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12: 37

December 12, 1991

Mr. Dennis Bryne
Hazardous Materials Department
County of Alameda
470 27th Street
Oakland, California 94607

Subject: *Additional Ground Water Monitoring Well Installation and Quarterly Ground Water Monitoring Report, Fourth Quarter 1991*
Shell Service Station
3420 San Pablo Avenue, Oakland, California
Shell WIC No. 204-5508-5306
Delta Project No. 40-88-666

Dear Mr. Miller:

Enclosed is a final copy of the Delta Environmental Consultants, Inc., *Additional Ground Water Monitoring Well Installation and Quarterly Ground Water Monitoring Report, Fourth Quarter 1991* report for your review. This report summarizes drilling and soil sampling activities and the installation of two off-site ground water monitoring wells performed on October 23, 1991. This report also contains results of quarterly monitoring of ground water elevation and quality conducted on October 23, 1991, at the above-referenced site.

If you have any questions concerning this report, please call me at (916) 638-2085.

Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

Lisa Rainger

Lisa Rainger
Project Manager

LR:(CL084.BP)
Enclosure

cc/enc: Ms. Lisa McCann, California Regional Water Quality Control Board, San Francisco Bay Region
Mr. Kurt Miller, Shell Oil Company
James Brownell, Delta Environmental Consultants, Inc.

ADDITIONAL GROUND WATER MONITORING WELL INSTALLATION AND QUARTERLY GROUND WATER MONITORING REPORT, FOURTH QUARTER 1991

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

December 12, 1991

Prepared By

DELTA ENVIRONMENTAL CONSULTANTS, INC.
3330 Data Drive, Suite 100
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3420 SAN PABLO AVENUE

OAKLAND, CALIFORNIA

SHELL WIC NO. 204-5508-5306

DELTA PROJECT NO. 40-88-666

1.0 INTRODUCTION

Delta Environmental Consultants, Inc. (Delta), has been authorized to conduct an investigation of soil and ground water conditions at a Shell gasoline service station (site), located at 3420 San Pablo Avenue, Oakland, California (Figure 1 and 2). The investigation is intended to characterize the distribution of petroleum hydrocarbon constituents in soil and ground water beneath and adjacent to the site. This report summarizes drilling and soil sampling activities and the installation of ground water monitoring wells performed on October 23, 1991. Also, this report presents results of ground water sampling activities performed on October 23, 1991. Included in this report are ground water level measurements recorded on November 8, 1991.

1.1 Previous Reports

This report supplements information provided in the following reports:

Report	Date	Author
Soil and Ground Water Investigation	September 1988	Ensco Environmental Services, Inc.
Phase I Hydrogeologic Assessment Investigation	August 14, 1989	Delta
Phase II Hydrogeologic Assessment Investigation	May 30, 1990	Delta
Quarterly Monitoring Report	July 30, 1990	Delta
Quarterly Monitoring Report	October 11, 1990	Delta
Quarterly Monitoring Report, Fourth Quarter 1990	January 4, 1991	Delta
Quarterly Monitoring Report, First Quarter 1991	April 25, 1991	Delta
Quarterly Monitoring Report, Second Quarter 1991	June 19, 1991	Delta
Quarterly Monitoring Report, Third Quarter 1991	September 18, 1991	Delta

1.2 Site Activity Summary

The following work has been performed during the months of October and November 1991 using field procedures described in Appendix A:

October 23, 1991 Two soil borings were advanced to a depth of 21.5 feet below grade and completed as ground water monitoring wells MW-10 and MW-11. Select soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), and total petroleum hydrocarbons (TPH) as gasoline.

Ground water samples were collected from ground water monitoring wells MW-1 through MW-11. Ground water samples were submitted for laboratory analysis of BTEX and TPH as gasoline. Ground water level measurements were recorded prior to ground water sampling.

Product recovery devices were installed in ground water monitoring wells MW-1 and MW-2.

November 8, 1991 Ground water level measurements were recorded from monitoring wells MW-1 through MW-11.

2.0 GROUND WATER MONITORING WELL INSTALLATION

2.1 Soil Boring Results

On October 23, 1991 two soil borings were advanced to a depth of 21.5 feet below grade and completed as 4-inch-diameter ground water monitoring wells MW-10 and MW-11 (Figure 2). The soil stratigraphy encountered during the course of drilling consists of silty clay from beneath the paved surface to 16.5 and 14.5 feet below grade in the borings of MW-10 and MW-11, respectively. The silty clay became more sandy in monitoring well MW-10 between 10 and 16.5 feet below grade. Clayey sandy silt was encountered to 21.5 feet below grade in the boring of monitoring well MW-10. Clayey silt was present in the boring of MW-11 from 14.5 to 19.5 feet below grade followed by clayey silty gravel to 21.5 feet below grade. Soil boring logs containing soil descriptions are included in Appendix B.

2.2 Soil Sample Analytical Results

Soil samples were collected at 5-foot vertical intervals during the course of drilling. Soil from each interval was collected in three 2 by 6-inch brass tubes. Upon retrieval, soil from one of the brass tubes was extracted and placed in a plastic bag and brought to ambient air temperature. The soil sample headspace was field-analyzed for the presence of organic vapors with an organic vapor meter (OVM). OVM screening results are included on the soil boring logs (Appendix B). OVM readings are recorded in parts per million (ppm) as only a relative measurement. Field screening results indicate that organic vapors were not present in soil samples collected from the boring of monitoring well MW-11. Organic vapor readings were present in soil samples collected from the boring of monitoring well MW-10 ranging from 51 to 213 ppm (20 and 10 feet below grade, respectively).

At each 5-foot interval one of the brass tubes containing a sample was sealed, capped, and stored in accordance to EPA procedures for possible chemical analysis. Soil samples were submitted for laboratory analysis based on the field-screening results and the location of the sample in relation to the ground water table. Soil samples were submitted for analysis of BTEX and TPH as gasoline. Soil sample analytical results for the October 23, 1991 drilling event are presented in Table 1. Soil sample analytical results indicate TPH as gasoline to be present at concentrations of 1.4 and 1.8 ppm in soil samples collected at 5 and 10 feet below grade, respectively, from the boring of monitoring well MW-10. Soil samples collected at 5 and 10 feet below grade from the boring of monitoring well MW-11 did not contain detectable levels of petroleum hydrocarbon constituents. Copies of the soil sample analytical certified reports are included in Appendix C.

2.3 Ground Water Monitoring Well Construction

Monitoring wells MW-10 and MW-11 are constructed of 4-inch-diameter, flush-threaded, Schedule 40 PVC material installed to a depth of approximately 19 feet below grade. The wells were screened with 0.02-inch-wide slots from 4 to 19 feet below grade. The annular space in each is filled with No. 3 sand to approximately .5 feet above the screened interval. A .5-foot-thick bentonite seal was placed above the sand pack. The remaining annular space in the well was filled with cement grout containing approximately 5 percent bentonite. The top of the well casings contain a locking water tight expansion caps and were completed at the surface with traffic rated well covers. The well construction details for monitoring wells

MW-11 are included in Appendix D. Copies of the encroachment permits obtained from the City of Oakland and monitoring well construction permits obtained from the Alameda County Flood Control and Water Conservation District are included in Appendix E.

3.0 THIRD QUARTER 1991 MONITORING RESULTS

3.1 Ground Water Level Measurements

Depth to ground water was measured and recorded from monitoring wells MW-1 through MW-11 on October 23 and November 8, 1991. Depth to ground water ranges between approximately 7.7 and 11.7 feet below the top of casings. Ground water level measurements recorded at the site since June 1989 are included in Table 2. The ground water level measurements recorded on November 9, 1991, were used to construct the water table contour map presented in Figure 3. The water table contour map indicates that there is no uniform direction of ground water flow beneath the site. This is consistent with previous water table contour maps. A depression in the ground water table is present in the vicinity of monitoring well MW-4. The direction of ground water flow is inferred to be towards the north beneath the northern portion of the site and towards the south beneath the southern portion of the site.

3.2 Ground Water Quality

Ground water samples were collected from monitoring wells MW-1 through MW-11 using procedures described in Appendix A. Ground water samples were submitted for laboratory analysis of BTEX and TPH as gasoline. Ground water sample analytical results for the October 1991 sampling event are summarized in Table 2, along with previous analytical results. Copies of the ground water analytical laboratory reports are included in Appendix F.

Prior to purging, monitoring well MW-1 contained a free-phase petroleum thickness of 0.01-foot and monitoring wells MW-2 and MW-6 were observed to have a sheen on the surface of the retrieved water sample. Based on the October 23, 1991 sampling event, the inferred distribution of benzene and TPH as gasoline in ground water is illustrated in Figures 4 and 5, respectively.

4.0 DISCUSSION

Depth to ground water beneath the site ranged between 8.11 and 11.04 feet below the top of casings on November 8, 1991, indicating a slight increase since August 1991 (Table 1). A uniform direction of ground water flow is not present beneath the site (Figure 3).

Free-phase petroleum was present in ground water monitoring well MW-1 in October 1991 at a thickness of 0.01-feet, which is consistent with measurements recorded in August 1991. A sheen was present on the surface of ground water samples retrieved from monitoring wells MW-2 and MW-6 in October 1991. Ground water analytical results for the October 1991 sampling event indicate concentrations of benzene decreased since August 1991 in ground water samples collected from monitoring wells MW-2, MW-3, MW-5, MW-7, and MW-9. Benzene concentrations remained the same in ground water samples collected from monitoring well MW-6. Concentrations of benzene increased between August and October 1991 in ground water samples collected from monitoring wells MW-4 and MW-8. Monitoring well MW-1 was not sampled in August 1991 due to the presence of free-phase petroleum. Concentrations of TPH as gasoline decreased in ground water samples collected from monitoring wells MW-3 between August and October 1991. TPH as gasoline increased in ground water samples collected from monitoring wells MW-2, MW-4, MW-5, MW-6, MW-7, MW-8, and MW-9.

Ground water samples collected from newly installed ground water monitoring wells MW-10 and MW-11 in October 1991 contained benzene concentrations of 1.6 and 0.0012 ppm, respectively.

Ground water levels and ground water quality will continue to be monitored on a quarterly basis. The next ground water sampling event is scheduled for January 1992.

5.0 RECOMMENDATIONS/SIGNATURES

The findings contained in this report are based on currently available information and are arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended. 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.

DELTA ENVIRONMENTAL CONSULTANTS, INC.

PREPARED BY:

C. K. Almeida

Charles Keoni Almeida
Project Geologist

Date 12/12/91

REVIEWED BY:

Lisa Rainger

Lisa Rainger
Project Manager

Date 12/12/91

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

James R. Brownell

James R. Brownell
California Registered
Geologist No. 5078

Date 12/12/91

REGISTERED GEOLOGIST
JAMES R. BROWNELL
No. 5078
STATE OF CALIFORNIA

TABLE 1

GROUND WATER ELEVATIONS

Monitoring Well	Date	Top of Riser Elevation (ft)	Water Depth (ft)	Ground Water Elevation (ft)	Physical Observations
MW-1	06/12/89	21.28	9.57	11.71	No sheen or product
	01/23/90		9.04	12.24	No sheen or product
	02/02/90		8.89	12.39	No sheen or product
	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
	01/28/91		11.62	9.66	0.03' Free product
	04/30/91		8.10	13.18	0.01' Free product
	08/06/91		10.86	10.42	0.01' Free product
	10/23/91		11.05	10.24	0.01' Free product
	11/08/91		10.79	10.49	No observation
MW-2	06/12/89	21.56	7.96	13.60	No sheen or product
	01/23/90		8.30	13.26	No sheen or product
	02/02/90		8.04	13.52	No sheen or product
	02/21/90		7.57	13.99	No sheen or product
	40/10/90		7.94	13.62	No sheen or product
	07/26/90		8.41	13.15	No sheen or product
	10/25/90		11.13	10.43	No sheen or product
	01/28/91		9.62	11.94	0.31' Free product
	04/30/91		6.76	14.80	0.01' Free product
	08/06/91		9.72	11.84	No sheen or product
	10/23/91		10.03	11.53	Sheen
	11/08/91		9.68	11.88	No observation
MW-3	06/12/89	21.78	10.77	11.01	No sheen or product
	01/23/90		9.26	12.52	No sheen or product
	02/02/90		9.33	12.45	No sheen or product
	02/21/90		8.24	13.54	No sheen or product
	04/10/90		10.26	11.52	No sheen or product
	07/26/90		10.98	10.80	No sheen or product
	10/25/90		12.70	9.08	No sheen or product
	01/28/91		NM[a]	---	---
	04/30/91		8.74	13.04	No sheen or product
	08/06/91		11.18	10.60	No sheen or product
	10/23/91		11.69	10.09	No sheen or product
	11/08/91		11.04	10.74	No observation
MW-4	06/12/89	20.31	11.19	9.12	No sheen or product
	01/23/90		9.25	11.06	No sheen or product
	02/02/90		8.04	12.27	No sheen or product
	02/21/90		7.90	12.41	No sheen or product
	04/10/90		9.30	11.01	No sheen or product
	07/26/90		9.56	10.75	No sheen or product
	10/25/90		11.98	8.33	No sheen or product
	01/28/91		10.69	9.62	No sheen or product
	04/30/91		8.17	12.14	No sheen or product
	08/06/91		10.57	9.74	No sheen or product
	10/23/91		10.46	9.85	No sheen or product
	11/08/91		10.56	9.75	No observation

TABLE 1-Continued

GROUND WATER ELEVATIONS

Monitoring Well	Date	Top of Riser Elevation (ft)	Water Depth (ft)	Ground Water Elevation (ft)	Physical Observations
MW-5	01/23/90	20.91	7.89	13.02	No sheen or product
	02/02/90		8.23	12.68	No sheen or product
	02/21/90		7.31	13.60	No sheen or product
	04/10/90		9.89	11.72	No sheen or product
	07/26/90		9.80	11.11	No sheen or product
	10/25/90		11.35	9.56	No sheen or product
	01/28/91		10.37	10.54	No sheen or product
	04/30/91		7.56	13.35	No sheen or product
	08/06/91		10.23	10.68	No sheen or product
	10/23/91		10.89	10.52	No sheen or product
	11/08/91		10.19	10.72	No observation
MW-6	01/23/90	22.32	7.57	14.75	No sheen or product
	02/02/90		7.86	14.46	No sheen or product
	02/21/90		6.95	15.37	No sheen or product
	04/10/90		9.25	13.07	No sheen or product
	07/26/90		8.64	13.68	No sheen or product
	10/25/90		11.79	10.53	No sheen or product
	01/28/91		9.99	12.33	Sheen on VOA sample
	04/30/91		7.03	15.29	No sheen or product
	08/06/91		10.61	11.71	No sheen or product
	10/23/91		11.68	10.64	Sheen
	11/08/91		9.84	12.48	No observation
MW-7	01/23/90	20.36	6.98	13.38	No sheen or product
	02/02/90		8.91	11.45	No sheen or product
	02/21/90		6.65	13.71	No sheen or product
	04/10/90		6.99	13.37	No sheen or product
	07/26/90		7.33	13.03	No sheen or product
	10/25/90		9.43	10.93	No sheen or product
	01/28/91		7.82	12.54	No sheen or product
	04/30/91		5.40	14.96	No sheen or product
	08/06/91		8.00	12.36	No sheen or product
	10/23/91		8.16	12.20	No sheen or product
	11/08/91		8.11	12.25	No observation
MW-8	01/23/90	20.95	7.19	13.76	No sheen or product
	02/02/90		7.32	13.36	No sheen or product
	02/21/90		6.90	14.05	No sheen or product
	04/10/90		7.20	13.75	No sheen or product
	07/26/90		7.58	13.37	No sheen or product
	10/25/90		10.11	10.84	No sheen or product
	01/28/91		9.33	11.62	No sheen or product
	04/30/91		6.35	14.60	No sheen or product
	08/06/91		9.60	11.35	No sheen or product
	10/23/91		9.73	11.22	No sheen or product
	11/08/91		9.56	11.39	No observation

TABLE 1-Continued

GROUND WATER ELEVATIONS

Monitoring Well	Date	Top of Riser Elevation (ft)	Water Depth (ft)	Ground Water Elevation (ft)	Physical Observations
MW-9	01/23/90	21.19	9.31	11.88	No sheen or product
	02/02/90		9.02	12.17	No sheen or product
	02/21/90		8.28	12.91	No sheen or product
	04/10/90		8.41	12.78	No sheen or product
	07/26/90		9.18	12.01	No sheen or product
	10/25/90		11.57	9.62	No sheen or product
	01/28/91		10.38	10.81	No sheen or product
	04/30/91		7.20	13.99	No sheen or product
	08/06/91		10.33	10.86	No sheen or product
	10/23/91		11.13	10.06	No sheen or product
	11/08/91		10.34	10.85	No observation
MW-10	10/23/91	19.74	8.57	11.17	No sheen or product
	11/08/91		7.72	12.02	No observation
MW-11	10/23/91	22.06	14.0	8.06	No sheen or product
	11/08/91		9.89	12.17	No observation

[a]Not measured; inaccessible due to obstruction.

TABLE 2

GROUND WATER CHEMICAL ANALYSIS
Concentrations in parts per million

Monitoring Well	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	EDB[a]	EDC[b]	TPH[c]
							0.010	12.0
MW-1	04/17/89	1.4	2.3	6.6	1.1	ND[d]		
	01/23/90[e]							
	04/10/90[e]							
	07/26/90[e]							
	10/25/90[e]							
	01/28/91[e]							
	04/30/91	2.4	2.1	1.9	10	NA[f]	NA	39
	08/06/91[e]							
	10/23/91	2.7	0.36	0.55	3.7	NA	NA	32
MW-2	04/17/89	12.0	1.8	12.0	2.2	<0.10	0.036	35.0
	01/23/90	0.11	0.0096	0.14	3.3	NA[f]	NA	40.0
	04/10/90	12.0	0.57	0.56	6.8	NA	NA	45.0
	07/26/90	15.0	0.84	1.4	10.0	NA	NA	53.0
	10/25/90	12.0	1.4	3.5	18.0	NA	NA	140.0
	01/28/91[e]							
	04/30/91	14	1.5	2.5	11	NA	NA	64
	08/06/91	15	1.4	2.7	13.0	NA	NA	50
	10/23/91	11	1.4	3.5	19.0	NA	NA	120
MW-3	04/17/89	0.003	0.0002	0.009	<0.0001	<0.001	<0.001	0.10
	01/23/90	0.0011	<0.0003	<0.0003	<0.0003	NA	NA	0.14
	04/10/90	0.0011	<0.0003	<0.0003	0.0012	NA	NA	0.25
	07/26/90	<0.0003	<0.0003	<0.0003	<0.0003	NA	NA	<0.03
	10/25/90	<0.0003	<0.0003	<0.0003	<0.0003	NA	NA	0.093
	01/28/91[g]	---	---	---	---	---	---	---
	04/30/91	<0.0003	<0.0003	<0.0003	0.00037	NA	NA	0.46
	08/06/91	0.008	0.001	0.004	0.015	NA	NA	0.43
	10/23/91	0.0021	<0.0003	0.00048	0.002	NA	NA	0.39
MW-4	04/17/89	0.0012	<0.0001	0.003	0.001	<0.0001	0.0015	0.50
	01/23/90	0.0012	<0.0003	<0.0003	<0.0003	NA	NA	0.15
	04/10/90	0.15	0.0035	0.0098	0.011	NA	NA	1.0
	07/26/90	0.078	0.0037	<0.0003	0.012	NA	NA	3.3
	10/25/90	0.61	0.18	0.12	0.29	NA	NA	3.8
	01/28/91	0.59	0.042	0.06	0.22	NA	NA	3.3
	04/30/91	0.35	0.013	0.029	0.042	NA	NA	1.3
	08/06/91	0.028	0.018	0.068	0.15	NA	NA	1.3
	10/23/91	0.097	0.0061	0.038	0.077	NA	NA	1.9
MW-5	01/23/90	0.0048	<0.0003	<0.0003	<0.0003	NA	NA	0.29
	04/10/90	0.04	.00059	0.00063	0.0027	NA	NA	0.75
	07/26/90	0.0089	<0.0003	<0.0003	<0.0003	NA	NA	1.7
	10/25/90	0.015	0.0018	0.0024	0.0099	NA	NA	0.32
	01/28/91	0.21	0.011	0.069	0.280	NA	NA	3.1
	04/30/91	0.16	0.0077	0.012	0.57	NA	NA	3.7
	08/06/91	0.21	0.027	0.24	0.66	NA	NA	9.1
	10/23/91	0.092	0.018	0.23	0.45	NA	NA	12.0

TABLE 2 - Continued

GROUND WATER CHEMICAL ANALYSIS
Concentrations in parts per million

Monitoring Well	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	EDB[a]	EDC[b]	TPH[c]
MW-6	01/23/90	0.46	0.10	0.0093	1.6	NA	NA	33.0
	04/10/90	0.46	0.021	0.004	0.17	NA	NA	9.2
	07/26/90	0.89	0.043	0.12	0.49	NA	NA	7.7
	10/25/90	1.0	0.027	0.27	0.26	NA	NA	8.7
	01/28/91	2.5	0.19	1.5	5.4	NA	NA	38.0
	04/30/91	1.9	0.28	1.7	6.0	NA	NA	42
	08/06/91	1.4	0.20	1.3	4.2	NA	NA	28.0
	10/23/91	1.4	0.23	1.8	6.7	NA	NA	53.0
MW-7	01/23/90	0.061	0.0013	<0.0003	1.6	NA	NA	3.2
	04/10/90	4.3	0.023	0.018	0.55	NA	NA	15.0
	07/26/90	3.8	0.024	0.28	0.34	NA	NA	8.8
	10/25/90	3.9	0.015	0.64	0.29	NA	NA	11.0
	01/28/91	4.0	<0.0003	0.62	0.15	NA	NA	14.0
	04/30/91	3.0	<0.0003	0.57	0.59	NA	NA	9.2
	08/06/91	4.3	0.076	0.77	0.73	NA	NA	13.0
	10/23/91	3.2	0.031	0.66	0.77	NA	NA	18.0
MW-8	01/23/90	0.16	0.73	0.047	3.3	NA	NA	22.0
	04/10/90	2.6	0.63	0.25	2.1	NA	NA	21.0
	07/26/90	3.6	1.6	0.61	3.6	NA	NA	20.0
	10/25/90	3.4	0.10	0.30	0.27	NA	NA	8.6
	01/28/91	3.6	0.58	0.84	2.6	NA	NA	25.0
	04/30/91	3.1	1.1	1.3	5.7	NA	NA	31
	08/06/91	3.7	1.1	1.4	6.1	NA	NA	32.0
	10/23/91	4.8	1.3	1.3	6.9	NA	NA	63.0
MW-9	01/23/90	<0.0003	0.0003	0.00097	0.003	NA	NA	0.0088
	04/10/90	0.50	0.0041	0.0013	0.05	NA	NA	2.5
	07/26/90	0.73	0.004	0.0067	0.012	NA	NA	2.5
	10/25/90	0.36	0.0029	0.046	0.0038	NA	NA	1.4
	01/28/91	0.14	0.0012	0.029	0.047	NA	NA	1.1
	04/30/91	0.27	0.015	0.10	0.12	NA	NA	1.9
	08/06/91	1.7	0.095	0.52	1.4	NA	NA	11.0
	10/23/91	1.0	0.047	<0.0003	0.94	NA	NA	20.0

TABLE 2 - Continued

GROUND WATER CHEMICAL ANALYSIS
Concentrations in parts per million

Monitoring Well	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	EDB[a]	EDC[b]	TPH[c]
MW-10	10/23/91	1.6	0.11	1.8	0.51	NA	NA	27
MW-11	10/23/91	0.0012	<0.0003	0.00037	0.00056	NA	NA	0.14

[a]Ethylene dibromide.
[b]1,2-dichloroethane.
[c]Total petroleum hydrocarbons as gasoline.
[d]Not detected.
[e]Not sampled due to the presence of free product.
[f]Not analyzed.
[g]Not sampled due to well obstruction.

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

North

QUADRANGLE LOCATION

0 2000 FT

SCALE 1 : 24,000

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 DvD 1/8/90

Delta Environmental Consultants, Inc.

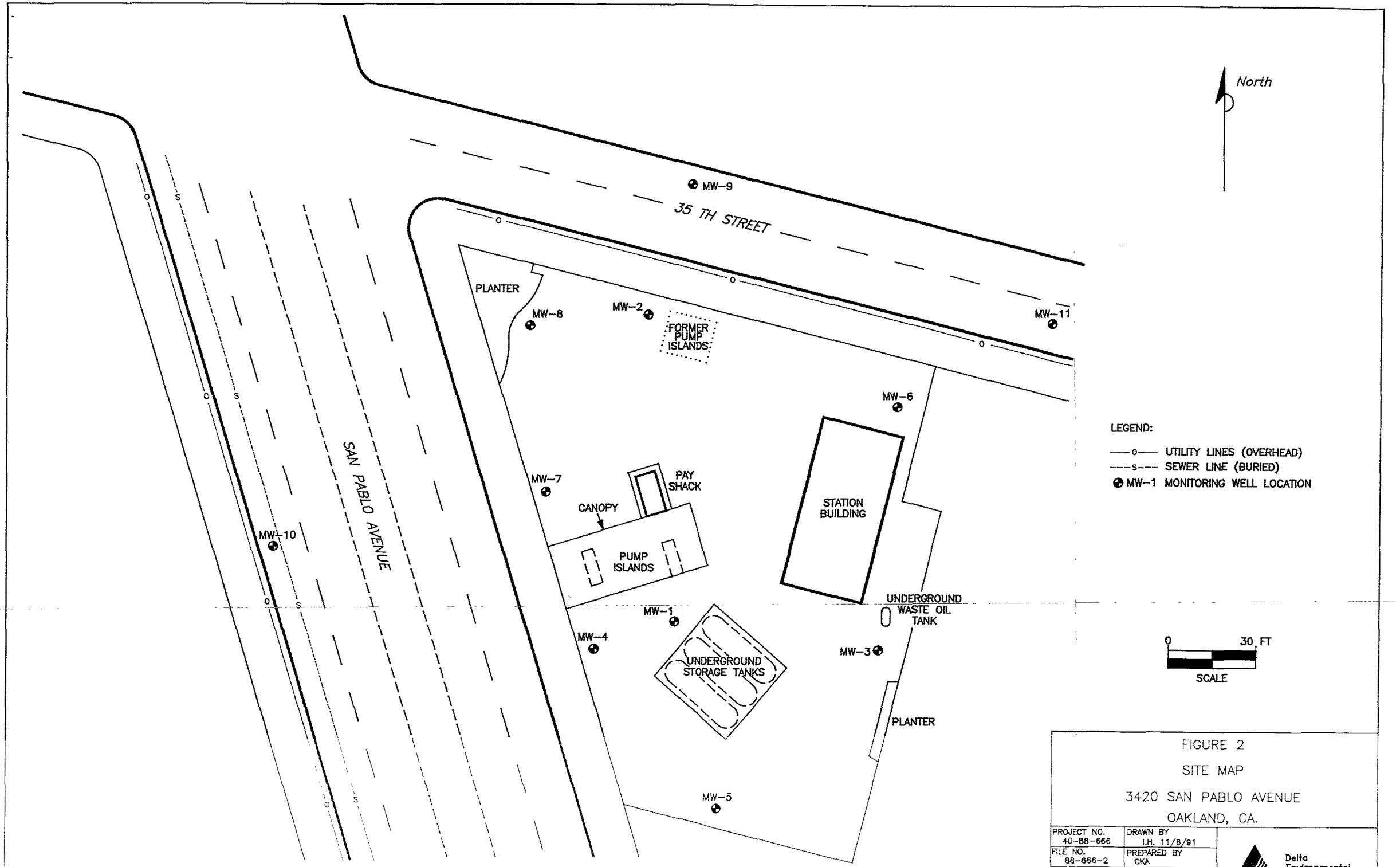


FIGURE 2

SITE MAP

3420 SAN PABLO AVENUE

OAKLAND, CA.

PROJECT NO. 40-88-666	DRAWN BY I.H. 11/8/91
FILE NO. 88-666-2	PREPARED BY CKA
REVISION NO. 2	REVIEWED BY 12/12/91 DER

Delta Environmental Consultants, Inc.

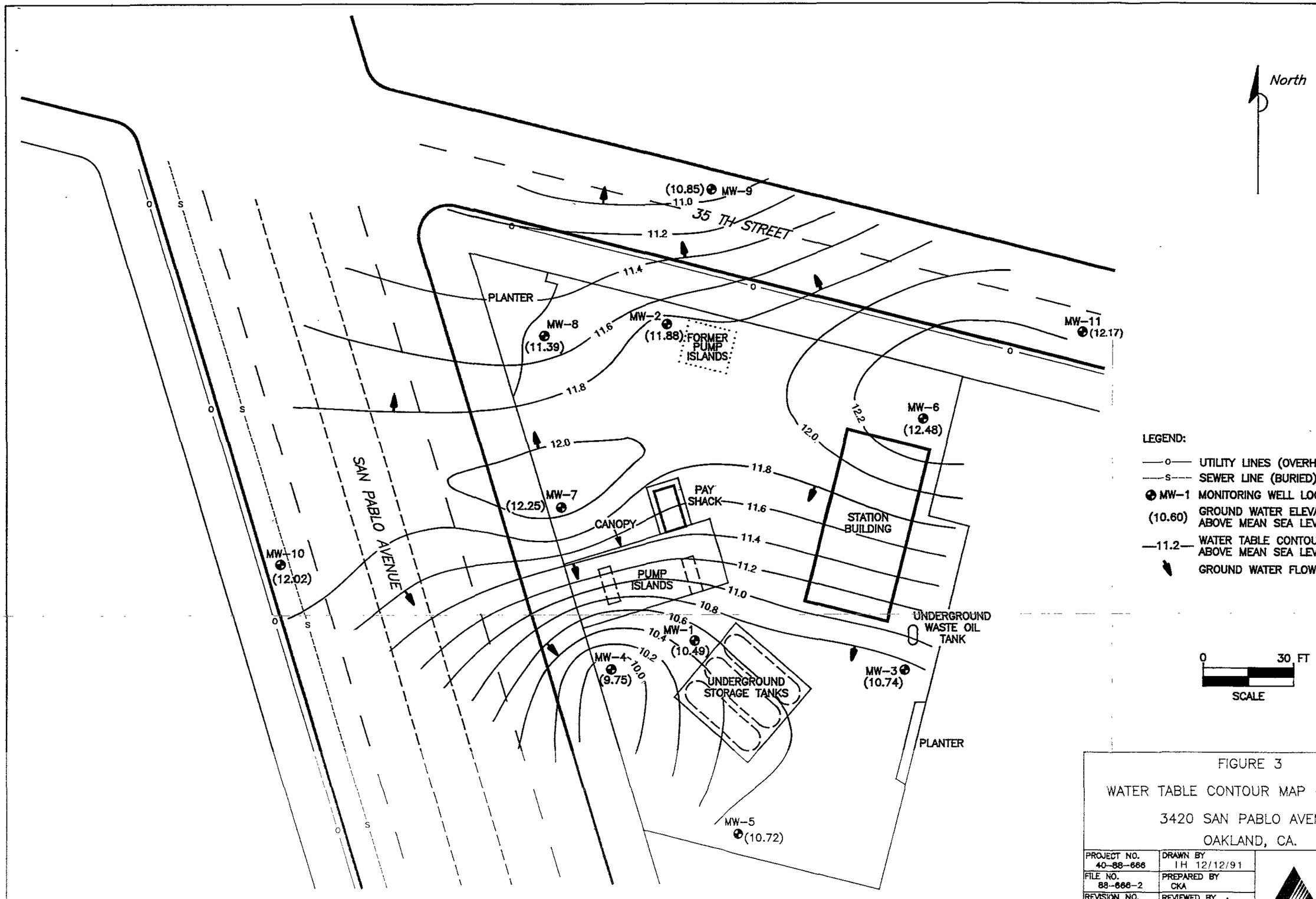


FIGURE 3

WATER TABLE CONTOUR MAP – 11/8/91

3420 SAN PABLO AVENUE

OAKLAND, CA.

PROJECT NO. 40-88-666	DRAWN BY IH 12/12/91
FILE NO. 88-666-2	PREPARED BY CKA
REVISION NO. 2	REVIEWED BY 12/12/91 LER

Delta Environmental Consultants, Inc.

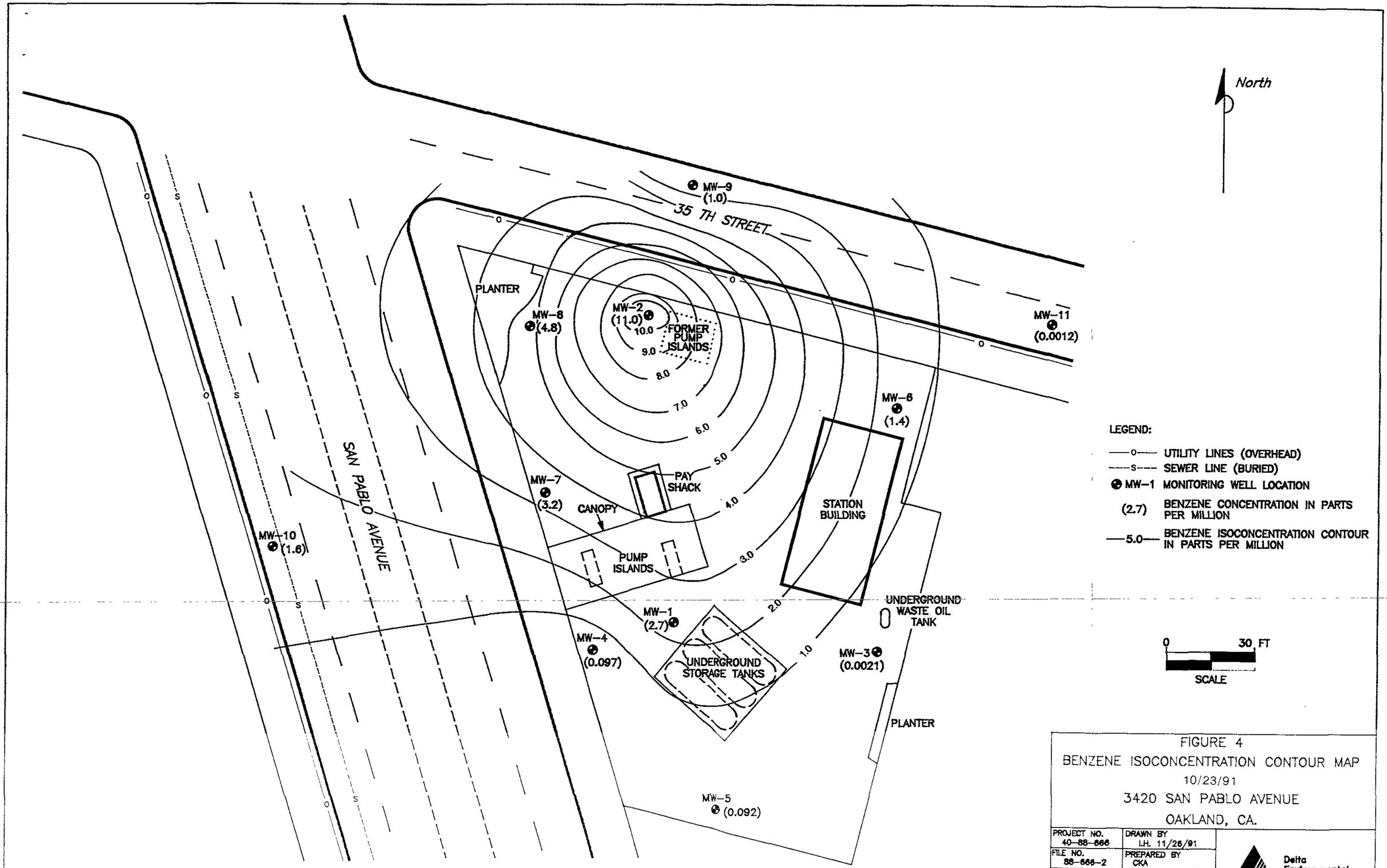


FIGURE 4

BENZENE ISOCONCENTRATION CONTOUR MAP

10/23/91

3420 SAN PABLO AVENUE

OAKLAND, CA.

PROJECT NO. 40-88-666	DRAWN BY I.H. 11/26/91
FILE NO. 88-666-2	PREPARED BY CKA
REVISION NO. 1	REVIEWED BY 12/13/91 AER

Delta Environmental Consultants, Inc.

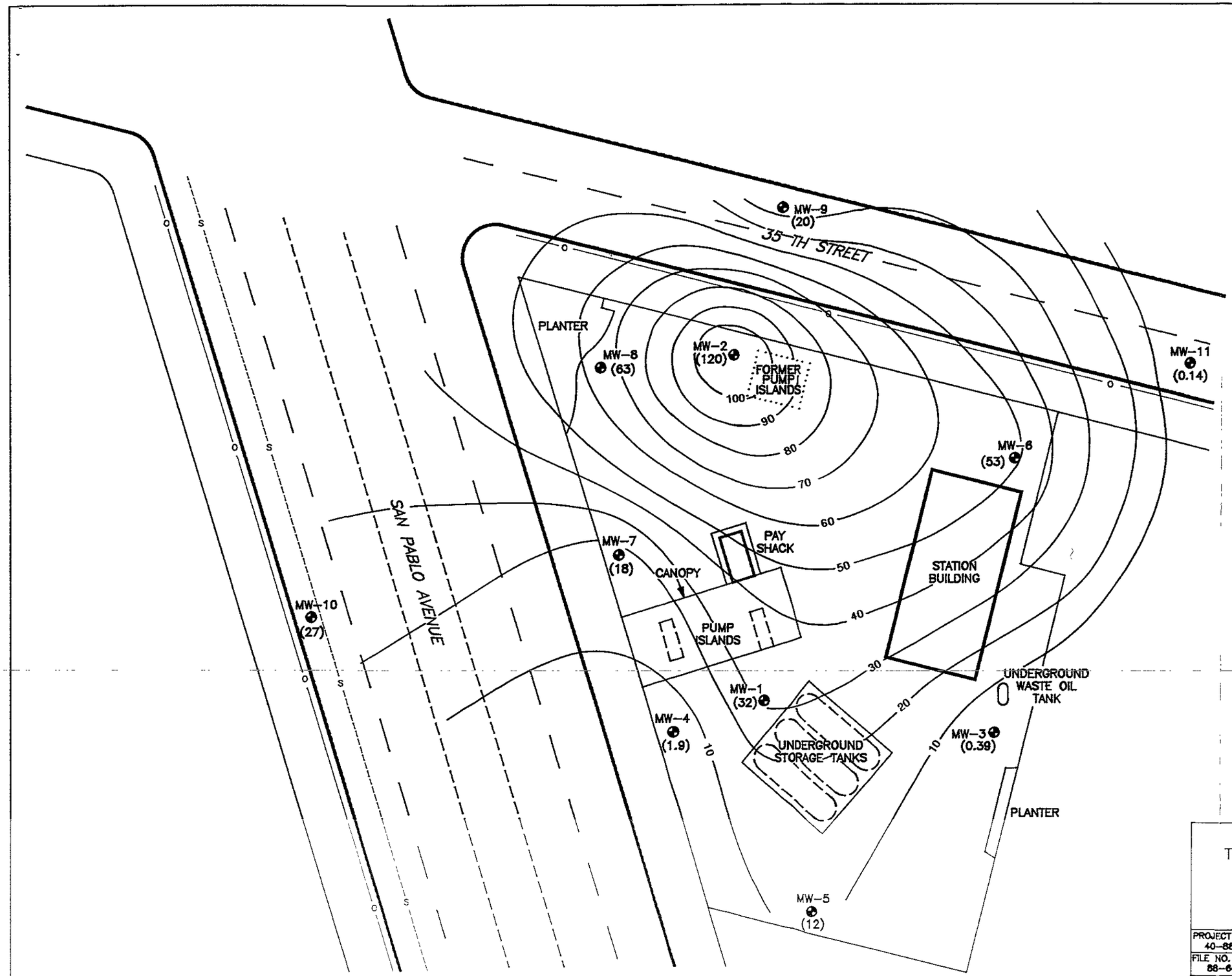


FIGURE 5

TPH ISOCONCENTRATION CONTOUR MAP

10/23/91

3420 SAN PABLO AVENUE

OAKLAND, CA.

PROJECT NO. 40-88-666	DRAWN BY L.H. 11/26/91
FILE NO. 88-666-2	PREPARED BY CKA
REVISION NO. 1	REVIEWED BY 12/12/91 KER

Delta Environmental Consultants, Inc.

APPENDIX A

Field Methods and Procedures

FIELD PROCEDURES

The following section describes field procedures that were completed by Delta personnel in the performance of the tasks involved with this project.

1.0 HEALTH AND SAFETY PLAN

Fieldwork performed by Delta and subcontractors at the site was conducted according to guidelines established in a Site Health and Safety Plan (SHSP). The SHSP is a document describes the hazards that may be encountered in the field and specifies protective equipment, work procedures, and emergency information. A copy of the SHSP was at the site and available for reference by appropriate parties during work at the site.

2.0 LOCATING UNDERGROUND UTILITIES

Prior to commencement of work on site, Delta researched the location of all underground utilities with the assistance of Underground Service Alert (USA). USA contacted the owners of the various utilities in the vicinity of the site to have the utility owners mark the locations of their underground utilities. Work associated with the boring and monitoring well installation was preceded by manual hand augering to a minimum depth of 5 feet below grade to avoid contact with underground fuel distribution and vent lines and other unmarked utilities.

3.0 SOIL BORING AND SOIL SAMPLING PROTOCOL

Soil borings and soil sampling was performed under the supervision of a Delta geologist. The soil borings were advanced using a truck-mounted hollow-stem auger drilling rig.

To reduce the chances of cross-contamination between boreholes, all downhole drilling equipment was steam-cleaned between each boring. To reduce cross-contamination between samples, the split-barrel sampler was washed in a soap solution and double-rinsed between each sampling event.

Soil sampling was conducted in accordance with ASTM 1586-84. Using this procedure, a 2-inch diameter, split-barrel sampler (California-type sampler) lined with three 2-inch by 6-inch long brass sample tubes is driven into the soil at approximately 5-foot intervals by a 140-pound weight falling 30 inches. The number of blow counts required to advance the sample 18 inches was recorded at each sample interval.

Upon recovery, a portion of the soil sample was placed in a plastic bag and sealed for later screening with an organic vapor meter (OVM). Another portion of the soil sample was used for classification and description. One of the samples was sealed in the brass tube and stored at approximately 4°C for transport to the laboratory. After the soil samples, placed in a plastic bags, were allowed to warm, inducing volatilization of petroleum hydrocarbon vapors, the headspace vapors were screened with an organic vapor meter (OVM). The highest observed reading and was then recorded on the boring logs.

4.0 GROUND WATER DEPTH DETERMINATION

Depth to ground water was measured to the nearest 0.01 foot using an electronic hand held water level indicator. The tip of the probe was examined to determine whether a product sheen was present.

5.0 MONITORING WELL DEVELOPMENT/PURGING AND SAMPLING

Following installation, the wells were surged with a surge block to remove fines from the sand pack. After surging, three to six casing volumes of ground water were purged from each well using a bailer or centrifugal pump to remove sediment and insure representative sample quality. Ground water sampling events conducted after the initial well development and sampling event were preceded by purging 3 well volumes as described above.

After the water levels within the wells were allowed to stabilize, a sample was collected with a dedicated, clean, disposable plastic bailer. Samples were contained in air-tight vials and then packed on ice and sent to the laboratory for analysis. Ground water samples were transported to the laboratory and analyzed within the EPA-specified holding time for requested analysis.

Each sample container submitted for analysis had a label affixed to identify the job number, sample date, time of sample collection, and a sample number unique to that sample. Samples were analyzed by a California-certified laboratory.

A chain-of-custody form was used to record possession of the sample from time of collection to its arrival at the laboratory. When the samples were shipped, the person in custody of them relinquished the samples by signing the chain-of-custody form and noting the time. The sample control officer at the laboratory verified sample integrity and confirmed that it was collected in the proper container, preserved correctly, and that there was an adequate volume for analysis.

6.0 SURVEYING

The top of each new well riser was surveyed on October 23, 1991, to allow correlation of the ground water levels at the site. The surveyed point on each well riser was marked to insure all future ground water level measurements are taken from the same location. The top of the casing monitoring well MW-2 was used as a bench mark with a surveyed elevation of 21.56 feet above mean sea level. All elevations were surveyed relative to the bench mark to the nearest 0.01-foot.

APPENDIX B

Soil Boring Logs

PROJECT NAME/LOCATION		Project Number	40-88-666	Boring Number	MW-10
Oakland Shell 3420 San Pablo Oakland, California		Contractor	West Hazmat	Drilling Method	H.S.A 10"
		Driller	Tom Wright	Drilling Rig	Acker
		Start	9:00 a.m. 10/23/91	Completed	10:45 a.m. 10/23/91
Landowner: City of Oakland		Surface Elev.		Logged By	Charles K. Almeida

Sample Type	Sample No.	Blow Count	Sample Interval (ft)	Sample Recovery (in.)	Depth Scale 1" = 4'	Descriptions of Materials and Conditions	Observations: Instrument: OVM Units: ppm	Observations: General Observation Notes
					1	Asphalt/Road Base		
					2			
					3			
					4			
CA	MW-10-1	7-20-25	5-6.5	16	5	CLAY; silty dark gray, medium plasticity; dry (CL)	55	
					6			
					7			
					8			
					9			
CA	MW-10-2	7-12-21	10-11.5	18	10	CLAY; silty, some coarse grained sand and .25"- diameter angular grains, very moist (CL)	213	
					11			
					12			
					13			
					14			
CA	MW-10-3	4-8-15	15-16.5	18	15	CLAY; silty gray green, medium to coarse gravely sand, minor fragments; very moist (CL)	118	
					16			
					17			
					18			
					19			
CA	MW-10-4	6-15-20	20-21.5	18	20	SANDY SILT; clayey tan brown, very fine grained sand, soft; very moist (ML)	51	
					21			
					22	Total Depth at 21.5 ft.		
					23			

BOREHOLE WATER LEVEL DATA			
Date	10/23/91		
Time	10:50 a.m.		
GWL	16.54		
Casing Depth	19.3		

Delta Environmental Consultants, Inc.

PROJECT NAME/LOCATION:	Project Number	40-88-666	Boring Number	MW-11
Oakland Shell 3420 San Pablo Avenue Oakland, California	Contractor	West Hazmat	Drilling Method	H.S.A. 10"
	Driller	Tom Wright	Drilling Rig	Acker
	Start	12:20 p.m. 10/23/91	Completed	2:15 p.m. 10/23/91 p.m.
Landowner: City of Oakland	Surface Elev.		Logged By	Charles K. Almeida

Sample Type	Sample No.	Blow Count	Sample Interval (ft)	Sample Recovery (in.)	Depth Scale 1" = 4'	Descriptions of Materials and Conditions	Observations: Instrument: OVM Units: ppm	Observations: General Observation Notes
					1	----------Asphalt/Road Base----------		
					2			
					3			
					4			
CA	MW-11-1	4-14-35	5-6.5	15	5	CLAY; silty dark brown, minor fine grained sand, medium plasticity--dry (CL)	0	
					6			
					7			
					8			
					9			
CA	MW-11-2	4-18-31	10-11.5	10	10	Tan brown, very moist.	0	
					11			
					12			
					13			
					14	gradational contact		
CA	MW-11-3	6-10-13	15-16.5	15	15	SILT; clayey, tan brown, minor fine to medium grained sand; saturated (ML)	0	
					16			
					17			
					18			
					19			
CA	MW-11-4	16-24-35	20-21.5	20	20	CLAYEY SILTY GRAVEL; brown, .25-.5" angular grains, minor coarse grained sand; saturated (GC)	0	
					21	----------Total Depth at 21.5 ft.----------		
					22			
					23			

BOREHOLE WATER LEVEL DATA			
Date	10/23/91		
Time	3:15 p.m.		
GWL	14.0		
Casing Depth	19.0		

Sheet 1 of 1

Delta Environmental Consultants, Inc.

APPENDIX C

Soil Sample Analytical Results

SEQUOIA ANALYTICAL

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

NOV - 7 1991

ACS 11/7/91

Delta Environmental Consultants
3330 Data Drive
Rancho Cordova, CA 95670
Attention: Lisa Ranger

Project: #40-88-666, Shell

Enclosed are the results from 5 soil samples, 11 water samples, received at Sequoia Analytical on November 2,1991. The requested analyses are listed below:

1104485	Water, MW-1	10/23/91	EPA 5030/8015/8020
1104486	Water, MW-2	10/23/91	EPA 5030/8015/8020
1104487	Water, MW-3	10/23/91	EPA 5030/8015/8020
1104488	Water, MW-4	10/23/91	EPA 5030/8015/8020
1104489	Water, MW-5	10/23/91	EPA 5030/8015/8020
1104490	Water, MW-6	10/23/91	EPA 5030/8015/8020
1104491	Water, MW-7	10/23/91	EPA 5030/8015/8020
1104492	Water, MW-8	10/23/91	EPA 5030/8015/8020
1104493	Water, MW-9	10/23/91	EPA 5030/8015/8020
1104494	Water, MW-10	10/23/91	EPA 5030/8015/8020
1104495	Water, MW-11	10/23/91	EPA 5030/8015/8020
1104496	Soil, MW-10-5	10/23/91	EPA 5030/8015/8020
1104497	Soil, MW-10-10	10/23/91	EPA 5030/8015/8020
1104498	Soil, MW-11-5	10/23/91	EPA 5030/8015/8020
1104499	Soil, MW-11-10	10/23/91	EPA 5030/8015/8020
1104500	Soil, A,B,C,D	10/23/91	CAM Metals 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

Maile A. Springer
Project Manager

SEQUOIA ANALYTICAL

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

Delta Environmental Consultants	Client Project ID:	#40-88-666, Shell	Sampled:	Oct 23, 1991
3330 Data Drive	Matrix Descript:	Water	Received:	Oct 24, 1991
Rancho Cordova, CA 95670	Analysis Method:	EPA 5030/8015/8020	Analyzed:	10/25-31/91
Attention: Lisa Ranger	First Sample #:	110-4485	Reported:	Nov 2, 1991

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

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
110-4485	MW-1	32,000	2,700	360	550	3,700
110-4486	MW-2	120,000	11,000	1,400	3,500	19,000
110-4487	MW-3	390	2.1	N.D.	0.48	2.0
110-4488	MW-4	1,900	97	6.1	38	77
110-4489	MW-5	12,000	92	18	230	450
110-4490	MW-6	53,000	1,400	230	1,800	6,700
110-4491	MW-7	18,000	3,200	31	660	770
110-4492	MW-8	63,000	4,800	1,300	1,300	6,900
110-4493	MW-9	20,000	1,000	47	N.D.	940
110-4494	MW-10	27,000	1,600	110	1,800	510
Detection Limits:		**30**	**0.30**	**0.30**	**0.30**	**0.30**

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

Maile A. Springer
Project Manager

SEQUOIA ANALYTICAL

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

Delta Environmental Consultants	Client Project ID:	#40-88-666, Shell	Sampled:	Oct 23, 1991
3330 Data Drive	Matrix Descript:	Water	Received:	Oct 24, 1991
Rancho Cordova, CA 95670	Analysis Method:	EPA 5030/8015/8020	Analyzed:	10/25-31/91
Attention: Lisa Ranger	First Sample #:	110-4495	Reported:	Nov 2, 1991

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

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
110-4495	MW-11	140	1.2	N.D.	0.37	0.56
Detection Limits:		**30**	**0.30**	**0.30**	**0.30**	**0.30**

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

Malie A. Springer
Project Manager

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: Sequoia Analy.
ADDRESS: 680 Chesapeake Dr. Redwood CA 94063

PROJ. NO. 40-88-666
PROJECT NAME: Oakland Shell
PROJECT LOCATION: 3420 San Pablo Ave Oakland CA
PROJECT MANAGER: Lisa Kainger

SAMPLERS (Signature) [signature]

LABORATORY SAMPLE ID	SAMPLE ID	DATE	TIME	SAMPLE TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TPHg/BTEX					REMARKS
1104485	MW-1	10-23	18:30	W	OAKLAND SHELL		2					
86	MW-2	10-23	18:23	W			2					
87	MW-3	10-23	16:50	W			2					
88	MW-4	10-23	17:00	W			2					
89	MW-5	10-23	17:20	W			2					
90	MW-6	10-23	18:10	W			2					
91	MW-7	10-23	17:32	W			2					
92	MW-8	10-23	18:00	W			2					

Analysis Requested & Container Description

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	10-24-91	11 36	[signature]	[signature]	10/24/91	1915	

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Turnaround Time:
			K. Moreno	10-24	7:15	Standard

Sealed for shipment by: (signature) C.K. Almeida
Date/Time 10/24/91 9:50
Shipment method: Courier

Sampler Comments:
WIC # 204-5508-5306
Shell Eng. Jack Brastad

Laboratory Comments:

Condition of Samples:

White: Return with analytical results to Delta Yellow: Laboratory Copy Pink: Delta's Copy

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: SEQUOIA ANALYT.
ADDRESS: 680 CHESAPEAK DR. REDWOOD CA 94063

PROJ. NO. 4088666

PROJECT NAME: OAKLAND SHELL
PROJECT LOCATION: 3420 SAN PABLO AVE, OAKLAND CA
PROJECT MANAGER: LISA RAINGER

SAMPLERS (Signature): [signature] / C.K. Almeida [signature]

Analysis Requested & Container Description

LABORATORY SAMPLE ID	SAMPLE ID	DATE	TIME	SAMPLE TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TPHg/BTEX	TTLC *	IGNITABILITY **				REMARKS
1104493	MW-9	10-23	17:45	W	OAKLAND SHELL	2	X						
96	MW10-5'	10-23	9:30	S	↓	1	X						
97	MW10-10'	10-23	9:45	S		1	X						
98	MW11-5'	10-23	12:55	S		1	X						
99	MW11-10'	10-23	1305	S		1	X						
4500	A,B,C,D	10-23	1355	S		4	X	X	X				COMPOSITE
1104494	MW-10	10-23	14:50	W		2	X						
95	MW-11	10-23	15:15	W		2	X						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
C.K. Almeida [signature]	10/24/91	11:36 9:40	[signature]	[signature]	10/24/91	1915	

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Turnaround Time:
			[signature]	10-24	7:15	STANDARD

Sealed for shipment by: (signature) C.K. Almeida [signature] | Date/Time 10/24/91/9. | Shipment method: COURIER

*RUN STLC IF TTLC 10 X STLC MAX, RUN ORGANIC
Sampler Comments: CONST. IF TTLC > REG. LEVEL

WIC # 204-5508-5306

SHELL ENG. JACK BRASTAD

Laboratory Comments:

Condition of Samples:

White: Return with analytical results to Delta Yellow: Laboratory Copy Pink: Delta's Copy

**RUN IGNITABILITY IF TPH >1000 ppm

APPENDIX D

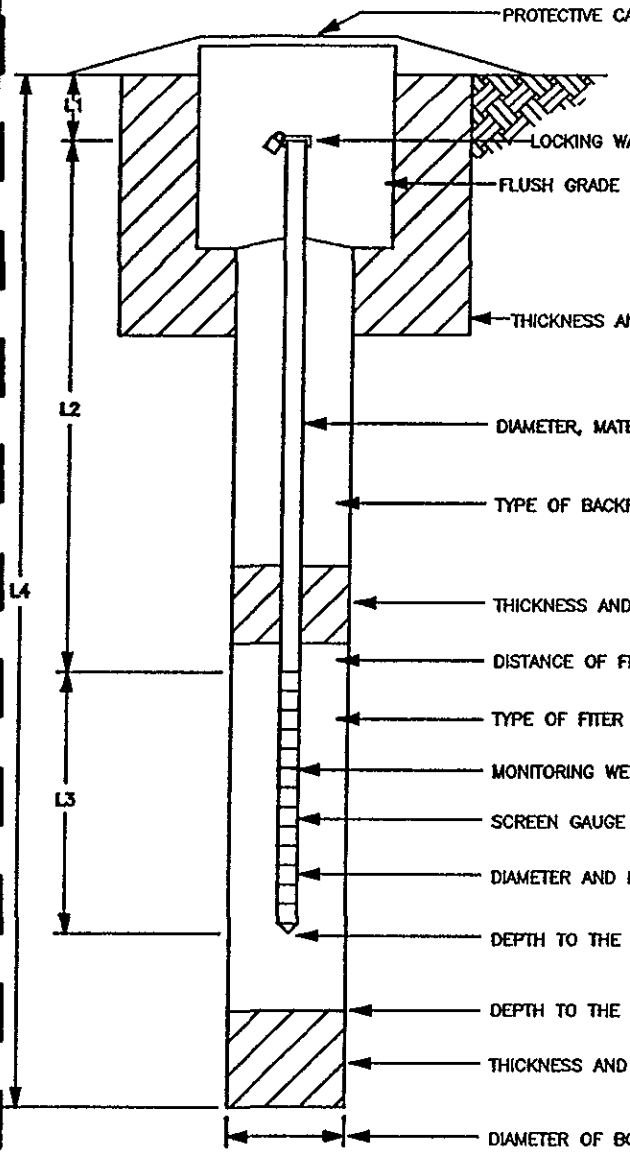
Ground Water Monitoring Well
Constructed Details

INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Oakland Shell
3420 San Pablo Avenue
DELTA NO.: 40-88-666

MONITORING WELL NO.: MW-11

ELEVATIONS:
TOP OF RISER: 22.06
GROUND LEVEL: ____



FLUSH GRADE WELL CONSTRUCTION
DIAMETER AND MATERIAL: 10 inch
TOTAL LENGTH: 12 inch

THICKNESS AND TYPE OF SEAL: 1-foot concrete

DIAMETER, MATERIAL, AND JOINT TYPE OF RISER PIPE: 4-inch PVC Flush Threaded

TYPE OF BACKFILL AROUND RISER: Portland cement < 5% Bentonite

THICKNESS AND TYPE OF SEAL: .5-foot Bentonite chips

DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN: .5 feet

TYPE OF FITER AROUND SCREEN: #3 Monterey sand

MONITORING WELL MATERIAL: PVC

SCREEN GAUGE OR SIZE OF OPENINGS (SLOT SIZE): 0.020 inch

DIAMETER AND LENGTH OF SCREEN: 4 inch x 15 feet

DEPTH TO THE BOTTOM OF MONITORING WELL: 19 feet

DEPTH TO THE BOTTOM OF FILTER SAND: 19 feet

THICKNESS AND TYPE OF SEAL: NA

DIAMETER OF BOREHOLE: 10 inch

L1 = .25 FT
L2 = 3.75 FT
L3 = 15 FT
L4 = 19 FT

MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *
10/23/91	15:15	14.0

INSTALLATION COMPLETED:
DATE: 10/23/91
TIME: 14:15

Delta Environmental Consultants, Inc.

* MEASURE POINT: Top of casing

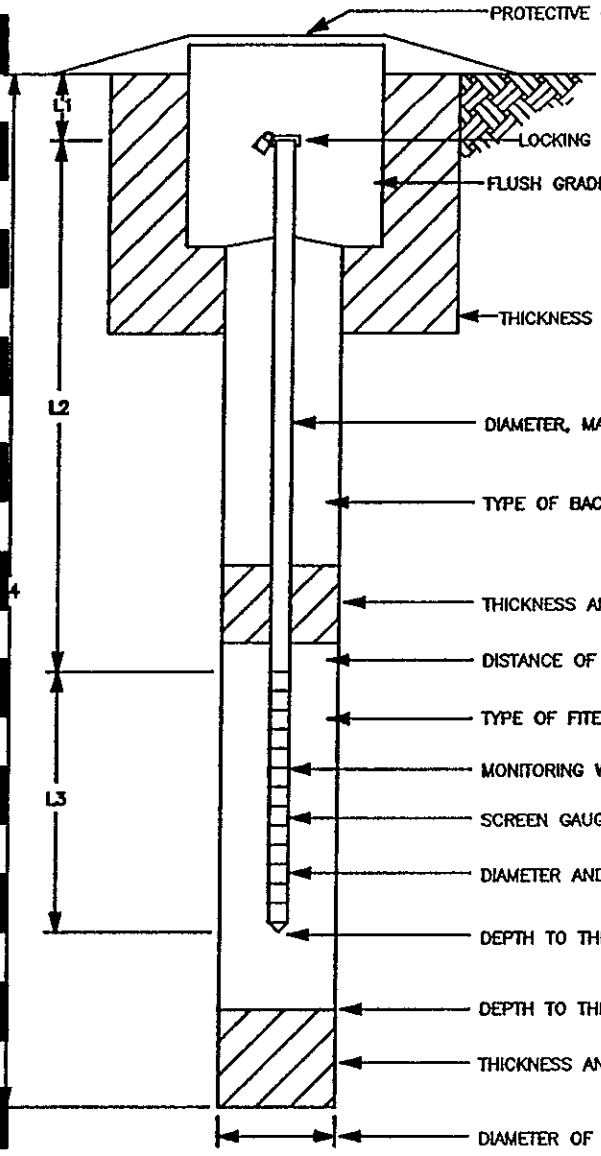
INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Oakland Shell
3420 San Pablo Avenue

DELTA NO.: 40-88-666

MONITORING WELL NO.: MW-10

ELEVATIONS:
TOP OF RISER: 19.74
GROUND LEVEL: _____



DIAMETER AND MATERIAL	10 inch
TOTAL LENGTH	12 inch
THICKNESS AND TYPE OF SEAL	1-foot concrete
DIAMETER, MATERIAL, AND JOINT TYPE OF RISER PIPE	4-inch PVC Flush Threaded
TYPE OF BACKFILL AROUND RISER	Portland cement < 5% Bentonite
THICKNESS AND TYPE OF SEAL	.5-foot Bentonite chips
DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN	.5 feet
TYPE OF FITER AROUND SCREEN	#3 Monterey sand
MONITORING WELL MATERIAL	PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT SIZE)	0.020 inch
DIAMETER AND LENGTH OF SCREEN	4 inch x 15 feet
DEPTH TO THE BOTTOM OF MONITORING WELL	19.3 feet
DEPTH TO THE BOTTOM OF FILTER SAND	19.3 feet
THICKNESS AND TYPE OF SEAL	NA
DIAMETER OF BOREHOLE	10 inch

L1 = .25 FT
L2 = 4.05 FT
L3 = 15 FT
L4 = 19.3 FT

INSTALLATION COMPLETED:
DATE: 10/23/91
TIME: 10:45 am

MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *
10/23/91	14:50	8.57

Delta Environmental Consultants, Inc.

* MEASURE POINT: Top of casing

APPENDIX E

Ground Water Monitoring Well
Construction and Encroachment Permits

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (510) 484-2600

17 October 1991

8

Delta Environmental Consultants
3330 Data Drive
Rancho Cordova, CA 95670

Gentlemen:

Enclosed is Drilling permit 91609 for a monitoring well construction project at 3420 San Pablo Avenue in Oakland for Shell Oil Company.

Please note that permit condition A-2 requires that a well construction report be submitted after completion of the work. The report should include drilling and completion logs, location sketch, and permit number.

If you have any questions, please contact Wyman Hong or me at 484-2600.

Very truly yours,

Craig A. Mayfield

Craig A. Mayfield
Water Resources Engineer

WH:mm
Enc.

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (510) 484-2600

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

.T[redacted]N OF PROJECT 35th Street, Oakland
across from the Shell Station located at
420 San Pablo Avenue

:N[redacted]
Shell Oil Company
[redacted] 1390 Willow Pass Phone 415-685-3851
[redacted] Concord Zip 94520-9998

IC[redacted]NT
[redacted] Delta Environmental Consultants Inc.
ess 3330 Data Dr #100 Phone 916-638-2085
[redacted] Rancho Cordova Zip 95670

OF PROJECT

C[redacted]nstruction		Geotechnical Investigation	
th[redacted]dic Protection	___	General	___
ter Supply		Contamination	___
n[redacted]oring	X	Well Destruction	___

OSED WATER SUPPLY WELL USE

st[redacted] ___ Industrial ___ Other X
c[redacted]l ___ Irrigation ___

LING METHOD:

Ro[redacted]ry ___ Air Rotary ___ Auger X
[redacted] ___ Other ___

LE[redacted]S LICENSE NO. C57 554979

PROJECTS

Or[redacted]l Hole Diameter 10 in. Maximum
Ca[redacted]ng Diameter 4 in. Depth 25 ft.
Surface Seal Depth 5 ft. Number 2

[redacted]NICAL PROJECTS

Number of Borings ___ Maximum
Ho[redacted] Diameter ___ in. Depth ___ ft.

[redacted]MATED STARTING DATE Oct 23 1991
MATED COMPLETION DATE Oct 23, 1991

[redacted] agree to comply with all requirements of this
it and Alameda County Ordinance No. 73-68.

[redacted]NT'S
ATURE *[signature]* Date 10/15/91

FOR OFFICE USE

PERMIT NUMBER 91609
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved *Wyman Hong* Date 16 Oct 91
Wyman Hong

61891

CITY OF OAKLAND

PERMIT TO EXCAVATE IN STREETS OR OTHER WORK AS SPECIFIED

on 35th st

OCT 16

LOCATION OF WORK: 3420 San Pablo ave, Oakland BETWEEN 35th st (Street/Ave.) AND 34 at see Map attached (Specify)

EXC 150.00
App Fee EXCU 50.00 150.00
APPL 30.00
$180.00 SUBTL 180.00
X9101319 CHECK 180.00
ITEM

PERMISSION TO EXCAVATE IN THE PUBLIC RIGHT-OF-WAY IS HEREBY GRANTED TO:

APPLICANT West Haz Mat Drilling Corp.

ADDRESS 3233 Fitzgerald Rancho Cordova PHONE #: (916) 638-7276

TYPE OF WORK: GAS____ ELECTRIC____ WATER____ TELEPHONE____ CABLE TV____ SEWER____ OTHER monitoring well (Specify)

NATURE OF WORK: Install a flush grade monitoring well 09-05-91 #1

I hereby affirm that I am exempt from the Contractor's License Law for the following reason (Sec. 7031.5. Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to it's issuance, also requires the applicant for such permit to file a signed statement that he is licensed pursuant to the provisions of the Contractor's License Law Chapter 9 (commencing with Sec. 7000) of Division 3 of the Business and Professions Code, or that he is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than $500):

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 70044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or through his own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he did not build or improve for the purpose of sale).

☐ I, as owner of the property, am exempt from the sale requirements of the above due to: (1) I am improving my principal place of residence or appurtenances thereto, (2) the work will be performed prior to sale. (3) I have resided in the residence for the 12 months prior to completion of the work, and (4) I have not claimed exemption in this subdivision on more than two structures more than once during any three-year period. (Sec. 7044. Business and Professions Code)

☐ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractor's License Law).

☐ I am exempt under Sec. _____, B&PC for this reason _____

Signature _____ Date _____

I hereby affirm that I have a certificate of consent to self-insure, or a certificate of Workers' Compensation Insurance, or a certified copy thereof (Sec. 3800, Lab C). STATE FUND

Policy # 1167891-91 Company Name ~~West Haz~~ STATE FUND

☐ Certified copy is hereby furnished.

■ Certified copy is filed with the city building inspection dept.

Signature M.R. Kinbel Date 9.3.91

(This section need not be completed if the permit is for one hundred dollars ($100) or less.)

I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the Workers' Compensation Laws of California.

Signature _____ Date _____

NOTICE TO APPLICANT. If, after making this Certificate of Exemption, you should become subject to the Workers' Compensation provisions of the Labor Code, you must forthwith imply with such provisions or this permit shall be deemed revoked.

PERMIT VOID 90 DAYS FROM DATE OF ISSUE UNLESS EXTENSION GRANTED BY DIRECTOR OF PUBLIC WORKS.

Approximate Starting Date DATE Sept 6 1991

Approximate Completion Date DATE Sept 6 1991

HOLIDAY RESTRICTION (1 NOV — 1 JAN) YES ✓ NO ✗

LIMITED OPERATION AREA (7AM – 9AM / 4PM – 6PM) YES ✓ NO ✗

DATE STREET LAST RESURFACED unknown DATE 179

SPECIAL PAVING DETAIL REQUIRED YES _____ NO X

24-HOUR EMERGENCY PHONE NUMBER 1-916-638-2085

PERMIT NOT VALID WITHOUT 24 HOUR NUMBER.

Telephone 273-3668 Forty-eight (48) HOURS BEFORE ACTUAL CONSTRUCTION.

ATTENTION

State law requires that contractor/owner call Underground Service Alert two working days before excavating to have below-ground utilities located. This permit is not valid uness applicant has secured an inquiry identification number issued by Underground Service Alert.

Call Toll Free: 800-642-2444 USA ID Number 26/953

This permit issued pursuant to all provisions of Chapter 6, Article 2 of the Oakland Municipal Code.

This permit is granted upon the express condition that the permittee shall be responsible for all claims and liabilities arising out of work performed under the permit or arising out of permittee's failure to perform the obligations with respect to street maintenance. The permittee shall, and by acceptance of the permit agrees to defend, indemnify, save and hold harmless the City, its officers and employees, from and against any and all suits, claims or actions brought by any person for or on account of any bodily injuries, disease or illness or damage to persons and/or property sustained or arising in the construction of the work performed under the permit or in consequence of permittee's failure to perform the obligations with respect to street maintenance.

CONTRACTOR

I hereby affirm that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

LICENSE # AND CLASS C57 554979 CITY BUSINESS TAX # 596620

X M.R. Kinbel Date 9.3.91

Signature of Contractor Owner or Agent

■ Agent for ☐ Contractor ☐ Owner

OFFICIAL USE ONLY

UTILITY COMPANY REPORT 10/ 0374 13:47TM

Supervisor _____

Completion Date _____

CITY INSPECTOR'S REPORT

	BACKFILL	PAVING
Initials		
Hours		
Date		
Concrete		
Asphalt		
Sidewalk		

Size of Cut: Sq. Ft. _____ Inches _____

Paved by _____ Type _____

Bill No. _____

Charges Backfill _____

Paving _____

Paving Insp. _____

Traffic Striping Replaced _____ Date

APPROVED

Engineering Services JWO Date 9-5-91

Planning _____ Date _____

Field Services _____ Date _____

Construction _____ Date _____

Traffic Engineering _____ Date _____

Electrical Engineering _____ Date _____

DIRECTOR OF PUBLIC WORKS

APPROVED BY: JW Ouellette

DATE: 9-6-91

EXTENSION GRANTED BY: _____

DATE: _____

[redacted] REV. 6/ [redacted] [illegible] [redacted]

CITY OF OAKLAND

PERMIT TO EXCAVATE IN STREETS OR OTHER WORK AS SPECIFIED

on San Pablo ave.

LOCATION OF WORK: 3420 San Pablo Ave Oakland 35th St (Street or Address) BETWEEN ~~35th st~~ (Street/Ave.) AND ~~34th st~~ (Specify) see map attached

PERMISSION TO EXCAVATE IN THE PUBLIC RIGHT-OF-WAY IS HEREBY GRANTED TO:

APPLICANT West Haz Mat Drilling Corp.

ADDRESS 3233 Fitzgerald Rancho cordova Ca PHONE #: (916) 638-7276

EXC 150.00
APP FEE 30.00
180.00

EXC 150.00
APPL 30.00
SUBTL 180.00
X9101318 CHECK 180.00

TYPE OF WORK: GAS____ ELECTRIC____ WATER____ TELEPHONE____ CABLE TV____ SEWER____ OTHER monitoring well (Specify)

NATURE OF WORK: Install a flush grade monitoring well. 09-05-91 #1 1C 0375 13:48TM

OWNER/BUILDER

I hereby affirm that I am exempt from the Contractor's License Law for the following reason (Sec. 7031.5. Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to it's issuance, also requires the applicant for such permit to file a signed statement that he is licensed pursuant to the provisions of the Contractor's License Law Chapter 9 (commencing with Sec. 7000) of Division 3 of the Business and Professions Code, or that he is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than $500):

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 70044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or through his own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he did not build or improve for the purpose of sale).

☐ I, as owner of the property, am exempt from the sale requirements of the above due to: (1) I am improving my principal place of residence or appurtenances thereto, (2) the work will be performed prior to sale. (3) I have resided in the residence for the 12 months prior to completion of the work, and (4) I have not claimed exemption in this subdivision on more than two structures more than once during any three-year period. (Sec. 7044. Business and Professions Code).

☐ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractor's License Law).

☐ I am exempt under Sec. ________, B&P.C. for this reason ________

Signature ________ Date ________

WORKER'S COMPENSATION

I hereby affirm that I have a certificate of consent to self-insure, or a certificate of Workers' Compensation Insurance, or a certified copy thereof (Sec. 3800, Lab C.).

Policy # 1167891-91 Company Name ~~Aetna~~ STATE FUND

☐ Certified copy is hereby furnished

☒ Certified copy is filed with the city building inspection dept.

Signature M. R. Kinloch Date

(This section need not be completed if the permit is for one hundred dollars ($100) or less.)

I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the Workers' Compensation Laws of California.

Signature ________ Date ________

NOTICE TO APPLICANT. If, after making this Certificate of Exemption, you should become subject to the Workers' Compensation provisions of the Labor Code, you must forthwith comply with such provisions or this permit shall be deemed revoked.

PERMIT VOID 90 DAYS FROM DATE OF ISSUE UNLESS EXTENSION GRANTED BY DIRECTOR OF PUBLIC WORKS.

Approximate Starting Date	DATE Sept 6 1991	
Approximate Completion Date	DATE Sept 6 1991	
HOLIDAY RESTRICTION (1 NOV — 1 JAN)	YES ____	NO X
LIMITED OPERATION AREA (7AM – 9AM / 4PM – 6PM)	YES ____	NO X
DATE STREET LAST RESURFACED unknown	DATE '63	
SPECIAL PAVING DETAIL REQUIRED	YES ____	NO X

24-HOUR EMERGENCY PHONE NUMBER 1-916-638-2085

PERMIT NOT VALID WITHOUT 24 HOUR NUMBER.

Telephone 273-3668 Forty-eight (48) HOURS BEFORE ACTUAL CONSTRUCTION.

ATTENTION

State law requires that contractor/owner call Underground Service Alert two working days before excavating to have below-ground utilities located. This permit is not valid unless applicant has secured an inquiry identification number issued by Underground Service Alert.

Call Toll Free: 800-642-2444 USA ID Number 261953

This permit issued pursuant to all provisions of Chapter 6, Article 2 of the Oakland Municipal Code.

This permit is granted upon the express condition that the permittee shall be responsible for all claims and liabilities arising out of work performed under the permit or arising out of permittee's failure to perform the obligations with respect to street maintenance. The permittee shall, and by acceptance of the permit agrees to defend, indemnify, save and hold harmless the City, its officers and employees, from and against any and all suits, claims or actions brought by any person for or on account of any bodily injuries, disease or illness or damage to persons and/or property sustained or arising in the construction of the work performed under the permit or in consequence of permittee's failure to perform the obligations with respect to street maintenance.

CONTRACTOR

I hereby affirm that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

LICENSE # AND CLASS 554979 C57 CITY BUSINESS TAX # 596620

X M. R. Kinloch Date 9-3-91

Signature of Contractor Owner or Agent

■ Agent for ☐ Contractor ☐ Owner

OFFICIAL USE ONLY

UTILITY COMPANY REPORT

Supervisor ________

Completion Date ________

CITY INSPECTOR'S REPORT

BACKFILL PAVING

Initials ________

Hours ________

Date ________

Concrete ________

Asphalt ________

Sidewalk ________

Size of Cut: Sq. Ft. ____ Inches ____

Paved by ________ Type ________

Bill No. ________

Charges Backfill ________

Paving ________

Paving Insp. ________

Traffic Striping Replaced ________ Date

APPROVED

Engineering Services JWO Date 9-5-91

Planning ________ Date ________

Field Services ________ Date ________

Construction ________ Date ________

Traffic Engineering ________ Date ________

Electrical Engineering ________ Date ________

DIRECTOR OF PUBLIC WORKS

APPROVED BY: JW Osalbo

DATE: 9-5-91

EXTENSION GRANTED BY: ________

DATE: ________

APPENDIX F

Ground Water Analytical Results

SEQUOIA ANALYTICAL

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

Delta Environmental Consultants	Client Project ID:	#40-88-666, Shell	Sampled:	Oct 23, 1991
3330 Data Drive	Matrix Descript:	Soil	Received:	Oct 24, 1991
Rancho Cordova, CA 95670	Analysis Method:	EPA 5030/8015/8020	Analyzed:	10/29-30/91
Attention: Lisa Ranger	First Sample #:	110-4496	Reported:	Nov 2, 1991

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)
110-4496	MW-10-5	1.4	0.015	0.0060	0.010	0.0080
110-4497	MW-10-10	1.8	0.060	N.D.	0.027	0.0070
110-4498	MW-11-5	N.D.	N.D.	N.D.	N.D.	N.D.
110-4499	MW-11-10	N.D.	N.D.	N.D.	N.D.	N.D.
110-4500	A,B,C,D	N.D.	N.D.	N.D.	N.D.	N.D.
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

Malle A. Springer
Project Manager

SEQUOIA ANALYTICAL

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

Delta Environmental Consultants	Client Project ID:	#40-88-666, Shell	Sampled:	Oct 23, 1991
3330 Data Drive	Sample Descript:	Soil, A,B,C,D	Received:	Oct 24, 1991
Rancho Cordova, CA 95670			Extracted:	Oct 25, 1991
Attention: Lisa Ranger	Lab Number:	110-4500	Reported:	Nov 2, 1991

INORGANIC PERSISTENT AND BIOACCUMULATIVE TOXIC SUBSTANCES

	Soluble Threshold Limit Concentration (Waste Extraction Test)			Total Threshold Limit Concentration		
Analyte	STLC Max. Limit (mg/L)	Detection Limit (mg/L)	Analysis Result (mg/L)	TTLC Max. Limit (mg/kg)	Detection Limit (mg/kg)	Analysis Result (mg/kg)
Antimony	15	0.050	-	500	0.25	N.D.
Arsenic	5	0.010	-	500	0.25	4.8
Barium	100	0.10	-	10,000	5.0	160
Beryllium	0.75	0.010	-	75	0.50	0.52
Cadmium	1	0.010	-	100	0.50	N.D.
Chromium (VI)	5	0.0050	-	500	0.050	N.D.
Chromium (III)	560	0.010	-	2,500	0.50	34
Cobalt	80	0.050	-	8,000	2.5	11
Copper	25	0.010	-	2,500	0.50	23
Lead	5	0.0050	-	1,000	0.25	6.5
Mercury	0.2	0.00020	-	20	0.010	N.D.
Molybdenum	350	0.050	-	3,500	2.5	N.D.
Nickel	20	0.050	-	2,000	2.5	47
Selenium	1	0.010	-	100	0.25	N.D.
Silver	5	0.010	-	500	0.50	N.D.
Thallium	7	0.50	-	700	0.25	N.D.
Vanadium	24	0.050	-	2,400	2.5	31
Zinc	250	0.010	-	5,000	0.50	49
Asbestos	-	10	-	10,000	100	-
Fluoride	180	0.10	-	18,000	1.0	-

TTLC results are reported as mg/kg of wet weight. Asbestos results are reported as fibers/g.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Malle A. Springer
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: Lisa Ranger

Client Project ID: #40-88-666, Shell
QC Sample Group: 1104485-87,89-90, 93
Reported: Nov 2, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J.J.	J.J.	J.J.	J.J.
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Oct 28, 1991	Oct 28, 1991	Oct 28, 1991	Oct 28, 1991
QC Sample #:	GBLK102891	GBLK102891	GBLK102891	GBLK102891
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	9.6	9.6	9.4	29
Matrix Spike % Recovery:	96	96	94	97
Conc. Matrix Spike Dup.:	9.7	9.7	9.6	29
Matrix Spike Duplicate % Recovery:	97	97	96	97
Relative % Difference:	1.0	1.0	2.1	0.0

SEQUOIA ANALYTICAL

Maile A. Springer
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

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

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: Lisa Ranger

Client Project ID: #40-88-666, Shell
QC Sample Group: 1104488, 95
Reported: Nov 2, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	L.Lanks	J.J.	J.J.	J.J.
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Oct 25, 1991	Oct 25, 1991	Oct 25, 1991	Oct 25, 1991
QC Sample #:	GBLK102591	GBLK102591	GBLK102591	GBLK102591
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	9.5	9.5	9.4	29
Matrix Spike % Recovery:	95	95	94	97
Conc. Matrix Spike Dup.:	9.4	9.3	9.3	28
Matrix Spike Duplicate % Recovery:	94	93	93	93
Relative % Difference:	1.1	2.1	1.1	3.5

SEQUOIA ANALYTICAL

Maile A. Springer
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

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: Lisa Ranger

Client Project ID: #40-88-666, Shell
QC Sample Group: 1104492, 94
Reported: Nov 2, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	S.Gill	S.Gill	S.Gill	S.Gill
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Oct 28, 1991	Oct 28, 1991	Oct 28, 1991	Oct 28, 1991
QC Sample #:	GBLK102891	GBLK102891	GBLK102891	GBLK102891
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	10	10	9.9	30
Matrix Spike % Recovery:	100	100	99	100
Conc. Matrix Spike Dup.:	10	11	10	32
Matrix Spike Duplicate % Recovery:	100	110	100	107
Relative % Difference:	0.0	9.5	1.0	6.5

SEQUOIA ANALYTICAL

Maile A. Springer
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

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: Lisa Ranger

Client Project ID: #40-88-666, Shell
QC Sample Group: 1104498 - 500
Reported: Nov 2, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	S.Hoffman	S.Hoffman	S.Hoffman	S.Hoffman
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Oct 29, 1991	Oct 29, 1991	Oct 29, 1991	Oct 29, 1991
QC Sample #:	GBLK102991	GBLK102991	GBLK102991	GBLK102991
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	0.18	0.18	0.54
Matrix Spike % Recovery:	95	90	90	90
Conc. Matrix Spike Dup.:	0.17	0.17	0.18	0.51
Matrix Spike Duplicate % Recovery:	85	85	90	85
Relative % Difference:	11	5.7	0.0	5.7

SEQUOIA ANALYTICAL

Maile A. Springer
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

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

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: Lisa Ranger

Client Project ID: #40-88-666, Shell
QC Sample Group: 1104496 - 97
Reported: Nov 2, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A.Maralit	A.Maralit	A.Maralit	A.Maralit
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991
QC Sample #:	GBLK103091	GBLK103091	GBLK103091	GBLK103091
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	0.19	0.19	0.57
Matrix Spike % Recovery:	95	95	95	95
Conc. Matrix Spike Dup.:	0.19	0.19	0.18	0.55
Matrix Spike Duplicate % Recovery:	95	95	90	92
Relative % Difference:	0.0	0.0	5.4	3.6

SEQUOIA ANALYTICAL

Maile A. Springer
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

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

SEQUOIA ANALYTICAL

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Delta Environmental Consultants
3330 Data Drive
Rancho Cordova, CA 95670
Attention: Lisa Ranger

Client Project ID: #40-88-666, Shell
QC Sample Group: 110-4491

Reported: Nov 2, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	S.Gill	S.Gill	S.Gill	S.Gill
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Oct 31, 1991	Oct 31, 1991	Oct 31, 1991	Oct 31, 1991
QC Sample #:	GBLK103191	GBLK103191	GBLK103191	GBLK103191
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	9.8	10	10	30
Matrix Spike % Recovery:	98	100	100	100
Conc. Matrix Spike Dup.:	10	11	11	32
Matrix Spike Duplicate % Recovery:	100	110	110	107
Relative % Difference:	2.0	9.5	9.5	6.5

SEQUOIA ANALYTICAL

Maile A. Springer
Project Manager

$$\%\ \text{Recovery:} = \frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$$

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

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Client Project ID: #40-88-666, Shell
QC Sample Group: 110-4500
Reported: Nov 2, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Mercury	Antimony	Thallium	Arsenic	Selenium	Hexavalent Chromium
Method:	EPA 245.5	EPA 7041	EPA 7841	EPA 7060	EPA 7740	EPA 7196
Analyst:	C.Medefesser	F.Contreras	F.Contreras	F.Contreras	F.Contreras	V.Anakaitis
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991	Oct 25, 1991
QC Sample #:	110-4646	110-3592	110-3592	110-4500	110-4500	110-4647
Sample Conc.:	N.D.	N.D.	N.D.	4.8	N.D.	N.D.
Spike Conc. Added:	0.20	7.5	7.5	50	50	5.0
Conc. Matrix Spike:	0.15	8.6	7.3	48	49	4.5
Matrix Spike % Recovery:	75	115	97	86	98	90
Conc. Matrix Spike Dup.:	0.15	8.6	7.3	51	47	4.7
Matrix Spike Duplicate % Recovery:	75	115	97	92	94	94
Relative % Difference:	0.0	0.0	0.0	6.1	4.2	4.4

SEQUOIA ANALYTICAL

Maile A. Springer
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

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

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QC Sample Group: 110-4500
Reported: Nov 2, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper
Method:	EPA 6010	EPA 6010	EPA 6010	EPA 6010	EPA 6010	EPA 6010
Analyst:	N.Herrera	N.Herrera	N.Herrera	N.Herrera	N.Herrera	N.Herrera
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991
QC Sample #:	110-5183	110-5183	110-5183	110-5183	110-5183	110-5183
Sample Conc.:	140	N.D.	N.D.	11	N.D.	3.6
Spike Conc. Added:	500	500	500	500	500	500
Conc. Matrix Spike:	600	480	490	470	470	510
Matrix Spike % Recovery:	92	96	98	92	94	101
Conc. Matrix Spike Dup.:	610	480	500	480	470	520
Matrix Spike Duplicate % Recovery:	94	96	100	94	94	103
Relative % Difference:	1.7	0.0	1.0	1.1	0.0	1.9

SEQUOIA ANALYTICAL

Malie A. Springer
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

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

SEQUOIA ANALYTICAL

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Client Project ID: #40-88-666, Shell
QC Sample Group: 110-4500
Reported: Nov 2, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Molybdenum	Nickel	Silver	Vanadium	Zinc
Method:	EPA 6010	EPA 6010	EPA 6010	EPA 6010	EPA 6010
Analyst:	N.Herrera	N.Herrera	N.Herrera	N.Herrera	N.Herrera
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991	Oct 30, 1991
QC Sample #:	110-5183	110-5183	110-5183	110-5183	110-5183
Sample Conc.:	N.D.	12	0.66	9.4	15
Spike Conc. Added:	500	500	500	500	500
Conc. Matrix Spike:	470	480	480	490	500
Matrix Spike % Recovery:	94	94	96	96	97
Conc. Matrix Spike Dup.:	480	490	480	490	510
Matrix Spike Duplicate % Recovery:	96	96	96	96	99
Relative % Difference:	2.1	2.1	0.0	0.0	2.0

SEQUOIA ANALYTICAL

Maile A. Springer
Project Manager

$$\%\ \text{Recovery:} = \frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$$

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

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