

R.T. NAHAS COMPANY *Since 1981*

REAL ESTATE DEVELOPERS AND INVESTORS

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July 27, 1993

Mr. Scott Seery
Alameda County Health Care Services
80 Swan Way
Oakland, CA 94621

RE: Frank Tien's Unocal Station
20405 Redwood Road
Castro Valley, CA

Dear Scott:

Enclosed is the Twelfth Quarterly Groundwater
Monitoring Report on the Unocal Service Station,
prepared by BSK Associates.

Sincerely,

*Randy Nahas*₁₅

Randall E. Nahas

REN/hrs

Enclosure

BSK & ASSOCIATES
GEOTECHNICAL CONSULTANTS, INC.

BSK JOB NO. P92057.3

**TWELFTH QUARTERLY
GROUNDWATER
MONITORING REPORT
UNOCAL 76 SERVICE STATION
20405 AND 20629 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA
JULY 1993**



& Associates

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July 23, 1993

BSK JOB P92057.3

R. T. Nahas Company/Eden Managements
20630 Patio Drive
Castro Valley, CA 94546

Subject: Twelfth Quarterly Groundwater Monitoring Report
Unocal 76 Service Station
20405 and 20629 Redwood Road
Castro Valley, California

Gentlemen:

As requested and authorized, we performed groundwater monitoring well quarterly sampling on July 1, 1993 at the above-referenced facility. This quarterly report presents the project background, groundwater data obtained during this sampling event, conclusions based on this quarter's data, and recommendations for further action.

BACKGROUND

BSK & Associates installed three groundwater monitoring wells (MW-2, MW-3 and MW-4) in December 1989 at the Unocal 76 Service Station located at 20405 Redwood Road, Castro Valley, California. The service station location is shown on Figure 1, Vicinity Map. The monitoring facilities were installed in order to comply with the California UST Monitoring requirements of Alternative 6, Subchapter 16, Title 23, California Code of Regulations. The results of well installations, soil sampling and chemical testing of the soil and water samples were summarized in our Report P89134, dated February 5, 1990. The groundwater monitoring well locations are shown on Figure 2, Site Plan.

BSK performed an assessment of the lateral extent of shallow soil contamination in April 1991 (see our Report P90165, dated April 1991). During the investigation, shallow soil contamination was observed to occur from the pump islands to the south property boundary, and within the east and west property boundaries.

The seventh quarterly monitoring report included the results of additional lateral contamination characterization in the off-site area to the south (BSK Report P92057.3, dated May 29, 1992). This report indicated the extension of a groundwater contaminant plume south of the site, between Wells MW-6 and MW-5, but north of MW-7.

In our Special Sampling Report of December 23, 1992, BSK determined that concentrations of Total Petroleum Hydrocarbons as Gasoline (TPHg) at MW-7 were related to Perchloroethene contamination, likely emanating from a nearby dry cleaner.

Review of Subsurface Conditions

The site subsurface soil conditions, as exposed by Borings MW-1A, MW-2, MW-3, and MW-4 of our previous investigation (P89134), consist primarily of silty and sandy clays. Four to five feet of black organic-rich silty clay fill are found immediately below the ground surface, followed by three to five feet of greenish-gray sandy/silty clay native material. In the western portion of the study area, the greenish clay is underlain by seven to eleven feet of yellow-brown sandy clay, grading to a clayey sand with depth. In the eastern portion of the tank area, the sandy clay and clayey sand are split by a six foot layer of silty clay. Light brown silty clay was encountered in each boring from 17 and 24 feet in depth, and continuing to the final depth explored. It is apparent from the boring logs that this lowermost clay layer slopes to the northeast.

In the areas of Wells MW-5 through MW-7, subsurface conditions comprised 10 to 20 feet of dark gray to yellow-gray silty clay, the upper 10 feet of which may be fill. The silty clay is underlain by 4 to 5 feet of orange-brown clayey silt to silty sand. This unit often contains fine, wet to saturated pores. At fifteen to twenty feet in depth, a silty to sandy grayish clay is encountered. This clay is very stiff to hard, often porous, and contains thin saturated lenses of fine sand and silt. At approximately 25 feet, clayey sand to sand was encountered. This unit is soft to firm and contains many fine lenses of sand, silt, and clay. The sand and silt are typically saturated.

Groundwater within the site has been encountered at both 13 to 15 feet and 19 to 23 feet. The lower water levels occur in clayey sands along the east and west boundaries of the site, and likely in its northern one-third. This water horizon is considered the first primary aquifer. A shallow "perched" water is found in clayey sand at 13 to 15 feet, occurring throughout the south-central portion of the site. Hydrostatic pressure in both units results in a piezometric surface 10 to 12 feet below ground surface. The similar piezometric surface suggests that the "perched" water is connected to the underlying aquifer. Additional evidence for this connection is the lack of a confining layer below the upper clayey sand in several borings in the south-central portion of the site.

Groundwater flow direction at the site has been towards the southwest since December 1989. Gradient has varied at the site from 0.4% to 2.0%. Electrical conductivity is a relatively low 500 to 1,000 micromhos, and pH has generally been slightly acidic. Seasonal precipitation appears to result in more southerly flow, a flatter gradient, and 1 to 2 feet higher water levels in early spring.

During soil boring investigations, soil contamination by petroleum hydrocarbons was observed olfactorily and by Photo-Ionization Detector (PID) in 13 borings in the project area. Hydrocarbons were detected at depths ranging from just below the asphalt pavement to 17 feet (the greatest depth of several borings in the area of greatest contamination). PID values reached 3,600 ppm, total ionizable hydrocarbons, in soil (the PID was calibrated daily to a 100 ppm

isobutylene standard with a 10.6 eV lamp). The greatest concentrations were observed between 10 feet in depth and first encountered groundwater (where encountered). It was noted that contamination was not always accompanied by soil staining, and volatilization was rapid upon exposure to air.

Groundwater contamination has been encountered at the site in samples obtained quarterly from Wells MW-2 and MW-3, and in Well MW-7. Wells MW-2 and MW-3 are adjacent to, and up and cross-gradient to what is believed to be the contaminant source area. Well MW-7 is down gradient from the source area; however, it appears that contamination encountered in Well MW-7 is not related to the Unocal contaminant plume.

TWELFTH QUARTERLY MONITORING ACTIVITIES

General

Quarterly monitoring of groundwater monitoring wells MW-2, MW-3, MW-4, MW-5, MW-6 and MW-7 was performed on July 1, 1993. Field procedures and observations are provided in the following text and figures.

Field Work

Wells MW-2, MW-3, MW-4, MW-5 and MW-6 were purged by a Teflon®-bladder pump or PVC/Teflon bailer. Well MW-7 was purged by a dedicated Teflon bailer. Four well casing volumes were removed from each well. Purge effluent was field monitored for pH, Temperature and Conductivity during purging to assess the influx of fresh formation water into the well. Purged water was then transferred to a 55-gallon DOT-approved steel drum for holding. Each drum was labeled according to its contents, content source, and date of accumulation.

Prior to purging, the depth to water in each well was measured using a Solinst electric sounding tape, marked in twentieths of a foot. The water depth was then interpolated to the 0.01 foot increment from the tape. Each well was subsequently examined for floating and sinking immiscible product layers and sheen, using a clean PVC bailer having dual check valves for point-source sampling. Groundwater flow direction and gradient data were determined from the depth measurements, and are presented in Figure 3, Potentiometric Surface Map.

Upon purge completion, each well was again measured to confirm a minimum of 80% well recovery prior to sampling. Water sampling was then performed with Teflon point-source bailer. Sampling for contaminants was performed in the order of their volatility, with the most volatile constituents sampled first. Each water sample obtained for a specific contaminant, or contaminants, was placed into the appropriate receptacle with preservative (as necessary), sealed, labeled and refrigerated for delivery to our State-certified laboratory.

A Well Field Log was prepared for each well sampled, recording the water depth, well volume, pH, water temperature, conductivity and other data. The Well Field Logs are presented as Figures 4.1 through 4.6.

Site Hydrology

Groundwater measurements were made of the six existing wells on July 1, 1993 in order to assess the flow direction and gradient in the area. On this date, groundwater flow was generally south-southeast. The gradient was approximately 1.2 percent. The flow direction and gradient are similar to the previous quarter. Groundwater levels have fallen 1.03 to 1.33 feet since March 1993. Groundwater flow direction and gradient are shown on Figure 3, Potentiometric Surface Map.

Temperature and pH data are presented in the Well Field Logs, Figures 4.1 through 4.6; little significant change has occurred in these parameters.

The changes in water level since March 1993 likely reflect cessation of winter precipitation inflow to the groundwater basin.

Chemical Analyses

Water samples obtained from Wells MW-2, MW-3, MW-5 and MW-7 are analyzed for constituents related to gasoline, since the wells are located adjacent to and downgradient from two 10,000 gallon underground gasoline tanks. The samples are tested for the following contaminants: Total Petroleum Hydrocarbons as Gasoline (TPHg) and Benzene, Toluene, Ethylbenzene and Xylene (BTEX). Well MW-4 is adjacent to a 500-gallon waste oil tank, and is tested for Total & Hydrocarbon Oil & Grease, Total Petroleum Hydrocarbons as Diesel (TPHd), TPHg, and BTEX.

The contaminants tested for are those specified by the Tri-Regional Water Quality Control Board Recommendations of August 10, 1990, and listed in the Alameda County Department of Environmental Health letter, dated April 26, 1990 to R.T. Nahas Co. Current and former analysis results are presented for comparison in the following tables. The Chemical Test Data Sheets are presented in Appendix A, Figures A-1 through A-8. The Project Chain-of-Custody record is shown in Figure A-9.

WATER ANALYSES - BTEX

TABLE 1
 (Results in µg/l)

Sample Date	Sample Location	Benzene (1)*	Toluene (100)±	Xylene (1750)*	Ethylbenzene (680)*
August 1990	Well MW-2	21	3.9	28	7.2
	Well MW-3	55	3.8	59	20
	Well MW-4	ND	ND	ND	ND
January 1991	Well MW-2	50	3.3	110	22
	Well MW-3	29	3.3	34	9.7
April 1991	Well MW-2	640	520	790	170
	Well MW-3	450	270	760	150
	Well MW-4	ND	ND	ND	ND
July 1991	Well MW-2	14	1	17	8
	Well MW-3	14	14	33	8
October 1991	Well MW-2	2.9	ND	6	2.5
	Well MW-3	ND	ND	ND	ND
	Well MW-4	ND	ND	ND	ND
January 1992	Well MW-2	480	870	860	160
	Well MW-3	4	10	8	2
April 1992	Well MW-2	70	0.3	7.0	15
	Well MW-3	1.0	0.4	0.9	ND
	Well MW-4	ND	ND	ND	ND
	Well MW-5	ND	ND	ND	ND
	Well MW-6	ND	0.3	ND	ND
	Well MW-7	0.4	0.3	0.9	0.3
July 1992	Well MW-2	10	ND	2.3	0.6
	Well MW-3	1.3	0.4	1.3	ND
	Well MW-5	ND	ND	ND	ND
	Well MW-6	ND	ND	ND	ND
	Well MW-7	ND	ND	ND	ND
October 1992	Well MW-2	2.3	ND	3.0	2.3
	Well MW-3	2.1	ND	0.3	ND
	Well MW-4	ND	ND	ND	ND
	Well MW-5	ND	0.4	ND	ND
	Well MW-6	ND	ND	ND	ND
	Well MW-7	ND	ND	ND	ND

WATER ANALYSES - BTEX

TABLE 1 (Continued)
 (Results in µg/l)

<u>Sampling Date</u>	<u>Sample Location</u>	<u>Benzene (1)*</u>	<u>Toluene (100)+</u>	<u>Xylene (1750)*</u>	<u>Ethylbenzene (680)*</u>
January 1993	Well MW-2	11	5.1	6.3	1.4
	Well MW-3	1.2	1.0	4.1	0.6
	Well MW-4	ND	ND	ND	ND
	Well MW-5	ND	ND	ND	ND
	Well MW-6	ND	ND	ND	ND
	Well MW-7	ND	ND	ND	ND
	March 1993	Well MW-2	110	32	28
Well MW-3		32	0.9	13	64
Well MW-4		ND	ND	ND	ND
Well MW-5		ND	ND	ND	ND
Well MW-6		ND	ND	ND	ND
Well MW-7		ND	ND	ND	ND

July 1993	Well MW-2	17	1.1	12	6.0
	Well MW-3	24	11	82	14
	Well MW-4	ND	ND	ND	ND
	Well MW-5	ND	ND	ND	ND
	Well MW-6	ND	ND	ND	ND
	Well MW-7	ND	ND	ND	ND

ND = None Detected

*DHS: Primary Drinking Water Standard (3/89)

+DHS: Action Level

WATER ANALYSES - TPH and OIL & GREASE

TABLE 2
 (Results in µg/l)

<u>Sampling Date</u>	<u>Sample Location</u>	<u>TPH as Gasoline (100)*</u>	<u>TPH as Diesel (100)*</u>	<u>Oil and Grease Total Hydrocarbon (100)*</u>
August 1990	Well MW-2	180	--	--
	Well MW-3	290	--	--
	Well MW-4	ND	ND	ND
January 1991	Well MW-2	430	--	--
	Well MW-3	110	--	--
April 1991	Well MW-2	4800	--	--
	Well MW-3	3600	--	--
	Well MW-4	ND	ND	ND
July 1991	Well MW-2	220	--	--
	Well MW-3	220	--	--
October 1991	Well MW-2	170	--	--
	Well MW-3	ND	ND	ND
	Well MW-4	ND	ND	ND
January 1992	Well MW-2	5200	--	--
	Well MW-3	60	--	--
April 1992	Well MW-2	300	--	--
	Well MW-3	ND	--	ND
	Well MW-4	ND	ND	ND
	Well MW-5	ND	--	--
	Well MW-6	ND	--	--
	Well MW-7	1300	--	--
July 1992	Well MW-2	84	--	--
	Well MW-3	ND	--	--
	Well MW-5	ND	--	--
	Well MW-6	ND	--	--
	Well MW-7	830	--	--

WATER ANALYSES - TPH and OIL & GREASE

TABLE 2 (Continued)
 (Results in µg/l)

<u>Sample Date</u>	<u>Sample Location</u>	<u>TPH as Gasoline (100)*</u>	<u>TPH as Diesel (100)*</u>	<u>Oil & Grease Total (100)*</u>	<u>Hydrocarbon (100)*</u>
October 1992	Well MW-2	ND	--	--	--
	Well MW-3	ND	--	--	--
	Well MW-4	ND	120	ND	--
	Well MW-5	ND	--	--	--
	Well MW-6	ND	--	--	--
	Well MW-7	3900	--	--	--
	January 1993	Well MW-2	170	--	--
Well MW-3		ND	--	--	--
Well MW-4		ND	ND	ND	--
Well MW-5		ND	--	--	--
Well MW-6		ND	--	--	--
Well MW-7		1900	--	--	--
March 1993		Well MW-2	720	--	--
	Well MW-3	330	--	--	--
	Well MW-4	ND	ND	ND	ND
	Well MW-5	ND	--	--	--
	Well MW-6	ND	--	--	--
	Well MW-7	830	--	--	--

July 1993	Well MW-2	220	--	--	--
	Well MW-3	330	--	--	--
	Well MW-4	ND	ND	--	1
	Well MW-5	ND	--	--	--
	Well MW-6	ND	--	--	--
	Well MW-7	680	--	--	--

-- = Not Tested

ND = None Detected

* = Quantified Action Levels are not provided for these parameters. The amount given is often informally used by regulatory agencies as a threshold value.

1 = Results in mg/l

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

On the basis of our findings to date, an unauthorized motor-fuel release to soil and groundwater has occurred at the site, in the vicinity of the two 10,000-gallon underground gasoline storage tanks.

Contaminant concentrations associated with gasoline have generally decreased in Monitoring Wells MW-2 and MW-3 since the last quarterly sampling event (March 1993); however, Benzene concentrations continue to meet or exceed State and Federal Standards in these wells. The TPIg concentration measured at Well MW-7 is believed to be related to Perchloroethylene contamination, as established in our Special Sampling report, dated December 23, 1992 (note the lack of BTEX concentrations in this well, despite the substantial quantity of TPH-Gasoline). Although no standard has been devised for Total Petroleum Hydrocarbon concentrations as Gasoline or Diesel, the quantities observed in Wells MW-2, MW-3 and MW-7 exceed general informal regulatory action levels. Total Petroleum Hydrocarbons as Diesel were not detected in Well MW-4 for the third consecutive quarter. However, a trace amount of Hydrocarbon Oil and Grease was detected.

The southern limit of the gasoline contaminant plume is believed to be located north of Well MW-7, as concluded from the lack of aromatic hydrocarbons and other gasoline related compounds detected at MW-7 since analyses began in April 1992.

At this time, it appears that Marshall Steel Cleaners is the most likely source for Perchloroethene contamination in groundwater (detected as TPIg) in Well MW-7.

Recommendations

With respect to the findings of this quarterly sampling, and the conclusions of this report, it is recommended that quarterly groundwater monitoring for gasoline constituents continue for Wells MW-2, MW-3, MW-6 and MW-7. Bi-annual monitoring for gasoline may be considered appropriate for Wells MW-4, MW-5 and MW-6 with respect to their location to the gasoline plume, groundwater flow directions, and absence of significant contaminant concentrations for six consecutive quarters.

BSK additionally recommends the further characterization of the Gasoline plume by temporary well-points in the southern one-half of the Nahas property to: 1) Further define the gasoline contaminant plume; 2) Further assess the existence of PCE on the Nahas property, and; 3) Provide remedial design information.

REPORT DISTRIBUTION

Copies of this report should be submitted to the Alameda County Department of Environmental Health for their review. We are providing you with extra copies for this purpose. We understand that copies of the report may be forwarded by ACEH to the Regional Water Quality Control Board in Oakland for their review.

LIMITATIONS

The findings and conclusions presented in this report are based on field review and observations, and from the limited testing program described in this report. This report has been prepared in accordance with generally accepted methodologies and standards of practice in the area. No other warranties, expressed or implied, are made as to the findings, conclusions and recommendations included in the report.

The findings of this report are valid as of the present. The passage of time, natural processes or human intervention on the property or adjacent property can cause changed conditions which can invalidate the findings and conclusions presented in this report.

BSK is pleased to continue to be of service to you during this project. If you have questions concerning the contents of the report, please do not hesitate to contact us.

The following are attached and complete this report:

FIGURE	1	Vicinity Map
FIGURE	2	Site Plan
FIGURE	3	Potentiometric Surface Map
FIGURES	4.1 through 4.6	Well Field Logs

APPENDIX "A"

FIGURES	A-1 through A-8	Twelfth Quarterly Laboratory Chemical Test Data Sheets
FIGURE	A-9	Project Chain-of-Custody Document

Respectfully submitted,
BSK & Associates



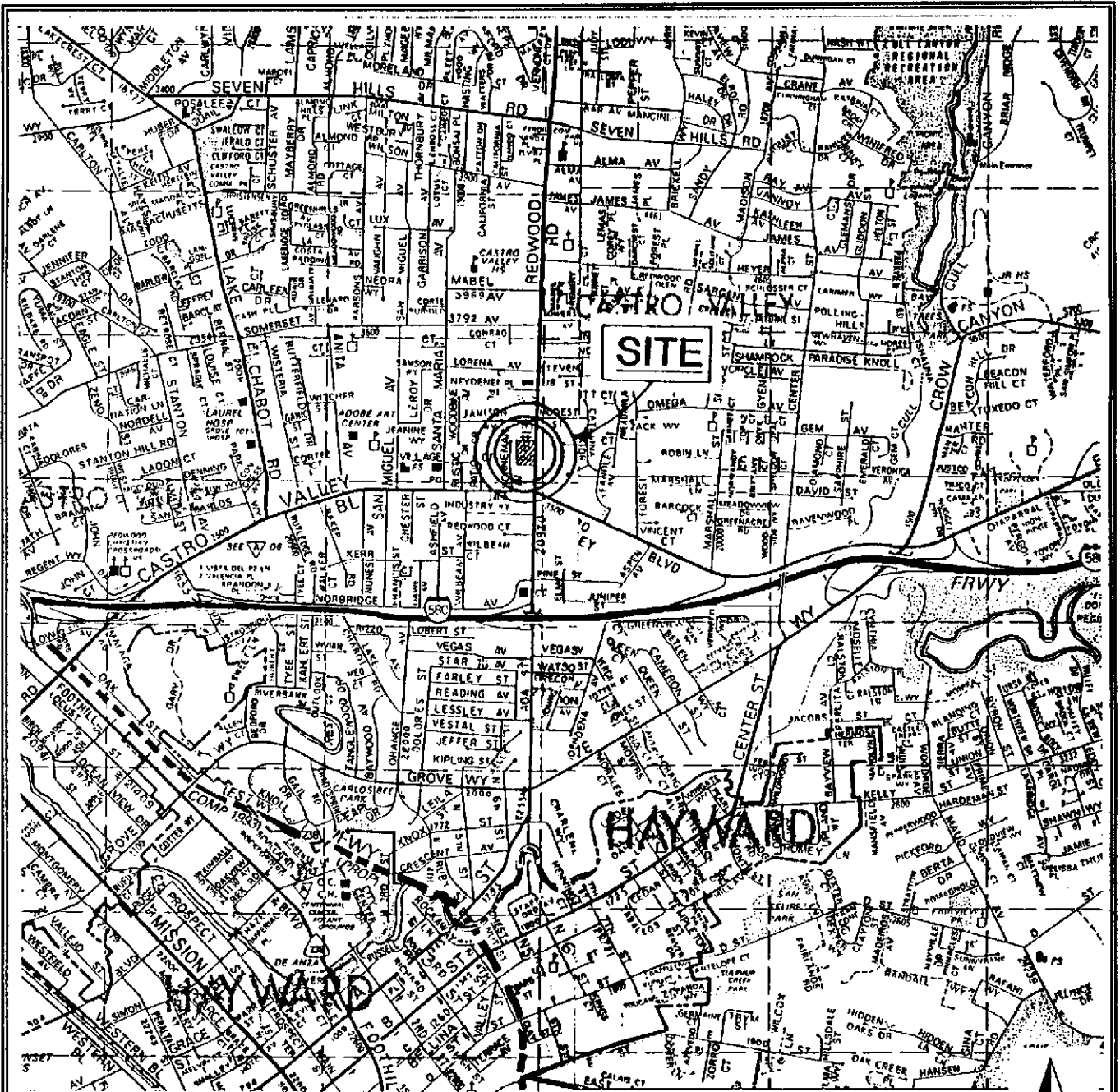
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Project Manager
C.E. No. 038101, R.E.A. No. 01528



Tim W. Berger, C.E.G. No. 1828
Project Geologist

AYE/TWB:ndp/slc
(reports/env/P92057.Q12)

Distribution:
R.T. Nahas Co. (4 copies - 1 loose)



Scale: 1" = 2200'

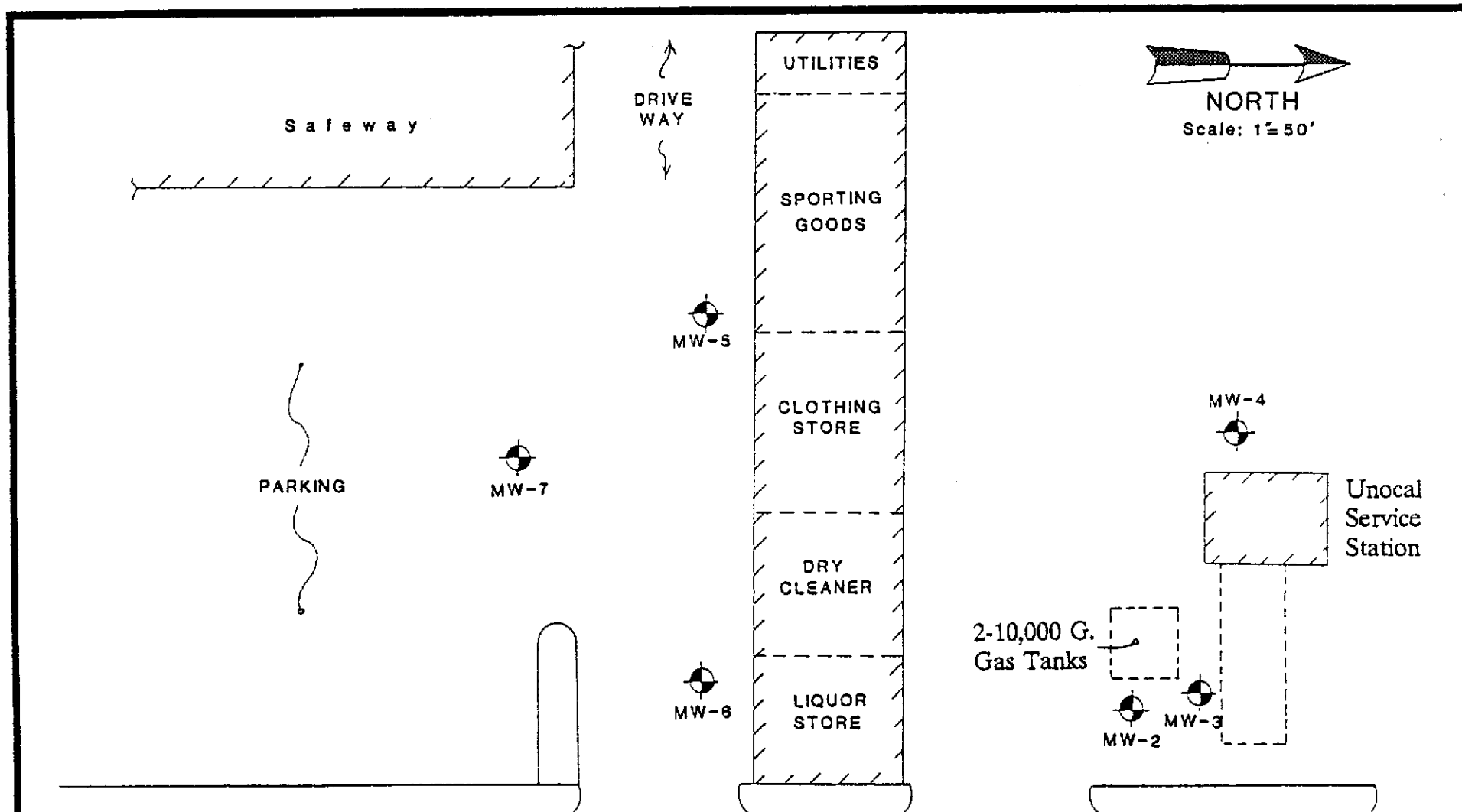


Source: Thomas Guide, 1992, Alameda and Contra Costa Counties


**TWELFTH QUARTERLY
GROUNDWATER
MONITORING REPORT
UNOCAL 76 SERVICE STATION
20405 AND 20629 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA**

VICINITY MAP
BSK Job No. P92057.3
July 1993
FIGURE: 1

**BSK
& ASSOCIATES**



LEGEND:

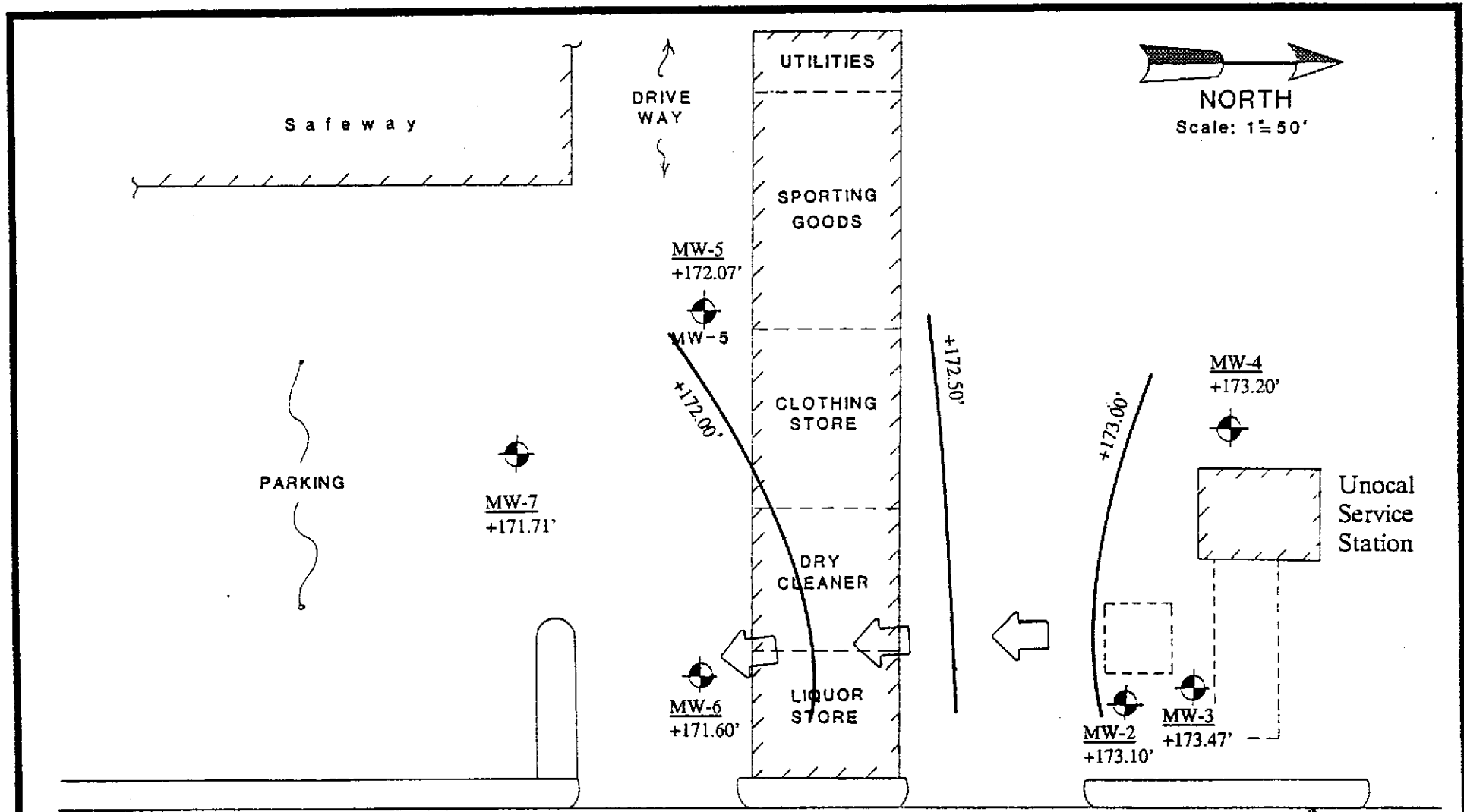
 - Location And Designation Of Groundwater Monitoring Well

REDWOOD ROAD




SITE PLAN

Job No. P92057.3
 July 1993
 FIGURE: 2





LEGEND:

-  - Location, Designation and Groundwater Elevation of Monitoring Well
-  - Line of Equal Potentiometric Surface Elevation (07/01/93)
-  - Groundwater Flow Direction

REDWOOD ROAD

POTENTIOMETRIC SURFACE MAP

Job No. P92057.3
 July 1993
 FIGURE: 3

BSK
 & ASSOCIATES

WELL FIELD LOG

Well Development: Date:
 Well Observation: x Date: 07/01/93
 Sample Collection: x Date: 07/01/93

Project Name: Twelfth Quarterly Sampling
 Location: Nahas/Union 76
 Personnel: MC, RFG
 Weather: Clear, warm, 80's

WELL INFORMATION:

Well Number	MW-2	Date Purged	07/01/93
Depth to Water - feet(TOC)	10.37	Purge Method	Teflon Bailer
Well Depth (feet)	30		
Water Volume (gallons)	3.3	Purge Begin	14:00
Reference Elevation - feet(TOC)	+183.47	Purge End	14:46
Groundwater Elevation (feet)	+173.10	Purge Rate	0.9 gal/min.
Measurement Technique	Solinst Electric Well Sounder		

IMMISCIBLE LAYERS:

Top: None, clear
 Bottom: Trace fine sand,
 Detection Method: Visual

Collection Method: Clear PVC Point-Source Bailer

WELL DEVELOPMENT/PURGE DATA:

TIME	VOLUME REMOVED (gallons)	ELECTRICAL CONDUCTIVITY (Ec/Range)	Ph	TEMP. (°F)	COLOR/COMMENTS
14:35	3.5	830	6.5	76	None
14:38	7.0	762	6.5	72	"
14:42	10.5	707	6.5	71	"
14:46	14.0	692	6.4	71	"

SAMPLE COLLECTION DATA

Sampling Equipment: Teflon Point-Source Bailer

TIME	ANALYSIS	AMOUNT/CONTAINER USED	SAMPLE INTERVAL
15:00	BTEX & TPH-G	2-40ml glass VOA with HCl	

Field Observations: None

BSK Job No.: P92057.3
 Date: July 1993
 Figure No.: 4.1

WELL FIELD LOG

Well Development:
 Well Observation: x
 Sample Collection: x

Date:
 Date: 07/01/93
 Date: 07/01/93

Project Name: Twelfth Quarterly Sampling
 Location: Nahas/Union 76
 Personnel: MC, RFG
 Weather: Clear, warm, 80's

WELL INFORMATION:

Well Number	MW-3	Date Purged	07/01/93
Depth to Water - feet(TOC)	10.56	Purge Method	Teflon Bailer
Well Depth (feet)	30		
Water Volume (gallons)	3.3	Purge Begin	13:52
Reference Elevation - feet(TOC)	+184.03	Purge End	14:10
Groundwater Elevation (feet)	+173.47	Purge Rate	0.8 gal/min.
Measurement Technique	Solinst Electric Well Sounder		

IMMISCIBLE LAYERS:

Top: None, clear
 Bottom: Clear, trace orange particles
 Detection Method: Visual
 Collection Method: Clear PVC Point-Source Bailer

WELL DEVELOPMENT/PURGE DATA:

TIME	VOLUME REMOVED (gallons)	ELECTRICAL CONDUCTIVITY (Ec/Range)	Ph	TEMP. (°F)	COLOR/COMMENTS
13:56	3.5	724	7.6	82	None
14:00	7.0	699	6.7	73	"
14:04	10.5	649	6.6	73	"
14:10	14.0	645	6.6	72	"

SAMPLE COLLECTION DATA

Sampling Equipment: Teflon Point-Source Bailer

TIME	ANALYSIS	AMOUNT/CONTAINER USED	SAMPLE INTERVAL
14:15	BTEX & TPH-G	2-40ml glass VOA with HCl	

Field Observations: Six feet from active gas pump island

BSK Job No.: P92057.3
 Date: July 1993
 Figure No.: 4.2

WELL FIELD LOG

Well Development: Date:
 Well Observation: Date: 07/01/93
 Sample Collection: Date: 07/01/93

Project Name: Twelfth Quarterly Sampling
 Location: Nahas/Union 76
 Personnel: MC, RFG
 Weather: Clear, warm, 80's

WELL INFORMATION:

Well Number	MW-4	Date Purged	07/01/93
Depth to Water - feet(TOC)	11.41	Purge Method	Teflon Bailer
Well Depth (feet)	25		
Water Volume (gallons)	2.3	Purge Begin	13:06
Reference Elevation - feet(TOC)	+184.61	Purge End	13:20
Groundwater Elevation (feet)	+173.20	Purge Rate	0.9 gal/min.
Measurement Technique	Solinst Electric Well Sounder		

IMMISCIBLE LAYERS:

Top: None, clear
 Bottom: None, clear
 Detection Method: Visual
 Collection Method: Clear PVC Point-Source Bailer

WELL DEVELOPMENT/PURGE DATA:

TIME	VOLUME REMOVED (gallons)	ELECTRICAL CONDUCTIVITY (Ec/Range)	Ph	TEMP. (°F)	COLOR/COMMENTS
13:10	2.5	535	7.3	71	None
13:14	5.0	537	6.7	69	"
13:17	7.5	530	6.6	68	"
13:20	10.0	529	6.6	68	"

SAMPLE COLLECTION DATA

Sampling Equipment: Teflon Point-Source Bailer

TIME	ANALYSIS	AMOUNT/CONTAINER USED	SAMPLE INTERVAL
13:30	BTEX & TPH-G	2-40ml glass VOA with HCl	
"	TPH-D	2-250 ml Amber Glass, w/H ₂ SO ₄	
"	Oil & Grease	1 Liter Amber Glass, w/H ₂ SO ₄	

Field Observations: None

BSK Job No.: P92057.3
 Date: July 1993
 Figure No.: 4.3

WELL FIELD LOG

Well Development: Date:
 Well Observation: x Date: 07/01/93
 Sample Collection: x Date: 07/01/93

Project Name: Twelfth Quarterly Sampling
 Location: Nahas/Union 76
 Personnel: MC, RFG
 Weather: Clear, warm, 80's

WELL INFORMATION:

Well Number	MW-6	Date Purged	07/01/93
Depth to Water - feet(TOC)	12.00	Purge Method	Teflon Bladder Pump, Teflon Bailer
Well Depth (feet)	29.0		
Water Volume (gallons)	2.9	Purge Begin	10:12
Reference Elevation - feet(TOC)	+183.60	Purge End	10:58
Groundwater Elevation (feet)	+171.60	Purge Rate	0.3 gal/min.
Measurement Technique	Solinst Electric Well Sounder		

IMMISCIBLE LAYERS:

Top: None
 Bottom: Trace orange clay
 Detection Method: Visual
 Collection Method: Clear PVC Point-Source Bailer

WELL DEVELOPMENT/PURGE DATA:

TIME	VOLUME REMOVED (gallons)	ELECTRICAL CONDUCTIVITY (Ec/Range)	pH	TEMP. (°F)	COLOR/COMMENTS
10:18	3.0	646	8.8	74.0	None
10:24	6.0	650	7.8	72.0	Switch to bailer
10:54	10.0	677	6.6	75.0	"
10:58	13.0	674	6.7	73.0	

SAMPLE COLLECTION DATA

Sampling Equipment: Teflon Point-Source Bladder

TIME	ANALYSIS	AMOUNT/CONTAINER USED	SAMPLE INTERVAL
11:15	BTEX & TPH-G	2-40ml glass VOA with HCl	

Field Observations: Well in busy parking lot.

BSK Job No.: P92057.3
 Date: July 1993
 Figure No.: 4.5

WELL FIELD LOG

Well Development: Date:
 Well Observation: x Date: 07/01/93
 Sample Collection: x Date: 07/01/93

Project Name: Twelfth Quarterly Sampling
 Location: Nahas/Union 76
 Personnel: MC, RFG
 Weather: Clear, warm, 80's

WELL INFORMATION:

Well Number	MW-7	Date Purged	07/01/93
Depth to Water - feet(TOC)	11.07	Purge Method	Teflon Bailer
Well Depth (feet)	28.0		
Water Volume (gallons)	2.9	Purge Begin	11:17
Reference Elevation - feet(TOC)	+182.78	Purge End	11:31
Groundwater Elevation (feet)	+171.71	Purge Rate	0.9 gal/min.
Measurement Technique	Solinst Electric Well Sounder		

IMMISCIBLE LAYERS:

Top: None, clear
 Bottom: None, trace orange clay
 Detection Method: Visual
 Collection Method: Clear PVC Point-Source Bailer

WELL DEVELOPMENT/PURGE DATA:

TIME	VOLUME REMOVED (gallons)	ELECTRICAL CONDUCTIVITY (Ec/Range)	pH	TEMP. (°F)	COLOR/COMMENTS
11:20	3.0	866	6.7	73.0	None
11:23	6.0	891	6.6	72.0	"
11:27	10.0	892	6.6	71.0	"
11:31	13.0	908	6.6	71.0	"

SAMPLE COLLECTION DATA

Sampling Equipment: Dedicated Bailer

TIME	ANALYSIS	AMOUNT/CONTAINER USED	SAMPLE INTERVAL
11:40	BTEX & TPH-G	2-40ml glass VOA with HCl	water surface

Field Observations: Well located in busy parking lot

BSK Job No.: P92057.3
 Date: July 1993
 Figure No.: 4.6

APPENDIX A

CHEMICAL TEST DATA SHEETS

AND

PROJECT-CHAIN-OF-CUSTODY RECORD



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FIGURE: A-1

Environmental Services

BSK-Pleasanton
 Nahas

Date Sampled : 07/01/93
 Time Sampled : 1500
 Date Received : 07/02/93
 Date of Analysis : 07/07/93
 Report Issue Date: 07/13/93

Case Number : Ch931761
 Lab ID Number : 1761-6
 Project Number : P92057.3
 Sample Description: MW-2

Sample Type : LIQUID

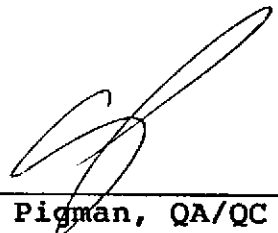
Analyses for BTEX by EPA Method 8020
and TPH(G) by EPA Method 8015
Prepared by Method 5030

Results Reported in Micrograms per Liter (ug/L)

Compound	Results	DLR
Benzene	17	0.3
Toluene	1.1	0.3
Ethylbenzene	6.0	0.3
Total Xylene Isomers	12	0.3
Total Petroleum Hydrocarbons (G)	220	50

Sample DLR = DLR x DLR Multiplier, DLR Multiplier = 1

DLR: Detection Limit for the Purposes of Reporting.
 Exceptional sample conditions or matrix interferences
 may result in higher detection limits.
 ND: None Detected


 Cynthia Pigman, QA/QC Supervisor


 Jeffrey Creager, Organics Manager



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Environmental Services

BSK-Pleasanton
 Nahas

Date Sampled : 07/01/93
 Time Sampled : 1415
 Date Received : 07/02/93
 Date of Analysis : 07/07/93
 Report Issue Date: 07/13/93

Case Number : Ch931761
 Lab ID Number : 1761-5
 Project Number : P92057.3
 Sample Description: MW-3

Sample Type : LIQUID

**Analyses for BTEX by EPA Method 8020
 and TPH(G) by EPA Method 8015
 Prepared by Method 5030**

Results Reported in Micrograms per Liter (ug/L)

Compound	Results	DLR
Benzene	24	0.3
Toluene	11	0.3
Ethylbenzene	14	0.3
Total Xylene Isomers	82	0.3
Total Petroleum Hydrocarbons (G)	330	50

Sample DLR = DLR x DLR Multiplier, DLR Multiplier = 1

DLR: Detection Limit for the Purposes of Reporting.
 Exceptional sample conditions or matrix interferences
 may result in higher detection limits.
 ND: None Detected


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 Jeffrey Creager, Organics Manager



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FIGURE: A-3

Environmental Services

BSK-Pleasanton
 Nahas

Date Sampled : 07/01/93
 Time Sampled : 1330
 Date Received : 07/02/93
 Date of Analysis : 07/07/93
 Report Issue Date: 07/13/93

Case Number : Ch931761
 Lab ID Number : 1761-4
 Project Number : P92057.3
 Sample Description: MW-4

Sample Type : LIQUID

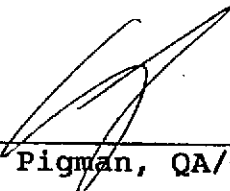
Analyses for BTEX by EPA Method 8020
and TPH(G) by EPA Method 8015
Prepared by Method 5030

Results Reported in Micrograms per Liter (ug/L)

Compound	Results	DLR
Benzene	ND	0.3
Toluene	ND	0.3
Ethylbenzene	ND	0.3
Total Xylene Isomers	ND	0.3
Total Petroleum Hydrocarbons (G)	ND	50

Sample DLR = DLR x DLR Multiplier, DLR Multiplier = 1

DLR: Detection Limit for the Purposes of Reporting.
 Exceptional sample conditions or matrix interferences
 may result in higher detection limits.
 ND: None Detected


 Cynthia Pigman, QA/QC Supervisor


 Jeffrey Creager, Organics Manager

R91 1009 BTPL.t



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Environmental Services

BSK-Pleasanton
Nahas

Date Sampled : 07/01/93
Time Sampled : 1330
Date Received : 07/02/93
Date of Analysis : 07/08/93
Report Issue Date: 07/13/93

Case Number : Ch931761
Lab ID Number : 1761-4
Project Number : P92057.3
Sample Description: MW-4

Sample Type : LIQUID

Analyses for TPH (Total Petroleum Hydrocarbons) as Diesel
by Method DHS GC/FID.

Results Reported in Micrograms per Liter (µg/L)

Analyte	Results	DLR
TPH(D)	ND	50

Sample DLR = DLR x DLR Multiplier, DLR Multiplier = 1

DLR: Detection Limit for the Purposes of Reporting.
Exceptional sample conditions or matrix interferences
may result in higher detection limits.

ND: None Detected

*-This sample contains lower molecular weight hydrocarbons.

**--This sample contains higher molecular weight hydrocarbons.

***-This sample contains both higher and lower molecular weight hydrocarbons.

Cynthia Pigman, QA/QC Supervisor

R920213 TPHDL.t

Jeffrey Creager, Organics Manager



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FIGURE: A-5

Environmental Services

BSK-Pleasanton
 Nahas

Date Sampled : 07/01/93
 Time Sampled : 1330
 Date Received : 07/02/93
 Date of Analysis : 07/08/93
 Report Issue Date: 07/13/93

Case Number : Ch931761
 Lab ID Number : 1761-4
 Project Number : P92057.3
 Sample Description: MW-4

Sample Type : LIQUID

Analyses for Hydrocarbon Oil & Grease by EPA Method 418.1

Results Reported in Milligram per Liter (mg/L)

Analyte	Results	DLR
Hydrocarbon Oil and Grease	1	1

Sample DLR = DLR x DLR Multiplier, DLR Multiplier = 1

DLR: Detection Limit for the Purposes of Reporting.
 Exceptional sample conditions or matrix interferences
 may result in higher detection limits.
 ND: None Detected
 --: Not Analyzed

Cynthia Pigman, QA/QC Supervisor

RS20302 OCHL

Jeffrey Creager, Organics Manager



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Environmental Services

BSK-Pleasanton
 Nahas

Date Sampled : 07/01/93
 Time Sampled : 1245
 Date Received : 07/02/93
 Date of Analysis : 07/07/93
 Report Issue Date: 07/13/93

Case Number : Ch931761
 Lab ID Number : 1761-3
 Project Number : P92057.3
 Sample Description: MW-5

Sample Type : LIQUID

**Analyses for BTEX by EPA Method 8020
 and TPH(G) by EPA Method 8015
 Prepared by Method 5030**

Results Reported in Micrograms per Liter (ug/L)

Compound	Results	DLR
Benzene	ND	0.3
Toluene	ND	0.3
Ethylbenzene	ND	0.3
Total Xylene Isomers	ND	0.3
Total Petroleum Hydrocarbons (G)	ND	50

Sample DLR = DLR x DLR Multiplier, DLR Multiplier = 1

DLR: Detection Limit for the Purposes of Reporting.
 Exceptional sample conditions or matrix interferences
 may result in higher detection limits.
 ND: None Detected


 Cynthia Pigman, QA/QC Supervisor


 Jeffrey Creager, Organics Manager

BSK-Pleasanton
 Nahas

Date Sampled : 07/01/93
 Time Sampled : 1115
 Date Received : 07/02/93
 Date of Analysis : 07/07/93
 Report Issue Date: 07/13/93

Case Number : Ch931761
 Lab ID Number : 1761-1
 Project Number : P92057.3
 Sample Description: MW-6

Sample Type : LIQUID

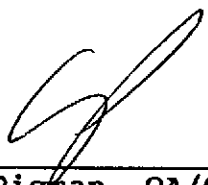
Analyses for BTEX by EPA Method 8020
and TPH(G) by EPA Method 8015
Prepared by Method 5030

Results Reported in Micrograms per Liter (ug/L)

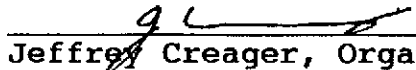
Compound	Results	DLR
Benzene	ND	0.3
Toluene	ND	0.3
Ethylbenzene	ND	0.3
Total Xylene Isomers	ND	0.3
Total Petroleum Hydrocarbons (G)	ND	50

Sample DLR = DLR x DLR Multiplier, DLR Multiplier = 1

DLR: Detection Limit for the Purposes of Reporting.
 Exceptional sample conditions or matrix interferences
 may result in higher detection limits.
 ND: None Detected



Cynthia Pigman, QA/QC Supervisor



Jeffrey Creager, Organics Manager



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Environmental Services

BSK-Pleasanton
 Nahas

Date Sampled : 07/01/93
 Time Sampled : 1140
 Date Received : 07/02/93
 Date of Analysis : 07/07/93
 Report Issue Date: 07/13/93

Case Number : Ch931761
 Lab ID Number : 1761-2
 Project Number : P92057.3
 Sample Description: MW-7

Sample Type : LIQUID

**Analyses for BTEX by EPA Method 8020
 and TPH(G) by EPA Method 8015
 Prepared by Method 5030**

Results Reported in Micrograms per Liter (ug/L)

Compound	Results	DLR
Benzene	ND	0.3
Toluene	ND	0.3
Ethylbenzene	ND	0.3
Total Xylene Isomers	ND	0.3
Total Petroleum Hydrocarbons (G)	680	50

Sample DLR = DLR x DLR Multiplier, DLR Multiplier = 1

DLR: Detection Limit for the Purposes of Reporting.
 Exceptional sample conditions or matrix interferences
 may result in higher detection limits.
 ND: None Detected


 Cynthia Pigman, QA/QC Supervisor


 Jeffrey Creager, Organics Manager

Client Name Nahas			Project or P.O.# P92057.3			Lab Use Only in this section		Analysis required							
Address 1181 Quarry Ln.			Phone # (510) 462-4000					TPH-Gasoline BTEX TPH-Diesel Oil & Grease Hyd. Hazardous sample Special handling required							
City, State, Zip Pleasanton CA			Report, attention Tim Berger			7/9/93 Remarks									
Date sampled	Time sampled	Type (See key below)	Sampled by M. Cline	Number of containers	Lab Sample number										
7/1/93	11:15	h	MW-6	2	P1	P	X	X							
	11:40	h	MW-7	2	P2	P	X	X							
	12:45	h	MW-5	2	P3	P	X	X							
	13:30	h	MW-4	5	P4	P	X	X	X	X					
	14:15	v	MW-3	2	P5	P	X	X							
7/1/93	15:00	h	MW-2	2	P6	P	X	X							

IMPORTANT NOTICE: No samples will be analyzed without an authorized signature in this section.

I am hereby requesting BSK's Normal Chain-of-Custody Procedures for the above samples. I understand that these procedures are generally consistent with those outlined in the U.S. E.P.A. SW 846 and that there is no extra charge for this service.

By: Marty Cline
Authorized Signature

I am hereby requesting BSK's Formal Chain-of-Custody Procedures for the above samples. I understand that these procedures are generally consistent with those outlined in U.S. EPA Contract Laboratory Program Statement of Work, Section F, and that there is a charge of \$50.00 per work order or \$5.00 a bottle, whichever is greater.

By: _____
Authorized Signature

Signature	Print Name	Company	Date	Time
Relinquished by <u>Marty Cline</u>	<u>Martin Cline</u>	<u>BSK & Associates</u>	<u>7/2/93</u>	<u>0805</u>
Received by				
Relinquished by				
Received by				
Relinquished by <u>[Signature]</u>	<u>Janiece Gorrison</u>	<u>BSK Labs</u>	<u>7/2/93</u>	<u>1555</u>
Received by				

BSK & Associates Chemical Laboratories

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Telephone (209) 485-8310 • Fax (209) 485-7427

KEY: Type: AQ-Aqueous SL-Studge SO-Soil PE-Petroleum OT-Other

Seals: P-Present A-Absent B-Broken

DISTRIBUTION: WHITE, CANARY - LABORATORY PINK - ORIGINATOR

Note:

Samples are discarded 14 days after results are reported unless other arrangements are made.

Hazardous samples will be returned to client or disposed of at client expense.

FIGURE: A-9