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Alameda County
Environmental Health

March 8, 2007

TRC Project No. 42016312

Ms. Donna Drogos
Supervising Hazardous Materials Specialist
Alameda County Health Services
1131 Harbor Bay Parkway
Alameda, California 94502-6577

SITE: 76 STATION NO. 0746
3943 BROADWAY
OAKLAND, CALIFORNIA

RE: FEASIBILITY STUDY WORK PLAN

Dear Ms. Drogos:

On behalf of ConocoPhillips Company (ConocoPhillips), TRC has prepared this work plan to conduct a feasibility study for the above-referenced site. This work plan includes a brief description of the site background, remediation efforts, and site conditions, and presents a scope of work for evaluating the feasibility of the selected remedial alternative for reducing hydrocarbon impacts to site soils and groundwater.

SITE BACKGROUND

The site is currently an active service station located on the western corner of Broadway and 40th Street in Oakland, California (Figure 1). Station facilities include two 12,000-gallon double-wall glasteel gasoline underground storage tanks (USTs) in a common pit, one 520-gallon double-wall glasteel waste oil UST, two dispenser islands, one station building, and a car wash building.

August 1989: Two 10,000-gallon steel gasoline USTs and one 280-gallon steel waste oil UST were removed and replaced with the current USTs. A total of approximately 350 cubic yards of soil was removed from the site during UST removal activities. The confirmatory soil sample was reported as non-detect for all constituents. The product piping was also removed. Confirmation soil sampling beneath piping and the waste oil tank contained low levels of petroleum hydrocarbons. During the tank removal activities, approximately 6,500 gallons of groundwater were pumped from the UST cavity. Concentrations of total petroleum hydrocarbons as gasoline (TPH-g) and benzene were reported as 1,200 micrograms per liter ($\mu\text{g/l}$) and 12 $\mu\text{g/l}$, respectively.

October 1989: Three monitoring wells (MW-1, MW-2, and MW-3) were installed at the site to depths ranging from 20 to 22.5 feet below grade (fbg).

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January 1990: Two additional monitoring wells (MW-4 and MW-5) were installed at the site to a depth of 20 fbg.

October 1990: Four additional monitoring wells (MW-6 through MW-9) were installed at and in the vicinity of the site at depths ranging from 20 to 22 fbg. Groundwater recovery tests were performed on four wells to determine potential locations for placement of recovery wells.

January 1992: Two offsite monitoring wells (MW-10 and MW-11) were installed in the vicinity of the site at depths ranging from 19 to 22 fbg.

June 1992: One recovery well (RW-1) and one additional offsite monitoring well (MW-12) were installed at the site to depths of 17.5 fbg.

February 1998: The product piping and associated dispenser islands were replaced at the site. Four soil samples were collected from beneath the dispenser islands. Petroleum hydrocarbons were reported at low to moderate levels. A total of 30.20 tons of stockpiled soil was transported from the site to the Forward Inc. Landfill in Stockton, California.

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

REMEDIATION STATUS

In 1989, approximately 350 cubic yards of soil was removed from the site during UST removal activities. During the tank removal activities, approximately 6,500 gallons of groundwater were pumped from the UST cavity.

In 1990, groundwater recovery tests were performed on four wells to determine potential locations for placement of recovery wells.

In 1993, a soil vapor extraction (SVE) pilot test was performed at the site on well RW-1. A maximum concentration of 8.6 $\mu\text{g/l}$ TPH-g was reported in the influent vapor stream. The calculated maximum hydrocarbon extraction rate during the test was 0.00049 lbs/hr. Based on the low extraction rate, high groundwater levels, and fine-grained soil beneath the site, vapor extraction was determined to not be a feasible remedial option. Well RW-1 was initially installed to perform a groundwater recovery test, but due to lack of groundwater recharge, the test was not performed.

In 1998, the product piping and associated dispenser islands were replaced at the site. Denbeste Transportation, Inc. of Windsor, California transported a total of 30.20 tons of stockpiled soil from the site to the Forward Inc. Landfill in Stockton, California for disposal on March 3, 1998.

On April 5-8, 2005, a 68-hour dual phase extraction (DPE) event was performed. During this event a mobile treatment system was used to remove vapors and liquids from wells RW-1, MW-3, and MW-5. During the event 39.03 pounds of hydrocarbons were recovered with 6,500 gallons of water.



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SITE CONDITIONS

Based on review of regional geologic maps (U.S. geological survey Miscellaneous Geologic Investigations Map I-3239 "Aerial and Engineering Geology of the Oakland West Quadrangle, California: by D. H. Radbruch, 1957), the site is underlain by Quaternary-age alluvium fan deposits (Temescal Formation), which typically consist of lenses of clayey gravel, sandy silty clay, and sand-clay-silt mixtures (KEI 1992).

The results of previous subsurface studies indicate that the site and immediate vicinity are directly underlain by artificial fill materials that range from 2 feet to 4 feet in thickness. The fill is then underlain by a clay zone up to 10 feet thick. To the eastern side of the site and offsite there is a 2 to 4 foot thick bed of silty sand and sand that lays between the fill and clay zone. Beneath the clay zone is a coarse-grained zone, which extends to approximately 14 fbg through out most of the site. This coarse grained zone is most likely the main water-bearing and contaminant transport zone. The coarse-grained zone is generally underlain by clay and/or silt materials that extend to the maximum depths explored (20 to 22.5 fbg). On the eastern side of the site and offsite a clayey sand zone is present at approximately 20 fbg to 22 fbg.

The most recent monitoring and sampling event was conducted at the site on December 21, 2006. The measured depth to groundwater on that date ranged from 6.91 to 12.78 feet below the tops of the well casings (TOC). The groundwater flow direction on December 21, 2006 was toward the west with a hydraulic gradient of 0.05 ft/ft. The historical groundwater flow direction has been consistently to the southwest or west.

Currently, the maximum concentrations of TPH-g, MTBE, and benzene are 78,000 µg/l (MW-5), 96 µg/l (MW-3), and 490 µg/l (MW-5) in the southern portion of the site. The groundwater contamination plume for this site is located in the south corner of the site and offsite to the southwest of the site beneath a building and to the southwest of the building in the vicinity of MW-8. In general, concentrations of contaminants of concern have decreased at the site and liquid phase hydrocarbons have not been observed in any site wells since November 29, 2004.

The subject site is located approximately 1,630 feet northwest of Glen Echo Creek and within a 1/2 mile radius there are three potential sensitive receptors: two (2) irrigation wells and one (1) domestic well. All three wells are located over a quarter mile from the site and upgradient or crossgradient to the site. Glen Echo Creek is also located crossgradient to the site.

PROPOSED SCOPE OF WORK

In April 2005 TRC completed a 68-hour DPE pilot test. The test was shortened due to limited water storage capacity. A vapor sample collected from the influent stream just prior to system shutdown, upon completion of the 68-hour test, contained 1,100 parts per million by volume (ppmv) of TPH-g, down from 5,600 ppmv present in the initial influent vapor sample collected. Although the influent vapor concentration decreased over the 68-hour event, a concentration of 1,100 ppmv is still a reasonably high value that would indicated a longer-term DPE event could be successful, assuming shut down was not required due to excessive production of purge water.



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TRC proposes to conduct a 120-hour (5-day) DPE event using a mobile treatment system (MTS). To avoid the excessive purge water production problems encountered during the April 2005 event, TRC will complete the event during the driest part of the season when water levels are at their lowest. In addition, TRC will coordinate with a local waste hauling company to have the water storage tank emptied periodically during the 5-day event. Monitoring well MW-5 will be used as the extraction well during the DPE event. Nearby wells MW-3, MW-4, and RW-1 will be used during the test to monitor vacuum response and groundwater drawdown resulting from vacuum extraction from MW-5 (Figure 2).

The MTS unit is capable of removing vapor- and dissolved-phase hydrocarbons from the subsurface. Vapor-phase hydrocarbons can be removed at air flow rates of up to 350 cubic feet per minute (cfm) using a high vacuum liquid ring pump (>28 inches of mercury), and groundwater can be extracted at flow rates of up to 10 gallons per minute (gpm).

The extracted vapors and liquid are separated at the MTS within an 80-gallon knockout pot. The water is then transferred to a temporary onsite storage tank (up to 6,500 gallons) pending profiling and off-site disposal at an appropriate facility. Soil vapor is abated using a propane-fired thermal oxidizer capable of treating hydrocarbon vapors with greater than 98% efficiency for non-methane hydrocarbons.

PRE-FIELD WORK ACTIVITIES

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

TRC will also acquire the necessary permits with the City of Oakland to complete lane closures to accommodate periodic waste (purge water) disposal. Purge water samples from the three wells to be used for extraction purpose will be collected prior to the start of the event and used to profile the liquid extracted during the DPE event.

In addition, prior to commencement of onsite work, TRC will notify the Bay Area Air Quality Management District (BAAQMD) of the proposed dual-phase extraction activities.

DUAL-PHASE EXTRACTION EVENT ACTIVITIES

During the event, the blower inlet vacuum, airflow rates and hydrocarbon vapor concentrations will be measured periodically (typically every 30 minutes). Wells MW-3, MW-4, and RW-1 will be used as observation wells to monitor hydraulic and pneumatic radii of influence.

Extracted liquids will be transferred to a temporary onsite storage tank (up to 6,500 gallons) and disposed of, as needed, by transfer to a vacuum truck and offsite disposal at an approved facility.



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The amount of hydrocarbon recovery will be calculated based on influent airflow rates and field measurements of hydrocarbon vapor concentrations, and will be used to determine the remedial effectiveness of the system.

A total of three influent vapor samples will be collected during the event: one at the start of the test, one four hours into the test, and one at the end of the test. Vapor samples will be submitted to a state certified laboratory for analysis of TPH-g, MTBE, ethanol and benzene, toluene, ethyl benzene and total xylenes (BTEX) by EPA Method 8260B.

Groundwater samples will be collected from each extraction well prior to system start-up and following system shutdown. Post system shutdown samples will be collected after sufficient time to allow the groundwater to recharge and for contaminant concentrations in groundwater to equilibrate. Samples will be submitted to a state certified laboratory for analysis of TPH-g, MTBE, ethanol and BTEX by EPA Method 8260B.

The groundwater samples will be appropriately preserved and submitted to a state-certified laboratory for analysis. Chain-of-Custody protocol will be followed, thereby providing a continuous record of sample possession before actual analysis.

REPORTING

Following completion of field work and receipt of laboratory results, a summary report will be prepared which will include field sheets, a data summary sheet, and laboratory analytical results. The report will also include an evaluation of results and recommendations.

A compliance report documenting effluent vapor concentrations and hydrocarbon abatement will be submitted to the BAAQMD within 30 days from the end of the event.

REFERENCES

Kaprealian Engineering Incorporated (KEI), Continuing Groundwater Investigation and Quarterly Report, Unocal Service Station # 0746, 3943 Broadway, Oakland, California, dated September 25, 1992.

TRC, Dual-Phase Extraction Report, 76 Service Station #0746, 3943 Broadway, Oakland, California, dated May 21, 2005.

TRC, Semi-Annual Monitoring Report, July through December 2006, 76 Station No. 0746, 3943 Broadway, Oakland, California, dated January 12, 2007.

TRC, Quarterly Status Report, Fourth Quarter 2006, 76 Station No. 0746, 3943 Broadway, Oakland, California, dated January 26, 2007.



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Please call Keith Woodburne at (925) 688-2488 if you have any questions regarding this report.

Sincerely,



For

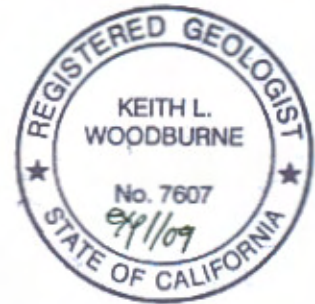
Rachelle Dunn
Senior Staff Geologist



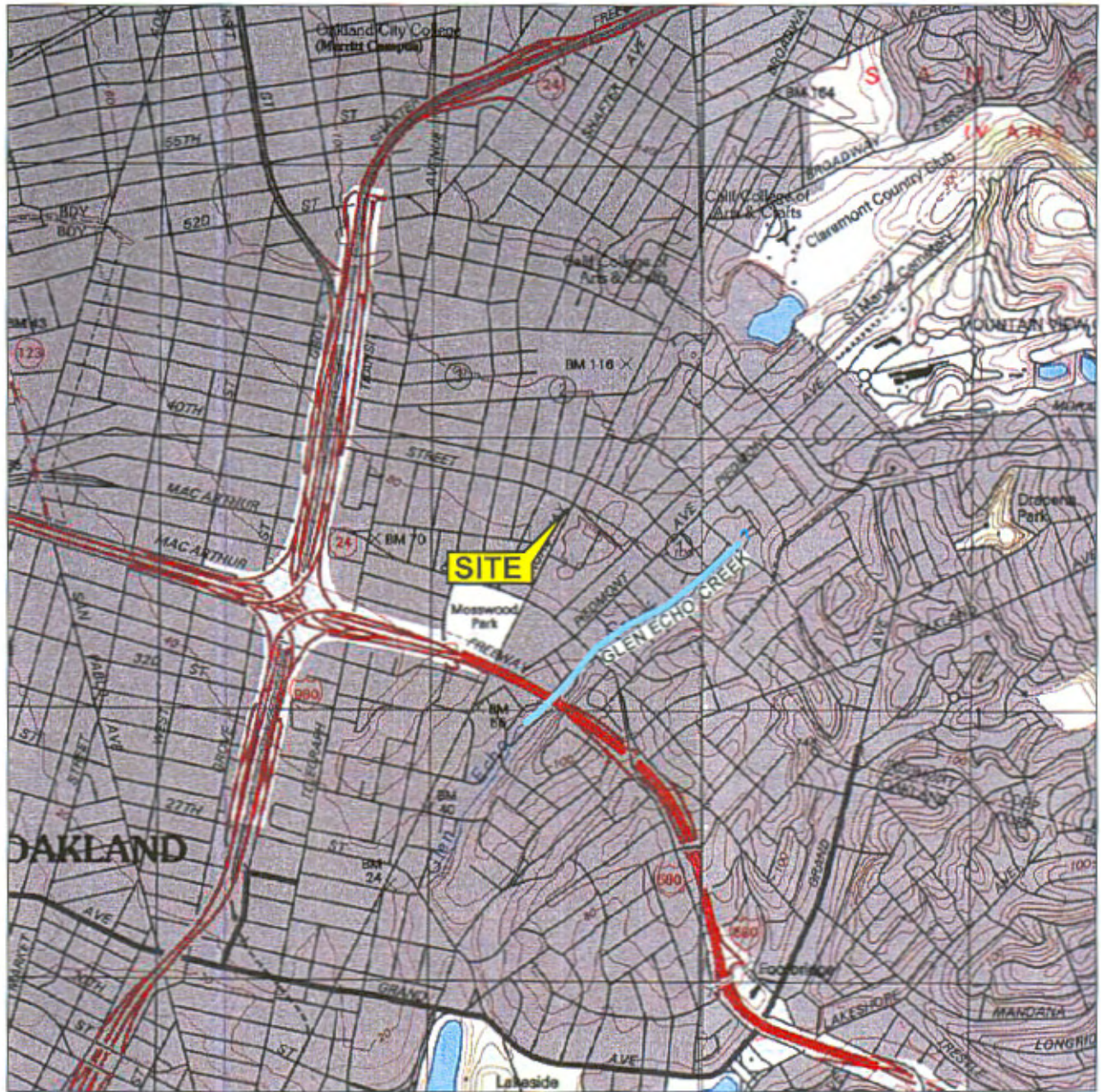
Keith Woodburne, P.G.
Senior Project Manager

Attachments: Figure 1 – Vicinity Map
Figure 2 – Site Plan
Appendix A – Health and Safety Plan

cc: Eric Hetrick, ConocoPhillips (electronic upload only)



FIGURES



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



SCALE 1 : 24,000



SOURCE:

United States Geological Survey
7.5 Minute Topographic Maps:
Oakland East and Oakland West
Quadrangles, California



QUADRANGLE
LOCATIONS

VICINITY MAP

76 Service Station #0746
3943 Broadway
Oakland, California



FIGURE 1



SOURCE: Site plan by Gettler-Ryan, May 2000; revised per client-provided as-built drawing, February 2004.



APPENDIX A
HEALTH AND SAFETY PLAN



SITE SPECIFIC HEALTH & SAFETY PLAN

**76 Service Station #0746
3943 Broadway
Oakland, California**

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ATTACHMENTS

- A SITE PLAN
- B OCCUPATIONAL HEALTH GUIDELINES AND TOXICOLOGICAL INFORMATION
- C EMERGENCY SERVICES
- D LOCAL AREA MAP
- E JOB SAFETY ANALYSES (JSAs)
- F TAILGATE SAFETY MEETING CHECKLIST AND HASP COMPLIANCE AGREEMENT
- G CONTRACTOR SITE HEALTH AND SAFETY PLAN

SITE SPECIFIC HEALTH AND SAFETY PLAN (HASP)

76 Service Station #0746
3943 Broadway
Oakland, California

1.0 INTRODUCTION

The purpose of this Health and Safety Plan (HASP) is to establish responsibilities, procedures, and contingencies for the protection of TRC employees, contractors, visitors, and the public while performing activities at 76 Service Station #0746. This site-specific HASP 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 HASP 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
SUBCONTRACTORS:	To Be Determined

The Subcontractor has also prepared a HASP for the purge water removal from the storage tank. Their HASP supplements TRC's HASP. A copy of their HASP is included in Attachment G. JSAs are included in Attachment E.

1.2 Scope of Work

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

- A 120-hour dual phase vapor extraction (DPVE) event using a mobile treatment system (MTS).
- A waste hauling company will empty the storage tank every other day, beginning the second day of the event.
- Monitoring wells MW-3, MW-5, and RW-1 will be used as the extraction wells for extracting groundwater and soil vapor (see Attachment A).
- During the event, the blower inlet vacuum, airflow rates and hydrocarbon vapor concentrations will be measured periodically (typically every 30 minutes). Select wells will be used as observation wells to monitor hydraulic and pneumatic radii of influence.
- A total of three influent vapor samples will be collected during the event: one at the start of the test, one four hours into the test, and one at the end of the test.



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- Groundwater samples will be collected from each extraction well prior to system start-up and following system shutdown.

2.0 SITE INFORMATION

This HASP considers the physical, chemical, and biological hazards that may be encountered during work activities at the site. Operations associated with this HASP 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:	TBD
Site Description (see Attachment A for site map):	The site is currently an active service station located on the western corner of Broadway and 40th Street in Oakland, California. Station facilities include two 12,000-gallon double-wall glasteel gasoline underground storage tanks (USTs) in a common pit, one 520-gallon double-wall glasteel waste oil UST, two dispenser islands, one station building, and a car wash building.
Approximate depth to groundwater:	7 to 9 feet
Contaminants of Concern (see Attachment B):	Diesel, 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)	Monika Krupa	Office (925) 688-2482 Cell (925) 250-3638

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Subcontractor Personnel		<input type="checkbox"/> NA
Subcontractor Company Name: To Be Determined		
Site Safety Officer (SSO)	TBD	
Assistant Site Safety Officer (SSO)	TBD	

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 Health and Safety Director	Gary Ritter	(860) 298-6256 – office (860) 573-0146 - cell

3.1 TRC Project Manager/Supervisor

- Overall responsibility for development of a complete and accurate HASP. The HASP 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 HASP to TRC Site Safety Officer.

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

- Responsible for the daily implementation of the HASP.
- Ensures HASP 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 HASP.
- Communicates any revisions to the scope of work or HASP 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.

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- It is TRC's intent to have a TRC SSO or Assistant SSO available onsite during work activities. On the occasion neither person is 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 HASP, including the JSAs.
- Are required to participate in Tailgate Safety Meetings prior to commencement of site work.
- Must acknowledge an understanding of the HASP by signing the "Safety Compliance Agreement" (See **Attachment F**).

3.5 Contractors & Subcontractors

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

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 HASP 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 exceed 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

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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 HASP 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. There are several processes incorporated in this HASP 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 HASP and JSAs.
- Communication and acknowledgement of understanding of HASP & 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. Results from either observation will be communicated during Tailgate Safety Meetings.

5.0 REVISIONS TO HASP

If a situation arises where the HASP requires revision, the following options are available:

- Except in the case of emergency situations, no deviations from the HASP may be implemented without the prior notification and approval of the TRC Site Safety Officer (SSO).
- If HASP 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 HASP in the field. HASP Revisions must then be communicated to affected personnel and the Project Manager/Supervisor.
- If HASP revisions are substantial (i.e. 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 HASP in the field. HASP Revisions must then be communicated to affected personnel and the Project Manager/Supervisor. It is up to the

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discretion of the Project Manager/Supervisor whether a revised HASP will be reissued to replace the original HASP 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 HASP. In addition, the list is not all-inclusive and may require additional hazards associated with a particular project/site to be added.

JSAs are included in **Attachment E** of this HASP.

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 (greater than 6 feet); fall protection / fall arrest
- Ladders use
- Sharp objects
- Welding hazards
- Confined spaces

Equipment (JSAs for specific equipment are included in Appendix E):

- Electrical equipment
- Hydraulic equipment
- Pneumatic equipment
- Cutting equipment (non-powered)
- Other equipment

6.2 Chemical Hazards

MSDSs can be found in **Attachment B** after the Occupational Health Guidelines and Toxicological Information Table.

- Refined Petroleum products / waste oil
- Asbestos
- Serpentine Soils

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- PCE, TCE (in groundwater)
- Ozone
- Environmental samples, soil cuttings, decontamination water, dust (nuisance, silica)
- Industrial chemicals - sodium hydroxide, phosphoric acid, flocculant, defoamer

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.)

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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.

PPE required by all personnel at all times on the 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 Level D

PPE which should be available at all times on the 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 VOC 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).

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- 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 nuisance 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:

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- 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.

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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 Zones: The exclusion zone around the MTS unit and monitoring wells MW-3, MW-5, and RW-1
Warm Zone: NA
Cold Zone: All other site locations

For the purposes of this HASP, 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.

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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 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

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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.

Personnel Decontamination Procedures:

Remove contaminated items (i.e. gloves) in an "inside out" manner. Contaminated garments are to be placed in designated plastic bags or drums prior to disposal or transfer offsite.

Equipment Decontamination Procedures:

Interface probes are decontaminated after each use. Hoses are decontaminated on the outside if they are applied to a well with free product. The inside of the hose is decontaminated through the action of pumping out the water in the well after the free product has been removed. For hydrocarbon readings, the Horiba is left on and decontaminates itself between readings. When testing a new well, the Horiba is left on for a period of time before readings are taken so that it equilibrates to the new well.

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:

- Set up exclusion zone using barricades, delineators, cones, or high visibility caution tape
- Locking any unattended vehicles and/or equipment

12.0 PERSONNEL TRAINING

TRC and contractor personnel are required to acknowledge their understanding and willingness to comply with this HASP 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)

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- Refinery 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

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 - Outside the station, on the corner of Broadway and 40th Street.

Secondary assembly area - North corner of Broadway and 40th Street, across the street from the station.

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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 HASP. 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 HASP 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 involve 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.

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14.0 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 is:

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.

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15.0 HEALTH AND SAFETY PLAN (HASP) SIGNATURE PAGE

Job Safety Analysis Author	Date:	HASP Author	Date:
Monika Krupa		Monika Krupa	
_____	_____	_____	_____

Review/Approvals:

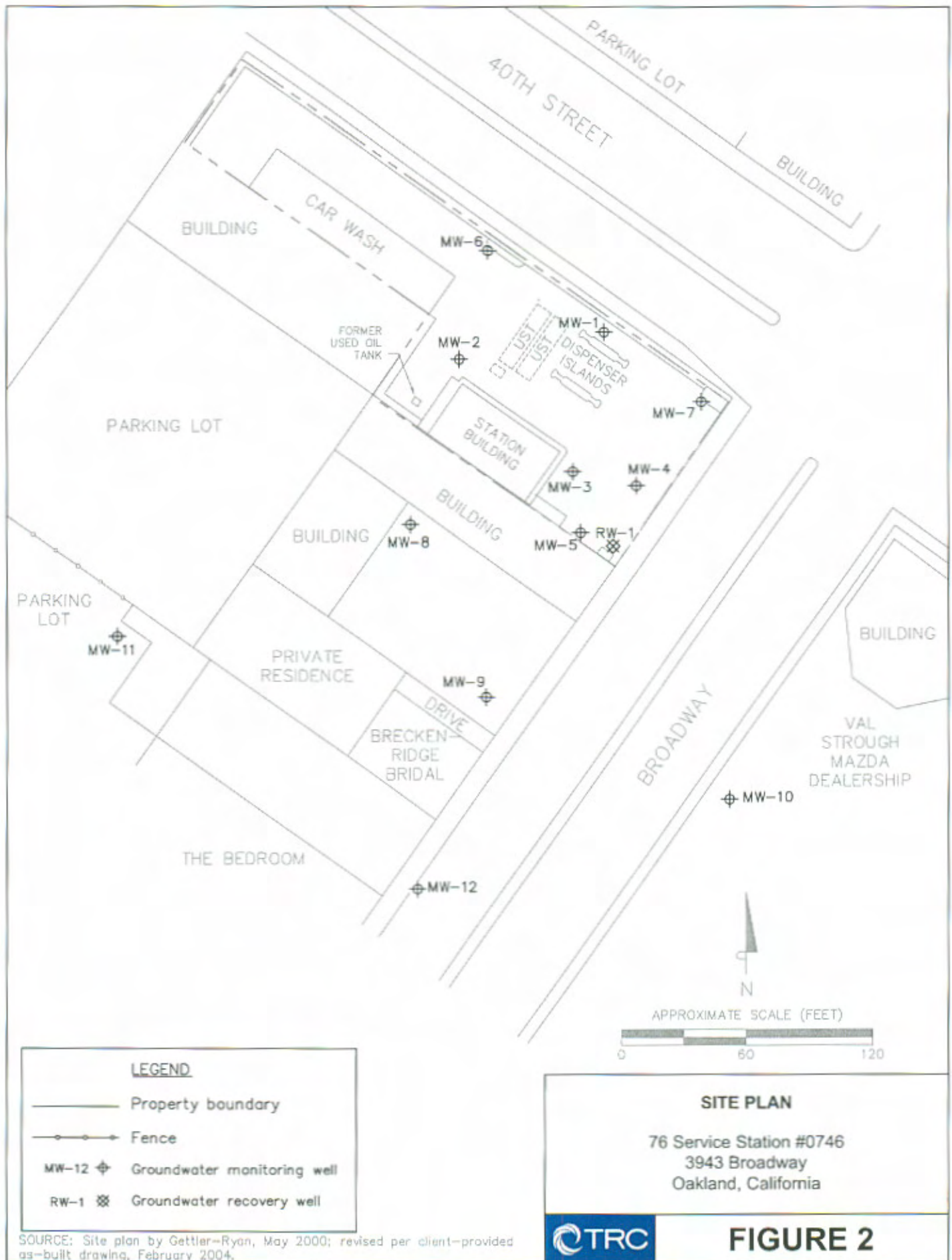
Site Safety Officer	Date:	Project Manager/Supervisor*	Date:
Facility/Field Supervisor Rachelle Dunn		Keith Woodburne	
_____	_____	_____	_____
Local Safety Coordinator* <input checked="" type="checkbox"/>	Date	EHS Supervisor/Safety Professional (CIH, CSP, other)*	Date
NA		<input checked="" type="checkbox"/> NA	
_____	_____	_____	_____

Additional Information or Instructions:

* Note: For most projects, the Project Manager/Supervisor will review, approve and sign the HASP. 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 HASPs not involving high-risk operations. It is recommended that for HASPs 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 HASP to ensure proper protective measures are being implemented.

ATTACHMENT A

SITE PLAN



SOURCE: Site plan by Gettler-Ryan, May 2000; revised per client-provided as-built drawing, February 2004.



FIGURE 2

ATTACHMENT B

**OCCUPATIONAL HEALTH GUIDELINES
AND TOXICOLOGICAL INFORMATION**

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 AND DIRECTIONS

EMERGENCY SERVICES

FACILITY / LOCATION

TELEPHONE

Emergency Situation911

Hospital (with 24-Hour Emergency Services):

Highland Hospital Campus

1411 East 31st Street

Oakland, CA 94602

Phone Number..... (510) 437-4800

Poison Control Center: Emergency 24-Hour Hotline..... (800) 876-4766

California Poison Control System - San Francisco Division..... (415) 502-6000

at San Francisco General Hospital

University of California San Francisco

Box 1369

San Francisco, California 94143-1369

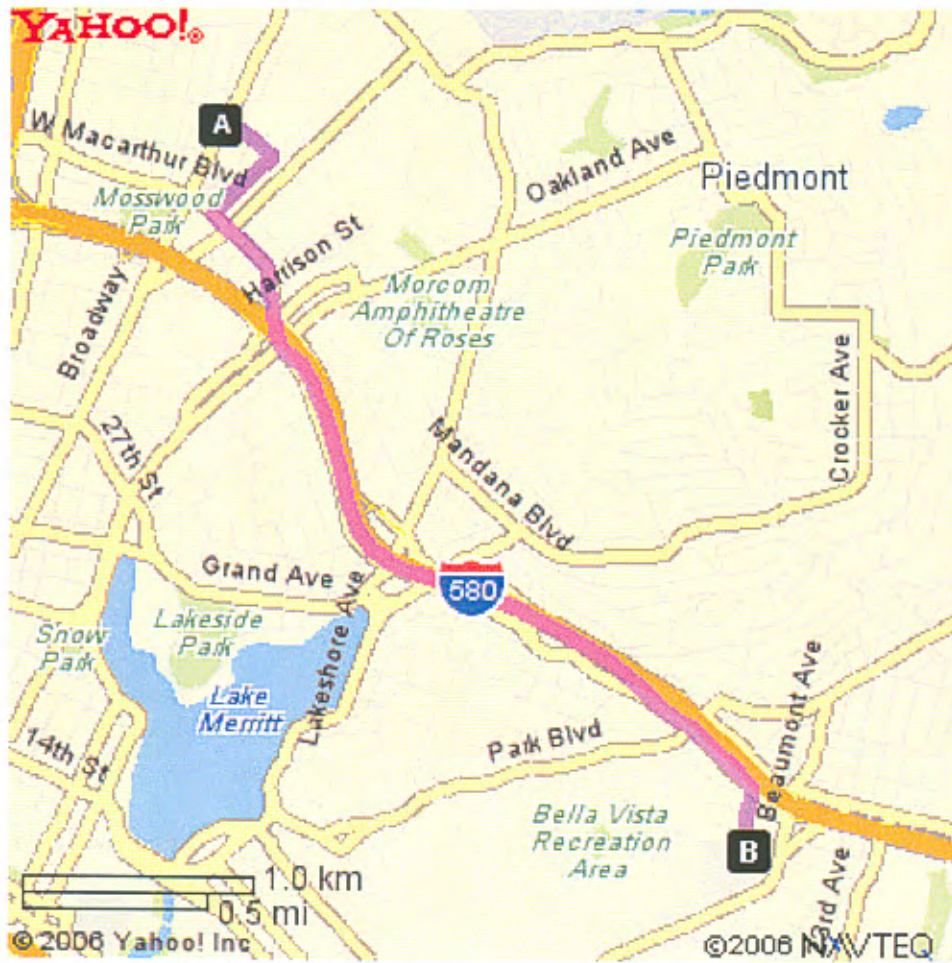
Office of Emergency Services: Hazardous Materials Spill Notification.....(800) 852-7550

TRC 24 HOUR Notification Number(800) 274-9072

Directions:

1. Start at **3943 BROADWAY, OAKLAND** - go < **0.1** mi
2. Turn **R** on **40TH ST** - go **0.2** mi
3. Turn **R** on **HOWE ST** - go **0.2** mi
4. Turn **L** on **W MACARTHUR BLVD** - go **0.4** mi
5. Take **L** ramp onto **I-580 EAST** toward **HAYWARD/STOCKTON** - go **1.3** mi
6. Take the **PARK BLVD** exit onto **MACARTHUR BLVD** - go **0.5** mi
7. Turn **R** on **STUART ST** - go **0.2** mi
8. Turn **L** on **E 31ST ST** - go < **0.1** mi
9. Arrive at **1411 E 31ST ST, OAKLAND**, on the **R**

ATTACHMENT D
LOCAL AREA MAP
with routes to hospital



ATTACHMENT E
JOB SAFETY ANALYSES



JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME / LOCATION (City, State) 76 Service Station 0746 Oakland, California		DATE: December 2006	<input type="checkbox"/> NEW <input checked="" type="checkbox"/> REVISED
WORK ACTIVITY (Description): Mobilization/Demobilization		List of Contractor(s) and key work activity: TRC	
SITE SPECIFIC JSA AUTHOR Monika Krupa (925)688-2482	POSITION / TITLE Staff Scientist	DEPT 4100	SIGNATURE
"TRC APPROVED" JSA DEVELOPMENT TEAM		POSITION / TITLE	APPROVAL DATE
Keith Woodburne (925)6882488		Project Manager	
Rachelle Dunn (925)688-2464		SSO	
Required PPE (indicate with "R"=Required, AN=As needed for task, A=Available, Must Have Available On-site)			
<input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> GLOVES <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> GOGGLES <input type="checkbox"/> FACE SHIELD	<input checked="" type="checkbox"/> HEARING PROTECTION <input checked="" type="checkbox"/> SAFETY SHOES: Protective Toe <input type="checkbox"/> 5pt.HARNES / LANYARD PPE CLOTHING: <input type="checkbox"/> Coveralls <input type="checkbox"/> Tyvek Suit <input type="checkbox"/> Nomex <input checked="" type="checkbox"/> Other (specify): level D	RESPIRATORY PROTECTION: <input type="checkbox"/> NA <input checked="" type="checkbox"/> 1/2 face Air Purifying Respirator (APR) <input type="checkbox"/> Particulate Mask: <input type="checkbox"/> PM100 <input type="checkbox"/> PM95 <input checked="" type="checkbox"/> Cartridge: <input checked="" type="checkbox"/> VOC <input type="checkbox"/> <input type="checkbox"/> Full face APR; specify cartridge type: <input type="checkbox"/> Air Supplied Respirator <input type="checkbox"/> SCBA <input type="checkbox"/> Air-line	Additional PPE:
Always perform a Safe Performance Self Assessment (SPSA): 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. Inspect Vehicle Equipment	1) Vehicle failures	1) Inspect fluids, tires, connections, and safety equipment regularly 1) Inspect gas tank level 1) Note any hazards with vehicle and report to the appropriate employee 1) Check trailer hitches for proper closure and safety devices (as necessary) 1) Inspect tailgate/stake bed closure	
2. Loading/Unloading	2) Muscle strains, cuts, and pinches	2) Ensure that appropriate PPE is worn and or accessible including: gloves, steel-toed boots, and safety glasses or goggles 2) Select vehicle size to meet fieldwork requirements 2) Prepare and equipment check-off list 2) Use proper lifting techniques (Squat to lift and lower. Do not bend at the waist or back, but use the legs for lifting. Keep the weight as close to you as possible. Bow your back in and raise up with your head first. If you must turn, turn with your feet, not your body. Never jerk or twist! Put the weight down by keeping your low back bowed in. Keep your feet apart.), and, if necessary (object >50lbs.) use additional mechanical lifting aid or additional labor.	
3. Driving	3) Accidents 4) Load shifting	3) Pay attention to the task at hand. Do not use cell phone while driving. 3) Obey traffic laws and drive defensively. 4) Tie down or secure items to prevent load shifts and equipment from flying out 4) Slow for curves and dips.	
4. Arrival at Site	5) Site conditions changed from plan	5) Talk to property manager and review exclusion area setup. 5) Observe traffic flow. 5) Modify traffic control plan if necessary 5) Identify Emergency Shut-off devices	
5. Leaving Site	6) Damage to customer vehicles 7) Vehicle failure 8) Muscle strains, cuts, and pinches.	6) Inspect site house keeping, sweep and pick up trash/debris. 6) Bag garbage to prevent fly-aways. Inspect tailgate/stake bed closure 7) Inspect gas tank level. Note any hazards with vehicle and report to the appropriate employee. 7) Check trailer hitches for proper closure and safety devices. 8) Use proper lifting techniques. 8) Wear leather gloves and safety glasses. Watch out for potential pinch points.	

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 knowledgeable & informed, sense to identify what could reasonably be expected to cause danger.



JOB SAFETY ANALYSIS

- 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".

Field Notes:

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JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME/ LOCATION (City, State) 76 Service Station 0746 Oakland, California		DATE: December 2006	<input type="checkbox"/> NEW <input checked="" type="checkbox"/> REVISED
WORK ACTIVITY (Description): Mobile Dual Phase Extraction Treatment System Event		List of Contractor(s) and key work activity: TRC	
SITE SPECIFIC JSA AUTHOR Monika Krupa (925)688-2482	POSITION / TITLE Staff Scientist	DEPT 4100	SIGNATURE
"TRC APPROVED" JSA DEVELOPMENT TEAM		POSITION / TITLE	APPROVAL DATE
Keith Woodburne (925)6882488		Project Manager	
Rachele Dunn (925)688-2464		SSO	
Required PPE (indicate with "R"=Required, AN=As needed for task, A=Available, Must Have Available On-site)			
<input type="checkbox"/> R REFLECTIVE VEST <input type="checkbox"/> AN HARD HAT <input type="checkbox"/> AN GLOVES <input type="checkbox"/> AN SAFETY GLASSES <input type="checkbox"/> AN GOGGLES <input type="checkbox"/> FACE SHIELD	<input type="checkbox"/> AN HEARING PROTECTION <input type="checkbox"/> R SAFETY SHOES: Protective Toe <input type="checkbox"/> 5pt.HARNES / LANYARD PPE CLOTHING: <input type="checkbox"/> Coveralls <input type="checkbox"/> Tyvek Suit <input type="checkbox"/> Nomex <input type="checkbox"/> R Other (specify): level D	RESPIRATORY PROTECTION: <input type="checkbox"/> NA <input checked="" type="checkbox"/> A 1/2 face Air Purifying Respirator (APR) <input type="checkbox"/> Particulate Mask: <input type="checkbox"/> PM100 <input type="checkbox"/> PM95 <input type="checkbox"/> A Cartridge: <input checked="" type="checkbox"/> VOC <input type="checkbox"/> <input type="checkbox"/> Full face ARP; specify cartridge type: <input type="checkbox"/> Air Supplied Respirator <input type="checkbox"/> SCBA <input type="checkbox"/> Air-line	Additional PPE:
Always perform a Safe Performance Self Assessment (SPSA): 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 Activities Perform pre-job site safety evaluation. Evaluate site conditions.	1) Lack of concentration or focus. 2) Fire and explosion 3) Electrocution / Electric Shock 4) Physical injury to visitors / spectators 5) Physical injury from being struck by moving vehicles 6) Hazards associated with working alone 7) Equipment Damage 8) Slip/trips and falls.	1) Conduct tailgate safety meeting reviewing Site Health and Safety Plan (HASP) and Job Safety Analysis (JSA). Review all plans (Scope of Work, Utility Plans, etc.) and logs in field notebook prior to starting a new task. Review planned actions and all personnel roles. Discuss with all onsite personnel potential hazards and scope of work. 2) No smoking or open flame. If necessary, smoke off-site in an area that is safe from traffic and fire. 2) Place ABC Fire extinguishers in accordance with site safety officer's direction. 3) De-Energize all circuits/power sources and follow TRC's Lock-Out, Tag-Out (LOTO) procedures if troubleshooting. 3) Perform all equipment and safety checks prior to event. 4) Set up exclusion zone using barricades, delineators, cones, and/or caution tape or snow fencing. 4) Use visitor check-in log and allow no one into an exclusion area with out proper PPE (as designated on this JSA) and proper training documentation (Hazwoper & LPS). 5) Use delineators, cones and caution tape to create an exclusion zone with multiple ingress and egress points. Create pathway as appropriate for pedestrians to walk around exclusion zone. Always face traffic when working (establish eye contact with drivers). 6) Inform property management of activities. If no other onsite personnel, call supervisor at beginning of job to tell him your location, and estimate a finish time. Call again at end of day to tell latest status and check out for safety. 6) Make sure others at home have emergency phone numbers. Have them call field personnel supervisor if you don't arrive in a timely manner and are unreachable. 7) Hoses running from the MTS unit must be protected with ramps to allow uninterrupted flow of traffic and reduce potential trip hazards. 7) Perform all necessary equipment and safety checks and inspections prior to event startup (per operating manual). 8) Maintain good house keeping - place unused equipment out of walkways and work areas. Clean-up all spills. Frequently monitor site/ramps for hazards.	

JOB SAFETY ANALYSIS

<p>2. Open well box lids to collect water samples, gauge water levels, and adjust or remove pumps (if part of scope of work).</p>	<p>9) Physical injury from being struck by moving vehicles.</p> <p>10) Slip, trips, falls and overhead hazards</p> <p>11) Physical injury from lifting lid/equipment and pinch points.</p> <p>12) Insect bites</p> <p>13) Physical injury from electrical pneumatic pumps.</p> <p>14) Physical injury and contamination</p> <p>15) Foreign object damage to wells.</p> <p>16) Explosion/Fire</p> <p>17) Cross-contamination</p>	<p>9) Review Exclusion Zone Set-Up JSA.</p> <p>9) Review traffic control plan as determined during project set-up meeting.</p> <p>9) Utilize vehicle, cones, and delineators to secure the area from potential hazards.</p> <p>9) Utilize additional personnel for safety watch as determined during project set-up meeting.</p> <p>10) Be aware of open well box and position lid/equipment opposite of immediate work area.</p> <p>10) Review areas for slip, trips, fall, and overhead hazards.</p> <p>11) Use proper lifting techniques (Squat to lift and lower. Do not bend at the waist. Keep the weight as close to you as possible. Bow your back in and raise up with your head first. If you must turn, turn with your feet, not your body. Never jerk or twist! Put the weight down by keeping your lower back bowed in. Keep you feet apart.), and if necessary (object > 50 lbs.) use additional mechanical lifting aid (tripod and winch) or additional labor.</p> <p>11) Watch out for potential pinch points.</p> <p>12) Use gloves when opening well boxes. Look for spiders and other insects.</p> <p>13) Ensure power is secured at the panel and lockout tagout procedures are followed when servicing electrical pumps. De-energize pneumatic pumps and use proper lock-out tag-out procedures.</p> <p>14) Wear leather gloves when working with tools and opening well lids, wear nitrile or latex gloves when handling water or soil. Wear Safety glasses with splash guards.</p> <p>15) Carry no loose pens or tools in pockets, place fasteners away from well opening.</p> <p>16) No smoking.</p> <p>16) Ground MTS Equipment</p> <p>17) Decon equipment prior to placing at each new well.</p>
<p>3. MTS Operations</p>	<p>18) LPG Explosion/Fire</p> <p>19) Frozen piping</p> <p>20) Night work</p> <p>21) Electrocution</p> <p>22) Hearing Damage</p>	<p>18) No smoking or open flames. Ground MTS Equipment, Leave cell phones in vehicles or leave exclusion zone before using phone.</p> <p>18) Use gloves when handling the LPG tanks.</p> <p>18) Follow proper propane filling instructions.</p> <p>18) MTS truck fire extinguishers easily accessible and in a ready position.</p> <p>19) Inspect LPS piping for ice blockage.</p> <p>20) Use additional lighting carried on MTS truck for overnight events.</p> <p>21) Use procedures outlined in maintenance manual to de-energize electrical and other potential energy sources when effecting repairs to system that is in operation.</p> <p>22) Use hearing protection when working near pump/generator.</p>
<p>4. System Shutdown and Restorage of Equipment</p>	<p>23) Physical Injury</p> <p>24) Exhaustion</p> <p>25) Muscle strains, cuts and pinches</p>	<p>23) Use the 2-man rule to monitoring onsite traffic when available and all the precautions outlined above when handling heavy equipment.</p> <p>24) Use procedures outlined in operating manual to secure system. Request assistance if overtired.</p> <p>25) Get assistance for moving heavy objects. Wear leather gloves to protect hands.</p>
<p>GENERAL SAFETY HAZARDS</p>	<p>POTENTIAL HAZARDS</p>	<p>³ HAZARD CONTROLS (beyond wearing "Required" PPE)</p>
<p>5. Ladders</p>	<p>26) Trips and falls</p> <p>27) Electrocution</p>	<p>26) Use proper wooden ladders that are firmly placed on the ground.</p> <p>27) No metal ladders are allowed around electrical control boxes.</p>

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JOB SAFETY ANALYSIS

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.

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Field Notes: _____

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JOB SAFETY ANALYSIS

COMPANY/PROJECT NAME/ LOCATION (City, State) 76 Service Station 0746 Oakland, California		DATE PREPARED FOR HSP: December 2006	<input type="checkbox"/> NEW <input checked="" type="checkbox"/> REVISED
JSA WORK ACTIVITY (Description): Vac Truck and Baker Tank Operations		List of Contractor(s) and key work activity: TBD	
SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE
Monika Krupa	Staff Scientist	4100	
"TRC APPROVED" JSA DEVELOPMENT TEAM		POSITION / TITLE	APPROVAL DATE
Keith Woodburne (925)6882488		Project Manager	
Rachelle Dunn (925)688-2464		SSO	
Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")			
R ___ HARD HAT R / A ___ GLOVES Specify: <input checked="" type="checkbox"/> leather <input checked="" type="checkbox"/> Nitrile <input type="checkbox"/> Other _____ R ___ SAFETY GLASSES ___ GOGGLES ___ FACE SHIELD	R ___ REFLECTIVE VEST A ___ HEARING PROTECTION R ___ SAFETY SHOES: <u>Protective Toe</u> ___ 5pt. HARNESS / LANYARD PPE CLOTHING: ___ Coveralls ___ Tyvek Suit ___ Nomex ___ Other (specify):	RESPIRATORY PROTECTION: <input checked="" type="checkbox"/> NA ___ 1/2 face Air Purifying Respirator (APR) ___ Particulate Mask: <input type="checkbox"/> PM100 <input type="checkbox"/> PM95 ___ Cartridge: <input type="checkbox"/> VOC <input type="checkbox"/> _____ ___ Full face APR; specify cartridge 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. b. Entrapment	a. Have one person watch traffic while the other creates exclusion zone in a high-use traffic area. a. Always wear safety vest, establish eye contact with operators utilizing flag men wear appropriate. a. Vehicles shall use reverse beepers or flagmen. b. Set up exclusion zone with multiple ingress & egress points	
2. Tank Drop/Load & Removal	a. Physical injury from equipment. b. Physical injury from being struck by moving vehicles. c. Spillage of hydrocarbon affected fluid. d. Back or muscle injury.	a. Wear appropriate PPE and any additional PPE as directed by the SSO. Wear orange safety vest, nitrile gloves and safety glasses. b. Wear safety vest. Utilize vehicle, cones and delineators to secure the area from potential hazards. c. Ensure that appropriate spill prevention/containment equipment is available onsite. d. Use proper lifting techniques and ensure drums are emptied before transporting.	
3. Fluid removal.	e. Physical injury from equipment and vacuum truck. f. Physical injury from being struck by moving vehicles. g. Spillage of hydrocarbon affected fluid. h. Back or muscle injury.	e. Wear appropriate PPE and any additional PPE as directed by the SSO. Wear orange safety vest, nitrile gloves and safety glasses. f. Wear safety vest. Utilize vehicle, cones and delineators to secure the area from potential hazards. g. Ensure that appropriate spill prevention/containment equipment is available onsite. h. Use proper lifting techniques and ensure drums are emptied before transporting.	
4. Perform site cleanup.	a. Back or muscle injury. b. Physical cuts from sharp metal edges.	a. Use proper lifting techniques, and if necessary (object > 50 lbs.) use additional mechanical lifting aid (drum dolly, forklift, powered liftgate, tripod and winch) or additional labor. b. Wear leather gloves and safety glasses. Watch out of potential pinch points.	
5. Field Changes:	a. b.	a. b.	
GENERAL SAFETY HAZARDS	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	3 HAZARD CONTROLS (beyond wearing "Required" PPE)	
6. 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.	



JOB SAFETY ANALYSIS

COMPANY/PROJECT NAME/ LOCATION (City, State) 76 Service Station 0746 Oakland, California		DATE PREPARED FOR HSP: December 2006	<input type="checkbox"/> NEW <input checked="" type="checkbox"/> REVISED
JSA WORK ACTIVITY (Description): Vac Truck and Baker Tank Operations		List of Contractor(s) and key work activity: TBD	
7. Cut/Pinched fingers or toes	a. Throughout work area; particularly when moving materials.	a. Wear leather gloves when lifting sharp or heavy equipment.	
8. Strained muscles.	a. Throughout work area; particularly when moving augers	a. Use proper lifting techniques; get help when moving heavy objects (>70 lbs).	
9. 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).	
10. Flying debris	a. In exclusion zone	a. Wear ANSI-approved safety glasses working around operating equipment.	
11. Loud Noise	a. In exclusion zone	a. Wear ANSI-approved hearing protection around operating equipment.	
12. 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 specified by SSO. a. Follow TRC's Cell Phone Use Guidelines.	
13. Exposure to hydrocarbon impacted soil or groundwater	a. In exclusion zone	a. Wear nitrile gloves during handling of soil or groundwater.	
14. 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.	

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JOB SAFETY ANALYSIS

ATTACHMENT F
TAILGATE SAFETY MEETING CHECKLIST
AND
HASP 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 (HASP).
- Emergency services:** Discuss location of nearest telephone and directions to hospital. Map, directions, phone numbers are provided in the HASP (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 Hearing Protection
 - Eye Protection - glasses goggles face shield
 - Hand Protection - leather nitrile other _____
 - Respiratory Protection - APR Particulate APR Chemical cartridge other
 - Protective Clothing - Tyvex Nomex Coveralls other Level D
- 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.

HASP 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: _____

HASP 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: _____

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Print Name: _____ Company: _____

Signature: _____ Date: _____

Print Name: _____ Company: _____

Signature: _____ Date: _____

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Signature: _____ Date: _____

Print Name: _____ Company: _____