

4-25-91

■ Subsurface Consultants, Inc.


PROGRESS REPORT 3
GROUNDWATER MONITORING
AND REMEDIATION
1330 MARTIN LUTHER KING, JR. WAY
SCI 430.010

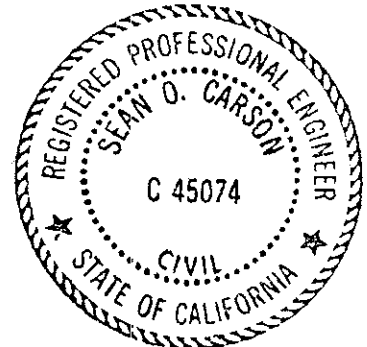
April 25, 1991

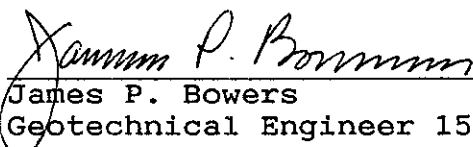
Prepared for:

Mr. John Esposito
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By:


Sean O. Carson
Civil Engineer 45074 (expires 3/31/94)




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Subsurface Consultants, Inc.
171 - 12th Street, Suite 201
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(415) 268-0461

April 25, 1991

91 APR 26 PM 3:29

LETTER OF TRANSMITTAL

TO: Mr. John Esposito
Bramalea Pacific
1221 Broadway, Suite 1800
Oakland, CA 94612

DATE: April 26, 1991
PROJECT: 1330 Martin Luther King, Jr. Way/Progress Report 3
SICI JOB NUMBER: 430.010

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| <input type="checkbox"/> a proposed scope of services | <input type="checkbox"/> with our comments |
| <input type="checkbox"/> specifications | <input type="checkbox"/> with Chain of Custody documents |
| <input type="checkbox"/> grading foundation plans | <input checked="" type="checkbox"/> for your use |
| <input type="checkbox"/> soil samples/groundwater samples | |
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REMARKS:

- COPIES TO: (1) Ms. Lois Parr, City of Oakland - OEDE, 1333 Broadway, #900, Oakland, CA
(1) Ms. Katherine Chesick, ACHCSA, 80 Swan Way, #200, Oakland, CA 94612
(1) Mr. Lester Feldman, RWQCB, 1800 Harrison Street, #700, Oakland, CA
(1) Mr. Donnell Choy, Office of City Attorney, 505 14th Street, 12th Floor, Oakland, CA
(1) Mr. Roy Ikeda, Crosby, Heafey, Roach & May, 1999 Harrison Street, Oakland, CA

BY: Jim Bowers
James P. Bowers (cul)

■ Subsurface Consultants, Inc.

171 12th Street • Suite 201 • Oakland, California 94607 • Telephone 415-268-0461

I INTRODUCTION

This report presents groundwater monitoring data and summarizes groundwater remediation through January 21, 1991 at 1330 Martin Luther King, Jr. Way in Oakland, California. Groundwater contamination resulted from a leaking underground gasoline storage tank. Free product from the tank has migrated beneath the intersection at 14th Street and Martin Luther King, Jr. Way. The extent of the free product and dissolved product plumes was characterized during previous investigations and recorded in a report dated November 20, 1989 by Subsurface Consultants, Inc (SCI).

Groundwater remediation commenced on April 30, 1990. Remediation consists of pumping groundwater from one well and treating it with a granular activated carbon (GAC) filtering system. Details of the groundwater treatment system, the hydrogeologic assessment, as well as tank removal and soil remediation activities are recorded in reports previously published by SCI.

II SUPPLEMENTAL INVESTIGATION

Several additional monitoring wells have been constructed to further define the lateral extent of the dissolved product plume. Wells 45, 46 and 58 have been installed at the locations shown on the Site Plan, Plate 1. The wells were constructed using methods described in our previous reports. Detailed well logs are

presented on Plates 4 through 6. These wells were permitted through the Alameda County Flood Control and Water Conservation District, Zone 7.

III GROUNDWATER LEVEL MEASUREMENTS

Groundwater levels were obtained by measuring the depth to groundwater from the top of casing (TOC) using an electronic well sounder. A level survey, using an assumed elevation reference, was performed to determine the TOC elevation of the monitoring wells. Water levels in wells that contained free product were measured using a steel tape with water and gasoline sensitive pastes. The water level data are presented in the Appendix.

The groundwater level data indicates that the natural groundwater flow direction is toward the northwest at a gradient of approximately 0.8 percent, as shown on Plate 1. The groundwater surface elevations shown on Plate 1 represent conditions prior to remediation pumping. Groundwater level data presented on Plate 2 represents typical conditions during groundwater extraction pumping. The data presented on Plate 3 represents recent conditions when groundwater pumping had temporarily been halted.

IV FREE PRODUCT

Free product measurements were conducted in wells known to contain free gasoline product and those wells close to the perimeter of the free product plume. As discussed in our previous report, free product thicknesses in several of the wells appears to be significantly greater than that which actually exists in the formation. Actual gasoline thicknesses were estimated by bailing the free product from the wells until stabilized free product levels were noted. Free product thicknesses measured after bailing ranged from 3 to 6 inches. The most recent estimated extent of the free product plume is shown on Plate 3. The extent of the free product is based on data from the groundwater wells and vapor extraction wells installed for soil remediation.

V GROUNDWATER REMEDIATION

Groundwater remediation began on April 30, 1990 and consists of pumping approximately 3 gallons per minute (gpm) from Well 28. The drawdown in the pumping well is approximately 5 feet. The water is treated with granular activated carbon (GAC) and then discharged into the EBMUD sanitary sewer system. The treatment system has been closely monitored by sampling and analyzing the water at points within the treatment system biweekly. The results of the monitoring program are submitted quarterly to EBMUD. Pumping rates were maintained except during intermittent intervals

when pumping was ceased for maintenance of the pumping and/or treatment systems. Typical stabilized groundwater elevation contours during pumping are shown on Plate 2. On December 12, 1990, pumping temporarily ceased because contaminant concentrations in Well 29 were increasing. This condition is discussed in more detail in subsequent sections of the report.

V GROUNDWATER QUALITY MONITORING

Groundwater samples were obtained from selected wells that did not contain free product. Before sampling, each well was purged using a bailer. Groundwater samples were obtained using dedicated Teflon bailers. Groundwater samples were retained in precleaned containers, placed in an iced cooler, and refrigerated until delivery to the analytical laboratory. Chain-of-custody documents accompanied the samples; copies are presented in the Appendix.

Analytical testing was performed by Curtis & Tompkins, Ltd., a State of California Department of Health Services certified analytical laboratory. The analytical testing program for the groundwater samples included:

1. Total volatile hydrocarbons - sample preparation and analysis using EPA methods 5030 (purge and trap extraction) and 8015 (gas chromatograph coupled to a flame ionization detector).
2. Purgeable aromatics - sample preparation and analysis using EPA methods 5030 and 8020 (gas chromatograph and photo ionization detector).
3. Organic lead - sample preparation and analysis using DHS method 1988 Luft Manual.

4. Ethylene Dibromide - sample preparation and analysis using EPA method 5046.
5. Purgeable Halocarbons - sample preparation and analysis using EPA methods 5030 and 8010 (gas chromatograph and electrolytic conductivity detector).

The results of the analytical testing are presented in Table 2. Copies of the analytical test reports are presented in the Appendix.

Groundwater quality data for representative conditions before, during and after pumping are presented on Plates 1 thru 3, respectively. Based upon recent groundwater quality data, we estimate that the extent of the dissolved product contamination plume is approximately that shown on Plate 3. The downgradient edge of the plume appears to extend not more than 150 feet downgradient of the previous fuel tank. This distance is significantly less than that figure recorded in our previous report. The revised estimate reflects new water quality data generated from Well 58.

Table 2. Contaminant Concentrations In Groundwater

<u>Test Boring</u>	<u>Sample Date</u>	<u>TVH¹</u> <u>(ppb)⁵</u>	<u>B²</u> <u>(ppb)</u>	<u>T²</u> <u>(ppb)</u>	<u>X²</u> <u>(ppb)</u>	<u>E²</u> <u>(ppb)</u>	<u>Total Organic Lead</u> <u>(ppb)</u>	<u>EDB³</u> <u>(ppb)</u>	<u>1,2 DCA⁴</u> <u>(ppb)</u>
11	07/05/88	10,000	1,800	ND ⁵	1,200	ND	-- ⁶	--	--
	04/03/89	53,000	7,100	4,000	2,400	380	--	--	--
	07/06/89	22,000	5,300	3,200	2,300	390	ND	26	--
	11/08/89	120,000	18,000	8,000	21,000	4,500	ND	37	--
	07/18/90	26,000	950	19	98	ND	--	--	--
	10/23/90	4,200	1,600	8.5	170	28	--	0.2	--
	01/21/91	1,900	600	6.2	84	60	--	0.15	--
28	09/02/88	890	431	75.4	84	ND	ND	9.2	--
	07/06/89	13,000	4,900	1,500	1,300	100	ND	27	--
29	09/02/88	ND	ND	8.1	ND	ND	ND	ND	--
	04/03/89	450	ND	2.0	6.7	2.0	--	--	--
	07/06/89	ND	ND	15	ND	ND	ND	ND	--
	11/08/89	780	ND	14	32	7.9	ND	ND	--
	10/23/90	1,800	1.2	6.5	4.8	2.7	--	--	--
	01/21/91	1,100	ND	3.7	4.9	1.3	--	ND	--
	03/28/91	500	ND	1.6	0.8	ND	--	--	--
31	09/02/88	ND	ND	ND	ND	ND	ND	ND	--
	04/03/89	ND	ND	ND	ND	ND	--	--	--
	07/06/89	ND	ND	ND	ND	ND	ND	ND	--
	11/08/89	ND	ND	ND	ND	ND	ND	ND	--
	07/18/90	ND	ND	ND	ND	ND	--	--	--
	01/21/91	ND	ND	0.6	2.1	ND	--	ND	--
32	10/23/90	48,000	7,600	8,200	5,600	150	--	3.8	--
	01/21/91	96,000	9,600	15,000	16,000	2,000	--	ND	--
39	04/03/89	2,000	250	11	210	ND	--	--	--
	07/06/89	7,900	2,700	1,300	860	97	ND	3.0	--
	11/08/89	9,300	4,500	760	310	150	ND	4.0	36
	07/18/90	ND	4.1	ND	ND	ND	--	--	--
	10/23/90	160	12	6.4	5.0	ND	--	ND	ND
	01/21/90	200	23	0.9	2.0	1.2	--	ND	--
	03/28/91	ND	ND	ND	ND	ND	--	--	--
42	07/06/89	13,000	4,500	100	1,000	ND	ND	8.0	--
	10/23/90	8,800	420	580	910	91	--	0.7	--
45	12/05/89	ND	ND	ND	ND	ND	ND	ND	--
	10/23/90	ND	0.9	1.4	1.8	ND	--	--	--
	01/21/91	ND	ND	ND	ND	ND	--	ND	--

Sample	Sample Date	TVH ¹ (ppb) ⁵	B ² (ppb)	T ² (ppb)	X ² (ppb)	E ² (ppb)	Total Organic Lead (ppb)	EDB ³ (ppb)	1,2 DCA ⁴ (ppb)
46	11/30/89	ND	2.1	1.9	2.0	ND	ND	ND	--
	07/18/90	ND	ND	ND	ND	ND	--	--	--
	10/23/90	ND	ND	0.6	ND	0.5	--	--	--
	01/21/91	ND	ND	ND	ND	ND	--	ND	--
58	01/30/91	ND	ND	ND	ND	ND	--	--	--
	03/28/91	ND	ND	ND	ND	ND	--	--	--

- 1 TVH = Total Volatile Hydrocarbons
- 2 BTXE = Benzene, Toluene, Xylene, and Ethylbenzene
- 3 EPA 8010, ethylene dibromide
- 4 EPA 8010, 1, 2 dichloroethane
- 5 ppb = parts per billion = ug/L = micrograms per liter
- 6 ND = None detected, chemicals not present at concentrations above the detection limits
- 7 -- = Test not performed

VI CONCLUSIONS

A. General

Based upon the groundwater quality data generated to date, it is apparent that groundwater pumping has reduced dissolved product concentrations. It is our opinion, that groundwater remediation by extraction will be even more effective once the free product is removed. Off-site soil remediation is currently underway utilizing soil vapor extraction technology. We judge that significant reductions in free product thicknesses and soil contamination concentrations will be realized during the coming months.

The stabilized groundwater conditions during pumping (shown on Plate 2) indicate that groundwater flow directions were reversed

downgradient of Well 28 to a distance of approximately 125 feet. The capture zone for the extraction well was estimated from the groundwater contours and appears to intercept the dissolved product plume. The estimated extent of the capture zone is shown on Plate 2. We therefore conclude that pumping 3 gpm from Well 28 will be effective in capturing the contaminated groundwater plume.

B. Additional Source of Gasoline Contamination

Review of the groundwater quality data presented in Table 3 suggests that there may be another source of gasoline contamination in the vicinity of Monitoring Well 29. In 1988, very low concentrations of toluene were detected in this well. Over time, we have observed significant increases in concentrations of gasoline and its soluble constituents in groundwater obtained from the well. For discussion purposes, the data from Table 3 pertinent to Wells 29 and 58 are presented below.

Table 3. Contaminant Concentrations in Groundwater From Wells 29 and 58

<u>Test Boring</u>	<u>Sample Date</u>	<u>TVH (ppb)</u>	<u>B (ppb)</u>	<u>T (ppb)</u>	<u>X (ppb)</u>	<u>E (ppb)</u>	<u>Total Organic Lead (ppb)</u>
29	09/02/88	ND	ND	8.1	ND	ND	ND
	04/03/89	450	ND	2.0	6.7	2.0	--
	07/06/89	ND	ND	15	ND	ND	ND
	11/08/89	780	ND	14	32	7.9	ND
	10/23/90	1,800	1.2	6.5	4.8	2.7	--
	01/21/91	1,100	ND	3.7	4.9	1.3	--
	03/28/91	500	ND	1.6	0.8	ND	--
58	01/30/91	ND	ND	ND	ND	ND	ND
	03/28/91	ND	ND	ND	ND	ND	--

The contamination detected in Well 29 appears to be associated with another source unrelated to the Martin Luther King Jr. Way (MLK) groundwater contamination problem. The groundwater sample from Well 58, which is situated between Well 29 and the MLK plume did not contain TVH or BTXE above detection limits. This data indicates that contaminants present in Well 29 are likely not associated with the MLK tank release.

We are currently uncertain of the source of gasoline contamination detected in Well 29. However, preliminary research conducted by SCI suggests that a source may exist in areas north of Well 29.

C. Future Groundwater Monitoring

Groundwater quality monitoring will continue on a quarterly basis. We propose that future sampling be performed on Wells 31, 58, 46, 45, 11, 39 and 32. Free product thicknesses will be measured in Wells 30, 42 and 43. We propose to delete Well 29 from the monitoring program since it appears that the MLK contamination problem does not extend into this area.

List of Attached Plates:

Plate 1	Groundwater Conditions: Before Pumping
Plate 2	Groundwater Conditions: During Pumping
Plate 3	Groundwater Conditions January 21, 1991
Plates 4 thru 6	Logs Of Borings 45, 46 and 58
Plate 7	Unified Soil Classification System

Appendix:

Groundwater Level Data
Laboratory Test Reports
Chain-of-Custody Documents

Distribution:

1 copy: Mr. John Esposito
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1221 Broadway, Suite 1800
Oakland, California 94612

1 copy: Ms. Lois Parr
City of Oakland
Office of Economic Development and Employment
1333 Broadway, Suite 900
Oakland, California 94612



1 copy: Ms. Katherine Chesick
Alameda County Health Care Services Agency
80 Swan Way, Suite 200
Oakland, California 94612

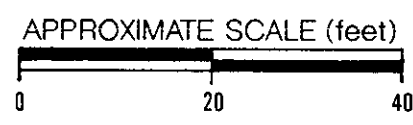
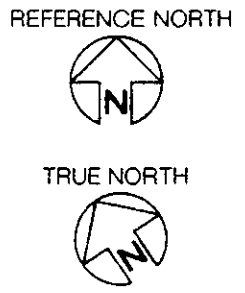
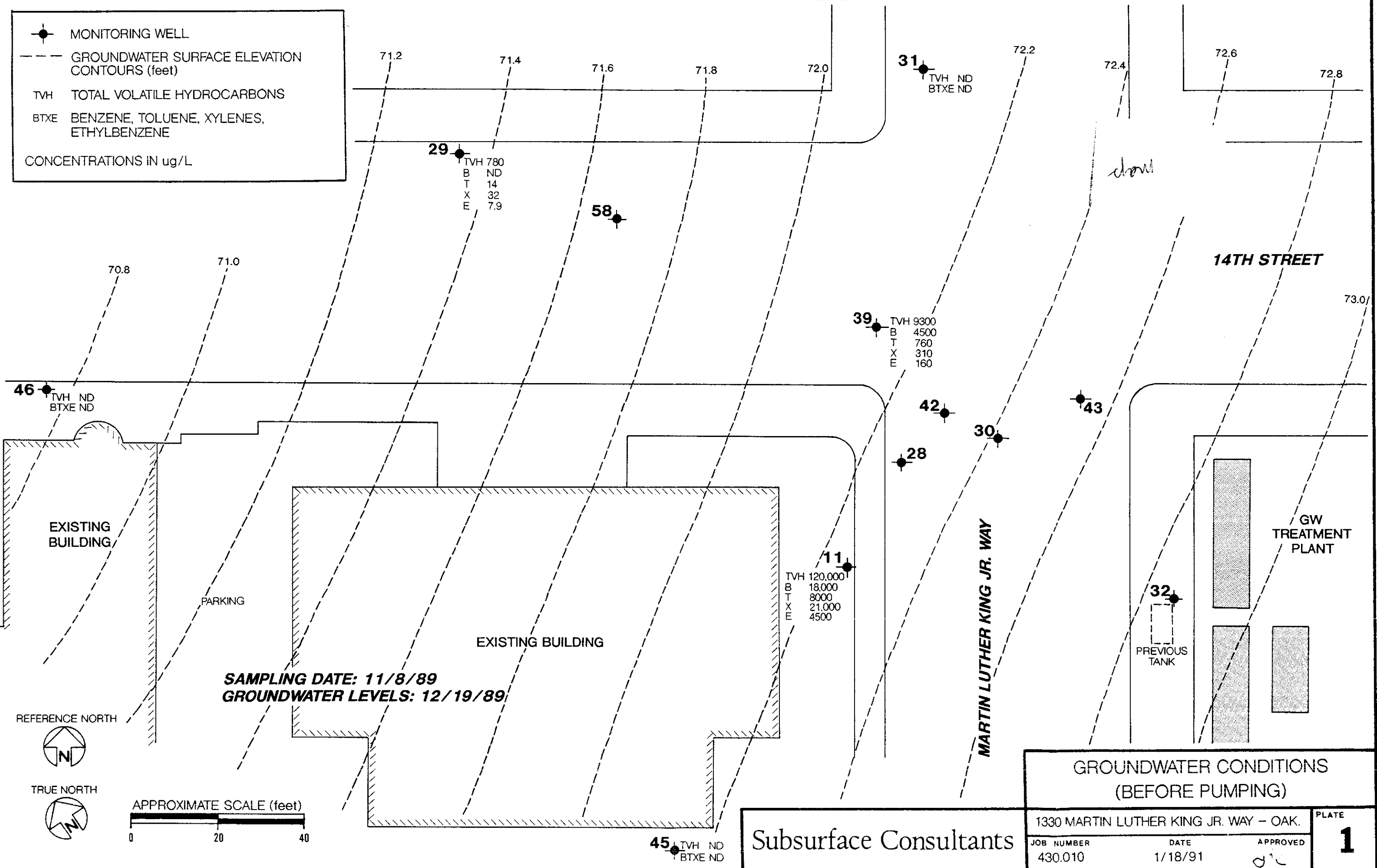
1 copy: Mr. Lester Feldman
Regional Water Quality Control Board
1800 Harrison Street, Suite 700
Oakland, California 94612

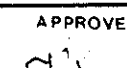
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505 14th Street, 12th Floor
Oakland, California 94612




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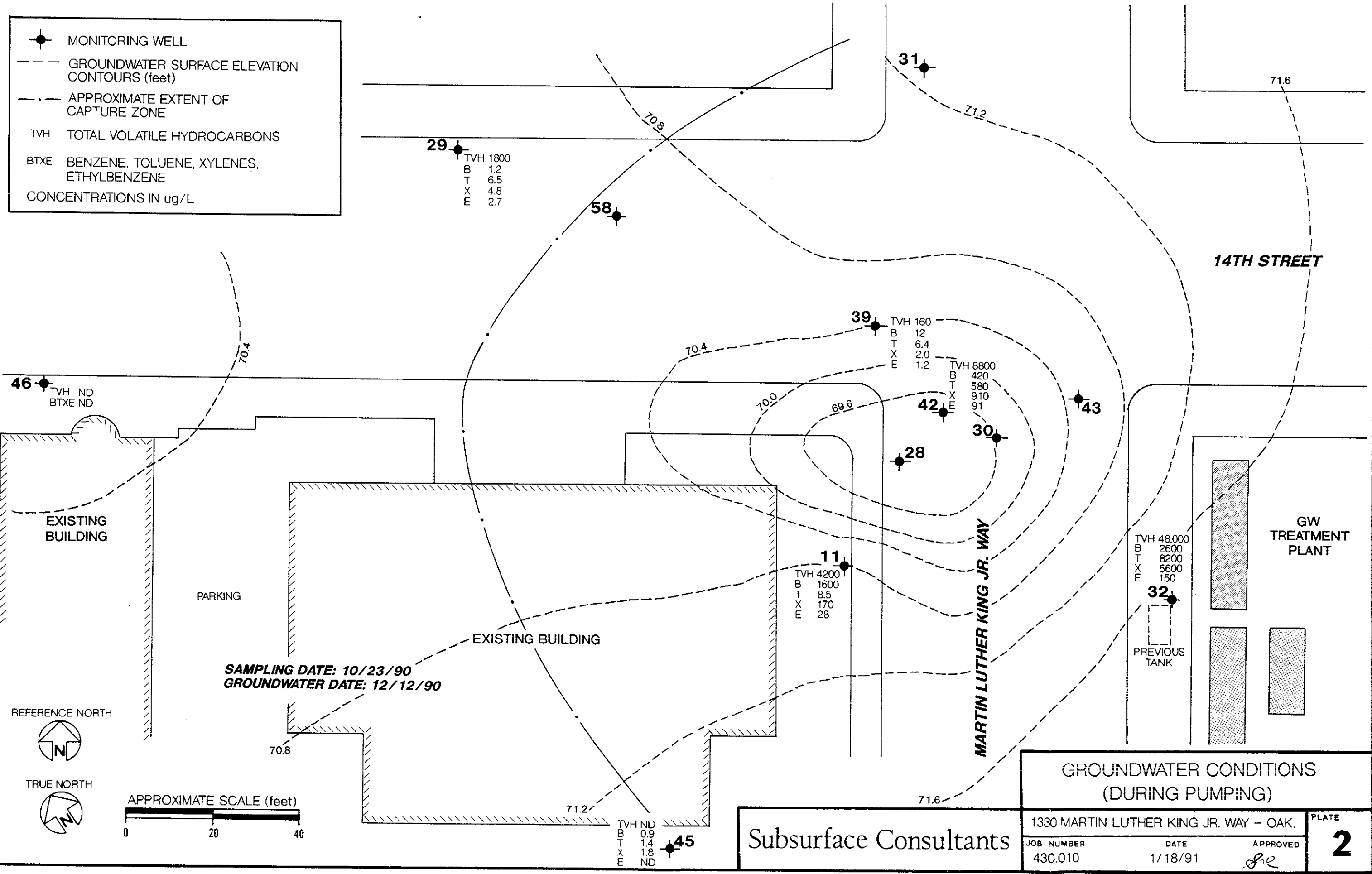
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 MONITORING WELL
 GROUNDWATER SURFACE ELEVATION CONTOURS (feet)
 TVH TOTAL VOLATILE HYDROCARBONS
 BTXE BENZENE, TOLUENE, XYLENES, ETHYLBENZENE
 CONCENTRATIONS IN ug/L



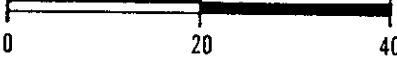



Subsurface Consultants			GROUNDWATER CONDITIONS (BEFORE PUMPING)	
			1330 MARTIN LUTHER KING JR. WAY - OAK.	
JOB NUMBER	DATE	APPROVED	PLATE 1	
430.010	1/18/91			

 MONITORING WELL
 GROUNDWATER SURFACE ELEVATION CONTOURS (feet)
 APPROXIMATE EXTENT OF CAPTURE ZONE
 TVH TOTAL VOLATILE HYDROCARBONS
 BTXE BENZENE, TOLUENE, XYLENES, ETHYLBENZENE
 CONCENTRATIONS IN ug/L

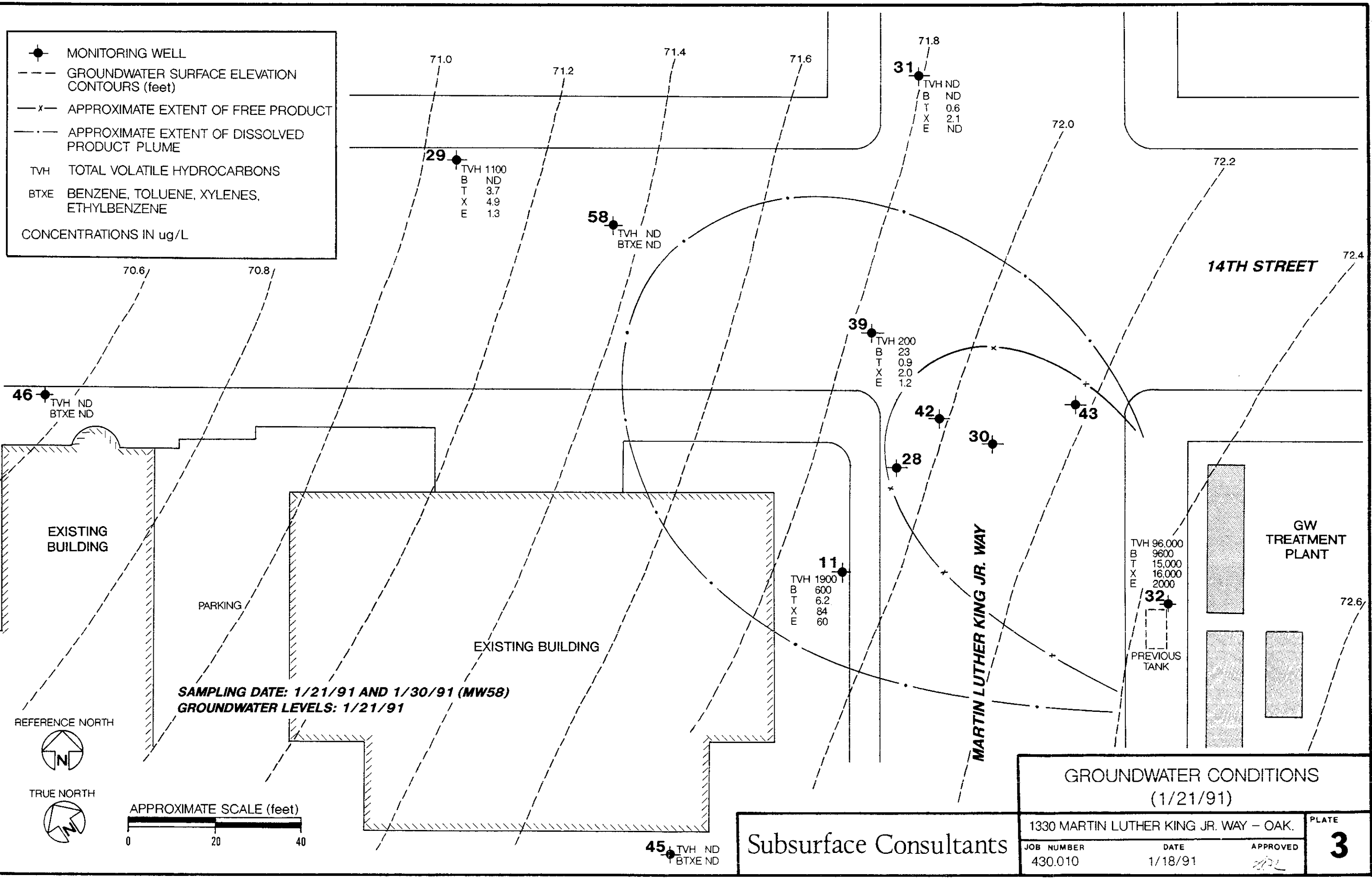


SAMPLING DATE: 10/23/90
 GROUNDWATER DATE: 12/12/90

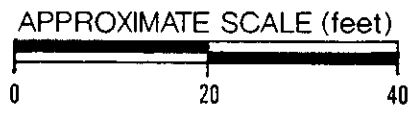
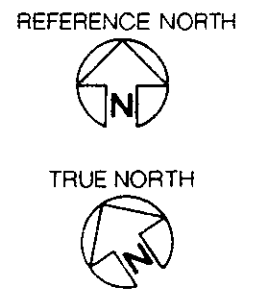
REFERENCE NORTH

 TRUE NORTH

 APPROXIMATE SCALE (feet)


Subsurface Consultants			GROUNDWATER CONDITIONS (DURING PUMPING)		PLATE 2
			1330 MARTIN LUTHER KING JR. WAY - OAK.		
JOB NUMBER	DATE	APPROVED			
430.010	1/18/91				

- MONITORING WELL
- - - GROUNDWATER SURFACE ELEVATION CONTOURS (feet)
- x- APPROXIMATE EXTENT OF FREE PRODUCT
- APPROXIMATE EXTENT OF DISSOLVED PRODUCT PLUME
- TVH TOTAL VOLATILE HYDROCARBONS
- BTXE BENZENE, TOLUENE, XYLENES, ETHYLBENZENE
- CONCENTRATIONS IN ug/L



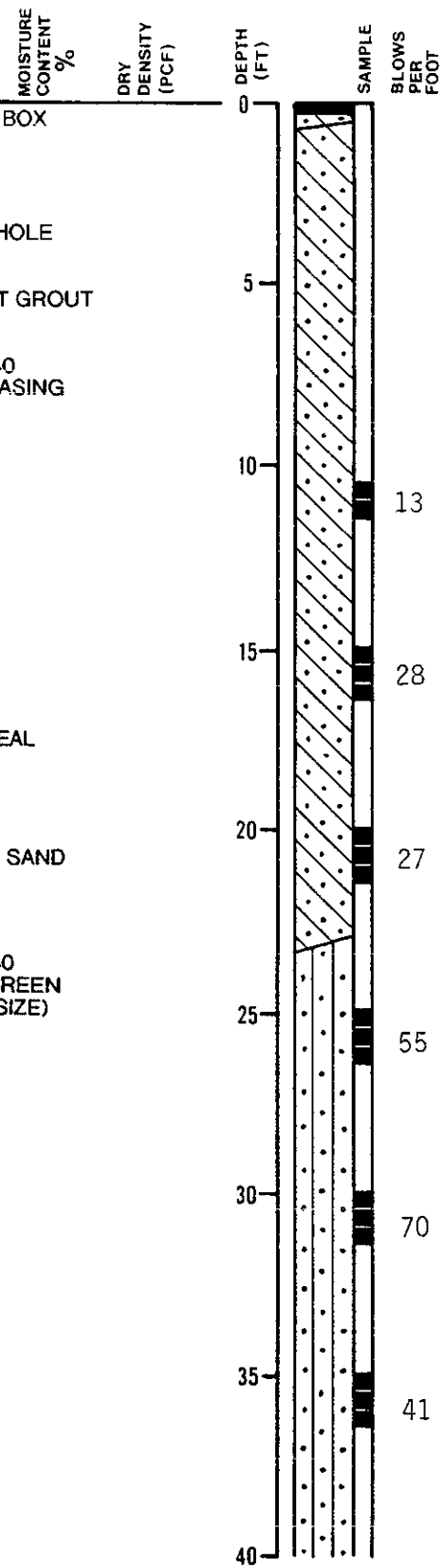
SAMPLING DATE: 1/21/91 AND 1/30/91 (MW58)
GROUNDWATER LEVELS: 1/21/91



GROUNDWATER CONDITIONS (1/21/91)		
1330 MARTIN LUTHER KING JR. WAY - OAK.		
JOB NUMBER 430.010	DATE 1/18/91	APPROVED
Subsurface Consultants		PLATE 3

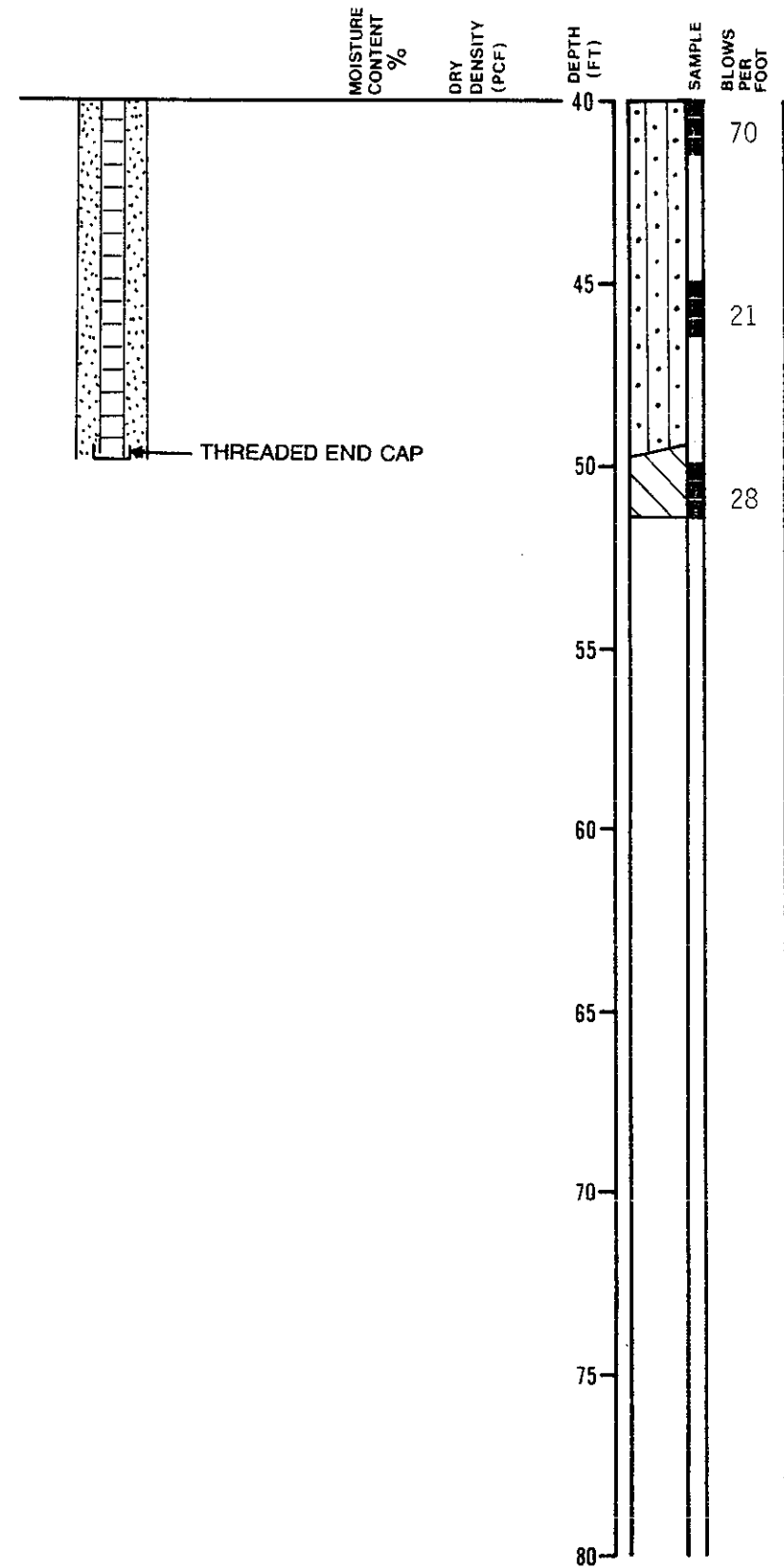
LOG OF TEST BORING 45

EQUIPMENT 8" Hollow Stem Auger
 DATE DRILLED 12/1/89
 ELEVATION 100.90 feet



ASPHALTIC CONCRETE - 4" thick
 BROWN CLAYEY SAND (SC)
 medium dense, moist
 BROWN CLAYEY SAND (SC)
 medium dense, moist

BROWN SILTY SAND (SM-SP)
 dense, moist



LIGHT BROWN SANDY CLAY (CL)
 stiff, moist

Subsurface Consultants

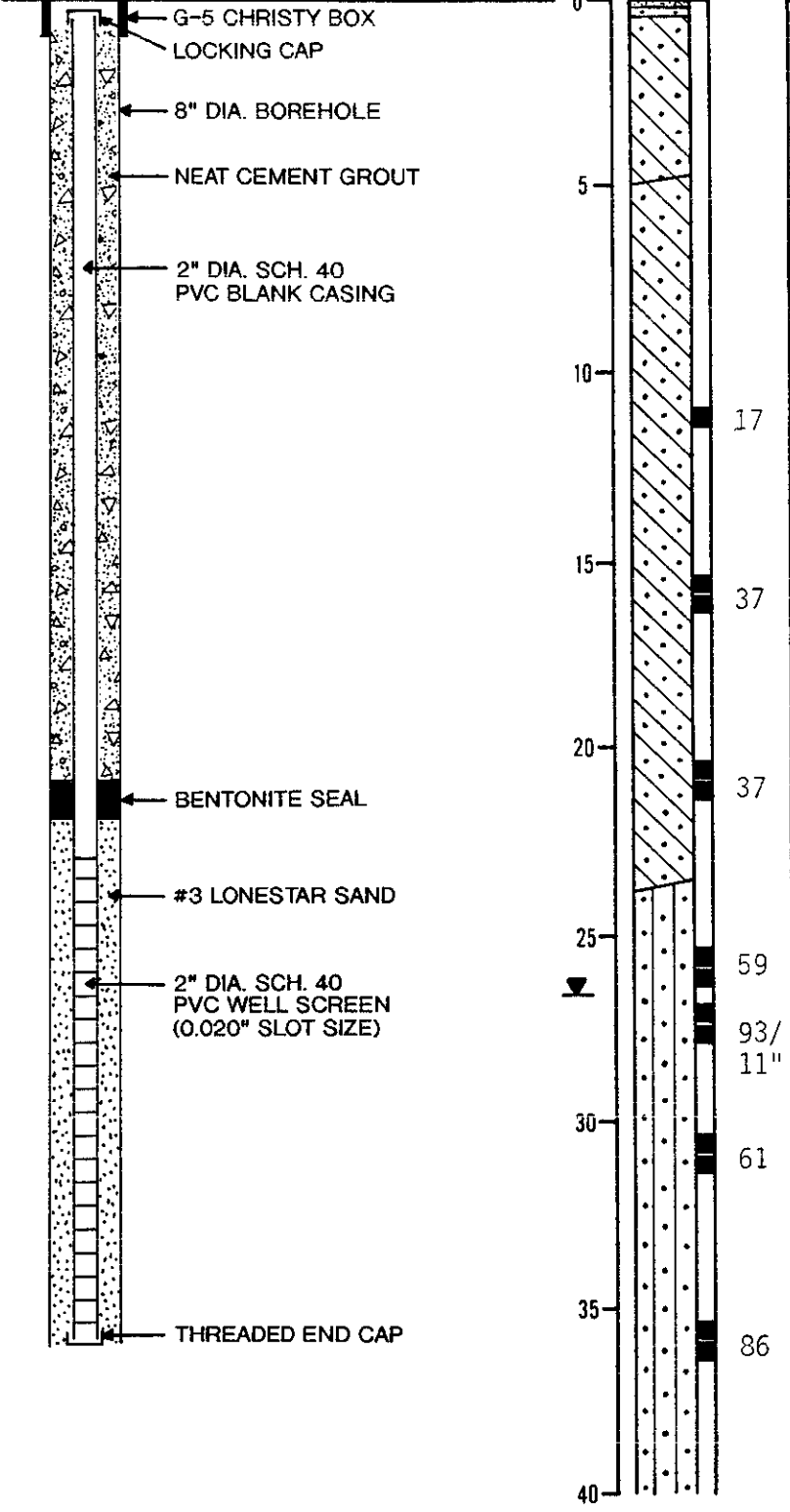
MARTIN LUTHER KING JR. WAY & 14TH
 JOB NUMBER 430.010
 DATE 3/7/91
 APPROVED *je*

PLATE
4

LOG OF TEST BORING 46

MOISTURE CONTENT %
 DRY DENSITY (PCF)
 DEPTH (FT)
 SAMPLE
 BLOWS PER FOOT

EQUIPMENT 8" Hollow Stem Auger
 DATE DRILLED 11/28/89
 ELEVATION 98.11 feet



CONCRETE SLAB - 3" thick
 LIGHT BROWN SAND (SP)
 medium dense, moist
 DARK BROWN CLAYEY SAND (SC)
 medium dense, moist
 BROWN CLAYEY SAND (SC)
 medium dense, moist

17

37

clay content varies

37

BROWN SILTY SAND (SM-SP)
 very dense, wet

59

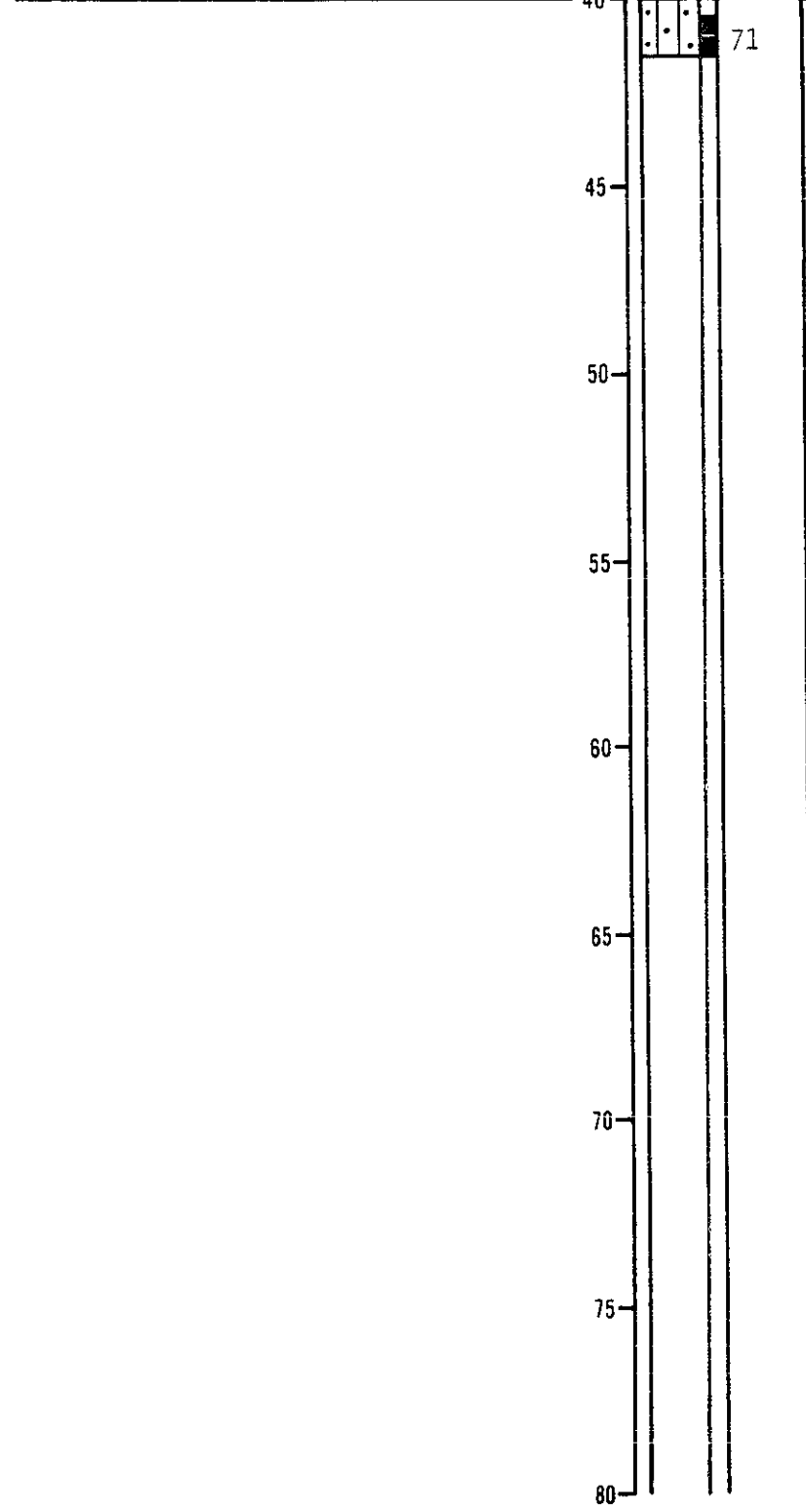
GROUNDWATER LEVEL DURING DRILLING

93/
11"

61

86

MOISTURE CONTENT %
 DRY DENSITY (PCF)
 DEPTH (FT)
 SAMPLE
 BLOWS PER FOOT



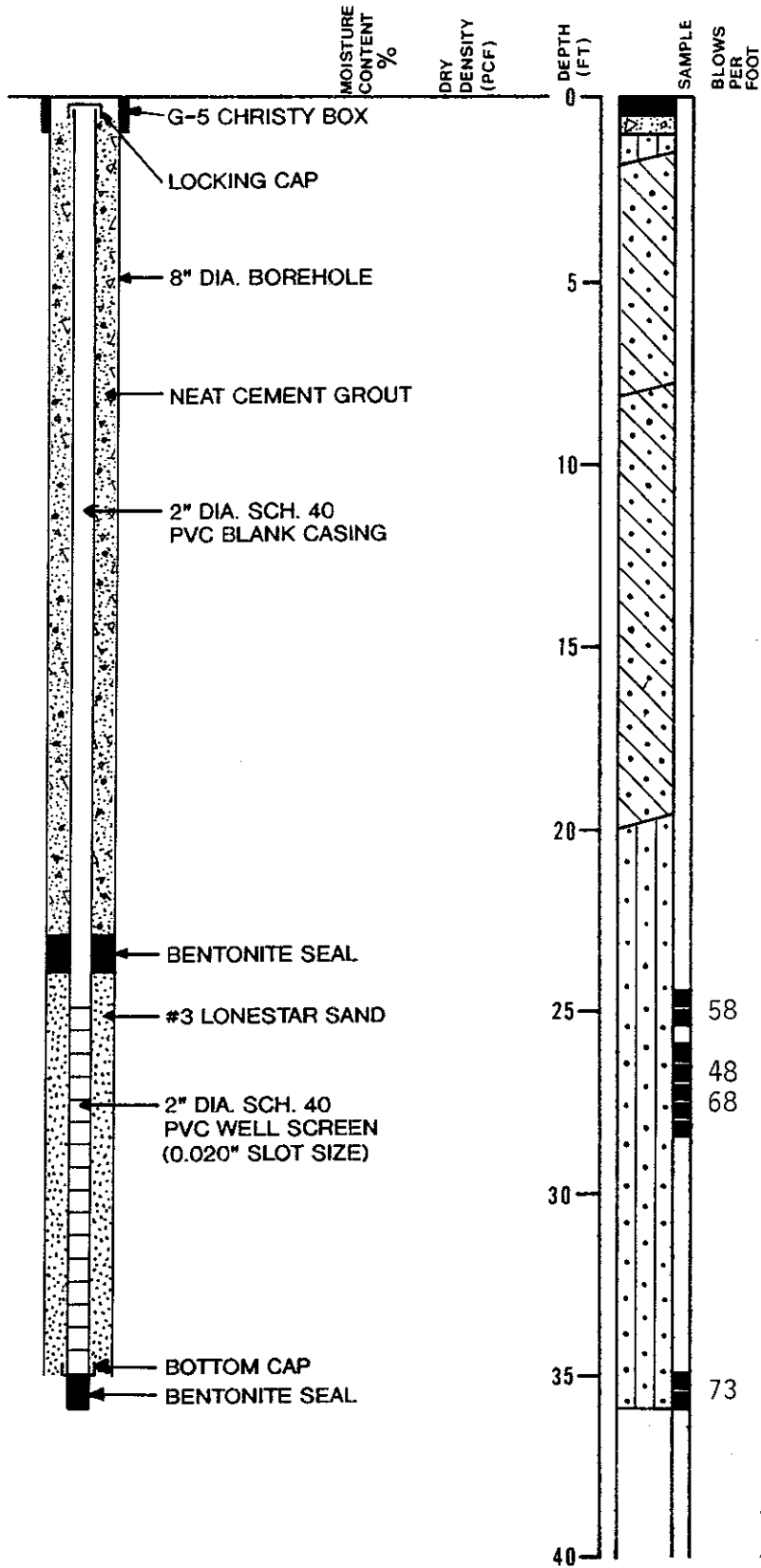
71

heaving sands during drilling

Subsurface Consultants	MARTIN LUTHER KING JR. WAY & 14TH			PLATE 5
	JOB NUMBER 430.010	DATE 3/7/91	APPROVED <i>JB</i>	

LOG OF TEST BORING 58

EQUIPMENT 8" Hollow Stem Auger
 DATE DRILLED 1/29/91
 ELEVATION 98.89 feet



ASPHALTIC CONCRETE - 7" thick
 CONCRETE SLAB - 6" thick
 GRAY GREEN GRAVELLY SAND (SM)
 Loose to medium dense, moist (fill)
 GRAY GREEN CLAYEY SAND (SC)
 medium dense, moist
 BROWN CLAYEY SAND (SC)
 medium dense, moist
 BROWN SILTY SAND (SM)
 medium dense, moist

Subsurface Consultants

1330 MARTIN LUTHER KING JR. WAY

PLATE

JOB NUMBER
 430.010

DATE
 2/28/91

APPROVED

[Signature]

6

GENERAL SOIL CATEGORIES		SYMBOLS	TYPICAL SOIL TYPES	
COARSE GRAINED SOILS More than half is larger than No. 200 sieve	GRAVEL More than half coarse fraction is larger than No. 4 sieve size	Clean Gravel with little or no fines	GW 	Well Graded Gravel, Gravel-Sand Mixtures
			GP 	Poorly Graded Gravel, Gravel-Sand Mixtures
		Gravel with more than 12% fines	GM 	Silty Gravel, Poorly Graded Gravel-Sand-Silt Mixtures
			GC 	Clayey Gravel, Poorly Graded Gravel-Sand-Clay Mixtures
	SAND More than half coarse fraction is smaller than No. 4 sieve size	Clean sand with little or no fines	SW 	Well Graded Sand, Gravelly Sand
			SP 	Poorly Graded Sand, Gravelly Sand
		Sand with more than 12% fines	SM 	Silty Sand, Poorly Graded Sand-Silt Mixtures
			SC 	Clayey Sand, Poorly Graded Sand-Clay Mixtures
FINE GRAINED SOILS More than half is smaller than No. 200 sieve	SILT AND CLAY Liquid Limit Less than 50%	ML 	Inorganic Silt and Very Fine Sand, Rock Flour, Silty or Clayey Fine Sand, or Clayey Silt with Slight Plasticity	
		CL 	Inorganic Clay of Low to Medium Plasticity, Gravelly Clay, Sandy Clay, Silty Clay, Lean Clay	
		OL 	Organic Clay and Organic Silty Clay of Low Plasticity	
	SILT AND CLAY Liquid Limit Greater than 50%	MH 	Inorganic Silt, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silt	
		CH 	Inorganic Clay of High Plasticity, Fat Clay	
		OH 	Organic Clay of Medium to High Plasticity, Organic Silt	
HIGHLY ORGANIC SOILS	PT 	Peat and Other Highly Organic Soils		

UNIFIED SOIL CLASSIFICATION SYSTEM

Subsurface Consultants

1330 MARTIN LUTHER KING JR. WAY

JOB NUMBER
430.010

DATE
3/13/91

APPROVED

SR

PLATE

7

Groundwater and Free-Product Elevations

<u>Monitoring Well</u>	<u>TOC Elev¹ (feet)</u>	<u>Date</u>	<u>Ground-water Depth (feet)</u>	<u>Ground-water Elevation (feet)</u>	<u>Free Product Thickness (feet)</u>	<u>Free Product Thickness (feet)</u>		
11	99.66	01/19/89	26.82	72.84	--	--		
		02/17/89	26.79	72.87	--	--		
		03/14/89	26.48	73.18	--	--		
		04/03/89	26.35	73.31	--	--		
		05/04/89	26.45	73.21	--	--		
		06/07/89	26.75	72.91	--	--		
		07/05/89	26.95	72.71	--	--		
		08/16/89	27.01	72.65	--	--		
		09/26/89	27.08	72.58	--	--		
		11/09/89	27.28	72.83	--	--		
		12/19/89	27.44	72.22	--	--		
		01/24/90	27.40	72.26	--	--		
		03/01/90	27.29	72.37	--	--		
		04/18/90	27.52	72.14	--	--		
		04/30/90	27.56	72.10	--	--		
		05/10/90	28.69	70.97	--	--		
		06/01/90	28.74	70.92	--	--		
		07/03/90	28.89	70.77	--	--		
		08/20/90	29.08	70.58	--	--		
		09/25/90	28.10	71.56	--	--		
		10/23/90	28.93	70.73	--	--		
11/12/90	28.97	70.79	--	--				
12/12/90	28.80	70.86	--	--				
01/21/91	27.75	71.91	--	--				
28	98.99	01/19/89	26.16	72.83	--	--		
		02/17/89	26.12	72.87	--	--		
		03/14/89	25.80	73.19	--	--		
		04/03/89	25.70	73.29	--	--		
		05/04/89	25.78	73.21	--	--		
		06/07/89	26.07	72.92	--	--		
		07/05/89	26.26	72.73	--	--		
		08/16/89	26.33	72.66	--	--		
		09/26/89	26.40	72.59	--	--		
		11/09/89	26.59	72.40	--	--		
		12/19/89	26.75	72.24	--	--		
		01/24/90	26.81	72.18	--	--		
		04/30/90	25.95	71.84	--	--		
			97.79	05/10/90	31.83	65.96	67.18	1.22
				06/01/90	26.88	70.92	72.02	1.11
		07/03/90	31.95	65.84	65.88	0.04		

<u>Monitoring Well</u>	<u>TOC Elev¹ (feet)</u>	<u>Date</u>	<u>Ground-water Depth (feet)</u>	<u>Ground-water Elevation (feet)</u>	<u>Free Product Elevation (feet)</u>	<u>Free Product Thickness (feet)</u>
		08/20/90	30.92	66.87	--	--
		09/25/90	26.27	71.52	--	--
		10/23/90	31.25	66.54	67.92	1.38
		11/12/90	30.92	66.87	--	--
		12/12/90	29.71	68.08	--	--
		01/21/91	28.00	69.79	--	--
29	97.95	01/19/89	26.14	71.81	--	--
		02/17/89	26.19	71.76	--	--
		03/14/89	25.99	71.96	--	--
		04/03/89	25.88	72.07	--	--
		05/04/89	25.88	72.07	--	--
		06/07/89	26.10	71.85	--	--
		07/05/89	26.19	71.76	--	--
		08/16/89	26.32	71.63	--	--
		09/26/89	26.38	71.57	--	--
		11/09/89	26.51	71.44	--	--
		12/19/89	26.66	71.29	--	--
		01/24/90	26.66	71.29	--	--
		03/01/90	26.54	71.41	--	--
		04/18/90	26.70	71.25	--	--
		04/30/90	26.73	71.22	--	--
		05/10/90	27.04	70.91	--	--
		06/01/90	27.16	70.79	--	--
		07/03/90	27.22	70.73	--	--
		08/20/90	27.46	70.49	--	--
		09/25/90	27.34	70.61	--	--
		10/23/90	27.40	70.55	--	--
		11/12/90	27.35	70.60	--	--
		12/12/90	27.35	70.60	--	--
		01/21/91	26.89	71.06	--	--
30	99.30	01/19/89	27.50	71.80	73.36	1.56
		02/17/89	27.73	71.57	73.53	1.96
		03/14/89	27.96	71.34	74.03	2.69
		04/03/89	28.44	70.86	73.42	2.56
		05/04/89	27.95	71.35	74.01	2.66
		06/07/89	28.47	70.83	73.84	3.01
		07/05/89	28.90	70.40	73.78	3.38
		09/26/89	28.42	69.88	73.55	3.67
		11/09/89	29.52	69.78	73.45	3.67
		01/24/90	27.27	72.08	72.27	0.19
		04/30/90	27.23	72.07	72.36	0.29
		05/10/90	28.64	70.66	71.23	0.57

<u>Monitoring Well</u>	<u>TOC Elev¹ (feet)</u>	<u>Date</u>	<u>Ground-water Depth (feet)</u>	<u>Ground-water Elevation (feet)</u>	<u>Free Product Elevation (feet)</u>	<u>Free Product Thickness (feet)</u>
		06/01/90	28.64	70.66	71.23	0.57
		07/03/90	29.07	70.23	71.02	0.79
		08/20/90	28.45	70.85	71.35	0.50
		09/25/90	27.76	71.54	71.81	0.27
		10/23/90	29.07	70.23	71.50	1.27
		11/12/90	28.95	70.35	70.85	0.50
		12/12/90	28.95	70.35	70.85	0.50
		01/21/91	29.00	70.30	72.57	2.27
31	98.90	01/19/89	26.15	72.75	--	--
		02/17/89	26.22	72.68	--	--
		03/14/89	26.01	72.89	--	--
		04/03/89	25.90	73.00	--	--
		05/04/89	25.89	73.01	--	--
		06/07/89	26.11	72.79	--	--
		07/05/89	26.28	72.76	--	--
		08/16/89	26.36	72.54	--	--
		09/26/89	26.50	72.40	--	--
		11/09/89	26.64	72.26	--	--
		12/19/89	26.76	72.14	--	--
		01/24/90	26.84	72.06	--	--
		03/01/90	26.70	72.20	--	--
		04/18/90	26.89	72.01	--	--
		04/30/90	26.87	72.03	--	--
		05/10/90	27.33	71.57	--	--
		06/01/90	27.43	71.47	--	--
		07/03/90	27.50	71.40	--	--
		08/20/90	27.66	71.24	--	--
		09/25/90	27.52	71.36	--	--
		11/12/90	27.64	71.26	--	--
		12/12/90	27.64	71.26	--	--
		01/21/91	27.09	71.81	--	--
		12/19/89	25.65	72.88	--	--
32	98.53	01/24/90	25.64	72.89	--	--
		04/30/90	25.82	72.71	--	--
		06/01/90	26.30	72.23	--	--
		10/23/90	26.70	71.83	--	--
		11/12/90	26.70	71.83	--	--
		12/12/90	26.67	71.86	--	--
		01/21/91	26.06	72.47	--	--

<u>Monitoring Well</u>	<u>TOC Elev¹ (feet)</u>	<u>Date</u>	<u>Ground-water Depth (feet)</u>	<u>Ground-water Elevation (feet)</u>	<u>Free Product Elevation (feet)</u>	<u>Free Product Thickness (feet)</u>
39	99.00	04/03/89	25.87	73.13	--	--
		05/04/89	25.91	73.09	--	--
		06/07/89	26.17	72.83	--	--
		07/05/89	26.38	72.62	--	--
		09/26/89	26.55	72.45	--	--
		11/09/89	26.70	72.30	--	--
		12/19/89	26.85	72.15	--	--
		01/24/90	26.86	72.14	--	--
		03/01/90	27.74	71.26	--	--
		04/18/90	26.89	72.11	--	--
		04/30/90	26.97	72.03	--	--
		05/10/90	28.30	70.70	--	--
		06/01/90	27.96	71.04	--	--
		07/03/90	28.17	70.83	--	--
		08/20/90	28.43	70.57	--	--
		09/25/90	27.67	71.33	--	--
		10/23/90	28.17	70.83	--	--
11/12/90	28.20	70.80	--	--		
12/12/90	28.31	70.69	--	--		
01/21/91	27.15	71.85	--	--		
42	99.12	04/03/89	25.77	73.35	--	--
		05/04/89	25.85	73.27	--	--
		06/07/89	26.13	72.99	--	--
		07/05/89	26.30	72.89	--	--
		09/26/89	26.50	72.62	--	--
		11/09/89	26.66	72.46	--	--
		12/19/89	26.82	72.30	--	--
		01/24/90	26.82	72.30	--	--
		03/01/90	26.69	72.43	--	--
		04/18/90	26.94	72.18	--	--
		04/30/90	26.95	72.17	--	--
		05/10/90	28.65	70.47	--	--
		06/01/90	28.15	70.97	--	--
		07/03/90	28.58	70.54	--	--
08/20/90	28.66	70.46	--	--		
09/25/90	27.52	71.60	--	--		
10/23/90	28.58	70.54	70.62	0.08		
11/12/90	28.66	70.46	70.67	0.21		
12/12/90	28.66	70.46	70.67	0.21		
43	98.87	04/03/89	25.32	73.55	73.63	0.08
		05/04/89	26.21	72.66	73.81	1.15
		06/07/89	26.54	72.33	73.58	1.25
		07/05/89	26.80	72.07	73.41	1.34
		09/26/89	27.92	70.95	73.20	2.25

Monitoring Well	TOC Elev ¹ (feet)	Date	Ground-water Depth (feet)	Ground-water Elevation (feet)	Free Product Elevation (feet)	Free Product Thickness (feet)
		11/09/89	28.44	70.43	73.32	2.89
		03/01/90	27.60	71.27	72.11	0.84
		04/18/90	27.54	71.33	72.79	1.46
		04/30/90	27.05	71.82	72.61	0.79
		05/10/90	28.19	70.68	71.87	1.19
		06/01/90	28.06	70.81	71.82	1.01
		07/03/90	28.36	70.51	71.21	0.70
		08/20/90	28.04	70.83	71.38	0.55
		09/25/90	27.26	71.61	71.97	0.36
		10/23/90	28.19	70.68	71.51	0.83
		11/12/90	28.04	70.83	71.38	0.55
		12/12/90	28.04	70.83	71.38	0.55
45	100.90	12/19/89	28.71	72.19	--	--
		04/30/90	28.85	72.05	--	--
		05/10/90	29.26	71.64	--	--
		06/01/90	29.34	71.56	--	--
		07/03/90	29.45	71.45	--	--
		08/20/90	29.55	71.35	--	--
		09/25/90	27.94	72.96	--	--
		10/23/90	29.50	71.40	--	--
		11/12/90	29.50	71.37	--	--
		12/12/90	29.53	71.37	--	--
		01/21/91	29.03	71.87	--	--
46	98.11	12/19/89	27.40	70.71	--	--
		04/30/90	27.46	70.63	--	--
		05/10/90	27.64	70.47	--	--
		06/01/90	27.62	70.49	--	--
		07/03/90	27.75	70.36	--	--
		08/20/90	27.92	70.19	--	--
		09/25/90	27.94	70.17	--	--
		10/23/90	27.86	70.25	--	--
		11/12/90	27.89	70.22	--	--
		12/12/90	27.83	70.28	--	--
		01/21/91	27.60	70.51	--	--

¹ Elevation reference: PG&E manhole approximately 30 feet south of 14th street on Martin Luther King Jr. Way, assumed to be 100.00 feet.



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2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 11/09/89
DATE REPORTED: 12/07/89
PAGE 1 OF 3

LAB NUMBER: 18662

CLIENT: SUBSURFACE CONSULTANTS

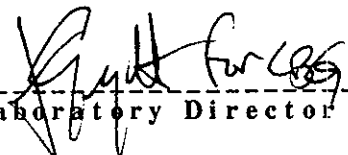
REPORT ON: 4 WATER SAMPLES

PROJECT #: 430.002
LOCATION: MLK

RESULTS: SEE ATTACHED



QA/QC Officer



Laboratory Director

LABORATORY NUMBER: 18662
 CLIENT: SUBSURFACE CONSULTANTS
 JOB NUMBER: 430.002
 JOB LOCATION: MLK

DATE RECEIVED: 11/09/89
 DATE ANALYZED: 11/22/89
 DATE REPORTED: 12/07/89
 PAGE 2 OF 3

Total Volatile Hydrocarbons (TVH) by EPA 8015
 Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
18662-1	11	120,000	18,000	8,000	4,500	21,000
18662-2	29	780	ND(1)	14	7.9	32
18662-3	31	ND(50)	ND(1)	ND(1)	ND(1)	ND(1)
18662-4	39	9,300	4,500	760	150	310

ND = None Detected; Limit of detection is indicated in parentheses.

QA/QC SUMMARY

%RPD	<1
%RECOVERY	83

LABORATORY NUMBER: 18662
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 430.002
 LOCATION: MLK

DATE RECEIVED: 11/09/89
 DATE ANALYZED: 11/21/89
 DATE REPORTED: 12/07/89
 PAGE 3 OF 3

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ANALYSIS: ETHYLENE DIBROMIDE (EDB)
 METHOD REFERENCE: EPA 601

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LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
18662-1	11	37	ug/L	0.83
18662-2	29	ND	ug/L	0.05
18662-3	31	ND	ug/L	0.05
18662-4	39	4.0	ug/L	0.05

ND = NOT DETECTED

QA/QC:

=====

RPD, %	3
RECOVERY, %	106

=====



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DEC 04 1989

AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

DATE RECEIVED: 11/09/89
DATE REPORTED: 11/27/89
PAGE 1 OF 3

LAB NUMBER: 18748

CLIENT: SUBSURFACE CONSULTANTS

REPORT ON: 1 WATER SAMPLE

JOB #: 430.002
LOCATION: MLK

RESULTS: SEE ATTACHED

M. E. Pringle

QA/QC Officer
[Signature]

Laboratory Director

LABORATORY NUMBER: 18748-1
 CLIENT: SUBSURFACE CONSULTANTS
 JOB #: 430.002
 SAMPLE ID: 39

DATE RECEIVED: 11/09/89
 DATE ANALYZED: 11/20/89
 DATE REPORTED: 11/27/89
 PAGE 2 OF 3

Title 26 Metals in Aqueous Solutions

METAL	RESULT mg / L	DETECTION LIMIT mg / L	METHOD
Antimony	ND	0.10	EPA 6010
Arsenic	ND	0.05	EPA 7060
Barium	0.22	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	ND	0.01	EPA 6010
Chromium (total)	ND	0.01	EPA 6010
Cobalt	ND	0.01	EPA 6010
Copper	ND	0.01	EPA 6010
Lead	ND	0.05	EPA 7420
Mercury	ND	0.002	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	ND	0.01	EPA 6010
Selenium	ND	0.05	EPA 6010
Silver	ND	0.01	EPA 6010
Thallium	ND	0.10	EPA 7841
Vanadium	ND	0.01	EPA 6010
Zinc	ND	0.01	EPA 6010

ND = Not Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	2	96	Mercury	6	103
Arsenic	7	99	Molybdenum	4	92
Barium	2	99	Nickel	1	101
Beryllium	<1	96	Selenium	9	88
Cadmium	2	88	Silver	7	83
Chromium	1	101	Thallium	13	87
Cobalt	3	98	Vanadium	2	98
Copper	3	102	Zinc	2	99
Lead	2	97			



LABORATORY NUMBER: 18748-1
CLIENT: SUBSURFACE CONSULTANTS
PROJECT #: 430.002
SAMPLE ID: 39

DATE RECEIVED: 11/09/89
DATE ANALYZED: 11/20/89
DATE REPORTED: 11/27/89
PAGE 3 OF 3

EPA 601
Purgeable Halocarbons in Water

Compound	Result ug/L	LOD ug/L
chloromethane	ND	5.0
bromomethane	ND	5.0
vinyl chloride	ND	5.0
chloroethane	ND	5.0
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
1,2-dichloroethene (total)	ND	5.0
chloroform	ND	5.0
freon 113	ND	5.0
1,2-dichloroethane	36	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
1,1,2-trichloroethane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
dibromochloromethane	ND	5.0
2-chloroethylvinyl ether	ND	5.0
bromoform	ND	5.0
tetrachloroethene	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
chlorobenzene	ND	5.0
1,3-dichlorobenzene	ND	5.0
1,2-dichlorobenzene	ND	5.0
1,4-dichlorobenzene	ND	5.0

ND = None Detected. Limit of detection (LOD) in last column.

QA/QC:

Duplicate: Relative % Difference
Average Spike Recovery %

6
74



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2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 11/30/89
DATE REPORTED: 12/05/89
PAGE 1 OF 4


LAB NUMBER: 18825

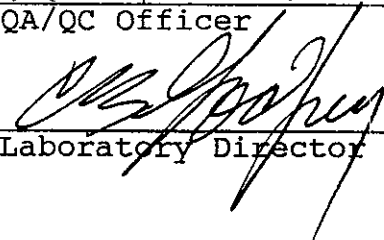
CLIENT: SUBSURFACE CONSULTANTS

REPORT ON: 1 WATER SAMPLE

PROJECT #: 430.002
LOCATION: MLK

RESULTS: SEE ATTACHED


QA/QC Officer


Laboratory Director

LABORATORY NUMBER: 18825
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 430.002

DATE RECEIVED: 11/30/89
 DATE ANALYZED: 12/01/89
 DATE REPORTED: 12/05/89
 PAGE 2 OF 4

=====

ORGANIC LEAD
 DHS METHOD
 MAY 1988 LUFT MANUAL

=====

LAB ID	CLIENT ID	ORGANIC LEAD	UNITS	DETECTION LIMIT
18825-1	⁴⁶ 44 W <i>Soe</i>	ND	mg/L	0.2

ND = NONE DETECTED

QA/QC SUMMARY

%RPD	<1
%RECOVERY	94



LABORATORY NUMBER: 18825
CLIENT: SUBSURFACE CONSULTANTS
PROJECT #: 430.002
LOCATION: MLK

DATE RECEIVED: 11/30/89
DATE ANALYZED: 12/04/89
DATE REPORTED: 12/05/89
PAGE 3 OF 4

=====
ANALYSIS: ETHYLENE DIBROMIDE
METHOD REFERENCE: EPA 504
=====

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
18825-1	⁴⁶ 44 W	ND	ug/L	0.05

ND = NONE DETECTED

QA/QC:

RPD, %	1
RECOVERY, %	103



LABORATORY NUMBER: 18825
CLIENT: SUBSURFACE CONSULTANTS
JOB NUMBER: 430.002
JOB LOCATION: MLK

DATE RECEIVED: 11/30/89
DATE ANALYZED: 12/01/89
DATE REPORTED: 12/05/89
PAGE 4 OF 4

Total Volatile Hydrocarbons (TVH) by EPA 8015
Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
18825-1	46 ^{see} 44 W	ND(50)	2.1	1.9	ND(1)	2.0

ND = None Detected; Limit of detection is indicated in parentheses.

QA/QC SUMMARY

%RPD	2
%RECOVERY	92



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2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 12/05/89

DATE REPORTED: 12/11/89

PAGE 1 OF 4

LAB NUMBER: 18865

CLIENT: SUBSURFACE CONSULTANTS

REPORT ON: 1 WATER SAMPLE

PROJECT #: 430.002

LOCATION: MLK

RESULTS: SEE ATTACHED



QA/QC Officer



Laboratory Director



LABORATORY NUMBER: 18865
CLIENT: SUBSURFACE CONSULTANTS
JOB NUMBER: 430.002
JOB LOCATION: MLK

DATE RECEIVED: 12/05/89
DATE ANALYZED: 12/06/89
DATE REPORTED: 12/11/89
PAGE 2 OF 4

Total Volatile Hydrocarbons (TVH) by EPA 8015
Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
18865-1	45 W	ND(50)	ND(1)	ND(1)	ND(1)	ND(1)

ND = None Detected; Limit of detection is indicated in parentheses.

QA/QC SUMMARY

%RPD	1
%RECOVERY	84

LABORATORY NUMBER: 18865
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 430.002/MLK

DATE RECEIVED: 12/05/89
 DATE ANALYZED: 12/06/89
 DATE REPORTED: 12/11/89
 PAGE 3 OF 4

=====

ORGANIC LEAD
 DHS METHOD
 MAY 1988 LUFT MANUAL

=====

LAB ID	CLIENT ID	ORGANIC LEAD	UNITS	DETECTION LIMIT
18865-1	45 W	ND	mg /L	0.2

ND = NONE DETECTED

QA/QC SUMMARY

%RPD	<1
%RECOVERY	102

LABORATORY NUMBER: 18865
CLIENT: SUBSURFACE CONSULTANTS
PROJECT #: 430.002
LOCATION: MLK

DATE RECEIVED: 12/05/89
DATE ANALYZED: 12/08/89
DATE REPORTED: 12/11/89
PAGE 4 OF 4

=====
ANALYSIS: ETHYLENE DIBROMIDE (EDB)
METHOD REFERENCE: EPA 504
=====

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
18865-1	45 W	ND	ug/L	0.05

ND = NOT DETECTED

QA/QC:

=====
RPD, % 17
RECOVERY, % 110
=====



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RECEIVED

AUG 14 1990
AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

DATE RECEIVED: 07/19/90
DATE REPORTED: 08/07/90

LAB NUMBER: 101113

CLIENT: SUBSURFACE CONSULTANTS

REPORT ON: 4 WATER SAMPLES

PROJECT #: 430.010
LOCATION: MLK

RESULTS: SEE ATTACHED

ASE

QA/QC Approval

[Signature]

Final Approval

LABORATORY NUMBER: 101113
 CLIENT: SUBSURFACE CONSULTANTS
 JOB NUMBER: 430.010
 JOB LOCATION: MLK

DATE RECEIVED: 07/19/90
 DATE ANALYZED: 08/07/90
 DATE REPORTED: 08/07/90

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	CLIENT ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
101113-1	11	26,000	950	19	ND(5.0)	98
101113-2	31	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
101113-3	39	ND(50)	4.1	ND(0.5)	ND(0.5)	ND(0.5)
101113-4	46	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit
 indicated in parentheses.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	116



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DATE RECEIVED: 10/23/90
DATE REPORTED: 11/06/90


LAB NUMBER: 102046

CLIENT: SUBSURFACE CONSULTANTS

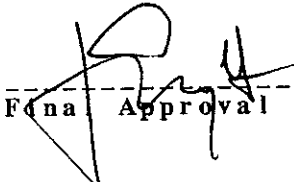
REPORT ON: 7 WATER SAMPLES

PROJECT #: 430.010
LOCATION: MLK EXTRACTION

RESULTS: SEE ATTACHED



QA/QC Approval



Final Approval

LABORATORY NUMBER: 102046
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 430.010
 LOCATION: MLK EXTRACTION

DATE RECEIVED: 10/23/90
 DATE ANALYZED: 11/05/90
 DATE REPORTED: 11/06/90

=====
 ANALYSIS: ETHYLENE DIBROMIDE
 ANALYSIS METHOD: EPA 504
 =====

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
102046-1	11	0.20	ug/L	0.05
102046-3	32	3.8	ug/L	0.05
102046-4	39	ND	ug/L	0.05
102046-5	42	0.70	ug/L	0.05

QA/QC SUMMARY

=====
 RPD, % 5
 RECOVERY, % 72
 =====

LAB NUMBER: 102046-4
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 430.010
 SAMPLE ID: 39

DATE RECEIVED: 10/23/90
 DATE ANALYZED: 10/29/90
 DATE REPORTED: 11/06/90

EPA 8010
 Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
chloromethane	ND	2.0
bromomethane	ND	2.0
vinyl chloride	ND	2.0
chloroethane	ND	2.0
methylene chloride	ND	1.0
trichlorofluoromethane	ND	1.0
1,1-dichloroethene	ND	1.0
1,1-dichloroethane	ND	1.0
1,2-dichloroethene (total)	ND	1.0
chloroform	ND	1.0
freon 113	ND	1.0
1,2-dichloroethane	ND	1.0
1,1,1-trichloroethane	ND	1.0
carbon tetrachloride	ND	1.0
bromodichloromethane	ND	1.0
1,2-dichloropropane	ND	1.0
cis-1,3-dichloropropene	ND	1.0
trichloroethylene	ND	1.0
1,1,2-trichloroethane	ND	1.0
trans-1,3-dichloropropene	ND	1.0
dibromochloromethane	ND	1.0
2-chloroethyl vinyl ether	ND	2.0
bromoform	ND	1.0
tetrachloroethene	ND	1.0
1,1,2,2-tetrachloroethane	ND	1.0
chlorobenzene	ND	1.0
1,3-dichlorobenzene	ND	1.0
1,2-dichlorobenzene	ND	1.0
1,4-dichlorobenzene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	13
RECOVERY, %	94

LAB NUMBER: 102046
 CLIENT: SUBSURFACE CONSULTANTS
 JOB NUMBER: 430.010
 JOB LOCATION: MLK EXTRACTION

DATE RECEIVED: 10/23/90
 DATE ANALYZED: 10/31/90
 DATE REPORTED: 11/06/90

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	CLIENT ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
102046-1	11	4,200	1,600	8.5	28	170
102046-2	29	1,800	1.2	6.5	2.7	4.8
102046-3	32	48,000	7,600	8,200	150	5,600
102046-4	39	160	12	6.4	ND(0.5)	5.0
102046-5	42	8,800	420	580	91	910
102046-6	45	ND(50)	0.9	1.4	ND(0.5)	1.8
102046-7	46	ND(50)	ND(0.5)	0.6	ND(0.5)	0.5

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	104



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DATE RECEIVED: 01/21/91

DATE REPORTED: 01/30/91

LAB NUMBER: 102801

CLIENT: SUBSURFACE CONSULTANTS

REPORT ON: 6 WATER SAMPLES

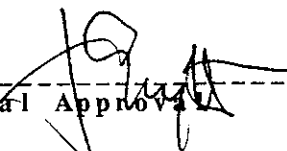
PROJECT #: 430.010

LOCATION: MLK GROUNDWATER REMEDIATION

RESULTS: SEE ATTACHED



QA/QC Approval



Final Approval

Berkeley

Wilmington

Los Angeles

LABORATORY NUMBER: 102801
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 430.010
 JOB LOCATION: MLK Groundwater Remediation

DATE RECEIVED: 01/21/91
 DATE ANALYZED: 01/24/91
 DATE REPORTED: 01/30/91

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
102801-1	MW-11	1,900	600	6.2	60	84
102801-2	MW-31	ND(50)	ND(0.5)	0.6	ND(0.5)	2.1
102801-3	MW-32	96,000	9,600	15,000	2,000	16,000
102801-4	MW-39	200	23	0.9	1.2	2.0
102801-5	MW-45	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
102801-6	MW-46	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	80

LABORATORY NUMBER: 102801
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 430.010

DATE RECEIVED: 01/21/91
 DATE ANALYZED: 01/22/91
 DATE REPORTED: 01/30/91

=====
 ANALYSIS: ETHYLENE DIBROMIDE
 ANALYSIS METHOD: EPA 504
 =====

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
102801-1	MW-11	0.15	ug/L	0.05
102801-2	MW-31	ND	ug/L	0.05
102801-3	MW-32	ND	ug/L	0.05
102801-4	MW-39	ND	ug/L	0.05
102801-5	MW-45	ND	ug/L	0.05
102801-6	MW-46	ND	ug/L	0.05

QA/QC SUMMARY

=====
 RPD, % 11
 RECOVERY, % 67
 =====



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DATE RECEIVED: 01/21/91

DATE REPORTED: 01/23/91

LAB NUMBER: 102800

CLIENT: SUBSURFACE CONSULTANTS

REPORT ON: 1 WATER SAMPLE

PROJECT #: 430.010

LOCATION: MLK EXTRACTION

RESULTS: SEE ATTACHED



QA/QC Approval



Final Approval

LABORATORY NUMBER: 102800
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 430.010
 JOB LOCATION: MLK EXTRACTION

DATE RECEIVED: 01/21/91
 DATE ANALYZED: 01/21/91
 DATE REPORTED: 01/23/91

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
102800-1	MW-29	1,100	ND(0.5)	3.7	1.3	4.9

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	83

LABORATORY NUMBER: 102800
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 430.010

DATE RECEIVED: 01/21/91
DATE ANALYZED: 01/23/91
DATE REPORTED: 01/23/91

=====
ANALYSIS: ETHYLENE DIBROMIDE (EDB)
ANALYSIS METHOD: EPA 504
=====

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
102800-1	MW-29	ND	ug/L	0.05

QA/QC SUMMARY

=====
RPD, % 8
RECOVERY, % 73
=====



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DATE RECEIVED: 02/01/91

DATE REPORTED: 02/04/91

LAB NUMBER: 102896

RECEIVED

CLIENT: SUBSURFACE CONSULTANTS


FEB 3 1991
AM 7,8,9,10,11,12,13,14,15,16 PM

REPORT ON: ONE WATER SAMPLE

PROJECT ID: 430.010

LOCATION: MLK EXTRACTION

RESULTS: SEE ATTACHED



QA/QC Approval



Final Approval

LABORATORY NUMBER: 102896
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 430.010
 JOB LOCATION: MLK EXTRACTION

DATE RECEIVED: 02/01/91
 DATE ANALYZED: 02/04/91
 DATE REPORTED: 02/04/91

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
102896-1	MW-58	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	6
RECOVERY, %	86



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2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 03/28/91

DATE REPORTED: 04/03/91


LAB NUMBER: 103379

CLIENT: SUBSURFACE CONSULTANTS

REPORT ON: 7 WATER SAMPLES

PROJECT ID: 430.010
LOCATION: MLK EXTRACTION

RESULTS: SEE ATTACHED



QA/QC Approval



Final Approval

LABORATORY NUMBER: 103379
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 430.010
 LOCATION: MLK EXTRACTION

DATE RECEIVED: 03/28/91
 DATE ANALYZED: 03/29/91
 DATE REPORTED: 04/03/91

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
103379-1	MW-29	500	ND(0.5)	1.6	ND(0.5)	0.8
103379-2	MW-58	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
103379-3	MW-39	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
103379-4	WI-25-2	2,800	450	180	29	230
103379-5	I-25	96	2.3	0.8	ND(0.5)	0.5
103379-6	B-25	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
103379-7	E-25	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit
 indicated in parentheses.

QA/QC SUMMARY

RPD, %	1
RECOVERY, %	100

Subsurface Consultants

CHAIN OF CUSTODY RECORD & ANALYTICAL TEST REQUEST

Project Name: MLK
 CI Job Number: 430.002
 Project Contact at SCI: Sean Carson
 Sampled By: Dennis Alexander
 Analytical Laboratory: Curtis & Tompkins
 Analytical Turnaround: Normal

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
<u>11</u>	<u>W</u>	<u>V(5)</u>	<u>11-8-89</u>		<u>TVH, BTXE & EDB</u>	
<u>29</u>	<u>W</u>	<u>V(5)</u>	<u>11-8-89</u>		<u>TVH, BTXE & EDB</u>	
<u>31</u>	<u>W</u>	<u>V(5)</u>	<u>11-8-89</u>		<u>TVH, BTXE & EDB</u>	
<u>39</u>	<u>W</u>	<u>V(5)</u>	<u>11-8-89</u>		<u>TVH, BTXE & EDB</u>	
					<u>601 Title 26 Metals</u>	
					<u>Requested by phone</u>	
					<u>11/17/89</u>	<u>ee</u>

* * * * *

Released by: Dennis Alexander Date: 11-9-89
 Released by Courier: _____ Date: _____
 Received by Laboratory: _____ Date: _____
 Relinquished by Laboratory: Selinda Peters Date: 11-9-89
 Received by: _____ Date: _____

Sample Type: W = water, S = soil, O = other (specify)
 Container Type: V = VOA, P = plastic, G = glass, T = brass tube,
 O = other (specify)

Notes to Laboratory:

- Notify SCI if there are any anomalous peaks on GC or other scans
- Questions/clarifications...contact SCI at (415) 268-0461

Subsurface Consultants

CHAIN OF CUSTODY RECORD & ANALYTICAL TEST REQUEST

Project Name: MLK
 S I Job Number: 430.002
 Project Contact at SCI: Sean Carson
 Sampled By: Dennis Alexander
 Analytical Laboratory: Curtis and Tompkins
 Analytical Turnaround: 48 hr.

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
# 44W	W	G 1liter	11-30-89		TVH	
44W 3e	W	V (5)	"		BIXE TEL EDB	

* * * * *

Released by: Dennis Alexander Date: 11-30-89
 Released by Courier: _____ Date: _____
 Received by Laboratory: Belinda Peters Date: 11-30-89
 Relinquished by Laboratory: _____ Date: _____
 Received by: _____ Date: _____

¹ Sample Type: W = water, S = soil, O = other (specify)
² Container Type: V = VOA, P = plastic, G = glass, T = brass tube, O = other (specify)
 Notes to Laboratory:
 -Notify SCI if there are any anomalous peaks on GC or other scans
 -Questions/clarifications...contact SCI at (415) 268-0461

Subsurface Consultants

CHAIN OF CUSTODY RECORD & ANALYTICAL TEST REQUEST

Project Name: MLK
 SC : Job Number: 430.002
 Project Contact at SCI: Sean Carson
 Sampled By: Dennis Alexander
 Analytical Laboratory: Curtis and Tompkins
 Analytical Turnaround: 48 hr. (ASAP)

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
<u>45W</u>	<u>W</u>	<u>G(1) liter</u>	<u>12-5-89</u>	}	<u>TVH/BTXE</u>	
<u>45W</u>	<u>W</u>	<u>(5) Voa's</u>	<u>"</u>			<u>TEL</u> <u>EDB</u>

* * * * *

Released by: Dennis Alexander Date: 12-5-89
 Released by Courier: _____ Date: _____
 Received by Laboratory: Nancy Smith Date: 12/06/89
 Relinquished by Laboratory: _____ Date: _____
 Received by: _____ Date: _____

¹ Sample Type: W = water, S = soil, O = other (specify)
² Container Type: V = VOA, P = plastic, G = glass, T = brass tube,
 O = other (specify)

Notes to Laboratory:
 -Notify SCI if there are any anomalous peaks on GC or other scans
 -Questions/clarifications...contact SCI at (415) 268-0461

Subsurface Consultants

CHAIN OF CUSTODY RECORD
& ANALYTICAL TEST REQUEST

Project Name: MLK
 SCI Job Number: 430,010
 Project Contact at SCI: Sean Carson
 Sampled By: Mark Kawakami
 Analytical Laboratory: Curtis + Tompkins
 Analytical Turnaround: Normal

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
<u>11</u>	<u>W</u>	<u>Vx3</u>	<u>7/18/90</u>		<u>TVH/BTXE</u>	<u>8015 / 602</u> <u>5830</u>
<u>31</u>	<u>W</u>	<u>Vx3</u>	<u>7/18/90</u>		<u>TVH/BTXE</u>	
<u>39</u>	<u>W</u>	<u>Vx3</u>	<u>7/18/90</u>		<u>TVH/BTXE</u>	
<u>46</u>	<u>W</u>	<u>Vx3</u>	<u>7/18/90</u>		<u>TVH/BTXE</u>	

* * * * *

Released by: Sean O. Carson Date: 7/19/90
 Released by Courier: _____ Date: _____
 Received by Laboratory: _____ Date: _____
 Relinquished by Laboratory: _____ Date: _____
 Received by: _____ Date: _____

¹ Sample Type: W = water, S = soil, O = other (specify)
² Container Type: V = VOA, P = plastic, G = glass, T = brass tube,
 O = other (specify)

Notes to Laboratory:
 -Notify SCI if there are any anomalous peaks on GC or other scans
 -Questions/clarifications...contact SCI at (415) 268-0461

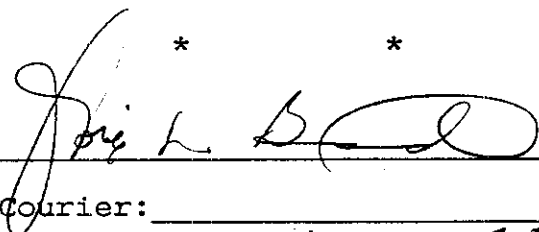
Subsurface Consultants

CHAIN OF CUSTODY RECORD
& ANALYTICAL TEST REQUEST

Project Name: MLK Extraction
 SCI Job Number: 430.010
 Project Contact at SCI: Sean Carson
 Sampled By: Fernando Velez
 Analytical Laboratory: Curtis + Tompkins
 Analytical Turnaround: Normal

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
<u>11</u>	<u>W</u>	<u>Vx2</u>	<u>10/23/90</u>		<u>TVH/BTXE</u>	
	<u>W</u>	<u>Vx2</u>	<u>10/23/90</u>		<u>EDB</u>	
<u>29</u>	<u>W</u>	<u>Vx2</u>	<u>10/23/90</u>		<u>TVH/BTXE</u>	
<u>32</u>	<u>W</u>	<u>Vx2</u>	<u>10/23/90</u>		<u>TVH/BTXE</u>	
	<u>W</u>	<u>Vx2</u>	<u>10/23/90</u>		<u>EDB</u>	
<u>39</u>	<u>W</u>	<u>Vx2</u>	<u>10/23/90</u>		<u>TVH/BTXE</u>	
		<u>Vx2</u>	<u>10/23/90</u>		<u>VOLs 8010</u>	
		<u>Vx2</u>	<u>10/23/90</u>		<u>EDB</u>	
<u>42</u>	<u>W</u>	<u>Vx2</u>	<u>10/23/90</u>		<u>TVH/BTXE</u>	
		<u>Vx2</u>	<u>10/23/90</u>		<u>EDB</u>	

* * * * *

Released by:  Date: _____

Released by Courier: _____ Date: _____

Received by Laboratory: Henry Hatten Date: 10/23/90 340P

Relinquished by Laboratory: _____ Date: _____

Received by: _____ Date: _____

¹ Sample Type: W = water, S = soil, O = other (specify)
² Container Type: V = VOA, P = plastic, G = glass, T = brass tube,
 O = other (specify)

Notes to Laboratory:
 -Notify SCI if there are any anomalous peaks on GC or other scans
 -Questions/clarifications...contact SCI at (415) 268-0461

Subsurface Consultants

CHAIN OF CUSTODY RECORD
& ANALYTICAL TEST REQUEST

Project Name: MLK Extraction
 SCI Job Number: 430,010
 Project Contact at SCI: Sean Caron
 Sampled By: Fernando Velez
 Analytical Laboratory: Curtis + Tompkins
 Analytical Turnaround: Normal

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
<u>45</u>	<u>W</u>	<u>Vx2</u>	<u>10/23/90</u>	<u> </u>	<u>TVH/BTXE</u>	<u> </u>
<u>46</u>	<u>W</u>	<u>Vx2</u>	<u>10/23/90</u>	<u> </u>	<u>TVH/BTXE</u>	<u> </u>

* * * * *

Released by: [Signature] Date: _____
 Released by Courier: _____ Date: _____
 Received by Laboratory: [Signature] Date: 10/23/90 3:40^p
 Relinquished by Laboratory: _____ Date: _____
 Received by: _____ Date: _____

¹ Sample Type: W = water, S = soil, O = other (specify)
² Container Type: V = VOA, P = plastic, G = glass, T = brass tube, O = other (specify)

Notes to Laboratory:
 -Notify SCI if there are any anomalous peaks on GC or other scans
 -Questions/clarifications...contact SCI at (415) 268-0461

Subsurface Consultants

Project Name: MLK Groundwater Remediation
 SCI Job Number: 430.010
 Project Contact at SCI: Sean Carson
 Sampled By: Dennis Alexander
 Analytical Laboratory: Curtis & Tompkins
 Analytical Turnaround: Normal except * (Rapid)

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
MW-11	W	VOA (5)	1-21-91		TVH/BTXE EDB	
* MW-29						
MW-31						
MW-32						
MW-39						
MW-45						
MW-46	↓	↓	↓		↓	

* * * * *

Released by: Dennis Alexander Date: 1-21-91
 Released by Courier: _____ Date: _____
 Received by Laboratory: [Signature] Date: 1-21-91 15:46
 Relinquished by Laboratory: _____ Date: _____
 Received by: _____ Date: _____

¹ Sample Type: W = water, S = soil, O = other (specify)
² Container Type: V = VOA, P = plastic, G = glass, T = brass tube, O = other (specify)

Notes to Laboratory:
 -Notify SCI if there are any anomalous peaks on GC or other scans
 -Questions/clarifications...contact SCI at (415) 268-0461


Subsurface Consultants

CHAIN OF CUSTODY RECORD
& ANALYTICAL TEST REQUEST

Project Name: MLK
 SCI Job Number: 430.010
 Project Contact at SCI: Sean Carson
 Sampled By: John Wolfe
 Analytical Laboratory: Curtis & Tompkins
 Analytical Turnaround: ~~5 day~~ 24 hr. RUSH!

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
<u>MW-58</u>	<u>W</u>	<u>VOA (4)</u>	<u>1/30/91</u>		<u>TVH/BTK</u>	

* * * * *

Released by:  Date: 2/1/91
 Released by Courier: _____ Date: _____
 Received by Laboratory: Mary Branten Date: 2/1/91 12:50p
 Relinquished by Laboratory: _____ Date: _____
 Received by: _____ Date: _____

¹ Sample Type: W = water, S = soil, O = other (specify)
² Container Type: V = VOA, P = plastic, G = glass, T = brass tube, O = other (specify)

Notes to Laboratory:
 -Notify SCI if there are any anomalous peaks on GC or other scans
 -Questions/clarifications...contact SCI at (415) 268-0461

Subsurface Consultants

CHAIN OF CUSTODY RECORD & ANALYTICAL TEST REQUEST

Project Name: Martin Luther King Tr. Way
 SCI Job Number: 430,010
 Project Contact at SCI: Sean Carson
 Sampled By: Charles Pearson
 Analytical Laboratory: Curtis & Tompkins
 Analytical Turnaround: Normal

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
MW-29	W	3 x Voa	3-28-91		TVH BTEX	
MW-38	W	3 x Voa	"		"	
MW-39	W	3 x Voa	"		"	
WI-25-1	W	2 x Voa	"			
WI-25-2	W	2 x Voa	"		TVH BTEX	
F-25	W	2 x Voa	"		"	
B-25	W	2 x Voa	"		"	
E-25	W	2 x Voa	"		"	

* * * * *

Released by: Charles Pearson Received by: Keane Date: 3-28-91
 Released by: _____ Received by: _____ Date: 3/28/91
 Received by Laboratory: _____ Date: _____
 Released by Laboratory: _____ Date: _____
 Released by: _____ Date: _____

¹ Sample Type: W = Water, S = Soil, O = Other (specify)
² Container Type: V = VOA, P = Plastic, G = Glass, T = Brass Tube, O = Other (specify)

NOTES TO LABORATORY:
 - Notify SCI if there are any anomalous peaks on GC or other scans
 - Questions/clarifications - Contact SCI at (415) 268-0461