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Woodward-Clyde Consultants

December 8, 1989
8910281A/1000

Mr. Dennis Byrne
Alameda County
Health Care Services Agency
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, CA 94621

**Subject: Work Plan for Groundwater Remediation
Thrifty Service Station No. 63
6125 Telegraph Avenue
Oakland, California**

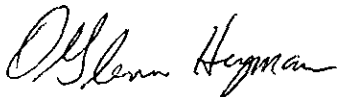
Dear Mr. Byrne:

Enclosed for your review is one copy of the Work Plan for Groundwater Remediation at the subject service station. This work plan follows the format and contains similar technical recommendations as those included in the work plan previously submitted to your office by Woodward-Clyde Consultants for remediation of groundwater at Thrifty Service Station No. 49 at 3400 San Pablo Avenue in Oakland. The work plan for Thrifty No. 49 was recently reviewed and approved by your office.

Please call us if you have any questions regarding the enclosed work plan.

Sincerely,

Woodward-Clyde Consultants



O. Glenn Heyman
Senior Staff Geologist



John McMillan, P.E.
Project Engineer

OGH:jvt
8910281L2 COT

Enclosure

Consulting Engineers, Geologists
and Environmental Scientists

Offices in Other Principal Cities



Woodward-Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

Prepared by

December 8, 1989

Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 90240

Prepared for

WORK PLAN
FOR GROUNDWATER REMEDIATION
THRIFTY SERVICE STATION 63
6125 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA

GROUNDWATER REMEDIATION

Thrifty Service Station 63
6125 Telegraph Avenue
Oakland, California

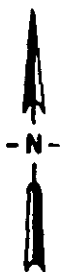
INTRODUCTION

This report outlines a plan to remediate subsurface petroleum product contamination at the Thrifty Service Station No. 63 located at 6125 Telegraph Avenue, in Oakland, California. This Plan has been prepared to comply with the Alameda County Health Department (ACHD) requirements for remediating subsurface petroleum product contamination. The proposed activities described below are designed to satisfy the remedial requirements of both the ACHD and the Regional Water Quality Control Board (RWQCB). This work plan will, however, only address those items related to groundwater remediation at the subject site. A site location map is provided in Figure 1. Detailed descriptions of the investigative activities conducted previously are included in Woodward-Clyde Consultants' (WCC) environmental assessment report submitted to the ACHD on December 16, 1986.

BACKGROUND

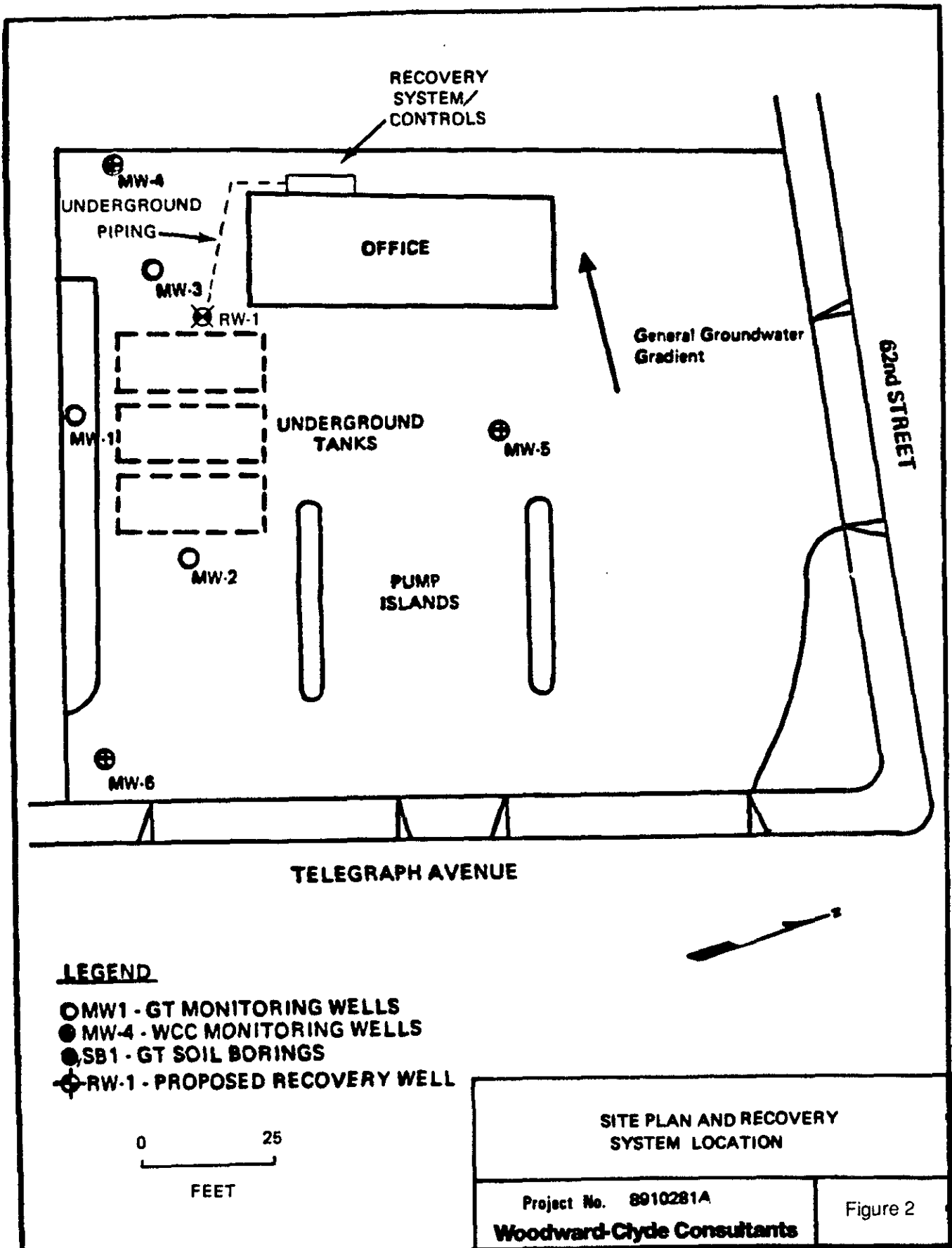
In November 1986, Thrifty Oil Company retained WCC to conduct a followup subsurface site assessment at the service station to further delineate the extent of the existing contamination. The initial site investigation was conducted by Groundwater Technology in August 1986 and consisted of advancing three borings and installing three 2-inch-diameter monitoring wells. Boring and well locations are shown on Figure 2.

Groundwater Technology collected soil samples at 5-foot intervals in all borings beginning at a depth of about 6 to 8 ft. Headspace tests were



MILES

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Figure 1. SITE LOCATION MAP	



performed on the samples in the field using a photoionization detector. The samples taken at a depth of 14.0 to 14.5 in Borings MW-2 and MW-3 and 17.0 to 17.5 feet in Boring MW-1 were submitted to an analytical laboratory for analysis. These samples submitted for chemical analyses were collected at or near the groundwater surface. The Groundwater Technology soil and groundwater analytical results are summarized below:

SOIL AND GROUNDWATER ANALYTICAL RESULTS SUMMARIZED FROM GROUNDWATER TECHNOLOGY, 1986.

Sample Type, Number, and Depth (feet)	Results in PPM				
	Total Petroleum Hydrocarbons	Benzene	Toluene	Ethyl Benzene	Xylenes
<u>Soil</u>					
MW-1, 17.0	471.5	7.6	6.3	7.3	39.7
MW-2, 14.0	735	12.6	26.4	10.7	64.3
MW-3, 14.0	52	5.4	1.9	1.3	6.9
<u>Water</u>					
MW-1	20.6	10.80	8.24	0.626	1.570
MW-2	1.5	0.08	0.125	0.038	0.191
MW-3	49.4	6.93	6.60	1.570	8.760

A subsequent site assessment conducted by WCC consisted of advancing three 30-foot deep borings and installing three monitoring wells. Soil samples were taken at 5-foot intervals down to the water table in all borings. Only those samples exhibiting signs of contamination and/or located at the water table were submitted to a lab for analysis. Water samples were taken from each of the three newly-installed wells and submitted for laboratory analysis. Relative well casing elevations were established to calculate the local groundwater gradient. The WCC soil and groundwater analytical results are summarized below:

SOIL AND GROUNDWATER ANALYTICAL RESULTS SUMMARIZED FROM WCC, 1986.

Sample Type, Number, and Depth (feet)	Results in PPM				
	Total Fuel Hydrocarbons	Benzene	Toluene	Ethyl Benzene	Xylenes
<u>Soil</u>					
MW-4, 10.5	<10	<0.5	<0.5	NT	<0.5
MW-4, 16.0	1100	13.0	14.0	NT	34.0
MW-5, 16.0	<10	<0.5	<0.5	NT	<0.5
MW-6, 15.5	<10	<0.5	<0.5	NT	<0.5
<u>Water</u>					
MW-4	100	3.2	2.7	2.4	14
MW-5	<1	0.0048	0.0021	<0.0005	<0.0048
MW-6	<1	<0.002	<0.002	<0.002	<0.002

NT = Not Tested

Subsequent to the WCC site assessment, water levels and product thicknesses (if any) have been monitored in each of the six wells about every three weeks. Free product, if present, has been recovered by manual bailing. The thickest free product was measured as 1.72 feet in MW-3 on September 27, 1987. The product thicknesses have varied in each of the wells, but have been generally decreasing over time since the well bailing program was started. Free product was measured on July 19, 1989 only in Monitoring Wells MW-2 and MW-4 at 0.05 feet and a trace amount, respectively.

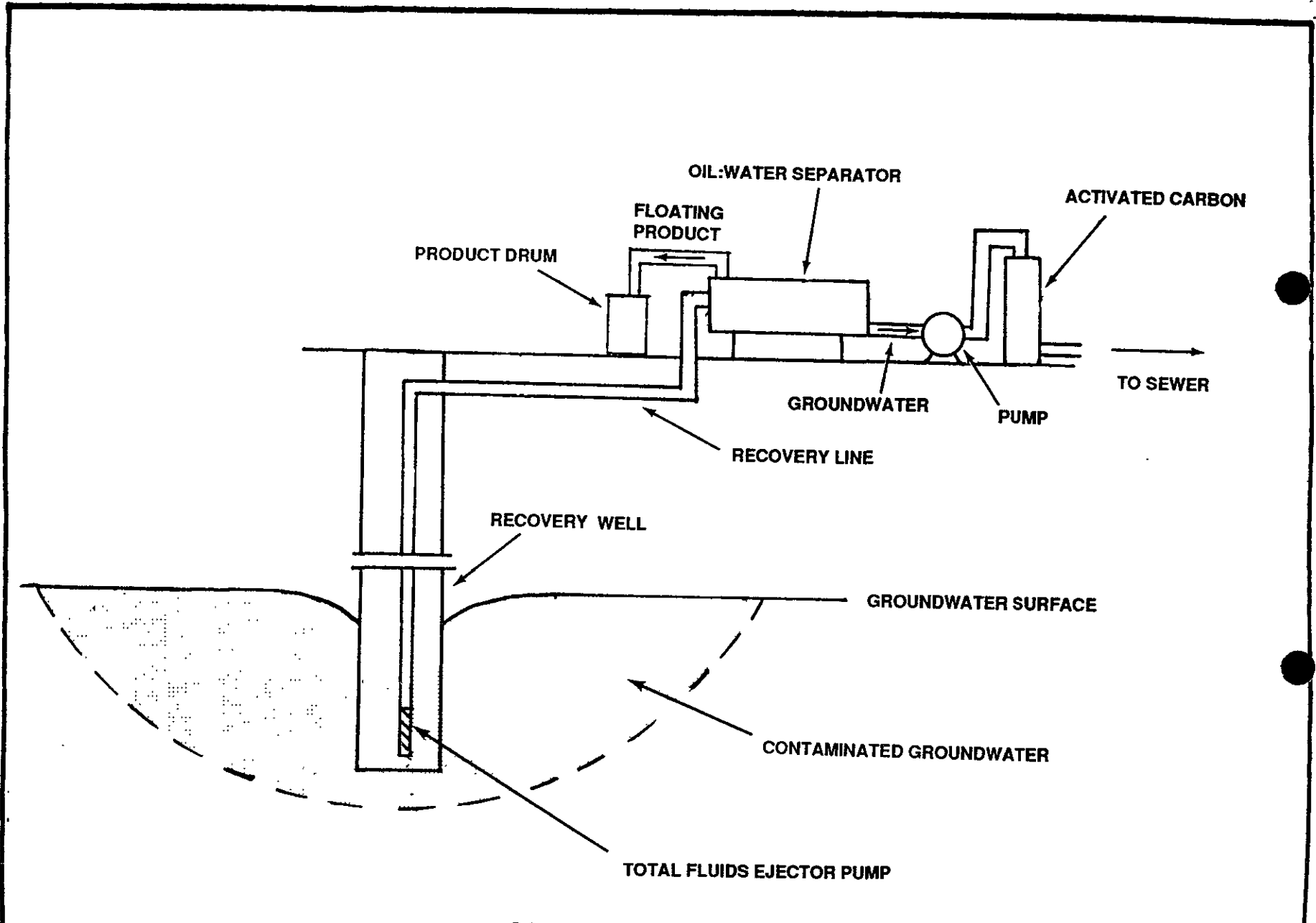
PROPOSED REMEDIATION

The proposed remediation will utilize one 6-inch diameter recovery well, RW-1, installed on October 12, 1989 at the location shown on Figure 2. A total fluids ejector pump system will be placed in the recovery well. The extracted groundwater and floating product will be pumped first through the

oil/water separator, then to a holding tank, and finally through a pair of activated carbon filters to remove the dissolved hydrocarbons before being discharged into the sanitary sewer. A discharge permit will be obtained from East Bay Municipal Utility District (EBMUD) prior to discharging the treated water. The recovery system will incorporate a series of sensors and controls to regulate pumping rates and to prevent overfilling of the treatment system. A diagram of the system layout is shown on Figure 2, while a conceptual schematic is shown on Figure 3. All tubing and hoses will be contained below grade in PVC conduits between the recovery well and oil/water separator. Floating product that is recovered in the separator tank will gravity drain to a product storage drum. The product drum will be equipped with secondary containment and a high level switch to shut down the system should it become full. A hazardous materials management plan (HMMP) will be prepared for the temporary on-site collection of the recovered product.

The initial recovery and pump test well is located at the west end of the tank complex at the approximate location shown in Figure 2. The recovery well was installed to a depth of approximately 29.5 feet below grade. A 0.020-inch slotted well screen was installed from 29 to 9 feet below grade, and a #2 sand filter pack was installed from the bottom of the boring to approximately 2 feet above the well screen. During the installation of the recovery well, soil samples were collected at 5-foot intervals. The soil boring and well construction details along with the soil analytical results will be presented with the report describing the installation of the recovery system.

A 24-hour pump test has been conducted in the proposed recovery well to evaluate various physical parameters of the local hydrogeologic regime. The data acquired from this test will be used to estimate recovery system pumping rates, area of influence and the rate of groundwater movement. The pump test results will also be used to size the total fluids pump, oil/water separator and piping. Well spacing, should more than one well be



Conceptual Recovery System
Schematic

Woodward-Clyde Consultants
Figure 3

required to cover the area over which floating product is known to exist, will also be estimated from the results of the pump test.

Recovery Well RW-1 was sampled within 24 hours after the completion of the pump test. The samples were submitted to Brown and Caldwell Laboratories and analyzed for priority pollutant metals, iron, manganese, hardness, alkalinity, calcium, sulfate, total dissolved solids, total suspended solids, total petroleum hydrocarbons (TPH), and by EPA Method 524.2 for volatile organic compounds. All analyses were conducted within the holding times except TPH, which was held three days beyond the holding time. The certified analytical report is attached to this document.

Following 30 days of continuous system operation, a report will be prepared evaluating the performance of the remedial system. Included in this evaluation will be a summary of water flow and product recovery rates, TPH concentrations in the effluent and water table contour maps showing the area of influence from pumping. Modifications will be proposed in the evaluation report should the system be deficient in complying with the effluent limitations or providing an adequate area of influence.

SCHEDULE

Upon approval of this work plan, WCC is prepared to begin implementation of the outlined remedial activities by applying for the necessary wastewater discharge and building permits. It has been our experience that the permitting process can be very involved. WCC will keep ACHD apprised of our permitting progress and will provide an appropriate construction schedule when those details are available.



LOG NO: E89-11-121

Received: 03 NOV 89

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Project: 8910081A
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REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-121-1	8910081A-RW1	03 NOV 89
PARAMETER	11-121-1	
Beryllium, mg/L	<0.01	
Cadmium, mg/L	<0.04	
Chromium, mg/L	<0.05	
Copper, mg/L	<0.08	
Lead, mg/L	<0.3	
Nickel, mg/L	<0.03	
Silver, mg/L	<0.02	
Thallium, mg/L	<0.2	
Zinc, mg/L	0.13	
Antimony, mg/L	<0.06	
Arsenic, mg/L	0.003	
Selenium, mg/L	<0.002	
Mercury, mg/L	0.0002	
Alkalinity (as CaCO3)		
Carbonate Alk (as CaCO3), mg/L	<1	
Bicarbonate Alk (as CaCO3), mg/L	510	
Hydroxide Alk (as CaCO3), mg/L	<1	
Total Alkalinity (as CaCO3), mg/L	510	
Filterable Residue (TDS), mg/L	570	
Hardness, (as CaCO3) , mg/L	470	
Non-filterable Residue (TSS), mg/L	45	
Sulfate, mg/L	11	
Calcium, mg/L	90	
Iron, mg/L	1.4	
Manganese, mg/L	1.8	
Priority Pol Metals Digestions, Date	11.08.89	



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REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-121-1	8910081A-RW1	03 NOV 89
PARAMETER	11-121-1	
TPH - Volatile Hydrocarbons		
Date Analyzed	11.20.89	
Dilution Factor, Times	2	
C4 to C12 Hydrocarbons, ug/L	2300	
Other TPH - Volatile Hydrocarbons	---	



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Project: 8910081A

REPORT OF ANALYTICAL RESULTS

Page 3

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-121-1	8910081A-RW1	03 NOV 89
PARAMETER	11-121-1	
EPA Method 524.2		
Date Analyzed	11.13.89	
Date Extracted	11.13.89	
Dilution Factor, Times	1	
1,1,1,2-Tetrachloroethane, ug/L	<0.2	
1,1,1-Trichloroethane, ug/L	<0.2	
1,1,2,2-Tetrachloroethane, ug/L	<0.2	
1,1,2-Trichloroethane, ug/L	<0.2	
1,1-Dichloroethane, ug/L	<0.2	
1,1-Dichloroethene, ug/L	<0.2	
1,1-Dichloropropene, ug/L	<0.2	
1,2,3-Trichlorobenzene, ug/L	<0.2	
1,2,3-Trichloropropane, ug/L	<0.2	
1,2,4-Trichlorobenzene, ug/L	<0.2	
1,2,4-Trimethylbenzene, ug/L	150	
1,2-Dibromo-3-chloropropane, ug/L	<2	
1,2-Dibromoethane, ug/L	<0.2	
1,2-Dichloroethane, ug/L	<0.2	
1,2-Dichlorobenzene, ug/L	<0.2	
1,2-Dichloropropane, ug/L	<0.2	
1,3,5-Trimethylbenzene, ug/L	70	
1,3-Dichlorobenzene, ug/L	<0.2	
1,3-Dichloropropane, ug/L	<0.2	
1,4-Dichlorobenzene, ug/L	<0.2	
2,2-Dichloropropane, ug/L	<0.2	
2-Chlorotoluene, ug/L	<0.2	
4-Chlorotoluene, ug/L	<0.2	



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Project: 8910081A^{2y}

REPORT OF ANALYTICAL RESULTS

Page 4

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-121-1	8910081A-RW1	03 NOV 89
PARAMETER	11-121-1	
Bromobenzene, ug/L	<0.2	
Bromochloromethane, ug/L	<0.2	
Bromodichloromethane, ug/L	<0.2	
Bromomethane, ug/L	<0.2	
Benzene, ug/L	830	
Bromoform, ug/L	<0.2	
Chlorobenzene, ug/L	<0.2	
Carbon Tetrachloride, ug/L	<0.2	
Chloroethane, ug/L	<0.2	
Chloroform, ug/L	<0.2	
Chloromethane, ug/L	<0.2	
Dibromochloromethane, ug/L	<0.2	
Dibromomethane, ug/L	<0.2	
Ethylbenzene, ug/L	<0.2	
Hexachlorobutadiene, ug/L	<0.2	
Isopropylbenzene, ug/L	<0.2	
Methylene chloride, ug/L	<0.2	
N-Butylbenzene, ug/L	<0.2	
N-Propylbenzene, ug/L	12	
Naphthalene, ug/L	4.1	
Styrene, ug/L	<0.2	
Trichloroethene, ug/L	<0.2	
Trichlorofluoromethane, ug/L	<0.2	
Toluene, ug/L	250	
Tetrachloroethene, ug/L	<0.2	
Vinyl chloride, ug/L	<0.2	
cis-1,2-Dichloroethene, ug/L	<0.2	



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Oakland, California 94607-4014

Project: 8910081A

REPORT OF ANALYTICAL RESULTS

Page 5

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-121-1	8910081A-RW1	03 NOV 89
PARAMETER	11-121-1	
m- and p-Xylene Isomers, ug/L	300	
o-Xylene, ug/L	320	
p-Isopropyl toluene, ug/L	4.4	
sec-Butylbenzene, ug/L	<0.2	
trans-1,2-Dichloroethene, ug/L	<0.2	
tert-Butylbenzene, ug/L	<0.2	
Other EPA Method 524.2	---	
Semi-Quantified Results **		
C5-C15 Hydrocarbons, ug/L	40000	

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

Nedy J. Ficklin for
Sim D. Lesley, Ph.D., Laboratory Director

Woodward-Clyde Consultants

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Chain of Custody Record

PROJECT NO. 89100 ²⁹ 81A			ANALYSES							REMARKS (Sample preservation, handling procedures, etc.)
SAMPLERS: (Signature) <i>[Signature]</i>			Sample Matrix (Soil, Water, Air)	ANALYSES						
DATE	TIME	SAMPLE NUMBER		EPA Method 8210	EPA Method 8000	EPA Method 8010	EPA Method 8015	602 G. ml BTEX	Number of Containers	
1/3		89100 ²⁹ 81A-RW1	X			X		2	40ml	
		"				X		2	40ml	
		"				X		1	L	
		"					X	1	L	
		89100 ²⁹ 81A-BT						2	40ml-48 hr TAT if possible	
								TOTAL NUMBER OF CONTAINERS	8	
RELINQUISHED BY: (Signature) <i>[Signature]</i>		DATE/TIME 3/11/89 1600	RECEIVED BY: (Signature)		RELINQUISHED BY: (Signature)		DATE/TIME	RECEIVED BY: (Signature)		
METHOD OF SHIPMENT:			SHIPPED BY: (Signature)		COURIER: (Signature)		RECEIVED FOR LAB BY: (Signature) <i>[Signature]</i>		DATE/TIME 11/3/89 1539	

LOG # 891121-1
891122-1 RUSH