



Executive Offices, Ordway Building

AUG 16 1994

August 16, 1994

Mr. Rich Hiett
California Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, CA 94612

Mr. Brian Oliva
Alameda County Dept. of Health Services
1131 Harbor Bay Parkway
Alameda, CA 94502

Re: Kaiser Permanente Medical Center, 280 West MacArthur
Blvd, Oakland, CA

Dear Sirs:

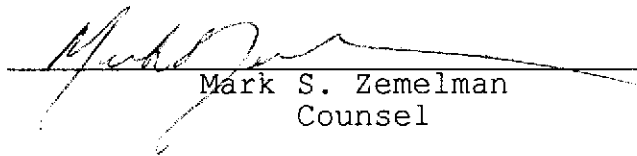
Enclosed is the August 1994 ground water monitoring report for the above-referenced site. Consistent with the findings and recommendations of the enclosed report, Kaiser Foundation Hospitals requests that your respective agencies issue a closure letter for the site.

Please call me if you have any questions or need further information.

Sincerely,

KAISER FOUNDATION HEALTH PLAN, INC.

By:


Mark S. Zemelman
Counsel



**REQUEST FOR CLOSURE AND
ANNUAL GROUNDWATER MONITORING REPORT**

**Kaiser Permanente Medical Center
280 West MacArthur Boulevard
Oakland, California**

Prepared for

**Kaiser Permanente Medical Center
280 West MacArthur Boulevard
Oakland, California 94611**

**August 1994
Project No. 1459.06**

Geomatrix Consultants

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**REQUEST FOR CLOSURE AND
ANNUAL GROUNDWATER MONITORING REPORT**
Kaiser Permanente Medical Center
280 West MacArthur Boulevard
Oakland, California

1.0 INTRODUCTION AND BACKGROUND

At the request of Kaiser Permanente Medical Center (Kaiser), on 2 March 1994 Geomatrix Consultants, Inc. (Geomatrix), conducted annual sampling at the Kaiser Permanente Medical Center at 280 West MacArthur Boulevard in Oakland, California (Figure 1). The work was performed in accordance with our proposal dated 29 April 1992. This report describes the activities and results of the annual sampling event of 2 March 1994, the quarterly groundwater elevation monitoring conducted from April 1993 to June 1994, and includes a summary of historical groundwater monitoring results. Conclusions and recommendations based on four years of groundwater monitoring results are also presented.

Annual groundwater monitoring is being performed in response to the detection of mineral spirits in shallow soil at two locations on the site, shown on Figure 2. Most of the soil that contained mineral spirits was removed in 1990, and the areas excavated are also shown in Figure 2. Six monitoring wells were installed near these areas between November 1990 and January 1991 to evaluate whether shallow groundwater is being affected by the residual mineral spirits in soil. Water-levels were measured monthly from November 1990 through March 1992 and were measured quarterly from April 1992 to June 1994. Groundwater from the monitoring wells was collected and analyzed quarterly from November 1990 through December 1991 and annually in March 1992, March 1993, and March 1994.

Previous site characterization efforts were reported by Geomatrix as follows: Soil investigations for mineral spirits were reported in May 1990 (Geomatrix, 1990). Installation of the on-site groundwater monitoring wells and results of the first quarter's groundwater monitoring were reported in April 1991 (Geomatrix, 1991a). The second and

third quarters' activities and groundwater monitoring results were reported in October 1991 (Geomatrix, 1991b). Fourth-quarter activities and groundwater monitoring results were reported in March 1992 (Geomatrix, 1992a). The first annual groundwater monitoring event in March 1992 and a summary of activities from November 1990 through March 1992 was reported in August 1992 (Geomatrix, 1992b). Results from the second annual groundwater monitoring event in March 1993 were reported in April 1993 (Geomatrix, 1993).

2.0 GROUNDWATER ELEVATIONS

The locations of the six project monitoring wells are shown on Figure 2. Depths to groundwater were measured quarterly in the six wells during the reporting year April 1993 to March 1994, and an additional round of water level measurements was collected in June 1994; these water levels were recorded to the nearest 0.01 foot. Water levels were measured from the surveyed measuring point with an electric sounder. Groundwater elevation data from April 1993 to June 1994, as well as all historical measurements, are summarized in Table 1.

Potentiometric surface maps for the current reporting year are presented as Figures 3 through 7. The potentiometric surface maps exclude water level data from well MW-5 because this well is screened approximately seven feet deeper than the uppermost water-bearing zone intersected by the other monitoring wells. Historically, the water levels in well MW-5 are consistently lower than water levels obtained from the other monitoring wells.

Groundwater elevation data collected from November 1990 through June 1994 indicates a consistent pattern of shallow groundwater flow toward monitoring well MW-2 from the southeast and northwest portions of the site, and from MW-3 and MW-4 toward MW-2 during both wet and dry seasons. This pattern is shown on Figures 3 through 7.

3.0 GROUNDWATER SAMPLING

Annual groundwater sampling was performed on 2 March 1994 by Geomatrix personnel. The sampling methodology and results for this event are described below.

3.1 METHODOLOGY

Before the groundwater was sampled, the wells were purged using a new disposable bailer for each well. All disposable bailers were rinsed with deionized water before each use. To obtain groundwater representative of site conditions, the wells were purged until the temperature, pH, and specific conductance of the purged groundwater had stabilized. At least four casing volumes were purged from all wells, except for MW-4 and MW-6, prior to sampling. Wells MW-4 and MW-6 were purged dry at three casing volumes, and were sampled shortly after recovery. Groundwater purged from the monitoring wells was temporarily stored on site in a labeled 55-gallon drum.

After each monitoring well was purged, a groundwater sample was collected using the same disposable bailer used to purge the well. The samples were placed in an ice-cooled chest for delivery to the analytical laboratory under Geomatrix chain-of-custody procedures.

Samples were analyzed by Anamatrix, Inc., of San Jose. All groundwater samples were analyzed for mineral spirits as well as the related compounds of benzene, toluene, ethylbenzene, and xylenes (BTEX), using EPA Methods modified 8015 and 8020, respectively. Samples from wells MW-1, MW-2, MW-4 and MW-5 were also analyzed for volatile organic compounds (VOCs) using EPA Method 8010. In addition, for quality control purposes, a blind duplicate of well MW-5 (labelled MW-7) was collected and analyzed for mineral spirits, BTEX, and VOCs, and a field blank (labeled MW-8) was collected and analyzed for VOCs. The field blank was collected by pouring deionized water through a new disposable bailer into the sample containers. Analytical results are summarized in Table 2. Copies of the laboratory analytical reports and chain-of-custody records for March 1994 are included in Appendix A.

Mineral Spirits and BTEX

Analysis of groundwater samples collected during the four year monitoring program indicates that groundwater has not been affected by residual mineral spirits in soil. Mineral spirits have not been detected in any of the wells on-site during the four years of monitoring.

Compounds related to mineral spirits have also been monitored during the four-year program. Benzene has not been detected in any of the wells during the monitoring program. Toluene, ethylbenzene and xylenes have been detected once each, at concentrations of 0.6 $\mu\text{g/l}$, 0.6 $\mu\text{g/l}$, and 2.3 $\mu\text{g/l}$, respectively. The Maximum Contaminant Level (MCL) in drinking water for these compounds is 1000 $\mu\text{g/l}$, 680 $\mu\text{g/l}$, and 1750 $\mu\text{g/l}$, respectively, indicating that shallow groundwater beneath the site has not been significantly affected by compounds related to mineral spirits.

The groundwater results are consistent with the analytical results on soil. During the soil investigation conducted in 1990 and 1991, the highest concentrations of BTEX compounds in soil were reported in a sample with 1800 mg/kg of mineral spirits (MB7-2). In this sample, xylene and ethylbenzene were reported at low concentrations of 5.5 mg/kg and 3.3 mg/kg, and benzene and toluene were not detected (Geomatrix, 1991a). These data confirm that BTEX compounds in mineral spirits are found at low concentrations.

We would expect, if the mineral spirits were mobile in the environment, that an impact on groundwater would be observed based on:

1. the close proximity of the monitoring wells to the two potential source areas;
2. the presence of permeable sediments between potential source areas and the monitoring well screen intervals; and
3. the suspected length of time (tens of years), that the mineral spirits had been present in soil.

6.0 REFERENCES

- Geomatrix Consultants, Inc., 1990, Site Characterization Report: Mineral Spirits in Soil, Kaiser Permanente Medical Center, 280 W. MacArthur Boulevard, Oakland, California, 8 May.
- Geomatrix Consultants, Inc., 1991a, Site Characterization and Remediation: Mineral Spirits in Soil, Kaiser Permanente Medical Center, 280 W. MacArthur Boulevard, Oakland, California, 5 April.
- Geomatrix Consultants, Inc., 1991b, Groundwater Monitoring Report, April-September 1991, Kaiser Permanente Medical Center, 280 W. MacArthur Boulevard, Oakland, California, 31 October.
- Geomatrix Consultants, Inc., 1992a, Groundwater Monitoring Report, October-December 1991, Kaiser Permanente Medical Center, 280 W. MacArthur Boulevard, Oakland, California, 30 March.
- Geomatrix Consultants, Inc. 1992b, Annual Groundwater Monitoring Report, April 1991-March 1992, Kaiser Permanente Medical Center, 280 W. MacArthur Boulevard, Oakland, California, 18 August.
- Geomatrix Consultants, Inc. 1993, Annual Groundwater Monitoring Report, April 1992-March 1993, Kaiser Permanente Medical Center, 280 W. MacArthur Boulevard, Oakland, California, 30 April.

TABLE 1

SUMMARY OF WATER-LEVEL MEASUREMENTS

November 1990 through March 1994

Kaiser Permanente Medical Center

Oakland, California

Date	Well I.D.	Elevation of Measuring Point (ft.)	Depth to Water (ft.)	Groundwater Elevation (ft.)
11/19/90	MW-1	71.78	5.19	66.59
	MW-2	82.10	20.70	61.40
	MW-3	102.04	40.52	61.52
	MW-4	82.57	dry	--
11/20/90	MW-1	71.78	5.20	66.58
	MW-2	82.10	20.42	61.68
	MW-3	102.04	41.08	60.96
	MW-4	82.57	dry	--
11/26/90	MW-1	71.78	4.73	67.05
	MW-2	82.10	20.34	61.76
	MW-3	102.04	40.25	61.79
	MW-4	82.57	dry	--
1/2/91	MW-1	71.78	5.13	66.65
	MW-2	82.10	20.15	61.95
	MW-3	102.04	40.11	61.93
	MW-4	82.57	dry	--
2/7/91	MW-1	71.78	5.67	66.11
	MW-2	82.10	19.96	62.14
	MW-3	102.04	40.07	61.97
	MW-4	82.57	dry	--
	MW-5	71.81	10.62	61.19
	MW-6	71.82	6.29	65.53
3/7/91	MW-1	71.78	5.40	66.38
	MW-2	82.10	19.70	62.40
	MW-3	102.04	39.55	62.49
	MW-4	82.57 ¹	18.39	64.18
	MW-5	71.81	9.76	62.05

TABLE 1

SUMMARY OF WATER-LEVEL MEASUREMENTS

November 1990 through March 1994

Kaiser Permanente Medical Center

Oakland, California

Date	Well I.D.	Elevation of Measuring Point (ft.)	Depth to Water (ft.)	Groundwater Elevation (ft.)
	MW-6	71.82	5.77	66.05
4/11/91	MW-1	71.78	5.14	66.64
	MW-2	82.10	17.97	64.13
	MW-3	102.04	38.05	63.99
	MW-4	82.58 ²	16.85	65.73
	MW-5	71.81	8.43	63.38
	MW-6	71.82	5.57	66.25
5/6/91	MW-1	71.78	6.14	65.64
	MW-2	82.10	18.85	63.25
	MW-3	102.04	38.62	63.42
	MW-4	82.58	18.49	64.09
	MW-5	71.81	9.19	62.62
	MW-6	71.82	6.74	65.08
6/11/91	MW-1	71.78	dry	--
	MW-2	82.10	19.56	62.54
	MW-3	102.04	39.25	62.79
	MW-4	82.58	19.35	63.23
	MW-5	71.81	7.57	62.04
	MW-6	71.82	9.77	64.25
7/24/91	MW-1	71.78	5.75	66.03
	MW-2	82.10	20.17	61.93
	MW-3	102.04	39.62	62.42
	MW-4	82.58	19.85	62.73
	MW-5	71.81	9.88	61.93
	MW-6	71.82	7.68	64.14
8/14/91	MW-1	71.78	5.32	66.46
	MW-2	82.10	20.17	61.93
	MW-3	102.04	39.81	62.23

TABLE 1

SUMMARY OF WATER-LEVEL MEASUREMENTS

November 1990 through March 1994

Kaiser Permanente Medical Center

Oakland, California

Date	Well I.D.	Elevation of Measuring Point (ft.)	Depth to Water (ft.)	Groundwater Elevation (ft.)
	MW-4	82.58	19.71	62.87
	MW-5	71.81	10.30	61.51
	MW-6	71.82	8.79	63.03
9/11/91	MW-1	71.78	5.80	65.98
	MW-2	82.10	20.53	61.57
	MW-3	102.04	40.22	61.91
	MW-4	82.58 ¹	dry	--
	MW-5	71.81	10.67	61.14
	MW-6	71.82	8.95	62.87
10/9/91	MW-1	71.78	dry	--
	MW-2	82.10	dry	--
	MW-3	102.04	40.45	61.59
	MW-4	82.58 ¹	dry	--
	MW-5	71.81	10.95	60.86
	MW-6	71.82	dry	--
11/14/91	MW-1	71.78	dry	--
	MW-2	82.10	20.68	61.42
	MW-3	102.04	40.25	61.79
	MW-4	82.58 ¹	dry	--
	MW-5	71.81	10.70	61.11
	MW-6	71.82	8.59	63.23
12/17/91	MW-1	71.78	dry	--
	MW-2	82.10	dry	--
	MW-3	102.04	40.37	61.67
	MW-4	82.58 ¹	dry	--
	MW-5	71.81	10.87	60.94
	MW-6	71.82	dry	--
1/15/92	MW-1	71.78	6.95	64.83

TABLE 1

SUMMARY OF WATER-LEVEL MEASUREMENTS

November 1990 through March 1994

Kaiser Permanente Medical Center

Oakland, California

Date	Well I.D.	Elevation of Measuring Point (ft.)	Depth to Water (ft.)	Groundwater Elevation (ft.)
	MW-2	82.10	20.31	61.79
	MW-3	102.04	39.97	62.07
	MW-4	82.58 ¹	dry	--
	MW-5	71.81	10.33	61.48
	MW-6	71.82	6.99	64.83
2/10/92	MW-1	71.78	6.45	65.33
	MW-2	82.10	20.20	61.90
	MW-3	102.04	39.77	62.27
	MW-4	82.49 ³	dry	--
	MW-5	71.81	10.23	61.58
	MW-6	71.82	7.83	63.99
3/25/92	MW-1	71.78	5.00	66.78
	MW-2	82.10	17.92	64.18
	MW-3	102.04	37.60	64.44
	MW-4	82.49	16.84	65.65
	MW-5	71.81	8.03	63.78
	MW-6	71.82	5.53	66.29
6/12/92	MW-1	71.78	5.74	66.04
	MW-2	82.10	19.62	62.48
	MW-3	102.04	39.34	62.70
	MW-4	82.49	19.21	63.28
	MW-5	71.81	9.79	62.02
	MW-6	71.82	8.22	63.60
9/17/92	MW-1	71.78	dry	--
	MW-2	82.10	20.62	61.48
	MW-3	102.04	40.25	61.79
	MW-4	82.49	19.74	62.75
	MW-5	71.81	10.74	61.07
	MW-6	71.82	8.93	62.89



TABLE 1

SUMMARY OF WATER-LEVEL MEASUREMENTS

November 1990 through March 1994

Kaiser Permanente Medical Center

Oakland, California

Date	Well I.D.	Elevation of Measuring Point (ft.)	Depth to Water (ft.)	Groundwater Elevation (ft.)
12/16/92	MW-1	71.78	5.57	66.21
	MW-2	82.10	20.03	62.07
	MW-3	102.04	39.61	62.43
	MW-4	82.49	19.64	62.85
	MW-5	71.81	9.98	61.83
	MW-6	71.82	8.95	62.87
3/2/93	MW-1	71.78	5.42	66.36
	MW-2	82.10	16.95	65.15
	MW-3	102.04	36.69	65.35
	MW-4	82.49	16.13	66.36
	MW-5	71.81	7.32	64.49
	MW-6	71.82	5.75	66.07
6/8/93	MW-1	71.78	6.62	65.16
	MW-2	82.10	18.70	63.40
	MW-3	102.04	38.27	63.77
	MW-4	82.49	18.47	64.02
	MW-5	71.81	8.87	62.94
	MW-6	71.82	7.45	64.37
9/9/93	MW-1	71.78	5.65	66.13
	MW-2	82.10	19.92	62.18
	MW-3	102.04	39.45	62.59
	MW-4	82.49	19.69	62.80
	MW-5	71.81	10.03	61.78
	MW-6	71.82	8.94	62.88
12/6/93	MW-1	71.78	5.85	65.93
	MW-2	82.10	20.30	61.80
	MW-3	102.04	39.83	62.21
	MW-4	82.49	19.78	62.71
	MW-5	71.81	10.40	61.41

TABLE 1

SUMMARY OF WATER-LEVEL MEASUREMENTS
 November 1990 through March 1994
 Kaiser Permanente Medical Center
 Oakland, California

Date	Well I.D.	Elevation of Measuring Point (ft.)	Depth to Water (ft.)	Groundwater Elevation (ft.)
	MW-6	71.82	8.96	62.86
3/2/94	MW-1	71.78	5.39	66.39
	MW-2	82.10	18.48	63.62
	MW-3	102.04	38.08	63.96
	MW-4	82.49	17.82	64.67
	MW-5	71.81	8.62	63.19
	MW-6	71.82	6.56	65.26
6/13/94	MW-1	71.78	6.79	64.99
	MW-2	82.10	19.32	62.78
	MW-3	102.04	38.90	63.14
	MW-4	82.49	19.14	63.35
	MW-5	71.81	9.48	62.33
	MW-6	71.82	7.92	63.90

Notes:

¹ Top of casing cracked.

² Measuring point resurveyed on 11 April 1991 by Bates and Bailey Land Surveyors of Berkeley, California.

³ Measuring point resurveyed on 15 January 1992 by Bates and Bailey Land Surveyors of Berkeley, California.

TABLE 2

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER¹

November 1990 through March 1994

Kaiser Permanente Medical Center

Oakland, California

Concentrations in micrograms per liter ($\mu\text{g/l}$)

Page 1 of 3

Well No.	Date Sampled	Mineral Spirits					EPA Method	EPA Method
			Benzene	Toluene	Ethyl-benzene	Xylenes	Compounds 8240/8010 ² Detected ³	Compounds 8270 Detected
MW-1	11/20/90	<1000 ⁴	<0.5	<0.5	<0.5	<0.5	-- ⁵	--
	1/2/91	--	--	--	--	--	--	None
	1/4/91	--	--	--	--	6 Chloroform	--	--
	2/7/91	<50	<0.5	<0.5	<0.5	<0.5	8 1,1,-DCA	--
	3/7/91	<50	--	--	--	--	--	--
	9/11/91	<50	<0.5	<0.5	<0.5	<0.5	None	--
	3/25/92	<50	<0.5	<0.5	<0.5	<0.5	None	--
	3/2/93	<50	<0.5	<0.5	<0.5	<0.5	3 1,1,1-TCA	--
	3/2/94	<50	<0.5	<0.5	<0.5	<0.5	13 1,1-DCA 2.6 1,1,1-TCA	--
MW-2	11/29/90	<50	<0.5	<0.5	<0.5	<0.5	--	--
	1/3/91	--	--	--	--	--	7 PCE 7 Freon 11	--
	1/4/91	--	--	--	--	--	--	None ⁶
	2/7/91	<50	<0.5	<0.5	<0.5	<0.5	None	--
	3/7/91	<50	--	--	--	--	--	None
	6/12/91	<50	<0.5	<0.5	<0.5	<0.5	9 Freon 11	None
	9/11/91	<50	<0.5	<0.5	<0.5	<0.5	8 Freon 11 3 Chloroform 11 PCE	--
	3/25/92	<50	<0.5	<0.5	<0.5	<0.5	7 Freon 11 3 Chloroform 9 PCE	--
	3/2/93	<50	<0.5	<0.5	<0.5	<0.5	4 Freon 11 1 Chloroform 13 PCE	--
	3/2/94	<50	<0.5	<0.5	<0.5	<0.5	2.8 Freon 11 1.1 Chloroform 9.1 PCE	--
MW-3	11/27/90	<50	<0.5	0.6	<0.5	2.3	--	--
	1/3/91	--	--	--	--	--	None	None
	2/7/91	<50	<0.5	<0.5	<0.5	<0.5	--	--
	6/12/91	<50	<0.5	<0.5	<0.5	<0.5	--	--
	9/11/91	<50	<0.5	<0.5	<0.5	<0.5	--	--
	12/17/91	<50	<0.5	<0.5	<0.5	<0.5	--	--
	3/25/92	<50	<0.5	<0.5	<0.5	<0.5	--	--
	3/2/93	<50	<0.5	<0.5	<0.5	<0.5	--	--

TABLE 2

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER¹

November 1990 through March 1994

Kaiser Permanente Medical Center

Oakland, California

Concentrations in micrograms per liter ($\mu\text{g/l}$)

Page 2 of 3

Well No.	Date Sampled	Mineral Spirits	Benzene	Toluene	Ethyl-benzene	Xylenes	EPA Method 8240/8010 ² Compounds Detected ³	EPA Method 8270 Compounds Detected
 	3/2/94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	3/11/91	<50	<0.5	<0.5	<0.5	<0.5	9 PCE	-- ⁷
	3/25/92	<50	<0.5	<0.5	<0.5	<0.5	10 PCE	--
	3/2/93	<50	<0.5	<0.5	<0.5	<0.5	28 PCE	--
	3/2/94	<50	<0.5	<0.5	<0.5	<0.5	6.7 PCE	--
MW-5	2/1/91	<50	-- ⁸	-- ⁸	-- ⁸	-- ⁸	25 Freon 11	None
	2/25/91	--	<0.5	<0.5	<0.5	<0.5	--	--
	3/7/91	<50	<0.5	<0.5	<0.5	<0.5	24 Freon 11	--
	6/12/91	<50	<0.5	<0.5	<0.5	<0.5	26 Freon 11	--
	9/11/91	<50	<0.5	<0.5	<0.5	<0.5	16 Freon 11 3 PCE	--
	12/17/91	<50	<0.5	<0.5	<0.5	<0.5	11 Freon 11 3 Freon 113 2 PCE	--
	3/25/92	<50	<0.5	<0.5	<0.5	<0.5	24 Freon 11 3 PCE	--
	3/2/93	<50	<0.5	<0.5	<0.5	<0.5	13 Freon 11 1 PCE	--
	3/2/94	<50	<0.5	<0.5	<0.5	<0.5	6.5 Freon 11 0.83 Chloroform 1.3 PCE	--
	3/2/94 ⁹	<50	<0.5	<0.5	<0.5	<0.5	6.2 Freon 11 0.74 Chloroform 1.1 PCE	--
MW-6	2/1/91	<50	-- ⁸	-- ⁸	-- ⁸	-- ⁸	--	-- ⁷
	3/7/91	<50	<0.5	<0.5	<0.5	<0.5	None	-- ⁷
	6/12/91	<50	<0.5	<0.5	<0.5	<0.5	--	-- ⁷
	3/25/92	<50	<0.5	<0.5	<0.5	<0.5	--	--
	3/2/93	<50	<0.5	<0.5	<0.5	<0.5	--	--
	3/2/94	<50	<0.5	<0.5	0.6	<0.5	--	--

TABLE 2

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER¹

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Notes:

- ¹ Total petroleum hydrocarbons as mineral spirits were analyzed by EPA Methods 5030/8015; benzene, toluene, ethylbenzene, and xylenes (BTEX) were analyzed by modified EPA Method 8020. All samples were analyzed by Anamatrix, Inc., except the MW-1 sample on 11/20/90, which was analyzed by BC Analytical. Laboratory reports, including detection limits, are included in Appendix A.
- ² All samples prior to 3/2/94 were analyzed by EPA Method 8240; samples for 3/2/94 were analyzed by EPA Method 8010.
- ³ 1,1-DCA = 1,1-dichloroethane; PCE = tetrachloroethene; Freon 11 = trichlorofluoromethane; Freon 113 = trichlorotrifluoroethane; 1,1,1-TCA = trichloroethane.
- ⁴ A hydrocarbon was detected in the sample at a concentration of 150 milligrams per liter (mg/l) by BC Analytical. Based on a fingerprint characterization using gas chromatography, Friedman and Bruya, Inc., characterized the compound as naturally occurring biogenic hydrocarbon and identified no mineral spirits in the sample.
- ⁵ -- not analyzed.
- ⁶ Sample volume was 400 ml instead of 1000 ml because of limited well recharge. Detection limits therefore ranged from 25 to 120 $\mu\text{g/l}$ instead of 10 to 50 $\mu\text{g/l}$ as is typical with EPA Method 8270 analyses.
- ⁷ Insufficient water available for this analysis.
- ⁸ Analyzed four days after the 14-day holding time, with no BTEX detected.
- ⁹ blind duplicate



SITE LOCATION
Kaiser Hospital
Oakland, California

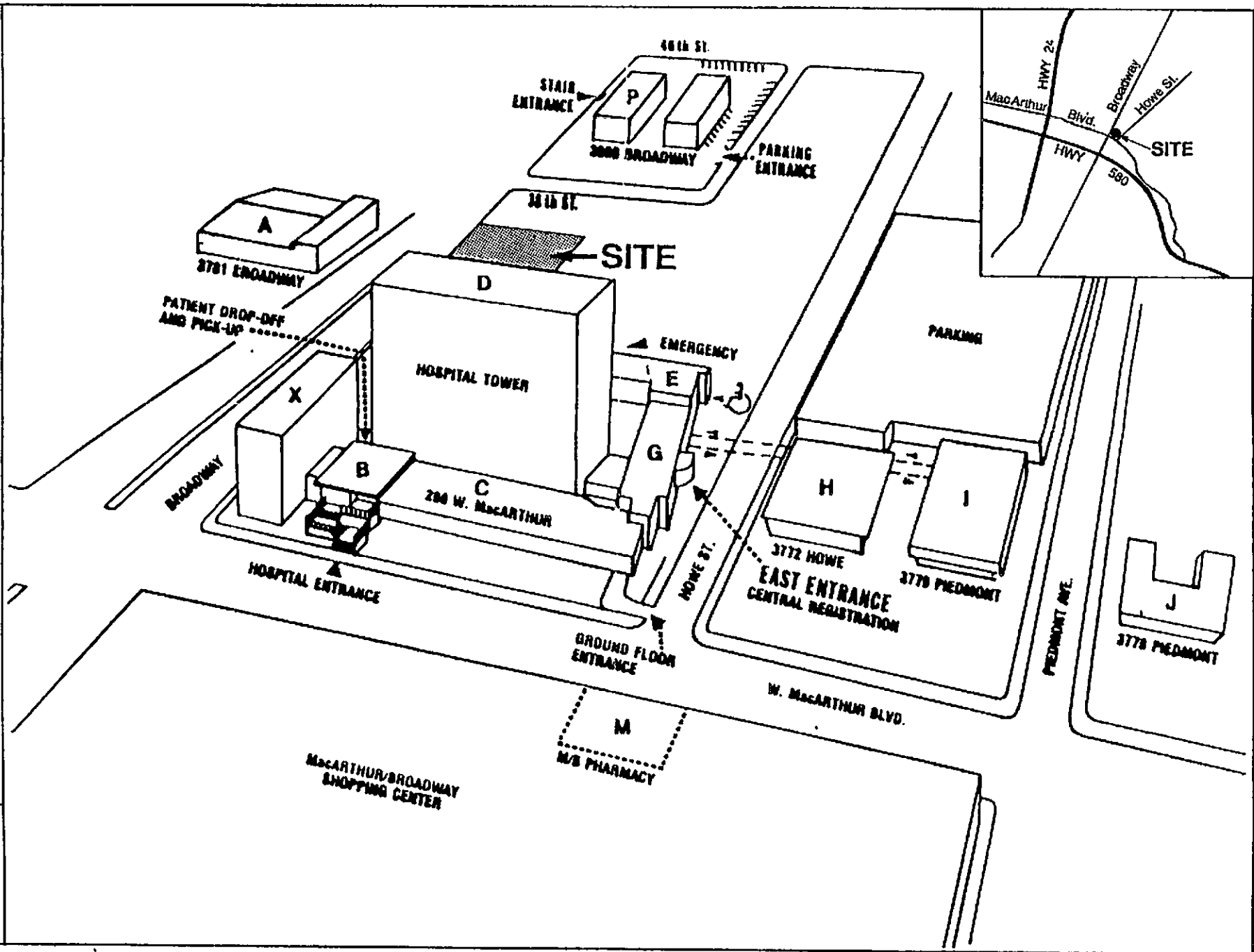
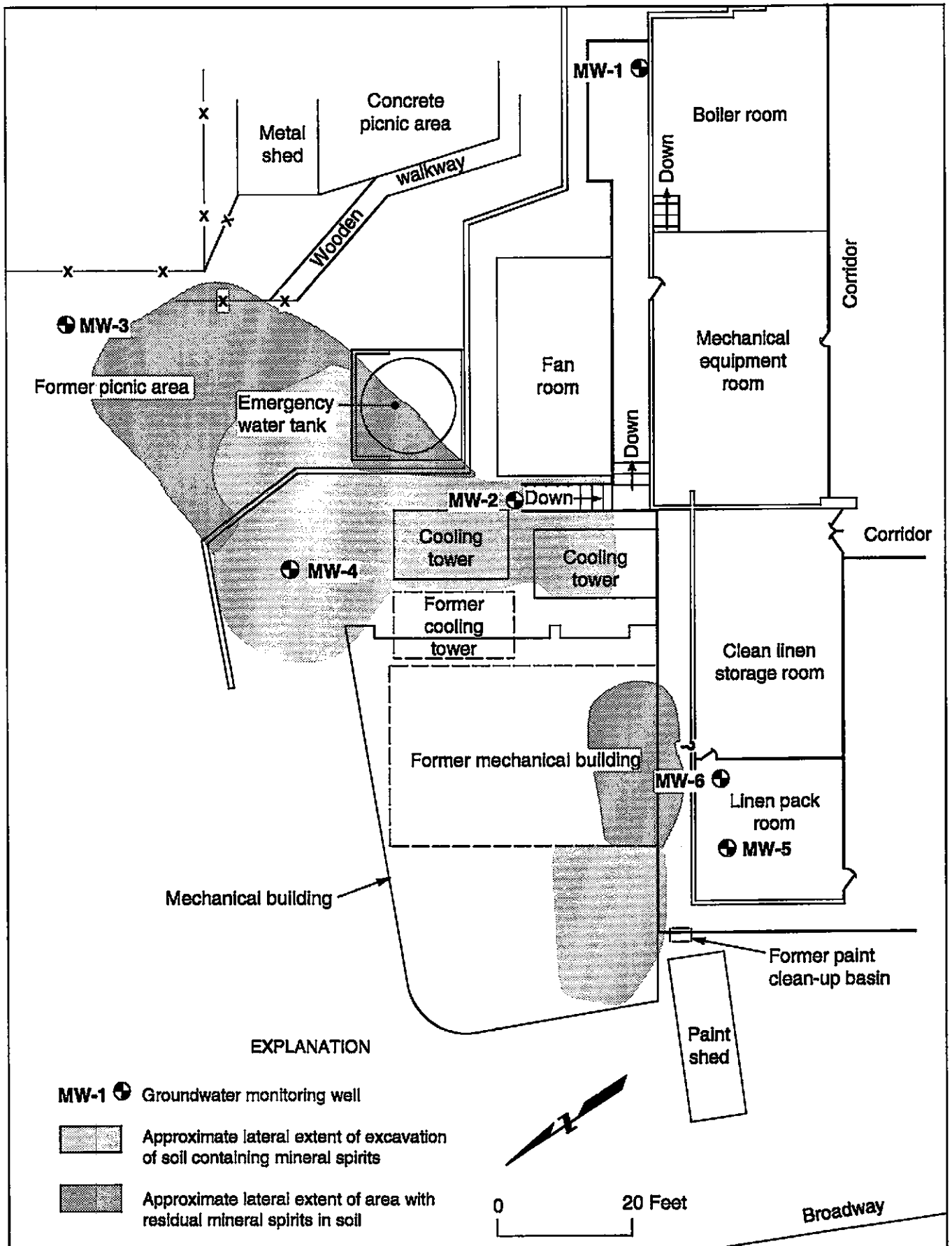


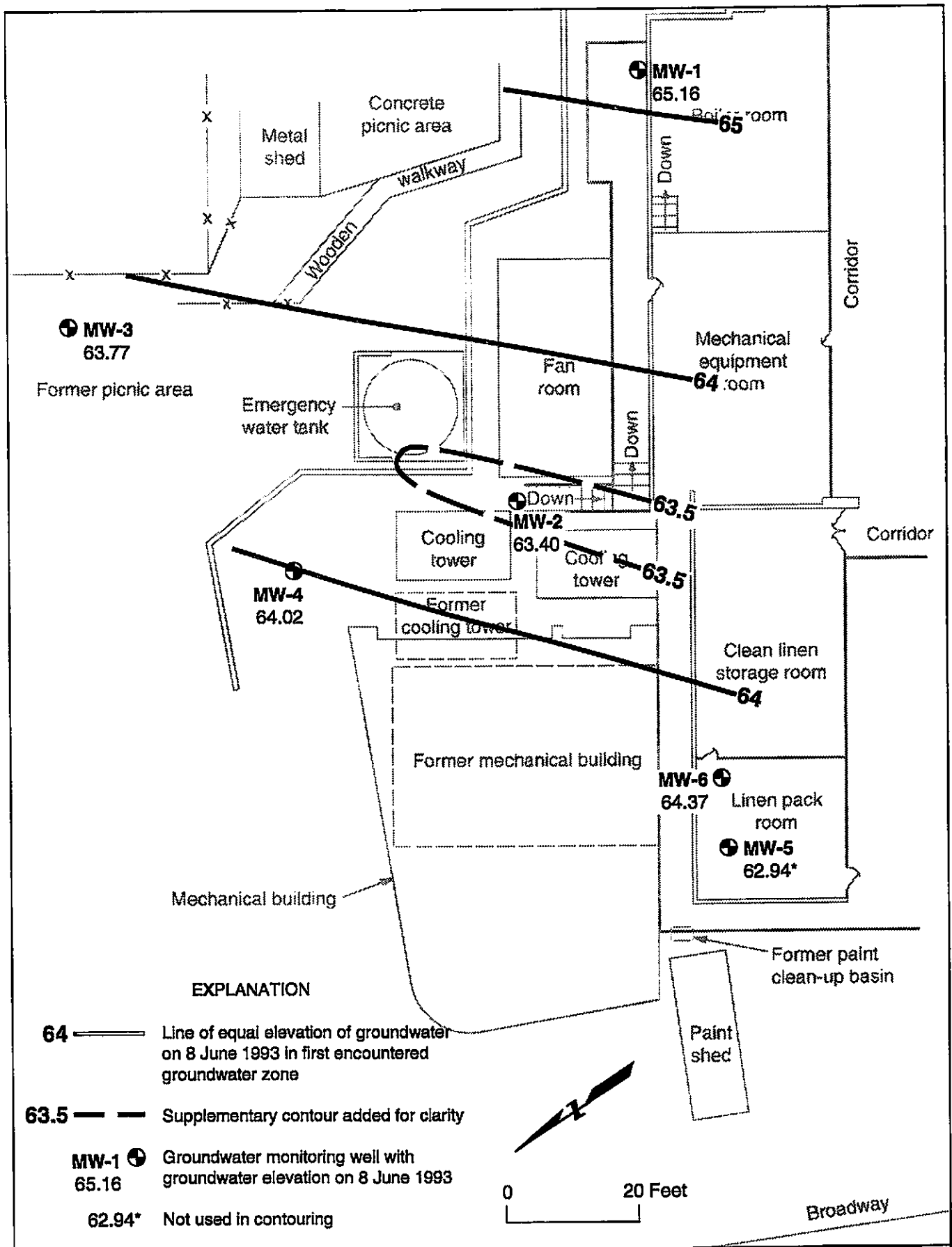
Figure
1
Project No.
1459.06



**SITE PLAN
MONITORING WELL LOCATIONS
Kaiser Permanente Medical Center
Oakland, California**

Figure
2

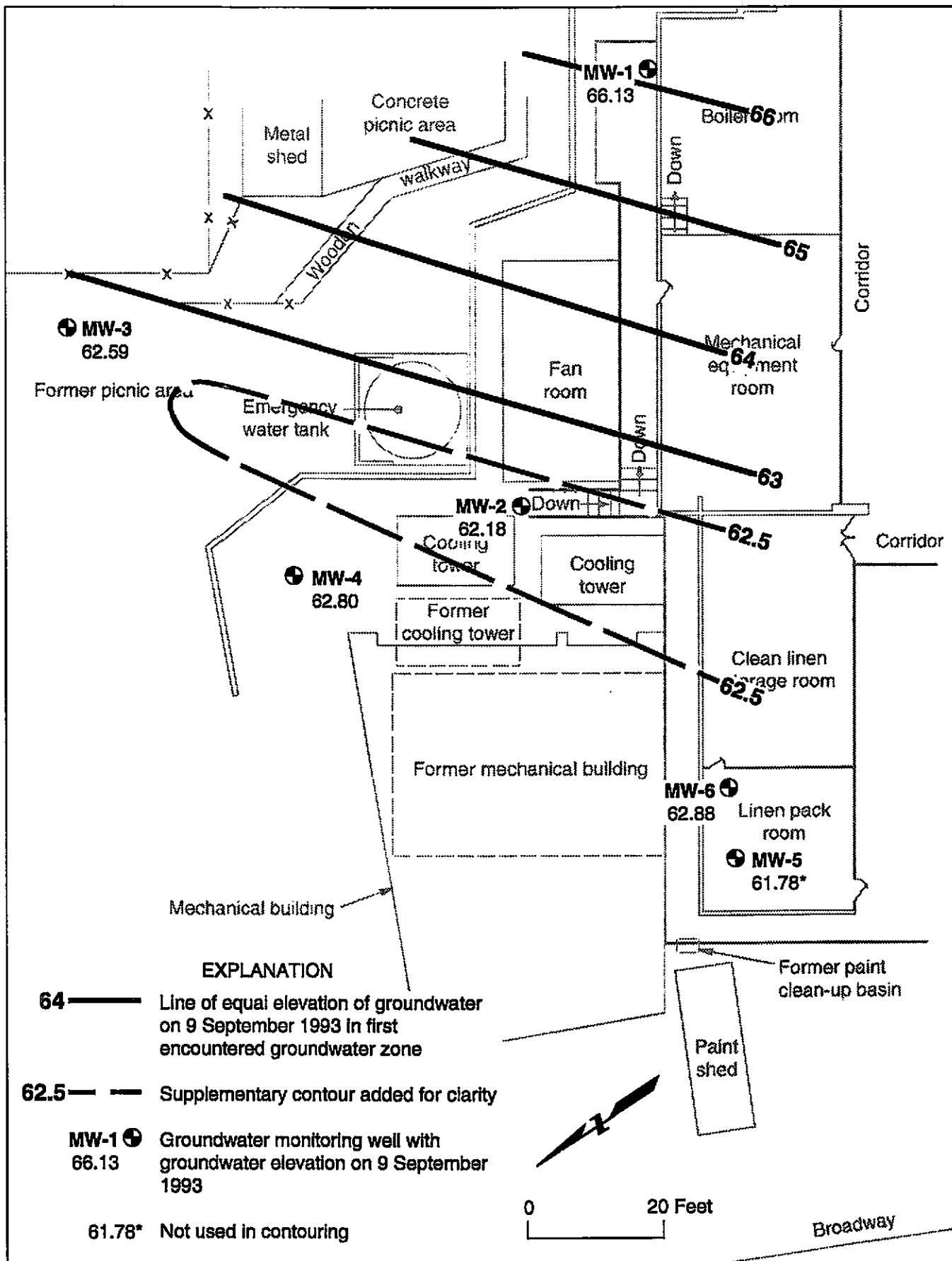
Project No.
1459.06



POTENTIOMETRIC SURFACE MAP
 8 JUNE 1993
 Kaiser Permanente Medical Center
 Oakland, California

Figure
 3

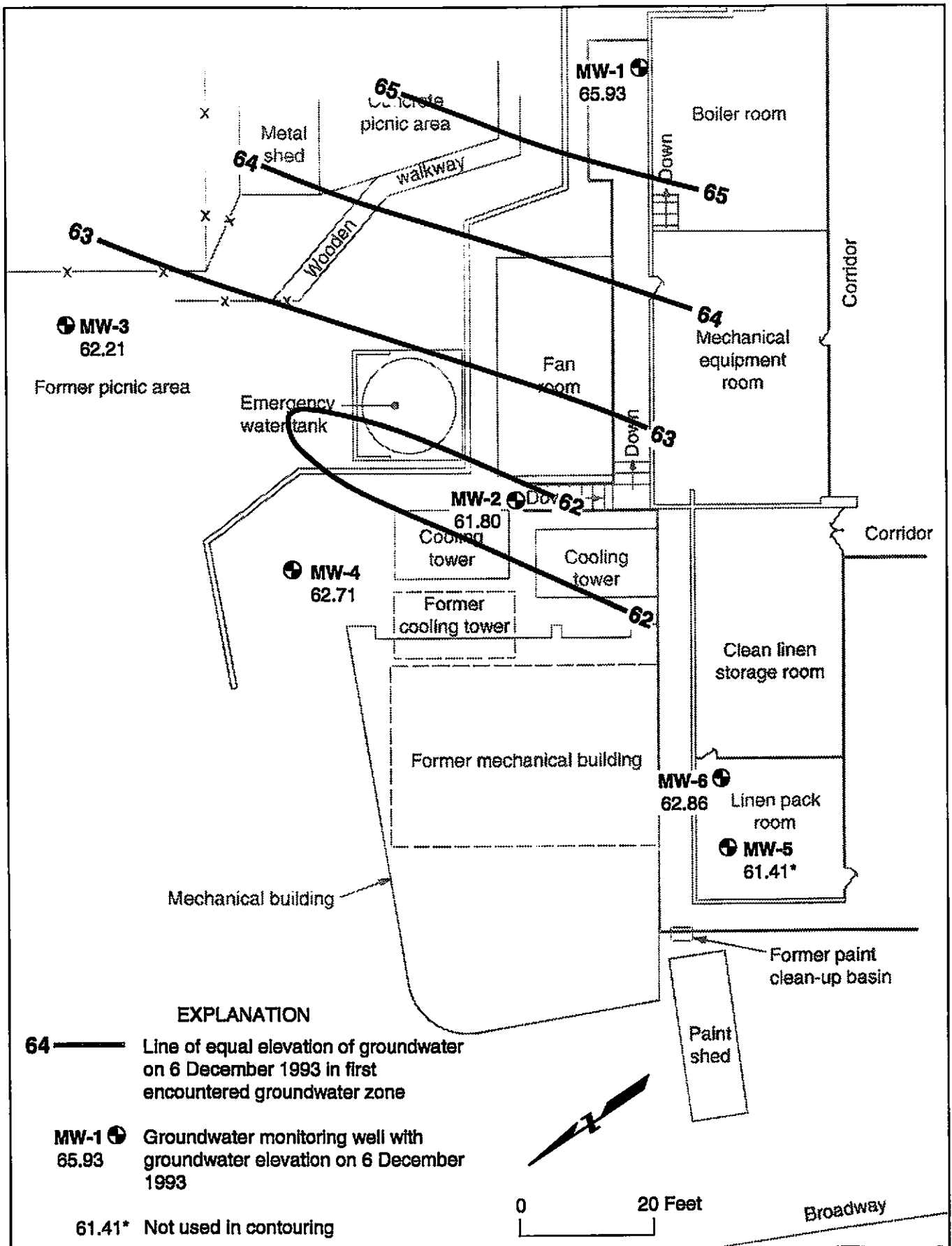
Project No.
 1459.06




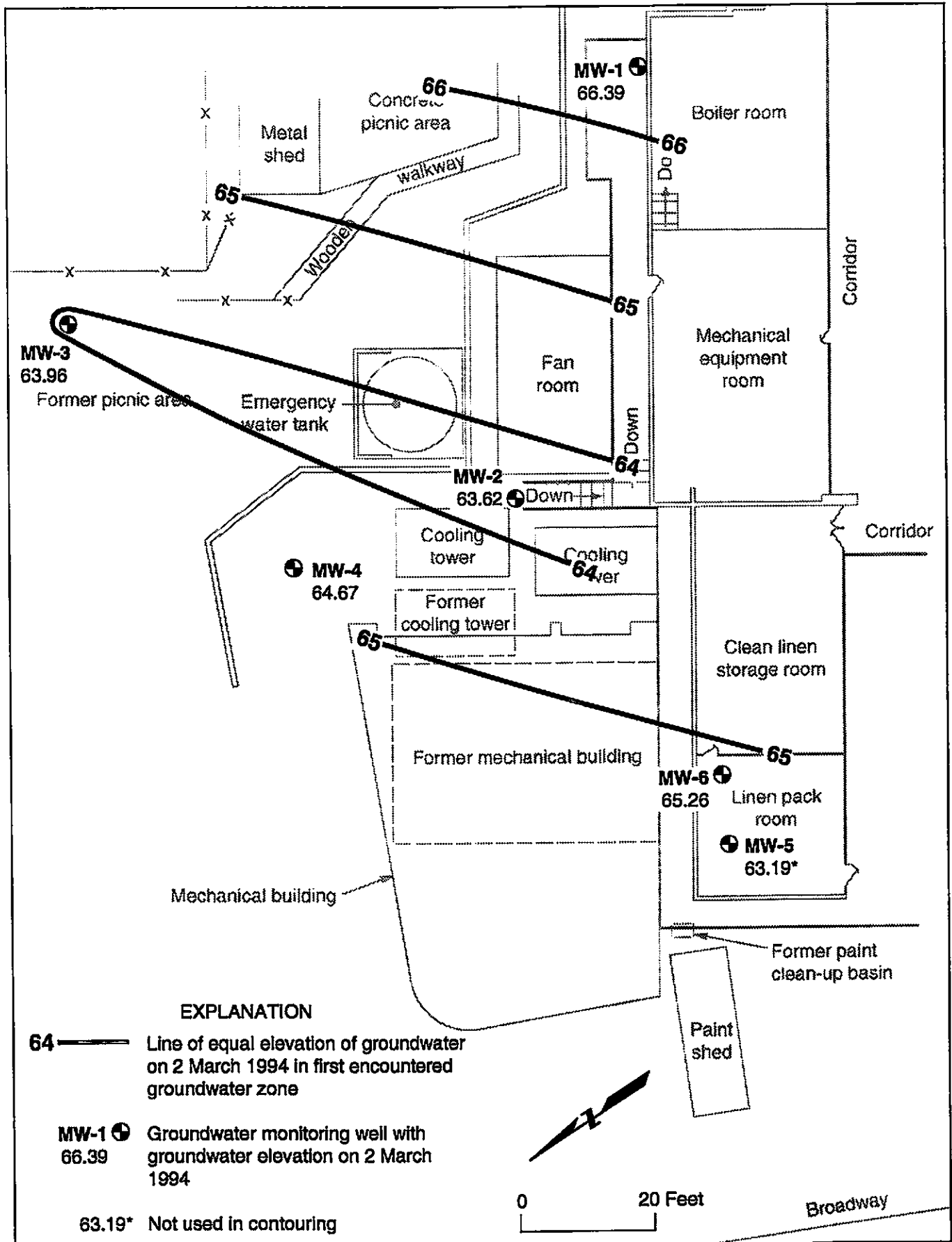
POTENTIOMETRIC SURFACE MAP
 9 SEPTEMBER 1993
 Kaiser Permanente Medical Center
 Oakland, California

Figure
 4

Project No.
 1459.06



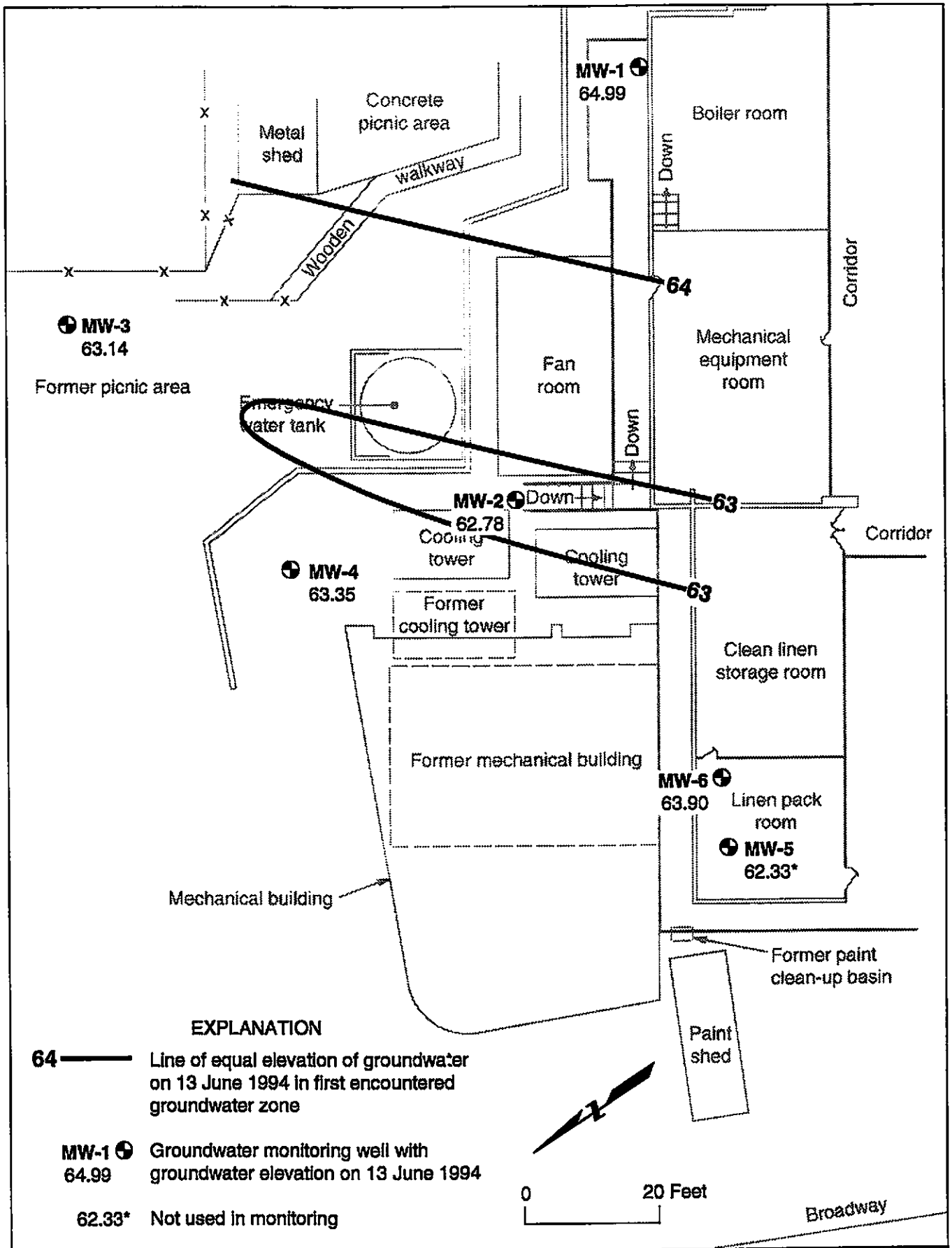
	POTENTIOMETRIC SURFACE MAP 6 DECEMBER 1993 Kaiser Permanente Medical Center Oakland, California	Figure 5
		Project No. 1459.06



POTENTIOMETRIC SURFACE MAP
 2 MARCH 1994
 Kaiser Permanente Medical Center
 Oakland, California

Figure
 6

Project No.
 1459.06



POTENTIOMETRIC SURFACE MAP
 13 JUNE 1994
 Kaiser Permanente Medical Center
 Oakland, California

Figure

7

Project No.
 1459.06

APPENDIX A

**ANALYTICAL LABORATORY REPORTS
AND CHAIN-OF-CUSTODY RECORDS FOR
GROUNDWATER SAMPLES - MARCH 1994**



Inchcape Testing Services

Anamatrix Laboratories

1961 Concourse Drive
Suite E
San Jose, CA 95131
Tel: 408-432-8192
Fax: 408-432-8198

MR. TIM WOOD
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9403042
Date Received : 03/02/94
Project ID : 1459.06
Purchase Order: N/A

The following samples were received at Anamatrix for analysis :

ANAMATRIX ID	CLIENT SAMPLE ID
9403042- 1	MW-1
9403042- 2	MW-8 Field Blank <i>FW</i>
9403042- 3	MW-3
9403042- 4	MW-2
9403042- 5	MW-6
9403042- 6	MW-5
9403042- 7	MW-7 Blind Duplicate of MW-5 <i>FW</i>
9403042- 8	MW-4

This report consists of 21 pages not including the cover letter, and is organized in sections according to the specific Anamatrix laboratory group which performed the analysis(es) and generated the data.

The results contained within this report relate to only the sample(s) tested. Additionally, these data should be considered in their entirety and Anamatrix cannot be responsible for the detachment, separation, or otherwise partial use of this report.

Anamatrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234.

If you have any further questions or comments on this report, please call us as soon as possible. Thank you for using Anamatrix.

Doug Robbins

Doug Robbins
Laboratory Director

03/14/94

Date



ANAMATRIX REPORT DESCRIPTION GC

Organic Analysis Data Sheets (OADS)

OADS forms contain tabulated results for target compounds. The OADS are grouped by method and, within each method, organized sequentially in order of increasing Anamatrix ID number.

Surrogate Recovery Summary (SRS)

SRS forms contain quality assurance data. An SRS form will be printed for each method, if the method requires surrogate compounds. They will list surrogate percent recoveries for all samples and any method blanks. Any surrogate recovery outside the established limits will be flagged with an "***", and the total number of surrogates outside the limits will be listed in the column labelled "Total Out".

Matrix Spike Recovery Form (MSR)

MSR forms contain quality assurance data. They summarize percent recovery and relative percent difference information for matrix spikes and matrix spike duplicates. This information is a statement of both accuracy and precision. Any percent recovery or relative percent difference outside established limits will be flagged with an "***", and the total number outside the limits will be listed at the bottom of the page. Not all reports will contain an MSR form.

Qualifiers

Anamatrix uses several data qualifiers (Q) in its report forms. These qualifiers give additional information on the compounds reported. They should help a data reviewer to verify the integrity of the analytical results. The following is a list of qualifiers and their meanings:

- U - Indicates that the compound was analyzed for, but was not detected at or above the specified reporting limit.
- B - Indicates that the compound was detected in the associated method blank.
- J - Indicates that the compound was detected at an amount below the specified reporting limit. Consequently, the amount should be considered an approximate value. Tentatively identified compounds will always have a "J" qualifier because they are not included in the instrument calibration.
- E - Indicates that the reported amount exceeded the linear range of the instrument calibration.
- D - Indicates that the compound was detected in an analysis performed at a secondary dilution.

Absence of a qualifier indicates that the compound was detected at a concentration at or above the specified reporting limit.

REPORTING CONVENTIONS

- ◆ Due to a size limitation in our data processing step, only the first eight (8) characters of your project ID and sample ID will be printed on the report forms. However, the report cover letter and report summary pages display up to twenty (20) characters of your project and sample IDs.
- ◆ Amounts reported are gross values, i.e., not corrected for method blank contamination.

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. TIM WOOD
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9403042
Date Received : 03/02/94
Project ID : 1459.06
Purchase Order: N/A
Department : GC
Sub-Department: VOA

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9403042- 1	MW-1	WATER	03/02/94	8010
9403042- 2	MW-8	WATER	03/02/94	8010
9403042- 4	MW-2	WATER	03/02/94	8010
9403042- 6	MW-5	WATER	03/02/94	8010
9403042- 7	MW-7	WATER	03/02/94	8010
9403042- 8	MW-4	WATER	03/02/94	8010

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. TIM WOOD
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9403042
Date Received : 03/02/94
Project ID : 1459.06
Purchase Order: N/A
Department : GC
Sub-Department: VOA

QA/QC SUMMARY :

- No QA/QC problems encountered for samples.

M. Hosseini 3/10/94
Department Supervisor Date

Jayhi Memarzadeh 3/10/94
Chemist Date

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 8010
 ANAMETRIX, INC. (408)432-8192

Project ID : 1459.06
 Sample ID : MW-1
 Matrix : WATER
 Date Sampled : 3/ 2/94
 Date Analyzed : 3/ 8/94
 Instrument ID : HP24

Anamatrix ID : 9403042-01
 Analyst : TM
 Supervisor :
 Dilution Factor : 1.0
 Conc. Units : ug/L

CAS No.	COMPOUND NAME	REPORTING LIMIT	AMOUNT DETECTED	Q
75-71-8	Dichlorodifluoromethane	1.0	ND	U
74-87-3	Chloromethane	1.0	ND	U
75-01-4	Vinyl chloride	.50	ND	U
74-83-9	Bromomethane	.50	ND	U
75-00-3	Chloroethane	.50	ND	U
75-69-4	Trichlorofluoromethane	.50	ND	U
76-13-1	Trichlorotrifluoroethane	.50	ND	U
75-35-4	1,1-Dichloroethene	.50	ND	U
75-09-2	Methylene chloride	1.0	ND	U
156-60-5	trans-1,2-Dichloroethene	.50	ND	U
75-34-3	1,1-Dichloroethane	.50	13.	U
156-59-2	cis-1,2-Dichloroethene	.50	ND	U
67-66-3	Chloroform	.50	ND	U
71-55-6	1,1,1-Trichloroethane	.50	2.6	U
56-23-5	Carbon tetrachloride	.50	ND	U
107-06-2	1,2-Dichloroethane	.50	ND	U
79-01-6	Trichloroethene	.50	ND	U
78-87-5	1,2-Dichloropropane	.50	ND	U
75-27-4	Bromodichloromethane	.50	ND	U
110-75-8	2-Chloroethylvinylether	1.0	ND	U
10061-01-5	cis-1,3-Dichloropropene	.50	ND	U
10061-02-6	trans-1,3-Dichloropropene	.50	ND	U
79-00-5	1,1,2-Trichloroethane	.50	ND	U
127-18-4	Tetrachloroethene	.50	ND	U
124-48-1	Dibromochloromethane	.50	ND	U
108-90-7	Chlorobenzene	.50	ND	U
75-25-2	Bromoform	.50	ND	U
79-34-5	1,1,2,2-Tetrachloroethane	.50	ND	U
541-73-1	1,3-Dichlorobenzene	.50	ND	U
106-46-7	1,4-Dichlorobenzene	.50	ND	U
95-50-1	1,2-Dichlorobenzene	.50	ND	U

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 8010
ANAMETRIX, INC. (408)432-8192

Project ID : 1459.06
Sample ID : MW-2
Matrix : WATER
Date Sampled : 3/ 2/94
Date Analyzed : 3/ 8/94
Instrument ID : HP24

Anamatrix ID : 9403042-04
Analyst : JM
Supervisor : sh
Dilution Factor : 1.0
Conc. Units : ug/L

CAS No.	COMPOUND NAME	REPORTING LIMIT	AMOUNT DETECTED	Q
75-71-8	Dichlorodifluoromethane	1.0	ND	U
74-87-3	Chloromethane	1.0	ND	U
75-01-4	Vinyl chloride	.50	ND	U
74-83-9	Bromomethane	.50	ND	U
75-00-3	Chloroethane	.50	ND	U
75-69-4	Trichlorofluoromethane	.50	2.8	U
76-13-1	Trichlorotrifluoroethane	.50	ND	U
75-35-4	1,1-Dichloroethene	.50	ND	U
75-09-2	Methylene chloride	1.0	ND	U
156-60-5	trans-1,2-Dichloroethene	.50	ND	U
75-34-3	1,1-Dichloroethane	.50	ND	U
156-59-2	cis-1,2-Dichloroethene	.50	ND	U
67-66-3	Chloroform	.50	1.1	U
71-55-6	1,1,1-Trichloroethane	.50	ND	U
56-23-5	Carbon tetrachloride	.50	ND	U
107-06-2	1,2-Dichloroethane	.50	ND	U
79-01-6	Trichloroethene	.50	ND	U
78-87-5	1,2-Dichloropropane	.50	ND	U
75-27-4	Bromodichloromethane	.50	ND	U
110-75-8	2-Chloroethylvinylether	1.0	ND	U
10061-01-5	cis-1,3-Dichloropropene	.50	ND	U
10061-02-6	trans-1,3-Dichloropropene	.50	ND	U
79-00-5	1,1,2-Trichloroethane	.50	ND	U
127-18-4	Tetrachloroethene	.50	9.1	U
124-48-1	Dibromochloromethane	.50	ND	U
108-90-7	Chlorobenzene	.50	ND	U
75-25-2	Bromoform	.50	ND	U
79-34-5	1,1,2,2-Tetrachloroethane	.50	ND	U
541-73-1	1,3-Dichlorobenzene	.50	ND	U
106-46-7	1,4-Dichlorobenzene	.50	ND	U
95-50-1	1,2-Dichlorobenzene	.50	ND	U

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 8010
 ANAMETRIX, INC. (408)432-8192

Project ID : 1459.06
 Sample ID : MW-4
 Matrix : WATER
 Date Sampled : 3/ 2/94
 Date Analyzed : 3/ 8/94
 Instrument ID : HP24

Anamatrix ID : 9403042-08
 Analyst : JN
 Supervisor : Jh
 Dilution Factor : 1.0
 Conc. Units : ug/L

CAS No.	COMPOUND NAME	REPORTING LIMIT	AMOUNT DETECTED	Q
75-71-8	Dichlorodifluoromethane	1.0	ND	U
74-87-3	Chloromethane	1.0	ND	U
75-01-4	Vinyl chloride	.50	ND	U
74-83-9	Bromomethane	.50	ND	U
75-00-3	Chloroethane	.50	ND	U
75-69-4	Trichlorofluoromethane	.50	ND	U
76-13-1	Trichlorotrifluoroethane	.50	ND	U
75-35-4	1,1-Dichloroethene	.50	ND	U
75-09-2	Methylene chloride	1.0	ND	U
156-60-5	trans-1,2-Dichloroethene	.50	ND	U
75-34-3	1,1-Dichloroethane	.50	ND	U
156-59-2	cis-1,2-Dichloroethene	.50	ND	U
67-66-3	Chloroform	.50	ND	U
71-55-6	1,1,1-Trichloroethane	.50	ND	U
56-23-5	Carbon tetrachloride	.50	ND	U
107-06-2	1,2-Dichloroethane	.50	ND	U
79-01-6	Trichloroethene	.50	ND	U
78-87-5	1,2-Dichloropropane	.50	ND	U
75-27-4	Bromodichloromethane	.50	ND	U
110-75-8	2-Chloroethylvinylether	1.0	ND	U
10061-01-5	cis-1,3-Dichloropropene	.50	ND	U
10061-02-6	trans-1,3-Dichloropropene	.50	ND	U
79-00-5	1,1,2-Trichloroethane	.50	ND	U
127-18-4	Tetrachloroethene	.50	6.7	U
124-48-1	Dibromochloromethane	.50	ND	U
108-90-7	Chlorobenzene	.50	ND	U
75-25-2	Bromoform	.50	ND	U
79-34-5	1,1,2,2-Tetrachloroethane	.50	ND	U
541-73-1	1,3-Dichlorobenzene	.50	ND	U
106-46-7	1,4-Dichlorobenzene	.50	ND	U
95-50-1	1,2-Dichlorobenzene	.50	ND	U

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 8010
 ANAMETRIX, INC. (408)432-8192

Project ID : 1459.06
 Sample ID : MW-5
 Matrix : WATER
 Date Sampled : 3/ 2/94
 Date Analyzed : 3/ 8/94
 Instrument ID : HP24

Anamatrix ID : 9403042-06
 Analyst : JM
 Supervisor : *[Signature]*
 Dilution Factor : 1.0
 Conc. Units : ug/L

CAS No.	COMPOUND NAME	REPORTING LIMIT	AMOUNT DETECTED	Q
75-71-8	Dichlorodifluoromethane	1.0	ND	U
74-87-3	Chloromethane	1.0	ND	U
75-01-4	Vinyl chloride	.50	ND	U
74-83-9	Bromomethane	.50	ND	U
75-00-3	Chloroethane	.50	ND	U
75-69-4	Trichlorofluoromethane	.50	6.5	U
76-13-1	Trichlorotrifluoroethane	.50	ND	U
75-35-4	1,1-Dichloroethene	.50	ND	U
75-09-2	Methylene chloride	1.0	ND	U
156-60-5	trans-1,2-Dichloroethene	.50	ND	U
75-34-3	1,1-Dichloroethane	.50	ND	U
156-59-2	cis-1,2-Dichloroethene	.50	ND	U
67-66-3	Chloroform	.50	.83	U
71-55-6	1,1,1-Trichloroethane	.50	ND	U
56-23-5	Carbon tetrachloride	.50	ND	U
107-06-2	1,2-Dichloroethane	.50	ND	U
79-01-6	Trichloroethene	.50	ND	U
78-87-5	1,2-Dichloropropane	.50	ND	U
75-27-4	Bromodichloromethane	.50	ND	U
110-75-8	2-Chloroethylvinylether	1.0	ND	U
10061-01-5	cis-1,3-Dichloropropene	.50	ND	U
10061-02-6	trans-1,3-Dichloropropene	.50	ND	U
79-00-5	1,1,2-Trichloroethane	.50	ND	U
127-18-4	Tetrachloroethene	.50	1.3	U
124-48-1	Dibromochloromethane	.50	ND	U
108-90-7	Chlorobenzene	.50	ND	U
75-25-2	Bromoform	.50	ND	U
79-34-5	1,1,2,2-Tetrachloroethane	.50	ND	U
541-73-1	1,3-Dichlorobenzene	.50	ND	U
106-46-7	1,4-Dichlorobenzene	.50	ND	U
95-50-1	1,2-Dichlorobenzene	.50	ND	U

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 8010
 ANAMETRIX, INC. (408)432-8192

Project ID : 1459.06
 Sample ID : MW-7
 Matrix : WATER
 Date Sampled : 3/ 2/94
 Date Analyzed : 3/ 9/94
 Instrument ID : HP24

Anamatrix ID : 9403042-07
 Analyst : TM
 Supervisor : sh
 Dilution Factor : 1.0
 Conc. Units : ug/L

CAS No.	COMPOUND NAME	REPORTING LIMIT	AMOUNT DETECTED	Q
75-71-8	Dichlorodifluoromethane	1.0	ND	U
74-87-3	Chloromethane	1.0	ND	U
75-01-4	Vinyl chloride	.50	ND	U
74-83-9	Bromomethane	.50	ND	U
75-00-3	Chloroethane	.50	ND	U
75-69-4	Trichlorofluoromethane	.50	6.2	U
76-13-1	Trichlorotrifluoroethane	.50	ND	U
75-35-4	1,1-Dichloroethene	.50	ND	U
75-09-2	Methylene chloride	1.0	ND	U
156-60-5	trans-1,2-Dichloroethene	.50	ND	U
75-34-3	1,1-Dichloroethane	.50	ND	U
156-59-2	cis-1,2-Dichloroethene	.50	ND	U
67-66-3	Chloroform	.50	.74	U
71-55-6	1,1,1-Trichloroethane	.50	ND	U
56-23-5	Carbon tetrachloride	.50	ND	U
107-06-2	1,2-Dichloroethane	.50	ND	U
79-01-6	Trichloroethene	.50	ND	U
78-87-5	1,2-Dichloropropane	.50	ND	U
75-27-4	Bromodichloromethane	.50	ND	U
110-75-8	2-Chloroethylvinylether	1.0	ND	U
10061-01-5	cis-1,3-Dichloropropene	.50	ND	U
10061-02-6	trans-1,3-Dichloropropene	.50	ND	U
79-00-5	1,1,2-Trichloroethane	.50	ND	U
127-18-4	Tetrachloroethene	.50	1.1	U
124-48-1	Dibromochloromethane	.50	ND	U
108-90-7	Chlorobenzene	.50	ND	U
75-25-2	Bromoform	.50	ND	U
79-34-5	1,1,2,2-Tetrachloroethane	.50	ND	U
541-73-1	1,3-Dichlorobenzene	.50	ND	U
106-46-7	1,4-Dichlorobenzene	.50	ND	U
95-50-1	1,2-Dichlorobenzene	.50	ND	U

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 8010
 ANAMETRIX, INC. (408)432-8192

Project ID : 1459.06
 Sample ID : MW-8
 Matrix : WATER
 Date Sampled : 3/ 2/94
 Date Analyzed : 3/ 8/94
 Instrument ID : HP24

Anamatrix ID : 9403042-02
 Analyst : JM
 Supervisor : SK
 Dilution Factor : 1.0
 Conc. Units : ug/L

CAS No.	COMPOUND NAME	REPORTING LIMIT	AMOUNT DETECTED	Q
75-71-8	Dichlorodifluoromethane	1.0	ND	U
74-87-3	Chloromethane	1.0	ND	U
75-01-4	Vinyl chloride	.50	ND	U
74-83-9	Bromomethane	.50	ND	U
75-00-3	Chloroethane	.50	ND	U
75-69-4	Trichlorofluoromethane	.50	ND	U
76-13-1	Trichlorotrifluoroethane	.50	ND	U
75-35-4	1,1-Dichloroethene	.50	ND	U
75-09-2	Methylene chloride	1.0	ND	U
156-60-5	trans-1,2-Dichloroethene	.50	ND	U
75-34-3	1,1-Dichloroethane	.50	ND	U
156-59-2	cis-1,2-Dichloroethene	.50	ND	U
67-66-3	Chloroform	.50	ND	U
71-55-6	1,1,1-Trichloroethane	.50	ND	U
56-23-5	Carbon tetrachloride	.50	ND	U
107-06-2	1,2-Dichloroethane	.50	ND	U
79-01-6	Trichloroethene	.50	ND	U
78-87-5	1,2-Dichloropropane	.50	ND	U
75-27-4	Bromodichloromethane	.50	ND	U
110-75-8	2-Chloroethylvinylether	1.0	ND	U
10061-01-5	cis-1,3-Dichloropropene	.50	ND	U
10061-02-6	trans-1,3-Dichloropropene	.50	ND	U
79-00-5	1,1,2-Trichloroethane	.50	ND	U
127-18-4	Tetrachloroethene	.50	ND	U
124-48-1	Dibromochloromethane	.50	ND	U
108-90-7	Chlorobenzene	.50	ND	U
75-25-2	Bromoform	.50	ND	U
79-34-5	1,1,2,2-Tetrachloroethane	.50	ND	U
541-73-1	1,3-Dichlorobenzene	.50	ND	U
106-46-7	1,4-Dichlorobenzene	.50	ND	U
95-50-1	1,2-Dichlorobenzene	.50	ND	U

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 8010
 ANAMETRIX, INC. (408)432-8192

Project ID : 1459.0
 Sample ID : VBLKB1
 Matrix : WATER
 Date Sampled : 0/ 0/ 0
 Date Analyzed : 3/ 8/94
 Instrument ID : HP24

Anamatrix ID : BM080211
 Analyst : TW
 Supervisor : DL
 Dilution Factor : 1.0
 Conc. Units : ug/L

CAS No.	COMPOUND NAME	REPORTING LIMIT	AMOUNT DETECTED	Q
75-71-8	Dichlorodifluoromethane	1.0	ND	U
74-87-3	Chloromethane	1.0	ND	U
75-01-4	Vinyl chloride	.50	ND	U
74-83-9	Bromomethane	.50	ND	U
75-00-3	Chloroethane	.50	ND	U
75-69-4	Trichlorofluoromethane	.50	ND	U
76-13-1	Trichlorotrifluoroethane	.50	ND	U
75-35-4	1,1-Dichloroethene	.50	ND	U
75-09-2	Methylene chloride	1.0	ND	U
156-60-5	trans-1,2-Dichloroethene	.50	ND	U
75-34-3	1,1-Dichloroethane	.50	ND	U
156-59-2	cis-1,2-Dichloroethene	.50	ND	U
67-66-3	Chloroform	.50	ND	U
71-55-6	1,1,1-Trichloroethane	.50	ND	U
56-23-5	Carbon tetrachloride	.50	ND	U
107-06-2	1,2-Dichloroethane	.50	ND	U
79-01-6	Trichloroethene	.50	ND	U
78-87-5	1,2-Dichloropropane	.50	ND	U
75-27-4	Bromodichloromethane	.50	ND	U
110-75-8	2-Chloroethylvinylether	1.0	ND	U
10061-01-5	cis-1,3-Dichloropropene	.50	ND	U
10061-02-6	trans-1,3-Dichloropropene	.50	ND	U
79-00-5	1,1,2-Trichloroethane	.50	ND	U
127-18-4	Tetrachloroethene	.50	ND	U
124-48-1	Dibromochloromethane	.50	ND	U
108-90-7	Chlorobenzene	.50	ND	U
75-25-2	Bromoform	.50	ND	U
79-34-5	1,1,2,2-Tetrachloroethane	.50	ND	U
541-73-1	1,3-Dichlorobenzene	.50	ND	U
106-46-7	1,4-Dichlorobenzene	.50	ND	U
95-50-1	1,2-Dichlorobenzene	.50	ND	U

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 8010
 ANAMETRIX, INC. (408)432-8192

Project ID : 1459.0
 Sample ID : VBLKB2
 Matrix : WATER
 Date Sampled : 0/ 0/ 0
 Date Analyzed : 3/ 9/94
 Instrument ID : HP24

Anamatrix ID : BM090211
 Analyst : TM
 Supervisor : DL
 Dilution Factor : 1.0
 Conc. Units : ug/L

CAS No.	COMPOUND NAME	REPORTING LIMIT	AMOUNT DETECTED	Q
75-71-8	Dichlorodifluoromethane	1.0	ND	U
74-87-3	Chloromethane	1.0	ND	U
75-01-4	Vinyl chloride	.50	ND	U
74-83-9	Bromomethane	.50	ND	U
75-00-3	Chloroethane	.50	ND	U
75-69-4	Trichlorofluoromethane	.50	ND	U
76-13-1	Trichlorotrifluoroethane	.50	ND	U
75-35-4	1,1-Dichloroethene	.50	ND	U
75-09-2	Methylene chloride	1.0	ND	U
156-60-5	trans-1,2-Dichloroethene	.50	ND	U
75-34-3	1,1-Dichloroethane	.50	ND	U
156-59-2	cis-1,2-Dichloroethene	.50	ND	U
67-66-3	Chloroform	.50	ND	U
71-55-6	1,1,1-Trichloroethane	.50	ND	U
56-23-5	Carbon tetrachloride	.50	ND	U
107-06-2	1,2-Dichloroethane	.50	ND	U
79-01-6	Trichloroethene	.50	ND	U
78-87-5	1,2-Dichloropropane	.50	ND	U
75-27-4	Bromodichloromethane	.50	ND	U
110-75-8	2-Chloroethylvinylether	1.0	ND	U
10061-01-5	cis-1,3-Dichloropropene	.50	ND	U
10061-02-6	trans-1,3-Dichloropropene	.50	ND	U
79-00-5	1,1,2-Trichloroethane	.50	ND	U
127-18-4	Tetrachloroethene	.50	ND	U
124-48-1	Dibromochloromethane	.50	ND	U
108-90-7	Chlorobenzene	.50	ND	U
75-25-2	Bromoform	.50	ND	U
79-34-5	1,1,2,2-Tetrachloroethane	.50	ND	U
541-73-1	1,3-Dichlorobenzene	.50	ND	U
106-46-7	1,4-Dichlorobenzene	.50	ND	U
95-50-1	1,2-Dichlorobenzene	.50	ND	U

SURROGATE RECOVERY SUMMARY -- EPA METHOD 8010
ANAMETRIX, INC. (408)432-8192

Project ID : 1459.06
Matrix : LIQUID

Anamatrix ID : 9403042
Analyst : TM
Supervisor : *sk*

	SAMPLE ID	SU1	SU2	SU3
1	VBLKB1	81	96	98
2	MW-8	78	98	103
3	MW-8 MS	94	108	104
4	MW-8 MSD	92	105	103
5	MW-1	85	97	96
6	MW-2	86	98	94
7	MW-5	84	98	92
8	MW-4	77	100	94
9	VBLKB2	74	88	85
10	MW-7	79	94	92
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

QC LIMITS

 SU1 = Bromochloromethane (56- 99)
 SU2 = 1-Chloro-2-fluorobenze (73-110)
 SU3 = 2-Bromochlorobenzene (65-108)

* Values outside of Anamatrix QC limits

MATRIX SPIKE RECOVERY FORM -- EPA METHOD 8010
 ANAMETRIX, INC. (408)432-8192

Project ID : 1459.06
 Sample ID : MW-8
 Matrix : WATER
 Date Sampled : 3/ 2/94
 Date Analyzed : 3/ 8/94
 Instrument ID : HP24

Anamatrix ID : 9403042-02
 Analyst : JM
 Supervisor : sk

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	%REC LIMITS
Trichlorotrifluoroethan	10.0	.0	9.2	92	42-111
1,1-Dichloroethene	10.0	.0	9.8	98	47-128
trans-1,2-Dichloroethen	10.0	.0	10.0	100	63-110
1,1-Dichloroethane	10.0	.0	10.4	104	72-128
cis-1,2-Dichloroethene	10.0	.0	10.1	101	62-126
1,1,1-Trichloroethane	10.0	.0	9.5	95	65-128
Trichloroethene	10.0	.0	9.0	90	64-115
Tetrachloroethene	10.0	.0	9.2	92	64-111
Chlorobenzene	10.0	.0	8.9	89	75-124
1,3-Dichlorobenzene	10.0	.0	8.5	85	68-119
1,4-Dichlorobenzene	10.0	.0	8.6	86	72-125
1,2-Dichlorobenzene	10.0	.0	8.8	88	70-131

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	% RPD	RPD LIMITS	%REC LIMITS
Trichlorotrifluoroethan	10.0	8.1	81	12	25	42-111
1,1-Dichloroethene	10.0	8.7	87	12	25	47-128
trans-1,2-Dichloroethen	10.0	9.0	90	11	25	63-110
1,1-Dichloroethane	10.0	9.3	93	11	25	72-128
cis-1,2-Dichloroethene	10.0	9.5	95	6	25	62-126
1,1,1-Trichloroethane	10.0	8.7	87	9	25	65-128
Trichloroethene	10.0	8.4	84	7	25	64-115
Tetrachloroethene	10.0	8.4	84	9	25	64-111
Chlorobenzene	10.0	8.3	83	7	25	75-124
1,3-Dichlorobenzene	10.0	8.3	83	2	25	68-119
1,4-Dichlorobenzene	10.0	8.5	85	2	25	72-125
1,2-Dichlorobenzene	10.0	8.7	87	2	25	70-131

* Value is outside of Anamatrix QC limits

RPD: 0 out of 12 outside limits
 Spike Recovery: 0 out of 24 outside limits

LABORATORY CONTROL SAMPLE
 EPA METHOD 601/8010
 ANAMETRIX, INC. (408)432-8192

Sample I.D. : LABORATORY CONTROL SAMPLE
 Matrix : WATER
 SDG/Batch : 03042
 Date analyzed : 03/08/94

Anamatrix I.D. : MM080111
 Analyst : TM
 Supervisor : *DL*
 Instrument I.D. : HP24

COMPOUND	SPIKE AMOUNT (ug/L)	AMOUNT RECOVERED (ug/L)	PERCENT RECOVERY	%RECOVERY LIMITS
Trichlorotrifluoroethane	10	10.0	99%	65 - 116
1,1-Dichloroethene	10	10.5	105%	64 - 125
trans-1,2-Dichloroethene	10	10.7	107%	77 - 113
1,1-Dichloroethane	10	10.6	106%	85 - 129
cis-1,2-Dichloroethene	10	10.4	104%	78 - 130
1,1,1-Trichloroethane	10	8.6	86%	83 - 125
Trichloroethene	10	8.5	85%	76 - 124
Tetrachloroethene	10	9.7	97%	80 - 118
Chlorobenzene	10	9.2	92%	81 - 130
1,3-Dichlorobenzene	10	9.2	92%	82 - 115
1,4-Dichlorobenzene	10	9.3	93%	85 - 122
1,2-Dichlorobenzene	10	9.4	94%	86 - 122

* Limits based on data generated by Anamatrix, Inc., December, 1993.

LABORATORY CONTROL SAMPLE
 EPA METHOD 601/8010
 ANAMETRIX, INC. (408)432-8192

Sample I.D. : LABORATORY CONTROL SAMPLE
 Matrix : WATER
 SDG/Batch : 03042
 Date analyzed : 03/09/94

Anamatrix I.D. : MM090111
 Analyst : TM
 Supervisor : Sh
 Instrument I.D.: HP24

COMPOUND	SPIKE AMOUNT (ug/L)	AMOUNT RECOVERED (ug/L)	PERCENT RECOVERY	%RECOVERY LIMITS
Trichlorotrifluoroethane	10	9.2	92%	65 - 116
1,1-Dichloroethene	10	9.7	97%	64 - 125
trans-1,2-Dichloroethene	10	9.7	97%	77 - 113
1,1-Dichloroethane	10	9.5	95%	85 - 129
cis-1,2-Dichloroethene	10	9.7	97%	78 - 130
1,1,1-Trichloroethane	10	9.0	90%	83 - 125
Trichloroethene	10	8.9	89%	76 - 124
Tetrachloroethene	10	9.1	91%	80 - 118
Chlorobenzene	10	9.1	91%	81 - 130
1,3-Dichlorobenzene	10	9.0	89%	82 - 115
1,4-Dichlorobenzene	10	9.0	90%	85 - 122
1,2-Dichlorobenzene	10	9.2	92%	86 - 122

* Limits based on data generated by Anamatrix, Inc., December, 1993.

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. TIM WOOD
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9403042
Date Received : 03/02/94
Project ID : 1459.06
Purchase Order: N/A
Department : GC
Sub-Department: TPH

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9403042- 1	MW-1	WATER	03/02/94	TPHgBTEX
9403042- 3	MW-3	WATER	03/02/94	TPHgBTEX
9403042- 4	MW-2	WATER	03/02/94	TPHgBTEX
9403042- 5	MW-6	WATER	03/02/94	TPHgBTEX
9403042- 6	MW-5	WATER	03/02/94	TPHgBTEX
9403042- 8	MW-4	WATER	03/02/94	TPHgBTEX

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. TIM WOOD
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9403042
Date Received : 03/02/94
Project ID : 1459.06
Purchase Order: N/A
Department : GC
Sub-Department: TPH

QA/QC SUMMARY :

- No QA/QC problems encountered for these samples.

Cheryl Balman 3/10/94
Department Supervisor Date

Kamel c. Kamel 3/10/94
Chemist Date

ANALYSIS DATA SHEET - TOTAL PETROLEUM HYDROCARBONS
(MINERAL SPIRITS WITH BTEX)
ANAMETRIX, INC. - (408) 432-8192

Anamatrix W.O.: 9403042
Matrix : WATER
Date Sampled : 03/02/94

Project Number : 1459.06
Date Released : 03/09/94

COMPOUNDS	Reporting Limit (ug/L)	Sample I.D.# MW-1	Sample I.D.# MW-3	Sample I.D.# MW-2	Sample I.D.# MW-6	Sample I.D.# MW-5
Benzene	0.5	ND	ND	ND	ND	ND
Toluene	0.5	ND	ND	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND	0.6	ND
Total Xylenes	0.5	ND	ND	ND	ND	ND
TPH as Mineral Spirits	50	ND	ND	ND	ND	ND
% Surrogate Recovery		101%	101%	102%	105%	107%
Instrument I.D.		HP4	HP4	HP4	HP4	HP4
Date Analyzed		03/07/94	03/07/94	03/07/94	03/07/94	03/07/94
RLMF		1	1	1	1	1

- ND - Not detected at or above the practical quantitation limit for the method.
- TPHg - Total Petroleum Hydrocarbons as mineral spirits is determined by GCFID using modified EPA Method 8015 following sample purge and trap by EPA Method 5030.
- BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA Method 8020 following sample purge and trap by EPA Method 5030.
- RLMF - Reporting Limit Multiplication Factor (Dilution).

Anamatrix control limits for surrogate p-Bromofluorobenzene recovery are 61-139%.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

Kamel G. Kamel 3/10/94
Analyst Date

Cheryl Balmer 3/10/94
Supervisor Date

ANALYSIS DATA SHEET - TOTAL PETROLEUM HYDROCARBONS
(GASOLINE WITH BTEX)
ANAMETRIX, INC. - (408) 432-8192

Anamatrix W.O.: 9403042
Matrix : WATER
Date Sampled : 03/02/94

Project Number : 1459.06
Date Released : 03/09/94

COMPOUNDS	Reporting Limit (ug/L)	Sample I.D.# MW-4	Sample I.D.# BM0703E1
Benzene	0.5	ND	ND
Toluene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Total Xylenes	0.5	ND	ND
TPH as Mineral Spirits	50	ND	ND
% Surrogate Recovery		104%	101%
Instrument I.D.		HP4	HP4
Date Analyzed		03/07/94	03/07/94
RLMF		1	1

- ND - Not detected at or above the practical quantitation limit for the method.
- TPHg - Total Petroleum Hydrocarbons as mineral spirits is determined by GCFID using modified EPA Method 8015 following sample purge and trap by EPA Method 5030.
- BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA Method 8020 following sample purge and trap by EPA Method 5030.
- RLMF - Reporting Limit Multiplication Factor (Dilution).

Anamatrix control limits for surrogate p-Bromofluorobenzene recovery are 61-139%.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

Kamel G. Kamel 3/10/94
Analyst Date

Carol Bulmer 3/10/94
Supervisor Date

TOTAL VOLATILE HYDROCARBON MATRIX SPIKE REPORT
 EPA METHOD 5030 WITH GC/PID
 ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 1459.06 MW-2
 Matrix : WATER
 Date Sampled : 03/02/94
 Date Analyzed : 03/08/94

Anamatrix I.D. : 9403042-04
 Analyst : *KL*
 Supervisor : *m*
 Date Released : 03/09/94
 Instrument I.D.: HP4

COMPOUND	SPIKE AMT (ug/L)	SAMPLE CONC (ug/L)	REC MS (ug/L)	%REC MS	REC MD (ug/L)	%REC MD	RPD	%REC LIMITS *
BENZENE	20.0	0.0	15.7	78%	17.2	86%	9%	45-139
TOLUENE	20.0	0.0	16.9	85%	18.4	92%	9%	51-138
ETHYLBENZENE	20.0	0.0	17.0	85%	19.2	96%	12%	48-146
TOTAL XYLENES	20.0	0.0	16.2	81%	18.3	92%	12%	50-139
p-BFB				103%		103%		61-139

* Quality control limits established by Anamatrix, Inc.

TOTAL VOLATILE HYDROCARBON MATRIX SPIKE REPORT
 EPA METHOD 5030 WITH GC/PID
 ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 1459.06 MW-4
 Matrix : WATER
 Date Sampled : 03/02/94
 Date Analyzed : 03/07/94

Anametrix I.D. : 9403042-08
 Analyst : *ARE*
 Supervisor : *WJ*
 Date Released : 03/09/94
 Instrument I.D.: HP4

COMPOUND	SPIKE AMT (ug/L)	SAMPLE CONC (ug/L)	REC MS (ug/L)	%REC MS	REC MD (ug/L)	%REC MD	RPD	%REC LIMITS *
BENZENE	20.0	0.0	20.3	102%	20.1	101%	-1%	45-139
TOLUENE	20.0	0.0	20.3	102%	21.0	105%	3%	51-138
ETHYLBENZENE	20.0	0.0	21.1	106%	21.7	109%	3%	48-146
TOTAL XYLENES	20.0	0.0	21.0	105%	22.1	111%	5%	50-139
p-BFB				101%		116%		61-139

* Quality control limits established by Anametrix, Inc.

TOTAL VOLATILE HYDROCARBON LABORATORY CONTROL SAMPLE REPORT
 EPA METHOD 5030 WITH GC/PID
 ANAMETRIX, INC. (408) 432-8192

Sample I.D. : LAB CONTROL SAMPLE
 Matrix : WATER
 Date Sampled : N/A
 Date Analyzed : 03/07/94

Anamatrix I.D. : MM0701E3
 Analyst : KK
 Supervisor :
 Date Released : 03/09/94
 Instrument I.D.: HP4

COMPOUND	SPIKE AMT. (ug/L)	LCS (ug/L)	REC LCS	%REC LIMITS *
Benzene	20.0	19.7	99%	52-133
Toluene	20.0	20.2	101%	57-136
Ethylbenzene	20.0	21.0	105%	56-139
Total Xylenes	20.0	21.2	106%	56-141
P-BFB			102%	61-139

* Quality control limits established by Anamatrix, Inc.

