Draft Interim Product Recoverability Report
Nestle USA, Inc.
Former Carnation Dairy Facility
1310 14th Street
Oakland, California

Prepared for

Nestle USA, Inc.

Prepared by

EA Engineering, Science, and Technology

May 1996

NESTLÉ USA, INC.

800 NORTH BRAND BLVD
GLENDALE, CA 91203

ENVIRONMENTAL STRATEGY/PLANNING

May 24, 1996

Alameda County Health Agency
Division of Clean Water Program
1131 Harbor Bay Parkway
Alameda, CA 94502-6577

Attn.: Ms. Jennifer Eberle

Ref: Interim Product Recoverability Report
Nestlé Food Company (Former Carnation Dairy Facility)
1310 14th Street, Oakland, California 94607

Dear Ms. Eberle:

Per our earlier conversation enclosed are two copies of "Interim Product Recoverability Report." EA Engineering Science and Technology has completed pilot tests on air sparging and is currently evaluating the test results. The report on this pilot tests will be forwarded to you as soon as the evaluation is complete. As you may recall from our earlier conference call, at present we are evaluating the "multi-phase bio-slurping" technology for removal of free product.

Should you have any questions, please contact me at (818) 549-5948.

Very truly yours,

Binayak P. Acharya

CC: Celeste Miller - 15 W/O
Walter Carey - NMF W/O
Noelia Marti-Colon - 20 W/O
Doug Oram - EA Engineering Science & Technology W/O

Oakland/achd2/52496

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ENVIRONMENTAL PROTECTION

60966.01.0008

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1310 14th Street
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800 North Brand Boulevard
Glendale, California 91203

Prepared by

A Engineering, Science, and Technology
3468 Mt. Diablo Boulevard, Suite B-100
Lafayette, California 94549
(510) 283-7077

May 1996

CONTENTS

1. INTRODUCTION

The Nestle Carnation Dairy site, located in a light industry zone of Oakland, with some commercial and residential properties nearby, was occupied by dairy product facilities from 1915 to the time it was closed in 1991. Petroleum hydrocarbons, in the form of a non-aqueous phase liquid (NAPL, also commonly referred to as free product), were first discovered on the site in 1989. Although several attempts have been made at remediation, no direct NAPL recovery has been conducted at the site. Since 18 December 1995, EA Engineering, Science, and Technology has been investigating the feasibility of recovering product at the site by periodically gauging and removing NAPL from wells. NAPL is being gauged and removed over the range of water level elevations normally encountered at the site. The results of three NAPL recovery tests are covered in this report. Additional testing is ongoing and is expected to be completed in mid-May. Additional product recovery/testing or remedial action will be implemented based on the results of the testing through mid-May.

1.1 SITE DESCRIPTION

The Nestle site, which slopes gently to the west, is completely paved over with asphalt or concrete. It abuts Cypress Street to the west, and lies between 14th Street and 16th Street south-north (Figure 1). The primary area of concern is a portion about 200 x 200 ft in the northwest corner. Along the north and west sides of this area is an L-shaped building 200 x 60 ft on the north side and 200 by 40 ft on the west. Four motor vehicle service bays occupied the northeast 80 x 60 ft section of the building (Figure 2).

The soil under the 200 x 200 ft area has been described by Harding Lawson Associates (HLA 1991) as largely clayey or silty sand to a depth of about 25 feet, with some shallow silt at the top, which is deeper in the northwest direction, and relatively few and small lenses of sand, more in the southeasterly direction.

The groundwater elevation at the site generally ranges seasonally between 4 and 7 ft above mean sea level, about 6-9 feet below ground surface. The regional and local groundwater gradient is to the northwest (see Figure 1).

Near the water table, NAPL is found regularly in up to 20 of the many wells on the site, mainly in the area where a waste oil UST (underground storage tank) and fuel dispensing lines were removed in 1989.

1.2 PREVIOUS WORK

Before 1989, delivery trucks were fueled near the service bays and were repaired and maintained in them. In that year Ananias Geological Engineers (AGE) removed the waste oil UST from within the service area and four USTs, two for gasoline and two for diesel fuel, from the area to the southeast of the bays, along with the fuel dispensing lines. Floating hydrocarbons were found in the excavations. AGE installed 33 4-in. monitoring wells, MW1-MW33 (MW 17-MW21 were later abandoned), and 103 2-in. PR (product recovery) wells, a groundwater extraction and treatment system, and a soil vapor extraction and treatment system. AGE

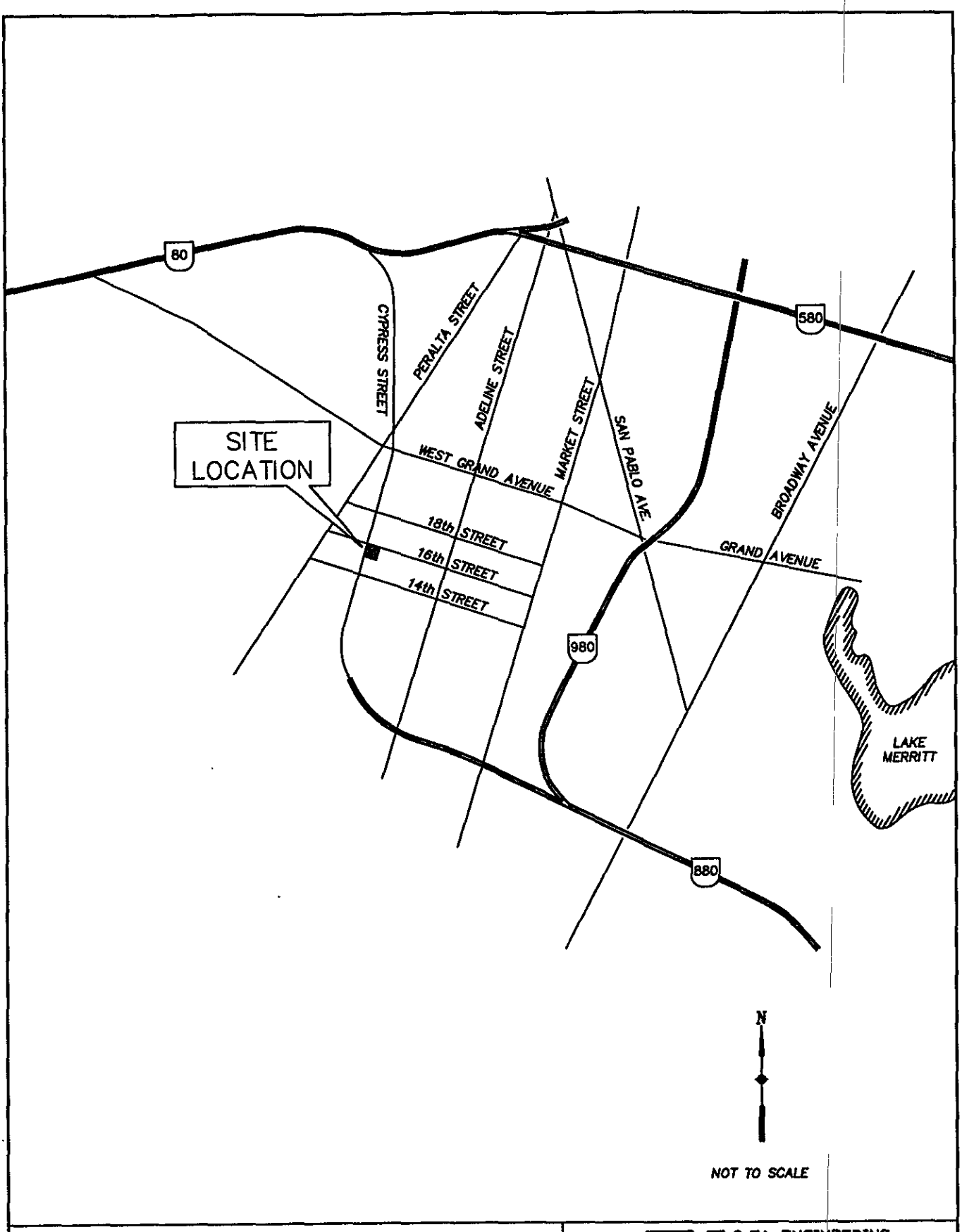

FIGURE 1.
SITE LOCATION MAP
NESTLE FACILITY, 1310 14th STREET,
OAKLAND, CALIFORNIA.

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

PROJECT NO: 60966.01.0008	DATE: 2/8/96
FILE NAME: LOCATION.DWG	REVIEWED BY: A. MOORE

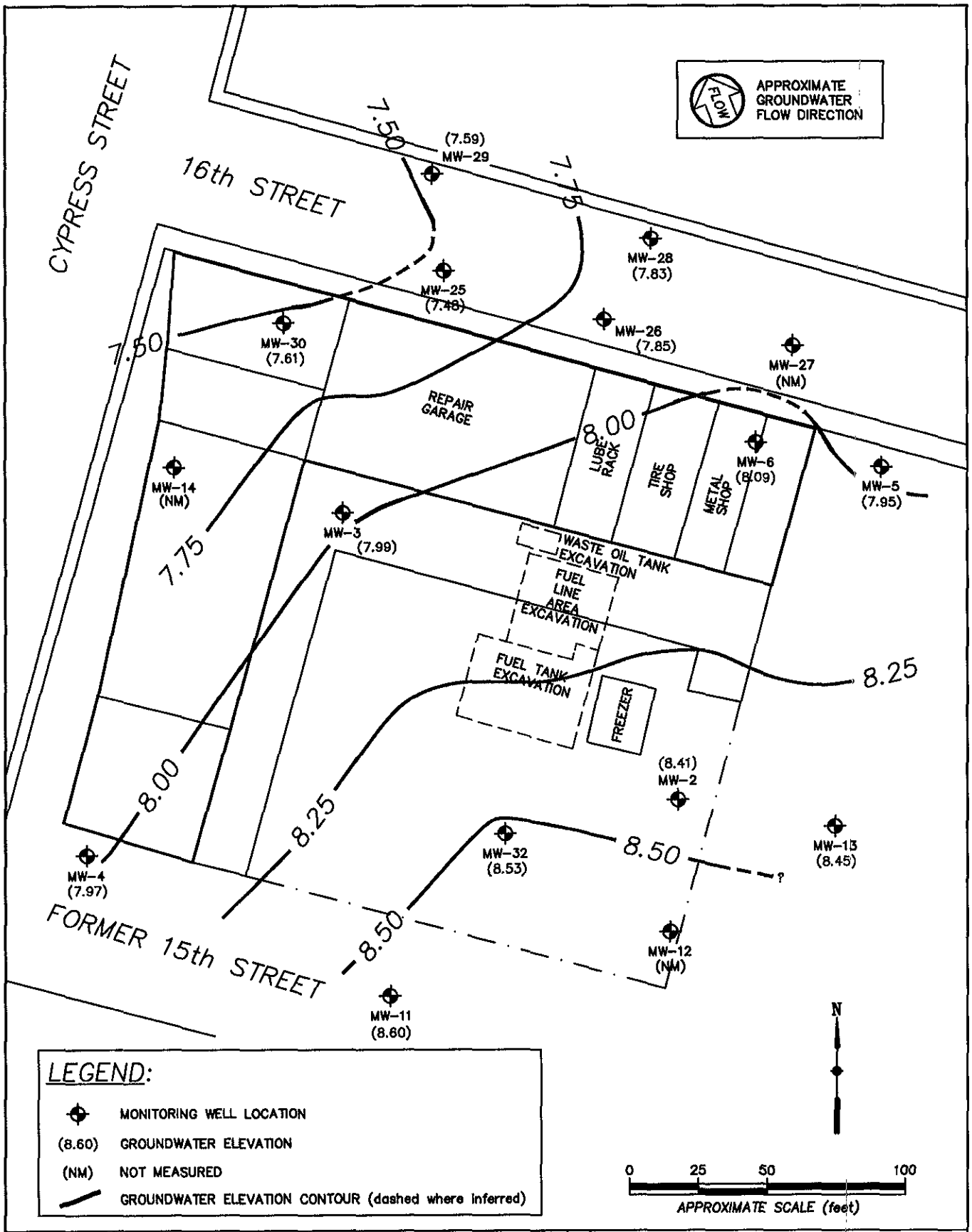

FIGURE 2.
GROUNDWATER ELEVATIONS IN SAMPLED WELLS
NESTLE FACILITY, OAKLAND, CALIFORNIA
12 MARCH 1996

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

PROJECT NO.: 60966.01.0008	DATE: 5/22/96
FILE NAME: NEST_296.DWG	REVIEWED BY: C. MARTING

stockpiled 60 cy (cubic yards) of soil from the excavations on the site. AGE extracted about 5,000 gallons of hydrocarbons in about 1.5 million gallons of water at the site.

In spring and summer 1991, HLA drilled 20 soil borings to the estimated bottom of the hydrocarbon-impacted zone (about 20 ft bgs) and sampled soil at 5 ft bgs, at the top of the impacted zone; at 10, 12.5, and 15 feet (the middle); and at 20 ft (at the bottom). HLA also gauged NAPL and groundwater in about 40 wells monthly, sampled the stockpiled soil, re-developed two MW and two PR wells and sampled groundwater in 20 MW wells at quarterly intervals. HLA gauged all available MW and selected PR wells. They estimated that about 23,000 cy of soil contained hydrocarbons at concentrations > 10 mg/kg, of which 13,000 cy had concentrations > 100 mg/kg.

On 9 July 1991, HLA measured 5 ft of NAPL in MW22, 1-2 ft in nine more wells, and 0-1 ft in seven wells. From these data, they estimated about 25,000 gal of liquid-phase hydrocarbons at the site on that date.

In 1994, Park (Park Environmental) reported removal of an estimated 5,200 gallons of NAPL (equivalent) with a vapor extraction system. Park also gauged NAPL and groundwater elevations, from February 1994 to early December 1995.

The persistence of NAPL at the site, even though it appears to be confined to a portion of the site, led the Nestle Company to retain EA (EA Engineering, Science, and Technology) to examine methods of remediation. This report describes the preliminaries of an investigation into the most effective means of accomplishing that task.

1.3 FREE PRODUCT RECOVERY CONCEPTUAL MODEL

Based on NAPL removal tests that started in December 1995, a conceptual model of the distribution and recoverability of free product at the site is being developed. Field efforts are ongoing in an attempt to reach conclusions about the behavior of the NAPL, with emphasis on its recoverability. The work thus far has led to the development of the conceptual model shown in Figure 3. The main points of the model are as follows:

- Results of the monitoring indicate that the product is not laterally or vertically continuous, and is not moving downgradient through the subsurface sediments. Thicknesses of NAPL were measured in 42 wells in one or more of the previous investigations. The number of wells containing NAPL was 15 on 16 April 1996.

- It is thought that the original release of free product (NAPL) has been smeared over the aquifer thickness between the elevation of the annual low water and the annual high water, as shown schematically in Figure 3. Free product is present as trapped globular masses among the grains of the aquifer that are wetted by the continuous phase of water. As a separate phase, the product likely has low mobility and is not recoverable to any great extent using conventional methods such as passive recovery, bailing, or dual-phase pumping.

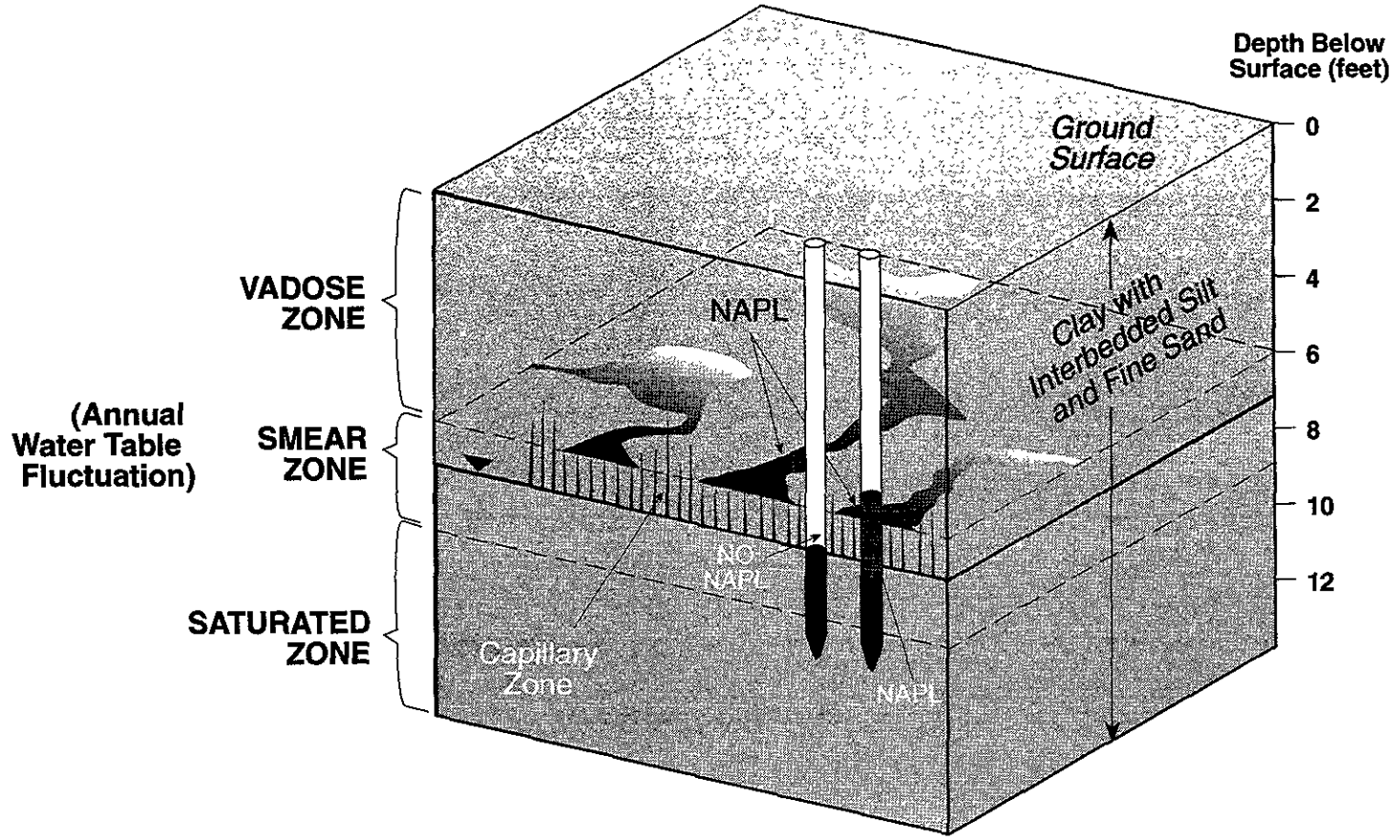

Figure 3. Conceptual model of distribution of NAPL, the Nestle site, Oakland, California.

Drawn	ELA	Date	5/3/96
Reviewed		Date	
Rev		Date	
Final		Date	

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- This smear zone, at the upper part of the saturated zone, is thought to contain most of the BTEX and TPH constituents. Smaller amounts of hydrocarbons are found in the vadose zone and as dissolved plumes in the saturated zone.

2. NAPL GAUGING AND REMOVAL

2.1 PRODUCT REMOVAL PROCEDURE

On three occasions: 18 December 1995, 27 February 1996, and 16 April 1996, certain wells were gauged and bailed. Forty-two wells (all those in which appreciable thicknesses of NAPL were measured between February 1994 and December 1995) were gauged with an oil-water interface probe, and the time was noted. If the well contained more than 0.05 feet of NAPL, the NAPL was removed with a peristaltic pump and the amount was noted. The well was re-gauged soon after, generally within five minutes. After all the wells on the site were gauged, the operator went back to the wells from which product had been removed and regauged them. If appreciable NAPL had accumulated (>0.05 ft), it was again removed. All of the wells from which NAPL was removed were gauged again 2-10 days later.

2.2 REDUCTION OF DATA

The data on depth to product and to water, the calculated thickness of NAPL, the amount of NAPL bailed, and any comments about conditions in the well were transcribed from a field notebook into a spreadsheet and used to calculate and plot information about the wells. The data are transcribed in Table 1.

3. RESULTS OF THE INVESTIGATION

3.1 LOCATION AND THICKNESS OF NAPL

Among the hundred or so wells in the area of interest, 42 wells (shown black in Figure 4) are routinely gauged, and greater or lesser thicknesses of NAPL are generally found in 17 of them (Figures 5 and 6). The occurrence of NAPL in some of the 17 wells is not consistent, as can be seen by comparing these figures. The inconsistency is graphed in Figure 7, where, for example, wells PR22 and MW23, which usually contain NAPL, did not in December 1994 and March 1995, respectively.

The variability over time of the NAPL thicknesses in each of the wells is likely influenced by a number of factors. When a graph of the NAPL thickness in wells versus time is compared with a groundwater hydrograph, it shows that there is a strong correlation between greater NAPL thickness (Figure 7) and higher water levels (Figure 8).

3.2 RECOVERY OF NAPL

The three systematic NAPL recovery events that have been conducted thus far indicate that a greater volume of NAPL can be collected when the water table elevation is higher: During the two days when NAPL was removed in December, a total of 3 gallons was recovered. The water level at this time was at its annual low level (Figure 8). In both February and April, the amount of NAPL removed increased to 16 gallons for each month. In February the water level had increased about one foot from that measured in December, and the water level peaked in March just prior to the April gauging and removal.

The results for a representative well, PR21, show the relationships between water level, NAPL thickness, and recoverable NAPL observed so far (Figure 9). The graph in the upper left shows that higher water levels correspond with greater NAPL thickness. The graph in the upper right shows that more NAPL was recovered during February and April, when the water level was higher, than was recovered in December, when the water level was low.

In the first three NAPL recovery tests, a total of 35 gallons (133 L) of NAPL was recovered from 17 wells. The volume of NAPL that has been removed from each well is indicated and noted (in liters) in Figure 10. A little over half of that volume was recovered from three wells (E-0, E-5, and PR21). NAPL is currently being gauged and removed from wells weekly for a period of four weeks, and the final report, which will contain conclusions and recommendations, will be prepared at that time. If at the end of the four weeks NAPL continues to recover into these wells, passive skimmers will be installed.

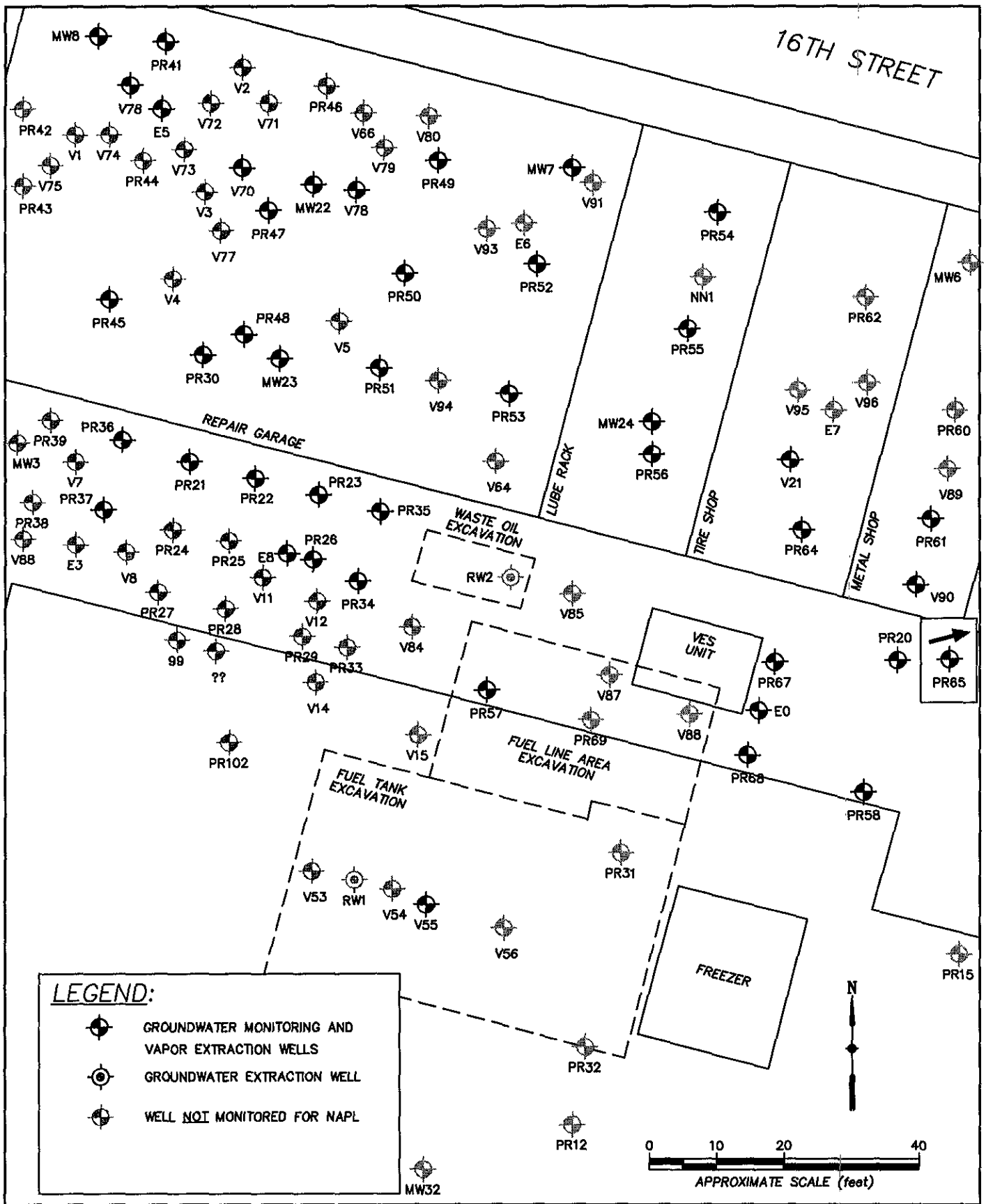

FIGURE 4.
LOCATION OF WELLS MONITORED FOR NAPL
NESTLE FACILITY,
OAKLAND, CALIFORNIA

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PROJECT NO.	DATE
60966.01.0008	5/22/96
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NESTLE5.DWG	C. MARTING

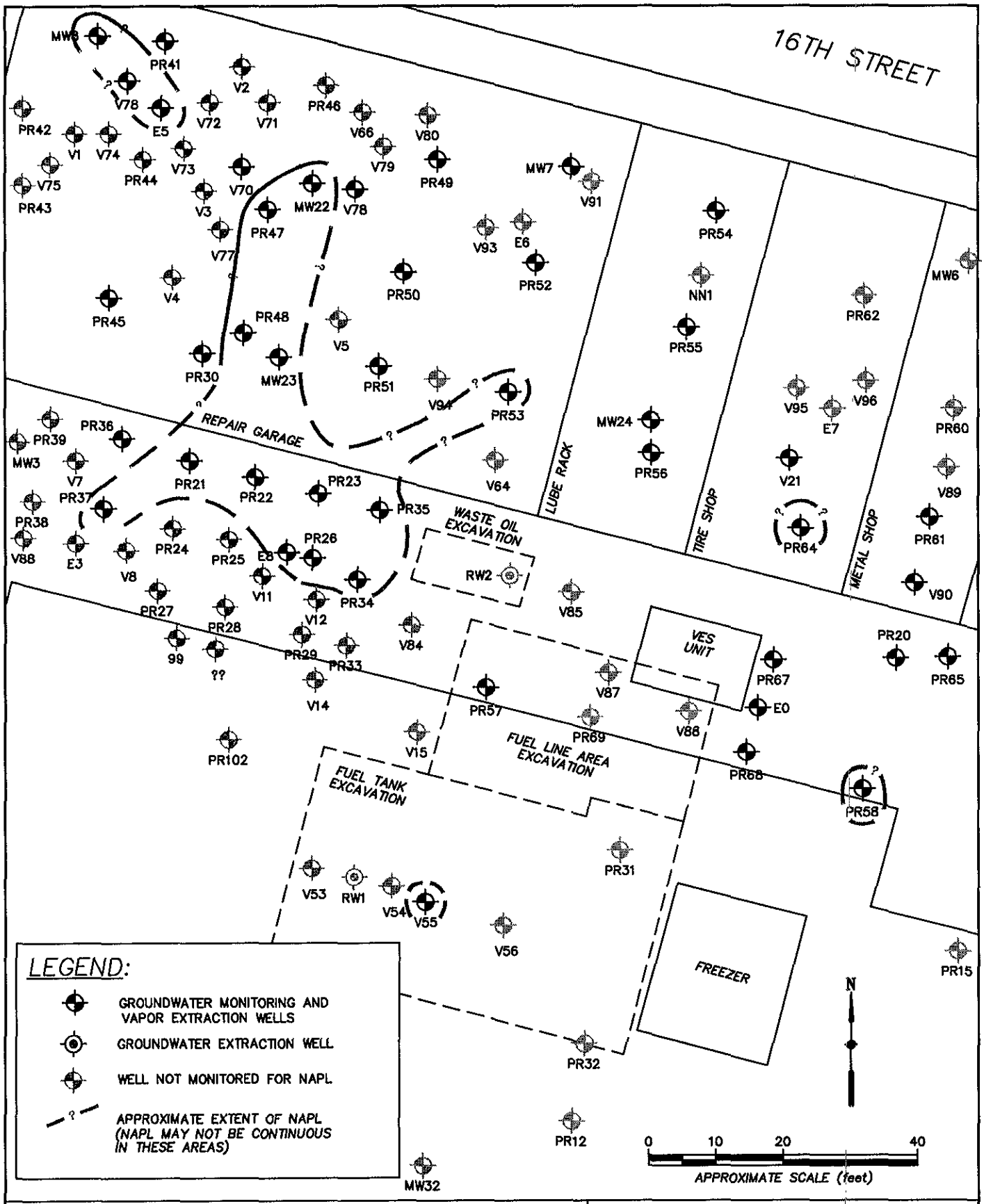

FIGURE 5.
SITE PLAN SHOWING WELL LOCATIONS CONTAINING FREE PRODUCT, 12/6/95 – 12/28/95
FORMER NESTLE FACILITY,
OAKLAND, CALIFORNIA

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

PROJECT NO.: 60966.01.0008	DATE: 5/22/96
FILE NAME: NESTLE2.DWG	REVIEWED BY: C. MARTING

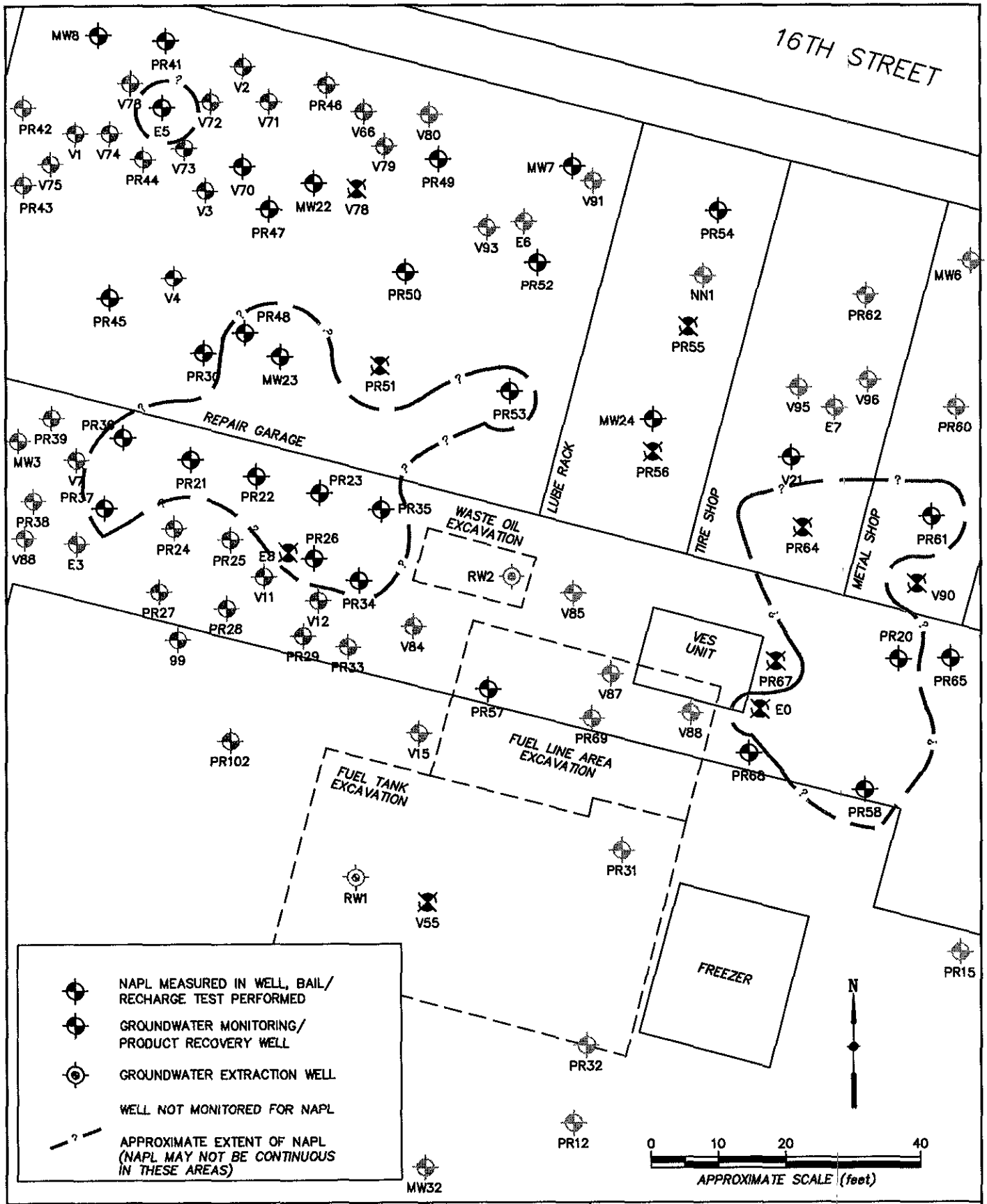

FIGURE 6.
SITE PLAN SHOWING WELL LOCATIONS CONTAINING FREE PRODUCT 27 FEBRUARY 1996
FORMER NESTLE FACILITY,
OAKLAND, CALIFORNIA

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

PROJECT NO. 60966.01.0008	DATE 5/22/96
FILE NAME NESTLE6.DWG	REVIEWED BY C. MARTING

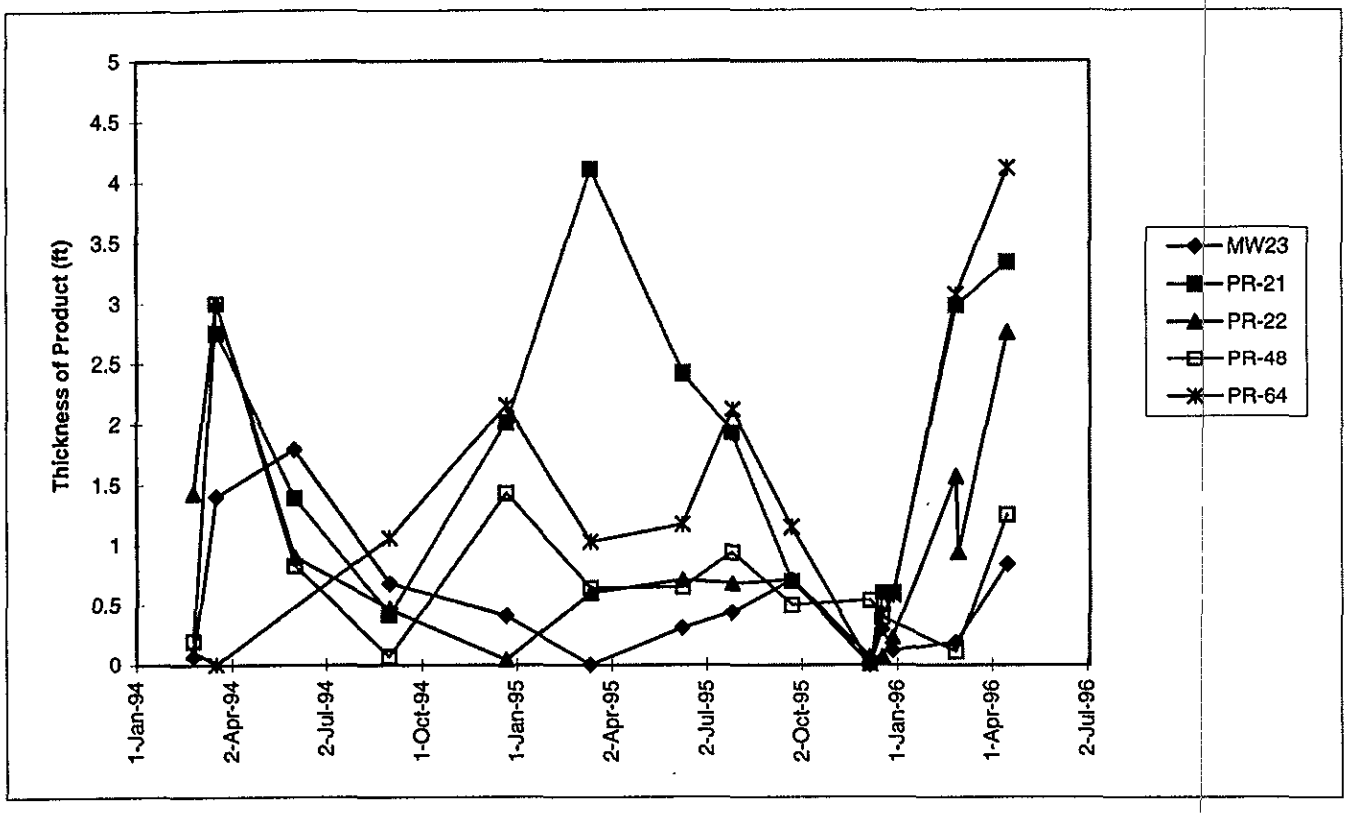

Figure 7. NAPL thickness in 5 wells, Nestle site, Oakland, California, 1 Jan 1994 - 16 Apr 1996.

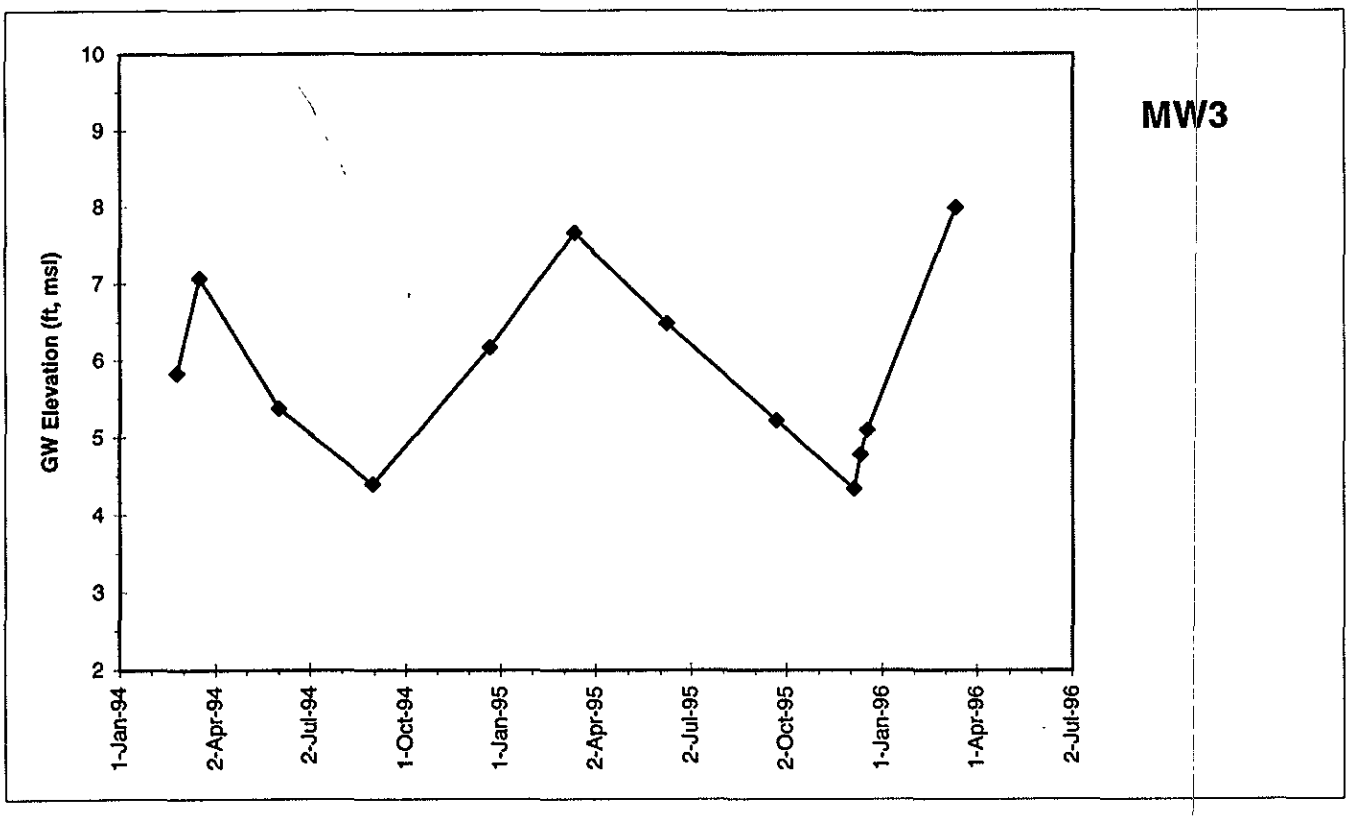

Figure 8. Hydrograph measured in well MW3, Nestle site, Oakland, California, 1 Jan 1994 - 16 Apr 1996.

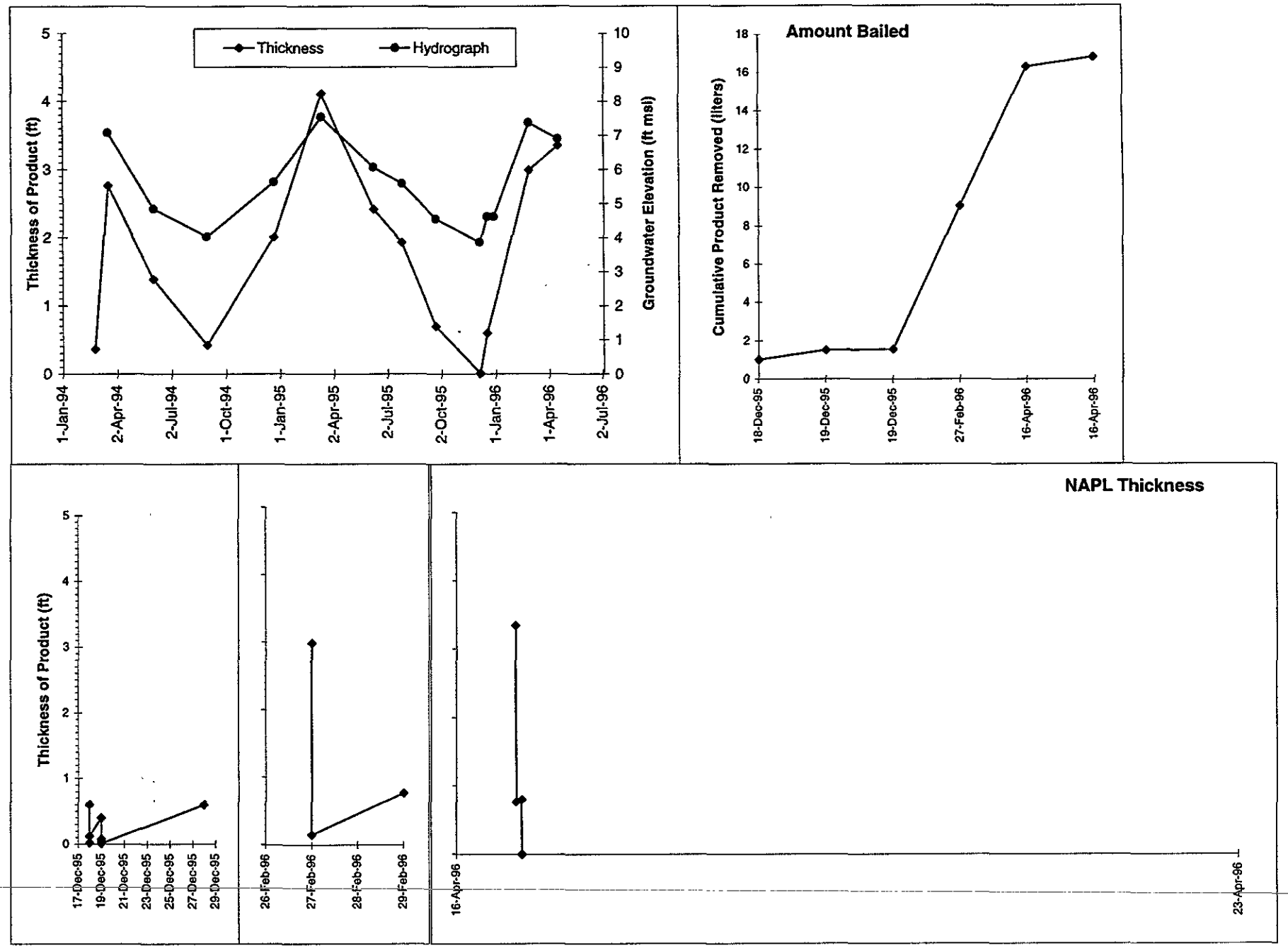

Figure 9. Measured NAPL thickness and amount of NAPL bailed in well PR21, Nestle Site, Oakland, California, 1994 - 1996.

PR21

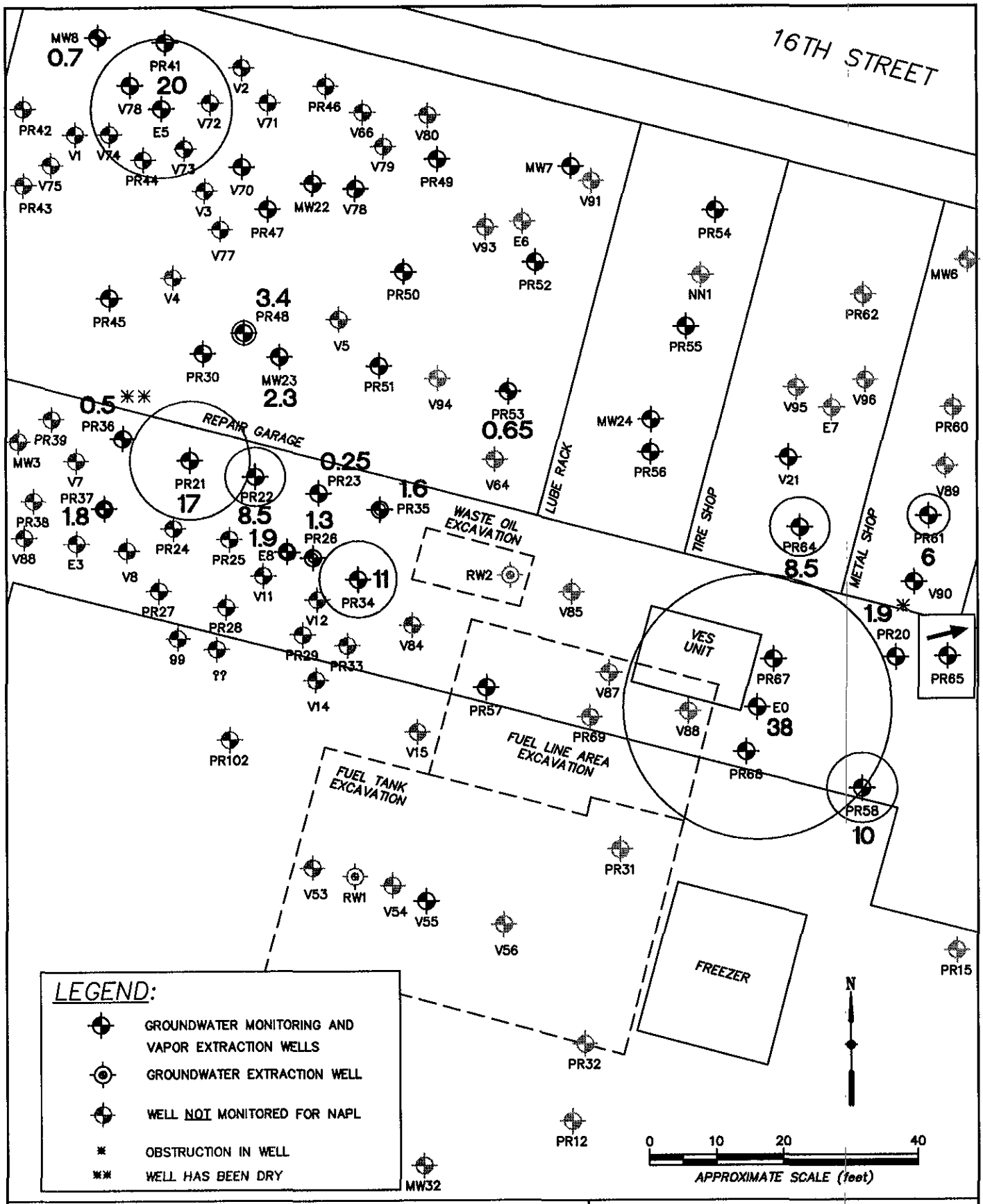

FIGURE 10.
TOTAL QUANTITY (LITERS) OF NAPL REMOVED FROM WELLS AT THE NESTLE FACILITY, OAKLAND, CA., DECEMBER 1995 – APRIL 1996

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FILE NAME: NESTLE5.DWG	REVIEWED BY: C. MARTING

TABLE 1 RESULTS OF GAUGING, NESTLE COMPANY FORMER CARNATION MILK PLANT, 1310 14TH STREET OAKLAND, 1994-1996

Well No.	Gauging Date	Time	TOC Elev.	Depth to Prod.	Depth to Water	Product Thick.	GWE	Comments
MW-7	24-Feb-94	-	14.29	8.64	9.78	1.14	4.51	
14.29	18-Mar-94	-	14.29	6.56	9.38	2.82	4.91	
	2-Jun-94	-	14.29	9.12	9.38	0.26	4.91	
	31-Aug-94	-	14.29	9.87	9.88	0.01	4.41	
	22-Dec-94	-	14.29	8.29	8.33	0.04	5.96	
	13-Mar-95	-	14.29	-	6.72	0.00	7.57	
	9-Jun-95	-	14.29	-	8.79	0.00	5.50	
	22-Sep-95	-	14.29	9.30	9.51	0.21	4.78	
	27-Feb-96	-	14.29	-	6.60	0.00	7.69	
	16-Apr-96	11:41		6.92	6.93	0.01	7.36	
MW-8	24-Feb-94	-	14.20	8.55	8.99	0.44	5.21	
	18-Mar-94	-	14.20	7.34	7.64	0.30	6.56	
	2-Jun-94	-	14.20	8.93	9.24	0.31	4.96	
	31-Aug-94	-	14.20	9.82	10.13	0.31	4.07	
	22-Dec-94	-	14.20	8.21	8.47	0.26	5.73	
	13-Mar-95	-	14.20	6.77	6.85	0.08	7.35	
	9-Jun-95	-	14.20	8.81	8.90	0.09	5.30	
	27-Jul-95	-	14.20	8.32	8.55	0.23	5.65	
	22-Sep-95	-	14.20	9.29	9.53	0.24	4.67	
	6-Dec-95	-	14.20	9.94	10.18	0.24	4.02	
	18-Dec-95	-	14.20	9.16	9.36	0.20	4.84	
	18-Dec-95	2:20	14.20	-	9.62	0.00	4.58	0.5n
	18-Dec-95	2:57	14.20	-	9.25	0.00	4.95	
	19-Dec-95	9:00	14.20	9.21	9.30	0.09	4.90	
	19-Dec-95	11:50	14.20	9.34	9.35	0.01	4.85	0.2n 0.4w
	19-Dec-95	12:20	14.20	9.25	9.28	0.03	4.92	
	28-Dec-95	9:30	14.20	9.22	9.27	0.05	4.93	
	27-Feb-96	-	14.20	-	6.67	0.00	7.53	
	16-Apr-96	11:50	14.20	-	6.98	0.00	7.22	
MW-22	24-Feb-94	-	14.44	8.59	10.13	1.54	4.31	
	18-Mar-94	-	14.44	6.98	-	>3.0	-	
	2-Jun-94	-	14.44	9.02	10.16	1.14	4.28	
	31-Aug-94	-	14.44	9.97	10.16	0.19	4.28	
	22-Dec-94	-	14.44	8.39	8.42	0.03	6.02	
	13-Mar-95	-	14.44	-	5.92	0	8.52	
	9-Jun-95	-	14.44	-	8.60	0	5.84	
	27-Jul-95	-	14.44	-	8.49	0	5.95	sheen
	22-Sep-95	-	14.44	9.42	9.74	0.32	4.70	
	6-Dec-95	-	14.44	10.08	10.38	0.30	4.06	2' no screen showing
	18-Dec-95	-	14.44	-	9.35	0	5.09	bailer shows no NAPL
	27-Feb-96	-	14.44	-	6.75	0	7.69	
	16-Apr-96	12:06	14.44	-	7.09	0.00		
MW-23	24-Feb-94	-	14.48	8.87	8.94	0.07	5.54	
	18-Mar-94	-		7.04	8.44	1.40	6.04	
	2-Jun-94	-		8.21	10.00	1.79	4.48	
	31-Aug-94	-		9.93	10.61	0.68	3.87	
	22-Dec-94	-		8.32	8.73	0.41	5.75	
	13-Mar-95	-		-	5.52	-	8.96	
	9-Jun-95	-		8.24	8.55	0.31	5.93	
	27-Jul-95	-		8.43	8.87	0.44	5.61	
	22-Sep-95	-		9.35	10.06	0.71	4.42	
	6-Dec-95	-		-	10.07	-	4.41	2', no screen showing; strong odor
	18-Dec-95	-		9.40	9.70	0.30	4.78	0.50n
	18-Dec-95	17:07		-	9.89	-	4.59	
	18-Dec-95	17:55		9.46	9.49	0.03	4.99	
	19-Dec-95	9:00		9.45	9.55	0.10	4.93	

TABLE 1 RESULTS OF GAUGING, NESTLE COMPANY FORMER CARNATION MILK PLANT, 1310 14TH STREET OAKLAND, 1994-1996

Well No.	Gauging Date	Time	TOC Elev.	Depth to Prod.	Depth to Water	Product Thick.	GWE	Comments
	19-Dec-95	10:50		-	9.88	-	4.60	0.05n 1w
	19-Dec-95	12:12		9.48	9.52	0.04	4.96	
	28-Dec-95	9:30		9.40	9.52	0.12	4.96	
	27-Feb-96	9:00		6.69	6.88	0.19	7.60	
	27-Feb-96	10:00		-	7.40	-	7.08	0.25n 0.5w
	29-Feb-96	-		6.85	7.00	0.15	7.48	
	16-Apr-96	12:19		6.91	7.75	0.84	6.73	1.50n 0.75w
		12:23		7.77	7.78	0.01	6.70	
		13:51		7.02	7.43	0.41	7.05	
MW-24	24-Feb-94	-	14.67	8.95	-	12.10	-	
	18-Mar-94	-	14.67	7.45	-	>3.0	-	
	2-Jun-94	-	14.67	9.11	10.08	0.97	4.59	
	31-Aug-94	-	14.67	10.19	10.58	0.39	4.09	
	22-Dec-94	-	14.67	-	8.55	0	6.12	
	13-Mar-95	-	14.67	-	6.68	0	7.99	
	9-Jun-95	-	14.67	-	9.54	0	5.13	
	22-Sep-95	-	14.67	9.35	10.76	1.41	3.91	
	6-Dec-95	-	14.67	10.39	10.39	0	4.28	
	27-Feb-96	-	14.67	-	6.70	0	7.97	
E-0	27-Jul-95	-		7.81	10.53	2.72		
	6-Dec-95	-		-	10.75	-		6", ~1' stickup
	27-Feb-96	9:00		5.5	9.42	3.92		30n 1w
	27-Feb-96	10:00		6.85	6.91	0.06		
	29-Feb-96	-		6.53	6.60	0.07		
	16-Apr-96	10:55		7.38	8.55	1.17		8n 1w
		13:38		7.65	7.68	0.03		
E-5	6-Dec-95	-		9.75	11.25	1.50		6"
	18-Dec-95	-		9.55	11.00	1.45		1.20n (1.2' blkish product left in ba
	18-Dec-95	11:15		10.05	10.10	0.05		11.0n (in 10 min.)
	18-Dec-95	11:16		9.98	10.04	0.06		
	18-Dec-95	11:20		9.72	9.80	0.08		
	18-Dec-95	11:50		9.45	9.65	0.20		
	18-Dec-95	12:18		9.45	9.64	0.19		
	18-Dec-95	12:48		9.43	9.63	0.20		
	18-Dec-95	14:21		9.43	9.63	0.20		
	18-Dec-95	14:25		9.66	9.68	0.02		1.50n
	18-Dec-95	15:00		9.45	9.47	0.02		
	19-Dec-95	9:00		9.49	9.53	0.04		
	19-Dec-95	11:30		9.63	9.65	0.02		0.50n 1.5w
	19-Dec-95	12:15		9.48	9.50	0.02		check w/ bailer - sheen
	28-Dec-95	9:30		9.48	9.67	0.19		
	27-Feb-96	9:00		7.00	7.27	0.27		
	27-Feb-96	10:00		7.50	7.53	0.03		5.70 n 5.7w
	29-Feb-96	-		7.06	7.09	0.03		
	16-Apr-96	11:53		6.18	6.18	0.00		
E-8	27-Jul-95	-		8.76	8.86	0.10		
	6-Dec-95	-		10.39	10.81	0.42		6"
	27-Feb-96	9:00		7.69	7.15	0.54		
	27-Feb-96	10:00		-	7.09	-		1.90n 1.9w
	29-Feb-96	-		7.05	7.07	0.02		
	16-Apr-96	13:16		7.00	7.00	0.00		
PR-20	24-Feb-94	-	14.36	8.2	9.35	1.15	5.01	
	18-Mar-94	-	14.36	6.28	9.69	3.41	4.67	

TABLE 1 RESULTS OF GAUGING, NESTLE COMPANY FORMER CARNATION MILK PLANT, 1310 14TH STREET OAKLAND, 1994-1996

Well No.	Gauging Date	Time	TOC Elev.	Depth to Prod.	Depth to Water	Product Thick.	GWE	Comments
	2-Jun-94	-	14.36	8.46	9.91	1.45	4.45	
	31-Aug-94	-	14.36	9.31	10.19	0.88	4.17	
	22-Dec-94	-	14.36	7.68	8.72	1.04	5.64	
	13-Mar-95	-	14.36	5.93	6.07	0.14	8.29	
	9-Jun-95	-	14.36	7.73	7.89	0.16	6.47	
	27-Jul-95	-	14.36	7.35	9.89	2.54	4.47	
	22-Sep-95	-	14.36	8.75	9.87	1.12	4.49	
	18-Dec-95	-	14.36	-	-	-	-	probably broken tube in well
	27-Feb-96	9:00	14.36	6.10	9.60	3.50	4.76	
	27-Feb-96	10:00	14.36	9.77	9.81	0.04	4.55	1.90n
	29-Feb-96	-	14.36	6.10	8.75	2.65	5.61	
	16-Apr-96	10:51		5.52	8.15			Depth to obstruction
PR-21	18-Mar-94	-	14.37	6.60	9.36	2.76	5.01	
	2-Jun-94	-	14.37	9.17	10.56	1.39	3.81	
	31-Aug-94	-	14.37	10.23	10.65	0.42	3.72	
	22-Dec-94	-	14.37	8.24	10.25	2.01	4.12	
	13-Mar-95	-	14.37	5.8	9.91	4.11	4.46	
	9-Jun-95	-	14.37	7.7	10.12	2.42	4.25	
	27-Jul-95	-	14.37	8.3	10.23	1.93	4.14	
	22-Sep-95	-	14.37	9.64	10.34	0.70	4.03	
	6-Dec-95	-	14.37	10.5	10.51	0.01	3.86	2", no screen, stickup ~6"
	18-Dec-95	-	14.37	9.60	10.20	0.60	4.17	
	18-Dec-95	1:30	14.37	10.23	10.25	0.02	4.12	1.0n (brownish)
	18-Dec-95	3:04	14.37	9.82	9.94	0.12	4.43	
	19-Dec-95	9:00	14.37	9.69	10.09	0.40	4.28	
	19-Dec-95	9:45	14.37	10.10	10.15	0.05	4.22	0.50n 0.025w
	19-Dec-95	9:50	14.37	10.32	10.33	0.01	4.04	0.05n 0.15w
	19-Dec-95	12:00	14.37	9.85	9.93	0.08	4.44	
	19-Dec-95	12:01	14.37	10.14	10.15	0.01	4.22	0.10n 0.2w
	19-Dec-95	12:25	14.37	10.00	10.01	0.01	4.36	
	28-Dec-95	9:30	14.37	9.60	10.20	0.60	4.17	
	27-Feb-96	9:00	14.37	6.25	9.24	2.99	5.13	
	27-Feb-96	10:00	14.37	8.95	9.10	0.15	5.27	7.5n
	29-Feb-96	-	14.37	7.23	8.00	0.77	6.37	
	16-Apr-96	12:36	14.37	6.63	9.98	3.35	4.39	7.25n 1.25w
	16-Apr-96	12:50	14.37	7.23	8.00	0.77	6.37	
	16-Apr-96	13:56	14.37	6.89	7.69	0.80	6.68	0.5n 0.5w
	16-Apr-96	14:02	14.37	-	7.69	-		
PR-22	24-Feb-94	-	14.43	8.09	9.52	1.43	4.91	
	18-Mar-94	-	14.43	6.50	-	>3.0	-	
	2-Jun-94	-	14.43	8.71	9.61	0.90	4.82	
	31-Aug-94	-	14.43	9.69	10.16	0.47	4.27	
	22-Dec-94	-	14.43	8.34	8.38	0.04	6.05	
	13-Mar-95	-	14.43	7.70	8.30	0.60	6.13	
	9-Jun-95	-	14.43	8.06	8.77	0.71	5.66	
	27-Jul-95	-	14.43	8.08	8.76	0.68	5.67	
	22-Sep-95	-	14.43	9.08	9.79	0.71	4.64	
	6-Dec-95	-	14.43	9.95	10.02	0.07	4.41	2", no screen
	18-Dec-95	-	14.43	9.17	9.24	0.07	5.19	
	18-Dec-95	3:05	14.43	9.16	9.25	0.09	5.18	
	19-Dec-95	9:00	14.43	9.21	9.31	0.10	5.12	
	19-Dec-95	10:00	14.43	9.54	9.57	0.03	4.86	0.1 n 1.4w
	19-Dec-95	12:03	14.43	9.27	9.30	0.03	5.13	
	28-Dec-95	9:30	14.43	9.15	9.38	0.23	5.05	
	27-Feb-96	9:00	14.43	6.21	7.78	1.57	6.65	
	27-Feb-96	10:00	14.43	-	7.58	-	6.85	1n 0.5w
	29-Feb-96	-	14.43	6.60	7.54	0.94	6.89	

TABLE 1 RESULTS OF GAUGING, NESTLE COMPANY FORMER CARNATION MILK PLANT, 1310 14TH STREET OAKLAND, 1994-1996

Well No.	Gauging Date	Time	TOC Elev.	Depth to Prod.	Depth to Water	Product Thick.	GWE	Comments
	16-Apr-96	12:53	14.43	6.55	9.32	2.77	5.11	7n 0.25w
	16-Apr-96	13:05	14.43	8.59	8.88	0.29	5.55	
	16-Apr-96	13:56	14.43	6.89	7.69	0.80	6.74	0.5n 0.5w
	16-Apr-96	14:02	14.43	-	7.69	0.00	6.74	
PR-23	24-Feb-94	-	14.47	8.40	8.76	0.36	5.71	
	18-Mar-94	-	14.47	6.72	7.78	1.06	6.69	
	2-Jun-94	-	14.47	8.71	9.09	0.38	5.38	
	31-Aug-94	-	14.47	9.51	9.68	0.17	4.79	
	22-Dec-94	-	14.47	7.97	8.03	0.06	6.44	
	13-Mar-95	-	14.47	5.81	6.15	0.34	8.32	
	9-Jun-95	-	14.47	7.54	7.60	0.06	6.87	
	27-Jul-95	-	14.47	8.02	8.10	0.08	6.37	
	22-Sep-95	-	14.47	8.56	8.68	0.12	5.79	
	6-Dec-95	-	14.47	9.35	9.46	0.11	5.01	2", no screen; some water enterin
	18-Dec-95	-	14.47	9.33	9.43	0.10	5.04	
	18-Dec-95	1:43	14.47	9.57	9.59	0.02	4.88	0.25n
	18-Dec-95	3:06	14.47	9.33	9.35	0.02	5.12	
	19-Dec-95	9:00	14.47	9.22	9.24	0.02	5.23	
	19-Dec-95	10:05	14.47	-	9.66	-	4.81	sheen n 1.5w
	19-Dec-95	12:05	14.47	9.30	9.31	0.01	5.16	
	28-Dec-95	9:30	14.47	-	8.80	-	5.67	
	27-Feb-96	-	14.47	-	7.70	-	6.77	
	16-Apr-96	13:09		7.62	7.63	0.01		
PR-26	24-Feb-94	-	14.38	8.51	9.05	0.54	5.33	
	18-Mar-94	-	14.38	6.54	8.59	2.05	5.79	
	2-Jun-94	-	14.38	9.02	9.41	0.39	4.97	
	31-Aug-94	-	14.38	9.68	9.85	0.17	4.53	
	22-Dec-94	-	14.38	-	8.04	-	6.34	
	13-Mar-95	-	14.38	-	6.54	-	7.84	
	9-Jun-95	-	14.38	-	7.77	-	6.61	
	22-Sep-95	-	14.38	9.31	9.44	0.13	4.94	
	6-Dec-95	-	14.38	9.97	10.09	0.12	4.29	2", no screen showing
	18-Dec-95	-	14.38	9.38	9.48	0.10	4.90	
	18-Dec-95	1:48	14.38	9.51	9.53	0.02	4.85	0.5 n
	18-Dec-95	3:07	14.38	9.33	9.34	0.01	5.04	
	19-Dec-95	-	14.38	9.26	9.29	0.03	5.09	
	19-Dec-95	10:10	14.38	9.49	9.50	0.01	4.88	0.25n 1.5w
	19-Dec-95	12:04	14.38	9.33	9.34	0.01	5.04	
	28-Dec-95	9:30	14.38	-	9.18	-	5.20	
	27-Feb-96	9:00	14.38	6.90	7.17	0.00	7.21	
	27-Feb-96	10:00	14.38	-	7.20	-	7.18	0.5n 0.5w
	29-Feb-96	-	14.38	-	6.80	-	7.58	
	16-Apr-96	13:18		6.55	6.85	0.00		
PR-34	24-Feb-94	-	14.49	8.37	9.54	1.17	4.95	
	18-Mar-94	-		6.2	9.01	2.81	5.48	
	2-Jun-94	-		8.96	10.03	1.07	4.46	
	31-Aug-94	-		9.72	10.09	0.37	4.40	
	22-Dec-94	-		7.51	9.96	2.45	4.53	
	13-Mar-95	-		5.38	9.44	4.06	5.05	
	9-Jun-95	-		6.35	9.89	3.54	4.60	
	27-Jul-95	-		7.65	9.95	2.30	4.54	
	22-Sep-95	-		9.00	10.03	1.03	4.46	
	6-Dec-95	-		10.89	11.16	0.27	3.33	2", w/ ~ .8' stickup
	18-Dec-95	-		10.06	10.58	0.52	3.91	0.75n (bailer shows .2' of product
	18-Dec-95	11:40		11.00	11.01	0.01	3.48	
	18-Dec-95	11:50		10.80	10.85	0.05	3.64	

TABLE 1 RESULTS OF GAUGING, NESTLE COMPANY FORMER CARNATION MILK PLANT, 1310 14TH STREET OAKLAND, 1994-1996

Well No.	Gauging Date	Time	TOC Elev.	Depth to Prod.	Water	Product Thick.	GWE	Comments
	18-Dec-95	12:21		10.49	10.50	0.01	3.99	
	18-Dec-95	12:45		10.39	10.46	0.07	4.03	
	18-Dec-95	1:50		10.26	10.34	0.08	4.15	
	18-Dec-95	3:09		10.21	10.31	0.10	4.18	
	19-Dec-95	9:00		10.20	10.36	0.16	4.13	
	19-Dec-95	10:20		9.83	9.84	0.01	4.65	0.2n 1.3w
	19-Dec-95	12:07		10.28	10.32	0.04	4.17	
	28-Dec-95	9:30		10.08	10.66	0.58	3.83	
	27-Feb-96	9:00		3.37	8.47	5.10	6.02	
	27-Feb-96	10:00		9.45	9.60	0.15	4.89	5.7n 1w
	29-Feb-96	-		7.23	8.45	1.22	6.04	
	16-Apr-96	13:20		6.26	9.73	3.47	4.76	4.25n 0.25w
	16-Apr-96	13:31		9.14	9.28	0.14	5.21	
	16-Apr-96	14:03		7.76	8.02	0.26	6.47	
PR-35	24-Feb-94	-	14.55	8.37	9.63	1.26	4.92	
	18-Mar-94	-		6.56	-	>3.0	-	
	2-Jun-94	-		7.50	9.20	1.70	5.35	
	31-Aug-94	-		9.78	9.90	0.12	4.65	
	22-Dec-94	-		8.16	8.29	0.13	6.26	
	13-Mar-95	-		6.25	7.10	0.85	7.45	
	9-Jun-95	-		7.63	8.54	0.91	6.01	
	27-Jul-95	-		8.04	8.88	0.84	5.67	
	22-Sep-95	-		9.10	9.83	0.73	4.72	
	6-Dec-95	-		9.87	10.27	0.40	4.28	2", no screen showing
	18-Dec-95	-		9.20	9.53	0.33	5.02	0.8n
	18-Dec-95	11:45		10.21	10.22	0.01	4.33	
	18-Dec-95	12:20		9.96	10.03	0.07	4.52	
	18-Dec-95	12:46		9.86	9.93	0.07	4.62	
	18-Dec-95	13:50		9.68	9.76	0.08	4.79	
	18-Dec-95	15:10		9.58	9.65	0.07	4.90	
	19-Dec-95	9:00		9.34	9.42	0.08	5.13	
	19-Dec-95	10:15		10.49	10.52	0.03	4.03	0.3n 0.5w (depths rcrdd 15 min ltr
	19-Dec-95	12:06		9.60	9.62	0.02	4.93	
	28-Dec-95	9:30		9.22	9.29	0.07	5.26	
	27-Feb-96	9:00		7.23	7.43	0.20	7.12	0.5n 0.5w
	27-Feb-96	10:00		7.23	7.24	0.01	7.31	
	29-Feb-96	-		6.55	6.66	0.11	7.89	
	16-Apr-96	13:13		7.07	7.34	0.27		
PR-36	24-Feb-94	-	14.40	8.35	9.48	1.13	4.92	
	18-Mar-94	-		6.83	8.26	1.43	6.14	
	2-Jun-94	-		8.63	9.76	1.13	4.64	
	31-Aug-94	-		9.72	10.09	0.37	4.31	
	22-Dec-94	-		8.08	8.27	0.19	6.13	
	13-Mar-95	-		6.76	6.91	0.15	7.49	
	9-Jun-95	-		7.81	8.04	0.23	6.36	
	27-Jul-95	-		7.7	7.92	0.22	6.48	
	22-Sep-95	-		-	dry	-	-	
	6-Dec-95	-		-	dry	-	-	2", no screen
	18-Dec-95	-		-	dry	-	-	
	28-Dec-95	9:30		-	dry	-	-	
	27-Feb-96	9:00		6.9	7.10	0.20	7.30	
	27-Feb-96	10:00		-	7.50	-	-	0.5n 0.5w
	29-Feb-96	-		6.59	6.64	0.05	7.76	
	16-Apr-96	12:27		6.85	6.98	0.13		
PR-37	24-Feb-94	-	14.29	8.19	9.48	1.29	4.81	
	18-Mar-94	-		6.05	8.40	2.35	5.89	

TABLE 1 RESULTS OF GAUGING, NESTLE COMPANY FORMER CARNATION MILK PLANT, 1310 14TH STREET OAKLAND, 1994-1996

Well No.	Gauging Date	Time	TOC Elev.	Depth to Prod.	Depth to Water	Product Thick.	GWE	Comments
	2-Jun-94	-		8.64	9.60	0.96	4.69	
	31-Aug-94	-		9.67	9.81	0.14	4.48	
	22-Dec-94	-		8.02	8.24	0.22	6.05	
	13-Mar-95	-		6.44	7.27	0.83	7.02	
	9-Jun-95	-		7.65	8.47	0.82	5.82	
	27-Jul-95	-		8.02	8.60	0.58	5.69	
	22-Sep-95	-		9.02	9.60	0.58	4.69	
	6-Dec-95	-		-	9.85	-	4.44	2", no screen
	18-Dec-95	-		9.03	9.15	0.12	5.14	
	18-Dec-95	1:39		9.22	9.24	0.02	5.05	0.5n (0:12)
	18-Dec-95	3:03		9.12	9.14	0.02	5.15	
	19-Dec-95	9:00		9.04	9.10	0.06	5.19	
	19-Dec-95	11:55		9.30	9.31	0.01	4.98	0.05n 0.4w
	19-Dec-95	12:24		9.22	9.25	0.03	5.04	
	28-Dec-95	9:30		9.07	9.25	0.18	5.04	
	27-Feb-96	9:00		6.28	7.42	1.14	6.87	
	27-Feb-96	10:00		7.62	7.64	0.02	6.65	1n 0.5w
	29-Feb-96	-		6.40	6.72	0.32	7.57	
	16-Apr-96	12:29		6.85	6.98	0.13	7.31	0.25n 0.75w
	16-Apr-96	12:33		7.40	7.41	0.01	6.88	
	16-Apr-96			6.67	6.96	0.29	7.33	
PR-48	24-Feb-94	-		8.93	9.13	0.20		
	18-Mar-94	-		6.73	-	>3.0		
	2-Jun-94	-		8.95	9.78	0.83		
	31-Aug-94	-		10.04	10.11	0.07		
	22-Dec-94	-		8.39	9.82	1.43		
	13-Mar-95	-		5.16	5.80	0.64		
	9-Jun-95	-		6.46	7.11	0.65		
	27-Jul-95	-		8.4	9.34	0.94		
	22-Sep-95	-		9.39	9.89	0.50		
	6-Dec-95	-		10.32	10.86	0.54		
	18-Dec-95	-		9.65	10.05	0.40		
	18-Dec-95	12:17		10.44	10.46	0.02		1n
	18-Dec-95	12:47		10.35	10.41	0.06		
	18-Dec-95	14:57		10.24	10.31	0.07		
	19-Dec-95	9:00		9.89	9.97	0.08		
	19-Dec-95	11:00		10.05	10.06	0.01		0.15n 0.4w
	19-Dec-95	12:13		10.03	10.07	0.04		
	27-Feb-96	9:00		6.83	6.94	0.11		0.25n 0.5w
	27-Feb-96	10:00		-	7.34	-		
	29-Feb-96	-		6.93	6.99	0.06		
	16-Apr-96	12:09		6.80	8.05	1.25		2n 1w
	16-Apr-96	12:18		-	9.00	-		
	16-Apr-96	13:49		8.01	8.37	0.36		
PR-53	24-Feb-94	-		8.73	11.74	3.01		
	18-Mar-94	-		6.49	-	>3.0	-	
	2-Jun-94	-		9.02	9.63	0.61		
	31-Aug-94	-		9.73	10.22	0.49		
	22-Dec-94	-		7.96	9.48	1.52		
	13-Mar-95	-		-	5.42	-		
	9-Jun-95	-		6.76	8.31	1.55		
	27-Jul-95	-		7.92	9.39	1.47		
	22-Sep-95	-		8.81	9.89	1.08		
	6-Dec-95	-		-	9.95	-		2', no screen showing
	18-Dec-95	-		9.35	9.47	0.12		
	18-Dec-95	14:00		9.51	9.53	0.02		0.1n
	18-Dec-95	15:11		9.44	9.49	0.05		

TABLE 1 RESULTS OF GAUGING, NESTLE COMPANY FORMER CARNATION MILK PLANT, 1310 14TH STREET OAKLAND, 1994-1996

Well No.	Gauging Date	Time	TOC Elev.	Depth to Prod.	Depth to Water	Product Thick.	GWE	Comments
	19-Dec-95	9:00		9.40	9.44	0.04		
	19-Dec-95	10:30		-	9.56	-		0.05n 1 w
	19-Dec-95	12:08		9.46	9.50	0.04		
	28-Dec-95	9:30		9.25	9.42	0.17		
	27-Feb-96	9:00		6.35	7.25	0.90		0.5n 0.5w
	27-Feb-96	10:00		-	8.45	-		
	29-Feb-96	-		6.63	6.90	0.27		
	16-Apr-96		Well could not be sampled					
PR-58	24-Feb-94	-		8.34	9.19	0.85		
	2-Jun-94	-		8.45	9.93	1.48		
	31-Aug-94	-		9.40	10.29	0.89		
	22-Dec-94	-		7.82	9.97	2.15		
	13-Mar-95	-		5.76	7.17	1.41		
	9-Jun-95	-		6.04	7.38	1.34		
	27-Jul-95	-		7.48	9.88	2.40		
	22-Sep-95	-		8.82	10.00	1.18		
	18-Dec-95	-		9.34	9.55	0.21		
		2:50		-	9.71	-		0.25n
		3:13		9.56	9.57	0.01		
	19-Dec-95	9:00		9.35	9.50	0.15		
		10:45		-	9.58	-		0.1n 0.2w
		12:10		9.46	9.50	0.04		
	28-Dec-93	9:30		9.27	9.84	0.57		
	27-Feb-96	9:00		5.93	8.60	2.67		7.5n 0.5w
		10:00		8.94	9.00	0.06		
	29-Feb-96	-		6.30	7.55	1.25		
	16-Apr-96	10:30		5.74	8.42	2.68		2.5n 0.5w
	16-Apr-96	10:35		8.82	8.95	0.13		
	16-Apr-96	11:00		7.78	8.06	0.28		
	16-Apr-96	13:34		6.64	7.11	0.47		
PR-61	24-Feb-94	-		8.75	9.14	0.39		
	18-Mar-94	-		7.28	7.63	0.35		
	2-Jun-94	-		9.01	10.04	1.03		
	31-Aug-94	-		-	10.08	-		
	22-Dec-94	-		8.37	8.38	0.01		
	13-Mar-95	-		-	4.86	-		
	9-Jun-95	-		-	5.12	-		
	27-Jul-95	-		8.23	9.53	1.30		
	22-Sep-95	-		-	9.40	-		
	6-Dec-95	-		-	10.00	-		2", no screen showing
	27-Feb-96	9:00		6.26	7.74	1.48		
	27-Feb-96	10:00		7.94	7.98	0.04		3.8n 0.5w
	29-Feb-96	-		6.60	7.05	0.45		
	16-Apr-96	10:38		6.80	8.03	1.23		2.2n 0.5w
	"	10:45		7.72	7.90	0.18		
		13:36		6.98	7.50	0.52		
PR-64	24-Feb-94	-		8.94	9.05	0.11		
	18-Mar-94	-		6.43	-	>3.0	-	
	31-Aug-94	-		9.85	10.91	1.06		
	22-Dec-94	-		8.09	10.24	2.15		
	13-Mar-95	-		5.55	6.58	1.03		
	9-Jun-95	-		7.89	9.06	1.17		
	27-Jul-95	-		8.55	10.67	2.12		
	22-Sep-95	-		9.70	10.85	1.15		
	6-Dec-95	-		-	11.10	-		2", no screen, ~1' stickup
	18-Dec-95	-		10.13	10.55	0.42		

TABLE 1 RESULTS OF GAUGING, NESTLE COMPANY FORMER CARNATION MILK PLANT, 1310 14TH STREET OAKLAND, 1994-1996

Well No.	Gauging Date	Time	TOC Elev.	Depth to Prod.	Water	Product Thick.	GWE	Comments
	18-Dec-95	2:42		-	11.81	-		0.5n
	18-Dec-95	3:12		-	10.66	-		
	19-Dec-95	9:00		10.19	10.31	0.12		
	19-Dec-95	10:35		-	11.70	-		0.2n 2 w
	19-Dec-95	12:09		-	10.30	-		
	28-Dec-95	9:30		9.74	10.32	0.58		
	27-Feb-96	9:00		6.36	9.44	3.08		
	27-Feb-96	10:00		9.75	9.80	0.05		3.8n 0.5w
	29-Feb-96	-		6.82	7.22	0.40		
	16-Apr-96	11:26	20.15	6.03	10.15	4.12		3.5n 1.5w
	16-Apr-96	13:40		6.71	7.94	1.23		0.5n 0.25w
	16-Apr-96	13:45		7.65	7.68	0.03		