



Chevron

SECRET 5/11/93

May 7, 1993

Chevron U.S.A. Products Company
2410 Camino Ramon
San Ramon, CA 94583

Marketing Department
Phone 510 842 9500

Ms. Jennifer Eberle
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94621

**Re: Former Chevron Service Station #9-4816
301 14th Street, Oakland**

Dear Ms. Eberle:

Enclosed we are forwarding the Additional Environmental Assessment Report dated April 30, 1993, prepared by our consultant Groundwater Technology, Inc. (GTI) for the above referenced site. As indicated in the report, one (1) boring was advanced and completed into a vapor extraction well designated VEW-3. Soil samples collected from the drill cuttings were analyzed for total petroleum hydrocarbons as gasoline (TPH-G) and BTEX. The sample collected at 20-feet below grade reported TPH-G at a concentration of 2,500 ppm and benzene at a concentration of 25 ppm.

We have incorporated this well into our extraction well network to increase the overall effectiveness of the system. Chevron will continue to monitor the effectiveness of the remediation system. As stated in my April 26, 1993, letter we plan to replace the ICE Engine with vapor-phase carbon within the next month. The ICE Engine is no longer cost effective based on the influent concentrations.

If you have any questions or comments, please do not hesitate to contact me at (510) 842-9581 .

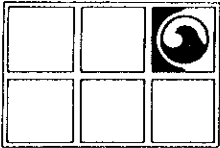
Very truly yours,
CHEVRON U.S.A. PRODUCTS COMPANY


Nancy Vukelich
Site Assessment and Remediation Engineer

Enclosure

cc: Mr. Rich Hiatt, RWQCB
Mr. R.W. Cosby, 225/1936
Mr. Thomas Berry, Weiss Associates
Ms B.C. Owen
File (9-4816A2)

Ms. Beth Castleberry
WARE & FREIDENRICH
400 Hamilton Avenue
Palo Alto, CA 94301



GROUNDWATER TECHNOLOGY, INC.

4057 Port Chicago Highway, Concord, CA 94520 (415) 671-2387

FAX: (415) 685-9148

April 30, 1993

Project No. 020204062

Ms. Nancy Vukelich
Chevron U.S.A. Products Company
2410 Camino Ramon
PO Box 5004
San Ramon, CA 94583

SUBJECT: Additional Environmental Assessment Report
Former Chevron Service Station No. 9-4816
301 14th Street
Oakland, California

Dear Ms. Vukelich:

On March 22, 1993, Chevron U.S.A. Products Company (Chevron) requested Groundwater Technology, Inc. to install one 4-inch vapor extraction well at the referenced site (Attachment 1, Figure 1). The well is to be used as a vapor extraction point. It was drilled to below the current water table to allow for remediation of separate-phase hydrocarbons.

Groundwater Technology prepared a site-specific Health and Safety Plan required by the Occupational Health and Safety Administration Standard "Hazardous Waste Operations and Emergency Response" guidelines (29 CFR 1910.120). The Health and Safety Plan was reviewed and signed by Groundwater Technology's on-site personnel and subcontractors before working at the site. A drilling permit to install the groundwater monitoring/extraction well was obtained from Zone 7 Alameda County Flood Control and Water Conservation District. A copy of the permit is included in Attachment 2.

On March 31, 1993, Groundwater Technology supervised the drilling of one 4-inch-diameter soil boring for the construction of vapor extraction well (VEW)-3. The soil boring was drilled with a truck-mounted drill rig equipped with 12-inch hollow-stem augers. The augers were steamed cleaned before drilling. The soil boring was drilled to a depth of approximately 30.5 feet below grade. A Groundwater Technology field geologist, under the supervision of a California Registered Geologist, logged the materials encountered during drilling using the Unified Soil Classification System. The materials encountered during drilling were clayey sands. During drilling of the soil boring for well VEW-3 on March 3, 1993, groundwater was encountered at approximately 21.5 feet below grade.

LR4062A1.TW

During drilling on March 31, 1993, soil samples were collected from the soil boring for vapor extraction well VEW-3 at 5-foot intervals from approximately 5 feet below grade to the bottom of the boring. The samples were collected using a 2-inch-outside-diameter split-spoon sampler lined with three 2-inch-diameter by 6-inch-long brass sample tubes. At each sampling interval, the sampler was driven 18 inches ahead of the hollow-stem augers into undisturbed soil. One sample from every 5-foot interval was sealed with aluminum foil, capped, taped, labeled, placed on ice in an insulated container, and delivered to a California-certified laboratory. Soil sampling was performed according to Groundwater Technology Standard Operating Procedures, which are included in Attachment 3. Two soil samples collected during drilling activities for vapor extraction well VEW-3 were submitted to a California-certified laboratory for benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons-as-gasoline (TPH-G) analyses using Environmental Protection Agency (EPA) Methods 5030/8020 and modified EPA Method 8015. The steam cleaning water was stored in labeled 55-gallon drums pending disposal. Approximately 0.9 cubic yard of soil cuttings generated during the drilling activities was placed on and covered with plastic sheets. Water generated from steam cleaning and development activities was removed and transported to the Chevron Refinery in Richmond.

Vapor extraction well VEW-3 was constructed of 15 feet of 4-inch-diameter Schedule 40 polyvinylchloride (PVC) casing with flush threads and 15 feet of 0.020-inch-slot well screen. A sand filter pack was placed around the well screen in well VEW-3 to approximately 2 feet above the slotted well screen. Vapor extraction well VEW-3 was completed with 1 foot of hydrated bentonite and a neat-cement seal to grade. The PVC casing was extended to 2 feet above grade and the wellhead was secured with a locking cap. Well construction details are included with the drill log (Attachment 4).

Analytical results of soil samples collected from the soil boring activities during the construction of vapor extraction well VEW-3 at 10 feet below grade reported concentrations of TPH-G and BTEX below the method detection limits. Analytical results of soil samples collected at 20 feet below grade reported TPH-G and benzene concentrations of 2,500 parts per million (ppm) and 25 ppm, respectively. Copies of the laboratory analytical results are included in Attachment 5. *ok*

On April 7, 1993, vapor extraction well VEW-3 was developed by surging and bailing groundwater using a PVC baller. Approximately 55 gallons of water were bailed from well VEW-3. This technique promotes a uniform sand filter pack, removes fine-grain sediments from the well screen and filter pack, and improves the hydraulic communication between the well and aquifer. At the request of Chevron, no groundwater samples were collected from VEW-3.

Groundwater Technology appreciates being of service on this project. If you have questions or comments about this letter report, please contact us at (510) 671-2387.

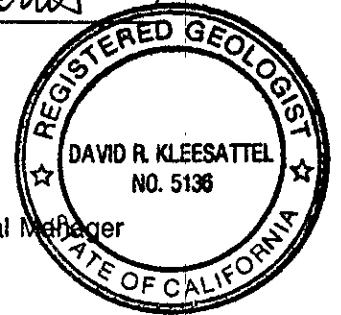
Sincerely,
Groundwater Technology, Inc.
Written/Submitted by

Tim Watchers
Tim Watchers
Project Geologist

Groundwater Technology, Inc.
Reviewed/Approved by

David R. Kleesattel
David R. Kleesattel
Registered Geologist
No. 5136

For:
John S. Gaines
Vice President, General Manager
West Region

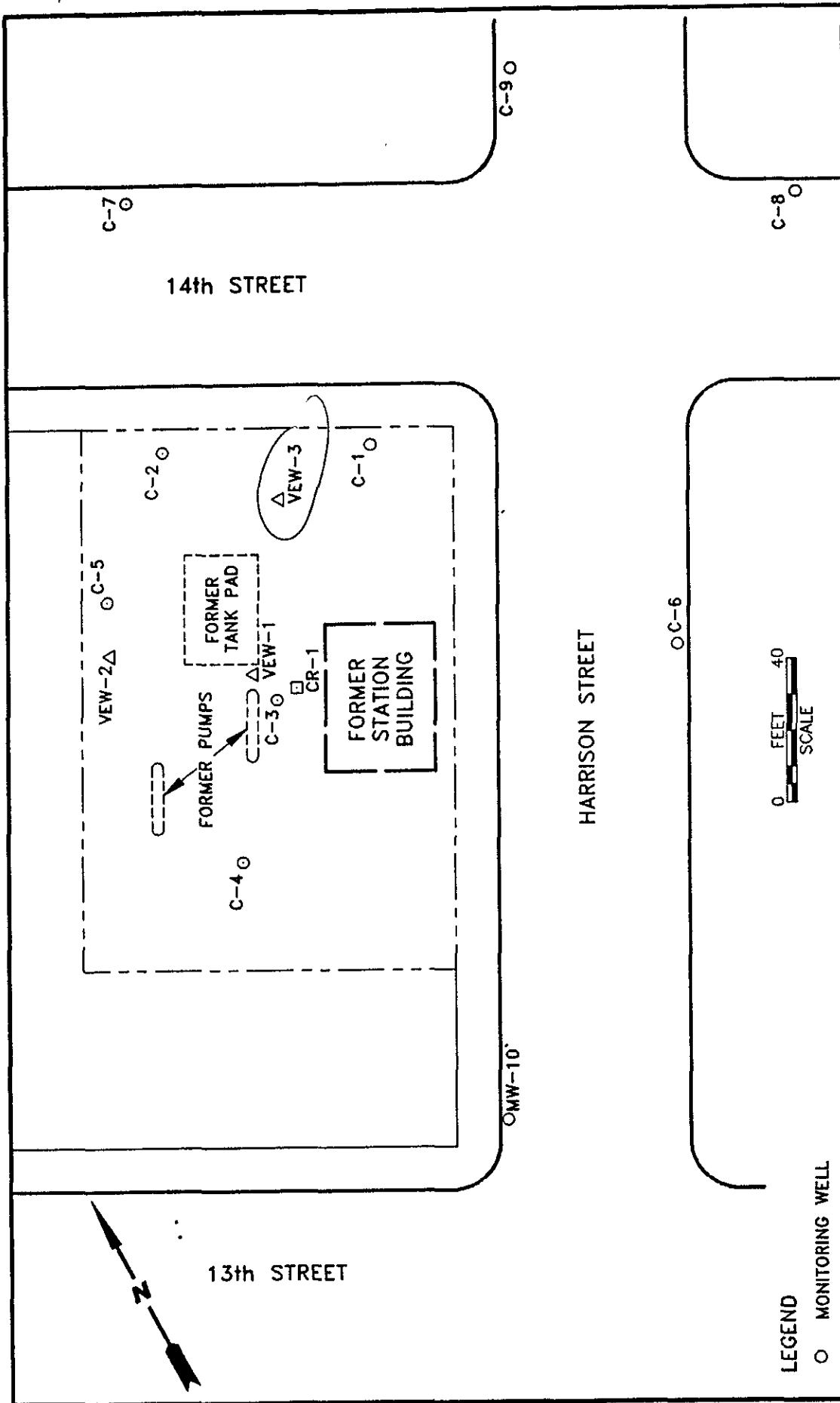


TW:ly

- Attachment 1 Figure
- Attachment 2 Permit
- Attachment 3 Groundwater Technology, Inc. Standard Operating Procedures
- Attachment 4 Well Construction Details and Drill Log
- Attachment 5 Laboratory Analytical Results

ATTACHMENT 1

FIGURE



LEGEND

- MONITORING WELL
- RECOVERY WELL
- △ VAPOR EXTRACTION WELL

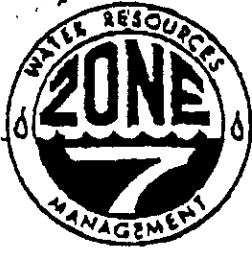


		GROUNDWATER TECHNOLOGY 4057 PORT CHICAGO HWY CONCORD, CA 94520 (510) 671-2387		LOCATION: 301 14th STREET OAKLAND, CALIFORNIA		REV. NO.: 0	DATE: 4/14/93
		CLIENT: CHEVRON U.S.A. PRODUCTS Co. SERVICE STATION No. 9-4816		ACAD FILE: SP493		PROJECT NO.: 020204062	
PM	PE/RG	DESIGNED TW	DETAILED ML	FIGURE: 1			

SITE PLAN

ATTACHMENT 2

PERMIT



ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588

VOICE (510) 484-2600
FAX (510) 482-3814

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 301 14th Street
Oakland, California

PERMIT NUMBER 93155
LOCATION NUMBER _____

CLIENT
Name Chevron U.S.A. Products Company
Address P.O. Box 5004 Phone 842-9581
City San Ramon Zip 94503-0804

PERMIT CONDITIONS:
Circled Permit Requirements Apply

APPLICANT
Name Groundwater Technology
Address 4057 Port Chicago Highway Phone 671-2387
City Concord, California Zip 94520

TYPE OF PROJECT
Well Construction _____ Geotechnical Investigation _____
Cathodic Protection _____ General _____
Water Supply _____ Contamination _____
Monitoring X Well Destruction _____

PROPOSED WATER SUPPLY WELL USE
Domestic _____ Industrial _____ Other none
Municipal _____ Irrigation _____

DRILLING METHOD:
Mud Rotary _____ Air Rotary _____ Auger X
Cable _____ Other _____

DRILLER'S LICENSE NO. _____

WELL PROJECTS
Drill Hole Diameter 12 in. Maximum _____
Casing Diameter 4 in. Depth 30 ft.
Surface Seal Depth 10 ft. Number 1

GEOTECHNICAL PROJECTS
Number of Borings 1 Maximum _____
Hole Diameter 12 in. Depth 30 ft.

ESTIMATED STARTING DATE April 16
ESTIMATED COMPLETION DATE April 16

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

- (A) GENERAL
 1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
 2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
 3. Permit is void if project not begun within 90 days of approval date.
- (B) WATER WELLS, INCLUDING PIEZOMETERS
 1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
 2. Minimum seal depth is 50 feet for municipal and industrial well or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.
- C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.
- D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.
- E. WELL DESTRUCTION. See attached.

year?

Approved Wyman Hong Date 29 Mar
Wyman Hong

APPLICANT'S _____

ATTACHMENT 3
STANDARD OPERATING PROCEDURES

**GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING GROUNDWATER MONITORING
SOP 8**

Groundwater monitoring of wells at the site shall be conducted using an ORS Environmental Equipment (ORS) INTERFACE PROBE™ and SURFACE SAMPLER™. The INTERFACE PROBE™ is a hand-held, battery-operated device for measuring depth to petroleum product and depth to water as measured from an established datum (*i.e.*, top of the well casing which has been surveyed). Separate-phase hydrocarbon (product) thickness is then calculated by subtracting the depth to product from the depth to water. In addition, water elevations are adjusted for the presence of fuel with the following calculation:

$$(\text{Product Thickness}) (0.8) + (\text{Water Elevation}) = \text{Corrected Water Elevation}$$

Note: The factor of 0.8 accounts for the density difference between water and petroleum hydrocarbons.

The INTERFACE PROBE™ consists of a dual-sensing probe which utilizes an optical liquid sensor and electrical conductivity to distinguish between water and petroleum products. A coated steel measuring tape transmits the sensor's signals to the reel assembly where an audible alarm sounds a continuous tone when the sensor is immersed in petroleum product and an oscillating tone when immersed in water. The INTERFACE PROBE™ is accurate to 1/16th inch.

A SURFACE SAMPLER™ shall be used for visual inspection of the groundwater to note sheens (difficult to detect with the INTERFACE PROBE™), odors, microbial action, etc.

The SURFACE SAMPLER™ used consists of a 12-inch-long case acrylic tube with a Delrin ball which closes onto a conical surface creating a seal as the sampler is pulled up. The sampler is calibrated in inches and centimeters for visual inspection of product thickness.

To reduce the potential for cross contamination between wells, the monitorings shall take place in order from the least to the most contaminated wells. Wells containing separate-phase hydrocarbons (free product) should be monitored last. Between each monitoring the equipment shall be washed with laboratory-grade detergent and double rinsed with distilled water.

**GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING WATER SAMPLING METHODOLOGY
SOP 9**

Before water sampling, each well shall be purged by pumping a minimum of four well volumes or until the discharge water indicates stabilization of temperature conductivity and pH. If the well is evacuated before four well volumes are removed or stabilization is achieved, the sample should be taken when the water level in the well recovers to 80 percent of its initial level.

Retrieval of the water sample, sample handling and sample preservation shall be conducted according to Standard Operating Procedure 10 concerning "Sampling for Volatiles in Water." The sampling equipment used shall consist of a Teflon® and/or stainless steel samplers which meet U.S. Environmental Protection Agency (EPA) regulations. Glass vials with Teflon® lids should be used to store the collected samples.

To ensure sample integrity, each vial shall be filled with the sampled water in such a way that the water stands above the lip of the vial. The cap should then be quickly placed on the vial and tightened securely. The vial should then be checked to ensure that air bubbles are not present prior to labeling of the sample. Label information should include a sample identification number, job identification, date, time, type of analysis requested, and sampler's name. Chain-of-custody records shall be completed according to Standard Operating Procedure (SOP) 11 concerning chain of custody.

The vials should be immediately placed in high quality coolers for shipment to the laboratory. The coolers should be packed with sufficient ice or freezer packs to ensure that the samples are kept below 4° Celsius (C). To minimize sample degradation the prescribed analysis shall take place within seven days of sample collection unless specially prepared acidified vials are used.

To minimize the potential for cross contamination between wells, all the well development and water sampling equipment which contacts the groundwater shall be cleaned between each sampling. As a second precautionary measure, the wells shall be sampled in order of increasing contaminant concentrations (the least contaminated well first, the most contaminated well last) as established by previous analysis.

**STANDARD OPERATING PROCEDURE 10
CONCERNING SAMPLING FOR VOLATILES IN WATER
(DISSOLVED GASOLINE, SOLVENTS, ETC.)
SOP 10**

1. Use only vials properly washed and baked.
2. Use clean sampling equipment. Scrub with Alconox or equivalent laboratory detergent and water followed by a thorough water rinse. Complete with a distilled water rinse.

Sampling equipment which has come into contact with liquid hydrocarbons (free product) should be regarded with suspicion. Such equipment should have tubing and cables replaced and all resilient parts washed with laboratory detergent solution as indicated above. Visible deposits may have to be removed with hexane. Solvent washing should be followed by detergent washing, as indicated above.

This procedure is valid for volatile organic analysis only. For extractable organics (for example, pesticides, or base neutrals for U.S. Environmental Protection Agency [EPA] Method 625 a final rinse with pesticide-grade isopropyl alcohol), followed by overnight or oven drying will be necessary.

3. Take duplicate samples. Mark on forms as a single sample with two containers to avoid duplication of analyses.
4. Take a site blank using distilled water or known uncontaminated source. This sample will be run at the discretion of the project manager.
5. Fill out labels and forms as much as possible ahead of time. Use an indelible marker.
6. Preservatives are required for some types of samples. Use specially prepared vials marked as indicated below, or use the appropriate field procedure (SOP 12 for acidification). Make note on forms that samples were preserved. Always have extra vials in case of problems. Samples for volatile analyses should be acidified below pH 2 upright. Eye protection, foot protection, and disposable vinyl gloves are required for handling. Samples designated for expedited service and analyzed within seven (7) days of sampling will be acceptable without preservation. Acid-causing burns. Glasses or goggles (not contact lenses) are necessary for protection of the eyes. Flush eyes with water for 15 minutes if contact occurs and seek medical attention. Rinse off hands frequently with water during handling.

For sampling chlorinated drinking water supplies for chlorinated volatiles, samples shall be preserved with sodium thiosulfate. Use vials labeled "CONTAINS THIOSULFATE." No particular cautions are necessary.

7. Fill vial to overflowing with water, avoiding turbulence and bubbling as much as possible. Water should stand above lip of vial.
8. Carefully, but quickly, slip cap onto vial. Avoid dropping the Teflon® septum from cap by not inverting cap until it is in contact with the vial. Disc should have Teflon® face toward the water. Also avoid touching white Teflon® face with dirty fingers.
9. Tighten cap securely, invert vial, and tap against hand to see there are not bubbles inside.

10. Label vial, using indelible ink, as follows:
 - A. Sample I.D. No.
 - B. Job I.D. No.
 - C. Date and Time
 - D. Type of analysis required
 - E. Your name
11. Unless the fabric-type label is used, place Scotch™ tape over the label to preserve its integrity.
12. For chain-of-custody reasons, sample vial should be wrapped end-for-end with Scotch™ tape or evidence tape and signed with indelible ink where the end of the tape seals on itself. The septum needs to be covered.
13. Chill samples immediately. Samples to be stored should be kept at 4° Celsius (C) (30° Fahrenheit [F]). Samples received at the laboratory above 10°C (as measured at glass surface by a thermocouple probe), after overnight shipping, will be considered substandard, so use a high quality cooler with sufficient ice or freezer packs.
14. Fill out Chain-of-Custody Manifest and Analysis Request Form (see Chain of Custody Procedures, SOP 11).

**GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING CHAIN OF CUSTODY
SOP 11**

1. Samples must be maintained under custody until shipped or delivered to the laboratory. The laboratory will then maintain custody. A sample is under custody if:
 - a) It is in your possession
 - b) It is in your view after being in your possession
 - c) You locked it up after it was in your possession
 - d) It is in a designated secure area
2. Custody of samples may be transferred from one person to another. Each transferrer and recipient must date, sign and note the time on the chain-of-custody form.
3. In shipping, the container must be sealed with tape, and bear the sender's signature across the area of bonding at the ends of the tape to prevent undetected tampering. Each sampling jar should be taped and signed as well. Scotch tape works well.
4. Write "sealed by" and sign in the "Remarks" box at the bottom of the form before sealing the box. Place form in a plastic bag and seal it inside the box.
5. The "REMARKS" section of the form is for documenting details such as:
 - a) Correlation of sample numbers if samples are split between labs.
 - b) QC numbers when lab is logging in the samples.
 - c) Sample temperature and condition when received by lab.
 - d) Preservation notation.
 - e) pH of samples when opened for analysis (if acidified).
 - f) Sampling observation or sampling problem.
6. The chain-of-custody form should be included inside the shipping container. A copy should be sent to the project manager.
7. When the samples are received by the lab, the chain-of-custody form will be dated, signed, and the time noted by a laboratory representative. The form will be retained in the laboratory files along with shipping bills and receipts .
8. At the time of receipt of samples by the laboratory, the shipping container will be inspected and the sealing signature will be checked. The samples will be inspected for condition and bubbles, and the temperature of a representative sample container will be measured externally by a thermocouple probe (held tightly between two samples) and recorded. The laboratory QC numbers will be placed on the labels, in the accession log, and on the chain-of-custody form. If samples are acidified, their pH will be measured by narrow range pH paper at the time of opening for analysis. All comments concerning procedures requiring handling of the samples will be dated and initialed on the form by the laboratory person performing the procedure. A copy of the completed chain-of-custody form with the comments on sample integrity will be returned to the sampler.

**GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING SOIL SAMPLING METHODOLOGY
SOP 14**

1. Soil samples should be collected and preserved in accordance with Groundwater Technology Standard Operating Procedure (SOP 15) concerning Soil Sample Collection and Handling when Sampling for Volatile Organics. A hollow stem soil auger should be used to drill to the desired sampling depth. A standard 2 inch diameter split spoon sampler 18 inches in length shall be used to collect the samples. The samples are contained in 2 inch diameter by 6 inch long thin walled brass tube liners fitted into the split spoon sampler (three per sampler).
2. The split spoon sampler should be driven the full depth of the spoon into the soil by a 140 pound hammer. The spoon shall then be extracted from the borehole and the brass tube liners containing the soil sample removed from the sampler. The ends of the liner tubes should be immediately covered with aluminum foil, sealed with a teflon or plastic cap, and taped with duct tape. After being properly identified with sample data entered on a standard chain of custody form the samples shall be placed on dry ice (maintained below 4~C) and transported to the laboratory within 24 hours.
3. One of the three soil samples retrieved at each sample depth shall be analyzed in the field using a photolization detector and/or explosimeter. The purpose of the field analysis is to provide a means to choose samples to be laboratory analyzed for hydrocarbon concentrations and to enable comparisons between the field and laboratory analyses. The soil sample shall be sealed in a plastic bag and allowed to equilibrate with the air surrounding the soil for approximately 10 minutes. One of the two field vapor instruments shall be used to quantify the amount of hydrocarbon released to the air from the soils. The data shall be recorded on the drill logs at the depth corresponding to the sample point.

**GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING SOIL SAMPLE COLLECTION AND
HANDLING WHEN SAMPLING FOR VOLATILE ORGANICS
SOP 15**

1. Use a sampling means which maintains the physical integrity of the samples. The project sampling protocol will designate a preferred sampling tool. A split spoon sampler with liners, or similar tube sampler which can be sealed, is best.
2. The samples should be sealed in the liner, with teflon plugs (The "California Sampler") or plastic caps.
3. For sending whole-core samples (above):
 - A. Seal ends of liner with teflon plugs or plastic caps, leaving no free air space inside.
 - B. Tape with duct tape.
 - C. Label the sample with the following information: sample identification, depth, date and time, project number and required analyses.
 - D. Place in plastic bag labeled with indelible marker. Use Well #, depth, date, and job #.
 - E. Place inside a second bag and place a labelling tag inside outer bag.
 - F. Enclose samples in a cooler with sufficient ice or dry ice to maintain samples at 4 degrees C during shipment.
 - G. Seal cooler with a lock, or tape with samplers signature so tampering can be detected.
 - H. Package cooler in a box with insulating material. Chain of custody forms can be placed in a plastic bag in this outer box.
 - I. If dry ice is used, a maximum of 5 pounds is allowed by Federal Express without special documents (documents are easy to obtain but are not necessary for under 5 pounds). Write "ORM-A dry ice", "_____ pounds, for research" on outside packaging and on regular airbill under classification. UPS does not accept dry ice.
 - J. Soil cores kept a 4 degrees C are only viable for up to 7 days when aromatic hydrocarbons are involved. The lab should prepare the samples in methanol once in the lab.
4. Good sampling practice would include preparing 1 out of 5 samples to be prepared in duplicates for analysis. These 4 out of 20 samples will be used for the following purposes:
 - A. One in every 20 samples should be analyzed as a field replicate to evaluate the precision of the sampling technique. A minimum of 1 sample per data set is suggested.
 - B. An additional 1 in 20 samples should be selected by sampler to be prepared in duplicate as alternative to Step (A). Choose a different soil type if available.

- C. The remaining 2 in 20 samples should be used by lab for spiking with reference materials for internal QC.

Other QC procedures can be specified at the project manager's discretion. See Table 3-2 (reference 2) attached.

5. Decontamination of equipment in the field requires a detergent wash, with a distilled water rinse.

REFERENCES

1. Soil Sampling Quality Assurance Users Guide, U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, NV, EPA 600/4-84-043, May 1984.
2. Preparation of Soil Sampling Protocol. Techniques and Strategies, U.S. EPA, Environmental Monitoring Systems Laboratory, Las Vegas, NV, EPA 600/4-83-020, August 1983 (PB83-206979).
3. Test Methods for Evaluating Solid Waste, U.S. EPA, Office of Solid Waste and Emergency Response, Washington, D.C., SW 846, July 1982.

**GROUNDWATER TECHNOLOGY, INC.
STANDARD OPERATING PROCEDURE
CONCERNING OPERATION/CALIBRATION OF
PHOTOIONIZATION ANALYZER
SOP 19**

1. The Thermo Environmental Instruments Inc. Model 580B OVM Photoionization Analyzer shall be used, using photoionization, to measure the concentration of trace gases over a range of less than 1 ppm to 2,000 ppm. The specific instrument used for investigations related to hydrocarbon contamination should be calibrated for direct readings in parts per million (ppm) volume/volume of Isobutylene. Specifics of the detection principle/theory and functions of various components can be found in the manufactures instruction manual.
2. To assure optimum performance, the photoionization analyzer should be calibrated with a standard gas mixture of known concentration from a pressurized container. A daily procedure for calibration involves bringing the probe and readout close to the calibration gas, cracking the valve on the tank and checking the instrument reading. This provides a useful spot check for the instrument.
3. A procedure conducted weekly for more accurate calibration of the instrument from a pressurized container is to connect one side of a "T" to the pressurized container of calibration gas, another side of the "T" to a rotameter and the third side of the "T" directly to the 8" extension to the photoionization probe (see Figure 2). Crack the valve of the pressurized container until a slight flow is indicated on the rotameter. The instrument draws in the volume of sample required for detection, and the flow in the rotameter indicates an excess of sample. Now adjust the span pot so that the instrument reads the exact value of the calibration gas. (If the instrument span setting is changed, the instrument should be turned back to the standby position and the electronic zero should be readjusted, if necessary).

ATTACHMENT 4
WELL CONSTRUCTION DETAILS AND DRILL LOG

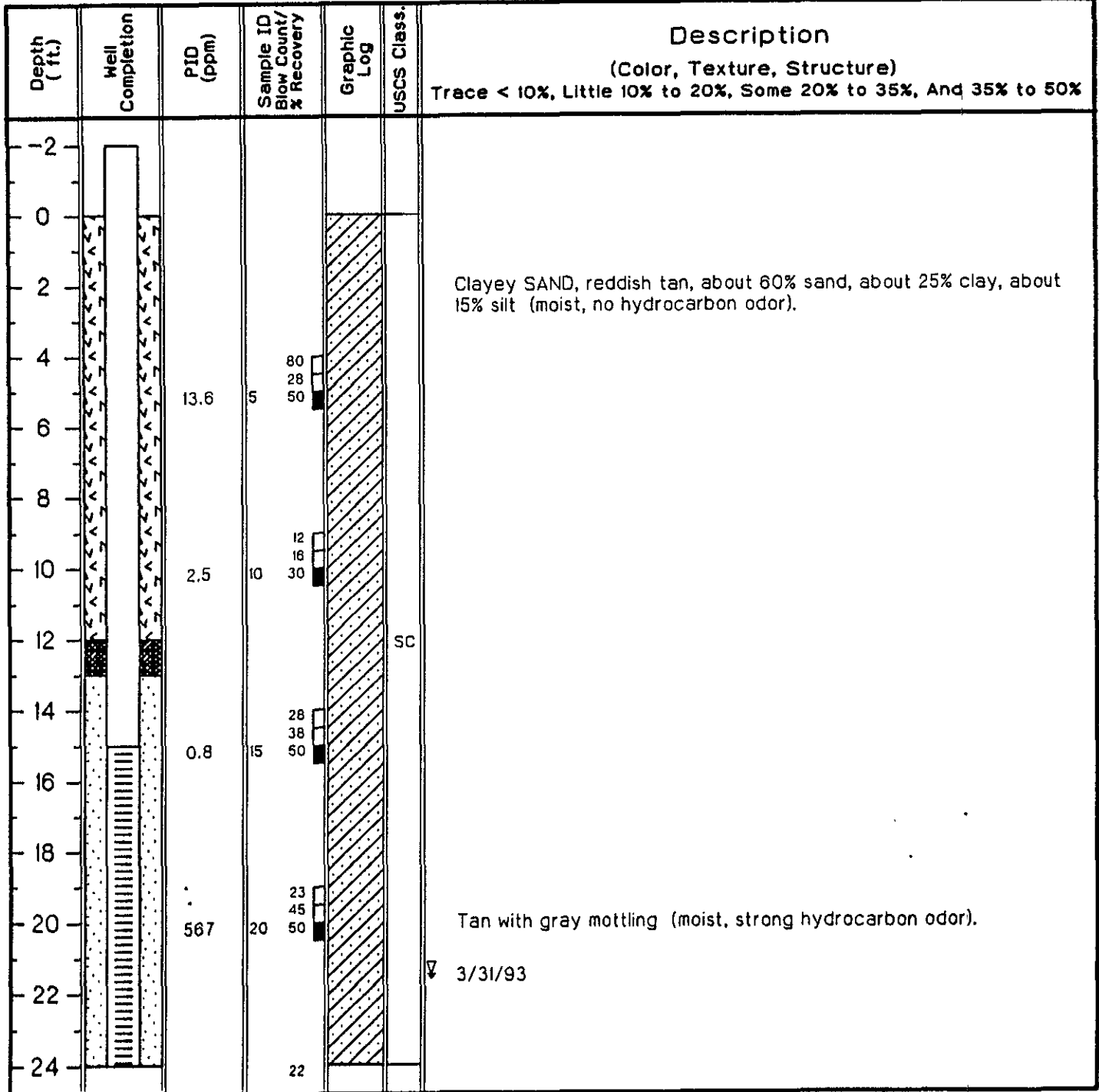


Project CHV/301 14th St. Owner Chevron
 Location Oakland, CA Project No. 020204062 Date drilled 3/31/93
 Surface Elev. N/A ft. Total Hole Depth 30.5 ft. Diameter 10 in.
 Top of Casing N/A ft. Water Level Initial 21.47 ft. Static N/A ft.
 Screen: Dia 4 in. Length 15 ft. Type/Size 0.020 in.
 Casing: Dia 4 in. Length 15 ft. Type PVC SCH 40
 Filter Pack Material #3 sand Rig/Core Type B-61/Mod. Cal. Split Spoon
 Drilling Company Kvilhaug Drilling Method Hollow Stem Auger Permit # 93155
 Driller Rod Furlow Log By S.C. Hurley
 Checked By David Kleesattel License No. RG# 5136 *David Kleesattel*

See Site Map
For Boring Location

COMMENTS:

The well was set at approximately 30.5 feet below grade and extended to 2.5 feet above grade. The soil cuttings were placed on plastic and was left on site until it could be analyzed and disposed of properly.



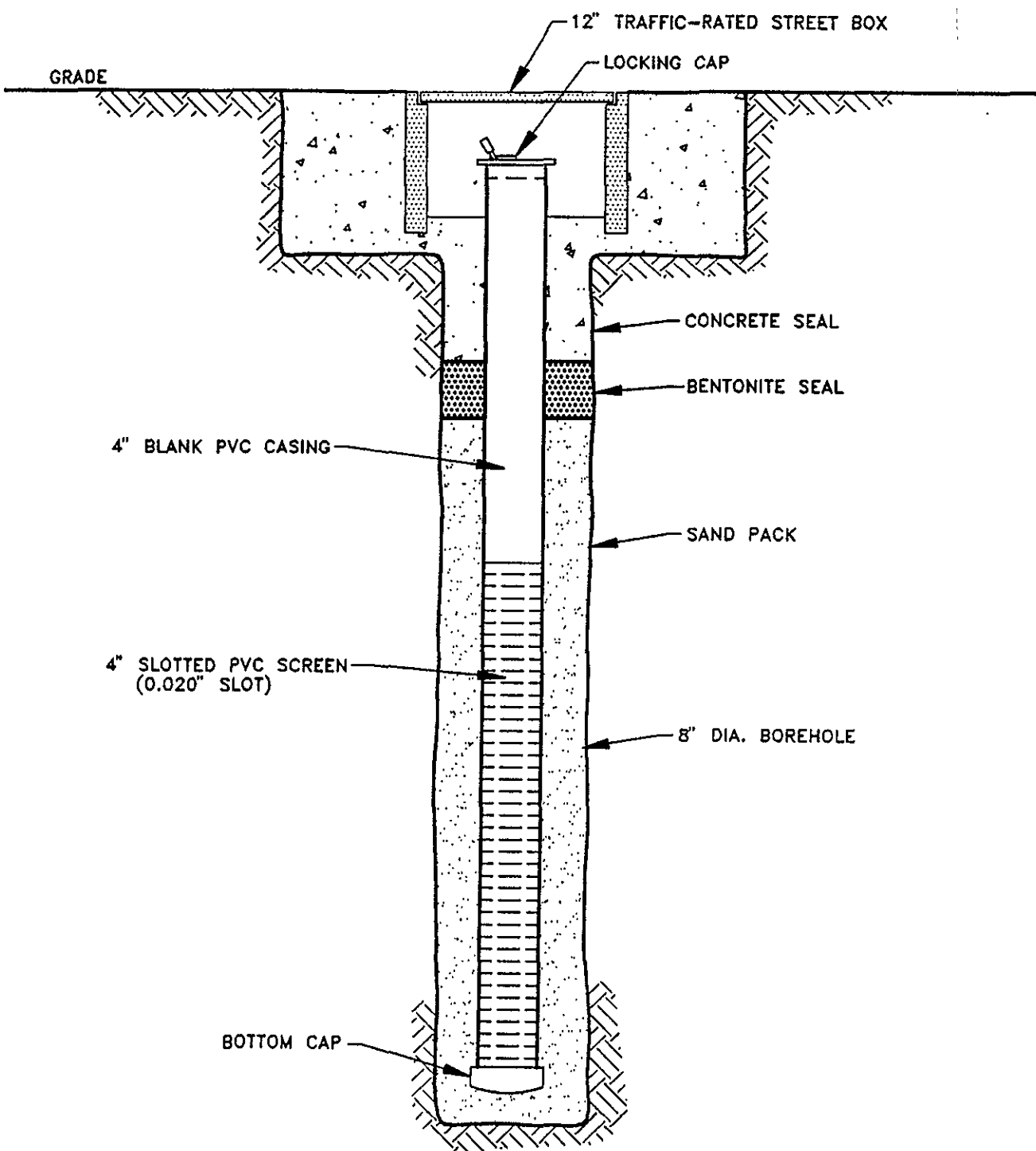


Drilling Log

Vapor Point VEW-3

Project CHV/301 14th St. Owner Chevron
Location Oakland, CA Project No. _____ Date drilled 3/31/93

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		531	25		SC SM	Flowing silty sands, gray (hydrocarbon odor)
26						
28						
30		144	30			End of boring at 30.5 feet.
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						



NOT TO SCALE

TYPICAL MONITORING WELL CONSTRUCTION

ATTACHMENT 5
LABORATORY ANALYTICAL RESULTS



Northwest Region
4080-C Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 from inside California
(800) 423-7143 from outside California
(510) 825-0720 (FAX)

Client Number: 020204062
Consultant Project Number: 020204062.030503
Project ID: Chevron, 301 14th Street
Work Order Number: C3-04-0052

April 13, 1993

Tim Watchers
Groundwater Technology, Inc.
4057 Port Chicago Hwy
Concord, CA 94520

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 04/01/93.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certificate numbers 194 and 1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

A handwritten signature in cursive script that reads 'Eileen F. Bullen'.

Eileen F. Bullen
Laboratory Director

Client Number: 020204062
 Consultant Project Number: 020204062.030503
 Project ID: Chevron, 301 14th Street
 Work Order Number: C3-04-0052

ANALYTICAL RESULTS

Volatile Organics in Soil

EPA Methods 8020 and Modified 8015a

GTEL Sample Number		02	04	0406F
Client Identification		VEW-3 (10)	VEW-3 (20)	METHOD BLANK
Date Sampled		03/31/93	03/31/93	--
Date Extracted		NA	NA	NA
Date Analyzed		04/06/93	04/09/93	04/06/93
Analyte	Detection Limit, mg/kg	Concentration, mg/kg		
Benzene	0.005	<0.005	25	<0.005
Toluene	0.005	<0.005	120	<0.005
Ethylbenzene	0.005	<0.005	23	<0.005
Xylene, total	0.015	<0.015	460	<0.015
BTEX, total	--	--	630	--
Gasoline	1	<1	2500	4
Detection Limit Multiplier		1	100	1
Percent solids		87.9	83.7	NA
BFB surrogate, % recovery		104	102	113

- a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Board LUFT Manual procedures. Bromofluorobenzene surrogate recovery acceptability limits of 31-127% are derived from the 99% confidence interval of all samples during the previous quarter. Expected surrogate value is 0.100 mg/kg.
 NA = Not Applicable.

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QC Matrix Spike and Duplicate Spike Results

Matrix: Soil

Analyte	Sample ID	Spike Amount	Units	Recovery, %	Duplicate Recovery, %	RPD, %	Control Limits
Modified EPA 8020:							
Benzene	C3040068-10	1.00	mg/Kg	95.0	81.4	15.4	24 - 127
Toluene	C3040068-10	1.00	mg/Kg	90.9	78.2	15.0	17 - 124
Ethylbenzene	C3040068-10	1.00	mg/Kg	85.6	73.3	15.5	19 - 129
Xylene, total	C3040068-10	3.00	mg/Kg	87.0	75.3	14.4	23 - 124

