe to do so.
  - If serious injury or life-threatening condition exists, call 911. Clearly describe the location, injury and conditions to the dispatcher. Designate a person to direct emergency equipment to the injured person.
- **Contain physical hazards.**
  - Act only if hazard is minimal and you are trained to deal with the situation. Otherwise evacuate and wait for emergency services to arrive.
- **Notify SSO and initiate incident reporting procedures.**
  - See page 2 of this HSP for contact information. In the event the SSO is not available, the order of notification should be 1) Assistant SSO, 2) TRC Project Manager and 3) HR Manager (if incident involves injury) or EHS Supervisor (if incident does not involves injury).
  - TRC SSO is to notify TRC Project Manager/Supervisor as soon as reasonably possible.
- Do not resume work until the SSO has determined it is safe to do so.

15.0 INCIDENT REPORTING

In case of an accident, TRC personnel are to immediately report the incident to their Project Manager/Supervisor and follow the TRC incident reporting procedures detailed in the TRC IIPP. TRC's incident reporting forms are available through the Project Manager/Supervisor and include:

- TRC Incident Report
- Driver's Report of Accident
- TRC Potential / Near Miss Reporting Form
- TRC Employees Report of Incident

- TRC Witness Report of Incident
- Corrective Action Form

All incidents and near misses are investigated in accordance with TRC's IIPP. The TRC Incident Report Form is to be completed and submitted to the TRC EHS Supervisor within 24 hours following any incident.

Contractor personnel are to report incidents to their SSO who is then required to report the incident to the TRC SSO, TRC Alternate SSO or TRC Project Manager immediately.

Some important information to include when reporting an incident are:

1. A description of the event (including date and time)
2. Details regarding personal injury and property damage, if any.
3. Whether emergency services were notified (i.e., medical facilities, fire department, police department) and the basis for that decision. Including time and names of persons/agencies notified, and their response.
4. Clarify the need for and type of TRC support.
5. Immediate corrective action(s) taken.

16.0 HEALTH AND SAFETY PLAN (HSP) SIGNATURE PAGE

Job Safety Analysis Author	**Date:**	**HSP Author**	**Date:**
_____	_____	_____	_____

Review/Approvals:

Site Safety Officer Facility/Field Supervisor	**Date:**	**Project Manager/Supervisor***	**Date:**
_____	_____	_____	_____
Local Safety Coordinator* ☐ **NA**	**Date**	**EHS Supervisor/Safety Professional (CIH, CSP, other)***	**Date**
_____	_____	_____	_____

Additional Information or Instructions:

_____

_____

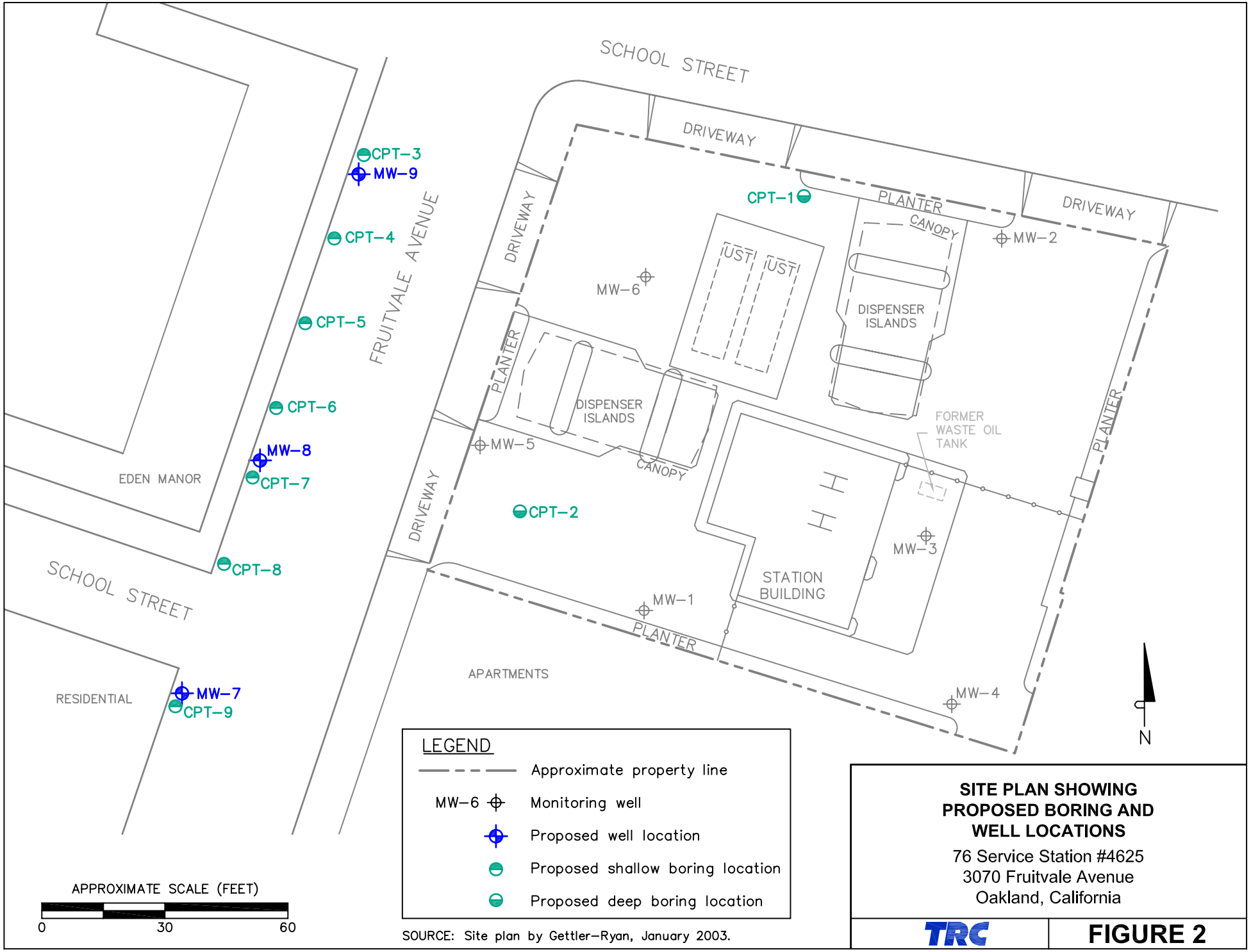
_____

_____

* Note: **For most projects, the Project Manager/Supervisor will review, approve and sign the HSP.** In the event the operations are beyond the normal scope of work, additional review is available upon the request from the PM/Supervisor. The Local Safety Coordinator is the first recourse for reviewing HSPs **not** involving high-risk operations. It is recommended that for HSPs involving high-risk operations (i.e. hazardous exposures to chemicals, large scale or deep excavations, confined space entry, etc.), the EHS Supervisor and/or a Safety Professional [Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP) or other professionally qualified person] be consulted for review of the HSP to ensure proper protective measures are being implemented.

ATTACHMENT A

SITE PLAN



SOURCE: Site plan by Gettler–Ryan, January 2003.

SITE PLAN SHOWING PROPOSED BORING AND WELL LOCATIONS

76 Service Station #4625
3070 Fruitvale Avenue
Oakland, California

TRC

FIGURE 2

ATTACHMENT B

OCCUPATIONAL HEALTH GUIDELINES AND TOXICOLOGICAL INFORMATION

Table B-1
OCCUPATIONAL HEALTH GUIDELINES AND TOXICOLOGICAL INFORMATION
Gasoline Constituents

Contaminant	ACGIH TLV-TWA (ppm)	NIOSH REL (ppm)	OSHA PEL (ppm)	STEL (ppm)	IDLH (ppm)	Routes of Exposure	Known or Suspected Carcinogen	Symptoms
Diesel (as Stoddard solvent)	for Diesel fuel/ Kerosene 14.4 (skin only)	Approx. 60-98	500	250-500 (NIOSH ceiling)	Approx. 3000-5600	Inhalation, Ingestion, Contact	No	Irritation to eyes, skin, mucous membrane; dermatitis, headache, fatigue, blurred vision, dizziness, slurred speech, confusion, convulsions, aspiration, weakness, restlessness, incoordination
Gasoline	300	n/a	n/a	500 (ACGIH)	n/a	Inhalation, Absorption, Ingestion, Contact	Yes	Irritation to eyes, skin, mucous membrane; dermatitis, headache, fatigue, blurred vision, dizziness, slurred speech, confusion, convulsions, aspiration
Benzene	0.5	0.1	1	1 (NIOSH)	500	Inhalation, Absorption, Ingestion, Contact	Yes	Irritation to eyes, skin, nose, resp system, giddiness, headache, nausea, staggered gait, fatigue, anorexia, weakness/exhaustion, dermatitis
Toluene	50	100	200	150 (NIOSH)	500	Inhalation, Absorption, Ingestion, Contact	No	Irritation to eyes, nose; fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, tears, nervousness, muscle fatigue, insomnia, dermatitis
Ethyl benzene	100	100	100	125 (NIOSH& ACGIH)	800	Inhalation, Ingestion, Contact	No	Irritation to eyes, skin, mucous membranes; headache, dermatitis, narcosis, coma
Xylenes (o,m,p,)	100	100	100	150 (NIOSH & ACGIH)	900	Inhalation, Absorption, Ingestion, Contact	No	Irritation to eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait, nausea, vomiting, abdominal pain, dermatitis
Methyl tert butyl ether ((MTBE)	40	n/a	n/a	n/a	n/a	n/a	n/a	n/a

DEFINITIONS

ACGIH TLV-TWA	American Conference of Governmental Industrial Hygienists, Threshold Limit Value-Time Weighted Average
NIOSH REL	National Institute of Occupational Safety & Health, Recommended Exposure Limit
STEL	Short Term Exposure Limit (Gasoline STEL is by ACGIH; BTEX STELs are by NIOSH)
OSHA PEL	Occupational Safety and Health Administration, Permissible Exposure Limit
IDLH	Immediately Dangerous to Life and Health
ppm	parts per million
CNS	Central Nervous System
n/a	not available (i.e., no value has been established)

Threshold Limit Value: Threshold limit values (TLVs) refer to airborne concentrations of substances and represent conditions under which it is believed nearly all workers may be repeatedly exposed, day after day, without adverse health effects.

Threshold Limit Value - Time Weighted Average: The time weighted average (TWA) is a concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. TLV-TWAs are established by the ACGIH.

Recommended Exposure Limit: Unless otherwise noted, the recommended exposure limit (REL) is a TWA concentration for up to a 10-hour workday during a 40-hour workweek. RELs are established by NIOSH to reduce or eliminate adverse occupational health effects.

Short Term Exposure Limit: A short-term exposure limit (STEL) is defined as a 15-minute TWA exposure that should not be exceeded at any time during a workday. When compared to the REL (or TLV-TWA for ACGIH standards), the STEL allows the worker to be exposed to a higher concentration, BUT for a shorter period of time. Exposures above the REL up to the STEL should not be longer than 15 minutes and should not occur more than four times per day.

Permissible Exposure Limit: Permissible exposure limits (PELs) are TWA concentrations that must not be exceeded during any 8-hour work shift of a 40-hour workweek. PELs are established by OSHA (29 CFR 1910.1000).

Immediately Dangerous to Life and Health: Immediately dangerous to life and health (IDLH) values are established as concentrations from which a worker can escape within 30 minutes without suffering loss of life, irreversible health effects, or other deleterious effects that could prevent him/her from escaping the hazardous environment. The purpose of establishing an IDLH exposure concentration is to ensure that workers can escape from a given contaminated environment in the event of failure of respiratory protection equipment.

ATTACHMENT C

EMERGENCY SERVICES
PHONE NUMBERS, DIRECTIONS, AND LOCAL AREA MAP

EMERGENCY SERVICES

FACILITY / LOCATION **TELEPHONE**

Emergency Situation 911

TRC 24 HOUR Notification Number 1-800-274-9072

Hospital Name, Address, Phone
Alameda County Medical Center Highland 510-534-8055
1411 East 31st Street, Oakland, California

Direct Number to Emergency Room 1-510-534-8055

Poison Control Center
California Poison Control System - San Francisco Division (800) 876-4766
at San Francisco General Hospital
University of California San Francisco
Box 1369
San Francisco, California 94143-1369

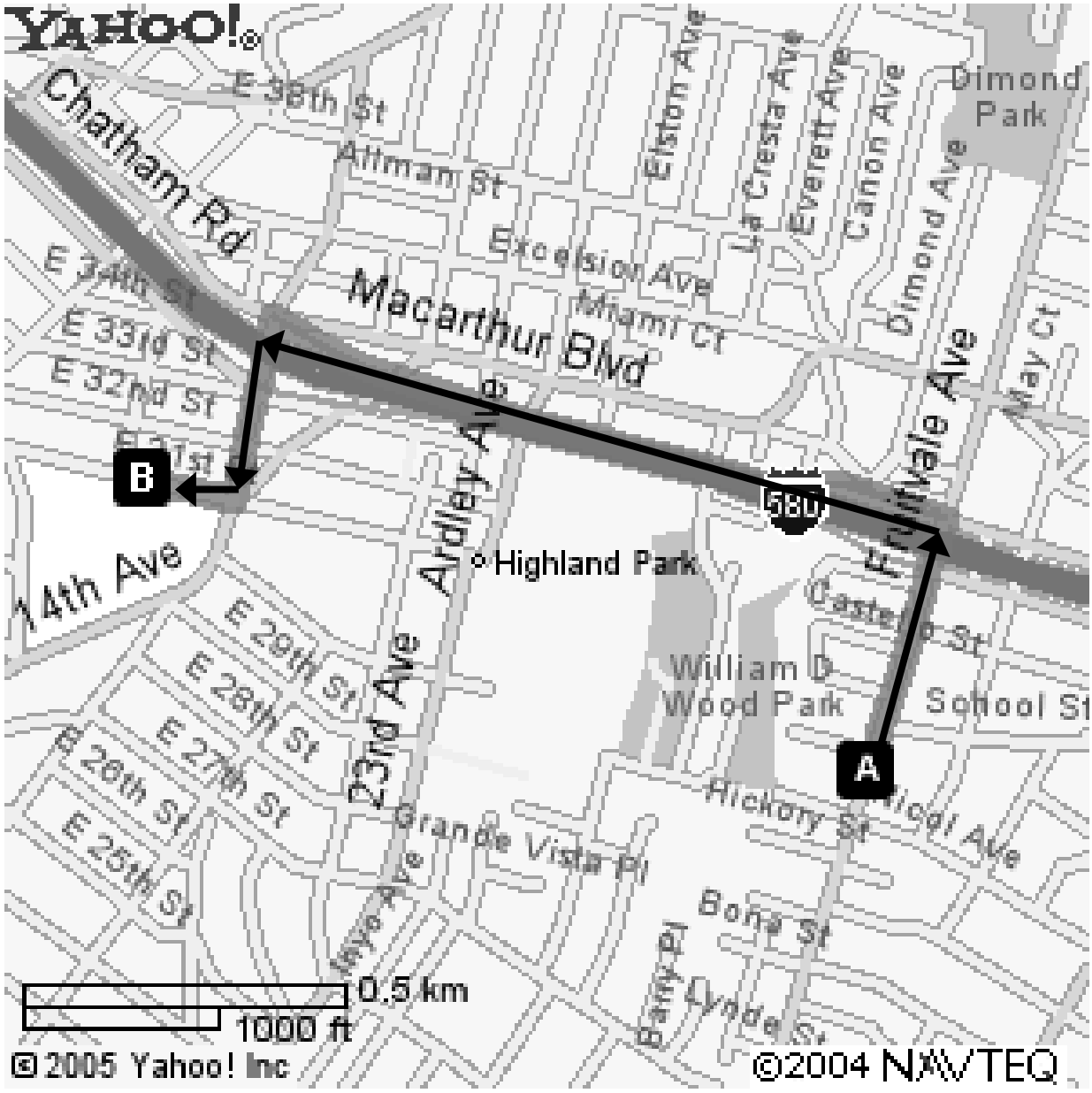
Office of Emergency Services (800) 852-7550

USA Dig Alert of Northern California (800) 227-2600

1. Start at **3070 FRUITVALE AVE, OAKLAND** going toward **SCHOOL ST** - go **0.3** mi
2. Turn L onto **I-580 WEST** toward **HAYWARD** - go **0.4** mi
3. Take the **14TH AVENUE/PARK BLVD** exit toward **BEAUMONT AVE** - go **0.3** mi
4. Turn L on **BEAUMONT AVE** - go **0.2** mi
5. Turn R on **E 31ST ST** - go **0.1** mi
6. Arrive at **ALAMEDA COUNTY MED CENTER-HIGHLAND**

ATTACHMENT D

LOCAL AREA MAP
with routes to hospital


YAHOO!
Chatham Rd
E 36th St
Altman St
Elston Ave
La Cresta Ave
Everett Ave
Canon Ave
Dimond Park
Dimond Ave
May Ct
Excelsion Ave
Miami Ct
Macarthur Blvd
E 34th St
E 33rd St
E 32nd St
B
580
Fruitvale Ave
14th Ave
Ardley Ave
Highland Park
Castle St
William D
Wood Park
School St
A
E 29th St
E 28th St
E 27th St
E 26th St
E 25th St
23rd Ave
Grande Vista Pl
Hickory St
Bond St
Lynde St
0.5 km
1000 ft
©2005 Yahoo! Inc
©2004 NAVTEQ

ATTACHMENT E

JOB SAFETY ANALYSIS

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED from S: Drive
76 Service Station #4625, Oakland, California	10/27/05	
JSA WORK ACTIVITY (Description): Hole Clearance	List of Contractor(s) and key work activity: Gregg Drilling	

SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE
Rachelle Dunn	Staff Geologist	Concord	

"TRC APPROVED" JSA DEVELOPMENT TEAM	POSITION / TITLE	APPROVAL DATE
Adrienne Collins	Concord Safety Coordinator	
Sonya Rieken	EHS Advisor	
Greg Burket	EHS Supervisor	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

R HARD HAT R /A GLOVES Specify: ☒ leather ☒ Nitrile ☐ Other _____. R SAFETY GLASSES _____GOGGLES _____FACE SHIELD	R REFLECTIVE VEST A HEARING PROTECTION R SAFETY SHOES: Protective Toe _____ 5pt.HARNESS / LANYARD PPE CLOTHING: _____Coveralls _____Tyvek Suit _____Nomex _____Other (specify):	RESPIRATORY PROTECTION: ☒ NA _____½ face Air Purifying Respirator (APR) _____Particulate Mask: ☐ PM100 ☐ PM95 _____ Cartridge: ☐ VOC ☐ _____ _____Full face ARP; specify cartiridge type: _____ Air Supplied Respirator _____SCBA _____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Set up Job Site	a. Physical Injury from being struck by moving vehicles or equipment.	a. Have one person watch traffic while the other creates exclusion zone in a high-use traffic area. a. Create an exclusion zone at least 10-feet beyond the limits of the hole clearance; use snow fencing, barricades, delineators, cones and/or caution tape in accordance with project specification.
2. Hole Clearance	a. Damage to underground utilities/piping b. Contact with chemical contamination c. Run-off and Soil Cross-Contamination	a. Follow procedures outlined in TRC's Subsurface disturbance checklist. Contact TRC PM if utility/piping is encountered. b. Wear nitrile gloves when handling water or soil. Wear required PPE, incluing safety glasses, while on job site. c. Cover all spoils stockpiles with plastic-sheeting and berm in accordance with local regulations.
3. Use of Air/Water Knifes	a. Physical injury from high-pressure air/water spray	a. Never place fingers or other body parts in front of high-pressure end of air knife/water knife nozzle. a. Always follow safe working procedures outlined in equipment handbook.
Field Changes: 4.	a. b. c. d.	a. b. c. d.

GENERAL SAFETY HAZARDS	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
5. Slips, trips, and falls	a. In exclusion zone	a. Clean as you work. Put equipment away when done using it. Blot up puddles of standing water and sweep work area. a. Cover or use appropriate warning to protect all unattended open holes.

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowleable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object?; caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

6. Cut/Pinched fingers or toes	a. Throughout work area; particularly when moving materials and during hole clearance	a. Wear leather gloves when lifting sharp or heavy equipment.
7. Strained muscles.	a. Throughout work area; particularly when moving materials and during hole clearance	a. Use proper lifting techniques; get help when moving heavy objects (>70 lbs).
8. Unauthorized Personnel in exclusion zone	a. In exclusion zone	a. Use visitor check-in log; do not allow anyone in exclusion zone without proper PPE and training documentation. (HAZWOPER/LPS).
9. Flying debris	a. In exclusion zone	a. Wear ANSI-approved safety glasses working around operating equipment.
10. Loud Noise	a. In exclusion zone	a. Wear ANSI-approved hearing protection around operating equipment.
11. Explosion/Fire	a. In exclusion zone	a. No smoking or open flame. Periodically monitor ambient air concentrations with PID/LEL Meter. Shut down job and move personnel and equipment upwind if hydrocarbon concentrations are **> 300 ppm or >10% of LEL**. a. Place 2-20lb ABC Fire extinguishers in location soecified by SSO. a. Follow TRC's Cell Phone Use Guidelines.

Field Notes:

LIMITATION: As part of TRC's EHS Policy, a JSA is provided by TRC for its employees. The purpose of a JSA is NOT to identify all hazards associated with a task, but to identify key potential hazards to get TRC and other onsite personnel thinking about other potential safety hazards and mitigating actions for unsafe conditions and behavior during various works. TRC recognizes that JSA's may not cover every conceivable step or hazard that emerges during a job, so we've provided a "Field Change" section below to amend a JSA if required. The JSA does not supersede or replace any local, state or federal permit, regulation, statute or other entities policies and procedures but is simply a tool for enhancing the execution of safe work at a jobsite under TRC's supervision. Similarly, all subcontractors are required to provide their own JSA(s) for their specialty prior to performing any work for TRC or its customers in accordance with TRC's EHS Policy; however, any unsafe condition or hazard not covered in any JSA is ultimately the direct responsibility of the person or entity performing the work.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED from S: Drive
76 Service Station #4625, Oakland, California	10/27/05	
JSA WORK ACTIVITY (Description): Drilling	List of Contractor(s) and key work activity: Woodward Drilling	

SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE
Rachelle Dunn	Staff Geologist	Concord	

"TRC APPROVED" JSA DEVELOPMENT TEAM	POSITION / TITLE	APPROVAL DATE
Adrienne Collins	Concord Safety Coordinator	
Sonya Rieken	EHS Advisor	
Greg Burket	EHS Supervisor	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

R HARD HAT R /A GLOVES Specify: ☒ leather ☒ Nitrile ☐ Other _____. R SAFETY GLASSES _____GOGGLES _____FACE SHIELD	R REFLECTIVE VEST A HEARING PROTECTION R SAFETY SHOES: Protective Toe _____ 5pt.HARNESS / LANYARD PPE CLOTHING: _____Coveralls ____Tyvek Suit _____Nomex ____Other (specify):	RESPIRATORY PROTECTION: ☒ NA _____½ face Air Purifying Respirator (APR) _____Particulate Mask: ☐ PM100 ☐ PM95 _____ Cartridge: ☐ VOC ☐ _____ _____Full face ARP; specify cartiridge type: _____ Air Supplied Respirator _____SCBA _____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Set up Job Site	a. Physical Injury from being struck by moving vehicles or equipment.	a. Have one person watch traffic while the other creates exclusion zone in a high-use traffic area. a. Create an exclusion zone at least 10-feet beyond the limits of the boring location; use snow fencing, barricades, delineators, cones and/or caution tape in accordance with project specification. a. Always wear safety vest, establish eye contact with operators utilizing flag men wear appropriate. a. Vehicles shall use reverse beepers or flagmen.
2. Drilling	a. Contact with subsurface water, gas, electrical, and/or fiber optic lines in the vicinity of drilling locations. b. Walking drill auger c. Broken wire cable or detached drill stem d. Distracted driller	a. Following the hole clearance and drilling procedures outlined in TRC's Subsurface Distrubance Safety Checklist. a. If unknown lines or obstructions are encouthered, stop drilling and notify Contact PM. Do not undermine any utilities. b. Place conductor casing in open boring prior to start of drilling operations. c. Do not stand directly in front of the drill rig while machinery is operating. Stand off to the side by driller's platform or opposite side of drill rig. d. Always communicate with the driller before approaching the operating drill stem.
3. Well Completion	a. Opening/closing/moving drums b. Overspray and cross-contamination during auger decontamination c. Broken pump hose d. Dust from concrete/cement bags	a. Wear leather gloves during the opening and closing of drums to protect fingers. a. Use only drum dolly to move drums with soil, grout, concrete, or decontamination water. b. Safety glasses, splash goggles, or face shield will be worn at all times when spraying/decontaminating augers. b. Do not overspray while cleaning augers. Create a "clean zone" with plastic liner for placement of decontaminated augers. c. Do not stand directly next to pump and hose when it is operating, stand to the side. d. Wear an approved dust and mist respirator when opening and dumping bags into mixer.

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowleable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object?; caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED from S: Drive
76 Service Station #4625, Oakland, California	10/27/05	
JSA WORK ACTIVITY (Description):	List of Contractor(s) and key work activity:	
Drilling	Woodward Drilling	

Field Changes: 4.	a. b. c. d.	a. b. c. d.

GENERAL SAFETY HAZARDS	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
5. Slips, trips, and falls	a. In exclusion zone	a. Clean as you work. Put equipment away when done using it. Blot up puddles of standing water and sweep work area. a. Cover or use appropriate warning to protect all unattended open holes.
6. Cut/Pinched fingers or toes	a. Throughout work area; particularly when moving materials.	a. Wear leather gloves when lifting sharp or heavy equipment.
7. Strained muscles.	a. Throughout work area; particularly when moving augers	a. Use proper lifting techniques; get help when moving heavy objects (>70 lbs).
8. Unauthorized Personnel in exclusion zone	a. In exclusion zone	a. Use visitor check-in log; do not allow anyone in exclusion zone without proper PPE and training documentation. (HAZWOPER/LPS).
9. Flying debris	a. In exclusion zone	a. Wear ANSI-approved safety glasses working around operating equipment.
10. Loud Noise	a. In exclusion zone	a. Wear ANSI-approved hearing protection around operating equipment.
11. Explosion/Fire	a. In exclusion zone	a. No smoking or open flame. Periodically monitor ambient air concentrations with PID/LEL Meter. Shut down job and move personnel and equipment upwind if hydrocarbon concentrations are **> 300 ppm or >10% of LEL.** a. Place 2-20lb ABC Fire extinguishers in location soecified by SSO. a. Follow TRC's Cell Phone Use Guidelines.
12. Exposure to hydrocarbon impacted soil or groundwater	a. In exclusion zone	a. Wear nitrile gloves during handling of soil or groundwater.
13. Soil and groundwater cross-contamination	a. In exclusion zone	a. Identify and delineate soil stockpile area or storage area of drummed soil cuttings/decontamination water.

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowleable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object?; caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS

Field Notes:

LIMITATION: As part of TRC's EHS Policy, a JSA is provided by TRC for its employees. The purpose of a JSA is NOT to identify all hazards associated with a task, but to identify key potential hazards to get TRC and other onsite personnel thinking about other potential safety hazards and mitigating actions for unsafe conditions and behavior during various works. TRC recognizes that JSA's may not cover every conceivable step or hazard that emerges during a job, so we've provided a "Field Change" section below to amend a JSA if required. The JSA does not supersede or replace any local, state or federal permit, regulation, statute or other entities policies and procedures but is simply a tool for enhancing the execution of safe work at a jobsite under TRC's supervision. Similarly, all subcontractors are required to provide their own JSA(s) for their specialty prior to performing any work for TRC or its customers in accordance with TRC's EHS Policy; however, any unsafe condition or hazard not covered in any JSA is ultimately the direct responsibility of the person or entity performing the work.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED from S: Drive
76 Service Station #4625, Oakland, California	10/27/05	
JSA WORK ACTIVITY (Description): Well Development	List of Contractor(s) and key work activity: Woodward Drilling	

SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE
Rachelle Dunn	Staff Geologist	Concord	

"TRC APPROVED" JSA DEVELOPMENT TEAM	POSITION / TITLE	APPROVAL DATE
Adrienne Collins	Concord Safety Coordinator	
Sonya Rieken	EHS Advisor	
Greg Burket	EHS Supervisor	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

R HARD HAT R /A GLOVES Specify: ☒ leather ☒ Nitrile ☐ Other _____. R SAFETY GLASSES _____GOGGLES _____FACE SHIELD	R REFLECTIVE VEST A HEARING PROTECTION R SAFETY SHOES: Protective Toe _____ 5pt.HARNESS / LANYARD PPE CLOTHING: _____Coveralls ____Tyvek Suit _____Nomex ____Other (specify):	RESPIRATORY PROTECTION: ☒ NA _____½ face Air Purifying Respirator (APR) _____Particulate Mask: ☐ PM100 ☐ PM95 _____ Cartridge: ☐ VOC ☐ _____ _____Full face ARP; specify cartiridge type: _____ Air Supplied Respirator _____SCBA _____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Set up Job Site	a. Physical Injury from being struck by moving vehicles or equipment.	a. Have one person watch traffic while the other creates exclusion zone in a high-use traffic area. a. Create an exclusion zone at least 10-feet beyond the limits of the boring location; use snow fencing, barricades, delineators, cones and/or caution tape in accordance with project specification. a. Always wear safety vest, establish eye contact with operators utilizing flag men wear appropriate. a. Vehicles shall use reverse beepers or flagmen.
2. Bail and surging well	a. Broken wire cable b. Distracted operator c. Overspray and cross-contamination during bailer and surge block decontamination	a. Do not stand directly in front of the development rig while machinery is operating. Stand off to the side. b. Always communicate with the operator before approaching the operating development rig. e. Safety glasses, splash goggles, or face shield will be worn at all times when spraying/decontaminating bailer and surge block. c. b. Do not overspray while cleaning bailer and surge block.
3. Purging well	a. Opening/closing/moving drums b. Overspray and cross-contamination during pump decontamination	a. Wear leather gloves during the opening and closing of drums to protect fingers. a. Use only drum dolly to move drums with soil, grout, concrete, or decontamination water. b. Safety glasses, splash goggles, or face shield will be worn at all times when spraying/decontaminating pump. b. Do not overspray while cleaning pump.
Field Changes: 4.	a. b. c. d.	a. b. c. d.

GENERAL SAFETY HAZARDS	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowleable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object?; caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED from S: Drive
76 Service Station #4625, Oakland, California	10/27/05	
JSA WORK ACTIVITY (Description): Well Development	List of Contractor(s) and key work activity: Woodward Drilling	

5. Slips, trips, and falls	a. In exclusion zone	a. Clean as you work. Put equipment away when done using it. Blot up puddles of standing water and sweep work area. a. Cover or use appropriate warning to protect all unattended open holes.
6. Cut/Pinched fingers or toes	a. Throughout work area; particularly when moving materials.	a. Wear leather gloves when lifting sharp or heavy equipment.
7. Strained muscles.	a. Throughout work area; particularly when moving augers	a. Use proper lifting techniques; get help when moving heavy objects (>70 lbs).
8. Unauthorized Personnel in exclusion zone	a. In exclusion zone	a. Use visitor check-in log; do not allow anyone in exclusion zone without proper PPE and training documentation. (HAZWOPER/LPS).
9. Flying debris	a. In exclusion zone	a. Wear ANSI-approved safety glasses working around operating equipment.
10. Loud Noise	a. In exclusion zone	a. Wear ANSI-approved hearing protection around operating equipment.
11. Explosion/Fire	a. In exclusion zone	a. No smoking or open flame. Periodically monitor ambient air concentrations with PID/LEL Meter. Shut down job and move personnel and equipment upwind if hydrocarbon concentrations are **> 300 ppm or >10% of LEL.** a. Place 2-20lb ABC Fire extinguishers in location soecified by SSO. a. Follow TRC's Cell Phone Use Guidelines.
12. Exposure to hydrocarbon impacted groundwater	a. In exclusion zone	a. Wear nitrile gloves during handling of groundwater.

Field Notes:

LIMITATION: As part of TRC's EHS Policy, a JSA is provided by TRC for its employees. The purpose of a JSA is NOT to identify all hazards associated with a task, but to identify key potential hazards to get TRC and other onsite personnel thinking about other potential safety hazards and mitigating actions for unsafe conditions and behavior during various works. TRC recognizes that JSA's may not cover every conceivable step or hazard that emerges during a job, so we've provided a "Field Change" section below to amend a JSA if required. The JSA does not supersede or replace any local, state or federal permit, regulation, statute or other entities policies and procedures but is simply a tool for enhancing the execution of safe work at a jobsite under TRC's supervision. Similarly, all subcontractors are required to provide their own JSA(s) for their specialty prior to performing any work for TRC or its customers in accordance with TRC's EHS Policy; however, any unsafe condition or hazard not covered in any JSA is ultimately the direct responsibility of the person or entity performing the work.

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowleable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object?; caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

ATTACHMENT F

TAILGATE SAFETY MEETING CHECKLIST

AND

HSP COMPLIANCE AGREEMENT

TAILGATE SAFETY MEETING CHECKLIST

Date / Time of Tailgate Meeting: _____

Vehicle Inspection: Driver will perform Driver's Daily Vehicle Inspection Checklist before leaving the yard or if changing drivers during the day.

Personnel training/qualifications: Check cards for OSHA HAZWOPER 40-hour certification/8-hour-refresher training (or any other specialized training to perform the task if appropriate). TRC personnel have been trained on the Company's Drug and Alcohol Policy and will inform all site personnel.

Supplies: Indicate location of first aid kit, fire extinguisher, clean water supply (drinking, eye wash), and Site Health and Safety Plan (HSP).

Emergency services: Discuss location of nearest telephone and directions to hospital. Map, directions, phone numbers are provided in the HSP (Attachment C).

The TRC Emergency Twenty-four Hour Number is 1-800-274-0972.

- **First-Aid/CPR volunteers: _____**

_____

Site background: Discuss types, locations, and concentrations of chemicals found onsite, presence of free product, depth to groundwater, etc.

Offsite Permits/Access Permits: Discuss any permitting requirements for the site.

Work activities: Discuss scope of work for the day and activities to be performed.

Potential hazards: Review JSAs. Discuss physical, chemical and biological hazards Discuss the prohibiting of any eating, drinking, and/or smoking in the work zone.

Personal protective equipment (PPE): Discuss required level of protection; review additional PPE requirements in JSAs, as needed.

☒ Hard Hat ☒ Safety Shoes/Boots ☒ Safety Vest
☒ Eye Protection - ☒ glasses ☐ goggles ☐ face shield
☒ Hand Protection - ☒ leather ☒ nitrile ☐ other _____ ☐ Hearing Protection
☐ Respiratory Protection - ☐ APR Particulate ☐ APR Chemical cartridge ☐ other _____
☐ Protective Clothing - ☐ Tyvex ☐ Nomex ☐ Coveralls ☐ other _____

Utilities: Utilities have been cleared/marked by appropriate divisions.

Traffic control (vehicular and pedestrian): Work area is properly delineated and cordoned off from traffic. Technician will put a traffic cone at all four corners of his parked vehicle. Upon completion of work, walk around vehicle to pick up cones and check all four sides and underneath vehicle for obstacles prior to moving truck.

Dispenser Emergency Shut-off Switch: Location has been identified/communicated with field personnel.

Dealer Notification: Notify dealer/owner of site work activities to be performed.

HSP COMPLIANCE AGREEMENT

By signing below, I have completed the Tailgate Safety Meeting Checklist, reviewed this Site Health and Safety Plan and the Job Safety Analysis (JSA) and understand their contents. I hereby agree to comply with all safety requirements outlined herein:

TRC

Signature: _____, Site Safety Officer (SSO)

Print Name: _____ Date: _____

Signature: _____, Asst. Site Safety Officer (Asst. SSO)

Print Name: _____ Date: _____

Contractor:

Signature: _____, Site Safety Officer (SSO)

Print Name: _____ Date: _____

Signature: _____, Asst. Site Safety Officer (Asst. SSO)

Print Name: _____ Date: _____

Contractor:

Signature: _____, Site Safety Officer (SSO)

Print Name: _____ Date: _____

Signature: _____, Asst. Site Safety Officer (Asst. SSO)

Print Name: _____ Date: _____

TRC Employees / Contractor Personnel / Visitors

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

HSP COMPLIANCE AGREEMENT (cont.)

By signing below, I have completed the Tailgate Safety Meeting Checklist, reviewed this Site Health and Safety Plan and the Job Safety Analysis (JSA) and understand their contents. I hereby agree to comply with all safety requirements outlined herein:

TRC Employees / Contractor Personnel / Visitors (cont.)

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

ATTACHMENT G

CONTRACTOR SITE HEALTH AND SAFETY PLAN

Code of Safe Practices For General & Field Operations

Section One – Safety Program

INTRODUCTION

Safety for the public and for all our employees is a primary concern of Woodward Drilling Co., Inc.

As we all know, almost daily there are changes taking place in city, county, state, and federal safety regulations. Woodward Drilling will make every effort to keep employees up to date and informed of any changes through weekly "tailgate" safety meetings, pay check memos, and other written or verbal forms.

The 40 hour Health and Safety Training, and Safety Manual highlights areas of safety concern which each employee needs to be aware, provides the Pyramid of Responsibility Concept of safety, and details of Woodward Drillings' policies and procedures, as they now exist.

All legislated regulations in effect now or in the future will take precedence over any current company policy.

PROGRAM OBJECTIVES

The primary objective of Woodward Drillings' safety program and code of safe practices is to provide for and ensure the safest work place possible. We at Woodward Drilling want to remain an industry safety leader.

PYRAMID OF RESPONSIBILITY

Safety is the responsibility of every Woodward Drilling employee. To continue the excellent safety program, Woodward Drilling has established a Pyramid of Responsibility for safety starting with the President and Safety & Regulations Manager at the apex and the newest employee at the base.

District Managers

The President/Chief Operating Officer and Safety & Regulations Manager are responsible for all aspects of the safety program.

District Managers' (DM) responsibilities for safety will be to:

- Familiarize themselves with company and site specific health and safety plans (HSP), and ensure their effective implementation;
- Be aware of all safety considerations when introducing a new process, procedure, machine or material into the work place;
- Give maximum support to all programs and committees whose function is to promote health and safety;
- Actively participate on the Safety Committee, as required;
- Review all accidents and near misses to ensure that proper reports are completed and appropriate action is taken to prevent repetition;
- Provide the leadership role for all employees to think and work safely.

Field Operations Managers and Operators

All Field Operations Managers (FOM) and Operators are defined as field safety managers and immediately responsible to the DM for safety.

When on site, FOM will have primary responsibility for site operational safety.

Field Operations Managers Operators, Shared

Managers, operators, their shared responsibilities for safety in the field and are key responsibilities

- Familiarize themselves with company and site specific health and safety plans;
- Assure complete safety training of employees prior to assignment of duties;
- Consistently and fairly enforce all company safety rules;
- Investigate injuries to determine cause, and take immediate action to prevent repetition;
- See that all injuries, no matter how minor, are treated immediately and reported to their supervisor/manager;
- Use company self-inspection checklist as required for frequent work area inspections for unsafe conditions and work practices;
- Review all inspection and safety documents for authenticity;
- Write up disciplinary action for employee infractions of safety rules;
- Review all *"tailgate"* safety meeting material to ensure proper topics are being covered;
- Monitor all personnel under their supervision and demonstrate the leadership which will instill the proper attitude and performance in all matters of safety.

Operators

The operator on any job site is the key person responsible for the safe operation of equipment, safety of crews, enforcing safety policies and preventing accidents.

Specific safety responsibilities include the following:

- Know, follow and periodically review company and site specific health and safety plans;
- Ensure that all components of equipment are in good, safe operating condition;
- Conduct bi-weekly safety inspections (15th and 30th of each month), making sure all items on the checklist are inspected thoroughly, and using crew members to assist with inspections to help keep them alert to safe conditions;
- Correct all unsafe conditions;
- Constantly emphasize safety by observing and immediately correcting any unsafe work practice;
- Conduct and involve crew members in "tailgate" safety meetings;
- Pay particular attention to the on-the-job training of new crew member's safe work practices;
- Set the example for safe practices and behavior for the crew;
- Instruct all crew members in the use of emergency shut down devices

Operators *(continued)*

- Check and test all safety devices of all assigned equipment at the beginning of each operating day, after any mobilization and rig up, and not allow drilling activities until all emergency shutdown and warning devices are functioning properly;
- Maintain a list of site specific emergency addresses and telephone numbers and inform crew members of the list's location;
- Only operate the rig from the console;
- Ensure safe "housekeeping" practices are followed on work site.

Drill Crew Members

Crew members' specific safety responsibilities are to:

- Know, follow and periodically review company and site specific health and safety plans;
- Be responsible for their own and the safety of other crew members;
- Follow supervisory personnel instructions;
- Take all steps necessary to correct any unsafe conditions or hazards when seen and report them to their supervisor;
- See that all injuries, no matter how minor, are treated immediately and reported to a supervisor/manager;
- Maintain an alert, aggressive and ambitious attitude toward their job;
- Take an active part in safety meetings;
- Not accept any job for which they feel unqualified or not trained to perform safely;
- Wear proper personal safety protection and use all safety equipment properly;
- Ensure all machine guards are in place and functioning.

New Crew Members

Safe practices are equally as important as the skills they will learn.

In addition to general crew member responsibilities, new crew member responsibilities also include:

- Be sure to know how to do something they are asked to do;
- Ask if not sure about an assignment. Correct on the job training is important.

Drivers

All drivers' specific responsibilities are to:

- Obey all traffic rules;
- Know, follow and periodically review safety policies and procedures.
- Drive defensively and stay alert behind the wheel;

Drivers *(continued)*

- Exercise courtesy at all times when driving;
- Give up right-away;
- Do not exceed DOT or state driving periods, and take all DOT or state required rest periods;
- Inspect truck/trailer before and after each trip, and report any unsafe conditions or hazards to supervisor.

PERSONAL PROTECTION PROGRAMS

In addition to the personal protective equipment normally required for our industry, Woodward Drilling Co., Inc. also maintains personal protection programs:

- Respiratory Protection (See Respiratory Protection Program).
- Hearing Conservation Program

Under Title 8, California Code of Regulations, Article 105, Control of Noise Exposure, Section 5095, "Agriculture, construction, and oil and gas drilling and servicing operations are exempt from the provisions of Sections 5097 through 5100)", which outline the establishment of a comprehensive Hearing Conservation Program (5097), Hearing Protectors (5098), Training Program (5099), and Record keeping (5100).

According to the Standard Industrial Classification (SIC), Woodward Drilling is classified as 1781 which is Special Trades Contractors, Well Drilling. Defined as such, Woodward Drilling Co., Inc. is exempt from establishment of a Hearing Conservation Program.

However, in the interests of employees' health, Woodward Drilling Co., Inc. does conduct a modified Hearing Conservation Program.

During the initial physical examination, all new employees are given an audiometric screening test which establishes a baseline for hearing acuity; and all employees are given audiometric surveillance tests during the annual monitoring physical.

Hearing Conservation

Further, employees are required to wear approved hearing protection on drill sites at all times during drilling operations, and in the shop areas when necessary.

All employees are required to wear approved hearing protection at any time at any work site when the noise level exceeds 85 db (decibels), or when the noise level is so intense that to be heard from 3 feet the voice has to be raised above a normal conversational level.

To support this program and encourage compliance:

- Training in hearing protection and use of ear protection is delivered during the initial 40 hour training and annual update;
- Woodward Drilling Co., Inc. provides a variety of approved hearing protection devices for all employees.

GENERAL SAFE PRACTICES
Personal Protection

Hard hats shall be worn on all drilling sites, shop or yard where work might be performed under heavy objects, or where there is the possibility of injury from falling objects; they shall be clearly marked as meeting ANSI Z89.1, Type A or B requirements.

Rings and jewelry shall not be worn during a work shift.

Hair shall be no longer than collar length or must be tied up above the collar.

Safety toe boots shall be worn at all times while in all work areas.

They will have a firm grip, non-slip design sole and flat heel made of puncture proof, chemical and moisture resistant material and comply with ANSI Z41.1 requirements.

Athletic/jogging type safety toe shoes will not be worn in any work area.

When necessary because of wet areas, mixing drilling chemicals, muds, or in contaminated areas, steel toe rubber boots shall be worn.

Employees shall have both types of boots available at the work site.

In addition to protection against chemicals, all drilling crew members and shop or yard personnel shall wear gloves for protection against cuts and abrasions which can occur when handling wire rope, and from sharp edges or burrs on drums, drill rods, or other drilling or sampling tools.

All gloves will be snug fitting with no loose cuffs or draw strings, and proper for the task.

Hearing protection is available and will be worn on all drilling sites when noise levels exceed 85 dB, or it is necessary to raise the voice above a normal conversational level to be heard.

Safety glasses shall be ANSI Z87.1 approved with side shields and will be worn on all drilling sites, or in the shop or yard during grinding operations or anytime when there is potential for eye injuries such as punctures, scrapes, cuts or burns from sharp objects, flying particles, or hazardous substances.

Face shields shall be worn over safety glasses when additional face shielding is required against flying particles and/or splash and spray of water or hazardous liquids.

Clear or shaded lens safety glasses will not be worn for any welding. Only helmets approved for arc welding, or welding glasses approved for gas welding shall be worn. (See Appendix)

Contact lenses will not be worn during a work shift in the shop or on any drill site.

INJURIES AND TREATMENT

No matter how minor, all injuries shall be reported to a supervisor immediately, who will complete and send an Industrial Injury Report (IIR 965, See Appendix) to the safety manager at the Rio Vista office as soon as possible following the injury.

First Aid Kits

Each rig is equipped with a fully supplied, approved first aid kit, and one is located in each of the shops break room. (See HSP, pg. 12)

All field personnel must successfully complete the Red Cross Standard First Aid and CPR training during the 40 hour health and safety class, and maintain current recertification as required.

First aid is emergency medical treatment rendered to an injured person to prevent further injury or death before proper medical treatment can be obtained.

An injury requiring more than first aid is considered serious.

Any seriously injured employee will be accompanied by another Woodward Drilling Co., Inc. employee and taken immediately to the nearest doctor or medical facility.

In the event of an accident on the job involving injury, the injured employee and the crew will be drug tested.

Any employee who becomes ill while at work shall report immediately to his supervisor.

PREVENTION AND PROTECTION (Fires)

Areas around shop equipment, rig decks and the ground area around the rig shall be kept free of oil and other materials which might create or aggravate fire hazards.

Combustible materials such as oily rags and waste shall be stored in covered metal containers and disposed of on a regular schedule.

When conditions require it, a 100' perimeter around the drill site shall be cleared and maintained free of dry combustible material such as grass or weeds.

Spills of any flammable liquid such as diesel or hydraulic fluid shall be immediately cleaned up with absorbent material and properly disposed.

All flammable liquids will be stored in clearly marked, approved containers.

Fire fighting equipment shall not be tampered with nor removed from their designated location except for fire protection or suppression.

Drill rigs will be equipped with a minimum of one 20# multipurpose ABC extinguisher; support vehicles will be equipped with a 5# ABC multipurpose extinguisher; and forklifts will be equipped with a 21/2# ABC multipurpose extinguisher.

Fire extinguishers shall be visually inspected monthly for condition and expiration date, and tag with date of annual inspection and inspector's name.

Extinguishers found to be damaged, unserviceable, expired or have been used shall be sent to the yard as soon as possible for replacement, and recharge by a qualified technician.

A maintenance inspection will be performed annually by a qualified technician

Lifting and Carrying

Proper lifting techniques as instructed during training shall be used.

Whenever possible, heavy objects will be moved with the aid of hand trucks, forklifts or additional personnel.

When carrying loads with others, all should agree who is leading and what signals are to be used.

Load should not be released until all personnel are ready.

When carrying extended loads such as pipe, watch to avoid striking objects or other workers.

Loads shall not be carried so vision is obstructed.

Drums

Precautions shall be taken when handling full drums.

Gloves shall be used as hand protection against cuts caused by mill burrs or rough edges.

Hand hold shall be released before a hand or fingers can be pinched between other drums or objects.

Drums should be pushed away with feet not with hands. They should not be kicked.

Before drums are pulled over on their sides, all caps/bungs shall be securely in place, and there is sufficient clearance for hands and feet when laying drums down.

When opening closed drums that have been exposed to heat from the sun or other sources, personnel shall stand clear and open slowly until the pressure is relieved.

Material Storage

Bagged material shall be stacked by stepping back the layers and cross-keying bags at least every ten (10) bags high.

Bags around the outside of the stack shall be placed with the mouths of the bags facing the center of the stack.

During unstacking, the top tier shall be kept nearly level and the necessary setback maintained.

Materials shall be stacked so the weight is equally distributed, and do not project into passages or walkways, or fall over.

Material storage areas shall be kept orderly and free of trip hazards.

Material Storage *(continued)*

Pipe, drill rod, casing, augers, and similar cylindrical drill tools shall be stacked orderly on racks or sills to prevent spreading, rolling or sliding.

Unless in racks, pipe and well casing shall not be stacked higher than 5 feet.

Where a batten is used, the outside pipe or casing shall be securely choked, and each tier of pipe shall be tapered back at least one pipe or casing.

Flammable Materials

Oils, greases and other flammable materials shall be labeled and properly stored in approved containers in designated locations.

Materials Disposal

Scrap, trash and other junk material shall be disposed of properly.

Hazardous materials will be separated from non-hazardous waste and disposed of in containers provided for each type of material.

Drilling waste such as cuttings or decon water will not be removed from a drill site under any circumstances.

Waste oil will be disposed of in a designated waste oil tank.

Used oil filters will be drained of waste oil and deposited in a designated 55 gallon barrel for final disposal.

Spent batteries will be stored in a designated area for proper disposal.

Jacks and Jack Stands

No one shall work under any vehicle which is not properly supported by cribbing, jacks, or jack stands designed for that purpose.

Wheels will be blocked, leveling jacks lowered, and the hand brake set before working under any carrier/drill rig.

Rated capacity of any jack shall not be exceeded.

Jacks shall be properly maintained according to the manufacturer's recommendations, and shall be inspected before and after each use.

Jacks leaking hydraulic oil shall be taken out of service for replacement or repair.

Jacks shall not be thrown or dropped.

Handles of hydraulic jacks shall not be left down creating a tripping hazard.

Jack handle swing shall be unobstructed and personnel will stand aside before operating the jack.

Jacks shall be placed on clean level surfaces.

Hardwood blocking at least twice (2x) the size of the base shall be positioned under jacks used on any earthen surface.

·cks and Jack Stands (continued)

Unless a jack is designed to prevent load shifting, metal-to-metal contact between the jack head and the load shall not be permitted.

If necessary, a minimum 2" thick hardwood block larger than the jack head shall be used between the jack and the metal contact surface.

Wood or metal extenders shall not be used to increase a jack's lift

height. All lifts shall be vertical with the jack centered under the load.

After raising a load, it shall be supported by proper jack stands or substantial wooden blocking.

When several jacks are used to lift a heavy load, they shall be raised simultaneously a little at a time in order to keep the load level.

Hand Tools Their are a few general rules which apply to the safe use of several of the hand tools frequently used on and around drill rigs and in the maintenance shop.

The proper tool, in good condition shall be used for the job being performed.

All tools and equipment must be inspected and maintained on a regular basis.

If a tool is damaged, it will be repaired before use or replaced.

All repairs and replacement shall be made without delay.

Employees shall clean and return all tools, equipment and materials to their proper place when a job is finished.

Hand tools that have been subjected to high heat will not be used.

Aluminum pipe wrenches shall not be used.

Adjustable, pipe, end and socket wrenches shall not be used if the jaws are sprung or worn such that slippage might occur.

All pipe wrenches will be kept clean and in good repair.

Jaws of pipe wrenches shall be wire brushed frequently to prevent a buildup of dirt, pipe dope or grease which can cause the wrench to slip.

Hook and heel jaws will be replaced when they become visibly worn.

Pipe wrenches will not be used in place of a drill rod holding device.

Pipe wrench jaws will not be heated. Pliers or pipe wrenches shall not

be used to loosen or tighten nuts.

Tools such as drift pins, wedges and chisels shall be kept free of mushroomed heads.

Files without handles will not be used.

Wooden handles on hand tools shall be kept free of splinters and/or cracks and shall be kept tight on tools.

Grinders/ Cut-off Machine *(Continued)*

Hands will be kept clear of cutting area.

All safety guards will be securely in place and properly adjusted before starting machine.

Work will be properly secured in machine vice before operation.

WELDING SAFETY

Employees performing welding, cutting, or heating shall be protected from welding hazards oy appropriate and approved personal protective equipment such as welding leathers, leather gauntlet gloves, welding helmet or welding glasses.

Safety glasses will not be used in place of proper welding glasses for welding or cutting.

Welding will not be done without proper eye protection.

All eye and face protection devices used when welding, cutting, chipping or grinding shall comply with the ANSI Z87.1 standard.

(See Appendix, Welding Lens Density Chart, for selection of proper welding lenses.)

When necessary, proper respiratory protection will be used.

All welding and cutting equipment and operations shall be in accordance with standards and recommended practices of ANSI Z49.1.

Workers and visitors shall be shielded from welding rays, flashes, sparks, molten metal, and slag.

Cables, hoses, and other equipment shall be kept clear of passageways, ladders, and stairways.

All welding, cutting, and metal heating operations shall be ventilated (natural or mechanical) such that personnel exposures to hazardous concentrations of airborne contaminants are kept within acceptable limits.

Before welding or heating any surface covered by preservative coating whose flammability is not known, a test shall be made to determine its flammability: the coating will be scraped and shall be considered highly flammable when scrapings burn with extreme rapidity.

Preservative coatings shall be removed a sufficient distance from the work area to ensure the temperature of the exposed area will not be appreciably raised. Artificial cooling of the metal surrounding the work area may be used to limit the size of the area to be stripped.

Gas Welding

Oil or other petroleum products shall not be used on any threaded portions of oxygen/ acetylene cylinders or gauges.

Regulators shall not be forced onto a cylinder valve.

Regulators shall not be over tightened when installing on cylinders.

"Creeping" regulators, faulty regulators which will not maintain a constant set pressure, shall not be used.

Pressure will not be left on unattended regulators.

Compressed Gas Cylinders

Compressed gas cylinders shall be secured by two chains when in an upright position.

When not in use, the protective cap shall always be in place.

When in storage, all compressed gas cylinders shall be separated from flammables by a noncombustible barrier with at least a half-hour fire rating, or kept at least 20 feet from flammables.

Unless protected by a guard integral to the body of a vehicle, compressed gas cylinders shall only be transported with gauges removed, cylinders properly secured and protective caps in place.

All empty cylinders shall be suitably marked as "EMPTY" or "MT."

Employees will stand to one side and slowly open compressed gas bottles.

Oxygen Cylinders

Oxygen cylinders when transported in a horizontal position shall be properly blocked or secured to prevent rolling or movement.

Oxygen shall not be used as a substitute for compressed air.

Oxygen cylinders shall be stored in an area separate from acetylene.

Oxygen cylinder valve shall be fully open when in use.

Oxygen regulator setting shall not exceed the normal 40 psi working pressure.

Oxygen cylinders shall not be moved with oily hands or gloves.

Acetylene Cylinders

Acetylene bottles shall never be laid down, and shall always be stored or transported in a secure, upright position.

When in use, the acetylene valve shall only be opened 1/4 turn.

Acetylene regulator discharge setting shall not exceed the 15 psi safe working pressure.

If not equipped with a shut-off wheel, the square key wrench or other suitable tool shall be kept with the acetylene cylinder for emergency shut-off.

The acetylene valve shall be pointed away from the oxygen cylinder when in tandem.

Arch Welding

Electric arc welding requires the use of welding helmets fitted with No. 10 or darker filter lenses.

Anyone helping an arc welder shall also wear a No. 10 or darker filter lens.

See Appendix, Welding Lens Density Chart for correct welding lens.

Protection shall be provided for coworkers when welding at night.

Arc welders shall not stand on wet floor or come in contact with a grounded surface.

Arc Welding *(continued)*

All welder-generators shall be properly grounded to vehicles before use.

When welding casing joints together as they are going in the hole, the ground clamp shall be connected to the casing or casing clamp, not the rig.

All welding leads shall be regularly inspected and maintained in good, safe working order.

Cables shall be completely insulated, flexible and capable of carrying the maximum current required for the job.

Coiled welding cable shall be spread out before use.

Cables with splices or repaired insulation within 10 feet of the stinger shall not be used.

When it becomes necessary to connect or splice lengths of cable together, insulated connectors of a capacity at least equivalent to the cable shall be used.

If connections are made by cable lugs, they shall be securely fastened together to provide good electrical contact, and the lug's exposed metal parts shall be completely insulated.

ELECTRICAL SAFETY

Makeshift wiring and equipment will not be permitted.

All wiring will be installed using high quality connectors, fixtures and wire insulated and protected with consideration for a drilling environment.

All wiring and fixtures used to provide electricity for drilling operations shall be installed by qualified personnel in accordance with the National Fire Code (NFPA 70-1984) with consideration of the American Petroleum Institute's recommended practices for electrical installations for production facilities (API-RP-500B).

Live parts of wiring or equipment shall be guarded to protect all persons or objects from harm.

Electrical cables will be guarded and located to prevent damage by drilling operations or by the movement of personnel, tools, or supplies.

Patched, oil soaked, worn or frayed electrical cords shall not be used.

All extension cords shall be of the 3-wire, grounded type of the proper amperage rating for the intended use.

All electrical tools shall have three-pronged, U-blade plugs.

All plug receptacles will be three-pronged, U-blade, grounded type and of the proper amperage rating for the tools that may be used.

Electrical hand tools shall be plugged into a circuit equipped with an approved ground fault circuit interrupter (GFCI).

Electrical tools with "lock-on" devices shall not be used.

All electrical welders, generators, control panels and similar devices shall be properly grounded.

ELECTRICAL SAFETY *(continued)*

Hands, boots and clothing shall be dry when handling electrical equipment.

Control panels, fuse boxes, transformers and similar equipment shall be installed in an approved, properly secured, protective enclosure.

Before working on electrical power or lighting systems, the main distribution panel box will be locked-out and the key shall be kept in personal possession of the employee performing the work until the work is completed.

Power shall be turned off before changing fuses or light bulbs, or performing any repair or maintenance.

Drill Site Lighting

Drilling projects sometimes require working at night or around the clock and require temporary electrical lighting.

All lights in the working areas of drill sites shall be enclosed in cages or similar enclosures to prevent loose or detached lamps or vapor tight enclosures from falling on workers.

Portable light towers will be used when necessary and will exceed the OSHA required 5 foot candles of illumination.

Lights shall be installed in a manner so as to produce the least possible glare or blind spots on tools, ladders, walkways, platforms and the entire work area.

Electric lighting cables shall not be attached to the derrick or other components or the drill rig. If this must be done, only approved fasteners shall be used.

Electrical wiring shall not be "strung" through the derrick.

Poles used to hold wiring and lights shall not be used for any other purpose.

Only plastic ANSI Z89.1 or ANSI Z89.2 approved hard hats shall be worn when electrical lighting is used.

Battery Service

Extreme caution will be used when servicing batteries.

Batteries will only be serviced in well ventilated areas while wearing safety glasses and a face shield.

When removing or charging a battery, the ground cable will be disconnected first to avoid the possibility or making a spark which could ignite flammable battery gases. For the same reason, when installing a battery, the ground will be connected last.

When charging a battery, the power source to the charger will be shut off before connecting or disconnecting the charger leads to the battery posts.

Before charging, cell caps shall be loosened to permit the escape of any explosive hydrogen gas generated during charging.

Cells shall be kept filled with electrolyte.

Battery Service *(continued)*

If necessary to visually check electrolyte level, only a flashlight will be used.

All tools shall kept off battery tops.

Spilled battery acid can burn skin and damage eyes.

In the event of a splash, immediately rinse acid from your skin with lots of cool water.

If acid should get in the eyes, flush immediately with large amounts of cool water for at least 15 minutes, and get medical attention at once.

VEHICLE MAINTENANCE

Except for those repairs or adjustments that can only be made with the engine running, the vehicle engine shall be shut down to make repairs, adjustments, or for lubrication.

During maintenance the ignition key shall be tagged as out of service, or the ignition key will be removed to prevent accidental starting of an engine.

When possible and appropriate, the drill rig shall be reduced to "zero energy state" by relieving pressure on all hydraulic, drilling fluid, and air systems prior to performing maintenance.

Caution will be used when opening drain plugs, radiator caps, and other plugs and caps that might be under pressure.

Before returning the carrier/rig to service, all caps, filler plugs, protective guards or panels, high pressure hose clamps, chains or cables that may have been removed for maintenance will be replaced.

A hot engine or exhaust system will not be touched until it has had time to cool.

FUEL SAFETY

Fuels shall never be used as cleaning solvents.

Fuels shall only be stored or transported in red, approved portable containers equipped with internal flame arresters, and the fuel type clearly marked on the container.

To allow for temperature expansion, portable containers shall not be completely filled.

Fuels shall never be transported inside of cars or truck cabs.

Fuels shall not be poured, handled or stored in open plastic or glass containers, in unventilated areas, near sources of flame, near electrical equipment, or near combustible materials such as cloth, cardboard boxes, paper, etc.

Fuels shall not be siphoned by mouth.

Electrical anti-static bonding cables will be properly connected between the carrier/rig equipment and other vehicle before fueling.

All electrical equipment, heaters in carrier cabs shall be turned off when fueling the carrier or drill rig, or other vehicle.

No smoking or open flame within 50 feet of fuel islands.

All fuel tanks shall be marked appropriately, and care shall be taken to ensure the correct fuel is put into the proper tank.

Only the type and quality of fuel recommended by the engine manufacturer will be used.

Do not spill fuel on hot surfaces: clean up any spillage before starting an engine.

Wool or metallic cloth or other material which can create static electricity will not be used to wipe up spills.

Spilled fuels or other flammable liquids will be contained with adsorbed material and disposed of properly.

OFFICE SAFETY

Desk drawers and file drawers shall be kept closed when not in use.

Heavy materials shall not be stored on top of file cabinets.

Office machine cords shall be kept out of walkways or properly covered to prevent tripping hazards or damage to cords.

Any defective electric cords, light fixtures or switches shall be reported immediately.

Broken glass or other sharp objects shall not be placed in waste baskets.

Razor blades or other sharp objects shall not be left loose in desk drawers. Store such items in a suitable container.

Smoking is not allowed in any office area.

VDTs will be mounted so that their position and height can be adjusted to reduce glare and for general operator comfort.

Chairs will be so designed that their height and position can be adjusted for proper sitting posture, and to prevent tipping.

APPENDICES

- Welding Lens Density Chart
- Industrial Accident Report

WELDING LENS DENSITY

Filter lenses or plates used in welding operations shall be in accordance with the following table.

These are minimum densities. Shades more dense than those listed may be used to suit an individual's needs.

Required Shades for Filter Lenses and Glasses in Welding, Cutting, Brazing, and Soldering:

OPERATION	SHADE NUMBER
Soldering	2
Torch Brazing	3 or 4
Cutting: Light < 1"	3 or 4
Medium, 1 to 6"	4 or 5
Heavy, > 6"	5 or 6
GAS WELDING:	
Light up to 1/8"	4 or 5
Medium 1/8" to 1/2"	5 or 6
Heavy 1/2" + 6 or 8	
ARC WELDING:	
Inert-gas metal-arc 1/16" to 5/32" electrodes (nonferrous)	11
1/16" to 5/32" electrodes (ferrous)	12
Shielded metal-arc welding: 1/16" to 5/32" electrodes	10
3/16" to 1/4"	12
5/16" to 3/8"	14
Carbon arc welding	14

Gas Welding

Hoses shall be inspected frequently for cracks, abrasions, and loose connections, and shall be replaced if found defective.

Fuel gas and oxygen hoses shall be readily distinguishable from each other, and shall not be interchangeable

When parallel runs of oxygen and fuel gas hose are taped together, not more than 4 out of every 12 inches shall be covered by tape.

Hoses that have been contaminated by oil, grease or other petroleum products shall not be used.

Before lighting the torch for the first use each working shift, hoses shall be purged individually.

Hoses extended over the ground or shop floor shall be kept free of kinks or loops.

Matches, lighters or hot metal shall not be used in place of proper friction lighters to light torches.

Defective torches shall not be used, and shall be inspected at the beginning of each working shift for leaking shut off valves, hose couplings and tip connections.

Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills or other devices designed for such purposes.

Torch valves shall be closed and the gas supply valves will be shut off whenever work is suspended.

No cutting or welding on or near any container that contains or may have contained any flammable or explosive material.

Cutting or welding shall not be done directly on concrete.

When cutting any container with a closed bottom, the welder's face shall be kept to one side.

Cutting or welding shall not be performed in hazardous locations.

Cutting or welding shall not be performed near flammable vapors, liquids, dust, or loose combustible material.

When possible, all combustibles shall be moved at least 30 to 40 feet from the cutting/ welding area.

Welder shall not be in such a position as to allow cutoffs to fall on feet, legs or other body parts.

When finished welding or cutting, material shall be marked "HOT" with soapstone.

When welding or cutting in the field, fire extinguishers shall be readily available, and a spotter will be used to watch sparks and slag.

Woodward Drilling Co., Inc

INDUSTRIAL INJURY REPORT

PLEASE PRINT CLEARLY AND CMPLETE EVERY BLANK

INJURED EMPLOYEE _____ RIG # _____

EMPLOYEES JOB TITLE _____ SUPERVISOR _____

LOCATION OF ACCIDENT _____ DRILL/CREW CHIEF _____

CREW MEMBERS _____

(CITY) _____ (COUNTY) _____

DATE OF INJURY _____ AM PM

WITNESSES _____

(NAME) (ADDRESS)

DISCRIPTION OF EMPLOYEES ACTIVITIES AT THE TIME OF THE INJURY. _____

HOW DID THE INJURY/ACCIDENT OCCUR? _____

DESCRIBE IN DETAIL THE INURY. (Be specific, right or left, upper or lower, front or back.) _____

IS THIS A LOST TIME INJURY? YES NO

WAS INJURED EMPLOYEE SENT TO DOCTOR? YES NO

IF YES, WHO TOOK INJURED EMPLOYEE? _____

NAME OF DOCTOR OR HOSPITAL _____

WAS SUPERVISOR PRESENT? YES NO

SIGNATURE OF SUPERVISOR _____

DATE OF REPORT _____

(USE REVERSE SIDE FOR COMMENTS, IF NECESSARY)

GREGG DRILLING & TESTING, INC.
GREGG IN SITU, INC.

HEALTH MONITORING AND SAFETY PROGRAM

REVISION NO. 3, FEBRUARY 26, 2004

TABLE OF CONTENTS

TABLES

APPENDICES

GREGG DRILLING & TESTING, INC.
GREGG IN SITU, INC.

HEALTH MONITORING AND SAFETY PROGRAM

1.0 COMPANY POLICY

To assure the health and safety of employees assigned to work at hazardous waste sites, Gregg Drilling/In Situ has developed and implemented a Health and Safety Program. A committee consisting of representatives of Gregg's technical staff with support from medical advisors administers this program. No personnel will be allowed on site until enrolled in the Health Monitoring Program and trained as appropriate for their assigned function.

This plan is based on Standard Operating Safety Guides (USEPA) and the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH/OSHA/USGC/EPA).

Gregg employees are to receive health and safety indoctrination prior to commencing work with the drilling equipment and will be provided with periodic follow-up indoctrination and training as appropriate. Indoctrination and training will include:

- Health Monitoring Program
- Review of General Chemical & Mechanical Dangers
- Emergency Response
- Decontamination
- Documentation and Record Keeping
- Updating of Health and Safety Plan
- Reference Guides for Hazardous Materials

When appropriate, a site-specific safety plan will be implemented and will include the following:

- site history
- Inventory of known chemicals (updated as possible)
- Project organization
- Work plan review
- Project documentation
- Review of site safety rules (site safety rules will be updated as new information is available or after an accident or implementation of contingency plan)
- Review of decontamination procedures
- Proper selection, use and care of personal protective equipment (PPE)
- Proper calibration and use of monitoring equipment
- Emergency response procedures

A summarized Safety Policy is presented in Appendix A. A site-specific safety checklist is presented in Appendix B. The checklist is intended to provide a framework within which information may be added regarding site-specific health and safety concerns.

2.0 HEALTH MONITORING PROGRAM

All drilling personnel and field staff must be enrolled in the Gregg Health Monitoring Program, developed in conjunction with Long Beach Medical Clinic for the Signal Hill office, Centers for Occupational Medicine for the Martinez office, Kelsey-Seybold of Kingwood, Texas for the Kingwood, Texas office, and Family Med Centers of Aiken for the Summerville, SC office. These programs consist of an initial medical examination to establish the employee's general health profile and provide important baseline laboratory data for comparative study. The scope of the initial comprehensive physical examination and laboratory testing routine is detailed in Table 1.

Table 1

3.0 INITIAL EXAMINATION

Physical Examination

- medical history survey
- physical examination
- vision: near and distant vision, color vision
- hearing: audiometry
- blood pressure
- weight, height
- temperature
- X-rays of chest and back if needed
- electrocardiogram: 12 lead
- spirometry

Lab Studies

- hematology
  - red blood count
  - white blood count
  - hemoglobin
  - hematocrit
  - platelet
  - indices
  - sedimentation rate
  - blood chemistry
  - SMA 17

Lab Studies (Continued)

- electrolytes
- SPGT
- carbon dioxide
- cholesterol
- serum iron
- urine analysis
- Papanicolaou (PAP) test (females)
- cholinesterase level
- thyroid function test T3/T4

Drug Tests

- amphetamines
- cocaine metabolite (benzoylecgonine)
- cannabinoids (THC)
- opiates (morphine, codeine)
- phencyclidine (PCP)
- barbituates
- benzodiazepine (metabolite)
- methodone
- methaqualone
- propoxyphene (darvon)

Follow-up examinations, including all specifics in Table 1, are completed for all personnel enrolled in the health monitoring program on an annual basis, or more frequently if project assignments warrant testing following specific field activities or if suspicion exists. The level of potential exposure that Gregg personnel are subjected to in carrying out hazardous waste work assignments are recorded by the individual and reviewed weekly by the site supervisor. The California Poison Control Center maintains a comprehensive reference library containing the current information concerning the carcinogenic, mutagenic, teratogenic and toxic characteristics of hazardous wastes.

4.0 REVIEW OF EXPOSURE SYMPTOMS

Symptoms of exposure to hazardous materials for each site will be reviewed by the Office Manager/Supervisor in order to indicate to personnel the recognized signs of possible exposure to those materials. This information will be supplemented with a discussion of the need for objecting in the personal health assessment to account for normal reaction to stressful situations. The Site Safety Officer (the lead driller) will be watchful for outward symptoms that may include skin irritations, skin discoloration, eye irritability, reduced libido, intolerance to heat or cold, or loss of

appetite. Employees will routinely be asked to assess their general state of health during individual projects. At the end of each week employees will briefly describe minor injuries and chemical experience (exposure potential at each job site). This description will be turned in with time records, reviewed by the corporate safety officer and filed in the employee's medical file (See Appendix C for example).

5.0 REVIEW OF GENERAL CHEMICAL & MECHANICAL DANGER

A set of standard on-site safety practices will be enforced during site activities to reduce the risks associated with handling contaminated materials and dangers inherent with working near heavy machinery. These safety practices are divided into three categories: personal precautions, rig safety, and general procedures and operations.

Personal Precautions

a. Any practice, which increases the probability of hand-to-mouth transfer and ingestion of contaminated material will be prohibited in any area designated contaminated. Prohibited activities include eating, drinking, chewing gum or tobacco, and smoking.
b. Hands and face will be thoroughly washed upon leaving the work area and before eating, drinking or any other activities.
c. Any excess facial hair, which interferes with proper fit of the mask-to-face seal, will be prohibited on personnel required to wear respirator protection. (While respirators are not typically required, workers will be prepared to upgrade to level "C" protection requiring the use of respirators).
d. Unnecessary contact with contaminated or suspected contaminated surfaces will be avoided. Workers will be instructed to avoid walking through puddles, mud, or other discolored surfaces; kneeling on the ground; and leaning, sitting, or placing equipment on drums, containers, vehicles or the ground.
e. Medicine and alcohol can increase adverse effects from exposure to toxic chemicals. Therefore, personnel will not take prescribed medication during field activities. Also, alcoholic beverage intake will not be tolerated immediately before or during field work.

6.0 RIG SAFETY

Gregg Drilling/In Situ has incorporated the National Drilling Federation's (NDF/DCDMA/NDCA) "Drilling Safety Guide" as our mechanical hazards and rig safety guide. This booklet (see Appendix D) is required reading for all field personnel. In addition a safety shutoff is installed on every rig. This shall be tested daily to insure proper operation.

General Procedures & Operations

Daily Safety Meeting

Each drilling crew is required to conduct a tailgate safety meeting at the start of each day. Topics to cover include the following: Entrance and exit to the site will be planned and emergency escape routes will be determined. Before drilling begins, a working phone will be located and the most expeditious route to a hospital established. Site specific hazards will be discussed and the clients safety requirements will be adopted in addition to GDT/GIS safety policies; the number of personnel and pieces of equipment in the work area will be minimized to the extent that it compromises the effectiveness of site operations; procedures for leaving a contaminated work area will be established prior to going on site; Work areas and decontamination procedures will be established based on site conditions.

7.0 PERSONAL PROTECTIVE EQUIPMENT

All Gregg Drilling/In Situ field personnel will be required to use Personal Protective Equipment (PPE). Training in the use of PPE will be given to all employees at the time of hire, during their initial 40 hour HAZWOPER training and during annual 8-hour refresher training. Each affected employee will be trained in the following areas: 1) When is PPE necessary; 2) What PPE is necessary; 3) How to properly don, duff, adjust and wear PPE; 4) The limitations of the PPE and 5) the proper care, maintenance and useful life and disposal of the PPE. The employee shall demonstrate an understanding of this training prior to being allowed to perform work requiring the use of the PPE.

The level of personal protective equipment required shall be determined by the type and levels of waste or spill material present at the site where project personnel may be exposed. Initial determination will be supplied by the client and in situations where the types of waste or spill material on site are unknown or the hazards are not clearly established or the situation changes during on-site activities, the Site Safety Officer must make a reasonable determination of the level of protection that will assure the safety of drilling personnel until the potential hazards have been determined precisely through monitoring, sampling, informational assessment, or other reliable methods. Once the hazards have been determined, protective levels commensurate with the hazards shall be employed. Protection levels will be continuously evaluated to reflect any new information acquired.

The levels of protection and related PPE are as follows:

Level D - Level D is the basic work uniform consisting of long pants (no shorts) and shirts (no tank tops or sleeveless shirts), or coveralls, ANSI approved steel toed boots, hard hat, safety glasses and work gloves. All Gregg field personnel will be required to wear a minimum of Level D PPE for all field activities. Training for the fit and use of Level D PPE will be given to the employee by the office safety coordinator at the time of hire.

Level C – Level C PPE consists of the used of all Level D PPE plus the use of an Air Purifying Respirator and/or Dermal Protection consisting of one or more of the following: chemical resistant coveralls, gloves and boot covers. Level C PPE will be used when the required level of respiratory protection is known, or reasonably assumed to be not greater than the level of protection afforded by air purifying respirators (either half face or full face), and hazardous materials exposure to the few unprotected areas of the body (i.e. the back of the neck) is unlikely. Refer to the Gregg Respiratory Protection Program section of this Heath Monitoring and Safety Program for the decision matrix regarding the selection of Level C PPE.

Level B – Level B PPE consists of Level C or greater dermal PPE and the use of a Full Face Supplied Air Respirator. The Site Safety Officer must select Level B protection when the highest level of respiratory protection is needed, but hazardous material exposure to the few unprotected areas of the body (i.e., the back of the neck) is unlikely.

Level A - Level A PPE consists of Level B PPE plus the use of a fully encapsulating chemical resistant suit. Level A PPE must be selected when the Site Safety Officer makes a reasonable determination that the highest available level of both respiratory and skin and eye contact protection is needed. It should be noted that while Level A provides maximum available protection, it does not protect against all possible hazards. Consideration of the heat stress that can arise from wearing Level A protection should also enter into the subtask leaders' decision. (Comfort is not a decision factor, but heat stress will influence work rate, scheduling, and other work practices.)

Project specific training will be given to each employee working on projects involving the use of Level B and Level A PPE. This training will be given by a qualified safety professional and will cover the site specific contaminants of concern, the proper use and operation of supplied air and supplied air respirators, the proper procedures for putting on and removing PPE, checking the fit of all required PPE, and the establishment of the exclusion zone, contaminant reduction zone and support zone. This training will also be covered in their 40-hour HAZWOPER training and during the annual 8-hour refresher training.

Any personnel not using PPE in a proper manner will be removed from the exclusion zone and retrained in the proper use of the PPE by the site safety officer. These actions will be documented and given to the Office Manager.

If a change is made in the workplace or in the PPE that renders the previous training obsolete, or if the employee does not know the proper use of the PPE, retraining, and recertification of the employee will be completed.

Gregg will supply employees with all required PPE except for steel toed work boots. Disposable respirators, chemical resistant gloves, Tyvec or coated coveralls, and ear plugs will be used when necessary. These are to be properly discarded after each use and replaced from the office supplies as they are consumed. Hard hats are to be inspected daily by the employee and replaced when damaged

or the head suspension is worn.

Employees will provide their own steel toed work boots. The boots shall be ANSI Z41.1 rated. Work boots are to be replaced when the soles are worn or if there are any holes in the upper portion of the boot. If requested by the employee, Gregg will provide steel toed rubber boots that meet the required specification.

All training will be documented and records of training will be kept in the employees file.

Respiratory protection criteria and suitable protection gear are summarized in Table 2-1.

Table 2-1

Protective Gear
(Air Quality Levels in PPM)

	Level D	Level C	Level B	Level A
Air Quality Above Background	0	0 to 5	5 - 500	500 - 1000
Respirator Type*		APR	SAR	SAR
CLOTHING				
Boots	X	X	X	X
Safety Glasses or equivalent	X	X	X	
Hard Hat	X	X	X	
Gloves, inner and/or outer	X	X	X	X
Booties			X	X
Coveralls	X	X	X	
Chemical Protective Coveralls		X	X	
Total Encapsulated Suit				X

* Use of a respirator is allowed where identification of organic vapor constituents has occurred and appropriate respirator cartridges have been obtained.

Fit testing of safety equipment will be an important part of establishing adequate respiratory and dermal protection. Fit testing will be accomplished prior to site explorations and each individual will be assigned a fitted respirator for the duration of the project. Refer to the Respirator Protection Program for a detailed discussion of respirator use and procedures.

It should be recognized that most situations require a different combination of respiratory and dermal protective gear, e.g., where no splash protection is required but a high respiratory hazard is present. The Site Safety Officer may elect a modification of the above.

8.0 EMERGENCY RESPONSE

On-site first aid

All Gregg Drilling / In Situ field personnel will be equipped with the following items at all times:

- 1 industrial first-aid kit (on rig)
- 1 half-mask respirator (3M Disposable Model Organic Vapor/Acid Gas Cartridge)
- 1 hard hat
- 1 pair of safety glasses
- ear protection
- disposable gloves
- chemical resistant coveralls (coated Tyvek)
- steel-toed boots
- fire extinguisher (on both rig and support truck)
- eyewash

First-Aid

At least one person qualified to perform *first aid* should be present on site at all times during work activity. This person will have earned a certificate in first-aid training from the American Red Cross or will have received equivalent training.

Transportation to Emergency Treatment

A vehicle (typically the support truck) will be available at all times for use in transporting personnel to the hospital. Hospital routes shall be discussed prior to on-site activity.

Contingency Planning

Prior to commencement of on-site activities, field personnel will review safety considerations with the Site Safety Officer. The Site Safety Officer is responsible for adherence to the designated safety precautions and assumes the role of Gregg's on-site coordinator with the client in an emergency response situation. Gregg's driller will serve as Gregg's on-site safety officer, unless prior arrangements are made.

9.0 POTENTIAL HAZARDS

The potential hazards associated with hazardous waste site investigation include 1) accidents; 2) contact, inhalation or ingestion of hazardous materials; 3) explosion; and 4) fire.

Accidents

Accidents must be handled on a case-by-case basis. Minor cuts, bruises, muscle pulls, etc., will still allow the injured person to undergo reasonable normal decontamination procedures prior to receiving direct first aid. More serious injuries may not permit complete decontamination procedures to be undertaken, particularly if the nature of the injury is such

that the victim should not be moved. The nature and degree of surface contamination at a site is generally low enough that emergency vehicles could reach the victim on site without undue hazard. However, in the event that access on site is limited, accident victims may be transported by GDT/GIS personnel trained for this response.

Contact and/or Ingestion of Hazardous Materials

Properly prescribed and maintained protective clothing and adherence to established safety procedures are designed to minimize these hazards. However, it is still a possibility that contact or ingestion of materials may occur. Should this happen, standard first aid procedures should be followed. The drilling rig will have a tank of water, which may be useful in some circumstances, particularly to flush off any exposed skin areas. Eye wash bottles will also be maintained at the site in case of emergencies. In cases of ingestion or other than minor contact with known substances, the Poison Control Center and local hospital should be contacted and the victim brought there immediately for further treatment and observation.

Explosion

The drilling crew should be keenly aware of combustible gas meter readings and withdraw at an indication of imminently hazardous conditions. The detection of such conditions shall be reported to local agencies for potential execution of the evacuation plan, should the situation be assessed as warranting such a response.

Fire

The combustible gas meter will also warn of imminent fire hazards at borings. The greatest fire hazard at the site should be recognized as handling the methanol use for decontamination. No smoking or open flames are allowed in this area. Carbon dioxide fire extinguishers will be kept at the drilling rig, and the decontamination area/field office. The fire department, previously informed of site activities, will be called as needed.

10.0 EVACUATION RESPONSE LEVELS

Evacuation responses will occur at three levels: (1) withdraw from immediate work area (100+ feet upwind); (2) site evacuation; (3) evacuation of surrounding area. Anticipated conditions, which might require these responses, are described below:

Withdrawal Up-Wind (100 or more feet)

a. Sensing ambient air conditions as containing greater contaminate concentrations than guidelines allow for the type of respiratory protection being worn. The work party may

return upon donning greater respiratory protection and/or assessing the situation as transient or past.

b. Breach in protective clothing or minor accident. The party may return when tear or other malfunction is repaired and first aid or decontamination has been administered

Site Evacuation

a. Sensing ambient air conditions as containing explosive and persistent levels of combustible gas or excessive levels of toxic gases, i.e., in excess of 100 ppm.
b. Fire or major accident.
c. Imminent explosion or explosion.

Surrounding Area Evacuation

a. Persistent, insuppressible release of toxic or explosive vapors from test pits and borings, (e.g., possible pressure release of punctured underground storage tank or drums). Air quality should be monitored at several distances downwind to assess danger to surrounding area before initiating this response.

11.0 EVACUATION PROCEDURES

Withdrawal Up-Wind

The drill crew will note general wind directions while on site. (A simple windsock may be set up near the drilling site for visual determinations.) Upon noting the conditions warranting movement away from the test pit or borehole, the crew will move up-wind a distance of approximately 100 feet or further as indicated by the PI meter. Donning SCBA and a safety harness and line, the Site Safety Officer or a member of the crew may return to the test pit or borehole to determine if the condition noted was transient or persistent. If persistent, then an alarm should be raised to notify on-site personnel of the situation and the need to leave the site or do SCBA. An attempt should be made to plug the source to decrease emissions only if greater respiratory protection is donned. The Site Safety Officer and client will be notified of conditions. Considering access to the site, if this situation occurs the crew may be instructed to evacuate the site rather than move up-wind.

Site Evacuation

Upon determination of conditions warranting site evacuation, the work party will proceed up-wind of the borehole and notify the security force, Site Safety Officer and the field office of site conditions. If the decontamination area is up-wind and greater than 500 feet from the borehole, the crew will pass quickly through decontamination to remove contaminated outer suits. If the hazard is toxic gas, respirators will be retained. The crew will proceed to the field office to assess the situation. There the respirators may be removed (if the PI meter indicates an acceptable condition). As more facts are determined from the field crew, these will be relayed to the appropriate agencies.

Evacuation of Surrounding Area

When the Site Manager determines that conditions warrant evacuation of down-wind residences and commercial operations, the local agencies will be notified and assistance requested. Designated on-site personnel will initiate evacuation of the immediate off-site area without delay.

12.0 DECONTAMINATION

Personnel Decontamination Procedure

A decontamination procedure will be carried out by all personnel leaving hazardous waste sites. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the site prior to decontamination. Typical procedures for removal of protective clothing are as follows:

a. Drop tools, monitors, samples and trash at designated drop stations. These drop stations will be plastic containers or drop sheets.
b. Step into designated shuffle pit area and scuff feet to remove large amounts of dirt from outer boots. If necessary, wash boots down with clear water in designated wash pit area.
c. Remove tape from boots and remove boots. Discard in drum container.
d. Remove outer gloves and place in container.
e. Remove hardhat and respirator and hang in the designated area.
f. Remove coveralls and discard in container.
g. Remove inner gloves and discard in container.
h. If the site required utilization of a decontamination trailer, all personnel would also shower before leaving the site at the end of the workday.

Note: Disposable items (coverall, inner gloves, and over boots) will be changed on a daily basis unless there is reason for changing sooner. Dual respirator canisters will be changed twice weekly unless more frequent changes are deemed appropriate by site surveillance data or personnel assessment.

A water hose and/or designated wash area will be available for wash down and cleaning purposes.

Equipment Decontamination Procedure

Equipment to be decontaminated during the project may include: (1) drilling rig and tools; (2) sample containers; (3) monitoring equipment; and (4) respirators.

All decontamination will be done by personnel in protective gear appropriate for the level of decontamination, determined by the Site Safety Officer. The decontamination work tasks will be split or rotated among support and work crews. Decontamination procedures within the trailer (if used) should take place only after other personnel have cleared the "hot area", moved to the clean

area and the door between the two areas closed.

Miscellaneous tools and samplers will be dropped into a plastic pail, tub or other container. They will be brushed off and rinsed (outside, if possible) and transferred into a second pail to be carried to further decontamination stations. They will be washed with a trisodium phosphate or detergent solution, rinsed with acetone or methanol and finally rinsed with clean water.

Drilling Rig and Tools

It is possible that the drill rigs will be contaminated during test pit/borehole activities. The contaminated portion of the rig will be cleaned with high-pressure water or portable high pressure steam followed by soap and water wash and rinse. Loose material will be removed by brush.

Monitoring Equipment

Monitoring equipment will be protected as much as possible from contamination by draping, masking or otherwise covering as much of the instruments as possible with plastic without hindering the operation of the unit. The contaminated equipment will be taken from the drop area and the protective coverings removed and disposed of in the appropriate containers. Any dirt or obvious paper wipes and the used wipers will be discarded. The units will then be taken inside in a clean plastic tub, wiped off with damp disposable wipes and dried. The units will be checked, standardized and recharged as necessary for the next day's operation. They will then be covered with new protective coverings.

Respirators

Under typical Level C conditions, Gregg personnel will use ½ face, disposable respirators. When the disposable respirator cartridges are spent, the respirator will be discarded and a new respirator will be used. When permanent respirators are used, the respirators will be decontaminated daily. The respirator will be taken from the drop area, the masks will be disassembled, the cartridges set aside and the rest placed in a cleansing solution. (Parts will be pre-coded, e.g. #1 on all parts of mask #1). After an appropriate time within the solution, the parts will be removed and rinsed off with tap water. The old cartridges will be marked to indicate length of usage and will be discarded into the contaminated trash container for disposal when considered spent. In the morning, masks will be re-assembled and new cartridges installed if appropriate. Personnel will inspect their own masks to be sure of proper readjustment of straps for proper fit.

Since all PPE is company-owned, employees are not responsible for decontamination of any employee-owned equipment.

13.0 DOCUMENTATION AND RECORD KEEPING

Samples of field activity documentation forms are attached. Minimum documentation consists of the daily field record kept by individuals.

The Site Safety Officer is also responsible for immediate notification of Gregg Drilling / In Situ's Health and Safety Coordinator in the event of personal injury.

14.0 UPDATING OF HEALTH AND SAFETY PLAN

Each individual involved in field operations for GDT/GIS is responsible for maintaining weekly safety sheets. These sheets are located on the back of the employee's time sheet. If any deficiency is encountered in the Health and Safety Plan it should be reported to the Health and Safety Coordinator. The Site Safety Officer will immediately initiate necessary changes to improve protection of field staff.

APPENDIX A

TO THE HEALTH AND SAFETY MONITORING PLAN

SAFETY POLICY

Safety Policy

Gregg Drilling & Testing, Inc. and Gregg In Situ, Inc.

It is our belief that the safety of employees is more important to our Company's business than sales, production, quality and cost. It is therefore, the policy of Gregg Drilling / In Situ to provide safe equipment, safe work practices, and a safe work environment for our employees. It is our belief that all accidents and injuries can be prevented.

To effect this policy:
It is the responsibility of each employee to prevent injury to himself and to others and to assist fellow employees to achieve the same goal. An employee's willingness to work in a safe manner is a condition of employment.

It is the responsibility of Gregg to formulate, coordinate, and to direct the company's safety program and to assist employees in achieving their safety accountabilities. It is the responsibility of all employees to support this safety policy and to participate actively in the safety program. The office manager and division supervisors at each location will be responsible to conduct periodic audits of all work sites to verify compliance with Gregg Safety Policies. Personnel not following these rules will be subject to the disciplinary actions listed below.

Standing Safety Regulations for

Gregg Drilling & Testing, Inc. and Gregg In Situ, Inc.

The following rules are basic to the safety of personnel and equipment. In order that we attain our goals in safety and to eliminate human suffering, these rules must be strictly enforced. The following penalties will be imposed upon employees violating the following rules:

First Offense	-	Verbal Warning
Second Offense	-	Written Warning
Third Offense	-	Discharge

The first two warnings will include recommendations of how to correct the problem and a possible need for re-training.

Standard Operating Procedures/Safe Work Practices

1) Hard hats shall be worn at all times on the job. The only exceptions being while in a building or the enclosed cab of a truck or other piece of equipment.
2) There shall be no walking, standing, or crawling under a suspended load.

3) No one shall operate equipment or machinery unless:
   a. He is properly qualified to perform the work assigned.
   b. He has been checked out and is familiar with the operations of that particular type of equipment and is acceptable to his supervisor.
   c. He has been directed to do so by supervisory personnel.
   d. He has inspected the equipment and determined it to be in safe operating condition.
   e. He has checked the area surrounding any machinery to determine that all employees are clear of the equipment.
4) Proper dress while on the job is important to you.
5) Safety shoes and hard-hat are mandatory dress standards. Do not wear loose hanging clothing that could get caught in machinery. Wear gloves whenever possible.
6) All gasoline engines shall be inoperative while taking on fuel; ignition must be off. A fire extinguisher shall be on hand. Other fire extinguishers will be located in strategic locations. If you empty a fire extinguisher, give it to your foreman to be replaced. Also the cleaning, oiling, greasing, and adjusting of machinery must not be done while the machine is in motion. There shall be no cleaning of parts or engines with gasoline; use a solvent. All drilling rigs shall have a fire extinguisher attached in a prominent place.
7) There shall be no work performed on any electrical equipment unless the source of electrical current is turned off, tagged and locked. No work shall be performed within ten (10) feet of an electrical overhead line. Only an authorized person shall repair electrical equipment. Assume all unknown wires to be hot. Double check for overhead wires before raising the mast of the rig.
8) Employees operating company vehicles shall strictly observe all state and local rules and regulations on public roadways and on all projects.
9) Work areas shall be kept orderly. Scrap materials shall be placed in piles located aside from the route traveled by vehicles and personnel and away from the immediate work areas. Scrap shall be disposed of as soon as practical.
10) Any employee under the influence of alcoholic beverages, narcotics or hallucinatory agents on the job shall be immediately discharged. (Please refer to drug policy.)
11) Report, immediately, all injuries, however minor, to your supervisor.
12) Careless or reckless actions, especially horseplay of any kind, will not be tolerated on a job site.
13) Use correct safety goggles when grinding, chipping, sand blasting, burning or welding or on any other operation where goggles are needed. As a 'bystander' do not look at arc welding. Your eyes could receive a 'flash burn'. Never strike tempered steel with a hammer due to this type of steel chipping off and embedding in your eyes or flesh.
14) When riding in trucks, sit down. Do not ride fenders or tailgates. Do not let legs or feet hang over end or sides of truck. Do not get on or jump off any vehicle while it is in motion. **Do not jump off any vehicle, pipe racks, etc.**
15) Do not try to lift or push objects that are too heavy for you. Learn to lift the proper way, by bending your knees, not your back. Get help if necessary.
16) Non-smoking signs mean just that. OBSERVE THEM.
17) Do not remove any safety devices or machine guards unless you are repairing said equipment. After repairs are completed, guards must be replaced prior to using equipment.

18) All tools must be kept in good condition. Do not use tools with cracked or loose handles or mushroomed heads.
19) When working in high places or where there is a chance of falling, employees must wear safety harness. Do not drop materials or tools from any scaffold or ladder.
20) Be sure that all air hose connections are properly fastened and safety chained.
21) Abide by Federal Safety and Health Regulations for Construction (1969), and the Federal Occupational Safety and Health Administration Act (1970).
22) In the event that an employee loses time from work due to congenital illness or non-work related injury, he must submit a doctor's release to his job supervisor or his designate upon his return to work.
23) Do not carry gas cans in the cab of any vehicle.
24) Safe driving is a habit. Practice it.

APPENDIX B

TO THE HEALTH AND SAFETY MONITORING PLAN

DRILLING SITE SAFETY CHECK LIST

DRILLING SITE SAFETY CHECK LIST

____ Locate nearest available telephone. Indicate location on site map.
____ Confirm and post emergency telephone numbers and route to hospital. (See Attachment).
____ Designate at least one vehicle for emergency use.
____ Determine wind direction, establish hotline, and set up decontamination on site map (Attachment) - POST SITE MAP.
____ Prior to working on site, an inspection for hazards, (i.e., visible utilities, overhead power lines, traffic conditions, etc.) will be made.
____ Additional procedures for estimating and avoiding risk. (Examples include use of safe work practices, SOP's tailgate safety meetings, monitoring, designation of Action Levels, use of personal protective equipment; use attachments for confined space entry, excavations, demolitions and/or heat stress when applicable.)
____ Conduct utility clearance prior to site activity (as a minimum hand auger to 5-feet).
____ Daily tailgate safety meetings.
____ First aid kit available in the drill rig or safety bag.
____ Isolate work area with barriers, barricades, or other demarcation.
____ Clean and secure work site prior to leaving for the day.
____ No eating, drinking or smoking in work area.
____ Check deadman/kill switches.
____ Have appropriate PPE available on site.

CLIENT_____

FIELD PERSONNEL_____

SITE SAFETY OFFICER_____

EQUIPMENT_____

SITE SAFETY PLAN_____

COMPLIANCE CHECK PERFORMED BY_____

DATE_____

VIOLATIONS: ACKNOWLEDGED BY (SIGN)_____

(SIGN)_____

APPENDIX C

TO THE HEALTH AND SAFETY MONITORING PLAN

PERSONAL EXPOSURE RECORD FORM

Note: This record form is the back of your timesheet.

APPENDIX D

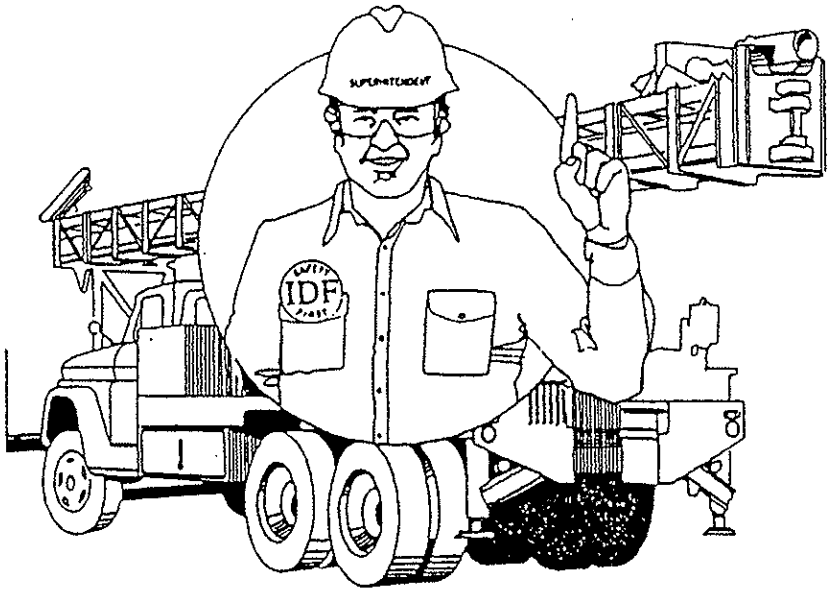
TO THE HEALTH AND SAFETY MONITORING PLAN

DRILLING SAFETY GUIDE

DRILLING SAFETY GUIDE

1. An Introduction To Drilling Safety

The organization for which you work is interested in your safety. Your employer cares about your safety not only when you are working on or around a drill rig, but also when you are traveling to and from a drilling site, moving the drill rig and tools from location to location on a site, or providing maintenance on a drill rig or drilling tools. This safety guide is for your benefit. Failure to heed the safety procedures contained in this manual could result in serious injury or death.



Every drill crew should have a designated safety supervisor who has the authority to enforce safety on the drilling site. A rig worker's first safety responsibility is to obey the directions of the safety supervisor.

2. Governmental Regulations

All local, state, and federal regulations or restrictions, currently in effect or effected in the future, take precedence over the recommendations and suggestions which follow. Government regulations will vary from country to country and from state to state.

3. The Safety Supervisor

The safety supervisor for the drill crew will, in most cases, be the drill rig operator. The safety supervisor must:

- Consider the "responsibility" for safety and the "authority" to enforce safety to be a matter of first importance.
- Be the leader in using proper personal safety gear and set an example in following the rules that are being enforced on others.
- Enforce the use of proper personal protective safety equipment and take appropriate corrective action when proper personal protective safety equipment is not being used.
- Understand that proper maintenance of tools and equipment and general "housekeeping" on the drill rig will provide an environment that will promote and enforce safety.
- Before drilling is started with a particular drill, ensure that anyone who operates the drill has had adequate training and is thoroughly familiar with the drill rig, its controls, and its capabilities.
- Inspect the drill rig at least daily for structural damage, loose bolts and nuts, proper tension in chain drives, loose or missing guards or protective covers, fluid leaks, damaged hoses, and/or damaged pressure gauges and pressure relief valves.
- Check and test all safety devices, such as emergency shutdown switches, at least daily and preferably at the start of a drilling shift. Drilling must not be permitted until all emergency shutdown and warning systems are working correctly. Do not allow any emergency device to be bypassed or removed.
- Check that all gauges, warning lights, and control levers are functioning properly and listen for unusual sounds each time an engine is started.
- Ensure that every drill rig worker is informed of safe operat-

ing practices on and around the drill rig. Provide every drill rig worker with a copy of the organization's drilling operations safety manual, and when appropriate, the drill rig manufacturer's operations and maintenance manual. Ensure that every employee reads and understands the safety manual.

- Carefully instruct a new worker in drilling safety and observe the new worker's progress towards understanding safe operating practices.
- Assess the mental, emotional, and physical capability of each worker to perform the assigned work in a proper and safe manner. Remove any worker from the drill site whose mental and physical capabilities might cause injury to the worker or coworkers.
- Ensure that a first-aid kit and a fire extinguisher, which are properly maintained, are on each drill rig and each additional vehicle.
- Be well trained in and capable of using first-aid kits, fire extinguishers, and all other safety devices and equipment. Train crew members.
- Maintain a list of addresses and telephone numbers of emergency assistance units (ambulance services, police, hospitals, etc.) and inform other members of the drill crew of the existence and location of the list.

4. Individual Protective Equipment

For most geotechnical, mineral, and/or groundwater drilling projects, individual protective equipment must include a safety hat, safety shoes, safety glasses, and close-fitting gloves and clothing. The clothing of the individual drill rig worker is not generally considered protective equipment; however, the worker's clothing should be comfortable but must be close fitting, without loose ends, straps, draw strings, belts or otherwise unfastened parts that might catch on some rotating or translating component of the drill rig. Rings and jewelry must not be worn during a work shift.

- *Safety Head Gear.* Safety hats (hard hats) must be worn by everyone working or visiting at or near a drilling site. All safety hats must meet the requirements of ANSI Z89.1. All safety hats must be kept clean and in good repair with the headband and crown straps properly adjusted for the individual drill rig worker or visitor.
- *Safety Shoes or Boots.* Safety shoes or boots must be worn by all drilling personnel and all visitors to the drill site that observe drilling operations within close proximity of the drill rig. All safety shoes or boots must meet the requirements of ANSI Z41.1.
- *Gloves.* All drilling personnel must wear gloves for protection against cuts and abrasions that could occur while handling wire rope or cable and from contact with sharp edges and burrs on drill rods and other drilling or sampling tools. All gloves must be close fitting and not have large cuffs or loose ties that can catch on rotating or translating components of the drill rig.
- *Safety Glasses.* All drilling personnel must wear safety glasses. All safety glasses must meet the requirements of ANSI Z87.1.
- *Other Protective Equipment.* For some drilling operations, the environment or regulations may dictate that other protective equipment be used. The requirement for such equipment must

be determined jointly by the management of the drilling organization and the safety supervisor. Such equipment might include face or ear protection or reflective clothing. Each drill rig worker must wear noise-reducing ear protectors when appropriate.

When drilling is performed in chemically or radiologically contaminated ground, special protective equipment and clothing may, and probably will, be required. The design and composition of the protective equipment and clothing must be determined jointly by the management and the client who requests the drilling services, and under some circumstances, with the concurrence of a health and safety professional.

5. Housekeeping On and Around the Drill Rig

The first requirement for safe field operations is that the safety supervisor understand and fulfill the responsibility for maintenance and "housekeeping" on and around the drill rig. The safety supervisor must:

- Provide suitable storage locations for all tools, materials, and supplies so that these items can be conveniently and safely handled without hitting or falling on a member of the drill crew or a visitor.
- Avoid storing or transporting tools, materials, or supplies within or on the mast (derrick) of the drill rig, unless designed for this purpose.
- Stack pipe, drill rods, casing, augers, and similar drilling tools in orderly fashion on racks or sills to prevent spreading, rolling, or sliding.
- Place penetration or other driving hammers at a safe location on the ground or secure them to prevent movement when not in use.
- Keep work areas, platforms, walkways, scaffolding, and other accessways free of materials, debris, obstructions, and substances such as ice, grease or oil that could cause a surface to become slick or otherwise hazardous.
- Keep all controls, control linkages, warning and operation lights and lenses free of oil, grease, and/or ice.
- Store gasoline only in a non-sparking, red container with a flame arrester in the fill spout and having the word "gasoline" easily visible.

6. Maintenance

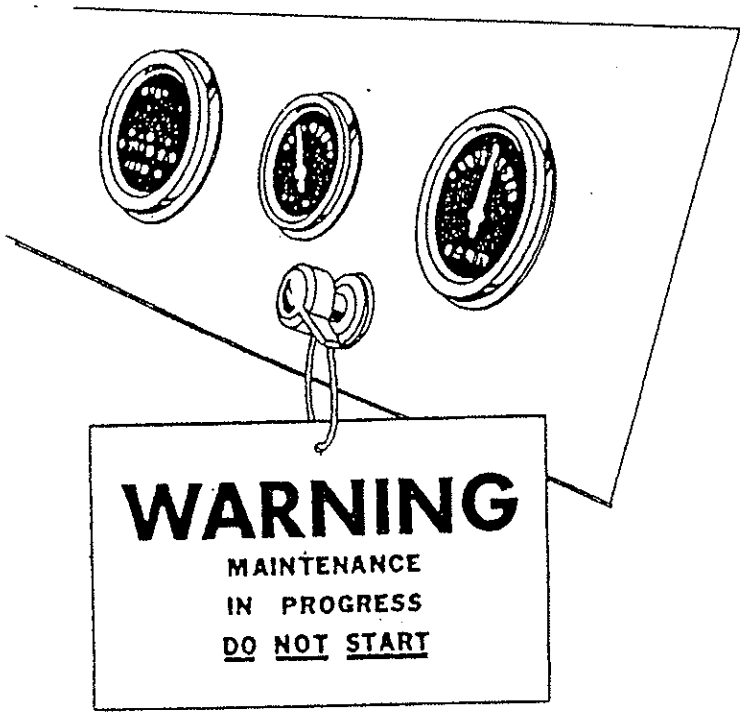
Good maintenance will make drilling operations safer. Also, maintenance must be performed safely. The following points are essential to safety:

- Wear safety glasses when performing maintenance on a drill rig or on drilling tools.
- Shut down the drill rig engine to make repairs or adjustments to a drill rig or to lubricate fittings (except repairs or adjustments that can only be made with the engine running). Take precautions to prevent accidental starting of an engine during maintenance by removing or tagging the ignition key.

• Block the wheels or lower the leveling jacks or both and set hand brakes before working under a drill rig.

• Release all pressure on the hydraulic systems, the drilling fluid system and the air pressure systems of the drill rig — when possible and appropriate — prior to performing maintenance. In other words, reduce the drill rig and operating systems to a "zero energy state" before performing maintenance. Use extreme caution when opening drain plugs and radiator caps and other pressurized plugs and caps.

• Do not touch an engine or the exhaust system of an engine following its operation until the engine and exhaust system have had adequate time to cool.



• Never climb the mast (derrick) to do maintenance or make repairs. Lower mast, stop engine and deenergize rig before starting maintenance or repair on mast.

• Never weld or cut on or near a fuel tank.

• Do not use gasoline or other volatile or flammable liquids as a cleaning agent on or around a drill rig.

• Follow the manufacturer's recommendations for applying the proper quantity and quality of lubricants, hydraulic oils and/or coolants.

• Replace all caps, filler plugs, protective guards or panels, and high pressure hose clamps and chains or cables that have been removed for maintenance before returning the drill rig to service.

7. Hand Tools

Since there are almost an infinite number of hand tools that can be used on or around a drill rig and in repair shops, there are an equal number of instructions for proper use. "Use the tool for its intended purpose" is the most important rule. The following suggestions apply to safe use of several hand tools that frequently are used on and around drill rigs:

• When a tool becomes damaged, either repair it before using it again or get rid of it.

• When using a hammer, any kind of hammer for any purpose, wear safety glasses and require all others around you to wear safety glasses.

• When using any kind of chisel or punch, for any purpose, wear safety glasses and require all others around you to wear safety glasses.

• Keep all tools cleaned and stored appropriately when not in use.

• Use wrenches — not pliers — on nuts.

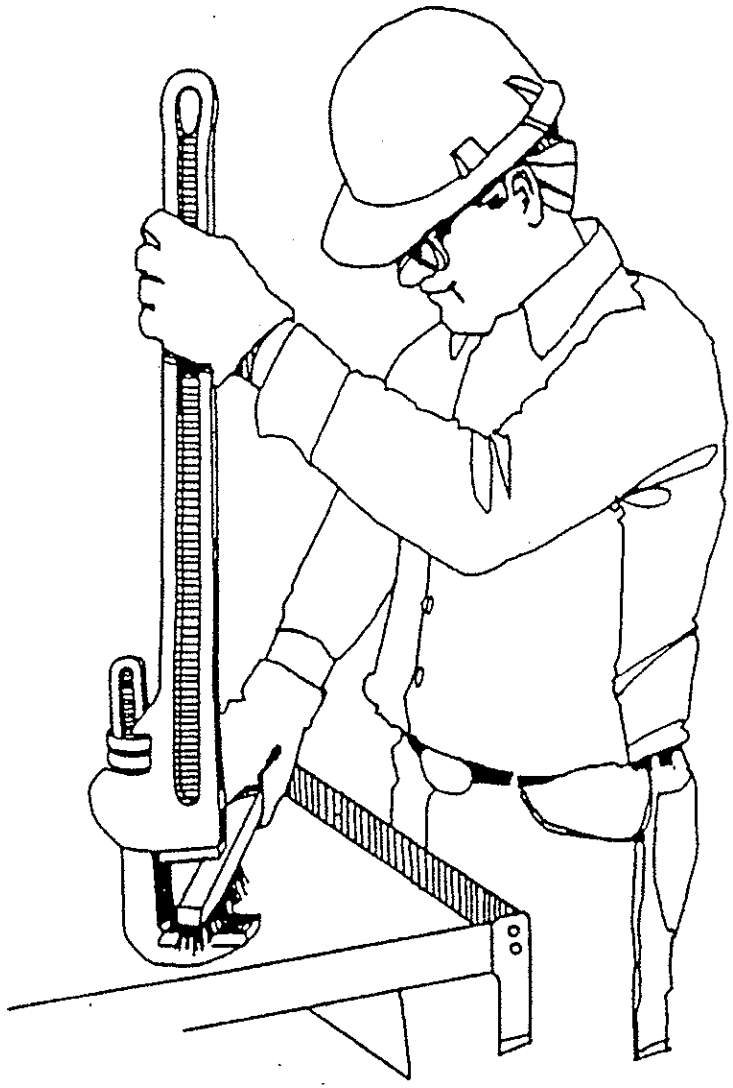
• Use screwdrivers with blades that fit the screw.

• When using a wrench on a tight nut, first use some penetrating oil and then use the largest wrench available that fits the nut. When possible pull on the wrench handle rather than push on it; apply force to the wrench with both hands when possible and with both feet firmly placed. Always assume that you may lose your footing; check the place that you may fall for sharp objects.

• Keep all pipe wrenches clean and in good repair. Use a wire brush frequently to clean the jaws of pipe wrenches. An accumulation of dirt and grease can cause wrenches to slip.

• Never use pipe wrenches in place of a rod-holding device.

• Replace hook and heel jaws when they become visibly worn.



• When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be smashed between the wrench handle and the ground or the platform if the wrench should slip or the tool joint suddenly let go.

8. Clearing the Work Area

Prior to drilling, adequately clear and level the site to accom-

Do not begin drilling if tree limbs, unstable ground, or site obstructions cause unsafe tool handling conditions.

9. Start-Up

Instruct all drill rig personnel and visitors to "stand clear" of the drill rig immediately prior to starting the engine.

• Make sure all brakes are set, all gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers or air controls are in the correct positions, and the cathead rope is not on the cathead before starting a drill rig engine.

• Start all engines according to the manufacturer's manual.

10. Drilling Operations

Safety requires the attention and cooperation of every worker and site visitor.

• Do not drive the drill rig from hole to hole with the mast (derrick) in the raised position.

• Before raising the mast (derrick), look up to check for overhead obstructions. (Refer to Section 11 on Overhead and Buried Utilities.)

• Before raising the mast (derrick), clear all drill rig personnel (with exception of the operator) and visitors from the areas immediately to the rear and the sides of the mast. Inform all drill rig personnel and visitors that the mast is being raised prior to raising it.

• Before the mast (derrick) of a drill rig is raised and drilling is begun, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. Relevel the drill rig if it settles after initial set up. Lower the mast (derrick) only when the leveling jacks are down and do not raise the leveling jack pads until the mast (derrick) is lowered completely.

• Before starting drilling operations, secure, and/or lock the mast (derrick) if required, according to the drill manufacturer's recommendations.

• Do not stand on the elevated deck of a truck-mounted or all-terrain-mounted drill rig while the drill rig is in operation unless necessary for special tasks and the operator has been notified.

• Only operate a drill rig from the position of the controls. Before leaving the area of the controls, shift the transmission

controlling the rotary drive into neutral and place the feed lever in neutral. Before leaving the vicinity of the drill, shut down the drill engine.

- Throwing or dropping tools must not be permitted. Carefully pass tools by hand between personnel or use a hoist line.
- Do not consume alcoholic beverages, other depressants, or chemical stimulants prior to starting work on a drill rig or while on the job.
- If it is necessary to drill within an enclosed area, make certain that exhaust fumes are conducted out of the area. Exhaust fumes are toxic and some cannot be detected by smell.
- Clean mud and grease from boots before stepping on a drill platform and use hand holds and railings. Watch for slippery ground when stepping down from the platform.
- During freezing weather, do not touch any metal parts of the drill rig with exposed flesh. Freezing of moist skin to metal can occur almost instantaneously.
- Drain all air and water lines and pumps when not in use if freezing weather is expected.
- Adequately cover or protect all unattended boreholes to prevent drill rig personnel, site visitors, or animals from stepping or falling into the hole. Cover, protect or backfill all open boreholes according to local or state regulations on completion of the drilling project.
- Never allow "horsing around" within the vicinity of the drill rig and tool and supply storage areas — even when the drill rig is shut down.
- When using a ladder on a drill rig, face the ladder and grasp either the side rails or the rungs with both hands while ascending or descending. Do not attempt to use one or both hands to carry a tool while on a ladder. Use a hoist line and a tool "bucket" or a safety hook to raise or lower hand tools.
- Terminate drilling operations during an electrical storm and move the complete crew away from the drill rig.

An elevated derrick platform should be used with the following precautions:

- When working on a derrick platform, use a safety belt and a lifeline. The safety belt must be at least 4 in. (100 mm) wide and should fit snugly but comfortably. The lifeline, when attached to the derrick, must be less than 6 ft. (2 m) long. The safety belt and lifeline must be strong enough to withstand the dynamic force of a 250 lb. (115 kg) weight (contained within the belt) falling 6 ft. (2 m).
- Use a safety device when climbing to a derrick platform that is higher than 20 ft. (6 m).
- When on a derrick platform, fasten the lifeline to the derrick just above the derrick platform and to a structural member that is not attached to the platform or to other lines or cables supporting the platform.
- When first arriving at a derrick platform, immediately inspect for broken members, loose connections, loose tools, or other loose materials.
- Securely attach tools to the platform with safety lines. Do not attach a tool to a line attached to one's wrist or any other part of the body.
- When working on a derrick platform, do not guide drill rods or pipe into racks or other supports by taking hold of a moving hoist line or a traveling block.
- Do not leave loose tools and similar items on the derrick platform or on structural members of the derrick.
- A derrick platform over 4 ft. (1.2 m) above ground surface must have toe boards and safety railing that are in good condition.
- Avoid being under rig workers on elevated platforms whenever possible.

If heavy objects must be manually lifted, exercise care to avoid injury.

- Before lifting an object without using a hoist, make sure that the load is within your personal lifting capacity. If it is too heavy, ask for assistance.
- Before lifting a relatively heavy object, approach the object by bending at the knees, keeping the back vertical and unarched while obtaining a firm footing. Grasp the object firmly with both hands and stand slowly and squarely while keeping the back vertical and unarched. In other words, perform the lifting with the muscles in the legs, not with the muscles in the lower back.
- If a heavy object must be moved some distance without the aid of machinery, keep the back straight and unarched. Change directions by moving the feet, not by twisting the body.

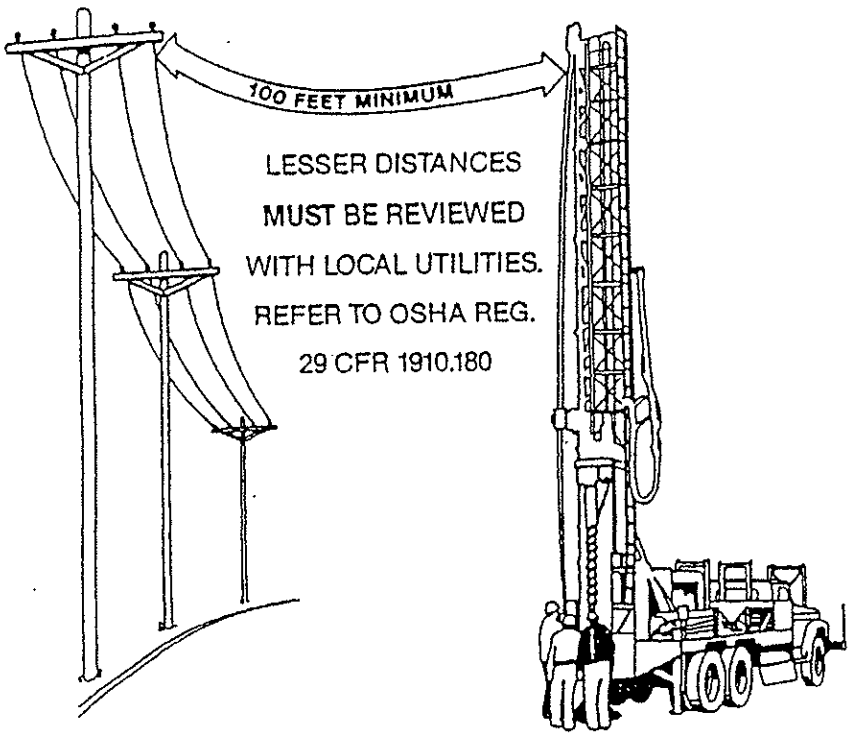
• Move heavy objects with the aid of hand carts whenever possible.

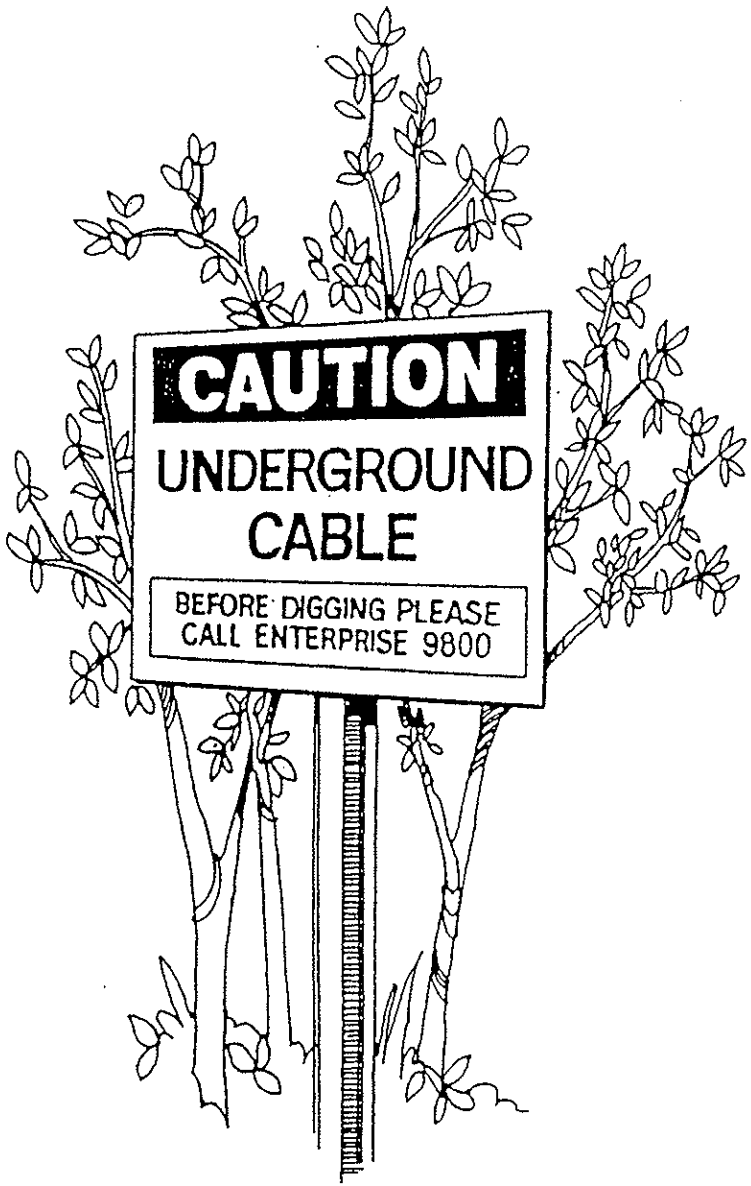
11. Overhead and Buried Utilities

Both supervisors and members of the exploration crew must take special precautions when a drill rig will be used on a site or project within the vicinity of electrical power lines and other utilities. Electricity can shock, it can burn, and it can cause death.

• Locate, note, and emphasize overhead and buried utilities on all boring location plans and boring assignment sheets.

• When overhead electrical power lines exist at or near a drilling site or project, consider all wires to be alive and dangerous.





• Watch for sagging power lines before entering a site. Do not lift power lines to gain entrance. Call the utility and ask them to lift or raise the lines or deenergize (turn off) the power.

• Before raising the drill rig mast (derrick) on a site in the vicinity of power lines, walk completely around the drill rig. Determine the minimum horizontal distance from any point on the drill rig

to the nearest power line when the mast is raised and/or being raised. If this horizontal distance is less than 100 ft. (30 m), first consult the local utility company and refer to OSHA REG 29 CFM 1910.180 before commencing operations.

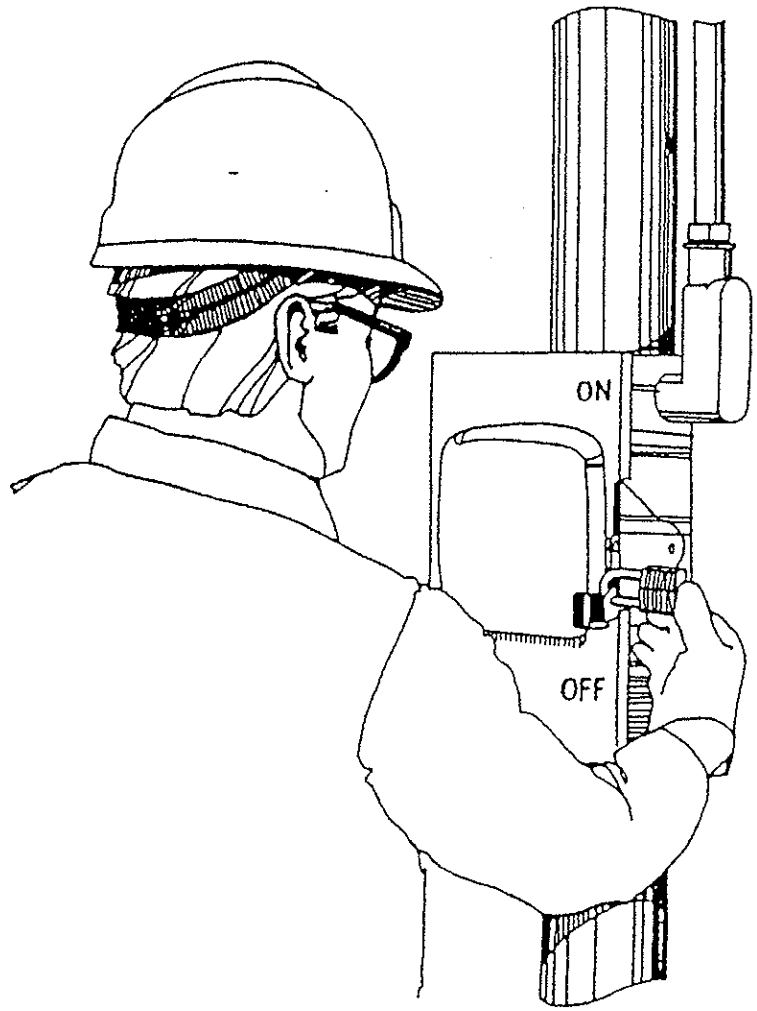
- Keep in mind that both hoist lines and overhead power lines can be moved toward each other by the wind.
- In order to avoid contact with power lines, only move the drill rig with the mast (derrick) down.
- If there are any questions concerning the safety of drilling on sites in the vicinity of overhead power lines, call the power company. The power company will provide expert advice at the drilling site as a public service and at no cost.

Electricity is as dangerous underground as overhead. Be aware of and always suspect the existence of underground utilities such as electrical power, gas, petroleum, telephone, sewer and water.

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

12. Supplying Power to the Job Site

Drilling projects sometimes require around-the-clock operations and, therefore, require temporary electrical lighting. In general, all wiring and fixtures used to provide electricity for drilling operations should be installed by qualified personnel in accordance with the National Electrical Code (NFPA70-1984) with consideration of the American Petroleum Institute's recommended practices for electrical installations for production facilities (API-RP-500B). Lights should be installed and positioned so that the work area and operating positions are well lighted without shadows or blind spots. The following are specific recommendations for land-based drilling operations:



- Before working on an electrical power or lighting system, lock-out the main panel box with your own lock and keep the key on your person at all times.
- Install all wiring using high quality connections, fixtures and wire. Be sure that the wiring is insulated and protected with consideration for the drilling environment. Do not use makeshift

wiring and equipment.

- Place all lights positioned directly above working areas in cages or similar enclosures to prevent loose or detached lamps or vaportight enclosures from falling on workers.
- Install lights so as to eliminate glare or "blind spots" on tools, ladders, walkways, platforms, and the complete working area.
- Locate and guard electrical cables to prevent damage by drilling operations or by the movement of personnel, tools, or supplies.
- Use only three-prong, U-blade, grounded type plug receptacles and have adequate current carrying capacity for the electrical tools that may be used.
- Use only electrical tools that have three-prong, U-blade, ground wire plugs and cords.
- Do not use electrical tools with lock-on devices.
- Provide adequate grounding for all electrical welders, generators, control panels, and similar devices.
- Provide secure protective enclosures on control panels, fuse boxes, transformers, and similar equipment.
- Avoid attaching electrical lighting cables to the derrick or other components of the drill rig. If this must be done, use only approved fasteners. Do not "string" wire through the derrick.
- Do not use poles used to hold wiring and lights for any other purpose.
- Turn power off before changing fuses or light bulbs.
- Require all workers in a drilling area illuminated with electrical lighting to wear safety head gear that protects the worker's head, not only against falling or flying objects, but also against limited electrical shock and burns according to ANSI Z89.1 and Z89.2.
- Allow only trained, designated personnel to operate electrical equipment.
- Do not permit unqualified field personnel to work on or near electric lines or devices.

13. Contact with Electricity

If a drill rig makes contact with electrical wires, it may or may not be insulated from the ground by the tires of the carrier. Under either circumstance, if the human body simultaneously comes in contact with the drill rig and the ground, electrocution can result, causing death or serious injury. If a drill rig or a drill rig carrier makes contact with overhead or underground electrical lines:

- Under most circumstances the operator and other personnel on the seat of the vehicle should remain seated and not leave the vehicle. They should not move or touch any part, particularly a metallic part, of the vehicle or the drill rig.
- If it is determined that the drill rig should be vacated, all personnel must jump clear and as far as possible from the drill. Personnel must not step off — but must jump off. Do not hang on to the vehicle or any part of the drill when jumping clear.
- If you are on the ground, stay away from the vehicle and the drill rig; do not allow others to get near the vehicle and the drill rig. Seek assistance immediately from local emergency personnel such as the police or a fire department.
- When an individual is injured and in contact with the drill rig or with power lines, attempt rescue with extreme caution. If a rescue is attempted, use a long, dry, unpainted piece of wood or a long, dry, clean rope. Keep as far away from the victim as possible and do not touch the victim until the victim is completely clear of the drill rig or electrical lines.
- Do not attempt to administer first aid unless the victim is completely clear of the electrical source. Begin cardiopulmonary resuscitation (CPR) immediately if a heart beat (pulse) cannot be detected.

14. Wire Line Hoists, Wire Rope, and Hoisting Hardware

Use wire line hoists, wire rope, and hoisting hardware only as stipulated by the American Iron and Steel Institute *Wire Rope Users Manual.*

- Visually inspect all wire ropes and fittings during use and thoroughly inspect them at least once a week for abrasion, broken wires, wear, reduction in rope diameter, reduction in wire diameter, fatigue, corrosion, damage from heat, improper reeving, jamming, crushing, bird caging, kinking, core protrusion, and/or damage to lifting hardware. Replace wire ropes when inspection indicates excessive damage, as described in the *Wire Rope Users Manual.*

• Thoroughly inspect all wire ropes that have not been used for a period of a month or more.

• Install all connections and end fittings, which consist of spliced eyes and various manufactured devices, according to the manufacturer's specifications. Do not exceed ratings specified by manufacturer.

• If a ball-bearing type hoisting swivel is used to hoist drill rods, inspect and lubricate swivel bearing daily to assure that the swivel freely rotates under load.

• If a rod slipping device is used to hoist drill rods, do not drill through or rotate drill rods through the slipping device; do not hoist more than 1 ft. (0.3 m) of the drill rod column above the top of the mast (derrick); do not hoist a rod column with loose tool joints; and do not make, tighten, or loosen tool joints while the rod column is being supported by a rod slipping device. If drill rods should slip back into the borehole, do not attempt to break the fall of the rods by hand or by tensioning the slipping device.

• Most sheaves on exploration drill rigs are stationary with a single part line. Never increase the number of parts of line without first consulting with the manufacturer of the drill rig.

• Wire ropes must be properly matched with each sheave. If the rope is too large, the sheave will pinch the wire rope. If the rope is too small, it will groove the sheave. Once the sheave is grooved, it will severely pinch and damage larger-sized wire ropes.

The following procedures and precautions must be understood and implemented for use of wire ropes and rigging hardware:

• Use tool handling hoists only for vertical lifting of tools (except when angle hole drilling). Do not use tool handling hoists to pull on objects away from the drill rig; however, drills may be moved using the main hoist of the drill if the wire rope is spooled through proper sheaves according to the manufacturer's recommendations.

• When stuck tools or similar loads cannot be raised with a hoist, disconnect the hoist line and connect the stuck tools directly to the feed mechanism of the drill. Do not use hydraulic leveling jacks for added pull to the hoist line or to the feed mechanism of the drill.

• When attempting to pull out a mired down vehicle or drill rig carrier, only use a winch on the front or rear of the vehicle and stay as far as possible away from the wire rope. Do not attempt to use tool hoists to pull out a mired down vehicle or drill rig carrier.

• Apply loads smoothly and steadily to minimize shock loading of a wire rope.

• Avoid sudden loading in cold weather.

• Never use frozen ropes.

• Protect wire rope from sharp corners or edges.

• Replace faulty guides and rollers.

• Replace worn sheaves or worn sheave bearings.

• Replace damaged latches on hooks before using.

• Know the working load of the equipment and tackle being used. Never exceed this limit.

• Periodically inspect and test hoist clutches and brakes.

• Know and do not exceed the rated capacity of mast hooks, rings, links, swivels, shackles, and other lifting aids.

• Always wear gloves when handling wire ropes.

• Do not use hands to guide wire rope on hoist drums.

• Following the installation of a new wire rope, first lift a light load to allow the wire rope to adjust.

• Never conduct any hoisting operations when the weather conditions are such that hazards to personnel, the public, or property are created.

• Never leave a load suspended in the air when the hoist is unattended.

• Keep hands away from hoists, wire rope, hoisting hooks, sheaves, and pinch points while slack is being taken up or when the load is being hoisted.

• Never hoist the load over the head, body, or feet of any personnel.

• Never use a hoist line to "ride" up the mast (derrick) of a drill rig.

• Use replacement wire ropes that conform to the drill rig manufacturer's specifications.

15. Cathead and Rope Hoists

Follow these procedures when using a cathead hoist:

• Keep the cathead clean and free of rust, oil and grease. Rust should be removed from the cathead with a wire brush having a handle.

• Check the cathead periodically, when the engine is not running, for rope wear grooves. If a rope groove forms to a depth greater than 1/8 in. (3 mm), replace the cathead.

• Always use a clean, dry, sound rope. A wet or oily rope may "grab" the cathead and cause drill tools or other items to be rapidly hoisted to the top of the mast.

• Should the rope "grab" the cathead or otherwise become tangled in the drum, release the rope and sound an appropriate alarm for all personnel, including the operator, to rapidly back away and stay clear. If the rope "grabs" the cathead, and tools are hoisted to the sheaves at the top of the mast, the rope will often break, releasing the tools. If the rope does not break, stay clear of the drill rig until the operator cautiously returns to turn off the drill rig engine and appropriate action is taken to release the tools. Keep careful watch on the suspended tools and quickly back away after turning off the engine.

• Always protect the rope from contact with chemicals. Chemicals can cause deterioration of the rope that may not be detected visibly.

• Never wrap the rope from the cathead (or any other rope, wire rope, or cable on the drill rig) around a hand, wrist, arm, foot, ankle, legs, or any other part of the body.

• Always maintain a minimum of 18 inches of clearance between the operating hand and the cathead drum when driving samplers, casing, or other tools with the cathead and rope method. Be aware that the rope advances toward the cathead with each hammer blow as the sampler or other drilling tool advances into the ground.

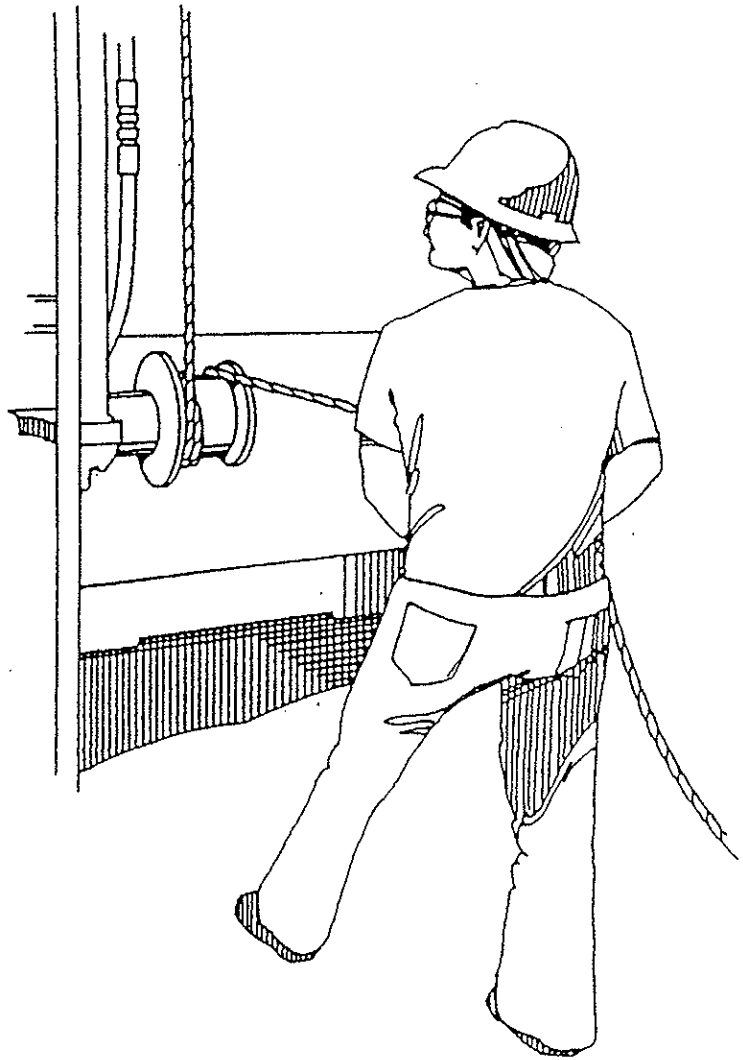
• Never operate a cathead (or perform any other task around a drill rig) with loose, unbuttoned, or otherwise unfastened clothing or when wearing gloves with large cuffs or loose straps or lacings.

• Do not use a rope that is any longer than necessary. A rope that is too long can form a ground loop or otherwise become entangled with the operator's legs.

• Do not use more rope wraps than are required to hoist a load.

• Do not leave a cathead unattended with the rope wrapped on the drum.

• Position all other hoist lines to prevent contact with the operating cathead rope.



• When using the cathead and rope for driving or back-driving, make sure that all threaded connections are tight and stay as far away as possible from the hammer impact point.

• Only operate the cathead standing on a level surface with good, firm footing conditions without distraction or disturbance.

16. Augers

Follow these general procedures when starting a boring with continuous flight or hollow-stem augers:

• Start an auger boring with the drill rig level, the clutch or hydraulic rotation control disengaged, the transmission in low gear, and the engine running at low RPM.

• Apply an adequate amount of down pressure prior to rotation to seat the auger head below the ground surface.

• Look at the auger head while slowly engaging the clutch or rotation control and starting rotation. Stay clear of the auger.

• Slowly rotate the auger and auger head while continuing to apply down pressure. Keep one hand on the clutch or on the rotation control at all times until the auger has penetrated about one foot or more below ground surface.

• If the auger head slides out of alignment, disengage the clutch or hydraulic rotation control and repeat the hole starting process.

• An auger guide can facilitate the starting of a straight hole through hard ground or a pavement.

Establish a system of responsibility for the operator and tool handler to follow during the series of various activities required for auger drilling, such as connecting and disconnecting auger sections, and inserting and removing the auger fork. The operator must ensure that the tool handler is well away from the auger column and that the auger fork is removed before starting rotation. In addition:

• When rotating augers, stay clear of the rotating auger and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason whatever.

• Only use the manufacturer's recommended method of securing the auger to the power coupling. Do not use an overlength pin or bolt. Do not touch the coupling or the auger with hands, a wrench, or any other tools during rotation.

• Whenever possible, use tool hoists to handle auger sections.

• Never place hands or fingers under the bottom of an auger section when hoisting the auger over the top of the auger section in the ground or other hard surfaces such as the drill rig platform.

• Never allow feet to get under the auger section that is being hoisted.

• Use a long-handed shovel to move auger cuttings away from the auger. Never use hands or feet to move cuttings away from the auger.

• Do not attempt to remove earth from rotating augers. Clean augers only when the drill rig is in neutral and the augers are stopped from rotating.

17. Rotary and Core Drilling

Check rotary drilling tools prior to drilling:

• Lubricate and check for frozen bearings before using water/air swivels and hoisting plugs. Water/air swivel bearings must be free before using, and stay clear of water/air swivel hose when rotating.

• Check drill rod chuck jaws periodically and replace when necessary.

• Check the capacities of hoists and sheaves against the anticipated weight to the drill rod string plus other expected hoisting loads.

During rotary or core drilling, follow these special precautions that involve chucking, joint break, hoisting, and lowering of drill rods:

• Only the operator of the drill rig should be allowed to brake or set a manual chuck so that rotation of the chuck will not occur prior to removing the wrench from the chuck.

• Drill rods should not be braked during lowering into the hole with drill rod chuck jaws.

• Do not lower drill rods into the hole with pipe wrenches.

• If a string of drill rods is accidentally or inadvertently released into the hole, do not attempt to grab the falling rods by hand or with a wrench.

• In the event of a plugged bit or other circulation blockage, relieve the high pressure in the piping and hose between the pump and the obstruction before breaking the first tool joint.

• When drill rods are hoisted from the hole, clean them only with a wiper made of rubber or other suitable material. Do not use hands to clean drilling fluid from drill rods.

• If work must progress above a portable drilling fluid (mud) pit, do not attempt to stand on narrow sides or cross members. Equip the mud pit with rough surfaced, fitted cover panels of adequate strength to hold drill rig personnel.

• Do not lift or lean unsecured drill rods against the mast. Either provide some method of securing the upper ends of the drill rod sections for safe vertical storage or lay the rods down.

18. Transporting a Drill Rig

When transporting a drill rig on and off a drilling site:

• Allow only licensed individuals to operate the vehicle. Comply with all federal, state, and local regulations.

• Know the traveling height (overhead clearance), width, length, and weight of the drill rig with carrier and know the highway and bridge load, width, and overhead limits. Allow adequate margins and make sure that they are not exceeded.

• Never move a drill rig unless the vehicle brakes are in sound working order.

• Allow for mast overhang when cornering or approaching other vehicles or structures.

• Be aware that the canopies of service stations and motels are often too low for a drill rig mast to clear with the mast in the travel position.

• Watch for low hanging electrical lines, particularly at the entrances to drilling sites, restaurants, motels, or other commercial sites.

• Never travel on a street, road, or highway with the mast (derrick) of the drill rig in the raised or partially raised position.

• Remove all ignition keys when a drill rig is left unattended.

19. Loading and Unloading

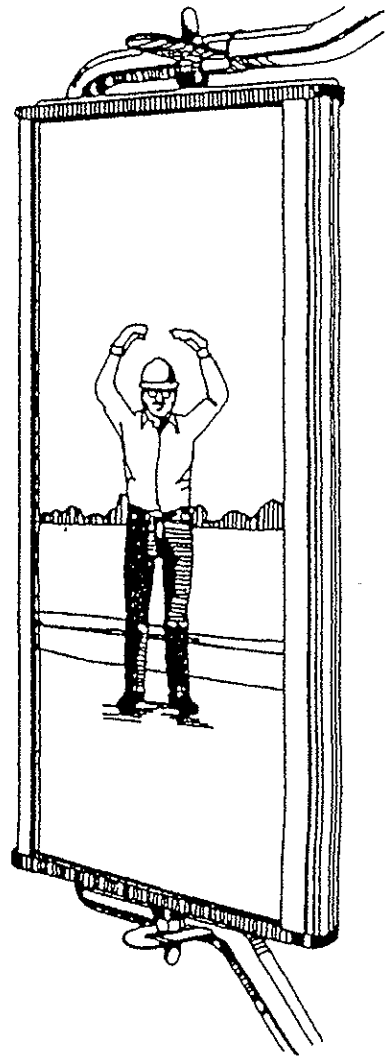
When loading or unloading a drill rig on a trailer or a truck:

• Use ramps of adequate design that are solid and substantial enough to bear the weight of the drill rig with carrier — including tooling.

• Load and unload on level ground.

• Use the assistance of someone on the ground as a guide.

• Check the brakes on the drill rig carrier before approaching loading ramps.



• Distribute the weight on the drill rig, carrier, and tools on the trailer so that the center of weight is approximately on the centerline of the trailer and so that some of the trailer load is transferred

to the hitch of the pulling vehicle. Refer to the trailer manufacturer's weight distribution recommendations.

- Secure the drill rig and tools to the hauling vehicle with ties, chains, and/or load binders of adequate capacity.

20. Off-Road Movement

Follow these procedures during off-road movement:

- Before moving a drill rig, first walk the route of travel, inspecting for depressions, stumps, gulleys, ruts, and similar obstacles.
- Always check the brakes of a drill rig carrier before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Discharge all passengers before moving a drill rig on rough or hilly terrain.
- Engage the front axle (for 4 x 4, 6 x 6, etc. vehicles or carriers) when traveling off highway on hilly terrain.
- Use caution when traveling side-hill. Conservatively evaluate side-hill capability of drill rigs because the arbitrary addition of drilling tools may raise the center of mass. When possible, travel directly uphill or downhill. Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Attempt to cross obstacles such as small logs and small erosion channels or ditches squarely rather than at an angle.
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.
- Set all brakes and/or locks after the drill has been moved to a new drilling site. When grades are present, block the wheels.
- Never travel off-road with the mast (derrick) of the drill rig in the raised or partially raised position.

21. Tires, Batteries, and Fuel

Check tires on the drill daily for safety and, during extended travel, for loss of air. Maintain air pressures for travel on streets, roads, and highways according to the manufacturer's recommendations. Only repair truck and off-highway tires with the required special tools and follow the recommendations of a tire manufac-

[illegible] repair manual.

If tires on all-terrain drills are deflated to reduce ground pressure for movement on soft ground, reinflate the tires to normal pressures before movement on firm or hilly ground or on streets, roads, and highways. Underinflated tires are not stable on firm ground.

During air pressure checks, inspect for:

- Missing or loose wheel lugs.
- Objects wedged between duals or embedded in the tire casing.
- Damaged or poorly fitting rims or rim flanges.
- Abnormal or uneven wear and cuts, breaks, or tears in the casing.

Batteries contain strong acid. Use extreme caution when servicing batteries.

- Service batteries only in a ventilated area and while wearing safety glasses.
- When a battery is removed from a vehicle or service unit, disconnect the battery ground clamp first.
- When installing a battery, connect the battery ground clamp last.
- When charging a battery with a battery charger, turn off the power source to the battery before either connecting or disconnecting charger leads to the battery posts. Loosen cell caps before charging to permit the escape of gas.
- Spilled battery acid can burn skin and should be immediately flushed with lots of water. If battery acid gets into someone's eyes, flush immediately with large amounts of water and see a medical physician at once.
- To avoid battery explosions, keep the cells filled with electrolyte, use a flashlight (not an open flame) to check electrolyte levels and avoid creating sparks around the battery by shorting across a battery terminal. Keep lighted or smoking materials and flames away from batteries.

Take special precautions for handling fuel and refueling the drill rig or carrier.

- Only use the type and quality of fuel recommended by the engine manufacturer.
- Refuel in a well-ventilated area.

- Do not fill fuel tanks while the engine is running. Turn off all electrical switches.
- Do not spill fuel on hot surfaces. Clean any spills before starting an engine.
- Wipe up spilled fuel with cotton rags or cloths; do not use wool or metallic cloth.
- Keep open lights, lighted smoking materials, flames, or sparking equipment well away from the fueling area.
- Turn off heaters in carrier cabs when refueling the carrier or the drill rig.
- Do not fill portable fuel containers completely full to allow expansion of the fuel during temperature changes.
- Keep the fuel nozzle in contact with the tank being filled to prevent static sparks from igniting the fuel.
- Do not transport portable fuel containers in the vehicle or carrier cab with personnel.
- During travel store fuel containers and hoses so they are in contact with a metal surface. This should prevent the buildup of static charge.

22. First Aid

Train at least one member of the drill crew, and if only one, preferably the drilling and safety supervisor, to perform first aid. First aid must be taught on a person-to-person basis, not by providing or reading a manual. Manuals should only provide continuing reminders and be used for reference. Courses provided or sponsored by the American Red Cross or a similar organization best satisfy the requirements of first aid training for drill crews.

For drilling operations it is particularly important that those responsible for first aid should be able to recognize the symptoms of and be able to provide first aid for electrical shock, heart attack, stroke, broken bones, eye injury, snake bite, and cuts or abrasions to the skin. Again, first aid for these situations is best taught to drill crew members by instructors qualified by an agency such as the American Red Cross.

Keep first aid kit available and well maintained on each drill site.

23. Drill Rig Utilization

Do not attempt to exceed manufacturers' ratings of speed, force, torque, pressure, flow, etc. Only use the drill rig and tools for the purposes for which they are intended and designed.

24. Drill Rig Alterations

Alterations to a drill rig or drilling tools must only be made by qualified personnel and only after consultation with the manufacturer.

APPENDIX E

SUPPLEMENTAL SAFETY PROGRAMS

BENZENE/CHEMICAL EXPOSURE PROGRAM
BLOOD BORNE PATHOGEN PROGRAM
FALL PROTECTION PROGRAM
FIRE PROTECTION PROGRAM
HEARING PROTECTION (Noise) PROGRAM
LOCK-OUT/TAG-OUT PROGRAM
RESPIRATOR PROTECTION PROGRAM

GREGG DRILLING & TESTING, INC.

Benzene/Chemical Exposure Program

1) Introduction

Gregg Drilling & Testing, Inc. (Gregg) is dedicated to the protection of its employees from on-the-job injuries. The purpose of this plan is to supplement our existing safety and health program and respiratory protection program to minimize employee exposure to chemicals including benzene. This program has been prepared in accordance with 29CFR, Section 1910.1028. Copies of this plan shall be included in Appendix E – Supplemental Safety Programs, of the Gregg Health and Safety Program. A copy of this program shall be kept by the office manager at each Gregg office and shall be made available to all employees upon request.

2) Scope and responsibility

Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia.

Breathing very high levels of benzene can result in death while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

This Benzene/Chemical Exposure Program covers all field personnel performing soil intrusive activities (soil borings, well installation and sampling, CPT soundings) at sites where benzene or gasoline are potential contaminants of concern. Gregg employees do not work with benzene as part of any work process; however, field personnel have the potential to be exposed to benzene either in its pure form or as a constituent of gasoline. Project locations where benzene exposure is most likely to occur are at petroleum refineries, bulk distribution terminals and retail service stations. All Gregg employees have the responsibility to work safely on the job and follow all safety procedures outlined in the Gregg Health and Safety Program, including this Benzene Program.

This plan is to be implemented by the Gregg Safety Officer at each office location. It will be reviewed by all Gregg employees at the time of hire and again as part of Gregg's annual Safety Training.

3) General Requirements

The purpose of this program is to reduce employee exposure to benzene to below the permissible exposure limit (PEL) of 1 part per million (ppm). When performing intrusive activities at sites with the potential for benzene exposure the following procedures should be implemented:

1) Air Monitoring – The air should be periodically monitored at the top of the augers, in the crew breathing space and at the perimeter of the exclusion zone. The air should be monitored using a suitable organic vapor analyzer. When organic vapors are present at the top of the augers in a concentration greater than 1 ppm above ambient, engineering controls should be implemented to keep organic vapors from entering the breathing zone. Measurement frequency should increase to once every 15 minutes.

2) Engineering Controls - shall consist of the use of a fan or blower to disperse vapor concentrations or the use of a vapor suppressant on the drill cuttings.

3) Direct Benzene Measurement - If engineering controls do not sufficiently reduce the concentrations of organic vapors to below 1ppm in the breathing zone, a direct measuring device (Dragger Tube) should be used to verify the concentration of benzene vapors in the organic vapor stream. If benzene concentrations in the breathing zone exceed 1ppm an air purifying respirator should be used by all personnel working in the exclusion zone. If no direct measurement devices are present on the site it should be assumed that the concentrations are benzene.

4) Respiratory Protection/PPE – An appropriate respirator and PPE should be selected for use. The proper selection and use of PPE and respirators including fit testing, medical monitoring, certification and record keeping are discussed in Section 7 of the Gregg Drilling Health Monitoring and Safety Program Plan. A complete Respirator Protection Program is included in the Gregg Health Monitoring and Safety Program. Respirators and other necessary PPE will be provided by the company to all Gregg employees.

4) Training

Each Gregg employee will be trained in Gregg's Benzene program as part of their initial safety training and again as part of Gregg's annual safety training. Training will be conducted by the Officer Manager. Records of this training will be kept in the employee's personnel file.

5) Program Review

This program will be reviewed and updated on an annual basis by the Gregg Drilling Corporate Safety officer.

GREGG DRILLING & TESTING, INC.

Blood Borne Pathogen Program

1) Introduction

Gregg Drilling & Testing, Inc. (Gregg) is dedicated to the protection of its employees from on-the-job injuries. The purpose of the Bloodborne Pathogens Program and Exposure Control Plan is to eliminate or minimize employee occupational exposure to blood and other potentially infectious material (OPIM) having visible blood, describe the necessary steps to do this, and comply with the Occupational Safety and Health Administration (OSHA) Bloodborne Pathogen Standard (29 Code of Federal Regulations (CFR) 1910.1030).

Copies of this plan shall be included in Appendix E – Supplemental Safety Programs, of the Gregg Health and Safety Program. A copy of this program shall be kept by the office manager at each Gregg office and shall be made available to all employees upon request.

2) Scope and responsibility

Bloodborne pathogens refer to certain infectious microorganisms that can be found in the blood of individuals and can be transferred from one infectious individual to other individuals through contact with blood or other body fluids. Therefore, biological hazards from contaminated body fluids such as blood, semen, vaginal secretions, and saliva are serious, potentially life threatening hazards.

OSHA promulgated its Bloodborne Pathogens Standard (29 CFR 1910.1030) to protect workers with potential exposure to Hepatitis B virus, Human Immunodeficiency Virus, and other blood borne pathogens. Gregg Drilling & Testing, Inc. (Gregg) has developed this plan to ensure compliance with the above-mentioned OSHA standard.

The Standard applies to all Gregg employees who have occupational exposure to blood or other potentially infectious materials (OPIM). OSHA defines occupational exposure as "reasonably anticipated skin, eye, mucous membrane, or potential contact with blood or other potentially infectious materials that may result from the performance of an employee's duties (29 CFR 1910.1030(b)). It will be reviewed by all Gregg employees at the time of hire and again as part of Gregg's annual Safety Training.

3) General Requirements

The following elements are contained in the Gregg Exposure Control Plan (ECP):

- Training
- Exposure determination
- Methods of compliance
- Hepatitis B vaccination, post-exposure evaluation and follow-up
- Reporting procedures
- Recordkeeping

All field employees with occupational exposure participate in a training program on Bloodborne Pathogens with the following frequency:

- at initial assignment of a task involving occupational exposures;
- annually thereafter;
- when changes that affect the employee's occupational exposure occur.

In addition, blood borne pathogen training will be provided as part of each employee's first aid training. All field and yard employees will undergo first aid training; therefore permitting more than one trained individual on site at all times.

Exposure Determination
The staff at Gregg is not subject to occupational exposure under normal working conditions(Group 2). In the consideration of safety however, it is important to remember that many employees are subject to a wide range of tasks that any position may demand. Although employees do not normally have exposure to blood, body fluids, or OPIM, it is important to remember employees may work in areas which are potentially hazardous. Many sites that we work on are in dilapidated repair, have had illicit dumping, vandalism, etc. that could contribute to dangerous conditions. There is always the possibility that contaminated sharp, broken glass, and other waste may be present at these sites. Therefore, occupational exposure should be determined at each new site that includes, but not limited to the following tasks: drilling, direct push sampling and cone penetration testing and rendering first aid. The exposure determination shall be made without regards to the use of personal protective equipment.

Methods of Compliance
Universal Precautions: The foundation of an overall exposure control plan is Universal Precautions. Universal Precautions is a concept of blood borne disease control which requires that all human blood and OPIM are treated as if known to be infectious for HIV, HBV, and other blood borne pathogens.

Proper Work Practices: Be aware of your surroundings. Inspect your site or work area before beginning work. The site safety officer should create a plan outlining all hazardous areas and the protection required to work in these areas. If you notice anything potentially hazardous, treat it as if it is infectious or contaminated material. Communicate any hazards that may be noticed in your site inspection to everybody working at that site.

Thoroughly wash any exposed body parts and/or equipment. If hand washing facilities are unavailable, use an antiseptic cleanser in conjunction with a clean cloth/paper towel or antiseptic novelettes. If these alternatives are used then the hands are to be washed with soap and running water as soon as feasible.

If employees incur exposure to their skin or mucous membranes then those areas shall be washed or flushed with water as soon as possible following contact.

In the case that first aid was administered for cuts or other injuries, any blood or other potentially infectious material soaked bandages must be put in a leak proof bag/container prior to disposal.

Engineering Controls
Sharps: Any sharps and/or glassware shall be handled with tongs, dust pans, and dust brushes to limit exposure to hands.

Personal Protection Equipment (PPE): Always use the proper PPE for the job/task which is to be performed. Whenever conducting any field activities the minimum PPE shall be level D which includes: safety glasses, gloves, work pants and shirt, and work boots with steel toe. When handling broken glass or other sharps, PPE shall include cut resistant gloves such as leather or Kevlar.

Work Area Restrictions: In work areas where there is a likelihood of exposure to blood or OPIM, employees are not to eat, drink, apply cosmetics or lip balm, smoke or handle contact lenses. Work areas will be restricted to authorized personnel only.

Engineering controls shall be maintained and evaluated periodically to ensure their continued effectiveness.

Hepatitis B Vaccine
No employee has been identified as having exposure to blood or other potentially infectious materials in their normal work duties at present. At any time if it is determined that employees will have exposure while performing routine work assignments then these employees will be offered the Hepatitis B vaccine,

at no cost to the employee. The vaccine will be offered within 10 working days of their initial assignment to work involving the potential from occupational exposure to blood or other potentially infectious materials unless the employee has previously had the vaccine or who wishes to submit to antibody testing to verify the employee to have sufficient viral immunity.

Employees who decline the Hepatitis B vaccine will sign a waiver which uses the wording in Appendix A of the OSHA standard.

Employees who initially decline the vaccine but who later wish to have it may then have the vaccine provided at no cost.

All first aid providers who render assistance in any situation involving the presence of blood or OPIM, regardless of whether or not a specific exposure incident occurs, must have the Hepatitis B vaccine made available to them as soon as possible but in no event later than 24 hours after the exposure incident.

Protective Measures for First Aid

Make sure it is safe for you to help another person (don't rush into a situation). Look for the cause of the injury/condition. Proper evaluation of the scene could save your life as well as other rescuers. The evaluation of the scene should include observations about the victim and the immediate surroundings. For example, if the cause was atmospheric conditions which lead to carbon monoxide poisoning, you should wear the proper PPE (e.g., SCBA) or consider waiting for qualified rescuers such as the fire department or paramedics.

Before approaching the victim or touching anything, make sure you are wearing the proper PPE. The minimum requirement for PPE shall include latex gloves and safety glasses, to protect from accidental exposure to blood or other body fluids of the victim.

Follow the appropriate methods of first aid care. Do not attempt to provide treatment or care which you have not been trained for. If you do provide care to a victim, do not leave the victim unless someone of equal or greater medical authority can replace you (e.g., a bystander that is not first aid trained cannot replace you, if you are first aid trained). If you need to call 911 for emergency assistance, designate a bystander or someone nearby to call for you.

Reporting Procedures

All employees exposed to blood or OPIM shall report the exposure and the incident before the end of the work shift to the office manager or operations administrator.

Reports of incidents (including first aid), must include the names of all persons involved and a description of the circumstances, including date and time, as well as a determination of whether an exposure incident has occurred. Records will be made available to employees upon request. Gregg will obtain written permission from the affected employee prior to releasing records to any third party .

4) Training

Each Gregg employee will be trained in Gregg's Blood Borne Pathogen Program as part of their initial safety training and again as part of Gregg's annual safety training. Records of this training will be kept in the employee's personnel file.

5) Program Review

The plan will be reviewed and updated annually and whenever necessary to reflect new or modified tasks and procedures which affect occupational exposure, and to reflect new or revised employee positions

with occupational exposure. The ECP will be kept on file and will be available upon request to all Gregg employees.

GREGG DRILLING & TESTING, INC.

FALL PROTECTION PROGRAM

1) INTRODUCTION

Gregg Drilling & Testing, Inc. has developed this Fall Protection Program to protect the Health and Safety of its employees. This Fall Protection Program has been prepared in accordance with California Code of Regulations, Title 8, Section 1670.

2) SCOPE AND RESPONSIBILITY

This fall protection plan covers all field and shop personnel who have the potential to fall more than 6 feet from the perimeter of a structure. This plan is to be prepared and implemented by the Gregg Safety Officer at each office location.

3) GENERAL REQUIREMENTS

Fall protection is required when an employee is working in a condition where he has the potential to fall 6 feet or more from the perimeter of a structure. The only time a Gregg employee should encounter this situation is when it is necessary to climb the drill mast to adjust a sheave or to make a repair to a drill head. When this situation is encountered only employees who have completed fall protection training will be allowed to climb the drill mast or to work more than 6 feet off the ground.

When climbing the mast the employee must wear a full body harness equipped with a dampened lanyard. The lanyard and harness must meet the requirements outlined in CCR, Title 8, Section 1670.

A safety monitoring plan will be conducted by the site safety officer. He/she will monitor the safety of employees, recognize fall hazards, and warn employees if they are unaware of the hazard. This person must be on the same working surface and in visual sight of the employees, as well as staying close enough for verbal communication. The safety officer should not conduct other assignments that take attention away from monitoring the employees in a hazardous situation.

If the situation arises that an employee is in an area where there is a fall risk but no conventional fall protection is available, this area will be identified and classified as a controlled access zone. The controlled access zone will be identified before entering job site at the tailgate safety meeting and will be erected prior to initiating work activities. The controlled access zone will be delineated over its entire area by a control line to limit access to the area. This control line shall be located no less than 6' nor more than 25' from the unprotected edge. The control line shall be constructed using a rope, wire or tape with a minimum strength of 200 pounds,supported by stanchions or delineators. The control line shall be located between 38" and 45" from the ground. The line should be marked with caution tape or other visibility devices located on 6' or less centers.

4) TRAINING

Only employees trained in the Gregg Drilling Fall Protection Program and in the proper use of fall protection equipment (harness and lanyard) will be allowed to work in an area exposed to a fall of greater than 6 feet. Equipment used must meet ANSI and ASTM requirements.

Employees will be given certification of training including their name, date, signature of person who provided training, and dates of training. Re-training shall be provided when it is noted that

there are deficiencies in training, the work place changes, or fall protection systems and equipment change rendering the previous training obsolete.

5) ACCIDENT INVESTIGATION

If an accident or serious incident occurs it will be fully investigated and any changes required will be immediately implemented to the fall protection plan. Employees will be notified of these changes and training will be re-administered if needed.

GREGG DRILLING & TESTING, INC.

Fire Protection Program

1) Introduction

Gregg Drilling & Testing, Inc. (Gregg) is dedicated to the protection of its employees from on-the-job injuries. The purpose of this plan is to supplement our existing safety and health program regarding fire safety. Copies of this plan shall be included in Appendix E – Supplemental Safety Programs, of the Gregg Health and Safety Program. A copy of this program shall be kept by the office manager at each Gregg office and shall be made available to all employees upon request.

2) Scope and responsibility

This program applies to all Gregg field, maintenance and yard crews.

This plan is to be implemented by the Gregg Safety Officer at each office location. It will be reviewed by all Gregg employees at the time of hire and again as part of Gregg's annual Safety Training.

3) General Requirements

Ten pound Type ABC Fire Extinguishers will be kept in the cab of each drill rig and each support truck operated by Gregg. It is the responsibility of the driver of the vehicle to verify the location of the fire extinguisher each day and to perform a visual inspection to assure the fire extinguisher is in operable condition and is adequately charged. This will be performed as part of the daily vehicle safety inspection and will be documented on the vehicle inspection form.

Yard and office fire extinguishers will be inspected monthly and the inspection tag will be initialed to indicate the inspection has been performed.

Fire extinguishers will be serviced or replaced on an annual basis. If the fire extinguisher is used it will be replaced with a new fire extinguisher before putting it into service on the vehicle. New replacement fire extinguishers are kept in the shop area at each office.

4) Training

Each Gregg employee will be trained in Gregg's fire program at the time of hire and annually as part of their annual safety training. The training will cover the use of fire extinguisher, inspection of the fire extinguisher and fire hazard evaluation related to the use of the fire extinguisher. Records of this training will be kept in the employee's personnel file.

5) Program Review

This program will be reviewed and updated on an annual basis by the Gregg Drilling Corporate Safety officer.

GREGG DRILLING & TESTING, INC.

HEARING PROTECTION PROGRAM

1) INTRODUCTION

Gregg Drilling & Testing, Inc. has developed this Hearing Conservation Program to protect the hearing of it's employees subjected to loud noise as a part of their daily work. This Hearing Conservation Program has been prepared in accordance with California Code of Regulations, Title 8, Section 5097.

2) SCOPE AND RESPONSIBILITY

This hearing conservation plan covers all field personnel who have the potential to be exposed to loud noises. This plan is to be implemented by the Gregg Safety Officer at each office location.

3) MONITORING

All field personnel covered in the Hearing Conservation Program will undergo a baseline and annual audiometric test in accordance with CCR, Title 8, Section 5097 as part of their annual physical per the Gregg Drilling & Testing, Inc. medical monitoring program. This will be conducted first thing in the morning when the employee has had at least 14 hours without exposure to workplace noise. Testing results will be reviewed by the Gregg medical monitoring physician. The employee and the company will be notified by the physician if a decrease in hearing levels is detected.

4) GENERAL REQUIREMENTS

Normal drill rig operations do not require hearing protection as the noise generated by all Gregg Drilling drill rigs is less than 80 decibels. In certain instances noise levels between 80 and 95 decibels may be encountered. These instances are as follows: 1) when using a hydraulic breaking hammer to push sample rods, 2) when using an asphalt "cookie cutter" to core ashpalt, or 3) when using a concrete drill bit to drill through concrete. When performing these tasks, employees are required to use as a minimum company provided ear plugs to protect their hearing.

Employees are also encouraged to use ear plugs when working inside buildings where noise levels can be amplified or when working near loud machinery at customer facilities.

Gregg Drilling will provide each employee with disposable earplugs as part of their safety bag. Contact the safety materials manager (Joe Contreras, Mo Rudd, Tim Cleary) when you need to replenish your supply as it is consumed.

5) TRAINING

Each employee will be instructed in the hearing conservation program and in the use of disposable ear plugs as part of new employee orientation and annually during regular safety training.

GREGG DRILLING & TESTING, INC.

LOCK-OUT/TAG-OUT PROGRAM

1) INTRODUCTION

Gregg Drilling & Testing, Inc. has developed this Lock-out/Tag-out Program to protect the Health and Safety of its employees. This Program has been prepared in accordance with California Code of Regulations, Title 8, Section 1670.

2) SCOPE AND RESPONSIBILITY

Maintenance personnel are required to lockout and tagout any equipment on which they will be performing any kind of maintenance or work that could result in an injury in the event of an unexpected startup. "Lockout" involves physically locking out the energy source(s) to a piece of equipment that is going to be worked on. The idea is to prevent an accidental movement or startup of the equipment while it is being worked upon. The lockout rule applies to almost every piece of equipment that is to be worked on. The exception to this is cord-and-plug equipment if it is unplugged and the plug is in the control of the worker at all times, and if there are no other sources of energy to the equipment. The types of work activities which could require Lockout/Tagout procedures include installing a piece of equipment, modifying a piece of equipment, and adjusting, maintaining, or servicing a piece of equipment in a manner in which an unexpected movement or startup of the equipment could cause injury.

The types of energy that may need to be addressed include electrical, hydraulic, pneumatic, and gravitational. Where a piece of equipment has more than a single source or type of energy, each will have to be addressed before the equipment is turned off. Where a confined space entry is involved, the confined space is to be addressed first, then the Lockout provisions should be addressed.

This plan is to be prepared and implemented by the Gregg Safety Officer at each office location.

3) GENERAL REQUIREMENTS

The lockout hardware used is to be durable for the type of use it will receive, identifiable as to its purpose and owner, and individually assigned so that only the worker using the lock has the key. The workers name will be clearly visible on the lockout/tagout device. Workers who will be conducting work which will involve Lockout/Tagout procedures are to notify any other workers who may be affected by the Lockout. No worker is to remove the lock of another without taking the necessary precautions and receiving proper authorization. Additional procedures related to Lockout/Tagout are found in the Attachments. Inspections of the lockout/tagout devices will be conducted annually by an office safety officer.

Procedure for equipment or machine shutdown must be performed in an orderly fashion and use the following procedure:

All energy isolating devices that are needed shall be physically located and operated to isolate the machine or equipment from the energy source

- Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees
- Lockout devices shall be affixed in a manner that will hold the energy isolating devices in a safe or off position
- Tagout devices shall be affixed in a manner that clearly indicates the operation or movement of energy isolating devices from the safe or off position (if tagout devices are being used with devices that have the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached)

- Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close a safely as possible in a position that is immediately obvious to anyone attempting to operate the device.
- All potentially hazardous stored or residual energy shall be relieved, disconnected, restrained and otherwise rendered safe
- If there is a possibility of reaccumulation of store energy, verification of isolation shall be continued until the servicing or maintainance is completed
- Prior to starting work on locked or tagged out machines or equipement, employees will verify that isolation and deenergization has been completed

If the lockout/tagout devices must be temporarily removed, the procedure must be conducted as follows:

- Tools must be cleared away
- Employees are removed
- Remove the lockout/tagout device
- Energize and proceed with testing
- De-energize and reapply control measures

If a group of employees is to work under the same lockout/tagout device, they should all apply their own labeled device to the group one while working and remove it when finished. The group will designate one person to keep track of the exposure of each employee in the group and notify others of the lockout/tagout devices being used at shift changes.

Only authorized trained workers will be allowed to use powered hand tools, and only after reviewing the manufacturer's safety procedures. All tools will be inspected by the operator prior to use and defective tools will be removed from service. Guards for moving parts are not to be removed.

Electric-power tools will be double-insulated or grounded. All power tools not plugged directly into a building's fixed electrical system must be plugged into a ground fault circuit interupter-protected supply (i.e. - an extension cord with a GFCI). Tools shall not be lifted or lowered by their electrical cords.

Pneumatic (air-powered) tools are to be connected to the hose in a manner which prevents accidental disconnecting. Impact tools shall have their attachments secured to prevent them from accidentally being expelled. Safety features, such as muzzle-to-work contact actuators on nail drivers, shall not be removed or overridden.

Fuel-powered tools shall be stopped while being refueled, serviced, or maintained. Regulations governing the storage and transport of flammable liquids are to be adhered to. If fuel-powered tools are operated indoors or in enclosed spaces, provisions shall be made to prevent the build-up of toxic gases.

4) TRAINING

All Gregg Drilling employees that work on equipment will be trained in the Gregg Lock-out/Tag-out Program.

Employees will be given certification of training including their name, date, signature of person who provided training, and dates of training. Re-training shall be provided when it is noted that there are deficiencies in training, the work place changes and equipment change rendering the previous training obsolete.

GREGG DRILLING & TESTING, INC.
GREGG IN SITU, INC.

RESPIRATOR PROTECTION PROGRAM

1.0 INTRODUCTION

The Occupational Safety and Health Administration (OSHA) has in place, a standard for respirator use (29 CFR 1910.134) which states that when effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to the following requirements:

a. Respirators shall be provided by Gregg Drilling / In Situ when such equipment is necessary to protect the health of the employees.

b. Gregg Drilling / In Situ shall be responsible for the establishment and maintenance of a respiratory protection program.

This document acts to ensure the protection of all employees from respiratory hazards through proper use of respirators. Respirators are to be used only when engineering controls of respiratory hazards are not feasible, while engineering controls are being installed or in the event of an emergency.

2.0 COMPANY POLICY

It is the policy of Gregg Drilling / In Situ that every employee be safeguarded against respiratory hazards in the workplace. It is the responsibility of Gregg Drilling / In Situ to ensure that the proper respiratory protection is available and used when occupational exposures to respiratory hazards exist.

In order to fulfill this commitment, Gregg Drilling / In Situ has developed a written Respiratory Protection Program for employees who work on hazardous waste sites or who have the potential to be exposed to hazardous materials.

Responsibility and authority for the respiratory program will be that of the Office/Operation Managers who will have sufficient knowledge of respiratory protection to properly supervise the Respiratory Protection Program.

Gregg Drilling / In Situ will provide, at no charge to its employees, all equipment, training and medical surveillance necessary to comply with this program.

3.0 PHYSICAL LIMITATIONS FOR RESPIRATORY WEARERS

OSHA regulations require that employees undergo a medical examination prior to wearing any negative pressure respirator. The physical examination will consist of a chest X-ray, pulmonary functions test, blood screen and a complete medical history in accordance with 29 CFR 1910.120, section F. Medical examinations must be repeated annually and employees are to be notified of the results.

Respiratory conditions such as emphysema and bronchitis can greatly reduce an employee's ability to wear a respirator. Also, employees who have high blood pressure, are obese or are chronic smokers are potential candidates for cardiac arrest, especially if they are required to wear respiratory protection.

Therefore, employees will not be assigned to tasks requiring respirators unless a local Physician of Industrial Medicine has determined that they are physically able to perform the work and use the respiratory equipment. Gregg Drilling / In Situ will select a reputable physician of Industrial Medicine and will be responsible for all expenses associated with the medical examination including reasonable compensation of employee time. Results of the medical exam will be kept confidential. The employee is allowed to contact the attending Physician to discuss the results of the exam.

Upon completion of the physical examination, the physician will place the respirator user into one of the following three categories:

Class 1	No restrictions
Class 2	Limited restrictions, specifically identified by the physician
Class 3	No respirator use allowed under any circumstances

The respirator user's medical status will be reviewed annually and the records will be retained in the employee's medical file.

4.0 APPROVED RESPIRATORS

Gregg Drilling / In Situ will select for use only those respirators tested, listed as satisfactory and approved by the National Institute for Occupational Safety and/or Health (NIOSH) and the Mine Safety and Health Administration (MSHA).

5.0 RESPIRATOR SELECTION

For respiratory protection from hazardous materials and in accordance with the American National Standards Institute, practices for respiratory protection (ANSI Z88.2-1980), the following respirators have been selected for Gregg Drilling / In Situ operations:

Scott/3M Half-Face Respirator or equivalent

Scott/3M Full-Face Respirator or equivalent

When using a supplied air respirator (SAR) of a self contained breathing apparatus (SCBA) for work involving the use of Level B or Level A PPE, the air supply must be grade D or better. All fittings for the respirators and hoses are to be non-compatible with nonrespirable gasses and containers. If an air compressor is used to supply the air, it must be located in a clean atmosphere with in-line purification and tagged to indicate date of filter change out. A carbon monoxide monitor is to be used to monitor the air near the compressor intake; the monitor is to have an alarm set at 10 ppm or is to be monitored frequently.

6.0 INSTRUCTION AND TRAINING

All Gregg Drilling / In Situ employees have been instructed and trained in the proper use of respirators and know their limitations. Both superintendents and workers will be so instructed. The training shall provide the employee the opportunity to handle the respirator, have it properly fitted, test its face piece-to-face seal, wear it in normal air for a familiarity period, and finally wear it in a test atmosphere. Every respirator wearer has received fitting instructions, including demonstrations and practice in how the respirator is to be worn, how to adjust it to maintain a good seal. The effectiveness of the training will be evaluated by frequent observations of respirator practices. To assure proper protection, a positive or negative fit check should be conducted each time the wearer uses a negative pressure respirator. Written records will be kept of the names of persons trained and the dates when training occurred. Each respirator wearer will be retrained in the proper usage, annually. The respirator wearer will be fully trained in the areas noted below.

The reason for the need of respiratory protection:

The primary objective shall be to prevent breathing atmospheric contamination when effective engineering controls are not feasible or while they are being instituted or evaluated.

The nature, extent and effects of the respiratory hazards to which the person may be exposed:

The nature of the hazard requiring the use of respirators must be considered when selecting proper respiratory protection. For specific information on a particular contaminant, refer to the manufacturer's Material Safety Data Sheet (MSDS) for this information.

An explanation of why engineering controls are not being applied or are not adequate and of what effort is being made to reduce or eliminate the need for respirators:

For much of Gregg Drilling/In Situ's work, engineering controls can implement to reduce or eliminate exposure to airborne contaminants. Drilling activity typically is outdoors and in temporary, short duration type projects. When engineering controls cannot adequately reduce the workers exposure to airborne contaminants, respiratory protection shall be implemented in accordance with Gregg Drilling In Situ's written Respiratory Protection Program.

An explanation of why a particular type of respirator has been selected for a specific respiratory hazard:

Half or full face piece respirators with the appropriate type cartridges. The chemical cartridge will be selected in accordance with the types of contaminants present. The respirator will be selected in accordance with the concentration of contaminants present.

An explanation of the operation, capabilities and limitations of the respirator selected:

Use all respiratory equipment in strict accordance with the manufacturer's instruction, labels, warning and limitations. These include but are not limited to:

1. Air purifying respirators do not supply oxygen. Use them only in adequately ventilated areas containing at least 19.5% oxygen.

2. Do not use air-purifying respirators when concentrations of contaminants are immediately dangerous to life and health (IDLH). Refer to evacuation procedures in these instances.

3. Leave the area immediately if:

   - Breathing becomes difficult;

   - Dizziness or other distress occurs;

   - You smell or taste the contaminant.

4. Never alter or modify any respirator device.

5. In the event of respirator breakthrough or resistance, the employee must leave the area, decontaminate and dawn a new respirator (disposable type) or replace cartridges (non-disposable). Used respirators and cartridges must be disposed in an appropriate container.

Instruction in inspecting, donning, checking the fit and wearing of the respirator:

Inspection

Follow all manufacturers' requirements. This will include that all respirators will be inspected before and after each use. Respirator inspections will include a check of the tightness of connections, the condition of the face piece, headbands, valves, connecting tubes and cartridges. Rubber and elastomere parts will be inspected for pliability and signs of deterioration. Also check for signs of contamination inside the face piece.

Donning

Follow manufacturer's instructions. They will include attaching the chemical cartridges, securing the respirator in place, adjusting the fit and properly removing the respirator.

Checking Fit

Positive Check Firmly place the palm of the hand over the exhalation valve cover and gently exhale into the face piece until a slight but definite pressure is created. When slight pressure is felt and no outward leakage of air between the face piece and the face is detected, the respirator is properly fitted. If leakage occurs, readjust the position of the face piece and tension of headbands and retest.

Negative Check Firmly place the palms of the hands over cartridges or filters, sealing off the inhalation area. Gently inhale causing the face piece to slightly collapse. If the face piece does not slightly collapse or a leak occurs, readjust the position of the face piece and tension of the headbands and retest.

An opportunity for each respirator wearer to handle the respirator, learn how to don and wear it properly, check its seals, wear it in a safe atmosphere and wear it in a test atmosphere:

This will be accomplished by following the instructions above. This should be done in an area free of contamination. When the respirator wearer has completed handling, donning, checking seals and wearing it in a safe atmosphere, they will then be allowed to wear it in a test atmosphere. The test atmosphere will consist of the respirator wearer properly donning the respirator then being exposed to a challenge agent, such as irritant smoke, within a few inches of the face piece seal. If choking or coughing occurs, the wearer does not have a good seal and should therefore reposition the face piece and retest again. During this period, the wearer should follow the standard protocol as identified in the standard for respirator use 29 CFR 1926.58.

Wearer should note all items that can reduce the efficiency of the respirator seal such as

facial hair etc. These should be eliminated to ensure a good seal whenever the respirator must be used.

An explanation of how cleaning, sanitizing, maintenance and storage of respirators are carried out:

1. *Cleaning and Sanitizing* Each respirator will be cleaned and sanitized at the end of each work day (more often if required). Respirators will be cleaned and sanitized with disposable alcohol pads or a soap and water solution. Office Safety Officer will survey end of day washing and cleaning. Respirators will be allowed to dry in an area free of contamination. Respirators issued to more than one employee will be cleaned after each use. If a disposable respirator is used, the respirator should be discarded at the end of each day.

2. *Inspection and Maintenance* All respirators will be inspected routinely before and after each use by the Office Manager/Supervisor. Respirator inspections include a check of the tightness of connections, the condition of the face piece, headbands, valves, connecting tube and cartridges. Rubber and elastomere parts will be inspected for pliability and signs of deterioration. If any part of the respirator is found defective during the inspection or use, that part (or entire respirator) will be discarded and replaced with a new one.

   Documentation must be maintained that employees have been cleaning and inspecting their respirators. The employee will complete a Respirator Inspection/Cleaning form before and after use of a respirator.

3. *Storage* After being cleaned, sanitized, dried and inspected for defects, the respirators will be stored in sealed plastic bags to protect then from dust, excessive moisture or damaging chemicals. The respirator will then be stored in a location to protect them against sunlight, excessive heat or extreme cold.

7.0 RESPIRATOR USE

Respirators will be used in accordance with the program whenever there is a possibility of exposure to airborne contaminants exists. This will include the following:

a. Whenever site safety plans require respiratory protection.

b. Whenever approaching permissible or published exposure levels, respiratory protection will be implemented.

c. During decontamination of equipment, respiratory protection will be implemented.

d. While performing hazardous non-routine tasks, respiratory protection will be implemented.

8.0 IMMEDIATE DANGER TO LIFE & HEALTH (IDLH) ATMOSHPERES

When working in areas with the potential for chemical exposure at IDLH concentrations the following procedures will be implemented:

a. A site specific safety plan will be prepared by a qualified industrial hygienist and reviewed by the Gregg office manager prior to commencing field activities.

b. An on-site safety meeting will be held prior to the initiation of field activities to review the proper procedures for donning and doffing PPE, Full Face SAR/SCBA respirators, work procedures, air monitoring and emergency signals and rescue procedures. A work exclusion zone, contaminant reduction zone and a support zone will be established and manned with appropriate personnel.

c. All workers in the exclusion zone will be equipped either a SAR or SCBA and a 5 minute emergency SCBA.

d. A minimum two man rescue crew will be stationed in the support zone. This crew will be equipped to go into the exclusion zone in the event of an emergency.

e. When using SAR or SCBA the air supply must be grade D or better. The air supply for the SAR must come from a supplied air cylinder trailer filled at an approved facility. No air compressors will be allowed for supplying the respirators.

Gregg Drilling & Testing, Inc.

Substance Abuse Policy

The Policy and Rules

Gregg Drilling / In Situ, Inc. is well aware that drug abuse in the workplace takes a toll on employee safety and productivity.

In order to provide a safe and productive work environment for all employees, rules have been developed to assist management in dealing with the possession, consumption, distribution, sale and/or use of intoxicating beverages or dangerous drugs in all circumstances where such conduct could be injurious to the Company, its employees, or its business.

These rules prohibit:

- The manufacture, distribution, sale, purchase, use or possession of illegal drugs, narcotics or other unlawful substances or materials on its premises, or while conducting business for the Company.
- The manufacture, distribution, sale, purchase, use or possession on its premises of substances or materials not authorized by the Company (such as firearms, weapons, intoxicating beverages, medically authorized drugs used improperly or unsafely, etc).
- Reporting to work or working under the influence of illegal drugs, narcotics, other unlawful substances, or intoxicating beverages.

A worker under the influence of drugs and/or alcohol is a danger to himself/herself and to his/her fellow workers. In order to provide a safe and healthful workplace for its employees, to have a productive and alert workforce and to ensure compliance with the above-described rules, the Company will conduct:

- Searches (with the assistance of law enforcement agencies if management of the facility believes circumstances warrant) of company property which includes lockers, desks, vehicles and HazMat bags on the facility's premises and/or job sites for illegal drugs or other unlawful or unauthorized substances or materials.
- Tests to determine the presence of any illegal drugs or other unlawful or unauthorized substances in an employee's body.

Employees who voluntarily refer themselves to the Company as having a drug or alcohol abuse problem before it is discovered on the job will be referred to their personal physician and will be allowed to request a medical leave of absence when recommended by their physician.

The Scope

The terms of this Program shall institute conditions of employment for all employees of Gregg Drilling / In Situ. This Program also applies to all contractors and vendors, and their employees, while on the Company's premises or on a Company's job-site.

Terms And Definitions

The following terms, when used throughout the Program, shall have the meanings assigned to them below:

1. *Company Premises* - all land, property, buildings, structures, installations, boats, aircraft or vehicles owned by or leased to the company or which are otherwise being utilized to conduct the business of the company.

2. *Company Job-Sites* - all land, property, buildings, structures on which the Company is conducting work.

3. *Unauthorized Substances or Materials* - include, but are not limited to:
   - ❖ intoxicating beverages, without company authorization;
   - ❖ controlled substances, including medically-authorized drugs or medications which are used improperly or unsafely;
   - ❖ equipment or paraphernalia used in connection with the manufacture, sale, purchase, transfer, use or possession of illegal drugs or other unlawful substances or materials.

4. *Unlawful Substances or Materials* - illegal drugs or any other substances or materials the manufacture, sale, purchase, transfer, use or possession of which are prohibited by federal, state or local law.

5. *Reasonable Suspicion* - a reasonable belief that an employee is using an illegal drug or unauthorized substance or material without authorization. A reasonable belief is based on specific contemporaneous physical, behavioral or performance indicators of the use of such substances under the terms of the program; (i.e. frequent absences, chronic tardiness, excessive use of sick leave, bankruptcy, increased medical claims, decreased productivity, sudden personality change, lying, theft, etc. The employee has a detectable level of a drug/alcohol in his/her body.

6. *Safety-Sensitive Position* - a position that is directly related to the safe operation or security of a facility or piece of equipment, and which, if not performed properly, could result in a serious safety risk or environmental hazard to employees, a facility, or the general public.

7. *A Measurable Amount* - the detection in an individual's body of any illegal drug, narcotic, other unlawful substance, or intoxicating beverage or any combination thereof, which is equal to or in excess of the cutoff levels established for determining the use of such substances under the terms of the Program.

Testing for Substance Abuse

Tests to detect the presence of any illegal or unauthorized substances in an employee's body (e.g., urine, blood or breathalyzer) shall be conducted by the company under the following circumstances:

1. *Pre-employment*, as part of the employment hiring process for all applicants.

2. *Pre-Access*, negative substance abuse tests are required upon initial enrollment into the random pool program.

3. *Reasonable Cause*, when the Company suspects that rules of employee conduct relating to substance abuse are being violated.

4. *Post-Accident,* when the Company suspects that substance abuse may have been a contributing factor in an employee's violation of any rule of employee conduct other than those relating to substance abuse.

5. *Post-Accident,* when the Company suspects that substance abuse may have been a contributing factor to a job-related bodily injury or an accident involving property damage exceeding $1,000.00, or an injury or accident involving any vehicle or equipment used for or on company business.

6. *Reasonable Cause*, when an employee has a series of documented behavioral or other problems affecting his or her job performance, and the Company suspects substance abuse is a contributing factor.

7. *On a random basis.*

8. *Post-Rehabilitation,* when an employee has completed an approved rehabilitation program, he/she will be subject to a **return-to-duty** test and will be subject to unannounced testing in addition to the random for up to 5 years.

During the pre-employment process, an applicant must undergo a urinalysis and/or blood screening test to determine the presence of any illegal drugs or other unlawful or unauthorized substances. The applicant shall be requested to sign a "consent and release form" (included on your application) in advance of such test, subject to any applicable state or local laws and regulations. If the applicant refuses to sign such a form or to submit to such a test, he or she will not be hired.

Employees in safety-sensitive positions will be subject to random drug testing procedures prescribed by the company. The Company maintains a random testing percentage of 50% spread evenly over a 12-month period. Office staff shall not be subject to random drug testing. Employees shall be considered in safety-sensitive positions by belonging to one or more of the following groups: driving a company vehicle, working on public property and/or among the public, working with hazardous materials, driving company equipment on or off company property. An employee who is impaired while performing any of the above items could cause great risk to the other employees or the general public.

Drug Testing

Drugs to be Tested	Screening Level (ng/ml)	Confirmation Level (ng/ml)
Amphetamines	300	300
Barbiturates	300	100
Cannabinoids: (THC, Marijuana)	20	10
Benzodiazepines	300	100
Cocaine	300	150
Opiates: (Heroine, etc.)	300	150
Methadone	300	100
PCP	25	25
Propoxyphene	300	200
Methaqualone	300	100

Upon arrival to the collection site, the employee will submit a Forensic Drug Testing Custody and Control Form given to them by the company. The collection site will then have the employee complete and sign the C and C form.

The collection sites to be used for the drug testing will be a Department of Health and Human Services (DHHS) certified laboratory.

Upon arrival at the laboratory, all samples are immediately checked for proper chain of custody information accompanying them. Each sample is then subjected to a screening test (immunoassay) to eliminate the vast quantity of negative tests. If this first test indicates a possible presence of drugs, a second (confirmatory) test is performed, using sophisticated methods and equipment (gas chromatography/mass spectrometry). The results from this second test are a "fingerprint" of the precise chemical components of the sample.[1]

Upon receiving the results of the drug/alcohol tests, the collection site will contact the company's Medical Review Officer (MRO) for the following purposes:

To review and verify test results before they are reported to the company;
To contact the employee whose test is reported positive by the lab and to provide an opportunity to discuss the test results;
To look for any legitimate medical explanation for a positive test;
To, if necessary, order a re-analyzation of the original specimen.

The MRO is a licensed physician with experience in dealing with substance abuse disorders.

---

[1] DISA, Inc. "Operations Manual", Fourth Edition, 1993

Alcohol Testing

	Screening Level (dl/mg)	Confirmation Level (dl/mg)
Alcohol	.02 BAC	.04 BAC

Upon arrival to the collection site, the employee will submit an Alcohol Test Requisition Form given to them by the company. The collection site will then have the employee complete and sign the requisition form.

The collection sites to be used for the alcohol testing utilizes the breath testing procedure currently recommended by the US Department of Transportation. The person conducting the test is a certified Blood Alcohol Technician (BAT) and utilizes a breathalyzer to perform the test.

If the employee tests positive for alcohol, he/she will be allowed to drive home only if he/she is under the current blood alcohol level law set by the State of California (.08). If the employee is at that level or above, transportation arrangements will be made.

Random Testing

Employees will be selected for random testing by using a computer-based random number generator that selects the employee's social security number. No employee shall be excluded from future random pools merely because he/she has already been selected and tested that year.

Employees will be subject to random testing on a random basis at a 50% annualized rate. The random selection and notification process will be administered by an outside data management company.

Searches

If there is reason to believe that any of the rules of employee conduct relating to substance abuse, described above under the Company's Policy, are violated or are being violated, unannounced searches of the company's property including lockers, desks, vehicles, HazMat bags, etc. on the premises or on job sites will be conducted. Searches of on-site personnel or personnel on the company's premises, of subcontractors and vendors may also be conducted for unlawful or unauthorized substances or materials. Any search of the employee's lunch box, personal tool box, purse, backpack, etc. will be considered unlawful without the employee's written consent. The employee reserves the right to privacy and has the right to deny an employer's search of their personal articles without the threat of termination.

Any such searches will be conducted whenever deemed necessary by authorized representatives of the company to ensure that safety rules and standards are met. Individualized suspicion is not required for such searches. The company also reserves the right to conduct random searches.

Company representatives will direct any searches on Company property and at Company job sites, after consent of the employee(s) in question. Such searches include, but are not limited to, drug detection examinations by qualified experts, fitness-for-duty examinations and other search techniques as the Company wishes to employ.

In cases involving the detection of suspected unlawful or unauthorized substances or materials the assistance of law enforcement agencies may be requested. If any suspected unlawful or unauthorized substances or materials are found during a search, they may be turned over to the appropriate law enforcement agency and criminal prosecution of the employees or persons involved in such activity may follow.

Employees or persons with whom suspected unlawful and unauthorized substances or materials have been found may not be held on the Company premises or at the job sites against their will.

Disciplinary Actions

Employees shall be subject to disciplinary actions, up to and including discharge for not adhering to any of the rules contained in the Company's Substance Abuse Program.

Refusal to Allow a Search or Test

Gregg Drilling / In Situ, Inc. has the right to search company property including desks, lockers, HazMat bags and company vehicles without the consent of the suspect employee. The company cannot search personal articles such as lunch boxes, personal tool boxes, purses, etc. without the consent of the employee. The employee reserves the right to refuse a search of their personal articles, but cannot refuse a search of company property even if held off-site.

If the Company has reason to believe that an employee has violated or is violating a substance abuse rule of employee conduct, or when an employee occupying a safety-sensitive position is selected for testing he/she will be requested to consent to testing, to permit the test results to be analyzed, and to release such results to the Company. By signing the Membership Application Form, the employee consents to all future random pool drug tests. By signing the Forensic Drug Testing Custody and Control Form, the employee consents to having the drug test results analyzed and released to the company. By signing the Alcohol Test Requisition Form, the employee consents to having the alcohol test results analyzed and released to the company. When the employee fails to consent to a drug/alcohol test whether random, with the annual physical, post-accident or for reasonable suspicion, the employee shall be only assigned work in non-safety sensitive areas, if available.

Positive Test Results

If an employee tests positive for drugs, he/she may be suspended for a period of thirty (30) days and placed on a 'no-pay leave of absence' during such period, and may be required to enroll in a substance abuse rehabilitation program. If an employee refuses to accept such a referral or to cooperate in any

treatment program recommended by the Company, the employee shall be discharged. An employee accepting such a referral and any treatment recommended may continue to participate in the company's employee benefit plans consistent with the coverage available to other employees on a no-pay, leave of absence status for other reasons.

Rehabilitation

Voluntary Self-Referral

When an employee voluntarily informs the Company of a substance abuse problem, any information concerning the employee's condition will be held confidential and will not be disclosed to any other company representatives without the employee's prior knowledge and permission. This confidentiality protection will remain effective during any treatment period and thereafter. Rehabilitation assistance is available to employees who have voluntarily removed themselves from their jobs, and is without risk of job loss, as long as they fully cooperate with the Company recommendations.

Before being allowed back to work, either in a safety-sensitive or non-safety-sensitive position, the employee must submit a medical certificate from an accredited rehabilitation center and/or a physician assigned by the Company, that the employee can perform the duties of his/her job. Moreover, the employee must agree to undergo post-recovery monitoring and unannounced testing for five years.

Management Referral

If an employee with a substance abuse problem does not voluntarily inform the Company about this and later ests positive on a substance abuse test, the suspension described under the disciplinary actions section may be imposed by the Company.

An employee whom the Company refers to a substance abuse program and who accepts this treatment, may have his or her employee benefit plan coverage continued consistent with the benefit plan coverage available to other employees on a "no-pay leave of absence" for other reasons. If an employee refuses such a referral or if he/she does not cooperate in the rehabilitation program, the employee may be terminated.

Before being allowed back to work, either in a safety-sensitive or non-safety-sensitive position, the employee must submit a medical certificate from an accredited rehabilitation center and/or a physician assigned by the Company, that the employee can perform the duties of his/her job. Moreover, the employee must agree to undergo post-recovery monitoring and unannounced testing for five years.

If an employee tests positive during the treatment or monitoring period or at any time thereafter, the employee may be discharged.

Subcontractors and Vendors

Contractors and vendors who are hired by Gregg Drilling In Situ, Inc. to perform services will be required, if deemed necessary by the Company, to have in effect, before commencing any work for the Company, a substance abuse testing program for the subcontractor's or vendor's employees assigned to the Company.

While working for GDT/GIS, employees of all (sub)contractors and vendors shall be subject (1) to the same substance abuse behavior rules which are applicable to employees of the Company and (2) to the same substance abuse search and testing procedures applicable to employees of the company and to unannounced drug testing by the Company.

If such employees fail to adhere to these rules, searches or testing procedures, they will be removed from the Company's job site and/or premises.

Confidentiality of Records

All records regarding substance abuse testing of employees and their respective treatment or rehabilitation shall be handled with uttermost confidentiality. Only the prime contact for Gregg Drilling / In Situ, Inc. receives and maintains records of positive/negative test results.

Administration

The terms and conditions of this Program shall be administered in accordance with guidelines established by the Company and in a manner consistent with all applicable federal, state and local laws.

The rules of employee conduct defined in this program are not intended to create any contractual or other employment rights; all employment is at will, terminable by either the employee or GDT/GIS at any time, with or without notice.

CONSENT FORM

I have hereby read and understand the company's substance abuse policy. I understand that failure to abide by the policies set by the company may include disciplinary action up to and including termination. I understand that any questions regarding these policies should be directed to the personnel department.

I hereby consent to drug and alcohol testing and search procedures as described above.

Employee Signature_____

Printed Name _____

Date _____/_____/_____

Administration
Signature _____

Printed Name _____

Date _____/_____/_____

GREGG DRILLING & TESTING, INC.
and
GREGG IN SITU, INC.

HAZARD COMMUNICATION (HAZCOM) PROGRAM

TABLE OF CONTENTS

GREGG DRILLING & TESTING, INC.
GREGG IN SITU, INC.

HAZARD COMMUNICATION (HAZCOM) PROGRAM

1.0 COMPANY POLICY

In order to protect the health and safety of our employees, Gregg Drilling/In Situ, Inc. (GDT/GIS) has developed the following Hazard Communication Program.

A. As a Company we intend to provide information about hazardous chemical substances used in the workplace through a comprehensive Hazard Communication Program.

B. GDT/GIS's written Hazard Communication Program applies to all operations, which may expose employees to hazardous substances as a result of normal work conditions or as a result of a reasonably foreseeable emergency.

C. This written Hazard Communication Program is available, upon request, to employees or their designated representative.

2.0. IDENTIFICATION OF HAZARDOUS SUBSTANCES USED IN THE WORKPLACE

A. Hazardous substances are materials or mixtures that pose physical or health hazards or are included by CAL/OSHA on the Directories list of Hazardous Substances.

B. "Exposure" is any situation arising from work conditions where an employee may ingest, inhale, absorb or otherwise come into contact with a hazardous substance.

C. Material Safety Data Sheets (MSDS) are documents that supply information about a particular hazardous substance of mixture. Manufacturers are required to provide MSDS's when the hazardous substances are sold to distributors or purchasers.

D. At each office location, current MSDS's shall be maintained for all of the hazardous substances to which employees may be exposed during the normal course of employment.

E. It will be the responsibility of each Office Manager to maintain a complete set of MSDS's for all hazardous materials used during the coarse of work

F. A hazardous substance shall not be used unless an MSDS for the substance is available for review. The MSDS for each new hazardous substance shall be

G. Provided to the local MSDS custodian for review and filing.

H. Upon request, a MSDS shall be provided to an employee during their work shift. A MSDS shall also be available to the employees designated representative, physician and CAL/OSHA Representatives.

I. Company management shall be alert to other employers whose work on job sites may expose GDT/GIS employees to additional hazardous substances. When it appears that such a potential exposure may occur, MSDS's for the materials should be obtained. Employees will also be trained to watch for hazardous substances and request MSDS's when no management personnel will be on the jobsite.

J. Each Office Manager shall also post the access to "Medical and Exposure Records" poster in the place where other employee notices are regularly posted.

3.0. LABELS

A. When hazardous substances are received, receiving personnel shall examine the containers to determine if the labels provide the following information:

1. The identity of the hazardous substances they contain;

2. Appropriate warnings for the physical and health hazards associated with those substances.

B. Each Office Manager shall ensure that the labels on containers of hazardous substances are not removed or defaced, unless the containers are immediately relabeled with the following information:

1. The identity of the hazardous substances they contain;

2. Appropriate warnings for the physical and health hazards associated with those substances.

C. Containers without complete labels or with defaced labels will not be used on the job.

D. When hazardous substances are transferred into portable containers, the portable containers shall be labeled with the identity of the hazardous substances they contain and appropriate warnings for the physical and health hazards associated with those

substances. Portable containers may be labeled with a copy of the manufacturers label or with a printed label that includes the appropriate information.

E. When an employee transfers a hazardous substance into a portable container for his or her own immediate use, the portable container need not be labeled.

F. Replacement labels may be obtained through the Office Manager.

4.0 INFORMATION AND TRAINING

A. Each employee shall receive formal hazard communication training in accordance with GDT/GIS's Hazard Communication Program and related SOPs. The training and MSDS includes information on the chemical labeling system used (i.e., HMIS).

B. When employees are exposed, or could be exposed, to hazardous substances in their work area, they shall also be provided information and training by the LHSR based on the data contained in the MSDS's for those hazardous substances.

C. Training shall be provided before employees are assigned duties with potential exposures to hazardous substances. Training shall also be given when new hazardous substances are introduced into the workplace or when a MSDS is materially changed.

D. Training shall be conducted and documented at safety meetings, and shall

E. Provide at least the following:

1. Information on which hazardous substances are in the workplace;

2. How to read and interpret information on MSDS's and labels;

3. Any physical or health hazards associated with the use of a hazardous substance or mixture being used in the workplace;

4. Proper precautions for handling, including specific procedures the company has implemented to protect workers from exposure such as personal protective equipment and safe work practices;

5. Emergency procedures for spills, fires, disposal and first aid;
6. Methods of detecting the presence of hazardous substances in the workplace, including odor, visual appearance and monitoring;

7. The right of employees, their representatives or their physicians to receive

information on hazardous substances to which employees may be exposed;

8. The right against discharge or discrimination due to an employee's exercise of his/her rights afforded by law; and

9. The details of this written Hazard Communication Program and the availability and location of this written Program and or MSDS's and other information.

F. For non-English speaking employees a translator fluent in both English and the native language of the affected employee will be used to review this Hazard Communication Program. If necessary because of job requirements, all pertinent MSDS information and specific task training will be given to the non-English speaking employee.

5.0. NON-ROUTINE TASK TRAINING

When employees are assigned to a non-routine task that may expose them to a hazardous substance for which they have not been trained, they shall be trained as appropriate.

6.0. ACCESS TO INFORMATION BY OTHER EMPLOYERS

When employees of another employer may be exposed to hazardous substances because of their proximity to a GDT/GIS job site, that employer shall be provided with a list of the hazardous substances being used at that job site by an authorized representative. This person shall also give the employer suggestions for appropriate protective measures needed to protect against exposure to such substances. If requested by the employer, names and addresses of suppliers or manufacturers of the hazardous substances being used shall also be provided so that the employer may obtain MSDS's and other information.

7.0. POTENTIALLY HAZARDOUS SUBSTANCES COMMONLY FOUND ON COMPANY PROPERTY OR JOBSITES

- Hydraulic Fluid
- Diesel Oil
- Lubricating Oil
- Bentonite
- Portland Cement
- Redi-mix concrete
- Antifreeze
- Gasoline
- Acetylene
- Oxygen gas
- Paint/Paint Additives
- Silica sand

GREGG DRILLING & TESTING, INC.
and
GREGG IN SITU, INC.

INJURY & ILLNESS PREVENTION PROGRAM (IIPP)

TABLE OF CONTENTS

APPENDICES

GREGG DRILLING & TESTING, INC.
GREGG IN SITU, INC.

INJURY & ILLNESS PREVENTION PROGRAM (IIPP)

1.0 COMPANY POLICY

Gregg Drilling / In Situ, Inc. (GDT/GIS) believes that everyone benefits from a safe and healthful work environment. We are committed to the maintenance of an injury-free and illness-free workplace, and compliance with applicable laws and regulations governing workplace safety.

To achieve this goal the Company has adopted an Injury & Illness Prevention Program (IIPP). Implementation of this program is everyone's responsibility, as we work together to identify and eliminate conditions and practices that negatively impact a safe and healthful work environment.

2.0 RESPONSIBILITY

The President of GDT/GIS, John Gregg, shall appoint a Program Administrator for the IIPP. The Program Administrator has the authority and overall responsibility for implementing the provisions of this program, and is supported by the Office Managers, Supervisors, and site Health and Safety Representatives. All employees are expected to work conscientiously to implement and maintain the IIPP program. Any questions regarding the program should be directed to the Program Administrator. Specific responsibilities of the implementation team are outlined in the following sections.

2.1 Program Administrator – Sonja DeKeyser-Muirs

a. Prepares an annual summary of injuries, illnesses, and corrective actions incorporating information from all offices.

b. Maintains current information on local, state, and federal health & safety regulations.

c. Plans, organizes, and coordinates health & safety training.

d. Establishes Occupational Accident, Injury, or Illness Report and investigation procedures and maintains injury and illness records.

2.2 Office Managers – Chris Christensen, Tim Cleary, Pat Keating

a. Implement program by assigning the various functions described herein to individuals within their reporting offices.

b. Ensure that provisions of any local or state regulations or client requirements are also implemented.

c. Assures that an adequate supply of Personal Protection Equipment (PPE) is available.

d. Establishes a system for maintaining records of inspection, hazard abatement, and training for their office.

e. Instruct employees that any and all workplace related injuries, illnesses, and accidents must be reported immediately to their supervisor.

f. Complete accident investigation for each accident. Ensure that corrective measures are taken to prevent recurrence of accidents, injuries or illnesses.

2.3 Supervisors – Chris Pruner, Tim Boyd, Joanna McKeehan, Brian Savela,

a. Assist the office managers in accident analysis and reporting as requested.

b. Ensures that a Health & Safety Plan (HASP) is addressed prior to initiation of any fieldwork at a hazardous waste site and accompanies personnel in the field.

c. Ensures that a Report of Occupational Accident, Injury, or Illness form is completed for any and all work related injuries or occupational illnesses and is submitted to the Program Administrator.

2.4 Site Health & Safety Representatives/Lead Drillers

a. Conduct Health & Safety briefings on site prior to beginning any field activities.

b. Report any and all injuries or occupational illnesses occurring at a field location to their immediate supervisor.

c. Assist the supervisor and Office Managers in hazard evaluation and abatement.

3.0 COMPLIANCE

Safety is a cooperative undertaking that requires participation by every employee. Failure by any employee to comply with safety rules will be grounds for corrective discipline. Supervisors shall insist that employees observe all applicable company, state, and federal safety rules and practices, and take action as necessary to obtain compliance.

Employees who are unaware of correct safety and health procedures will be trained or retrained.

Willful violations of safe work practices may result in disciplinary action in accordance with company policies.

Employees who follow safe and healthful work practices will have this fact recognized and documented.

To carry out this policy:

Employees shall report all unsafe conditions and equipment to their supervisor or safety coordinator.

3.1 General Work Practices

a. Employees shall report immediately all accidents, injuries and illnesses to their supervisor or safety coordinator. The Report of Occupational Accident, Injury, or Illness form may be used for reporting purposes.

b. Horseplay, scuffling, or other acts that tend to adversely influence the safety or well being of the employees are prohibited.

c. Use proper lifting techniques to avoid back injury. Use mechanical lifting aids whenever possible.

d. Means of egress shall be kept unblocked, well lit and unlocked during work hours.

e. Work areas and areas of travel will be clean and free of debris. Work areas will be cleaned daily. Liquid spills and trip/fall hazards will be removed immediately.

f. In the event of fire, sound the alarm (if applicable) and evacuate.

g. Upon hearing a fire alarm stop work and proceed to the nearest clear exit. Gather at the designated location.

h. Only workers trained for it may attempt to respond to a fire or other emergency.

i. Make certain that electrical equipment is properly grounded. Do not modify electrical wiring unless qualified to do so.

j. Small equipment and hand tools must be inspected to ensure they are in good repair and safe to use i.e., chisels, wrenches, hammers, etc. This includes electrically powered hand tools.

k. All safety guards must be in place and in good operating order. Tools/equipment missing guards will be removed from site/service until repaired.

l. No illegal drugs, firearms, or alcoholic beverages are allowed on site. This is grounds for immediate termination.

3.2 Drilling/Site Operations Work Practices

For a complete list of safe work practices pertaining to field activities, refer to the attached Workplace Injury and Illness Prevention Program(see Appendix A) and the Drilling Safety Guide(see Appendix D to the Health and Safety Monitoring Plan). Among the more general work practices are:

1. HARD HAT IS TO BE WORN AT ALL TIMES WHILE ON JOB SITE OR IN AREAS WHERE WORK IS BEING CONDUCTED.

2. ANSI-approved steel-toed shoes or boots are required for all field operations.

3. Noise protection is required for all activities where noise level is in excess of 85 dba (i.e. auto hammer, hydraulic hammer, jackhammer)

4. Gregg employees exposed to the hazards of vehicular traffic are required to wear orange warning garments. During dusk, dawn or dark times, employees must wear warning garments made of reflective material.

5. Safety glasses are required while in or around construction work areas - where debris or particulates have the potential to contact the eye.

6. Personnel working in and around dust, hazardous materials or using any liquid/material, which might cause or create a health hazard, must use the proper type respirator and cartridge. These employees are also required

7. To be trained/fitted and must comply with Gregg Drilling / In Situ, Inc's Respiratory Protection Program.

8. No open or sleeveless type shirts. When working around equipment, loose shirt ends must be secured to prevent them from being caught in or on equipment.

9. Long cloth pants should be worn and properly fitted.

10. An emergency eye wash station must be available at work location.

11. HAND AUGER EACH BORING LOCATION TO 5 FEET BEFORE DRILLING.

12. Do not drill within 2' of the edge of a USA marked utility.

13. Brace and shore equipment on steep or unstable terrain.

14. Check that fittings and pressurized lines are in good repair before using. Secure all lines to prevent whipping.

15. Inspect wire ropes & clamps; replace if frayed, etc.

16. Heavy equipment must remain at least 10 feet from overhead power line

17. Of 50 kV or less. For each kV over 50, increase distance 0.5 foot per kV.

18. Do not work under suspended loads. Barricade accessible areas under the swing radius of the load.

19. A back-up alarm is required for every drill rig. Observer remains in contact with operator, and signals when back up is safe. All personnel must remain outside of the equipment's turning radius. Make equipment operators aware of your presence: inform operators at the beginning of the day if you must work in their vicinity. Do not back-up rig, support vehicles or equipment unless you have an observer at the rear of the vehicle.

20. Keep fire extinguishers in the clear but near operations. Do not tamper with extinguishers. Maintain all fire fighting equipment in operating condition. In case of fire, turn on an alarm at once (if present), and then use the correct type of

extinguisher. Use equipment correctly; do not delay.

21. Employees are not allowed to set up traffic control unless they have prior approval of the office manager. Traffic controls must be in accordance with the specifications included in the latest version of the AManual of Traffic Controls for Construction and Maintenance Work Zones≅ (1990).

22. When open flames or welding is conducted, fire protection equipment must be present. All fire protection equipment must be in good working order, proper type and readily available for emergency use. Each employee must be trained in proper use of this equipment.

23. No riding on equipment is permitted unless it is designed to carry passengers. Riding on vehicles is permitted if seats are available (no riding in the back of support truck or running board, etc.)

24. Do not enter a confined space without getting permission from the office manager. Only personnel trained in confined space entry procedures can enter a confined space. No person may enter a confined space unless a confined space entry plan is approved by company safety officer.

25. If you must enter a trench/excavation, make sure the trench/excavation meets OSHA standards before you enter. All excavations 5 feet deep or more must be sloped or shored. Excavations 4 feet deep or more must have a ladder every 25 feet. If you work near a trench/excavations, remain 2 feet from the edge at all times.

26. All spills shall be wiped up promptly.

27. Always use the correct lifting technique. Never attempt to lift or push an object that is too heavy. Contact the supervisor when help is needed to move a heavy object.

28. When carrying objects, use caution in watching for and avoiding obstructions or loose material.

29. Do not stack material in an unstable manner.

30. Yard/Office Work Practices

31. Work areas should be maintained in a neat, orderly manner. Throw trash and refuse into proper waste containers. Store all tools, augers and materials in such manner as to avoid slips, trips and falls.

32. Keep stairways clear of items that can be tripped over. All areas under stairways that are egress routes should not be used to store combustibles.

33. Materials and equipment will not be stored against doors or exits, fire ladders or fire extinguisher stations.

34. Make certain that gas cylinders are properly anchored, chained and capped. Keep cylinders away from ignition sources and protected from direct sunlight.

35. Keep fire extinguishers in the clear but near operations. Do not tamper with extinguishers. Maintain all fire fighting equipment in operating condition. In case of fire, turn on an alarm at once, and then use the correct type of extinguisher. Use equipment correctly; do not delay.

36. Use only approved National Fire Protection (NFPA) or Underwriters Laboratories (UL) containers, cabinets and portable tanks for storage and dispensing of flammable materials. Keep flammable liquids in closed containers with contents and directions for safe use. Refer to MSDSs attached to this HSP for specific information on any chemicals brought to this site.

37. Move welding activities down-wind from explosive atmospheres. If welding must be done in or above a boring, flush the boring with nitrogen gas or carbon dioxide and notify the SHSC and PHSM. An intrinsically safe blower will be used to dissipate explosive gases, and a platform will be built to remove the welding site from the head of the boring. The boring will be covered to prevent sparks from falling into the boring.

38. All chemicals or flammables brought on site must be inspected by Safety Personnel to ensure safe use procedures, MSDS on file and area for safe storage. Hazardous chemicals require a MSDS upon arriving on site.

39. All spills shall be wiped up promptly.

40. Never stack material precariously on top of lockers, file cabinets or other high places.

41. Do not stack material in an unstable manner.

42. Always use the correct lifting technique. Never attempt to lift or push an object that is too heavy. Contact the supervisor when help is needed to move a heavy object.

43. When carrying objects, use caution in watching for and avoiding obstructions or loose material.

44. Report exposed wiring and cords that are frayed or have deteriorated insulation so that they can be repaired promptly.

45. Never use a metal ladder where it could come in contact with energized parts of equipment, fixtures or circuit conductors.

46. Maintain sufficient access and working space around all electrical equipment for ready and safe operations and maintenance.

47. Do not use any portable electrical equipment or tools that are not grounded or double insulated.

48. Plug all electrical equipment into appropriate wall receptacles, or into an extension of only one cord of similar size and capacity. Three-pronged plugs should be used to ensure continuity of ground.

49. All cords running into walk areas must be taped down or inserted through rubber protectors to prevent tripping hazards.

50. Inspect motorized vehicles and other mechanized equipment daily or prior to use.

51. Shut off engine and set brakes prior to loading or unloading vehicles.

52. Wear hearing protection in all areas identified as having high noise exposure.

53. Goggles or face shields must be worn when grinding.

54. Do not use any faulty or worn hand tools.

55. Guard floor openings by a cover, guardrail, or equivalent.

56. Do not eat in areas where hazardous chemicals are present.

57. Be aware of potential hazards involving various chemicals stored or used in the workplace.

58. Cleaning supplies should be stored away from edible items on kitchen shelves.

59. Store cleaning solvents and flammable liquids in appropriate containers.

60. Keep solutions that may be poisonous or are not intended for consumption in well-labeled containers.

61. When working with a VDT, have all furniture adjusted, positioned and arranged to minimize strain on all parts of the body.

62. Never leave lower desk or cabinet drawers open; they constitute a tripping hazard. Use care when opening and closing drawers to avoid pinching fingers.

63. Do not open more than one upper drawer at a time, particularly the top two drawers on tall file cabinets.

64. Keep appliances such as coffeepots or microwave ovens in working order and inspect them for signs of wear, heat or frayed cords.

65. Fans used in work areas should be guarded, and guards must not allow fingers to be inserted through the mesh. Newer fans are equipped with proper guards.

66. Always use the correct lifting technique. Never attempt to lift or push an object that is too heavy. Contact the supervisor when help is needed to move a heavy object.

4.0 COMMUNICATION

Matters concerning occupational safety and health will be communicated to employees by means of written documentation, staff meetings, formal and informal training, and/or postings.

Communications from employees to supervisors and/or safety representatives about unsafe or unhealthy conditions is encouraged and may be verbal or written, as the employee chooses. The employee may use the Report of Occupational Accident, Injury, or Illness form and remain anonymous.

No employee shall be retaliated against for reporting hazards or potential hazards, or for making suggestions related to safety.

The results of the investigation of any employee safety suggestion or report of hazard will be distributed to all employees affected by the hazard, or posted on appropriate bulletin boards.

5.0 HAZARD ASSESSMENT & CONTROL

Hazard control is the heart of an effective IIPP program. The Company's hazard control procedure is: identify hazards that exist or develop in the workplace, describe how to correct those hazards, and initiate steps to prevent their recurrence.

5.1 Assessment of Hazards

Inspection of the workplace is our primary tool used to identify unsafe conditions and practices. While we encourage all employees to continuously identify and correct hazards and poor safety practices, certain situations require formal evaluation and documentation. Along with each inspection/investigation, the Program Administrator or designee shall evaluate the severity of the hazard identified, and if it cannot be abated immediately, suggest priority for corrective action. The Hazard Assessment and Correction Record form is to be used to document inspections/investigations.

The Program Administrator or designee will conduct an inspection or investigation whenever any of the following occur:

a. The introduction of a new substance, process, procedure, or piece of equipment presents a new safety/health hazard.

b. The Program Administrator becomes aware of a new or previously unrecognized hazard, either independently or by receipt of information from an employee, including receipt of a Report of Occupational Accident, Injury, or Illness form.

c. An occupational injury, occupational illness, or near-miss accident occurs.

All investigations and findings shall be fully documented on the Hazard Assessment and Correction Record and filed as directed in Recordkeeping.

5.2 Abatement of Hazards

It is the Company's intention to eliminate all hazards and unsafe work practices immediately. Some corrective actions require more time. Priority will be given to severe and imminent hazards.

The Hazard Assessment and Correction Record form completed during the inspection/investigation will be reviewed by the Program Administrator or designee to evaluate measures taken to abate the hazard or correct the unsafe work practice. Actions to be taken may include, but are not limited to:

- fixing or replacing defective equipment
- implementing safety procedures
- installing guards, modifying equipment
- employee training
- posting warning notices

All such actions taken and the dates they are completed shall be documented on the appropriate forms.

When corrective action involves multiple steps or cannot be completed promptly, an action plan will be developed.

While corrective action is in progress, necessary precautions are to be taken to protect or remove employees from exposure to the hazard.

Employees shall not enter an imminent hazard area without prior specific approval of the Program Administrator or designee. Employees expected to correct the imminent hazard shall be properly trained and provided with necessary safeguards.

6.0 ACCIDENT, INJURY & ILLNESS INVESTIGATION

The purpose of an accident investigation is to find the cause of an accident, injury, or illness and prevent further occurrences, not to assign blame.

All accidents and injuries are to be fully investigated using the following procedures:

a. Employees shall immediately report all accidents, injuries, near misses, and property incidents to immediate supervisor.

Upon report of injury, the Supervisor shall:

a. Immediately ensure employee receives proper first aid or medical attention.

b. Give injured employee an Employee Claim For Workers= Compensation Benefits form within 24 hours of the supervisor's knowledge of injury. This form must be entirely completed and a copy must be given to the employee as receipt. If employee is unconscious or a fatality occurs, the form should be immediately supplied to a family member.

c. Complete Supervisors Report of Injury form.

- Interview injured employee
- Interview witnesses
- Survey accident scene
- Reconstruct accident if necessary
- Report: who, what, when, why, where, how on form
- Correct any unsafe conditions immediately
- Make recommendations to prevent reoccurrence
- Follow up on corrective action

d. If the injury requires medical treatment beyond first aid, or if any lost time was involved, an Employers Report of Occupational Injury or Illness must be completed.

e. All Employees Claim for Workers Compensation Benefits forms will be reviewed by the Program Administrator and the Associate/Office Manager and corrective action recommendations will be developed if applicable.

f. All recommended corrective action will be followed up by the Program

g. Administrator to ensure the proper action is taken.

Along with each inspection/investigation, the Program Administrator or designee shall evaluate the severity of the hazard identified, and if it cannot be abated immediately, suggest priority for corrective action. The Hazard Assessment and Correction Record form is to be used to document inspections/investigations.

7.0 TRAINING

The Program Administrator or designee shall ensure that all employees will receive training on recognizing the safety and health hazards to which they may be exposed.

7.1 Field Personnel

All employees expected to conduct field activities must complete an initial 40-Hour Hazardous Waste Site Safety training in accordance with 40 CFR Section 1910.120. These employees also receive an annual 8-Hour Health & Safety Refresher training course involving general workplace safety, job-specific hazards, and/or hazardous materials as applicable.

All training shall be documented on a training record form and a copy of the training certificates filed in the employees personnel file.

7.2 Supervisors

Supervisors are responsible for ensuring that employees under their direction receive training on general workplace safety, and specific instructions regarding hazards unique to any job assignment.

When supervisors are unable to provide the required training themselves, they should request that the Program Administrator or designee provide training. Training topics may include human relations, trainer skills, production/process skills, and familiarization with hazards and risks faced by employees.

8.0 RECORDKEEPING

Each supervisor will maintain an updated copy of the Company's IIPP. The Program Administrator will retain the following records on file for at least three (3) years:

8.1 Injury & Illness Prevention Program (IIPP)

- Master copy of IIPP, changes/updates

8.2 Communication

Documents verifying that the Company has maintained ongoing two-way communication with employees, such as;

- memos, letters to employees on safety and health issues
- new employee safety orientation session acknowledgement form
- employee suggestions and Company response
- all records of inspections/investigations, including date, name of person who performed the inspection/investigation, unsafe conditions and work practices identified, corrective action taken and date of correction.
- Forms covered in this category include:
  - Report of Occupational Accident, Injury, or Illness
  - Hazard Assessment and Correction Record

8.3 Training

Record of employee health and safety training containing the employees name and training date. Training record examples are:

Employee Safety Meeting Attendance
Employee Safety Checklist
Employee Safety Training Verification

8.4 Inspection Documentation

Hazard Assessment and Correction Record forms will be maintained by the Program Administrator.

8.5 Injury & Illness Investigation

A file will be established for each accident. The file will be maintained in the Program Administrators office. The file will contain:

- Supervisors Report of Injury or Illness form
- Employees Claim for Workers= Compensation Benefits form
- Employers Report of Occupational Injury or Illness.
- Notes and related items such as Doctors report

A log of Occupational Injuries & Illnesses logs (OSHA 200) will be maintained at

each office location and posted once a year, no later than February 1, and must remain in place until March 1. These documents will be maintained for 5 years.

A Supplementary Record of Occupational Injuries & Illnesses Summary log (OSHA 101) will be maintained at each office location. These documents will be maintained for 5 years.

8.6 Training

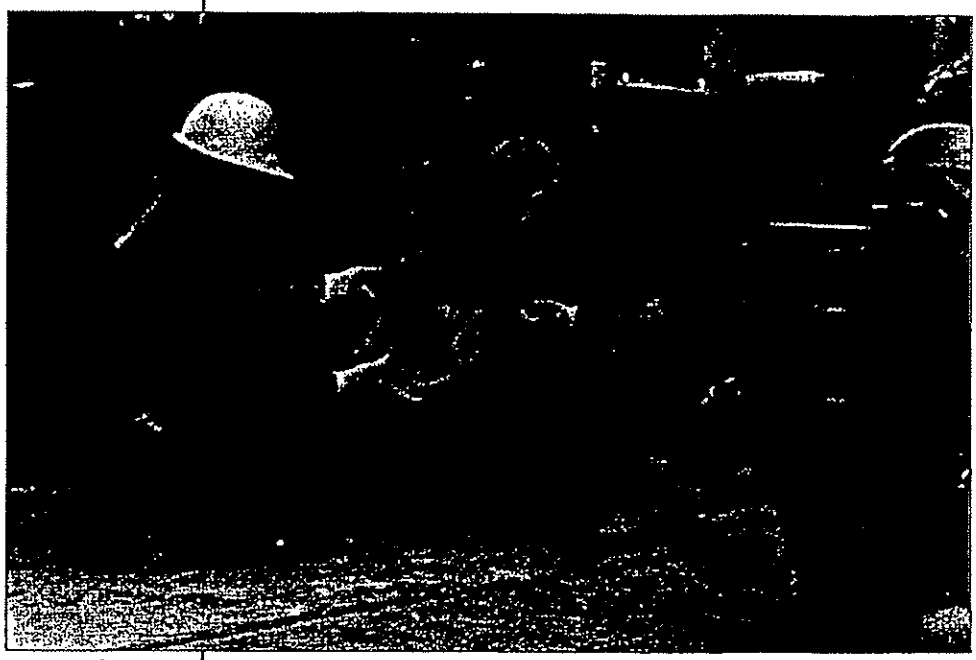
All training course certificates will be maintained in the training section of each employees personnel file.

All training programs will have attendance logs, which the employee will sign at the time of the training. This log will be maintained in the Program Administrators' office

APPENDIX A

WORKPLACE INJURY & ILLNESS PREVENTION PROGRAM

WORKPLACE INJURY & ILLNESS PREVENTION PROGRAM

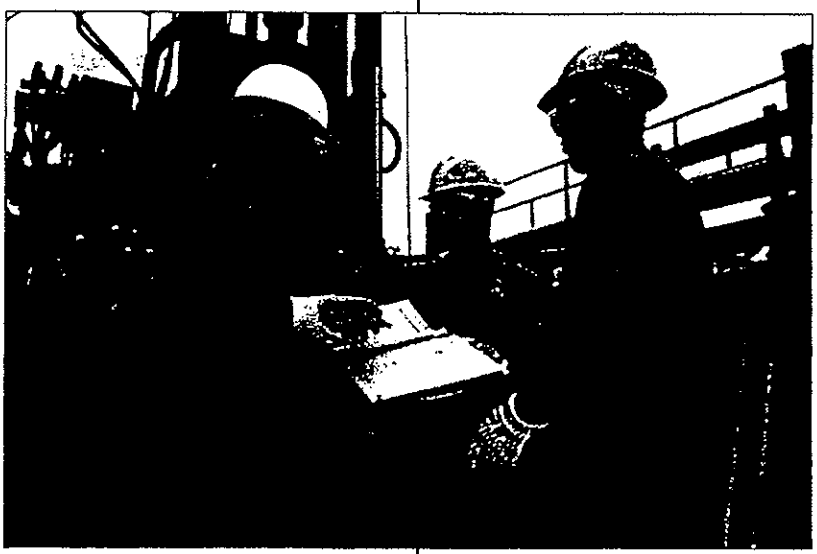


WORKPLACE INJURY & ILLNESS PREVENTION PROGRAM

Produced by Jack Lewis
2620—4th Ave. N. Ste. 606
Seattle, Washington 98109

Telephone (206) 281-4635

TABLE OF CONTENTS



INTRODUCTION

Welcome Aboard.

Most new employees want to begin on the right foot. As your employer, we want you to start off strong and stay on track.

ORIENTATION

We want you to learn your new job as quickly as possible. This is why we offer this one-day orientation program you are about to begin.

You will soon realize we are in a fast-paced, strenuous service business. Everyone who works for us must learn what to do, understand when to do it, and practice the skills required until it becomes second nature.

Today, we introduce you to your job duties, and provide training so you can be safe and productive during your first week on the job. You will learn and be tested in these four areas today:

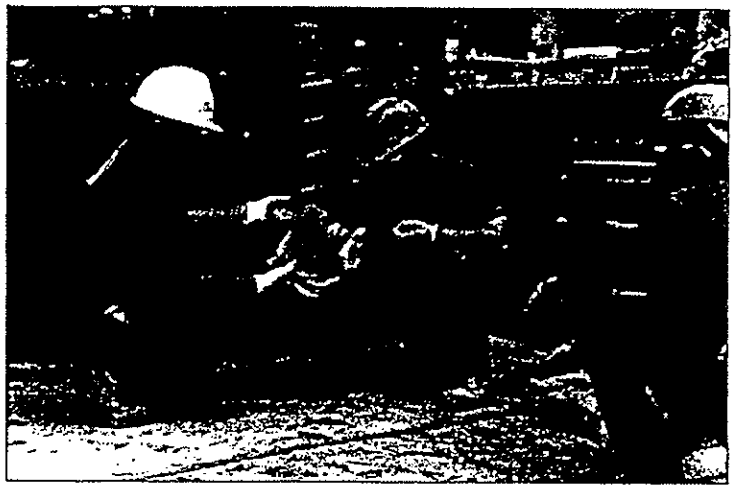
UNITS FOR TODAY

- Safety First
- Vehicle Operation
- Steam Cleaning
- Clean-Up

Each unit presents different aspects of your job. Ask questions until you understand. Plan to take written quizzes. You will also practice what you have learned under the guidance of a training supervisor.

ON-THE-JOB TRAINING

It is one thing to learn classroom information and quite another to apply it properly in the field. This is why we provide on-the-job training in drilling techniques, steam cleaning, and well completion. We want you to know what to do, to practice doing it safely every day, and to become skillful enough to teach others who join your crew to do it properly.



We get everyone involved with on-the-job training because each person contributes to what happens on a drilling crew. The more on-the-job training you receive, the sooner you can do your job well and assist others to do the same. We expect you to keep learning and to pass on what you know to others.

RIGHT-TO-KNOW

At our company, we believe a safe, injury-free workplace depends on clear, current two-way communication between the supervisors and workers. We encourage employees to inform us immediately of hazards in the workplace without fear of reprisal.

We ensure that all employees are knowledgeable about the materials and equipment they work with, which known hazards are present, and how these are controlled. Therefore, each employee needs to understand these things:

- No employee is expected to undertake a task until he/she has received instructions on how to do it safely, and has been authorized to perform the task properly.
- No employee should undertake any task that appears to be unsafe.
- No employee should use chemicals without fully understanding the toxic properties and having knowledge to work with them safely.
- Mechanical safeguards must always be in place and remain in place during use.
- Employees are to report to a supervisor all unsafe conditions encountered during work.
- Any work-related injury or illness suffered, however slight, must be reported at once.
- Personal protective equipment is to be used as required, and properly maintained.

EVERYONE PAYS

Workplace injuries are costly to everyone. Our purpose is to keep these unnecessary costs to a minimum by preventing accidents.

Cost to Employees

- Worker's physical pain and suffering.
- Hardship to the worker's family.
- Reduced earnings during recuperation.
- Loss of morale if an accident results in a long-term handicap.
- Reduced earnings if injury affects worker's ability to function at previous performance level.
- Reduction of a person's productive work years.
- Permanent effects of accident on health and well being of the injured worker.

Cost to Employers

- Medical expenses related to accident.
- Wages paid injured worker while not producing.
- Wages paid to non-injured workers who stop production to assist with accident or stop to watch, talk about it, or who depend on output normally provided by injured worker.
- Overtime necessary to make up lost production.
- Reduced production of new or substitute worker.
- Increased compensation insurance premiums.
- Replacement of damaged tools or equipment.
- Supervisory time away from normal activities as a result of accident.
- Administrative time required to investigate the accident, process forms, and settle claims.
- Loss of contracts or cancellation of orders.
- Effects of accident of company image and public relations.

YOUR JOB DUTIES

Your job is to help the drilling crew keep the drilling rig in operation.

Drive Vehicles

You fuel and service drilling rigs and other vehicles, which means regularly maintaining and cleaning them. You are expected to drive trucks and trailers safely.

Load Supplies

You load and unload drilling equipment, tools, and supplies in setting up a job site at the start and finish of each project. This includes returning augers, tools, and equipment to the proper place on a drilling rig.

Drilling Support

You assist the drilling crew by operating the steam cleaner, setting wells, and doing the cement work to finish each well. You make sure enough drilling supplies are at hand to keep up with drilling.

Handle Core Samples

You carry core samples from the drilling rig to the geologist. You assist the geologist by breaking, cleaning, and re-loading samplers.

Clean-Up Job Site

You clean-up and maintain the drilling rig, tools, and related equipment. You collect and dispose trash or haul it away. You do job site housekeeping to keep it safe for others and efficient for drilling operations.

TYPICAL WORK DAY

Although the details and type of drilling you do on each project may vary, your duties generally follow this sequence:

Check Vehicles

Check for proper load, materials, and equipment as needed. Load vehicle with supplies if necessary. Do pre-trip vehicle inspection.

Travel to Job Site

Make sure you know exactly where job site is. Determine best travel route to job site. Drive support vehicles safely. Stay in sight of other vehicles while traveling. Call office immediately if you have problems.

On-Site Duties

Unload vehicles.
Unload support vehicles and trailers. Set up supplies and cleaning areas.
Help driller.
Keep driller supplied with tools and materials. Assist in maintenance and equipment repair. Shovel drill cuttings away from hole.
Collect drilling samples.
Set-up sample station. Assist geologist with samples. Provide clean samplers as needed.
Clean-up job site.
Steam clean tools and equipment. Do job site housekeeping.Collect and dispose of trash.
Grout and finish work.
Mix grout for finishing wells. Smooth grout around completed well head.

Return to Shop

Load vehicles neatly for return trip. Drive support vehicles safely.

Check Out

Before leaving the shop, driller may ask you to: return auger and unused materials to respective places, maintain and clean rig and support vehicles and load for next day's work.

WHO'S IN CHARGE?

Most new employees want to know who the boss is. This only makes sense to understand the chain of command.

The driller is your direct supervisor. Follow the driller's instructions and ask questions whenever you are in doubt. At first, you may work with various crews on different drilling projects. Therefore, your driller for the day might change.

You will find that various people have opinions about the work you do. Geotechnical consultants direct a drill crew's activities. Property tenants and client representatives may also watch you, inspect your finished work, and make comments to the driller about what they see.

REMEMBER

If someone tells you to do things differently than what your driller has told you, check with the driller before proceeding.

QUIZ

Answer these questions in the space on front and back of this page.

What is the purpose of this training program?

Give the reason for on-the-job training?

What are you expected to do once you finish your on-the-job training?

List two of the "rights" you, as an employee, have in dealing with workplace hazards?

List three costs to an employee that can result from a workplace injury?

List your five major job duties.

Describe the sequence of a typical work day.

List your on-site duties.

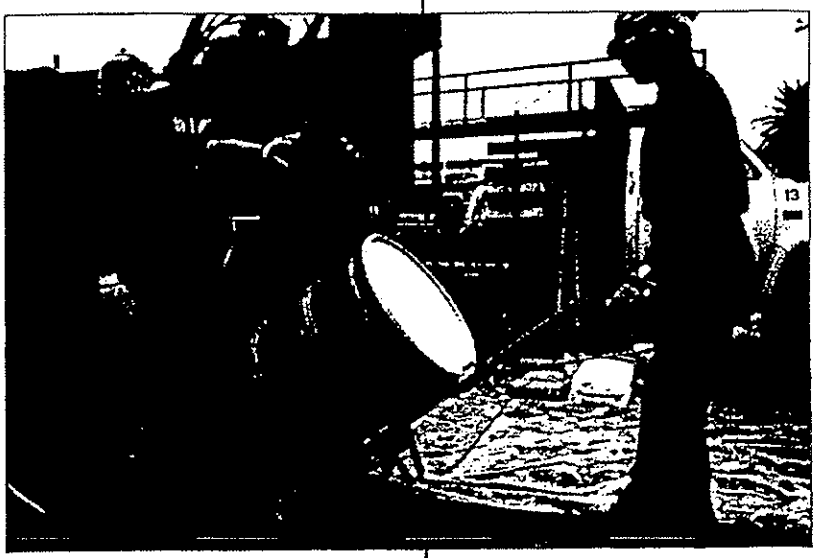
Who is your direct supervisor?

Name others who may review your work.

Supervisory Review:

Name

Date



SAFETY FIRST

We are committed to everyone's safety.

Environmental drilling can be hazardous work. *Safety First* is not just a motto for lip service; it is a principle of our business operations.

SAFETY FIRST

Safety experts believe over ninety percent of accidents are avoidable. They say human error, not mechanical failure, is the cause of most accidents.

However, workers with proper safety training, who are careful and pay attention, need not be injured. This is the reason our company concentrates on increasing employee safety awareness. We want you to develop a reliable "safety sense" and use good judgment during drilling activities.

Everyone loses whenever accidents occur. The individual suffers pain, loss of income, and may become crippled, even die. The crew loses morale and efficiency. The company must earn between $10—15 in additional revenue for each dollar spent on an accident. It costs $10,000 to $15,000 to pay for a minor $1000 accident. Therefore, each person, every crew, and the company has a stake in observing *Safety First*. We all win when we practice accident prevention.

REMEMBER

Ask for safety training before doing something for the first time.

SAFETY PAYS

- Don't use unsafe equipment.
- Operate equipment safely.
- Don't drive unsafe vehicles.
- Drive defensively.
- Do not smoke on site.
- Do not eat or drink near rig.
- Wash hands and face before eating and drinking.

DRILLING RIG SAFETY

During your first days on this job, think safety at all times. Ask questions if you are unsure how to protect yourself and others from injury.

As a new employee, avoid these situations to keep from hurting yourself:

- Falling on a slippery surface or tripping over equipment.
- Setting or dropping a heavy object on your hands or feet.
- Spraining your back by lifting improperly.
- Hitting your thumb or finger with a hammer.
- Chipping a metal fragment into your eye.
- Catching loose fitting clothes on a rotating auger or drill pipe.
- Getting an infection in a neglected "little scratch".
- Smashing a hand or foot in moving machinery.
- Becoming injured by "daydreaming".

MOST COMMON INJURIES

- Slipping and falling.
- Getting dirt in eye while steam cleaning or while hitting auger and rods with hammer.
- Cutting fingers from handling augers, and heavy objects.
- Injuring back from improper lifting.

SAFETY GEAR

What you wear can be as important to drilling safety as what you do. Protective safety gear helps prevent accidents. The specific clothes and gear you use depends on the situation.

STANDARD GEAR

- Hard Hat
- Steel-Toed Boots
- Gloves
- Safety Glasses

Hard Hat

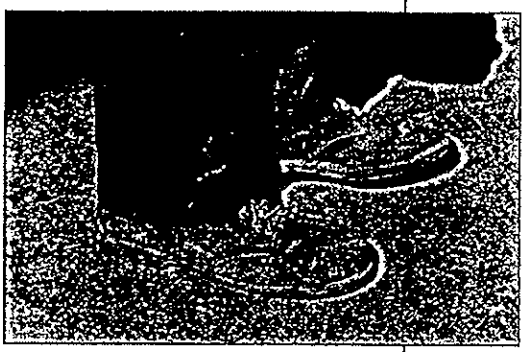
A hard hat is the number one piece of safety equipment. It **always must** be worn around a drilling rig. A hard hat protects you from falling objects. A hard hat can reduce a 4000 pound force, which can easily break your neck, to an 800 pound force, which you can withstand without injury.

For your own protection, OSHA regulations allow government inspectors to assess fines for not wearing hard hats. Our company supports this regulation and expects you to always wear a hard hat on the job.

Steel-Toed Boots

Steel-toed boots are mandatory. Steel-toed boots protect your feet and toes from serious injury. Safety boots make you more "sure footed" in wet or muddy drilling conditions.

As with hard hats, OSHA regulations allow government inspectors to assess fines for not wearing steel-toed boots. Our company supplies steel-toed *rubber* boots for its employees. You provide your own leather steel-toed boots. Look for these features in selecting your leather boots:



- Steel toe protection.
- Puncture-proof steel insert between inner and outer soles.
- Slip resistant sole materials.
- Firm arch support construction.
- Rugged, specially treated exteriors.

Gloves

Protect your hands with gloves. Be sure your gloves are designed for the job to be done. Cloth, leather, and rubber are most common.

Cloth protects your hands from dirt, chafing, abrasions, slivers, and low heat. Leather protects from sparks, chips, rough material, and moderate heat. Rubber protects against solvents, acids, and some chemicals.

Make sure your glove fits properly and allows for quick removal. Do not use gloves with large cuffs that can become snagged on rotating machinery.

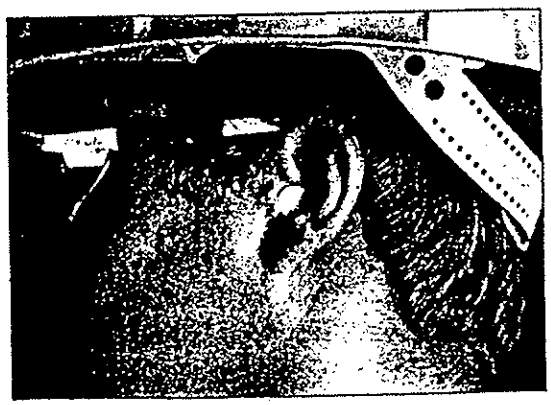
Safety Glasses

The slightest eye injury can be painful. Prevent eye injuries with safety glasses or goggles. These are furnished as needed. Wear them in these situations:

- Working around drilling rig.
- Using steam cleaning equipment.
- Mixing grout.
- Breaking bricks or concrete.
- Hammering on metal.
- Working in dusty conditions.
- Cutting or welding.

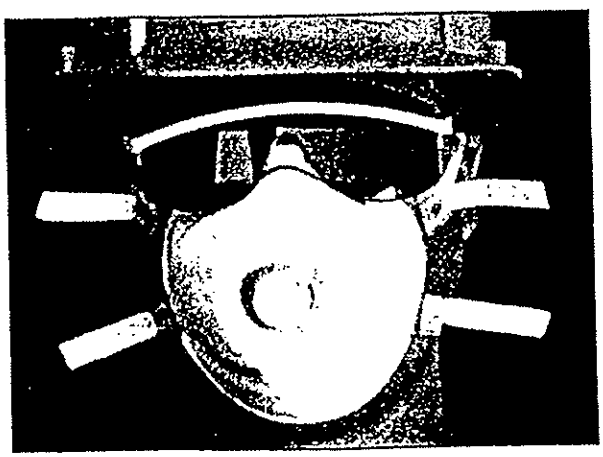
Ear Plugs

Wear ear plugs around noisy equipment especially when sound level exceeds 85 D.B. Ear plugs prevent permanent hearing loss. We provide them for you. Ask for a pair and use them.



Dust Masks

Use a mask to protect yourself from fine, air-born particles. Dust can enter your lungs while mixing grout or adding sand to a well. Masks are also provided by us for your safety.



REMEMBER

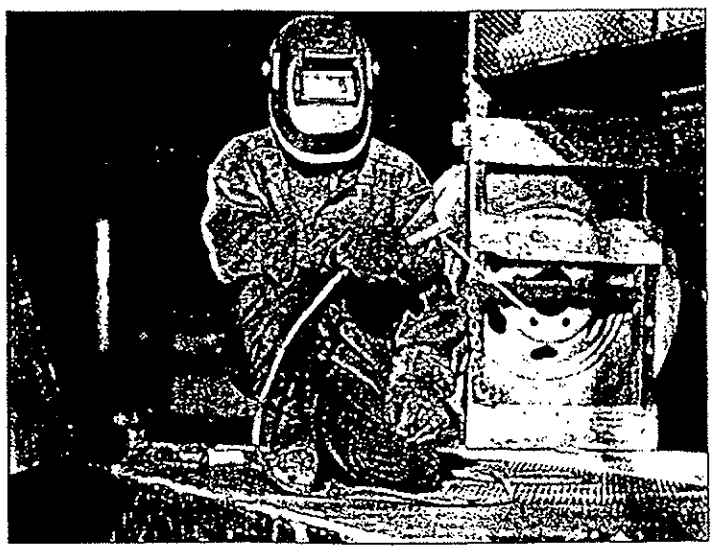
Keep track and take care of the safety gear you are given.

Work Clothes

Dress for danger on a drilling site. Clothes can either protect you, or increase the chance of an accident, depending on what you wear.

Choose overalls and pants without cuffs. Pant legs should be close fitting and ankle length with no loose belt straps, pocket flaps or other attachments to catch on moving equipment.

Wear long sleeves with snug fitting cuffs. If short sleeve shirts are worn, the sleeve should fit snugly on arm to avoid it catching on anything.

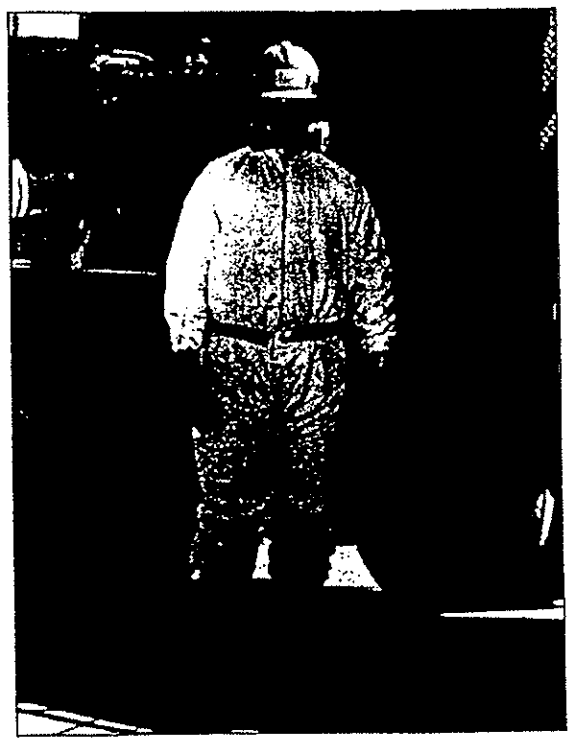


SPECIAL PROTECTIVE GEAR

We have listed the basic safety gear for working on a normal drilling crew. However, some drilling jobs involve hazardous materials. Before working on one of these, you must attend a forty hour training that includes the selection and use of proper protective gear and equipment.

You will be issued and are expected to wear protective gear below, as the situation warrants it:

- Gloves for handling various hazardous materials.
- Respirators, dust masks, and supplied air breathing apparatus.
- Goggles for dusty areas.
- Chemical resistant coveralls (Tyvek).

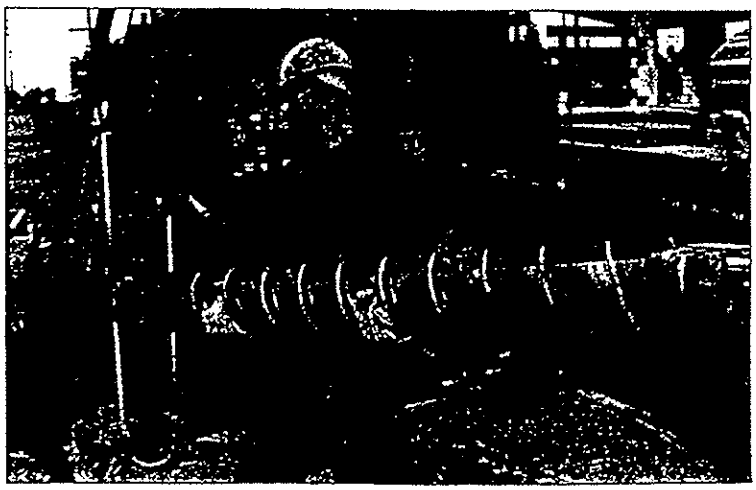


PROPER LIFTING

Back injury is a common drilling injury. Improper lifting causes lower-back pain even for those who are strong. Almost 65 percent of workers have back pain at some time during their work.

Proper lifting takes the hazard out of moving heavy objects. Ask someone who knows how to demonstrate the following procedures. Then, use them, whenever you lift something, either on- or off-the-job:

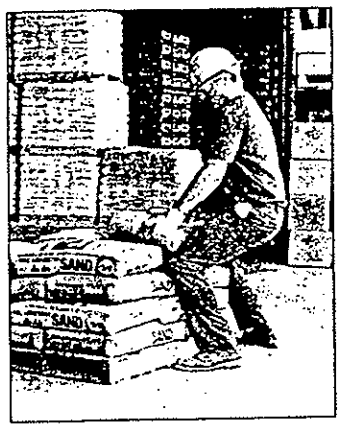
- Make sure you can lift load safely, otherwise get help.
- Use a mechanical lifting device, if available.
- Inspect route to be traveled, making sure sufficient clearance.
- Look for any obstructions or spills.
- Inspect the object to decide how it should be grasped.
- Look for sharp edges, slivers, or other things that might cause injury.



Lifting Techniques

Watch an experienced drill crew member for the safe, easiest way to do heavy lifting.

- Keep feet parted—one along side, one behind object for better balance.
- Keep back straight, nearly vertical, with the spine, back muscles, and body in correct alignment.



- Tuck chin into chest.
- Bend knees.
- Assume squatting position.

REMEMBER

- **Lift loads safely or get help.**
- **Tuck chin to chest.**
- **Bend knees.**
- **Move slowly and carefully.**
- **Avoid twisting your body.**

- Tuck elbows and arms close to body.
- Keep body weight directly over feet.
- Start lift with thrust of rear foot.
- Move slowly and care fully, especially in muddy, slippery areas.
- Avoid twisting body in setting object down.

JOB-SITE HOUSEKEEPING

Clean job-sites reduce accidents and injuries. A clean work environment adds to drilling speed and efficiency. Together, good housekeeping improves working conditions and safety practices.

Housekeeping means cleaning-up which is an ongoing part of drilling, rather than an occasional activity. The right time to clean-up is immediately after a mess is made.

Housekeeping Plan

Follow these suggestions to make your housekeeping efforts more efficient.

- Ask driller where to unload equipment and supplies.
- Put materials in a convenient place where they can be safely handled without hitting or falling on anyone.
- Find a safe place for tools you pick up, not on edge of truck bed.
- Put unused augers and rods out of the way.
- Place fire extinguishers and first aid kits in easily accessible spot.
- Decide on place for trash collection.
- Determine a steam cleaning site that reduces mess.
- Every crew member is responsible for site clean-up.

REMEMBER

When you are not given a task to do, *clean something.*

Housekeeping Clues

Look for cleaning to do around a job site. At one time or another, everything needs cleaning. Look for these clues as signs of poor housekeeping:

- General disorder and overcrowding.
- Loose objects on ground as possible tripping hazards.
- Slippery materials that cause slips and falls.
- Muddy areas that could get tracked all over work site.
- Objects out of place, possible obstacles.
- Rubbish that could get blown or scattered around site.
- Poorly stacked materials that might fall on workers or become ruined.
- Projecting nails that cause puncture or scratch wounds.

Housekeeping Rules

Follow these general guidelines for maintaining a safe, clean job site:

- Keep immediate area near bore hole free at all times from drill cuttings, supplies, and obstructions.
- Secure loose or light materials stored on the ground.
- Remove empty bags and used containers from work area.
- Pick up tools, materials or debris to avoid tripping hazards.
- Avoid leaning shovels and brooms against drilling rig to keep it from breaking the handles.
- Return tools to rack when finished with them.
- Sweep or wash off dirt or mud as soon as possible.
- Keep cat head rope coiled when not in use.
- Keep excess pipe and connections in rack, off the ground.
- Keep water hose clean and coiled when not in use.
- Keep fire extinguishing equipment ready and in good order.
- Check and maintain condition of safety gear.
- Contain water; do not let it run over a job-site.

SHOP SAFETY

Shop safety includes proper use of hand tools, fire extinguishers, and welding gear. Learn where to look for tools and equipment in the supply room. Find the fire extinguishers in the welding, warehouse, and office areas. Know how to protect yourself during welding activities.

Tools

Hand tools are used during drilling operations. Learn to use these tools correctly:

- chisels
- wrenches
- hammers
- screwdrivers
- pliers
- punches
- files

Choose the right tool size, type, and weight for the job. Do not substitute one tool for another when the proper tool is not at hand.

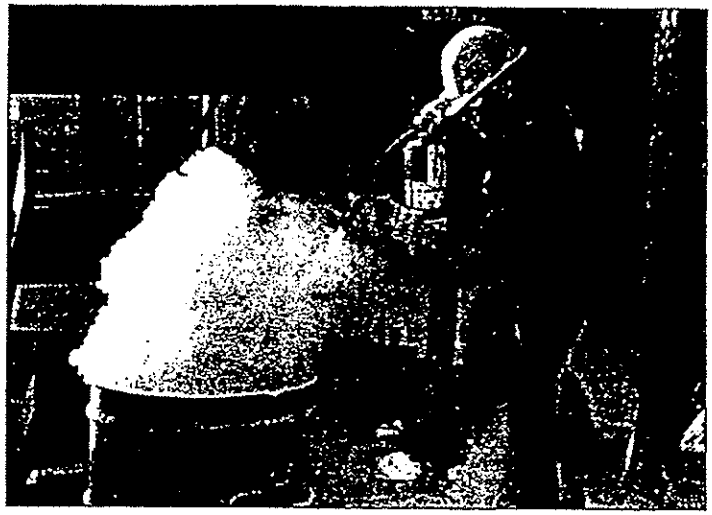
- Check condition before using tools.
- Position your hands so fingers do not get smashed if the tool slips or the connection suddenly "breaks".
- Keep tools clean and maintained including brooms, shovels, and wheel barrows.
- Do not toss wheel barrows, troughs, or equipment from a truck while loading and unloading.
- Return tools and equipment to the proper storage place.

REMEMBER

The wrong tool for the wrong job causes accidents.

Fire Extinguishers

Learn how to use fire extinguishers and know where they are located especially in the warehouse, welding area, supply room, drilling rig, and support vehicles.



Welding

You may be asked to assist someone using a cutting torch or welder. Do not weld unless you know what to do and what is expected of you. Do not look directly at the arc, even for a second. Exposure to a welding arc can cause severe sunburn requiring medical treatment.

BEWARE

Do not look directly at the arc, even for a second.

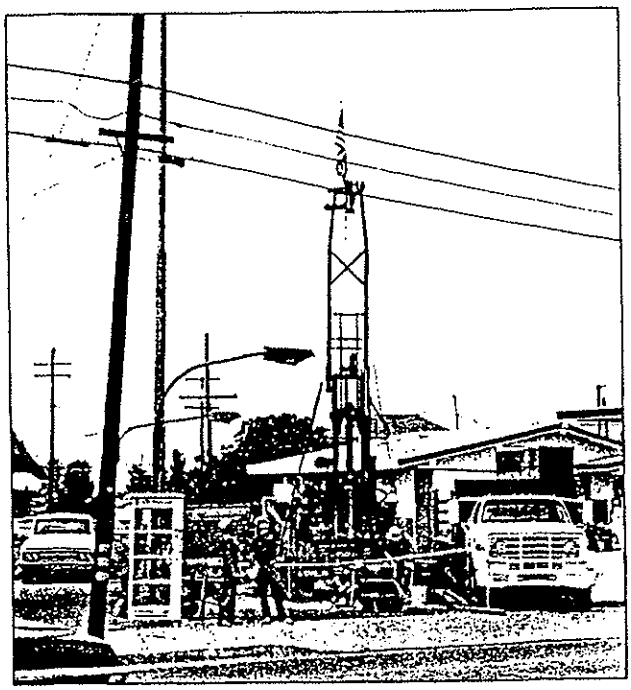
Protect yourself by wearing leather gloves, a leather or asbestos apron, oil-free clothing, and safety shoes. Protect your eyes with either a welding helmet or wear goggles.

ELECTRICAL SAFETY

Electrical safety is a big part of drilling. This means you should be fully aware of overhead and underground power lines. It also includes knowing how to maintain and operate electrical equipment properly.

Power Lines

Drill crews have been killed or severely injured when a drilling rig touched overhead power lines or severed an underground line.



With city drilling you are close to power lines on adjacent streets. Service stations often are located on corner lots with overhead lines on two or three sides of the drilling site.

Keep at least ten feet between any part of the drilling rig and surrounding wires. Look overhead when guiding the drill rig around the site.

Under normal conditions, power lines are safe. But when a rig is too close to them, abnormal conditions result.

Extreme Electrical Danger

If your drilling rig should connect with overhead power lines, do these things:

- Consider all wires alive and dangerous. Since current always flows to ground whenever a suitable path is available, the rig can become electrified.

- If you are inside vehicle, stay seated. **Do not try to leave the rig until power has been turned off.**

- If rig is to be vacated, then jump clear and away from rig. ***Jump***. Do not step off or hang onto any part of the vehicle in jumping clear.

- Keep others away from the rig.

- Even though tires insulate it from the ground, the rig only appears safe. Anyone who touches it provides a conductor for the deadly current.

Electrical Equipment

Electrical shock can also occur if equipment is maintained improperly or operated unsafely. Care and common sense minimizes danger and reduces the chance of fire resulting from electrical faults.

- Do not work on electrical parts unless you are sure they are disconnected.
- Never splice, connect, or handle live circuits.
- Make sure test flow or possible leaks will not spray water into any electrical enclosures such as starters, control boxes, or connection boxes during testing.
- Be certain all electrical equipment is properly grounded.

Underground Utilities

Look for signs above ground that show where underground utilities may be located before drilling. These could be fire hydrants, water mains, electrical boxes, and other posted warnings. If you have questions or concerns, ask the driller.

FIRE SAFETY

Preventive maintenance is crucial to avoid fire hazards. This applies for repairing and setting-up of equipment as well as refueling.

Maintenance and Set-up

Do not operate equipment if you notice this:

- Worn or leaky fuel and hydraulic lines.
- Improper ignition wiring on all equipment.
- Signs of shorts in battery cables and contact points.

Set-up equipment using these methods:

- Clear area of all combustibles such as tall, dry grass, trash, and construction materials.
- Put gas cans and drip pans in safe, secure place on job site.
- Keep fully charged fire extinguishers readily available.

Refueling

Use common sense. Follow these procedures while refueling equipment:

- Check fuel level before starting equipment to avoid having to stop for refueling.
- No smoking allowed within 25 feet of any refueling area.
- Use proper funnels and pour spouts to reduce spills.
- Turn equipment off and allow it to cool before fueling.
- Keep ABC multi-purpose fire extin guisher in immediate area.
- Do not overfill tanks to leave space for fuel expansion in tanks.
- Use only approved containers for fuels.

QUIZ

Answer these questions in the space on front and back of this page.

Are most accidents caused by human or mechanical error?

What are the four most common injuries?

What four safety gear items must you wear?

What is the key for choosing safe clothes to wear around drilling equipment?

Name five points to remember for safe and proper lifting?

List six clues that job site housekeeping is needed?

Name three ways to protect yourself while welding?

What three things should you do if a drilling rig becomes electrified?

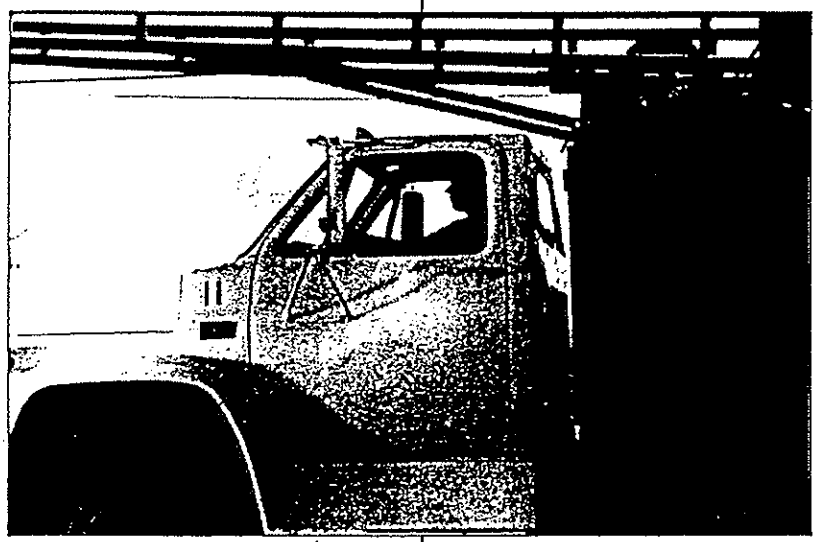
Name above-ground signs that indicate underground utilities?

What can you do to avoid fire hazards?

Supervisory Review:

Name

Date



VEHICLE OPERATION

Drill crews drive vehicles both on and off-the-road.

At this company, our objective is to prevent vehicle accidents from happening at all.

VEHICLE OPERATION

Our company attempts to prevent accidents by providing driver training, conducting regular vehicle maintenance, and practicing safe vehicle operation.

In this unit, you learn to safely operate the trucks and forklifts used on the job by studying these topics:

- How to perform a vehicle inspection.
- How to fuel, lubricate, and load.
- How to drive all vehicles safely.

You take quizzes after each section. Then, you do hands-on exercises on the trucks and forklift as a supervisor observes what you have learned.

VEHICLE INSPECTION

The U. S. Department of Transportation (D.O.T.) requires every driver to prepare a written report at the end of each work day, for each vehicle operated.

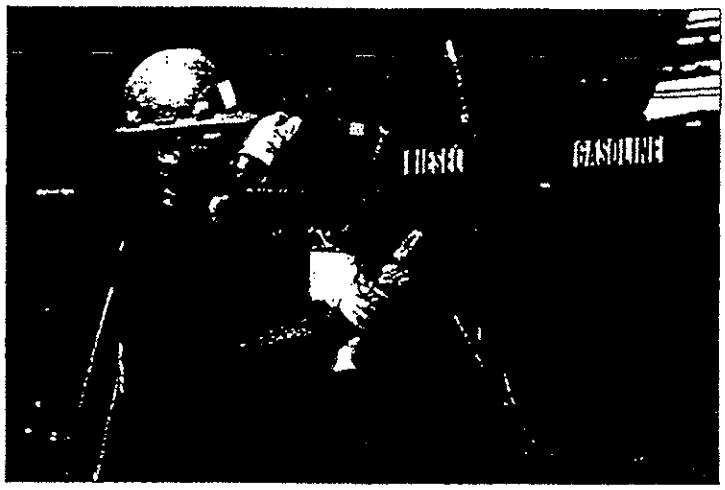
The report must indicate any defect or deficiency discovered by, or reported to, the driver which could affect safe operation. If no defects or deficiencies are found, the report should indicate this and be signed by the driver who did the vehicle inspection.

BEFORE DRIVING ANY MOTOR VEHICLE, DO THESE THREE THINGS

1. Be satisfied that the vehicle is in safe operating condition.
2. Review the last vehicle inspection report on the vehicle.
3. Sign the report only if defects noted by the previous driver have been corrected.

FUEL AND LUBRICATION

Before leaving the shop, fill up with gas, diesel, oil, and water. Know the right type of fuel for each vehicle you drive. Some vehicles have dual fuel tanks, which means you must learn how to switch tanks.

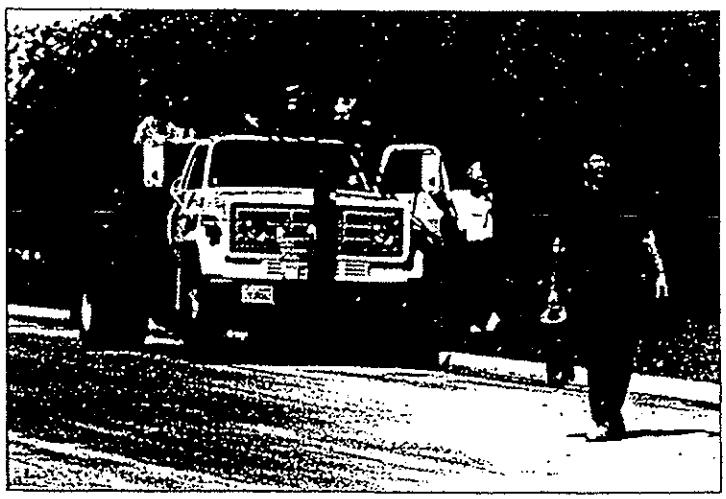


Check the gas gauge frequently as you drive. If you run out of gas en route, use the gas can on the drilling rig or steam cleaner. This should be enough fuel to get you to the closest service station. Always have some gas money with you to handle emergencies. Never leave truck or rig unattended.

REMEMBER

Check the gauges frequently:

- **Fuel**
- **Oil**
- **Temp**



QUIZ

Answer these questions in the space on front and back of this page.

How often is a driver required by law to do a written report on vehicles driven?

What is a person looking for in doing a vehicle inspection?

What if nothing is wrong with the vehicle?

What are three things to do before driving a vehicle?

Which four fluid levels do you check before starting the engine?

PROPER LOADING

Learn basic loading procedures because improperly loaded trucks can be dangerous. Other drivers can be hit by the loose cargo. Your steering can be affected when loads are poorly loaded. Loose loads also can injure you during a quick stop or crash.

You are responsible for inspecting your load, recognizing signs of poorly balanced weight, and checking that everything is securely tied down, regardless of who loaded the truck.

Don't Get Top Heavy

Distribute your load as low as possible. Put heaviest cargo on the bottom.

Balance Weight

Poor weight balance makes vehicle handling unsafe. Distribute load evenly between front and rear axles and left to right on truck bed.

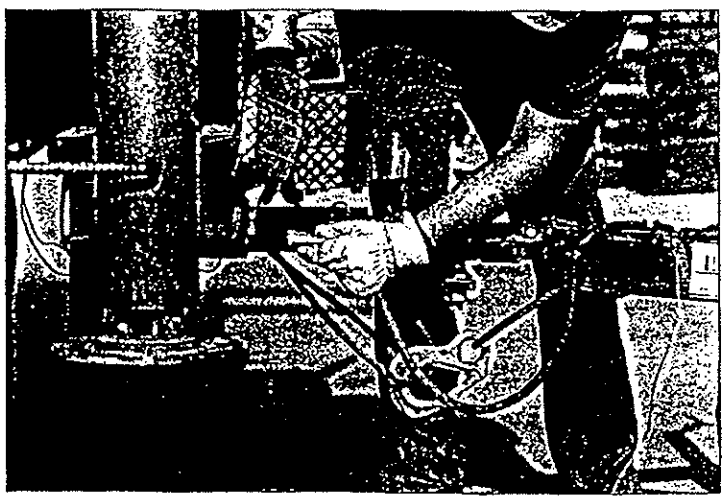
Do this *before you leave* the warehouse or *return from the job site*. Loads coming back to the shop after a day on site must be safely and neatly stacked. This helps the warehouse crew unload the truck easily.

TRAILER HOOK-UP

Learn how to hook-up and drive a truck-trailer combination. The basic steps for trailer hook-ups are listed below. Since every rig and trailer is different, learn the specifics of hooking up each one you operate.

TRAILER HOOK-UP BASICS

- Ball is correct size and tight.
- Ball Socket is securely pinned.
- Pin and safety pin are in place on ball slide.
- Safety chain attached securely.
- Safety brakes connected.
- Jack is up.
- Trailer lights work.



BACKING SAFELY

Backing a truck or a trailer can be dangerous because you cannot see everything behind your vehicle. Avoid backing whenever you can. Try to park so you can pull forward when you leave. If you must back a vehicle, follow these simple safety rules:

Inspect Your Path

Walk around truck and trailer before you begin. Check clearance to the sides, overhead, in and near the path your vehicle will take. Adjust mirrors prior to driving or backing a vehicle. Use both mirrors constantly to help you see whether the trailer is drifting to one side or the other.

Back Slowly

Back as slowly as possible. Use lowest reverse gear. This lets you make corrections before getting too far off course. You can also stop quickly.

Back Toward Driver's Side

You can see better this way. You can watch the rear of your vehicle by looking out the side window. Use driver-side backing—even if it means going around the block to put your vehicle in this position.

QUIZ

Answer these questions in the space on front and back of this page.

What are three dangers that can result from driving with improperly loaded cargo?

How can you fix a load that is top heavy?

What do you do to secure a load?

What seven basics must be checked as part of a trailer hook-up?

List three basic driving precautions in towing a trailer?

KNOW YOUR VEHICLE

Learn how to shift gears correctly. If you fail to get your truck into the proper gear while driving, you have less control.

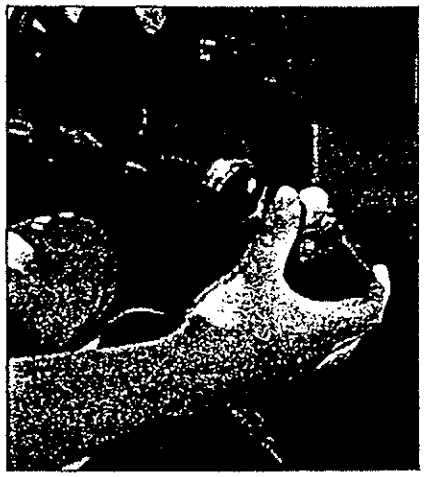
Gear Shift Pattern

Know the gear shift pattern for each vehicle you drive *before* you take it on the road.

Stay in lower gears to control speed on long downhill grades.

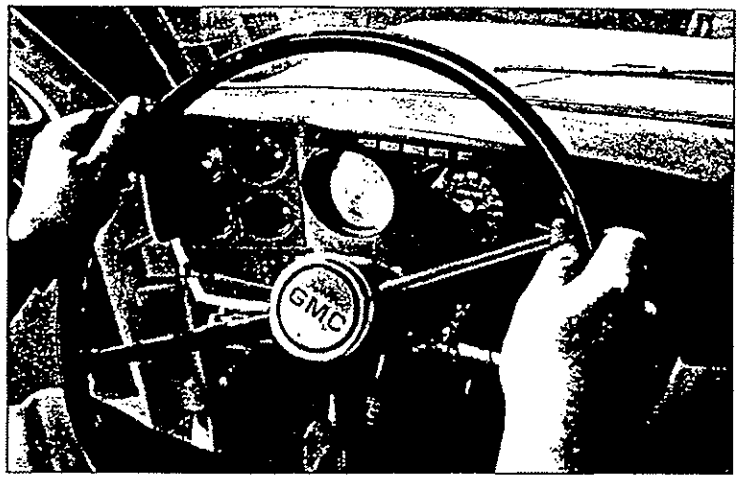
Split Axle Rear-ends

Get trained on how to engage a split axle rear-end before using it. Learn what is involved from someone who knows. Have this "trainer" watch you practice, so you have complete instructions on how to do it properly.
If you are not sure about this, leave it in high range.



REMAIN ALERT

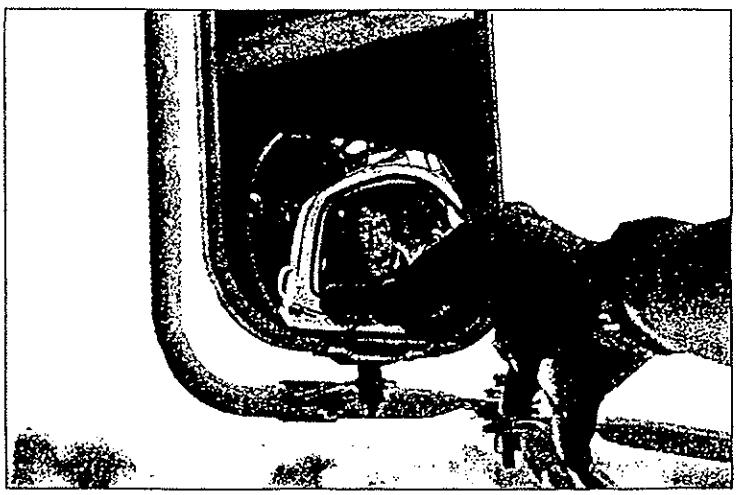
Watch gauges for signs of trouble, especially the oil, water, and fuel. Use your senses (look, listen, smell, and feel) to check for problems as well.



Check your mirror before making a lane change to be sure no one is alongside you or about to pass. Check you mirrors to make sure there is enough room. Double check that your path is clear. After signaling, check again to see that no one moved out of your blind spot.

REMEMBER

Do not drive in the fast lane.



STOPPING DISTANCES

Total stopping distance is a function of three elements: perception distance, reaction distance, and braking distance.

Perception Distance

This is how far your vehicle travels from the time your eyes see a hazard until your brain recognizes it. Perception time for an alert driver is about 3/4 second. At 55 mph, you travel 60 feet in 3/4 second.

Reaction Distance

This is how far your vehicle travels from the time your brain tells your foot to move from accelerator to the brake pedal. The average driver has a reaction time of 3/4 second which accounts for an additional 60 feet at 55 mph.

Braking Distance

This is how long it takes to stop once the brakes are applied. At 55 mph, on dry pavement with good brakes, it can take a heavy vehicle about 170 feet to stop within 4 1/2 seconds. Thus, total stopping distance at 55 mph is about six seconds. The vehicle travels 290 feet, which is about as long as a football field.

REMEMBER

Drive defensively. Heavy trucks take much longer to stop than your car.

Driving too fast for conditions is a major cause of fatal crashes. High speed increases stopping distance greatly. If you double your speed, it takes almost four times as much distance to stop. Your vehicle has four times the destructive power if it crashes. Drive more slowly to reduce your braking distance.

QUIZ

Answer these questions in the space on front and back of this page.

When do you learn a gear shift pattern?

What is the rule to observe before driving a split-axle rear-end?

Who is the best person to teach you about driving a split-axle correctly?

What is most important to know about your emergency brakes?

Which four senses do you use to spot trouble as you drive?

FORKLIFT LOADING

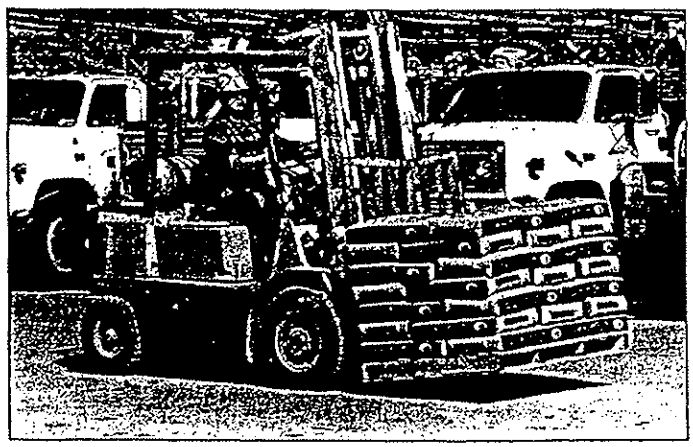
It is important to know about the proper loading of cargo when operating a lift truck. This involves load stability, rated capacity, fork adjustments, and backrest heights.

Load Stability

Load stability depends upon how well a stack is formed. In stacking loads of different sizes, place larger loads at the bottom and smaller ones on top; or heavier loads on bottom and lighter ones on top.

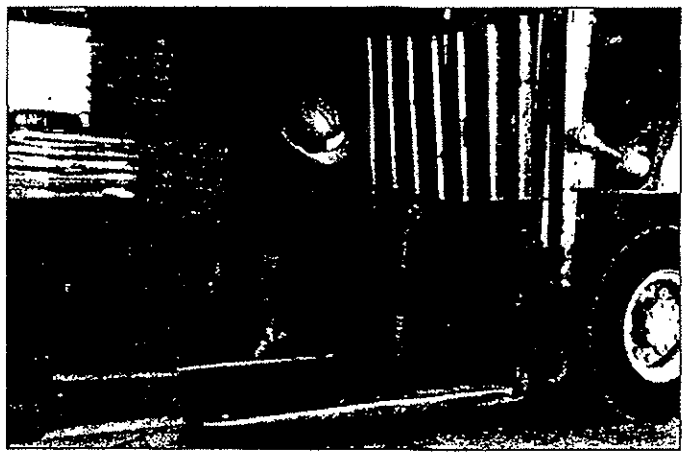
Stacking Pallets

In stacking pallets, use a brick laying pattern so bags are turned alternately and each one is astride two or more bags in the layer below.



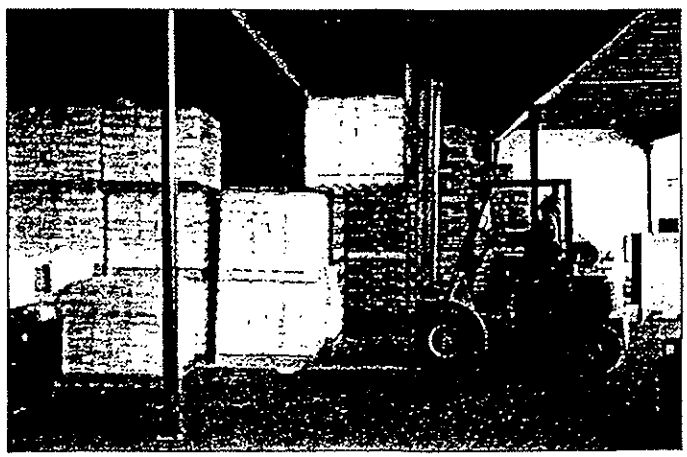
Adjust Forks

Adjust forks for centered loading. Set the forks as far apart as possible for maximum support of pallet or load. Too small a fork spread can cause unstable or off-center loading. Be careful of forks beyond load. If forks are longer than load, move forks under load so the tips do not extend beyond load.



Backrest Height

Observe backrest height. Do not pick up loads beyond backrest height. If you must pick up loads extending beyond backrest, be sure to band them to prevent falling objects.



Allow No Riders

Allow no riders. A lift truck is designed for only one rider—the operator. Never allow anyone to hold loose loads, walk or stand under raised forks, or pick loads off lifted forks.

Prevent Tip Over

Be on the alert for tip over. Do not turn on, or angle across an hill. Do not tilt elevated loads forward. Do not elevate tilted loads. Do not pick up an off center load. Be aware of the poor stability of an empty lift truck. Do not travel with the forks raised unsafely high. Always lower forks to ground when finished loading.

Stay Aboard

Do not jump off if your truck starts to tip over. Stay in your seat, hold firmly to the steering wheel, brace your feet, and lean away from the point of impact. Your chances of survival are better if you stay with your truck.

QUIZ

Answer these questions in the space on front and back of this page.

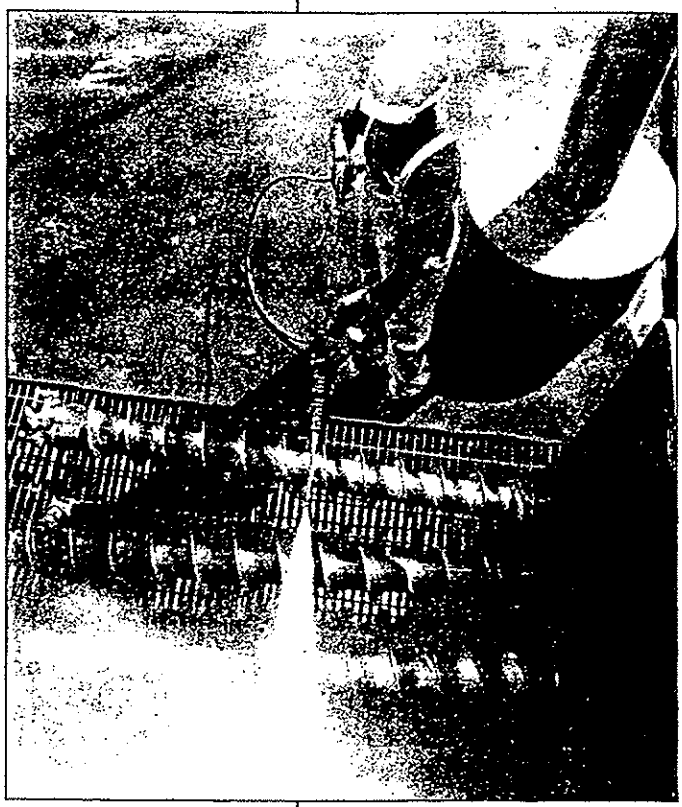
What can you do to assure load stability?

What happens if loads exceed rated capacity?

How are the forks adjusted to fit the load?

What does backrest height indicate about the size of load you pick up?

What should you do if a load extends beyond the backrest?



STEAM CLEANING

The drilling we do is a dirty job.

The mud from drilling is removed by steam cleaning the work tools, equipment and job site.

SETTING UP A DE-CON AREA

The first step in steam cleaning is setting up a decontamination area on site. The better you set up at the beginning, the easier and safer steam cleaning is for you.

Site Selection

Think before setting up your steam cleaning operation. Avoid blocking traffic. Stay out of the way of drilling activities. Set up near a water supply and keep natural drainage in mind to reduce run-off and clean-up. Position equipment so over-spray does not get on vehicles or private property. Allow for adequate ventilation because exhaust fumes can be lethal. Above all, do not operate near anything flammable where a spark or open flame could start a fire or explosion.

Safety Gear

Wear safety gear to protect yourself. This means gear for your face, hands, feet, and body. Use a shield and safety goggles for your face and eyes. Wear gloves to protect your hands and arms. Wear rubber boots or steel-toed boots. Wear long pants and long sleeve shirts. Safety gear if for your own protection.

FUELING PROCEDURES

Before starting the steam cleaner, check fuel tank levels to be sure they are full. Have enough fuel and oil to run it for an extended period. Add diesel and gas into proper tanks. Do not mix oil with gasoline.

Add fuel in an open area away from flames or sparks. Use safety precautions because fuels are highly flammable and can explode easily. Never siphon fuel with your mouth.

Add Diesel

To fill the diesel tank, follow this procedure:

- Fill diesel tank with diesel or kerosene.
- Never use gasoline.
- Wipe up any spills.

Add Gasoline

To fill the gasoline tank, follow this procedure:

- Wait until engine is cool to touch.
- Fill tank with regular gasoline.
- Do not siphon gas to or from a tank with your mouth.
- Wipe up any spills.

Check Oil

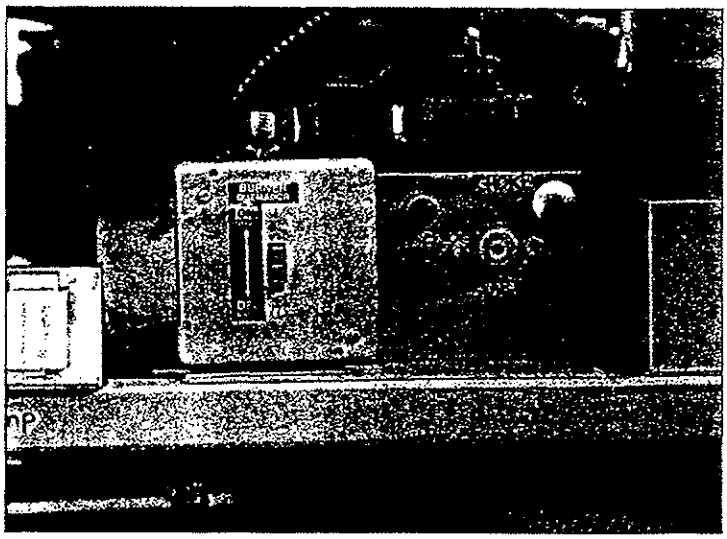
Check oil levels before every use:

- Clean area around oil fill tube before removing dipstick.
- Pull dipstick out of tube and wipe with clean cloth.
- Replace dipstick in tube and push all the way down.
- Remove dipstick. If oil is below "FULL" mark, add enough oil to return to "FULL" mark. Do not overfill.
- Read label on air cleaner for recom mended oil viscosity (30 W).
- Return dipstick to tube and push all the way down.

Starting Engine

Once steam cleaner is fueled and oil checked, start engine following this procedure:

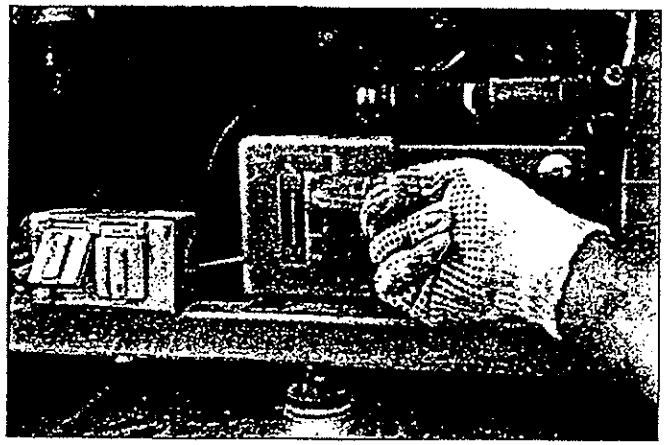
- Make sure burner switch is in "OFF" position.
- Move ignition switch to RUN position.
- Pull choke ring all the way.
- Press starter button.
- When engine is running smoothly, slowly push choke ring all the way.



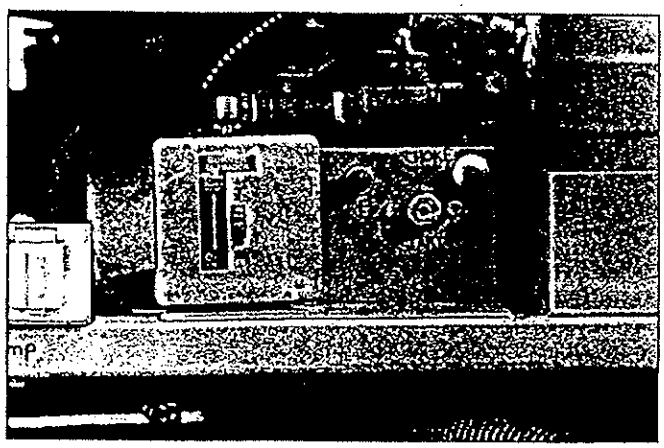
BIGGEST RISKS WHILE STEAM CLEANING

- Slip and fall.
- Burn from scalding water.
- Cut hands from handling augers.
- High pressure water cuts skin.
- Overspray damage to building or vehicle paint.
- Dirt in eyes.

- Put burner switch in "OFF" position.

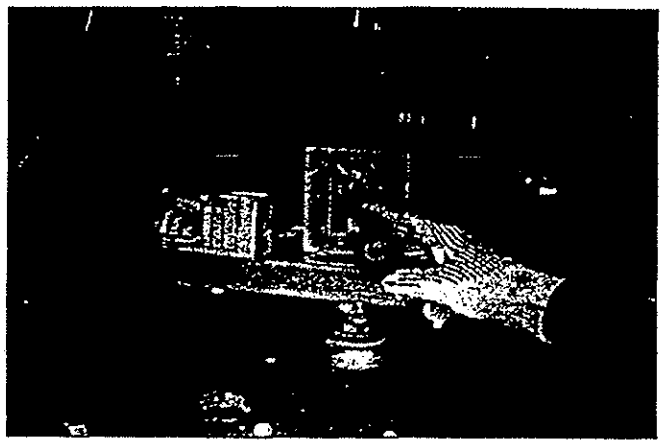


- Start engine.



- Hold sprayer gun firmly.

- Never leave machine (even for a minute) without shutting burner off and running cold water through the spray gun.



- Wear eye protection.

Containing Run-off

Steam cleaning results in dirt and muddy water which must be collected and stored. Otherwise, it can spread across the property and leave mud and possibly hazardous waste deposits. To prevent this, drilling equipment is steam cleaned in the de-con unit or troughs.

This catches the run-off material which can then be loaded into storage drums.

Safety Precautions

Your personal safety is most important. These steam cleaning precautions are obvious, but please observe them for everyone's sake.

SAFETY PRECAUTIONS

- Wear eye protection.
- Make sure all equipment and belt guards are in proper position.
- Operate the machine only in well-ventilated areas.
- Remember hot water under high pressure can cause injury.
- Keep the spray stream away from your hands and body.
- Do not touch the hot metal wand.
- Never point nozzle at anyone.
- Never run machine for more than three minutes with trigger off.
- Do not touch hot engine.
- Never shut down engine without running cool water through it.

QUIZ

Answer these questions in the space on front and back of this page.

What makes steam cleaning dangerous?

List four things to consider in choosing a site for setting-up a de-con area.

What safety gear is worn for steam cleaning?

List five fuel safety precautions.

What are three of the biggest risks while steam cleaning?

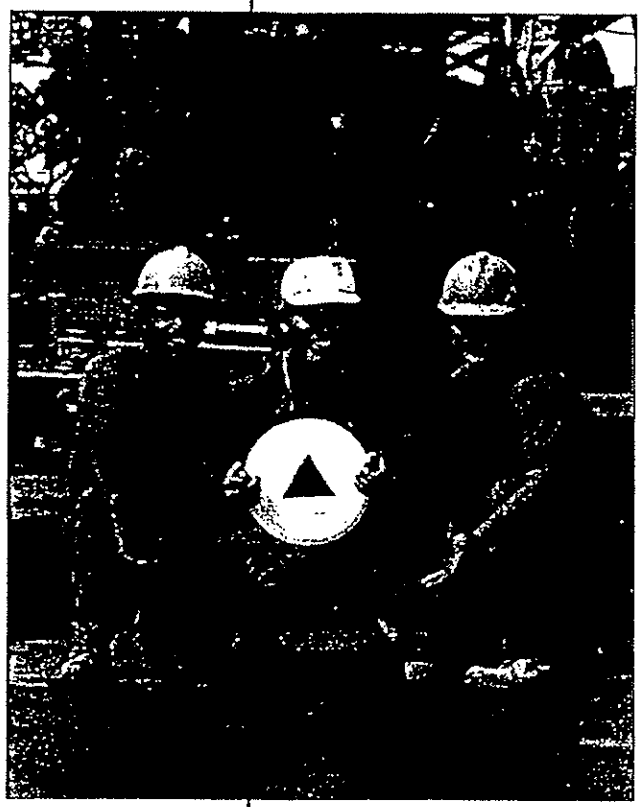
STEAM CLEANING EXERCISE

Once you complete the quiz on steam cleaning, ask your supervisor to review your score. Be ready to discuss what you have learned about steam cleaning, especially the proper procedures and safety precautions. Also be sure to ask any questions you may have regarding the steam cleaning process.

Your supervisor will give you instructions regarding a practical hands-on exercise for preparing, starting up, operating, and shutting down the steam cleaner. You will practice these activities:

- Setting up a steam cleaning area.
- Washing drilling tools and equipment.
- Containing run-off water and debris.

This prepares you for what to expect when you begin steam cleaning on the job site.



WELL FINISH & CLEAN-UP

Clients seldom see or understand the work we do for them.

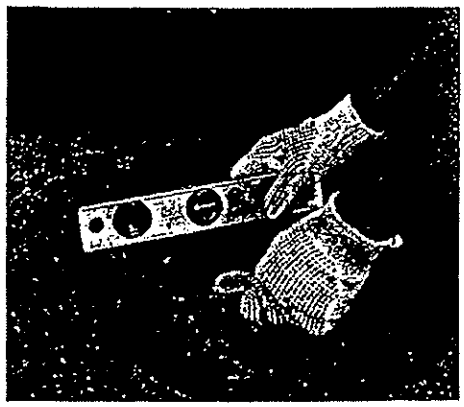
We are judged by our quality of well finish and clean-up work.

WELL FINISH WORK

Well finish work takes place after drilling, sampling, and setting the well is complete.

First, the space between the P.V.C. casing and the drilled hole is filled with sand, bentonite and cement grout to keep water from seeping into it.

Then, a well cover is installed about one-half inch above grade so water does not run inside the well cover.

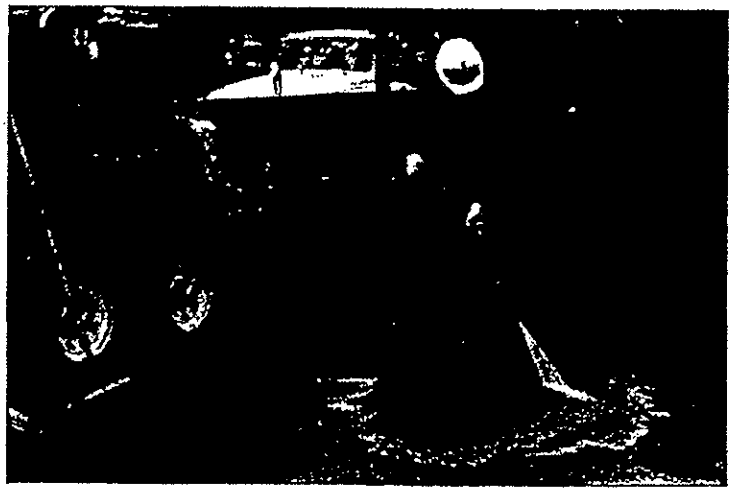


REMEMBER

The driller oversees well finish work and will answer questions as you mix grout, install well covers, and add the final touches.

Finally, concrete around the well cover is trowelled smooth.

After mixing grout, wash inside and outside the wheelbarrow and all the hand tools with water until clean. Wash grout off the pavement, *before it sets up*, otherwise your clean-up takes much longer.



To mix grout with a pump, check gas and oil and prime the side case with water before starting the engine.

When finished, circulate clean water through entire system, including the pump, hoses and mixer. Disassemble and steam clean all parts including o-rings, case, and impeller.

Drain and steam clean the boxes and trough. Put the pump back together correctly with all gaskets in place.

Haul Trash Away

Trash accumulates during drilling operations. Collect and dispose of trash in the waste bins on site or haul it back to the warehouse. Gather used sand and concrete bags, cartons, equipment wrappings, and all other litter, even if it does not belong to us.

Ask the driller if the trash is to be disposed on site or hauled away. If transported, load trash and secure it for highway travel so it can not blow away.

Wash Down Job Site

Your final task is to wash down everything. This includes the drilling support equipment, trucks, and parking lot. Rinse drilling equipment of all sand and grout, rather than leaving this for the warehouse crew. Keep trucks clean by rinsing away any dirt or overspray before driving on the highway. Hose down parking lot completely and sweep away any stray material deposits or pools of water.

Take Final Look

Before leaving, look around the job site one final time to be sure you are leaving it in an improved condition.

Quiz

Answer these questions in the space provided.

Why is well finish and clean-up important?

What are three steps of well finish work?

Name two methods for mixing grout?

List safety gear worn while mixing cement?

What is the safety hazard in mixing grout?

APPENDIX B

GENERAL FIELD PROCEDURES

GENERAL FIELD PROCEDURES

A description of the general field procedures used during site investigation and monitoring activities is presented below. For an overview of protocol, refer to the appropriate section(s).

DRILLING AND SOIL SAMPLING

Soil borings are drilled using continuous-flight, hollow-stem augers. Borings that are not completed as monitoring wells are grouted to within 5 feet of the ground surface with a cement/bentonite slurry. The remaining 5 feet is filled with concrete.

Soil samples are obtained for soil description, field hydrocarbon vapor screening, and possible laboratory analysis. Soil samples are retrieved from the borings by one of two methods: 1) continuously, using a 5-foot-long, continuous-core barrel sampler advanced into the soil with the lead auger; sample tubes are driven into the core with a mallet, or 2) at 2.5- or 5-foot intervals, using a standard split-spoon sampler lined with four 1.5-inch-diameter stainless steel or brass sample inserts. The split-spoon sampler is driven approximately 18 inches beyond the lead auger with a 140-pound hammer dropped from a height of 30 inches.

For hand auger borings and hand-held, power-driven auger borings, soil samples are retrieved using a hand-driven slide hammer lined with a 1.5-inch-diameter stainless steel sample tube.

During drilling activities, soil adjacent to the laboratory sample is screened for combustible vapors using a combustible gas indicator (CGI) or equivalent field instrument. For each hydrocarbon vapor-screening event, a 6-inch-long by 2.5-inch-diameter sample insert is filled approximately 1/3 full with the soil sample, capped at both ends, and shaken. The probe is then inserted through a small opening in the cap, and a reading is taken after approximately 15 seconds and recorded on the boring log. The remaining soil recovered is removed from the sample insert or sampler, and described in accordance with the Unified Soil Classification System. For each sampling interval, field estimates of soil type, density/consistency, moisture, color, and grading are recorded on the boring logs.

SOIL SAMPLE HANDLING

Upon retrieval, soil samples are immediately removed from the sampler, sealed with Teflon sheeting and polyurethane caps, and wrapped with tape. Each sample is labeled with the project number, boring/well number, sample depth, geologist's initials, and date of collection. After the samples have been labeled and documented in the chain of custody record, they are placed in a cooler with ice at approximately 4 degrees Celsius (°C) prior to and during transport to a state-certified laboratory for analysis. Samples not selected for immediate analysis may be transported in a cooler with ice and archived in a frostless refrigerator at approximately 4°C for possible future testing.

MONITORING WELL INSTALLATION

Monitoring wells are constructed of 2-inch-diameter, flush-threaded Schedule 40 PVC blank and screened (0.020-inch slot size) casing. Where possible, the screened interval will extend at least 10 feet above, and 10 to 20 feet below, the top of the groundwater table. The annular space surrounding

the screened casing is backfilled with No. 3 Monterey sand (filter pack) to approximately 2 feet above the top of the screened section.

During well construction, the filter pack is completed by surging with a rig-mounted surge block. A 3-foot-thick bentonite annular seal is placed above the filter pack. The remaining annular space is grouted with Portland cement and/or bentonite grout to the surface. Utility access boxes are installed slightly above grade. Locking, watertight caps are installed to prevent unauthorized access to the well, and limit infiltration of surface fluids.

FLUID LEVEL MONITORING

Fluid levels are monitored in the wells using an electronic interface probe with conductance sensors. The presence of liquid-phase hydrocarbons is verified using a hydrocarbon-reactive paste. The depth to liquid-phase hydrocarbons and water is measured relative to the well box top or top of casing. Well boxes or casing elevations are surveyed to within 0.02 foot relative to a county or city benchmark.

GROUNDWATER PURGING AND SAMPLING

Groundwater monitoring wells are purged and sampled in accordance with standard regulatory protocol. Typically, monitoring wells that contain no liquid-phase hydrocarbons are purged of groundwater prior to sampling so that fluids sampled are representative of fluids within the formation. Temperature, pH, and specific conductance are typically measured after each well casing volume has been removed. Purging is considered complete when these parameters vary less than 10% from the previous readings, or when four casing volumes of fluid have been removed. Samples are collected without further purging if the well does not recharge within 2 hours to 80% of its volume before purging.

The purged water is either pumped directly into a licensed vacuum truck or temporarily stored in labeled drums prior to transport to an appropriate treatment or recycling facility. If an automatic recovery system (ARS) is operating at the site, purged water may be pumped into the ARS for treatment.

Groundwater samples are collected by lowering a 1.5-inch-diameter, bottom-fill, disposable polyethylene bailer just below the static water level in the well. The samples are carefully transferred from the check-valve-equipped bailer to 1-liter and 40-milliliter glass containers. The sample containers are filled to zero headspace and fitted with Teflon-sealed caps. Each sample is labeled with the project number, well number, sample date, and sampler's initials. Samples remain chilled at approximately 4°C prior to analysis by a state-certified laboratory.

CHAIN OF CUSTODY PROTOCOL

Chain of custody protocol is followed for all soil and groundwater samples selected for laboratory analysis. The chain of custody form(s) accompanies the samples from the sampling locality to the laboratory, providing a continuous record of possession prior to analysis.

DECONTAMINATION

Drilling and Soil Sampling

Drilling equipment is decontaminated by steam cleaning before being brought onsite. The augers are also steam cleaned before each new boring is commenced. Prior to use, the sampler and sampling tubes are brush-scrubbed in a Liquinox and potable water solution and rinsed twice in clean potable water. Sampling equipment and tubes are also decontaminated before each sample is collected to avoid cross-contamination between borings.

Groundwater Sampling

Purging and sampling equipment that could contact well fluids is either dedicated to a particular well or cleaned prior to each use in a Liquinox solution followed by two tap water rinses, prior to analysis.