



RESNA  
INDUSTRIES

WATER WORK CORP.

91 JAN 23 AM 11:56

Paul

January 25, 1991

Mr. Barney Chan  
Alameda County Health Department  
Hazardous Waste Division  
80 Swan Way, Room 200  
Oakland, CA 94621

Re: Desert Petroleum Incorporated, Former Station No. 793  
4035 Park Boulevard, Oakland, CA

Dear Margo:

Enclosed is a copy of our report for the above referenced site.

If you have any questions or comments regarding this project,  
please contact our Escalon office at 209/838-3507.

Respectfully,  
WaterWork

*Paul H. Ketchum*

for Russell W. Juncal  
CA Registered Geologist No. 3864

JK/tdp

Enclosure

pc: Desert Petroleum, Inc.  
RWQCB-San Francisco Bay Region



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WATER WORK CORP.

PROGRESS REPORT/EVALUATION OF REMEDIATION ALTERNATIVES

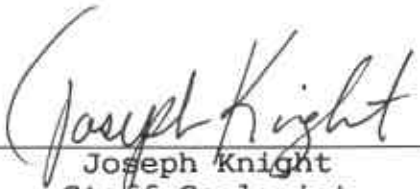
Desert Petroleum Incorporated  
Former Station No. 793  
4035 Park Boulevard  
Oakland, CA 94602


prepared for:

Desert Petroleum Incorporated  
2060 Knoll Drive  
Ventura, CA 93003

for submittal to:

Alameda County Health Department  
Hazardous Waste Division  
80 Swan Way, Room 200  
Oakland, CA 94621

  
Joseph Knight  
Staff Geologist

  
Russell W. Juncal  
CA Registered Geologist No. 3864

January 8, 1991

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## 1.0 INTRODUCTION/PREVIOUS WORK

The former Desert Petroleum station no. 793 is located at 4035 Park Boulevard in the City of Oakland, Alameda County, California (Figures 1 and 2). The station which has been leased to Mr. Jason Golpad, most recently operated under the name of J & M's Beacon Service Station. On November 30, 1989, Desert Petroleum was notified by the Alameda County Health Department (ACHD) that gasoline was leaking into a sewer on Brighton Avenue (Figure 2), near the station. This report details the work that has been done to: (1), determine the source of the gasoline leak, (2), stop the leakage of gasoline, (3), assess the extent of contamination due to leakage of gasoline and (4), remediate contamination due to the leakage of gasoline.

## 2.0 SITE DESCRIPTION

The station is located at the intersection of Park Boulevard and Hampel Road in a predominantly residential neighborhood (Figure 2). It is on the flank of a hill which slopes approximately 10 degrees to the west. The ground surface of the station itself is fairly level due to grading and a deck which is located at the western corner of the station (Figure 2). Based on the U.S.G.S. topographical map of the area, the surface elevation of the station is approximately 100 feet above mean sea level (MSL). There is an approximate 12 foot drop from the surface of the deck, at the far western corner of the station, to the ground surface below. The area beneath the deck encloses an open area, and access to the area beneath the deck can be gained from the driveway which parallels the northwest property line of the station.

Improvements at the station consist of a building, two pump islands, a waste oil tank, and three underground fuel storage tanks (Figure 2). The underground fuel storage tanks consist of an 8,000 gallon tank for regular leaded gasoline, a 10,000 gallon tank for regular unleaded gasoline and an 8,000 gallon tank for super unleaded gasoline. The age of the tanks is unknown, but is thought to be approximately 20 years. They are steel and were relined approximately four years ago. When the tanks were relined, the associated pipng was also replaced.

## 3.0 SITE HISTORY/SUMMARY OF WORK PERFORMED

On Thursday, November 30, 1989, Mr. Ariu Levi of the Alameda County Health Department notified Desert Petroleum that gasoline was detected in a sewerline on Brighton Avenue. The product appeared to be entering the line through a crack in the bottom of the sewer manway. Desert Petroleum subsequently reconstructed and audited tank inventories and sales records. The audit indicated overages on all tanks.

On Friday, December 1, 1989, Mr. Jason Golpad, the site operator, was contacted by Desert Petroleum and advised to test the fuel tanks and associated lines using an approved testing company and system.

On Wednesday, December 6, 1989, the underground storage tanks were tested. The results of these tests were inconclusive. The tank tester advised that additional testing would be required for conclusive results. Further testing was not considered worthwhile and the tanks were emptied to prevent any possible further release of product.

On Thursday, December 7, 1989 all fuel was removed from the underground storage tanks. However, the retail fueling facility had already been closed on December 5. The supply lines were pressure tested by Walton Engineering. The regular leaded and super unleaded lines passed but the regular unleaded supply line did not. Further investigation on this date verified a 1/2 inch hole in the unleaded supply line beneath the eastern pump island. Also on Thursday, December 7, 1989, an ultrasound investigation was conducted to determine the location of the sewer lines. Figure 2 shows the location of sewer lines both on-site and off-site. In addition, an on-site soil gas investigation was conducted. The results of the soil gas investigation indicate the site to be largely unimpacted by petroleum hydrocarbons. There was one hot spot associated with the pump islands and some contamination associated with the sewer line located in the western corner of the property.

On Friday, December 8, 1989, Desert Petroleum filed an Unauthorized Release Report. Drilling permits for site assessment were obtained from the Alameda County Flood Control and Water Conservation District, Zone 7. Underground Service Alert was notified and asked to locate lines on and near the site and around the sewer on Brighton Avenue (USA work order 334-954).

On December 11, 12, and 13, 1989, the drilling and sampling of six soil borings was initiated in order to assess possible contamination beneath the site. The sample results from each boring showed low levels of petroleum hydrocarbons beneath the site. These laboratory results are summarized in Table 1. Details of this work was presented in the Remediation Service International January 1990 report.

RSI's S.A.V.E. system was installed on the site on December 13, 14 and 15. This unit is a four cylinder industrial internal combustion engine which uses gasoline vapors as fuel. Vapors are supplied to the extent possible by extraction from soil gas. In the event that insufficient vapors are available from the soil and groundwater, the gasoline vapor influent from extraction wells may be combined with propane or natural gas to achieve necessary fuel levels for engine operation. Vapors and water are extracted from the

1989

soil by placing a partial vacuum on extraction wells RS-1, RS-5 and RS-6.

On July 24, 1990, WaterWork Corporation advanced two soil borings along the sewer line behind the station (Figure 2). These borings were installed to investigate the possibility that hydrocarbons were being preferentially transported along the route of the municipal sewer. Using a hand auger, sample DPOSS1 was collected from a depth of 3.5 feet below grade. The sample was analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX) and total purgeable hydrocarbon (TPHG), however, no hydrocarbons were detected. A sample from the second soil boring (DPOSS2), which was sampled at 5 feet below grade, showed low concentrations of aromatic hydrocarbons (Table 1).

On July 25, 1990, WaterWork conducted a pump test of well RS-5 at a rate of 1.1 gpm for 495 min. The test data plots and hydraulic parameter calculations are contained in Appendix I. The results of this pump test is discussed in section 5.0 Groundwater Remediation Alternatives. The static water level was measured in RS1, RS5 and RS7 (Table 2) before starting the pump test to establish the groundwater gradient beneath the site (Figure 3).

On Tuesday, August 21, 1990, WaterWork Corporation sampled two additional soil borings downgradient of the sewerline behind the station. The soil boring locations are shown on Figure 2. Boring DPO-SB1 was sampled at 5 feet below grade. Boring DPO-SB2 was sampled at 5, 10, 15 and 20 feet below grade to establish the vertical profile of hydrocarbon concentration down to the water table. The samples were analyzed for oil and grease and BTEX/TPHG. The laboratory analysis of the soil sample from DPO-SB1 indicate high levels of aromatic (BTEX) and nonaromatic gasoline hydrocarbons (Table 1). However, no oil and grease hydrocarbons were detected. Water was encountered at approximately 10 feet below grade in boring SB1. Although not collected in a manner which would yield a sample characteristic of the formation water, a grab sample of water which flowed into the boring was taken. These qualitative results are shown on Table 3. The groundwater samples from DPO-SB1 show significant levels of aromatic (BTEX) and other purgeable hydrocarbons and 42 ppm of oil and grease hydrocarbons. Logs of borings SB1 and SB2 are contained in Appendix II.

One additional boring, DP-SB3, was extended on September 19, 1990, behind the apartment complex to determine the lateral extent of the hydrocarbon contamination (Figure 2). This boring was sampled at 15 feet below grade. The sample was analyzed for BTEX/TPH as gasoline. Laboratory results from DP-SB3 indicates levels of xylenes slightly above the detection limit. No other hydrocarbon constituents were detected (Table 1). The laboratory report and chain-of-custody documentation for this sample is shown in Appendix III.

not  
in  
Table 3

#### 4.0 FOURTH QUARTER ACTIVITIES

The RSI S.A.V.E. vapor extraction/treatment system has been in operation since December 1989; its performance is summarized in Appendix IV.

Groundwater monitoring/sampling for the fourth quarter of 1990 was conducted on December 20. Monitoring data collected indicate the groundwater gradient is toward the south at a magnitude of 0.066 or 350 feet per mile (Figure 3). The monitoring data also show free product in wells RS-5, RS-6 and RS-7. This will supplement the existing vapor extraction system which removes volatile hydrocarbons from both the vadose zone and groundwater. Free product was removed by bailing approximately 15-20 gallons of product and water from each of these wells. Monitoring well RS-1 was purged by extraction of four well volumes (casing/sand pack), after which, RS-1 was sampled using a bottom emptying device. This water sample was transported to Applied Analytical to be analyzed for BTEX/TPHG by EPA method 8015/8020.

Laboratory results from RS-1 indicate benzene (3500 ppb), toluene (330 ppb), ethylbenzene (170 ppb), and total petroleum hydrocarbons as gasoline (15000 ppb) (Table 2). The laboratory report and chain-of-custody documentation is shown in Appendix III. The next quarterly sampling round will be conducted in March 1991.

#### 5.0 GROUNDWATER REMEDIATION ALTERNATIVES

##### 5.1 Hydraulic Control

Investigation to date has indicated the shallow groundwater has been impacted by the release of petroleum hydrocarbons. No surface water bodies occur within a quarter mile radius of the site and none are threatened. Perched groundwater in the area occurs within low permeability sediments (as indicated by boring logs as well as the enormous gradient in shallow groundwater) which is most likely recharged by the sewer lines both on-site and off-site, and is not used beneficially. The presence of hydrocarbons in the subsurface off-site is strongly correlated with the rout of sewer lines. Additionally, the water level in well RS-7 is the exact elevation of the water level in the adjacent sewer line. These observations suggest the sewer or sewer line backfill is acting as a preferential conduit for hydrocarbon migration.

The remediation strategy for the site includes two components:

1. Control of hydrocarbon movement in the vadose and saturated zones.

## 2. Removal or demobilization of residual hydrocarbon.

The remediation of groundwater at the site will require some pumping and subsequent treatment. This will supplement the existing vapor extraction system which removes volatile hydrocarbons from both the vadose zone and groundwater. A containment alternative, such as slurry wall construction was not considered based on both operational considerations and the very high cost. The hydrologic data indicates that pumping from RS-5 at approximately 1.1 gpm will not provide a capture zone capable of completely recovering the hydrocarbon plume in groundwater, as presently defined (Appendix I). A small area of free product is also present on site, however thicknesses are too small to be effectively recovered by down hole skimming and will be recovered by the vapor extraction system.

Because pumping from RS-5 alone will probably not control plume movement entirely, two additional recovery wells are proposed. These wells will be placed along the suspected path of migration (sewerline) and downgradient of the station. These recovery wells would be installed with the property owners permission at the approximate locations shown on Figure 2. The depth of the wells would be approximately 20-25 feet below grade.

Due to the low flow rates pumping and potentially explosive environment, a pneumatic type pump is proposed for groundwater depression. The pump will convey fluid in underground conduit to the treatment compound where it will enter a separator to remove any free product. The water stream will then flow to the actual treatment system. Separated product will be stored in a double contained tank and removed monthly.

Once plume containment is achieved by the pumping system, several alternatives exist for treatment of the produced water and any associated off-gasses. Also several options are available for disposal of the treated water. These alternatives are discussed below.

### 5.2 Water Treatment/Disposal

Two alternatives were considered for removing dissolved hydrocarbons from the pumped groundwater. These are, (1) activated carbon adsorption and (2) air stripping with off-gas treatment. The air stripping option was considered with several off-gas treatment alternatives including: vapor phase carbon adsorption thermal oxidation, catalytic oxidation and internal combustion.

Each of the water treatment and off-gas treatment alternatives are proven effective methodologies, which are well documented in the literature. The only hydrocarbon destruc-



tion technology, which may not be applicable at the site, is catalytic oxidation. This is because it is not generally recommended if concentrations exceed approximately 3000 ppm TPHG.

Each of the treatment technologies are capable of removing greater than 99% of the dissolved hydrocarbons and are essentially equivalent in the terms of meeting discharge limitations. Because the PSI GAVE unit with water treatment capability is already on-site it is the clearly preferred alternative for treatment.

Three disposal options for the treated water have been considered for the site, 1) disposal to the City waste water treatment system, 2) disposal to the City storm sewer system and 3) reinjection on or adjacent to the property.

Discussions with the City of Oakland are necessary to evaluate the first disposal option. The third option while desirable in terms of aiding the recovery of the dissolved plume, requires an injection point upgradient of the dissolved plume. Although recent monitoring results suggest the area near MW1 could be utilized for an injection well or infiltration gallery, this must be confirmed by additional sampling since the initial round of samples from MW1 indicated some dissolved hydrocarbon was present. The investigation results of the pending off site drilling are also needed to evaluate this option.

The only water disposal option which presently appears viable is discharge to the storm sewer system. A discharge permit is currently being investigated.

## 6.0 COMPARISON OF INTERIM REMEDIAL ACTION ALTERNATIVES

The objective of any remedial action is to eliminate or reduce risk to humans and the environment. The primary focus of the remedial action plan at this site is to control the spread of free product and/or groundwater containing high concentrations of dissolved product away from the source area (underground tank pit).

The remediation alternatives have been compared and evaluated according to the following criteria.

1. Level of protection of human health and the environment, including beneficial uses of ground and surface waters.
2. Reduction of toxicity, mobility and volume of contaminants.
3. Compliance with regulatory guidelines.
4. Cost effectiveness.

5. Short term effectiveness.
6. Long term effectiveness.
7. Implementability.
8. Regulatory and Community acceptance.
9. Impacts on water conservation.

As discussed in section 5.2 a pump and treat approach is the obvious choice for interim remediation. Between the treatment options for the recovered water (activated carbon or air stripping) the nine criteria above do not discriminate. Similarly, the off-gas treatment alternatives which would be proposed (catalytic oxidation, vapor phase carbon absorption or thermal oxidation) are equivalent in terms of these criteria. With respect to impacts on water conservation it could be argued that reinjection of the treated water is somewhat more favorable than discharge to the storm sewer, however the impact is negligible for the quantities proposed for treatment. Moreover, as discussed in section 5.2 reinjection is not feasible at the site until further investigation in the upgradient direction is complete.

#### 7.0 RECOMMENDED INTERIM REMEDIAL ACTION

Based on review of the technically feasible alternatives the recommended interim remedial action for the site is pumping of groundwater from existing wells RS-5 and , RS-6 and future wells, RS-8 and RS-9, surface product separation, removal of dissolved hydrocarbons by air stripping and combustion, and subsequent discharge to either the City's sewer or storm drain system or an upgradient well.

This approach meets the criteria of protection human health and the environment. Hydrologic analysis indicates pumping from the recovery wells will prevent the further downgradient movement of dissolved hydrocarbons in the groundwater as well as recovering the free product source. The ongoing vapor extraction system will jointly recover hydrocarbons from soils and groundwater at the site.

Implementation of this program will entail the installation of four pneumatic pumping systems which will convey fluids to the fenced treatment compound at the rear of the station building. Free product will be separated from the water stream which will then be treated prior to discharge.

A monitoring/sampling program for the system effluent will be implemented in accordance with discharge requirements. System operational data, including the volume of free product recovered and water treated, will be included in regular quarterly monitoring reports for the site.

Table 1  
Desert Petroleum-Oakland  
Laboratory Analysis-Soil  
(in ppm)

Date	Sample ID	B	T	E	X	TPHG	O&G
07/24/90	DPO-SS1-3.5'	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (1.0)	NA
	DPO-SS2-5.0'	<del>0.0050</del>	ND (0.0050)	ND (0.0050)	0.011	ND (1.0)	NA
08/21/90	DPO-SB1-5.0'	2.5	17	9.4 ✓	47 ✓	<del>ND</del>	ND (30)
	DPO-SB2-5.0'	<del>0.051</del>	1.4	0.92	4.4	<del>ND</del>	ND (30)
	DPO-SB2-10'	<del>0.05</del> ✓	21 ✓	5.0	4.3	<del>ND</del>	ND (30)
	DPO-SB2-15'	<del>0.052</del>	0.13	0.019	0.099	ND (1.0)	ND (30)
	DPO-SB2-20'	<del>0.050</del>	0.033	0.0076	0.030	ND (1.0)	ND (30)
09/19/90	DP-SB3-15'	ND (0.0050)	ND (0.0050)	ND (0.0050)	0.0073	ND (1.0)	NA

Note: ppm = Parts Per Million  
 B = Benzene  
 T = Toluene  
 E = Ethylbenzene  
 X = Xylenes  
 TPHG = Total Petroleum Hydrocarbons as Gasoline  
 O&G = Oil and Grease  
 ND = None Detected  
 NA = Not Analyzed

Table 2  
Well Elevation  
Desert Petroleum-Oakland

Well #	Elevation* (MSL)	Depth to Water	Water Elevation
-----			
07/25/90			
RS1	100.18	14.0	86.18
RS5	99.44	19.415	80.025
RS7	67.88	4.16	63.72
12/20/90			
RS1	100.18	17.17	83.01
RS5	99.44	21.0	78.44
RS7	67.88	4.12	63.7

\* MSL Elevation is based on assumption that arbitrary datum is 100 feet above MSL (Oakland East Quad)

Table 3  
Desert Petroleum-Oakland  
Laboratory Analysis-Water  
(in ppb)

Date	Sample ID	B	T	E	X	TPHG
12/14/89	RS-1	2,600	2,700	200	1,200	19,000
	RS-5	3,100	4,300	670	3,400	57,000
	RS-6	1,400	1,700	160	860	11,000
07/18/90	RS-7	24,000	210,000 ✓	50,000 ✓	740,000 ✓	5,600,000 ✓
08/21/90	DP-SB1-W	110,000 ✓	130,000	13,000	73,000	740,000
12/20/90	RS-1	3,500	330	170	760	15,000

Note: ppb = Parts Per Billion  
 B = Benzene  
 T = Toluene  
 E = Ethylbenzene  
 X = Xylenes  
 TPHG = Total Petroleum Hydrocarbons as Gasoline  
 NA = Not Analyzed

Also:  
 42ppm O+G in SB-1 on 8-21-90

# WATERWORK



## Legend



Site Location

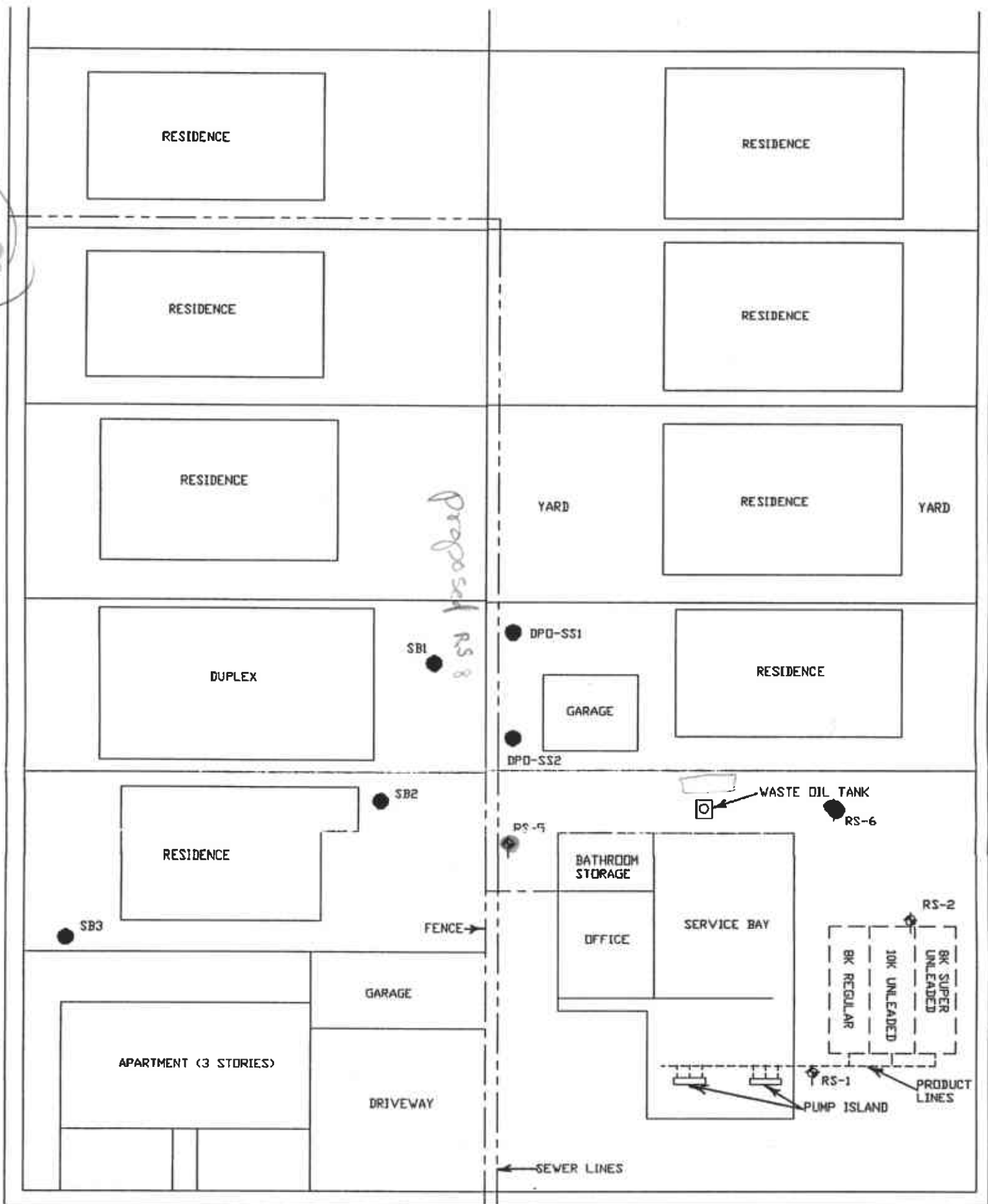
Figure 1  
Site Location Map  
Desert Petroleum SS#793  
4035 Park Boulevard  
Oakland, CA



Scale in Feet



0 2640



BRIGHTON AVENUE

HAMPEL STREET

MEDIAN PARK BOULEVARD MEDIAN

LEGEND:

- SB2 WATERWORK SOIL BORING
- RS-7 MONITORING WELL

SCALE IN FEET

0 30

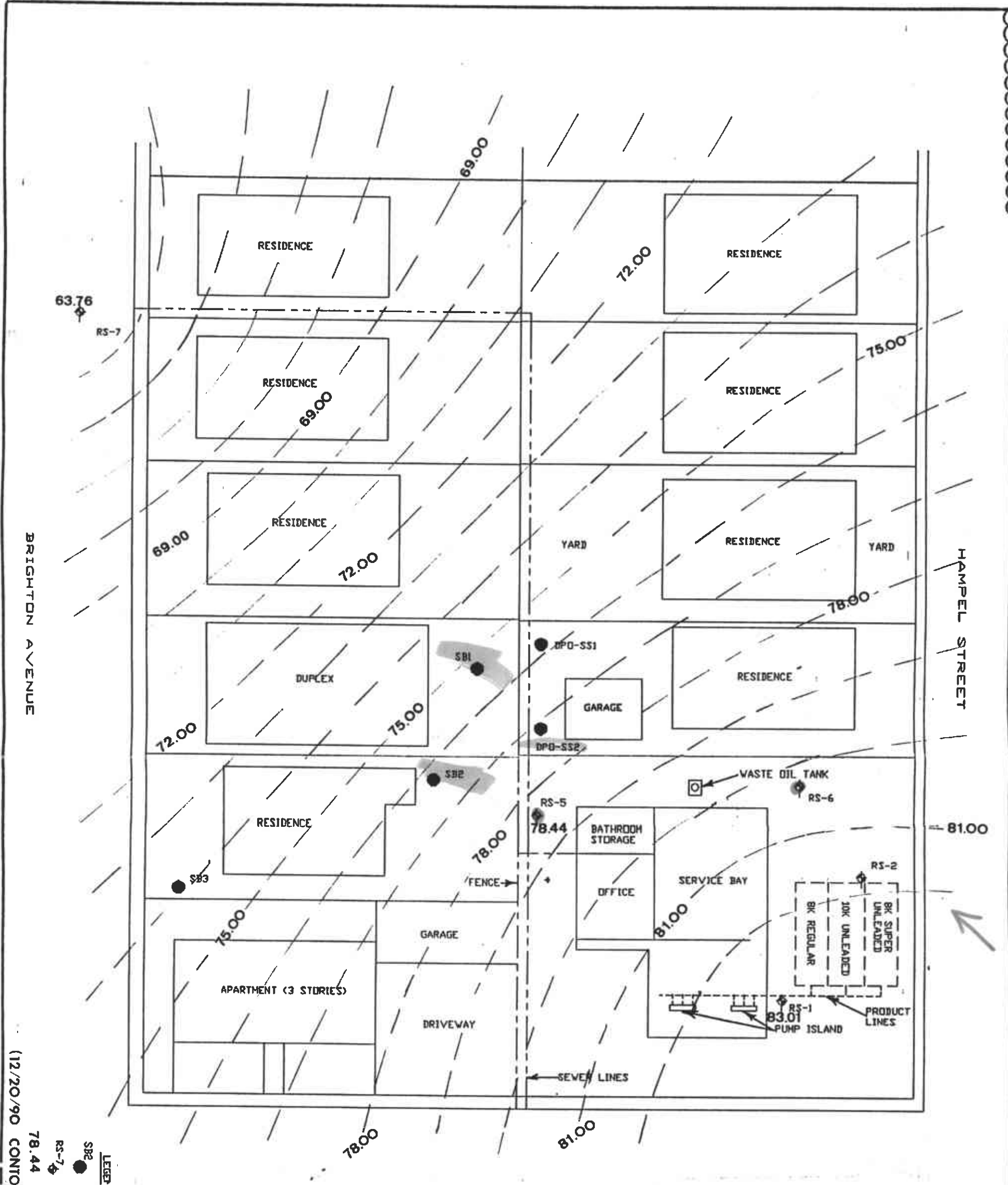


SITE PLAN  
 DESERT PETROLEUM SS#793  
 4035 PARK BOULEVARD  
 OAKLAND, CA

FIGURE 2



Gradient

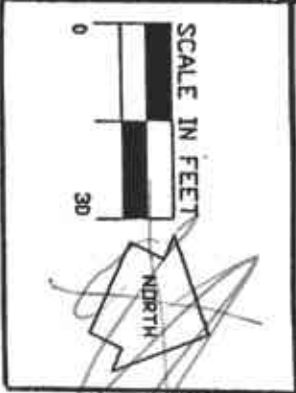


LEGEND

- WATERWORK SOIL BORING
- ◆ MONITORING WELL
- 78.44 GROUNDWATER ELEVATION
- (12/20/90 CONTOUR INTERVAL 1.0)

MEDIAN PARK BOULEVARD MEDIAN

7 # Super pump  
 1 # Low pump



GROUNDWATER GRADIENT MAP  
 DESERT PETROLEUM SS#793  
 4035 PARK BOULEVARD  
 OAKLAND, CA

FIGURE 3

Formation Parameters Calculated from a 1.1 gpm Constant Rate Test  
(Cooper-Jacob Method)

Pumping Well RS-5:

Slope of semilog straight line = 3.5'/cycle

$$T = 264 Q \div M = 83 \text{ gallons/day/ft}$$

where T = Transmissivity  
Q = Pumping rate in gallons/minute  
M = Slope of semilog straight line

\*Observation Well RS-6:

$$M = 0.11 \text{ (see attached figure)}$$
$$T = 2640 \text{ gallons/day/ft}$$

Using  $t_0$  from the semilog plot = 150 minutes

$$\text{Storage coefficient} = S = 0.3 T t_0 \div r^2 = 0.01$$

where  $t_0$  = intercept of the semilog straight line at zero drawdown (in days)

r = distance from observation well to the pumping (in feet)

An estimate of a reasonable capture zone range due to pumping well RS-5 at 1.1 gpm can be made using the two calculated transmissivity values above.

The maximum pumping rate used below is based on pump test extrapolation of the long term sustainable pumping rate from RS-5.

$$V_n = \text{Natural groundwater velocity} = Ki \div \sigma' = Ti \div b\sigma'$$

where K = Hydraulic conductivity  
T = Transmissivity  
b = Saturated thickness  
 $\sigma'$  = Porosity  
i = gradient

Using a saturated thickness of 20.0 feet in RS-5, the two transmissivities calculated from the pump test (83 and 2640 gpd/ft) and the gradient calculated from Figure 3;

$$V_n = 0.123 - 3.91 \text{ ft/day}$$

$V_p$  = groundwater velocity induced by pumping at a given radius (r) from the pumping well =

$$Q \div 2\pi r b \sigma'$$

where Q = Pumping rate

At the down gradient edge of the capture zone (r) the natural velocity ( $V_n$ ) equals the pumping induced velocity ( $V_p$ ), therefore

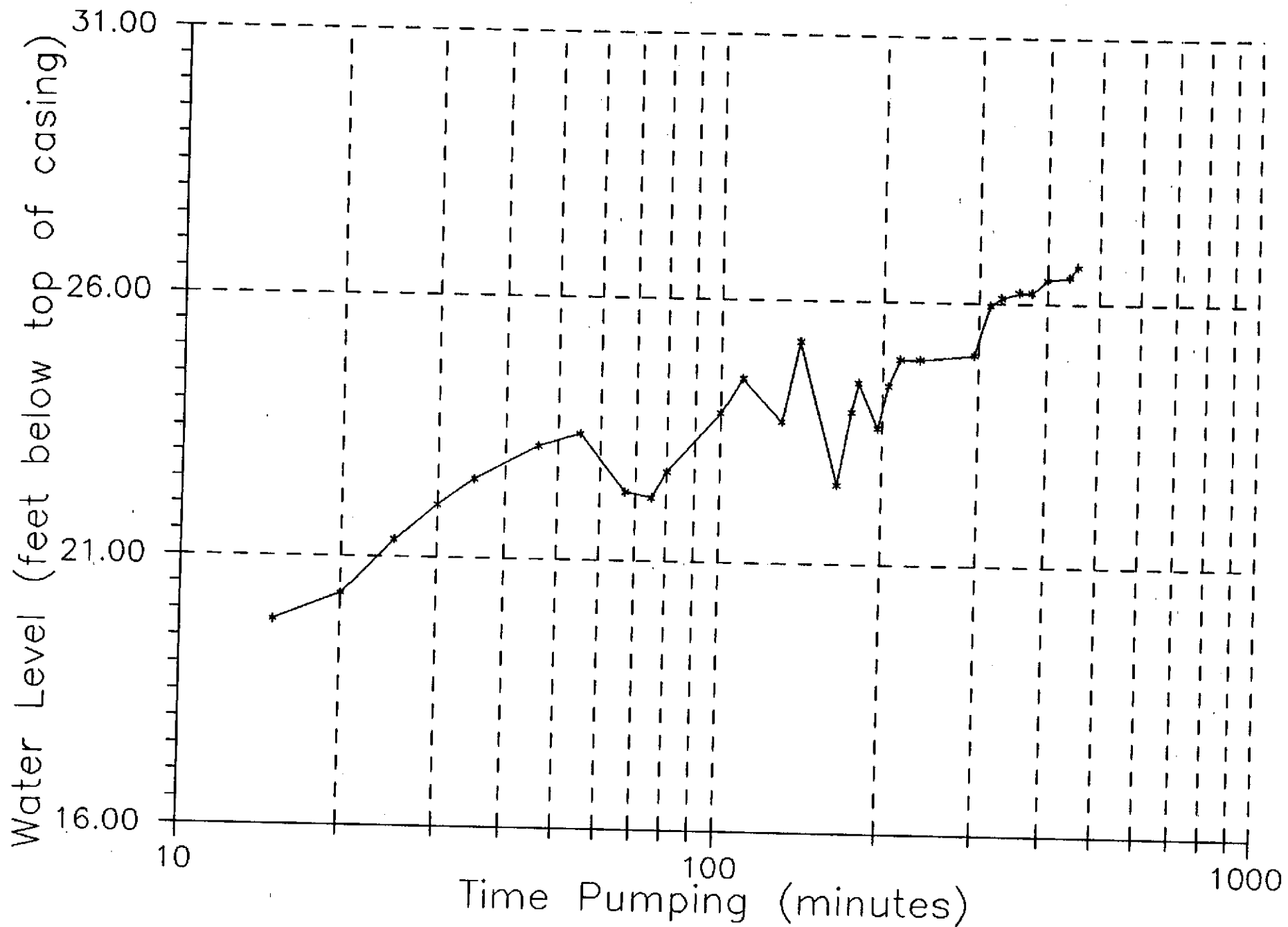
$$K_i \div \theta = Q - 2\pi r b \theta, \text{ or}$$
$$0.123 - 3.91 \text{ ft/day} = 228 \text{ ft}^3/\text{day} - 31.1 (r)$$

OR

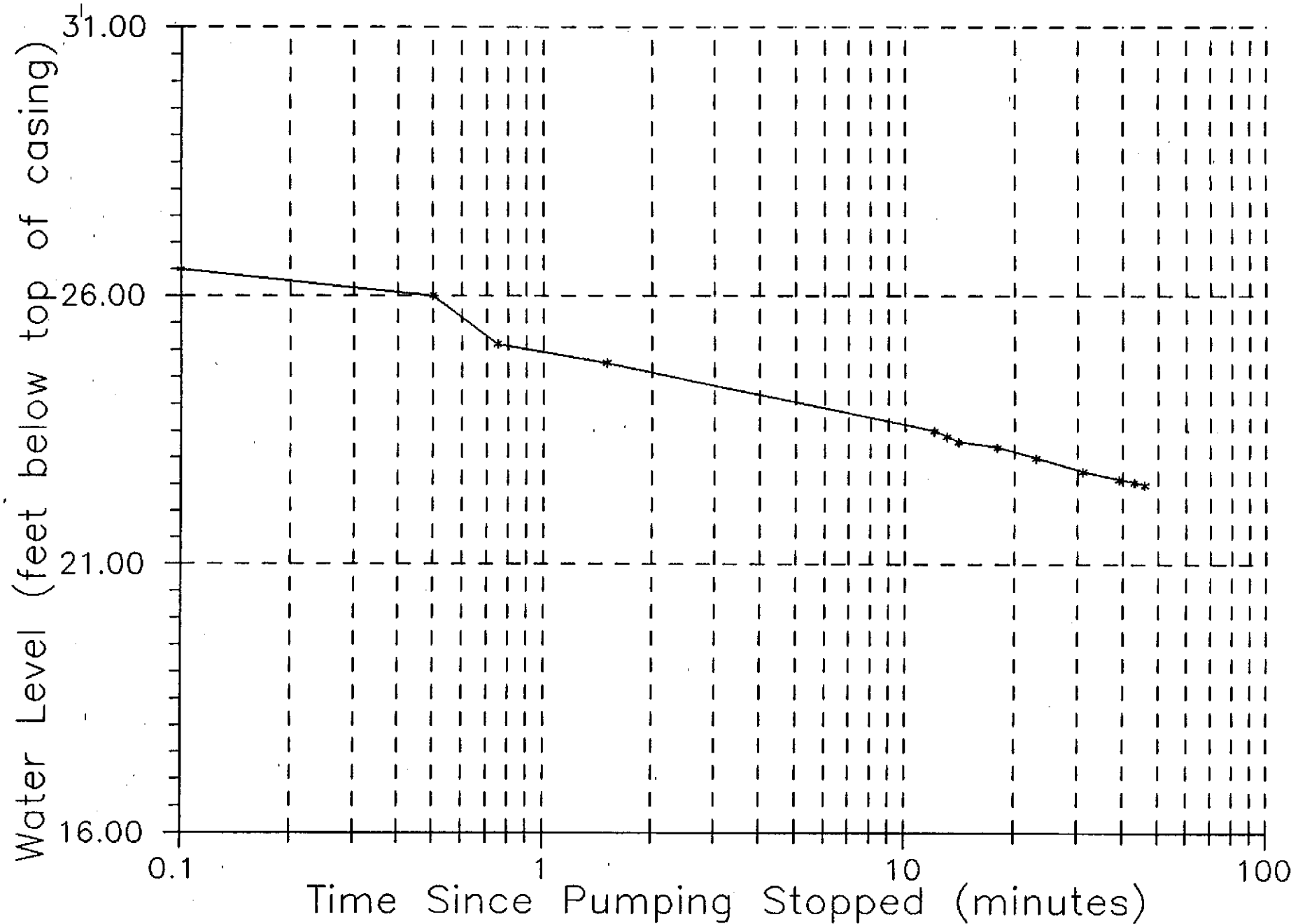
$r = 13.7 - 0.43$  feet = down gradient edge of capture zone due to the pumping of well RS-5 at 1.1 gpm.

\* = Based on the very large gradient observed at the site and the observed soil types in the borings it appears that the T value derived from the RS-6 observation data is probably not representative of the conditions at the site.

# Well RS-5 Pumping Test



# Well RS-5 Pumping Test - RECOVERY DATA



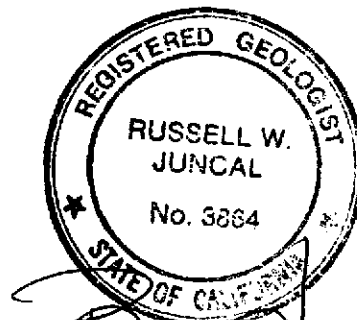
# WATERWORK

## WELL/BORING LOG

PROJECT DESERT PETROLEUM-OAKLAND LOCATION 4035 PARK BOULEVARD, OAKLAND, CA PROJECT NO. 60330-1  
 WELL/BORING NO. SB1 SURFACE ELEVATION NS FT WELLHEAD ELEVATION NS FT  
 DATE DRILLED 08/21/90 REVIEWED BY RUSSELL W. JUNCAL, RG 3864 LOGGED BY JOE KNIGHT  
 DRILLING COMPANY --- DRILLER JOE KNIGHT METHOD HAND AUGER  
 BORE HOLE DIAMETER 2 IN DEPTH DRILLED 11.5 FT DEPTH TO WATER: INITIAL 10 FT STATIC --- FT  
 CASING TYPE --- DIAMETER --- IN SCHEDULE --- INTERVAL --- FT TO --- FT  
 SCREEN TYPE --- DIAMETER --- IN SLOT SIZE --- IN INTERVAL --- FT TO --- FT  
 FILTER PACK TYPE --- INTERVAL --- FT TO --- FT  
 SURFACE SEAL TYPE BACKFILL INTERVAL 0 FT TO 11.5 FT

NOTES

WELL DETAIL	DEPTH (FT.)	PID (PPM)	SAMPLE ID BLOWCOUNT	U.S.G. LOG	SOIL DESCRIPTION
	0				0-2/3' SANDY ORGANIC SOIL; >95% SR-R, F, M-HRD SND; PRLY GRDD; <5% FNS; DRK YLLW BRN; NPD; ORG; MST; N HCL REACTION; HOMO
	2			OL/OH	2/3-4/5.5' LEAN/FAT CLAY; <5% SND; >95% FNS; M-H DRY STRNGTH; N-SLV DLTN-CY; M-H TGHNS; M-H PLST; M YLLW BRN; SL-M PD; N ORG; MST; WEAK HCL REACTION; HOMO
	4			CL/CH	
	6	10	DP-SB1-5'		4/5.5-11.5' SANDY SILT/SILTY SAND; <45% SR-R, F, HRD SND; PRLY GRDD; >55% FNS; L-M DRY STRNGTH; SLV-R DLTN-CY; L-M TGHNS; M-H PLST; DRK YLLW ORNG; N-SL PD; N ORG; MST; N HCL REACTION; HOMO; FEDEX MTT-LING
	8			ML/SM	
	10				
	12				
	14				
	16				
	18				
	20				
	22				
	24				
	26				
	28				
	30				
	32				
	34				
	36				
	38				
	40				
	42				



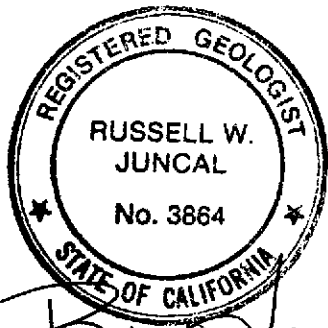
*Russell W. Juncal*

# WATERWORK

## WELL/BORING LOG

PROJECT DESERT PETROLEUM-OAKLAND LOCATION 4035 PARK BOULEVARD, OAKLAND, CA PROJECT NO. 60330-1  
 WELL/BORING NO. SB2 SURFACE ELEVATION NS FT WELLHEAD ELEVATION NS FT  
 DATE DRILLED 08/21/90 REVIEWED BY RUSSELL W. JUNCAL, RG 3864 LOGGED BY JOE KNIGHT  
 DRILLING COMPANY --- DRILLER JOE KNIGHT METHOD HAND AUGER  
 BORE HOLE DIAMETER 2 IN DEPTH DRILLED 23 FT DEPTH TO WATER: INITIAL --- FT STATIC --- FT  
 CASING TYPE --- DIAMETER --- IN SCHEDULE --- INTERVAL --- FT TO --- FT  
 SCREEN TYPE --- DIAMETER --- IN SLOT SIZE --- IN INTERVAL --- FT TO --- FT  
 FILTER PACK TYPE --- INTERVAL --- FT TO --- FT  
 SURFACE SEAL TYPE BACKFILL INTERVAL 0 FT TO 23 FT  
 NOTES

WELL DETAIL	DEPTH (FT.)	PID (PPM)	SAMPLE ID BLOWCOUNT	U.S.G. LOG	SOIL DESCRIPTION
	0				0-2/3' SANDY ORGANIC SILT; >95% SR-R, F, HRD SND; PRLY GRDD; <5% FNS; DRK YLLW BRN; NPC; ORG; MST; N HCL REACTION; HOMO
	2			OL/DH	2/3-4/5.5' LEAN/FAT CLAY; <5% SND; >95% FNS; M-H DRY STRNGTH; N-SLW DLTNCY; M-H TGHNSS; M-H PLST; M YLLW BRN; SL-M PQ; N ORG; MST; WEAK HCL REACTION; HOMO
	4	15	DP-SB2-5'		4/5.5-23' SANDY SILT/SILTY SAND; <45% SR-R, F, HRD SND; PRLY GRDD; >55% FNS; L-M DRY STRNGTH; SLW-R DLTNCY; L-M TGHNSS; M-H PLST; DRK YLLW BRN; N-SL PQ; N ORG; MST; N HCL REACTION; HOMO
	6				
	8				
	10		DP-SB2-10'		
	12				
	14			ML/SM	
	16		DP-SB2-15'		
	18				
	20	6	DP-SB2-20'		
	22				
	24				
	26				
	28				
	30				
	32				
	34				
	36				
	38				
	40				
	42				



*Russell W. Juncal*

# APPLIED ANALYTICAL

## Environmental Laboratories

42501 Albrae St., Suite 100  
Fremont, CA 94538  
Bus: (415) 623-0775  
Fax: (415) 651-8647

### ANALYSIS REPORT

1020lab.frm

Attention: Mr. Joe Knight  
Water Work  
2350A Walsh Avenue  
Santa Clara, CA 95051  
Project: AGS 19511-L, Project #330  
DP Oakland

Date Sampled: 12-20-90  
Date Received: 12-23-90  
BTEX Analyzed: 01-02-91  
TPHg Analyzed: 01-02-91  
TPHd Analyzed: NR  
Matrix: Water

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	10	10	10	10	1000	100

#### SAMPLE

#### Laboratory Identification

RS-1 W1012443	3500	330	170	760	15000	NR
------------------	------	-----	-----	-----	-------	----

ppb = parts per billion =  $\mu\text{g/L}$  = micrograms per liter.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

NR = Analysis not requested.

#### ANALYTICAL PROCEDURES

**BTEX**— Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

**TPHg**—Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

**TPHd**—Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

  
\_\_\_\_\_  
Laboratory Representative

\_\_\_\_\_  
January 7, 1991

\_\_\_\_\_  
Date Reported





**COPY**

Coast-to-Coast Analytical Services

Coast-to-Coast Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number: G-2643-1  
Collected: 07/18/90  
Received: 07/19/90  
Tested: 07/29/90  
Collected by: R. Juncal

Fuel Fingerprint Analysis - CAL DHS TPH DRAFT & EPA METHOD 8240/8260 (GC/MS)  
EXTRACTED BY EPA METHOD 5030 (purge-and-trap)\*\*

ATTN: R. W. Juncal  
Waterwork  
1710 Main Street  
Escalon,

SAMPLE DESCRIPTION:  
260 Desert Petroleum, Oakland, Liquid From  
Well RS-7, Water Layer Under Floating Free  
Product

Compound Analyzed	Detection Limit in ug/L (PQL)*	Concentration in ug/L
Benzene	5.	24000.
Toluene	5.	210000.
Ethylbenzene	5.	50000.
Xylenes	5.	740000.
1,2-Dichloroethane (EDC)	5.	not found
Ethylene Dibromide (EDB)	5.	not found
-----		
TOTAL PURGEABLE PETROLEUM HYDROCARBONS (Gasoline).....	200.	5600000.
(Diesel #2, Stoddard Solvent, Kerosene, Jet Fuel, Mineral Spirits)..	200.	<200.
-----		
BTX as a Percent of Fuel		17.
Percent Surrogate Recovery		130.

\*(Practical Quantitation Limit)  
\*\*Soil samples sonicated during extraction.

NOTE: High concentration of some analytes caused the sample to be run diluted, resulting in raised Practical Quantitation Limits for analytes. Refer to instrument blank for undiluted Practical Quantitation Limits.

MSD#7  
08/01/90  
G2643f1.wr1/68  
MH/jl/jl/co

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES  
*Mary Havlicek*  
Mary Havlicek, Ph.D., President

Coast-to-Coast Analytical Services

Coast-to-Coast Analytical Services 141 Suburban Road San Luis Obispo, California 93401 (805) 543-2553

Lab Number: G-2643-2 Collected: 07/18/90 Received: 07/19/90 Tested: 08/06/90 Collected by: R.W. Juncal

TOTAL PETROLEUM HYDROCARBON ANALYSIS EPA METHOD 625/8270 (GC/MS)

ATTN: R. W. Juncal Waterwork 1710 Main Street Escalon, CA 95320

SAMPLE DESCRIPTION: 260 Desert Petroleum, Oakland, Liquid From Well RS-7, Free Product

Table with 3 columns: Component Determined, Practical Quantitation Limit in percent, Concentration in percent. Rows include TOTAL PETROLEUM HYDROCARBONS (Gasoline), TOTAL PETROLEUM HYDROCARBONS (Motor Oil), TOLUENE, ETHYLBENZENE, and XYLENES.

The values presented are developed by comparison of sample extracts with a simulated extract prepared from authentic Motor Oil and Gasoline. Internal standards are employed for greater accuracy. Sample was extracted by EPA Method 3580.

\*Semiquantitative

MSD#5 08/14/90 G2643tp2.wr1/51 MH/dp/dc/co

Respectfully submitted, COAST-TO-COAST ANALYTICAL SERVICES

Mary Havlicek, Ph.D. President

Coast-to-Coast  
Analytical  
Services

Coast-to-Coast  
Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number: B-07290-1  
Collected:  
Received:  
Tested: 07/29/90  
Collected by:

Fuel Fingerprint Analysis - CAL DHS TPH DRAFT & EPA METHOD 8240/8260 (GC/MS)  
EXTRACTED BY EPA METHOD 5030 (purge-and-trap)\*\*

CCAS

SAMPLE DESCRIPTION:  
METHOD BLANK

Compound Analyzed	Detection Limit in ug/L (PQL)*	Concentration in ug/L
Benzene	0.1	not found
Toluene	0.5	not found
Ethylbenzene	0.5	not found
Xylenes	0.5	not found
1,2-Dichloroethane (EDC)	0.1	not found
Ethylene Dibromide (EDB)	0.1	not found
Methyl-tert-Butyl Ether (MTBE)	0.1	not found
-----		
TOTAL PURGEABLE PETROLEUM HYDROCARBONS (Gasoline).....	50.	<50.
(Diesel #2, Stoddard Solvent, Kerosene, Jet Fuel, Mineral Spirits)...	50.	<50.
-----		
BTX as a Percent of Fuel		not applicable
Percent Surrogate Recovery		110.

\*(Practical Quantitation Limit)  
\*\*Soil samples sonicated during extraction.

MSD#7  
08/01/90  
B07290f1.wr1/68  
MH/j1/j1/co

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES  
*Mary Havlicek*  
Mary Havlicek, Ph.D., President

Coast-to-Coast  
Analytical  
Services

Coast-to-Coast  
Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number: S-07290-2  
Collected:  
Received:  
Tested: 07/29/90  
Collected by:

Fuel Fingerprint Analysis - CAL DHS TPH METHOD & EPA 8240/8260 (GC/MS)  
EXTRACTED BY EPA METHOD 5030 (purge-and-trap)\*\*

CCAS

SAMPLE DESCRIPTION:  
1/2X STD. (#072990-2) BTE, EDB, EDC, MTBE  
@ 2.0 ug/L & Xylenes @ 8.0 ug/L

Compound Analyzed	Detection Limit in ug/L (PQL)*	Concentration w/spike in ug/L	Percent Recovery
Benzene	0.1	2.6	130.
Toluene	0.5	2.0	100.
Ethylbenzene	0.5	2.0	100.
Xylenes	0.5	8.1	101.
1,2-Dichloroethane (EDC)	0.1	1.7	85.
Ethylene Dibromide (EDB)	0.1	1.6	80.
Methyl-tert-Butyl Ether	0.1	1.7	85.

TOTAL PURGEABLE PETROLEUM HYDROCARBONS  
(Gasoline).....50. not applicable

(Diesel #2, Stoddard Solvent,  
Kerosene, Jet Fuel, Mineral Spirits)...50. not applicable

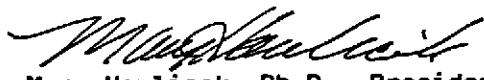
BTX as a Percent of Fuel not applicable

Percent Surrogate Recovery 106.

\*(Practical Quantitation Limit)  
\*\*Soil samples sonicated during extraction.

MSD#7  
08/01/90  
S07290f2.wr1/68  
MH/jl/jl/co

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES

  
Mary Havlicek, Ph.D., President

Coast-to-Coast  
Analytical  
Services

Coast-to-Coast  
Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number: QS-07290-1  
Collected:  
Received:  
Tested: 07/29/90  
Collected by:

Fuel Fingerprint Analysis - CAL DHS TPH METHOD & EPA 8240/8260 (GC/MS)  
EXTRACTED BY EPA METHOD 5030 (purge-and-trap)\*\*

CCAS

SAMPLE DESCRIPTION:  
ANALYTE-FREE SOIL SPIKE, Spiked  
to 0.040 mg/Kg with VOA Stock

Compound Analyzed	Detection Limit in mg/Kg (PQL)*	Concentration w/spike in mg/Kg	Percent Recovery
Benzene	0.001	0.041	103.
Toluene	0.001	0.050	125.
Ethylbenzene	0.001	0.045	113.
Xylenes	0.001	0.046	115.
1,2-Dichloroethane (EDC)	0.001	0.058	145.
Ethylene Dibromide (EDB)	0.001	0.058	145.
Methyl-tert-Butyl Ether	0.001	0.054	135.

TOTAL PURGEABLE PETROLEUM HYDROCARBONS  
(Gasoline).....0.05 not applicable

(Diesel #2, Stoddard Solvent,  
Kerosene, Jet Fuel, Mineral Spirits)....0.05 not applicable

BTX as a Percent of Fuel not applicable

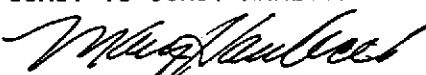
Percent Surrogate Recovery 118.

\*(Practical Quantitation Limit)

\*\*Soil samples sonicated during extraction.

MSD#7  
08/01/90  
QS0729f1.wr1/68  
MH/ec/jl/co

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES

  
Mary Havlicek, Ph.D., President

Coast-to-Coast  
Analytical  
Services

Coast-to-Coast  
Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number: QS-07290-2  
Collected:  
Received:  
Tested: 07/29/90  
Collected by:

Fuel Fingerprint Analysis - CAL DHS TPH METHOD & EPA 8240/8260 (GC/MS)  
EXTRACTED BY EPA METHOD 5030 (purge-and-trap)\*\*

CCAS

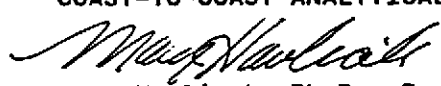
SAMPLE DESCRIPTION:  
ANALYTE-FREE SOIL SPIKE, Spiked  
to 0.08 mg/Kg with Gasoline

Compound Analyzed	Detection Limit in mg/Kg (PQL)*	Concentration w/spike in mg/Kg	Percent Recovery
Benzene	0.001	0.003	100.
Toluene	0.001	0.010	100.
Ethylbenzene	0.001	0.003	97.
Xylenes	0.001	0.015	100.
1,2-Dichloroethane (EDC)	0.001	not spiked	-----
Ethylene Dibromide (EDB)	0.001	not spiked	-----
Methyl-tert-Butyl Ether	0.001	not spiked	-----
-----			
TOTAL PURGEABLE PETROLEUM HYDROCARBONS (Gasoline).....	0.05	0.09	113.
(Diesel #2, Stoddard Solvent, Kerosene, Jet Fuel, Mineral Spirits)....	0.05	<0.05	-----
-----			
BTX as a Percent of Fuel		31.	-----
Percent Surrogate Recovery			114.

\*(Practical Quantitation Limit)

\*\*Soil samples sonicated during extraction.

MSD#7  
08/01/90  
QS0729f2.wr1/68  
MH/jl/jl/co

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES  
  
Mary Havlicek, Ph.D., President

Coast-to-Coast  
Analytical  
Services

Coast-to-Coast  
Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number: QS-0729-3  
Collected:  
Received:  
Tested: 07/29/90  
Collected by:

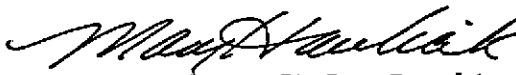
Fuel Fingerprint Analysis - CAL DHS TPH METHOD & EPA 8240/8260 (GC/MS)  
EXTRACTED BY EPA METHOD 5030 (purge-and-trap)\*\*

CCAS

SAMPLE DESCRIPTION:  
ANALYTE-FREE WATER SPIKE, Spiked  
to 2.0 ug/L with VOA Stock

Compound Analyzed	Detection Limit in ug/L (PQL)*	Concentration w/spike in ug/L	Percent Recovery
Benzene	0.1	1.7	85.
Toluene	0.5	2.5	125.
Ethylbenzene	0.5	2.4	120.
Xylenes	0.5	2.6	130.
1,2-Dichloroethane (EDC)	0.1	1.8	90.
Ethylene Dibromide (EDB)	0.1	1.7	85.
Methyl-tert-Butyl Ether	0.1	1.8	90.
-----			
TOTAL PURGEABLE PETROLEUM HYDROCARBONS (Gasoline).....	50.	not applicable	
(Diesel #2, Stoddard Solvent, Kerosene, Jet Fuel, Mineral Spirits)...	50.	not applicable	
-----			
BTX as a Percent of Fuel		not applicable	
Percent Surrogate Recovery		106.	
=====			
*(Practical Quantitation Limit)			
**Soil samples sonicated during extraction.			

MSD#7  
08/01/90  
QS7290f3.wr1/68  
MH/ec/re/co

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES  
  
Mary Havlicek, Ph.D., President



CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

PROJ. NO. 260		PROJECT NAME DESERT PETROLEUM - OAKLAND				NO. OF CON- TAINERS 2	*ANALYSIS TYPE REQUESTED				
SAMPLERS: (Signature) RW Juncal JK.							FUEL FINGERPRINT * TPH by B270 *				
I.D. NO.	DATE	TIME	COMP	GRAB	STATION & LOCATION	REMARKS					
DPD- R57	7-18-90	1310		✓	LIQUID FROM WELL RS-7	✓	✓				SG-2643-1 & 2 *RUN FUEL FINGERPRINT ON WATER FRACTION; TPH (BY B270) ON PRODUCT FRACTION. WE BELIEVE MULTIPLE PRODUCT TYPES MAY BE INVOLVED; PLEASE DIFFERENTIATE IF POSSIBLE.
											Please Return Ice chest & Blue Ice
											Samples mail TO CCAS
Relinquished by:		Date	Time	Received by:		Relinquished by:		Date	Time	Received by:	
Relinquished by:		Date	Time	Received by:		Relinquished by:		Date	Time	Received by:	
Relinquished by:		Date	Time	Received by Laboratory:		Date	Time	REMARKS (Shipping Related):			
Joseph Light		7/18/90	1200	Chi Sang		7-19-90	11:00	rec'd cold sealed & intact			



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

COPY

Waterwork  
1710 Main Street  
Escalon, CA 95320  
Attention: Russell Juncal

Client Project ID: Desert Petroleum, Oakland  
Matrix Descript: Soil  
Analysis Method: EPA 5030/8015/8020  
First Sample #: 007-4734

Sampled: Jul 24, 1990  
Received: Jul 27, 1990  
Analyzed: Aug 6, 1990  
Reported: Aug 9, 1990

## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
007-4734	DPO-SS1-3.5'	N.D.	N.D.	N.D.	N.D.	N.D.
007-4735	DPO-SS2-5'	N.D.	0.0050	N.D.	N.D.	0.011

Detection Limits:	1.0	0.0050	0.0050	0.0050	0.0050
-------------------	-----	--------	--------	--------	--------

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.  
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

*Elizabeth W. Hackl*  
Elizabeth W. Hackl  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Waterwork  
1710 Main Street  
Escalon, CA 95320  
Attention: Russell Juncal

Client Project ID: Desert Petroleum, Oakland

QC Sample Group: 0074734-5

Reported: Aug 9, 1990

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8015/ 8020	EPA 8015/ 8020	EPA 8015/ 8020	EPA 8015/ 8020
Analyst:	Gloria/Dinsay	Gloria/Dinsay	Gloria/Dinsay	Gloria/Dinsay
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Aug 6, 1990	Aug 6, 1990	Aug 6, 1990	Aug 6, 1990
QC Sample #:	008-0716	008-0716	008-0716	008-0716
Sample Conc.:	N.D.	N.D.	N.D.	0.021
Spike Conc. Added:	0.20	0.20	0.20	0.60
Conc. Matrix Spike:	0.19	0.20	0.19	0.51
Matrix Spike % Recovery:	95	100	95	85
Conc. Matrix Spike Dup.:	0.18	0.18	0.18	0.47
Matrix Spike Duplicate % Recovery:	90	90	90	78
Relative % Difference:	5.4	11	5.4	8.2

SEQUOIA ANALYTICAL

Elizabeth W. Haack  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

RECEIVED SEP 10 1990

<b>Waterwork</b>	<b>Client Project ID:</b> #60330-1, Desert Petroleum-Oakland	<b>Sampled:</b> Aug 21, 1990
1710 Main Street	<b>Matrix Descript:</b> Soil	<b>Received:</b> Aug 22, 1990
Escalon, CA 95320	<b>Analysis Method:</b> EPA 5030/8015/8020	<b>Analyzed:</b> Aug 24, 1990
<b>Attention:</b> Russell Juncal	<b>First Sample #:</b> 008-4035	<b>Reported:</b> Sep 4, 1990

## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
008-4035	DP-SB-1-5'	390	2.5	17	9.4	47
008-4036	DP-SB-2-5'	41	0.31	1.4	0.92	4.4
008-4037	DP-SB-2-10'	230	3.5	21	5.0	43
008-4038	DP-SB-2-15'	N.D.	0.052	0.13	0.019	0.099
008-4039	DP-SB-2-20'	N.D.	0.030	0.033	0.0076	0.030

<b>Detection Limits:</b>	<b>1.0</b>	<b>0.0050</b>	<b>0.0050</b>	<b>0.0050</b>	<b>0.0050</b>
--------------------------	------------	---------------	---------------	---------------	---------------

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard. Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

  
Elizabeth W. Hackl  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Waterwork  
1710 Main Street  
Escalon, CA 95320  
Attention: Russell Juncal

Client Project ID: #60330-1, Desert Petroleum-Oakland  
Matrix Descript: Soil  
Analysis Method: SM 503 D&E (Gravimetric)  
First Sample #: 008-4035

Sampled: Aug 21, 1990  
Received: Aug 22, 1990  
Extracted: Aug 24, 1990  
Analyzed: Aug 24, 1990  
Reported: Sep 4, 1990

## TOTAL RECOVERABLE PETROLEUM OIL

Sample Number	Sample Description	Oil & Grease mg/kg (ppm)
008-4035	DP-SB-1-5'	N.D.
008-4036	DP-SB-2-5'	N.D.
008-4037	DP-SB-2-10'	N.D.
008-4038	DP-SB-2-15'	N.D.
008-4039	DP-SB-2-20'	N.D.

Detection Limits:

30

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

  
Elizabeth W. Hackl  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Waterwork 1710 Main Street Escalon, CA 95320 Attention: Russell Juncal	Client Project ID: #60330-1, Desert Petroleum-Oakland Sample Descript.: Water, DP-SB-1-W Analysis Method: EPA 5030/ 8015/8020 Lab Number: 008-4040 B - C	Sampled: Aug 21, 1990 Received: Aug 22, 1990 Analyzed: Aug 28, 1990 Reported: Sep 4, 1990
---	---	--

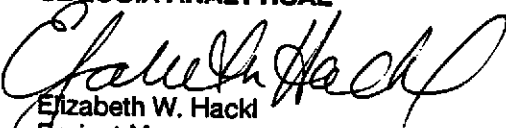
## TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit $\mu\text{g/L}$ (ppb)	Sample Results $\mu\text{g/L}$ (ppb)
---------	--	---

Analyte	Detection Limit $\mu\text{g/L}$ (ppb)	Sample Results $\mu\text{g/L}$ (ppb)
Low to Medium Boiling Point Hydrocarbons	30	740,000
Benzene	0.30	110,000
Toluene	0.30	130,000
Ethyl Benzene	0.30	13,000
Xylenes	0.30	73,000

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.  
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

  
Elizabeth W. Hackl  
Project Manager



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680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Waterwork  
1710 Main Street  
Escalon, CA 95320  
Attention: Russell Juncal

Client Project ID: #60330-1, Desert Petroleum-Oakland  
Matrix Descript: Water  
Analysis Method: SM 503 A&E (Gravimetric)  
First Sample #: 008-4040 A

Sampled: Aug 21, 1990  
Received: Aug 22, 1990  
Extracted: Aug 24, 1990  
Analyzed: Aug 24, 1990  
Reported: Sep 4, 1990

## TOTAL RECOVERABLE PETROLEUM OIL

Sample Number	Sample Description	Oil & Grease mg/L (ppm)
0084040 A	DP-SB-1-W	42

Detection Limits:

5.0

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

  
Elizabeth W. Hackl  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Waterwork  
1710 Main Street  
Escalon, CA 95320  
Attention: Russell Juncal

Client Project ID: #60330-1, Desert Petroleum-Oakland

QC Sample Group: 0084035 - 0084039

Reported: Sep 4, 1990

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J.Dinsay	J.Dinsay	J.Dinsay	J.Dinsay
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Aug 24, 1990	Aug 24, 1990	Aug 24, 1990	Aug 24, 1990
QC Sample #:	008-3910	008-3910	008-3910	008-3910
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.20	0.20	0.20	0.60
Conc. Matrix Spike:	0.12	0.15	0.15	0.47
Matrix Spike % Recovery:	60	75	75	78
Conc. Matrix Spike Dup.:	0.13	0.16	0.16	0.48
Matrix Spike Duplicate % Recovery:	65	80	80	80
Relative % Difference:	8.0	6.5	6.5	2.0

SEQUOIA ANALYTICAL

*Elizabeth W. Hackl*  
Elizabeth W. Hackl  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$





# SEQUOIA ANALYTICAL

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Waterwork  
1710 Main Street  
Escalon, CA 95320  
Attention: Russell Juncal

Client Project ID: #60330-1, Desert Petroleum-Oakland

QC Sample Group: 008-4040

Reported: Sep 4, 1990

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes	Total Oil & Grease	Total Oil & Grease
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	SM503D&E	SM503A&E
Analyst:	W. Parks	W. Parks	W. Parks	W. Parks	LL	LL
Reporting Units:	µg/L	µg/L	µg/L	µg/L	mg/kg	mg/L
Date Analyzed:	Aug 28, 1990	Aug 28, 1990	Aug 28, 1990	Aug 28, 1990	Aug 20, 1990	Aug 21, 1990
QC Sample #:	0082194MS	0082194MS	0082194MS	0082194MS	008-2100	BLK8/20/90
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	60	N.D.
Spike Conc. Added:	10	10	10	30	6,600	100
Conc. Matrix Spike:	11	10	11	32	5,600	88
Matrix Spike % Recovery:	110	100	110	110	84	88
Conc. Matrix Spike Dup.:	11	9.4	10	29	5,700	86
Matrix Spike Duplicate % Recovery:	110	90	100	100	85	86
Relative % Difference:	0.0	6.0	9.1	9.4	1.0	2.0

SEQUOIA ANALYTICAL

*Elizabeth W. Hackl*  
Elizabeth W. Hackl  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$





# SEQUOIA ANALYTICAL

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RECEIVED OCT 15 1990

Waterwork	Client Project ID: Desert Petroleum, #60330-1	Sampled: Sep 19, 1990
1710 Main Street	Sample Descript.: Soil, DPSB3-15	Received: Sep 20, 1990
Escalon, CA 95320	Analysis Method: EPA 5030/8015/8020	Analyzed: Oct 3, 1990
Attention: Russell Juncal	Lab Number: 009-2482	Reported: Oct 4, 1990

## TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Low to Medium Boiling Point Hydrocarbons.....	1.0	N.D.
Benzene.....	0.0050	N.D.
Toluene.....	0.0050	N.D.
Ethyl Benzene.....	0.0050	N.D.
Xylenes.....	0.0050	0.0075

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.  
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

*Elizabeth W. Hackl*  
Elizabeth W. Hackl  
Project Manager

Please Note:  
Amended report on 10/12/90.



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
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Waterwork  
1710 Main Street  
Escalon, CA 95320  
Attention: Russell Juncal

Client Project ID: Desert Petroleum, #60330-1

QC Sample Group: 009-2482

Reported: Oct 4, 1990

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020/8015	EPA 8020/8015	EPA 8020/8015	EPA 8020/8015
Analyst:	G.Meyer	G.Meyer	G.Meyer	G.Meyer
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Oct 3, 1990	Oct 3, 1990	Oct 3, 1990	Oct 3, 1990
QC Sample #:	009-2440	009-2440	009-2440	009-2440
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.20	0.20	0.20	0.60
Conc. Matrix Spike:	0.19	0.20	0.20	0.61
Matrix Spike % Recovery:	95	100	100	100
Conc. Matrix Spike Dup.:	0.19	0.18	0.20	0.60
Matrix Spike Duplicate % Recovery:	95	90	100	100
Relative % Difference:	0.0	10	0.0	1.7

SEQUOIA ANALYTICAL

*Elizabeth W. Hackl*  
Elizabeth W. Hackl  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$



S.A.V.E. SYSTEM PERFORMANCE DATA

SUMMARY TABLE

PROJECT LOCATION: DESERT PETROLEUM, INC. STATION #793

page 1 of 3

MONTH			DEC 89	JAN 90	FEB 90	MAR 90	APR 90	MAY 90
GROUNDWATER	SPRAY AERATOR WATER IN	GALLONS						
		TPH-PPM*						
	SPRAY AERATOR WATER OUT	GALLONS						
		TPH-PPM*						
VAPOR	RECOVERED VAPORS FROM WELLS	SCFM*	21.2	28.9	34.9	36.3	21.3	22.2
		TPH-PPM*	47500.0	28000.0	12000.0	8600.0	6550.0	4500.0
	TOTAL VAPORS TO ENGINE	SCF	129409.2	488700.0	509884.2	576435.0	330265.8	451809.0
		TPH-PPM*	47500.0	28000.0	12000.0	8600.0	6550.0	4500.0
AIR	TO SPRAY AERATOR	SCFM	9.7	7.3	7.4	5.2	3.8	3.3
	TO ENGINE	SCFM	9.7	7.3	7.4	5.2	3.8	3.3
FREE PRODUCT	RECOVERED FROM WELLS	GALLONS						
ENGINE	EXHAUST	TPH-PPM*	ND		ND	ND		ND
		CO-PPM*	23.0		3.0	26.0		12.0
	OPERATION	HOURS	69.8	225.0	200.9	231.5	219.3	295.3
	SPEED	RPM	1879.7	1828.1	1771.9	1807.1	1786.1	1805.5
TOTAL CONTAMINANT REMOVED	FROM THE PROJECT LOCATION	GALLONS	160.4	415.4	192.0	164.9	69.8	67.3

\* DENOTES AVERAGE CONCENTRATIONS.

S.A.V.E. SYSTEM PERFORMANCE DATA

SUMMARY TABLE

PROJECT LOCATION: DESERT PETROLEUM, INC. STATION #793

page 2 of 3

MONTH			JUN 90	JUL 90	AUG 90	SEP 90	OCT 90	NOV 90
GROUNDWATER	SPRAY AERATOR WATER IN	GALLONS						
		TPH-PPM*						
	SPRAY AERATOR WATER OUT	GALLONS						
		TPH-PPM*						
VAPOR	RECOVERED VAPORS FROM WELLS	SCFM*	13.8	16.2	22.9	23.0	22.4	23.9
		TPH-PPM*	1100.0	270.0	2350.0	3150.0	3900.0	3600.0
	TOTAL VAPORS TO ENGINE	SCF	271177.2	178860.0	666582.0	96373.8	141855.0	467415.0
		TPH-PPM*	1100.0	270.0	2350.0	3150.0	3900.0	3600.0
AIR	TO SPRAY AERATOR	SCFM	10.0	5.8	4.0	1.3	2.1	8.6
	TO ENGINE	SCFM	10.0	5.8	4.0	1.3	2.1	8.6
FREE PRODUCT	RECOVERED FROM WELLS	GALLONS						
ENGINE	EXHAUST	TPH-PPM*	ND	ND	ND	ND	ND	55.0
		CO-PPM*	6.0				0.0	
	OPERATION	HOURS	189.9	135.5	413.0	66.1	96.5	239.7
	SPEED	RPM	1800.0	1585.4	1908.5	1785.3	1758.4	1796.1
TOTAL CONTAMINANT REMOVED	FROM THE PROJECT LOCATION	GALLONS	6.6	1.4	50.7	10.9	19.2	47.1

\* DENOTES AVERAGE CONCENTRATIONS.

## S.A.V.E. SYSTEM PERFORMANCE DATA

## SUMMARY TABLE

PROJECT LOCATION: DESERT PETROLEUM, INC. STATION #793

page 3 of 3

MONTH		DEC 90							TOTAL
GROUNDWATER	SPRAY AERATOR WATER IN	GALLONS							
		TPH-PPM*							
	SPRAY AERATOR WATER OUT	GALLONS							
		TPH-PPM*							
VAPOR	RECOVERED VAPORS FROM WELLS	SCFM*	23.0						
		TPH-PPM*	2300.0						
	TOTAL VAPORS TO ENGINE	SCF	310150.8						
		TPH-PPM*	2300.0						
AIR	TO SPRAY AERATOR	SCFM	7.3						
	TO ENGINE	SCFM	7.3						
FREE PRODUCT	RECOVERED FROM WELLS	GALLONS							
ENGINE	EXHAUST	TPH-PPM*	ND						
		CO-PPM*							
	OPERATION	HOURS	170.6					2553.1	
	SPEED	RPM	1845.2						
TOTAL CONTAMINANT REMOVED	FROM THE PROJECT LOCATION	GALLONS	20.6					1226.3	

\* DENOTES AVERAGE CONCENTRATIONS.