

0722 '91 T.L.R.

**SOIL AND GROUNDWATER  
INVESTIGATION**

**CHEVRON SERVICE STATION NO. 9-5542  
7007 San Ramon Road  
Dublin, California**

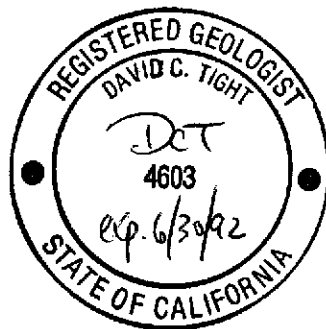
July 19, 1991

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## 1.0 INTRODUCTION

This report presents the results of the soil and groundwater investigation conducted by Burlington Environmental Inc. - *Chempro Division* (Burlington) at Chevron U.S.A., Inc. (Chevron) Service Station No. 9-5542, located at 7007 San Ramon Road in Dublin, California. During the removal of the underground storage tanks, petroleum hydrocarbons were detected in the soil. Chevron requested that Burlington conduct an investigation to evaluate the occurrence of petroleum hydrocarbons in the soil and groundwater beneath the site. On March 12, 1990, Burlington submitted a workplan to Chevron to perform the investigation. The work was conducted in March and April 1990. The following report presents the results of the investigation.

### 1.1 SCOPE OF WORK

The investigation consisted of the following tasks:

- \* Decommissioned an onsite monitoring well, which was damaged during station remodeling.
- \* Drilled and sampled four soil borings, and submitted and analyzed the soil samples for petroleum hydrocarbons and selected metals.
- \* Converted the four soil borings to 2-inch-diameter groundwater monitoring wells.
- \* Developed the four monitoring wells.
- \* Collected groundwater samples from the four monitoring wells, and submitted and analyzed the samples for petroleum hydrocarbons and selected metals.
- \* Measured the depth-to-water in each of the four monitoring wells.
- \* Surveyed the monitoring wells for elevation and location.

### 1.2 SITE DESCRIPTION AND HISTORY

The site is occupied by an operating service station located at the intersection of San Ramon Road and Dublin Boulevard in Dublin, California (see Figure 1). The site is located approximately 1,500 feet north of Interstate 580 and 3,150 feet east of Interstate 680. Properties surrounding the site consist of commercial

businesses. Gasoline service stations occupy the northwest and southwest corners of the San Ramon Road and Dublin Boulevard intersection.

The site is situated at the southern end of the San Ramon Valley and the western end of the Livermore Valley. The station is approximately 360 feet above mean sea level (MSL) and the topography surrounding the site slopes to the east toward San Ramon Creek.

The previous service station contained four underground storage tanks, including two 10,000-gallon tanks, a 4,000-gallon tank, and a 500-gallon tank. In February 1990, the station was demolished and the underground storage tanks were removed (see Figure 2). During the excavation of the underground storage tanks, soil samples were collected along the product lines, in the gasoline-tank pit, and in the used-oil-tank pit, and composite samples were collected from each soil stockpile. The samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline and benzene, toluene, ethylbenzene, and total xylenes (BTEX). The analyses of these samples indicated that petroleum hydrocarbons were present in the soils, with the highest concentrations in the southeastern portion of the former underground storage tank complex (Blaine Tech Services, 1990).

### **1.3 LIMITATIONS**

Services provided hereunder were performed in accordance with current generally accepted environmental consulting principles and practices. No other warranty, expressed or implied, is made.

The opinions presented apply to site conditions existing at the time of performance of services and are based in part on interpretation of data from discrete sampling locations which may not represent conditions between sampling locations. Burlington is unable to report on or accurately predict events which may impact the site following performance of services, whether occurring naturally or caused by external forces. Burlington assumes no responsibility for conditions Burlington did not investigate, or conditions not generally recognized as environmentally unacceptable at the time services were performed.

## 2.0 INVESTIGATIVE METHODS

The site work was conducted from March 26 to 28, 1990. One pre-existing onsite monitoring well was decommissioned, and four soil borings were drilled and converted to 2-inch-diameter groundwater monitoring wells. Selected soil and groundwater samples from each boring were collected and submitted for chemical analysis to GTEL Environmental Laboratories, Inc. (GTEL) of Concord, California. A water-level survey was conducted using all site wells. The well-heads were surveyed for location and elevation.

The following sections describe the methods used in this site investigation.

### 2.1 DRILLING OPERATIONS

The well decommission and borings were drilled by B & F Drilling Inc., of Rancho Cordova, California, with a Mobile B-61 drill rig. Prior to drilling, permits were obtained from the Alameda County Flood Control and Water Conservation District (ACFCWCD) (see Appendix C), and the workplan was approved by the Alameda County Department of Health.

#### 2.1.1 Well Decommission

A pre-existing 3-inch-diameter polyvinyl chloride (PVC) monitoring well (ACFCWCD number 3S/1W 2H9), located near the former underground storage tank complex (see Figure 2), was damaged during the renovation of the service station. This monitoring well was decommissioned by drilling out the PVC casing with 10-inch outside-diameter (OD) hollow-stem augers to five feet below the original completion depth of the well, and sealing the hole with bentonite-cement grout.

Composite samples of the soil cuttings produced during the decommission were collected and analyzed for TPH as gasoline and BTEX to ensure proper disposal. The certified analytical results (CARs) and chain-of-custody forms (COCs) are presented in Appendix E.

### **2.1.2 Soil Borings**

Four soil borings were drilled to determine the subsurface lithology, and to evaluate the presence of petroleum hydrocarbons in the soil beneath the site. Monitoring well MW-1 was drilled through the fill of the former underground tanks (see Figure 2). Monitoring well MW-2 was located at the northern corner of the property, hydraulically upgradient of the former and present onsite underground storage tanks. Monitoring well MW-3 was located hydraulically across gradient from the underground storage tanks. Monitoring well MW-4 was located hydraulically downgradient of the former and present underground storage tanks and the pump islands.

The borings were drilled using 8-inch OD hollow-stem augers. Borings MW-1, MW-2, MW-3, and MW-4 were drilled and sampled to depths of 37.0, 38.5, 36.5, and 37.0 feet below ground level (BGL), respectively. Two-inch-diameter monitoring wells were constructed within each boring (see Section 2.4). All soil cuttings produced during the drilling operation were drummed, labeled, and stored onsite pending chemical results. All drummed soil was disposed of by Burlington in accordance with Chevron guidelines.

### **2.2 SOIL SAMPLING**

Soil samples were collected to determine subsurface lithology and for laboratory analysis. The methods of soil sample collection, soil logging, and sample selection for analysis are described in Appendix A. Boring logs are presented in Appendix C.

Selected soil samples were analyzed using GTEL for TPH as gasoline, using modified EPA method 8015, and BTEX, using EPA method 8020. In addition, soil samples from boring MW-4 were analyzed for TPH as diesel using modified EPA method 8015, chlorinated hydrocarbons using EPA method 8240, total oil and grease using modified EPA method 413.2, and total metals, including lead (Pb), chromium (Cr), cadmium (Cd), and zinc (Zn), by atomic absorption.

### **2.3 WELL INSTALLATION**

Two-inch-diameter groundwater monitoring wells were installed in borings MW-1 through MW-4. The wells were constructed with schedule 40 PVC well casing,

with 0.020-inch machine-slotted well screen. The wells were completed to roughly 1 foot above grade prior to asphaltting and landscaping. The well installation techniques are described in Appendix A. Well construction data are summarized on Table 1 and presented in Appendix C.

On April 2 and 3, 1990, the wells were developed to remove fine-grained sediments from the sand pack in the vicinity of the well screen (see Appendix A). Monitoring wells MW-2 and MW-3 contained up to 5 feet of fines, which were removed prior to development. During well development, 40 to 50 gallons of groundwater were removed from the monitoring wells. The water purged during well development was contained in 55-gallon drums and stored onsite for disposal by Chevron.

#### **2.4 GROUNDWATER SAMPLING**

On April 3 and 4, 1991, groundwater samples were collected from each monitoring well and submitted to GTEL for chemical analysis. Phase-separated hydrocarbons were not observed in any of the monitoring wells, but wells MW-1 and MW-4 had moderate hydrocarbon odor. The groundwater samples were collected and analyzed for TPH as gasoline using modified EPA method 8015, BTEX using EPA method 602, and ethylene dibromide using EPA method 504. In addition, samples from monitoring well MW-4 were analyzed for TPH as diesel using modified EPA method 8015, chlorinated hydrocarbons using EPA method 624, total oil and grease using modified EPA method 413.2, and total selected metals, Pb, Cd, Cr, and Zn, by atomic absorption.

A bailer rinsate sample, collected before sampling began, a duplicate sample from well MW-1, and a trip blank were analyzed for the same parameters as the groundwater samples for quality assurance. Groundwater sampling procedures are summarized in Appendix B. The CARs and COCs are presented in Appendix E.

#### **2.5 WATER-LEVEL SURVEY**

On April 2, 1990, the depth-to-water (DTW) in each well was obtained to determine the groundwater flow direction and gradient beneath the site. DTW was measured from the top of casing as a reference elevation using an electric



water-level sounder (see Appendix B). The DTW values were converted to groundwater elevations relative to MSL by subtracting the DTW from the surveyed well-head elevation.

## **2.6 WELL-HEAD SURVEY**

On April 4, 1990, Ruth and Going, Inc., professional land surveyors of San Jose, California, surveyed the locations and elevations of the monitoring wells at the site. The locations were surveyed to the nearest 1-foot northing and easting, and the top of casing elevations were surveyed to the closest 0.01-foot MSL. The well-head survey data are presented in Table 2.

## **3.0 RESULTS**

### **3.1 GEOLOGY**

#### **3.1.1 Regional Geology**

The San Ramon Valley and Livermore Valley are part of a basin within the Diablo Range of central California. The north-northwest striking San Ramon Valley is probably underlain by a fault that connects the Concord and Calaveras faults. The mountains surrounding the San Ramon Valley are predominantly composed of Tertiary sediments. The Valley is underlain by 100's of feet of Quaternary deposits derived from these older rocks (Helley et al., 1979).

#### **3.1.2 Site Geology**

The site is underlain by Quaternary alluvium associated with the alluvial fan formed by Dublin Creek (Helley et al., 1979). The subsurface geology, extending to a depth of approximately 37 feet, is predominantly composed of sandy clay and clayey sand, with silty sand and gravel lenses. This stratigraphy suggests a distal alluvial fan depositional environment. The soil types encountered during drilling are presented on the boring logs in Appendix C.

### **3.2 SITE HYDROGEOLOGY**

#### **3.2.1 Groundwater Elevation Data**

During drilling, the first-encountered saturated zone beneath the site occurred at depths between 26 and 28 feet BGL. Following monitoring well installation, the static water level was between 24 and 27 feet BGL, which corresponds to groundwater elevations of between 337 and 339 feet MSL (see Table 3).

#### **3.2.2 Groundwater Flow Direction and Gradient**

Based on the groundwater elevation data collected on April 2, 1990, the groundwater flow direction is to the northeast, with a hydraulic gradient of approximately 0.007 ft/ft. The groundwater elevations and a contour map of the potentiometric surface are presented on Figure 3.

### **3.3 GEOCHEMICAL RESULTS**

#### **3.3.1 Soil Geochemistry**

Selected soil samples obtained from borings MW-1 through MW-4 were analyzed for TPH as gasoline and BTEX. In addition MW-4 was analyzed for TPH as diesel, chlorinated hydrocarbons, oil and grease, and total selected metals Pb, Cd, Cr, and Zn. The CARs are presented in Appendix E, and summarized on Table 4.

Soil samples from boring MW-1 contained the highest concentrations of TPH as gasoline and benzene with 1,300 ppm and 38 ppm, respectively, at 25 foot BGL, and 270 ppm and 1 ppm, respectively, at the 30 foot BGL. Additionally, the 25 foot BGL sample from boring MW-4 contained 39 ppm of total oil and grease. Analyzed soil samples from other depths and borings contained less than 100 ppm of TPH as gasoline, and less than the detection limit of benzene.

Rinsate and trip blank quality assurance samples were collected during the drilling procedure, and analyzed for petroleum hydrocarbons. Because the quality assurance samples did not contain significant detectable concentrations of petroleum hydrocarbons, decontamination procedures are considered to be adequate and sample concentrations are considered to be representative of site conditions.

#### **3.3.2 Groundwater Geochemistry**

Groundwater samples collected from monitoring wells MW-1, MW-2, MW-3, and MW-4 were analyzed for TPH as gasoline, BTEX, and ethylene dibromide. In addition, samples from monitoring well MW-4 were analyzed for TPH as diesel, total oil and grease, and total selected metals. The analytical results are summarized on Table 5. The CARs are presented in Appendix E.

Groundwater samples from wells MW-1 and MW-4 contained over 40,000 parts per billion (ppb) of TPH as gasoline and 4,000 ppb of benzene. Additionally, well MW-4 contained 18,000 ppb of total oil and grease. Samples from MW-3 contained 2,200 ppb of TPH as gasoline and 36 ppb of benzene. Well MW-2 did not contain detectable concentrations of petroleum hydrocarbons.

The quality assurance samples, including rinsates, duplicates, and trip blanks, did not contain detectable concentrations of any of the tested analytical parameters. Decontamination procedures are considered to be adequate, and sample concentrations are considered to be representative of site conditions.

#### 4.0 SUMMARY

The site investigation at Chevron Service Station No. 9-5542 in Dublin, California, was conducted to characterize the soil and groundwater beneath the site. Four soil borings were drilled and completed as 2-inch diameter monitoring wells. The wells were installed in the fill of the former underground storage tanks pit (MW-1), and upgradient (MW-2), crossgradient (MW-3) and downgradient (MW-4) of the former underground storage tanks.

The geologic and hydrogeologic data generated in this investigation indicate that the site is underlain by low permeability sandy clays and clayey sands, with silty sand and gravel lenses. The first-encountered water-bearing zone beneath the site occurs at a depth of roughly 25 feet BGL or approximately 338 feet MSL. The groundwater potentiometric surface slopes to the northeast at a gradient of approximately 0.007 ft/ft.

Analysis of selected soil samples from the borings reveal that (1) TPH as gasoline was detected in samples from boring MW-1 and MW-3, with a maximum concentration of 1,300 ppm in boring MW-1, (2) total oil and grease was detected in boring MW-4, and (3) samples from boring MW-2 did not contain detectable concentrations of petroleum hydrocarbons.

The analysis of groundwater samples from the monitoring wells reveal that (1) wells MW-1, MW-3 and MW-4 contained detectable concentrations of petroleum hydrocarbons, with over 40,000 ppb of TPH as gasoline in wells MW-1 and MW-4, (2) well MW-4 contained 18,000 ppb of total oil and grease, and (3) well MW-2 did not contain detectable concentrations of petroleum hydrocarbons.

## 5.0 REFERENCES

- Blaine Tech Services, Inc., 1990. Multiple Event Sampling Report 900214-K-1. Full service station demolition with removal of all above ground and subsurface installations. Chevron Service Station No. 5542, 7007 San Ramon Road, Dublin, California. March 7, 1990.
- Helley, E.J., K.R. LaJoie, W.E. Spangle, and M.L. Blair, 1979. Flatland deposits of the San Francisco Bay Region, California - their geology and engineering properties, and their importance to comprehensive planning. United States Geological Survey Professional Paper 943. 83 pp.

**Table 1**  
**MONITORING WELL CONSTRUCTION DATA**  
 Chevron Service Station No. 9-5542

Monitoring Well	Boring Depth (ft-BGL)	Casing Depth (ft-BGL)	Surface-Seal Interval (ft-BGL)	Screen Interval (ft-BGL)	Bottom-Seal Interval (ft-BGL)	Casing Diameter (Inch)	Screen Slot Size (Inch)
MW-1	37.0	37.00	0-19	20-35	35-37	2	0.02
MW-2	38.5	38.80	0-20	22-37	37-38.5	2	0.02
MW-3	36.5	36.00	0-19	20-35	35-36.5	2	0.02
MW-4	37.0	36.00	0-19	20-35	35-37	2	0.02

ft-BGL = Feet below ground level

Wellheads completed roughly 1 foot above grade prior to landscaping and asphaltting.

Depth measurements taken approximately 1 foot below present ground level.

**Table 2**  
**WELL-HEAD SURVEY DATA**  
Chevron Service Station No. 9-5542

Monitoring Well	Well-head Elevation (ft-MSL)	TOC Elevation (ft-MSL)	Northing (feet)	Easting (feet)
MW-1	364.82	364.25	5009.47	4982.79
MW-2	364.58	363.81	5014.97	4898.36
MW-3	362.47	362.18	4910.48	4998.12
MW-4	363.30	362.97	4980.65	5040.93

ft-MSL = Feet above mean sea level

TOC = Top of casing

Survey conducted by Ruth and Going, Inc., on 4/4/90



**Table 3**  
**WATER-LEVEL ELEVATION DATA**  
Chevron Service Station No. 9-5542

Well	TOC Elevation (ft-MSL)	Depth to Water (ft-BTOC)	Water Elevation (ft-MSL)
MW-1	364.25	26.42	337.83
MW-2	364.58	26.23	338.35
MW-3	362.18	24.25	337.93
MW-4	362.97	25.46	337.51

TOC = Top of casing  
ft-MSL = Feet above mean sea level  
ft-BTOC = Feet below top of casing  
Measured on April 2, 1990.

**Table 4**  
**SOIL ANALYSES AND ANALYTICAL TECHNIQUES**  
**Chevron Service Station No. 9-5542**

SOIL BORING	SAMPLE DEPTH (ft-BGL)	SAMPLE NO.	TPH	TPH	TOTAL OIL & GREASE	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	Pb	TOTAL METALS		
			Gasoline	Diesel							Cr	Cd	Zn
Detection Method			8015	8015	413.2	8020	8020	8020	8020	6010	6010	6010	6010
Detection Limit (ppm)			10.00	10.00	5.00	0.01	0.01	0.01	0.015	10.00	5.00	3.00	5.00
MW-1	25	SS-18-D	1,200.00	NA	NA	28.00	150.00	34.00	100.00	NA	NA	NA	NA
	30	SS-19-D	270.00	NA	NA	1.00	4.00	4.00	18.00	NA	NA	NA	NA
MW-2	15	SS-5-D	ND	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA
MW-3	15	SS-11-D	ND	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA
	20	SS-12-D	ND	NA	NA	ND	0.01	0.01	0.12	NA	NA	NA	NA
	25	SS-13-D	51.00	NA	NA	ND	0.02	0.05	0.28	NA	NA	NA	NA
MW-4	15	SS-25-D	ND	ND	NA	NA	NA	NA	NA	37.00	26.00	ND	39.00
	20	SS-26-D	ND	ND	NA	NA	NA	NA	NA	41.00	25.00	ND	44.00
	25	SS-27-D	ND	ND	39.00	2.70	23.00	5.60	46.00	26.00	13.00	ND	28.00

Soil chemistry values presented in parts per million (ppm).

NA = No Analysis

ND = Less than method detection limit

TPH = Total Petroleum Hydrocarbons

ft-BGL = Feet below ground level

Soil samples collected between March 26 and 27, 1990.

**TABLE 5**  
**GROUNDWATER ANALYSES AND ANALYTICAL TECHNIQUES**  
**Chevron Service Station No. 9-5542**

MONITORING WELL	SAMPLE NO.	TPH		TOTAL OIL & GREASE	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	ETHYLENE DIBROMIDE	Pb	TOTAL METALS		
		Gasoline	Diesel								Cr	Cd	Zn
Detection Method		8015	8015	413.2	8020	8020	8020	8020	504	239.2	6010	6010	6010
Detection Limit (ppb)		50.00	100.00	1,000.00	0.30	0.30	0.30	0.60	0.05	5.00	100.00	50.00	100.00
MW-1	WS-1D	46,000.00	NA	NA	8,400.00	7,400.00	860.00	5,600.00	1.04	NA	NA	NA	NA
MW-1 DUP.	WS-5D	43,000.00	NA	NA	8,400.00	7,200.00	840.00	5,200.00	1.10	NA	NA	NA	NA
MW-2	WS-2D	ND	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA
MW-3	WS-3D	2,200.00	NA	NA	36.00	5.00	6.00	17.00	ND	NA	NA	NA	NA
MW-4	WS-4D	43,000.00	ND	18,000.00	4,000.00	5,000.00	790.00	5,500.00	20.00	ND	ND	ND	ND
RINSATE	RS-13D	ND	NA	NA	ND	0.40	ND	ND	ND	NA	NA	NA	NA
TRIP BLANK	-	ND	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA

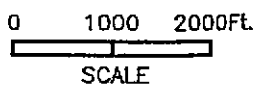
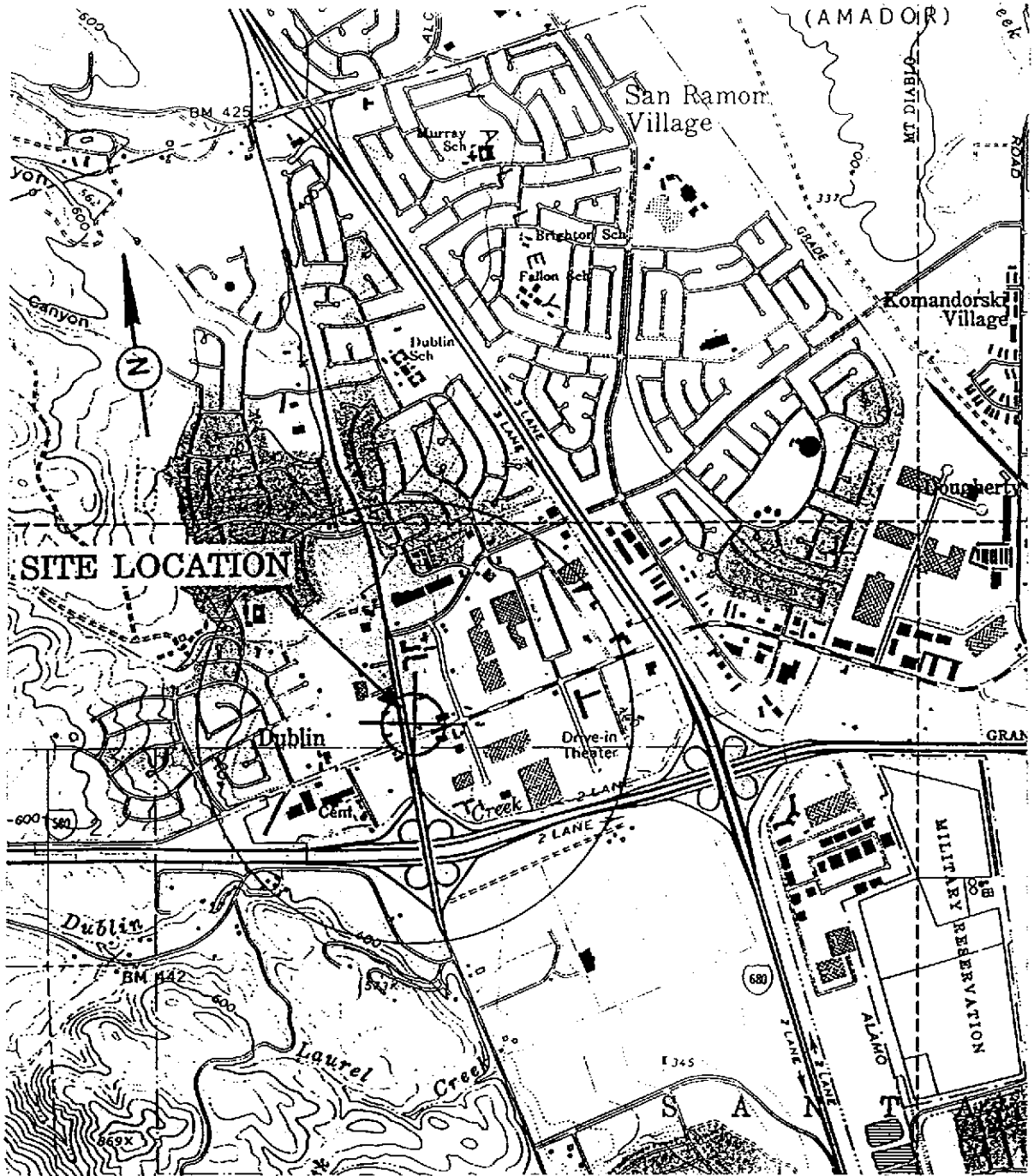
Groundwater chemistry values presented in parts per billion (ppb)

ND = Less than method detection limit

NA = No Analysis

TPH = Total petroleum hydrocarbons

Samples collected on April 3 and 4, 1990



ADAPTED FROM USGS 7.5 MINUTE DUBLIN QUADRANGLE 1980



**SITE LOCATION MAP**  
Chevron Service Station No. 9-5542  
7007 San Ramon Road  
Dublin, California

Reviewed By : *K. Rob*

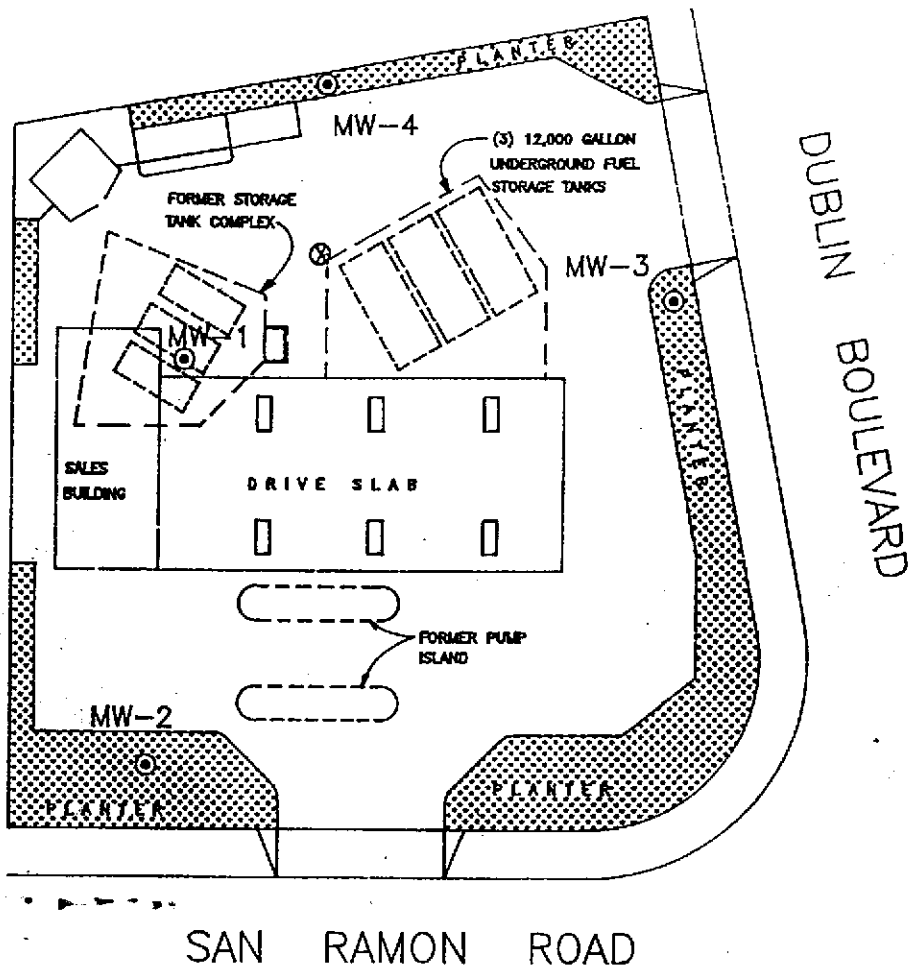
Date : *7/18/91*

**Figure 1**

Project No. CHV141/196

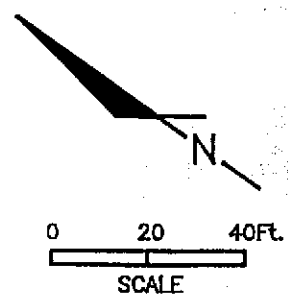
Drawn By : PPK  
Date : 7/16/91

Drawing No. A0619601



**LEGEND**

- ⊙ GROUNDWATER MONITOR WELL AND DESIGNATION
- ⊗ DECOMMISSIONED GROUNDWATER MONITOR WELL



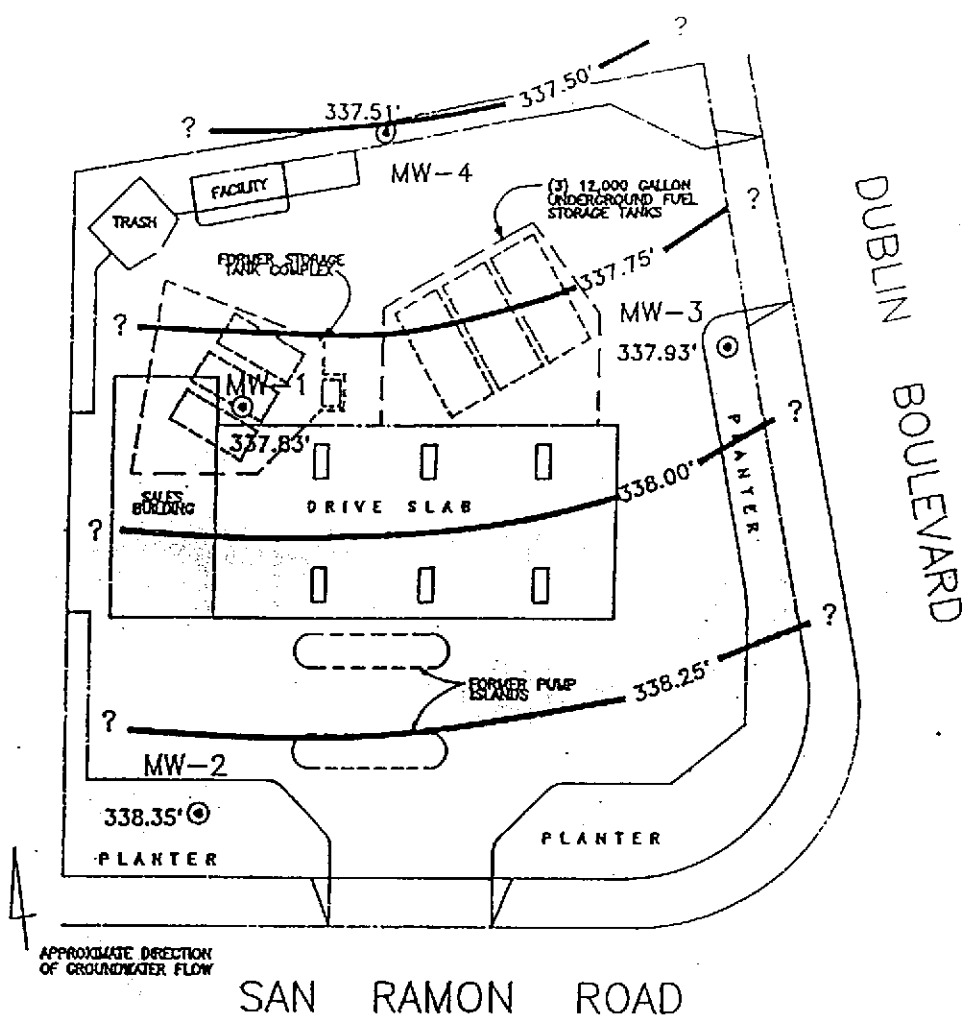
**SITE PLAN**  
 Chevron Service Station No. 9-5542  
 7007 San Ramon Road  
 Dublin, California

Reviewed By : *K. Lab*      Date : 7/18/91

**Figure 2**

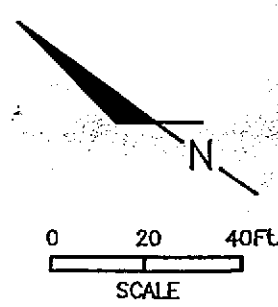
Project No. CHV141/196


Drawn By PPK	Date 7/16/91
Drawing No. A0619602	



**LEGEND**

- ⊙ GROUNDWATER MONITOR WELL
- 337.51' GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (FT-MSL); MEASURED ON 4/2/90
- 338.00'- GROUNDWATER ELEVATION CONTOUR (FT-MSL); CONTOUR INTERVAL = 0.25FT



 <b>BURLINGTON ENVIRONMENTAL INC.</b> <small>CERCLA/PCRA Division</small>	<b>GROUNDWATER ELEVATION CONTOUR MAP</b> Chevron Service Station No. 9-5542 7007 San Ramon Road Dublin, California		<b>Figure 3</b>	
	Project No. CHV141/196			
	Reviewed By : <i>R. P. Kelly</i>		Date : 7/18/91	
			Drawing No. A0619603	

**Appendix A**

**EXPLORATORY BORING, SOIL SAMPLING,  
DECONTAMINATION, WELL DECOMMISSIONING,  
MONITORING WELL INSTALLATION AND  
WELL DEVELOPMENT PROCEDURES**

## **Appendix A**

### **Exploratory Boring, Soil Sampling, Decontamination, Well Decommissioning, Monitoring Well Installation and Well Development Procedures**

#### **EXPLORATORY BORING**

Before the exploratory borings were drilled, a number of actions were taken: drilling permits and encroachment permits were obtained, if necessary, from the appropriate agency prior to drilling, and an underground utility-locating service was hired to clear the proposed drilling sites for subsurface utilities. In addition, Underground Service Alert (USA) was contacted to schedule visits to the site by public and private utility companies. Each company located its utilities with the aid of maps, and the locating service verified and marked these locations. All utility clearances were coordinated with the client or client representative before drilling began.

Field personnel began drilling by excavating the first four feet of soil with a hand auger to ensure that there were no subsurface obstructions. The exploratory borings to be completed as 2-inch-diameter monitoring wells were drilled with 8-inch outer-diameter (OD) hollow-stem augers (HSA). The borings for the 4- or 6-inch-diameter extraction or injection wells were drilled with 10- or 12-inch OD HSA, respectively. The augers were steam cleaned before each boring was drilled.

#### **SOIL SAMPLING**

Soil samples were collected while drilling to evaluate the geochemistry and stratigraphy of the soil beneath the boring location. The soil was sampled by driving an 18-inch-long modified-California split-spoon sampler fitted with 2-inch-diameter brass liners beyond the tip of the auger into undisturbed soil. The split-spoon sampler was driven into the soil with a 140-pound hammer. As the sampler was driven into the soil, blow counts were recorded for each 6-inches of penetration. The blows were recorded on the boring logs. Samples were



collected every 5 feet or less, depending on the lithology encountered. Soil samples were classified and logged according to the Unified Soil Classification System. The work was supervised by a California State registered geologist to ensure that it met regulatory standards.

Soil samples were selected for chemical analysis using a photoionization detector (PID). The PID determines the relative concentration of total volatile organic compounds. The soil samples were selected for analysis where (1) the PID reading first detected a reading above the background level, (2) at the point above this interval where the PID reading was negligible, (3) at the first point below the volatile-organic-bearing interval where the PID reading was negligible, and (4) at the water table. If no volatile organics were detected with the PID, the sample collected 5 feet above the water table was submitted for analysis

Each soil sample was sealed inside the brass liners with aluminium foil (shiny side towards the sample) and polypropylene end caps, and wrapped with duct tape. The soil samples were labeled, and stored in an iced cooler for shipment to a California Department of Health Services (DHS)-approved laboratory. At the time of sampling, each sample was logged on a chain-of-custody record which accompanied the sample to the laboratory. Soil samples selected for analysis had the request for analysis noted on the chain-of-custody. The remaining soil samples were sent to the laboratory on a hold-for-analysis basis.

Soil sampling equipment was steam cleaned between each boring and washed in an tri-sodium phosphate (TSP) solution and rinsed in deionized water between each sampling point. The 2-inch-diameter brass liners which were placed in the split-spoon sampler for soil sample collection had previously been steam-cleaned.

Drill cuttings were drummed and temporarily stored onsite. Each drum was labeled with the soil boring number and depth from which the soils were extracted. Drill cuttings were disposed of using the appropriate method based on the analyses of the soil samples collected during drilling.

## DECONTAMINATION PROCEDURES

Proper decontamination and cleansing of all equipment was performed to prevent cross-contamination between wells and sampling locations. The two methods of decontamination used at the site were steam cleaning and detergent washing followed by tap water and deionized water rinses. During field work, all equipment that was placed in the borings or wells, or that came in contact with groundwater was decontaminated as follows:

<u>Equipment</u>	<u>Decontamination Procedures</u>
Drill Rig	Steam cleaned prior to arriving onsite
Augers	Steam cleaned prior to drilling each boring
Drill Tools	Steam cleaned prior to drilling each boring
Split-Spoon Sampler	Steam cleaned between each boring, then TSP washed, and tap water and deionized water rinsed between each sampling interval
PVC Casing	Steam cleaned before installing in well
Well Development Equipment	TSP washed, and steam cleaned
Water Level Sensor	TSP washed, tap water and deionized water rinsed between each use
Pumps	Steam cleaned between each use
Bailers	Steam cleaned between each use
Teflon™ Sampling Bailer	TSP washed, then steam cleaned and rinsed with deionized water prior to sampling each well

The water used for steam cleaning was obtained from the site or was contained in the water tank of the drill rig or driller's support truck. Deionized water was used for rinses. The water generated during decontamination procedures was stored in 55-gallon drums onsite and was disposed of by a contractor.

## **QUALITY ASSURANCE SAMPLING**

One rinsate sample was collected at the beginning of each day or after 20 samples had been collected to determine if the sampling equipment was adequately decontaminated. After decontamination, rinsate samples were collected from the equipment used for sampling (split-spoon sampler or Teflon™ bailer). The rinsate samples were taken by: (1) trickling or rinsing deionized water through the split-spoon sampler and across the brass liners which the soils contacted, or through the inside of the Teflon bailer, and (2) filling the appropriate sample vial for analysis. The rinsate samples were labeled, placed in coolers, noted on the sample log and chain-of-custody forms, and handled according to EPA procedures. The samples were sent to the analytical laboratory and analyzed for the same parameters as the soil or groundwater samples collected after the rinsate samples were taken.

## **WELL DECOMMISSIONING**

Groundwater monitoring, extraction, injection, or vadose wells were decommissioned by drilling out the polyvinyl chloride (PVC) well pipe with 8-, 10-, or 12-inch OD HSA or by pressure-grouting, as deemed appropriate.

Wells decommissioned by over-drilling were drilled to a depth greater than the bottom of the boring. Soil samples were not collected during the over-drilling of the wells. The soil and grout produced during over-drilling were sampled for soil disposal purposes only. The soils were drummed and subsequently sampled by driving a hand-held drive sampler with brass liners into the drummed soil. The full liners will be removed, the ends covered with foil, capped, taped, and placed in an iced cooler pending laboratory analysis. Drill cuttings were disposed of using the appropriate method based on the analyses of the soil samples collected during drilling.

Wells decommissioned by pressure grouting were sealed by pumping a bentonite-cement grout into the casing of the well. The pressure-grout method fills the entire casing length and forces grout through the screened interval of the casing, which seals the void space of the sand pack. Pressure grouting effectively decommissions the well and does not produce soil cuttings.

## **WELL INSTALLATION**

Soil borings were completed as monitoring wells by installing 2-inch-diameter, flush-threaded, PVC casing inside the boring. Soil borings were completed as extraction or injection wells by installing 4- or 6-inch diameter, flush-threaded, PVC casing inside the borehole. No solvent cements were used on the casing. The screened casing will be machine-slotted with 0.010- or 0.020-inch slots. Screened sections of casing extend across the saturated interval to 5 to 10 feet above the first encountered water. A threaded bottom cap was attached to the bottom of the casing. The annular space surrounding the casing was at least 2-inches-thick, and packed with No. 2/12 (if 0.010" slot) or No. 3 sand (if 0.020" slot) to approximately 2 feet above the top of the screened interval. A minimum of a 1-foot-thick bentonite seal was set above the sandpack and bentonite cement was tremie-grouted to the surface.

A traffic-rated vault box was set in concrete to protect the wells. The top of the casing was fitted with a water-tight locking well seal to guard against tampering and to keep foreign material out of the well. Well tags were affixed to the casing for identification. Well locations were surveyed to the closest 1-foot Northing and Easting and top-of-casing elevations were measured to the nearest 0.01 foot. Detailed well completion diagrams were then prepared.

## **WELL DEVELOPMENT**

Monitoring, extraction, injection, and vadose wells were developed by surging, swabbing, bailing, pumping, or air-lift methods until a non-turbid discharge or stabilization of parameters was obtained. During well development, the groundwater was monitored for pH, temperature, and specific conductivity until these parameters stabilized within ten percent of the last reading. All development equipment was steam cleaned between wells. Development and steam-cleaning water was contained in 55-gallon drums until treated through the onsite remediation system or a contractor can collect the water and transport it offsite for treatment.

**Appendix B**  
**GROUNDWATER SAMPLING AND ANALYSIS**  
**PROCEDURES**

**Appendix B**  
**Groundwater Sampling and Analysis**  
**Procedures**

**INTRODUCTION**

The sampling and analysis procedures for water-quality monitoring programs are contained in this Appendix. These procedures will ensure that consistent and reproducible sampling methods will be used, proper analytical methods will be applied, analytical results will be accurate, precise, and complete, and the overall objectives of the monitoring program will be achieved.

**SAMPLE COLLECTION**

Sample collection procedures include: equipment cleaning, water-level and total well-depth measurements, and well purging and sampling.

**Equipment Cleaning**

Pre-cleaned sample bottles, caps, and septa will be provided by a California Department of Health Services (DHS)-approved laboratory. All sampling containers were used only once and discarded after analyses were completed.

Before starting the sampling event and between each event, all equipment to be placed in the well or come in contact with groundwater was disassembled and cleaned thoroughly with detergent water, steam cleaned with tap water, and rinsed with deionized water. Any parts that may absorb contaminants, such as plastic pump valves or bladders, were cleaned as described above or replaced. The water-level sounder was washed with detergent and rinsed with deionized water before use in the each well. The rinse water was stored in 55-gallon drums onsite and will be disposed of by a contractor of the client's choice.

**Quality Control Samples**

To determine if the Teflon™ (Teflon) bailer used for sampling is sufficiently decontaminated, rinsate samples were taken. One rinsate sample was collected

at the beginning of each day and additional rinsate samples were collected every 20 samples. The samples were collected by filling the Teflon sampling bailer with deionized water and then decanting that water into the sample vials. The rinsate samples were analyzed for the same parameters as the groundwater.

### **Water-Level, Phase-Separated Hydrocarbon, and Total Well-Depth Measurements**

Before purging and sampling, the depth to water, phase-separated hydrocarbons (PSH) thickness, and the total well depth was measured using an electric sounder, a bottom-filling clear Lucite™ bailer, and/or an oil/water interface probe. The electric sounder, manufactured by Slope-Indicator, Inc., is a transistorized instrument that uses a reel-mounted, two conductor, coaxial cable that connects the control panel to the sensor. Cable markings are stamped at 1-foot intervals. An engineer's rule was used to measure the depths to the nearest 0.01 foot. The water level was measured by lowering the sensor into the monitoring well. A low current circuit is completed when the sensor contacts the water, which serves as an electrolyte. The current is amplified and fed across an indicator light and audible buzzer, signaling contact with water. A sensitivity control compensates for very saline or conductive water. After the water level was determined, the bailer will be lowered to a point just below the liquid level, retrieved, and inspected for PSH.

If PSH were encountered, its thickness was measured with an oil/water interface probe. This instrument's dual-sensing probe utilizes an optical liquid sensor and electrical conductivity probe. The instrument emits a solid tone when immersed in oil, and an oscillating tone when immersed in water. If PSH greater than 1/32-inch in thickness was detected, a sample was not collected from that well.

All liquid measurements were recorded to the nearest 0.01 foot in the field logbook. The groundwater elevation at each monitoring well was calculated by subtracting the measured depth to water from the surveyed well-casing elevation. Total well depth was measured by lowering the sensor to the bottom of the well. Total well depth, used to calculate purge volumes and to determine whether the well screen is partially obstructed by silt, was recorded to the nearest 0.5 foot in the field logbook.

## Well Purging

Before sampling, standing water in the casing was purged from the monitoring well using a bailer, pneumatic displacement pump, or a piston pump. Samples were collected after three well casing volumes had been purged, and the pH, specific conductance, and temperature have stabilized, or 5 well volumes had been evacuated. Some low yield monitoring wells were expected to be evacuated to dryness after the removal of less than three casing volumes. Such low yield monitoring wells were allowed to recover for a minimum of two hours. If the well had recovered to 80% of its original water level after two hours, a sample was collected. Otherwise, the well was allowed to recover up to 24 hours prior to sampling. If sufficient water had recharged after 24 hours, the monitoring well was sampled.

All field measurements were recorded in a waterproof field logbook. Water sample field data sheets were prepared to record the field data. These data sheets were reviewed by the sampling coordinator when the sampling event was completed.

The pH, specific conductance, and temperature meter was calibrated each day before beginning field activities. The calibration was checked once each day to verify meter performance. All field meter calibrations were recorded in the field logbook.

Groundwater generated from well-purging operations were contained for temporary storage in 55-gallon drums. All drums were labeled and stored onsite in a location designated by the client or client representative. The sampler will record the following information on the drum label for each drum generated:

- \* Drum content (groundwater)
- \* Source (well designation)
- \* Date generated
- \* Client contact
- \* Project number
- \* Name of sampler



The groundwater will be stored onsite for a maximum of 90 days. We will notify the client that the water is ready for removal and transport the drums off-site at the client's request when the water has been removed.

### **Well Sampling**

A Teflon bailer was used for well sampling. Glass bottles of at least 40 milliliters volume and fitted with Teflon-lined septa were used in sampling for volatile organics. These bottles were filled completely to prevent air from remaining in the bottle. A positive meniscus forms when the bottles are completely full. A convex Teflon septum was placed over the meniscus to eliminate air. After capping, the bottles were inverted and tapped to verify that they did not contain air bubbles. The sample containers for other parameters were filled, and capped. Duplicate sample analyses were performed on five percent of the groundwater samples collected.

### **SAMPLE HANDLING AND DOCUMENTATION**

The following section specifies the procedures and documentation used during sample handling.

#### **Sample Handling**

All sample containers were labeled immediately following sample collection. Samples were kept cool with cold packs or ice contained in Ziplock™ storage bags until received by the laboratory. Cold packs or ice were replaced each day to maintain refrigeration. At the time of sampling, each sample was logged on a Chain-of-Custody record which accompanied the sample to the DHS-approved laboratory.

#### **Sample Documentation**

The following procedures were used during sampling and analysis to provide Chain-Of-Custody control:

- \* Field logbooks to document sampling activities in the field
- \* Labels to identify individual samples

- \* Chain-of-custody record sheets for documenting possession and transfer of samples

### Field Logbook

In the field, the sampler recorded the following information on the Water Sample Field Data Sheet for each sample collected:

- \* Project number
- \* Client name
- \* Location
- \* Name of sampler
- \* Date and time
- \* Pertinent well data (e.g., casing diameter, depth to water, total well depth)
- \* Calculated and actual purge volumes
- \* Purging equipment used
- \* Sampling equipment used
- \* Appearance of each sample (e.g., color, turbidity, sediment)
- \* Results of field analyses (i.e., temperature, pH, specific conductance)
- \* General comments

The field logbooks were signed by the sampler.

### Labels

Sample labels contain the following information:

- \* Project number
- \* Sample number (i.e., well designation)
- \* Sampler's initials
- \* Date and time of collection
- \* Type of preservative used (if any)

### **Sampling and Analysis Chain-of-Custody Record**

The Sampling and Analysis Chain-of-Custody record, initiated at the time of sampling, contains, but is not limited to, the well designation, sample type, analytical request, date of sampling, and the name of the sampler. The record sheet was signed, and dated by the sampler when transferring the samples. The number of custodians in the chain of possession were kept to a minimum.

**Appendix C**

**BORING LOGS, WELL CONSTRUCTION DETAILS,  
WELL DRILLER'S REPORT FORMS, AND  
WELL INSTALLATION AND DECOMMISSION PERMITS**

# LOG OF EXPLORATORY BORING

PROJECT NUMBER 1196

BORING NO. MW-1

PROJECT NAME CHEVRON SERVICE STATION NO. 9-5542

PAGE 1 OF 2

BY K. RAHMAN DATE 3/27/90

SURFACE ELEV. 364.25 ft.

PID (ppm)	RECOVERY (in./in.)	BLOW CT. (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
164	8/18	19 31 refusal		5		<p><b>FILL.</b></p> <p><b>FILL: GRAVELLY SILT (ML)</b>, dark brown (10YR, 3/3); 50-60% low plasticity fines; 5-10% fine to medium sand; 15-25% fine to medium gravel; trace iron-oxide staining of clasts; hard; dry; no product odor.</p>	
73	10/18	14 20 33		10		<p>@ 10': hard; dry; no product odor.</p>	
				15		<p>@ 17': cobbles; drainage baserock; fill in former tank excavation.</p>	
				20			

**REMARKS**

Boring was drilled using 8-inch diameter hollow-stem augers. Soil samples were collected using a 2-inch diameter modified-California split-spoon sampler. A 2-inch diameter groundwater monitor well was installed. The wellhead was completed roughly 1 foot above grade prior to resurfacing.

*David C. Tigler RG#4603 Exp. 6/30/92*

# LOG OF EXPLORATORY BORING

PROJECT NUMBER 1196

BORING NO. MW-1

PROJECT NAME CHEVRON SERVICE STATION NO. 9-5542

PAGE 2 OF 2

BY K. RAHMAN DATE 3/27/90

SURFACE ELEV. 364.25 ft.

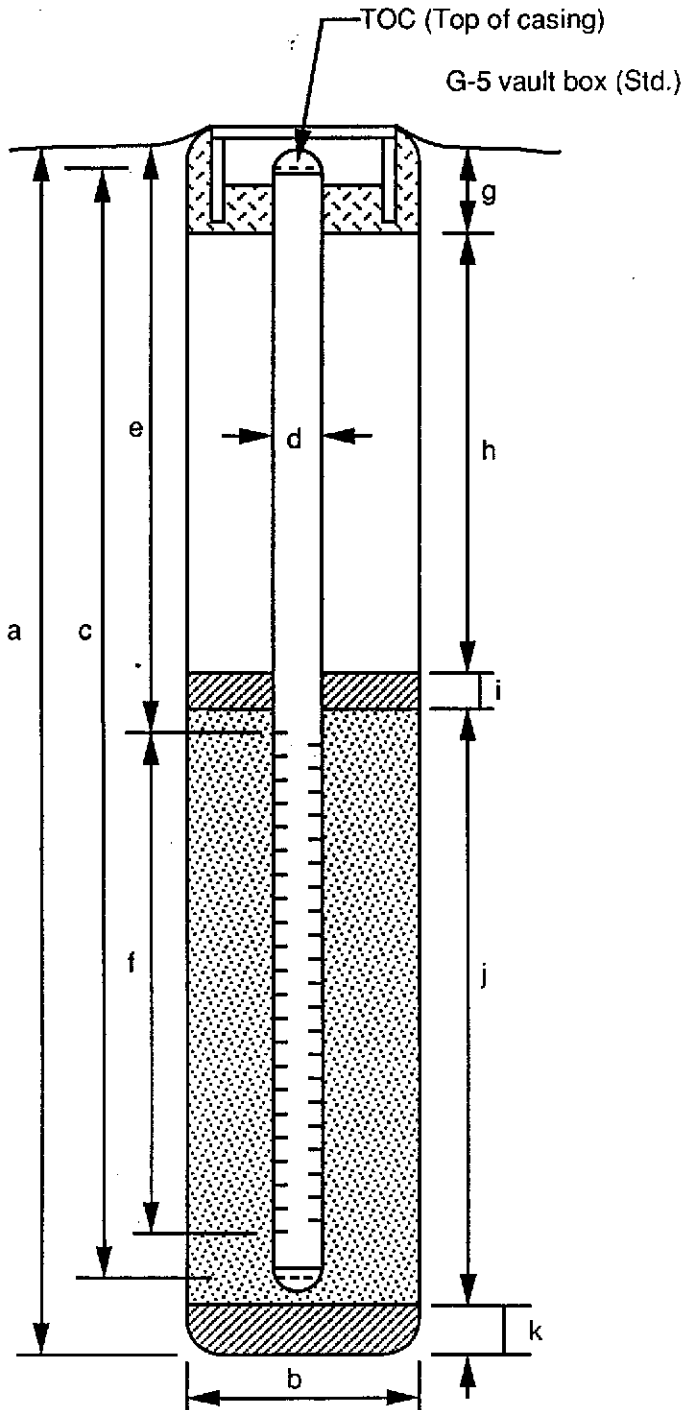
PID	RECOVERY	BLOW CT.	GROUND WATER LEVELS	DEPTH IN FT.	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
(ppm)	(in./in.)	(blws/ft)					
				25	25	<p>FILL, continued.</p> <p>CLAY (CL), dark brown (10YR, 3/3); 90-95% moderate plasticity fines; 5-10% fine sand; damp; moderate product odor.</p> <p>@25': abundant caliche; trace iron-oxide staining; trace manganese-oxide staining; damp; very stiff; moderate product odor.</p>	
1175	16/18	7 12 15	4/2/90 ▼	30	30	<p>SANDY CLAY (CL), dark grayish brown (10YR, 4/2); 60-70% moderate plasticity fines; 25-35% fine to medium sand; trace fine gravel; abundant caliche; trace iron-oxide and manganese-oxide staining; very stiff; damp; moderate product odor.</p>	
288	18/18	3 7 10		35	35	<p>@35': mottled dark grayish brown (10YR, 4/2) and dark brown (10YR,3/3); very stiff; wet; no product odor.</p> <p><b>BORING TERMINATED AT 35 FEET AND SAMPLED TO 37 FEET.</b></p>	
89.1	18/24	6 10 15		40	40		

**REMARKS**

Boring was drilled using 8-inch diameter hollow-stem augers. Soil samples were collected using a 2-inch diameter modified-California split-spoon sampler. A 2-inch diameter groundwater monitor well was installed. The wellhead was completed roughly 1 foot above grade prior to resurfacing.

# WELL DETAILS

PROJECT NUMBER 1196 BORING / WELL NO. MW-1  
 PROJECT NAME Chevron SS No. 9-5542 TOP OF CASING ELEV. 364.25'  
 LOCATION 7007 San Ramon Road, Dublin GROUND SURFACE ELEV. \_\_\_\_\_  
 WELL PERMIT NO. 90182 DATUM MSL  
 INSTALLATION DATE 3/27/90



## EXPLORATORY BORING

a. Total depth 37 ft.  
 b. Diameter 8 in.  
 Drilling method Hollow-Stem Auger

## WELL CONSTRUCTION

c. Total casing length 37 ft.  
 Material Schedule 40 PVC  
 d. Diameter 2 in.  
 e. Depth to top perforations 20 ft.  
 f. Perforated length 15 ft.  
 Perforated interval from 20 to 35 ft.  
 Perforation type Machine Slotted  
 Perforation size 0.020 inch  
 g. Surface seal 1 ft.  
 Material Concrete (above grade)  
 h. Backfill 16 ft.  
 Material Bentonite-Cement Grout  
 i. Seal 3 ft.  
 Material Bentonite  
 j. Gravel pack 16 ft.  
 Gravel pack interval from 19 to 35 ft.  
 Material # 3 Sand  
 k. Bottom seal/fill 2.0 ft.  
 Material Bentonite

\* Wellhead completed roughly 1-foot above grade prior to asphaltting. Depth measurements taken 1-foot below final grade.

Form prepared by KBR

*DET* ✓

**CONFIDENTIAL**

STATE OF CALIFORNIA DWR  
WELL COMPLETION REPORT  
(WELL LOGS)

**REMOVED**



# LOG OF EXPLORATORY BORING

PROJECT NUMBER 1196

BORING NO. MW-2

PROJECT NAME CHEVRON SERVICE STATION NO. 9-5542

PAGE 1 OF 2

BY K. Rahman DATE 3/26/90

SURFACE ELEV. 364.58 ft.

PID (ppm)	RECOVERY (in./in.)	BLOW CT. (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				5	5	5	<p><b>FILL.</b></p> <p><b>SILT (ML)</b>, very dark brown (10YR, 2/2); 80-85% low plasticity fines; 10-15% fine sand; trace fine gravel; damp; no product odor.</p>	
6.0	15/18	8 15 22		10	10	10	<p><b>SILT (ML)</b>, very dark grayish brown (2.5Y, 3/2); 90-95% low plasticity fines; 5-10% fine to medium sand; trace rootholes; trace rootlets; hard; damp; no product odor.</p> <p>@10': trace coarse sand; trace iron-oxide staining; hard; damp; no product odor.</p>	
7.9	13/18	8 10 29		15	15	15	<p><b>SANDY GRAVEL (GP)</b>, very dark grayish brown (2.5Y, 4/2); 5-10% low plasticity fines; 30-40% fine to coarse sand; 50-60% fine to medium gravel, angular to subrounded; abundant iron-oxide staining; dense; dry; no product odor.</p>	
12.2	13/18	21 18 25		20	20	20	<p>@15': dark grayish brown (2.5Y, 4/2); dense; damp; no product odor.</p> <p><b>SILTY CLAY (CL)</b>.</p>	

**REMARKS**

Boring was drilled using 8-inch diameter hollow stem augers. Soil samples were collected using a 2-inch diameter modified-California split-spoon sampler. A 2-inch diameter groundwater monitor well was installed. The wellhead was completed roughly 1 foot above grade prior to landscaping.

*David C. Tjelt RG#4603 Exp. 6/30/92*

# LOG OF EXPLORATORY BORING

PROJECT NUMBER 1196

BORING NO. MW-2

PROJECT NAME CHEVRON SERVICE STATION NO. 9-5542

PAGE 2 OF 2

BY K. Rahman DATE 3/26/90

SURFACE ELEV. 364.58 ft.

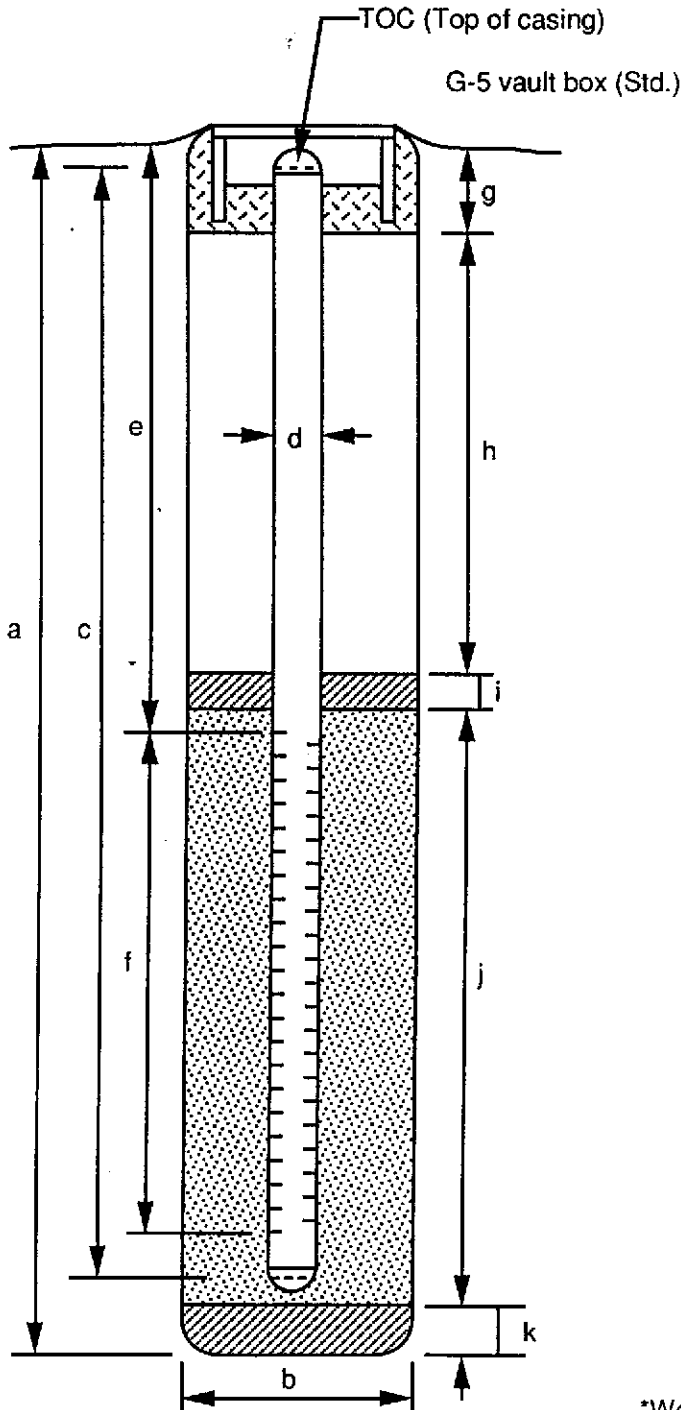
PID	RECOVERY	BLOW CT.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
(ppm)	(in./in.)	(blws/ft)						
12.7	13/18	7 6 8					<b>SILTY CLAY (CL)</b> , dark grayish brown (2.5Y, 4/2); 90-95% moderate to high plasticity fines; trace fine sand; trace fine gravel; trace caliche; stiff; damp; faint organic odor.	
9.0	14/24			25			@25': dark olive gray (5Y, 3/2); stiff; damp; faint organic odor.	
				4/2/90				
				3/26/90				
8.1	18/18	6 9 8		30			@30': olive (5Y, 4/3); 5-10% fine to coarse sand; trace wood fragments; trace iron-oxide and manganese-oxide staining; very stiff; wet; no product odor.	
-	13/18	7 6 12		35			@35': very stiff; wet; no product odor.	
5.6		3 6 7					@37': stiff; wet; no product odor.	
				40			<b>BORING TERMINATED AT 37 FEET AND SAMPLED TO 38.5.</b>	

**REMARKS**

Boring was drilled using 8-inch diameter hollow stem augers. Soil samples were collected using a 2-inch diameter modified-California split-spoon sampler. A 2-inch diameter groundwater monitor well was installed. The wellhead was completed roughly 1 foot above grade prior to landscaping.

# WELL DETAILS

PROJECT NUMBER 1196 BORING / WELL NO. MW-2  
 PROJECT NAME Chevron SS No. 9-5542 TOP OF CASING ELEV. 364.58'  
 LOCATION 7007 San Ramon Road, Dublin GROUND SURFACE ELEV. \_\_\_\_\_  
 WELL PERMIT NO. 90182 DATUM MSL  
 INSTALLATION DATE 3/26/90



## EXPLORATORY BORING

a. Total depth 38.5 ft.  
 b. Diameter 8 in.  
 Drilling method Hollow-Stem Auger

## WELL CONSTRUCTION \*

c. Total casing length 38.8 ft.  
 Material Schedule 40 PVC  
 d. Diameter 2 in.  
 e. Depth to top perforations 22 ft.  
 f. Perforated length 15 ft.  
 Perforated interval from 22 to 37 ft.  
 Perforation type Machine Slotted  
 Perforation size 0.020 inch  
 g. Surface seal 1 ft.  
 Material Concrete (above grade)  
 h. Backfill 17 ft.  
 Material Bentonite-Cement Grout  
 i. Seal 3 ft.  
 Material Bentonite  
 j. Gravel pack 17 ft.  
 Gravel pack interval from 20 to 37 ft.  
 Material # 3 Sand  
 k. Bottom seal/fill 1.5 ft.  
 Material Bentonite

\*Wellhead completed roughly 1-foot above grade prior to landscaping. Depth measurements taken 1-foot below final grade.

Form prepared by KBR

*DET*

**CONFIDENTIAL**

STATE OF CALIFORNIA DWR  
WELL COMPLETION REPORT  
(WELL LOGS)

**REMOVED**

# LOG OF EXPLORATORY BORING

PROJECT NUMBER 1196

BORING NO. MW-3

PROJECT NAME CHEVRON SERVICE STATION NO. 9-5542

PAGE 1 OF 2

BY K. RAHMAN DATE 3/26/90

SURFACE ELEV. 362.18 ft.

PID (ppm)	RECOVERY (in./in.)	BLOW CT. (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				5	5	FILL, gravel; silt.	
-	8/18	12 17 25		5	5	SILT (ML), olive (5Y, 4/3); 90-95% low plasticity fines; 5-10% fine sand; thinly laminated; hard; dry; no product odor.	
5.5	11/18	11 15 17		10	10	SANDY CLAY (CL), olive (5Y, 4/3); 70-80% moderate plasticity fines; 15-25% fine to coarse sand; trace fine gravel; trace rootholes; trace caliche; hard; dry; no product odor.	
11.5	13/18	8 16 16		15	15	CLAYEY SAND (SC), olive gray (5Y, 4/2); 25-35% moderate plasticity fines; 50-60% fine to coarse sand; 10-15% fine to medium gravel; dense; damp; faint organic odor.	
				20	20	CLAY (CL).	

**REMARKS**

Boring was drilled using 8-inch diameter hollow-stem augers. Soil samples were collected using a 2-inch diameter modified-California split-spoon sampler. A 2-inch diameter groundwater monitor well was installed. The wellhead was completed roughly 1 foot above grade prior to landscaping.

*David C. T.ight RGH7603 Exp. 6/30/92*

# LOG OF EXPLORATORY BORING

PROJECT NUMBER 1196

BORING NO. MW-3

PROJECT NAME CHEVRON SERVICE STATION NO. 9-5542

PAGE 2 OF 2

BY K. RAHMAN DATE 3/26/90

SURFACE ELEV. 362.18 ft.

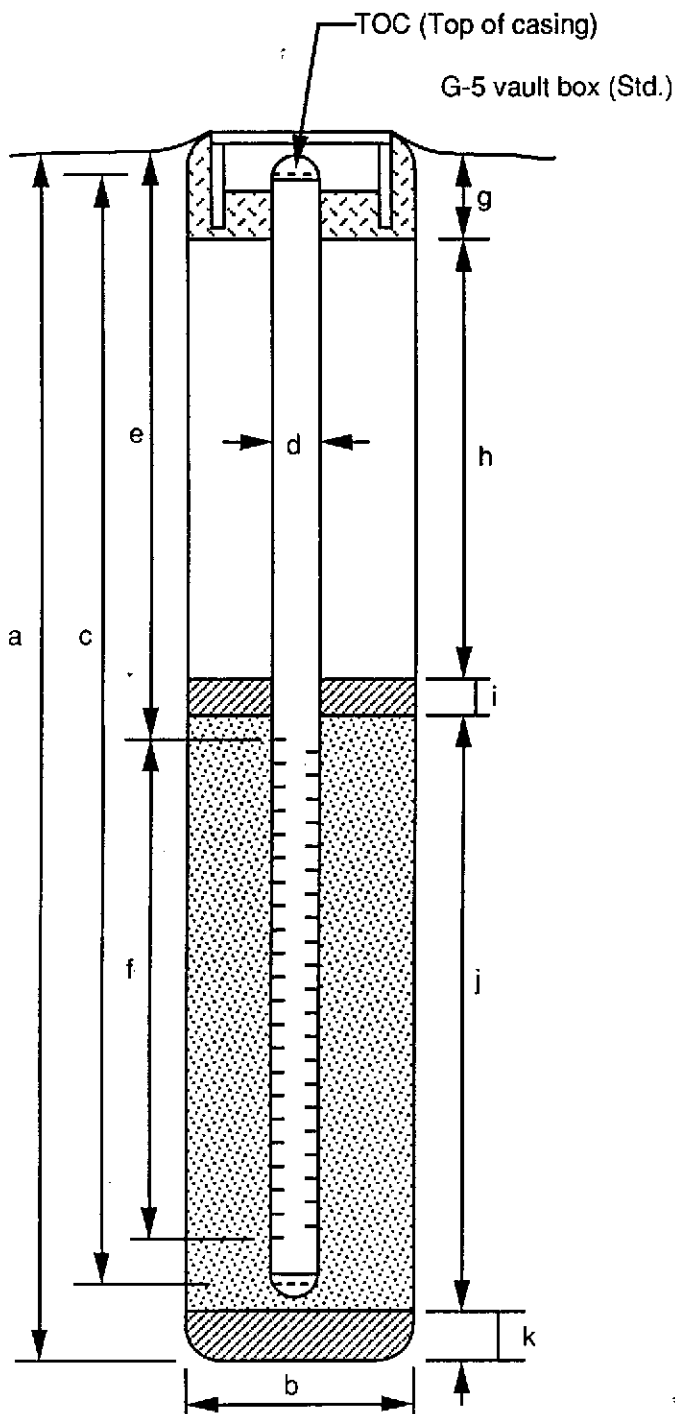
PID	RECOVERY	BLOW CT.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
(ppm)	(in./in.)	(blws/ft)						
160	14/18	6 12 18				4/2/90 ▽	CLAY (CL), mottled olive gray (5Y, 4/2) and olive (5Y, 5/2); 90-95% moderate plasticity fines; 5-10% fine sand; some caliche; abundant rootholes; very stiff; damp; faint product odor.	
197	15/18	8 10 34		25 ▽		3/26/90	SILTY SAND (SM), dark gray (5Y, 4/1); 20-30% low plasticity fines; 70-80% fine to coarse sand; dense; wet; faint product odor. SANDY GRAVEL (GP), dark gray (5Y, 4/3); trace low plasticity fines; 15-25% fine to coarse sand; 70-80% fine to medium gravel; dense; faint product odor.	
4.6	15/18	6 8 11		30			SANDY CLAY (CL), olive (5Y, 4/3); 80-90% moderate plasticity fines; 10-20% fine to coarse sand; trace caliche; very stiff; wet; no product odor.	
5.9	14/18	14 14 29		35			@35': trace manganese-oxide and iron-oxide staining; hard; wet; no product odor.	
							<b>BORING TERMINATED AT 35 FEET AND SAMPLED TO 36.5 FEET.</b>	
40								

**REMARKS**

Boring was drilled using 8-inch diameter hollow-stem augers. Soil samples were collected using a 2-inch diameter modified-California split-spoon sampler. A 2-inch diameter groundwater monitor well was installed. The wellhead was completed roughly 1 foot above grade prior to landscaping.

# WELL DETAILS

PROJECT NUMBER 1196 BORING / WELL NO. MW-3  
 PROJECT NAME Chevron SS No. 9-5542 TOP OF CASING ELEV. 362.18'  
 LOCATION 7007 San Ramon Road, Dublin GROUND SURFACE ELEV. \_\_\_\_\_  
 WELL PERMIT NO. 90182 DATUM MSL  
 INSTALLATION DATE 3/26/90



## EXPLORATORY BORING

a. Total depth 36.5 ft.  
 b. Diameter 8 in.  
 Drilling method Hollow-Stem Auger

## WELL CONSTRUCTION

c. Total casing length 36 ft.  
 Material Schedule 40 PVC  
 d. Diameter 2 in.  
 e. Depth to top perforations 20 ft.  
 f. Perforated length 15 ft.  
 Perforated interval from 20 to 35 ft.  
 Perforation type Machine Slotted  
 Perforation size 0.020 inch  
 g. Surface seal 1 ft.  
 Material Concrete (above grade)  
 h. Backfill 16 ft.  
 Material Bentonite-Cement Grout  
 i. Seal 3 ft.  
 Material Bentonite  
 j. Gravel pack 16 ft.  
 Gravel pack interval from 19 to 35 ft.  
 Material # 3 Sand  
 k. Bottom seal/fill 1.5 ft.  
 Material Bentonite

\*Wellhead completed roughly 1-foot above grade prior to landscaping. Depth measurements taken 1-foot below final grade.

Form prepared by KBR

DCT ✓

**CONFIDENTIAL**

STATE OF CALIFORNIA DWR  
WELL COMPLETION REPORT  
(WELL LOGS)

**REMOVED**



# LOG OF EXPLORATORY BORING

PROJECT NUMBER 1196

BORING NO. MW-4

PROJECT NAME CHEVRON SERVICE STATION NO. 9-5542

PAGE 1 OF 2

BY K. RAHMAN DATE 3/28/90

SURFACE ELEV. 362.97 ft.

PID	RECOVERY	BLOW CT.	GROUND WATER LEVELS	DEPTH IN FT.	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
(ppm)	(in./in.)	(blws/ft)					
				5		FILL, gravelly silt.	
59	10/24	6 11 17		5		<b>SANDY CLAY (CL)</b> , very dark grayish brown (2.5Y, 3/2); 70-80% low to moderate plasticity fines; 15-25% fine to medium sand; trace fine gravel; trace iron-oxide staining; very stiff; dry; no product odor.	
40.6	15/18	12 14 23		10		<b>SILTY SAND (SM)</b> , very dark grayish brown (2.5Y, 3/2); 10-20% low plasticity fines; 70-80% fine to coarse sand; 5-10% fine gravel; trace iron-oxide staining; some rootlets; hard; dry; no product odor.	
38	10/18	9 15 19		15		@15': olive (5Y, 5/3); 75-85% fine to coarse sand, predominantly medium; trace fine gravel; abundant caliche; trace iron-oxide staining; hard; dry; no product odor.	
				20			

**REMARKS**

Boring was drilled using 8-inch diameter hollow-stem augers. Soil samples were collected using a 2-inch diameter modified-California split-spoon sampler. A 2-inch diameter groundwater monitor well was installed. The wellhead was completed roughly 1 foot above grade prior to landscaping.

David C. Tjelt RG 4603 Exp. 6/30/92

# LOG OF EXPLORATORY BORING

PROJECT NUMBER 1196

BORING NO. MW-4

PROJECT NAME CHEVRON SERVICE STATION NO. 9-5542

PAGE 2 OF 2

BY K. RAHMAN DATE 3/28/90

SURFACE ELEV. 362.97 ft.

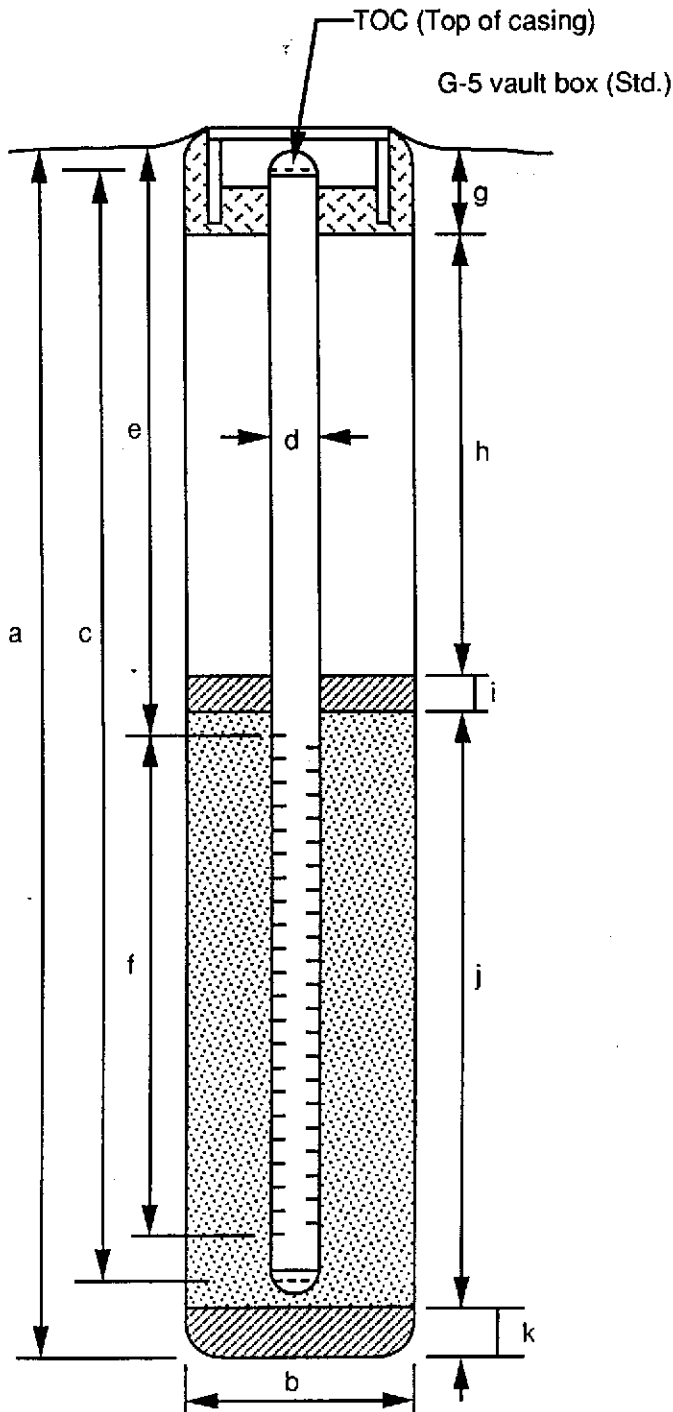
PID	RECOVERY	BLOW CT.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
(ppm)	(in./in.)	(blws/ft)						
383	15/18	7 10 15					<b>SILTY SAND (SM), continued</b> @20': olive gray (5Y, 4/2); some caliche; trace manganese-oxide staining; very stiff; damp; faint product odor.	
749	15/18	7 9 12	4/2/90 ▽	25			<b>SANDY CLAY (CL), mottled dark olive gray (5Y, 3/2) and olive gray (5Y, 4/2); 90-95% moderate plasticity fines; 5-10% predominantly fine to medium sand; trace caliche; very stiff; damp; moderate product odor.</b>	
51.1	18/18	4 5 10	▽	30			<b>CLAYEY SAND (SC), olive gray (5Y, 4/2); 20-30% moderate plasticity fines; 70-80% fine to coarse sand, predominantly medium; abundant rootholes, coated with caliche; stiff; wet; no product odor.</b>	
43.6	10/24	15 21 29		35			@35': hard; wet; no product odor.	
				40			<b>BORING TERMINATED AT 35 FEET AND SAMPLED TO 37 FEET.</b>	

**REMARKS**

Boring was drilled using 8-inch diameter hollow-stem augers. Soil samples were collected using a 2-inch diameter modified-California split-spoon sampler. A 2-inch diameter groundwater monitor well was installed. The wellhead was completed roughly 1 foot above grade prior to landscaping.

# WELL DETAILS

PROJECT NUMBER 1196 BORING / WELL NO. MW-4  
 PROJECT NAME Chevron SS No. 9-5542 TOP OF CASING ELEV. 362.97'  
 LOCATION 7007 San Ramon Road, Dublin GROUND SURFACE ELEV. \_\_\_\_\_  
 WELL PERMIT NO. 90182 DATUM MSL  
 INSTALLATION DATE 3/28/90



## EXPLORATORY BORING

a. Total depth 37 ft.  
 b. Diameter 8 in.  
 Drilling method Hollow-Stem Auger

## WELL CONSTRUCTION \*

c. Total casing length 36 ft.  
 Material Schedule 40 PVC  
 d. Diameter 2 in.  
 e. Depth to top perforations 20 ft.  
 f. Perforated length 15 ft.  
 Perforated interval from 20 to 35 ft.  
 Perforation type Machine Slotted  
 Perforation size 0.020 inch  
 g. Surface seal 1 ft.  
 Material Concrete (above grade)  
 h. Backfill 16 ft.  
 Material Bentonite-Cement Grout  
 i. Seal 3 ft.  
 Material Bentonite  
 j. Gravel pack 16 ft.  
 Gravel pack interval from 19 to 35 ft.  
 Material # 3 Sand  
 k. Bottom seal/fill 2 ft.  
 Material Bentonite

\* Wellhead completed roughly 1-foot above grade prior to landscaping. Depth measurements taken 1-foot below final grade.

*DCT* ✓

Form prepared by KBR

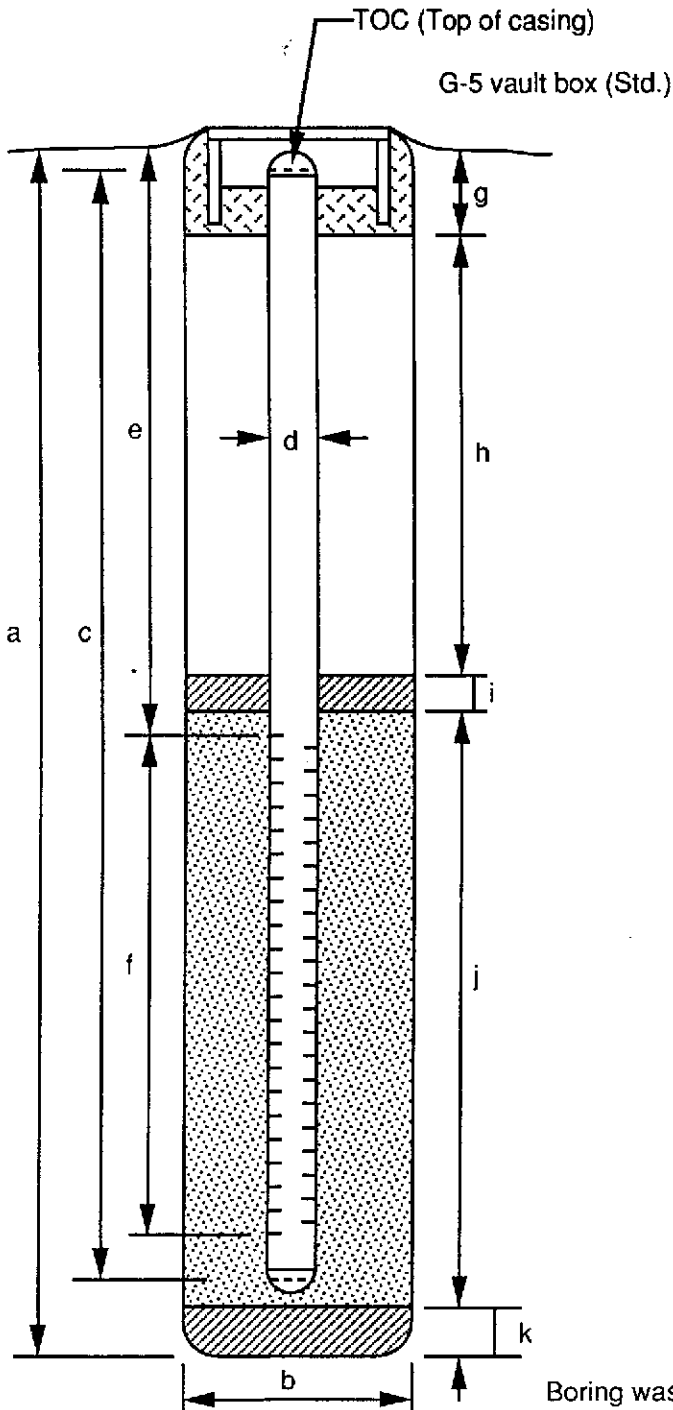
**CONFIDENTIAL**

STATE OF CALIFORNIA DWR  
WELL COMPLETION REPORT  
(WELL LOGS)

**REMOVED**

# WELL DETAILS

PROJECT NUMBER 1196 BORING / WELL NO. 3S/1W 2H9  
 PROJECT NAME Chevron SS No. 9-5542 TOP OF CASING ELEV. \_\_\_\_\_  
 LOCATION 7007 San Ramon Road, Dublin GROUND SURFACE ELEV. ~360'  
 WELL PERMIT NO. 90194 DATUM MSL  
 INSTALLATION DATE 3/27/90



## EXPLORATORY BORING

a. Total depth 39.5 ft.  
 b. Diameter 10 in.  
 Drilling method Hollow-Stem Auger

## WELL CONSTRUCTION

c. Total casing length 37 ft.  
 Material Schedule 80 PVC  
 d. Diameter 3 in.  
 e. Depth to top perforations NA ft.  
 f. Perforated length NA ft.  
 Perforated interval from NA to NA ft.  
 Perforation type NA  
 Perforation size NA  
 g. Surface seal 2 ft.  
 Material Bentonite  
 h. Backfill NA ft.  
 Material NA  
 i. Seal NA ft.  
 Material NA  
 j. Gravel pack 35 ft.  
 Gravel pack interval from 2 to 37 ft.  
 Material # 3 Sand  
 k. Bottom seal/fill NA ft.  
 Material NA

Boring was sealed to the surface with bentonite-cement grout, and covered with 5 to 6 inches of asphalt during resurfacing.

NA = Not Applicable or unknown.

Form prepared by KBR

*DCTV*

**CONFIDENTIAL**

STATE OF CALIFORNIA DWR  
WELL COMPLETION REPORT  
(WELL LOGS)

**REMOVED**



RECEIVED  
MAR 16 REC'D  
ZONE 7 ADMINISTRATOR

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94566 (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

1) LOCATION OF PROJECT 7007 SAN RAMON RD  
DOUBLIN, CA

PERMIT NUMBER 90182  
LOCATION NUMBER \_\_\_\_\_

(2) CLIENT  
Name CHEVRON USA  
Address 2410 CAMINO RAMON Phone 415 542-9500  
City SAN RAMON Zip 94583-0804

PERMIT CONDITIONS

Circled Permit Requirements Apply

(3) APPLICANT  
Name CHEMICAL PROCESSORS INC  
Address 50 GILMAN ST SUITE B Phone 415 524-9372  
City BERKELEY Zip 94710

(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.

(4) DESCRIPTION OF PROJECT  
Water Well Construction  Geotechnical Investigation  
Cathodic Protection \_\_\_\_\_ General \_\_\_\_\_  
Well Destruction \_\_\_\_\_ Contamination \_\_\_\_\_

(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 wells or 20 feet for domestic, irrigation, and monitoring wells unless a lesser depth is specially approved.

(5) PROPOSED WATER WELL USE  
Domestic \_\_\_\_\_ Industrial \_\_\_\_\_ Irrigation \_\_\_\_\_  
Municipal \_\_\_\_\_ Monitoring  Other \_\_\_\_\_

(6) PROPOSED CONSTRUCTION  
Drilling Method:  
Mud Rotary \_\_\_\_\_ Air Rotary \_\_\_\_\_ Auger   
Cable \_\_\_\_\_ Other \_\_\_\_\_

- 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.

DRILLER'S LICENSE NO. 519428

WELL PROJECTS  
Drill Hole Diameter 7 In. Maximum  
Casing Diameter 2 In. Depth 45 ft.  
Surface Seal Depth 20 ft. Number 4

GEOTECHNICAL PROJECTS  
Number of Borings \_\_\_\_\_ Maximum  
Hole Diameter \_\_\_\_\_ In. Depth \_\_\_\_\_ ft.

(7) ESTIMATED STARTING DATE 4/1/90  
ESTIMATED COMPLETION DATE 5/1/90

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

Approved Wyman Hong Date 16 Mar 90  
Wyman Hong

APPLICANT'S SIGNATURE Craig C. [Signature] Date 3/14/90  
for Chevron



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94566 (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 7007 San Ramon Rd. Dublin, CA

PERMIT NUMBER 90194 LOCATION NUMBER 3S/1W 2H9

CLIENT Name CHEVRON USA Address 2410 Camino Ramon Phone 415-842-9500 City San Ramon Zip 94583-0804

PERMIT CONDITIONS

Circled Permit Requirements Apply

APPLICANT Name CHEMICAL PROCESSORS, INC Address 950 B. Gilman St. Phone 415-524-9372 City Berkeley, CA Zip 94710

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

PROPOSED WATER SUPPLY WELL USE Domestic Industrial Other Municipal Irrigation

DRILLING METHOD: Mud Rotary Air Rotary Auger X Cable Other

DRILLER'S LICENSE NO. 519428

WELL PROJECTS Decommissioned with: Drill Hole Diameter 10 in. Maximum Casing Diameter 8 in. Depth 40 ft. Surface Seal Depth 40 ft. Number 1

GEOTECHNICAL PROJECTS Number of Borings Maximum Hole Diameter in. Depth ft.

ESTIMATED STARTING DATE 3/26/90 ESTIMATED COMPLETION DATE 3/27/90 5/1/90

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

APPLICANT'S SIGNATURE David C. [Signature] Date 3/23/90

- 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 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 wells 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.

Approved [Signature] Date 26 Mar 90 Todd Wendler



**Appendix D**  
**GROUNDWATER PURGE RECORDS**

# WATER SAMPLE FIELD DATA SHEET

PROJECT NO.: 1196 SAMPLE ID.: WS-20  
 CLIENT: Chevron DATE: 4/3/90  
 LOCATION: Dublin SAMPLE POINT DESIGNATION: MW-2  
 SAMPLER: KME

GROUND-WATER \_\_\_\_\_ OTHER (NR) \_\_\_\_\_  
 CASING DIAMETER: 2 inch  3 inch \_\_\_\_\_ 4 inch \_\_\_\_\_ 6 inch \_\_\_\_\_ OTHER \_\_\_\_\_  
 CASING ELEVATION (feet/MSL): \_\_\_\_\_ CALCULATED PURGE VOL. (gal.): \_\_\_\_\_  
 DEPTH OF WELL (feet): 38.8 ACTUAL PURGE VOL. (gal.): \_\_\_\_\_  
 DEPTH TO WATER (feet): 26.3

### FIELD MEASUREMENTS

TIME	VOLUME (gal.)	PH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR (visual)	OTHER
<u>7:42</u>	<u>2</u>	<u>7.39</u>	<u>11,800</u>	<u>56.1</u>	<u>brown</u>	
<del>7:42</del>						
<u>7:46</u>	<u>5</u>	<u>7.13</u>	<u>11,900</u>	<u>57.5</u>	<u>"</u>	
<u>7:49</u>	<u>7</u>	<u>7.10</u>	<u>11,800</u>	<u>56.7</u>	<u>"</u>	
<u>7:54</u>	<u>10</u>	<u>7.09</u>	<u>11,600</u>	<u>56.3</u>	<u>"</u>	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

ODOR: None

### PURGE METHOD

2" BLADDER PUMP     BAILER (Teflon)     WELL WIZARD     DEDICATED  
 SUBMERSIBLE PUMP     BAILER (PVC)     CENTRIFUGAL PUMP     OTHER \_\_\_\_\_  
 PERISTALTIC PUMP     DIPPER  
 PNEUMATIC DISPLACEMENT PUMP

### SAMPLE METHOD

2" BLADDER PUMP     BAILER (Teflon)     WELL WIZARD     DEDICATED  
 SURFACE SAMPLER     BAILER (PVC)     DIPPER     OTHER \_\_\_\_\_  
 PERISTALTIC PUMP     SUBMERSIBLE PUMP

WELL INTEGRITY: \_\_\_\_\_

REMARKS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# WATER SAMPLE FIELD DATA SHEET

PROJECT NO.: 1196      SAMPLE ID.: WS-1D WS-5D  
 CLIENT: Chevron      DATE: 4/3/90  
 LOCATION: Dublin      SAMPLE POINT DESIGNATION: MW-1  
 SAMPLER: KME

GROUND-WATER \_\_\_\_\_ OTHER (NR) \_\_\_\_\_  
 CASING DIAMETER: 2 inch  3 inch \_\_\_\_\_ 4 inch \_\_\_\_\_ 6 inch \_\_\_\_\_ OTHER \_\_\_\_\_  
 CASING ELEVATION (feet/MSL): \_\_\_\_\_ CALCULATED PURGE VOL. (gal.): 1.8  
 DEPTH OF WELL (feet): 36.72 ACTUAL PURGE VOL. (gal.): \_\_\_\_\_  
 DEPTH TO WATER (feet): 26.5

### FIELD MEASUREMENTS

TIME	VOLUME (gal.)	PH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR (visual)	OTHER
<u>8:56</u>	<u>2</u>	<u>7.20</u>	<u>12,000</u>	<u>66.2</u>	<u>gray</u>	_____
<u>9:00</u>	<u>4</u>	<u>7.12</u>	<u>12,500</u>	<u>65.7</u>	<u>gray</u>	_____
<u>9:04</u>	<u>6</u>	<u>7.05</u>	<u>12,000</u>	<u>65.0</u>	<u>h</u>	_____
<u>9:09</u>	<u>8</u>	<u>7.04</u>	<u>11,900</u>	<u>66.0</u>	<u>h</u>	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

ODOR: Mod. Hydrocarbon

### PURGE METHOD

2" BLADDER PUMP     BAILER (Teflon)     WELL WIZARD     DEDICATED  
 SUBMERSIBLE PUMP     BAILER (PVC)     CENTRIFUGAL PUMP     OTHER \_\_\_\_\_  
 PERISTALTIC PUMP     DIPPER  
 PNEUMATIC DISPLACEMENT PUMP

### SAMPLE METHOD

2" BLADDER PUMP     BAILER (Teflon)     WELL WIZARD     DEDICATED  
 SURFACE SAMPLER     BAILER (PVC)     DIPPER     OTHER \_\_\_\_\_  
 PERISTALTIC PUMP     SUBMERSIBLE PUMP

WELL INTEGRITY: \_\_\_\_\_

REMARKS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# WATER SAMPLE FIELD DATA SHEET

PROJECT NO.: 1196      SAMPLE ID.: WS-3D  
 CLIENT: Chevron      DATE: 4/3/90  
 LOCATION: Dublin      SAMPLE POINT DESIGNATION: MW-3  
 SAMPLER: KME

GROUND-WATER \_\_\_\_\_ OTHER (NR) \_\_\_\_\_  
 CASING DIAMETER: 2 inch  3 inch \_\_\_\_\_ 4 inch \_\_\_\_\_ 6 inch \_\_\_\_\_ OTHER \_\_\_\_\_  
 CASING ELEVATION (feet/MSL): \_\_\_\_\_ CALCULATED PURGE VOL. (gal.): \_\_\_\_\_  
 DEPTH OF WELL (feet): \_\_\_\_\_ ACTUAL PURGE VOL. (gal.): \_\_\_\_\_  
 DEPTH TO WATER (feet): \_\_\_\_\_

### FIELD MEASUREMENTS

TIME	VOLUME (gal.)	PH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR (visual)	OTHER
<u>7.22</u>	<u>2</u>	<u>6.94</u>	<u>13,400</u>	<u>62.8</u>	<u>gray</u>	<del>gray</del>

ODOR: None

### PURGE METHOD

2" BLADDER PUMP     BAILER (Teflon)     WELL WIZARD     DEDICATED  
 SUBMERSIBLE PUMP     BAILER (PVC)     CENTRIFUGAL PUMP     OTHER \_\_\_\_\_  
 PERISTALTIC PUMP     DIPPER     PNEUMATIC DISPLACEMENT PUMP

### SAMPLE METHOD

2" BLADDER PUMP     BAILER (Teflon)     WELL WIZARD     DEDICATED  
 SURFACE SAMPLER     BAILER (PVC)     DIPPER     OTHER \_\_\_\_\_  
 PERISTALTIC PUMP     SUBMERSIBLE PUMP

WELL INTEGRITY: \_\_\_\_\_

REMARKS: Bailed Dry at 3.5 gals.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# WATER SAMPLE FIELD DATA SHEET

PROJECT NO.: 1196  
 CLIENT: Chevron  
 LOCATION: Dublin  
 SAMPLER: KME

SAMPLE ID.: WS-4D  
 DATE: 4/3/90  
 SAMPLE POINT DESIGNATION: MW-4

GROUND-WATER \_\_\_\_\_ OTHER (NR) \_\_\_\_\_  
 CASING DIAMETER: 2 inch  3 inch \_\_\_\_\_ 4 inch \_\_\_\_\_ 6 inch \_\_\_\_\_ OTHER \_\_\_\_\_  
 CASING ELEVATION (feet/MSL): \_\_\_\_\_ CALCULATED PURGE VOL. (gal.): .18  
 DEPTH OF WELL (feet): 35.81 ACTUAL PURGE VOL. (gal.): 8  
 DEPTH TO WATER (feet): 25.5

### FIELD MEASUREMENTS

TIME	VOLUME (gal.)	PH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR (visual)	OTHER
<u>8:26</u>	<u>2</u>	<u>6.77</u>	<u>13,100</u>	<u>65.4</u>	<u>gray</u>	_____
<u>8:30</u>	<u>4</u>	<u>6.86</u>	<u>12,600</u>	<u>62.9</u>	<u>"</u>	_____
<u>8:34</u>	<u>6</u>	<u>6.86</u>	<u>12,700</u>	<u>61.6</u>	<u>"</u>	_____
<u>8:38</u>	<u>8</u>	<u>6.85</u>	<u>13,000</u>	<u>62.4</u>	<u>ol</u>	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

ODOR: Mod. Hydrocarbon

### PURGE METHOD

2" BLADDER PUMP     BAILER (Teflon)     WELL WIZARD     DEDICATED  
 SUBMERSIBLE PUMP     BAILER (PVC)     CENTRIFUGAL PUMP     OTHER \_\_\_\_\_  
 PERISTALTIC PUMP     DIPPER     PNEUMATIC DISPLACEMENT PUMP

### SAMPLE METHOD

2" BLADDER PUMP     BAILER (Teflon)     WELL WIZARD     DEDICATED  
 SURFACE SAMPLER     BAILER (PVC)     DIPPER     OTHER \_\_\_\_\_  
 PERISTALTIC PUMP     SUBMERSIBLE PUMP

WELL INTEGRITY: \_\_\_\_\_

REMARKS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Appendix E**

**CERTIFIED ANALYTICAL RESULTS  
AND CHAIN-OF-CUSTODY FORMS**

**SOIL AND GROUNDWATER DATA**



**Western Region**

4080-C Pike Ln., Concord, CA 94520  
(415) 685-7852  
In CA: (800) 544-3422  
Outside CA: (800) 423-7143

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003883, D003884, D003885  
D003886, D003887  
Report Issue Date: April 16, 1990

Craig Schwyn  
Chemical Processors, Inc.  
950 B. Gilmas Street  
Berkeley, CA 94710

Dear Mr. Schwyn:

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories on March 28, 1990.

A formal quality control/quality assurance 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 to perform analyses for drinking water, wastewater, and hazardous waste materials according to approved 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.

*Emma P. Popek / RMB*

Emma P. Popek  
Laboratory Director

GTEL Concord, CA  
D003883A.DOC

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003883  
 Report Issue Date: April 13, 1990

Table 1

ANALYTICAL RESULTS

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Soil  
 EPA Method 8020/8015<sup>1</sup>

GTEL Sample Number		01	02	03	04
Client Identification		SS-5-D	SS-11-D	SS-12-D	SS-13-D
Date Sampled		03/26/90	03/26/90	03/26/90	03/26/90
Date Extracted		04/09/90	04/09/90	04/09/90	04/09/90
Date Analyzed		04/09/90	04/09/90	04/09/90	04/09/90
Analyte	Detection Limit, mg/Kg	Concentration, mg/Kg			
Benzene	0.005	<0.005	<0.005	<0.005	<0.005
Toluene	0.005	<0.005	<0.005	0.01	0.02
Ethylbenzene	0.005	<0.005	<0.005	0.01	0.05
Xylene (total)	0.015	<0.015	<0.015	0.12	0.28
TPH as Gasoline	10	<10	<10	<10	51

GTEL Sample Number		05	06		
Client Identification		SS-18-D	SS-19-D		
Date Sampled		03/28/90	03/28/90		
Date Extracted		04/09/90	04/09/90		
Date Analyzed		04/09/90	04/09/90		
Analyte	Detection Limit, mg/Kg	Concentration, mg/Kg			
Benzene	0.005	38	1		
Toluene	0.005	150	4		
Ethylbenzene	0.005	34	4		
Xylene (total)	0.015	180	18		
TPH as Gasoline	10	1300	270		

1 = Extraction by EPA Method 5030



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003883  
Report Issue Date: April 13, 1990

## QA Conformance Summary

### Purgeable Aromatics and Total Petroleum Hydrocarbons as Gasoline in Soil EPA Method 8020/8015

#### 1.0 Blanks

Five of 5 target compounds were below detection limits in the reagent water blank and reagent methanol blank as shown in Tables 2a and 2b.

#### 2.0 Independent QC Check Sample

The control limits were met for 4 out of 4 QC check compounds as shown in Table 3.

#### 3.0 Surrogate Compound Recoveries

Percent recovery limits were met for the surrogate compound (naphthalene) for all samples as shown in Table 4.

#### 4.0 Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Accuracy and Precision

4.1 Percent recovery limits were met for 4 of 4 compounds in the MS and MSD as shown in Table 5.

4.2 Relative percent difference (RPD) criteria was met for 4 of 4 analytes in the MS and MSD as shown in Table 5.

#### 5.0 Sample Handling

5.1 Sample handling and holding time criteria were met for all samples.

5.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003883  
Report Issue Date: April 13, 1990

Table 2a

REAGENT WATER BLANK DATA

Purgeable Aromatics and Total Petroleum Hydrocarbons  
as Gasoline in Soil  
EPA Method 8020/8015

Date of Analysis: 04/09/90

Analyte	Concentration, ug/L
Benzene	<0.3
Toluene	<0.3
Ethylbenzene	<0.3
Xylene (total)	<0.6
Gasoline	<50

<# = Not detected at the indicated detection limit.

Table 2b

REAGENT METHANOL BLANK DATA

Purgeable Aromatics and Total Petroleum Hydrocarbons  
as Gasoline in Soil  
EPA Method 8020/8015

Date of Analysis: 04/09/90  
MeOH Lot No: AW044

Analyte	Concentration, mg/Kg
Benzene	<0.005
Toluene	<0.005
Ethylbenzene	<0.005
Xylene (total)	<0.015
Gasoline	<10

<# = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003883  
 Report Issue Date: April 13, 1990

Table 3

INDEPENDENT QC CHECK SAMPLE RESULTS

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Soil  
 EPA Method 8020/8015

Date of Analysis: 04/02/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Benzene	50	49	98	85-115
Toluene	50	44	88	85-115
Ethylbenzene	50	44	88	85-115
Xylene (total)	150	134	89	85-115

Table 3a

INDEPENDENT QC CHECK SAMPLE SOURCE

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Soil  
 EPA Method 8020/8015

Analyte	Lot Number	Source
Benzene	LA18042	SUPELCO
Toluene	LA18042	SUPELCO
Ethylbenzene	LA18042	SUPELCO
Xylene (total)	LA18042	SUPELCO

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003883  
 Report Issue Date: April 13, 1990

Table 4  
 SURROGATE COMPOUND RECOVERY

Naphthalene

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Soil  
 EPA Method 8020/8015

Acceptability Limits<sup>1</sup>: 60 - 130 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Water Blank	200	163	82
MeOH Blank	200	168	84
01	200	216	108
02	200	196	98
03	200	204	102
04	200	246	123
05	200	194	97
06	200	256	128
MS	200	194	97
MSD	200	230	115

MS = Matrix Spike

MSD = Matrix Spike Duplicate

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003883  
 Report Issue Date: April 13, 1990

Table 5

MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD) RECOVERY  
 AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Soil  
 EPA Method 8020/8015

Date of Analysis: 04/09/90  
 Sample Used: D003883-01

Client ID: SS-5-D  
 Units: mg/Kg

Analyte	Sample Result	Concentration Added	MS Result	MS, % Recovery	MSD Result	MSD, % Recovery
Benzene	<0.005	2.86	2.41	84	2.24	78
Toluene	<0.005	2.86	2.65	93	2.51	88
Ethylbenzene	<0.005	2.86	2.36	83	2.26	79
Xylene (total)	<0.005	8.58	7.1	83	6.79	79

Analyte	RPD, %	Maximum RPD, %	Acceptability Limits <sup>1</sup> % Recovery
Benzene	7	30	50 - 112
Toluene	6	30	50 - 108
Ethylbenzene	5	30	50 - 113
Xylene (total)	5	30	50 - 114

<# = Not Detected at the indicated detection limit

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003884  
 Report Issue Date: April 5, 1990

Table 1

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Gasoline, Diesel in Soil  
Modified EPA Method 8015

GTEL Sample Number		01	02	03	
Client Identification		SS-25-D	SS-26-D	SS-27-D	
Date Sampled		03/26-28/90	03/26-28/90	03/26-28/90	
Date Extracted		03/31/90	03/31/90	03/31/90	
Date Analyzed		04/03/90	04/03/90	04/03/90	
Analyte	Detection Limit, mg/Kg	Concentration, mg/Kg			
Gasoline	10	<10	<10	<10	
Diesel	10	<10	<10	<10	

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003884  
Report Issue Date: April 5, 1990

### QA Conformance Summary

#### Total Petroleum Hydrocarbons as Gasoline, Diesel in Soil Modified EPA Method 8015

1.0 Blanks

The Reagent blank was below the detection limit as shown in Table 2.

2.0 Surrogate Compound Recoveries

Percent recovery limits were met for the surrogate compound (Octadecane) for all samples as shown in Table 3.

3.0 Matrix Spike (MS) Accuracy

Percent recovery limits were met for diesel in the MS as shown in Table 4.

4.0 Sample Duplicate Precision

Relative percent difference (RPD) criterion was met for all analytes in the sample duplicate as shown in Table 5.

5.0 Sample Handling

5.1 Sample handling and holding time criteria were met for all samples.

5.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003884  
Report Issue Date: April 5, 1990

Table 2

REAGENT BLANK DATA

Total Petroleum Hydrocarbons as Gasoline, Diesel in Soil  
Modified EPA Method 8015

Date of Analysis: 04/03/90

Analyte	Concentration, mg/Kg
Gasoline	< 10
Diesel	< 10

< # = Not detected at the indicated detection limit.



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003884  
Report Issue Date: April 5, 1990

Table 3  
SURROGATE COMPOUND RECOVERY

Octadecane

Total Petroleum Hydrocarbons as Gasoline, Diesel in Soil  
Modified EPA Method 8015

Acceptability Limits<sup>1</sup>: 70 - 130 %

GTEL No.	Expected Result, mg/Kg	Surrogate Result, mg/Kg	Surrogate Recovery, %
Blank	100	86	86
01	100	93	93
02	100	85	85
03	100	81	81
01 DUP	100	102	102
MS	100	91	91

MS = Matrix Spike Sample

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003884  
 Report Issue Date: April 5, 1990

Table 4

MATRIX SPIKE (MS) RECOVERY REPORT

Total Petroleum Hydrocarbons as Gasoline, Diesel in Soil  
 Modified EPA Method 8015

Date of Analysis: 04/03/90  
 Sample Spiked: D003718-01  
 Units: mg/Kg

Analyte	Sample Result	Amount Added	Expected Result	MS Result	MS, % Recovery	Acceptability Limits, % <sup>1</sup>
Diesel	<10	500	500	366	73	63 - 127

<sup>1</sup> = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

<# = Not detected at the indicated detection limit.

Table 5

LABORATORY DUPLICATE SAMPLE RESULTS  
 AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Total Petroleum Hydrocarbons as Gasoline, Diesel in Soil  
 Modified EPA Method 8015

Date of Analysis: 04/03/90  
 Sample Used: 01  
 Client ID: SS-25-D  
 Units: mg/Kg

Analyte	Sample Result	Duplicate Result	RPD, %	Maximum RPD, %
Gasoline	<10	<10	NA	30
Diesel	<10	<10	NA	30

NA = Not Applicable

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003885  
Report Issue Date: April 6, 1990

Table 1

ANALYTICAL RESULTS

Total Recoverable Oil and Grease in Soil by Infrared  
MODIFIED EPA Method 413.2

Sample Identification		Date Sampled	Date Extracted	Date Analyzed	Concentration, mg/Kg <sup>1</sup>
GTEL No.	Client ID				
03	SS-27-D	03/28/90	04/04/90	04/06/90	39

1. = Method detection limit = 5.0 mg/Kg; analyte below this level would not be detected.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003885  
Report Issue Date: April 6, 1990

## QA Conformance Summary

### Total Recoverable Oil and Grease in Soil by Infrared MODIFIED EPA Method 413.2

#### 1.0 Blanks

The method blank was below the detection limit as shown in Table 2.

#### 2.0 Initial Instrument Calibration

The range of concentrations of the initial instrument calibration are shown in Table 3.

#### 3.0 Calibration Verification Standards

- 3.1 The control limits were met for the initial calibration verification standard (ICVS) as shown in Table 4.
- 3.2 The control limits were met for the continuing calibration verification standard (CCVS) as shown in Table 4.

#### 4.0 Matrix Spike (MS) Accuracy

The control limits were met for the reference oil in the MS as shown in Table 5.

#### 5.0 Sample Duplicate Precision

Relative percent difference (RPD) criterion was met for the sample duplicate as shown in Table 6.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003885  
Report Issue Date: April 6, 1990

Table 2

METHOD BLANK DATA

Total Recoverable Oil and Grease in Soil by Infrared  
MODIFIED EPA Method 413.2

Date of Analysis: 04/04/90

Analyte	Concentration, mg/Kg
Oil and Grease	<5

<# = Not detected at the indicated detection limit.

Table 3

INITIAL CALIBRATION STANDARDS DATA

Total Recoverable Oil and Grease in Soil by Infrared  
MODIFIED EPA Method 413.2

Date of Analysis: 04/04/90

Standard Number	Concentration, mg/L
1	1.0
2	5.1
3	10.1
4	50.5
5	101.0

Project Number: SFB-175-0204.72  
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 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003885  
 Report Issue Date: April 6, 1990

Table 4

INITIAL AND CONTINUING CALIBRATION  
VERIFICATION STANDARDS RESULTS

Total Recoverable Oil and Grease in Soil by Infrared  
MODIFIED EPA Method 413.2

Date of Analysis: 04/04/90

Initial Calibration Verification Standard				
Analyte	Expected Result, mg/L	Observed Result, mg/L	Recovery, %	Acceptability Limits, % <sup>1</sup>
Oil and Grease	5.0	4.7	94	80 - 120
Continuing Calibration Verification Standard				
Analyte	Expected Result, mg/L	Observed Result, mg/L	Recovery, %	Acceptability Limits, % <sup>1</sup>
Oil and Grease	5.0	4.5	90	80 - 120

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Table 4a

INITIAL AND CONTINUING CALIBRATION  
VERIFICATION STANDARDS SOURCE

Total Recoverable Oil and Grease in Soil by Infrared  
MODIFIED EPA Method 413.2

Initial Calibration Verification Standard		
Analyte	Lot Number	Source
Oil and Grease	R07/STK1	GTEL
Continuing Calibration Verification Standard		
Analyte	Lot Number	Source
Oil and Grease	R06/STK1	GTEL

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003885  
 Report Issue Date: April 6, 1990

Table 5

**MATRIX SPIKE (MS) RECOVERY REPORT**

Total Recoverable Oil and Grease in Soil by Infrared  
 MODIFIED EPA Method 413.2

Date of Analysis: 04/04/90  
 Sample Spiked: Sand (Lot #9236) Units: mg/Kg

Analyte	MS Result	Sample Result	Amount Recovered	Amount Added	MS, % Recovery	Acceptability Limits, %
Oil and Grease	56	<5	56	49.3	114	70 - 130

Table 6

**LABORATORY DUPLICATE SAMPLE RESULTS  
 AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT**

Total Recoverable Oil and Grease in Soil by Infrared  
 MODIFIED EPA Method 413.2

Date of Analysis: 04/04/90 Client ID: SS-27-D  
 Sample Used: 03 Units: mg/Kg

Analyte	Sample Result	Duplicate Result	RPD, %	Maximum RPD, %
Oil and Grease	38	39.6	4.1	20

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003886  
 Report Issue Date: April 6, 1990

Table 1  
 ANALYTICAL RESULTS  
 Purgeable Hydrocarbons in Soil  
 EPA Method 8240

Date Sampled		03/28/90			
Date Analyzed		04/03/90			
Client Identification		SS-27-D			
GTEL Sample Number		01			
Analyte	Detection Limit, ug/Kg	Concentration, ug/Kg			
Chloromethane	500	<500			
Bromomethane	500	<500			
Vinyl Chloride	500	<500			
Chloroethane	500	<500			
Methylene Chloride	250	<250			
Acetone	5000	<5000			
Carbon Disulfide	250	<250			
1,1-Dichloroethene	250	<250			
1,1-Dichloroethane	250	<250			
<i>trans</i> -1,2-Dichloroethene	250	<250			
Chloroform	250	<250			
1,2-Dichloroethane	250	<250			
2-Butanone	5000	<5000			
1,1,1-Trichloroethane	250	<250			
Carbon Tetrachloride	250	<250			
Vinyl Acetate	2500	<2500			
Bromodichloromethane	250	<250			
1,2-Dichloropropane	250	<250			
<i>cis</i> -1,3-Dichloropropene	250	<250			
Trichloroethene	250	<250			
Dibromochloromethane	250	<250			
1,1,2-Trichloroethane	250	<250			
Benzene	250	2700			
<i>trans</i> -1,3-Dichloropropene	250	<250			
2-Chloroethylvinylether	500	<500			



Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003886  
 Report Issue Date: April 6, 1990

Table 1 con't  
 ANALYTICAL RESULTS

Purgeable Hydrocarbons in Soil  
 EPA Method 8240

Date Sampled		03/28/90			
Date Analyzed		04/03/90			
Client Identification		SS-27-D			
GTEL Sample Number		01			
Analyte	Detection Limit, ug/Kg	Concentration, ug/Kg			
Bromoform	250	<250			
4-Methyl-2-Pentanone	2500	<2500			
2-Hexanone	2500	<2500			
Tetrachloroethene	250	<250			
1,1,2,2-Tetrachloroethane	250	<250			
Toluene	250	23000			
Chlorobenzene	250	<250			
Ethylbenzene	250	5600			
Styrene	250	<250			
1,2-Dichlorobenzene	250	<250			
1,3-Dichlorobenzene	250	<250			
1,4-Dichlorobenzene	250	<250			
Xylene (total)	250	46000			
Trichlorofluoromethane	250	<250			

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003886  
Report Issue Date: April 6, 1990

## QA Conformance Summary

### Purgeable Hydrocarbons in Soil EPA Method 8240

- 1.0 Blanks  
One of 39 target compounds found in Reagent water blank and MeOH blank as shown in Tables 2 and 2a.
- 2.0 Independent QC Check Sample  
The control limits were met for 8 of 8 QC check compounds in the aqueous QC check sample as shown in Table 3.
- 3.0 Surrogate Compound Recoveries  
Recovery limits were met for all three surrogate compounds for all samples as shown in Tables 4a, 4b, and 4c.
- 4.0 Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Accuracy and Precision
  - 4.1 Accuracy:  
Percent recovery limits were met for 10 of 10 compounds in the MS and MSD as shown in Table 5.
  - 4.2 Precision:  
Relative Percent Difference (RPD) criteria were met for 5 of 5 compounds in the MS and MSD as shown in Table 5.
- 5.0 Sample Handling
  - 5.1 Sample handling and holding time criteria were met for all samples.
  - 5.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003886  
 Report Issue Date: April 6, 1990

Table 2  
 REAGENT WATER BLANK DATA  
 Purgeable Hydrocarbons in Soil  
 EPA Method 8240

Date of Analysis: 04/03/90

Analyte	Observed Result, ug/Kg
Chloromethane	ND
Bromomethane	ND
Vinyl Chloride	ND
Chloroethane	ND
Methylene Chloride	ND
Acetone	14
Carbon Disulfide	ND
1,1-Dichloroethene	ND
1,1-Dichloroethane	ND
<i>trans</i> -1,2-Dichloroethene	ND
Chloroform	ND
1,2-Dichloroethane	ND
2-Butanone	ND
1,1,1-Trichloroethane	ND
Carbon Tetrachloride	ND
Vinyl Acetate	ND
Bromodichloromethane	ND
1,2-Dichloropropane	ND
<i>cis</i> -1,3-Dichloropropene	ND
Trichloroethene	ND
Dibromochloromethane	ND
1,1,2-Trichloroethane	ND
Benzene	ND
<i>trans</i> -1,3-Dichloropropene	ND
2-Chloroethylvinylether	ND

Table 2 continued on page 6

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003886  
Report Issue Date: April 6, 1990

Table 2 con't  
REAGENT WATER BLANK DATA  
Purgeable Hydrocarbons in Soil  
EPA Method 8240

Analyte	Observed Result, ug/Kg
Bromoform	ND
4-Methyl-2-Pentanone	ND
2-Hexanone	ND
Tetrachloroethene	ND
1,1,2,2-Tetrachloroethane	ND
Toluene	ND
Chlorobenzene	ND
Ethylbenzene	ND
Styrene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Xylene (total)	ND
Trichlorofluoromethane	ND

ND = Not detected above the statistical detection limit.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003886  
Report Issue Date: April 6, 1990

Table 2a

REAGENT MEOH BLANK DATA

Purgeable Hydrocarbons in Soil  
EPA Method 8240

Date of Analysis: 04/03/90

Analyte	Observed Result, ug/Kg
Chloromethane	ND
Bromomethane	ND
Vinyl Chloride	ND
Chloroethane	ND
Methylene Chloride	ND
Acetone	370
Carbon Disulfide	ND
1,1-Dichloroethene	ND
1,1-Dichloroethane	ND
<i>trans</i> -1,2-Dichloroethene	ND
Chloroform	ND
1,2-Dichloroethane	ND
2-Butanone	ND
1,1,1-Trichloroethane	ND
Carbon Tetrachloride	ND
Vinyl Acetate	ND
Bromodichloromethane	ND
1,2-Dichloropropane	ND
<i>cis</i> -1,3-Dichloropropene	ND
Trichloroethene	ND
Dibromochloromethane	ND
1,1,2-Trichloroethane	ND
Benzene	ND
<i>trans</i> -1,3-Dichloropropene	ND
2-Chloroethylvinylether	ND

Table 2a continued on page 8

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003886  
Report Issue Date: April 6, 1990

Table 2a con't  
REAGENT MEOH BLANK DATA  
Purgeable Hydrocarbons in Soil  
EPA Method 8240

Analyte	Observed Result, ug/Kg
Bromoform	ND
4-Methyl-2-Pentanone	ND
2-Hexanone	ND
Tetrachloroethene	ND
1,1,2,2-Tetrachloroethane	ND
Toluene	ND
Chlorobenzene	ND
Ethylbenzene	ND
Styrene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Xylene (total)	ND
Trichlorofluoromethane	ND

ND = Not detected above the statistical detection limit.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003886  
 Report Issue Date: April 6, 1990

Table 3  
 INDEPENDENT QC CHECK SAMPLE RESULTS  
 Purgeable Hydrocarbons in Soil  
 EPA Method 8240

Date of Analysis: 03/29/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Trichloroethylene	50	46	92	60-140
Carbon Tetrachloride	50	47	94	80-120
1,1,1-Trichloroethane	50	48	96	60-140
1,1,2-Trichloroethane	50	46	92	60-140
Vinyl Chloride	50	34	68	60-140
Benzene	50	45	90	60-140
1,1-Dichloroethylene	50	46	92	60-140
1,2-Dichlorobenzene	50	45	90	60-140

Table 3a  
 INDEPENDENT QC CHECK SAMPLE SOURCE  
 Purgeable Hydrocarbons in Soil  
 EPA Method 8240

Analyte	Lot Number	Source
Trichloroethylene	LA19682	PURGEABLE A SUPELCO
Carbon Tetrachloride	LA19682	PURGEABLE A SUPELCO
1,1,1-Trichloroethane	LA18769	PURGEABLE B SUPELCO
1,1,2-Trichloroethane	LA18769	PURGEABLE B SUPELCO
Vinyl Chloride	LA20078	PURGEABLE C SUPELCO
Benzene	LA18769	PURGEABLE B SUPELCO
1,1-Dichloroethylene	LA19682	PURGEABLE A SUPELCO
1,2-Dichlorobenzene	LA19682	PURGEABLE A SUPELCO

Project Number: SFB-175-0204.72  
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Facility Number: 9-5542  
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Table 4a  
SURROGATE COMPOUND RECOVERY

d8-Toluene

Purgeable Hydrocarbons in Soil  
EPA Method 8240

Recovery Acceptability Limits<sup>1</sup>: 81 - 117 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Water Blank	50	50	100
MeOH Blank	50	52	104
01	50	51	102
MS	50	54	108
MSD	50	53	106

MS = Matrix spike sample  
MSD = Matrix spike duplicate sample  
1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003886  
Report Issue Date: April 6, 1990

Table 4b  
SURROGATE COMPOUND RECOVERY  
Bromofluorobenzene  
Purgeable Hydrocarbons in Soil  
EPA Method 8240

Recovery Acceptability Limits<sup>1</sup>: 74 - 121 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Water Blank	50	49	98
MeOH Blank	50	49	98
01	50	50	100
MS	50	53	106
MSD	50	53	106

MS = Matrix spike sample  
MSD = Matrix spike duplicate sample  
1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003886  
Report Issue Date: April 6, 1990

Table 4c  
SURROGATE COMPOUND RECOVERY  
d4-1,2-Dichloroethane  
Purgeable Hydrocarbons in Soil  
EPA Method 8240

Recovery Acceptability Limits<sup>1</sup>: 70 - 121 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Water Blank	50	51	102
MeOH Blank	50	52	104
01	50	52	104
MS	50	51	102
MSD	50	51	102

MS = Matrix spike sample  
MSD = Matrix spike duplicate sample  
1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003886  
 Report Issue Date: April 6, 1990

Table 5  
 MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)  
 RECOVERY AND RELATIVE PERCENT DEVIATION (RPD)  
 REPORT

Purgeable Hydrocarbons in Soil  
 EPA Method 8240

Date of Analysis: 04/02/90  
 Sample Spiked: D003720-04

Units: ug/Kg

Analyte	Sample Result	Amount Added	MS Result	MSD Result
1,1-Dichloroethene	ND	2500	2000	2100
Trichloroethene	ND	2500	1900	2000
Benzene	ND	2500	1900	2050
Toluene	ND	2500	2000	2200
Chlorobenzene	ND	2500	2000	2150

Analyte	MS, % Recovery	MSD, % Recovery	RPD, %	Acceptability Limits <sup>1</sup>	
				Maximum RPD, %	% Recovery
1,1-Dichloroethene	80	84	5	22	59-172
Trichloroethene	76	80	5	24	62-137
Benzene	76	82	7	21	66-142
Toluene	80	88	9	21	59-139
Chlorobenzene	80	86	7	21	60-133

ND = Not Detected above the statistical detection limit

1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003887  
 Report Issue Date: April 4, 1990

Table 1  
 ANALYTICAL RESULTS

Total Threshold Limit Concentration in Soil<sup>1</sup>

GTEL Sample Number		01	02	03	
Client Identification		SS-25-D	SS-26-D	SS-27-D	
Date Sampled		03/28/90	03/28/90	03/28/90	
Date Extracted		03/30/90	03/30/90	03/30/90	
Date Analyzed		03/30/90	03/30/90	03/30/90	
Analyte	Detection Limit, mg/Kg	Concentration, mg/Kg			
Cadmium	3	<3	<3	<3	
Chromium	5	26	25	13	
Lead	10	37	41	26	
Zinc	5	39	44	28	

1 = EPA Method 3050/6010.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003887  
Report Issue Date: April 4, 1990

QA Conformance Summary  
Total Threshold Limit Concentration in Soil

- 1.0 Blanks  
The method blank was below the detection limit for all analytes as shown in Table 2.
- 2.0 Laboratory Control Sample (LCS)  
The control limits were met for all analytes in the aqueous LCS as shown in Table 3.
- 3.0 Calibration Verification Standards  
The control limits were met for all analytes in the initial calibration verification standard (ICVS) as shown in Table 5.
- 4.0 Matrix Spike (MS) Accuracy  
Percent recovery limits were met for all analytes in the MS as shown in Table 6.
- 5.0 Sample Duplicate Precision  
Relative percent difference criteria were met for the sample duplicate as shown in Table 7.
- 6.0 Sample Handling
  - 6.1 Sample handling and holding time criteria were met for all samples.
  - 6.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003887  
Report Issue Date: April 4, 1990

Table 2  
REAGENT BLANK DATA

Total Threshold Limit Concentration in Soil

Date of Analysis: 03/30/90

Analyte	Concentration, mg/Kg
Cadmium	ND
Chromium	ND
Lead	ND
Zinc	ND

ND = Not detected above the detection limit.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003887  
Report Issue Date: April 4, 1990

Table 3  
LABORATORY CONTROL SAMPLE RESULTS  
Total Threshold Limit Concentration in Soil

Date of Analysis: 03/30/90

Analyte	Expected Result, mg/L	Observed Result, mg/L	Recovery, %	Acceptability Limits, %
Cadmium	3.0	3.2	107	80 - 120
Chromium	3.0	3.2	107	80 - 120
Lead	10.0	10.3	103	80 - 120
Zinc	3.0	3.2	107	80 - 120

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003887  
Report Issue Date: April 4, 1990

Table 3a  
LABORATORY CONTROL SAMPLE SOURCE  
Total Threshold Limit Concentration in Soil

Analyte	Lot Number	Source
Cadmium	EP-20071-1	EMS
Chromium	EP-20071-1	EMS
Lead	EP-20071-1	EMS
Zinc	EP-20071-1	EMS



Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003887  
 Report Issue Date: April 5, 1990

Table 4  
 INITIAL CALIBRATION STANDARDS DATA  
 Total Threshold Limit Concentration in Soil

Standard ID	Spex 3-83-VSA				
Date of Analysis	03/30/90				
Analyte	Standard Concentration, mg/L				
Cadmium	0	10			
Chromium	0	10			
Lead	0	10			
Zinc	0	10			

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003887  
Report Issue Date: April 4, 1990

Table 5  
INITIAL CALIBRATION VERIFICATION STANDARDS RESULTS  
Total Threshold Limit Concentration in Soil

Date of Analysis: 03/30/90

Analyte	Expected Result, mg/L	Observed Result, mg/L	Recovery, %	Acceptability Limits, %
Cadmium	4.0	4.4	110	80 - 120
Chromium	4.0	4.5	112	80 - 120
Lead	4.0	4.5	112	80 - 120
Zinc	4.0	4.5	112	80 - 120

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003887  
Report Issue Date: April 4, 1990

Table 5a  
INITIAL CALIBRATION VERIFICATION STANDARDS SOURCE  
Total Threshold Limit Concentration in Soil

Analyte	Lot Number	Source
Cadmium	Spex 3-83-VSB	Spex
Chromium	Spex 3-83-VSB	Spex
Lead	Spex 3-83-VSB	Spex
Zinc	Spex 3-83-VSB	Spex

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003887  
Report Issue Date: April 4, 1990

Table 6  
MATRIX SPIKE (MS) RECOVERY REPORT  
Total Threshold Limit Concentration in Soil

Date of Analysis: 03/30/90  
Sample Spiked: 01

Client ID: SS-25-D  
Units: mg/Kg

Analyte	MS Result	Sample Result	Recovered	Expected	MS, % Recovery	Acceptability Limits, %
Cadmium	430	<3	430	500	86	80 - 120
Chromium	445	19	426	500	85	80 - 120
Lead	446	30	416	500	83	80 - 120
Zinc	451	31	420	500	84	80 - 120

<# = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003887  
 Report Issue Date: April 6, 1990

Table 7

LABORATORY DUPLICATE SAMPLE RESULTS  
 AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Total Threshold Limit Concentration in Soil

Date of Analysis: 03/30/90  
 Sample Used: 01

Client ID: SS-25-D  
 Units: mg/Kg

Analyte	Sample Result	Duplicate Result	RPD, %	Maximum RPD, %
Cadmium	<3	<3	NA	20
Chromium	19	33	32*	20
Lead	30	44	38*	20
Zinc	31	46	38*	20

NA = Not Applicable

\* = RPD results are out of limit due to matrix effects (sample was not homogenous).

# Chain-of-Custody Record

P.O. Box 5004  
San Ramon, CA 94583  
FAX (415) 842-9591

Chevron Facility Number 9-5542

Consultant Release Number 3236620 Consultant Project Number 1196

Consultant Name Chemical Processors, Inc.

Address 950 B Gilman St., Berkeley, CA

Fax Number 415-524-7439

Project Contact (Name) Craig Schwyn

(Phone) 415-524-9372

Chevron Contact (Name) JOHN RANDALL

(Phone) 415-842-9625

Laboratory Name GTEL

Contract Number \_\_\_\_\_

Samples Collected by (Name) Khaled Rahman

Collection Date 3/26/90

Signature Khaled Rahman

Sample Number	Lab Number	Number of Containers	Matrix		Type	Time	Sample Preservation	Lead	Analyses To Be Performed							Remarks		
			S = Soil	A = Air					W = Water	C = Charcoal	G = Grab	C = Composite	Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline	Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline + Diesel	503 Oil and Grease		Arom. Volatiles - BTXE Soil: 8020/Wtr.: 602	Arom. Volatiles - BTXE Soil: 8240/Wtr.: 624
1-D		1	S		G		NONE	X									X	
2-D		1	S		G			X									X	
3-D		1	S		G			X									X	
4-D		1	S		G			X									X	
5-D		1	S		G			X	X			X					X	
6-D		1	S		G			X									X	
7-D		1	S		G			X									X	
8-D		1	S		G		↓	X									X	
9-D		1	S		G		NONE	X									X	
10-D		1	S		G			X									X	
11-D		1	S		G			X	X			X					X	
12-D		1	S		G			X	X			X					X	
13-D		1	S		G			X	X			X					X	

Acquired By (Signature) <u>Khaled Rahman</u>	Organization <u>Chempro</u>	Date/Time <u>3/28/90 3:45</u>	Received By (Signature) <u>[Signature]</u>	Organization <u>Chempro</u>	Date/Time <u>3/28/90 3:45p</u>	Turn Around Time (Circle Choice) 24 Hrs 48 Hrs 5 Days <u>1 Day</u>
Acquired By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	
Acquired By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	

M. Navon 7/11/90

# Chain-of-Custody Record

Chevron U.S.A. Inc.  
 P.O. Box 5004  
 San Ramon, CA 94583  
 FAX (415) 842-9591

Chevron Facility Number 9-5542  
 Consultant Release Number 3236620 Consultant Project Number 1196  
 Consultant Name Chemical Processors, Inc.  
 Address 950 B Gilman St., Berkeley, CA  
 Fax Number 415-524-7439  
 Project Contact (Name) Craig Schwyn  
 (Phone) 415-524-9372

Chevron Contact (Name) JOHN RANDALL  
 (Phone) 415-842-9625  
 Laboratory Name GTEL  
 Contract Number \_\_\_\_\_  
 Samples Collected by (Name) Khaled Rahman  
 Collection Date 3/26/90, 3/27/90, 3/28/90  
 Signature Khaled' Rah

Sample Number	Lab Number	Number of Containers	Matrix		Type	Time	Sample Preservation	Iced	Analyses To Be Performed							Remarks			
			S = Soil	A = Air					W = Water	C = Charcoal	G = Grub	C = Composite	Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline	Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline + Diesel	503 Oil and Grease		Arom. Volatiles - BTXE Soil: 8020/Wtr.: 802	Arom. Volatiles - BTXE Soil: 8240/Wtr.: 824	Total Lead, Cr, Cd/Pb DHS-Luft
-14-D		1	S		G		NONE	X											
-15-D		1	S		G		↓	X											
-16-D		1	S		G		NONE	X											collected 3/27
-17-D		1	S		G		↓	X											
-18-D		1	S		G		↓	X	X				X						
-19-D		1	S		G		↓	X	X				X						
-20-D		1	S		G		↓	X											
<del>-21-D</del>		1	S		<del>GC</del>		NONE	X											<del>D-10-D</del>
<del>5-22-D</del>		1	S		<del>GC</del>		↓	X											<del>D-12-D</del>
-23-D		1	S		G		NONE	X											collected 3/28
-24-D		1	S		G		↓	X											
-25-D		1	S		G		↓	X	X	X	X		X	X					
-26-D		1	S		G		↓	X	X	X	X		X	X					

Acquired By (Signature) <u>Khaled Rahman</u>	Organization <u>Chempro</u>	Date/Time <u>3/28/90 3:50</u>	Received By (Signature) <u>Maria J. Manzi</u>	Organization <u>Chempro</u>	Date/Time <u>3/28/90 3:50p</u>	Turn Around Time (Circle Choice) 24 Hrs 48 Hrs 5 Days <u>10 Days</u>
Acquired By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	
Acquired By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)	Organization	Date/Time	

# Chain-of-Custody Record

Chevron U.S.A. Inc.  
 P.O. Box 5004  
 San Ramon, CA 94583  
 FAX (415) 842-9591

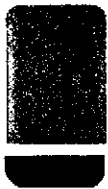
Chevron Facility Number 9-5542  
 Consultant Release Number 3236620 Consultant Project Number 1196  
 Consultant Name Chemical Processors, Inc.  
 Address 950 B Gilman St., Berkeley, CA  
 Fax Number 415-524-7439  
 Project Contact (Name) Craig Schwyn  
 (Phone) 415-524-9372

Chevron Contact (Name) JOHN RANDALL  
 (Phone) 415-842-9625  
 Laboratory Name GTEL  
 Contract Number \_\_\_\_\_  
 Samples Collected by (Name) Khaled Rahman  
 Collection Date 3/28/90  
 Signature Khaled Rah

Sample Number	Lab Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite	Time	Sample Preservation	Iced	Analyses To Be Performed							Remarks	
								Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline	Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline + Diesel	503 Oil and Grease	Arom. Volatiles - BTXE Soil: 8020/Wtr.: 602	Arom. Volatiles - BTXE Soil: 8240/Wtr.: 624	Total Lead, Cd, Zn DHS-Luft	EDB DHS-AB 1803		
-27-D		1	S	G		None	X	X	X		X	X				
-28-D		1	S	G		↓	X						X			
-29-D		1	S	G		↓	X						X			
B-2		1	W				X									TRAVEL BLANK

Inquished By (Signature) <u>Khaled Rahman</u>	Organization <u>Chevron</u>	Date/Time <u>3/28/90 3:50</u>	Received By (Signature) <u>Craig Schwyn</u>	Organization <u>Chevron</u>	Date/Time <u>3/28/90 3:50</u>	Turn Around Time (Circle Choice) 24 Hrs 48 Hrs 5 Days <u>10 Days</u>
Inquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	
Inquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)	Organization	Date/Time	





# GTEL

ENVIRONMENTAL  
LABORATORIES, INC.

**Western Region**

4080-C Pike Ln., Concord, CA 94520

(415) 685-7852

In CA: (800) 544-3422

Outside CA: (800) 423-7143

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003889, D003890,  
D003891, D003892,  
D003893  
Report Issue Date: April 12, 1990

Craig Schwyn  
Chemical Processors Inc.  
950 B. Gilman Street  
Berkeley, CA 94710

Dear Mr. Schwyn:

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories on 03/28/90.

A formal quality control/quality assurance 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 to perform analyses for drinking water, wastewater, and hazardous waste materials according to approved 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.

Emma P. Popek  
Laboratory Director

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003889  
 Report Issue Date: April 12, 1990

Table 1  
 ANALYTICAL RESULTS

Total Petroleum Hydrocarbons  
 as Gasoline in Water  
 EPA Method 8015<sup>1</sup>

GTEL Sample Number		01	02	03	
Client Identification		RS-1-D	RS-6-D	RS-11-D	
Date Sampled		03/26/90	03/27/90	03/28/90	
Date Analyzed		04/05/90	04/05/90	04/05/90	
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Gasoline	50	<50	<50	50	

1 = Extraction by EPA Method 5030

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003889  
Report Issue Date: April 12, 1990

QA Conformance Summary  
Total Petroleum Hydrocarbons  
as Gasoline in Water  
EPA Method 8015

- 1.0 Blanks  
One of 1 target compound was below detection limits in the reagent blank as shown in Table 2.
- 2.0 Independent QC Check Sample  
The control limits were met for 1 out of 1 QC check compound as shown in Table 3.
- 3.0 Surrogate Compound Recoveries  
Percent recovery limits were met for the surrogate compound (naphthalene) for all samples as shown in Table 4.
- 4.0 Matrix Spike (MS) Accuracy  
Percent recovery limits were met for 4 of 4 compounds in the MS as shown in Table 5.
- 5.0 Reagent Water Spike (WS) and Reagent Water Spike Duplicate (WSD) Accuracy and Precision
- 5.1 Percent recovery limits were met for 4 of 4 compounds in the WS and WSD as shown in Table 6.
- 5.2 Relative percent difference (RPD) criteria was met for 4 of 4 analytes in the WS and WSD as shown in Table 6.
- 6.0 Sample Handling
- 6.1 Sample handling and holding time criteria were met for all samples.
- 6.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003889  
Report Issue Date: April 12, 1990

Table 2

REAGENT BLANK DATA

Total Petroleum Hydrocarbons  
as Gasoline in Water  
EPA Method 8015

Date of Analysis: 04/05/90

Analyte	Concentration, ug/L
Gasoline	<50

<# = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003889  
Report Issue Date: April 12, 1990

Table 3  
INDEPENDENT QC CHECK SAMPLE RESULTS

Total Petroleum Hydrocarbons  
as Gasoline in Water  
EPA Method 8015

Date of Analysis: 04/05/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Gasoline	1040	1120	108	85 - 115

Table 3a  
INDEPENDENT QC CHECK SAMPLE SOURCE

Total Petroleum Hydrocarbons  
as Gasoline in Water  
EPA Method 8015

Analyte	Source
Gasoline	Chevron

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003889  
Report Issue Date: April 12, 1990

Table 4  
SURROGATE COMPOUND RECOVERY

Naphthalene

Total Petroleum Hydrocarbons  
as Gasoline in Water  
EPA Method 8015

Acceptability Limits<sup>1</sup>: 70 - 130 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	200	223	112
01	200	141	70
02	200	143	71
03	200	145	72
MS	200	155	77
WS	200	162	81
WSD	200	155	78

MS = Matrix Spike  
WS = Reagent Water Spike  
WSD = Reagent Water Spike Duplicate  
1 = Acceptability limits are derived from the 99% confidence interval  
of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003889  
 Report Issue Date: April 12, 1990

Table 5  
 MATRIX SPIKE (MS) RECOVERY  
 REPORT

Total Petroleum Hydrocarbons  
 as Gasoline in Water  
 EPA Method 8015

Date of Analysis: 04/05/90  
 Sample Used: D003850-01

Client ID: MW14  
 Units: ug/L

Analyte	Sample Result	Concentration Added	MS Result	MS, % Recovery	Acceptability Limits, % Recovery <sup>1</sup>
Benzene	<0.3	25	21.0	84	71 - 123
Toluene	<0.3	25	20.0	80	69 - 120
Ethylbenzene	<0.3	25	20.7	83	72 - 121
Xylene (total)	<0.6	75	61.4	82	75 - 123

<# = Not Detected at the indicated detection limit  
 1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003889  
 Report Issue Date: April 12, 1990

Table 6

REAGENT WATER SPIKE (WS) AND REAGENT WATER SPIKE DUPLICATE (WSD) RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Total Petroleum Hydrocarbons  
 as Gasoline in Water  
 EPA Method 8015

Date of Analysis: 04/05/90

Units: ug/L

Analyte	Concentration Added	WS Result	WS, % Recovery	WSD Result	WSD, % Recovery
Benzene	25	22.9	92	22.7	91
Toluene	25	21.8	87	21.6	86
Ethylbenzene	25	22.6	90	22.4	90
Xylene (total)	75	70.2	94	69.9	93

Analyte	RPD, %	Maximum RPD, %	Acceptability Limits <sup>1</sup> % Recovery
Benzene	1	30	76 - 120
Toluene	1	30	72 - 117
Ethylbenzene	0	30	73 - 123
Xylene (total)	1	30	81 - 125

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003890  
Report Issue Date: April 6, 1990

Table 1

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Diesel in Water  
Modified EPA Method 8015

Sample Identification		Date Sampled	Date Extracted	Date Analyzed	Concentration <sup>1</sup> , ug/L
GTEL No.	Client ID				
01	RS-8-D	03/28/90	04/01/90	04/03/90	<100

<sup>1</sup> = Method detection limit = 100 ug/L; analyte below this level would not be detected.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003890  
Report Issue Date: April 6, 1990

### QA Conformance Summary

#### Total Petroleum Hydrocarbons as Diesel in Water Modified EPA Method 8015

1.0 Blanks

The Reagent blank was below the detection limit as shown in Table 2.

2.0 Independent QC Check Sample

The control limits were met for 1 out of 1 QC check compound as shown in Table 3.

3.0 Surrogate Compound Recoveries

Percent recovery limits were met for the surrogate compound (octadecane) for all samples as shown in Table 4.

4.0 Reagent Water Spike (WS) and Reagent Water Spike Duplicate (WSD) Accuracy and Precision

4.1 Percent recovery limits were met for diesel in the WS and WSD as shown in Table 5.

4.2 Relative percent difference (RPD) criteria was met for diesel in the WS and WSD as shown in Table 5.

5.0 Sample Handling

5.1 Sample handling and holding time criteria were met for all samples.

5.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003890  
Report Issue Date: April 6, 1990

Table 2

REAGENT BLANK DATA

Total Petroleum Hydrocarbons as Diesel in Water  
Modified EPA Method 8015

Date of Analysis: 04/03/90

Analyte	Concentration, ug/L
Diesel	<100

<# = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003890  
Report Issue Date: April 6, 1990

Table 3

INDEPENDENT QC CHECK SAMPLE RESULTS

Total Petroleum Hydrocarbons as Diesel in Water  
Modified EPA Method 8015

Date of Analysis: 04/03/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Diesel	1294	1229	95	80 - 120

Table 3a

INDEPENDENT QC CHECK SAMPLE SOURCE

Total Petroleum Hydrocarbons as Diesel in Water  
Modified EPA Method 8015

Analyte	Source
Diesel	Shell

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003890  
Report Issue Date: April 6, 1990

Table 4  
SURROGATE COMPOUND RECOVERY

Octadecane

Total Petroleum Hydrocarbons as Diesel in Water  
Modified EPA Method 8015

Acceptability Limits<sup>1</sup>: 70 - 130 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	100	78	78
01	100	103	103
WS	100	101	101
WSD	100	125	125

WS = Reagent Water Spike  
WSD = Reagent Water Spike Duplicate  
1 = Acceptability limits are derived from the 99% confidence interval  
of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003890  
 Report Issue Date: April 6, 1990

Table 5

REAGENT WATER SPIKE (WS) AND REAGENT WATER SPIKE DUPLICATE (WSD) RECOVERY  
 AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Total Petroleum Hydrocarbons as Diesel in Water  
 Modified EPA Method 8015

Date of Analysis: 04/03/90

Units: ug/L

Analyte	Concentration Added	WS Result	WS, % Recovery	WSD Result	WSD, % Recovery
Diesel	1000	835	84	1031	103

Analyte	RPD, %	Maximum RPD, %	Acceptability Limits % Recovery <sup>1</sup>
Diesel	20	30	60 - 123

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003891  
 Report Issue Date: April 6, 1990

Table 1  
 ANALYTICAL RESULTS  
 Purgeable Aromatics in Water  
 MODIFIED EPA METHOD 602<sup>1</sup>

GTEL Sample Number		01	02		
Client Identification		RS-2-D	RS-7-D		
Date Sampled		03/26/90	03/27/90		
Date Analyzed		04/03/90	04/03/90		
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Benzene	0.3	<0.3	<0.3		
Toluene	0.3	<0.3	<0.3		
Ethylbenzene	0.3	<0.3	<0.3		
Xylene (total)	0.6	<0.6	<0.6		

1 = Extraction by EPA Method 5030

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003891  
Report Issue Date: April 6, 1990

QA Conformance Summary  
Purgeable Aromatics in Water  
MODIFIED EPA METHOD 602

1.0 Blanks

Four of 4 target compounds were below detection limits in the reagent blank as shown in Table 2.

2.0 Independent QC Check Sample

The control limits were met for 4 out of 4 QC check compounds as shown in Table 3.

3.0 Surrogate Compound Recoveries

Percent recovery limits were met for the surrogate compound (naphthalene) for all samples as shown in Table 4.

4.0 Matrix Spike (MS) Accuracy

Percent recovery limits were met for 4 of 4 compounds in the MS as shown in Table 5.

5.0 Reagent Water Spike (WS) and Reagent Water Spike (WSD) Duplicate Precision

Relative percent difference (RPD) criteria was met for 4 of 4 analytes in the WS and WSD as shown in Table 6.

6.0 Sample Handling

6.1 Sample handling and holding time criteria were met for all samples.

6.2 There were no exceptional conditions requiring dilution of samples.



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003891  
Report Issue Date: April 6, 1990

Table 2

REAGENT BLANK DATA

Purgeable Aromatics in Water  
MODIFIED EPA METHOD 602

Date of Analysis: 04/03/90

Analyte	Concentration, ug/L
Benzene	<0.3
Toluene	<0.3
Ethylbenzene	<0.3
Xylene (total)	<0.6

<# = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003891  
 Report Issue Date: April 6, 1990

Table 3  
 INDEPENDENT QC CHECK SAMPLE RESULTS

Purgeable Aromatics in Water  
 MODIFIED EPA METHOD 602

Date of Analysis: 04/03/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Benzene	50	54.8	110	85 - 115
Toluene	50	52.7	105	85 - 115
Ethylbenzene	50	53.5	107	85 - 115
Xylene (total)	150	161.4	108	85 - 115

Table 3a  
 INDEPENDENT QC CHECK SAMPLE SOURCE

Purgeable Aromatics in Water  
 MODIFIED EPA METHOD 602

Analyte	Lot Number	Source
Benzene	LA18042	SUPELCO
Toluene	LA18042	SUPELCO
Ethylbenzene	LA18042	SUPELCO
Xylene (total)	LA18042	SUPELCO

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003891  
Report Issue Date: April 6, 1990

Table 4  
SURROGATE COMPOUND RECOVERY

Naphthalene

Purgeable Aromatics in Water  
MODIFIED EPA METHOD 602

Acceptability Limits<sup>1</sup>: 70 - 130 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	200	197	99
01	200	136	69
02	200	139	70
MS	200	158	79
WS	200	139	70
WSD	200	152	76

MS = Matrix Spike  
WS = Reagent Water Spike  
WSD = Reagent Water Spike Duplicate  
1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003891  
 Report Issue Date: April 6, 1990

**Table 5**  
**MATRIX SPIKE (MS) RECOVERY REPORT**  
 Purgeable Aromatics in Water  
 MODIFIED EPA METHOD 602

Date of Analysis: 04/03/90  
 Sample Spiked: D003903-02

Client ID: MW-2  
 Units: ug/L

Analyte	Sample Result	Concentration Added	Concentration Recovered	MS Result	MS, % Recovery	Acceptability Limits, <sup>1</sup> %
Benzene	<0.3	25	23.8	23.8	95	71 - 123
Toluene	<0.3	25	22.3	22.3	89	69 - 120
Ethylbenzene	<0.3	25	23.7	23.7	95	72 - 121
Xylene (total)	<0.6	75	73.5	73.5	98	75 - 123

<# = Not detected at the indicated detection limit.

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003891  
 Report Issue Date: April 6, 1990

Table 6

REAGENT WATER SPIKE (WS) AND REAGENT WATER SPIKE DUPLICATE (WSD)  
 RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Purgeable Aromatics in Water  
 MODIFIED EPA METHOD 602

Date of Analysis: 04/03/90

Units: ug/L

Analyte	Concentration Added	WS Result	WS, % Recovery	WSD Result	WSD, % Recovery
Benzene	25	23.5	94	23.7	95
Toluene	25	21.6	86	21.7	87
Ethylbenzene	25	22.8	91	22.8	91
Xylene (total)	75	70.7	98	70.7	98

Analyte	RPD, %	Maximum RPD, %	Acceptability Limits <sup>1</sup> % Recovery
Benzene	1	30	76-120
Toluene	1	30	72-117
Ethylbenzene	0	30	73-123
Xylene (total)	0	30	81-125

<sup>1</sup> = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003892  
 Report Issue Date: April 6, 1990

Table 1  
 ANALYTICAL RESULTS  
 Purgeable Hydrocarbons in Water  
 EPA Method 624

Date Sampled		03/26-28/90	03/26-28/90		
Date Analyzed		04/04/90	04/04/90		
Client Identification		RS-12-D	TB-2		
GTEL Sample Number		01	02		
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Chloromethane	10	<10	<10		
Bromomethane	10	<10	<10		
Vinyl Chloride	10	<10	<10		
Chloroethane	10	<10	<10		
Methylene Chloride	5	<5	<5		
1,1-Dichloroethene	5	<5	<5		
1,1-Dichloroethane	5	<5	<5		
<i>trans</i> -1,2-Dichloroethene	5	<5	<5		
Chloroform	5	<5	<5		
1,2-Dichloroethane	5	<5	<5		
1,1,1-Trichloroethane	5	<5	<5		
Carbon Tetrachloride	5	<5	<5		
Bromodichloromethane	5	<5	<5		
1,2-Dichloropropane	5	<5	<5		
<i>cis</i> -1,3-Dichloropropene	5	<5	<5		
Trichloroethene	5	<5	<5		
Dibromochloromethane	5	<5	<5		
1,1,2-Trichloroethane	5	<5	<5		
Benzene	5	<5	<5		
<i>trans</i> -1,3-Dichloropropene	5	<5	<5		
2-Chloroethylvinylether	10	<10	<10		

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003892  
 Report Issue Date: April 6, 1990

Table 1 (Continued)  
 ANALYTICAL RESULTS  
 Purgeable Hydrocarbons in Water  
 EPA Method 624

Date Sampled		03/26-28/90	03/26-28/90		
Date Analyzed		04/04/90	04/04/90		
Client Identification		RS-12-D	TB-2		
GTEL Sample Number		01	02		
Analyte	Detection Limit	Concentration, ug/L			
Bromoform	5	<5	<5		
Tetrachloroethene	5	<5	<5		
1,1,2,2-Tetrachloroethane	5	<5	<5		
Toluene	5	<5	<5		
Chlorobenzene	5	<5	<5		
Ethylbenzene	5	<5	<5		
1,2-Dichlorobenzene	5	<5	<5		
1,3-Dichlorobenzene	5	<5	<5		
1,4-Dichlorobenzene	5	<5	<5		
Trichlorofluoromethane	5	<5	<5		

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003892  
Report Issue Date: April 6, 1990

QA Conformance Summary  
Purgeable Hydrocarbons in Water  
EPA Method 624

- 1.0 Blanks  
Zero of 31 target compounds found in Reagent blank as shown in Table 2.
- 2.0 Independent QC Check Sample  
The control limits were met for 8 of 8 QC check compounds in the aqueous QC check sample as shown in Table 3.
- 3.0 Surrogate Compound Recoveries  
Recovery limits were met for all three surrogate compounds for all samples as shown in Tables 4a, 4b, and 4c.
- 4.0 Matrix Spike (MS) Accuracy  
Percent recovery limits were met for 5 of 5 compounds in the MS as shown in Table 5.
- 5.0 Reagent Water Spike (WS) and Reagent Water Spike Duplicate (WSD) Precision  
Relative percent difference (RPD) criteria were met for 5 of 5 compounds in the WS and WSD as shown in Table 6.
- 6.0 Sample Handling
  - 6.1 Sample handling and holding time criteria were met for all samples.
  - 6.2 There were no exceptional conditions requiring dilution of samples.



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003892  
Report Issue Date: April 6, 1990

Table 2  
REAGENT BLANK DATA

Purgeable Hydrocarbons in Water  
EPA Method 624

Date of Analysis: 04/04/90

Analyte	Observed Result, ug/L
Chloromethane	ND
Bromomethane	ND
Vinyl Chloride	ND
Chloroethane	ND
Methylene Chloride	ND
1,1-Dichloroethene	ND
1,1-Dichloroethane	ND
<i>trans</i> -1,2-Dichloroethene	ND
Chloroform	ND
1,2-Dichloroethane	ND
1,1,1-Trichloroethane	ND
Carbon Tetrachloride	ND
Bromodichloromethane	ND
1,2-Dichloropropane	ND
<i>cis</i> -1,3-Dichloropropene	ND
Trichloroethene	ND
Dibromochloromethane	ND
1,1,2-Trichloroethane	ND
Benzene	ND
<i>trans</i> -1,3-Dichloropropene	ND
2-Chloroethylvinylether	ND

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003892  
Report Issue Date: April 6, 1990

Table 2 (Continued)

REAGENT BLANK DATA

Purgeable Hydrocarbons in Water  
EPA Method 624

Analyte	Observed Result, ug/L
Bromoform	ND
Tetrachloroethene	ND
1,1,2,2-Tetrachloroethane	ND
Toluene	ND
Chlorobenzene	ND
Ethylbenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Trichlorofluoromethane	ND

ND = Not detected above the statistical detection limit

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003892  
 Report Issue Date: April 6, 1990

Table 3  
 INDEPENDENT QC CHECK SAMPLE RESULTS  
 Purgeable Hydrocarbons in Water  
 EPA Method 624

Date of Analysis: 03/29/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Trichloroethylene	50	46	92	60 - 140
Carbon Tetrachloride	50	47	94	80 - 120
1,1,1-Trichloroethane	50	48	96	60 - 140
1,1,2-Trichloroethane	50	46	92	60 - 140
Vinyl Chloride	50	34	68	60 - 140
Benzene	50	45	90	60 - 140
1,1 Dichloroethylene	50	46	92	60 - 140
1,2-Dichlorobenzene	50	45	90	60 - 140

Table 3a  
 INDEPENDENT QC CHECK SAMPLE SOURCE  
 Purgeable Hydrocarbons in Water  
 EPA Method 624

Analyte	Lot Number	Source
Trichloroethylene	LA19682	Purgeable A Supelco
Carbon Tetrachloride	LA19682	Purgeable A Supelco
1,1,1-Trichloroethane	LA18769	Purgeable B Supelco
1,1,2-Trichloroethane	LA18769	Purgeable B Supelco
Vinyl Chloride	LA20078	Purgeable C Supelco
Benzene	LA18769	Purgeable B Supelco
1,1 Dichloroethylene	LA19682	Purgeable A Supelco
1,2-Dichlorobenzene	LA19682	Purgeable A Supelco

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003892  
Report Issue Date: April 6, 1990

Table 4a  
SURROGATE COMPOUND RECOVERY  
d8-Toluene  
Purgeable Hydrocarbons in Water  
EPA Method 624

Recovery Acceptability Limits<sup>1</sup>: 88 - 110 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	50	51	102
01	50	50	100
02	50	49	98
MS	50	50	100
WS	50	50	100
WSD	50	50	100

MS = Matrix spike  
WS = Reagent Water spike  
WSD = Reagent Water spike duplicate  
1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003892  
Report Issue Date: April 6, 1990

Table 4b  
SURROGATE COMPOUND RECOVERY  
Bromofluorobenzene  
Purgeable Hydrocarbons in Water  
EPA Method 624

Recovery Acceptability Limits<sup>1</sup>: 86 - 115 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	50	51	102
01	50	49	98
02	50	49	98
MS	50	50	100
WS	50	49	98
WSD	50	50	100

MS = Matrix spike  
WS = Reagent Water spike  
WSD = Reagent Water spike duplicate  
1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003892  
Report Issue Date: April 6, 1990

Table 4c  
SURROGATE COMPOUND RECOVERY  
d4-1,2-Dichloroethane  
Purgeable Hydrocarbons in Water  
EPA Method 624

Recovery Acceptability Limits<sup>1</sup>: 76 - 114 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	50	50	100
01	50	51	102
02	50	52	104
MS	50	53	106
WS	50	54	108
WSD	50	53	106

MS = Matrix spike  
WS = Reagent Water spike  
WSD = Reagent Water spike duplicate  
1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003892  
 Report Issue Date: April 6, 1990

Table 5  
**MATRIX SPIKE (MS) RECOVERY REPORT**  
 Purgeable Hydrocarbons in Water  
 EPA Method 624

Date of Analysis: 04/04/90  
 Sample Spiked: 01

Client ID: RS-12-D  
 Units: ug/L

Analyte	MS Result	Sample Result	Concentration Recovered	Concentration Added	MS, % Recovery	Acceptability Limits <sup>1</sup> , %
1,1-Dichloroethene	60	ND	60	50	120	61 - 145
Trichloroethene	51	ND	51	50	102	71 - 120
Benzene	51	ND	51	50	102	76 - 127
Toluene	52	ND	52	50	104	76 - 125
Chlorobenzene	54	ND	54	50	108	75 - 130

1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.  
 ND = Not detected

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003892  
 Report Issue Date: April 6, 1990

Table 6

REAGENT WATER SPIKE (WS) AND REAGENT WATER SPIKE DUPLICATE (WSD)  
 RECOVERY AND RELATIVE PERCENT DEVIATION (RPD) REPORT

Purgeable Hydrocarbons in Water  
 EPA Method 624

Date of Analysis: 04/04/90

Units: ug/L

Analyte	Concentration Added	WS Result	WS, % Recovery	WSD Result	WSD, % Recovery
1,1-Dichloroethene	50	45	90	50	100
Trichloroethene	50	39	78	42	84
Benzene	50	40	80	42	84
Toluene	50	40	80	43	86
Chlorobenzene	50	42	84	45	90

Analyte	RPD, %	Acceptability Limits <sup>1</sup>	
		Maximum RPD, %	% Recovery
1,1-Dichloroethene	10	14	61 - 145
Trichloroethene	7	14	71 - 120
Benzene	5	11	76 - 127
Toluene	7	13	76 - 125
Chlorobenzene	7	13	75 - 130

<sup>1</sup> = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.



Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003893  
 Report Issue Date: April 5, 1990

Table 1  
 ANALYTICAL RESULTS

Total Threshold Limit Concentration in Water<sup>1</sup>

GTEL Sample Number		01			
Client Identification		RS-10-D			
Date Sampled		03/28/90			
Date Extracted		03/30/90			
Date Analyzed		03/30/90			
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Cadmium 1	50	<50			
Chromium 1	100	<100			
Lead 2	5	<5			
Zinc 1	100	<100			

1 = EPA Method 3005/6010.  
 2 = EPA Method 3005/239.2.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003893  
Report Issue Date: April 5, 1990

QA Conformance Summary  
Total Threshold Limit Concentration in Water

1.0 Blanks

The method blank was below the detection limit for all analytes as shown in Table 2.

2.0 Laboratory Control Sample (LCS)

The control limits were met for all analytes in the aqueous LCS as shown in Table 3.

3.0 Calibration Verification Standards

The control limits were met for all analytes in the initial calibration verification standard (ICVS) as shown in Table 5.

4.0 Matrix Spike (MS) Accuracy

Percent recovery limits were met for all analytes in the MS as shown in Table 6.

5.0 Sample Duplicate Precision

Relative percent difference criteria were met for the sample duplicate as shown in Table 7.

6.0 Sample Handling

6.1 Sample handling and holding time criteria were met for all samples.

6.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003893  
Report Issue Date: April 5, 1990

Table 2

REAGENT BLANK DATA

Total Threshold Limit Concentration in Water

Date of Analysis: 03/30/90

Analyte	Concentration, ug/L
Cadmium	ND
Chromium	ND
Lead	ND
Zinc	ND

ND = Not detected above the detection limit.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003893  
Report Issue Date: April 5, 1990

Table 3  
LABORATORY CONTROL SAMPLE RESULTS  
Total Threshold Limit Concentration in Water

Date of Analysis: 03/30/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Cadmium	3000	3400	113	80 - 120
Chromium	3000	3200	107	80 - 120
Lead				80 - 120
Zinc	3000	3300	110	80 - 120

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003893  
Report Issue Date: April 5, 1990

Table 3a  
LABORATORY CONTROL SAMPLE SOURCE  
Total Threshold Limit Concentration in Water

Analyte	Lot Number	Source
Cadmium	EP - 200714	EMS
Chromium	EP - 200714	EMS
Lead		
Zinc	EP - 200714	EMS

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003893  
 Report Issue Date: April 5, 1990

Table 4  
 INITIAL CALIBRATION STANDARDS DATA  
 Total Threshold Limit Concentration in Water

Standard ID	Spex 3-83-VS				
Date of Analysis	03/30/90				
Analyte	Standard Concentration, ug/L				
Cadmium	0	10000			
Chromium	0	10000			
Lead	0	20	50	100	
Zinc	0	10000			

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003893  
Report Issue Date: April 5, 1990

Table 5  
INITIAL CALIBRATION VERIFICATION STANDARDS RESULTS  
Total Threshold Limit Concentration in Water

Date of Analysis: 03/30/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Cadmium	4000	4200	105	80 - 120
Chromium	4000	4200	105	80 - 120
Lead	50	53	106	80 - 120
Zinc	4000	4200	105	80 - 120

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003893  
Report Issue Date: April 5, 1990

Table 5a  
INITIAL CALIBRATION VERIFICATION STANDARDS SOURCE  
Total Threshold Limit Concentration in Water

Analyte	Lot Number	Source
Cadmium	3-83-VS B	Spex
Chromium	3-83-VS B	Spex
Lead	3-83-VS B	Spex
Zinc	3-83-VS B	Spex



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003893  
Report Issue Date: April 5, 1990

Table 6  
MATRIX SPIKE (MS) RECOVERY REPORT  
Total Threshold Limit Concentration in Water

Date of Analysis: 03/30/90  
Sample Spiked: 01

Client ID: RS-10-D  
Units: ug/L

Analyte	MS Result	Sample Result	Recovered	Expected	MS, % Recovery	Acceptability Limits, %
Cadmium	1010	<50	1010	1000	101	80 - 120
Chromium	1030	<100	1030	1000	103	80 - 120
Lead	1080	<5	1080	1000	108	80 - 120
Zinc	1030	<100	1030	1000	103	80 - 120

<# = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003893  
Report Issue Date: April 5, 1990

Table 7

LABORATORY DUPLICATE SAMPLE RESULTS  
AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Total Threshold Limit Concentration in Water

Date of Analysis: 03/30/90  
Sample Used: 01

Client ID: RS-10-D  
Units: ug/L

Analyte	Sample Result	Duplicate Result	RPD, %	Maximum RPD, %
Cadmium	<50	<50	NA	20
Chromium	<100	<100	NA	20
Lead	<5	<5	NA	20
Zinc	<100	<100	NA	20

NA = Not Applicable





**Western Region**

4080-C Pike Ln., Concord, CA 94520  
(415) 685-7852  
In CA: (800) 544-3422  
Outside CA: (800) 423-7143

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003882  
Report Issue Date: April 3, 1990

Craig Schwyn  
Chemical Processors, Inc.  
950 B. Gilman  
Berkeley, CA 94710

Dear Mr. Schwyn:

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories on 03/28/90.

A formal quality control/quality assurance 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 to perform analyses for drinking water, wastewater, and hazardous waste materials according to approved 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.

Emma P. Popek  
Laboratory Director

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003882  
 Report Issue Date: April 3, 1990

Table 1

ANALYTICAL RESULTS

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Soil  
 EPA Method 8020/8015<sup>1</sup>

GTEL Sample Number		01*	02*	03*	04*
Client Identification		D-(1,2,4)-5	D-(5,6)-5	D-(7,8)-5	D-(13,14)-5
Date Sampled		03/28/90	03/28/90	03/28/90	03/28/90
Date Extracted		03/30/90	03/30/90	03/30/90	03/30/90
Date Analyzed		03/30/90	03/30/90	03/30/90	03/30/90
Analyte	Detection Limit, mg/Kg	Concentration, mg/Kg			
Benzene	0.005	<0.005	<0.005	4	0.01
Toluene	0.005	<0.005	<0.005	31	0.13
Ethylbenzene	0.005	<0.005	<0.005	11	0.22
Xylene (total)	0.015	<0.015	<0.015	55	1
TPH as Gasoline	10	<10	<10	500	48

GTEL Sample Number		05*			
Client Identification		SS-(21,22) -D			
Date Sampled		03/28/90			
Date Extracted		03/30/90			
Date Analyzed		03/30/90			
Analyte	Detection Limit, mg/Kg	Concentration, mg/Kg			
Benzene	0.005	<0.005			
Toluene	0.005	0.01			
Ethylbenzene	0.005	<0.005			
Xylene (total)	0.015	<0.015			
TPH as Gasoline	10	<10			

<sup>1</sup> = Extraction by EPA Method 5030  
 \* = Composite

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003882  
Report Issue Date: April 3, 1990

QA Conformance Summary  
Purgeable Aromatics and Total Petroleum Hydrocarbons  
as Gasoline in Soil  
EPA Method 8020/8015

1.0 Blanks

Five of 5 target compounds were below detection limits in the reagent water blank and reagent methanol blank as shown in Tables 2a and 2b.

2.0 Independent QC Check Sample

The control limits were met for 4 out of 4 QC check compounds as shown in Table 3.

3.0 Surrogate Compound Recoveries

Percent recovery limits were met for the surrogate compound (naphthalene) for all samples as shown in Table 4.

4.0 Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Accuracy and Precision

4.1 Percent recovery limits were met for 4 of 4 compounds in the MS and MSD as shown in Table 5.

4.2 Relative percent difference (RPD) criteria was met for 4 of 4 analytes in the MS and MSD as shown in Table 5.

5.0 Sample Handling

5.1 Sample handling and holding time criteria were met for all samples.

5.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D003882  
Report Issue Date: April 3, 1990

Table 2a

REAGENT WATER BLANK DATA

Purgeable Aromatics and Total Petroleum Hydrocarbons  
as Gasoline in Soil  
EPA Method 8020/8015

Date of Analysis: 03/29/90

Analyte	Concentration, ug/L
Benzene	<0.3
Toluene	<0.3
Ethylbenzene	<0.3
Xylene (total)	<0.6
Gasoline	<50

<# = Not detected at the indicated detection limit.

Table 2b

REAGENT METHANOL BLANK DATA

Purgeable Aromatics and Total Petroleum Hydrocarbons  
as Gasoline in Soil  
EPA Method 8020/8015

Date of Analysis: 03/29/90  
MeOH Lot No: AW393

Analyte	Concentration, mg/Kg
Benzene	<0.005
Toluene	<0.005
Ethylbenzene	<0.005
Xylene (total)	<0.015
Gasoline	<10

<# = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003882  
 Report Issue Date: April 3, 1990

Table 3

INDEPENDENT QC CHECK SAMPLE RESULTS

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Soil  
 EPA Method 8020/8015

Date of Analysis: 03/26/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Benzene	50	57	115	85-115
Toluene	50	54	108	85-115
Ethylbenzene	50	54	108	85-115
Xylene (total)	150	161	107	85-115

Table 3a

INDEPENDENT QC CHECK SAMPLE SOURCE

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Soil  
 EPA Method 8020/8015

Analyte	Lot Number	Source
Benzene	LA18042	Supelco
Toluene	LA18042	Supelco
Ethylbenzene	LA18042	Supelco
Xylene (total)	LA18042	Supelco



Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003882  
 Report Issue Date: April 3, 1990

Table 4  
 SURROGATE COMPOUND RECOVERY

Naphtthalene

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Soil  
 EPA Method 8020/8015

Acceptability Limits<sup>1</sup>: 60 - 130 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Water Blank	200	148	74
MeOH Blank	200	148	74
01	200	160	80
02	200	162	81
03	200	220	110
04	200	204	102
05	200	180	90
MS	200	152	76
MSD	200	198	99

MS = Matrix Spike  
 MSD = Matrix Spike Duplicate  
 1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D003882  
 Report Issue Date: April 3, 1990

Table 5

MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD) RECOVERY  
 AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Soil  
 EPA Method 8020/8015

Date of Analysis: 03/29/90  
 Sample Used: D003721-01

Units: mg/Kg

Analyte	Sample Result	Concentration Added	MS Result	MS, % Recovery	MSD Result	MSD, % Recovery
Benzene	<0.005	2.86	2.94	103	2.89	101
Toluene	<0.005	2.86	2.91	102	2.91	102
Ethylbenzene	<0.005	2.86	2.89	101	2.96	104
Xylene (total)	<0.015	8.58	8.40	98	8.89	104

Analyte	RPD, %	Maximum RPD, %	Acceptability Limits <sup>1</sup> % Recovery
Benzene	2	30	50 - 112
Toluene	0	30	50 - 108
Ethylbenzene	3	30	50 - 113
Xylene (total)	6	30	50 - 114

<# = Not Detected at the indicated detection limit

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.



**Western Region**

4080-C Pike Ln., Concord, CA 94520  
(415) 685-7852  
In CA: (800) 544-3422  
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Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004095, D004096,  
D004097, D004098,  
D004099, D004100  
Report Issue Date: April 19, 1990

Craig Schwyn  
Chemical Processors Inc.  
950 Gilman Street, Suite B  
Berkeley, CA 94710

Dear Mr. Schwyn:

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories on 04/05/90.

A formal quality control/quality assurance 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 to perform analyses for drinking water, wastewater, and hazardous waste materials according to approved 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.

Emma P. Popek  
Laboratory Director

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004095  
 Report Issue Date: April 13, 1990

Table 1

ANALYTICAL RESULTS

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Water  
 EPA Method 8020/8015<sup>1</sup>

GTEL Sample Number		01	02	03	04
Client Identification		RS-13D	WS-1D	WS-2D	WS-3D
Date Sampled		04/3-4/90	04/3-4/90	04/3-4/90	04/3-4/90
Date Analyzed		04/10/90	04/10/90	04/10/90	04/10/90
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Benzene	0.3	<0.3	8400	<0.3	36
Toluene	0.3	0.4	7400	<0.3	5
Ethylbenzene	0.3	<0.3	860	<0.3	6
Xylene (total)	0.6	<0.6	5600	<0.6	17
TPH as Gasoline	50	<50	46000	<50	2200

GTEL Sample Number		05	06	07	
Client Identification		WS-4D	WS-5D	TRIP BLANK	
Date Sampled		04/3-4/90	04/3-4/90	04/3-4/90	
Date Analyzed		04/10/90	04/10/90	04/10/90	
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Benzene	0.3	4000	8400	<0.3	-
Toluene	0.3	5000	7200	<0.3	
Ethylbenzene	0.3	790	840	<0.3	
Xylene (total)	0.6	5500	5200	<0.6	
TPH as Gasoline	50	43000	43000	<50	

1 = Extraction by EPA Method 5030

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004095  
Report Issue Date: April 13, 1990

## QA Conformance Summary

### Purgeable Aromatics and Total Petroleum Hydrocarbons as Gasoline in Water EPA Method 8020/8015

#### 1.0 Blanks

Five of 5 target compounds were below detection limits in the reagent blank as shown in Table 2.

#### 2.0 Independent QC Check Sample

The control limits were met for 4 out of 4 QC check compounds as shown in Table 3.

#### 3.0 Surrogate Compound Recoveries

Percent recovery limits were met for the surrogate compound (naphthalene) for all samples as shown in Table 4.

#### 4.0 Matrix Spike (MS) Accuracy

Percent recovery limits were met for 4 of 4 compounds in the MS as shown in Table 5.

#### 5.0 Reagent Water Spike (WS) and Reagent Water Spike (WSD) Duplicate Precision

Relative percent difference (RPD) criteria was met for 4 of 4 analytes in the WS and WSD as shown in Table 6.

#### 6.0 Sample Handling

6.1 Sample handling and holding time criteria were met for all samples.

6.2 There were exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004095  
Report Issue Date: April 13, 1990

Table 2

REAGENT BLANK DATA

Purgeable Aromatics and Total Petroleum Hydrocarbons  
as Gasoline in Water  
EPA Method 8020/8015

Date of Analysis: 04/10/90

Analyte	Concentration, ug/L
Benzene	<0.3
Toluene	<0.3
Ethylbenzene	<0.3
Xylene (total)	<0.6
Gasoline	<50

<# = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004095  
 Report Issue Date: April 13, 1990

Table 3

INDEPENDENT QC CHECK SAMPLE RESULTS

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Water  
 EPA Method 8020/8015

Date of Analysis: 04/06/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Benzene	50	54	108	85 - 115
Toluene	50	54	108	85 - 115
Ethylbenzene	50	50	100	85 - 115
Xylene (total)	150	156	104	85 - 115

Table 3a

INDEPENDENT QC CHECK SAMPLE SOURCE

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Water  
 EPA Method 8020/8015

Analyte	Lot Number	Source
Benzene	LA18042	Supelco
Toluene	LA18042	Supelco
Ethylbenzene	LA18042	Supelco
Xylene (total)	LA18042	Supelco

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004095  
 Report Issue Date: April 13, 1990

Table 4  
**SURROGATE COMPOUND RECOVERY**  
**Naphthalene**

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Water  
 EPA Method 8020/8015

Acceptability Limits<sup>1</sup>: 70 - 130 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	200	206	103
01	200	171	86
02	200	166	83
03	200	161	80
04	200	218	109
05	200	164	82
06	200	170	85
07	200	211	106
MS	200	186	93
WS	200	170	85
WSD	200	155	78

MS = Matrix Spike  
 WS = Reagent Water Spike  
 WSD = Reagent Water Spike Duplicate  
 1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004095  
Report Issue Date: April 13, 1990

Table 5

MATRIX SPIKE (MS) RECOVERY REPORT

Purgeable Aromatics and Total Petroleum Hydrocarbons  
as Gasoline in Water  
EPA Method 8020/8015

Date of Analysis: 04/10/90  
Sample Spiked: D004122-06B

Client ID: CD-7  
Units: ug/L

Analyte	Sample Result	Concentration Added	Concentration Recovered	MS Result	MS, % Recovery	Acceptability Limits <sup>1</sup> , %
Benzene	<0.3	25	25.2	25.2	101	71 - 123
Toluene	<0.3	25	25.8	25.8	103	69 - 120
Ethylbenzene	<0.3	25	24.6	24.6	98	72 - 121
Xylene (total)	<0.6	75	75.6	75.6	101	75 - 123

<# = Not detected at the indicated detection limit.

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004095  
 Report Issue Date: April 13, 1990

Table 6

REAGENT WATER SPIKE (WS) AND REAGENT WATER SPIKE DUPLICATE (WSD)  
 RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Purgeable Aromatics and Total Petroleum Hydrocarbons  
 as Gasoline in Water  
 EPA Method 8020/8015

Date of Analysis: 04/10/90

Units: ug/L

Analyte	Concentration Added	WS Result	WS, % Recovery	WSD Result	WSD, % Recovery
Benzene	25	22.7	91	22.2	89
Toluene	25	22.7	91	22	88
Ethylbenzene	25	22.2	89	21.6	86
Xylene (total)	75	69.5	93	66.8	89

Analyte	RPD, %	Maximum RPD, %	Acceptability Limits <sup>1</sup> % Recovery
Benzene	2	30	84 - 128
Toluene	3	30	83 - 122
Ethylbenzene	3	30	82 - 120
Xylene (total)	4	30	86 - 123

<sup>1</sup> = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004096  
Report Issue Date: April 18, 1990

Table 1

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Diesel in Water  
Modified EPA Method 8015

Sample Identification		Date Sampled	Date Extracted	Date Analyzed	Concentration <sup>1</sup> , ug/L
GTEL No.	Client ID				
01	WS-4D	04/04/90	04/12/90	04/13/90	<100

<sup>1</sup> = Method detection limit = 100 ug/L; analyte below this level would not be detected.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004096  
Report Issue Date: April 18, 1990

### QA Conformance Summary

#### Total Petroleum Hydrocarbons as Diesel in Water Modified EPA Method 8015

1.0 Blanks

The Reagent blank was below the detection limit as shown in Table 2.

2.0 Independent QC Check Sample

The control limits were met for 1 out of 1 QC check compound as shown in Table 3.

3.0 Surrogate Compound Recoveries

Percent recovery limits were met for the surrogate compound (octadecane) for all samples as shown in Table 4.

4.0 Reagent Water Spike (WS) and Reagent Water Spike Duplicate (WSD) Accuracy and Precision

4.1 Percent recovery limits were met for diesel in the WS and WSD as shown in Table 5.

4.2 Relative percent difference (RPD) criteria was met for diesel in the WS and WSD as shown in Table 5.

5.0 Sample Handling

5.1 Sample handling and holding time criteria were met for all samples.

5.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004096  
Report Issue Date: April 18, 1990

Table 2  
REAGENT BLANK DATA

Total Petroleum Hydrocarbons as Diesel in Water  
Modified EPA Method 8015

Date of Analysis: 04/18/90

Analyte	Concentration, ug/L
Diesel	< 100

< # = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004096  
Report Issue Date: April 18, 1990

Table 3

INDEPENDENT QC CHECK SAMPLE RESULTS

Total Petroleum Hydrocarbons as Diesel in Water  
Modified EPA Method 8015

Date of Analysis: 04/18/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Diesel	1294	1167	90	80 - 120

Table 3a

INDEPENDENT QC CHECK SAMPLE SOURCE

Total Petroleum Hydrocarbons as Diesel in Water  
Modified EPA Method 8015

Analyte	Source
Diesel	Shell

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004096  
Report Issue Date: April 18, 1990

Table 4  
SURROGATE COMPOUND RECOVERY

Octadecane

Total Petroleum Hydrocarbons as Diesel in Water  
Modified EPA Method 8015

Acceptability Limits<sup>1</sup>: 70 - 130 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	100	70	70
01	100	117	117
WS	100	102	102
WSD	100	70	70

WS = Reagent Water Spike  
WSD = Reagent Water Spike Duplicate  
1 = Acceptability limits are derived from the 99% confidence interval  
of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004096  
 Report Issue Date: April 18, 1990

Table 5

**REAGENT WATER SPIKE (WS) AND REAGENT WATER SPIKE DUPLICATE (WSD) RECOVERY  
 AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT**

**Total Petroleum Hydrocarbons as Diesel in Water  
 Modified EPA Method 8015**

Date of Analysis: 04/18/90

Units: ug/L

Analyte	Concentration Added	WS Result	WS, % Recovery	WSD Result	WSD, % Recovery
Diesel	1000	893	89	733	73

Analyte	RPD, %	Maximum RPD, %	Acceptability Limits % Recovery <sup>1</sup>
Diesel	19.7	30	60 - 123

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004097  
Report Issue Date: April 10, 1990

Table 1

ANALYTICAL RESULTS

Total Recoverable Oil and Grease in Water by Infrared  
EPA Method 413.2

Sample Identification		Date Sampled	Date Extracted	Date Analyzed	Concentration, mg/L <sup>1</sup>
GTEL No.	Client ID				
01	WS-4D	04/03,04/90	04/06/90	04/06/90	18

<sup>1</sup> = Method detection limit = 1.0 mg/L; analyte below this level would not be detected.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004097  
Report Issue Date: April 10, 1990

## QA Conformance Summary

### Total Recoverable Oil and Grease in Water by Infrared EPA Method 413.2

#### 1.0 Blanks

The method blank was below the detection limit as shown in Table 2.

#### 2.0 Initial Instrument Calibration

The range of concentrations of the initial instrument calibration are shown in Table 3.

#### 3.0 Calibration Verification Standards

3.1 The control limits were met for the initial calibration verification standard (ICVS) as shown in Table 4.

3.2 The control limits were met for the continuing calibration verification standard (CCVS) as shown in Table 4.

#### 4.0 Matrix Spike (MS) Accuracy

The control limits were met for the reference oil in the MS as shown in Table 5.

#### 5.0 Sample Duplicate Precision

No sample was provided for a duplicate run.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004097  
Report Issue Date: April 10, 1990

Table 2

METHOD BLANK DATA

Total Recoverable Oil and Grease in Water by Infrared  
EPA Method 413.2

Date of Analysis: 04/06/90

Analyte	Concentration, mg/L
Oil and Grease	<1

<# = Not detected at the indicated detection limit.

Table 3

INITIAL CALIBRATION STANDARDS DATA

Total Recoverable Oil and Grease in Water by Infrared  
EPA Method 413.2

Date of Analysis: 04/06/90

Standard Number	Concentration, mg/L
1	1.0
2	5.0
3	10.1
4	50.4
5	100.7

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004097  
 Report Issue Date: April 10, 1990

Table 4

INITIAL AND CONTINUING CALIBRATION  
 VERIFICATION STANDARDS RESULTS

Total Recoverable Oil and Grease in Water by Infrared  
 EPA Method 413.2

Date of Analysis: 04/06/90

Initial Calibration Verification Standard				
Analyte	Expected Result, mg/L	Observed Result, mg/L	Recovery, %	Acceptability Limits, % <sup>1</sup>
Oil and Grease	4.9	4.1	84	80 - 120
Continuing Calibration Verification Standard				
Analyte	Expected Result, mg/L	Observed Result, mg/L	Recovery, %	Acceptability Limits, % <sup>1</sup>
Oil and Grease	4.9	4.2	86	80 - 120

<sup>1</sup> = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Table 4a

INITIAL AND CONTINUING CALIBRATION  
 VERIFICATION STANDARDS SOURCE

Total Recoverable Oil and Grease in Water by Infrared  
 EPA Method 413.2

Initial Calibration Verification Standard		
Analyte	Lot Number	Source
Oil and Grease	R07/STK2	GTEL
Continuing Calibration Verification Standard		
Analyte	Lot Number	Source
Oil and Grease	R06/STK2	GTEL

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004097  
Report Issue Date: April 10, 1990

Table 5

MATRIX SPIKE (MS) RECOVERY REPORT

Total Recoverable Oil and Grease in Water by Infrared  
EPA Method 413.2

Date of Analysis: 04/06/90

Sample Spiked: D.I. Water

Units: mg/L

Analyte	MS Result	Sample Result	Amount Recovered	Amount Added	MS, % Recovery	Acceptability Limits, % <sup>1</sup>
Oil and Grease	5.1	<1	5.1	5.0	102	70 - 130

1 = Arbitrary limits, pending experimental determination.

< # = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004098  
 Report Issue Date: April 13, 1990

Table 1  
 ANALYTICAL RESULTS  
 Purgeable Hydrocarbons in Water  
 EPA Method 624

Date Sampled		04/03/90			
Date Analyzed		04/10/90			
Client Identification		WS-4D			
GTEL Sample Number		01			
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Chloromethane	10	<10			
Bromomethane	10	<10			
Vinyl Chloride	10	<10			
Chloroethane	10	<10			
Methylene Chloride	5	<5			
1,1-Dichloroethene	5	<5			
1,1-Dichloroethane	5	<5			
trans-1,2-Dichloroethene	5	<5			
Chloroform	5	<5			
1,2-Dichloroethane	5	<5			
1,1,1-Trichloroethane	5	<5			
Carbon Tetrachloride	5	<5			
Bromodichloromethane	5	<5			
1,2-Dichloropropane	5	<5			
cis-1,3-Dichloropropene	5	<5			
Trichloroethene	5	<5			
Dibromochloromethane	5	<5			
1,1,2-Trichloroethane	5	<5			
Benzene	5	6000			
trans-1,3-Dichloropropene	5	<5			
2-Chloroethylvinylether	10	<10			

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004098  
 Report Issue Date: April 13, 1990

Table 1 (Continued)

ANALYTICAL RESULTS

Purgeable Hydrocarbons in Water  
EPA Method 624

Date Sampled		04/03/90			
Date Analyzed		04/10/90			
Client Identification		WS-4D			
GTEL Sample Number		01			
Analyte	Detection Limit	Concentration, ug/L			
Bromoform	5	<5			
Tetrachloroethene	5	<5			
1,1,2,2-Tetrachloroethane	5	<5			
Toluene	5	8200			
Chlorobenzene	5	<5			
Ethylbenzene	5	1500			
1,2-Dichlorobenzene	5	<5			
1,3-Dichlorobenzene	5	<5			
1,4-Dichlorobenzene	5	<5			
Trichlorofluoromethane	5	<5			

QA Conformance Summary  
Purgeable Hydrocarbons in Water  
EPA Method 624

- 1.0 Blanks  
Zero of 31 target compounds found in Reagent blank as shown in Table 2.
- 2.0 Independent QC Check Sample  
The control limits were met for 8 of 8 QC check compounds in the aqueous QC check sample as shown in Table 3.
- 3.0 Surrogate Compound Recoveries  
Recovery limits were met for all three surrogate compounds for all samples as shown in Tables 4a, 4b, and 4c.
- 4.0 Matrix Spike (MS) Accuracy  
Percent recovery limits were met for 5 of 5 compounds in the MS as shown in Table 5.
- 5.0 Reagent Water Spike (WS) and Reagent Water Spike Duplicate (WSD) Precision  
Relative percent difference (RPD) criteria were met for 10 of 5 compounds in the WS and WSD as shown in Table 6.
- 6.0 Sample Handling
  - 6.1 Sample handling and holding time criteria were met for all samples.
  - 6.2 There were no exceptional conditions requiring dilution of samples.



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004098  
Report Issue Date: April 13, 1990

Table 2

REAGENT BLANK DATA

Purgeable Hydrocarbons in Water  
EPA Method 624

Date of Analysis: 04/10/90

Analyte	Observed Result, ug/L
Chloromethane	ND
Bromomethane	ND
Vinyl Chloride	ND
Chloroethane	ND
Methylene Chloride	ND
1,1-Dichloroethene	ND
1,1-Dichloroethane	ND
<i>trans</i> -1,2-Dichloroethene	ND
Chloroform	ND
1,2-Dichloroethane	ND
1,1,1-Trichloroethane	ND
Carbon Tetrachloride	ND
Bromodichloromethane	ND
1,2-Dichloropropane	ND
<i>cis</i> -1,3-Dichloropropene	ND
Trichloroethene	ND
Dibromochloromethane	ND
1,1,2-Trichloroethane	ND
Benzene	ND
<i>trans</i> -1,3-Dichloropropene	ND
2-Chloroethylvinylether	ND

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004098  
Report Issue Date: April 13, 1990

Table 2 (Continued)

REAGENT BLANK DATA

Purgeable Hydrocarbons in Water  
EPA Method 624

Analyte	Observed Result, ug/L
Bromoform	ND
Tetrachloroethene	ND
1,1,2,2-Tetrachloroethane	ND
Toluene	ND
Chlorobenzene	ND
Ethylbenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Trichlorofluoromethane	ND

ND = Not detected above the statistical detection limit

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004098  
 Report Issue Date: April 13, 1990

Table 3  
 INDEPENDENT QC CHECK SAMPLE RESULTS  
 Purgeable Hydrocarbons in Water  
 EPA Method 624

Date of Analysis: 03/29/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Trichloroethylene	50	46	92	60 - 140
Carbon Tetrachloride	50	47	94	80 - 120
1,1,1-Trichloroethane	50	48	96	60 - 140
1,1,2-Trichloroethane	50	46	92	60 - 140
Vinyl Chloride	50	34	68	60 - 140
Benzene	50	45	90	60 - 140
1,1 Dichloroethylene	50	46	92	60 - 140
1,2-Dichlorobenzene	50	45	90	60 - 140

Table 3a  
 INDEPENDENT QC CHECK SAMPLE SOURCE  
 Purgeable Hydrocarbons in Water  
 EPA Method 624

Analyte	Lot Number	Source
Trichloroethylene	LA19682	Purgeable A Supelco
Carbon Tetrachloride	LA19682	Purgeable A Supelco
1,1,1-Trichloroethane	LA18769	Purgeable B Supelco
1,1,2-Trichloroethane	LA18769	Purgeable B Supelco
Vinyl Chloride	LA20078	Purgeable C Supelco
Benzene	LA18769	Purgeable B Supelco
1,1 Dichloroethylene	LA19682	Purgeable A Supelco
1,2-Dichlorobenzene	LA19682	Purgeable A Supelco

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004098  
Report Issue Date: April 13, 1990

Table 4a  
SURROGATE COMPOUND RECOVERY

d8-Toluene

Purgeable Hydrocarbons in Water  
EPA Method 624

Recovery Acceptability Limits<sup>1</sup>: 88 - 110 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	50	50	100
01	50	51	102
MS	50	50	100
WS	50	50	100
WSD	50	50	100

MS = Matrix spike  
WS = Reagent Water spike  
WSD = Reagent Water spike duplicate  
1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004098  
Report Issue Date: April 13, 1990

Table 4b  
SURROGATE COMPOUND RECOVERY  
Bromofluorobenzene  
Purgeable Hydrocarbons in Water  
EPA Method 624

Recovery Acceptability Limits<sup>1</sup>: 86 - 115 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	50	50	100
01	50	50	100
MS	50	50	100
WS	50	50	100
WSD	50	50	100

MS = Matrix spike  
WS = Reagent Water spike  
WSD = Reagent Water spike duplicate  
1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004098  
Report Issue Date: April 13, 1990

Table 4c  
SURROGATE COMPOUND RECOVERY  
d4-1,2-Dichloroethane  
Purgeable Hydrocarbons in Water  
EPA Method 624

Recovery Acceptability Limits<sup>1</sup>: 76 - 114 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	50	48	96
01	50	53	106
MS	50	51	102
WS	50	54	108
WSD	50	53	106

MS = Matrix spike  
WS = Reagent Water spike  
WSD = Reagent Water spike duplicate  
1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004098  
Report Issue Date: April 13, 1990

Table 5  
MATRIX SPIKE (MS) RECOVERY REPORT  
Purgeable Hydrocarbons in Water  
EPA Method 624

Date of Analysis: 04/10/90  
Sample Spiked: 01

Client ID: WS-4D  
Units: ug/L

Analyte	MS Result	Sample Result	Concentration Recovered	Concentration Added	MS, % Recovery	Acceptability Limits <sup>1</sup> , %
1,1-Dichloroethene	57	ND	57	50	114	61 - 145
Trichloroethene	49	ND	49	50	98	71 - 120
Benzene	123	60	63	50	126	76 - 127
Toluene	137	82	56	50	112	76 - 125
Chlorobenzene	48	ND	48	50	96	75 - 130

1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.  
ND = Not Detected

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004098  
 Report Issue Date: April 13, 1990

Table 6

REAGENT WATER SPIKE (WS) AND REAGENT WATER SPIKE DUPLICATE (WSD)  
 RECOVERY AND RELATIVE PERCENT DEVIATION (RPD) REPORT

Purgeable Hydrocarbons in Water  
 EPA Method 624

Date of Analysis: 04/10/90

Units: ug/L

Analyte	Concentration Added	WS Result	WS, % Recovery	WSD Result	WSD, % Recovery
1,1-Dichloroethene	50	45	90	50	100
Trichloroethene	50	39	78	42	84
Benzene	50	40	80	42	84
Toluene	50	40	80	43	86
Chlorobenzene	50	42	84	45	90

Analyte	RPD, %	Acceptability Limits <sup>1</sup>	
		Maximum RPD, %	% Recovery
1,1-Dichloroethene	10	14	61 - 145
Trichloroethene	7	14	71 - 120
Benzene	5	11	76 - 127
Toluene	7	13	76 - 125
Chlorobenzene	7	13	75 - 130

1 = Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004099  
Report Issue Date: April 17, 1990

Table 1

ANALYTICAL RESULTS

Ethylene Dibromide in Water  
Modified EPA Method 504

Sample Identification		Date Sampled	Date Extracted	Date Analyzed	Concentration, ug/L <sup>1</sup>
GTEL No.	Client ID				
01	RS-13D	04/03-04/90	04/06/90	04/10/90	<0.02
02	WS-1D	04/03-04/90	04/06/90	04/10/90	1.04
03	WS-2D	04/03-04/90	04/06/90	04/10/90	<0.02
04	WS-3D	04/03-04/90	04/06/90	04/10/90	<0.02
05	WS-4D	04/03-04/90	04/06/90	04/10/90	<0.02
06	W5-5D	04/03-04/90	04/06/90	04/10/90	1.1

1 = Method detection limit = 0.02 ug/L; analyte below this level would not be detected.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004099  
Report Issue Date: April 17, 1990

## QA Conformance Summary

### Ethylene Dibromide in Water Modified EPA Method 504

#### 1.0 Blanks

The Reagent blank was below the detection limit as shown in Table 2.

#### 2.0 Surrogate Compound Recoveries

Percent recovery limits were met for the surrogate compound (dibromochloropropane) for all samples as shown in Table 3.

#### 3.0 Reagent Water Spike (WS) and Reagent Water Spike Duplicate (WSD) Accuracy and Precision

3.1 Percent recovery limits were met for EDB in the WS and WSD as shown in Table 4.

3.2 Relative percent difference (RPD) criteria was met for EDB in the WS and WSD as shown in Table 4.

#### 4.0 Sample Handling

4.1 Sample handling and holding time criteria were met for all samples.

4.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004099  
Report Issue Date: April 17, 1990

Table 2

REAGENT BLANK DATA

Ethylene Dibromide in Water  
Modified EPA Method 504

Date of Analysis: 04/10/90

Analyte	Concentration ug/L
Ethylene Dibromide	<0.02

<# = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004099  
Report Issue Date: April 17, 1990

Table 3  
SURROGATE COMPOUND RECOVERY

Dibromochloropropane

Ethylene Dibromide in Water  
Modified EPA Method 504

Acceptability Limits<sup>1</sup> : 80 - 120 %

GTEL No.	Expected Result, ug/L	Surrogate Result, ug/L	Surrogate Recovery, %
Blank	1	0.975	97
01	1	0.92	92
02	1	0.94	94
03	1	0.89	89
04	1	0.86	86
05	1	0.90	90
06	1	0.91	91
WS	1	0.87	87
WSD	1	0.88	88

WS = Reagent Water Spike

WSD = Reagent Water Spike Duplicate

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004099  
 Report Issue Date: April 17, 1990

Table 4

REAGENT WATER SPIKE (WS) AND REAGENT WATER SPIKE DUPLICATE (WSD) RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Ethylene Dibromide in Water  
Modified EPA Method 504

Date of Analysis: 04/10/90

Units: ug/L

Analyte	Concentration Added	WS Result	WS, % Recovery	WSD Result	WSD, % Recovery
Ethylene Dibromide	1	1.05	105	108	108

Analyte	RPD, %	Maximum RPD, %	Acceptability Limits % Recovery <sup>1</sup>
Ethylene Dibromide	3	30	66 - 142

1 = Acceptability limits are derived from the 99% confidence interval of all samples during the previous quarter.

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004100  
 Report Issue Date: April 20, 1990

Table 1

ANALYTICAL RESULTS

Total Threshold Limit Concentration in Water<sup>1</sup>

GTEL Sample Number		01			
Client Identification		WS-4D			
Date Sampled		04/03/90			
Date Extracted		04/05/90			
Date Analyzed		04/05/90			
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Cadmium	50	<50			
Chromium	100	<100			
Lead <sup>2</sup>	5	20			
Zinc	100	<100			

1 = EPA Method 3005/6010  
 2 = EPA Method 3005/239.2

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004100  
Report Issue Date: April 20, 1990

QA Conformance Summary  
Total Threshold Limit Concentration in Water

- 1.0 Blanks  
The method blank was below the detection limit for all analytes as shown in Table 2.
- 2.0 Laboratory Control Sample (LCS)  
The control limits were met for all analytes in the aqueous LCS as shown in Table 3.
- 3.0 Calibration Verification Standards  
The control limits were met for all analytes in the initial calibration verification standard (ICVS) as shown in Table 5.
- 4.0 Matrix Spike (MS) Accuracy  
Percent recovery limits were met for all analytes in the MS as shown in Table 6.
- 5.0 Sample Duplicate Precision  
Relative percent difference criteria were met for the sample duplicate as shown in Table 7.
- 6.0 Sample Handling
  - 6.1 Sample handling and holding time criteria were met for all samples.
  - 6.2 There were no exceptional conditions requiring dilution of samples.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004100  
Report Issue Date: April 9, 1990

Table 2  
REAGENT BLANK DATA

Total Threshold Limit Concentration in Water

Date of Analysis: 04/05/90

Analyte	Concentration, ug/L
Cadmium	ND
Chromium	ND
Lead	ND
Zinc	ND

ND = Not detected above the detection limit.



Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004100  
Report Issue Date: April 9, 1990

Table 3  
LABORATORY CONTROL SAMPLE RESULTS  
Total Threshold Limit Concentration in Water

Date of Analysis: 04/05/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Cadmium	300	295	98	80 - 120
Chromium	300	289	96	80 - 120
Lead	1000	946	95	80 - 120
Zinc	300	291	97	80 - 120

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004100  
Report Issue Date: April 9, 1990

Table 3a  
LABORATORY CONTROL SAMPLE SOURCE  
Total Threshold Limit Concentration in Water

Analyte	Lot Number	Source
Cadmium	EP-20071-1	EMS
Chromium	EP-20071-1	EMS
Lead	EP-20071-1	EMS
Zinc	EP-20071-1	EMS

Project Number: SFB-175-0204.72  
 Consultant Project Number: 1196  
 Contract Number: N46CWC0244-9-X  
 Facility Number: 9-5542  
 Work Order Number: D004100  
 Report Issue Date: April 9, 1990

Table 4  
 INITIAL CALIBRATION STANDARDS DATA  
 Total Threshold Limit Concentration in Water

Standard ID	SPEX 3-83-VS				
Date of Analysis	04/05/90				
Analyte	Standard Concentration, ug/L				
Cadmium	0	10000			
Chromium	0	10000			
Lead	0	20	50	100	
Zinc	0	10000			

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004100  
Report Issue Date: April 9, 1990

Table 5  
INITIAL CALIBRATION VERIFICATION STANDARDS RESULTS  
Total Threshold Limit Concentration in Water

Date of Analysis: 04/05/90

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %
Cadmium	4000	4068	98	80 - 120
Chromium	4000	4084	96	80 - 120
Lead	50	49	98	80 - 120
Zinc	4000	4069	97	80 - 120

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004100  
Report Issue Date: April 9, 1990

Table 5a  
INITIAL CALIBRATION VERIFICATION STANDARDS SOURCE  
Total Threshold Limit Concentration in Water

Analyte	Lot Number	Source
Cadmium	3-83-VSB	SPEX
Chromium	3-83-VSB	SPEX
Lead	3-83-VSB	SPEX
Zinc	3-83-VSB	SPEX

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004100  
Report Issue Date: April 9, 1990

Table 6  
MATRIX SPIKE (MS) RECOVERY REPORT  
Total Threshold Limit Concentration in Water

Date of Analysis: 04/05/90  
Sample Spiked: 01

Client ID: WS-4D  
Units: ug/L

Analyte	MS Result	Sample Result	Recovered	Expected	MS, % Recovery	Acceptability Limits, %
Cadmium	911	<50	911	1000	91	80 - 120
Chromium	946	<100	946	1000	95	80 - 120
Lead	1000	20	980	1000	98	80 - 120
Zinc	908	<100	908	1000	91	80 - 120

<# = Not detected at the indicated detection limit.

Project Number: SFB-175-0204.72  
Consultant Project Number: 1196  
Contract Number: N46CWC0244-9-X  
Facility Number: 9-5542  
Work Order Number: D004100  
Report Issue Date: April 9, 1990

Table 7

LABORATORY DUPLICATE SAMPLE RESULTS  
AND RELATIVE PERCENT DIFFERENCE (RPD) REPORT

Total Threshold Limit Concentration in Water

Date of Analysis: 04/05/90  
Sample Used: 01

Client ID: WS-4D  
Units: ug/L

Analyte	Sample Result	Duplicate Result	RPD, %	Maximum RPD, %
Cadmium	<50	<50	NA	20
Chromium	<100	<100	NA	20
Lead	20	20	0	20
Zinc	<100	<100	NA	20

NA = Not applicable

# Chain-of-Custody Record

Chevron U.S.A. Inc.  
 P.O. Box 5004  
 San Ramon, CA 94583  
 FAX (415) 842-9591

Chevron Facility Number 9-5542  
 Consultant Release Number 3236620 Consultant Project Number 1196  
 Consultant Name Chemical Processors Inc.  
 Address 950-B Gilman St. Berkeley, CA  
 Fax Number 415-524-7439  
 Project Contact (Name) Craig Schwyn  
 (Phone) 415-524-9372

Chevron Contact (Name) John Randall  
 (Phone) \_\_\_\_\_  
 Laboratory Name GTEL  
 Contract Number \_\_\_\_\_  
 Samples Collected by (Name) Kevin Elliott  
 Collection Date 4/3/90 - 4/4/90  
 Signature Kevin Elliott

Sample Number	Lab Number	Number of Containers	Matrix S = Soil W = Water A = Air C = Charcoal	Type G = Grab C = Composite	Time	Sample Preservation	Iced	Analyses To Be Performed										Remarks
								Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline	Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline + Diesel	503 Oil and Grease	Arom. Volatiles - BTXE Soil: 8020/Wtr.: 602	Arom. Volatiles - BTXE Soil: 8240/Wtr.: 624	Total Lead DHS-Luft	EDB DHS-AB 1803	Total Metals Pb, Cr, Cd, Zn DHS LUFT			
RS-13D		6	W	G	12:30	none	✓	X				X			X			
WS-1D		6	W	G	13:30	none	✓	X				X			X			
WS-2D		6	W	G	8:27	none	✓	X				X			X			
WS-3D		6	W	G	8:15	none	✓	X				X			X			
WS-4D		9	W	G	13:00	none	✓	X	X	X		X			X	X		
WS-5D		6	W	G	13:30	none	✓	X				X			X			
Trip Blank		2						X				X						

Relinquished By (Signature) <u>Kevin Elliott</u>	Organization <u>Chempro</u>	Date/Time <u>4/4/90 14:00</u>	Received By (Signature) <u>David Bradstone</u>	Organization <u>Concord Courier</u>	Date/Time <u>4/4/90 21</u>	Turn Around Time (Circle Choice) 24 Hrs 48 Hrs 5 Days <u>10 Days</u>
Relinquished By (Signature) <u>David Bradstone</u>	Organization <u>Concord Courier</u>	Date/Time <u>4/4/90 5:45</u>	Received By (Signature)	Organization	Date/Time	
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature) <u>Fathy Diana</u>		Date/Time <u>4/5/90</u>	