RESNA
Working to Restore Nature

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INTERIM REMEDIAL INVESTIGATION

Exxon Station 7-7003
349 Main Street
Pleasanton, California

Prepared for

Exxon Company, U.S.A.
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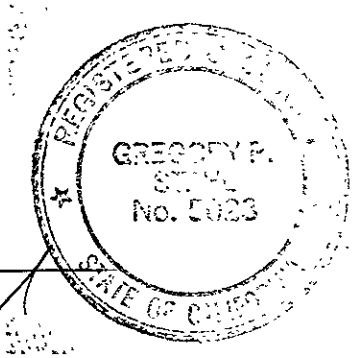

July 21, 1994
RESNA Report 130015.99

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For Exxon Company U.S.A.

1.0 INTRODUCTION

As requested by Exxon Company U.S.A. (Exxon), RESNA Industries Inc. (RESNA) has prepared this Interim Remedial Investigation for interim remediation of onsite gasoline hydrocarbon-impacted soil and groundwater at Exxon Station 7-7003 located at 349 Main Street in Pleasanton, California. The subject site is located at 349 Main Street on the southwestern corner of Angela and Main Streets in Pleasanton, California, Site Vicinity Map (Plate 1). This interim remedial investigation has also been prepared for review, comment, and approval by the California Regional Water Quality Control Board (CRWQCB) San Francisco Bay Region, the Alameda County Flood Control and Water Conservation District (Zone 7), and the Dublin-San Ramon Services District. The locations of the groundwater monitoring wells, vapor extraction wells, and former site features are shown on the Generalized Site Plan (Plate 2).

The proposed scope of work under this interim remedial investigation consists of evaluating the feasibility of installing an interim remediation system at this site. The feasibility and conceptual design of the interim remediation system is based upon the results of a soil vapor extraction test and a pumping test performed by RESNA.

Work performed for this remedial investigation included drilling three soil borings (B-19, B-20, and B-21) on May 3 and 4, 1993; collecting and describing soil samples from the borings; installing one 4-inch inner-diameter groundwater monitoring well (MW-8) in boring B-19; installing two 4-inch inner-diameter vapor-extraction wells (VE-2 and VE-3) in borings B-20 and B-21; surveying wellhead elevations; performing a combined 24-hour pumping and recovery test on groundwater monitoring well MW-2 on June 3 and 4, 1993; performing quarterly sampling and DTW measurements on June 8 and 9, 1993; performing a vapor extraction test (VET) on the three vapor-extraction wells on August 5, 1993; and submitting selected soil, air, and groundwater samples for laboratory analysis.

This interim remedial investigation includes summaries of field procedures used during this remedial investigation, findings, interpretation of the data, and conclusions. This work was performed in accordance with Addendum One to the Work Plan (RESNA, November 30, 1992), the Site Safety Plan (RESNA, April 30, 1993), and Field Protocol included in Appendix A, Field Protocol.

2.0 SITE DESCRIPTION AND BACKGROUND

2.1 General

The site is a relatively flat, predominately asphalt- and concrete-covered lot at an elevation of approximately 343 feet above mean sea level (MSL) and is located in a commercial and residential area.

2.2 Regional and Local Geology and Hydrogeology

The site is in the north-central portion of the Livermore Valley, within the Coast Ranges Geomorphic Province of Northern California. The Livermore Valley is approximately 13

miles long in an east-west direction, approximately 4 miles wide, and surrounded by hills of the Diablo Range (California Department of Water Resources, 1974). The valley slopes gently toward the west. The principal streams in the area are Arroyo Valley Creek and Arroyo Mocho Creek, which flow toward the western end of the valley. Arroyo Mocho Creek is approximately 2 miles north of the site, and Arroyo Valley Creek is approximately ½ mile north of the site.

Livermore Valley is underlain by sediments, water-bearing rocks, and non-water-bearing rocks. The sediments and water-bearing units comprise the Livermore Valley groundwater basin and include valley-fill materials, the Tassajara Formation, and the Livermore Formation (California Department of Water Resources, 1966, 1974). The Livermore Valley groundwater basin is divided into sub-basins on the basis of fault traces or other hydrologic discontinuities (California Department of Water Resources, 1974). The groundwater system in Livermore Valley is a multilayered system with an unconfined aquifer overlying a sequence of leaky or semiconfined aquifers. Groundwater in the basin flows downslope toward the east-west-trending axis of the valley and then flows generally to the west (Alameda County Flood Control and Water Conservation District - Zone 7, 1991). Local groundwater flow is to the northwest based on groundwater monitoring data collected at the site (RESNA, September 10, 1992).

2.3 Previous Site Environmental Work

Prior to the present monitoring, RESNA, formerly Applied GeoSystems (AGS), performed an environmental investigation related to the removal and replacement of three gasoline underground storage tanks (USTs) and one used-oil UST in August 1989 (AGS, October 1, 1989). Additionally, RESNA performed an environmental investigation between January and June 1990 that included drilling 13 borings around the former gasoline UST area and adjacent to the former used-oil UST, installing groundwater monitoring wells MW-1 through

MW-5 in five of the borings, and analyzing soil and groundwater samples (AGS, August 1, 1990). AGS drilled five borings north and northwest of the former gasoline UST area and installed groundwater monitoring wells MW-6 and MW-7, and vapor extraction well VE-1 between February and March 1991 (AGS, October 24, 1991). Quarterly monitoring was initiated by AGS in the first quarter of 1990 (AGS, August 1, 1990) and is ongoing. Previously reported results of monitoring of groundwater elevations, soil laboratory testing, and groundwater laboratory testing are presented in Table 1, Cumulative Groundwater Monitoring and Sampling Data, and Table 2, Cumulative Results of Laboratory Analyses of Soil Samples. A brief summary of the previous work performed at the site, as well as the results of the recent quarterly sampling, is included in Appendix B, Previous Environmental Work.

3.0 GROUNDWATER MONITORING WELL AND VAPOR EXTRACTION WELL INSTALLATION

The purpose of the well installation was to further evaluate the lateral and vertical extent of gasoline hydrocarbons in the soil, and to further evaluate the lateral extent of gasoline hydrocarbons in the groundwater. The well installation was performed in accordance with the Site Safety Plan (RESNA, April 30. 1993) and the Field Protocol (Appendix A). The results of the well installation consisting of well completion logs (Plates C-1 through C-7); geologic cross sections (Plate C-8); groundwater gradient map (Plate C-9); and TPHg/Benzene concentrations in groundwater (Plate C-10) are included in Appendix C.

4.0 PUMPING AND RECOVERY TESTS

The aquifer pumping and recovery tests were performed to evaluate the general aquifer characteristics and the feasibility of pump and treat for interim groundwater remediation. A combined 24-hour pumping and recovery test using MW-2 as the pumping well was

performed on June 3 and 4 1993. The pumping tests were performed in accordance with the Site Safety Plan (RESNA, August 13, 1993) and the Field Protocol (Appendix A). The results of the pumping and recovery tests consisting of groundwater gradient maps at the beginning and end of the pumping test (Plates D-1 and D-2); groundwater drawdown map at the end of the pumping test (Plate D-3); time-drawdown plots (Plates D-4 through D-15); distance versus drawdown plot (Plate D-16); predicted zone of capture (Plate D-17); and groundwater gradient map at the end of the recovery test (Plate D-18) are included in Appendix D.

5.0 VAPOR EXTRACTION TEST

RESNA performed a one-day onsite VET on August 5, 1993, to collect site specific data and evaluate the feasibility of using vapor-extraction as a soil remediation alternative. The VET had three main objectives: (1) to evaluate the vapor flow rates that can be extracted from the vapor extraction wells; (2) to evaluate the hydrocarbon concentration of extracted vapors; and (3) to estimate an effective radius of influence for the vapor extraction wells for future engineering design, if applicable. A three-day notification letter informing the Bay Area Air Quality Management District (BAAQMD) of a one-day VET to be performed onsite by RESNA was submitted on August 2, 1994. The VET was performed in accordance with the Site Safety Plan (August 4, 1993) and the Field Protocol (Appendix A). The results of the VET are included in Appendix E.

6.0 DISCUSSION AND CONCLUSIONS

Based on the results of this and previous investigations, RESNA concludes the following:

6.1 Soil Investigation

- Concentrations of TPHg in subsurface soil were not detected at the method detection limit north, west, and southeast of the former underground storage tank area. The soils in these areas appear to vertically delineated to less than 50 parts per million (ppm).

6.2 Groundwater Investigation

- Groundwater was encountered at an average depth of approximately 15 to 18 feet below grade. The groundwater flow direction was toward the northwest with an approximate gradient of 0.09.

- The lateral extent of gasoline hydrocarbons in the first encountered groundwater appears to be delineated to 50 ppb TPHg to the north, northeast, and southwest of the former USTs. The lateral extent of benzene in the first encountered groundwater appears to be delineated to 0.05 ppb to the northeast, east, southeast and west of the former USTs.

- The lateral extent of gasoline hydrocarbons in the first encountered groundwater has not been delineated to the west, south, and southeast of the former USTs. The distribution of the TPHg concentrations in groundwater suggest that gasoline hydrocarbons have migrated to the northwestern site boundaries.

- The highest concentrations of gasoline hydrocarbons detected in the first encountered groundwater appears to be adjacent to the former underground storage tanks (USTs) in the northern portion of the site.

6.3 Pumping Test

- The water-bearing zone beneath the site between depths of approximately 40 and 60 feet below grade appears to be heterogeneous, anisotropic, and confined.

- The average estimated transmissivity of this zone ranged from approximately 0.035 to 0.799 ft^2/min and the average confined storativity ranged from approximately 0.0017 to 0.057.

- At a maximum sustainable pumping rate of 2.3 gpm out of well MW-2, the estimated limit of a capture zone downgradient of well MW-2 is about 15 feet, and the width of this zone upgradient is about 97 feet.

- Installation of groundwater extraction well(s) onsite could establish hydraulic control of the plume.

6.4 Vapor Extraction Test

- Maximum achievable flowrates from wells VE-1 through VE-3 ranged from 30 to 61 actual cubic feet per minute (acfm) indicating the vapor extraction at the site is feasible.

- The highest vacuum responses (0.17 to 0.19 IWC) were observed in VE-1 and VE-2 while extracting from VE-3 at a flow rate of 61 acfm.

- Assuming TPHg vapor concentrations in extracted soil gas of 50 mg/m^3 or less (because analytical results of field samples indicated TPHg concentrations were not detected at the MDL of 50 mg/m^3), and a maximum flow rate of 61 acfm, a maximum TPHg mass extraction rate of less than 0.27 ppd was estimated.

- The negligible extraction rate of TPHg does not currently warrant the installation of a vapor extraction system (VES) at this time.

7.0 LIMITATIONS

This report was prepared in accordance with generally accepted standards of environmental engineering and geological practice in California at the time this investigation was performed. This investigation was conducted solely for the purpose of evaluating environmental conditions of the soil with respect to gasoline-related hydrocarbons previously detected at the site. Evaluation of the soil for used-oil related hydrocarbons was not part of this investigation. No soil engineering or geotechnical references are implied or should

be inferred. Evaluation of the geologic conditions at the site for the purpose of this investigation is made from a limited number of observation points. Subsurface conditions may vary away from the data points available. This report has been prepared solely for Exxon Company, U.S.A. and any reliance on this report by third parties shall be at such party's sole risk.

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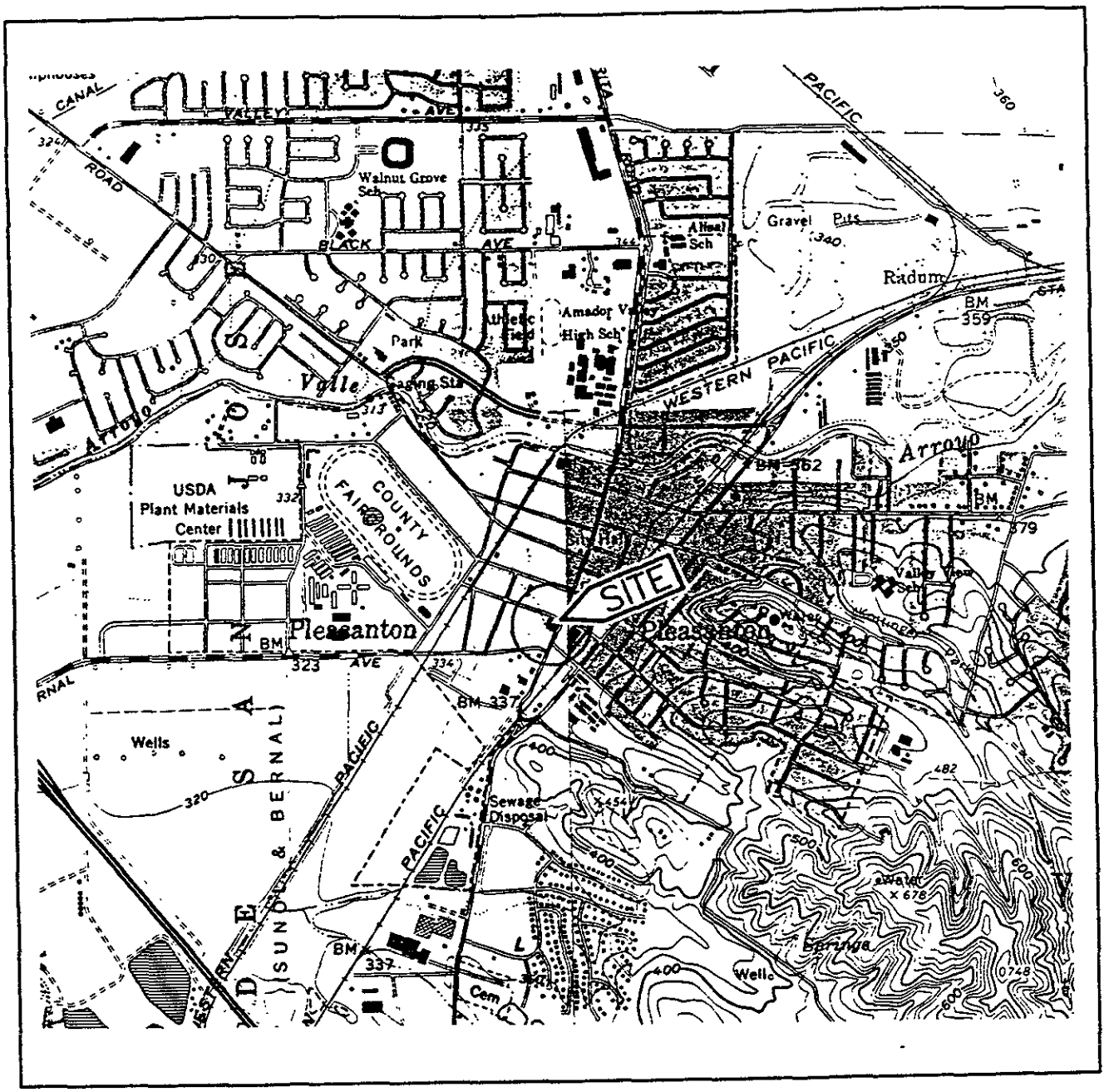

Source: U.S. Geological Survey
7.5–Minute Quadrangles
Dublin, Livermore, California
Photorevised 1980

N

Approximate Scale
2000 1000 0 2000
feet

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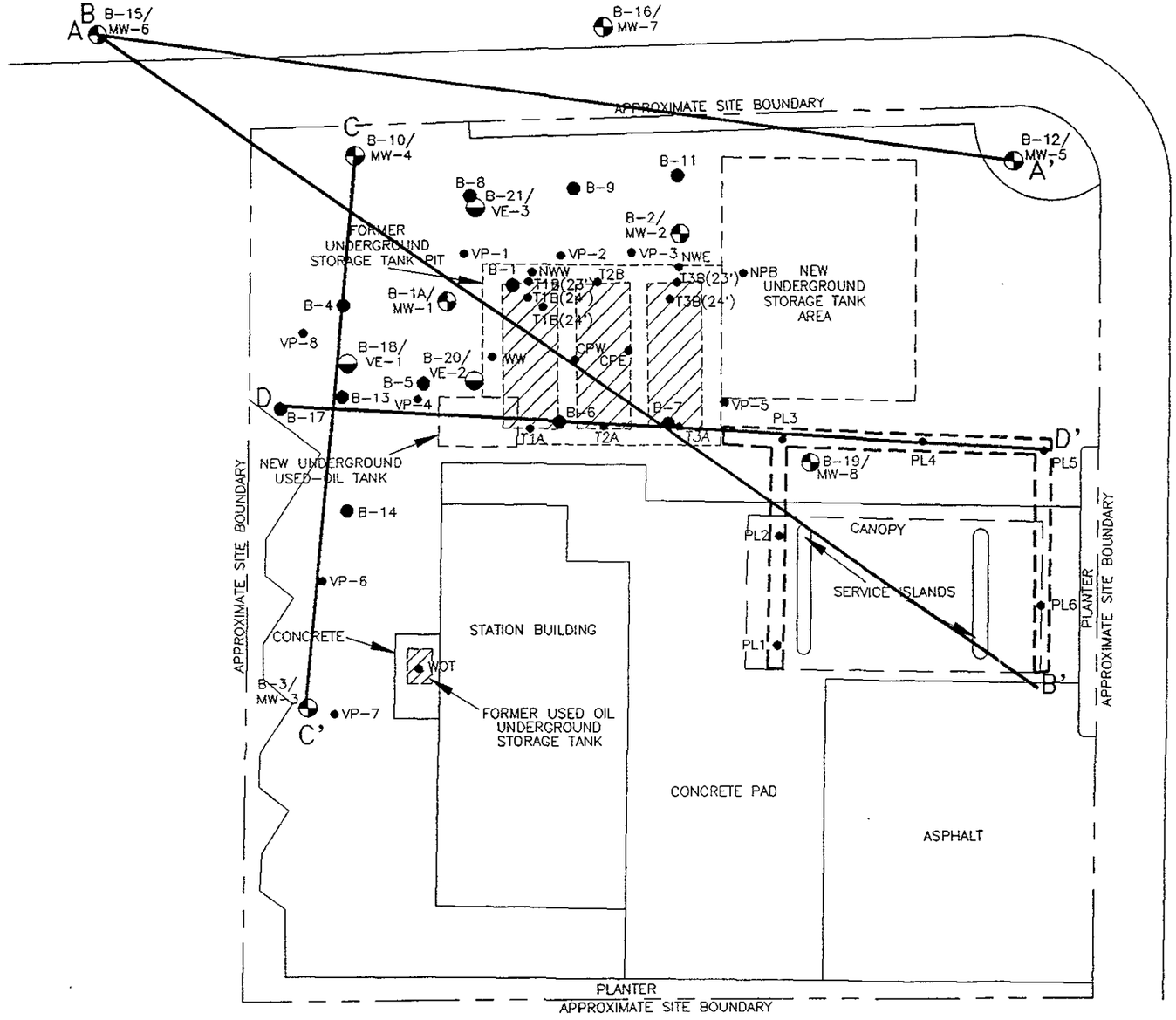
SITE VICINITY MAP
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
1



EXPLANATION

- = Approximate product line trench location
- = Former underground gasoline storage tanks
- B-19/ MW-8 = Monitoring well (RESNA, 02, 03/91 AND 05/93)
- B-21/ VE-3 = Vapor extraction well (RESNA, 02, 03/91 AND 05/93)
- B-17 = Soil boring (RESNA, 01, 05, and 06/90 and 02 and 03/91)
- VP-8 = Soil vapor sampling point (RESNA, 06/89)
- T3B or PL6 = Tank pit or product line soil sample (RESNA, 07/89)
- D — D' = Geologic cross section

Approximate Scale

20 10 0 20 40

feet

Source: Surveyed by Ron Archer Civil Engineer, Inc., June 1990 and April 1991.

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GENERALIZED SITE PLAN
Exxon Service Station 7-7003
349 Main Street
Pleasanton, California

PLATE 2

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Exxon Service Station 7-7003
349 Main Street, Pleasanton, California
(Page 1 of 7)

Well ID # (TOC)	Sampling Date	SUBJ	DTW	Elev.	TPHg	B	T	E	X	Lead	TOG	VOCs
		<	feet	>	<	parts per billion						>
MW-1 (343.83)	02/23/90	NLPH	26.08	317.75	3300	21	9.2	59	19	100	NA	NA
	06/15/90	NLPH	26.49	317.34	1300	7.9	5.9	32	58	<50	NA	NA
	08/90	NLPH	26.47	317.36	2500	77	280	50	250	<50	NA	NA
	12/18/90	NLPH	28.00	315.83	390	9.0	2.0	43	400	<100	NA	NA
	03/19/91	NLPH	23.63	320.20	4500	45	12	240	300	<100	NA	12.0[1]
	06/27/91	NLPH	22.11	321.72	710	5.4	2.6	29	34	<100	NA	ND
	09/26/91	NLPH	27.75	316.08	290	1.9	<0.5	0.6	0.6	<100	NA	ND
	01/10/92	NLPH	25.61	318.22	5400	52	15	690	496	<100	NA	6.1[1]
	03/12-13/92	NLPH	22.52	321.31	1400	87	22	1200	1000	NA	NA	2.1[5] 14[1] 1.2[4] 0.5[6] 0.8[3]
	06/09/92	NLPH	21.53	322.30	4500	27	5.9	400	300	<100	<5000	ND
	09/28-29/92	NLPH	29.84	313.99	60	<0.5	0.9	<0.5	<0.5	NA	<5000	ND
	12/12/92	NLPH	23.86	319.97	1400	53	18	1100	570	NA	<5000	49[1]
	02/02-03/93	NLPH	19.00	324.83	10,000	61	27	900	840	NA	<5000	2.2[5] 19[1] 1.1[6] 2.4[3]
	06/08-09/93	NLPH	16.62	327.21	7500	42	32	970	720	NA	<5000	1.8[1] 1.0[4] 0.8[3]
	09/22-23/93	NLPH	19.63	324.20	6600	36	34	820	540	NA	<5000	0.6[3]
	11/17-18/93	NLPH	20.82	323.01	5900	24	10	470	300	NA	NA	ND
	02/16-17/94	NLPH	21.47	322.36	6,700	42	15	470	330	NA	NA	ND

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Exxon Service Station 7-7003
349 Main Street, Pleasanton, California

Well ID # (TOC)	Sampling Date	SUBJ	DTW	Elev.	TPHg	B	T	E	X	Lead	TOG	VOCs
		<	feet	>	<	parts per billion						>
MW-2												
(344.22)	02/23/90	NLPH	26.31	317.91	650	3.0	2.0	0.98	6.5	8.0	NA	NA
	06/15/90	NLPH	26.25	317.97	670	<0.5	2.6	<0.5	<0.5	<50	NA	NA
	08/90	NLPH	26.15	318.07	1300	24	130	37	170	<50	NA	NA
	12/18/90	NLPH	27.94	316.28	470	<0.3	0.5	1.0	3.0	<100	NA	NA
	03/19/91	NLPH	23.41	320.81	700	10	3.4	6.1	3.8	<100	NA	ND
	06/27/91	NLPH	21.63	322.59	1400	8.7	2.1	8.8	33	<100	NA	ND
	09/26/91	NLPH	27.19	317.03	300	<0.5	0.6	0.6	3.9	<100	NA	ND
	01/10/92	NLPH	25.67	318.55	800	9.3	1.0	2.4	3.2	<100	NA	ND
	03/12-13/92	NLPH	22.28	321.94	350	<0.5	0.6	0.63	1.0	NA	NA	ND
	06/09/92	NLPH	21.17	323.05	150	1.9	2.5	2.51	5.1	<100	NA	ND
	09/28-29/92	NLPH	29.58	314.64	71	<0.5	<0.5	<0.5	<0.5	NA	NA	ND
	12/12/92	Not Measured					Not Sampled					
	02/02-03/93	NLPH	18.69	325.53	720	3.9	8.2	21	20	NA	NA	NA
	06/08-09/93	NLPH	16.32	327.90	160	0.5	3.3	5.7	2.0	NA	NA	NA
	09/22-23/93	NLPH	19.43	324.79	240	0.7	5.6	4.0	2.6	NA	NA	NA
	11/17-18/93	NLPH	20.56	323.66	490	1.2	2.3	3.2	1.3	NA	NA	NA
	02/16-17/94	NLPH	20.93	323.29	280	<0.5	2.3	1.0	2.0	NA	NA	NA
MW-3												
(342.90)	02/23/90	NLPH	24.78	318.12	<20	<0.5	<0.5	<0.5	<0.5	100	NA	NA
	06/15/90	NLPH	25.29	317.61	200	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	08/90	NLPH	25.40	317.50	3200	54	380	23	400	<50	NA	NA
	12/18/90	NLPH	26.84	316.06	200	8.0	12	6.0	24	<100	<5000	4.1[3]
	03/19/91	NLPH	22.13	320.77	<50	<0.5	<0.5	<0.5	<0.5	<100	<5000	ND
	06/27/91	NLPH	21.04	321.86	<50	<0.5	<0.5	<0.5	<0.5	<100	<5000	ND
	09/26/91	NLPH	26.63	316.27	<50	<0.5	<0.5	<0.5	<0.5	<100	<5000	ND
	01/10/92	NLPH	24.26	318.64	<50	<0.5	<0.5	<0.5	<0.5	<100	5100	ND

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Exxon Service Station 7-7003
349 Main Street, Pleasanton, California

Well ID # (TOC)	Sampling Date	SUBJ	DTW	Elev.	TPHg	B	T	E	X	Lead	TOG	VOCs
		<	feet	>	<			parts per billion				>
MW-3 (cont)	03/12-13/92	NLPH	21.60	321.30	<50	<0.5	<0.5	<0.5	<0.5	NA	5000	ND
	06/09/92	NLPH	20.88	322.02	<50	<0.5	<0.5	<0.5	<0.5	<100	<5000	ND
	09/28-29/92	NLPH	28.67	314.23	<50	<0.5	<0.5	<0.5	<0.5	NA	<5000	ND
	12/12/92	NLPH	20.73	322.17	<50	<0.5	<0.5	<0.5	1.3	NA	<5000	NA
	02/02-03/93	NLPH	19.30	323.60	<50	<0.5	<0.5	<0.5	<0.5	NA	<5000	NA
	06/08/93	NLPH	15.89	327.01	<50	0.6	0.9	3.4	2.8	NA	<5000	NA
	09/22/93	NLPH	18.63	324.27	<50	<0.5	1.0	1.6	4.4	NA	*	NA
	11/17-18/93	NLPH	19.97	322.93	<50	<0.5	<0.5	<0.5	1.5	NA	NA	NA
	02/16-17/94	NLPH	20.64	322.26	<50	1.5	5.3	1.6	9.2	NA	NA	NA
MW-4 (343.38)	06/15/90	NLPH	30.94	312.44	<20	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	08/90	NLPH	31.21	312.17	120	5.2	5.4	5.4	9.9	<50	NA	NA
	12/18/90	NLPH	32.86	310.52	50	7.0	1.0	<0.3	2.0	<100	NA	NA
	03/19/91	NLPH	26.76	316.62	160	1.8	0.8	2.2	11	<100	NA	ND
	06/27/91	NLPH	25.91	317.47	<50	<0.5	<0.5	<0.5	<0.5	<100	NA	ND
	09/26/91	NLPH	32.29	311.09	<50	<0.5	<0.5	<0.5	<0.5	<100	NA	1.0[4]
	01/10/92	NLPH	29.06	314.32	98	0.9	<0.5	7.6	4.4	<100	NA	1.0[4]
	03/12-13/92	NLPH	24.25	319.13	82	1.2	<0.5	5.3	4.3	NA	NA	ND
	06/09/92	NLPH	25.00	318.38	<50	0.6	1.0	<0.5	2.5	<100	NA	0.7[4]
	09/28-29/92	NLPH	34.41	308.97	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	ND
	12/12/92	NLPH	30.77	312.61	99	1.0	0.9	7.0	11	NA	NA	ND
	02/02-03/93	NLPH	21.03	322.35	170	2.3	2.2	6.2	8.4	NA	NA	ND
	06/08-09/93	NLPH	18.35	325.03	<50	0.7	0.9	0.7	<0.5	NA	NA	0.6[4]
	09/22-23/93	NLPH	21.86	321.52	59	0.8	2.0	3.1	5.3	NA	NA	ND
	11/17-18/93	NLPH	22.98	320.40	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	ND
	02/16-17/94	NLPH	23.94	319.44	98	8.7	17	4.2	24	NA	NA	0.5[4]

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Exxon Service Station 7-7003
349 Main Street, Pleasanton, California

Well ID # (TOC)	Sampling Date	SUBJ	DTW	Elev.	TPHg	B	T	E	X	Lead	TOG	VOCs
		<	feet	>	<	parts per billion						>
MW-5												
(345.20)	06/15/90	NLPH	26.94	318.26	<20	<0.5	<0.5	<0.5	<0.5	60	NA	NA
	08/90	NLPH	26.90	318.30	120	9.7	12	7.6	17	<50	NA	NA
	12/18/90	NLPH	28.31	316.89	50	2.0	3.5	2.0	8.0	<100	NA	NA
	03/19/91	NLPH	23.98	321.22	160	<0.5	<0.5	<0.5	<0.5	<100	NA	0.5[1]
	06/27/91	NLPH	22.41	322.79	<50	<0.5	<0.5	<0.5	<0.5	<100	NA	ND
	09/26/91	NLPH	27.77	317.43	<50	<0.5	<0.5	<0.5	<0.5	<100	NA	ND
	01/10/92	NLPH	26.38	318.82	98	<0.5	<0.5	<0.5	0.6	<100	NA	ND
	03/12-13/92	NLPH	22.08	323.12	82	<0.5	<0.5	<0.5	<0.5	NA	NA	ND
	06/09/92	NLPH	31.98	313.22				Not Sampled				
	09/28-29/92	NLPH	30.26	314.94	<50	NR	<0.5	<0.5	<0.5	NA	NA	ND
	12/12/92	NLPH	27.20	318.00	210	0.9	11	0.5	3.1	NA	NA	NA
	02/02-03/93	NLPH	20.01	325.19	70	<0.5	2.7	<0.5	0.9	NA	NA	NA
	06/08-09/93	NLPH	16.80	328.40	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NA
	09/22/93	NLPH	20.28	324.92	<50	1.0	<0.5	1.1	2.1	NA	NA	NA
	11/17-18/93	NLPH	21.19	324.01	<50	<0.5	<0.5	<0.5	0.9	NA	NA	NA
	02/16-17/94	NLPH	21.61	323.89	<50	1.2	4.3	1.4	8.2	NA	NA	NA
MW-6												
(342.25)	03/19/91	NLPH	34.42	307.83	<50	<0.5	<0.5	<0.5	<0.5	<100	NA	ND
	06/27/91	NLPH	35.01	307.24	<50	2.6	1.8	0.8	<0.30	<100	NA	ND
	09/26/91	NLPH	40.34	301.91	<50	<0.5	<0.5	<0.5	<0.5	<100	NA	ND
	01/10/92	NLPH	36.20	306.05	<50	<0.5	<0.5	<0.5	<0.5	<100	NA	ND
	03/12-13/92	NLPH	31.95	310.30	<50	<0.5	<0.5	NR	NR	NA	NA	ND
	06/09/92	NLPH	33.22	309.03	<50	<0.5	<0.5	<0.5	<0.5	<100	NA	ND
	09/28-29/92	NLPH	40.96	301.29	<50	<0.5	<0.5	0.9	0.9	NA	NA	ND
	12/12/92	Not Measured			<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NA
	02/02/93	NLPH	26.51	315.74	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NA

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Exxon Service Station 7-7003
349 Main Street, Pleasanton, California

Well ID # (TOC)	Sampling Date	SUBJ	DTW	Elev.	TPHg	B	T	E	X	Lead	TOG	VOCs
		<	feet	>	<	parts per billion						>
MW-6 (cont)	06/08/93	NLPH	22.62	319.63	<50	0.6	0.7	1.7	1.8	NA	NA	NA
	09/22/93	NLPH	26.74	315.51	<50	<0.5	<0.5	0.7	1.1	NA	NA	NA
	11/17-18/93	NLPH	28.49	313.76	<50	0.6	0.8	1.2	3.9	NA	NA	NA
	02/16-17/94	NLPH	29.83	312.42	51	3.8	7.9	2.0	11.0	NA	NA	NA
MW-7 (343.62)	03/19/91	NLPH	24.68	318.94	140	<0.5	<0.5	<0.5	<0.5	<100	NA	0.7[1] 0.8[2]
	06/27/91	NLPH	23.10	320.52	100	5.2	5.6	3.9	16	<100	NA	ND
	09/26/91	Not Measured				Not Sampled						
	01/10/92	NLPH	26.98	316.64	<50	<0.5	<0.5	<0.5	<0.5	<100	NA	ND
	03/12-13/92	NLPH	21.86	321.76	120	<0.5	<0.5	<0.5	<0.5		NA	ND
	06/09/92	NLPH	22.32	321.30	81	<0.5	<0.5	<0.5	<0.5	<100	NA	ND
	09/28-29/92	NLPH	31.92	311.70	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	ND
	12/12/92	NLPH	28.80	314.82	200	5.1	6.9	3.3	19	NA	NA	NA
	02/02-03/93	NLPH	19.50	324.12	170	<0.5	6.6	0.6	1.7	NA	NA	NA
	06/08-09/93	NLPH	16.72	326.90	<50	<0.5	0.8	<0.5	<0.5	NA	NA	NA
	09/22/93	NLPH	19.90	323.72	<50	0.6	0.9	0.7	1.1	NA	NA	NA
	11/17-18/93	NLPH	20.75	322.87	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NA
	02/16-17/94	NLPH	21.36	322.26	<50	0.9	2.7	<0.5	3.2	NA	NA	NA
MW-8 (344.00)	06/08-09/93	NLPH	15.78	328.22	65	<0.5	1.1	0.8	1.7	NA	NA	NA
	09/22-23/93	NLPH	18.86	325.14	110	4.1	8.9	6.7	14	NA	NA	NA
	11/17-18/93	NLPH	20.01	323.99	78	<0.5	0.9	<0.5	<0.5	NA	NA	NA
	02/16-17/94	NLPH	20.30	323.70	<50	<0.5	1.8	<0.5	<0.5	NA	NA	NA

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Exxon Service Station 7-7003
349 Main Street, Pleasanton, California

Well ID # (TOC)	Sampling Date	SUBJ	DTW feet	Elev.	TPHg	B	T	E	X	Lead	TOG	VOCs
					parts per billion							
VE-1 (343.38)	09/28/92	NLPH	31.92	311.46			Not Sampled					
	06/08/93	NLPH	16.44	326.94	5800	<5.0	15	830	500	NA	NA	NA
	09/22-23/93	NLPH	19.47	323.91	3700	5.4	21	380	240	NA	NA	NA
	11/17-18/93	NLPH	20.64	322.74	3600	5.8	2.0	220	180	NA	NA	NA
	02/16-17/94	NLPH	21.20	322.18	7,600	31	4.0	500	300	NA	NA	NA
VE-2 (343.39)	06/08/93	NLPH	16.20	327.19	7000	10	18	900	340	NA	NA	NA
	09/22-23/93	NLPH	19.23	324.16	2600	15	33	240	82	NA	NA	NA
	11/17-18/93	NLPH	20.44	322.95	3500	22	<0.5	220	56	NA	NA	NA
	02/16-17/94	NLPH	20.90	322.49	3,400	45	<5.0	220	60	NA	NA	NA
VE-3 (343.39)	06/08/93	NLPH	16.48	326.91	130	3.1	3.1	18	15	NA	NA	NA
	09/22-23/93	NLPH	18.96	324.43	130	11	7.3	13	32	NA	NA	NA
	11/17-18/93	NLPH	20.00	323.39			Not Sampled					
	02/16-17/94	NLPH	21.02	322.37	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NA
	Maximum Contaminant Levels (MCLs)				---	1.0	---	680	1750	---	---	see
	Drinking Water Action Levels (DWALs)				---	---	100	---	---	---	---	below

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Exxon Service Station 7-7003
349 Main Street, Pleasanton, California
(7 of 7)

Notes:

SUBJ	=	Results of subjective evaluation, free-phase product thickness (PT) in feet
NLPH	=	No liquid-phase hydrocarbons present in well
TOC	=	Elevation of top of well casing relative to mean sea level
DTW	=	Depth to water
Elev.	=	Elevation of groundwater
TPHg	=	Total petroleum hydrocarbons as gasoline analyzed using modified EPA method 5030/8015.
BTEX	=	Benzene, Toluene, Ethylbenzene, and total Xylenes analyzed using modified EPA method 5030/8020.
TPHd	=	Total petroleum hydrocarbons as diesel analyzed using EPA method 3510/8015.
VOCs	=	Volatile organic compounds analyzed using EPA method 624.
TOG	=	Total oil and grease analyzed using Standard Method 5520.
<	=	Less than the indicated detection limit shown by the laboratory
NA	=	Not Analyzed
ND	=	Not Detected
NR	=	Not Recorded
*	=	Analyzed for total petroleum hydrocarbons as diesel using EPA method 3510/8015.
1	=	Chloroform (No MCL or DWAL)
2	=	Bromodichloromethane (No MCL or DWAL)
3	=	Tetrachloroethene
4	=	1,2-Dichloroethane (MCL = 0.5 ppb)
5	=	Methylene Chloride (DWAL = 40.0 ppb)
6	=	Tricholoroethene
MCLs	=	Maximum Contaminant Levels (California Department of Health Services, October 1990)
DWAL	=	Drinking Water Action Level (California Department of Health Services, October 1990)
---	=	Not applicable
RESNA	=	RESNA Industries Inc. began monitoring and sampling

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APPENDIX A

FIELD PROTOCOL

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FIELD PROTOCOL

The following presents RESNA Industries' field protocol for a typical site investigation involving gasoline hydrocarbon-impacted soil and/or groundwater.

Site Safety Plan

The Site Safety Plan describes the safety requirements for the evaluation of gasoline hydrocarbons in soil, groundwater, and the vadose-zone at the site. The site Safety Plan is applicable to personnel of RESNA Industries and its subcontractors. RESNA Industries personnel and subcontractors of RESNA Industries scheduled to perform the work at the site are briefed on the contents of the Site Safety Plan before work begins. A copy of the Site Safety Plan is available for reference by appropriate parties during the work. A site Safety Officer is assigned to the project.

Soil Borings

Prior to the drilling of borings and construction of monitoring wells, permits are acquired from the appropriate regulatory agency. In addition to the above-mentioned permits, encroachment permits from the City or State are acquired if drilling of borings offsite on City or State property is necessary. Copies of the permits are included in the appendix of the project report. Prior to drilling, Underground Service Alert (USA) is notified of our intent to drill, and known underground utility lines and structures are approximately marked.

The borings are drilled by a truck-mounted drill rig equipped with 8- or 10-inch-diameter, solid-stem or hollow-stem augers. Other methods such as rotary or casing hammer may be used if special conditions are encountered. The augers, sampling equipment and other equipment that comes into contact with the soil are steam-cleaned prior to drilling each boring to minimize the possibility of cross-contamination. Sampling equipment is cleaned with a trisodium phosphate solution and rinsed with clean water between samples. After drilling the borings, monitoring wells are constructed in the borings, or neat-cement grout with bentonite is used to backfill the borings to the ground surface.

Borings for groundwater monitoring wells are drilled to a depth of no more than 20 feet below the depth at which a saturated zone is first encountered, or a short distance into a stratum beneath the saturated zone which is of sufficient texture, moisture, and consistency to be judged as a perching layer by the field geologist, whichever is shallower. Drilling into a deeper aquifer below the shallowest aquifer is begun only after a conductor casing is properly installed and allowed to set, to seal the shallow aquifer.

Drill Cuttings

Drill cuttings subjectively evaluated as containing gasoline hydrocarbons at levels greater than 100 parts per million (ppm) are separated from those subjectively evaluated as containing gasoline hydrocarbons at levels less than 100 ppm. Evaluation is based either on subjective evidence of soil discoloration, or on measurements made using a field calibrated OVM. Readings are taken by placing a soil sample into a ziplock-type plastic bag and allowing volatilization to occur. The intake probe of the OVM is then inserted into the headspace created in the plastic bag immediately after opening it. The drill cuttings from the borings are placed in labeled 55-gallon drums approved by the Department of Transportation, or on plastic at the site, and covered with plastic. The cuttings remain the responsibility of the client.

Soil Sampling in Borings

Soil samples are collected at no greater than 5-foot intervals from the ground surface to the total depth of the borings. The soil samples are collected by advancing the boring to a point immediately above the sampling depth, and then driving a California-modified, split-spoon sampler containing brass sleeves through the hollow center of the auger into the soil. (A standard penetrometer, which does not contain liners, may be used to collect samples when laboratory analysis for volatile components is not an issue. The sampler and brass sleeves are laboratory-cleaned, steam-cleaned, or washed thoroughly with Alconox® and water, prior to each use. The sampler is driven with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler each successive six inches are counted and recorded to evaluate the relative consistency of the soil. When necessary, the sampler may be pushed by the drill rig hydraulics. In this case, the pressure exerted (in pounds per square inch) is recorded.

The samples selected for laboratory analysis are removed from the sampler and quickly sealed in their brass sleeves with aluminum foil, plastic caps, and plastic zip-lock bags or aluminized duct tape. The samples are then labeled, promptly placed in iced storage, and delivered to a laboratory certified by the State of California to perform the analyses requested.

One of the samples in brass sleeves not selected for laboratory analysis at each sampling interval is tested in the field using an OVM that is field calibrated at the beginning of each day it is used. This testing is performed by inserting the intake probe of the OVM into the headspace in the plastic bag containing the soil sample as described in the Drill Cuttings section above. The OVM readings are presented in Logs of Borings included in the project report.

Logging of Borings

A geologist is present to log the soil cuttings and samples using the Unified Soil Classification System. Samples not selected for chemical analysis, and the soil in the sampler shoe, are extruded in the field for inspection. Logs include texture, color, moisture, plasticity, consistency, blow counts, and any other characteristics noted. Logs also include subjective evidence for the presence of gasoline hydrocarbons, such as soil staining, noticeable or obvious product odor, and OVM readings.

Sampling of Stockpiled Soil

One composite soil sample is collected for each 50 cubic yards of stockpiled soil, and for each individual stockpile composed of less than 50 cubic yards. Composite soil samples are obtained by first evaluating relatively high, average, and low areas of hydrocarbon concentration by digging approximately one to two feet into the stockpile and placing the intake probe of a field calibrated OVM against the surface of the soil; and then collecting one sample from the "high" reading area, and three samples from the "average" areas. Samples are collected by removing the top one to two feet of soil, then driving laboratory-cleaned brass sleeves into the soil. The samples are sealed in the sleeves using aluminum foil, plastic caps, and plastic zip-lock bags or aluminized duct tape; labeled; and promptly placed in iced storage for transport to the laboratory, where compositing is performed.

Monitoring Well Construction

Monitoring wells are constructed in selected borings using clean 2- or 4-inch-diameter, thread-jointed, Schedule 40 polyvinyl chloride (PVC) casing. No chemical cements, glues, or solvents are used in well construction. Each casing bottom is sealed with a threaded end-plug, and each casing top with a locking plug. The screened portions of the wells are constructed of machine-slotted PVC casing with 0.020-inch-wide (typical) slots for initial site wells. Slot size for subsequent wells may be based on sieve analysis and/or well development data. The screened sections in groundwater monitoring wells are placed to allow monitoring during seasonal fluctuations of groundwater levels.

The annular space of each well is backfilled with No. 2 by 12 sand or similar sorted sand (groundwater monitoring wells), or pea gravel (vapor extraction wells) to approximately two feet above the top of the screened casing for initial site wells. The sand pack grain size for subsequent wells may be based on sieve analysis and/or well development data. A 1- to 2-foot-thick bentonite plug is placed above the sand as a seal against cement entering the filter pack. The remaining annulus is then backfilled with a slurry of water, neat cement, and bentonite to approximately one foot below the ground surface.

An aluminum utility box with a PVC apron is placed over each wellhead and set in concrete placed flush with the surrounding ground surface. Each wellhead cover has a seal to protect the monitoring well against surface-water infiltration and requires a special wrench to open. The design discourages vandalism and reduces the possibility of accidental disturbance of the well.

Groundwater Monitoring Well Development

The monitoring wells are developed by bailing or over-pumping and surge-block techniques. The wells are either bailed or pumped, allowed to recharge, and bailed or pumped again until the water removed from the wells is determined to be clear. Turbidity measurements (in NTUs) are recorded during well development and are used in evaluating well development. The development method used, initial turbidity measurement, volume of water removed, final turbidity measurement, and other pertinent field data and observations are recorded. The wells are allowed to equilibrate for at least 48 hours after development prior to sampling. Water generated by well development is stored in 17E Department of Transportation (DOT) 55-gallon drums on site, and remains the responsibility of the client.

Groundwater Sampling

The static water level in each well is measured to the nearest 0.01-foot using a Solinst® electric water-level sounder or oil/water interface probe (if the wells contain floating product) cleaned with Alconox® and water before use in each well. The depth of each well is also measured. The liquid in the wells is examined for visual evidence of gasoline hydrocarbons by gently lowering approximately half the length of a Teflon® bailer (cleaned with Alconox® and water) past the air/water interface. The sample is then retrieved and inspected for floating product, sheen, emulsion, color, sediment, and clarity. Obvious product odor is recorded if noted. If floating product is present in the well, the thickness of floating product is measured using an oil/water interface probe and is recorded to the nearest 0.01 foot. Floating product is removed from wells on site visits.

Groundwater samples from the wells are collected in approximate order of increasing product concentration, as best known or estimated. Wells which do not contain floating product are purged using a submersible pump. Equipment which comes in contact with the interior of the well or the groundwater is cleaned with Alconox® and deionized or distilled water prior to use in each well. The wells are purged until withdrawal is of sufficient duration to result in stabilized pH, temperature, and electrical conductivity of the water. These parameters are measured to the nearest 0.1 pH unit, 0.1 degree F, and 10 umhos/cm, respectively, using portable meters calibrated daily to a buffer and conductivity standard, according to the manufacturer's specifications. A minimum of four well volumes is purged from each well. If the well becomes dewatered, the water level is allowed to recover to at

least 80 percent of the initial water level. When recovery of the water level has not reached at least 80 percent of the static water level after two hours, a groundwater sample will be collected when sufficient volume is available to fill the sample container. Prior to the collection of each groundwater sample, the Teflon® bailer is cleaned with Alconox® and rinsed with tap water and deionized water, and the latex gloves worn by the sampler changed. Hydrochloric acid is added to the sample vials as a preservative (when applicable). Sample containers remain sealed until usage at the site. A sample method blank is collected by pouring distilled water into the bailer and then into sample vials. Method blanks are analyzed periodically to verify effective cleaning procedures. A sample of the formation water is then collected from the surface of the water in each of the wells using the Teflon® bailer. The water samples are then gently poured into laboratory-cleaned, 40-milliliter (ml) glass vials, 500 ml plastic bottles or 1-liter glass bottles (as required for specific laboratory analysis), sealed with Teflon®-lined caps, and inspected for air bubbles to check for headspace, which would allow volatilization to occur. If a bubble is evident, the cap is removed, more sample is added, and the bottle resealed. The samples are then labeled and promptly placed in iced storage, and the wellhead is secured. A field log documenting sampling procedures and parameter monitoring is maintained. Water generated by the purging of wells is stored in 17E DOT 55-gallon drums, and floating product bailed from the wells is stored in double containment onsite; this water and product remains the responsibility of the client.

Vadose-Zone Monitoring and Vapor Well Purging

Vapor readings are made with a field-calibrated OVM, which has a lower detection limit of 0.1 ppm. After the OVM is turned on, it is allowed sufficient warm-up time for stabilization. Prior to purging each vadose-zone monitoring well, a well cap with a hose barb drilled and tapped into the well cap is secured to the well. The inlet of the vacuum pump is connected to the hose barb with tubing. OVM readings are taken from the exhaust port of the vacuum pump as the well is purged. Each well is purged for approximately 2 to 5 minutes or until about five well volumes of air have been removed. Ambient readings of the air at the site are taken with the OVM after each well is purged.

Air Sampling

The vacuum pump is first purged with ambient air. Vadose-zone monitoring is then performed as described above. A new Tedlar sample bag is then placed on the outlet port of the vacuum pump with the valve closed. The valve is then opened to allow filling of the bag with an air sample. The valve is closed when the sample bag is 3/4-full (to allow for expansion of gas due to temperature changes), and the bag is removed. The sample pump is purged with ambient air after each sample is taken. A field log documenting sampling procedures is maintained. The samples are transported to the laboratory without exposure to sunlight or cooling, for analysis with 72-hour turnaround.

Sample Labeling and Handling

Sample containers are labeled in the field with the job number, unique sample location, depth, and date, and promptly placed in iced storage for transport to the laboratory. A Chain of Custody Record is initiated by the field geologist and updated throughout handling of the samples, and accompanies the samples to a laboratory certified by the State of California for the analyses requested. Samples are transported to the laboratory promptly to help ensure that recommended sample holding times are not exceeded. Samples are properly disposed of after their useful life has expired.

Pumping and Recovery Tests

The initial water levels in wells to be used during the test are measured prior to commencement of pumping. The flow rate of the pump is adjusted to the desired pumping rate, and water levels allowed to recover to initial levels. Pumping then begins, and the starting time of pumping is recorded. Drawdowns in observation wells are recorded at intervals throughout pumping using pressure transducers and manual methods. Evacuated water is stored in a storage tank at the site and remains the responsibility of the client. After the pump is shut off, recovery measurements are taken in the wells until recovery is at least 80 percent of the initial water level. Barometric pressure and tidal information (if appropriate) are collected for the time interval of the pumping test to allow evaluation of possible effects of atmospheric pressure and tidal fluctuations on the groundwater levels.

Quality Assurance/Quality Control

The sampling and analysis procedures employed by RESNA for groundwater sampling and monitoring follow regulatory guidance for quality assurance/quality control (QA/QC). Quality control is maintained by site-specific field protocols and quality control checks performed by the laboratory. Laboratory and field handling of samples may be monitored by including QC samples for analysis. QC samples may include any combination of the following. The number and types of QC samples are selected and analyzed on a project-specific basis.

Trip blanks - Trip blanks are sent to the project site, and travel with project site samples. They are not opened, and are returned from a project site with the samples for analysis.

Field blank - Prepared in the field using organic-free water. Field blanks accompany project site samples to the laboratory and are analyzed periodically for specific chemical compounds present at the project site where they were prepared.

Duplicates - Duplicate samples are collected from a selected well and project site. They are analyzed at two different laboratories, or at the same laboratory under different labels.

Equipment blank - Periodic QC samples are collected from field equipment rinsate to verify adequate cleaning procedures.

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APPENDIX B

PREVIOUS ENVIRONMENTAL WORK

PREVIOUS ENVIRONMENTAL WORK

June 1989

In June 1989, at the request of Exxon, RESNA (formerly AGS) performed a soil-vapor survey to evaluate the concentrations of gasoline hydrocarbons in the soil prior to the removal and replacement of the gasoline and used-oil underground storage tanks (USTs). Vapor samples were collected using a Photovac Model 10S70 at eight locations near the service islands, the product lines, and the former USTs, at depths of 15 feet and between 23 and 28 feet below grade. The sample locations are shown on the Generalized Site Plan (Plate 2). Data from this survey indicated detectable levels of hydrocarbons in the soil around the former gasoline USTs and west of the used-oil UST. The highest organic field readings were found on the western side of the former USTs (AGS, July 20, 1989).

July and August 1989

In July 1989, three 8,000-gallon steel gasoline USTs and a used-oil UST were removed from the site. The gasoline USTs were used to store unleaded, premium unleaded, and leaded gasoline. Examination of the steel tanks after removal indicated no signs of leakage, holes, pitting, or areas of weakness. After removal of the USTs, a total of 22 soil samples were collected for laboratory analysis. Of these samples, 14 were from the excavation at depths of 14 and 23 feet below grade, one from the used-oil UST excavation at a depth of 7 feet, one from near the new tank pit at a depth of 13 feet, and 6 from near the product lines at a depth of 3 feet (AGS, October 1, 1989). In August 1989, new fiberglass gasoline USTs were installed east of the former gasoline UST pit, and a new fiberglass used-oil UST was installed northeast of the old used-oil UST pit.

Results of the laboratory analysis indicated nondetectable gasoline hydrocarbon concentrations in the areas near the product line trench, the new tank pit floor, and at a depth of approximately 14 feet near the southern side and the center of the old tank pit. However, the results from the samples collected at approximate depths of 23 feet near the northern side of the tank pit indicated concentrations of up to 150 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPHg). An additional foot of soil was excavated in this area (to a depth of 24 feet), and samples from this depth contained up to 40 ppm TPHg. The results of analyses of the sample from near the used-oil UST showed no detectable TPHg, total petroleum hydrocarbons as diesel (TPHd), total oil and grease (TOG), or volatile organic compounds (VOCs). Low concentrations of chromium, zinc, and lead were detected in the sample. Results of laboratory analysis of soil samples are summarized in Table 2, Cumulative Results of Laboratory Analyses of Soil Samples.

Based on the results of this investigation, RESNA recommended the installation of three groundwater monitoring wells to assess the impact of gasoline hydrocarbons on the groundwater beneath the site.

January through June 1990

An initial subsurface investigation was conducted by RESNA in two phases. The investigation included drilling 13 soil borings in the vicinity of the former USTs, installing groundwater monitoring wells MW-1 through MW-5 in five of the borings, evaluating the concentrations of gasoline hydrocarbons in the soil and groundwater beneath the site, evaluating the groundwater gradient at the site, and conducting a records review of wells within ½ mile radius of the site. The first phase was performed between January 13 and 15, 1990 (AGS, August 1, 1990). Borings B-1, B-1A, B-2, and B-3 were drilled and soil samples were collected at 2½ to 5 foot intervals. Groundwater was encountered at depths of 30 to 33 feet below grade and groundwater monitoring wells MW-1, MW-2, and MW-3 were installed in borings B-1A, B-2, and B-3, respectively. The second phase was conducted between May 29 and June 4, 1990, in which borings B-4 through B-12 were drilled and sampled. Groundwater was encountered in B-10 at 32 feet and in B-12 at 42 feet, and monitoring wells MW-4 and MW-5 were installed in B-10 and B-12, respectively. Analytical results of soil samples showed that levels of TPHg were present at concentrations up to 1,400 ppm southwest of the former gasoline USTs. Total lead concentrations did not exceed 14 ppm and the highest values were found southwest of the UST pit (see Table 2).

Quarterly groundwater monitoring data indicated a groundwater flow direction to the west to northwest with a gradient of approximately 0.007 in February 1990 to 0.008 in June 1990. Cumulative groundwater monitoring data is presented on Table 1. Groundwater analyses showed that concentrations of TPHg were found in the groundwater beneath the site northwest of the former UST pit. Cumulative results of laboratory analysis of groundwater samples are shown in Table 1. In June 1990, the highest gasoline hydrocarbon concentrations were present in MW-1. Total lead was not detectable except in the sample from MW-5, which contained 0.06 ppm.

A review of available well records from the Alameda County Flood Control and Water Conservation District (ACFCWCD), Zone 7, in Pleasanton, California, revealed there were 10 wells within ½ mile of the site. Of these, only one well was an active water supply well, located ½ mile northeast of the site.

Based on the results of this investigation, RESNA concluded: monitoring wells MW-1 through MW-3 and MW-5 appeared to be screened in a shallow, laterally discontinuous saturated zone, and monitoring well MW-4 was screened in a deeper saturated zone; groundwater use in the vicinity of the site appeared to be limited; the direction of groundwater flow in the shallower zone appeared to be to the northwest at a gradient of approximately 0.007 to 0.008. Hydrocarbons in soil appeared to be delineated north, east, and south of the former USTs. Results of groundwater analyses indicated the presence of gasoline hydrocarbons in the groundwater beneath the site, with the highest concentrations in well MW-1, west (approximately downgradient) of the former USTs. The dissolved hydrocarbon plume was not delineated offsite west and north of the former gasoline USTs.

February and March 1991

A supplemental subsurface investigation was conducted by RESNA that included drilling 6 soil borings in the vicinity of the former USTs, installing groundwater monitoring wells

MW-6 and MW-7 and vapor well VE-1 in three of the borings, evaluating the concentrations of gasoline hydrocarbons in the soil and groundwater beneath the site, and evaluating the groundwater gradient at the site (AGS, October 24, 1991). Geologic cross sections generated during this phase of work are reproduced on Plate C-8 in Appendix C. The highest concentration of TPHg (580 ppm) was detected in a soil sample at a depth of 23 feet (above groundwater) in boring B-13. Groundwater analyses showed the highest TPHg concentration (4,500 parts per billion [ppb]) was detected in the groundwater sample from MW-1. RESNA concluded that the groundwater in the shallowest saturated zone beneath the site appeared to be semiconfined, and had a flow direction to the northwest with a gradient of 0.125. The steep gradient was thought to be related to steeply sloping sand and gravel units. Soil with TPHg concentrations greater than 100 ppm appeared to be limited to an area generally west of the former USTs at depths between 21 and 26 feet below grade. Gasoline hydrocarbons in the soil appear to be delineated north, south, east, and west of the former USTs. The results of groundwater analyses indicate the presence of gasoline hydrocarbons in the groundwater beneath the site, with the highest concentrations in well MW-1 to the west (approximately downgradient) of the former USTs. The dissolved hydrocarbon plume was thought to extend offsite to the north and possibly west of the former USTs. The extent of gasoline hydrocarbons in the groundwater was approximately delineated.

December 1990-December 1993

An RESNA geologist performed quarterly monitoring of wells at the site on December 18, 1990, June 27 and September 26, 1991; January 10, March 12, and June 9, and September 28, 1992; and, February 2, June 9, September 22, and November 17, 1993 (AGS, February 26, October 24, October 31, and December 5, 1991; RESNA, March 30, May 28, September 10, and November 30, 1992; February 2, March 25, August 2, October 22, and December 27, 1993). Groundwater was sampled for laboratory analysis from wells MW-1 through MW-7 (as applicable). The DTW measurements, wellhead elevations, groundwater elevations, and laboratory analyses results are presented in Table 1, Cumulative Groundwater Monitoring and Sampling. The groundwater gradient interpreted during these monitoring episodes was consistent with the previously interpreted groundwater gradients for this site.

RESNA
Working to Restore Nature

APPENDIX C

GROUNDWATER MONITORING WELL AND VAPOR EXTRACTION WELL INSTALLATION

FIELD WORK

Drilling

Well construction permits were acquired from Zone 7 prior to drilling. Copies of the permits are attached at the end of Appendix C. Three soil borings (B-19, B-20, and B-21) were drilled on May 3 and 4, 1993. Borings B-19 through B-21 were drilled in the vicinity of the gasoline USTs and pump islands to evaluate further the source area(s), the vertical and horizontal extent of gasoline hydrocarbons, and the potential subsurface pathways beneath the site. Groundwater monitoring well MW-8 was constructed in boring B-19 to evaluate the presence of hydrocarbons in the soil and groundwater. Vapor extraction wells (VE-2 and VE-3) were constructed in borings B-20 and B-21 to evaluate the efficiency and practicality of vapor extraction as an interim soil remediation alternative by allowing performance of a vapor extraction test. The locations of borings and vapor extraction wells are shown on Plate 2, Generalized Site Plan.

Soil Sampling and Description

Soil samples were collected from the soil borings and described in accordance with the Unified Soil Classification System (Plate C-1). Borings B-19 through B-21 were sampled at 5 foot intervals or less from ground surface to a total depth of approximately 25 feet (just at or below first-encountered groundwater). Sampling procedures used during this field work are described in the field protocol section.

Soil samples collected in the field were screened by a geologist for the presence of gasoline hydrocarbon vapor using an Organic Vapor Meter (OVM). OVM field readings ranged from zero parts per million (ppm) to 277 ppm, with the highest reading in boring B-20 at a depth of approximately 20 feet below ground surface. The individual OVM readings are listed on boring logs B-19 through B-21 (Plates C-2 through C-7), in the column labeled PID (Photoionization Detector).

Materials encountered during various phases of subsurface investigations were interbedded layers of sandy clay to sandy silt, clayey sand with gravel, silty to gravelly sand, and sandy gravel. An upper 19 to 25 feet of sandy clay to clayey sand were encountered, which is underlain by saturated clayey sand with gravel to sandy gravel with clay. The permeable layer is underlain by a sandy clay aquitard. Descriptions of the materials encountered in the soil borings are presented on the boring logs (Plates C-2 through C-7). Geologic cross sections showing soil stratigraphic correlations are presented on Plate C-8. Locations of the geologic cross sections are shown on Plate 2. The correlations are based upon subsurface geologic information collected from the soil borings drilled during this and previous investigations performed at this site.

Soil Stockpile Sampling

Four soil samples were collected from the drill cutting stockpile on March 10, 1993 and April 6, 1993. A description of the sampling of stockpiled soil protocol is included in Appendix A.

Groundwater Monitoring Well Construction

As mentioned previously, soil boring B-19 was completed as a groundwater monitoring well designated as well MW-8. The well was constructed of 4-inch inner-diameter PVC casing. Groundwater monitoring well B-19/MW-8 was constructed with screened casing from 17 to 23½ feet below ground surface. The well was constructed with 0.10 inch machine-slotted screened casing using pea-sized gravel as wellpack material. Blank casing was set from the top of the screened casing and completed to within a few inches below ground surface (see Plates C-2 and C-3 for a typical monitoring well construction detail).

Vapor Extraction Well Construction

As mentioned previously, soil borings B-20 and B-21 were completed as vapor extraction wells VE-2 and VE-3, respectively. The wells were constructed of 4-inch inner-diameter polyvinyl chloride (PVC) casing. Vapor extraction well B-20/VE-2 was constructed with screened casing from 11 to 24 feet below ground surface and B-21/VE-3 with screened casing from 13 to 23½ feet below ground surface. The vapor wells were constructed with 0.10 inch machine-slotted screened casing using pea-sized gravel as wellpack material. Blank casing was set from the top of the screened casing and completed to within a few inches below ground surface (see Plates C-4 through C-7 for vapor extraction well construction details).

Groundwater Level Measurements and Sampling

RESNA personnel performed quarterly sampling and depth-to-water (DTW) measurements on June 8 and 9, 1993, on eight groundwater monitoring wells (MW-1 through MW-8) and three vapor extraction wells (VE-1 through VE-3). Field work during this quarter consisted of measuring DTW levels, subjectively analyzing water from the wells for the presence of free-phase hydrocarbons, removing any free-phase hydrocarbons encountered, and purging and sampling the groundwater from monitoring wells MW-1 through MW-8 and vapor extraction wells VE-1 through VE-3 for laboratory analysis. Cumulative DTW levels and subjective analyses data are summarized in Table 1. Monitoring wells MW-1 through MW-8 were purged and sampled in accordance with RESNA's Field Protocol (Appendix A).

Surveying

On May 21, 1993, the wellheads of the new groundwater monitoring well and vapor-extraction wells were surveyed to a local National Geodetic Vertical Datum benchmark by licensed land surveyor Ron Archer Civil Engineer, Inc. of Pleasanton, California. The results of this survey are attached at the end of Appendix C.

ANALYTICAL METHODS

Soil Samples

Fourteen soil samples (out of 20 soil samples collected from soil borings B-19 through B-21) were submitted under chain of custody protocol to PACE Incorporated Laboratories (California Hazardous Waste Testing Laboratory Certification No. 1282) in Novato, California. The chain of custody records are attached in Appendix F, Laboratory Analysis Reports and Chain of Custody Records. The soil samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) using modified Environmental Protection Agency (EPA) Methods 5030/8020 and total petroleum hydrocarbons as gasoline (TPHg) using modified EPA Methods 5030/8015. The soil samples selected for laboratory analysis were based on:

- location above first-encountered groundwater;
- areas where the presence of gasoline hydrocarbons were suspected; and
- 5-foot intervals and/or changes in stratigraphic units as recommended for definition of gasoline hydrocarbons in soil.

Water Samples

Groundwater samples collected from monitoring wells MW-1 through MW-8 were analyzed for BTEX and TPHg using modified EPA Methods 5030/8015/8020. Groundwater samples were analyzed by PACE Incorporated Laboratories. The chain of custody records are attached in Appendix F.

FIELD AND LABORATORY RESULTS

Field Results

Groundwater Gradient Evaluation

RESNA calculated groundwater elevations for monitoring wells MW-1 through MW-8 and vapor wells VE-1 through VE-3 by subtracting the measured DTW level from the elevation of the wellhead. The measured DTW levels, wellhead elevations, and groundwater elevations for this and previous monitorings at the site are summarized in Table 1. Based on the June 8, 1993, groundwater elevation data, the local groundwater gradient was interpreted to be approximately 0.09 toward the northwest. RESNA's interpretation of the local groundwater gradient for this quarter is shown on Plate C-9, Groundwater Gradient Map. This groundwater gradient and flow direction is generally consistent with those previously interpreted for this site.

Stockpile Removal

On December 13, 1993 and December 13, 1994, approximately 224 tons of soil was removed from the site by Dillard Environmental Services and taken to BFI Landfill in Livermore,

California. Soil removal notice is presented in Appendix I, Soil Removal Records. This soil was generated during the well installation and tank removal.

Laboratory Results

Soil Analyses

Results of laboratory analyses of soil samples are summarized in Table 2, Cumulative Results of Laboratory Analysis of Soil Samples. Copies of laboratory reports and chain of custody documents for soil samples obtained during this investigation are included in Appendix F.

Laboratory analysis of soil samples collected from borings B-19 through B-21 indicated:

- TPHg and BTEX were not detected at or above laboratory detection limits of 1.0 part per million (ppm) TPHg and 0.005 ppm BTEX.

Water Analyses

Results of laboratory analyses of groundwater samples are summarized in Table 1, Cumulative Groundwater Monitoring and Sampling. Copies of laboratory reports and chain of custody documents for water samples obtained during this investigation are included in Appendix F. Graphic distributions of TPHg and benzene concentrations in the local groundwater for the second quarter 1993 monitoring are shown on Plate C-10, TPHg/Benzene Concentrations in Groundwater.

Second quarter 1993 analytical results of groundwater samples from groundwater monitoring wells MW-1 through MW-8 and vapor extraction wells VE-1 through VE-3 indicate:

- TPHg and BTEX were nondetected in well MW-5;
- TPHg was detected in the groundwater samples from monitoring wells MW-1, MW-2, MW-8, and vapor extraction wells VE-1 through VE-3 at concentrations ranging from 65 parts per billion [ppb] (MW-8) to 7,500 (MW-1). TPHg was not detected in the groundwater sample from wells MW-3 through MW-7;
- benzene was detected in the groundwater samples from monitoring wells MW-1 through MW-4, MW-6, and vapor extraction wells VE-2 and VE-3 at concentrations ranging from 0.5 ppb (MW-2) to 42 ppb (MW-1). The detected concentrations of benzene in well MW-1, and vapor extraction wells VE-2 and VE-3 are greater than the State of California Department of Health Services (DHS) Maximum Contaminant Level (MCL) of 1.0 ppb benzene for drinking water. Benzene was not detected in the groundwater samples from wells MW-5, MW-7, MW-8, and VE-1;

- except for ethylbenzene in wells MW-1, VE-1, and VE-2, toluene, ethylbenzene, and total xylenes in the groundwater samples from groundwater monitoring wells MW-1 through MW-4, MW-6 through MW-8, and vapor extraction wells VE-1 through VE-3 were either nondetected or were less than the DHS Drinking Water Action Level (DWAL) of 100 ppb toluene, and MCLs of 680 ppb ethylbenzene and 1,750 ppb total xylenes;

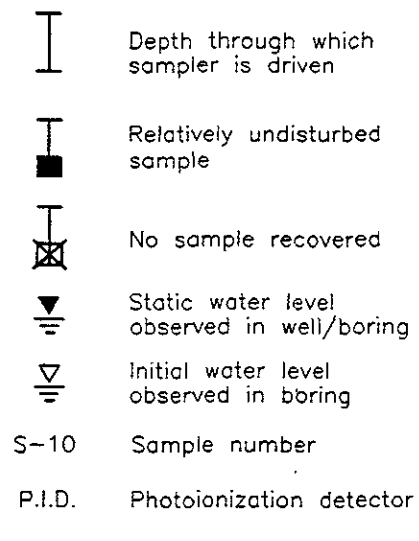
- TOG was nondetected in wells MW-1 and MW-3;

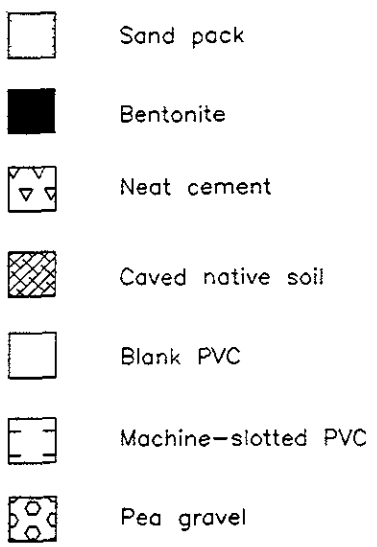
- 1.8 ppb chloroform, 1.0 ppb 1, 2-dichloroethane, and 0.8 ppb tetrachloroethene were detected in well MW-1. 0.6 ppb 1, 2-dichloroethane was detected in well MW-4.

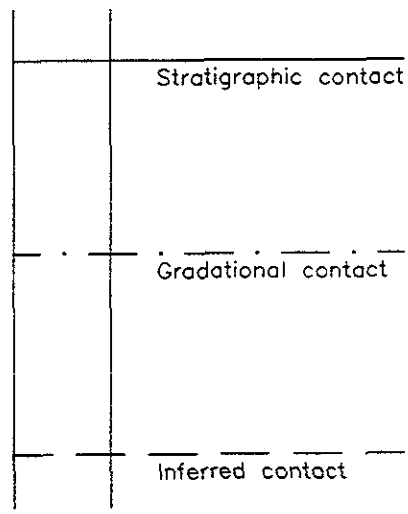
UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISION		LTR	DESCRIPTION
COARSE-GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel-sand mixtures, little or no fines.
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines.
		GM	Silty gravels, gravel-sand-silt mixtures.
		GC	Clayey gravel, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS	SW	Well-graded sand or gravelly sands, little or no fines.
		SP	Poorly-graded sands or gravelly sands, little or no fines.
		SM	Silty sands, sand-silt mixtures.
		SC	Clayey sands, sand-clay mixtures.

MAJOR DIVISION		LTR	DESCRIPTION
FINE-GRAINED SOILS	SILTS AND CLAYS LL<50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS LL>50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils.







BLOWS REPRESENT THE NUMBER OF BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES TO DRIVE THE SAMPLER THROUGH EACH 6 INCHES OF AN 18-INCH PENETRATION.

GRADATIONAL AND INFERRED CONTACT LINES SEPARATING UNITS ON THE LOG REPRESENT APPROXIMATE BOUNDARIES ONLY. ACTUAL BOUNDARIES MAY BE GRADUAL. LOGS REPRESENT SUBSURFACE CONDITIONS AT THE BORING LOCATION AT THE TIME OF DRILLING ONLY.

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PROJECT 130015.05

UNIFIED SOIL CLASSIFICATION SYSTEM AND SYMBOL KEY
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
C-1

Depth of boring: 26 feet Diameter of boring: 12 inches Date drilled: 05/04/93

Well depth: 23-1/2 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 17 to 23-1/2 feet Slot size: 0.010-inch

Drilling Company: Exploration Geoservices Driller: Dave and Dennis

Method Used: Hollow-Stem Auger Field Geologist: B. Sieminski

Signature of Registered Professional:

Registration No.: RG 5023 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0						
					Asphalt (4 inches).	
				GP	Sandy gravel, brownish-gray, damp, dense; baserock.	
2				ML	Sandy silt with clay and gravel, brown, damp, low plasticity, stiff	
				SM	Silty sand, fine grained, with gravel, brown, damp, loose to medium dense.	
4		5				
	S-5	5	5.5			
6						
8				CL	Sandy clay, trace fine gravel, brown, moist, low plasticity, stiff.	
		5				
10	S-10	6	4.3			
		10				
12						
14				ML/SC	Sandy silt with clay and gravel, light brown mottled gray and red, moist, low plasticity, very stiff; interbedded with clayey sand with gravel, light brown mottled, gray and red, moist, medium dense; with yellow staining, roots; noticeable product odor.	
		6				
	S-15	11	3.5			
16		15				
		6		SC	Clayey sand with gravel, light brown mottled gray and red, moist, medium dense; obvious product odor, roots.	
18	S-17.5	8	62			
		11		▽		
				GC	Sandy gravel with clay, brown with gray mottling, wet, very dense.	
20		17				
	S-20	24	3.5			
		48				

(Section continues downward)

RESNA Working to Restore Nature

PROJECT: 130015.05

LOG OF BORING B-19/MW-8

Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE C-2

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				GP–GC	Sandy gravel with clay, brown with gray mottling, **wet**; very dense.	
24	S–24	13 19 26	12	CL	Sandy clay, reddish–brown, damp, medium plasticity, hard.	
		35			Increasing sand, trace gravel.	
26	S–25.5	50	4		Total Depth = 26 feet.	
28						
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

RESNA
Working to Restore Nature

PROJECT 130015.05

LOG OF BORING B-19/MW-8
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
C-3

Depth of boring: 25 feet Diameter of boring: 12 inches Date drilled: 05/03/93

Well depth: 24 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 11 to 24 feet Slot size: 0.010-inch

Drilling Company: Exploration Geoservices Driller: Dave and Dennis

Method Used: Hollow-Stem Auger Field Geologist: B. Sieminski

Signature of Registered Professional:

Registration No.: RG 5023 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0						
					Asphalt (10 inches).	
2				ML	Sandy silt with clay, dark brown, moist, low plasticity, firm; roots; moisture from water seeping from gravel fill of waste-oil tank.	
4				SM	Silty sand, fine grained, trace gravel, light brown, moist, loose.	
	S-5	3 3	2.2			
6						
8				ML	Sandy silt with clay, brown, moist, low plasticity, very stiff.	
10	S-10	4 7	0			
12						
14				SC	Clayey sand, finw to medium grained, with gravel, light brown, damp, dense.	
	S-15	10 13 18	0		Color change to brown; with gray and red mottling, some yellow staining; becoming moist.	
16						
18	S-18	5 9 12	5	CL	Sandy clay, trace gravel, brown mottled gray and red, damp to moist, medium plasticity, very stiff; noticeable product odor.	
				▽ SC	Clayey sand with gravel, gray, wet; medium dense; obvious product odor.	
20	S-20	7 9 13	277			
					(Section continues downward)	

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PROJECT: 130015.05

LOG OF BORING B-20/VE-2

Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE

C-4

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
				SC	Clayey sand with gravel, gray, wet, medium dense; obvious product odor.	
22		6		GP-GC	Sandy gravel with clay, gray, damp, dense; obvious product odor.	
		9				
	S-23	12	17	CL	Gravelly clay with sand, brown mottled gray, moist, low plasticity, very stiff; noticeable product odor.	
24		12				
		17				
	S-24.5	25	33		Increasing sand, becoming damp.	
					Total Depth = 25 feet.	
26						
28						
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

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PROJECT 130015.05

LOG OF BORING B-20/VE-2
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
C-5

Depth of boring: 25-1/2 feet Diameter of boring: 12 inches Date drilled: 05/03/93

Well depth: 23-1/2 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 13 to 23-1/2 feet Slot size: 0.010-inch

Drilling Company: Exploration Geoservices Driller: Dave and Dennis

Method Used: Hollow-Stem Auger Field Geologist: B. Sieminski

Signature of Registered Professional: _____

Registration No.: RG 5023 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0						
				GP	Asphalt (4 inches)	
				SM	Gravel, brown, damp, dense; baserock.	
2					Silty sand fine grained, with gravel, dark brown, damp, medium dense.	
					Color change to brown; increasing gravel.	
4						
	S-5	6 8	2			
6						
8				ML	Sandy silt, brown, damp, low plasticity, hard.	
	S-10	10 27	3			
10						
12						
				SM	Silty sand, fine to medium grained, with gravel, light brown, damp, dense.	
14						
	S-15	12 17 22	2.5			
16						
	S-17.5	12 11 19	4	CL	Sandy clay, trace gravel, brown mottled gray and black, moist, medium plasticity, very stiff.	
18						
	S-20	10 12 18	1.8	▽		
20					(Section continues downward)	

RESNA Working to Restore Nature

PROJECT: 130015.05

LOG OF BORING B-21/VE-3

Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE C-6

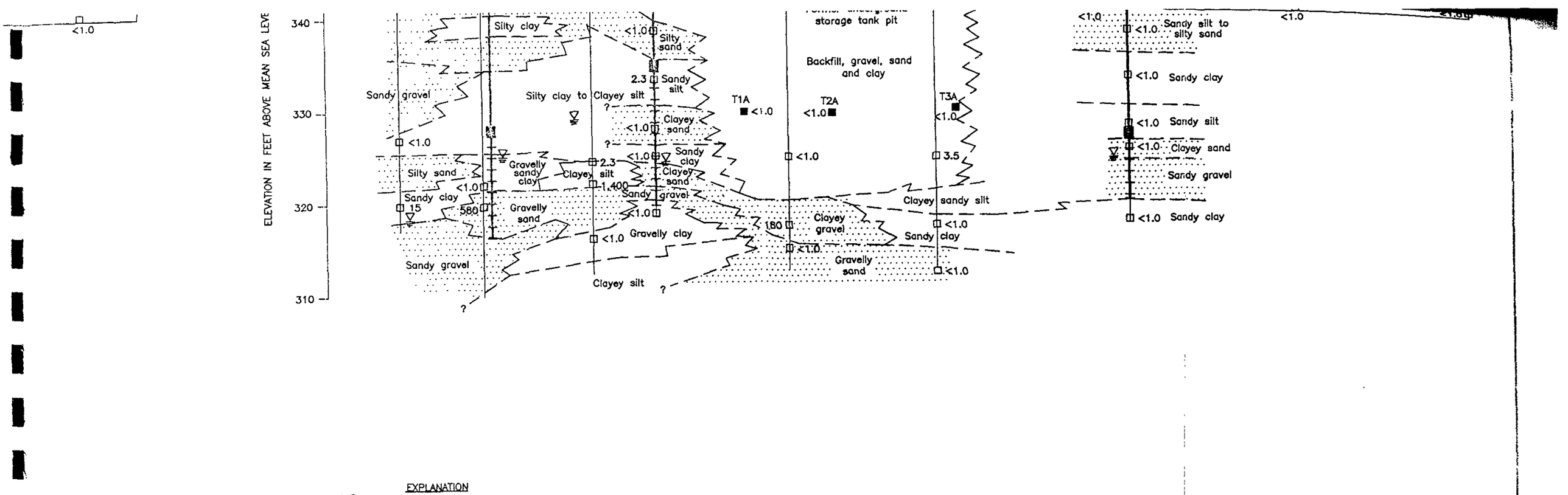
Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				CL	With wet clayey sand lenses.	
24	S-25	33 50	11	GP-GC	Sandy gravel with clay, gray, wet, very dense.	
26					Total Depth = 25-1/2 feet.	
28						
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

RESNA
Working to Restore Nature

PROJECT 130015.05

LOG OF BORING B-21/VE-3
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
C-7



EXPLANATION

100 — = Line of equal concentration of TPHg in soil in parts per million

150 ■ = Laboratory analyzed tank pit soil sample showing concentration of TPHg in parts per million (ppm)

320 □ = Laboratory analyzed soil sample showing concentration of TPHg in ppm

= Bentonite plug

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well (03/18/91)

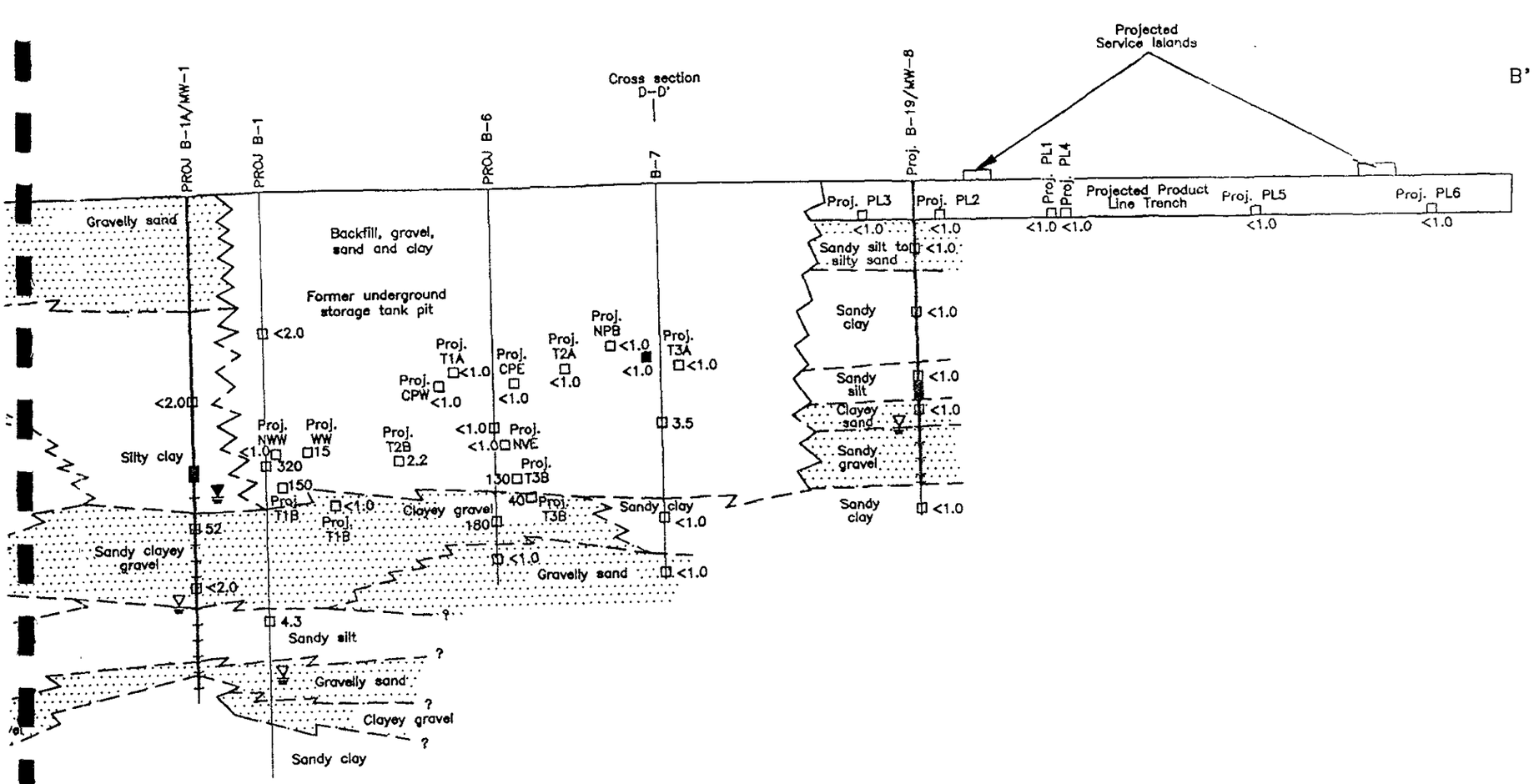
= More permeable sediments

RESNA
Working to Restore Nature

PROJECT 130015.05

GEOLOGIC CROSS SECTION A-A', B-B', C-C', AND D-D'
Exxon Service Station 7-7003
349 Main Street
Pleasanton, California

PLATE
C-8



Approximate Horizontal and Vertical Scale

10 5 0 10 20

feet

EXPLANATION

100 — = Line of equal concentration of T in parts per million

150 = Laboratory analyzed tank pit soi showing concentration of TPHg i per million (ppm)

320 = Laboratory analyzed soil sample concentration of TPHg in ppm

= Bentonite plug

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well (03/1

= More permeable sediments

A'

PROJ MW-4

Proj. B-8
Proj. B-21/ME-3

PROJ B-9
PROJ MW-7

PROJ B-11
PROJ B-2/MW-2

MW-5

Gravelly sand

Silty sand

Sandy silt

Silt

Clayey sand

Silty sand with gravel

Gravelly sand

Clayey silt to silt

Sandy clay

Silty clay with gravel

Sandy silt

Sandy clay

Sand

Silty clay

Sandy clayey silt

Clayey sand

Sandy silt

Sandy gravel

Gravelly clay

silt

Sand

Sandy gravel

Silty clay

<1.0

<2.0

C

MW-4

ELEVATION IN FEET ABOVE MEAN SEA LEVEL

350

340

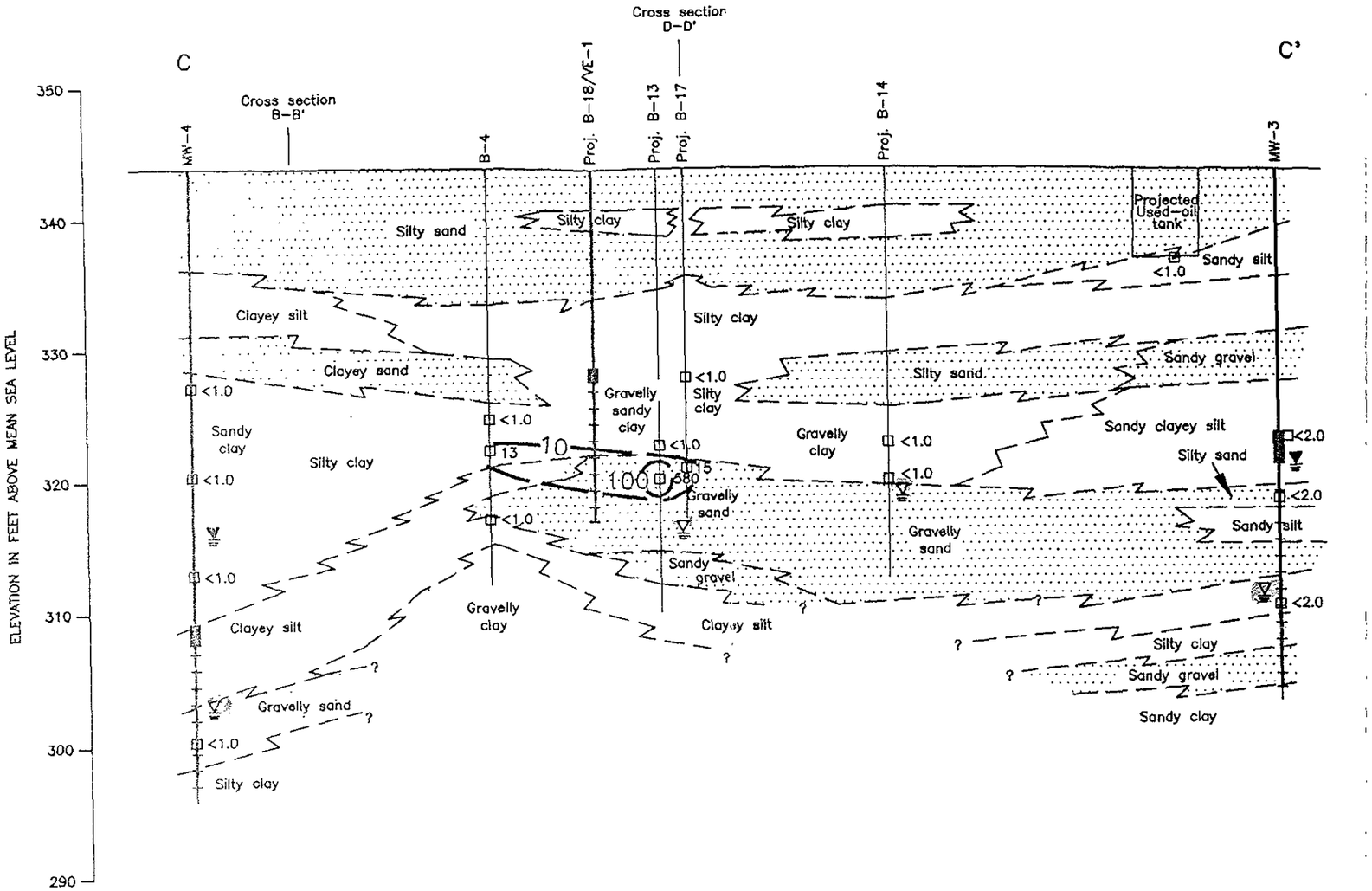
330

320

310

300

290


C
C'
Cross section B–B'
Cross section D–D'
MW–4
B–4
Proj. B–18/VE–1
Proj. B–13
Proj. B–17
Proj. B–14
MW–3
ELEVATION IN FEET ABOVE MEAN SEA LEVEL
350
340
330
320
310
300
290
Silty sand
Silty clay
Silty clay
Projected Used–oil tank
Sandy silt
<1.0
Clayey silt
Clayey sand
<1.0
Silty clay
<1.0
Silty clay
Sandy gravel
Silty sand
Sandy clay
Silty clay
<1.0
<1.0
13
10
100
680
15
<1.0
Gravelly sandy clay
<1.0
Gravelly clay
<1.0
<1.0
Sandy clayey silt
<2.0
Silty sand
<2.0
Gravelly sand
Sandy gravel
Gravelly sand
Sandy silt
<1.0
Clayey silt
Gravelly clay
Clayey silt
<2.0
Silty clay
Sandy gravel
Gravelly sand
<1.0
Sandy clay
Silty clay

A

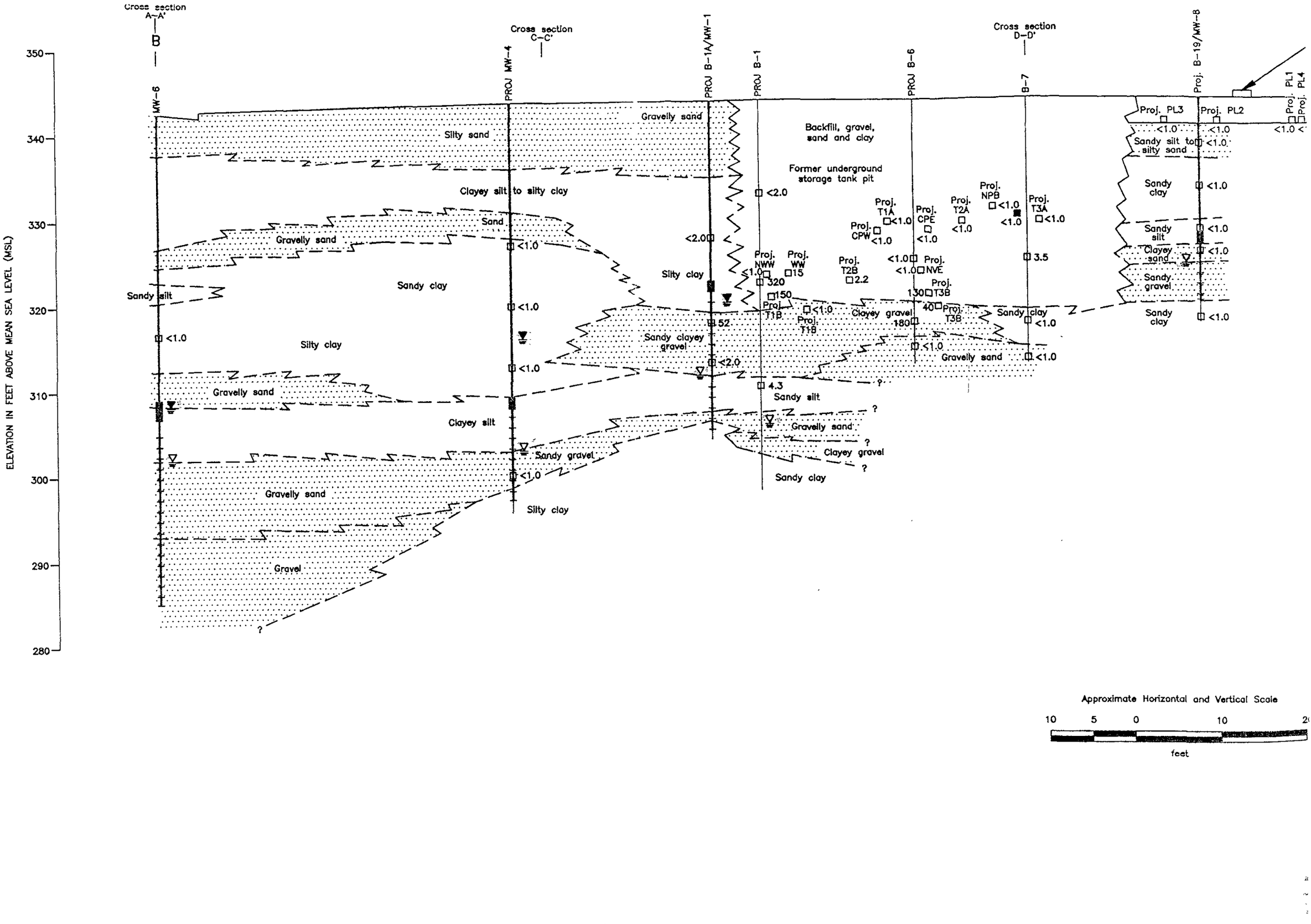
ELEVATION IN FEET ABOVE MEAN SEA LEVEL

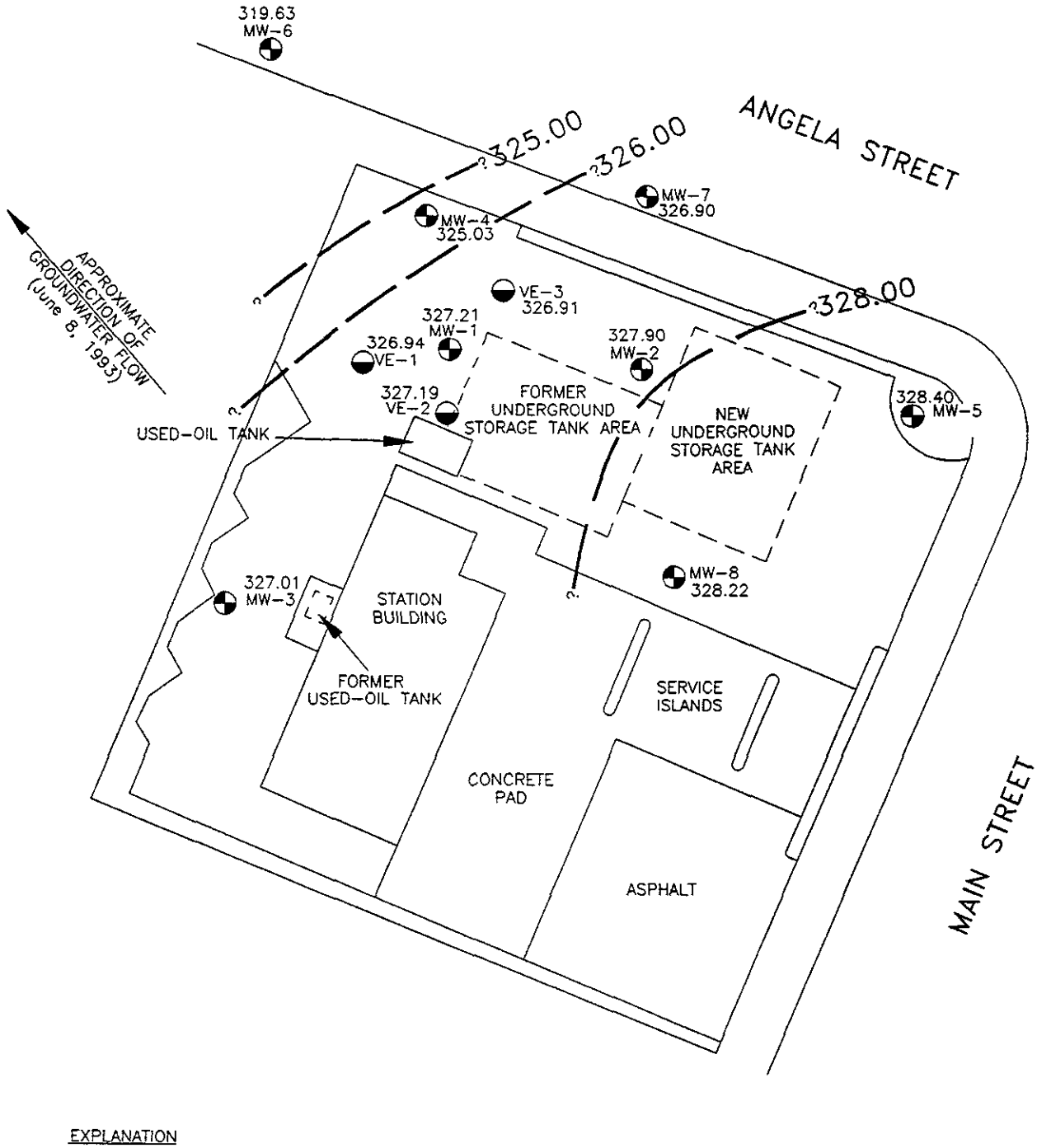
350
340
330
320
310
300
290
280

MW-6
PROJ MW-4
Proj. B-8
Proj. B-21/VE-3
PROJ B-9
PROJ MW-7
PROJ B-11
PROJ B-2/MW-2
MW-5

Clayey silt
Gravelly sand
Sandy clay
Sandy silt
Silty clay
Gravelly sand
Clayey silt
Gravelly sand
Sand
Sandy clayey silt
Clayey sand
Sandy clay
Silty clay
Sandy clayey silt
Clayey silt
Sand
Silty clay
Silty sand
Silty sand with gravel
Silty clay with gravel
Clayey sand
Sandy gravel
Silty clay
Gravelly sand
Silty sand
Sandy silt
Sandy gravel
Gravelly clay
Sandy silt
Sandy clay
Sand
Gravelly sand
Clayey silt to silt
Silt

<1.0
<2.0
7


Cross section A–A'
Cross section C–C'
Cross section D–D'
ELEVATION IN FEET ABOVE MEAN SEA LEVEL (MSL)
350
340
330
320
310
300
290
280
MW-6
PROJ MW-4
PROJ B-1A/MW-1
PROJ B-1
PROJ B-6
B-7
Proj. B-19/MW-8
Proj. PL1
Proj. PL2
Proj. PL3
Proj. PL4
Silty sand
Gravelly sand
Clayey silt to silty clay
Sand
Gravelly sand
Sandy clay
Sandy silt
Silty clay
Gravelly sand
Clayey silt
Sandy gravel
Gravelly sand
Gravel
Silty clay
Backfill, gravel, sand and clay
Former underground storage tank pit
Silty clay
Sandy clayey gravel
Clayey gravel
Gravelly sand
Sandy silt
Gravelly sand
Clayey gravel
Sandy clay
Sandy silt to silty sand
Sandy clay
Sandy silt
Clayey sand
Sandy gravel
Sandy clay
Proj. T1A
Proj. CPE
Proj. CPW
Proj. T2A
Proj. NPB
Proj. T3A
Proj. NWW
Proj. WW
Proj. T2B
Proj. NVE
Proj. T3B
Proj. T1B
Proj. T1B
Proj. T3B
<1.0
<2.0
3.5
320
150
15
2.2
130
40
180
52
4.3
Approximate Horizontal and Vertical Scale
10 5 0 10
feet



EXPLANATION

328.00 = Approximate line of equal elevation of groundwater in feet above mean sea level (MSL)

328.40 = Elevation of groundwater in feet above MSL, June 8, 1993

MW-8 = Monitoring well

VE-3 = Vapor extraction well

Approximate Scale

30 15 0 30 60

feet

Source: Surveyed by Ron Archer Civil Engineer, Inc., June 1990, April 1991 and May 1993.

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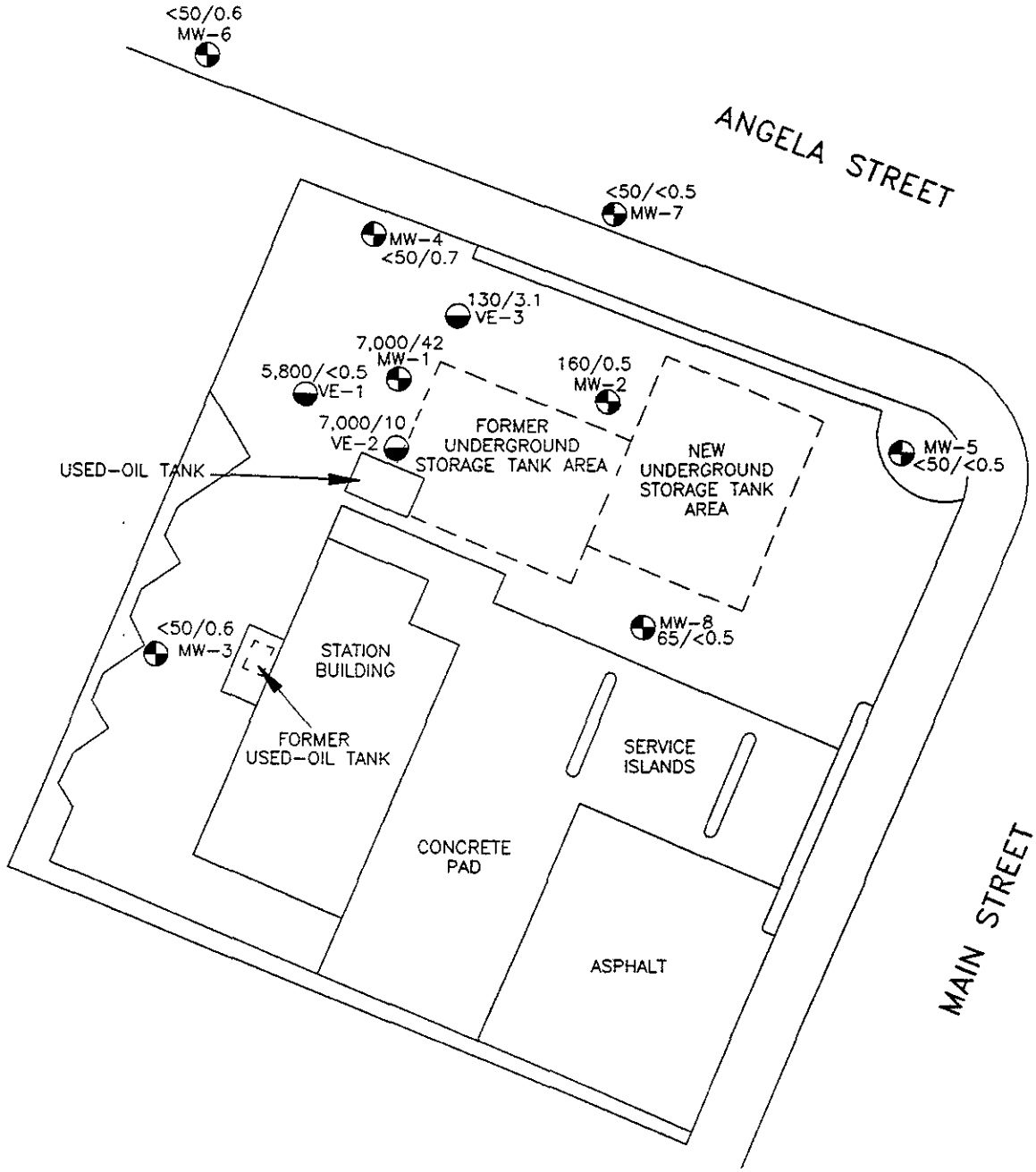
PROJECT 130015.05 30015502

GROUNDWATER GRADIENT MAP
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
C-9



EXPLANATION

7,000/42 = Concentration of TPHg/Benzene in groundwater in parts per billion, June 8 and 9, 1993

MW-8 = Monitoring well

VE-3 = Vapor extraction well

Approximate Scale

30 15 0 30 60

feet

Source: Surveyed by Ron Archer Civil Engineer, Inc., June 1990, April 1991 and May 1993.

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PROJECT 130015.05

30015502

TPHg/BENZENE CONCENTRATIONS
IN GROUNDWATER
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
C-10

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

ION OF PROJECT 349 Main Street
Pleasanton, CA 94566

IENT
Exxon Company USA
ss P.O. Box 4415 Phone (713) 656-7755
Houston, TX Zip 77210-4415

ICANT
RESNA Industries Inc.
ss 3315 Almaden Expy #34 Phone (408) 264-7723
San Jose, CA Zip 95118

OF PROJECT
Construction
Cathodic Protection ___
Water Supply
Monitoring X
Geotechnical Investigation
General
Contamination X
Well Destruction ___

OPOSED WATER SUPPLY WELL USE
stic ___ Industrial ___ Other ___
cipal ___ Irrigation ___

ING METHOD:
Rotary ___ Air Rotary ___ Auger X
ble ___ Other ___

ER'S LICENSE NO. 484288

PROJECTS
Drill Hole Diameter 12 in. Maximum
Casing Diameter 4 in. Depth 45 ft.
Surface Seal Depth 10 ft. Number 3

TECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

TIMATED STARTING DATE Mar. 31, 1993
TIMATED COMPLETION DATE April 1, 1993

hereby agree to comply with all requirements of this mit and Alameda County Ordinance No. 73-68.

PLICANT'S

FOR OFFICE USE

PERMIT NUMBER 93154
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 29 Mar 93

RON ARCHER
CIVIL ENGINEER, INC.

CONSULTING • PLANNING • DESIGN • SURVEYING

4133 Mohr Ave., Suite E Pleasanton, CA 94566
(510) 462-9372

MAY 4 - 1993

FEBRUARY 22. 1990 JOB NO. 1657
REVISED: JUNE 5. 1990
REVISED: APRIL 9. 1991
* REVISED: MAY 21. 1993

ELEVATIONS OF EXISTING MONITOR WELLS AT THE EXXON SERVICE STATION NO. 7-7003. LOCATED AT 349 MAIN STREET AT ANGELA STREET. CITY OF PLEASANTON. ALAMEDA COUNTY. CALIFORNIA.

FOR: RESNA INDUSTRIES INC.
PROJECT NO. 13015.02

BENCHMARK: (NO.R-1257)
TOP OF BRASS DISK STAMPED R-1257. 1974. SET IN CONCRETE 0.20 BELOW GROUND PROTECTED BY A 4 INCH DIAMETER PLASTIC PIPE. 67.5 FEET SOUTHWEST OF THE CENTERLINE OF EAST ANGELA STREET. 39.0 FEET NORTHWEST OF THE NORTH OF THE NORTHWEST RAIL OF THE SOUTHERN PACIFIC RAILROAD TRACKS. 17.4 FEET SOUTH OF EAST CORNER OF THE EXISTING BUILDING AT #30 EAST ANGELA STREET.
ELEVATION TAKEN AS 345.637. M.S.L.. CITY OF PLEASANTON DATUM.

MONITOR WELL DATA TABLE

WELL DESIGNATION	ELEV	DESCRIPTION
MW1	343.83	TOP OF PVC CASING
	344.02	TOP OF BOX
MW2	344.22	TOP OF PVC CASING
	344.67	TOP OF BOX
MW3	342.70	TOP OF PVC CASING
	342.98	TOP OF BOX
MW4	343.38	TOP OF PVC CASING
	343.82	TOP OF BOX
MW5	345.20	TOP OF PVC CASING
	345.60	TOP OF BOX
MW6	342.25	TOP OF PVC CASING
	342.66	TOP OF BOX
MW7	343.62	TOP OF PVC CASING
	343.98	TOP OF BOX
* MW8	344.00	TOP OF PVC CASING
	344.53	TOP OF BOX
VE-1	343.38	TOP OF PVC CASING
	343.73	TOP OF BOX
* VE-2	343.39	TOP OF PVC CASING
	344.02	TOP OF BOX
* VE-3	343.49	TOP OF PVC CASING
	344.16	TOP OF BOX

MONITOR WELL DATA TABLE

WELL DESIGNATION	ELEV	DESCRIPTION
SOIL BORINGS:		
S-13-NPB	344.57	TOP OF PAVEMENT
B-1A	344.18	TOP OF PAVEMENT
B-4	343.75	TOP OF PAVEMENT
B-5	343.93	TOP OF PAVEMENT
B-6	344.21	TOP OF PAVEMENT
B-7	344.40	TOP OF PAVEMENT
B-8	344.16	TOP OF PAVEMENT
B-9	344.34	TOP OF PAVEMENT
B-11	344.68	TOP OF PAVEMENT
B-13	343.60	TOP OF PAVEMENT
B-14	343.59	TOP OF PAVEMENT
B-17	343.63	GROUND

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APPENDIX D

PUMPING AND RECOVERY TESTS

FIELD WORK

Pumping and Recovery Test

A step-drawdown test was performed on May 14, 1993, to select the optimum pumping rate at which to perform the constant discharge test. Well MW-2 was initially pumped at 3 gallon per minute (gpm) for 60 minutes with a drawdown of 9.21 feet; the pumping rate was then increased to 4 gpm for 41 minutes with a drawdown 17.81 feet. The results of the step-drawdown test indicated that the well could sustain a pumping rate of about 3½ gpm.

Immediately prior to beginning the constant discharge test on June 3, 1993, RESNA field personnel measured DTW levels in pumping well MW-2 and in observation wells MW-1 and MW-3 through MW-8 to evaluate the hydraulic gradient and groundwater flow direction on the day of the pumping test. Water level measurements were obtained from the wells with an electric DTW probe. Floating product was not observed in the wells. DTW measurements are reported in Table 1 of this report. The appropriate field procedures are described in Appendix A.

The 12½ hour pumping and 10½ hour recovery tests were conducted on June 3 and 4, 1993. Monitoring well MW-2 was pumped using a submersible pump and the pumping rate was adjusted by valving. An attempt was made to keep the pumping rate generally at 2.5 gpm (481 ft^3/day). However, the pumping rate varied twice during the test; the rate decreased to a minimum of 2.1 gpm for about 3½ hours starting at approximately 100 minutes into the pumping test; and, the rate decreased to a minimum of 2.2 gpm for about 2 hours starting at approximately 400 minutes into the test. The weighted average pumping rate during the 12½ hour test was estimated to be about 2.3 gpm (443 ft^3/day). The discharge rate was measured using a flowmeter and was confirmed by periodic measurements using a calibrated one-gallon bucket and a stopwatch. The distances of observation wells MW-1 and MW-3 through MW-8 from pumping well MW-2 were as follows: 36, 91, 49, 51, 92, 33 and 40 feet, respectively. Pressure transducers attached to a Hermit datalogger were placed in wells MW-1, MW-2, MW-5, MW-7, and MW-8 from which water level data were recorded every five minutes or less. Water levels were measured using an electric sounder in wells MW-3, MW-4, and MW-6 at periodic intervals during both the pumping and recovery portions of the test. Water levels were also measured using the electric sounder in wells MW-1, MW-2, MW-5, MW-7, and MW-8 at periodic intervals to confirm the measurements made by the datalogger. After pumping for 12½ hours, the pump was turned off and recovery data were obtained for 10½ hours, at which time nearly 100 percent recovery had been achieved. Barometric pressure data were obtained from Livermore Airport approximately every ½ hour during the first 10 hours of the pumping test to allow evaluation of possible effects of atmospheric pressure on the groundwater levels. The discharge water was removed from the site by a licensed hazardous waste hauler on August 20, 1993.

Weather during the tests was dry until approximately 6 hours into the test, at which time light rain began. This light rain continued intermittently during the remainder of the test.

Pumping and Recovery Test Results

The groundwater gradient and flow direction evaluated, based on water level measurements obtained prior to the beginning of the pumping test on June 3, 1993, was consistent with previous gradients and flow directions of 0.10 to the northwest, as shown on Plate D-1. Groundwater elevations are shown on Table 5 of this report.

In tests where the specific capacity of the well (gallons per foot of drawdown) is low in relation to the casing size, a significant period of the test can be affected by casing storage. During the initial portion of the test, much of the pumped water is derived from the well casing. Only after the water level has been lowered significantly does the water-bearing zone begin producing. Casing storage also affects observation wells that are close to the pumping well. The time when casing storage effects became negligible was estimated to be approximately 18 minutes using the method by Schafer as described in Driscoll (1986). A change in slope on the time-drawdown graphs for the observation wells suggested that casing storage was significant until about 12 minutes into the test.

The barometric pressure remained relatively constant (readings did not vary more than 0.04 inches of mercury) during the first 10 hours of the test (the time which barometric pressure data was available). Because barometric pressure did not appear to vary significantly during the 10 hours of available data it was decided that the barometric pressure response, or barometric efficiency, of the water-bearing unit beneath the site did not need to be addressed. The ½ hourly barometric pressure readings are presented in Table D-1 of Appendix D.

The drawdown in the pumping well MW-2 reached approximately 8½ feet, and the maximum drawdowns in the observation wells ranged from 1.28 feet in well MW-1 nearest the pumping well to 0.11 feet in well MW-5. The maximum drawdown values at the end of the pumping test are shown on Table 6 of this report, and time-drawdown data is attached. The groundwater gradient at the time of maximum drawdown is shown on Plate D-2, and the maximum drawdowns are contoured on Plate D-3.

Transmissivity (T) and storage coefficient (S) values were estimated from time-drawdown data measured by the datalogger in observation wells MW-1, MW-5, MW-7, and MW-8; and from manually obtained data in these wells and observation well MW-4. T and S values were estimated using the method of Cooper and Jacob (1946) utilizing the AQTESOLV software (Geraghty & Miller, 1991). In addition, T values were estimated from recovery time-drawdown plots (Plates D-4 through D-15) measured by the datalogger in wells MW-1, MW-7, and MW-8 using the Theis method (1935) utilizing AQTESOLV. Results are presented in Table 7 of this report.

For comparison with the AQTESOLV results, T and S were also estimated using distance-drawdown data for the time of maximum drawdown at 760 minutes. This plot is included as Plate D-16, and results are shown in Table 7.

The estimated T values ranged from 0.035 to 0.799 ft^2/min, and probably differ due to actual variations within the water-bearing zone. The well logs support this apparent heterogeneity. The estimated S values varied from 0.0017 to 0.057 data and were in the range characteristic of confined aquifers.

The T values were generally higher for upgradient wells MW-5 and MW-8 (between 0.555 and 0.799 ft^2/min), lower for downgradient wells MW-1, MW-4, and MW-7 (between 0.065 and 0.168 ft^2/min), and lower for an estimated T value (0.035 ft^2/min) using a distance drawdown plot for all the wells monitored during the pumping test. Because the downgradient wells are situated in the vicinity where groundwater is most impacted, and will be the focus of remediation, the T values for these wells (MW-1, MW-4, and MW-7) and from the distance drawdown plot were used to estimate the zone of capture, as discussed below.

Zone of Capture

A preliminary estimate of the steady-state capture zone (Bear, 1979) for this well was evaluated for an estimated pumping rate (Q) of 2.3 gpm (= 443 ft^3/d), a transmissivity (T) of 0.105 ft^2/min (= 152 ft^2/d; the average T of wells MW-1, MW-4, MW-7, and distance drawdown plot, using method discussed above), and the average hydraulic gradient (dh/dl) beneath the vicinity of wells MW-1, MW-4, MW-7 of 0.03. The width (w) of the zone of capture upgradient of MW-2 is 97 ft and the distance to the downgradient stagnation point is about 15 ft.

$$W = Q / T\,(dh/dl)$$
$$= 443\ ft^3/d\ /\ 152\ ft^2/d\ (0.03)$$
$$= 97\ ft$$

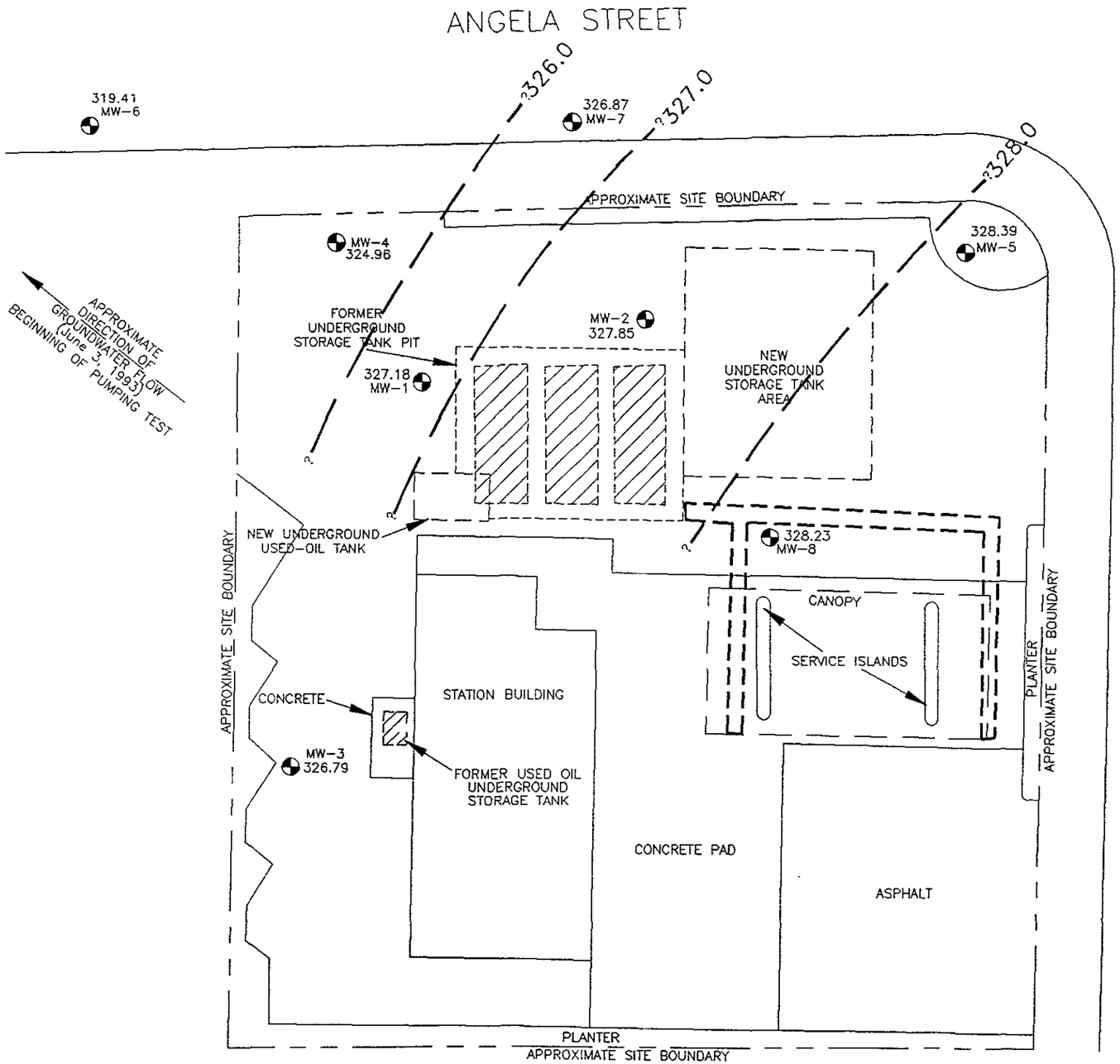
$$r = Q/2\,\pi\,T\,(dh/dl)$$
$$= 443\ ft^3/d\ /\ [2\ (3.1416)\ 152\ ft^2/d\ (0.03)]$$
$$= 15\ ft$$

The maximum predicted zone of capture for the water-bearing zone that was tested is depicted on Plate D-17, assuming a pumping rate of 2.3 gpm from well MW-2.

The groundwater gradient after approximately 10½ hours of recovery was approximately 0.10 to the northwest, as shown on Plate D-18. This gradient indicates that the water-bearing zone is restored to its initial flow direction.

These capture zone calculations should be considered approximate and preliminary given the formation heterogeneity.

Based on extrapolation of drawdown data from pumping well MW-2 on a semi-log plot, a maximum sustainable one year pumping rate of 2.5 gpm is estimated. This estimate is based on the assumptions that wells being pumped are similar to MW-2 in construction, and the pumping wells possess a water column of approximately 20 feet. This estimate is subject to numerous uncertainties including long term recharge affects and the validity of extrapolating the pumping test data over one year.



EXPLANATION

- = Approximate product line trench location
- = Former underground gasoline storage tanks
- MW-8 = Monitoring well (RESNA, 02, 03/91 AND 05/93)
- 328.0 = Approximate line of equal elevation of groundwater in feet above mean sea level (MSL)
- 328.39 = Elevation of groundwater in feet above MSL, June 3, 1993, beginning of pumping test

Approximate Scale

20 10 0 20 40

feet

Source: Surveyed by Ron Archer Civil Engineer, Inc., June 1990 and April 1991.

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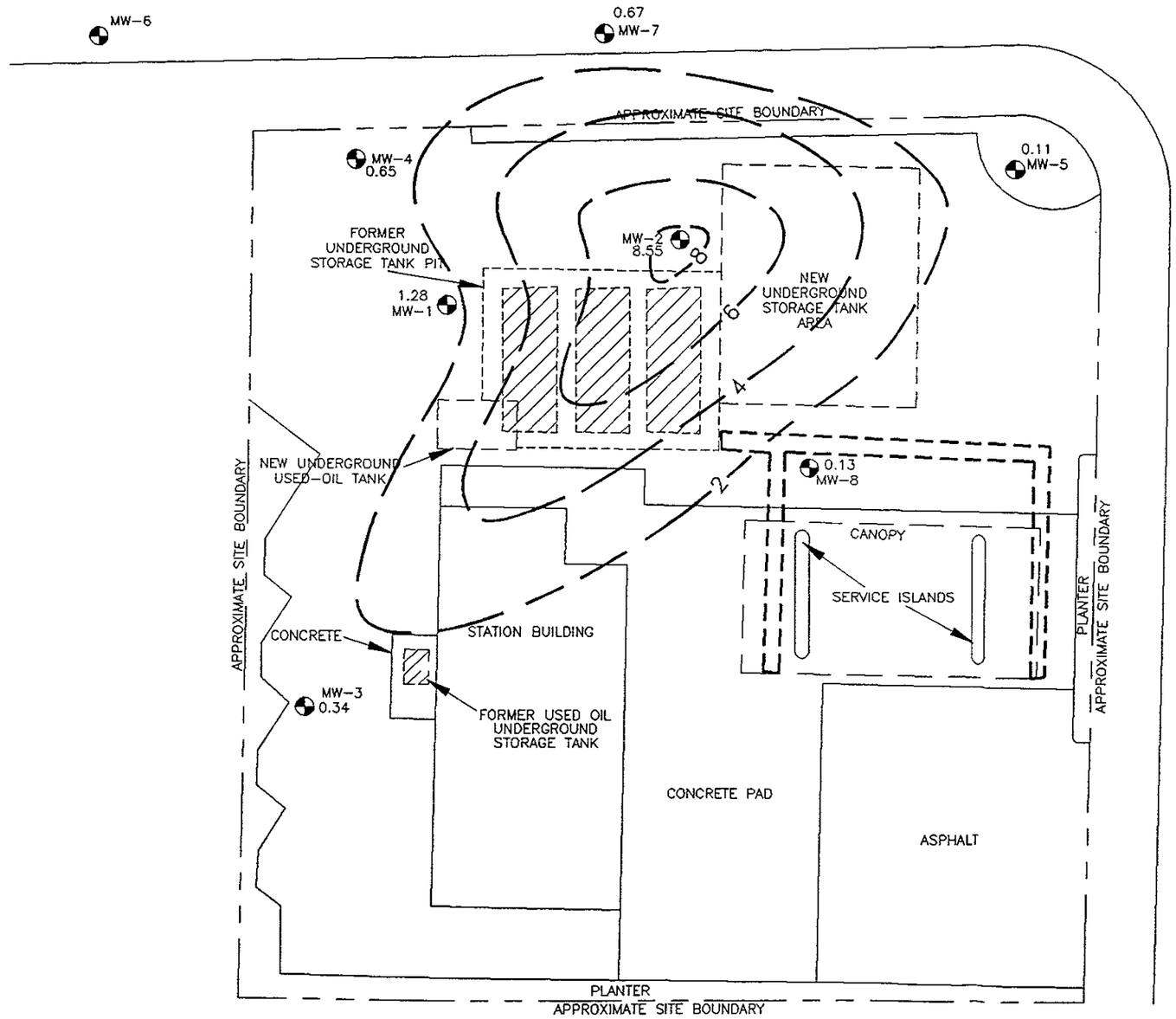
PROJECT 130015.05 3015502

GROUNDWATER GRADIENT MAP,
BEGINNING OF PUMPING TEST
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
D-1

ANGELA STREET



MAIN STREET

EXPLANATION

— — = Approximate product line trench location

= Former underground gasoline storage tanks

MW-8 = Monitoring well (RESNA, 02, 03/91 AND 05/93)

8 = Approximate line of equal drawdown in well in feet below initial water level

8.55 = Drawdown in feet below initial water level June 3, 1993, end of pumping test

Approximate Scale

20 10 0 20 40

feet

Source: Surveyed by Ron Archer Civil Engineer, Inc., June 1990 and April 1991.

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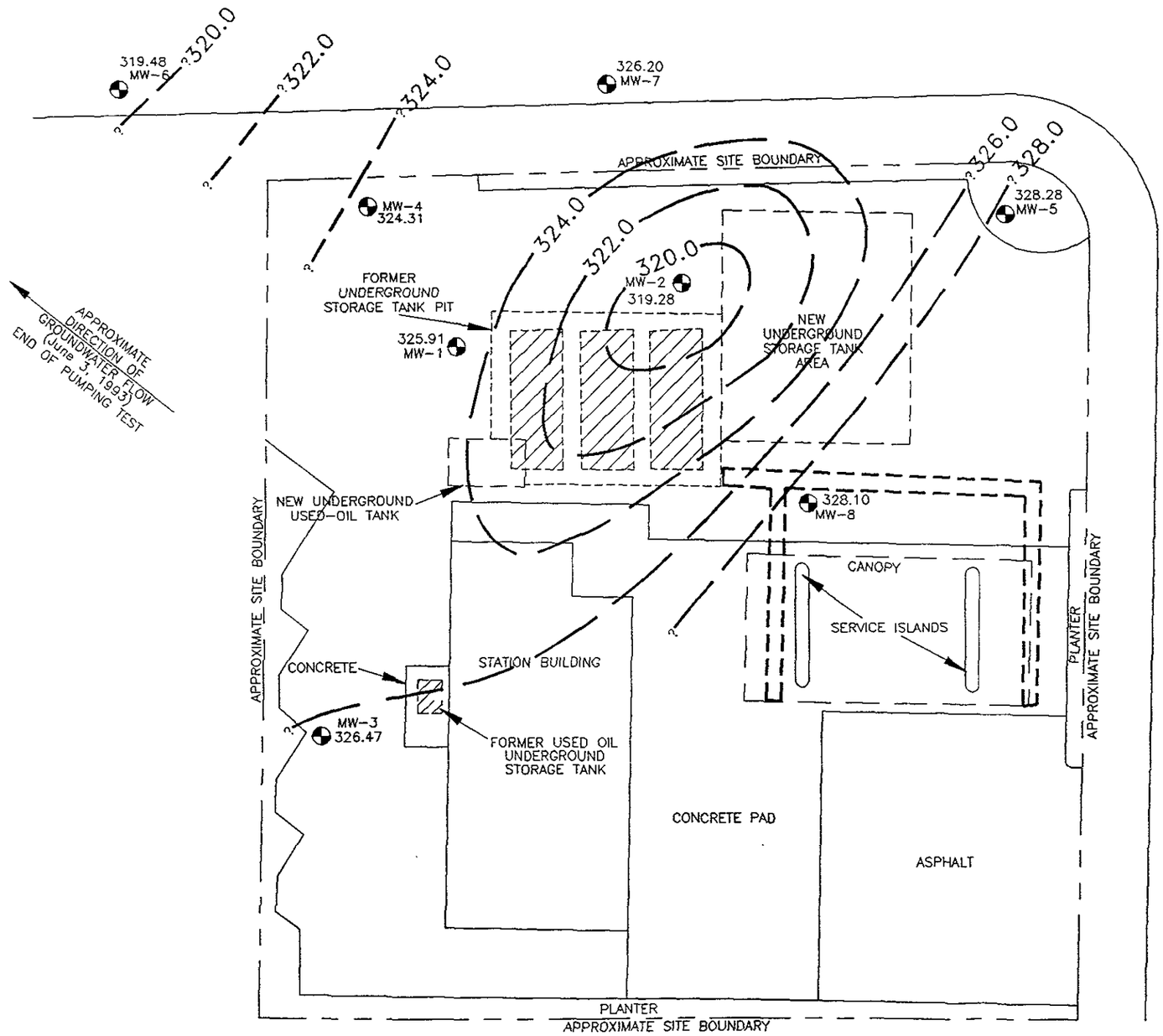
PROJECT 130015.05 3015SQ2

GROUNDWATER DRAWDOWN MAP,
END OF PUMPING TEST
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
D-3



EXPLANATION

— — = Approximate product line trench location

= Former underground gasoline storage tanks

MW-8 = Monitoring well (RESNA, 02, 03/91 AND 05/93)

328.0 = Approximate line of equal elevation of groundwater in feet above mean sea level (MSL)

328.10 = Elevation of groundwater in feet above MSL, June 3, 1993, END of pumping test

Approximate Scale

20 10 0 20 40

feet

Source: Surveyed by Ron Archer Civil Engineer, Inc., June 1990 and April 1991.

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PROJECT 130015.05 3015502

GROUNDWATER GRADIENT MAP,
END OF PUMPING TEST
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
D-2

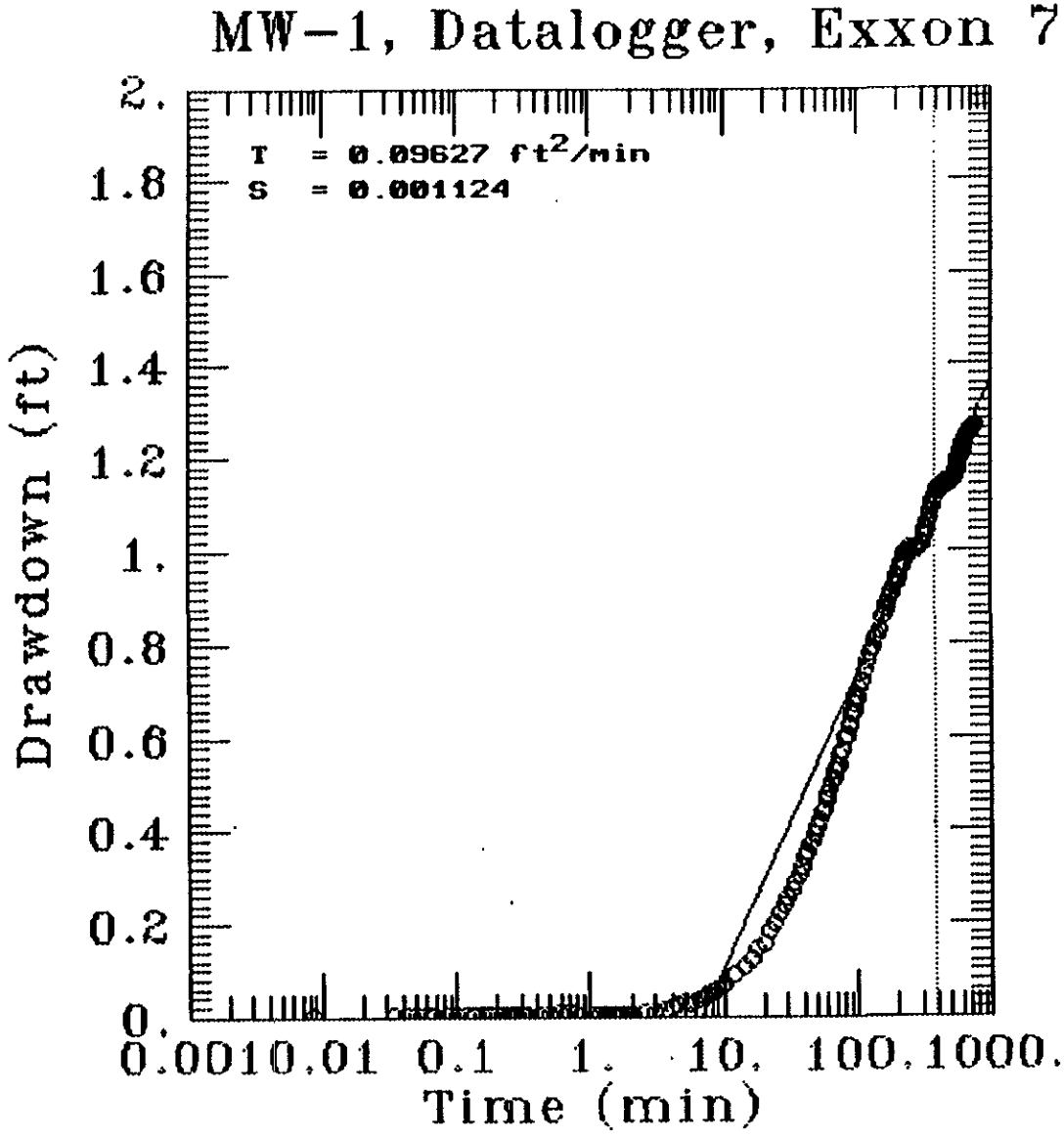

MW-1, Datalogger, Exxon 7003
T = 0.09627 ft²/min
S = 0.001124
Drawdown (ft)
2.
1.8
1.6
1.4
1.2
1.
0.8
0.6
0.4
0.2
0.
0.001 0.01 0.1 1. 10. 100. 1000.
Time (min)

PLATE D-4

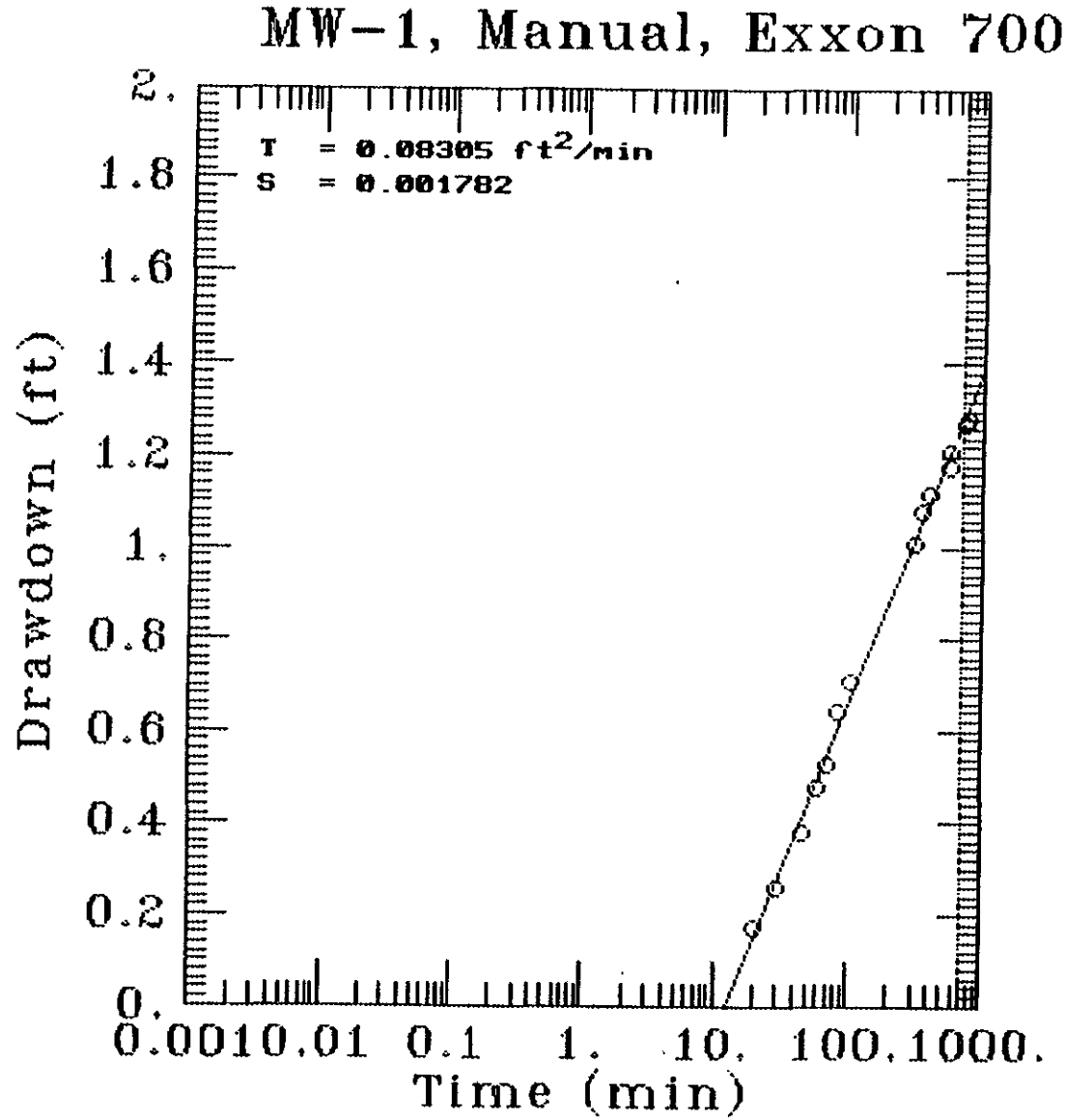

MW-1, Manual, Exxon 7003
T = 0.08305 ft²/min
S = 0.001782
Drawdown (ft)
2.
1.8
1.6
1.4
1.2
1.
0.8
0.6
0.4
0.2
0.
0.001 0.01 0.1 1. 10. 100. 1000.
Time (min)

PLATE D-5

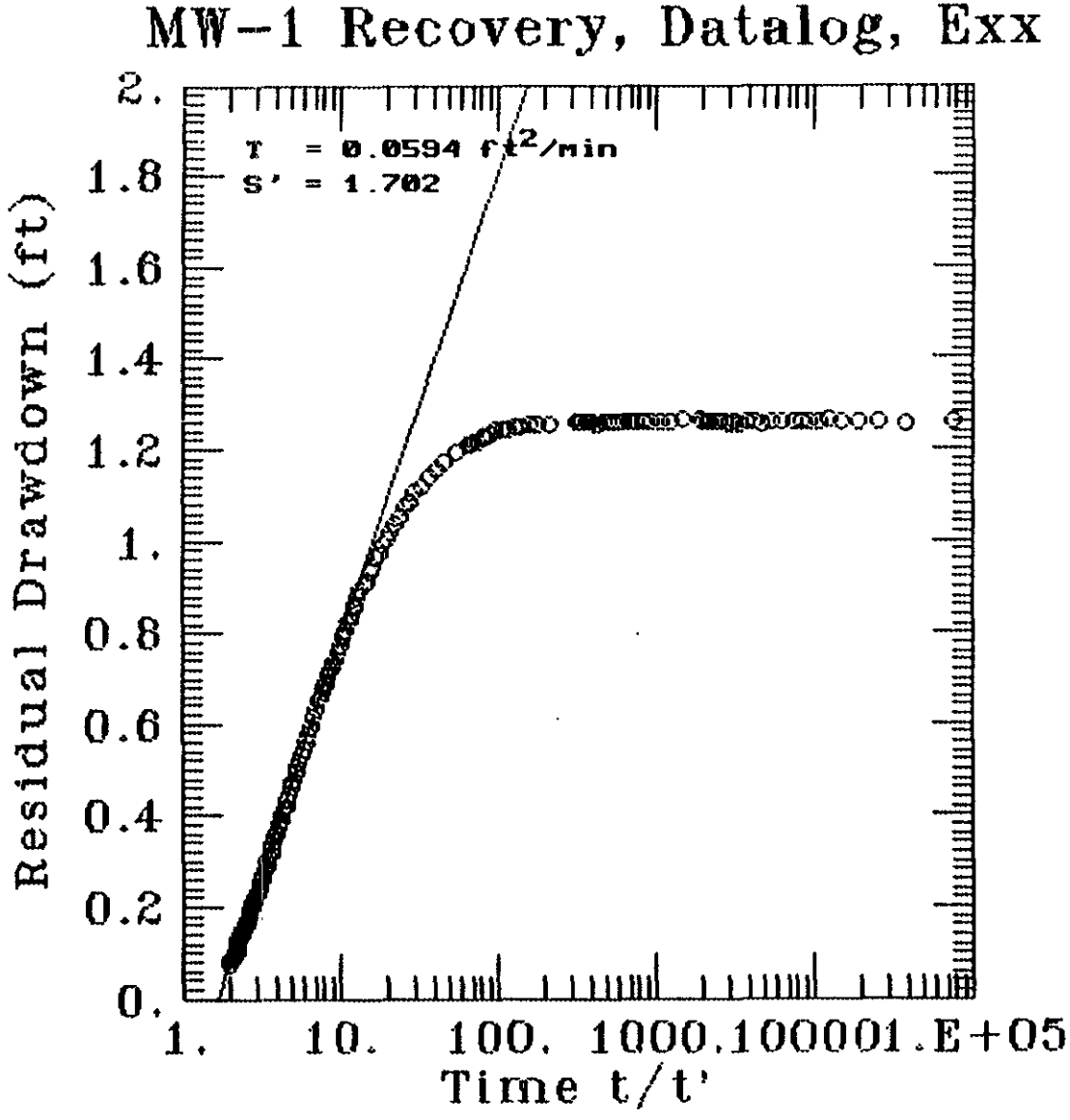

MW-1 Recovery, Datalog, Exx 7003
T = 0.0594 ft²/min
S' = 1.702
Residual Drawdown (ft)
2.
1.8
1.6
1.4
1.2
1.
0.8
0.6
0.4
0.2
0.
1.
10.
100.
1000.
100001.
E+05
Time t/t'

PLATE D-6

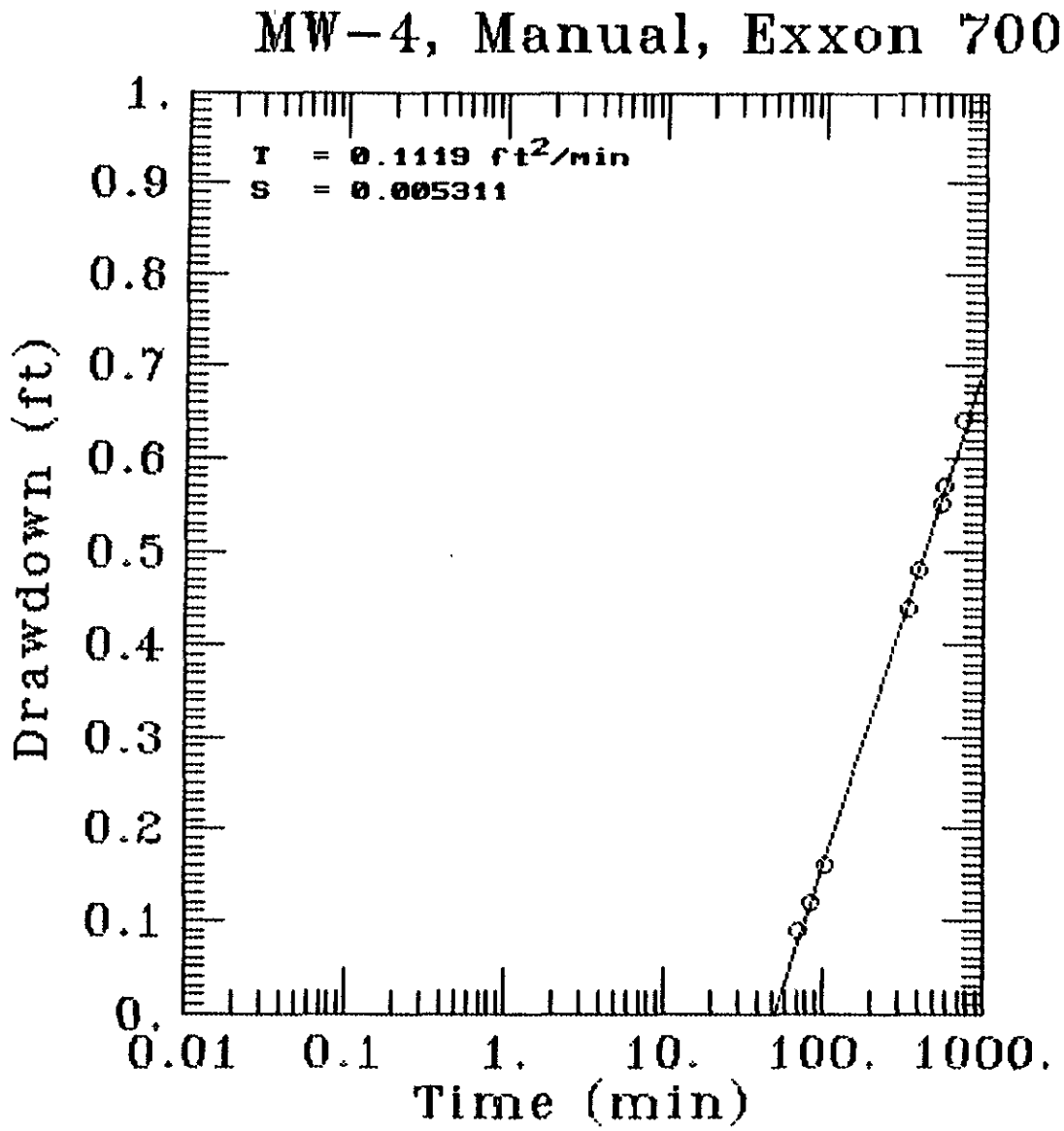

MW-4, Manual, Exxon 7003
T = 0.1119 ft²/min
S = 0.005311
Drawdown (ft)
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
0.01
0.1
1.
10.
100.
1000.
Time (min)

PLATE D-7

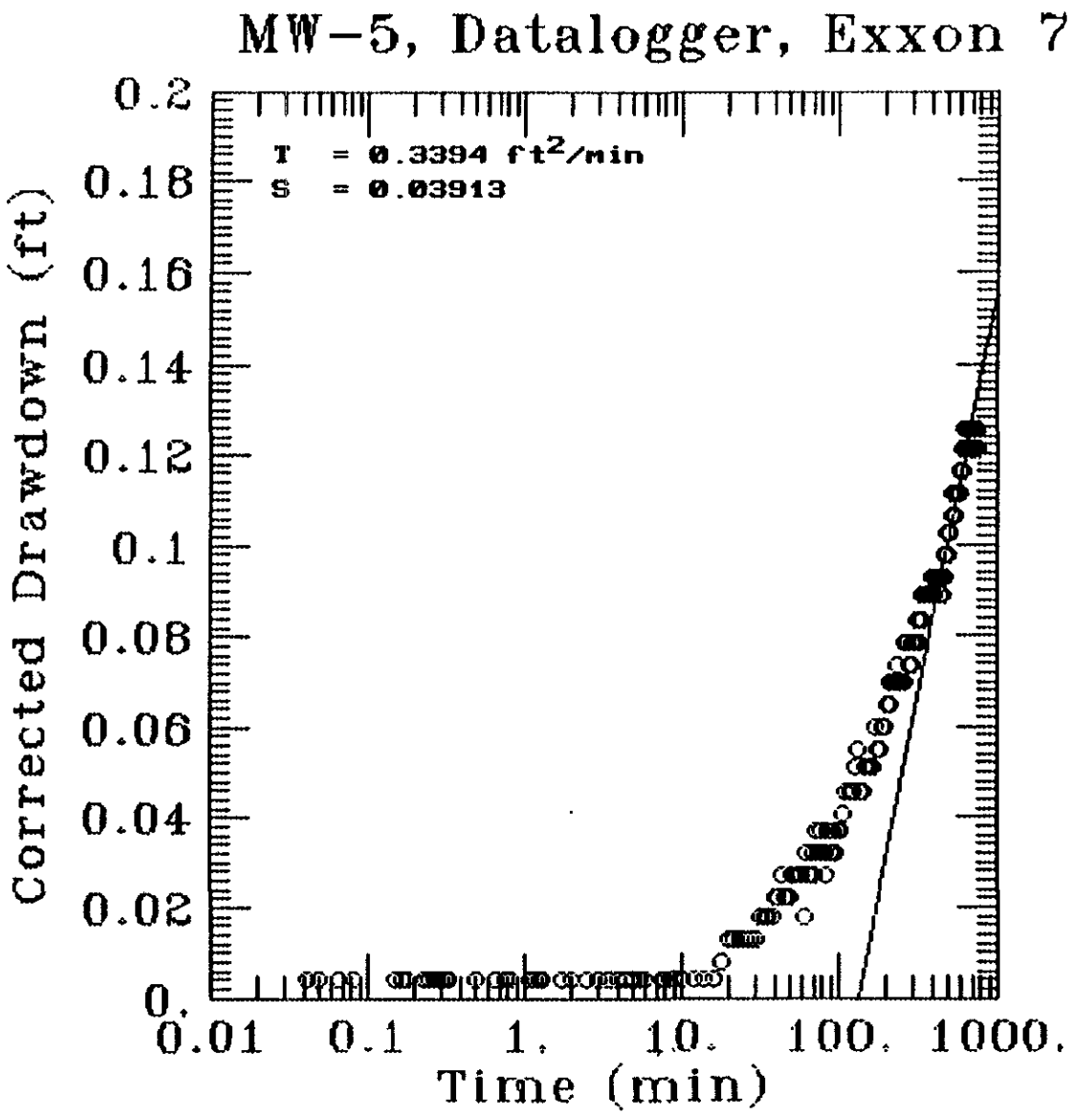

MW-5, Datalogger, Exxon 7003
T = 0.3394 ft²/min
S = 0.03913
Corrected Drawdown (ft)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0.
0.01
0.1
1.
10.
100.
1000.
Time (min)

PLATE D-8

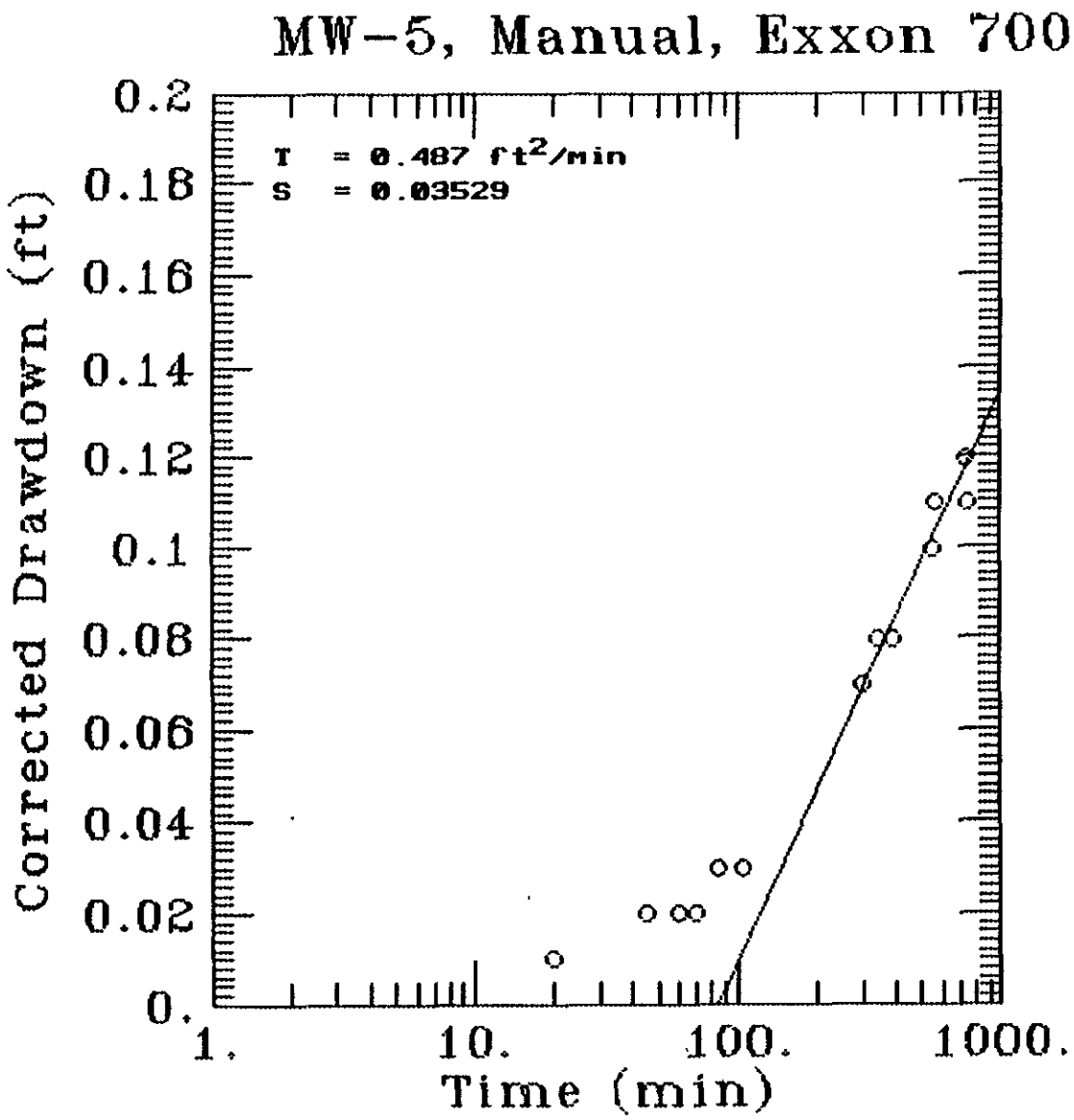

MW-5, Manual, Exxon 7003
T = 0.487 ft²/min
S = 0.03529
Corrected Drawdown (ft)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0.
1.
10.
100.
1000.
Time (min)

PLATE D-9

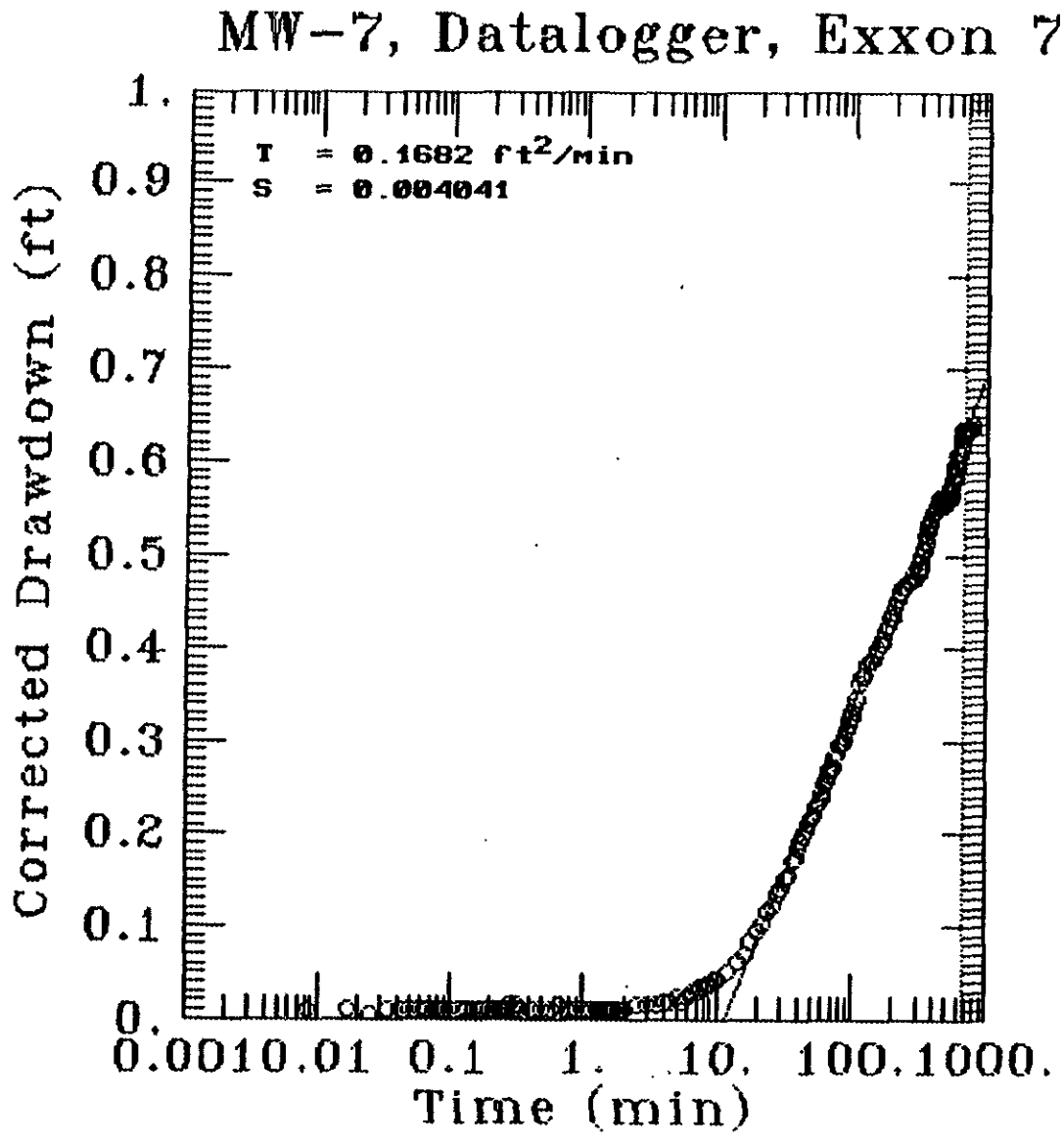

MW-7, Datalogger, Exxon 7003
T = 0.1682 ft²/min
S = 0.004041
Corrected Drawdown (ft)
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
0.001 0.01 0.1 1. 10. 100. 1000.
Time (min)

PLATE D-10

MW-7 Recovery, Datalog, Exx 7003

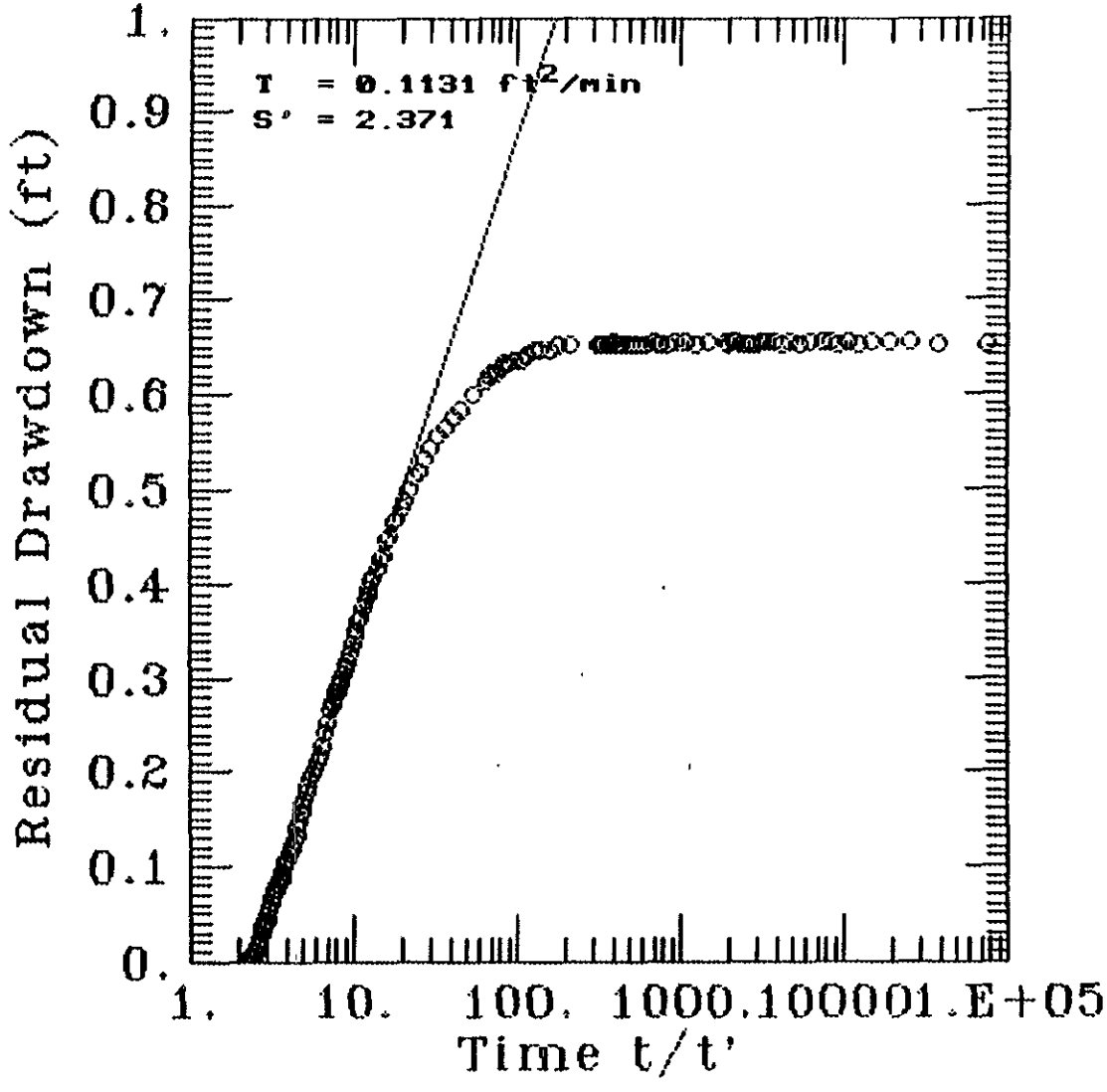


PLATE D-11

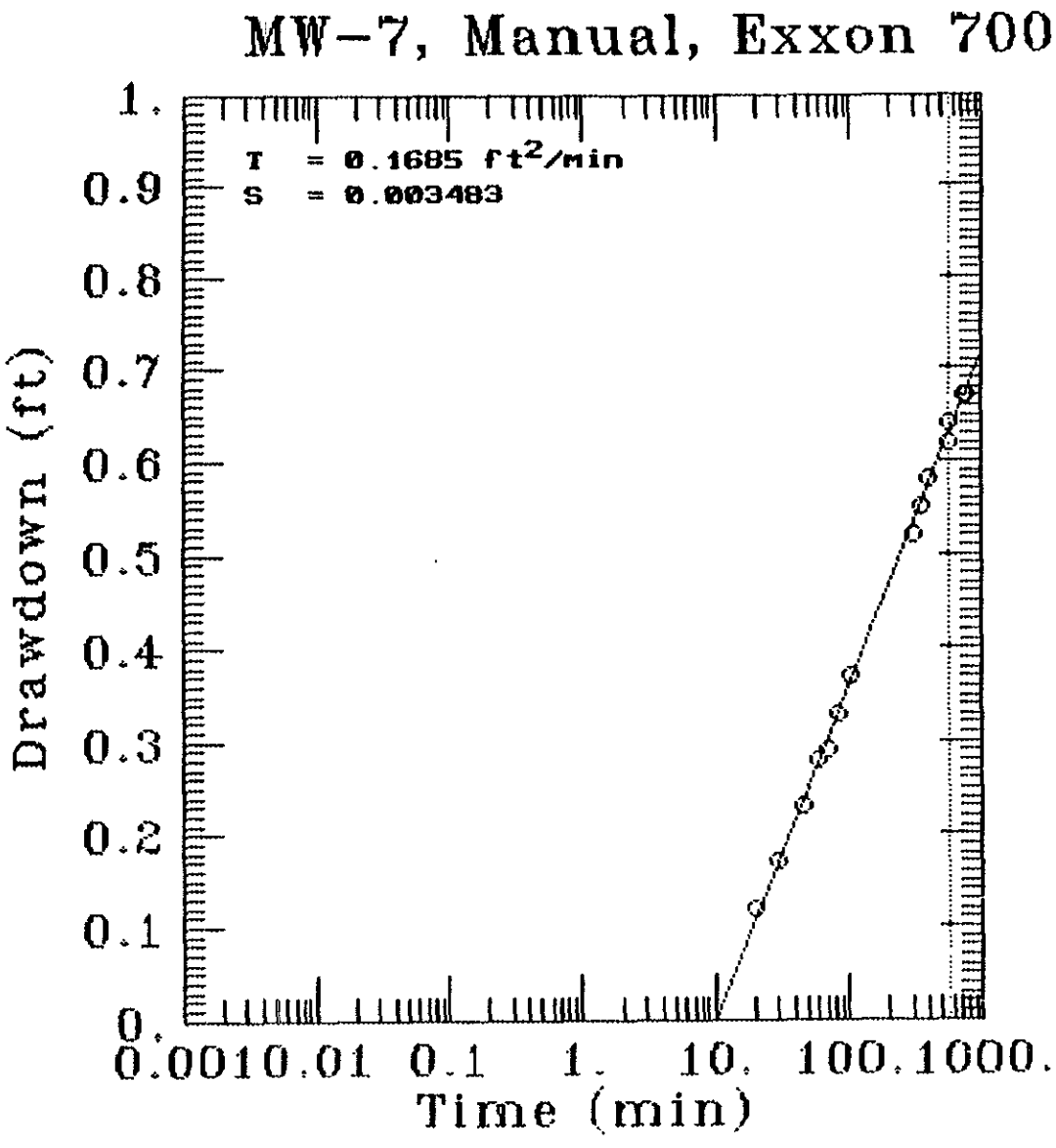

MW-7, Manual, Exxon 7003
T = 0.1685 ft²/min
S = 0.003483
Drawdown (ft)
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
0.001 0.01 0.1 1. 10. 100. 1000.
Time (min)

PLATE D-12

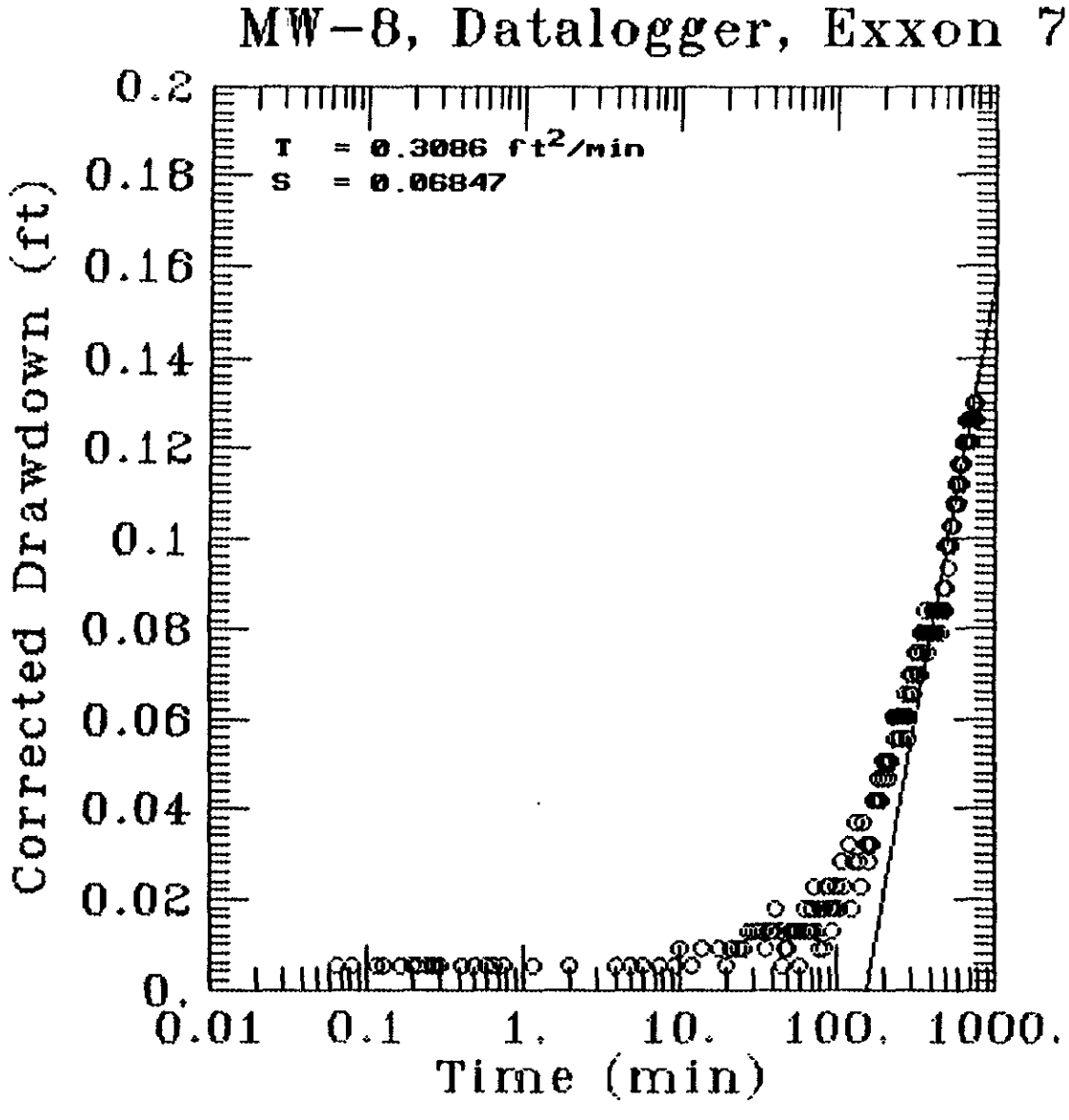

MW-8, Datalogger, Exxon 7003
T = 0.3086 ft²/min
S = 0.06847
Corrected Drawdown (ft)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0.
0.01
0.1
1.
10.
100.
1000.
Time (min)

PLATE D-13

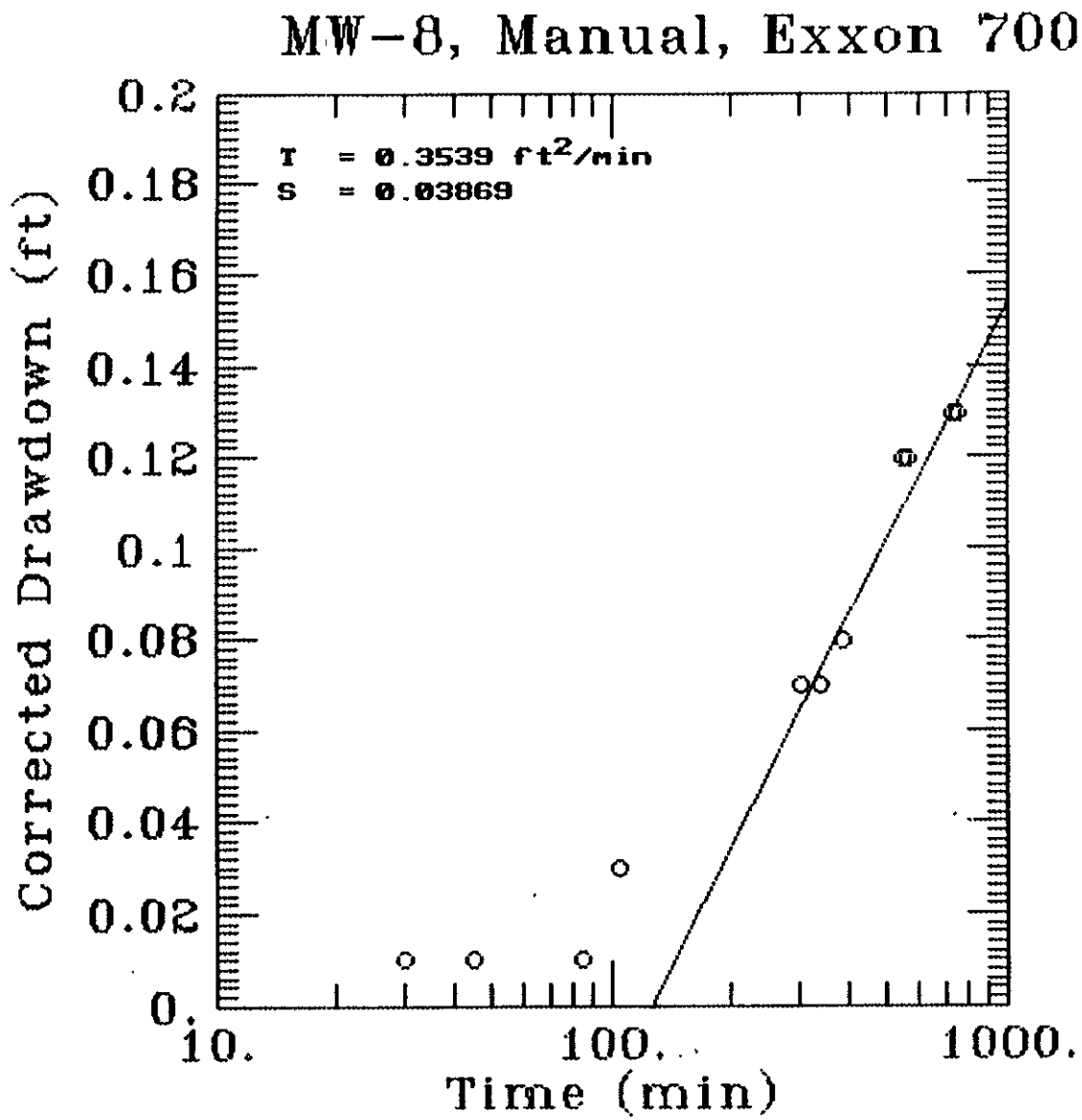

MW-8, Manual, Exxon 7003
T = 0.3539 ft²/min
S = 0.03869
Corrected Drawdown (ft)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0.
10.
100.
1000.
Time (min)

PLATE D-14

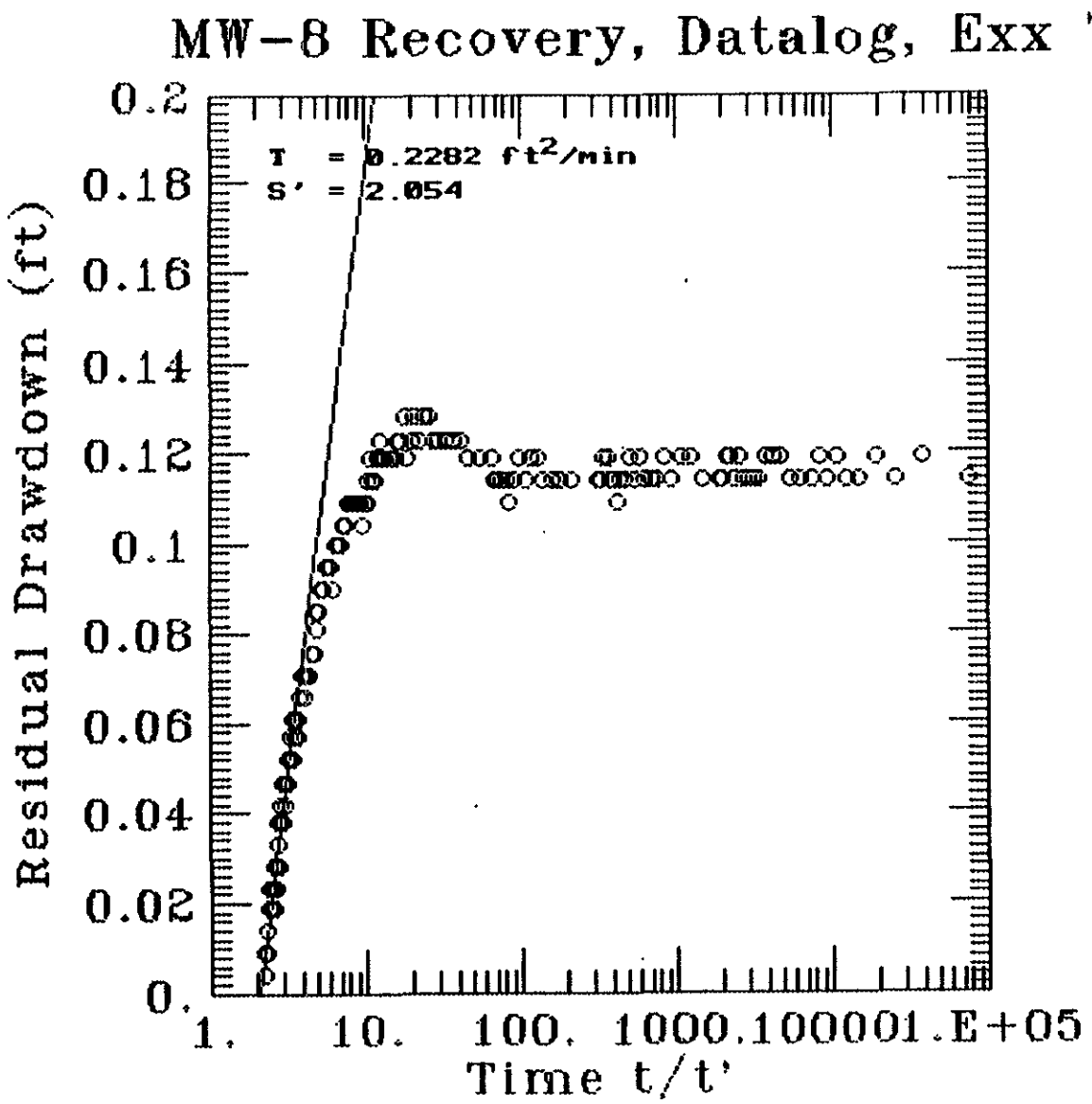

MW-8 Recovery, Datalog, Exx 7003
T = 0.2282 ft²/min
S' = 2.054
Residual Drawdown (ft)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0.
1.
10.
100.
1000.
100001.
E+05
Time t/t'

PLATE D-15

Distance Versus Drawdown Plot

Exxon 7003, Pleasanton, California

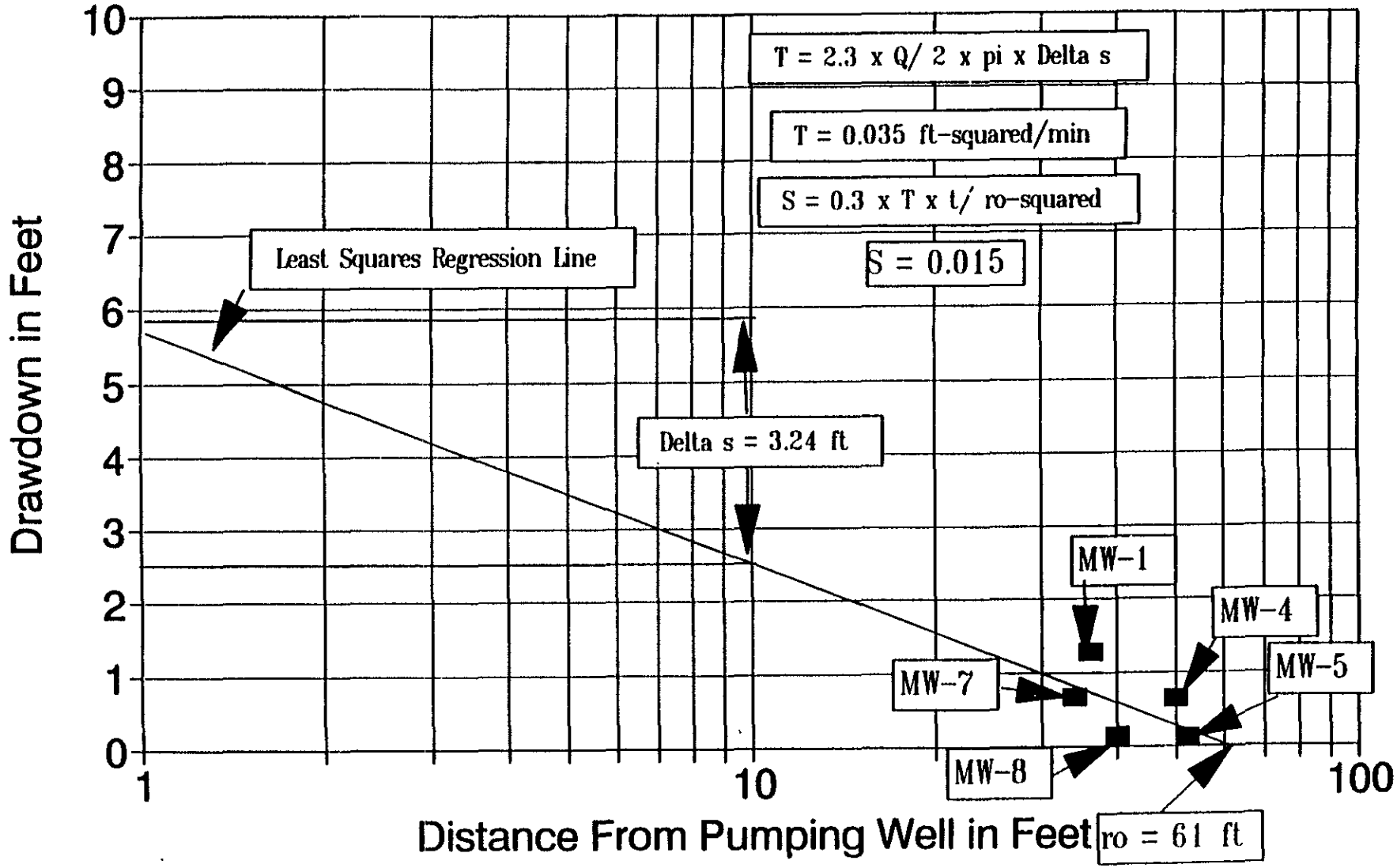
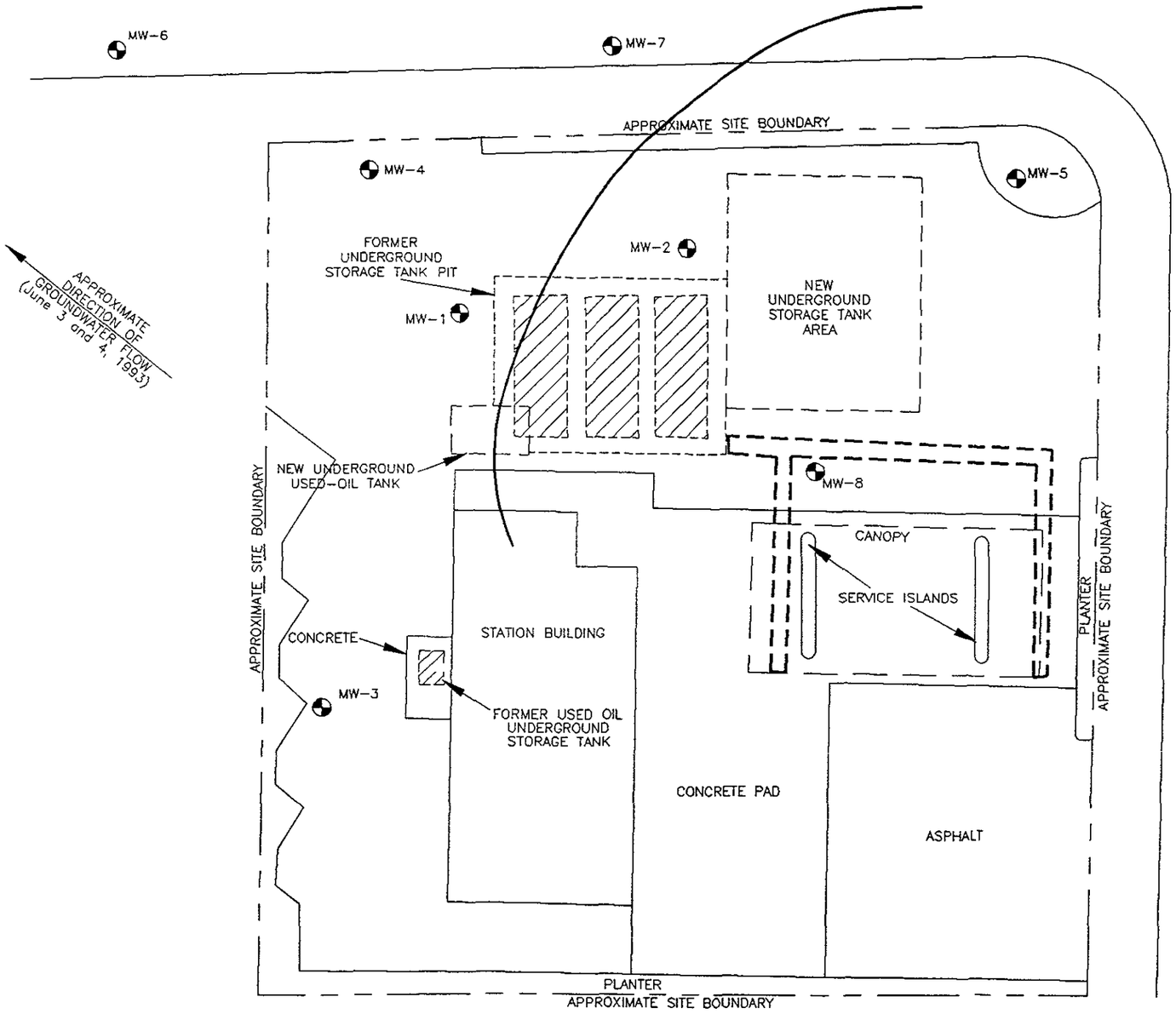


PLATE D-16

ANGELA STREET



MAIN STREET

EXPLANATION

— — = Approximate product line trench location

= Former underground gasoline storage tanks

MW-8 = Monitoring well (RESNA, 02, 03/91 AND 05/93)

= Predicted zone of capture at about 2.3 gallons per minute pumping rate and a gradient of 0.03

Approximate Scale

20 10 0 20 40

feet

Source: Surveyed by Ron Archer Civil Engineer, Inc., June 1990 and April 1991.

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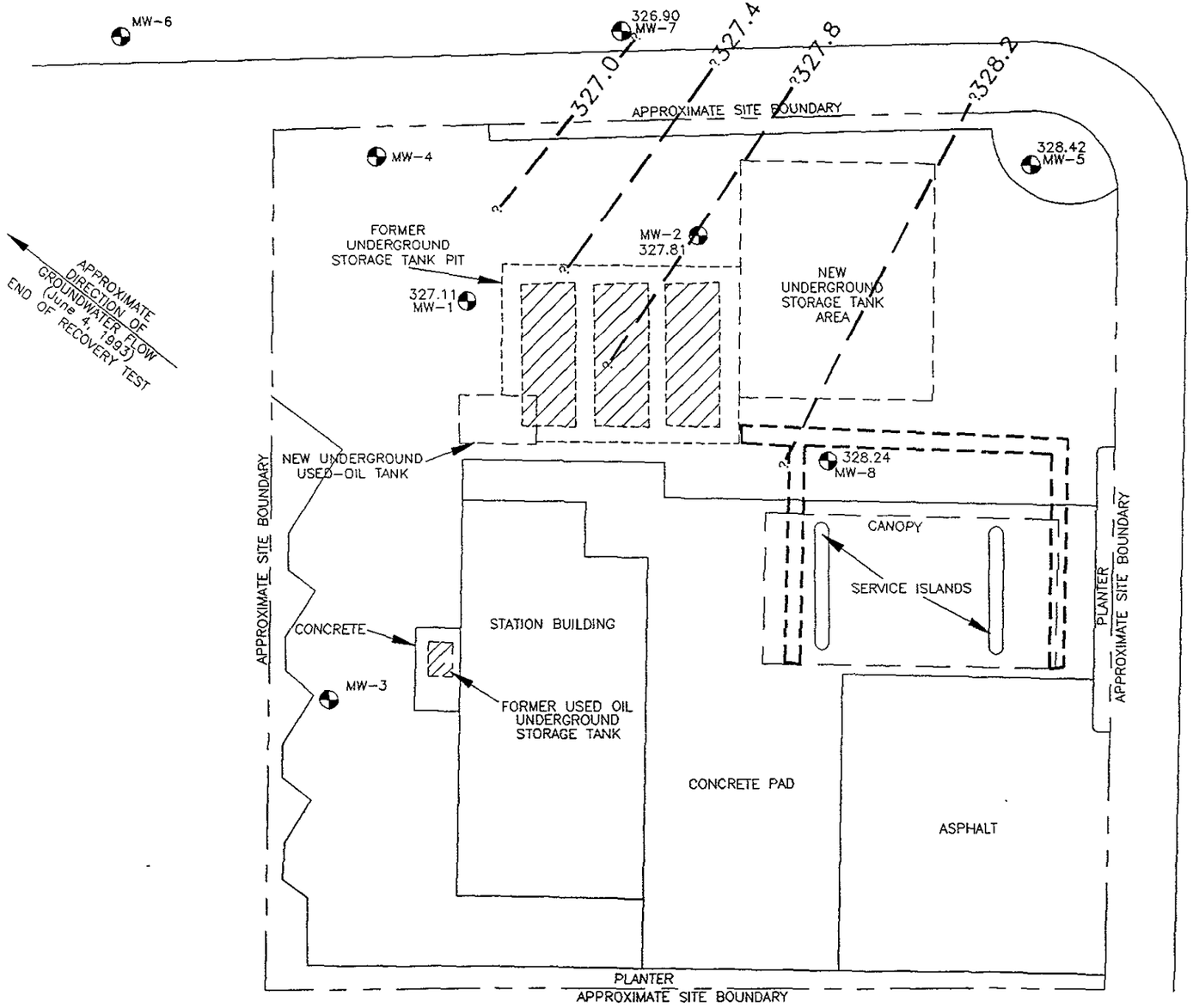
PROJECT 130015.05 3015SQ2

PREDICTED ZONE OF CAPTURE
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
D-17

ANGELA STREET



MAIN STREET

EXPLANATION

— — = Approximate product line trench location

= Former underground gasoline storage tanks

MW-8 = Monitoring well (RESNA, 02, 03/91 AND 05/93)

328.2 = Approximate line of equal elevation of groundwater in feet above mean sea level (MSL)

328.42 = Elevation of groundwater in feet above MSL, June 4, 1993, end of recovery test

Approximate Scale

20 10 0 20 40

feet

Source: Surveyed by Ron Archer Civil Engineer, Inc., June 1990 and April 1991.

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PROJECT 130015.05 3015502

GROUNDWATER GRADIENT MAP, END OF RECOVERY TEST
Exxon Station 7-7003
349 Main Street
Pleasanton, California

PLATE
D-18

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Table D-1
BAROMETRIC PRESSURE DURING PUMPING TEST - JUNE 3, 1993
LIVERMORE AIRPORT
(inches of mercury)

TIME	PRESSURE
11:23	30.03
11:45	30.04
12:45	30.03
13:45	30:02
14:45	30.03
15:45	30.02
16:45	30.01
17:45	30.00
18:45	29.99
19:45	30.00
20:45	30.00

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APPENDIX E

VAPOR EXTRACTION TEST

FIELD WORK

Vapor Extraction Test

RESNA performed a one day onsite VET on August 5, 1993, to collect site specific data and evaluate the feasibility of using vapor-extraction as a soil remediation alternative. The VET had three main objectives: (1) to evaluate achievable air flow rates from the vapor extraction wells; (2) to evaluate hydrocarbon concentrations of the extracted vapors; and (3) to estimate an effective radius of influence for the vapor-extraction wells for future engineering design, if applicable.

VET Protocol and Equipment

The vapor extraction equipment consisted of a six-cylinder internal combustion (IC) engine with a motor-driven vacuum blower, and instrumentation for measuring air velocity, air pressure, temperature, and organic vapor concentrations. The vapor extraction wells were connected to the IC engine using polyvinyl chloride (PVC) piping, fittings, and wellhead connections. Prior to conducting the VET, depth-to-water was measured in the on-site monitoring wells and vapor extraction wells as shown in Table 3, Vapor Extraction Test Field Monitoring Data.

Three existing vapor extraction wells (VE-1, VE-2, and VE-3) were used as either extraction wells or monitoring points during the VET. The location of these wells, as well as other pertinent site features, are shown on Plate 2. Information regarding well diameters, depth to groundwater (where present), screen availability, etc. is summarized in Table 3. The IC engine was used to apply a vacuum to the vapor extraction wells and induce air flow through the soils. Extracted hydrocarbon vapor was abated inside the IC engine by combustion.

The VET consisted of three phases. A Phase I test (120 minutes) was performed on well VE-2 to collect representative influent and effluent vapor samples and measure vacuum response in monitoring wells VE-1 and VE-3. Phase II and III tests (30 minutes each) were performed using wells VE-1 and VE-3 separately as extraction wells to collect representative influent vapor samples and measure vacuum response in the monitoring wells.

Vapor samples were collected from a sample port on the influent and effluent (where applicable) side of the IC engine using an electric sample pump and opaque Mylar sample bags with ¼ inch Tygon tubing connected to a brass wellhead fitting. The samples were sealed in the bags and labeled with the sample number, date, time, and sampler's name. The samples were immediately stored in a cool place for transport to a State Certified analytical laboratory under Chain of Custody documentation.

Air flow rates were measured from each wellhead using a pitot tube and magnahelic gauge installed in a 2 inch PVC pipe manifold connecting the wellhead to the IC engine. Applied vacuum at the wellhead was measured using a magnehelic pressure gauge placed in the manifold piping. Extracted vapors were screened for percent oxygen and organic vapor concentrations using a combination oxygen meter and Lower Explosive Limit (LEL) meter calibrated to methane. Vacuum response at each observation well was monitored with a magnehelic pressure gauge.

ANALYTICAL METHODS

Vapor samples obtained from vapor extraction wells VE-1, VE-2, and VE-3 were analyzed for TPHg using EPA Methods 8015/8020, and BTEX using EPA Method 8020. The vapor samples were submitted under chain of custody record and analyzed by PACE Incorporated Laboratories. Copies of the analytical report and the chain of custody record are included in Appendix F.

VAPOR EXTRACTION TEST RESULTS

Flow Rate and Applied Vacuum

Test data collected during the VET is summarized in Table 3, Vapor Extraction Test Field Monitoring Data. Extraction rates achieved during the entire VET ranged from approximately 30 to 61 actual cubic feet per minute (acfm) at applied vacuums of 21 and 50 inches of water column (IWC), respectively.

Vacuum Response

Vacuum response data collected during the VET is also summarized in Table 3. For extraction well VE-2, an applied vacuum of 40 IWC provided a vacuum response of 0.12 IWC in both VE-1 and VE-3 located 18.5 and 25 feet, respectively from VE-2. For extraction well VE-1, an applied vacuum of 21 IWC induced a vacuum response of 0.01 in VE-2 and no measurable response in VE-3 located at 18.5 and 30 feet away, respectively. For extraction well VE-3, an applied vacuum of 25 inches WC induced a vacuum response of 0.20 inches WC in VE-2 and 0.18 inches WC in VE-1 located 25 and 30 feet away, respectively.

Vapor Concentrations and Mass Extraction Rates

The results of laboratory testing for soil gas samples submitted for analysis are summarized in Table 4, Results of Laboratory Analyses of Air Samples. Analytical results of the wellhead influent air samples indicated TPHg concentrations were not detected at the

method detection limit (MDL) of 50 mg/m^3 and benzene concentrations ranged from not detected at the MDL of 0.5 to 5.7 mg/m^3. Based on the achieved flowrates and assuming zero TPHg vapor concentrations, the maximum TPHg mass extraction rate during the VET was estimated to be less than 0.27 pounds per day (ppd).

DISCUSSION

Our evaluation of data obtained from the VET can be summarized as follows:

- Maximum achievable flowrates from wells VE-1 through VE-3 ranged from 30 to 61 actual cubic feet per minute (acfm) indicating the vapor extraction at the site is feasible.

- The highest vacuum responses (0.17 to 0.19 IWC) were observed in VE-1 and VE-2 while extracting from VE-3 at a flow rate of 61 acfm.

- Assuming zero TPHg vapor concentrations in extracted soil gas because analytical results of field samples indicated TPHg concentrations were not detected at the MDL of 50 mg/m^3, a maximum TPHg mass extraction rate of less than 0.27 ppd was estimated.

- The negligible extraction rate of TPHg does not currently warrant the installation of a vapor extraction system (VES) at this time.

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APPENDIX F

LABORATORY ANALYSIS REPORTS AND CHAIN OF CUSTODY RECORDS

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REPORT OF LABORATORY ANALYSIS

June 23, 1993

Mr. Marc Briggs
RESNA
3315 Almaden Expressway Suite 34
San Jose, CA 95118

RE: PACE Project No. 430610.509
Client Reference: Exxon 7-7003 (EE)

Dear Mr. Briggs:

Enclosed is the report of laboratory analyses for samples received June 10, 1993.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Michael Cohen
Project Manager

Enclosures

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

RESNA
3315 Almaden Expressway Suite 34
San Jose, CA 95118

June 23, 1993
PACE Project Number: 430610509

Attn: Mr. Marc Briggs

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089875	
Date Collected:			06/08/93	
Date Received:			06/10/93	
			W-16-VE1	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/15/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	500	5800	06/15/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/15/93
Benzene	ug/L	5.0	ND	06/15/93
Toluene	ug/L	5.0	15	06/15/93
Ethylbenzene	ug/L	5.0	830	06/15/93
Xylenes, Total	ug/L	5.0	500	06/15/93

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Mr. Marc Briggs
Page 2

June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089883	
Date Collected:			06/08/93	
Date Received:			06/10/93	
Client Sample ID:			W-16-VE2	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/15/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	250	7000	06/15/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/15/93
Benzene	ug/L	2.5	10	06/15/93
Toluene	ug/L	2.5	18	06/15/93
Ethylbenzene	ug/L	2.5	900	06/15/93
Xylenes, Total	ug/L	2.5	340	06/15/93

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REPORT OF LABORATORY ANALYSIS

June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089891	
Date Collected:			06/08/93	
Date Received:			06/10/93	
Client Sample ID:			W-16-VE3	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/15/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	130	06/15/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/15/93
Benzene	ug/L	0.5	3.1	06/15/93
Toluene	ug/L	0.5	3.1	06/15/93
Ethylbenzene	ug/L	0.5	18	06/15/93
Xylenes, Total	ug/L	0.5	15	06/15/93

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REPORT OF LABORATORY ANALYSIS

Mr. Marc Briggs
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June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089905	
Date Collected:			06/08/93	
Date Received:			06/10/93	
Client Sample ID:			W-16-MW3R	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/15/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	06/15/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/15/93
Benzene	ug/L	0.5	0.6	06/15/93
Toluene	ug/L	0.5	1.7	06/15/93
Ethylbenzene	ug/L	0.5	ND	06/15/93
Xylenes, Total	ug/L	0.5	ND	06/15/93

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REPORT OF LABORATORY ANALYSIS

June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089913	
Date Collected:			06/08/93	
Date Received:			06/10/93	
Client Sample ID:			W-16-MW3	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/15/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	06/15/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/15/93
Benzene	ug/L	0.5	0.6	06/15/93
Toluene	ug/L	0.5	0.9	06/15/93
Ethylbenzene	ug/L	0.5	3.4	06/15/93
Xylenes, Total	ug/L	0.5	2.8	06/15/93
OIL AND GREASE, SILICA GEL (LUFT)				
Oil and Grease, Gravimetric (SM5520)	mg/L	5.0	ND	06/12/93
Date Extracted			06/11/93	

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REPORT OF LABORATORY ANALYSIS

Mr. Marc Briggs
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June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089921	
Date Collected:			06/08/93	
Date Received:			06/10/93	
Client Sample ID:			W-23-MW6R	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/15/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	06/15/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/15/93
Benzene	ug/L	0.5	ND	06/15/93
Toluene	ug/L	0.5	1.1	06/15/93
Ethylbenzene	ug/L	0.5	ND	06/15/93
Xylenes, Total	ug/L	0.5	ND	06/15/93

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REPORT OF LABORATORY ANALYSIS

Mr. Marc Briggs
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June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089930	
Date Collected:			06/08/93	
Date Received:			06/10/93	
Client Sample ID:			W-23-MW6	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/15/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	06/15/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/15/93
Benzene	ug/L	0.5	0.6	06/15/93
Toluene	ug/L	0.5	0.7	06/15/93
Ethylbenzene	ug/L	0.5	1.7	06/15/93
Xylenes, Total	ug/L	0.5	1.8	06/15/93

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Mr. Marc Briggs
Page 8

June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089948	
Date Collected:			06/09/93	
Date Received:			06/10/93	
Client Sample ID:			W-15-MW8	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/16/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	65	06/16/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/16/93
Benzene	ug/L	0.5	ND	06/16/93
Toluene	ug/L	0.5	1.1	06/16/93
Ethylbenzene	ug/L	0.5	0.8	06/16/93
Xylenes, Total	ug/L	0.5	1.7	06/16/93

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Mr. Marc Briggs
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June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089956	
Date Collected:			06/09/93	
Date Received:			06/10/93	
Client Sample ID:			W-16-MW5	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/16/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	06/16/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/16/93
Benzene	ug/L	0.5	ND	06/16/93
Toluene	ug/L	0.5	ND	06/16/93
Ethylbenzene	ug/L	0.5	ND	06/16/93
Xylenes, Total	ug/L	0.5	ND	06/16/93

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Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089964	
Date Collected:			06/09/93	
Date Received:			06/10/93	
Client Sample ID:			W-17-MW7	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/16/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	06/16/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/16/93
Benzene	ug/L	0.5	ND	06/16/93
Toluene	ug/L	0.5	0.8	06/16/93
Ethylbenzene	ug/L	0.5	ND	06/16/93
Xylenes, Total	ug/L	0.5	ND	06/16/93

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June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089972	
Date Collected:			06/09/93	
Date Received:			06/10/93	
Client Sample ID:			W-21-MW4	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/15/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	06/15/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/15/93
Benzene	ug/L	0.5	0.7	06/15/93
Toluene	ug/L	0.5	0.9	06/15/93
Ethylbenzene	ug/L	0.5	0.7	06/15/93
Xylenes, Total	ug/L	0.5	ND	06/15/93
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
Dichlorodifluoromethane	ug/L	2.0	ND	06/11/93
Chloromethane	ug/L	2.0	ND	06/11/93
Vinyl Chloride	ug/L	2.0	ND	06/11/93
Bromomethane	ug/L	2.0	ND	06/11/93
Chloroethane	ug/L	2.0	ND	06/11/93
Trichlorofluoromethane (Freon 11)	ug/L	2.0	ND	06/11/93
1,1-Dichloroethene	ug/L	0.5	ND	06/11/93
Methylene Chloride	ug/L	2.0	ND	06/11/93
trans-1,2-Dichloroethene	ug/L	0.5	ND	06/11/93
cis-1,2-Dichloroethene	ug/L	0.5	ND	06/11/93
1,1-Dichloroethane	ug/L	0.5	ND	06/11/93
Chloroform	ug/L	0.5	ND	06/11/93
1,1,1-Trichloroethane (TCA)	ug/L	0.5	ND	06/11/93
Carbon Tetrachloride	ug/L	0.5	ND	06/11/93
1,2-Dichloroethane (EDC)	ug/L	0.5	0.6	06/11/93
Trichloroethene (TCE)	ug/L	0.5	ND	06/11/93
1,2-Dichloropropane	ug/L	0.5	ND	06/11/93
Bromodichloromethane	ug/L	0.5	ND	06/11/93
2-Chloroethylvinyl ether	ug/L	0.5	ND	06/11/93
cis-1,3-Dichloropropene	ug/L	0.5	ND	06/11/93
trans-1,3-Dichloropropene	ug/L	0.5	ND	06/11/93
1,1,2-Trichloroethane	ug/L	0.5	ND	06/11/93
Tetrachloroethene	ug/L	0.5	ND	06/11/93

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June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089972	
Date Collected:			06/09/93	
Date Received:			06/10/93	
Client Sample ID:			W-21-MW4	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
Dibromochloromethane	ug/L	0.5	ND	06/11/93
Chlorobenzene	ug/L	0.5	ND	06/11/93
Bromoform	ug/L	0.5	ND	06/11/93
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND	06/11/93
1,3-Dichlorobenzene	ug/L	0.5	ND	06/11/93
1,4-Dichlorobenzene	ug/L	0.5	ND	06/11/93
1,2-Dichlorobenzene	ug/L	0.5	ND	06/11/93
Bromochloromethane (Surrogate Recovery)			118%	06/11/93
1,4-Dichlorobutane (Surrogate Recovery)			116%	06/11/93

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REPORT OF LABORATORY ANALYSIS

Mr. Marc Briggs
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June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089980	
Date Collected:			06/09/93	
Date Received:			06/10/93	
Client Sample ID:			W-16-MW2	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/16/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	160	06/16/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/16/93
Benzene	ug/L	0.5	0.5	06/16/93
Toluene	ug/L	0.5	3.3	06/16/93
Ethylbenzene	ug/L	0.5	5.7	06/16/93
Xylenes, Total	ug/L	0.5	2.0	06/16/93

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Client Reference: Exxon 7-7003 (EE)

Parameter	Units	MDL		DATE ANALYZED
PACE Sample Number:			70 0089999	
Date Collected:			06/09/93	
Date Received:			06/10/93	
Client Sample ID:			W-17-MW1	
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	06/16/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	250	7500	06/16/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	06/16/93
Benzene	ug/L	2.5	42	06/16/93
Toluene	ug/L	2.5	32	06/16/93
Ethylbenzene	ug/L	2.5	970	06/16/93
Xylenes, Total	ug/L	2.5	720	06/16/93
OIL AND GREASE, SILICA GEL (LUFT)				
Oil and Grease, Gravimetric (SM5520)	mg/L	5.0	ND	06/12/93
Date Extracted			06/11/93	
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
Dichlorodifluoromethane	ug/L	2.0	ND	06/14/93
Chloromethane	ug/L	2.0	ND	06/14/93
Vinyl Chloride	ug/L	2.0	ND	06/14/93
Bromomethane	ug/L	2.0	ND	06/14/93
Chloroethane	ug/L	2.0	ND	06/14/93
Trichlorofluoromethane (Freon 11)	ug/L	2.0	ND	06/14/93
1,1-Dichloroethene	ug/L	0.5	ND	06/14/93
Methylene Chloride	ug/L	2.0	ND	06/14/93
trans-1,2-Dichloroethene	ug/L	0.5	ND	06/14/93
cis-1,2-Dichloroethene	ug/L	0.5	ND	06/14/93
1,1-Dichloroethane	ug/L	0.5	ND	06/14/93
Chloroform	ug/L	0.5	1.8	06/14/93
1,1,1-Trichloroethane (TCA)	ug/L	0.5	ND	06/14/93
Carbon Tetrachloride	ug/L	0.5	ND	06/14/93
1,2-Dichloroethane (EDC)	ug/L	0.5	1.0	06/14/93
Trichloroethene (TCE)	ug/L	0.5	ND	06/14/93
1,2-Dichloropropane	ug/L	0.5	ND	06/14/93
Bromodichloromethane	ug/L	0.5	ND	06/14/93
2-Chloroethylvinyl ether	ug/L	0.5	ND	06/14/93

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REPORT OF LABORATORY ANALYSIS

Mr. Marc Briggs
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June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0089999	
Date Collected:			06/09/93	
Date Received:			06/10/93	
Client Sample ID:			W-17-MW1	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
cis-1,3-Dichloropropene	ug/L	0.5	ND	06/14/93
trans-1,3-Dichloropropene	ug/L	0.5	ND	06/14/93
1,1,2-Trichloroethane	ug/L	0.5	ND	06/14/93
Tetrachloroethene	ug/L	0.5	0.8	06/14/93
Dibromochloromethane	ug/L	0.5	ND	06/14/93
Chlorobenzene	ug/L	0.5	ND	06/14/93
Bromoform	ug/L	0.5	ND	06/14/93
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND	06/14/93
1,3-Dichlorobenzene	ug/L	0.5	ND	06/14/93
1,4-Dichlorobenzene	ug/L	0.5	ND	06/14/93
1,2-Dichlorobenzene	ug/L	0.5	ND	06/14/93
Bromochloromethane (Surrogate Recovery)			116 %	06/14/93
1,4-Dichlorobutane (Surrogate Recovery)			124 %	06/14/93

These data have been reviewed and are approved for release.

Darrell C. Cain
Regional Director

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FOOTNOTES
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June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.

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QUALITY CONTROL DATA

June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

HALOGENATED VOLATILE COMPOUNDS EPA 8010
Batch: 70 21931
Samples: 70 0089972

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Dichlorodifluoromethane	ug/L	2.0	ND
Chloromethane	ug/L	2.0	ND
Vinyl Chloride	ug/L	2.0	ND
Bromomethane	ug/L	2.0	ND
Chloroethane	ug/L	2.0	ND
Trichlorofluoromethane (Freon 11)	ug/L	2.0	ND
1,1-Dichloroethene	ug/L	0.5	ND
Methylene Chloride	ug/L	2.0	ND
trans-1,2-Dichloroethene	ug/L	0.5	ND
cis-1,2-Dichloroethene	ug/L	0.5	ND
1,1-Dichloroethane	ug/L	0.5	ND
Chloroform	ug/L	0.5	ND
1,1,1-Trichloroethane (TCA)	ug/L	0.5	ND
Carbon Tetrachloride	ug/L	0.5	ND
1,2-Dichloroethane (EDC)	ug/L	0.5	ND
Trichloroethene (TCE)	ug/L	0.5	ND
1,2-Dichloropropane	ug/L	0.5	ND
Bromodichloromethane	ug/L	0.5	ND
2-Chloroethylvinyl ether	ug/L	0.5	ND
cis-1,3-Dichloropropene	ug/L	0.5	ND
trans-1,3-Dichloropropene	ug/L	0.5	ND
1,1,2-Trichloroethane	ug/L	0.5	ND
Tetrachloroethene	ug/L	0.5	ND
Dibromochloromethane	ug/L	0.5	ND
Chlorobenzene	ug/L	0.5	ND
Bromoform	ug/L	0.5	ND
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND
1,3-Dichlorobenzene	ug/L	0.5	ND
1,4-Dichlorobenzene	ug/L	0.5	ND
1,2-Dichlorobenzene	ug/L	0.5	ND
Bromochloromethane (Surrogate Recovery)			113%
1,4-Dichlorobutane (Surrogate Recovery)			116%

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QUALITY CONTROL DATA

June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

HALOGENATED VOLATILE COMPOUNDS EPA 8010
Batch: 70 21931
Samples: 70 0089972

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
1,1-Dichloroethane	ug/L	0.5	10.00	101%	99%	2%
Trichloroethene (TCE)	ug/L	0.5	10.00	106%	103%	2%
1,1,2-Trichloroethane	ug/L	0.5	10.00	97%	101%	4%
Tetrachloroethene	ug/L	0.5	10.00	102%	100%	1%

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QUALITY CONTROL DATA

June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

HALOGENATED VOLATILE COMPOUNDS EPA 8010
Batch: 70 22005
Samples: 70 0089999

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Dichlorodifluoromethane	ug/L	2.0	ND
Chloromethane	ug/L	2.0	ND
Vinyl Chloride	ug/L	2.0	ND
Bromomethane	ug/L	2.0	ND
Chloroethane	ug/L	2.0	ND
Trichlorofluoromethane (Freon 11)	ug/L	2.0	ND
1,1-Dichloroethene	ug/L	0.5	ND
Methylene Chloride	ug/L	2.0	ND
trans-1,2-Dichloroethene	ug/L	0.5	ND
cis-1,2-Dichloroethene	ug/L	0.5	ND
1,1-Dichloroethane	ug/L	0.5	ND
Chloroform	ug/L	0.5	ND
1,1,1-Trichloroethane (TCA)	ug/L	0.5	ND
Carbon Tetrachloride	ug/L	0.5	ND
1,2-Dichloroethane (EDC)	ug/L	0.5	ND
Trichloroethene (TCE)	ug/L	0.5	ND
1,2-Dichloropropane	ug/L	0.5	ND
Bromodichloromethane	ug/L	0.5	ND
2-Chloroethylvinyl ether	ug/L	0.5	ND
cis-1,3-Dichloropropene	ug/L	0.5	ND
trans-1,3-Dichloropropene	ug/L	0.5	ND
1,1,2-Trichloroethane	ug/L	0.5	ND
Tetrachloroethene	ug/L	0.5	ND
Dibromochloromethane	ug/L	0.5	ND
Chlorobenzene	ug/L	0.5	ND
Bromoform	ug/L	0.5	ND
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND
1,3-Dichlorobenzene	ug/L	0.5	ND
1,4-Dichlorobenzene	ug/L	0.5	ND
1,2-Dichlorobenzene	ug/L	0.5	ND
Bromochloromethane (Surrogate Recovery)			127 %
1,4-Dichlorobutane (Surrogate Recovery)			140 %

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QUALITY CONTROL DATA

June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

HALOGENATED VOLATILE COMPOUNDS EPA 8010
Batch: 70 22005
Samples: 70 0089999

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
1,1-Dichloroethane	ug/L	0.5	10.00	107%	110%	2%
Trichloroethene (TCE)	ug/L	0.5	10.00	107%	106%	0%
1,1,2-Trichloroethane	ug/L	0.5	10.00	104%	105%	0%
Tetrachloroethene	ug/L	0.5	10.00	105%	104%	0%

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QUALITY CONTROL DATA

June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

OIL AND GREASE, SILICA GEL (LUFT)
Batch: 70 21897
Samples: 70 0089913, 70 0089999

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Oil and Grease, Gravimetric (SM5520)	mg/L	5.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Oil and Grease, Gravimetric (SM5520)	mg/L	5.0	20	95%	95%	0%

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Client Reference: Exxon 7-7003 (EE)

PURGEABLE FUELS AND AROMATICS
Batch: 70 21994
Samples: 70 0089875, 70 0089883, 70 0089891, 70 0089905, 70 0089913
70 0089921, 70 0089930, 70 0089948, 70 0089956, 70 0089964
70 0089972, 70 0089980, 70 0089999

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	1000	89%	84%	5%
Benzene	ug/L	0.5	100	109%	108%	0%
Toluene	ug/L	0.5	100	111%	111%	0%
Ethylbenzene	ug/L	0.5	100	110%	111%	0%
Xylenes, Total	ug/L	0.5	300	110%	115%	4%

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FOOTNOTES
for pages 17 through 22

June 23, 1993
PACE Project Number: 430610509

Client Reference: Exxon 7-7003 (EE)

MDL	Method Detection Limit
ND	Not detected at or above the MDL.
RPD	Relative Percent Difference

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☐ Huntington Beach, CA, 5702 Bolsa Avenue, 92649 (714) 892-2565

Consultant's Name: RESNA

Address: 3315 ALAMADEN EXPY SUITE 34, SAN JOSE, CA. 95118

Site Location: 349 MAIN ST PLEASANTON

Project #:

Consultant Project #: 13015.01

Consultant Work Release #:

Project Contact: JEANNE BUCKTHAL | MARC BRIGGS

Phone #(408) 264-7723 Fax #: 264-2635

Laboratory Work Release #: 09300255

EXXON Contact: MARLA GUENSLER ☐ EE ☐ C&M

Phone #(510) 246-8776 Fax #:

EXXON RAS #: 7-7003

Sampled by (print): JEFFREY D. SALA

Sampler's Signature: Jeffrey D Sala

Shipment Method:

Air Bill #:

Shipment Date: 6/10/93

TAT: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Standard (5 day)

ANALYSIS REQUIRED

Sample Condition as Received
Temperature ° C: PALE
Cooler #: COOLER
Inbound Seal Yes No
Outbound Seal Yes No

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1	HOLD	VOC's (601)	TOG						COMMENTS
W-16-VE1R	6/8/93 4:45	water	HCl	2	9000.8				X								
W-16-VE1	6/8/93 4:50			3	8987.5	X											
W-16-VE2R	6/8/93 5:05			2	9001.6				X								
W-16-VE2	6/8/93 5:10			3	8988.3	X											
W-16-VE3R	6/8/93 5:25			2	9002.4				X								
W-16-VE3	6/8/93 5:30			3	8989.1	X											
W-16-MW3R	6/8/93 6:00			2	8990.5	X											
W-16-MW3	6/8/93 6:05			3	8991.3	X											
W-16-MW3TOG	6/8/93 6:05			1							X						

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time	Additional Comments:
Jeffrey D. Sala/RESNA	6/10/93	9:00 AM		6/10	1015	
	6/10	1115		6/10	1115	

Distribution: WHITE & YELLOW White - Original Yellow - Exxon Pink - Lab Goldenrod - Consultant Field Staff

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Consultant's Name: RESNA

Address: 3315 ALAMADEN EXPY SUIT 34, SAN JOSE, CA. 95118

Site Location: 349 MAIN ST PLEASANTON

Project #.

Consultant Project #. 130015.01

Consultant Work Release #:

Project Contact: JEANNE BUCKTHAL/MARC BRIGGS

Phone #(408) 264-7723 Fax #:264-2614

Laboratory Work Release #: 09300255

EXXON Contact: MARLA QUENSLER ☐ EE ☐ C&M

Phone #(510) 246-8776 Fax #:

EXXON RAS #: 7-1003

Sampled by (print): JEFFREY D. SALA

Sampler's Signature: Jeffrey D Sala

Shipment Method:

Air Bill #.

Shipment Date: 6/10/93

TAT: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Standard (5 day)

ANALYSIS REQUIRED

Sample Condition as Received
Temperature °C: RALF
Cooler #: COOLER
Inbound Seal Yes No
Outbound Seal Yes No

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1	HOLD	VOC's (602)								COMMENTS
W-23-MW6R	6/8/93 6:15	WATER	HCl	2	8992.1	X												
W-23-MW6	6/8/93 6:20			3	8993.0	X												
W-15-MW8R	6/9/93 10:45			2	9003.2				X									
W-15-MW8	6/9/93 10:50			3	8994.8	X												
W-16-MW5R	6/9/93 11:10			2	9004.0				X									
W-16-MW5	6/9/93 11:15			3	8995.6	X												
W-17-MW7R	6/9/93 1:30			2	9005.9				X									
W-17-MW7	6/9/93 1:35			3	8996.4	X												

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time	Additional Comments:
Jeffrey D Sala/RESNA	6/10/93	9:00 AM		6/10	1015	
Ed Path. Rice	6/11	1115	Shirley Brown	6/11	1115	

Distribution: White - Original Yellow - Exxon Pink - Lab Goldenrod - Consultant Field Staff

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Consultant's Name: RESNA

Address: 3315 ALAMADEN EXPY SUITE 34, SAN JOSE, CA. 95118

Site Location: 349 MAIN ST PLEASANTON

Project #:

Consultant Project #: 130015.01

Consultant Work Release #:

Project Contact: JEANNE BUCKNALL/MARC BRIGGS

Phone #(408) 264-7723 Fax #: 264-2635

Laboratory Work Release #: 09300255

EXXON Contact: MARLA GUENSLER ☐ EE ☐ C&M

Phone #(510) 246-8776 Fax #:

EXXON RAS #: 7-7003

Sampled by (print): JEFFREY D. SALA

Sampler's Signature: Jeffrey D. Sala

Shipment Method:

Air Bill #:

Shipment Date: 6/10/93

TAT: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Standard (5 day)

ANALYSIS REQUIRED

Sample Condition as Received
Temperature °C: AMB
Cooler #: COURIER
Inbound Seal Yes No
Outbound Seal Yes No

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1	HOLD	VOC's (601)	TOG							COMMENTS
W-21-MW4R	6/9/93 2:05	water	HCl	2	9006.7				X									
W-21-MW4V	6/9/93 2:10			3	8997.2					X								
W-21-MW4	6/9/93 2:10			3	↓	X												
W-16-MW2R	6/9/93 2:25			2	9007.5				X									
W-16-MW2	6/9/93 2:30			3	8998.0	X												
W-17-MW1R	6/9/93 2:55			2	9008.3				X									
W-17-MW1V	6/9/93 3:00			3	8999.9					X								
W-17-MW1	6/9/93 3:00			3	↓	X												
W-17-MW1TOG	6/9/93 3:00	↓	↓	1	↓						X							

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time
Jeffrey D. Sala/RESNA	6/10/93	9:00A	Fed Ex/Pace	6/10	1015
Ed Foltz/Pace	6/10	1115	Shirley Brown	6/10	1117

Additional Comments:

Distribution: 1/2 4/3 White - Original Yellow - Exxon Pink - Lab Goldenrod - Consultant Field Staff

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August 13, 1993

Mr. Marc Briggs
RESNA
3315 Almaden Expressway Suite 34
San Jose, CA 95118

RE: PACE Project No. 430806.512
Client Reference: Exxon 7-7003(EE)

Dear Mr. Briggs:

Enclosed is the report of laboratory analyses for samples received August 06, 1993.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Stacy P. Hoch

Stacy P. Hoch
Project Manager

Enclosures

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

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RESNA
3315 Almaden Expressway Suite 34
San Jose, CA 95118

August 13, 1993
PACE Project Number: 430806512
PACE WPP# 3038

Attn: Mr. Marc Briggs

Client Reference: Exxon 7-7003(EE)

PACE Sample Number:			70 0126703	
Date Collected:			08/05/93	
Date Received:			08/06/93	
			A-VE2-30	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
GASOLINE AND AROMATICS-AIR (M8015/8020)				
Non-Methane Hydrocarbons, as n-octane	mg/m3	50	ND	08/09/93
Volatile Aromatic Compounds (EPA M8020)			-	08/09/93
Benzene	mg/m3	0.5	ND	08/09/93
Toluene	mg/m3	0.5	ND	08/09/93
Ethylbenzene	mg/m3	0.5	ND	08/09/93
Xylenes, Total	mg/m3	0.5	1.1	08/09/93

Client Reference: Exxon 7-7003(EE)

PACE Sample Number:			70 0126711	
Date Collected:			08/05/93	
Date Received:			08/06/93	
Client Sample ID:			A-EFF-30	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
GASOLINE AND AROMATICS-AIR (M8015/8020)				
Non-Methane Hydrocarbons, as n-octane	mg/m3	50	ND	08/09/93
Volatile Aromatic Compounds (EPA M8020)			-	08/09/93
Benzene	mg/m3	0.5	5.7	08/09/93
Toluene	mg/m3	0.5	0.5	08/09/93
Ethylbenzene	mg/m3	0.5	ND	08/09/93
Xylenes, Total	mg/m3	0.5	1.3	08/09/93

Mr. Marc Briggs
Page 3

August 13, 1993
PACE Project Number: 430806512

Client Reference: Exxon 7-7003(EE)

PACE Sample Number:			70 0126720	
Date Collected:			08/05/93	
Date Received:			08/06/93	
Client Sample ID:			A-VE2-120	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
GASOLINE AND AROMATICS-AIR (M8015/8020)				
Non-Methane Hydrocarbons, as n-octane	mg/m3	50	ND	08/09/93
Volatile Aromatic Compounds (EPA M8020)			-	08/09/93
Benzene	mg/m3	0.5	ND	08/09/93
Toluene	mg/m3	0.5	ND	08/09/93
Ethylbenzene	mg/m3	0.5	ND	08/09/93
Xylenes, Total	mg/m3	0.5	1.4	08/09/93

Mr. Marc Briggs
Page 4

August 13, 1993
PACE Project Number: 430806512

Client Reference: Exxon 7-7003(EE)

PACE Sample Number:			70 0126738	
Date Collected:			08/05/93	
Date Received:			08/06/93	
Client Sample ID:			A-VE3-30	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
GASOLINE AND AROMATICS-AIR (M8015/8020)				
Non-Methane Hydrocarbons, as n-octane	mg/m3	50	ND	08/09/93
Volatile Aromatic Compounds (EPA M8020)			-	08/09/93
Benzene	mg/m3	0.5	ND	08/09/93
Toluene	mg/m3	0.5	ND	08/09/93
Ethylbenzene	mg/m3	0.5	ND	08/09/93
Xylenes, Total	mg/m3	0.5	1.0	08/09/93

Mr. Marc Briggs
Page 5

August 13, 1993
PACE Project Number: 430806512

Client Reference: Exxon 7-7003(EE)

PACE Sample Number:			70 0126746	
Date Collected:			08/05/93	
Date Received:			08/06/93	
Client Sample ID:			A-VE1-30	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
GASOLINE AND AROMATICS-AIR (M8015/8020)				
Non-Methane Hydrocarbons, as n-octane	mg/m3	50	ND	08/09/93
Volatile Aromatic Compounds (EPA M8020)			-	08/09/93
Benzene	mg/m3	0.5	ND	08/09/93
Toluene	mg/m3	0.5	ND	08/09/93
Ethylbenzene	mg/m3	0.5	ND	08/09/93
Xylenes, Total	mg/m3	0.5	1.2	08/09/93

These data have been reviewed and are approved for release.

Darrell C. Cain
Regional Director

Client Reference: Exxon 7-7003(EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.

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EXXON COMPANY, U.S.A.

P.O. Box 4415, Houston, TX 77210-4415

CHAIN OF CUSTODY

430806.512

☒ Novato, CA, 11 Digital Drive, 94949 (415) 883-6100

☐ Huntington Beach, CA, 5702 Bolsa Avenue, 92649 (714) 892-2565

Consultant's Name: RESNA

Address: 3315 Almaden Expwy. Suite 34 San Jose CA

Page 1 of 1

Project #:

Consultant Project #: 130015.03

Site Location: Exxon 7-7003 Hayward

Project Contact: Nora Chan + Marc Briggs

Phone #: 408/264-7723 Fax #: -2435

Consultant Work Release #:

EXXON Contact: Marla Gunsler ☒ ER ☐ C&M

Phone #: 510/246-8776 Fax #: 8798

Laboratory Work Release #:

Sampled by (print) Jim Schollard

Sampler's Signature: Jim Schollard

EXXON RAS #: Exxon 7-7003

Shipment Method: Courier

Air Bill #: NA

TAT: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ ~~96 hr. (Standard (5 day))~~

Shipment Date: 8/6/93

ANALYSIS REQUIRED

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1
	8/5/93	air						
-VE2-30	12:45	Air	NA	1	12670-3	X		
-Eff-30	12:45	"	"	1	12671-1	X		
-VE2-120	14:45	"	"	1	12672-0	X		
-VE3-30	15:10	"	"	1	12673-9	X		
-VE1-30	16:00	"	"	1	12674-6	X		

Sample Condition as Received
Temperature °C: ____
Cooler #: ____
Inbound Seal Yes No
Outbound Seal Yes No

COMMENTS

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time
Jim Schollard	8/6/93	12:10	Resnet	8/6/93	12:10
Resnet	8.6.93	12:34	Randy Johnson/Pace	8/6/93	1233
Randy Johnson/Pace	8/6/93	1700	Sandra Ormes/Pace	8/6/93	1700

Additional Comments: Please report results in milligram per cubic meter (mg/m³)

White - Original Yellow - Exxon Pink - Lab Goldenrod - Consultant Field Staff

GCMS/3

130015.02

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REPORT OF LABORATORY ANALYSIS

May 13, 1993

Mr. Marc Briggs
RESNA
3315 Almaden Expressway Suite 34
San Jose, CA 95118

RE: PACE Project No. 430506.511
Client Reference: Exxon 7-7003 (EE)

Dear Mr. Briggs:

Enclosed is the report of laboratory analyses for samples received May 06, 1993.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Stephanie Matzo

Stephanie Matzo
Project Manager

Enclosures

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REPORT OF LABORATORY ANALYSIS

RESNA
3315 Almaden Expressway Suite 34
San Jose, CA 95118

May 13, 1993
PACE Project Number: 430506511

Attn: Mr. Marc Briggs

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064619	
Date Collected:			05/03/93	
Date Received:			05/06/93	
Client Sample ID:			S-5-B21	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/10/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/10/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/10/93
Benzene	ug/kg wet	5.0	ND	05/10/93
Toluene	ug/kg wet	5.0	ND	05/10/93
Ethylbenzene	ug/kg wet	5.0	ND	05/10/93
Xylenes, Total	ug/kg wet	5.0	ND	05/10/93

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Mr. Marc Briggs
Page 2

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064627	
Date Collected:			05/03/93	
Date Received:			05/06/93	
Client Sample ID:			S-10-B21	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

REPORT OF LABORATORY ANALYSIS

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064635	
Date Collected:			05/03/93	
Date Received:			05/06/93	
Client Sample ID:			S-15-B21	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

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Mr. Marc Briggs
Page 4

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064643	
Date Collected:			05/03/93	
Date Received:			05/06/93	
Client Sample ID:			S-17.5-B21	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

Mr. Marc Briggs
Page 5

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

Parameter	Units	MDL		DATE ANALYZED
PACE Sample Number:			70 0064651	
Date Collected:			05/03/93	
Date Received:			05/06/93	
Client Sample ID:			S-24.5-B20	
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

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Mr. Marc Briggs
Page 6

May 13, 1993
PACE Project Number: 43050651

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064660	
Date Collected:			05/03/93	
Date Received:			05/06/93	
Client Sample ID:			S-5-B20	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

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Mr. Marc Briggs
Page 7

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:				70 0064678	
Date Collected:				05/03/93	
Date Received:				05/06/93	
Client Sample ID:				S-10-B20	
Parameter	Units		MDL		DATE ANALYZED
ORGANIC ANALYSIS					
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):				-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg	wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):				-	05/11/93
Benzene	ug/kg	wet	5.0	ND	05/11/93
Toluene	ug/kg	wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg	wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg	wet	5.0	ND	05/11/93

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THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Mr. Marc Briggs
Page 8

May 13, 1993
PACE Project Number: 43050651

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064686	
Date Collected:			05/03/93	
Date Received:			05/06/93	
Client Sample ID:			S-15-B20	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS. (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

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Mr. Marc Briggs
Page 9

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064694	
Date Collected:			05/03/93	
Date Received:			05/06/93	
Client Sample ID:			S-18-B20	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

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Mr. Marc Briggs
Page 10

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064708	
Date Collected:			05/04/93	
Date Received:			05/06/93	
Client Sample ID:			S-5-B19	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

REPORT OF LABORATORY ANALYSIS

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064716	
Date Collected:			05/04/93	
Date Received:			05/06/93	
Client Sample ID:			S-10-B19	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

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REPORT OF LABORATORY ANALYSIS

Mr. Marc Briggs
Page 12

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:				70 0064724	
Date Collected:				05/04/93	
Date Received:				05/06/93	
Client Sample ID:				S-15-B19	
Parameter	Units		MDL		DATE ANALYZED
ORGANIC ANALYSIS					
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):				-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg	wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):				-	05/11/93
Benzene	ug/kg	wet	5.0	ND	05/11/93
Toluene	ug/kg	wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg	wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg	wet	5.0	ND	05/11/93

REPORT OF LABORATORY ANALYSIS

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064724	
Date Collected:			05/04/93	
Date Received:			05/06/93	
Client Sample ID:			S-15-B19	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

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FAX: 415-883-2673

Mr. Marc Briggs
Page 13

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:			70 0064732	
Date Collected:			05/04/93	
Date Received:			05/06/93	
Client Sample ID:			S-17.5-B19	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	05/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	05/11/93
Benzene	ug/kg wet	5.0	ND	05/11/93
Toluene	ug/kg wet	5.0	ND	05/11/93
Ethylbenzene	ug/kg wet	5.0	ND	05/11/93
Xylenes, Total	ug/kg wet	5.0	ND	05/11/93

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REPORT OF LABORATORY ANALYSIS

Mr. Marc Briggs
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May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PACE Sample Number:				70 0064740	
Date Collected:				05/04/93	
Date Received:				05/06/93	
Client Sample ID:				S-25.5-B19	
Parameter	Units		MDL		DATE ANALYZED
ORGANIC ANALYSIS					
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):				-	05/12/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg	wet	1000	ND	05/12/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):				-	05/12/93
Benzene	ug/kg	wet	5.0	ND	05/12/93
Toluene	ug/kg	wet	5.0	ND	05/12/93
Ethylbenzene	ug/kg	wet	5.0	ND	05/12/93
Xylenes, Total	ug/kg	wet	5.0	ND	05/12/93

These data have been reviewed and are approved for release.

Darrell C. Cain
Regional Director

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

Mr. Marc Briggs
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FOOTNOTES
for pages 1 through 14

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.

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Offices Serving: Minneapolis, Minnesota
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Denver, Colorado

Client Reference: Exxon 7-7003 (FE)

PURGEABLE FUELS AND AROMATICS
Batch: 70 21040
Samples: 70 0064619

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/kg wet	200	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/kg wet	1.0	ND
Toluene	ug/kg wet	1.0	ND
Ethylbenzene	ug/kg wet	1.0	ND
Xylenes, Total	ug/kg wet	1.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M	ug/kg wet	200	1000	92%	90%	2%
Benzene	ug/kg wet	1.0	40.0	102%	103%	0%
Toluene	ug/kg wet	1.0	40.0	96%	96%	0%
Ethylbenzene	ug/kg wet	1.0	40.0	95%	95%	0%
Xylenes, Total	ug/kg wet	1.0	120	98%	98%	0%

Mr. Marc Briggs
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QUALITY CONTROL DATA

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

PURGEABLE FUELS AND AROMATICS
Batch: 70 21051
Samples: 70 0064627, 70 0064635, 70 0064643, 70 0064651, 70 0064660
70 0064678, 70 0064686, 70 0064694, 70 0064708, 70 0064716
70 0064724, 70 0064732, 70 0064740

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/kg wet	200	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/kg wet	1.0	ND
Toluene	ug/kg wet	1.0	ND
Ethylbenzene	ug/kg wet	1.0	ND
Xylenes, Total	ug/kg wet	1.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M	ug/kg wet	200	1000	104%	92%	12%
Benzene	ug/kg wet	1.0	40.0	98%	98%	0%
Toluene	ug/kg wet	1.0	40.0	95%	95%	0%
Ethylbenzene	ug/kg wet	1.0	40.0	97%	97%	0%
Xylenes, Total	ug/kg wet	1.0	120	100%	100%	0%

Mr. Marc Briggs
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FOOTNOTES
for pages 16 through 17

May 13, 1993
PACE Project Number: 430506511

Client Reference: Exxon 7-7003 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.
RPD Relative Percent Difference

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EXXON COMPANY, U.S.A.

P.O. Box 4415, Houston, TX 77210-4415

CHAIN OF CUSTODY

4/30506-511

☒ Novato, CA, 11 Digital Drive, 94949 (415) 883-6100

☐ Huntington Beach, CA, 5702 Bolsa Avenue, 92649 (714) 892-2565

Page 1 of 2

Consultant's Name: RESNA

Address: 3315 Almaden Expressway, Suite 34, San Jose, CA 95118

Site Location: 349 Main St., Pleasanton

Project #:

Consultant Project #: 7-7003

Consultant Work Release #:

Project Contact: Marc Briggs

Phone #(408)264-7723 Fax #:264-2435

Laboratory Work Release #: 09300255/COH1

EXXON Contact: Vicki Guensler ☐ EE ☐ C&M

Phone #: (510)246-8776 Fax #:

EXXON RAS #: 7-7003

Sampled by (print): BARBARA SIEMINSKI

Sampler's Signature: Barbara Sieminski

Shipment Method: Courier

Air Bill #:

Shipment Date:

TAT. ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Standard (5 day)

ANALYSIS REQUIRED

Sample Condition as Received
Temperature ° C: ____
Cooler #: ____
Inbound Seal Yes No
Outbound Seal Yes No
PACE Courier

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1										COMMENTS
S-5-B21	5/3/93	Soil		1	64619	X												
S-10-B21	5/3/93	Soil			64627	X												
S-15-B21	5/3/93	Soil			64635	X												
S-17.5-B21	5/3/93	Soil			64643	X												
S-24.5-B21	5/3/93	Soil			64651	X												
S-5-B20	5/3/93	Soil			64660	X												
S-10-B20	5/3/93	Soil			64678	X												
S-15-B20	5/3/93	Soil			64686	X									1			
S-18-B20	5/3/93	Soil			64694	X												

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time
Barbara Sieminski	5/6	1330	Ed Kolb - Pace	5/6	1330
Ed Kolb - Pace	5/6	1600	Pace	5/6/93	1600

Additional Comments.

Distribution: R/3 White - Original Yellow - Exxon Pink - Lab Goldenrod - Consultant Field Staff

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EXXON COMPANY, U.S.A.

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CHAIN OF CUSTODY

450806.511

☒ Novato, CA, 11 Digital Drive, 94949 (415) 883-6100

☐ Huntington Beach, CA, 5702 Bolsa Avenue, 92649 (714) 892-2565

Consultant's Name: RESNA

Address: 3315 Almaden Expressway, Suite 34, San Jose, CA 95118

Site Location: 349 Main St., Pleasanton

Project #:

Consultant Project #: [illegible] 13005.01

Consultant Work Release #:

Project Contact: Marc Briggs

Phone # (408) 264-7723 Fax #: 264-2435

Laboratory Work Release #: C930225S/(0#1)

EXXON Contact: Marla Guenzler ☐ EE ☐ C&M

Phone # (510) 246-8776 Fax #:

EXXON RAS #: 7-7603

Sampled by (print): BARBARA SIEMINSKI

Sampler's Signature: Barbara Sieminski

Shipment Method: Courier

Air Bill #:

Shipment Date:

TAT: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Standard (5 day)

ANALYSIS REQUIRED

Sample Condition as Received
Temperature ° C: ____
Cooler #: ____
Inbound Seal Yes No
Outbound Seal Yes No
PACE courier

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1	COMMENTS
S-5-B19	5/4/93	Soil		1	6470.8	X			
S-10-B19	5/4/93	Soil			6471.6	X			
S-15-B19	5/4/93	Soil			6472.4	X			
S-17.5-B19	5/4/93	Soil			6473.2	X			
S-25.5-B19	5/4/93	Soil		↓	6474.0	X			

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time
Barbara Sieminski	5/6	1330	Ed Kottler - Pace	5/6	1330
Ed Kottler Pace	5/6	1600	D. Lapp Pace	5/6/93	1600

Additional Comments

Distribution: R/3 White - Original Yellow - Exxon Pink - Lab Goldenrod - Consultant Field Staff

RESNA
Working to Restore Nature

APPENDIX H

SOIL REMOVAL RECORD

Dillard Environmental Services

A Division of Dillard Trucking, Inc.

P.O. Box 218 • Byron, CA 94514
Phone (510) 634-6850 • Fax (510) 634-0569
EPA #CAD981692809 • D.O.H.S. #1715 • CA LIC. #624665-A HAZ

January 18, 1994

RESNA
3315 Almaden Expressway #34
San Jose, CA 94118

Fax# (408)264-2435

Attn: Mark Briggs

Re: Exxon Station #7-7003 - 349 Main Street, Pleasanton, CA
Removed - 224 cubic yards of bulk soil

Dear Mark:

Please be advised that the bulk soil from the above referenced site has been removed. The soil was taken to BFI Landfill, Livermore on December 13, 1993.

I trust that you will find everything in order. If you have any questions, please do not hesitate to call.

Sincerely,

DILLARD ENVIRONMENTAL SERVICES
A Division of Dillard Trucking, Inc.

Donna L. Pedersen
Project Manager

DLP/st