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**Delta**  
Environmental  
Consultants, Inc.

91 JAN 15 AM 11:59

3300 Data Drive, Suite 100  
Rancho Cordova, CA 95670  
916/638-2085  
FAX:916/638-8385

January 7, 1991

Mr. Dennis Byrne  
Environmental Health Services  
Hazardous Materials Department  
County of Alameda  
470 27th Street  
Oakland, California 94607

Subject: *Quarterly Monitoring Report*  
Shell Service Station  
3420 San Pablo Avenue  
Oakland, California  
Shell Wic No. 204-5508-5306  
Delta Project No. 40-88-666

Dear Mr. Byrne:

Enclosed is a copy of Delta Environmental Consultant's, Inc. (Delta), *Quarterly Monitoring Report* for the subject site. Delta is currently seeking encroachment permits upgradient of MW-6, and on the west side of San Pablo Avenue across from the site, to complete our hydrogeologic investigation.

If you have any questions regarding this matter, please contact me at (916) 638-2085.

Sincerely,

**DELTA ENVIRONMENTAL CONSULTANTS, INC.**

*Hal Hansen* for

Hal Hansen  
Hydrogeologist/Project Manager

HH:ria  
Enclosure

cc/enc: Ms. Lisa McCann, California Regional Water Quality Control Board,  
San Francisco Bay Region  
Mr. Jack Brastad, Shell Oil Company



QUARTERLY MONITORING REPORT, FOURTH QUARTER 1990

3420 SAN PABLO AVENUE

OAKLAND, CALIFORNIA

SIHELL WIC NO. 204-5508-5306

DELTA PROJECT NO. 40-88-666

**Delta  
Environmental  
Consultants, Inc.**

**QUARTERLY MONITORING REPORT, FOURTH QUARTER 1990**

**3420 SAN PABLO AVENUE  
OAKLAND, CALIFORNIA  
SHELL WIC NO. 204-5508-5306  
DELTA PROJECT NO. 40-88-666**

**Prepared by:**

**Delta Environmental Consultants, Inc.  
3330 Data Drive, Suite 100  
Rancho Cordova, California 95670  
(916) 638-2085**

**January 4, 1991**

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QUARTERLY MONITORING REPORT, FOURTH QUARTER 1990

3420 SAN PABLO AVENUE  
OAKLAND, CALIFORNIA  
SHELL WIC NO. 204-5508-5306  
DELTA PROJECT NO. 40-88-666

1.0 INTRODUCTION

This report presents results of ground water quality and ground water elevation measurements made by Delta Environmental Consultants, Inc. (Delta), in October 1990 for nine existing monitoring wells at the Shell service station located at 3420 San Pablo Avenue, Oakland, California (site) (Figure 1).

Previous reports on the site include the following:

<u>Report</u>	<u>Date</u>	<u>Author</u>
<i>Soil and Ground Water Investigation</i>	September 1988	Ensco Environmental Services, Inc.
<i>Phase I Hydrogeologic Assessment Investigation</i>	August 14, 1989	Delta
<i>Phase II Hydrogeologic Assessment Investigation</i>	May 30, 1990	Delta
<i>Quarterly Monitoring Report</i>	July 30, 1990	Delta
<i>Quarterly Monitoring Report</i>	October 11, 1990	Delta

On October 25, 1990, a site visit was made to perform the following:

- Measure and record water levels.
- Collect water samples from monitoring wells MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, and MW-9 for analysis of volatile organics and total petroleum hydrocarbons (TPH) by U.S. Environmental Protection Agency (EPA) Methods 8015 and 8020.

2.0 SITE DATA

2.1 Depth to Ground Water Elevations

Depth to ground water was measured and recorded at monitoring wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, and MW-9 on October 25, 1990. The results are presented in Table 1. During the subjective analysis of water removed from the wells, it was noted that monitoring well MW-1 contained 0.04 foot of free product. Figure 2 is a ground water contour map showing the location of the nine monitoring wells and the measured ground water elevations. The October 25, 1990, ground water elevations indicate a complex pattern of ground water flow. The general trend of ground water flow appears to be in a southern direction, except for irregularities in the water table surface near monitoring wells MW-5 and MW-9.

QUARTERLY MONITORING REPORT, FOURTH QUARTER 1990

3420 San Pablo Avenue, Oakland, California

Shell Wic No. 204-5508-5306

Delta Project No. 40-88-666

Page 2

2.2 Ground Water Quality

Ground water samples collected from monitoring wells MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, and MW-9 on October 25, 1990, were analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX), and total petroleum hydrocarbons (TPH) as gasoline. Monitoring well MW-1 was not sampled because it contained 0.04 foot of free product. The results from these laboratory analyses are presented in Table 2. Analytical results from samples collected during previous sampling events are provided for comparison. Copies of certified laboratory reports for the October 1990 sampling event are included in Appendix A.

Dissolved hydrocarbons were detected in samples collected from each monitoring well in October 1990. Benzene concentrations ranged from less than 0.3 parts per billion (ppb) in monitoring well MW-3 to 12,000 ppb benzene in monitoring well MW-2.

3.0 DISCUSSION

The water level has decreased in each monitoring well since July 1990. Water levels ranged from 9.43 in monitoring well MW-7 to 12.70 in monitoring well MW-3. Free product thickness in monitoring well MW-1 has increased from 0.01 to 0.04 foot between July and October 1990. Dissolved benzene concentrations have decreased in monitoring wells MW-2, MW-8, and MW-9 between July and October 1990.

Delta will continue to monitor water levels and water quality on a quarterly basis. The next sampling event will take place in January 1991. Delta is currently seeking an encroachment permit from the City of Oakland to install an upgradient monitoring well and a monitoring well to assess the lateral extent of petroleum hydrocarbon constituents in ground water to complete the hydrogeologic investigation of this site.

QUARTERLY MONITORING REPORT, FOURTH QUARTER 1990

3420 San Pablo Avenue, Oakland, California

Shell Wic No. 204-5508-5306

Delta Project No. 40-88-666

Page 3

4.0 REMARKS/SIGNATURES

The recommendations contained in this report represent our professional opinions and are based in part on information supplied by the client. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time and location. This report has been prepared solely for the use of Shell and any reliance on this report by third parties shall be at such party's sole risk. Other than this, no warranty is implied or intended.

**DELTA ENVIRONMENTAL CONSULTANTS, INC.**

This report was prepared by:

Michael J. Hansen  
Hal E. Hansen  
Project Manager

Date 1-7-91

The work performed in this report was done under the supervision of a California Registered Geologist:

Dale A. van Dam

Dale A. van Dam, R.G.  
California Registered  
Geologist #4632

Date 1/7/91

/law

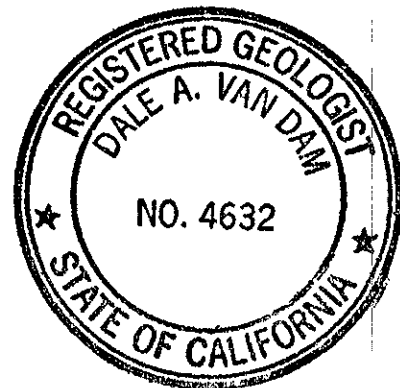


TABLE 1

## Ground Water Elevations

<u>Monitoring Well</u>	<u>Date</u>	<u>Top of Riser Elevation (ft)</u>	<u>Water Depth (ft)</u>	<u>Ground Water Elevation (ft)</u>	<u>Physical Observations</u>
MW-1	06/12/89	21.28	9.57	11.71	---
	01/23/90		9.04	12.24	Odor
	02/02/90		8.89	12.39	Odor
	02/21/90		8.00	13.28	0.01' Free product
	04/10/90		9.47	11.81	0.01' Free product
	07/26/90		9.73	11.55	0.01' Free product
	10/25/90		12.53	8.75	0.04' Free product
MW-2	06/12/89	21.56	7.96	13.60	---
	01/23/90		8.30	13.26	No odor
	02/02/90		8.04	13.52	Odor
	02/21/90		7.57	13.99	No odor
	04/10/90		7.94	13.62	No odor
	07/26/90		8.41	13.15	---
	10/25/90		11.13	10.43	---
MW-3	06/12/89	21.78	10.77	11.01	---
	01/23/90		9.26	12.52	No odor
	02/02/90		9.33	12.45	No odor
	02/21/90		8.24	13.54	No odor
	04/10/90		10.26	11.52	No odor
	07/26/90		10.98	10.80	---
	10/25/90		12.70	9.08	---
MW-4	06/12/89	20.31	11.19	9.12	---
	01/23/90		9.25	11.06	No odor
	02/02/90		8.04	12.27	No odor
	02/21/90		7.90	12.41	---
	04/10/90		9.30	11.01	No odor
	07/26/90		9.56	10.75	---
	10/25/90		11.98	8.33	---
MW-5	01/23/90	20.91	7.89	13.02	Slight odor
	02/02/90		8.23	12.68	No odor
	02/21/90		7.31	13.60	Slight odor
	04/10/90		9.89	11.72	No odor
	07/26/90		9.80	11.11	---
	10/25/90		11.35	9.56	---
MW-6	01/23/90	22.32	7.57	14.75	No odor
	02/02/90		7.86	14.46	No odor
	02/21/90		6.95	15.37	No odor
	04/10/90		9.25	13.07	No odor
	07/26/90		8.64	13.68	---
	10/25/90		11.79	10.53	---



**TABLE 1-Continued**  
**Ground Water Elevations**

<u>Monitoring Well</u>	<u>Date</u>	<u>Top of Riser Elevation (ft)</u>	<u>Water Depth (ft)</u>	<u>Ground Water Elevation (ft)</u>	<u>Physical Observations</u>
MW-7	01/23/90	20.36	6.98	13.38	No odor
	02/02/90		8.91	11.45	Odor
	02/21/90		6.65	13.71	No odor
	04/10/90		6.99	13.37	No odor
	07/26/90		7.33	13.03	---
	10/25/90		9.43	10.93	---
MW-8	01/23/90	20.95	7.19	13.76	---
	02/02/90		7.32	13.36	Slight odor
	02/21/90		6.90	14.05	No odor
	04/10/90		7.20	13.75	Very slight odor
	07/26/90		7.58	13.37	No odor
	10/25/90		10.11	10.84	---
MW-9	01/23/90	21.19	9.31	11.88	---
	02/02/90		9.02	12.17	No odor
	02/21/90		8.28	12.91	No odor
	04/10/90		8.41	12.78	No odor
	07/26/90		9.18	12.01	No odor
	10/25/90		11.57	9.62	---

TABLE 2

## Ground Water Chemical Analysis (ppb)

Monitoring Well	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	EDB <sup>a</sup>	EDC <sup>b</sup>	TPH <sup>c</sup>
MW-1	04/17/89	1,400	2,300	6,600	1,100	ND <sup>d</sup>	10.0	12,000
	01/23/90							FP <sup>e</sup>
	04/10/90							FP
	07/26/90							FP
	10/25/90							FP
MW-2	04/17/89	12,000	1,800	12,000	2,200	<100	36.0	35,000
	01/23/90	110	9.6	140	3,300	NA <sup>f</sup>	NA	40,000
	04/10/90	12,000	570	560	6,800	NA	NA	45,000
	07/26/90	15,000	840	1,400	10,000	NA	NA	53,000
	10/25/90	12,000	1,400	3,500	18,000	NA	NA	140,000
MW-3	04/17/89	3.0	2.0	9.0	<1.0	<1.0	<1.0	100
	01/23/90	1.1	<0.3	<0.3	<0.3	NA	NA	140
	04/10/90	1.1	<0.3	<0.3	1.2	NA	NA	250
	07/26/90	<0.3	<0.3	<0.3	<0.3	NA	NA	<30
	10/25/90	<0.3	<0.3	<0.3	<0.3	NA	NA	93
MW-4	04/17/89	1.2	<1.0	3.0	1.0	<0.1	1.5	500
	01/23/90	1.2	<0.3	<0.3	<0.3	NA	NA	150
	04/10/90	150	3.5	9.8	11	NA	NA	1,000
	07/26/90	78	3.7	<0.3	12	NA	NA	3,300
	10/25/90	610	180	120	290	NA	NA	3,800
MW-5	01/23/90	4.8	<0.3	<0.3	<0.3	NA	NA	290
	04/10/90	40	0.59	0.63	2.7	NA	NA	750
	07/26/90	8.9	<0.3	<0.3	<0.3	NA	NA	1,700
	10/25/90	15	1.8	2.4	9.9	NA	NA	320 <sup>g</sup>
MW-6	01/23/90	460	100	9.3	1,600	NA	NA	33,000
	04/10/90	460	21	40	170	NA	NA	9,200
	07/26/90	890	43	120	490	NA	NA	7,700
	10/25/90	1,000	27	270	260	NA	NA	8,700
MW-7	01/23/90	61	1.3	<0.3	1,600	NA	NA	3,200
	04/10/90	4,300	23	18	550	NA	NA	15,000
	07/26/90	3,800	24	280	340	NA	NA	8,800
	10/25/90	3,900	15	640	290	NA	NA	11,000
MW-8	01/23/90	160	730	47.0	3,300	NA	NA	22,000
	04/10/90	2,600	630	250	2,100	NA	NA	21,000
	07/26/90	3,600	1,600	610	3,600	NA	NA	20,000
	10/25/90	3,400	100	300	270	NA	NA	8,600 <sup>h</sup>
MW-9	01/23/90	<0.3	0.3	0.97	3.0	NA	NA	8.8
	04/10/90	500	4.1	1.3	50	NA	NA	2,500
	07/26/90	730	4.0	6.7	12	NA	NA	2,500
	10/25/90	360	2.9	46	3.8	NA	NA	1,400

<sup>a</sup>Ethylene dibromide.<sup>b</sup>1,2-dichloroethene.<sup>c</sup>Total petroleum hydrocarbons as gasoline.<sup>d</sup>Not detected.<sup>e</sup>Free product.<sup>f</sup>Not analyzed.



GENERAL NOTES:  
 BASE MAPS FROM U.S.G.S.  
 OAKLAND WEST, CA.  
 7.5 MINUTE TOPOGRAPHIC  
 PHOTOREVISED 1980

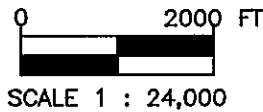
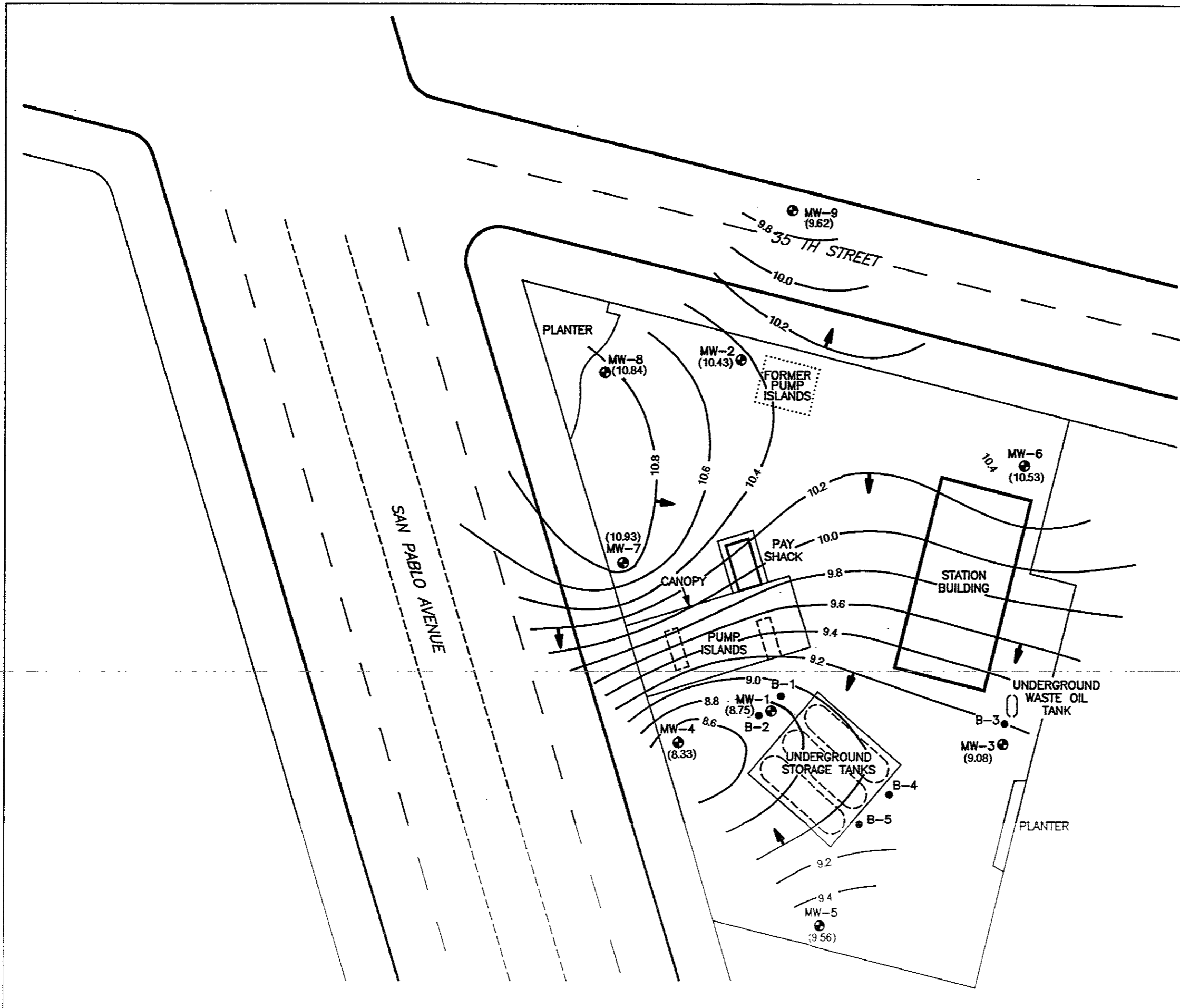


FIGURE 1  
 SITE LOCATION MAP  
 3420 SAN PABLO AVENUE  
 OAKLAND, CA.

PROJECT NO. 40-88-666	DRAWN BY I.H. 12/20/90
FILE NO.	PREPARED BY HEH
REVISION NO. 1	REVIEWED BY DVS 1/8/90



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 Environmental  
 Consultants, Inc.



- LEGEND:**
- B-1 SOIL BORING LOCATION
  - ⊕ MW-1 MONITORING WELL LOCATION
  - (8.75) GROUND WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
  - 9.6 — WATER TABLE CONTOUR IN FEET ABOVE MEAN SEA LEVEL
  - ↘ GROUND WATER FLOW DIRECTION

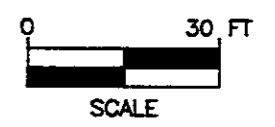


FIGURE 2  
WATER TABLE CONTOUR MAP - 10/25/90  
3420 SAN PABLO AVENUE  
OAKLAND, CA.

PROJECT NO. 40-88-668	DRAWN BY IH 11/15/90
FILE NO.	PREPARED BY TEL
REVISION NO. 1	REVIEWED BY DVD 11/6/91

Delta  
Environmental  
Consultants, Inc.

**APPENDIX A**

**Certified Analytical Laboratory Reports**



# SEQUOIA ANALYTICAL

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

Delta Environmental Consultants  
3330 Data Drive  
Rancho Cordova, CA 95670  
Attention: Hal Hanson

NOV 13 1990

Project: #40-88-666/Oakland SHELL

*DCJ* 11/15/90

Enclosed are the results from 8 water samples received at Sequoia Analytical on October 26, 1990. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
010-0686 A-B	Water, MW-9	10/26/90	EPA 5030/8015/8020
010-0687 A-B	Water, MW-2	10/26/90	EPA 5030/8015/8020
010-0688 A-B	Water, MW-3	10/26/90	EPA 5030/8015/8020
010-0689 A-B	Water, MW-4	10/26/90	EPA 5030/8015/8020
010-0690 A-B	Water, MW-5	10/26/90	EPA 5030/8015/8020
010-0691 A-B	Water, MW-6	10/26/90	EPA 5030/8015/8020
010-0692 A-B	Water, MW-7	10/26/90	EPA 5030/8015/8020
010-0693 A-B	Water, MW-8	10/26/90	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Julia R. Malerstein  
Project Manager



# SEQUOIA ANALYTICAL

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

Delta Environmental Consultants 3330 Data Drive Rancho Cordova, CA 95670 Attention: Hal Hanson	Client Project ID: #40-88-666/Oakland SHELL Matrix Descript: Water Analysis Method: EPA 5030/8015/8020 First Sample #: 010-0686 A-B	Sampled: Oct 26, 1990 Received: Oct 26, 1990 Analyzed: 10/29-30/90 Reported: Nov 2, 1990
---	--	---

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

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons $\mu\text{g/L}$ (ppb)	Benzene $\mu\text{g/L}$ (ppb)	Toluene $\mu\text{g/L}$ (ppb)	Ethyl Benzene $\mu\text{g/L}$ (ppb)	Xylenes $\mu\text{g/L}$ (ppb)
010-0686 A-B	MW-9	1,400	360	2.9	46	3.8
010-0687 A-B	MW-2	140,000	12,000	1,400	3,500	18,000
010-0688 A-B	MW-3	93	N.D.	N.D.	N.D.	N.D.
010-0689 A-B	MW-4	3,800	610	180	120	290
010-0690 A-B	MW-5	320	15	1.8	2.4	9.9
010-0691 A-B	MW-6	8,700	1,000	27	270	260
010-0692 A-B	MW-7	11,000	3,900	15	640	290
010-0693 A-B	MW-8	8,600	3,400	100	300	270

<b>Detection Limits:</b>	<b>30</b>	<b>0.30</b>	<b>0.30</b>	<b>0.30</b>	<b>0.30</b>
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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

Julia R. Malerstein  
Project Manager



# SEQUOIA ANALYTICAL

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

Delta Environmental Consultants  
3330 Data Drive  
Rancho Cordova, CA 95670  
Attention: Hal Hanson

Client Project ID: #40-88-666/Oakland SHELL

QC Sample Group: 0100686-93

Reported: Nov 2, 1990

## QUALITY CONTROL DATA REPORT

### ANALYTE

	Benzene	Toluene	Ethyl Benzene	Xylenes
--	---------	---------	---------------	---------

Method:	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020
Analyst:	E. Hamilton	E. Hamilton	E. Hamilton	E. Hamilton
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Oct 29, 1990	Oct 29, 1990	Oct 29, 1990	Oct 29, 1990
QC Sample #:	010-0654	010-0654	010-0654	010-0654

Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	20	20	20	60
Conc. Matrix Spike:	21	22	22	66
Matrix Spike % Recovery:	110	110	110	110
Conc. Matrix Spike Dup.:	21	21	22	66
Matrix Spike Duplicate % Recovery:	110	110	110	110
Relative % Difference:	0	4.7	0	0

SEQUOIA ANALYTICAL

*Julia R. Malerstein*  
Julia R. Malerstein  
Project Manager

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



# CHAIN OF CUSTODY



**Delta**  
Environmental  
Consultants, Inc.

Delta Environmental  
Consultants, Inc.  
3330 Data Drive, Suite 100  
Rancho Cordova, CA 95670  
916/638-2085 • FAX 916/638-8385

LABORATORY SAMPLES SENT TO:  
SEQUIA ANALYTICAL

PROJ. NO. 40-88  
666

PROJECT NAME: OAKLAND Shell

PROJECT LOCATION: 3420 SAN PABLO AVE

PROJECT MANAGER: HEHANBORN

Analysis Requested & Container Description

ADDRESS: \_\_\_\_\_

SAMPLERS (Signature)  
Tristy J. Lundquist

NUMBER OF CONTAINERS	Analysis Requested & Container Description	
	BTEX	TPH(CS)

REMARKS

LABORATORY SAMPLE ID	SAMPLE ID	DATE	TIME	SAMPLE TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	BTEX	TPH(CS)	REMARKS
	MW-9	10/26	13 <sup>30</sup>	W		2	X	X	0100686 AB
	MW-2		16 <sup>30</sup>			2	X	X	687
	MW-3		14 <sup>10</sup>			2	X	X	688
	MW-4		14 <sup>30</sup>			2	X	X	689
	MW-5		15 <sup>00</sup>			2	X	X	690
	MW-6		17 <sup>00</sup>			2	X	X	691
	MW-7		15 <sup>30</sup>			2	X	X	692
	MW-8	✓	16 <sup>00</sup>	✓		2	X	X	693 ↓

Relinquished by: (Signature) <u>Tristy J. Lundquist</u>	Date 10/26	Time 11 <sup>00</sup>	Received by: (Signature) <u>T. Balay</u>	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
--	---------------	--------------------------	---	------------------------------	------	------	--------------------------

Relinquished by: (Signature)	Date	Time	Received at Laboratory by: (Signature) <u>[Signature]</u>	Date 10/26	Time 12:30	Turnaround Time:
------------------------------	------	------	--	---------------	---------------	------------------

Sealed for shipment by: (signature) <u>Tristy J. Lundquist</u>	Date/Time 10/26/90 11 <sup>00</sup>	Shipment method: SEQUIA COURIER
---	--	------------------------------------

Sampler Comments: Shell Contact. D. Lundquist WIC # 204-5508-5306 AFE # 086636 CT/DL# 5441	Laboratory Comments:
Condition of Samples:	