

**FINAL REPORT
LNAPL ASSESSMENT AND
GROUNDWATER CHARACTERIZATION EVALUATION
(VOLUME II - Appendices)
Part 1**

Mill Springs Park Apartments
1809 Railroad Avenue
Livermore, California

Submitted to:

WINGFIELD VENTURE FUND
125 North Park Avenue
Hinsdale, Illinois 60521

Prepared by:

EARTH TECH
2030 Addison Street, Suite 500
Berkeley, CA 94704

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Project N^o. 687157.08

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APPENDIX A

HEALTH AND SAFETY PLAN

**Health and Safety Plan
Mill Springs Park Apartments
LNAPL Characterization**

Livermore, California

Prepared For:
Wingfield Venture Fund
131 East Maple Street
Hinsdale, Illinois 60521

Prepared by:
EARTH TECH
Health and Safety Department
100 West Broadway, Suite 5000
Long Beach, California 90802-5785
(310) 495-4449

August 1995

Project No. 687157.08

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1.0 INTRODUCTION

1.1 GENERAL

The provisions of this Health and Safety Plan are mandatory for all EARTH TECH and subcontractor onsite personnel engaged in light nonaqueous phase liquid (LNAPL) characterization activities at the Mill Springs Park (MSP) Apartments (see Figure 1-1). Tasks addressed in the plan include, but are not limited to:

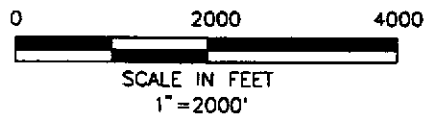
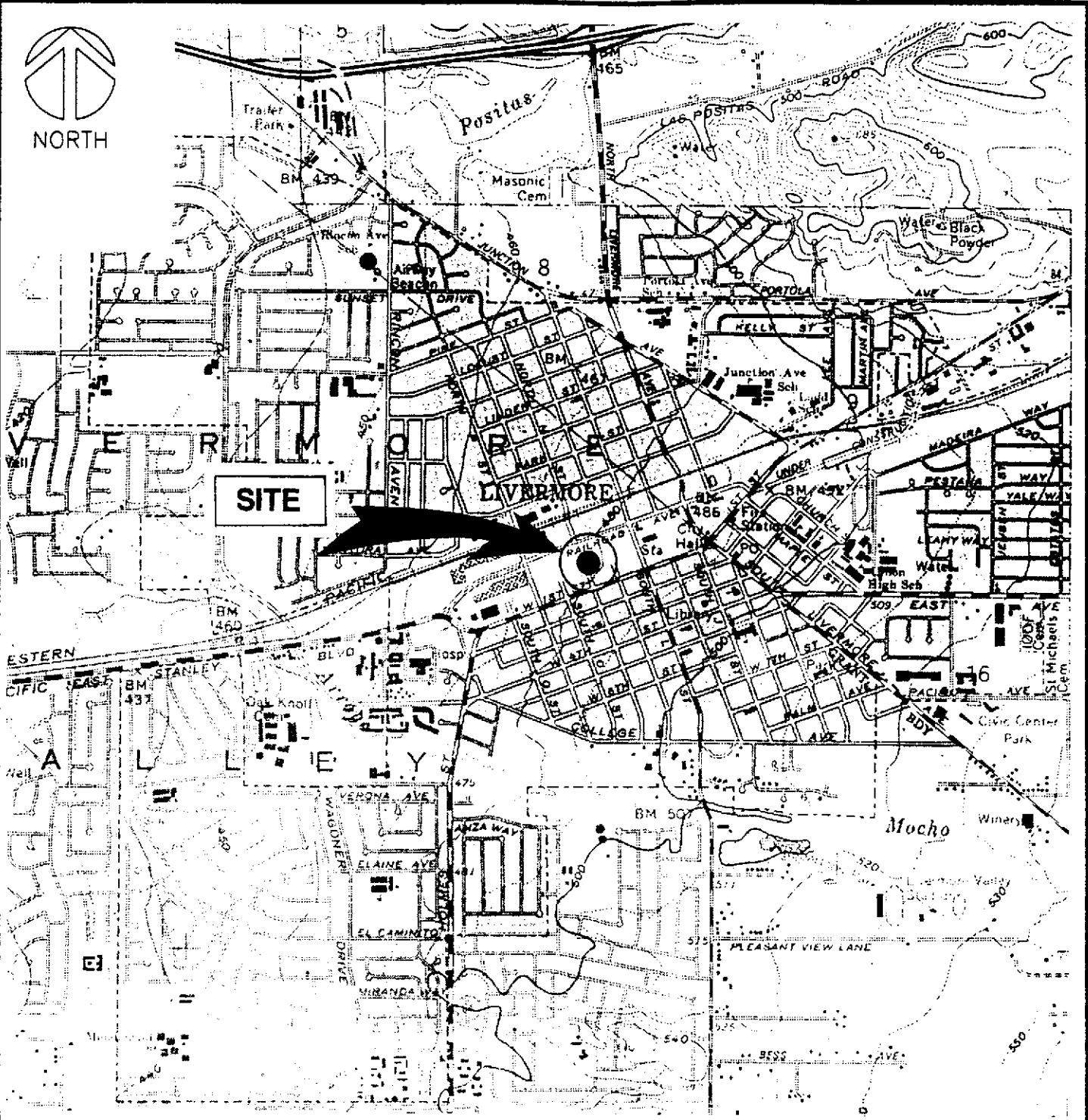
1. Initial work location reconnaissance, including boring location and utility clearance
2. Drilling using conventional hollow-stem auger drilling equipment for soil/groundwater sample collection
3. Subsurface soil/groundwater characterization using specialized Power Punch™ equipment and conventional groundwater monitoring wells.

Operational changes to this plan that could affect the health or safety of personnel, the community, or the environment will not be made without prior approval of the cognizant EARTH TECH Project Manager and the EARTH TECH Health and Safety Section.


In the event of a conflict between this plan and federal, state, or local regulations, the more stringent will apply.

1.2 POLICY STATEMENT

It is the policy of EARTH TECH to provide a safe and healthful work environment for all its employees. EARTH TECH considers no phase of operations or administration to be of greater importance than injury and illness prevention. Safety takes precedence over expediency or shortcuts. At EARTH TECH, we believe every accident and every injury is avoidable. We will take every reasonable step to reduce the possibility of injury, illness, or accident.



SOURCE: USGS 7 1/2 MINUTE TOPOGRAPHIC QUADRANGLE,
LIVERMORE, CALIFORNIA,
PHOTOREVISED 1980, AT SCALE 1:24,000

EARTH  TECH	PROJECT: 687157.08
	LIVERMORE CALIFORNIA
MILL SPRINGS PARK APARTMENT	
VICINITY MAP	
SEPTEMBER 1995	FIGURE 1

This Health and Safety Plan presents procedures to be employed during all soil/groundwater sampling and handling (containerization, removal, etc.) activities. The practices and procedures presented in this Health and Safety Plan are mandatory for all EARTH TECH employees and subcontractors while engaged such operations at any EARTH TECH-managed site. EARTH TECH also requires that all visitors to work sites abide by these procedures.

1.3 REFERENCES

This Health and Safety Plan complies with applicable U.S. Department of Labor Occupational Safety and Health Administration (OSHA), California Occupational Safety and Health Administration (CAL/OSHA), and U.S. Environmental Protection Agency (EPA) regulations. This plan follows the guidelines established by the regulatory agencies in the following documents.

- *Standard Operating Safety Guides*, U.S. EPA, November 1984
- *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH 85-115, 1985
- Title 8 of the California Code of Regulations, General Industry Safety Orders and the Construction Safety Orders (CAL/OSHA)
- Title 29 of the Code of Federal Regulations, Part 1910 (29 CFR 1910), Occupational Safety and Health Standards (OSHA), with special attention to Section 1910.120, Hazardous Waste Operations and Emergency Response
- Title 29 of the Code of Federal Regulations, Part 1926 (29 CFR 1926), Safety and Health Regulations for Construction (OSHA)
- National Oil and Hazardous Substances Contingency Plan

2.0 HEALTH AND SAFETY RESPONSIBILITIES

Field investigation entails field operations involving EARTH TECH and/or subcontractor personnel. The following sections contain the lines of authority and communication which will be established for all work sites.

2.1 ALL PERSONNEL

Each person is responsible for his/her own health and safety, for completing tasks in a safe manner, and for reporting any unsafe acts or conditions to his/her supervisor and/or the Site Supervisor. All personnel are responsible for continuous adherence to these health and safety procedures during the performance of their work. No person may work in a manner that conflicts with the letter or intent of safety and environmental precautions expressed in these procedures. After due warnings, EARTH TECH will dismiss from the site any person who violates safety procedures. EARTH TECH employees are subject to progressive discipline and may be terminated for blatant or continued violations. All onsite personnel will be trained in accordance with 8 CCR §5192 (29 CFR 1910.120) and this document.

2.2 PROJECT MANAGER (Mr. Mark Milani, PE)

The Project Manager has overall management authority for this operation, and is ultimately responsible to the Chief Operating Officer (COO) of EARTH TECH for ensuring that all project activities are completed in accordance with requirements set forth in this plan. The Project Manager will confer with the designated Health and Safety Professional on all matters affecting health and safety. Other responsibilities include:

- Reading and becoming familiar with this plan.
- Requiring a prompt and thorough investigation of all accidents.
- Scheduling an Accident Review Board within 10 days of an injury involving a workers' compensation claim or OSHA-recordability, or any accident with more than a \$500 loss.

2.3 TASK MANAGER (Mr. Mark Milani, PE)

The Task Manager is responsible for coordinating with the client, discipline managers, and subcontractors to complete the activities associated with this project to the satisfaction of the client and in accordance with requirements set forth in this plan. The Task Manager will confer with the cognizant Health and Safety Professional on all matters affecting health and safety. Other responsibilities include:

- Reading and becoming familiar with this plan
- Conducting periodic safety reviews of the project site and project documentation
- Maintaining compliance with the Health and Safety Plan and other safety regulations
- Approving in writing each addendum to the Health and Safety Plan.
- Ensuring that site personnel assigned have received the proper training and medical clearance prior to entering the site
- Maintaining the presence of a qualified first-aid provider on site
- Discussing potential health and safety hazards with the designated Health and Safety Professional and the Project Manager.
- Implementing changes as directed by the Project Manager and approved Health and Safety Plan addenda.

2.4 SITE SUPERVISOR (Mr. Mark Peterson, R.G.)

The Site Supervisor manages all EARTH TECH and subcontractor activities at the work site and is responsible for field implementation of the Health and Safety Plan. This includes communicating site requirements to all personnel, observing that field supervisors and subcontractors enforce all provisions of the plan, working with the Site Safety Officer to implement all elements of this Health and Safety Plan, and consulting with the Health and Safety Professional regarding changes to the Health and Safety Plan. Other responsibilities include:

- Reading and becoming familiar with this plan
- Enforcing the Health and Safety Plan and other safety regulations

- Stopping work, as required, to maintain personal and environmental health and safety
- Determining evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation
- Ensuring that all site personnel and visitors have received the proper training and medical clearance prior to entering the site
- Establishing Exclusion, Contamination Reduction, and Support zones
- Presenting tailgate safety meetings and maintaining attendance logs and records
- Implementing the respiratory protection program
- Maintaining decontamination procedures which meet established criteria
- Discussing potential health and safety hazards with the designated Health and Safety Professional and the Project Manager
- Implementing changes as directed by the Project Manager and in approved Health and Safety Plan addenda.

2.5 HEALTH AND SAFETY PROFESSIONAL (Mr. Ronald Partilla, CSP, OHST)

The designated Health and Safety Professional is responsible for overseeing all aspects of the site safety program, and preparing any site-specific safety guidance documents or addenda to this plan.

The designated Health and Safety Professional reports to the EARTH TECH Health and Safety Manager, and is independent of the individual Project Manager. The Health and Safety Professional is the contact for regulatory agencies on matters of safety and health. Other responsibilities of the Health and Safety Professional include:

- General health and safety program administration
- Conducting project health and safety audits
- Developing site-specific employee/community emergency response plans, as required, based on expected hazards
- Determining the level of personnel protection required
- Updating equipment or procedures based on information obtained during site operations

- Establishing air monitoring parameters based on expected contaminants
- Implementing employee exposure assessment notification.

2.6 SITE SAFETY OFFICER (Mr. Mark Peterson, R.G.)

The Site Supervisor or designated alternate will serve as the Site Safety Officer (SSO) at the work site. The SSO is responsible for performing the routine duties for health and safety, with the assistance of the designated Health and Safety Professional. The SSO will administer this Health and Safety Plan and the applicable site-specific safety guidance document. These responsibilities include:

- Performing regular and frequent site inspections to find hazards and observe employees at work
- Stopping work when necessary to prevent injury or illness and ensure personal and environmental health and safety
- Investigating all injuries and illnesses
- Developing and implementing corrective action plans to eliminate or mitigate hazards
- Implementing air monitoring according to directives in this Health and Safety Plan
- Forwarding all employee exposure monitoring information to the Health and Safety Professional to enable the exposure notification.

2.7 SUBCONTRACTORS

Onsite subcontractors and their personnel are responsible for reading, understanding, and complying with all site requirements. Subcontractors are required to follow the guidelines established in this Health and Safety Plan, OSHA HAZWOPER regulations, CAL/OSHA regulations, and Construction Safety Orders, and should develop safety guidance specific to work functions which supplement this Health and Safety Plan for the subcontractor's personnel. Each subcontractor will designate a safety coordinator, with the authority and responsibility to implement health and safety requirements for the subcontractor's employees. The safety coordinator will also serve as the subcontractor's point of contact with the SSO concerning safety issues.

2.8 ONSITE PERSONNEL AND VISITORS

All personnel working for EARTH TECH and its subcontractors are required to read and acknowledge their understanding of this Health and Safety Plan. All visitors to contaminated areas of the project site must also read and acknowledge their understanding of this Health and Safety Plan. All personnel are expected to abide by the requirements of this Health and Safety Plan and cooperate with site supervision to ensure a safe and healthful work site. Site personnel are required to report immediately any of the following to the Site Supervisor:

- Accidents and injuries, no matter how minor
- Unexpected or uncontrolled releases of any hazardous substances
- Any symptoms of exposure to a hazardous substance
- Any unsafe or malfunctioning equipment
- Any changes in site conditions which may affect the health or safety of project personnel.

3.0 SCOPE OF WORK

3.1 SITE DESCRIPTION

The Mill Springs Park Apartment facility is a multi-unit complex located at 1809 Railroad Avenue in the city of Livermore, California.

3.2 SCOPE OF WORK

The primary objective of this investigation is to perform field sampling and analytical testing to estimate the horizontal extent of LNAPL and LNAPL thickness on the MSP Apartments site.

The specific scope of work for this LNAPL characterization will include the following elements:

- Site Reconnaissance and Utility Clearance will be performed to verify underground utilities and encumbrances (i.e. overhead utilities, trees, surface structures etc.). Proposed boring areas at the site will be cleared of underground utilities and obstructions to enable subsurface investigation.
- Hollow-stem Auger Drilling will be performed at 11 locations to depths of 28 and 35 feet below ground surface (bgs) across the site. Since the exact locations of the borings has not been established, the work zones have been developed to enable flexibility. All soil borings will be continuous sampled to the full depth of the boring.
- Specialized Power Punch Equipment will be used to collect groundwater samples from the site. Power Punch equipment is expected to extend to depths between 5 feet and 30 feet bgs. The exact sample locations and number of Power Punch installations have not been established. Boring locations will be determined in the field.
- Monitoring Well Installation will be performed at up to two grab groundwater sample locations. Monitoring well locations will be determined based on the grab groundwater sample results. All wells will be drilled using hollow stem auger drilling equipment. Monitoring wells will be constructed at time of removal of grab groundwater sample probes. Additional soil samples may be collected from the zone where Power Punch probes were installed. Well development of two monitoring wells will be performed by surging and bailing.
- Surface Coring, Waste Management and Equipment Decontamination will be performed by site personnel. Coring of concrete or asphalt will be accomplished to provide access to investigation locations. The drilling contractor will establish and manage an area to be used to store decontamination fluids and well development water generated during drilling and monitoring well installation activities (see next bullet for additional waste

management guidelines). Potentially contaminated equipment will be steam cleaned between borings and prior to off-site transport operations. All decon fluids will be collected and containerized for proper characterization (see below).

- Investigation Generated Wastes are anticipated to consist of soil cuttings generated from the drilling operations and groundwater during well development/sampling. Drill cuttings and excess groundwater will be placed in Department Transportation (DOT) approved 17H (open head style) drums.

Decontamination fluids will be generated as part of cleaning augers, drill bits, sampling equipment and other down-hole equipment. The decontamination fluids will be contained and stored in DOT approved drums.

Drums will be labeled by content type and date of accumulation. Drums will be transferred to a designated waste accumulation area on the site.

- Site Restoration activities will include grouting of soil borings and Power Punch probe holes using the down-hole tremie method. Following grouting, the surface will be patched with ready mix concrete to match surrounding grade. Construction related debris will be removed from the site and work areas will be swept.

4.0 HEALTH AND SAFETY PROGRAMS

4.1 MEDICAL SCREENING AND HEALTH SURVEILLANCE

All personnel performing work activities inside any Exclusion Zone (see Section 9.2) shall conform with the following medical monitoring requirements.

4.1.1 Physical Examinations

All onsite personnel shall have completed a physical exam in accordance with the requirements of 8 CCR §5192 (f) (29 CFR 1910.120 [f]). Exam requirements will be specified by the examining physician.

The results of medical examinations are to be evaluated by a physician specializing in occupational medicine. The medical evaluation includes a judgment of the employee's ability to use respiratory protective equipment and to participate in hazardous waste site activities. The examining physician must document his evaluation/recommendations on an appropriate Health Status Report (HSR) or similar form of documentation. Restrictions of onsite activities may be required for personnel with certain medical conditions which could be aggravated by chemical exposure or physical demands at the site. Each employee is responsible for notifying the Health and Safety Professional of physical or medical restrictions. The Health and Safety Professional will then ensure that project management observes and enforces the restrictions.

A copy of each persons HSR will be made available for review following a request from the Health and Safety Professional. Employees who have not received a medical examination within 12 months (365 days) of their previous medical exam will:

- Be required to immediately obtain an appropriate medical exam and provide a copy of the HSR to the Health and Safety Professional for review prior to starting work on the project
- Be removed from the project until the appropriate medical exam has been performed and a copy of the associated HSR has been provided to the Health and Safety Professional.

Project management or other personnel who are not routinely exposed to site hazards may be waived from the annual medical examination requirement by the Health and Safety Professional provided that they meet the following:

- Medical examinations are received on a frequency determined by the examining physician, but not to exceed every two (2) years
- Site activities performed by the exempted personnel do not entail exposure to contaminants in excess of the permissible exposure limits or other exposure limitations as outlined in this Health and Safety Plan.

4.1.2 Medical Assistance

Telephone numbers and locations for local fire department, hospitals, ambulance service, and other emergency services shall be maintained at the site by the SSO (see Table 11-1).

Information regarding non-emergency medical treatment for onsite injury, onsite illness, or onsite exposure to chemical contaminants will be provided to the hospital by the Site Supervisor.

4.1.3 First Aid

A first aid kit will be available at each work location for use by qualified site personnel. First aid kits will contain only items which have been approved by a physician in writing. An inventory list, signed by the consulting physician, will be included with each first aid kit.

4.2 NOTIFICATION AND RECORD KEEPING

Any injury or illness will be immediately reported to the SSO, who will implement any immediate corrective actions and report the incident to the Site Supervisor. Upon learning of an injury or illness, the Site Supervisor shall immediately perform all required notifications, including:

- Project Manager.
- Health and Safety Professional.

OSHA requires notification within 24 hours, and preferably during the same work shift, in the event of a fatality or severe injury requiring hospitalization. The Health and Safety Professional will make such notifications to OSHA, and therefore must receive the information in time to make the notification without penalty.

The Site Supervisor shall record in the site daily activity log who is on site and the personal protective equipment (PPE) used by each person on site.

4.3 GENERAL HEALTH AND SAFETY TRAINING

All field personnel and visitors involved with site activities will have completed the necessary health and safety training courses prior to entering and controlled areas of the site (Exclusion or Contamination Reduction zones). To comply with the provisions established in 8 CCR §5192 (e)(2) and (e)(3) [29 CFR 1910.120 (e)(2) and (e)(3)] (40-hour or 24-hour initial training), the basic training topics will include, but are not limited to:

- Hazard communication
- Flammable atmospheres and ignition controls
- Toxic chemical recognition
- Exposure guidelines
- Protective clothing
- Respiratory protection
- Hearing conservation
- Heat stress
- Decontamination
- Prevention of slip, trip, and fall hazards
- Safe lifting techniques and safe work practices.

All personnel will receive annual refresher training in accordance with 8 CCR §5192 (e)(8) [29 CFR 1910.120 (e)(8)]. Work supervisors will receive an additional required 8 hours of training which addresses supervisor responsibilities and obligations in maintaining an effective health and safety program in accordance with 8 CCR §5192 (e)(4) [29 CFR 1910.120 (e)(4)].

4.4 SITE-SPECIFIC TRAINING

All project personnel will be trained about potential hazards at the site, and exposure prevention or control measures. Field personnel will be:

- Instructed on the contents of applicable portions of this plan
- Made aware of task-specific physical hazards and other hazards which may be encountered during site work (see Section 5.1).
- Informed about the potential routes of exposure, protective clothing, precautionary measures, and symptoms or signs of chemical exposure, and heat stress
- Made aware of fire prevention measures, fire extinguishment methods, and evacuation procedures.

The site specific training will be performed at the start of the project and on a daily basis thereafter. The training will be conducted by the SSO or his designated representative before daily work activities begin, and should be documented on the Tailgate Safety Briefing Sign-in Log. A copy of the form is found in Appendix A.

5.0 HAZARD ASSESSMENT

5.1 POTENTIAL HAZARDS

LNAPL characterization activities at The MSP Apartments site presents a wide range of potential chemical and physical hazards to which personnel may be exposed. These are due both to the hazards presented by the work location itself (e.g., presence of contamination), and those which may be encountered during the completion of the required scope of work. The potential hazards include, but are not limited to:

1. Exposure to gasoline, waste oils, benzene, toluene, ethyl benzene, and xylene (BTEX), and lead (organic) during LNAPL characterization activities
2. Cleaning and decontamination of equipment
3. Hazardous noise produced during characterization/drilling activities
4. Explosion and fire risk produced during drilling activities due to the presence of volatile organic compounds
5. Heat/Cold stress (depending heavily on time of year), personal protective equipment, and site specific work tasks/activities
6. Hazards involving underground electrical, gas or other utilities, or overhead electrical lines, may be encountered
7. Slippery and unstable surfaces, steep grades and uneven terrain encountered during excavation/backfill activities
8. Snapping cables, slings, and ropes during drilling and/or well installation operations
9. Energized electrical equipment malfunctions in onsite support equipment and machinery
10. Physical hazards associated with concrete/asphalt coring activities
11. Steam cleaning equipment hazards (e.g., scalding water, contact hazards, etc.).

5.2 TASK HAZARD ANALYSIS

5.2.1 Reconnaissance Activities

Reconnaissance activities include initial site walks, staking or other marking activities, geophysical clearance operations, and setup of site security and control measures. During these activities the work site will be walked and work locations identified. Excavation boundaries will be marked with stakes.

Hazards which may be encountered include heat stress and sunburn; although the work area has been used for parking there is still the potential for unprepared walking surfaces to be encountered. Level D personal protective equipment will be worn at all times during site reconnaissance activities. Also, the following requirements should be observed:

1. Watch carefully where you walk. Do not step in shadows until you are sure of your footing. Shadows may hide pits, holes, or other unstable footing.
2. Carefully choose your footholds when crossing rocky, uneven, or loose ground surfaces.
3. Stay within site of your buddy.

5.2.2 Drilling/Well Installation Operations

Drill rigs will be used for borehole and groundwater monitoring well installation. Operating around drilling equipment presents potential hazards from falling equipment, mechanical failure, being caught in machinery, etc. Appendix B provides safety procedures which should be followed by all personnel. Equipment should be properly inspected on a regular basis in accordance with industry-established procedures to minimize the risk of mechanical failure. In addition to physical hazards associated with drilling equipment, there is the potential for excessive noise to be produced around the drill rig. Section 5.9 provides details concerning the hazards associated with high noise levels.

Soil cuttings produced during drilling operation have the potential to be contaminated with hazardous materials. Cuttings should be handled using proper protective equipment (see Section 7.2). Anyone with the potential to contact contaminated materials (including contact during sample collection and handling)

is required to utilize Modified Level D protective equipment, unless on-site monitoring indicates the need for increased respiratory protection.

5.2.3 Groundwater/Soil Sampling

Subsurface groundwater and soil samples will be collected by using drilling/Power Punch equipment or traditional collection techniques. Contaminated subsurface materials present the risk of contact with hazardous substances. Section 5.3 presents the hazards associated with the chemical contaminants which may be encountered, and Table 6-2 presents applicable monitoring and exposure guidelines. During sample collection where the potential exist for personnel contact with contaminated soils/groundwater, the use of Modified Level D protective equipment (see Section 7.2.2) will be required.

5.2.4 Power Punch Testing

By its nature, Power Punch investigations pose only very slight risks associated with chemical exposure; however noise levels produced by the equipment and/or support equipment may be significant, as is the potential for hand injuries.

5.2.5 Concrete/Asphalt Coring

Concrete/asphalt coring activities present relatively limited hazards to site personnel; however, precautionary measures must be taken in order to reduce the likelihood of personal injury while performing these activities. Hazards associated with coring activities include hazardous noise exposures and electrical or mechanical hazards associated with coring equipment operation. Additionally, site personnel should pay close attention to their footing at all times due to the use of cooling water during the coring activities. Should minor repairs or maintenance activities need to be performed on the coring equipment, the guidelines established for lockout/tagout in Section 5.12 and electrical safety in Section 5.11 will be observed. Exposures to hazardous noise will be controlled in accordance with Section 5.9. The hazards presented by slippery surfaces and associated hoses and water lines will be observed in accordance with Section 5.8.

5.2.6 Equipment Maintenance

Site activities may result in equipment breakdown or failures that may require limited maintenance to be performed by site personnel. Maintenance activities performed on electrically operated equipment will comply with Sections 5.11 and 5.12 at all times when potential electrical shock or accidental start-up hazards are present.

5.3 CHEMICALS OF CONCERN

5.3.1 Gasoline

Gasoline is a complex mixture of hydrocarbons and additives. Chronic exposures or exposures to a high concentration of gasoline vapor may cause unconsciousness, coma, and possible death from respiratory failure. Exposure to low concentrations of gasoline vapor may produce flushing of the face, slurred speech, and mental confusion. Gasoline constituents can be divided into five major groups: alkanes, alkenes, cycloalkenes, aromatics, and additives. The aromatics are the constituents generally regarded as the greatest toxic concern. The major aromatics in gasoline are benzene, toluene, ethyl benzene, and xylene (BTEX). Of these, benzene is considered to be the most potent. Tetra-ethyl and tetra-methyl lead are also constituents found in typical gasoline products. These have both been identified as carcinogens and present a moderate hazard when in contact with exposed skin. Other trace constituents found in gasoline can also be irritating to the skin if repeated or prolonged exposure occurs. Both the OSHA PEL and ACGIH TLV for gasoline are 300 ppm.

5.3.2 Diesel

Like gasoline, diesel fuel is a complex mixture of hydrocarbons. It is manufactured through refining of middle distillate crude oil components, and thus is somewhat less volatile than gasoline (which comes from light stocks). Exposure to diesel fuels can produce intoxication and other CNS depression effects in cases of acute exposure, and can lead to defatting of skin and contact dermatitis in case of contact exposure. Like gasoline, diesel fuel contains some small quantities of volatile hydrocarbon additives, including BTEX members. There are no established exposure standards from either OSHA or ACGIH for diesel fuel, however action levels should be developed that reflect the potential presence of BTEX (particularly benzene) when diesel fuels are present.

5.3.3 Waste Oils

Oils are composed of higher molecular weight carbon chain molecules, possessing a low vapor pressure. For this reason they present primarily a contact hazard. The potential for acute exposure is negligible; however, chronic exposure can lead to liver damage. Waste oils, primarily waste motor oils, may also be contaminated by a variety of heavy metals during use.

5.3.4 Volatile Organic Compounds (BTEX)

Benzene: is a known human carcinogen. Prolonged skin contact with benzene or excessive inhalation of its vapor may cause headache, weakness, loss of appetite, and lassitude. Continued exposure can cause collapse, bronchitis, and pneumonia. The most important health hazards are cancer (leukemia), bone marrow effects, and injuries to the blood-forming tissue from chronic low-level exposure. The OSHA PEL is 1 ppm, and the ACGIH TLV is 10 ppm.

Toluene: Exposure to vapors of toluene may cause irritation of the eyes, nose, upper respiratory tract, and skin. Exposure to 200 ppm for 8 hours causes mild fatigue, weakness, confusion, tearing, and a sensation of prickling, tingling, or creeping on the skin that has no objective cause. Exposure to higher concentrations may cause headache, nausea, dizziness, dilated pupils, and euphoria, and, in severe cases, may cause unconsciousness and death. The liquid is irritating to the eyes and the skin. Contact with the eyes may cause transient corneal damage, conjunctival irritation, and burns if not promptly removed. Repeated and/or prolonged contact with the skin may cause drying and cracking. Toluene may be absorbed through the skin in toxic amounts. Ingestion causes irritation of the gastrointestinal tract and may cause effects resembling those from inhalation of the vapor. Chronic overexposure to toluene may cause irreversible liver and kidney injury. Both the OSHA PEL and the ACGIH TLV are 100 ppm.

Ethyl benzene: its vapor is severely irritating to the eyes and to the mucous membranes of the respiratory system. Sustained inhalation of excessive levels can cause depression of the central nervous system (CNS) characterized by dizziness, headache, narcosis, and coma. Skin contact with liquid Ethyl benzene causes irritation; dermatitis and defatting can also develop. The acute oral toxicity of Ethyl benzene is low, however, ingestion of it poses a serious aspiration hazard. Aspirating even a small amount into the lungs can result in extensive edema (lungs filled with fluid) and hemorrhaging of the lung tissue. No systemic effects are suspected at the levels that produce pronounced, unignorable, disagreeable skin and eye irritation. The established Permissible Exposure Level (PEL) is set well below this intolerable level. The OSHA PEL and the ACGIH TLV are both 100 ppm.

Xylene: Liquid xylene is a skin irritant and causes itching, dryness, and defatting; prolonged contact may cause blistering. Inhaling xylenes can depress the Central Nervous System (CNS), and ingesting it can result in gastrointestinal disturbance; and possibly hematemesis (vomiting blood). Effects on the eyes, kidneys, liver, lungs, and the CNS are also reported. Both the OSHA PEL and the ACGIH TLV are 100 ppm.

5.3.5 Heavy Metals

As a group, the heavy metals (including lead, arsenic, chromium, nickel, and selenium) are toxic to a number of organs and organ systems in the body including the liver, kidneys, blood-forming organs (primarily located in the bones), and the CNS (especially lead). Acute exposure to metals can produce symptoms such as stomach distress and vomiting, mental confusion and sluggishness, heart palpitations, breathing difficulties, and renal (kidney) failure. Chronic exposures can be characterized by deterioration in function of the liver and kidneys, CNS degradation, and abnormal changes in blood cell counts (especially white blood cells). Exposure to chromium may also lead to formation of lung and gastric cancers.

The primary route of exposure to heavy metals of concern during this project is contact with contaminated soils and water, which can lead to entry through open wounds or contamination and ingestion of food. Preventing this route of exposure necessitates the use of appropriate protective clothing and proper decontamination procedures.

5.4 DRILL RIG SAFETY

Operating around drilling equipment presents potential hazards from falling equipment, mechanical failure, being caught in machinery, etc. Appendix B provides safety procedures which should be followed by all personnel. Equipment should be properly inspected on a regular basis in accordance with industry-established procedures to minimize the risk of mechanical failure. In addition to physical hazards associated with drilling equipment, there is the potential for excessive noise to be produced around the drill rig. Section 5.9 provides details concerning the hazards associated with high noise levels.

5.5 EXPLOSIVE HAZARDS

Borehole installation activities increase the potential for the occurrence of elevated concentrations of volatile organic compounds that may be released. Explosive concentrations of these constituents could develop in small and confined spaces. Explosivity must be monitored with a Combustible Gas Indicator (CGI) in accordance with the requirements found in Section 6.0 (see Table 6-2). Monitored areas will include all excavations, trenches, confined spaces, well casings, and indoor work areas where explosive concentrations may develop prior to monitoring activities, and locations that could potentially pose

hazards as remedial activities progress. Flammable chemical compounds may not be identified and, therefore, any vapor or liquid must be treated as if it were flammable.

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Borehole installation activities will cease if concentrations exceed 10% of the Lower Explosive Limit (LEL), and personnel will withdraw to a position upwind of the affected area (see Table 6-2 for action guidelines).

SMOKING IS PROHIBITED INSIDE THE WORK AREA.

B fires. They require blanketing or smothering to extinguish the fire, which will act to keep oxygen away from the fuel. Fire extinguisher types appropriate for use on flammable-liquid fires include carbon dioxide (CO₂), dry chemical, film-forming foam, or multipurpose dry chemical. A *Class B* extinguisher is designated with a white "B" on a square background of red.

5.6 HEAVY MACHINERY

The use of heavy machinery (drilling, trenching and digging equipment, cranes, etc.) in areas where unprotected personnel are operating warrants special attention on the part of all personnel. Operators should ensure that equipment is working properly and is being run in a safe manner, and should be aware of the location of unprotected personnel at all times while operating this machinery to avoid serious accidents. Other personnel must be aware of heavy equipment operations, and exercise proper caution to avoid placing themselves in an unsafe situation.

5.7 HEAT STRESS

Heat stress is a major hazard, especially for workers wearing protective clothing. The same protective materials that shield the body from chemical exposure also limit the dissipation of body heat and moisture. Personal protective clothing can therefore create a hazardous condition. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as

15 minutes. Site personnel will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim and the prevention of heat stress casualties.

5.7.1 Heat Exhaustion

Symptoms: Usually begins with muscular weakness, dizziness, nausea, and a staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, with clammy skin, and he or she may perspire profusely. The pulse is weak and fast, breathing is shallow. He or she may faint unless they lie down. This may pass, but sometimes it remains and death could occur.

First Aid: Immediately remove the victim to the Contamination Reduction Zone, in a shady or cool area with good air circulation (avoid drafts or sudden chilling). Remove all protective outer wear. Call a physician. Treat the victim for shock. (Make the victim lie down, raise his or her feet 6-12 inches and keep him or her warm but loosen all clothing.) If the victim is conscious, it may be helpful to give him or her sips of water. Transport victim to a medical facility as soon as possible.

5.7.2 Heat Stroke

Symptoms: This is the most serious of heat casualties due to the fact that the body excessively overheats, body temperatures often rise to between 105°-110°. As the victim progresses toward heat stroke symptoms such as headache, dizziness, nausea, oppression, can be noted, and the skin is observed to be dry, red, and hot. Sudden collapse and loss of consciousness follows quickly and death is imminent if exposure continues. The attack will usually occur suddenly.

First Aid: Immediately evacuate the victim to a cool and shady area. Remove all protective outer wear and all personal clothing. Lay the victim on his or her back with the head and shoulders slightly elevated. Apply cold wet towels, ice bags, etc. to the head, armpits, and thighs. Sponge off the bare skin with cool water or rubbing alcohol, if available, or even place the victim in a tub of cool water. The main objective is to cool without chilling the victim. Give no stimulants or hot drinks. Transport the victim to a medical facility as soon as possible.

5.7.3 Prevention of Heat Stress

One of the major causes of heat casualties is the depletion of body fluids. On the site there must be plenty of fluids available. Personnel should replace water and electrolytes lost through sweating. Electrolytes can be replaced by commercial mixes such as Gatorade.

5.7.4 Prevention of Sunburn

When working in the sun, whether it is hot or cold, exposed skin is vulnerable to sunburn. Protect exposed skin with an appropriate sun-screen. A sun-screen with a sun protection factor (SPF) of 15 or greater is recommended for a full day in the sun.

5.8 SLIPS, TRIPS, FALLS, AND PROTRUDING OBJECTS

Hazards from protruding objects, careless movements, or placement of materials on paths or foot traffic areas present a problem with regard to slips, trips, falls, and puncture wounds. Personnel will use a reasonable amount of effort to ensure the prevention of such injuries.

5.9 HAZARDOUS NOISE ENVIRONMENTS

Working around large equipment often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary and/or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities.

The Health and Safety Professional will monitor employee exposure to hazardous noise levels from time to time as part of the hearing conservation program (see Section 6.2). However, for the purposes of this plan, hearing protection will be worn at all times when normal conversation becomes difficult at distances of 3 feet or less.

5.10 UNDERGROUND UTILITIES

Various forms of underground utility lines or pipes may be encountered during site activities. Prior to the start of intrusive operations, geophysical clearance is mandated, as well as obtaining authorization from all concerned public and base utility department offices. Should intrusive operations cause equipment to come into contact with utility lines, the SSO and the Health and Safety Manager will be notified immediately. Work will be suspended until the appropriate actions for the particular situations can be taken.

5.11 ELECTRICAL SAFETY

Electrical safety practices to prevent electrical injuries to employees and to protect EARTH TECH property will be utilized at all times. This is primarily concerned with electrical power service equipment, electrical distribution systems and testing and trouble shooting electronic equipment

5.11.1 Instructions

The following instructions will be followed during all work activities where energized electrical equipment is exposed:

1. Observe all equipment operating procedures as recommended by manufacturers.
2. Appropriately ground all electrical equipment.
3. Provide standard warning signs to identify the electrical hazards, their exact location and actions necessary to avoid the hazard.
4. Observe good housekeeping practices at all times. Give attention to keeping work areas clear around switches, terminals, controls, etc.
5. Identify circuit breakers and cut-off switches to indicate equipment controlled.
6. Do not perform work on electrical or electronic equipment unless adequately illuminated.
7. Use protective equipment such as rubber mats, rubber gloves, and insulated tubing wherever operations warrant.
8. Wear approved eye and face protection while working around high voltages.

5.11.2 Treatment in Case of Injury

The nearest medical treatment facility is notified in all cases involving injury from electrical shock. The employee is not permitted to resume work until given clearance by the Health and Safety Manager after consultation with EARTH TECH's occupational physician.

5.12 EQUIPMENT LOCKOUT

This section establishes the minimum requirements for lockout of energy sources that could cause injury to personnel due to unexpected energizing, start-up, or release of stored energy during the operation, repair, or maintenance of equipment or a process.

Where complexity of the equipment/process requires a more comprehensive procedure, it shall be developed and included as part of the site-specific safety guidance document.

Only authorized employees shall perform the lockout procedure. All authorized employees shall receive training in recognition of the applicable hazardous energy sources and in adequate methods and means for their isolation.

Employees authorized to perform lockout shall be certain as to which switch, valve, or other energy-isolating devices apply to the equipment being locked out. More than one energy source (electrical, mechanical, etc.) may be involved. Any questionable identifications of sources shall be cleared by project management.

5.12.1 Instructions

The following lock-out procedures shall be observed:

1. Notify all affected employees of the need and requirement for a lockout.
2. Shut down operating equipment by normal stopping procedures (depress stop button, open toggle switch, etc.).

Make sure power sources (electrical, mechanical, hydraulic, etc.) are disconnected or isolated from the equipment. Stored energy, such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc., must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.

Lockout the energy-isolating devices with an assigned individual lock. If the device(s) cannot accommodate a lock, contact the site safety officer to approve any alternate methods of protection or warning (e.g., tagout, barricade, etc.).

After ensuring that no personnel are exposed, and to ensure that all energy sources have been disconnected, operate the push button or other normal operating controls to make certain the equipment will not operate.

CAUTION: Return operating control to neutral position after the test.

5.12.2 Restoring Equipment to Service

When the operation is complete and equipment is ready for testing or normal service, check the equipment area to see that no one is exposed. When the equipment is all clear, remove all locks. The energy-isolating devices may be operated to restore energy to equipment.

SPECIAL CAUTION: When restoring pressurized air to an equipment/process, keep all personnel clear of machine pinch points.

5.12.3 Procedure Involving More Than One Person

If more than one individual is required to lock out equipment, each individual involved shall place his or her own personal lock on the energy isolating device(s). The SSO may lock out equipment for all of the personnel. In such cases, it shall be the responsibility of the SSO to carry out all steps of the lockout practice and inform the field personnel when it is safe to work on the equipment. Additionally, the SSO shall not remove any locks until it has been verified that all individuals are clear.

6.0 MONITORING PLAN

This section of the Health and Safety Plan outlines monitoring strategies and analytical methods which can be used to assess employee exposure to chemical and physical hazards. Monitoring will consist primarily of on-site determination of various parameters (airborne contaminant concentrations, heat stress effects, etc.), but may be supplemented by more sophisticated monitoring techniques where necessary.

6.1 AIRBORNE CONTAMINANT CONCENTRATIONS

To assess the concentrations of airborne organic vapors that may be released during soil sampling, removal and handling activities, monitoring will be accomplished both in worker breathing zones and at the boundaries of the Exclusion Zone. Monitoring will be conducted using the instrumentation specified in Table 6-1.

TABLE 6-1 Air Contaminant Monitoring Instrumentation

INSTRUMENT	MANUFACTURER/MODEL	SUBSTANCES DETECTED
Flame Ionization Detector (FID) (Required)	Foxboro OVA 108 Foxboro OVA 128	Combustible/organic vapors and gases, hydrocarbons
Photo Ionization Detector (PID) (Adequate substitute for FID)	H-Nu PI-101 Photovac MicroTIP MSA Photon Thermo Environmental OVM	Chlorinated (TCE) and aromatic hydrocarbons
Detector Tube Kit (Required)	Draeger 81-01841	Benzene only 0.5-10 ppm
Multi gas Detector (Required)	Neotronics Exotox-55 ISC TMX-410 GasTech GX-91 MSA 360 or 361	Oxygen, %LEL (combustible and flammable vapors and gases), hydrogen sulfide, and methane

TABLE 6-2 Monitoring Program Action Levels

PARAMETER	LOCATION AND INTERVAL	RESPONSE LEVEL	RESPONSE
Hydrocarbons (Total by FID or PID)	Breathing zone, every 15 minutes during intrusive work or contaminated soil handling	< 10 ppm	Continue Level D/modified D work and continue monitoring
Hydrocarbons (Total by FID or PID)	Breathing zone, every 15 minutes during intrusive work or contaminated soil handling	10 - 15 ppm above background	Monitor for benzene in the breathing zone. Continue work in Level D/modified D unless benzene is indicated.
Hydrocarbons (Total by FID or PID)	Breathing zone, every 15 minutes during intrusive work or contaminated soil handling	15 - 50 ppm above background	Contact SSO, upgrade PPE to Level C, organic vapor cartridge
Hydrocarbons (Total by FID or PID)	Breathing zone, every 15 minutes during intrusive work or contaminated soil handling	> 50 ppm	Cease work, exit, and contact SSO
Hydrocarbons (Total by FID or PID)	Edge of Exclusion Zones, every 15 minutes during intrusive work	< 10 ppm	Continue work and continue monitoring
Hydrocarbons (Total by FID or PID)	Edge of Exclusion Zones, every 15 minutes during intrusive work	> 10 ppm	Cease work and contact the SSO
Benzene (Draeger 81-01841 Benzene 0.5/c)	Breathing Zone, every 30 minutes as indicated by hydrocarbon monitoring	No color change noted	Continue Level D/modified D work and continue monitoring
Benzene (Draeger 81-01841 Benzene 0.5/c)	Breathing zone, every 30 minutes as indicated by hydrocarbon monitoring	Color change noted	Contact SSO, upgrade PPE to Level C, organic vapor cartridge
Hydrogen Sulfide (Multi gas detector)	Breathing zone continuously during any confined space entry	< 7 ppm	Continue work in specified PPE
Hydrogen Sulfide (Multi gas detector)	Breathing zone continuously during any confined space entry	> 7 ppm	Exit immediately and contact the SSO. Continue work only in Level B PPE
Explosivity (%LEL)	As necessary during intrusive operations and confined space entry	< 10% LEL	Continue work and continue monitoring
Explosivity (%LEL)	As necessary during intrusive operations and confined space entry	> 10% LEL	Cease work, exit, and contact SSO

6.1.1 Work Space (Exclusion Zone) Monitoring

Workplace monitoring must be sufficient to properly characterize employee exposures, and provide knowledge of work location conditions in enough detail to determine PPE requirements as work progresses. Required monitoring procedures, instrumentation, frequency and locations are specified in Table 6-2, along with response actions based upon monitoring results.

In general, monitoring will be used to evaluate worker breathing zone concentrations of site contaminants as a measure of exposure potential and for determination of the need for changes in specified respiratory protection. Evaluation of specific Work space areas (confined spaces, trenches, etc.) can also be required (see Table 6-2 and hazard-specific guidance provided in Section 5.0). In addition, monitoring for explosive conditions shall be conducted as specified in Table 6-2.

6.1.2 Work Area Boundary Monitoring

Monitoring will be conducted to assess release of contaminants to the surrounding "community" (the area, and anyone in it, not within the controlled work area(s) related to this project). Release of contaminants to the community can be monitored through determination of airborne levels of contaminants present at the boundary of the controlled area(s). This evaluation will be conducted using the same direct reading instrumentation employed for Work space evaluation (see Section 6.1.1 and Table 6-1). Monitoring results will be evaluated against the appropriate action level criteria specified in Table 6-2. In the event that concentrations of contaminants released at the work area boundary exceed established action levels, appropriate mitigation measures will be implemented as directed by the SSO/Field Supervisor, or onsite work will cease.

6.2 NOISE EXPOSURE

Exposure to excessive noise can damage hearing ability and cause permanent hearing loss. It is the intent of EARTH TECH to prevent permanent hearing loss from noise exposure.

When noise levels exceed 85 decibels on the A-weighted scale (85 dBA), workers will use appropriate hearing protection. All EARTH TECH field personnel who are medically monitored participate in a

hearing conservation program. This program is mandatory for employees whose 8-hour equivalent noise exposure exceeds 85 dBA ($L_{eq} > 85$ dBA). The hearing conservation program includes the following elements:

- Baseline survey of noise exposures.
- Baseline audiometric testing.
- Annual audiometric testing.
- Annual training on the use and need for hearing protection.
- Distribution of hearing protectors to employees in the program.
- Maintenance of records.

6.3 HEAT STRESS MONITORING

In hot, sunny environments there is a high potential for heat stress to pose a significant safety hazard to workers. This is especially true where the use of mandated protective clothing will limit the body's ability to dissipate excess heat through evaporation of sweat. To mitigate the effects of heat stress, it will be necessary to establish a work routine that incorporates appropriate rest periods to allow workers to remove protective clothing, drink fluids (vital when extreme sweating is occurring) and rest. The frequency and length of such work breaks must be determined by the individual work location supervisor based upon factors such as the ambient temperature and sunshine, the amount of physical labor being performed, the physical condition of the workers, and protective clothing being used. In any case, breaks must be sufficient to prevent workers from manifesting symptoms of heat stress, which can include irritability, confusion, lethargy, and headache.

Workers should be encouraged to immediately report any difficulties or heat-related problems that they may experience or observe in fellow workers. Supervisors should use such information to alter the work-break schedule to accommodate such problems. During breaks, workers should be encouraged to drink plenty of water or other liquids to replace lost fluids and to help cool off. Should any worker exhibit signs of severe heat distress, such as profuse sweating, extreme confusion and irritability, or pale, clammy skin, that worker should be relieved of all duties at once and made to rest in a cool location and drink plenty of water. Anyone exhibiting symptoms of heat stroke (red, dry skin, or unconsciousness) should be taken immediately to the nearest medical facility, taking steps to cool the person during

transportation (clothing removal, wet the skin, air conditioning, etc.). Heat stroke is a life threatening condition that must be treated by competent medical authority.

6.4 PERSONAL SAMPLING

Measurement of employee exposure to chemical contaminants will be performed at the discretion of the Health and Safety Professional. Monitoring techniques will also be determined by the Health and Safety Professional, and will conform with applicable OSHA and NIOSH sampling methods. Samples will be collected by, or under the direction of, a member of the EARTH TECH Health and Safety Department. Any analytical laboratory performing analysis of personal samples shall be accredited by the American Industrial Hygiene Association (AIHA) and be a participant in the AIHA Proficiency Analytical Testing (PAT) program.

6.5 MAINTENANCE AND CALIBRATION OF EQUIPMENT

All monitoring equipment will be maintained and calibrated in accordance with manufacturer recommendations. All pertinent data will be logged in a health and safety logbook and maintained on site for the duration of site activities. Calibration of all monitoring equipment will be performed daily.

Where personal sampling is performed, the EARTH TECH Health and Safety Department will be responsible for informing employees and subcontractors of their monitoring results to comply with OSHA regulations and good occupational health practices. Within 5 working days after the receipt of monitoring results, the Health and Safety Department will notify each employee, in writing, of the results which represent that employee's exposure.

Whenever the results indicate that employee exposure exceeds the permissible exposure limits, notification shall be provided to affected employee stating that the permissible exposure limit was exceeded and providing a description of the corrective action taken to reduce exposure to a level below the PEL. Results of monitoring for other hazardous and harmful physical agents shall also be reported to employees in the same manner.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 PERSONAL PROTECTIVE CLOTHING

The harmful effects that chemical substances may have on the human body often necessitate the use of protective clothing. Proper selection of personal protective equipment (PPE) depends upon a number of factors. Protection against different types of chemicals and differing concentrations of those substances can be quite varied. The tasks to be performed and the probability of exposure to the substance must also be considered when specifying protective clothing.

Once the specific hazard has been identified, appropriate clothing can be selected. The protection level assigned must match the hazard confronted. Protective clothing ensembles range from safety glasses, hard hats, and safety shoes to fully encapsulating suits with a supplied source of breathing air. Selection of appropriate PPE are specified in the task hazard analyses found in Section 5.2, and upgrade criteria are based upon on-site monitoring results are presented as Table 6-2. In addition, Section 7.2 provides additional guidance concerning the appropriate levels of protection which should be utilized during site activities.

7.1.1 Head Protection

Employees will wear hard hats if the potential exists for exposure to flying or falling objects, or when working around heavy equipment. Hard hats are mandatory when working in Exclusion Zones to provide protection during operation of drill rigs and other heavy equipment. Ear protection and face shields may be attached to hard hats.

7.1.2 Eye Protection

Eye protection will be worn inside the Exclusion Zones at all times. Due to the limited potential for high velocity impact hazards associated with the activities, the use of sunglasses will be permitted at the work sites. Wire framed sunglasses used for eye protection will not be permitted at any time. Subcontractor employees who do not have suitable eye protection will have an appropriate type of eye protection provided to them by their respective employers.

Eye protection will meet the following minimum requirements:

- Provide adequate protection against the particular hazards for which they are designed
- Be reasonably comfortable when worn under the designated conditions
- Fit snugly and not unduly interfere with the wearer's movements
- Be durable
- Be easily cleaned and disinfected.

Contact lenses do not provide adequate eye protection. Contact lens wearers must use the same additional eye protection as for non-lens wearers. Contact lenses may be worn under full-face respirators, but are generally not acceptable with half-mask respirators.

Persons whose vision requires correction and are required to wear eye protection may wear goggles or spectacles of one of the following types:

- Spectacles whose protective lenses provide optical correction (Rx).
- Goggles that can be worn over corrective (Rx) spectacles without disturbing the adjustment of the spectacles.
- Goggles that incorporate corrective (Rx) lenses mounted behind the protective lenses.

7.1.3 Ear Protection

Appropriate hearing protection, including ear plugs, canal caps, and ear muffs, will be provided when noise may be a problem, such as around heavy machinery, power support equipment, and impact tools. Employees who may be exposed to hazardous noise must be participants in a hearing conservation program which meets the requirements of 8 CCR §5096-5100 (29 CFR 1910.95).

7.1.4 Foot Protection

Employees will wear appropriate foot protection while working on site, which will consist of leather or water- and chemical-resistant boots with safety toes. Footwear (including leather work boots and chemical-resistant boots) must meet the specifications of ANSI Z41.1-1969, which is the standard for industrial footwear with safety toes. Protection against liquid hazardous chemicals requires boots of neoprene, polyvinyl chloride (PVC), butyl rubber, or other material selected for resistance to the specific chemical. For tasks where contact with contaminated materials is expected to be slight or nonexistent, leather work boots with safety toes are appropriate.

7.1.5 Hand Protection

Employees will use appropriate hand protection when exposed to hazards that could cause injury to the hands. Gloves must resist puncturing and tearing as well as provide any necessary chemical resistance.

Protective clothing will be worn over glove cuffs to prevent any liquid from spilling into the gloves. A pair of inner gloves adds an extra layer of protection for the hands during the removal of outer gloves and other chemically protective items and will be worn at all times when outer protective gloves are required. Where necessary heavy leather gloves may be worn over chemical protective gloves when doing heavy work. If they become contaminated, they will be discarded because leather is difficult to decontaminate.

7.1.6 Respiratory Protection

The use of respiratory protection is not anticipated for this project, and will not be allowed without the concurrence of the Health and Safety Professional. If respiratory protection is used the following requirements will be enforced:

- Only personnel who have been trained to wear and maintain respirators properly shall be allowed to use respiratory protection.
- Only properly cleaned, maintained, NIOSH-approved respirators shall be used on site.

- Selection of respirators will be made by the Health and Safety Professional or his designee. On-site any decisions regarding upgrading or downgrading of respiratory protection will be made by the SSO based upon site conditions and requirements specified in Table 6-2.
- Used air-purifying cartridges shall be replaced at the end of each shift. Powered Air-Purifying Respirator (PAPR) cartridges will be changed when flow falls below 4 cfm through the cartridge.
- Positive and negative pressure tests shall be performed each time the respirator is donned.
- Only personnel who have been fit tested within the last 12 months will be allowed to work in atmospheres where respirators are required. Subcontractors shall provide certificates of a respirator fit test completed within the last 12 months for each employee on site.
- Respirator users shall be instructed in the proper use and limitations of respirators.
- If an employee has difficulty in breathing during the fit test or during use, he/she shall be evaluated medically to determine if he/she can wear a respirator safely while performing assigned tasks.
- No employee shall be assigned to tasks requiring the use of respirators if, based upon the most recent examination, a physician determines that the health or safety of the employee will be impaired by respirator use.
- Air-supplied respirators shall be assembled according to manufacturer's specifications. Hose length, couplings, valves, regulators, manifolds, and all accessories shall meet American National Standards Institute (ANSI) and the manufacturer's requirements.
- Respirators shall be cleaned and sanitized daily after use.
- Respirators shall be inspected during cleaning. Worn or deteriorated parts shall be replaced.
- Facial hair that might interfere with a good face piece seal or proper operation of the respirator is prohibited.
- When respiratory protection is in use, the SSO shall review the respiratory protection program daily to ensure employees are properly wearing and maintaining their respirators and that the respiratory protection is adequately protecting the employees.

7.1.7 Body Protection

Protective clothing and body protection is selected on the basis of the tasks to be performed and the hazards, both chemical and physical, to which the worker may be exposed. For all work areas, including the "clean" support and administrative areas, appropriate work clothing will be worn that at least covers from the knees to shoulders. Tank and halter tops are not appropriate. Bathing suits, shorts, and cut-off pants are not appropriate.

In more hazardous work areas, substantial pants and long sleeves are appropriate. Chemical-protective body protection will be selected using predicted chemical exposures and the clothing manufacturer's chemical-specific permeation and degradation information to provide optimum protection.

7.2 CHEMICAL PROTECTIVE ENSEMBLES

Often, personal protective equipment is required for protection from more than one hazard. Common assemblies of personal protective equipment have evolved in the hazardous waste practice.

The designated levels of protection are, in increasing complexity: D, C, B, and A. These ensembles provide progressively increasing protection against chemical hazards. The specific equipment comprising each level of protection will vary slightly, but are defined primarily by the type of respiratory protective equipment used, and secondly by skin protection.

The information presented below consists of a description of each level of protection and the typical PPE associated with that level. Variations of the PPE requirements for each task associated with this project are outlined in Table 7-1.

7.2.1 Level D

Level D protection is the lowest level of personal protection allowed on hazardous waste sites. Respiratory protection is not required, as the atmosphere is assumed to be breathable and uncontaminated.

Hard hats are required if there is the potential for overhead hazards, especially around heavy equipment (drill rigs). A face shield and/or safety glasses will also be worn.

During site activities, Level D protection will be the primary level of protection worn during all operations where contact with contaminated materials is unlikely (e.g., geophysical testing). Upgrading to greater levels of protection will be executed as required in the monitoring guidelines outlined in Table 6-2.

Table 7-1 Task Specific PPE Guidance

Activities to be performed:			
<input checked="" type="checkbox"/> Borehole Installation	<input checked="" type="checkbox"/> Excavating & Sampling	<input checked="" type="checkbox"/> Well Sampling	<input checked="" type="checkbox"/> Well Installation/Development
<input type="checkbox"/> Sediment/Surf. H ₂ O Samp.	<input type="checkbox"/> Oil/Water Sep. Sampling	<input checked="" type="checkbox"/> Site Reconnaissance	<input type="checkbox"/> Hand Augering/Soil Sampling
<input type="checkbox"/> Drum Sampling	<input type="checkbox"/> Catch Basin Sampling	<input type="checkbox"/> Soil Gas Testing	<input type="checkbox"/> Other: _____
Site Reconnaissance: Level D			
<input checked="" type="checkbox"/> Typical Work Uniform	<input type="checkbox"/> Outer Protective Gloves	<input type="checkbox"/> Tyvek® Coveralls	<input type="checkbox"/> Safety-Toe Rubber Boots
<input checked="" type="checkbox"/> Hard Hats	<input type="checkbox"/> Polycoated Tyvek®	<input checked="" type="checkbox"/> Safety-Toe Boots	Safety Glasses/Face Shield
<input type="checkbox"/> Nomex® Coveralls	<input type="checkbox"/> Inner Protective Gloves	<input type="checkbox"/> Hearing Protection	
Borehole Installation: Modified Level D			
<input checked="" type="checkbox"/> Typical Work Uniform	<input checked="" type="checkbox"/> Outer Protective Gloves	<input checked="" type="checkbox"/> Tyvek® Coveralls*	<input checked="" type="checkbox"/> Safety-Toe Rubber Boots
<input checked="" type="checkbox"/> Hard Hats	<input type="checkbox"/> Polycoated Tyvek®	<input type="checkbox"/> Safety-Toe Boots	<input checked="" type="checkbox"/> Safety Glasses/Face Shield
<input type="checkbox"/> Nomex® Coveralls	<input checked="" type="checkbox"/> Inner Protective Gloves	<input checked="" type="checkbox"/> Hearing Protection	
Well Installation: Modified Level D			
<input checked="" type="checkbox"/> Typical Work Uniform	<input checked="" type="checkbox"/> Outer Protective Gloves	<input checked="" type="checkbox"/> Tyvek® Coveralls*	<input checked="" type="checkbox"/> Safety-Toe Rubber Boots
<input checked="" type="checkbox"/> Hard Hats	<input type="checkbox"/> Polycoated Tyvek®	<input type="checkbox"/> Safety-Toe Boots	<input checked="" type="checkbox"/> Safety Glasses/Face Shield
<input type="checkbox"/> Nomex® Coveralls	<input checked="" type="checkbox"/> Inner Protective Gloves	<input checked="" type="checkbox"/> Hearing Protection	
Well Development: Modified Level D			
<input checked="" type="checkbox"/> Typical Work Uniform	<input checked="" type="checkbox"/> Outer Protective Gloves	<input checked="" type="checkbox"/> Tyvek® Coveralls	<input checked="" type="checkbox"/> Safety-Toe Rubber Boots
<input checked="" type="checkbox"/> Hard Hats	<input type="checkbox"/> Polycoated Tyvek®	<input type="checkbox"/> Safety-Toe Boots	<input checked="" type="checkbox"/> Safety Glasses/Face Shield
<input type="checkbox"/> Nomex® Coveralls	<input checked="" type="checkbox"/> Inner Protective Gloves	<input checked="" type="checkbox"/> Hearing Protection	
Well Sampling: Modified Level D			

Activities to be performed:

- | | | | |
|--|---|---|---|
| <input checked="" type="checkbox"/> Borehole Installation | <input checked="" type="checkbox"/> Excavating & Sampling | <input checked="" type="checkbox"/> Well Sampling | <input checked="" type="checkbox"/> Well Installation/Development |
| <input type="checkbox"/> Sediment/Surf. H ₂ O Samp. | <input type="checkbox"/> Oil/Water Sep. Sampling | <input checked="" type="checkbox"/> Site Reconnaissance | <input type="checkbox"/> Hand Augering/Soil Sampling |
| <input checked="" type="checkbox"/> Typical Work Uniform | <input checked="" type="checkbox"/> Outer Protective Gloves | <input checked="" type="checkbox"/> Tyvek® Coveralls | <input checked="" type="checkbox"/> Safety-Toe Rubber Boots |
| <input checked="" type="checkbox"/> Hard Hats | <input type="checkbox"/> Polycoated Tyvek® | <input type="checkbox"/> Safety-Toe Boots | <input checked="" type="checkbox"/> Safety Glasses/Face Shield |
| <input type="checkbox"/> Nomex® Coveralls | <input checked="" type="checkbox"/> Inner Protective Gloves | <input type="checkbox"/> Hearing Protection | |

Other H&S considerations: * - Tyvek Coveralls need not be donned during well installation and drilling activities until drilling depth reaches 10 feet above groundwater or Level C upgrade conditions are encountered.

Criteria for Selection of Level D Protection

The use of Level D protective equipment is permissible if all of the following conditions are met:

1. Total hydrocarbon and other contaminant concentrations have not been measured above the Level C upgrade action levels specified in Table 6-2.
2. Work functions preclude splashes, immersion, significant skin contact or potential for unexpected inhalation of any chemical contaminants.

Level D protection is primarily a work uniform. It can be worn in areas where only boots may be slightly contaminated, and there are no inhalable toxic substances.

Typical Level D Equipment List

Hard hat

Safety glasses/face shield

Safety-toed work boots

Hearing protection (as required)

Full-face air purifying respirator (available for emergency use).

7.2.2 Modified Level D

If the potential exists for contact with chemical contaminants (e.g., splashes, "dirty operations," etc.), however the respiratory hazard is low, the use of a Modified Level D ensemble is appropriate. Modified Level D consists of protective clothing to preclude hazards due to contact with contaminated materials, but does not provide increased respiratory protection. The use of protective clothing in a Modified Level D ensemble can also serve to aid in personal cleaning and decontamination efforts through the use of disposable outer protective garments.

The use of Modified Level D PPE will be required for on-site operations where contact with contaminated soils can be expected (i.e., hand augering, sample collection, excavation activities, soil handling/containerization).

Typical Modified Level D Equipment List

Chemical-resistant disposable outer coveralls (e.g., Tyvek™ or polyethylene-coated Tyvek™ coveralls)

Chemical-resistant (e.g., nitrile) outer gloves (taped to outer coveralls)

Chemical-resistant (e.g., nitrile) inner gloves

Butyl apron (optional, for use where splash potential is high)

Hard hat

Safety glasses/face shield

Chemical-resistant safety boots (taped to outer coveralls)

Hearing protection (as required)

Full-face air purifying respirator (available for emergency use).

7.2.3 Level C

Level C protection is defined by the use of a full-face, air-purifying respirator. This level of protection can be used when low levels of contaminants of a known nature are present, sufficient oxygen is available, and contaminants are not considered immediately dangerous to life or health (IDLH).

Due to the low volatility of the expected site contaminants, the use of Level C PPE is not anticipated.

Typical Level C Equipment List

Full-face air-purifying respirator equipped with organic vapor/acid gas/high-efficiency particulate air cartridges

Chemical-resistant disposable outer coveralls (e.g., Tyvek™ or polyethylene-coated Tyvek™ coveralls)

Chemical-resistant (e.g., nitrile or Silver Shield®) outer glove (taped to outer coveralls)

Chemical-resistant (e.g., nitrile) inner gloves

Butyl apron (optional, for use where splash potential is high)

Hard hat

Chemical resistant safety boots (taped to coveralls)

Hearing protection (as required)

Self-contained breathing apparatus (available for emergency use).

7.2.4 Level B

The need for the use of Level B protective equipment during site activities is considered to be highly unlikely. Should on-site monitoring indicate that Level C PPE is inadequate, the SSO will contact the Health and Safety professional for further guidance. Upgrade to Level B PPE will not be permitted without the concurrence of the Health and Safety Professional, and the preparation of supplemental Health and Safety requirements addressing the additional procedures which will be observed.

7.2.5 Level A

The use of Level A protective equipment is not permissible for this project. Where the use of Level B equipment is insufficient, all work operations will cease and the Health and Safety Professional shall be contacted for appropriate response procedures.

8.0 DECONTAMINATION

Decontamination of equipment and personnel will be performed to control the contaminant migration from hazardous waste site operations.

Decontamination involves the physical removal and/or neutralization of harmful contaminants. The extent of decontamination depends on the hazard and the quantities of the contaminant.

Contamination can occur from:

- Contacting vapors, gases, mists, or air particulates
- Splashes while sampling or opening containers
- Walking or driving through puddles or on contaminated soil
- Handling contaminated instruments or equipment
- Assisting contaminated personnel during routine operations, decontamination procedures, and emergencies
- Chemicals used for the decontamination of equipment.

All decontamination will be performed by personnel wearing protective gear appropriate for the level of decontamination as determined by the SSO. The decontamination work tasks may be split or rotated among support and work crews.

8.1 DECONTAMINATION PROCEDURES

Contamination reduction procedures appropriate for the existing work area will be developed and specified by the SSO. Such procedures must be in place before site operations begin, and they must remain in place (modified as necessary) throughout the period of activity. Wherever possible, the need

for decontamination should be reduced through work practices that minimize contact with contaminants. Personnel should avoid walking through heavily contaminated areas, should not kneel or directly touch contaminated materials, and should use remote handling and sampling techniques when feasible.

Decontamination will be performed only in designated areas. Separate areas may be set up for equipment and personnel. A Contamination Reduction Corridor will be established at each station. Personnel and equipment must move through this corridor during all phases of the decontamination process.

8.2 DECONTAMINATION HAZARDS

Contamination on the upper areas of protective clothing pose a greater risk to the worker because volatile compounds could make breathing hazardous both for the worker and for the decontamination personnel. There is also an increased probability of contaminant contact with the skin when the worker is doffing the upper part of the clothing.

Disposable items (Tyvek™ coveralls, inner gloves, and latex over boots) must be replaced as they become heavily soiled, torn at any portion, or when personnel break for extended periods of time. Dual respirator canisters will be changed as deemed appropriate by site air monitoring data, personnel determination of contaminant breakthrough, or as specified by the Health and Safety Department.

The assigned level of protection for a site also impacts the complexity of the decontamination effort. The higher the level of protection, the more equipment must be managed with every site entry or exit. Additional personnel must be available to handle the equipment load and the standby emergency response duties.

8.3 CONTAMINATION REDUCTION CORRIDOR

A decontamination corridor is a pathway established for the egress of personnel and equipment from the Exclusion Zone to the support zone (Section 8.9.2). As one moves through the decontamination corridor,

one must observe the required steps for decontamination, one at a time, in sequence as specified by the SSO.

Exit from the Exclusion Zone is only through this pathway. A separate pathway into the Exclusion Zone may be established. Control over entry and egress traffic is handled by the SSO, or the designated work site safety representative.

8.4 PERSONNEL DECONTAMINATION

Decontamination procedures are carried out on all personnel leaving hazardous waste sites. Under no circumstances (except emergency evacuations) will personnel be allowed to leave the site without decontamination.

Decontamination of personnel should be performed at the Personal Decontamination Station on the site and should consist primarily of soap and water washing and water rinse of exterior protective gear to remove contaminants, followed by doffing of the gear. Coveralls should be removed by turning the clothing inside out. A procedure appropriate to the degree of contamination should be established. The extent of washing required, or modifications to the sequence, may be specified as appropriate.

8.4.1 Level D Personnel Decontamination

Personnel exiting the Exclusion Zone while site activities require the use of Level D PPE (as outlined in Section 7.2.1) will perform decontamination in accordance with the following guidelines:

- Place tools, instruments, samples and trash at an appropriate location. The equipment drop area should be clean and dry and at a minimum, plastic bags should be available for trash. Waste PPE will not be placed in the same containers as general trash
- Inspect equipment, samples, and if applicable, tools for signs of residual amounts of contamination or excessive soil buildup. If present, soils and contamination must be

completely cleaned off of equipment, samples, and tools prior to removal from the Exclusion Zone areas

- Personnel will visually check themselves for signs of excessive soils and possible contamination. If observed, soils and contamination will be completely removed before further decontamination is performed
- Prior to exiting the Exclusion Zone areas, personnel will wash their hands with soap and water in order to minimize the potential for contaminant exposure.

8.4.2 Modified Level D Personnel Decontamination

Where activities are performed in Modified Level D PPE (as outlined in Table 7-1) personnel will perform decontamination using the following guidelines:

- Place tools, instruments, samples and trash at an appropriate location. The equipment drop area should be clean and dry and at a minimum, plastic bags should be available for trash. Waste PPE will not be placed in the same containers as general trash
- Inspect equipment, samples, and if applicable, tools for signs of residual amounts of contamination or excessive soil buildup. If present, soils and contamination must be completely cleaned off of equipment, samples, and tools prior to removal from the exclusion zone areas
- Personnel will visually check themselves for signs of excessive soils and possible contamination. If observed, soils and contamination will be completely removed before further decontamination is performed
- Wash and rinse outer work gloves and boots (boot covers) with soap and water
- Wash/brush off outer protective coverall (Tyvek™)
- Untape wrists and ankles
- Remove outer work gloves and place them in an appropriate container specified for waste PPE
- Remove outer Tyvek™ coveralls and place them in an appropriate container specified for waste PPE

- Wash, rinse, and remove inner protective gloves and place them in an appropriate container specified for waste PPE
- Wash hands using soap and water (separate from other decontamination cleaners/solutions).

8.4.3 Level C Personnel Decontamination

Personnel involved in Site Activities which require the use of Level C PPE (see Table 7-1) will observe the decontamination procedures outlined below. These guidelines consist of the following:

- Place tools, instruments, samples and trash at an appropriate location. These areas should be clean and dry, and at a minimum contain plastic bags for trash. Waste PPE will not be placed in the same containers as general trash.
- Inspect equipment, samples and if applicable, tools for signs of residual amounts of contamination or excessive soil buildup. If present, soils and contamination must be completely cleaned off of equipment, samples and tools prior removal from the exclusion zone areas.
- Personnel will visually check themselves for signs of excessive soils and possible contamination. If observed, soils and contamination will be completely removed before further decontamination is performed.
- Wash and Rinse outer work gloves and boots (boot covers) with soap and water
- Wash/brush off outer protective coverall (Tyvek)
- Untape wrists and ankles
- Remove outer work gloves and place them in an appropriate container specified for waste PPE.
- Remove outer Tyvek coveralls and place them in an appropriate container specified for waste PPE.
- Remove respirator mask (also goggles if worn).
- Wash, rinse, and remove inner protective gloves and place them in an appropriate container specified for waste PPE.
- Wash hands using soap and water (separate from other decontamination cleaners/solutions).

8.5 EQUIPMENT DECONTAMINATION

Equipment to be decontaminated includes heavy equipment, tools, monitoring equipment, sampling equipment, and sample containers; trucks and trailers; and the decontamination equipment itself when the decontamination is closed down.

Before entering the site, all equipment will be cleaned to remove grease, oil, encrusted dirt, or other potential contaminants. Wherever possible, gross contamination of equipment will be removed in the Exclusion Zone prior to bringing equipment back to the Contamination Reduction Corridor.

General equipment decontamination consists of a soap and water wash, and a water rinse. If soap and water alone cannot remove contamination, additional procedures may be used such as a solvent rinse/wipe or steam cleaning.

Tools: Tools will be dropped into a plastic pail, tub or other container in the Exclusion Zone. They will be brushed off, rinsed, and transferred into a second pail to be carried to the decontamination station. Generally, tools will be washed with a detergent solution, rinsed with methanol and/or hexane, and finally rinsed with clean water.

Avoid using wooden tools; they cannot be adequately decontaminated due to their absorptive properties. If used, wooden tools cannot be removed from the Exclusion Zone until the end of the project, and then only to be disposed of as hazardous waste.

Sampling Equipment: Sampling equipment will be decontaminated before and between sampling to prevent cross contamination, and when the equipment leaves the Exclusion Zone. Sampling equipment may include trowels, shovels, bailers, submersible pumps, geotechnical samplers, sleeves, and backhoes buckets.

All sampling equipment will be decontaminated using an Alconox wash, or equivalent, followed by two clean water rinses. The sampling tool will then be rinsed with deionized or distilled water and air dried.

Heavy Equipment: Trucks, bulldozers, backhoes and other heavy equipment shall be cleaned with high-pressure water or a portable high-pressure steam spray followed by a soap and water wash and rinse. Loose material shall be removed by brush.

All cleaning water should be collected and stored in approved 55-gallon drums or suitable containers and sampled to determine proper disposal options.

Respirator Decontamination: Respirators when worn will be decontaminated daily. Taken from the drop area, the masks will be disassembled, the cartridges set aside or disposed of and the rest placed in a cleansing solution. Personnel will inspect their own masks to be sure of proper strap readjustment for correct fit.

Certain parts of contaminated respirators, such as the harness assembly or cloth components, are difficult to decontaminate. If grossly contaminated, they may have to be discarded, and replaced.

In addition to being decontaminated, all respirators, protective clothing, and other personal articles must be sanitized before they can be used again. The insides of masks and clothing become soiled from exhalation, body oils, and perspiration. The manufacturer's instructions should be followed in sanitizing the respirator mask. If practical, protective clothing should be machine washed after a thorough decontamination. Otherwise, it should be cleaned by hand.

Instruments: Monitoring equipment should be protected as much as possible from contamination. Drape, mask, or otherwise cover as much of the instruments as possible with plastic without hindering the operation of the unit. The HNuTM meter, for example, can be placed in a clear plastic bag that allows reading of the scale and operation of the knobs. The HNuTM sensor can be partially wrapped, keeping the sensor tip and discharge port clear.

Contaminated instruments will be taken from the drop area, their protective coverings removed, and disposed of in appropriate containers. Any remaining dirt or obvious contamination will be brushed or wiped with a damp disposable paper wipe. The units can then be placed in a clean plastic tub, taken inside, wiped with damp disposable wipes and dried.

Be aware that many instrument manufacturers and rental companies will not accept contaminated equipment for repair, and that a heavily contaminated piece of equipment, if improperly handled, may have to be disposed of as hazardous waste.

8.6 DISPOSAL OF DECONTAMINATION WASTES

Solid and liquid decontamination waste should be containerized. Solids may be double bagged, or placed in a sealed drum or similar container. Liquids will be collected during decontamination and placed in sealed containers or pumped into holding tanks for future testing and disposal. Containers must be clearly labeled for content, the operation from which they were filled, and the dates.

8.7 DECONTAMINATION DURING EMERGENCIES

Often during emergencies the need to quickly respond to an accident or injury must be weighed against the risk to the injured party from chemical exposure. It may be that the time lost or the additional handling of an injured person during the decontamination process may cause greater harm to the individual than the exposure that would be received by undressing that person without proper decontamination.

This decision must be made by the SSO. The SSO, as the onsite focus for safety matters, must be familiar with the safety criteria and the logic behind them. Each operation is different, and the risks to personnel from exposure vs. injury are different.

An additional consideration to include when bypassing decontamination of injured personnel is the acceptance of contaminated personnel at emergency facilities. Many facilities will not accept contaminated personnel. Site response personnel should accompany contaminated victims to the medical facility to advise on matters involving decontamination.

8.7.1 Physical Injury

Physical injuries can range from minor to life threatening. Life-saving care should be instituted immediately without considering decontamination. The outside garments can be removed (depending on the weather) if this does not cause delays, interfere with treatment, or aggravate the problem. Respiratory masks and backpack assemblies must always be removed. Fully encapsulating suits or chemical-resistant clothing can be cut away.

If the outer contaminated garments cannot be safely removed, the individual should be wrapped in plastic, rubber, or blankets to help prevent contaminating medical personnel and/or the inside of ambulances. Outside garments are then removed at the medical facility. No attempt should be made to wash or rinse the victim unless it is known that he has been contaminated with an extremely toxic or corrosive material

that could also cause severe injury or loss of life. For minor medical problems or injuries, the normal decontamination procedure should be followed.

8.7.2 Heat Stress

Heat-related illness ranges from heat fatigue to heat stroke, the latter being the most serious. Heat stroke requires prompt treatment to prevent irreversible damage to health or death. Protective clothing may have to be cut off. Less serious forms of heat stress require prompt attention or they may lead to a heat stroke. Unless the victim is obviously contaminated, decontamination should be omitted or minimized and treatment begun immediately.

8.7.3 Chemical Exposure

Chemical exposure can be divided into two categories:

1. Direct contact through either touch (e.g., acid burns) or inhalation.
2. Indirect contact through gross contamination of clothing or equipment.

Injuries from contaminant inhalation can only be treated by qualified physicians. If the contaminant is on the skin or in the eyes, immediate measures must be taken to counteract its effect. First-aid treatment usually involves flooding the affected area with water; however, for a few chemicals, water may cause more severe problems.

When protective clothing is grossly contaminated, contaminants may be transferred to the wearer or to treatment personnel and cause injuries. Unless severe medical problems could be created by splashing, the protective clothing should be washed off as rapidly as possible and carefully removed.

Personnel must be aware of the chemical properties of the site hazards as well as the decon rinse solutions used to prevent cross contamination during the sampling process. Personnel shall discuss with the SSO

the compatibilities of the rinse solutions (e.g., water, methanol, hexane) with the contaminants being removed prior to decon activities.

9.0 SITE CONTROL AND WORK ZONES

Control will be established around each work location to protect untrained or unprotected workers from exposure to contaminants or other hazards. The SSO or his designated work location safety representative will be responsible for delineating these areas based upon requirements set forth in Section 9.1, results of monitoring obtained during work operations, and site-specific conditions (e.g., proximity of roads or buildings and terrain peculiarities).

9.1 GENERAL

Each work crew will use the "buddy system" during all field work activities, unless a specific exemption is made by the Health and Safety Professional. In addition, the following procedures shall be observed:

- Personnel shall not enter any area identified with hazard warning signs.
- When lightning is within 3 miles, field operations shall cease.
- All vehicles must be operated in a safe manner.
- The use of seat belts is mandatory at all times when the vehicle is in operation.
- Personnel will not enter a proposed or existing work area or continue remedial activities if unsafe site conditions are present. This includes the presence of unfriendly people or animals.

Control will be established around each work site to prevent the endangerment of untrained or unprotected workers.

9.2 THE EXCLUSION AND CONTAMINATION REDUCTION ZONES

Work locations where ongoing operations create the potential for contact with or inhalation (above action levels) of contaminants are considered to be limited-access, controlled areas. An **Exclusion Zone** must

be established at each such work location to prevent unauthorized access by personnel when there is the potential for exposure to contaminants. Once work begins, no one will be allowed within the Exclusion Zone without wearing the designated level of protective equipment and meeting the training and medical monitoring requirements specified in this plan.

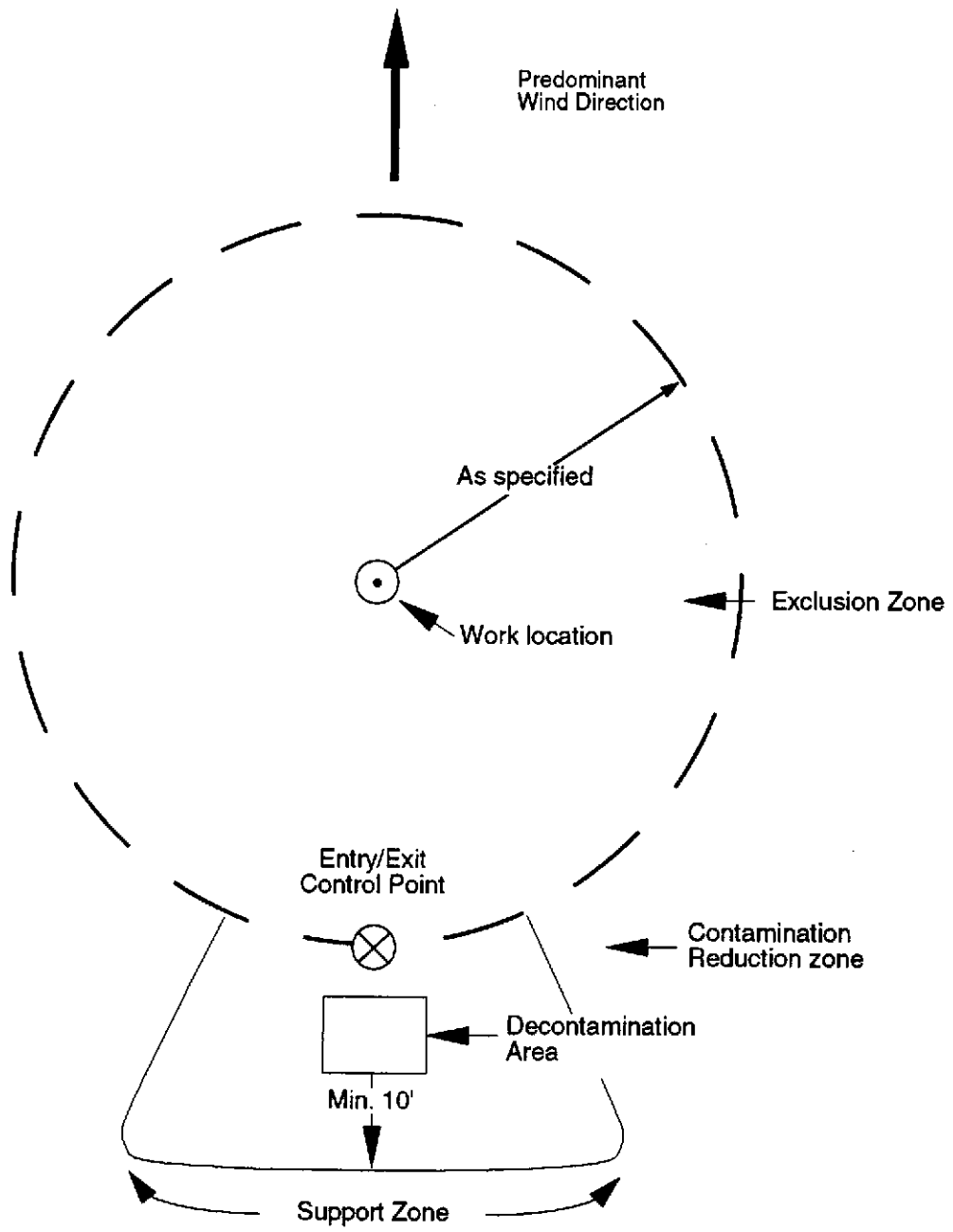
A single entry/exit point should be established at the edge of each Exclusion Zone to facilitate control of personnel entering the area, and as the location for the set-up of decontamination stations outside the Exclusion Zone. An area 10 feet around this decontamination/entry area, but outside the boundary of the Exclusion Zone itself, should be considered as having the potential for exposure to contaminants brought out of the Exclusion Zone by work personnel, and therefore should also be access-controlled. This area will be designated as the **Contamination Reduction Zone (CRZ)**, and should be located upwind from the work location, if possible, or else cross-wind. The CRZ should never be downwind from the work area. Figure 9-1 depicts an example of Exclusion/Contamination Reduction Zone set-up.




Initial requirements for Exclusion Zone set-up are presented here as a guide, however location-specific factors must also be considered. It must be emphasized that Exclusion Zone limits must be sufficient to prevent anyone outside the zone from being exposed to any contaminated materials, or airborne contaminants released during work activities in excess of the action levels established in Table 5-2, as well as physical hazards due to the operations. The CRZ must be large enough to encompass decontamination activities and prevent unauthorized personnel from approaching closer than is safe, typically 10 feet away from all activities (decontamination, etc.) in all directions except toward the Exclusion Zone (where full PPE use is in effect). Typical distances for initial set up of the Exclusion Zone are:

Hand Augering: Ten feet in all directions from the sampling location (using visual control only, no "Caution tape)

Excavation Operations: Thirty feet in all directions from the outer extent of the work location

Bulk Soil Handling and Containerization: Thirty feet in all directions from the outer extent of the work location



Explanation	
	Approximate Center Point
	Traffic Control Entrance
	Exclusion Boundary

Mill Springs Park Apartments		
Typical Work Location Area Control		
Date: 8-95	Health and Safety Plan	
Project No. 68-7157-08	EARTH  TECH	Figure 9-1

Drilling Operations (soil boreholes/well installation): Thirty feet in all directions from the outer extent of the work area

Soil/Groundwater Sampling: Ten feet in all directions from the sampling location (using visual control only, no "Caution tape)

Decontamination: Thirty feet in all directions from the decon location for large (vehicle, drilling equipment, etc.) efforts conducted at a decon pad. For personal and small parts decon conducted at the work location, keep decon activities within the applicable Exclusion/Contamination Reduction Zone established for that operation.

Exclusion Zones should be delineated, where practical, using yellow "CAUTION" tape and/or fencing to provide a physical barrier to any non-site personnel. Placement of vehicles can be used to provide additional security. The use of "CAUTION" tape (or other visible marker) to delineate the CRZ is not required so long as access to the area is limited to work personnel only. Additionally, all personnel should be alert to prevent unauthorized, accidental entrance into controlled-access areas (Exclusion Zones and CRZs). If such an entry should occur, the trespasser should be immediately escorted outside the area, or all work at that location must cease. All personnel, equipment and supplies which enter controlled-access areas must be decontaminated or containerized as waste prior to leaving (through the CRZ only).

At the conclusion of all hazardous work location tasks, controlled areas must be properly cleaned so as to be nonhazardous ("clean") prior to relaxation of entry control procedures and PPE requirements. This will occur at tank removal locations when backfill of the excavation has reached the level of the top of the tank (prior to its removal). Once this occurs, Exclusion Zone requirements and use of chemically protective PPE can be discontinued, however use of Level D PPE will still be required.

9.3 THE SUPPORT ZONE

Areas outside the controlled-access portions of the work location (Exclusion Zones and CRZs) are considered to be the Support Zone. In this area the potential to encounter contamination is highly unlikely.

The Support Zone can be used for set up and storage of all equipment, vehicles and supplies which are not required for immediate use in the Exclusion Zone, and can serve as a work area for all nonhazardous tasks which might be undertaken (e.g., paperwork). A break area will also be designated in the Support

Zone where personnel can eat, drink, and smoke. The break area is the only place at the work location where such activities are permitted. In most instances the boundaries of the Support Zone will not be delineated in any special way, and can be regarded as the general area of the work location which is outside the controlled-access areas.

9.4 COMMUNICATIONS

Effective communication is essential to safe working conditions and the successful completion of the project. External communication is maintained by EARTH TECH using cellular telephone links. Cellular phones will be required during sampling, monitoring activities, excavation/trenching, and all other remedial activities to maximize communications with emergency response units (e.g., police, ambulance teams, fire department, etc.).

9.5 EXCLUSION ZONE CONTROL RECORDS

Exclusion Zone control records will be maintained on a daily basis. Site visitors and personnel who enter the Exclusion Zones should be annotated as part of the work location control records. These records will be recorded and maintained as part of the health and safety records or appropriately annotated in the SSO's Field Log Book. Other information to be recorded will include details concerning monitoring efforts undertaken and results (if available), and unusual events that may occur.

10.0 HEALTH AND SAFETY OPERATING PROCEDURES

10.1 GENERAL

10.1.1 Smoking, Eating, and Drinking

Smoking, eating and drinking will not be permitted inside Exclusion Zones and Contamination Reduction Zones (CRZs) at any time. Field workers will first wash hands and face after leaving Exclusion Zones or CRZs prior to eating or drinking. Consumption of alcoholic beverages is prohibited at the site.

10.1.2 Contact with Contaminated Materials

Field personnel should avoid contact with potentially contaminated substances. They should not walk through puddles, pools, mud, etc., and should avoid, whenever possible, kneeling on the ground and leaning or sitting on equipment or the ground. Monitoring equipment should not be placed on a potentially contaminated surface, including the ground surface.

All field crew members should make use of their senses (all senses) to alert them to potentially dangerous situations, e.g., presence of strong, irritating, or nauseating odors.

10.1.3 Site Awareness

Field crew members shall be familiar with the physical characteristics and requirements of the work site, including:

- Entering Exclusion Zones upwind from contamination sources
- Accessibility to equipment and vehicles
- Communication

- Hot zones (areas of known or suspected contamination)
- Site access
- Emergency procedures and evacuation assembly points
- Location of protective and emergency equipment and relevant first-aid procedures.

The number of personnel and equipment in the contaminated area should be minimized, consistent with site operations.

10.2 SITE HEALTH AND SAFETY MEETINGS

10.2.1 Site Safety Orientation

The SSO will conduct a site safety orientation for every person assigned to the project on the following occasions:

- Before field personnel begin work at the site.
- When there are significant revisions or modifications to the Health and Safety Plan.
- When additional workers or subcontractors begin field work and when authorized visitors are required to enter the Exclusion Zone Areas.

A record of the site safety orientation will be documented by each personnel's signing of the signature page which accompanies each site-specific addendum. Additional meetings, including attendees, will be maintained in the project health and safety file. The Health and Safety Professional will assist the SSO to develop the site safety orientation. As a minimum, the orientation and training meeting agenda must include:

- A review of this Health and Safety Plan and the site-specific safety guidance document.

- Verification of medical and safety training clearances, including respirator fit testing.
- Hazard awareness of chemicals which may be encountered on site.
- Fire safety training, fire extinguishment, and evacuation procedures.
- Distribution of the Health and Safety Plan and the site-specific safety guidance document.
- Attendee signatures to acknowledge receipt and understanding of the plan and an agreement to comply.

10.2.2 Tailgate Safety Briefings

The Site Supervisor will conduct a tailgate safety briefing at the start of each work day to review and discuss the health and safety issues associated with the work, problems encountered, and modifications to existing procedures. Documentation of the tailgate safety briefings will be accomplished by using the tailgate safety briefing sign-in log located in Appendix A. The Site Supervisor maintains copies of the tailgate safety briefing sign-in logs in the project files. All field personnel associated with each days project activities are required to attend these meetings.

10.3 ACCIDENT OR INCIDENT REPORTS

All accidents and incidents that occur on site during field activities associated with this project will be promptly reported to the SSO and the Site Supervisor. The Site Supervisor will provide timely notification to the Project Manager. The supervisor of the injured employee or work crew where the accident occurred will initiate the written report. For convenience, the *Injury Report* form in Appendix A may be used to ensure all relevant information is recorded. The Project Manager or Field Supervisor may complete the "Manager" section of the Injury Report and forward the Injury Report to the EARTH TECH Health and Safety Section in the Long Beach Office. The SSO will investigate every accident or illness and, if related to work, complete the Accident/Injury Investigation form found in Appendix A. The Health and Safety Professional will assist accident investigations and Accident Review Boards. The Project Manager will ensure the Accident Review Board recommendations are implemented.

10.4 VISITOR CLEARANCES

Visitors will not be allowed within the Exclusion Zones unless they comply with the health and safety requirements of this plan, and can demonstrate a need for entry into the work area which is acceptable to the Site Supervisor. All visitors (including the site owner or the owner's representative, regulatory agency representatives or EARTH TECH clients) desiring to enter any Exclusion Zone must observe the following procedures:

- The SSO has received written confirmation that each of the visitors has received the proper training and medical monitoring required by this plan. Verbal confirmation can be considered acceptable provided such confirmation is made by an officer or other authorized representative of the visitor's organization.
- The visitor has been briefed on the hazards associated with the site activities being performed and have acknowledged receipt of this briefing by signing the appropriate tailgate safety briefing form

If the site visitor requires entry to any Exclusion Zone, but does not comply with the above requirements, all work activities within the Exclusion Zone must be suspended and monitoring using direct reading instruments must indicate that no airborne contaminant concentrations are present which exceed the established background levels. Until these requirements have been met entry will not be permitted.

10.5 HOUSEKEEPING

During site activities work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials. Anyone observed throwing contaminated material or PPE away with municipal wastes will be removed from the site.

10.5.1 Water Supply

A water supply meeting the requirements of 8 CCR §1524 will be utilized, consisting of the following:

Potable Water. An adequate supply of potable water will be available for field personnel consumption. Potable water will be available for field personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Where drinking fountains are not available, individual use cups will be provided as well as adequate disposal containers. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.

Non-Potable Water. Non-potable water may be used for hand washing and cleaning activities. Non-potable water will not be used for drinking purposes.

10.5.2 Toilet Facilities

In accordance with 8 CCR §1526 a minimum of one toilet facility will be provided for each sex in a group of 20 employees or less. Where there are least than 5 employees, a toilet facility for each sex need not be provided.

Exceptions to this requirement will apply to mobile crews where work activities and locations permit transportation to nearby toilet facilities.

10.5.3 Washing Facilities

In accordance with 8 CCR §1527, employees will be provided washing facilities (e.g., buckets with water and Alconox) at each work location. The use of water and hand soap (or similar substance) will be used by each employee following exit from the Exclusion Zone, prior to breaks and at the end of daily work activities.

10.6 CONTRACTOR SAFETY

In addition to the requirements of this Health and Safety Plan, subcontractors of EARTH TECH will observe the rules outlined in the "General Safety Rules for Contractors" which are located in Appendix C of this document. Compliance with these rules will be observed by subcontractors during all phases of site activities.

10.7 BUDDY SYSTEM

All onsite personnel shall use the buddy system. The work crew shall be paired off in teams of two. Team members shall maintain visual contact with each other. Team members must observe each other and be alert for signs of heat stress or toxic exposure, including nonvisual effects of toxic exposure, such as:

1. Changes in complexion and skin discoloration.
2. Changes in coordination or demeanor.
3. Excessive salivation and pupillary response.
4. Changes in speech pattern.
5. Headaches, dizziness, blurred vision.
6. Nausea, cramps.
7. Irritation of eyes, skin or respiratory tract.

Anyone exhibiting symptoms should be taken immediately to the nearest medical facility, taking steps to cool the person during transportation, including removing clothing, applying cool water to the skin, placing in air conditioned space, etc.

11.0 EMERGENCY CONTINGENCY PLAN

11.1 GENERAL

There are three major categories of emergencies that could occur during the MSP Apartments project:

1. Illnesses and physical injuries (including injury-causing chemical exposure)
2. Catastrophic event (fire, explosion, earthquake, or chemical)
3. Safety equipment problems.

Although a catastrophic event or severe medical emergency is unlikely to occur during work activity at the site, an emergency contingency plan has been prepared for this project should such critical situations arise. The purpose of this plan is to establish the appropriate response actions for emergency situations, the means of communication, and the responsibilities of key personnel at the site.

11.2 RESPONSIBILITIES

11.2.1 Site Safety Officer (SSO)

The SSO will be the primary contact individual and coordinator of all emergency activities. He/she will be responsible for:

- Evaluating the severity of the emergency
- Implementing appropriate response action
- Summoning appropriate emergency services (fire department, ambulance, etc.).
- Notifying all site personnel, the Health and Safety Professional, and concerned authorities of the emergency situation.

11.2.2 Other Onsite Personnel

It will be the obligation of the field personnel to inform the SSO of all emergency situations and to abide by their issued response actions. Special medical problems of field personnel such as allergies to insects, plants, prescription medication, etc. will be reported to the SSO.

11.3 WORK STOPPAGE AND CORRECTIVE ACTIONS

The SSO will require temporary work stoppage and implementation of corrective actions in certain or all work zones if the following conditions are encountered:

- Air monitoring shows concentrations of airborne contaminants exceeding Level C requirements as presented in Table 6-2
- Concentrations of airborne contaminants outside the site exceeds 50 percent of the unprotected exposure limits recommended by OSHA (OSHA PELs)
- Emergency conditions directly affect the health and safety of onsite workers or offsite residents or properties.

Corrective actions may include modification of personal protection levels, ventilation, evacuation, or other necessary measures as indicated in site-specific guidance documents. The SSO will be empowered to unilaterally stop work if necessary to meet health and safety requirements.

11.4 MEDICAL EMERGENCIES

Medical emergencies can be described as situations that present a significant threat to the health of personnel. These can result from chemical exposures, heat stress, cold stress, and poisonous insect or snake bites. Medical emergencies must be dealt with immediately and proper care should be administered. This may be in the form of first aid and emergency hospitalization.

11.5 SAFETY EQUIPMENT PROBLEMS

An emergency may develop due to malfunction or other problems associated with health and safety equipment being used by field personnel. These equipment problems must be corrected before proceeding with field activities. Health and safety problems that may occur include:

- Leaks or tears in protective clothing
- Failure of respiratory protective devices (SCBA, air-purifying respirators)
- Encountering contaminants for which prescribed protective equipment may not be suitable.

11.6 EMERGENCY EQUIPMENT

Provisions will be made to have appropriate emergency equipment available and in proper working condition.

11.6.1 First Aid Kits

Each work site shall have a first-aid kit meeting the following requirements:

- First-aid kits in weather-proof containers, approved by EARTH TECH Occupational Physician and meeting all regulatory requirements, shall be present at all locations where EARTH TECH employees will be working.
- Whenever a new first-aid kit is assembled, a new Inventory List/Physician's Authorization Certificate shall be placed in the first-aid kit as part of its inventory.
- First-aid kits shall be available at the job site at all times.
- Use of any item from the first-aid kit shall necessitate completion of a Supervisor's Employee Injury Report. The report shall be submitted to Health and Safety within 1 working day.

- For local field services work, first-aid kits shall be returned to the storeroom at the end of each workday.
- First-aid kits shall be inspected and restocked weekly. An inventory of first-aid supplies sufficient to restock kits on a weekly basis shall be maintained.
- For jobs outside the local area, the site supervisors shall replenish the kit from the nearest pharmaceutical source, with equivalent supplies to those used (until proper restocking by the storeroom can be accomplished), unless such supplies can economically be made available to the job from the storeroom.
- Personnel permitted to use first-aid kits shall possess a current first-aid card.

11.6.2 Eyewash Units

Eyewash units meeting the requirements of ANSI Standard 2358.1-1990 will be utilized at the site. All units shall also comply with the provisions of 8 CCR §5162, and shall be capable of supplying hands-free irrigation for both eyes for at least 15 minutes at a flow rate of at least 0.4 gallons per minute.

11.6.3 Fire Extinguisher

A fire extinguisher capable of extinguishing Class A, B, and C fires will be available for use at the site at all times. Site personnel will be readily aware of the location of the fire extinguisher at all times in the event of an incident where a fire extinguisher may be utilized.

11.7 CATASTROPHIC EVENT PROCEDURES

In the event of a catastrophic incident:

- Work activities will cease and all project personnel will be evacuated from the work location. The evacuation will proceed in a direction opposite of the critically affected area with all personnel assembling in a predesignated location outside of the job site proper.

- A headcount will be taken of the assembled employees and any injured individuals shall be administered first aid
- If not present at the work location, the SSO will be contacted immediately

A universal signal for emergency evacuation (e.g., use of a horn), and designation of the evacuation assembly location, shall be established by the SSO and briefed to all workers during initial site-specific training. Any changes mandated by changing site conditions shall be determined by the SSO and communicated to workers during the daily tailgate safety briefing.

11.8 MEDICAL EMERGENCY PROCEDURES

In the event of a medical emergency:

- All injured individuals may be given appropriate emergency first aid by a qualified individual trained in first aid
- Severely injured personnel shall be transported to the designated hospital listed in Table 11-1.

Table 11-1 Emergency Telephone Numbers

Local Fire Department (Communication Center)	911
Security Police	911
Fire Dept	911
Regional Medical Care	(510) 447-7000

Valley Memorial Hospital
 1111 E. Stanley Boulevard
 Livermore, California

Directions to Hospital: Exit Mill Springs site to Railroad Ave (westbound), right turn onto E. Stanley Blvd.
 Enter hospital (left turn into emergency area from E. Stanley Blvd.)

Regional Poison Control	(800) 484-5151
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Information and Response Organizations

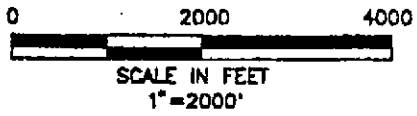
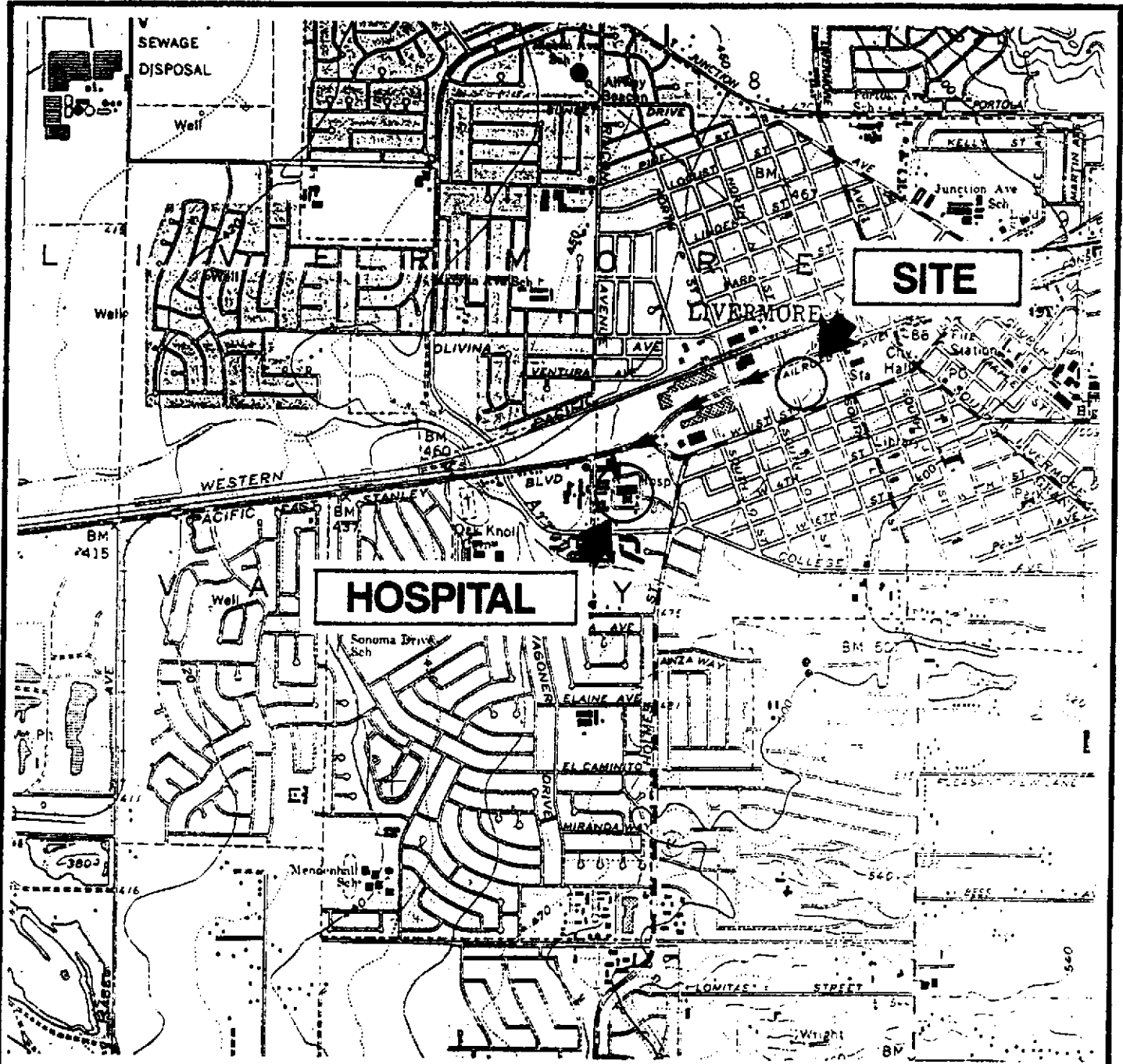
CHEMTREC	(800) 424-9300
National Poison Control Center	(800) 458-5842
TSCA Hotline	(202) 554-1404
Centers for Disease Control (CDC)	(404) 452-4100
National Response Center	(800) 424-8802
EPA Environmental Response Team (ERT)	(201) 321-6660
Resource Conservation and Recovery Act (RCRA) Hotline	(800) 424-9346

EARTH TECH Personnel

Berkeley Office	(510) 540-6954
Project Manager (Mark Milani, PE)	(510) 540-6954
Site Safety Officer (TBD)	(TBD)

Health and Safety Professionals

Jonathan R. Moore, CSP	
(Work)	(310) 495-4449
(Pager)	(310) 527-6330
Ronald A. Partilla, CSP, OHST	
(Work)	(310) 495-4449
(Pager)	(310) 527-6331
Robert M. Poll, CIH, CSP	
(Work)	(310) 495-4449
(Pager)	(310) 764-7507



SOURCE: USGS 7 1/2 MINUTE TOPOGRAPHIC QUADRANGLE,
LIVERMORE, CALIFORNIA, PHOTOREVISED 1980, AT SCALE 1:24,000

EARTH TECH	PROJECT: 887157.08
	LIVERMORE CALIFORNIA

MILL SPRINGS
PARK APARTMENT

VICINITY MAP AND HOSPITAL ROUTE

AUGUST 1995

FIGURE 2

APPENDIX A
HEALTH AND SAFETY FORMS

Injury Report

E A R T H  T E C H

This is an official document to be initiated by the injured employee's supervisor. Please answer all questions completely. This report must be forwarded to the Health and Safety Section office within 24 hours of the injury.

Injured's name		S.S.No.	Sex	Birthdate
Home address		City	State	Zip
Job Title	Section	Hire date	Hourly wage	Phone

Supervisor

Date of incident	Time	Time reported	To whom
Client name	Client address		Time shift began
Exact location of incident		Did injured leave work?	When?
Has injured returned to work? <input type="checkbox"/> Yes <input type="checkbox"/> No		Did employee miss a regularly scheduled shift? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Doctor/hospital name		Address	
Witness name		Statements attached <input type="checkbox"/> Yes <input type="checkbox"/> No	
Nature of injury		Body part	
Medical attention			
Job assignment at time of accident			
Describe incident			
What caused the accident?			
What corrective action has been taken to prevent recurrence?			
Supervisor/foreman Print name		Signature	Date

Manager

Comments on incident and corrective action		
Manager Print name	Signature	Date

Health and Safety

Concur with action taken? <input type="checkbox"/> Yes <input type="checkbox"/> No			Remarks:
OSHA classification <input type="checkbox"/> Incident only <input type="checkbox"/> First aid <input type="checkbox"/> No lost work days <input type="checkbox"/> Lost work days <input type="checkbox"/> Restricted activity <input type="checkbox"/> fatality			
Days away from work	Days of restricted work	Total days charged	
HS Professional Print name	Signature	Date	

Accident/Injury Investigation

Must be completed within 72 hours



1. Date _____ Section _____ Date of Accident /Injury _____

Employee Name _____

Supervisor Name _____

Job Number/Name _____

Location of Accident/Injury _____

2. Accident/Injury Classification

- Injury** Near Miss **Vehicle** Chargeable **DOT** DOT Vehicle
 First Aid Nonchargeable DOT Reportable
 OSHA Recordable Not at Fault
 Lost Workday

General Liability

3. Description (Provide facts, describe how incident occurred, provide diagram (on back) or photos)

4. Analysis 1 (What unsafe acts or conditions contributed to the incident?)

5. Analysis 2 (What systematic or management deficiencies contributed to the incident?)

6. Corrective action (List corrective action items, responsible person, scheduled completion date)

7. Witnesses (Attach statements or indicate why unavailable)

8. Investigated by	_____	_____	_____
	Print Name	Signature	Date
Manager	_____	_____	_____
	Print Name	Signature	Date

Attach additional pages if needed.

APPENDIX B
DRILL RIG SAFETY GUIDELINES

DRILLING EQUIPMENT OPERATIONS

B.1 General Drilling Practices

Prior to the start of site work, the drilling subcontractor will inspect all drilling equipment. The inspection will be documented in the field records. If field operations last longer than one week, the drilling equipment inspection must be repeated on a weekly basis.

EARTH TECH will conduct geophysical clearance and determine the location of all underground utilities before the start of drilling operations. In addition to obtaining the utility locations from the client, EARTH TECH will make a utility survey of each drilling point. The utility survey shall include both magnetometer and ground penetrating radar survey. Documentation that nearby utilities have been marked on the ground and that the drill site has been cleared shall be kept on file by EARTH TECH and confirmed to the drilling subcontractor.

Drill rig maintenance and safety is the responsibility of the drilling subcontractor. The following information is provided as general guidelines for safe practices during drilling activities, and installation of monitoring/extraction wells.

1. No food or beverage will be consumed or stored in the work area.
2. EARTH TECH will contact appropriate utilities agency to survey, mark and flag locations of buried utility lines.
3. Maintain orderly housekeeping on and around the drill rig.
4. Store tools, materials and supplies to allow safe handling by drill crew members. Proper storage on racks or sills will prevent spreading, rolling or sliding.
5. Avoid storage or transportation of tools, materials or supplies within or on the drill rig derrick.
6. Maintain working surfaces free of obstructions or potentially hazardous substances.
7. Store gasoline only in containers specifically designed or approved for such use.
8. Wear eye protection when chipping, chiseling or breaking material that presents risk of flying objects.
9. The departing driller should inform the oncoming driller of any special hazards or ongoing work that may affect the safety of the crew.
10. Fire fighting equipment should not be tampered with and should not be removed for other than the intended fire-fighting purposes or for servicing.
11. If lubrication fittings are not accessible with guards in place, machinery should be stopped for oil and greasing.

6. Note wind speed and direction to prevent overhead utility lines from contacting rig derrick. Allow at least 20 feet clearance between rig mast and utility lines.

B1.3 Hoisting Operations

1. Drillers should never engage the rotary clutch without watching the rotary table and ensuring it is clear of personnel and equipment.
2. Unless the draw works is equipped with an automatic feed control, the brake should not be left unattended without first being tied down.
3. Drill pipe or casing should not be picked up suddenly.
4. Drill pipe should not be hoisted until the driller is sure that the pipe is latched in the elevator, or the derrick man has signaled that he may safely hoist the pipe.
5. During instances of unusual loading of the derrick or mast, such as when making an unusually hard pull, only the driller should be on the rig floor and no one should be on the rig or derrick.
6. The brakes on the draw works of every drilling rig should be tested by each driller, when he comes on shift, to determine whether they are in good order. The brakes should be thoroughly inspected by a competent individual each week.
7. A hoisting line with a load imposed should not be permitted to be in direct contact with any derrick member or stationary equipment, unless it has been specifically designed for line contact.
8. Workers should never stand near the well bore whenever any wire line device is being run.
9. Hoisting control stations should be kept clean and controls labeled as to their functions.
10. Inspect wire, rope, hoisting hardware, swivels, hooks, bearings, sheaves, guides, rollers, clutches, brakes for the following:
 - abrasions
 - breaks
 - wear
 - fatigue
 - corrosion
 - jamming
 - kinking
11. Avoid the suspension of loads when hoist is unattended.
12. Prevent hoisting loads directly over field personnel.
13. Restrict hoisting operations during unfavorable environmental conditions such as rain or high winds.

14. Maintain safe hand distance from hoisting equipment (e.g., wire rope, hooks, pinch points) when slack is reduced.

B1.4 Riding Hoisting Equipment

Under no circumstances will personnel be permitted to ride the traveling block or elevators, nor will the cat line be used as a personnel carrier.

B1.5 Cat Line Operations

1. Only experienced workers will be allowed to operate the cat head controls. The kill switch must be clearly labeled and operational prior to operation of the cat line.
2. The cat head area must be kept free of obstructions and entanglements.
3. The operator should not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted.
4. Personnel should not stand near, step over, or go under a cable or cat line which is under tension.
5. Employees rigging loads on cat lines should:
 - Keep out from under the load
 - Keep fingers and feet where they will not be crushed
 - Be sure to signal clearly when the load is being picked up
 - Use standard visual signals only and not depend on shouting to coworkers
 - Make sure the load is properly rigged, since a sudden jerk in the cat line will shift or drop the load.

B1.6 Pipe Handling

1. Pipe should be loaded and unloaded, layer by layer, with the bottom layer pinned or blocked securely on all four corners. Each successive layer should be effectively blocked or chocked.
2. Workers should not be permitted on top of the load during loading, unloading, or transferring of pipe or rolling stock.
3. Employees should be instructed never to try to stop rolling pipe or casing; they should be instructed to stand clear of rolling pipe.
4. Slip handles should be used to lift and move slips. Employees should not be permitted to kick slips into position.
5. When pipe is being hoisted, personnel should not stand where the bottom end of the pipe could whip and strike them.
6. Pipe stored in racks, catwalks, or on flatbed trucks should be chocked to prevent rolling.

B1.7 Derrick Operations

1. The derrick climber should be used whenever climbing the derrick. Personnel on the derrick should be tied off, or otherwise protected from falling when working in an unguarded elevated position.
2. All stands of pipe and drill collars racked in a derrick should be secured with rope or otherwise adequately secured.
3. Tools, derrick parts, or materials of any kind should not be thrown from the derrick.
4. The elevators must be properly clamped onto all pipe joints prior to the driller engaging the load.

B1.8 Making and Breaking Joints

1. Tongs should be used for the initial making up and breaking of the joint. The rotary table should not be used for the initial breaking of a joint.
2. Employees making or breaking joints should not be permitted to stand within the arc of the tong handles when the tong pull line is under tension. Employees should handle the tongs only by the appropriate handles.
3. Employees should be trained in the safe use of spinning chains. Spinning chains should not be handled near the rotary table while it is in motion.

B1.9 Drilling Operations

1. Begin auger borings slowly with the drive engine operating at low speed.
2. Establish a communication system between driller, helper and geologist for responsibilities during drilling operations.
3. Engage auger to power coupling as recommended by manufacturer.
4. Restrict contact with power coupling or auger during rotation.
5. Prevent placing hands or feet under auger during rotation.
6. Prevent placing hands or feet under auger sections during hoisting over hard surfaces.
7. Avoid the removal of spoil cuttings with hands or feet.
8. Assure drill rig is in neutral and the augers are not rotating before cleaning augers.

APPENDIX C
GENERAL SAFETY RULES FOR CONTRACTORS

Introduction

The rules and requirements contained in this attachment have been written for the guidance of Contractors who are performing work under contract with Earth Technology. This booklet prescribes general requirements. Additional specific rules may be necessary to ensure the safety of workers on a particular job. The Contractor, working in collaboration with the Earth Technology representative, will be expected to establish such additional rules and procedures as may be necessary to conduct a safe operation and comply with all Earth Technology, regulatory, and insurance requirements and those of our clients. Earth Technology health and safety professionals are available to assist.

The term Contractor, as used in this attachment, shall be understood to include any and all persons, sole proprietorships, partnerships, corporations, or other business ventures under contract, oral or written, to EARTH TECH.

Contractor is responsible for informing its subcontractors of these requirements, for directing and supervising work of subcontractors, and for assuring that its subcontractors adhere to the requirements herein. EARTH TECH may request Contractor to provide proof of its subcontractor's adherence to all rules and regulations and will prohibit access to EARTH TECH property or job sites or our client's property for those Contractors not in compliance.

In order to assist Contractor in following these instructions, a EARTH TECH Representative will be assigned to the Contractor to act as EARTH TECH's agent in all matters relative to work activities at EARTH TECH facilities or job sites. Under no circumstances shall any work be started until the EARTH TECH Representative has been contacted, a job orientation has been conducted by the EARTH TECH Representative, and all permits, insurance, EARTH TECH, client, and regulatory pre-job requirements met.

The EARTH TECH Representative and the EARTH TECH Health and Safety professionals are authorized to stop any work which they may consider hazardous to EARTH TECH personnel or equipment or Contractor personnel. This authority may be delegated to appropriate individuals.

General Safety Rules and Requirements

Accident Reporting

All accidents (personal and property damage) shall be reported orally to the EARTH TECH Representative as soon as emergency conditions no longer exist. A written report shall follow within 7 days after emergency conditions are resolved.

Alcohol, Firearms, etc.

Alcoholic beverages, illegal drugs or narcotics, or guns and ammunition are not permitted on EARTH TECH property or job sites. Personnel under the influence of alcohol or drugs shall not be allowed on EARTH TECH property or job sites.

Approvals

The Contractor shall be required to obtain pertinent work permits or authorization and approval from the EARTH TECH Representative before:

- Working on existing pipelines or equipment
- Entering tanks or closed vessels
- Entering any designated high-hazard areas
- Using torches, electrodes, electronic motors, forges, soldering irons, any open flames, or any device which could produce sparks or ignition source
- Closing walkways, roads, or restricting traffic
- Starting excavations
- Removing tanks from excavations
- Backfilling excavations
- Using utilities such as steam, water, compressed air, or electricity
- Sandblasting, spray painting, or guniting
- Storing flammable materials such as gasoline, oil, paints, oxygen cylinders, etc.
- Walking or working on roofs of buildings or equipment

- Drilling, boring, preparing test pits, or using geophysical equipment or any other exploratory equipment requiring penetration of surfaces
- Operating cranes or similar equipment near overhead power lines or pipelines
- Opening cutting through fire walls or berms
- Fueling or repairing Contractor operating equipment on EARTH TECH property or job sites.

Security

For security reasons, entrance to and exit of EARTH TECH facilities and job sites is restricted to those areas designated as the Contractor's work area.

Speed Limits

All vehicles on EARTH TECH job sites and facilities must observe a maximum speed limit of 10 mph unless otherwise posted.

Vehicle Safety

- All vehicles must be parked in authorized areas only.
- There will be no passing of moving vehicles at job sites where there are narrow roads and short-sight distances.
- Vehicles will only be operated by personnel with valid licenses and good driving records.
- Vehicles shall have all required inspection and operating permits.
- Seat belts shall be used.

Safe Work Practices

Communication

Communication and coordination is vital to prevent accidents on construction sites. Every worker must be aware of equipment operating in his vicinity.

Confined Space Entry

Confined spaces include storage tanks, bins, sewers, in-ground vaults, degreasers, boilers, vessels, tunnels, manholes, pits, etc. These enclosures, because of inadequate ventilation and/or the introduction of hazardous gases and vapors, may present conditions that could produce asphyxiation or injury.

Before entering a confined space, Contractor must notify the EARTH TECH Representative of intent to enter. The EARTH TECH Representative will review with Contractor the safe entry requirements which include:

Removal of Contents. Before entering, confined spaces should be as clean and free of hazardous materials and chemicals as possible. Where appropriate, confined spaces may be purged by water or other suitable means. Purging with hazardous solvents should be avoided where possible.

Isolation. All input lines which discharged into the confined space shall be disconnected and capped or isolated. The use of a single in-line valve shut-off as the sole means of isolating the confined space from any input lines is prohibited.

However, the use of a double in-line valving arrangement with a vent or drain in between the two valves is acceptable provided that dangerous air contaminants are not introduced by such venting. Isolation valves shall be locked closed, vent or drain valves shall be locked open, and the key shall be kept by that person performing the job.

Electrical Lockout. Where electrical devices located within the confined space (motors, switches, etc.) are to be repaired or worked on, the line-disconnect switches supplying the power must be tagged and locked in the "OFF" position. The lock key is to be kept by the person performing the job, and only this person is authorized to unlock the switch and remove the tag upon completion of the job. Where more than one person is working on the line, each must place a lock on the switch and retain his own key.

- Where there are multiple sources of power to an electrical device that supplies power to the device through an automatic or manual bus transfer switch, lockout devices must be placed on the breaker nearest to the electrical device that is to be isolated, and an electrician shall test the power supply lines to ensure that power has been secured.
- Line-disconnect switches supplying power to any mechanical apparatus in the confined space (mixers, conveyors, etc.) must also be tagged and locked in the "OFF" position. This must be done for any entry, even though work will not be performed on the apparatus itself.

Securing of Covers. All manhole and clean out covers shall be removed and the openings maintained clear of any obstructions. When hinged doors or lids are provided, they shall be secured so they cannot close. See Excavations and Trenches for guarding requirements.

Testing Atmosphere. A qualified person (NIOSH Publication No. 80-106) using only equipment approved and tagged for Class 1, Division 1 locations shall make appropriate tests of the atmosphere in the confined space and place a record of the test results at the entrance to the confined space. Testing shall ensure the following:

- Combustible gas and vapor concentrations do not exceed 10 percent of the lower explosive limit
- Oxygen content is no less than 20 percent and no greater than 25 percent
- Appropriate respiratory protective equipment and other appropriate personal protective devices have been provided for all employees when concentrations of toxic materials exceed established threshold limit values (TLVs).

Continuous Monitoring. If the nature of the work to be performed introduces, or has the potential to introduce, harmful air contaminants, continuous monitoring of the atmosphere and/or the oxygen content drops below 20 percent, all personnel shall evacuate the confined space immediately.

Ventilation. All confined spaces found to be unsafe must be ventilated by means of mechanical exhaust systems arranged so as to avoid recirculating contaminated air. The Contractor must contact the EARTH TECH Representative to obtain approval not to ventilate. Personnel shall be evacuated immediately in the event of failure of the mechanical ventilation system. The confined space shall be retested prior to reentry following ventilation system repair.

Buddy System. At least two workers shall remain outside the confined space. One standby worker shall be stationed just outside the access opening of the any confined space while such space is occupied. This person shall:

- Maintain continuous awareness of the activities and well-being of the occupant in the confined space
- Be able to maintain communication at all times
- Be alert and fully capable of quickly summoning help
- Be physically able and equipped to assist in the rescue of an occupant from a confined space under emergency conditions.

Safety Gear and Personal Protective Equipment. All Contractor employees must be instructed in accordance with OSHA regulations regarding safety gear and personal protective clothing, hard hats,

respirators, lifelines, and harnesses. Such instructions shall be received and documented before entering any confined space.

Compressed Gas Cylinders

Valve protection caps. Valve protection caps shall be in place when compressed gas cylinders are transported, moved, or stored.

Cylinder valves. Cylinder valves shall be closed when work is finished and when cylinders are empty or are moved.

Compressed gas cylinders. Compressed gas cylinders shall be secured against rolling or tipping (roped or chained) at all times, except when cylinders are actually being hoisted or carried.

Gas regulators. Gas regulators shall be in proper working order while in use.

Leaks. If a leak develops in a gas cylinder, after donning appropriate safety equipment, immediately remove it to a safe location. If the leak cannot be corrected, report it to the EARTH TECH Representative.

Identification of Contents. Cylinders should be permanently marked or stenciled to identify the type of gas in the cylinder.

Breathing Air. All compressed breathing air shall meet OSHA specifications for breathing air quality. All compressed breathing air cylinders shall have their contents checked at the job site for correct oxygen concentration and rejected for breathing air if the oxygen concentration is not 20.7% \pm 0.2%.

Oil and oily rags. Oil and oily rags shall be kept away from oxygen equipment.

Cranes, Hoists, and Other Heavy Equipment

Contractor personnel will not be permitted to use hoists and powered apparatus belonging to EARTH TECH unless approval is obtained in each instance from the EARTH TECH Representative.

ROPs. Roll over protection shall be used when conditions or regulations call for such use.

Cutting or Welding

Hot Work/Welding/Burning. "Hot Work" authorization must be obtained from the EARTH TECH Representative before any welding, cutting, or other "hot work" is done. "Hot work" permits and results of tests are to be submitted to the EARTH TECH Representative at the completion of the job or at the end of each workday.

Welding Flash. Noncombustible or flame-proof shields or screens must be provided to protect welder or others who might be harmed by direct rays or arc.

Personal Protective Equipment. Goggles, gloves, aprons, and other personal protective equipment appropriate to the job shall be used.

High Fire-Hazard Areas

- Contractor personnel are responsible to see that a fire watch is maintained and all adjacent combustible materials are protected or removed as designated by the EARTH TECH Representative.
- Contractor shall provide his own calibrated combustible gas meter or other instruments for checking areas before hot work.
- Documentation of calibration shall be submitted to the EARTH TECH Representative for review by the EARTH TECH Health and Safety Section.
- Contractor is responsible for all testing and monitoring required by applicable regulations and to assure work place safety.
- EARTH TECH shall have the right, not the responsibility, to perform additional testing. EARTH TECH testing shall not be in lieu of Contractor's requirements.
- In the event of a bona fide emergency, such as emergency spill response work, and where the Contractor warrants that he cannot conduct the required testing, EARTH TECH may upon written agreement then conduct all tests necessary to assure safety and regulatory compliance. The Contractor shall cosign the "hot work" permit form when tests are conducted by EARTH TECH personnel.
- Contractor shall provide his own fire extinguisher(s) for welding and cutting, as designated by the EARTH TECH Representative.

Electrical Safety

Grounding. The noncurrent-carrying metal parts of fixed, portable, or plug-connected equipment shall be grounded. Since ground wires can break, they shall be tested with an electrical resistance meter to assure conductivity as often as necessary to assure safety. Portable tools and appliances protected by an approved system of double insulation need not be grounded.

Extension Cords. Extension Cords shall be the three-wire type for grounded tools (two-wire is permissible for double-insulated tools) and shall be protected from damage; do not fasten with staples or extend across an aisle way or walkway. Worn or frayed cords shall not be used. Cords shall not be run through doorways where the door could cut or damage them.

Light Bulbs. Exposed bulbs on temporary lights shall be guarded to prevent accidental contact, except where bulbs are deeply recessed in the reflector. Temporary lights shall not be suspended by their electric cords unless designed for this use. Explosion-proof bulb covers shall be used when contact with flammable vapors or gases is likely and shall meet Class I, Division I requirements.

Electrical Receptacles. Receptacles for attachment plugs shall be of the approved, dead-front, concealed contact type. Where different voltages, frequencies, or types of current are supplied, receptacles shall be of such design that attachment plugs are not interchangeable.

Wet Environments. Work done in wet environments shall require ground fault interrupters and water-tight connectors.

Emergency Equipment

EARTH TECH's fire equipment is not to be moved, relocated, or otherwise rendered inaccessible unless specific permission is granted in each case by the EARTH TECH Representative.

Self-contained breathing apparatus, first aid equipment, fire blankets, stretchers, eyewash fountains, and deluge showers are not to be moved, relocated, or blocked without the express permission of the EARTH TECH Representative.

Excavations and Trenches

Permits. Before any excavation work begins, all required permits shall be obtained.

"Dig-Alert". Before any excavation work begins, the existence and location of underground pipes, electrical conductors, etc., must be determined by Contractor who shall in turn notify the EARTH TECH Representative.

Cave In Protection. The walls and spaces of all excavations and trenches (which will be entered by people) more than 4 feet deep shall be guarded by shoring, sloping of the ground, or some other equivalent means, in accordance with Cal/OSHA regulations.

Daily Inspections. Daily inspections of excavations shall be made by the Contractor. If there is evidence of possible cave-in or slide, all work in the excavation shall cease until the necessary safeguards have been taken.

Egress. Trenches more than 4 feet deep shall have ladders or steps located so as to require 10 feet or less of lateral travel between means of access.

Backfill. All trenches shall be backfilled as soon as practical after work is completed and all associated equipment removed.

Housekeeping. All Contractor equipment, such as pipe, rebar, etc., shall be kept out of traffic lanes and access ways. Equipment shall be stored in a manner which ensures the safety of EARTH TECH and Contractor employees at all times.

Fall In Protection. All trenches shall be completely guarded on all sides. Standard guardrails are preferred. However, when wooden or metal barricades are used for trench guarding, they shall be spaced no further apart than 20 feet, and at least two feet from the edge of the trench. Such barricades shall be at least 36 inches high when erected.

- Battery-lighted barricades shall be used as follows:
 - (1) A minimum of two battery-lighted barricades shall be used at corners, one on each side of the barricade.
 - (2) At least one battery-lighted barricade shall be used where vehicular traffic approaches the trench at right angles.
 - (3) Where trenches parallel roadway, distance between battery-lighted barricades shall not exceed 40 feet unless this requirement conflicts with Item (1), above, and additional units are required.
 - (4) All battery-lighted units shall be serviced as necessary to ensure equipment is operating.
- Caution tape shall be stretched securely between barricades. The caution tape shall be at least 3/4-inch-wide and shall be yellow or yellow and black and may have the words "CAUTION - DO NOT ENTER."
- Barricaded sections immediately adjacent to where pedestrians cross trenches shall be arranged to direct pedestrians to the walkway or bridge.

Encroachment. Use of other trench excavating equipment, or storage of equipment or supplies within a distance equal to the depth of the trench, will not be permitted without approval by the EARTH TECH Representative.

Bridges. All pedestrian bridges shall be of sufficient strength to prevent no greater vertical deflection than one-half inch when a 250-pound weight is applied to the center of the bridge.

- Handrails shall consist of intermediate and top rails on both sides of the bridge. The top rail shall be between 42 and 45 inches above the walking surface and be capable of withstanding a lateral force of 200 pounds against the center of the top rail.
- All surfaces which a person could reasonably contact should be sufficiently free of splinters, nails, or protrusions which may cause injury.
- All bridges intended for vehicular traffic shall be constructed to withstand twice the load of the heaviest vehicle anticipated.

Earth Grading Activity

Vest. All persons within an area where earthmoving are operating shall wear a safety vest or jacket at all times. Vests may be red, orange, or day-glo green in color, but bright or fluorescent orange is preferred. Significantly faded or damaged vest must be replaced.

Communication. Anytime a test pit is to be excavated, the technician shall notify the grading contractor's **authorized** representative for that area. That individual may be acting in the capacity as a dump man, operator, or supervisor from an independent vehicle. Advise that representative of the test pit location and request their cooperation to promote safety during the test period. This should include their advising those under their supervision of your existence in the grading area. Make a notation on your records of the name of the individual with whom you spoke so that the communication is documented.

- Provide notice to the grading contractor
- Identify location of test pit
- Request the cooperation through the completion of the tests and document accordingly.
- A flag must be affixed to any vehicle driving in an earth grading activity area and hazard warning lights shall be operated.

Flags. Every over-the-road vehicle operating in the area of earthmoving equipment activity must carry a flag. The flag must be at least 300 square inches in area with no dimension less than 12 inches. Flags must be high visibility red, orange, day-glo green and mounted approximately 12 feet above grade level.

Hazard Warning Lights. Every over-the-road vehicle operating in the area of earthmoving equipment activity must operate the hazard warning flashers at all times.

Rotating or Flashing Beacon. All vehicles stationary in the grading area shall use a rotating or flashing amber beacon or strobe light on the top of the cab of the vehicle during all field testing.

Orientation of Test Pits. The technician is responsible for selecting a test pit location. Of paramount concern is the technician's safety. The test pit should be located behind the established pattern of grading equipment and outside any existing patterns. The orientation of the pit should include the use of the technician's vehicle as a barrier to potential oncoming traffic. The waste pile created from the excavation of the test pit should be opposite the vehicle so that the test pit is positioned between the vehicle and the waste pile. A flag shall be placed immediately on top of the waste (spoil) pile, satisfying the same requirements as the vehicle flag. See Figures C-1 and C-2.

Zone of Non-Encroachment. The location of the test pit must be selected so that no earthmoving equipment will approach closer than 50 feet from the center of the test pit. See Figure C-1. This is not only for the technician's safety, but to ensure the integrity of the test. Excessive vibration from the operation of earthmoving equipment operating too closely may impair the accuracy or spoil the test results.

Completion of Tests. Immediately upon completion of tests, record the data and withdraw flags and vehicles outside the grading area to record notes and do calculations.

Fire Prevention

EARTH TECH Representative, or his designee, is authorized to correct any condition which he may consider a fire hazard. In any emergency, the site personnel are authorized to act directly with Contractor's Foreman in regard to fire hazards without waiting for the EARTH TECH Representative.

Floor Openings

Floor openings shall be guarded by substantial barriers, railings, and/or covering materials strong enough to sustain twice the load of pedestrians or vehicular traffic. Barriers will be supplied by the Contractor.

Where a danger of falling exists for personnel, elevated floor areas must be provided with guardrails. In addition, toeboards shall be provided when the possibility of falling objects striking personnel below exists.

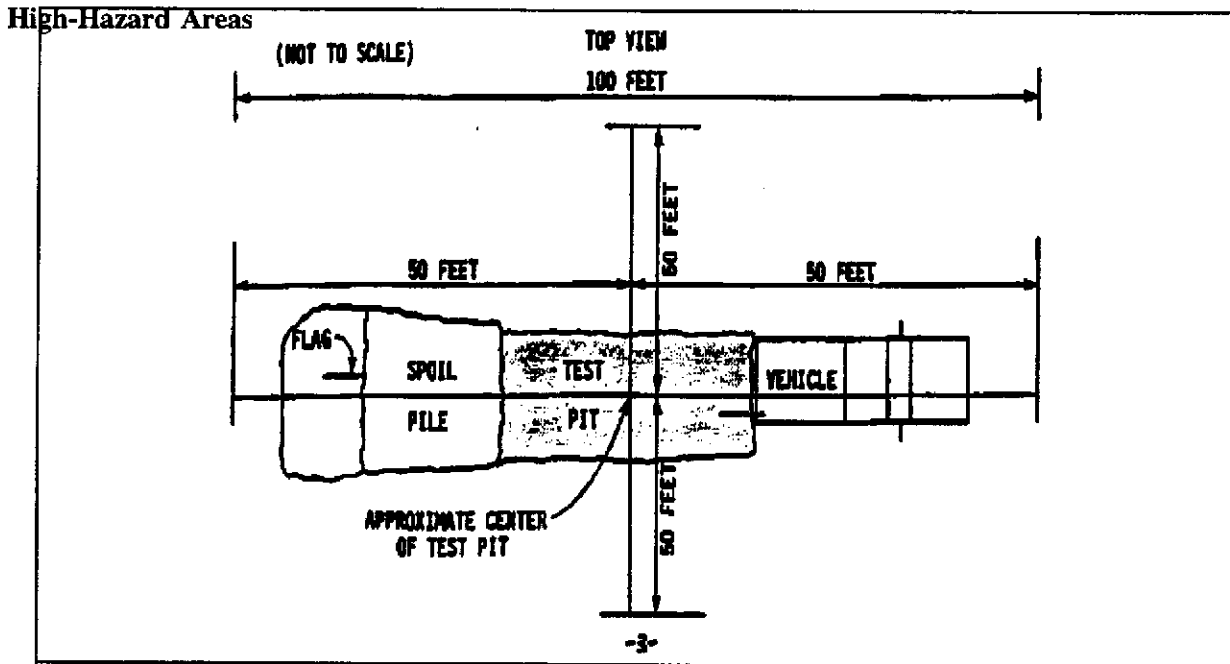


Figure C-1

Although this list may not be all inclusive, there are certain areas and operations at EARTH TECH facilities and job sites where extra precautions must be taken because of the nature of the hazards. When

starting up any operation, the Contractor is required to check with the EARTH TECH Representative for a review of the safety and health rules which apply before entering any of the following areas:

- Confined spaces (tanks, manholes, vaults, pits, etc.)
- Laboratories
- Chemical storage and disposal areas.

The contractor is also required to check with the EARTH TECH Representative before any work is done on a flammable gas or solvent line; a tank or vessel that presently contains, or has contained, a flammable material; and before making an excavation anyplace on the site.

Housekeeping

Material should be carefully stacked and located so that it does not block aisles, doors, self-contained breathing apparatus, fire extinguishers, fire blankets, stretchers, emergency eyewash fountains, emergency safety showers, fixed ladders, stairways, or electrical breaker panels.

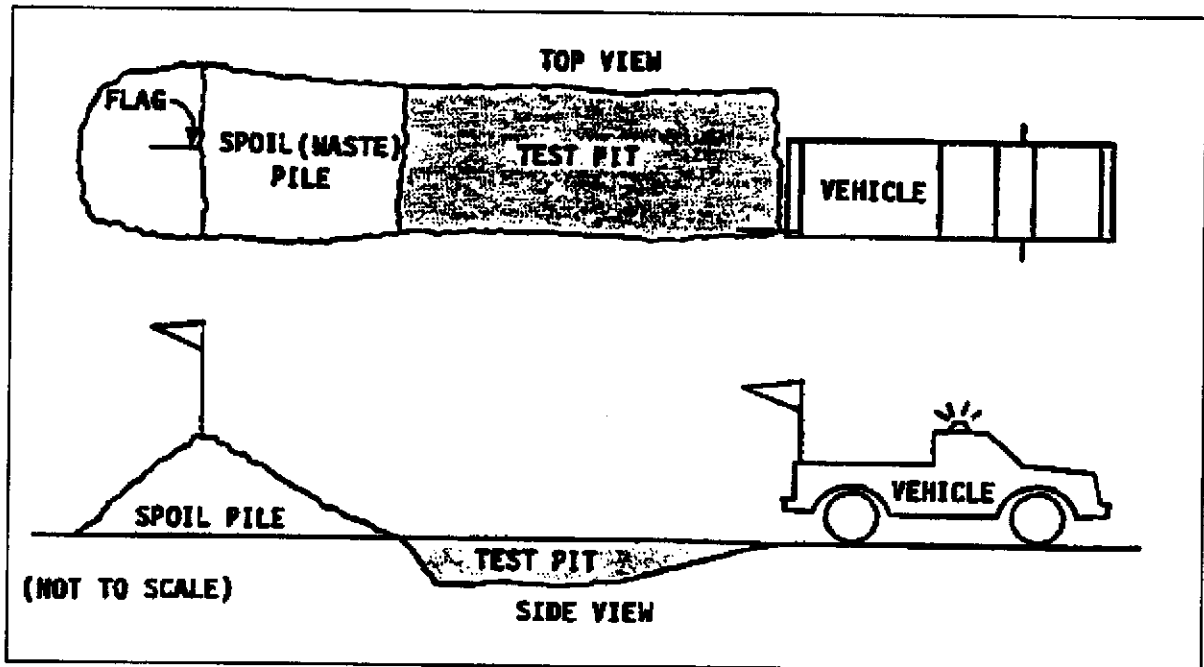


Figure C-2

- Nails protruding from boards must be removed or bent over.
- All work areas shall be kept clear of form and scrap lumber and all other debris.
- Combustible scrap, waste materials, and debris shall be removed at regular and frequent intervals.
- Containers shall be provided for the collection and separation of refuse by type. Covers shall be provided on containers used for flammable, combustible, or harmful substances.
- Overhead storage of debris, tools, equipment, pipes, etc., is prohibited.
- At the end of each work day, Contractor shall provide for pick up of all debris such as paper, rags, empty cans and bottles, etc.

Ladders

The use of ladders with broken or missing rungs or steps, broken or split handrails, or with other faulty or defective construction is prohibited.

- Ladders must not be placed adjacent to a door unless the door is locked or guarded.
- Metal ladders shall not be used for electrical work.

- Tie off top of ladder to structure.

Medical Service and First Aid

Emergency Medical Service. Preplanned emergency medical service shall be provided as designated by Contractor and approved by the EARTH TECH Representative.

First Aid Kit. Each Contractor shall provide a first aid kit for his employees which meets minimum OSHA requirements.

Mobile Cranes

Mobile cranes, including portable crane derricks, power shovels, or similar equipment, shall not be operated within ten feet of overhead electrical power lines.

Overhead Work

No overhead work shall be performed when, as a result of that work, the possibility of a falling object striking any person exists. Do not work above any person at any time.

Personal Protective Clothing and Equipment

In certain construction and maintenance operations, personal protective equipment such as safety glasses, chemical goggles, respirators, hard hats, and protective clothing is required. The type of protective equipment to be worn will be determined by the degree of exposure to the potential hazard. There will be very few occasions when hard hats and eye protection will not be required at EARTH TECH job sites. When in doubt of the safety measures to be observed, Contractor shall contact the EARTH TECH Health and Safety Section. This shall not, however, relieve Contractor of his responsibilities to determine appropriate protection.

Eye protection is required when engaging in such operations as the following:

- Drilling, chipping, grinding, wire brushing
- Handling caustics and acids
- Breaking bricks or concrete
- Hammering chisels, drift pins, etc.
- Burning or welding
- Other situations which create a possible eye hazard, e.g., chemical environments.

Photographs

Only EARTH TECH photographers are permitted to carry cameras or take pictures. If progress or finished construction photographs are desired, request for same should be made through the EARTH TECH Representative.

Power Tools

Power and Air-Actuated Tools. Gasoline-powered, electric, or air-actuated tools are not to be used on EARTH TECH property or job sites without prior approval of the EARTH TECH Health and Safety Department. To obtain approval, Contractor must contact the EARTH TECH Representative.

Explosive-Actuated Tools. Explosive-actuated (powder-actuated) fastening tools shall meet the design requirements in "American National Standard Safety Requirements for Explosive-Actuated Fastening Tools" (ANSI A10.3-1970). A tool which does not meet these design standards cannot be used.

- Power tools shall never be left unattended in a place where they would be available to unauthorized persons.
- Power tools shall not be used in explosive or flammable atmospheres.

Fall Protection

Appropriate fall protection, such as safety harness and lanyard, must be worn when worker is exposed to falling more than 8 feet. Lanyard or lifeline must be tied off to appropriate structure capable of supporting five times the weight of the person (nominal 1000 pounds).

- Appropriate fall protection, such as safety harness and lanyard, must be worn when working above eight feet on straight or extension ladders when the work involves pushing, pulling, or action which may dislodge the person from the ladder.
- Safety harnesses are also required on swinging or portable scaffolds when handrails and toeboards are not provided (eight feet or more above ground or floor level).
- Safety harnesses and lifelines (including extraction devices for top entry spaces) are required on all work performed in confined spaces where an oxygen deficiency or toxic vapors may exist.
- All lifelines shall be safety secured to stable and adequate supports.
- Safety harnesses and lifelines must be worn on rooftops where there are no guardrails and where the work is within ten feet of the edge.

Salamanders

- "Hot work" authorization must be obtained from the EARTH TECH Representative before using a salamander.

- Salamanders must be a Factory Mutual or Underwriters Laboratories-approved type.
- Position salamanders away from all combustible material to reduce the possibility of uncontrolled fire.
- Guard salamanders from traffic to prevent them from being overturned.

Scaffolds

All scaffolds, whether fabricated on site, purchased, or rented, shall conform to the specifications found in ANSI A10.8, Safety Requirements for Scaffolding. Rolling scaffolds shall maintain a three-to-one height-to-base ratio.

- The footing or anchorage for a scaffold shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement.
- Unstable objects, such as barrels, boxes, loose bricks, or concrete blocks, shall not be used to support scaffolds or planks.
- No scaffold shall be erected, moved, dismantled, or altered except under the supervision of competent persons.
- Scaffolds and their components shall be capable of supporting at least four times the maximum intended load without failure.
- Guardrails and toeboards shall be installed on all open sides and ends of platforms more than 10 feet above the ground or floor.
- Scaffolds measuring four to ten feet in height, and having a horizontal dimension of less than 45 inches, shall have standard guardrails installed on all open sides and ends of the platform.
- Wire, synthetic, or fiber rope used for suspended scaffolds shall be capable of supporting at least six times the rated load.
- No riveting, welding, burning, or open flame work shall be performed on any staging suspended by means of fiber or synthetic rope.
- Tested fiber or approved synthetic ropes shall be used for or near any work involving the use of corrosive substances.
- All scaffolds, boatswain's (bosun's) chairs, and other work access platforms shall conform to the requirements set forth in the federal OSHA Regulations for Construction (29 CFR 1926.451) except where the specifications in ANSI A10.8 or state or local regulations are more rigorous.

Smoking and Open Flames

Smoking and the use of open flames are strictly prohibited in areas where flammable liquids, gases, or highly combustible materials are stored, handled, or processed. Obey "No Smoking" signs. Smoke only in designated areas.

Solvents and Paints

- Adequate ventilation must be maintained at all times when paints or solvents are used.
- Personnel should use proper respiratory protection and protective clothing when toxicity of the material requires such protection.
- Flammable solvents and materials must be used with extreme caution when possible sources of ignition exist.
- Flammable paints and solvents must be stored in an approved (Factory Mutual or Underwriters Laboratories) flammable liquids storage cabinet when storage is required inside the buildings. If an approved cabinet is not available, paints and solvents must be removed from the building when not in use.
- Flammable liquids must be dispensed in safety cans with flash arresters bearing a Factory Mutual or Underwriters Laboratories approval. These containers must be clearly identified as to their contents.
- Material Safety Data sheets, for materials used by the Contractor, shall be maintained by the Contractor, and a copy provided to the EARTH TECH Representative.

Tarpaulins

When tarpaulins are required for the detection of hot slag, dust, paint drippings, etc., or as security barriers, they shall be flame-resistant and in good condition.

Tools

Hand and power tools shall be kept in safe operating condition. Mushroomed heads on cold chisels, star drills, etc., are unsafe and should not be used. Hammers should have handles which are not cracked, split, or broken.

Nonsparking tools may be necessary in certain areas where flammable materials are handled or where sparks could create an explosion.

Transporting Material and Equipment

Extreme care must be taken while carrying sections of pipe, conduit, and other materials to assure safety to EARTH TECH, Contractor, and client personnel and property. This includes, but is not limited to, flagging and use of two people to carry pipe of lengths greater than 10 feet.

- Tools, materials, and equipment must not be left unattended in access ways.
- Tools, material, and equipment shall not be removed from the job site without permission of the EARTH TECH Representative.

Walking and Work Surfaces

- Workroom floors shall be clean and, to the extent possible, dry.
- Drainage mats, platforms, or false floors should be used where wet processes are performed.
- Floors shall be free from protruding nails, splinters, holes, and loose boards or tiles.
- Permanent aisles or passageways shall be marked.
- Floor holes shall be protected by covers that leave no openings of more than one inch wide.
- Floor openings into which persons can accidentally walk shall be guarded by standard railing and toeboards.
- Open-sided floors, platforms, and runways higher than four feet shall be guarded by standard railings.
- Toeboards shall be used wherever people can pass below, or where hazardous equipment or materials are located below.

Warning Signs

All posted warning, safety, and security signs and barriers shall be observed. Additionally, Contractor shall provide warning signs, barriers, barricades, etc. wherever such protection is needed. Where signs and barricades do not provide adequate protection, particularly along a road, flagmen shall be used.






Contractors are expected to brief their employees on these requirements and enforce these rules with their employees. EARTH TECH management may stop or suspend work at any time the Contractor fails to comply with EARTH TECH rules and regulations.

Regulatory References

- (a) *Standard Operating Safety Guides*, USEPA, November 1984
- (b) *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH 85-115, 1985
- (c) Title 29 of the Code of Federal Regulations, Part 1910 (29 CFR 1910), Occupational Safety and Health Standards (USDOL/OSHA), with special attention to Section .120, Hazardous Waste Operations and Emergency Response
- (d) Title 29 of the Code of Federal Regulations, Part 1926 (29 CFR 1926), Safety and Health Regulations for Construction (USDOL/OSHA)
- (e) Title 8 of the California Code of Regulations, Chapter 4, Subchapter 7, (commencing with Section 3200) General Industry Safety Orders (Cal/OSHA), with special attention to Section 5192, Hazardous Waste Operations and Emergency Response
- (f) Title 8 of the California Code of Regulations, Chapter 4, Subchapter 4, (commencing with Section 1500) Construction Safety Orders (Cal/OSHA)
- (g) Title 22 of the California Code of Regulations, Division 4, Chapter 30 (commencing with Section 66000) Environmental Health Standards for the Management of Hazardous Waste (California Environmental Protection Agency, Department of Toxic Substances Control)
- (h) Title 22 of the California Code of Regulations, Division 2, Chapter 3, (commencing with Section 12000) Safe Drinking Water and Toxic Enforcement Act Regulations (California Health and Welfare Agency)
- (I) National Oil and Hazardous Substances Contingency Plan

BOREHOLE LOG





Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: South Property Line		Borehole Number: H-1	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/08/95 - 08/08/95	Total Depth: 35.00'
Drilling Method: HSA		Depth to Bedrock: None	
Drilling Fluid: None		Number of Samples: 5	Depth to Water: 28.00'
Completion Information: Install temporary wellpoint: 2" sch 40 PVC w/10' of 0.010" slotted screen		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M. Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
5	SD1		13 17 17	815		0/0			AS GP	2" Asphalt / 5" base rock SANDY GRAVEL (GP)	
10	SD2		15 14 17	820		0/0				SANDY GRAVEL (GP/GM), brown (10YR4/3), moist, medium dense, trace clay and very fine to very coarse sand, angular gravel to 2"	
15	SD3		13 22 9	840		0/0			SC	CLAYEY SAND (SC) with gravel, brown (10YR4/3), wet, medium dense and very fine to coarse grained, angular gravel to 1"	
20	SD4		12 14 25	850							
	SD5		7 19	856		0/0				Increased clay @ 24' CLAYEY SAND with gravel olive brown (2.5Y4/3), wet, dense	

No recovery rock in shoe of sampler

BOREHOLE LOG

Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: South Property Line		Borehole Number: H-2	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/07/95 - 08/07/95	Total Depth: 36.50'
Drilling Method: HSA			Depth to Bedrock: None
Drilling Fluid: None		Number of Samples: 7	Depth to Water: 28.00'
Completion Information: Install temporary wellpoint: 2" sch 40 PVC w/10' of 0.010" slotted screen with T-152 filter sack		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M. Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Ceologic Unit	Graphic	USCS	Lithologic Description	Remarks
5	SD1		8 12 16			0/0			AS GP	Asphalt & base rock SANDY GRAVEL (GP), brown (10YR4/3), light gray (10YR7/2), dry, medium, dense, medium sand, angular gravel to 2"	
10	SD2		6 18 21			0/0			GM	Gravel with clayey sand matrix, dark gray (10YR4/1) and brown (10YR4/3), moist, medium dense, fine to coarse sand, subrounded gravel to 1 1/2"	
15	SD3		6 2 53			0/0					
20	SD4		6 21 42			0/0					Wet @ 21 feet

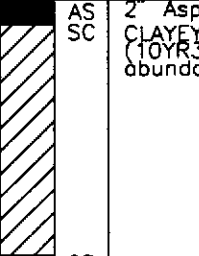
BOREHOLE LOG

Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: South Property Line		Borehole Number: H-3	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/09/95 - 08/09/95	Total Depth: 35.00'
Drilling Method: HSA		Depth to Bedrock: None	
Drilling Fluid: None		Number of Samples: 5	Depth to Water: 27.00'
Completion Information: Install temporary 2" sch 40 PVC casing with 10' of 0.010" screen		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M.Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
									AS SP	Asphalt & base rock GRAVELLY SAND (SD), brown (10YR4/3) and light gray (10YR6/1), dry, loose, fine to very coarse sand, subrounded gravel to 1 1/2"	
5	SD1		4 4 8	755		0/0			GC	Gravel, with clayey sand matrix, dark gray (10YR4/1) and brown (10YR4/3), moist, dense, subrounded gravel to 1 1/2"	
10	SD2		7 18 24	805							
15	SD3		3 5 7	815		0/0			ML	CLAYEY SILT (ML), mottled brown (10YR4/3) and grayish brown (10YR5/2), moist, stiff	
20	SD4		6 9 10	825		0/0					
	SD5		14 25	840		0/0				Increased clay content with thin clay lenses (<5)	

BOREHOLE LOG

Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: South East Property Corner		Borehole Number: H-4	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/07/95 - 08/07/95	Total Depth: 35.00'
Drilling Method: Hollow Stem Auger		Depth to Bedrock: None	
Drilling Fluid: None		Number of Samples: 6	Depth to Water: 28.00'
Completion Information: Installed temporary well casing to 35' bgs with 10' of 0.01" screen		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M.Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
5	SD1		10 17 19	1440		0/0			AS SC	2" Asphalt over 4" base rock CLAYEY SAND (SC), very dark gray (10YR3/1), dry medium dense, abundant gravel	
									SP	SANDY GRAVEL (SP) with clay, dark brown (10YR3/3), dry, dense, subangular gravel to 1"	
10	SD2		6 7 18	1445		0/0			ML	CLAYEY SILT (ML), yellowish brown (10YR5/4), dry, very stiff	
15	SD3			1455		0/0					
20	SD4		3 5 6	1505		0/0					

BOREHOLE LOG

Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: East Property Line		Borehole Number: H-5	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/08/95 - 08/08/95	Total Depth: 35.00'
Drilling Method: Hollow Stem Auger			Depth to Bedrock: None
Drilling Fluid: None		Number of Samples: 5	Depth to Water: 27.00'
Completion Information: Install temporary 2" sch 40 PVC casing with 10' of 0.01" screen		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M.Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
									AS SC	Asphalt & base rock FILL: CLAYEY SAND (SC), with gravel, very dark gray and dark brown, moist, loose	
5	SD1		5 7 9	1330		0/0			SP	GRAVELLY SAND (SP), dark brown (10YR3/3), dry, medium dense, medium to very coarse sand, angular gravel to 1"	
10	SD2		9 12 23	1340		0/0			ML	CLAYEY SILT (ML), dark yellowish brown (10YR4/4), moist, very stiff	
15	SD3		8 16 23	1350		0/0			SP	GRAVELLY SAND (SP), brown (10YR4/3), moist to wet, dense, very fine to very coarse sand, subrounded gravel to 3/4"	
20	SD4		12 18 20	1400		0/0			GC SP	GRAVEL (GC) with SANDY CLAY matrix, brown (10YR4/3), wet, dense, gravel to 1.5", some yellowish brown staining. GRAVELLY SAND (SP), brown (10YR4/3), wet, dense, very fine to very coarse sand, trace clay	
	SD5		2 5	1415		0/0			ML	CLAYEY SILT, dark yellowish brown (10YR4/4), moist, stiff	




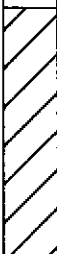

BOREHOLE LOG

Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: East Property Line		Borehole Number: H-6	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/09/95 - 08/09/95	Total Depth: 35.00'
Drilling Method: Hollow Stem Auger			Depth to Bedrock: None
Drilling Fluid: None		Number of Samples: 5	Depth to Water: 25.00'
Completion Information: Install temporary 2" sch 40 PVC casing with 10' of 0.01" screen		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M.Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
5	SD1		3 5 8	1315		0/0			AS SP	Asphalt & base rock GRAVELLY SAND (SP), brown (10YR4/3) and gray (10YR5/1), wet, medium dense, fine to very coarse sand, subangular to round gravel to 1 1/2"	
10	SD2		9 9 22	1320		0/0			ML GC	CLAYEY SILT (ML), dark yellowish brown (10YR4/4), moist, very stiff, some gravel to 1/2" GRAVEL (GC) with CLAYEY SAND matrix, dark yellowish brown (10YR4/4) and dark gray (10YR4/1), moist to wet, dense, angular to subrounded gravel to 2 1/2"	
15	SD3		8 12 24	1330		0/0					
20	SD4		11 22 27	1340		0/0			SP	GRAVELLY SAND (SP) with trace clay, mottled light olive brown (2.5Y4/3), and brown (10YR4/3), wet, dense, very fine to very coarse sand, subrounded gravel to 2"	
	SD5		10 20	1350		38/0					

BOREHOLE LOG

Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: North East Property Corner		Borehole Number: H-7	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/09/95 - 08/09/95	Total Depth: 35.00'
Drilling Method: Hollow Stem Auger			Depth to Bedrock: None
Drilling Fluid: None		Number of Samples: 5	Depth to Water: 28.00'
Completion Information: Install temporary 2" sch 40 PVC casing with 10' of 0.01" screen		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M.Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
						3/0			AS GP	Asphalt & base rock SANDY GRAVEL (GP), gray (10YR 5/1) to dark gray (104R 4/1), dry, loose to medium dense	Light diesel/oil odor in upper 3'
5	SD1		7 9 10	1000		0/0					
10	SD2		9 14 21	1010		0/0			SP	GRAVELLY SAND & SILT (SP/SM), olive brown (2.5Y 4/3), dry, medium dense, silt to coarse and grained sand, angular and subrounded gravel to 1 1/2"	Poor recovery no sample obtained
15	SD3		2 3 8	1016		0/0			CL	SILTY CLAY (CL), mottled brown (10YR4/3) with dark yellowish brown (104R 4/6), moist to wet, stiff	
20	SD4		6 30 31	1040		0/0			GC	GRAVEL (GC), with clayey sand matrix, brown (104R 4/3) and gray (104R 5/1), moist to wet locally, fine to coarse sand, subangular gravel to >2"	





BOREHOLE LOG

Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: North Side of Property		Borehole Number: H-8	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/08/95 - 08/08/95	Total Depth: 35.00'
Drilling Method: HSA			Depth to Bedrock: None
Drilling Fluid: None		Number of Samples: 7	Depth to Water: 28.00'
Completion Information:		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M.Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
									AS SP	2" Asphalt/5" base rock GRAVELLY SAND (SP), brown (10YR 4/3) to dark gray (10YR 4/1), dry, medium dense, fine to very coarse sand subrounded gravel to 3/4" (FILL)	
5	SD1		12 7 9	1045		0/0			GP	SANDY GRAVEL (GP), light gray (10YR 6/1), dry, dense, gravel to 2"	
10	SD2		7 10 12	1050		0/0			ML	CLAYEY SILT (ML), dark yellowish brown (10YR 4/4), dry, very stiff	
15	SD3		2 4 3	1058		0/0			CL	SILTY CLAY (CL), dark yellowish brown (10YR 4/4), moist to wet, medium stiff, few rootlets present.	
20	SD4		21 29 38	1107		0/0			SP	GRAVELLY SAND (SP), dark brown (10YR 3/3), moist to wet locally, very dense, fine to coarse grained, subangular gravel to 1"	
	SD5		10 16	1120		0/0					


BOREHOLE LOG

Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: West Side of Property		Borehole Number: H-9	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/09/95 - 08/09/95	Total Depth: 40.00'
Drilling Method: Hollow Stem Auger		Depth to Bedrock: None	
Drilling Fluid: None		Number of Samples: 7	Depth to Water: 36.00'
Completion Information: Install temporary well: 2" sch 40 PVC with 10' of 0.01" screen		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M.Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
5	SD1	2	3	1530		0/0			AS GP	Asphalt & base rock SANDY GRAVEL (GP), brown (7.5 YR 4/3), dry, medium dense, medium to coarse sand, angular gravel to 1"	No sample retained
										Some clay in sand matrix	
										Gravel to 2"	
10	SD2	23	17	1535		0/0					
15	SD3	8	6	1545		0/0			ML	CLAYEY SILT (ML), dark yellowish brown (10 YR 4/4), moist stiff, some gravel to 3/4"	
										becomes very stiff, dry	
20	SD4	3	10	1555		0/0				moist & stiff, no gravel	

BOREHOLE LOG


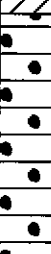


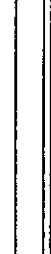
Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: West Side of Property		Borehole Number: H-9	Page 2 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/09/95 - 08/09/95	Total Depth: 40.00'
Drilling Method: Hollow Stem Auger			Depth to Bedrock: None
Drilling Fluid: None		Number of Samples: 7	Depth to Water: 36.00'
Completion Information: Install temporary well: 2" sch 40 PVC with 10' of 0.01" screen		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M.Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
	SD5	N	5 6	1610		0/0					
30	SD6	N	2 7	1620		0/0			CL	SANDY CLAY, brown (10 YR 4/3), wet, medium stiff	
35	SD7	N	3 4	1635		0/0					
40										Bottom at 40 feet	
45											

GW @ 36 feet

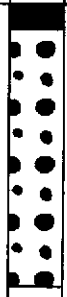
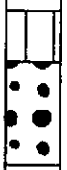
BOREHOLE LOG

Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: South Property Line		Borehole Number: H-10	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/08/95 - 08/08/95	Total Depth: 35.00'
Drilling Method: Hollow Stem Auger			Depth to Bedrock: None
Drilling Fluid: None		Number of Samples: 5	Depth to Water: 28.00'
Completion Information: Install temporary well: 2" sch 40 PVC with 10' of 0.01" screen		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M.Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
5	SD1	18 20	1755	0/0					AS SC	2" Asphalt over 5" base rock CLAYEY SAND (SC), with gravel, dark brown (10YR3/3), wet, dense [Fill(?)]	
5				0/0					GC	GRAVEL (GC), with clayey sand matrix, dark, yellowish brown (10YR 4/4), moist, dense, gravel to <2"	
10	SD2	2 4	1802	0/0					ML	CLAYEY SILT (ML), olive brown (2.5Y 4/3), moist, stiff	
15	SD3	2 5	1810	0/0						Mottled, with dark brown staining some fine gravel	Poor recovery
20	SD4	2 6	1820	0/0							

BOREHOLE LOG

Project Name: Mill Springs Park Apartments		Project Number: 687157.08	
Borehole Location: South Property Line		Borehole Number: H-11	Page 1 of 2
Drilling Agency: Bay Area Exploration		Driller: Tim Dunne	
Drilling Equipment: CME 55		Date(s): 08/08/95 - 08/08/95	Total Depth: 35.00'
Drilling Method: Hollow Stem Auger			Depth to Bedrock: None
Drilling Fluid: None		Number of Samples: 5	Depth to Water: 28.00'
Completion Information: Install temporary well: 2" sch 40 PVC to 35' with 10' of 0.01" screen		Borehole Dia.: 6.00in	Elevation: .00' Datum: MSL
		Logged By: M.Peterson	Checked By:

Depth (ft)	Number	Type	Blow Count	Sample Time	FID (ppm)	PID (ppm)	Geologic Unit	Graphic	USCS	Lithologic Description	Remarks
5	SD1		4 7	1600		0/0			AS GP	Asphalt & base rock SANDY GRAVEL (GP), brown (10YR 4/3), moist, loose to medium dense, subrounded gravel to 2" (Fill?)	
									SP	GRAVELLY SAND (SP), brown (10YR 4/3), moist, medium dense	
10	SD2		5 15	1610		0/0			ML GP SP	CLAYEY SILT (ML), brown (10YR 4/3), dry, very stiff, trace sand	
										GRAVEL (GP), with clayey sand matrix, olive brown (2.5 Y 4/3), moist, medium dense	
										GRAVELLY SAND (SP), with trace clay, brown (10YR 4/3), wet, very dense, fine to very coarse sand, subangular gravel to 3/4"	
15	SD3		20 30	1615		0/0					
20	SD4		7 10	1625		0/0					



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710. Phone (415) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 17-AUG-95
Lab Job Number: 122171
Project ID: N/A
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

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LABORATORY NUMBER: 122171-001
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILL SPRINGS
SAMPLE ID: G1-VOAS

DATE SAMPLED: 08/09/95
DATE RECEIVED: 08/09/95
DATE ANALYZED: 08/15/95
DATE REPORTED: 08/17/95
BATCH NO: 22622

EPA 8010
Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	12
Bromomethane	ND	12
Vinyl chloride	ND	12
Chloroethane	ND	12
Methylene chloride	ND	120
Trichlorofluoromethane	ND	6.0
1,1-Dichloroethene	ND	6.0
1,1-Dichloroethane	ND	6.0
cis-1,2-Dichloroethene	ND	6.0
trans-1,2-Dichloroethene	ND	6.0
Chloroform	ND	6.0
Freon 113	ND	6.0
1,2-Dichloroethane	ND	6.0
1,1,1-Trichloroethane	ND	6.0
Carbon tetrachloride	ND	6.0
Bromodichloromethane	ND	6.0
1,2-Dichloropropane	ND	6.0
cis-1,3-Dichloropropene	ND	6.0
Trichloroethene	ND	6.0
1,1,2-Trichloroethane	ND	6.0
trans-1,3-Dichloropropene	ND	6.0
Dibromochloromethane	ND	6.0
Bromoform	ND	12
Tetrachloroethene	260	6.0
1,1,2,2-Tetrachloroethane	ND	6.0
Chlorobenzene	ND	6.0
1,3-Dichlorobenzene	ND	6.0
1,4-Dichlorobenzene	ND	6.0
1,2-Dichlorobenzene	ND	6.0

ND = Not detected at or above reporting limit.

Surrogate Recovery

=====
Bromobenzene 105 %
=====

Curtis & Tompkins, Ltd



8010 BS/BSD Report

Matrix: WATER
Batch No: 22622 325227107001 325227116002
Date Analyzed: 15-AUG-95
Spike File: 227W001
Spike Dup File: 227W002
Analyst: LW

	Instrdrg	SpikeAmt	% Rec	Limits
<u>BS RESULTS</u>				
1,1-Dichloroethene	23.9	20	119 %	68-134%
Trichloroethene	24.1	20	121 %	85-141%
Chlorobenzene	20.2	20	101 %	69-135%
Surrogate Recoveries				
Bromobenzene	105.4	100	105 %	85-119%
<u>BSD RESULTS</u>				
1,1-Dichloroethene	22.6	20	113 %	68-134%
Trichloroethene	23.5	20	117 %	85-141%
Chlorobenzene	20.0	20	100 %	69-135%
Surrogate Recoveries				
Bromobenzene	106.2	100	106 %	85-119%
<u>RPD DATA</u>				
1,1-Dichloroethene	6 %			< 14%
Trichloroethene	3 %			< 14%
Chlorobenzene	1 %			< 13%

Column: Rtx 502.2
Water Limits based on LCS Data Generated 5/95
Soil Limits based on 3/90 SOW

Results within Specifications - PASS

VERBAL ADDITIONS/CANCELLATIONS TO ANALYSIS
 REQUEST SHEET

 Client: Mark Milani Date: 2/14

 Requested By: Earth Tech Time: _____ AM _____ PM

Recorded By: _____

Current Lab ID (Previous Lab ID)	Client ID	Circle Matrix	Specify add or cancel	Analysis	Due Date
12217100/ (1221242	G1	water soil waste oil other	add	8010	2/14
()		water soil waste oil other			
()		water soil waste oil other			
()		water soil waste oil other			
()		water soil waste oil other			
()		water soil waste oil other			



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A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 22-AUG-95
Lab Job Number: 122193
Project ID: 687157.08
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

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TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: LUFT
Location: Mill Springs	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122193-001	MSP-H6	22671	08/14/95	08/16/95	08/19/95	
122193-002	MSP-H4	22671	08/14/95	08/16/95	08/19/95	
122193-003	MSP-H2	22671	08/14/95	08/16/95	08/19/95	
122193-004	MSP-H11	22671	08/14/95	08/16/95	08/19/95	

Analyte	Units	122193-001	122193-002	122193-003	122193-004
Diln Fac:		1	1	1	1
Diesel Range	ug/L	540 Y	<50	<50	<50
Fuel Oil #6	ug/L	<1300	<1300	<1300	<1300
Surrogate					
Hexacosane	%REC	93	103	101	100



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: LUFT
Location: Mill Springs	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122193-005	MSP-H9	22671	08/14/95	08/16/95	08/19/95	
122193-006	MSP-MW1	22671	08/14/95	08/16/95	08/19/95	
122193-007	MSP-H10	22671	08/14/95	08/16/95	08/19/95	

Analyte	Units	122193-005	122193-006	122193-007
Diln Fac:		1	1	1
Diesel Range	ug/L	260 Y	1100 Y	<50
Fuel Oil #6	ug/L	<1300	<1300	<1300
Surrogate				
Hexacosane	%REC	95	115	100



Lab #: 122193

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: 3520
Location: Mill Springs	

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water	Prep Date: 08/16/95
Batch#: 22671	Analysis Date: 08/18/95
Units: ug/L	
Diln Fac: 1	

BS Lab ID: QC01614

Analyte	Spike Added	BS	%Rec #	Limits
Diesel Range	2565	2104	82	60-140
Surrogate	%Rec	Limits		
Hexacosane	102	60-140		

BSD Lab ID: QC01615

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel Range	2565	2178	85	60-140	3	<35
Surrogate	%Rec	Limits				
Hexacosane	100	60-140				

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits
 RPD: 0 out of 1 outside limits
 Spike Recovery: 0 out of 2 outside limits



Lab #: 122193

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08 Prep Method: 3520
Location: Mill Springs

METHOD BLANK

Matrix: Water Prep Date: 08/16/95
Batch#: 22671 Analysis Date: 08/18/95
Units: ug/L
Diln Fac: 1

MB Lab ID: QC01613

Analyte	Result	
Diesel Range	<50	
Fuel Oil #6	<1300	
Surrogate	%Rec	Recovery Limits
Hexacosane	101	60-140



Curtis & Tompkins, Ltd

LABORATORY NUMBER: 122171-METHOD BLANK
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILL SPRINGS
SAMPLE ID: MB

DATE ANALYZED: 08/15/95
DATE REPORTED: 08/17/95
BATCH NO: 22622

EPA 8010
Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl chloride	ND	2.0
Chloroethane	ND	2.0
Methylene chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0

ND = Not detected at or above reporting limit.

Surrogate Recovery

=====
Bromobenzene

106 %
=====



LABORATORY NUMBER: 122193
 CLIENT: THE EARTH TECHNOLOGY
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS

DATE SAMPLED: 08/14/95
 DATE RECEIVED: 08/14/95
 DATE ANALYZED: 08/17/95
 DATE REPORTED: 08/22/95
 BATCH NO: 22670

Total Volatile Hydrocarbons with BTXE in Aqueous Solution
 TVH by California DOHS Method/LUFT Manual October 1989
 MTBE & BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	MTBE (ug/L)
122193-001	MSP-H6	16,000	7,700+	1,100	120	800	67,000*
122193-004	MSP-H11	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)
122193-005	MSP-H9	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	0.8	ND(2.0)
122193-007	MSP-H10	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

* Result obtained from a 1:1000 dilution analyzed on 08/20/95. (Batch No:22735).

+ Result obtained from a 1:100 dilution QC Batch No:22697.

QA/QC SUMMARY: MS/MSD of sample no:122193-004

RPD, %	1
RECOVERY, %	104



LABORATORY NUMBER: 122193
 CLIENT: THE EARTH TECHNOLOGY
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS

DATE SAMPLED: 08/14/95
 DATE RECEIVED: 08/14/95
 DATE ANALYZED: 08/17/95
 DATE REPORTED: 08/22/95
 BATCH NO: 22697

Total Volatile Hydrocarbons with BTXE in Aqueous Solution
 TVH by California DOHS Method/LUFT Manual October 1989
 MTBE & BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	MTBE (ug/L)
122193-002	MSP-H4	210	9.2	ND(0.5)	ND(0.5)	4.8	29
122193-003	MSP-H2	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	5.4	ND(2.0)
122193-006	MSP-MW1	11,000	190	260	110	900	210*
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

* Result obtained from a 1:8 dilution analyzed on 08/20/95 (Batch No:22735).

QA/QC SUMMARY: MS/MSD of sample no:122146-001

RPD, %	<1
RECOVERY, %	102

122193

Chain of Custody Record

Lab job no.: _____
 Date 09/14/95
 Page 1 of 2

Laboratory Curtis & Tompkins
 Address 2323 - 5th Ave
Berkeley, CA

Method of Shipment: drop-off

Client Earth Tech
 Address 2030 Addison St. #500
Berkeley, CA 94709

Shipment No. _____

Project Name / Number quail Mill Springs 1687157.08

Project Manager Mark Milani

Telephone No. 510/540-6954

Fax No. 510/540-7496

Contract / Purchase Order / Quote _____

Samplers: (Signature) TJD

Filtered / No. of Containers	Analysis Required			Remarks
	3015 TPH	3015 TPH	3020 HCB	
3	X	X	X	
1	X			
3	X	X	X	
1	X			
3	X	X	X	
1	X			
3	X	X	X	
1	X			
3	X	X	X	
1	X			

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation	
						Temp.	Chemical
MSP-H6	-	09/14/95	1150	Water	40 ml VOA	4°C	HCL
MSP-H6	"	"	1150	"	1 L amber	4°C	none
MSP-H4	"	"	1210	"	40 ml VOA	4°C	HCL
MSP-H4	"	"	1210	"	1 L amber	"	none
MSP-H2	"	"	1225	"	40 ml VOA	"	HCL
MSP-H2	"	"	1225	"	1 L amber	"	none
MSP-H11	"	"	1245	"	40 ml VOA	"	HCL
MSP-H11	"	"	1245	"	1 L amber	"	none
MSP-H9	"	"	1545	"	40 ml VOA	"	HCL
MSP-H9	"	"	1545	"	1 L amber	"	none
MSP-MW1	"	"	1600	"	40 ml VOA	"	HCL
MSP-MW1	"	"	1600	"	1 L amber	"	none

Relinquished by: Signature: <u>TJD</u> Printed: <u>TAN Dinh</u> Company: <u>Earth Tech</u> Reason: <u>Lab drop-off</u>	Date: <u>09/14/95</u> Time: <u>1800</u>	Received by: Signature: _____ Printed: _____ Company: _____ Reason: _____	Date: _____ Time: _____	Relinquished by: Signature: _____ Printed: _____ Company: _____ Reason: _____	Date: _____ Time: _____	Received by: Signature: <u>T. B. S.</u> Printed: <u>T. B. S.</u> Company: <u>CEI</u> Reason: _____	Date: <u>09/14/95</u> Time: <u>6:10</u>
Comments: <u>5 days TAT</u>							

122193

Chain of Custody Record

Lab job no.: _____
 Date 08/14/95
 Page 2 of 2

Laboratory Curtin & Tompkins
 Address 2323 - 5th
Berkeley, CA

Method of Shipment: drop off

Client Earth Tech
 Address 2030 Addison St. #500
Berkeley, CA 94704

Shipment No. _____

Project Manager Mark Milani

Telephone No. 510/540-6954

Project Name / Number Mill Springs / 681157.08

Fax No. 510/540-7496

Contract / Purchase Order / Quote _____

Samplers: (Signature) [Signature]

Priority	No. of Containers	Analysis Required				Remarks
		8015 TPAH	8015 TPAH	8020 MTBE	8020 MTBE	
		X	X	X		
		X				

7

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation		Temp.	Chemical	-	3	X	X	X					
						Temp.	Chemical												
MSP-H10	-	08/14/95	1310	Water	40 ml JDA	4°C	HCL												
MSP-H10	-	"	1300	"	1 Liter Amber	"	none												

Relinquished by: <u>[Signature]</u> Signature _____ Printed <u>Tan Dinh</u> Company <u>Earth Tech</u> Reason <u>lab drop-off</u>	Date <u>08/14/95</u> Time <u>1800</u>	Received by: _____ Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Relinquished by: _____ Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: <u>[Signature]</u> Signature <u>Tan Dinh</u> Printed <u>T. Dinh</u> Company <u>CT</u> Reason _____	Date <u>8/14</u> Time <u>6:10</u>			
Comments: <u>5 days TAT</u>				Relinquished by: _____ Signature _____ Printed _____ Company _____ Reason _____				Date _____ Time _____	Received by: _____ Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710. Phone (415) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 23-AUG-95
Lab Job Number: 122174
Project ID: 687157.08
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

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TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Project#: 687157.08
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122174-002	MSP-H7	22616	08/11/95	08/14/95	08/23/95	
122174-003	MSP-H5	22616	08/11/95	08/14/95	08/22/95	
122174-004	MSP-H3	22616	08/11/95	08/14/95	08/23/95	
122174-005	MSP-H1	22616	08/11/95	08/14/95	08/23/95	

Analyte	Units	122174-002	122174-003	122174-004	122174-005
Diln Fac:		1	1	1	1
Diesel Range	ug/L	620 YL	74 YL	<50	<50
Fuel Oil #6	ug/L	<1300	<1300	<1300	<1300
Surrogate					
Hexacosane	%REC	107	115	110	109

Y: Sample exhibits fuel pattern which does not resemble standard

L: Lighter hydrocarbons than indicated standard



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Project#: 687157.08
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122174-006	MSP-H8	22616	08/11/95	08/14/95	08/23/95	

Analyte	Units	122174-006
Diln Fac:		1
Diesel Range	ug/L	87 YL
Fuel Oil #6	ug/L	<1300
Surrogate		
Hexacosane	%REC	103

Y: Sample exhibits fuel pattern which does not resemble standard
L: Lighter hydrocarbons than indicated standard



Lab #: 122174

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Project#: 687157.08
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: 3520

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 22616
Units: ug/L
Diln Fac: 1

Prep Date: 08/14/95
Analysis Date: 08/22/95

LCS Lab ID: QC01392

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	2414	2565	94	60-140
Surrogate	%Rec	Limits		
Hexacosane	99	60-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

Lab #: 122174

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: 3520
Location: Mill Springs	

METHOD BLANK

Matrix: Water	Prep Date: 08/14/95
Batch#: 22616	Analysis Date: 08/22/95
Units: ug/L	
Diln Fac: 1	

MB Lab ID: QC01391

Analyte	Result	
Diesel Range	<50	
Fuel Oil #6	<1300	
Surrogate	%Rec	Recovery Limits
Hexacosane	94	60-140



LABORATORY NUMBER: 122174
CLIENT: THE EARTH TECHNOLOGY
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS

DATE SAMPLED: 08/11/95
DATE RECEIVED: 08/11/95
DATE ANALYZED: 08/15/95
DATE REPORTED: 08/22/95
BATCH NO: 22610

Total Volatile Hydrocarbons with BTXE in Aqueous Solution
TVH by California DOHS Method/LUFT Manual October 1989
MTBE & BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	MTBE (ug/L)
122174-001	GROTH-MW1	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)
122174-005	MSP-H1	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: MS/MSD of sample no:122102-002

=====
RPD, % <1
RECOVERY, % 106
=====



LABORATORY NUMBER: 122174
CLIENT: THE EARTH TECHNOLOGY
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS

DATE SAMPLED: 08/11/95
DATE RECEIVED: 08/11/95
DATE ANALYZED: 08/17/95
DATE REPORTED: 08/22/95
BATCH NO: 22670

Total Volatile Hydrocarbons with BTXE in Aqueous Solution
TVH by California DOHS Method/LUFT Manual October 1989
MTBE & BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	MTBE (ug/L)
122174-002	MSP-H7	17,000	3,200	820	740	1,900	14,000
122174-003	MSP-H5	4,000	1,300	270	43	350	14,000*
122174-004	MSP-H3	ND(50)	10	ND(0.5)	ND(0.5)	ND(0.5)	26
122174-006	MSP-H8	7,300	3,000	89	140	230	15,000
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)

* Result obtained from a 1:150 dilution QC Batch No:22697.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: MS/MSD of sample no:122193-004

=====
RPD, % 1
RECOVERY, % 104
=====



Laboratory Santis & Tompkins
 Address 2323 - 5th Ave
Berkeley, CA

Client Earth Tech
 Address 2030 Addison St., #500
Berkeley, CA 94704

Project Name / Number Mill Springs / 687157.0P

Contract / Purchase Order / Quote

122174

Chain of Custody Record

Method of Shipment: drop-off

Shipment No. _____

Project Manager Mark Milani

Telephone No. 510 / 540 - 6954

Fax No. 510 / 540 - 7496

Samplers: (Signature) TD

Lab job no. _____

Date 08/11/95

Page _____ of _____

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation		Temp.	Chemical	Analysis Required					Remarks	
										Fluoride	No. of Containers	2015 Tptg	2015 Tptg	fuel oil		2020 HTRF
-1	GROTH - MW1	08/11/95	1210	water	40 ml vials	4°C	Hcl	-	3	X			X			
2	MSP - H7	"	1240	"	"	4°C	Hcl	-	3	X		X	X			
	MSP - H7	"	1240	"	1 L amber	"	none	-	1		X					
3	MSP - H5	"	1305	"	40 ml VOA	"	HCL	-	3	X		X	X			
	MSP - H5	"	1305	"	1 L amber	"	none	-	1		X					
4	MSP - H3	"	1410	"	40 ml VOA	"	HCL	-	3	X		X	X			
	MSP - H3	"	1410	"	1 L amber	"	none	-	1		X					
5	MSP - H1	"	1420	"	40 ml VOA	"	HCL	-	3	X		X	X			
	MSP - H1	"	1420	"	1 L amber	"	none	-	1		X					
6	MSP - H8	"	1445	"	40 ml VOA	"	Hcl	-	3	X		X	X			
	MSP - H8	"	1450	"	1 L amber	"	none	-	1		X					

Relinquished by: Signature <u>TD</u> Printed <u>Tan Dinh</u> Company <u>Earth Tech</u> Reason <u>Lab drop-off</u>	Date <u>08/11/95</u> Time <u>1755</u>	Received by: Signature <u>Kenneth</u> Printed <u>K. HOCH</u> Company <u>CLT</u> Reason <u>LAB</u>	Date <u>8/11/95</u> Time <u>1755</u>	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____
Comments: <u>5-day TAT</u>				Relinquished by: Signature _____ Printed _____ Company _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____	Date _____ Time _____



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2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 24-AUG-95
Lab Job Number: 122124
Project ID: N/A
Location: Mill Springs

Reviewed by:

Kevin Hahn

Reviewed by:

Tracy Babjan

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LABORATORY NUMBER: 122124
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 LOCATION: MILL SPRINGS

DATE SAMPLED: 08/09/95
 DATE RECEIVED: 08/09/95
 DATE ANALYZED: 08/15/95
 DATE REPORTED: 08/24/95
 BATCH NO: 22610

Total Volatile Hydrocarbons with BTXE in Aqueous Solution
 TVH by California DOHS Method/LUFT Manual October 1989
 MTBE & BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	MTBE (ug/L)
122124-002	G1-VOAS	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: MS/MSD of sample No: 122102-002

RPD, % <1
 RECOVERY, % 106



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122124
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILL SPRING

DATE SAMPLED: 08/09/95
DATE RECEIVED: 08/09/95
DATE ANALYZED: 08/11/95
DATE REPORTED: 08/24/95
BATCH NO: 22570

Total Volatile Hydrocarbons as Gasoline in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	TVH AS GASOLINE (ug/L)	REPORTING LIMIT (ug/L)
122124-003	G1A-VOA	ND	50
METHOD BLANK	N/A	ND	50

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: MS/MSD of sample No:122113-001

RPD, %	<1
RECOVERY, %	106



LABORATORY NUMBER: 122124
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILL SPRING

DATE SAMPLED: 08/09/95
DATE RECEIVED: 08/09/95
DATE ANALYZED: 08/17/95
DATE REPORTED: 08/24/95
BATCH NO: 22670

Total Volatile Hydrocarbons as Gasoline in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	TVH AS GASOLINE (ug/L)	REPORTING LIMIT (ug/L)
122124-004	G1B-VOA	ND	50
METHOD BLANK	N/A	ND	50

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: MS/MSD of sample No:122193-004

RPD, % 1
RECOVERY, % 104



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122124-001	G1-LITER AMBER	22616	08/09/95	08/14/95	08/22/95	

Analyte	Units	122124-001
Diln Fac:		1
Diesel Range	ug/L	<50
Fuel Oil #6	ug/L	<1300
Surrogate		
Hexacosane	%REC	108



Lab #: 122124

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill SpringsAnalysis Method: CA LUFT (EPA 8015M)
Prep Method: 3520

METHOD BLANK

Matrix: Water
Batch#: 22616
Units: ug/L
Diln Fac: 1Prep Date: 08/14/95
Analysis Date: 08/22/95

MB Lab ID: QC01391

Analyte	Result	
Diesel Range	<50	
Fuel Oil #6	<1300	
Surrogate	%Rec	Recovery Limits
Hexacosane	94	60-140



Lab #: 122124

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons			
Client:	The Earth Technology Corporation	Analysis Method:	CA LUFT (EPA 8015M)
Location:	Mill Springs	Prep Method:	3520
LABORATORY CONTROL SAMPLE			
Matrix:	Water	Prep Date:	08/14/95
Batch#:	22616	Analysis Date:	08/22/95
Units:	ug/L		
Diln Fac:	1		

LCS Lab ID: QC01392

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	2414	2565	94	60-140
Surrogate	%Rec	Limits		
Hexacosane	99	60-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

122124

Chain of Custody Record

Laboratory Canary & Tompkins
 Address 2323 - 5th Ave
Berkeley, CA

Client Earth Tech
 Address 2030 Addison St., #500
Berkeley, CA 94709

Project Name / Number Mill Springs

Method of Shipment: drop-off

Shipment No. _____

Project Manager Mark Milan

Telephone No. 510/540-6954

Fax No. 510/834-9646

Samplers: (Signature) [Signature]

OTVE
 50000
 per min

Lab Job no.: _____
 Date 08/09/95
 Page 1 of 1

Priority	No. of Containers	Analysis Requested	Remarks
TPH	1	X	
5 parameters	4	X	
TPH, HCL, VOA	1	X	
8810/8020	1	X	composite 3 -> 1
	2		(osmeter used)

-1
 -2
 -3
 -4
 -5

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation					
						Temp	Chemical				
G1	-	08/09/95	1530	Water	1 L amber	4C		-	1	X	
G1	-	08/09/95	"	"	VOAS	"	HCL	-	4	X	X
G1A	-	"	"	"	VOA	"	"	-	1	X	
G1B	-	"	"	"	"	"	"	-	2	X	
G1D								-	1	X	
Trihalobts									2		

Relinquished by:
 Signature [Signature]
 Printed Mark G. Petersen
 Company Earth Tech
 Reason lab drop-off

Date 08-09-95
 Time 20:20
 Received by:
 Signature [Signature]
 Printed KEITH E. WELLS
 Company C&T
 Reason _____

Relinquished by:
 Signature _____
 Printed _____
 Company _____
 Reason _____

Date _____
 Time _____
 Received by:
 Signature _____
 Printed _____
 Company _____
 Reason _____

Comments: _____

Relinquished by:
 Signature _____
 Printed _____
 Company _____
 Reason _____

Date _____
 Time _____
 Received by:
 Signature _____
 Printed _____
 Company _____
 Reason _____



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A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 09-OCT-95
Lab Job Number: 122617
Project ID: 687157.08
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

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LABORATORY NUMBER: 122617
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS

DATE SAMPLED: 09/13/95
 DATE RECEIVED: 09/13/95
 DATE ANALYZED: 09/14-15/95
 DATE REPORTED: 09/22/95
 BATCH NO: 23287

Total Volatile Hydrocarbons with BTXE in Aqueous Solution
 TVH by California DOHS Method/LUFT Manual October 1989
 MTBE & BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	MTBE (ug/L)
122617-001	MSP-H1	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)
122617-002	MSP-H4	ND(50)	1.3	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)
122617-003	MSP-H7	5,800	2,800	77	280	510	11,000
122617-004	MSP-H8	4,000	2,200*	61	42	120	8,000*
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)

* Result obtained from a 1:80 dilution.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: MS/MSD OF SAMPLE NO:122563-001

=====
 RPD, % 2
 RECOVERY, % 99
 =====



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: LUFT
Location: Mill Springs	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122617-001	MSP-H1	23266	09/13/95	09/14/95	09/18/95	

Analyte	Units	122617-001
Diln Fac:		1
Diesel Range	ug/L	<50
Fuel Oil #6	ug/L	<1300
Surrogate		
Hexacosane	%REC	125



Lab #: 122617

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: 3520
Location: Mill Springs	

METHOD BLANK

Matrix: Water	Prep Date: 09/14/95
Batch#: 23266	Analysis Date: 09/16/95
Units: ug/L	
Diln Fac: 1	

MB Lab ID: QC04104

Analyte	Result	
Diesel Range	<50	
Fuel Oil #6	<1300	
Surrogate	%Rec	Recovery Limits
Hexacosane	124	60-140



Lab #: 122617

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: 3520
Location: Mill Springs	

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water	Prep Date: 09/14/95
Batch#: 23266	Analysis Date: 09/16/95
Units: ug/L	
Diln Fac: 1	

BS Lab ID: QC04105

Analyte	Spike Added	BS	%Rec #	Limits
Diesel Range	2565	1877	73	60-140
Surrogate	%Rec	Limits		
Hexacosane	131	60-140		

BSD Lab ID: QC04106

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel Range	2565	2132	83	60-140	10	<35
Surrogate	%Rec	Limits				
Hexacosane	133	60-140				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits



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2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

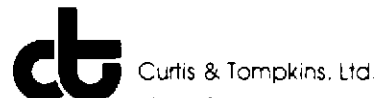
The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 25-AUG-95
Lab Job Number: 122222
Project ID: 687157.08
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

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LABORATORY NUMBER: 12222
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS

DATE SAMPLED: 08/16/95
 DATE RECEIVED: 08/16/95
 DATE ANALYZED: 08/23/95
 DATE REPORTED: 08/25/95
 BATCH NO: 22759

Total Volatile Hydrocarbons with BTXE in Aqueous Solution
 TVH by California DOHS Method/LUFT Manual October 1989
 MTBE & BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	MTBE (ug/L)
122222-001	MSP-H5A	970	340	ND(5.0)	ND(5.0)	80	4,800*
122222-002	MSP-H9A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)

* Result obtained from a 1:50 dilution (Batch No:22808).

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: BS/BSD

RPD, %	2
RECOVERY, %	103



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Project#: 687157.08
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122222-001	MSP-H5A	22671	08/16/95	08/16/95	08/21/95	
122222-002	MSP-H9A	22671	08/16/95	08/16/95	08/22/95	

Analyte	Units	122222-001	122222-002
Diln Fac:		1	1
Diesel Range	ug/L	<50	<50
Fuel Oil #6	ug/L	<1300	<1300
Surrogate			
Hexacosane	%REC	99	97

Lab #: 122222

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: 3520
Location: Mill Springs	

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water	Prep Date: 08/16/95
Batch#: 22671	Analysis Date: 08/19/95
Units: ug/L	
Diln Fac: 1	

BS Lab ID: QC01614

Analyte	Spike Added	BS	%Rec #	Limits
Diesel Range	2565	2104	82	60-140
Surrogate	%Rec	Limits		
Hexacosane	102	60-140		

BSD Lab ID: QC01615

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel Range	2565	2178	85	60-140	3	<35
Surrogate	%Rec	Limits				
Hexacosane	100	60-140				

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits
 RPD: 0 out of 1 outside limits
 Spike Recovery: 0 out of 2 outside limits

Lab #: 122222

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: 3520
Location: Mill Springs	

METHOD BLANK

Matrix: Water	Prep Date: 08/16/95
Batch#: 22671	Analysis Date: 08/19/95
Units: ug/L	
Diln Fac: 1	

MB Lab ID: QC01613

Analyte	Result	
Diesel Range	<50	
Fuel Oil #6	<1300	
Surrogate	%Rec	Recovery Limits
Hexacosane	101	60-140

122222

The Earth Technology Corporation

Chain of Custody Record

Lab Job no. _____

Laboratory Qualis & Tompkins
Address 2323 5th St
Berkeley, CA

Date 08/16/95

Page 1 of 1

Method of Shipment: drop-off

Client Earth Tech
Address 2030 Addison St, #500
Berkeley, CA 94704

Shipment No. _____

Project Manager Mark Milani

Telephone No. 510/540-6954

Project Name / Number Mill Springs / 687157.08

Fax No. 510/540-7496

Contract / Purchase Order / Quote _____

Samplers: (Signature) Tan Dinh

Priority	No. of Containers	Analyte Required				Remarks
		1015 TPHd	1015 TPHg	Fuel Oil	3020 MTBE	
		X	X	X		

-1-
-2-

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation								
						Temp.	Chemical							
MSP-H5A	-	08/16/95	1040	Water	40 ml VOA	4°C	HCL	-	3	X	X	X		
MSP-H5A	-	"	1040	"	1 L amber	"	None	-	1	X				
MSP-H9A	-	"	1100	"	40 ml VOA	"	HCL	-	3	X	X	X		
MSP-H9A	-	"	1100	"	1 L amber	"	None	-	1	X				

Relinquished by: Signature <u>Tan Dinh</u> Printed <u>Tan Dinh</u> Company <u>Earth Tech</u> Reason <u>Lab drop-off</u>	Date <u>08/16/95</u> Time <u>1245</u>	Received by: Signature <u>K. Hoch</u> Printed <u>K. Hoch</u> Company <u>CT</u> Reason <u>LAB.</u>	Date Time	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date Time	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date Time
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Comments: <u>5-day TAT</u>	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date Time	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date Time
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2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 29-AUG-95
Lab Job Number: 122071
Project ID: 687157.08
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

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Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122071
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS

DATE SAMPLED: 08/07/95
DATE RECEIVED: 08/07/95
DATE ANALYZED: 08/11/95
DATE REPORTED: 08/28/95
BATCH NO: 22565

Total Volatile Hydrocarbons as Gasoline in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	TVH AS GASOLINE (mg/Kg)	REPORTING LIMIT (mg/Kg)
122071-004	MSP-H2-SD5	ND	1.0
122071-009	MSP-H4-SD5	ND	1.0
122071-010	MSP-H4-SD6	ND	1.0
Method Blank	N/A	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: MS/MSD of sample No:122047-001

RPD, %	3
RECOVERY, %	79



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122071
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS

DATE SAMPLED: 08/07/95
DATE RECEIVED: 08/07/95
DATE ANALYZED: 08/18/95
DATE REPORTED: 08/28/95
BATCH NO: 22702

Total Volatile Hydrocarbons as Gasoline in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	TVH AS GASOLINE (mg/Kg)	REPORTING LIMIT (mg/Kg)
122071-001	MSP-H2-SD2	ND	1.0
122071-008	MSP-H4-SD3	ND	1.0
Method Blank	N/A	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: MS/MSD of sample No:122071-008

RPD, %	<1
RECOVERY, %	101



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122071
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS

DATE SAMPLED: 08/07/95
DATE RECEIVED: 08/07/95
DATE ANALYZED: 08/18/95
DATE REPORTED: 08/28/95
BATCH NO.: 22702

Total Volatile Hydrocarbons with BTXE in Solids and Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
122071-002	MSP-H2-SD3	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
122071-005	MSP-H2-SD6	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
122071-007	MSP-H4-SD1	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
METHOD BLANK	N/A	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: MS/MSD of Sample No:122071-008

RPD, % <1
RECOVERY, % 101



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Project#: 687157.08
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122071-001	MSP-H2-SD2	22732	08/07/95	08/19/95	08/23/95	
122071-002	MSP-H2-SD3	22732	08/07/95	08/19/95	08/23/95	
122071-004	MSP-H2-SD5	22732	08/07/95	08/19/95	08/23/95	
122071-005	MSP-H2-SD6	22732	08/07/95	08/19/95	08/23/95	

Analyte	Units	122071-001	122071-002	122071-004	122071-005
Diln Fac:		1	1	1	1
Diesel Range	mg/Kg	<1	<1	<1	<1
Fuel Oil #6	mg/Kg	<25	<25	<25	<25
Surrogate					
Hexacosane	%REC	74	73	77	73



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Project#: 687157.08
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122071-007	MSP-H4-SD1	22732	08/07/95	08/19/95	08/23/95	
122071-008	MSP-H4-SD3	22732	08/07/95	08/19/95	08/23/95	
122071-009	MSP-H4-SD5	22732	08/07/95	08/19/95	08/23/95	

Analyte	Units	122071-007	122071-008	122071-009
Diln Fac:		1	1	1
Diesel Range	mg/Kg	<1	<1	<1
Fuel Oil #6	mg/Kg	<25	<25	<25
Surrogate				
Hexacosane	%REC	68	69	75



Lab #: 122071

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Project#: 687157.08
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: SHAKER TABLE

METHOD BLANK

Matrix: Soil
Batch#: 22732
Units: mg/Kg
Diln Fac: 1

Prep Date: 08/19/95
Analysis Date: 08/23/95

MB Lab ID: QC01850

Analyte	Result	
Diesel Range	<1.0	
Fuel Oil #6	<25	
Surrogate	%Rec	Recovery Limits
Hexacosane	75	60-140



Lab #: 122071

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: SHAKER TABLE
Location: Mill Springs	

LABORATORY CONTROL SAMPLE

Matrix: Soil	Prep Date: 08/19/95
Batch#: 22732	Analysis Date: 08/23/95
Units: mg/Kg	
Diln Fac: 1	

LCS Lab ID: QC01851

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	42.9	51.3	84	60-140
Surrogate	%Rec	Limits		
Hexacosane	79	60-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits



Lab #: 122071

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
 Project#: 687157.08
 Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
 Prep Method: SHAKER TABLE

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: MSP-H4-SD3
 Lab ID: 122071-008
 Matrix: Soil
 Batch#: 22732
 Units: mg/Kg
 Diln Fac: 1

Sample Date: 08/07/95
 Received Date: 08/07/95
 Prep Date: 08/19/95
 Analysis Date: 08/23/95

MS Lab ID: QC01852

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Diesel Range	51.3	<1.000	39.8	78	50-150
Surrogate	%Rec	Limits			
Hexacosane	72	60-140			

MSD Lab ID: QC01853

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Diesel Range	51.3	43.1	84	50-150	8	<30
Surrogate	%Rec	Limits				
Hexacosane	72	60-140				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits

LABORATORY NUMBER: 122071-001
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS
 SAMPLE ID: MSP-H2-SD2

DATE SAMPLED: 08/07/95
 DATE RECEIVED: 08/07/95
 DATE ANALYZED: 08/16/95
 DATE REPORTED: 08/28/95
 BATCH NO: 22655

EPA 8010 Compound List by EPA 8240
 Purgeable Halocarbons in Solids & Soil

Compound	Result ug/kg	Reporting Limit ug/kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	2.0
Tetrachloroethene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	97 %
Toluene-d8	111 %
Bromofluorobenzene	92 %



LABORATORY NUMBER: 122071-001
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H2-SD2

DATE SAMPLED: 08/07/95
DATE RECEIVED: 08/07/95
DATE ANALYZED: 08/16/95
DATE REPORTED: 08/28/95
BATCH NO: 22655

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Solids & Soil

COMPOUND	RESULT ug/kg	REPORTING LIMIT ug/kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	97 %
Toluene-d8	111 %
Bromofluorobenzene	92 %

LABORATORY NUMBER: 122071-004
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS
 SAMPLE ID: MSP-H2-SD5

DATE SAMPLED: 08/07/95
 DATE RECEIVED: 08/07/95
 DATE ANALYZED: 09/11/95
 DATE REPORTED: 08/17/95
 BATCH NO: 22538

EPA 8010 Compound List by EPA 8240
 Purgeable Halocarbons in Solids & Soil

Compound	Result ug/kg	Reporting Limit ug/kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	2.0
Tetrachloroethene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	94 %
Toluene-d8	104 %
Bromofluorobenzene	96 %



Curtis & Tompkins, Ltd

LABORATORY NUMBER: 122071-004
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H2-SD5

DATE SAMPLED: 08/07/95
DATE RECEIVED: 08/07/95
DATE ANALYZED: 09/11/95
DATE REPORTED: 08/17/95
BATCH NO: 22538

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Solids & Soil

COMPOUND	RESULT ug/kg	REPORTING LIMIT ug/kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	94 %
Toluene-d8	104 %
Bromofluorobenzene	96 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122071-005
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H2-SD6

DATE SAMPLED: 08/07/95
DATE RECEIVED: 08/07/95
DATE ANALYZED: 08/16/95
DATE REPORTED: 08/28/95
BATCH NO: 22655

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Solids & Soil

COMPOUND	RESULT ug/kg	REPORTING LIMIT ug/kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	94 %
Toluene-d8	104 %
Bromofluorobenzene	90 %

LABORATORY NUMBER: 122071-007
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS
 SAMPLE ID: MSP-H4-SD1

DATE SAMPLED: 08/07/95
 DATE RECEIVED: 08/07/95
 DATE ANALYZED: 08/16/95
 DATE REPORTED: 08/28/95
 BATCH NO: 22655

EPA 8010 Compound List by EPA 8240
 Purgeable Halocarbons in Solids & Soil

Compound	Result ug/kg	Reporting Limit ug/kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	2.0
Tetrachloroethene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	99 %
Toluene-d8	109 %
Bromofluorobenzene	92 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122071-007
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H4-SD1

DATE SAMPLED: 08/07/95
DATE RECEIVED: 08/07/95
DATE ANALYZED: 08/16/95
DATE REPORTED: 08/28/95
BATCH NO: 22655

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Solids & Soil

COMPOUND	RESULT ug/kg	REPORTING LIMIT ug/kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	99 %
Toluene-d8	109 %
Bromofluorobenzene	92 %

LABORATORY NUMBER: 122071-008
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS
 SAMPLE ID: MSP-H4-SD3

DATE SAMPLED: 08/07/95
 DATE RECEIVED: 08/07/95
 DATE ANALYZED: 08/16/95
 DATE REPORTED: 08/28/95
 BATCH NO: 22655

EPA 8010 Compound List by EPA 8240
 Purgeable Halocarbons in Solids & Soil

Compound	Result ug/kg	Reporting Limit ug/kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	2.0
Tetrachloroethene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	85 %
Toluene-d8	94 %
Bromofluorobenzene	84 %



LABORATORY NUMBER: 122071-008
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H4-SD3

DATE SAMPLED: 08/07/95
DATE RECEIVED: 08/07/95
DATE ANALYZED: 08/16/95
DATE REPORTED: 08/28/95
BATCH NO: 22655

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Solids & Soil

COMPOUND	RESULT ug/kg	REPORTING LIMIT ug/kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	85 %
Toluene-d8	94 %
Bromofluorobenzene	84 %

LABORATORY NUMBER: 122071-009
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS
 SAMPLE ID: MSP-H4-SD5

DATE SAMPLED: 08/07/95
 DATE RECEIVED: 08/07/95
 DATE ANALYZED: 08/15/95
 DATE REPORTED: 08/28/95
 BATCH NO: 22611

EPA 8010 Compound List by EPA 8240
 Purgeable Halocarbons in Solids & Soil

Compound	Result ug/kg	Reporting Limit ug/kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	2.0
Tetrachloroethene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	111 %
Toluene-d8	102 %
Bromofluorobenzene	99 %

LABORATORY NUMBER: 122071-009
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS
 SAMPLE ID: MSP-H4-SD5

DATE SAMPLED: 08/07/95
 DATE RECEIVED: 08/07/95
 DATE ANALYZED: 08/15/95
 DATE REPORTED: 08/28/95
 BATCH NO: 22611

EPA 8020 Compound List by EPA 8240
 Volatile Aromatic Hydrocarbons in Solids & Soil

COMPOUND	RESULT ug/kg	REPORTING LIMIT ug/kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	111 %
Toluene-d8	102 %
Bromofluorobenzene	99 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122071-010
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H4-SD6

DATE SAMPLED: 08/07/95
DATE RECEIVED: 08/07/95
DATE ANALYZED: 08/15/95
DATE REPORTED: 08/28/95
BATCH NO: 22611

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Soils

COMPOUND	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERY

1,2-Dichloroethane-d4	101 %
Toluene-d8	96 %
Bromofluorobenzene	91 %

LABORATORY NUMBER: 122071-Method Blank
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS
 SAMPLE ID: MB

DATE ANALYZED: 09/14/95
 DATE REPORTED: 08/17/95
 BATCH NO: 22611

EPA 8010 Compound List by EPA 8240
 Purgeable Halocarbons in Solids & Soil

Compound	Result ug/kg	Reporting Limit ug/kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	2.0
Tetrachloroethene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	115 %
Toluene-d8	98 %
Bromofluorobenzene	92 %

LABORATORY NUMBER: 122071-Method Blank
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS
 SAMPLE ID: MB

DATE ANALYZED: 09/14/95
 DATE REPORTED: 08/17/95
 BATCH NO: 22611

EPA 8020 Compound List by EPA 8240
 Volatile Aromatic Hydrocarbons in Solids & Soil

COMPOUND	RESULT ug/kg	REPORTING LIMIT ug/kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	115 %
Toluene-d8	98 %
Bromofluorobenzene	92 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122071-Method Blank
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: Method Blank

DATE ANALYZED: 08/11/95
DATE REPORTED: 08/28/95
BATCH NO: 22538

EPA 8010 Compound List by EPA 8240
Purgeable Halocarbons in Solids & Soil

Compound	Result ug/kg	Reporting Limit ug/kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	2.0
Tetrachloroethene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	100 %
Toluene-d8	104 %
Bromofluorobenzene	97 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122071-Method Blank
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: Method Blank

DATE ANALYZED: 08/11/95
DATE REPORTED: 08/28/95
BATCH NO: 22538

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Solids & Soil

COMPOUND	RESULT ug/kg	REPORTING LIMIT ug/kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	100 %
Toluene-d8	104 %
Bromofluorobenzene	97 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122071-Method Blank
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: MB

DATE ANALYZED: 08/16/95
DATE REPORTED: 08/28/95
BATCH NO: 22655

EPA 8010 Compound List by EPA 8240
Purgeable Halocarbons in Solids & Soil

Compound	Result ug/kg	Reporting Limit ug/kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	2.0
Tetrachloroethene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	113 %
Toluene-d8	111 %
Bromofluorobenzene	99 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122071-Method Blank
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: MB

DATE ANALYZED: 08/16/95
DATE REPORTED: 08/28/95
BATCH NO: 22655

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Solids & Soil

COMPOUND	RESULT ug/kg	REPORTING LIMIT ug/kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane	113 %
Toluene-d8	111 %
Bromofluorobenzene	99 %



8010MS MS/MSD Report

Matrix Sample Number: 122071-010

Lab No: QC01047 QC01048

Matrix: SOIL

Batch No: 22538 435223086034 435223092035 435223080033 Analyst: TW

Date Analyzed: 11-AUG-95

Spike File: DHA34

Spike Dup File: DHA35

	ppb	SpikeAmt	% Rec	Limits
<u>MS RESULTS</u>				
1,1-Dichloroethene	57	50	114 %	59-172%
Trichloroethene	58.5	50	117 %	62-137%
Benzene	60.7	50	121 %	66-142%
Toluene	64.7	50	75 %	59-139%
Chlorobenzene	61.5	50	123 %	60-133%
Surrogate Recoveries				
1,2-Dichloroethane-d4	52.6	50	105 %	75-143%
Toluene-d8	55	50	110 %	77-134%
Bromofluorobenzene	50.4	50	101 %	65-129%
<u>MSD RESULTS</u>				
1,1-Dichloroethene	57.8	50	116 %	59-172%
Trichloroethene	56.8	50	114 %	62-137%
Benzene	58.8	50	118 %	66-142%
Toluene	62.8	50	71 %	59-139%
Chlorobenzene	59.2	50	118 %	60-133%
Surrogate Recoveries				
1,2-Dichloroethane-d4	51.3	50	103 %	75-143%
Toluene-d8	56.2	50	112 %	77-134%
Bromofluorobenzene	50.9	50	102 %	65-129%
<u>MATRIX RESULTS</u>				
1,1-Dichloroethene	0			
Trichloroethene	0			
Benzene	0			
Toluene	27.1			
Chlorobenzene	0			
<u>RPD DATA</u>				
1,1-Dichloroethene	1 %			< 22%
Trichloroethene	3 %			< 24%
Benzene	3 %			< 21%
Toluene	3 %			< 21%
Chlorobenzene	4 %			< 21%

Curtis & Tompkins, Ltd



8260A BS/BSD Report

Lab No: QC01532 QC01533

Date Analyzed: 16-AUG-95

Matrix: Soil

Batch No: 22655 425228151004 425228158005

Spike File: CHG04

Spike Dup File: CHG05

Analyst: LLH

	ppb	SpikeAmt	% Rec	Limits
<u>BS RESULTS</u>				
1,1-Dichloroethene	52.5	50	105 %	59-172%
Trichloroethene	52.6	50	105 %	62-137%
Benzene	54.6	50	109 %	66-142%
Toluene	57.0	50	114 %	59-139%
Chlorobenzene	59.5	50	119 %	60-133%
Surrogate Recoveries				
1,2-Dichloroethane-d4	53.8	50	108 %	70-121%
Toluene-d8	52.5	50	105 %	81-117%
Bromofluorobenzene	47.5	50	95 %	74-121%
Dibromofluoromethane	56.8	50	114 %	80-120%
<u>BSD RESULTS</u>				
1,1-Dichloroethene	53.6	50	107 %	59-172%
Trichloroethene	53.8	50	108 %	62-137%
Benzene	55.7	50	111 %	66-142%
Toluene	57.7	50	115 %	59-139%
Chlorobenzene	60.4	50	121 %	60-133%
Surrogate Recoveries				
1,2-Dichloroethane-d4	53.8	50	108 %	70-121%
Toluene-d8	55.0	50	110 %	81-117%
Bromofluorobenzene	49.2	50	98 %	74-121%
Dibromofluoromethane	56.9	50	114 %	80-120%
<u>RPD DATA</u>				
1,1-Dichloroethene	2 %			< 14%
Trichloroethene	2 %			< 14%
Benzene	2 %			< 11%
Toluene	1 %			< 13%
Chlorobenzene	2 %			< 13%

Results within Specifications - PASS

Table 1

SAMPLE ID	8015 TPHg	8015 TPHd	FUEL oil	EPA 8020	EPA 8010
MSP-H1-SD2	X		X	X	X
MSP-H1-SD3	X	X	X	X	X
MSP-H1-SD4	X			X	
MSP-H1-SD5	X	X	X	X	X
MSP-H2-SD2	X	X	X	X	X
MSP-H2-SD3	X		X	X	
MSP-H2-SD4 (hold)					
MSP-H2-SD5	X	X	X	X	X
MSP-H2-SD6	X		X	X	
MSP-H2-SD7 (hold)					
MSP-H3-SD1 (hold)					
MSP-H3-SD2 (hold)					
MSP-H3-SD3	X	X	X	X	
MSP-H3-SD4 (hold)					
MSP-H3-SD5	X	X	X	X	
MSP-H4-SD1	X		X	X	
MSP-H4-SD3	X		X	X	
MSP-H4-SD5	X	X	X	X	X
MSP-H4-SD6	X			X	
MSP-H5-SD1	X		X	X	
MSP-H5-SD2	X		X	X	
MSP-H5-SD3 (hold)					
MSP-H5-SD4 (hold)					
MSP-H5-SD5	X	X	X	X	
MSP-H6-SD1 (hold)					
MSP-H6-SD2	X	X	X	X	
MSP-H6-SD4	X		X	X	
MSP-H6-SD5-1	X	X	X	X	
MSP-H6-SD5-2	X	X	X	X	
MSP-H7-SD1	X		X	X	
MSP-H7-SD3	X		X	X	
MSP-H7-SD4	X		X	X	
MSP-H7-SD5	X	X	X	X	
MSP-H8-SD1 (hold)					
MSP-H8-SD2	X		X	X	
MSP-H8-SD3	X	X	X	X	
MSP-H8-SD4 (hold)					
MSP-H8-SD5	X	X	X	X	
MSP-H9-SD2	X	X	X	X	
MSP-H9-SD3-1	X	X	X	X	
MSP-H9-SD3-2	X	X	X	X	
MSP-H9-SD4 (hold)					
MSP-H9-SD5-1	X	X	X	X	
MSP-H9-SD5-2	X	X	X	X	
MSP-H9-SD6 (hold)					
MSP-H9-SD7	X		X	X	
MSP-H10-SD2 (hold)					
MSP-H10-SD3	X	X	X	X	
MSP-H10-SD5	X	X	X	X	
MSP-H11-SD1 (hold)					
MSP-H11-SD2	X	X	X	X	
MSP-H11-SD3 (hold)					X
MSP-H11-SD4	X		X	X	
MSP-H11-SD5	X	X	X	X	X

Chain of Custody Record

Lab job no. _____
 Date 8-7-95
 Page 1 of 1

Laboratory Canby & Torkelson
 Address 3225 5th St
Berkeley, CA 94702

Method of Shipment: _____

Client Earth Tech
 Address 2030 Addison St
Berkeley, CA 94704

Shipment No. _____

Project Name / Number Full Spec 160715 708

Project Manager _____

Telephone No. _____

Fax No. _____

Contract / Purchase Order / Quote _____

Samplers: (Signature) _____

Priority	No. of Containers	EPA 815-D-MS	EPA 815-D-MS	EPA 815-D-MS	EPA 815-D-MS	EPA 815-D-MS	EPA 815-D-MS	EPA 815-D-MS	EPA 815-D-MS	Analysis Requested		Remarks
										Temp.	Chemical	
-	1	/	/	/	/	/	/	/	/	/	/	Hold
-	1	/	/	/	/	/	/	/	/	/	/	Hold
-	1	/	/	/	/	/	/	/	/	/	/	Hold
-	1	X	/	/	/	/	/	/	/	/	/	Hold
-	1	/	/	/	/	/	/	/	/	/	/	Hold
-	1	/	/	/	/	/	/	/	/	/	/	Hold
-	1	/	/	/	/	/	/	/	/	/	/	Hold
-	1	X	/	/	/	/	/	/	/	/	/	Hold
-	1	X	/	/	/	/	/	/	/	/	/	Hold

1
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10

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation	
						Temp.	Chemical
MSP-H2-SD2	H2/11.5	"	1215	Soil	6" Lx		
MSP-H2-SD3	H2/11.5	"	1220	"	"		
MSP-H2-SD4	H2/21.5	"	1225	"	"		
MSP-H2-SD5	H2/21.5	"	1230	"	"		
MSP-H2-SD6	H2/31.5	"	1235	"	"		
MSP-H2-SD7	H2/41.5	"	1240	"	"		
MSP-H4-SD1	H4/6.5	"	1440	"	"		
MSP-H4-SD3	H4/16.5	"	1454	"	"		
MSP-H4-SD5	H4/26.5	"	1515	"	"		
MSP-H4-SD6	H4/29	"	1530	"	"		

Relinquished by: Signature _____ Printed <u>Tan Dink</u> Company <u>Earth Tech</u> Reason <u>Lab drop-off</u>	Date <u>08/07/95</u> Time <u>11:30</u>	Received by: Signature _____ Printed <u>Kevon Beck</u> Company <u>CAT</u> Reason <u>Analysis</u>	Date Time	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date Time	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date Time	
Comments: <u>All 7PH @ EPA 3015 (L-PA) collect against individual standard (gasoline, diesel, fuel oil)</u>				Relinquished by: Signature _____ Printed _____ Company _____ Reason _____				Date Time



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710. Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 05-SEP-95
Lab Job Number: 122125
Project ID: N/A
Location: Mills Spring

Reviewed by: _____

Reviewed by: _____

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TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mills Spring

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122125-003	MSP-H3-SD3	22753	08/09/95	08/21/95	09/02/95	
122125-005	MSP-H3-SD5	22753	08/09/95	08/21/95	09/03/95	
122125-009	MSP-H7-SD5	22753	08/09/95	08/21/95	09/03/95	
122125-011	MSP-H6-SD2	22753	08/09/95	08/21/95	09/03/95	

Analyte	Units	122125-003	122125-005	122125-009	122125-011
Diln Fac:		1	1	1	1
Diesel Range	mg/Kg	<1	<1	<1	<1
Fuel Oil #6	mg/Kg	<25	<25	<25	<25
Surrogate					
Hexacosane	%REC	76	94	78	91



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mills Spring

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122125-015	MSP-H9-SD2	22753	08/09/95	08/21/95	09/03/95	
122125-016	MSP-H9-SD3-1	22753	08/09/95	08/21/95	09/03/95	
122125-017	MSP-H9-SD3-2	22753	08/09/95	08/21/95	09/03/95	

Analyte	Units	122125-015	122125-016	122125-017
Diln Fac:		1	1	1
Diesel Range	mg/Kg	<1	<1	<1
Fuel Oil #6	mg/Kg	<25	<25	<25
Surrogate				
Hexacosane	%REC	95	81	82



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mills Spring

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122125-013	MSP-H6-SD5-1	22577	08/09/95	08/13/95	08/17/95	
122125-014	MSP-H6-SD5-2	22577	08/09/95	08/13/95	08/17/95	
122125-019	MSP-H9-SD5-1	22577	08/09/95	08/13/95	08/17/95	
122125-020	MSP-H9-SD5-2	22577	08/09/95	08/13/95	08/17/95	

Analyte	Units	122125-013	122125-014	122125-019	122125-020
Diln Fac:		1	1	1	1
Diesel Range	mg/Kg	<1	<1	<1	<1
Fuel Oil #6	mg/Kg	<25	<25	<25	<25
Surrogate					
Hexacosane	%REC	102	78	89	79



Lab #: 122125

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mills SpringAnalysis Method: CA LUFT (EPA 8015M)
Prep Method: SHAKER TABLE

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 22753
Units: mg/Kg
Diln Fac: 1Prep Date: 08/21/95
Analysis Date: 09/01/95

LCS Lab ID: QC01942

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	45.8	51.3	89	60-140
Surrogate	%Rec	Limits		
Hexacosane	83	60-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits



Lab #: 122125

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mills SpringAnalysis Method: CA LUFT (EPA 8015M)
Prep Method: SHAKER TABLE

METHOD BLANK

Matrix: Soil
Batch#: 22753
Units: mg/Kg
Diln Fac: 1Prep Date: 08/21/95
Analysis Date: 09/01/95

MB Lab ID: QC01941

Analyte	Result	
Diesel Range	<1.0	
Fuel Oil #6	<25	
Surrogate	%Rec	Recovery Limits
Hexacosane	84	60-140



Lab #: 122125

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
 Location: Mills Spring

Analysis Method: CA LUFT (EPA 8015M)
 Prep Method: SHAKER TABLE

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
 Lab ID: 122187-002
 Matrix: Soil
 Batch#: 22753
 Units: mg/Kg dry weight
 Diln Fac: 1

Sample Date: 08/11/95
 Received Date: 08/11/95
 Prep Date: 08/21/95
 Analysis Date: 09/03/95
 Moisture: 14%

MS Lab ID: QC01943

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Diesel Range	59.65	<1.163	51.98	72	50-150
Surrogate	%Rec	Limits			
Hexacosane	94	60-140			

MSD Lab ID: QC01944

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Diesel Range	59.65	53.84	75	50-150	4	<30
Surrogate	%Rec	Limits				
Hexacosane	89	60-140				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits



Lab #: 122125

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mills Spring

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: SHAKER TABLE

METHOD BLANK

Matrix: Soil
Batch#: 22577
Units: mg/Kg
Diln Fac: 1

Prep Date: 08/13/95
Analysis Date: 08/16/95

MB Lab ID: QC01231

Analyte	Result	
Diesel Range	<1.0	
Fuel Oil #6	<25	
Surrogate	%Rec	Recovery Limits
Hexacosane	94	60-140



Lab #: 122125

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mills SpringAnalysis Method: CA LUFT (EPA 8015M)
Prep Method: SHAKER TABLE

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 22577
Units: mg/Kg
Diln Fac: 1Prep Date: 08/13/95
Analysis Date: 08/16/95

LCS Lab ID: QC01232

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	44.9	51.3	88	60-140
Surrogate	%Rec	Limits		
Hexacosane	88	60-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits



LABORATORY NUMBER: 122125
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILLS SPRING

DATE SAMPLED: 08/09/95
DATE RECEIVED: 08/09/95
DATE ANALYZED: 08/19/95
DATE REPORTED: 08/23/95
BATCH NO.: 22730

Total Volatile Hydrocarbons with BTXE in Solids and Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
122125-003	MSP-H3-SD3	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
122125-005	MSP-H3-SD5	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
122125-006	MSP-H7-SD1	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
122125-007	MSP-H7-SD3	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
122125-008	MSP-H7-SD4	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
METHOD BLANK	N/A	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: MS/MSD of sample No:122175-001

=====
RPD, % 3
RECOVERY, % 87
=====

LABORATORY NUMBER: 122125
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 LOCATION: MILLS SPRING

DATE SAMPLED: 08/09/95
 DATE RECEIVED: 08/09/95
 DATE ANALYZED: 08/21/95
 DATE REPORTED: 08/23/95
 BATCH NO.: 22760

Total Volatile Hydrocarbons with BTXE in Solids and Wastes
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
122125-012	MSP-H6-SD4	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
122125-015	MSP-H9-SD2	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
122125-016	MSP-H9-SD3-1	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
122125-017	MSP-H9-SD3-2	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
122125-022	MSP-H9-SD7	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
METHOD BLANK	N/A	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)

ND = Not detected at or above reporting limit; Reporting limit
 indicated in parentheses.

QA/QC SUMMARY

=====

LCS RECOVERY, %

=====

103

=====

LABORATORY NUMBER: 122125
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILLS SPRING

DATE SAMPLED: 8/09/95
DATE RECEIVED: 08/09/95
DATE ANALYZED: 08/16/95
DATE REPORTED: 08/23/95
BATCH NO: 22651



Total Volatile Hydrocarbons as Gasoline in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	TVH AS GASOLINE (mg/Kg)	REPORTING LIMIT (mg/Kg)
122125-013	MSP-H6-SD5-1	ND	1.0
122125-014	MSP-H6-SD5-2	1.6	1.0
122125-019	MSP-H9-SD5-1	ND	1.0
122125-020	MSP-H9-SD5-2	ND	1.0
METHOD BLANK	N/A	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: MS/MSD of sample No:122036-003

RPD, % 10
RECOVERY, % 103



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122125
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILLS SPRING

DATE SAMPLED: 08/09/95
DATE RECEIVED: 08/09/95
DATE ANALYZED: 08/22/95
DATE REPORTED: 08/23/95
BATCH NO.: 22777

Total Volatile Hydrocarbons with BTXE in Solids and Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
122125-009	MSP-H7-SD5	ND(1.0)	19	ND(5.0)	ND(5.0)	ND(5.0)
122125-011	MSP-H6-SD2	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
METHOD BLANK	N/A	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: MS/MSD of sample No:122187-003

=====
RPD, % <1
RECOVERY, % 84
=====



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122125-013
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H6-SD5-1

DATE SAMPLED: 08/09/95
DATE RECEIVED: 08/09/95
DATE ANALYZED: 08/16/95
DATE REPORTED: 08/31/95
BATCH NO: 22655

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Soils

COMPOUND	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Benzene.....	95	5.0
Toluene.....	9.2	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	13	5.0
Chlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERY

1,2-Dichloroethane-d4	79 %
Toluene-d8	87 %
Bromofluorobenzene	76 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122125-014
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H6-SD5-2

DATE SAMPLED: 08/09/95
DATE RECEIVED: 08/09/95
DATE ANALYZED: 08/16/95
DATE REPORTED: 08/31/95
BATCH NO: 22655

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Soils

COMPOUND	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Benzene.....	160	5.0
Toluene.....	39	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	45	5.0
Chlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERY

1,2-Dichloroethane-d4	100 %
Toluene-d8	113 %
Bromofluorobenzene	96 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122125-019
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H9-SD5-1

DATE SAMPLED: 08/09/95
DATE RECEIVED: 08/09/95
DATE ANALYZED: 08/16/95
DATE REPORTED: 08/31/95
BATCH NO: 22655

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Soils

COMPOUND	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERY

1,2-Dichloroethane-d4	98 %
Toluene-d8	102 %
Bromofluorobenzene	89 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122125-020
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H9-SD5-2

DATE SAMPLED: 08/09/95
DATE RECEIVED: 08/09/95
DATE ANALYZED: 08/16/95
DATE REPORTED: 08/31/95
BATCH NO: 22655

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Soils

COMPOUND	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERY

1,2-Dichloroethane-d4	89 %
Toluene-d8	101 %
Bromofluorobenzene	88 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122125-Method Blank
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILL SPRINGS
SAMPLE ID: MB

DATE ANALYZED: 08/16/95
DATE REPORTED: 08/31/95
BATCH NO:22655

EPA 8020 Compound List by EPA 8240
Volatile Aromatic Hydrocarbons in Soils

COMPOUND	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Benzene.....	ND	5.0
Toluene.....	ND	5.0
Ethyl Benzene.....	ND	5.0
Total Xylenes.....	ND	5.0
Chlorobenzene.....	ND	5.0
1,4-Dichlorobenzene.....	ND	5.0
1,3-Dichlorobenzene.....	ND	5.0
1,2-Dichlorobenzene.....	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERY

1,2-Dichloroethane-d4	113 %
Toluene-d8	111 %
Bromofluorobenzene	99 %

Curtis & Tompkins, Ltd



Curtis & Tompkins, Ltd.

8260A Laboratory Control Sample Report

Lab No: QC01610
Date Analyzed: 17-AUG-95
Matrix: WATER
Batch No: 22656 425229022021

LCS Datafile: CHG21

Operator: LLH

Compound	ug/L	SpikeAmt	% Rec	Limits
1,1-Dichloroethene	50.89	50	102 %	61-145%
Trichloroethene	49.49	50	99 %	71-120%
Benzene	51.23	50	102 %	76-127%
Toluene	53.84	50	108 %	76-125%
Chlorobenzene	56.21	50	112 %	75-130%

Surrogate Recoveries

1,2-Dichloroethane-d4	56.52	50	113 %	70-121%
Toluene-d8	51.96	50	104 %	81-117%
Bromofluorobenzene	48.47	50	97 %	74-121%
Dibromofluoromethane	54.68	50	109 %	80-120%

Results within Specifications - PASS

Note: Instrument C and D surrogates based on LCS data

Curtis & Tompkins, Ltd



Curtis & Tompkins, Ltd.

8260A BS/BSD Report

Lab No: QC01532 QC01533

Date Analyzed: 16-AUG-95

Matrix: Soil

Batch No: 22655 425228151004 425228158005

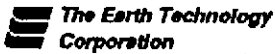
Spike File: CHG04

Spike Dup File: CHG05

Analyst: LLH

	ppb	SpikeAmt	% Rec	Limits
<u>BS RESULTS</u>				
1,1-Dichloroethene	52.5	50	105 %	59-172%
Trichloroethene	52.6	50	105 %	62-137%
Benzene	54.6	50	109 %	66-142%
Toluene	57.0	50	114 %	59-139%
Chlorobenzene	59.5	50	119 %	60-133%
Surrogate Recoveries				
1,2-Dichloroethane-d4	53.8	50	108 %	70-121%
Toluene-d8	52.5	50	105 %	81-117%
Bromofluorobenzene	47.5	50	95 %	74-121%
Dibromofluoromethane	56.8	50	114 %	80-120%
<u>BSD RESULTS</u>				
1,1-Dichloroethene	53.6	50	107 %	59-172%
Trichloroethene	53.8	50	108 %	62-137%
Benzene	55.7	50	111 %	66-142%
Toluene	57.7	50	115 %	59-139%
Chlorobenzene	60.4	50	121 %	60-133%
Surrogate Recoveries				
1,2-Dichloroethane-d4	53.8	50	108 %	70-121%
Toluene-d8	55.0	50	110 %	81-117%
Bromofluorobenzene	49.2	50	98 %	74-121%
Dibromofluoromethane	56.9	50	114 %	80-120%
<u>RPD DATA</u>				
1,1-Dichloroethene	2 %			< 14%
Trichloroethene	2 %			< 14%
Benzene	2 %			< 11%
Toluene	1 %			< 13%
Chlorobenzene	2 %			< 13%

Results within Specifications - PASS



Chain of Custody Record

Lab job no.: _____
 Date 8-9-95
 Page 2 of 2

Laboratory Curtis & Tompkins
 Address 2373 5th St
Berkeley, CA

Method of Shipment: 1

Client EARTH TECH
 Address 2030 Addison St #500
Berkeley CA 94704

Shipment No. 2

Project Manager Mark Milner

Project Name / Number Mill Springs / 19715708

Telephone No. 415-840-6754

Fax No. 415-840-7476

Contract / Purchase Order / Quote _____

Samplers: (Signature) [Signature]

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation		Analysis Requested					Remarks	
						Temp.	Chemical	Heavy Metals	Trace Metals	PH	DO	TOC		Other
MSP-116-SD5	25-28" 3/4	8/6	17:50	S	2 x 1 1/2" HDPE			1	X	X	X	X		
MSP-116-SD5	25-35" 1/2	"	18:00	"	"			1	X	X	X	X		hold
MSP-119-SD2	10" A-NH	"	17:30	"	"			1	/	/	/	/		hold
MSP-119-SD3	10" B-NH	"	15:40	"	"			1	/	/	/	/		hold
MSP-119-SD2	20" 1/2 1/2	"	15:45	"	"			1	/	/	/	/		"
MSP-119-SD4	2" h-21	"	15:45	"	"			1						hold
MSP-119-SD5	25" h-26	"	16:10	"	"			1	X	X	X	X		hold
MSP-119-SD5	25" h-26	"	16:10	"	"			1	X	X	X	X		hold
MSP-119-SD6	31-31" h	"	16:30	"	"			1						hold
MSP-119-SD7	35-35" h	"	16:30	"	"			1	/	/	/	/		hold

Relinquished by: Signature <u>[Signature]</u> Printed <u>Mark Milner</u> Company <u>EARTH TECH</u> Reason <u>Analysis</u>	Date <u>8/9/95</u> Time <u>17:30</u>	Received by: Signature <u>[Signature]</u> Printed <u>[Signature]</u> Company <u>CEC</u> Reason _____	Date _____ Time _____	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____
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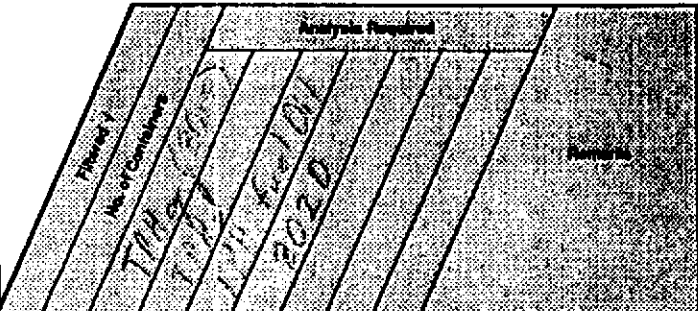
Comments: <u>All 119 SD 1-7 J.15</u>	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____
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Chain of Custody Record

Lab job no.: _____
 Date: 8-9-95
 Page: 1 of 2

Laboratory: Enviro & Tomph
 Address: 2323- 5th Avenue
Berkeley, CA
 Client: Earth Tech
 Address: 2030 Addison Street # 500
Berkeley, CA 94704
 Project Name / Number: Miller Spring
 Contract / Purchase Order / Quote: _____

Method of Shipment: air
 Shipment No.: 3
 Project Manager: Mark Johnson
 Telephone No.: 916-835-6154
 Fax No.: 916-835-6154
 Samplers: (Signature) [Signature]



Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation		Remarks
						Temp.	Chemical	
MSP-H3-SD1	5-5 1/2	8/9/95	0755	401	1" 20			Hold
MSP-H3-SD2	10-10 1/2		0805	"	"			Hold
MSP-H3-SD3	14 1/2-15		0815	"	"			Hold
MSP-H3-SD4	17 1/2-20		0825	"	"			Hold
MSP-H3-SD5	24 1/2-25		0840	"	"			Hold
MSP-H7-SD1	6-6 1/2		1000	"	"			Hold
MSP-H7-SD3	16-16 1/2		1016	"	"			Hold
MSP-H7-SD4	20-20 1/2		1040	"	"			Hold
MSP-H7-SD5	26-26 1/2		1055	"	"			Hold
MSP-H6-SD1	5-5 1/2		1315	"	"			Hold
MSP-H6-SD2	9-9 1/2		1320	"	"			Hold
MSP-H6-SD4	20-20 1/2		1340	"	"			Hold

Relinquished by: Signature: <u>[Signature]</u> Printed: <u>Mark Johnson</u> Company: <u>Earth Tech</u> Reason: <u>lab drop-off</u>	Date: <u>8/9/95</u> Time: <u>20:20</u>	Received by: Signature: <u>[Signature]</u> Printed: <u>KENT E. GROSS</u> Company: <u>ET</u> Reason: _____	Date: _____ Time: _____	Relinquished by: Signature: _____ Printed: _____ Company: _____ Reason: _____	Date: _____ Time: _____	Received by: Signature: _____ Printed: _____ Company: _____ Reason: _____	Date: _____ Time: _____
--	---	---	----------------------------	---	----------------------------	---	----------------------------

Comments: All TSP P EIA BOLS (Luff). Check against indicated Standard (analytical limit not met)



Chain of Custody Record

Lab job no.: _____
 Date 8-9-95
 Page 2 of 2

Laboratory Curtis & Tompkins
 Address 2323 5th St
Berkeley, CA

Method of Shipment: ET

Client EARTH TECH
 Address 2030 Addison St #500
Berkeley CA 94704

Shipment No. 3

Project Manager Mark Milani

Project Name / Number Mill Springs / 68715708

Telephone No. 510-540-6954

Fax No. 510-540-7496

Contract / Purchase Order / Quote _____

Samplers: (Signature) [Signature]

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation		Analysis Required					Remarks
						Temp.	Chemical	TPH	TPH	TPH	TPH	TPH	
-13- MSP-H6-SD5-1		8/9/95	13:50	Soil	2" x 6" SS Sloane	4°C	Ø	1	X	X	X	X	
-12- MSP-H6-SD5-2		"	13:50	"	"	"	"	1	X	X	X	X	
-15- MSP-H9-SD2		"	15:35	"	"	"	"	1					Hold
-16- MSP-H9-SD3-1		"	15:45	"	"	"	"	1					"
-17- MSP-H9-SD3-2		"	15:45	"	"	"	"	1					"
-18- MSP-H9-SD4		"	15:55	"	"	"	"	1					"
-19- MSP-H9-SD5-1		"	16:10	"	"	"	"	1	X	X	X	X	
-20- MSP-H9-SD5-2		"	16:10	"	"	"	"	1	X	X	X	X	
-21- MSP-H9-SD6		"	16:20	"	"	"	"	1					Hold
-23- MSP-H9-SD7		"	16:35	"	"	"	"	1					"

-13-
-12-
-15-
-16-
-17-
-18-
-19-
-20-
-21-
-23-

Relinquished by: Signature <u>[Signature]</u> Printed <u>Mark Peterson</u> Company <u>EARTH TECH</u> Reason <u>Analyses</u>	Date <u>8/9/95</u> Time <u>20:20</u>	Received by: Signature <u>[Signature]</u> Printed <u>KEITH E. GROSS</u> Company <u>C&T</u> Reason _____	Date <u>8/9/95</u> Time <u>20:45</u>	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____			
Comments: _____ _____ _____				Relinquished by: Signature _____ Printed _____ Company _____ Reason _____				Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____



122125

Chain of Custody Record

Lab Job no.: _____
 Date 8-9-95
 Page 1 of 2

Laboratory Lucas & Tompkins
 Address 2323 - 5th Avenue
Berkeley, CA
 Client Earth Tech
 Address 2030 Addison Street, #500
Berkeley, CA 94704
 Project Name / Number Mills Spring
 Contract / Purchase Order / Quote _____

Method of Shipment: drop-off
 Shipment No. 3
 Project Manager Mark Milani
 Telephone No. 510/540-6954
 Fax No. 510/540-7496
 Samplers: (Signature) [Signature]

Analysis Required	Remarks		
		Temp.	Chemical
TPH (8015)	Mold	54°C	None
TPH (8015)		"	"
TPH (8015)		"	"
TPH (8015)		"	"
TPH (8015)		"	"
TPH (8015)		"	"
TPH (8015)		"	"
TPH (8015)		"	"
TPH (8015)		"	"
TPH (8015)		"	"
TPH (8015)		"	"
TPH (8015)		"	"

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation	
						Temp.	Chemical
-1- MSP-H3-SD1		8/9/95	0755	soil	6" ad	54°C	None
-2- MSP-H3-SD2		"	0805	"	"	"	"
-3- MSP-H3-SD3		"	0815	"	"	"	"
-4- MSP-H3-SD4		"	0825	"	"	"	"
-5- MSP-H3-SD5		"	0840	"	"	"	"
-6- MSP-H7-SD1		"	1000	"	"	"	"
-7- MSP-H7-SD3		"	1016	"	"	"	"
-8- MSP-H7-SD4		"	1040	"	"	"	"
-9- MSP-H7-SD5		"	1055	"	"	"	"
-10- MSP-H6-SD1		"	1315	"	"	"	"
-11- MSP-H6-SD2		"	1320	"	"	"	"
-12- MSP-H6-SD4		"	1340	"	"	"	"

Relinquished by: Signature <u>[Signature]</u> Printed <u>Mark Peterson</u> Company <u>Earth Tech</u> Reason <u>lab drop-off</u>	Date <u>8/9/95</u> Time <u>20:20</u>	Received by: Signature <u>[Signature]</u> Printed <u>KEITH E. GIBBS</u> Company <u>CET</u> Reason _____	Date <u>8/9/95</u> Time <u>20:20</u>	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____			
Comments: _____ _____ _____				Relinquished by: Signature _____ Printed _____ Company _____ Reason _____				Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____



Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 06-SEP-95
Lab Job Number: 122101
Project ID: N/A
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

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TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation Analysis Method: CA LUFT (EPA 8015M)
 Location: Mill Springs Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-001	MSP-H1-SD2	22732	08/08/95	08/19/95	08/23/95	
122101-002	MSP-H1-SD3	22732	08/08/95	08/19/95	08/23/95	
122101-004	MSP-H1-SD5	22732	08/08/95	08/19/95	08/23/95	
122101-006	MSP-H8-SD2	22732	08/08/95	08/19/95	08/23/95	

Analyte	Units	122101-001	122101-002	122101-004	122101-006
Diln Fac:		1	1	1	1
Diesel Range	mg/Kg	<1	<1	<1	<1
Fuel Oil #6	mg/Kg	<25	<25	<25	<25
Surrogate					
Hexacosane	%REC	73	74	74	72



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-007	MSP-H8-SD3	22732	08/08/95	08/19/95	08/24/95	
122101-009	MSP-H8-SD5	22753	08/08/95	08/21/95	09/02/95	
122101-010	MSP-H5-SD1	22753	08/08/95	08/21/95	09/02/95	
122101-011	MSP-H5-SD2	22753	08/08/95	08/21/95	09/02/95	

Analyte	Units	122101-007	122101-009	122101-010	122101-011
Diln Fac:		1	1	1	1
Diesel Range	mg/Kg	<1	<1	<1	<1
Fuel Oil #6	mg/Kg	<25	<25	<25	<25
Surrogate					
Hexacosane	%REC	69	80	82	72



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-014	MSP-H5-SD5	22753	08/08/95	08/21/95	09/02/95	
122101-016	MSP-H11-SD2	22753	08/08/95	08/21/95	09/02/95	
122101-018	MSP-H11-SD4	22753	08/08/95	08/21/95	09/01/95	
122101-019	MSP-H11-SD5	22753	08/08/95	08/21/95	09/02/95	

Analyte	Units	122101-014	122101-016	122101-018	122101-019
Diln Fac:		1	1	1	1
Diesel Range	mg/Kg	<1	<1	<1	<1
Fuel Oil #6	mg/Kg	<25	<25	<25	<25
Surrogate					
Hexacosane	%REC	69	93	84	85



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-021	MSP-H10-SD3	22753	08/08/95	08/21/95	09/02/95	
122101-022	MSP-H10-SD5	22753	08/08/95	08/21/95	09/02/95	

Analyte	Units	122101-021	122101-022
Diln Fac:		1	1
Diesel Range	mg/Kg	<1	<1
Fuel Oil #6	mg/Kg	<25	<25
Surrogate			
Hexacosane	%REC	81	73



Lab #: 122101

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: SHAKER TABLE

METHOD BLANK

Matrix: Soil
Batch#: 22732
Units: mg/Kg
Diln Fac: 1

Prep Date: 08/19/95
Analysis Date: 08/23/95

MB Lab ID: QC01850

Analyte	Result	
Diesel Range	<1.0	
Fuel Oil #6	<25	
Surrogate	%Rec	Recovery Limits
Hexacosane	75	60-140

Lab #: 122101

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons			
Client:	The Earth Technology Corporation	Analysis Method:	CA LUFT (EPA 8015M)
Location:	Mill Springs	Prep Method:	SHAKER TABLE
METHOD BLANK			
Matrix:	Soil	Prep Date:	08/21/95
Batch#:	22753	Analysis Date:	09/01/95
Units:	mg/Kg		
Diln Fac:	1		

MB Lab ID: QC01941

Analyte	Result	
Diesel Range	<1.0	
Fuel Oil #6	<25	
Surrogate	%Rec	Recovery Limits
Hexacosane	84	60-140



Lab #: 122101

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill SpringsAnalysis Method: CA LUFT (EPA 8015M)
Prep Method: SHAKER TABLE

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 22732
Units: mg/Kg
Diln Fac: 1Prep Date: 08/19/95
Analysis Date: 08/23/95

LCS Lab ID: QC01851

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	42.9	51.3	84	60-140
Surrogate	%Rec	Limits		
Hexacosane	79	60-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits



Lab #: 122101

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill SpringsAnalysis Method: CA LUFT (EPA 8015M)
Prep Method: SHAKER TABLE

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 22753
Units: mg/Kg
Diln Fac: 1Prep Date: 08/21/95
Analysis Date: 09/01/95

LCS Lab ID: QC01942

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	45.8	51.3	89	60-140
Surrogate	%Rec	Limits		
Hexacosane	83	60-140		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits



Lab #: 122101

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
 Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
 Prep Method: SHAKER TABLE

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
 Lab ID: 122071-008
 Matrix: Soil
 Batch#: 22732
 Units: mg/Kg
 Diln Fac: 1

Sample Date: 08/07/95
 Received Date: 08/07/95
 Prep Date: 08/19/95
 Analysis Date: 08/23/95

MS Lab ID: QC01852

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Diesel Range	51.3	<1.000	39.8	78	50-150
Surrogate	%Rec	Limits			
Hexacosane	72	60-140			

MSD Lab ID: QC01853

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Diesel Range	51.3	43.1	84	50-150	8	<30
Surrogate	%Rec	Limits				
Hexacosane	72	60-140				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits



Lab #: 122101

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons			
Client:	The Earth Technology Corporation	Analysis Method:	CA LUFT (EPA 8015M)
Location:	Mill Springs	Prep Method:	SHAKER TABLE
MATRIX SPIKE/MATRIX SPIKE DUPLICATE			
Field ID:	ZZZZZZ	Sample Date:	08/11/95
Lab ID:	122187-002	Received Date:	08/11/95
Matrix:	Soil	Prep Date:	08/21/95
Batch#:	22753	Analysis Date:	09/03/95
Units:	mg/Kg dry weight	Moisture:	14%
Diln Fac:	1		

MS Lab ID: QC01943

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Diesel Range	59.65	<1.163	51.98	72	50-150
Surrogate	%Rec	Limits			
Hexacosane	94	60-140			

MSD Lab ID: QC01944

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Diesel Range	59.65	53.84	75	50-150	4	<30
Surrogate	%Rec	Limits				
Hexacosane	89	60-140				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits

Lab #: 122101

BATCH QC REPORT

Page 1 of 1

TVH-Total Volatile Hydrocarbons

 Client: The Earth Technology Corporation
 Location: Mill Springs

 Analysis Method: CA LUFT (EPA 8015M)
 Prep Method: EPA 5030

METHOD BLANK

 Matrix: Soil
 Batch#: 22730
 Units: ug/Kg
 Diln Fac: 1

 Prep Date: 08/18/95
 Analysis Date: 08/18/95

MB Lab ID: QC01843

Analyte	Result		
Gasoline C4-C12	<1.0		
Surrogate	%Rec		Recovery Limits
Trifluorotoluene	98		75-125
Bromobenzene	96		75-125



Lab #: 122101

BATCH QC REPORT

Page 1 of 1

BTXE			
Client:	The Earth Technology Corporation	Analysis Method:	BTXE
Location:	Mill Springs	Prep Method:	EPA 5030
METHOD BLANK			
Matrix:	Soil	Prep Date:	08/18/95
Batch#:	22702	Analysis Date:	08/18/95
Units:	mg/Kg		
Diln Fac:	1		

MB Lab ID: QC01731

Analyte	Result		
Benzene	<5.0		
Toluene	<5.0		
Ethylbenzene	<5.0		
m,p-Xylenes	<5.0		
o-Xylene	<5.0		
Surrogate	%Rec		Recovery Limits
Trifluorotoluene	101		85-115
Bromobenzene	103		75-125

Lab #: 122101

BATCH QC REPORT

Page 1 of 1

BTXE			
Client:	The Earth Technology Corporation	Analysis Method:	BTXE
Location:	Mill Springs	Prep Method:	EPA 5030
METHOD BLANK			
Matrix:	Soil	Prep Date:	08/18/95
Batch#:	22730	Analysis Date:	08/18/95
Units:	mg/Kg		
Diln Fac:	1		

MB Lab ID: QC01843

Analyte	Result		
Benzene	<5.0		
Toluene	<5.0		
Ethylbenzene	<5.0		
m,p-Xylenes	<5.0		
o-Xylene	<5.0		
Surrogate	%Rec		Recovery Limits
Trifluorotoluene	100		85-115
Bromobenzene	104		75-125

LABORATORY NUMBER: 122101-001
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 LOCATION: MILL SPRINGS
 SAMPLE ID: MSP-H1-SD2

DATE SAMPLED: 08/08/95
 DATE RECEIVED: 08/08/95
 DATE ANALYZED: 08/17/95
 DATE REPORTED: 08/31/95
 BATCH NO: 22655

EPA 8010 Compound List by EPA 8240
 Volatile Halocarbons in Soil & Wastes

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	10
Tetrachloroethylene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	109 %
Toluene-d8	105 %
Bromofluorobenzene	89 %

LABORATORY NUMBER: 122101-002
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 LOCATION: MILL SPRINGS
 SAMPLE ID: MSP-H1-SD3

DATE SAMPLED: 08/08/95
 DATE RECEIVED: 08/08/95
 DATE ANALYZED: 08/17/95
 DATE REPORTED: 08/31/95
 BATCH NO: 22655

EPA 8010 Compound List by EPA 8240
 Volatile Halocarbons in Soil & Wastes

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	10
Tetrachloroethylene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	91 %
Toluene-d8	94 %
Bromofluorobenzene	77 %



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122101-004
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 LOCATION: MILL SPRINGS
 SAMPLE ID: MSP-H1-SD5

DATE SAMPLED: 08/08/95
 DATE RECEIVED: 08/08/95
 DATE ANALYZED: 08/17/95
 DATE REPORTED: 08/31/95
 BATCH NO: 22655

EPA 8010 Compound List by EPA 8240
 Volatile Halocarbons in Soil & Wastes

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	10
Tetrachloroethylene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	93 %
Toluene-d8	96 %
Bromofluorobenzene	76 %



LABORATORY NUMBER: 122101-016
CLIENT: THE EARTH TECHNOLOGY CORPORATION
LOCATION: MILL SPRINGS
SAMPLE ID: MSP-H11-SD2

DATE SAMPLED: 08/08/95
DATE RECEIVED: 08/08/95
DATE ANALYZED: 08/17/95
DATE REPORTED: 08/31/95
BATCH NO: 22655

EPA 8010 Compound List by EPA 8240
Volatile Halocarbons in Soil & Wastes

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	10
Tetrachloroethylene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	108 %
Toluene-d8	105 %
Bromofluorobenzene	86 %

LABORATORY NUMBER: 122101-019
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 LOCATION: MILL SPRINGS
 SAMPLE ID: MSP-H11-SD5

DATE SAMPLED: 08/08/95
 DATE RECEIVED: 08/08/95
 DATE ANALYZED: 08/17/95
 DATE REPORTED: 08/31/95
 BATCH NO: 22655

EPA 8010 Compound List by EPA 8240
 Volatile Halocarbons in Soil & Wastes

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	10
Tetrachloroethylene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	97 %
Toluene-d8	97 %
Bromofluorobenzene	76 %

LABORATORY NUMBER: 122101-Method Blank
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 LOCATION: MILL SPRINGS
 SAMPLE ID: MB

DATE ANALYZED: 08/17/95
 DATE REPORTED: 08/31/95
 BATCH NO: 22655

EPA 8010 Compound List by EPA 8240
 Volatile Halocarbons in Soil & Wastes

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
Bromoform	ND	10
Tetrachloroethylene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	124 %
Toluene-d8	106 %
Bromofluorobenzene	98 %

Curtis & Tompkins, Ltd



Curtis & Tompkins, Ltd.

8260A BS/BSD Report

Lab No: QC01532 QC01533

Date Analyzed: 16-AUG-95

Matrix: Soil

Batch No: 22655 425228151004 425228158005

Spike File: CHG04

Spike Dup File: CHG05

Analyst: LLH

	ppb	SpikeAmt	% Rec	Limits
<u>BS RESULTS</u>				
1,1-Dichloroethene	52.5	50	105 %	59-172%
Trichloroethene	52.6	50	105 %	62-137%
Benzene	54.6	50	109 %	66-142%
Toluene	57.0	50	114 %	59-139%
Chlorobenzene	59.5	50	119 %	60-133%
Surrogate Recoveries				
1,2-Dichloroethane-d4	53.8	50	108 %	70-121%
Toluene-d8	52.5	50	105 %	81-117%
Bromofluorobenzene	47.5	50	95 %	74-121%
Dibromofluoromethane	56.8	50	114 %	80-120%
<u>BSD RESULTS</u>				
1,1-Dichloroethene	53.6	50	107 %	59-172%
Trichloroethene	53.8	50	108 %	62-137%
Benzene	55.7	50	111 %	66-142%
Toluene	57.7	50	115 %	59-139%
Chlorobenzene	60.4	50	121 %	60-133%
Surrogate Recoveries				
1,2-Dichloroethane-d4	53.8	50	108 %	70-121%
Toluene-d8	55.0	50	110 %	81-117%
Bromofluorobenzene	49.2	50	98 %	74-121%
Dibromofluoromethane	56.9	50	114 %	80-120%
<u>RPD DATA</u>				
1,1-Dichloroethene	2 %			< 14%
Trichloroethene	2 %			< 14%
Benzene	2 %			< 11%
Toluene	1 %			< 13%
Chlorobenzene	2 %			< 13%

Results within Specifications - PASS



TVH-Total Volatile Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-001	MSP-H1-SD2	22702	08/08/95	08/18/95	08/18/95	
122101-002	MSP-H1-SD3	22702	08/08/95	08/18/95	08/18/95	
122101-003	MSP-H1-SD4	22702	08/08/95	08/18/95	08/18/95	
122101-004	MSP-H1-SD5	22702	08/08/95	08/18/95	08/18/95	

Analyte	Units	122101-001	122101-002	122101-003	122101-004
Diln Fac:		1	1	1	1
Gasoline C4-C12	mg/Kg	<1	<1	<1	<1
Surrogate					
Trifluorotoluene	%REC	100	100	100	106
Bromobenzene	%REC	98	99	97	99



TVH-Total Volatile Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-006	MSP-H8-SD2	22702	08/08/95	08/18/95	08/18/95	
122101-007	MSP-H8-SD3	22702	08/08/95	08/18/95	08/18/95	
122101-009	MSP-H8-SD5	22702	08/08/95	08/18/95	08/18/95	
122101-010	MSP-H5-SD1	22702	08/08/95	08/18/95	08/18/95	

Analyte	Units	122101-006	122101-007	122101-009	122101-010
Diln Fac:		1	1	1	1
Gasoline C4-C12	mg/Kg	<1	<1	<1	<1
Surrogate					
Trifluorotoluene	%REC	102	100	103	104
Bromobenzene	%REC	103	100	104	105



TVH-Total Volatile Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-011	MSP-H5-SD2	22702	08/08/95	08/18/95	08/18/95	
122101-014	MSP-H5-SD5	22702	08/08/95	08/18/95	08/18/95	
122101-016	MSP-H11-SD2	22702	08/08/95	08/18/95	08/18/95	
122101-018	MSP-H11-SD4	22702	08/08/95	08/19/95	08/19/95	

Analyte	Units	122101-011	122101-014	122101-016	122101-018
Diln Fac:		1	1	1	1
Gasoline C4-C12	mg/Kg	<1	<1	<1	<1
Surrogate					
Trifluorotoluene	%REC	100	99	98	80
Bromobenzene	%REC	99	100	97	78



TVH-Total Volatile Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-019	MSP-H11-SD5	22730	08/08/95	08/19/95	08/19/95	
122101-021	MSP-H10-SD3	22730	08/08/95	08/19/95	08/19/95	
122101-022	MSP-H10-SD5	22730	08/08/95	08/19/95	08/19/95	

Analyte	Units	122101-019	122101-021	122101-022
Diln Fac:		1	1	1
Gasoline C4-C12	mg/Kg	<1	<1	<1
Surrogate				
Trifluorotoluene	%REC	97	98	86
Bromobenzene	%REC	95	97	83



BTXE

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: BTXE
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-001	MSP-H1-SD2	22702	08/08/95	08/18/95	08/18/95	
122101-002	MSP-H1-SD3	22702	08/08/95	08/18/95	08/18/95	
122101-003	MSP-H1-SD4	22702	08/08/95	08/18/95	08/18/95	
122101-004	MSP-H1-SD5	22702	08/08/95	08/18/95	08/18/95	

Analyte	Units	122101-001	122101-002	122101-003	122101-004
Diln Fac:		1	1	1	1
Benzene	ug/Kg	<5	<5	<5	<5
Toluene	ug/Kg	<5	<5	<5	<5
Ethylbenzene	ug/Kg	<5	<5	<5	<5
m,p-Xylenes	ug/Kg	<5	<5	<5	<5
o-Xylene	ug/Kg	<5	<5	<5	<5
Surrogate					
Trifluorotoluene	%REC	101	102	102	104
Bromobenzene	%REC	105	106	104	103



BTXE

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: BTXE
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-006	MSP-H8-SD2	22702	08/08/95	08/18/95	08/18/95	
122101-007	MSP-H8-SD3	22702	08/08/95	08/18/95	08/18/95	
122101-009	MSP-H8-SD5	22702	08/08/95	08/18/95	08/18/95	
122101-010	MSP-H5-SD1	22702	08/08/95	08/18/95	08/18/95	

Analyte	Units	122101-006	122101-007	122101-009	122101-010
Diln Fac:		1	1	1	1
Benzene	ug/Kg	<5	<5	<5	<5
Toluene	ug/Kg	<5	<5	<5	<5
Ethylbenzene	ug/Kg	<5	<5	<5	<5
m, p-Xylenes	ug/Kg	<5	<5	<5	<5
o-Xylene	ug/Kg	<5	<5	<5	<5
Surrogate					
Trifluorotoluene	%REC	101	97	99	98
Bromobenzene	%REC	107	103	106	104



BTXE

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: BTXE
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-011	MSP-H5-SD2	22702	08/08/95	08/18/95	08/18/95	
122101-014	MSP-H5-SD5	22702	08/08/95	08/18/95	08/18/95	
122101-016	MSP-H11-SD2	22702	08/08/95	08/18/95	08/18/95	
122101-018	MSP-H11-SD4	22702	08/08/95	08/18/95	08/18/95	

Analyte	Units	122101-011	122101-014	122101-016	122101-018
Diln Fac:		1	1	1	1
Benzene	ug/Kg	<5	<5	<5	<5
Toluene	ug/Kg	<5	<5	<5	<5
Ethylbenzene	ug/Kg	<5	<5	<5	<5
m,p-Xylenes	ug/Kg	<5	<5	<5	<5
o-Xylene	ug/Kg	<5	<5	<5	<5
Surrogate					
Trifluorotoluene	%REC	97	98	99	80
Bromobenzene	%REC	103	105	103	84



BTXE

Client: The Earth Technology Corporation
Location: Mill Springs

Analysis Method: BTXE
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122101-019	MSP-H11-SD5	22730	08/08/95	08/19/95	08/19/95	
122101-021	MSP-H10-SD3	22730	08/08/95	08/19/95	08/19/95	
122101-022	MSP-H10-SD5	22730	08/08/95	08/19/95	08/19/95	

Analyte	Units	122101-019	122101-021	122101-022
Diln Fac:		1	1	1
Benzene	ug/Kg	<5	<5	<5
Toluene	ug/Kg	<5	<5	<5
Ethylbenzene	ug/Kg	<5	<5	<5
m,p-Xylenes	ug/Kg	<5	<5	<5
o-Xylene	ug/Kg	<5	<5	<5
Surrogate				
Trifluorotoluene	%REC	100	100	87
Bromobenzene	%REC	102	105	89

Lab #: 122101

BATCH QC REPORT

Page 1 of 1

TVH-Total Volatile Hydrocarbons			
Client:	The Earth Technology Corporation	Analysis Method:	CA LUFT (EPA 8015M)
Location:	Mill Springs	Prep Method:	EPA 5030
LABORATORY CONTROL SAMPLE			
Matrix:	Soil	Prep Date:	08/18/95
Batch#:	22702	Analysis Date:	08/18/95
Units:	ug/Kg		
Diln Fac:	1		

LCS Lab ID: QC01730

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C4-C12	10.2	10.03	105	75-125
Surrogate	%Rec	Limits		
Trifluorotoluene	82	75-125		
Bromobenzene	102	75-125		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits



Lab #: 122101

BATCH QC REPORT

Page 1 of 1

TVH-Total Volatile Hydrocarbons

Client: The Earth Technology Corporation
Location: Mill SpringsAnalysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 22730
Units: ug/Kg
Diln Fac: 1Prep Date: 08/18/95
Analysis Date: 08/18/95

LCS Lab ID: QC01842

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C4-C12	9.6	10.03	96	75-125
Surrogate	%Rec	Limits		
Trifluorotoluene	107	75-125		
Bromobenzene	104	75-125		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits



Lab #: 122101

BATCH QC REPORT

Page 1 of 1

BTXE			
Client:	The Earth Technology Corporation	Analysis Method:	BTXE
Location:	Mill Springs	Prep Method:	EPA 5030
LABORATORY CONTROL SAMPLE			
Matrix:	Soil	Prep Date:	08/18/95
Batch#:	22702	Analysis Date:	08/18/95
Units:	mg/Kg		
Diln Fac:	1		

LCS Lab ID: QC01730

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	107.9	100	108	85-115
Toluene	106.7	100	107	85-115
Ethylbenzene	106.3	100	106	85-115
m,p-Xylenes	113.9	100	114	85-150
o-Xylene	101.8	100	102	85-150
Surrogate	%Rec	Limits		
Trifluorotoluene	101	85-115		
Bromobenzene	100	75-125		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 5 outside limits



Lab #: 122101

BATCH QC REPORT

Page 1 of 1

BTXE			
Client:	The Earth Technology Corporation	Analysis Method:	BTXE
Location:	Mill Springs	Prep Method:	EPA 5030
LABORATORY CONTROL SAMPLE			
Matrix:	Soil	Prep Date:	08/18/95
Batch#:	22730	Analysis Date:	08/18/95
Units:	mg/Kg		
Diln Fac:	1		

LCS Lab ID: QC01842

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	107.6	100	108	85-115
Toluene	105.8	100	106	85-115
Ethylbenzene	106.4	100	106	85-115
m,p-Xylenes	112.6	100	113	85-150
o-Xylene	103.3	100	103	85-150
Surrogate	%Rec	Limits		
Trifluorotoluene	100	85-115		
Bromobenzene	104	75-125		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 5 outside limits

Lab #: 122101

BATCH QC REPORT

Page 1 of 1

TVH-Total Volatile Hydrocarbons			
Client:	The Earth Technology Corporation	Analysis Method:	CA LUFT (EPA 8015M)
Location:	Mill Springs	Prep Method:	EPA 5030
METHOD BLANK			
Matrix:	Soil	Prep Date:	08/18/95
Batch#:	22702	Analysis Date:	08/18/95
Units:	ug/Kg		
Diln Fac:	1		

MB Lab ID: QC01731

Analyte	Result	
Gasoline C4-C12	<1.0	
Surrogate	%Rec	Recovery Limits
Trifluorotoluene	100	75-125
Bromobenzene	97	75-125



Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878

2323 Fifth Street, Berkeley, CA 94710. Phone (510) 486-0900

29 September 1995

Mr. Mark Milani
Earth Tech
2030 Addison St.
Suite 500
Berkeley, CA 94704

RE: Project# 687157.08/Mill Springs Park
Fuel Fingerprint Identification

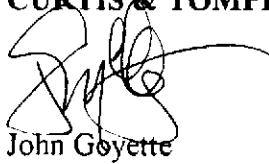
Dear Mr. Milani:

Curtis & Tompkins, Ltd. (C&T) recently completed an analytical program in support of the above-referenced project. Among the samples were two fuel samples received 9/13/95 and identified as MSP-DP1 and MSP-DP2, and an LNAPL sample received 9/22/95 and identified as MW-1. These three samples were diluted and analyzed as standards using the California LUFT Manual method for gasoline-range volatile hydrocarbons. Chromatograms for these three analytical runs are attached. The following comments are based on review of these chromatograms.

- A. Sample MW-1 is unequivocally gasoline based on pattern comparison.
- B. The chromatographic peak pattern (or "fingerprint") of sample MW-1 is very similar to samples DP-1 and DP-2, especially in light of the fact that MW-1 is floating atop a groundwater plume and thus has been exposed to a number of environments before being sampled.
- C. We are confident that the source of this sample was a recent release. A gross estimation of the timeframe of a spill can be made based on the size of the peaks representing the earlier-eluting (more volatile) components in comparison to the less volatile components. Sample MW-1 does not exhibit a pattern consistent with an older, "weathered" product.

Please let me know if we can provide any further information or clarification.

Sincerely,
CURTIS & TOMPKINS, LTD.



John Goyette
Operations Manager

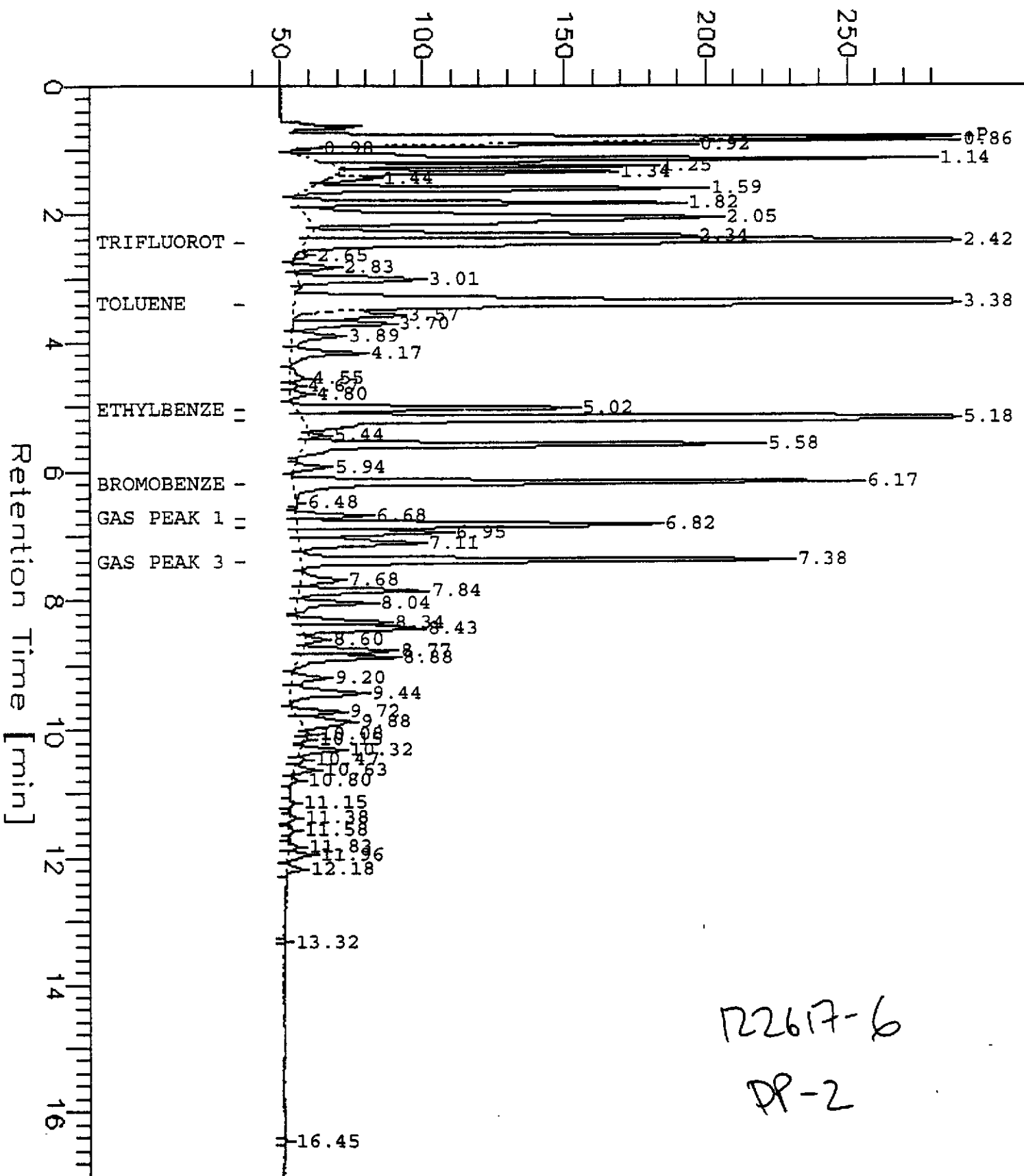
FileName : G:\GC04\268J032.raw
Start Time : 0.00 min
Scale Factor: -1

End Time : 17.00 min
Plot Offset: 37 mV

Date : 9/26/95 9:51 AM
Low Point : 37.31 mV
Plot Scale: 250 mV

Page 1 of 1
High Point : 287.31 mV

Response [mV]



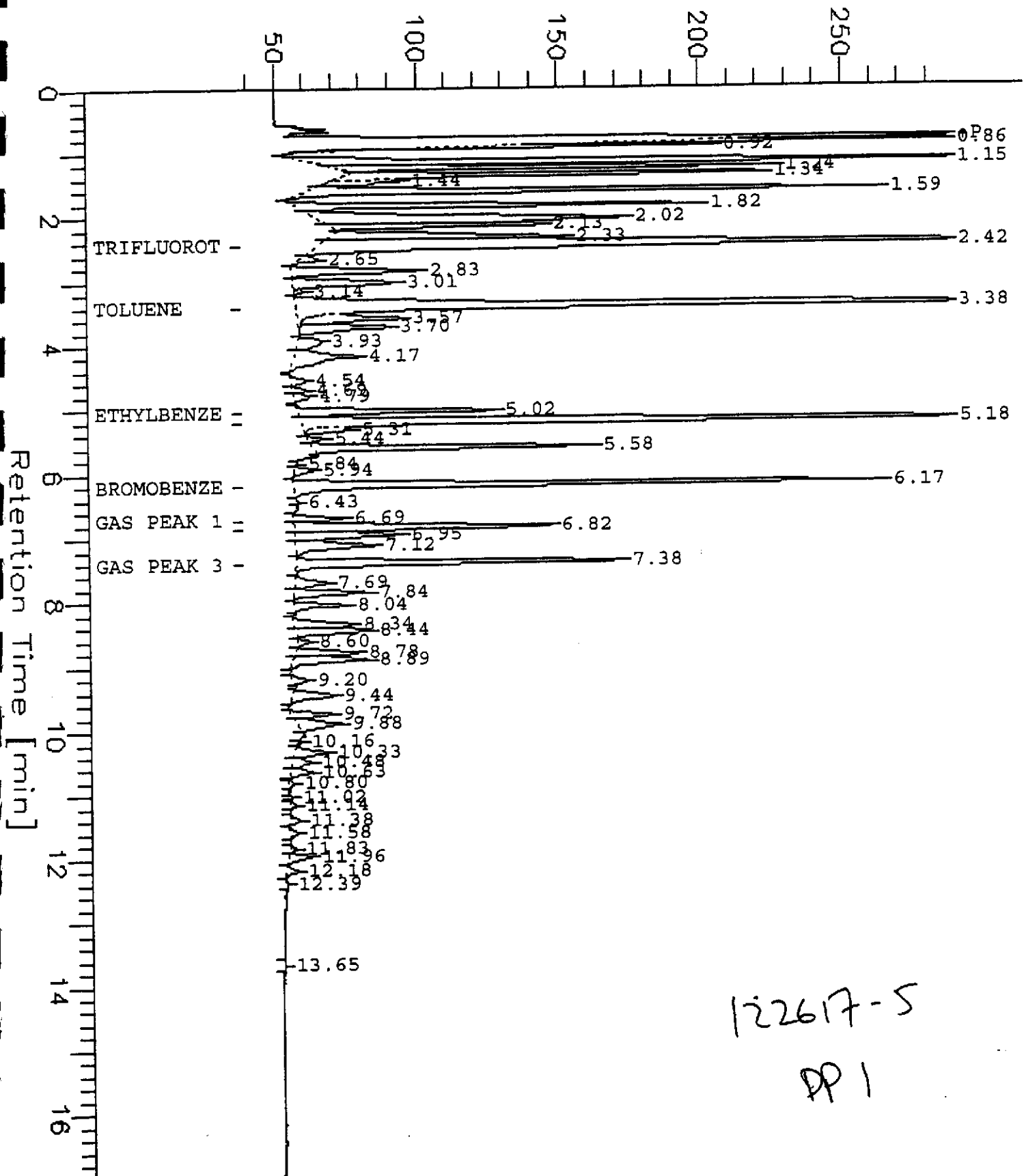
FileName : G:\GC04\268J031.raw
Start Time : 0.00 min
Scale Factor : -1

End Time : 17.00 min
Plot Offset: 38 mV

Date : 9/26/95 9:23 AM
Low Point : 37.65 mV
Plot Scale: 250 mV

Page 1 of 1
High Point : 287.65 mV

Response [mV]



122617-5
PP 1

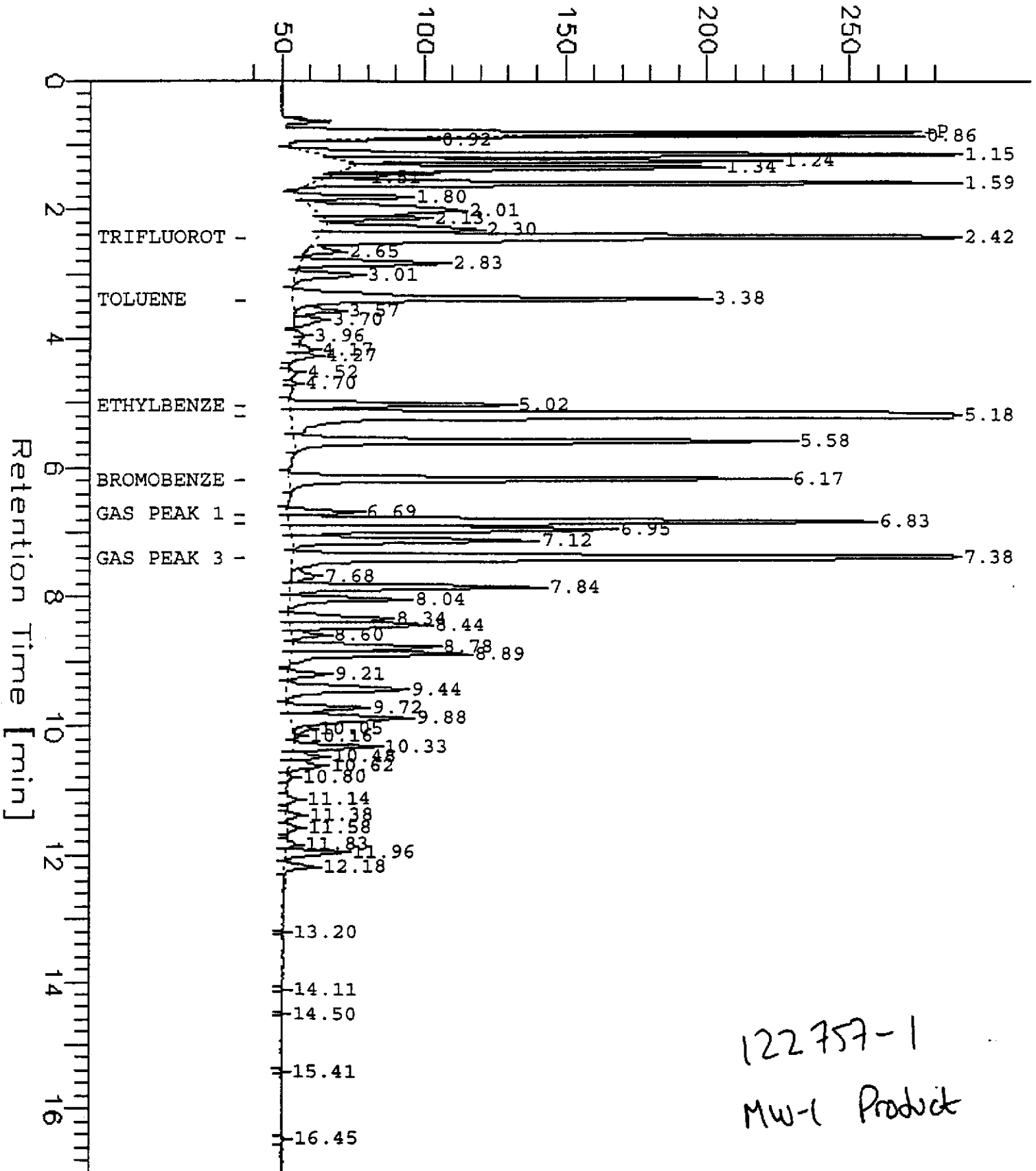
FileName : G:\GC04\270J003.raw
Start Time : 0.00 min
Scale Factor: -1

End Time : 17.00 min
Plot Offset: 37 mV

Date : 9/27/95 12:30 PM
Low Point : 36.98 mV
Plot Scale: 250 mV

Page 1 of 1
High Point : 286.98 mV

Response [mV]





Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710. Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

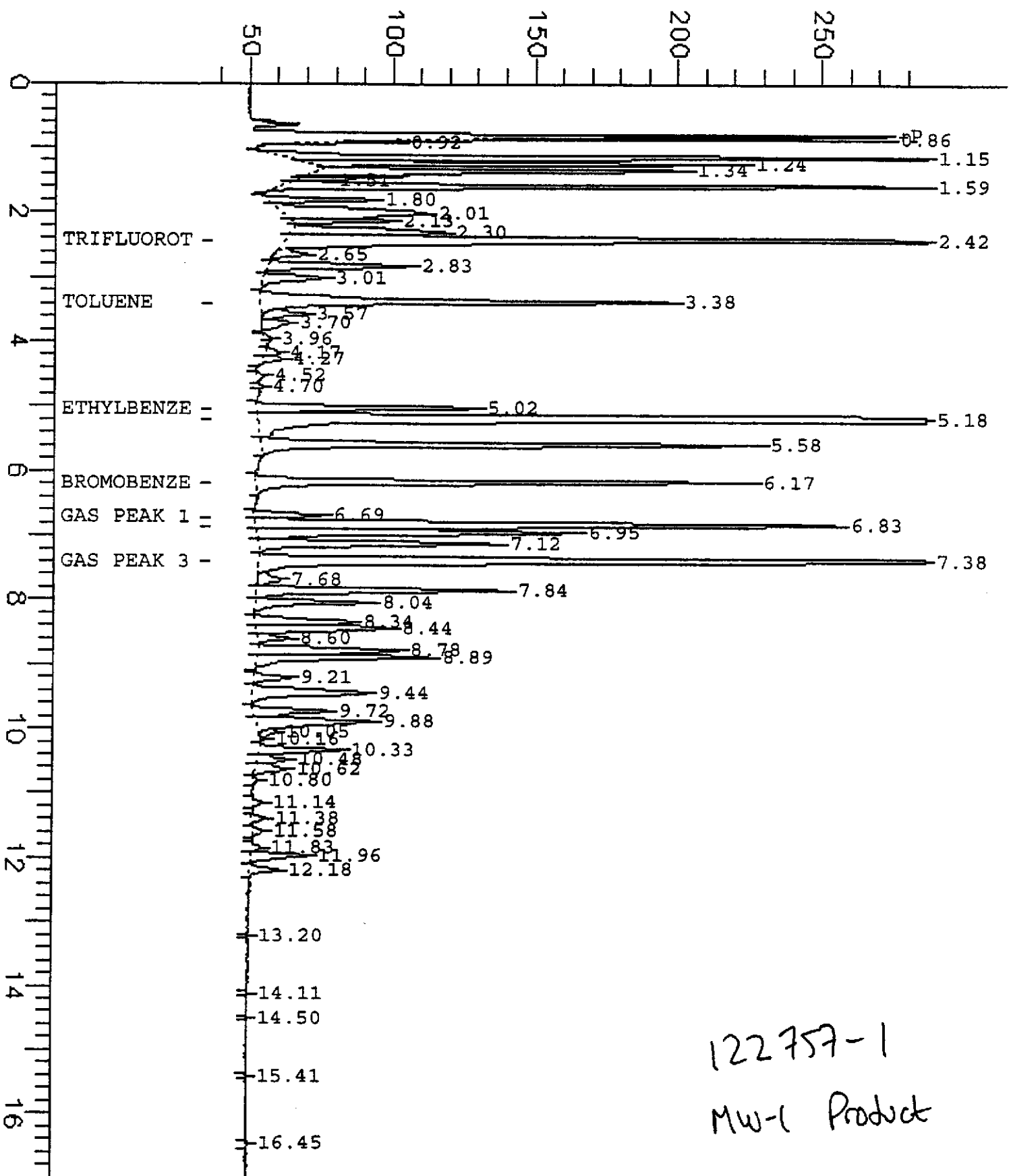
Date: 09-OCT-95
Lab Job Number: 122757
Project ID: 687157.08
Location: Mill Springs

Reviewed by:  _____

Reviewed by:  _____

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Response [mV]



Retention Time [min]

122757-1
MW-1 Product

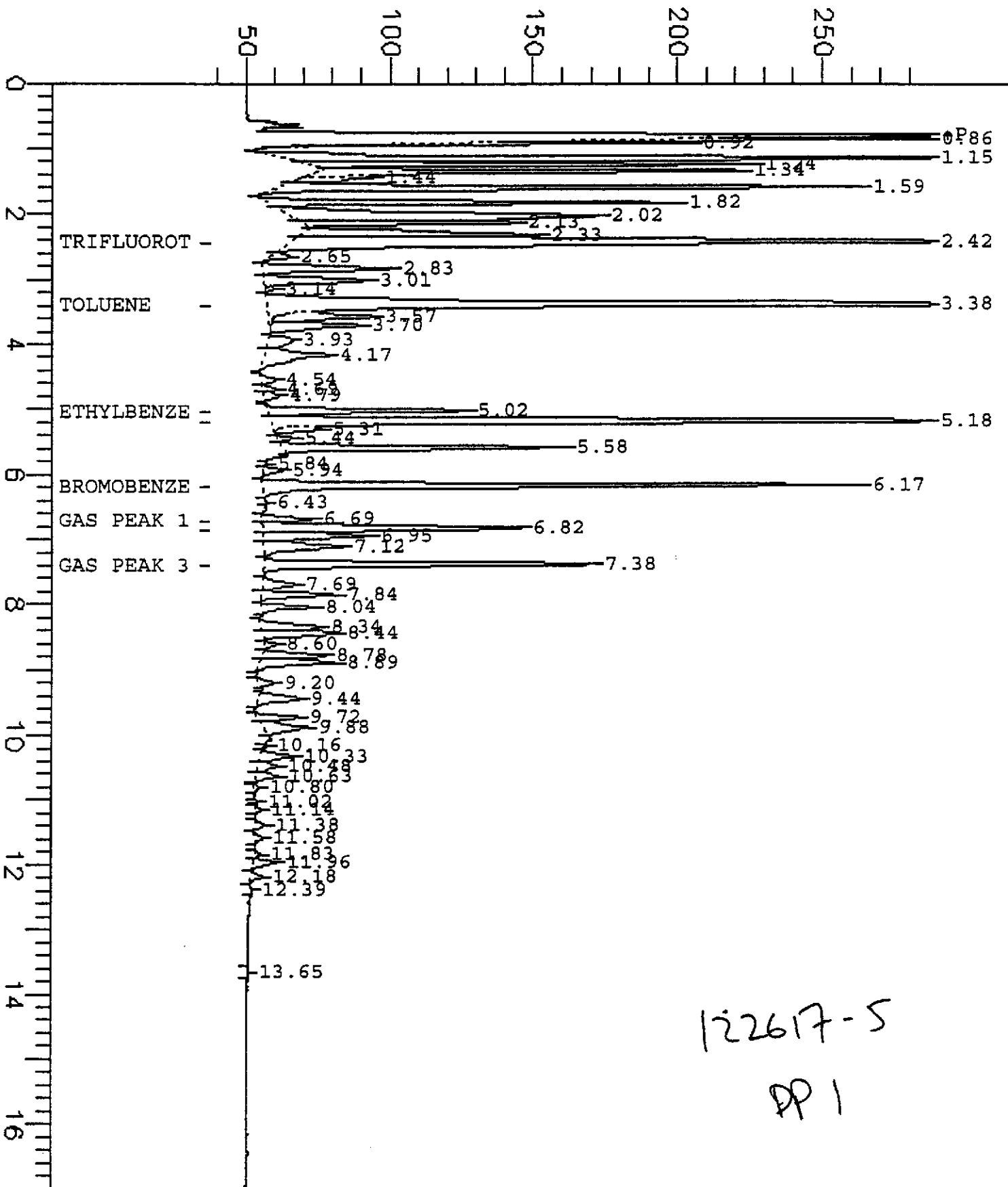
FileName : G:\GC04\268J031.raw
Start Time : 0.00 min
Scale Factor: -1

End Time : 17.00 min
Plot Offset: 38 mV

Date : 9/26/95 9:23 AM
Low Point : 37.65 mV
Plot Scale: 250 mV

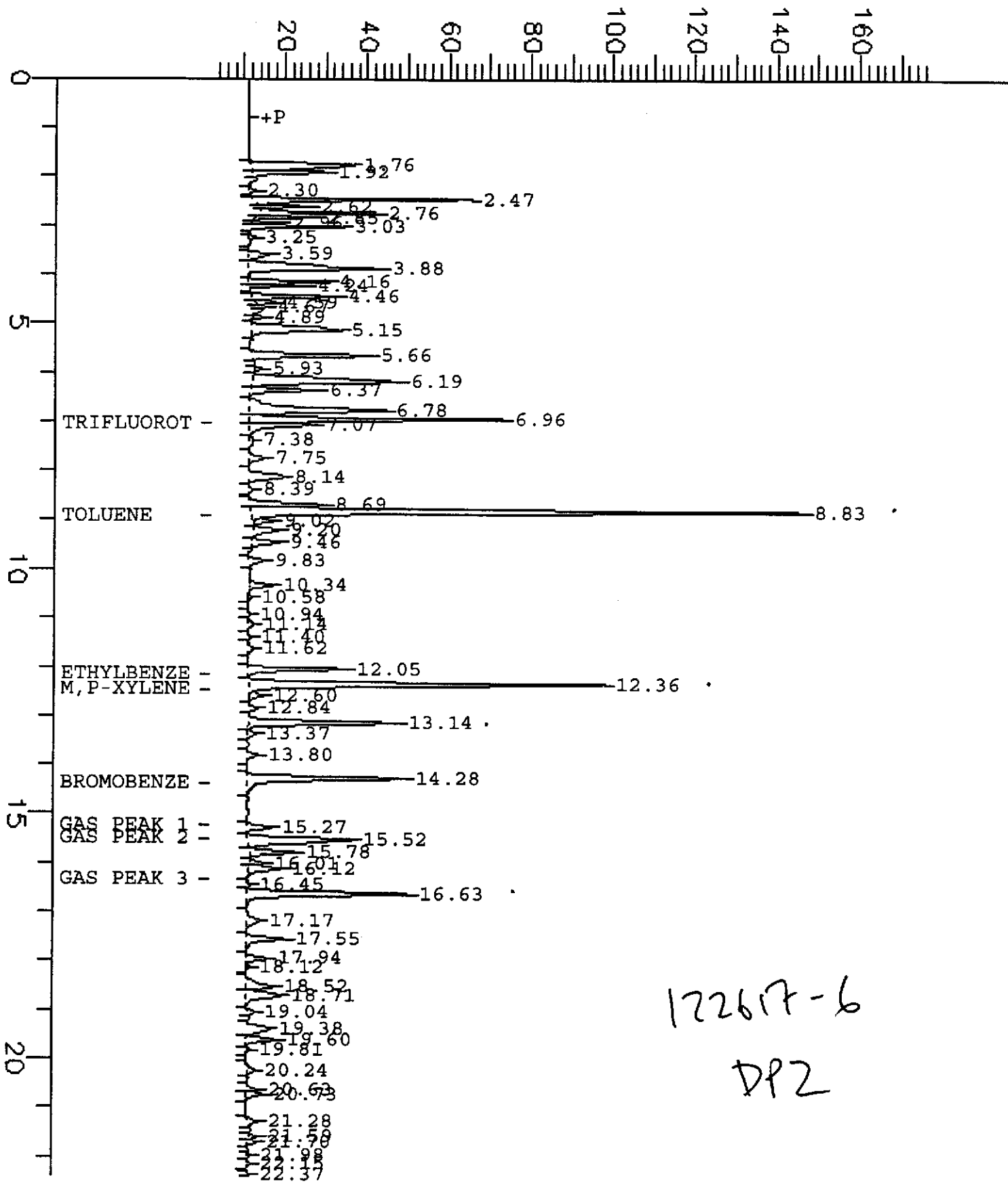
Page 1 of 1
High Point : 287.65 mV

Response [mV]



122617-5
PP 1

Response [mV]



172617-6
DP2

APPENDIX C

CERTIFIED CHEMICAL ANALYTICAL REPORTS
IDW CHARACTERIZATION



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 16-AUG-95
Lab Job Number: 122166
Project ID: 687157.08
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

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Curtis & Tompkins, Ltd.

SAMPLE ID: COMP(S1-4)
LAB ID: 122166-005
CLIENT: The Earth Technology Corporation
PROJECT ID: 687157.08
LOCATION: Mill Springs
MATRIX: WET Leachate

DATE SAMPLED: 08/11/95
DATE RECEIVED: 08/11/95
DATE REPORTED: 08/16/95

Metals Analytical Report

Compound	Result (ug/L)	Reporting Limit (ug/L)	QC Batch	Method	Analysis Date
Lead	200	150	22598	EPA 6010A	08/16/95



CLIENT: The Earth Technology Corporation
JOB NUMBER: 122166

DATE REPORTED: 08/16/95

BATCH QC REPORT
BLANK SPIKE / BLANK SPIKE DUPLICATE

Compound	Spike Amount	BS Result	BSD Result	Units	BS % Recovery	BSD % Recovery	Average Recovery	RPD	QC Batch	Method	Analysis Date
Lead	500	4940	4940	ug/L	99	99	99	0	22598	EPA 6010A	08/16/95



CLIENT: The Earth Technology Corporation
JOB NUMBER: 122166

DATE REPORTED: 08/16/95

**BATCH QC REPORT
PREP BLANK**

Compound	Result	Reporting Limit	Units	QC Batch	Method	Analysis Date
Lead	ND	150	ug/L	22598	EPA 6010A	08/16/95

ND = Not Detected at or above reporting limit

LABORATORY NUMBER: 122166
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS

DATE SAMPLED: 08/11/95
 DATE RECEIVED: 08/11/95
 DATE ANALYZED: 08/14/95
 DATE REPORTED: 08/15/95
 BATCH NO.: 22588

Total Volatile Hydrocarbons with BTXE in Solids and Wastes
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
122166-004	COMP(S1-4)	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
METHOD BLANK	N/A	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)

ND = Not detected at or above reporting limit; Reporting limit
 indicated in parentheses.

QA/QC SUMMARY: MS/MSD of sample no:122044-005

RPD, %	6
RECOVERY, %	81



TEH-Tot Ext Hydrocarbons

Client: The Earth Technology Corporation
Project#: 687157.08
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122166-005	COMP(S1-4)	22577	08/11/95	08/13/95	08/16/95	

Analyte	Units	122166-005
Diln Fac:		1
Diesel Range	mg/Kg	37
Surrogate		
Hexacosane	%REC	95

Lab #: 122166

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

 Client: The Earth Technology Corporation
 Project#: 687157.08
 Location: Mill Springs

 Analysis Method: CA LUFT (EPA 8015M)
 Prep Method: LUFT

LABORATORY CONTROL SAMPLE

 Matrix: Soil
 Batch#: 22577
 Units: mg/Kg
 Diln Fac: 1

 Prep Date: 08/16/95
 Analysis Date: 08/16/95

LCS Lab ID: QC01232

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	44.9	51.3	88	60-140
Surrogate	%Rec	Limits		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

Lab #: 122166

BATCH QC REPORT

Page 1 of 1

TEH-Tot Ext Hydrocarbons

 Client: The Earth Technology Corporation
 Project#: 687157.08
 Location: Mill Springs

 Analysis Method: CA LUFT (EPA 8015M)
 Prep Method: LUFT

METHOD BLANK

 Matrix: Soil
 Batch#: 22577
 Units: mg/Kg
 Diln Fac: 1

 Prep Date: 08/16/95
 Analysis Date: 08/16/95

MB Lab ID: QC01231

Analyte	Result	
Diesel Range	<1.0	
Surrogate	%Rec	Recovery Limits
Hexacosane	94	60-140



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122166-004
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: COMP(S1-4)

DATE SAMPLED: 08/11/95
DATE RECEIVED: 08/11/95
DATE REPORTED: 08/15/95

PARAMETER	RESULT	UNITS	REPORTING LIMIT	METHOD
Reactive Cyanide	ND	mg/Kg	10	SW-846 Section 7.3.3.2
Reactive Sulfide	ND	mg/Kg	10	SW-846 Section 7.3.4.2
Ignitability	Does Not Ignite			SW-846 Section 7.1

ND = Not detected at or above reporting limit.

QA/QC SUMMARY	Analysis Date	RPD, %	RECOVERY, %
Cyanide	08/15/95	<1	56
Sulfide	08/15/95	<1	76
Ignitability	08/15/95	<1	--

DATE REPORTED: 08/15/95

 LABORATORY NUMBER: 122166-METHOD BLANK
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.08
 LOCATION: MILL SPRINGS
 SAMPLE ID: MB

PARAMETER	RESULT	UNITS	REPORTING LIMIT	METHOD
Reactive Cyanide	ND	mg/Kg	10	SW-846 Section 7.3.3.2
Reactive Sulfide	ND	mg/Kg	10	SW-846 Section 7.3.4.2

ND = Not detected at or above reporting limit.

QA/QC SUMMARY	Analysis Date	RPD, %	RECOVERY, %
Cyanide	08/15/95	<1	56
Sulfide	08/15/95	<1	76
Ignitability	08/15/95	<1	--

Client: The Earth Technology Corporation **Laboratory Login Number:** 122166
Project Name: Mill Springs **Report Date:** 15 August 95
Project Number: 687157.08

ANALYSIS: pH

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	Method	Analyst	QC Batch
122166-005	COMP(S1-4)	Soil	11-AUG-95	11-AUG-95	15-AUG-95	7.8	SU #	EPA 9045	TR	22638
							# Soil pH measured in 0.01 M CaCl ₂			

Q C B a t c h R e p o r t

 Client: The Earth Technology Corporation
 Project Name: Mill Springs
 Project Number: 687157.08

 Laboratory Login Number: 122166
 Report Date: 15 August 95

ANALYSIS: pH

QC Batch Number: 22638

Calibration Verification Results

Sample	Result	TV	Difference	Limit	Analyzed
ICV	7.01	7.00	.01	< 0.10	15-AUG-95
CCV	7.01	7.00	.01	< 0.10	15-AUG-95

Sample Duplicate Results

Sample	Duplicate	RPD	Analyzed
7.79	7.82	.4%	15-AUG-95



Chain of Custody Record

122146

Lab job no.: _____
 Date 08/11/95
 Page 1 of 1

Laboratory Curtis & Tompkins
 Address 2323 - 5th Ave.
Berkeley, CA

Method of Shipment: drop-off

Client Earth Tech
 Address 2030 Addison Street, #500
Berkeley, CA 94704

Shipment No. _____

Project Manager Mark Milani

Project Name / Number Mill Springs / 687157.08

Telephone No. 510/540-6954

Fax No. 510/540-7496

Contract / Purchase Order / Quote _____

Samplers: (Signature) Ta D

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Temp.	Preservation		Remarks
							Temp.	Chemical	
S-1	-	08/11/95	1445	Soil	6" 1a	4C	None	None	Composite A → 1 see note @ below
S-2	-	"	1450	"	"	"	None	None	
S-3	-	"	1455	"	"	"	None	None	
S-4	-	"	1500	"	"	"	None	None	
Comp									

- 1
- 2
- 3
- 4
- 5

Relinquished by: Signature <u>Ta D</u> Printed <u>Tan Dinh</u> Company <u>Earth Tech</u> Reason <u>Lab drop-off</u>	Date <u>08/11/95</u> Time <u>1755</u>	Received by: Signature <u>Kevin Hoch</u> Printed <u>Kevin Hoch</u> Company <u>CT</u> Reason <u>Lab</u>	Date <u>8/11/95</u> Time <u>1755</u>	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____
---	--	--	---	---	--------------------------	---	--------------------------

Comments: note: 48 hr - TaT

Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____
---	--------------------------	---	--------------------------



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2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 14-SEP-95
Lab Job Number: 122307
Project ID: 687157.08
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

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TVH-Total Volatile Hydrocarbons

Client: The Earth Technology Corpora
Project#: 687157.08
Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122307-001	POLY-WATER	22862	08/21/95	08/25/95	08/25/95	
122307-002	G1-WATER	22862	08/21/95	08/25/95	08/25/95	
122307-003	DRUM-WATER	22862	08/21/95	08/25/95	08/25/95	

Analyte	Units	122307-001	122307-002	122307-003
Diln Fac:		10	10	10
Gasoline C4-C12	ug/L	<500	<500	<500
Surrogate				
Trifluorotoluene	%REC	94	93	94
Bromobenzene	%REC	95	93	97



BTXE

Client: The Earth Technology Corpora
Project#: 687157.08
Location: Mill Springs

Analysis Method: BTXE
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122307-001	POLY-WATER	22862	08/21/95	08/25/95	08/25/95	
122307-002	G1-WATER	22862	08/21/95	08/25/95	08/25/95	
122307-003	DRUM-WATER	22862	08/21/95	08/25/95	08/25/95	

Analyte	Units	122307-001	122307-002	122307-003
Diln Fac:		10	10	10
MTBE	ug/L	1200	360	<20
Benzene	ug/L	<5	<5	<5
Toluene	ug/L	<5	<5	6.5
Ethylbenzene	ug/L	<5	<5	<5
m,p-Xylenes	ug/L	29	<5	<5
o-Xylene	ug/L	61	<5	<5
Surrogate				
Trifluorotoluene	%REC	94	95	92
Bromobenzene	%REC	100	101	100



Lab #: 122307

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons

Client: The Earth Technology Corporation
 Project#: 687157.08
 Location: Mill Springs

Analysis Method: CA LUFT (EPA 8015M)
 Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
 Batch#: 22862
 Units: ug/L
 Diln Fac: 1

Prep Date: 08/25/95
 Analysis Date: 08/25/95

LCS Lab ID: QC02381

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C4-C12	2109	2006	105	75-125
Surrogate	%Rec	Limits		
Trifluorotoluene	101	75-125		
Bromobenzene	99	75-125		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

Lab #: 122307

BATCH QC REPORT

Page 1 of 1

BTXE			
Client:	The Earth Technology Corporation	Analysis Method:	BTXE
Project#:	687157.08	Prep Method:	EPA 5030
Location:	Mill Springs		
LABORATORY CONTROL SAMPLE			
Matrix:	Water	Prep Date:	08/25/95
Batch#:	22862	Analysis Date:	08/25/95
Units:	ug/L		
Diln Fac:	1		

LCS Lab ID: QC02381

Analyte	Result	Spike Added	%Rec #	Limits
MTBE	24.3	20	122	85-125
Benzene	21.2	20	106	85-115
Toluene	20.5	20	103	85-115
Ethylbenzene	21	20	105	85-115
m,p-Xylenes	21.8	20	109	85-115
o-Xylene	19.7	20	100	85-115
Surrogate	%Rec	Limits		
Trifluorotoluene	93	75-125		
Bromobenzene	99	75-125		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 6 outside limits

Lab #: 122307

BATCH QC REPORT

Page 1 of 1

TVH-Total Volatile Hydrocarbons

Client: The Earth Technology Corporation	Analysis Method: CA LUFT (EPA 8015M)
Project#: 687157.08	Prep Method: EPA 5030
Location: Mill Springs	

METHOD BLANK

Matrix: Water	Prep Date: 08/25/95
Batch#: 22862	Analysis Date: 08/25/95
Units: ug/L	
Diln Fac: 1	

MB Lab ID: QC02382

Analyte	Result	
Gasoline C4-C12	<50	
Surrogate	%Rec	Recovery Limits
Trifluorotoluene	93	69-120
Bromobenzene	91	70-122

Lab #: 122307

BATCH QC REPORT

Page 1 of 1

BTXE			
Client:	The Earth Technology Corporation	Analysis Method:	BTXE
Project#:	687157.08	Prep Method:	EPA 5030
Location:	Mill Springs		
METHOD BLANK			
Matrix:	Water	Prep Date:	08/25/95
Batch#:	22862	Analysis Date:	08/25/95
Units:	ug/L		
Diln Fac:	1		

MB Lab ID: QC02382

Analyte	Result		
MTBE	<2.0		
Benzene	<0.5		
Toluene	<0.5		
Ethylbenzene	<0.5		
m,p-Xylenes	<0.5		
o-Xylene	<0.5		
Surrogate	%Rec		Recovery Limits
Trifluorotoluene	90		75-125
Bromobenzene	93		75-125



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122307-002
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: G1-WATER

DATE SAMPLED: 08/21/95
DATE RECEIVED: 08/21/95
DATE ANALYZED: 08/28/95
DATE REPORTED: 08/31/95
BATCH NO: 22907

EPA 8010 Compound List by EPA 8240
Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl chloride	ND	2.0
Chloroethane	ND	2.0
Methylene chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	1.7	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	3.1	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	8.0	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	114 %
Toluene-d8	107 %
Bromofluorobenzene	107 %



Curtis & Tompkins, Ltd

LABORATORY NUMBER: 122307-Method Blank
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS
SAMPLE ID: MB

DATE ANALYZED: 08/28/95
DATE REPORTED: 08/31/95
BATCH NO: 22907

EPA 8010 Compound List by EPA 8240
Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl chloride	ND	2.0
Chloroethane	ND	2.0
Methylene chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0

ND = Not detected at or above reporting limit.

SURROGATE RECOVERIES

1,2-Dichloroethane-d4	106 %
Toluene-d8	106 %
Bromofluorobenzene	100 %

Curtis & Tompkins, Ltd



Curtis & Tompkins, Ltd.

8010MS MS/MSD Report

Matrix Sample Number: 122280-021 Date Analyzed: 28-AUG-95
 Lab No: QC02626 QC02627 Spike File: DHS12
 Matrix: WATER Spike Dup File: DHS13
 Batch No: 22907 435240161012 435240167013 435240156011 Analyst: TW

	ppb	SpikeAmt	% Rec	Limits
<u>MS RESULTS</u>				
1,1-Dichloroethene	71.8	50	117 %	61-145%
Trichloroethene	197	50	91 %	71-120%
Benzene	59.1	50	118 %	76-127%
Toluene	59.1	50	118 %	76-125%
Chlorobenzene	57	50	114 %	75-130%
Surrogate Recoveries				
1,2-Dichloroethane-d4	54.4	50	109 %	75-143%
Toluene-d8	52.5	50	105 %	77-134%
Bromofluorobenzene	52.3	50	105 %	65-129%
<u>MSD RESULTS</u>				
1,1-Dichloroethene	72.6	50	119 %	61-145%
Trichloroethene	199	50	96 %	71-120%
Benzene	61	50	122 %	76-127%
Toluene	61.3	50	123 %	76-125%
Chlorobenzene	58.7	50	117 %	75-130%
Surrogate Recoveries				
1,2-Dichloroethane-d4	56.3	50	113 %	75-143%
Toluene-d8	54.6	50	109 %	77-134%
Bromofluorobenzene	52.9	50	106 %	65-129%
<u>MATRIX RESULTS</u>				
1,1-Dichloroethene	13.2			
Trichloroethene	151			
Benzene	0			
Toluene	0			
Chlorobenzene	0			
<u>RPD DATA</u>				
1,1-Dichloroethene	1 %			< 14%
Trichloroethene	1 %			< 14%
Benzene	3 %			< 11%
Toluene	4 %			< 13%
Chlorobenzene	3 %			< 13%

122307



Chain of Custody Record

Lab Job no. _____
 Date 08/21/95
 Page 1 of 1

Laboratory Contra & Tompkins
 Address 2323 - 5th Street
Berkeley, CA

Method of Shipment: drop-off

Client Earth Tech
 Address 2030 Addison St, #500
Berkeley, CA 94704

Shipment No. _____
 Project Manager Mack Milani

Project Name / Number Mill Springs / 687157.03

Telephone No. 510/510-6954

Fax No. 510/510-7496

Contract / Purchase Order / Quote _____

Samplers: (Signature) Tan Duh

Received by	No. of Containers	Analysis Required					Remarks
		2015 - Asst. Analyst	2020	2015 - Analyst	2010		
- 3	X X						
- 1		X					
4	X X		X				
1			X				
3	X X						
1			X				

-1<
-2<
-3<

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation	
						Temp.	Chemical
Poly-water	-	08/21/95	1510	Water	40 ml VOA	4°C	HCL
Poly-water	-	"	1500	Water	1L - amber	"	none
GI-water	-	"	1600	"	40ml VOA	"	HCL
GI-water	-	"	1600	"	1L - amber	"	none
DRUM-WATER	-	"	1615	"	40ml - VOA	"	HCL
DRUM-WATER	-	"	1615	"	1L - amber	"	none

Relinquished by: Signature <u>Tan Duh</u> Printed <u>Tan Duh</u> Company <u>Earth Tech</u> Reason <u>Lab drop-off</u>	Date <u>08/21/95</u> Time <u>1815</u>	Received by: Signature <u>J.W. Williams</u> Printed <u>J.W. Williams</u> Company <u>ciT</u> Reason <u>Analysis</u>	Date <u>08/21</u> Time <u>1815</u>	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____
Comments: <u>5 day TAT</u>				Relinquished by: Signature _____ Printed _____ Company _____ Reason _____			