One Market Plaza Spear Street Tower, Suite 717 San Francisco, CA 94105 (415) 957-9557



8 May 1990 Project 1459.05

Mr. John Adams, Project Manager Kaiser Foundation Health Plan 1950 Franklin Street, 11th Floor Oakland, California 94612-2998

Subject:

Site Characterization - Mineral Spirits in Soil

Kaiser Permanente Medical Center 280 West MacArthur Boulevard

Oakland, California

Dear Mr. Adams:

Enclosed is the subject report for characterization of soil affected by mineral spirits at the Kaiser Permanente Medical Center construction site behind the hospital on Broadway. A copy of this report should be sent to Ms. Susan Hugo at the Alameda County Department of Health Services and to Mr. Lester Feldman at the California Regional Water Quality Control Board.

We appreciate the opportunity to provide our consulting engineering services to Kaiser. Please contact Ms. Cheri Young or either of the undersigned, if you have any questions of require further information.

Sincerely yours,

GEOMATRIX CONSULTANTS, INC.

N. Debra Favre

Project Manager

NDF/evr

Enclosure

cc:

Ms. Fonda Karelitz - Kaiser Foundation Health Plan Ken Ayers - Kaiser Permanente Medical Center Mark Zemelman - McCutchen, Doyle, Brown & Enersen

Geomatrix Consultants, Inc. Consulting Engineers and Earth Scientists



SITE CHARACTERIZATION REPORT Mineral Spirits in Soil

Prepared for

Kaiser Permanente Medical Center 280 W. MacArthur Boulevard Oakland, California

May 1990 Project No. 1459C/E

Geomatrix Consultants



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SITE CHARACTERIZATION - MINERAL SPIRITS IN SOIL KAISER PERMANENTE MEDICAL CENTER Oakland, California

1.0 INTRODUCTION

1.1 Purpose

At the request of the Kaiser Foundation Health Plan (Kaiser), Geomatrix conducted a series of studies to characterize the extent of mineral spirits in soil behind Kaiser Permanente Medical Center (Kaiser Hospital), at 280 West MacArthur Boulevard in Oakland, California (Figure 1). This report summarizes our findings and presents our recommended plan for remediation of soil affected by mineral spirits.

1.2 Site Conditions

The Kaiser Hospital site is located behind the hospital tower and is entered from Broadway, as shown on Figure 1. The site is essentially level and paved. Permanent structures on the site include the mechanical building, a cooling tower, and an emergency water tank, which are shown on Figure 2. Temporary structures include a Kaiser Construction Services office trailer and a shipping container used for storage. The east boundary of the site is a hillside leading to a grassy picnic area used by Kaiser personnel. The south boundary of the site is the recessed footing of the linen building, which is approximately four feet wide and four feet below the asphalt grade. The west and north boundaries of the site are marked by a chain-link fence.

2.0 SUMMARY OF WORK PERFORMED

During Kaiser's excavation for a new sewer line trench between the mechanical and linen buildings at the Hospital, construction workers noted an unusual odor. Kaiser retained Geomatrix Consultants, Inc. (Geomatrix), to collect soil samples from the trench and identify the odoriferous substance. A soil sample was collected from below the trench backfill near a CONTR/1459-DF.TXT



rusty joint in a drain line leading from a paint clean-up basin. The basin is shown on Figure 2. Laboratory analysis of the sample detected mineral spirits, benzene, and toluene at concentrations of 2600, 0.4, and 1.0 parts per million (ppm), respectively. Based on this finding, Kaiser requested Geomatrix to assess the extent of mineral spirits in the soil in this area.

Characterization of the extent of mineral spirits in soil near the mechanical building began in November 1989. Six soil borings were drilled to depths of 10 and 15 feet within 20 feet of the mechanical building (see Figure 2). Three to four samples per boring were analyzed for total fuel hydrocarbons and benzene, toluene, xylene, and ethylbenzene (BTX&E). Mineral spirits were detected in only one boring, B-2, located near the intersection of the mechanical and linen buildings, at a maximum concentration of 80 milligrams per kilogram (mg/kg) at a depth of 9.5 feet. Based on the results of this boring program Geomatrix estimated that approximately 25 cubic yards of soil were affected by mineral spirits. The results also indicated that the soil containing mineral spirits did not pose a significant present or potential hazard to human health and safety, property, or the environment.

Excavation of soil containing detectable mineral spirits was initiated on 12 February 1990 just west of the mechanical building near the paint basin discharge line (Figure 2 - Excavation #1). The excavation was completed in the north, west, and south directions, and Geomatrix obtained confirmation soil samples. The sample results indicated soils containing detectable mineral spirits had been removed, except in the area below the mechanical building foundation.

Kaiser Construction Services abandoned excavation activities west of the mechanical building, while Geomatrix conducted a drilling and soil sampling program within and around the mechanical building to define the extent of mineral spirits in this area. Between 27 February and 2 March 1990 Geomatrix drilled six borings within the mechanical building and 13 borings along the east and north sides of the building, as shown on Figure 2.



Concurrent with Geomatrix's drilling program to define the extent of mineral spirits in soil within and around the mechanical building, Kaiser Construction Services began excavating the hillside northeast of the mechanical building (Figure 2 - Excavation #2). These soils also were observed to contain elevated concentrations of mineral spirits. At Kaiser's request Geomatrix conducted a drilling and soil sampling program on the hillside to determine the extent of soil containing mineral spirits in this area. Geomatrix drilled eight borings around the hillside excavation between 12 and 15 March 1990, as shown on Figure 2.

At Kaiser's request, on 16 March 1990 additional soil borings were drilled on the north and east sides of the original Excavation #1 near the mechanical building to confirm the absence of mineral spirits in these areas. The boring locations are shown on Figure 2.

3.0 FIELD INVESTIGATION

Logs for borings drilled to characterize the site are presented in Appendix A. Summarized in Appendix B are the field methods used for the work initiated in February 1990, to observe and document excavation activities and to more fully characterize soil affected by mineral spirits at the site.

All soil samples collected for chemical analysis from the excavations and borings were delivered to BC Analytical of Emeryville, California, under chain-of-custody procedures. Samples were analyzed for total petroleum hydrocarbons as mineral spirits as well as benzene, toluene, xylene, and ethylbenzene (BTX&E) by EPA Methods 8015/8020 in series. The reporting limits for these compounds are 10 milligrams per kilogram (mg/kg) for mineral spirits and 0.3 mg/kg for BTX&E. Analytical results are tabulated in Table 1; laboratory reports and chain-of-custody records are presented in Appendix C.



4.0 RESULTS

Summarized below are the results of the site characterization and excavation observation work conducted to date. The data from the different phases of work were assembled to define the extent of soil affected by mineral spirits at the site. Described in the following sections is the extent of soil affected by mineral spirits.

4.1 Paint Shed/Mechanical Building Area

This area is the location of Excavation # 1. The limits of the excavation are shown on Figure 2. The excavation was bounded on the east by the edge of the mechanical building and on the south by a retaining wall between the asphalt parking area and the linen building. The vertical extent of the excavation was approximately 6 feet on the west side and 12 feet on the east side, as shown in the cross section, Figure 3.

Five confirmation soil samples (E-1 through E-5) were collected in February 1990 from the north, west, and southwest walls and floor of the excavation. Mineral spirits and BTX&E were not detected in these samples, indicating that soils containing mineral spirits in excess of 10 mg/kg had been removed from the excavation in these directions (Table 1). The vertical extent of mineral spirits just west of the mechanical building foundation was found after the excavation of the building basement and foundation was completed on 25 April 1990. One soil sample (E-6) was collected at the base of the excavation at a depth of 13 feet in this location, and mineral spirits and BTX&E were not detected indicating that the excavation of soil containing mineral spirits was complete in this area. Volatile organic compounds (VOCs) were detected in soil from the excavation east wall using a photoionization detector (PID). A blue-green soil discoloration and a hydrocarbon odor also provided evidence that the excavation was not complete in the eastern direction below the mechanical building.

4.2 Mechanical Building Interior

Based on the soil discoloration and high PID readings at the east wall of the excavation, a 12-foot-long horizontal boring was drilled with a hand auger approximately five feet below the



mechanical building to determine the extent of affected soils in this direction. The soils encountered were screened continuously with the PID and showed positive readings to approximately 11.5 feet. These readings indicate that soils with detectable mineral spirits extend approximately 11.5 feet under the west edge of the mechanical building.

Two of the six borings drilled within the mechanical building contained soils in which mineral spirits were detected. The boring locations are shown on Figure 2, with the depth range of soil where VOCs were detected by the PID. Figure 3 shows the extent of affected soil beneath the mechanical building in cross section. Boring MB-1 showed the greatest vertical extent and concentration of mineral spirits. Samples screened using the PID indicated detectable VOCs from a depth of 1.0 to approximately 18.0 feet. A laboratory analysis of soil from a depth of 18.5 feet detected no mineral spirits or BTX&E confirming the limits of mineral spirits in the area of boring MB-1. Samples screened using the PID readings from boring MB-2 indicated detectable VOCs (at least 10 ppm) from a depth of approximately 3.5 to 9.5 feet. Borings MB-3 through MB-6 revealed no detectable VOCs; laboratory analyses confirmed the absence of mineral spirits. Based on these borings and analytical results, the volume of soil that contains detectable mineral spirits beneath the mechanical building was estimated to be 120 to 190 cubic yards.

Groundwater was encountered in borings MB-1 and MB-2 at depths of approximately 18.0 and 17.5 feet, respectively. Surface infiltration water was encountered in boring MB-4 due to a surface mechanical installation. Groundwater was not encountered in borings MB-3, MB-5, or MB-6. Although no groundwater samples were analyzed, a soil sample acquired from just below the water table for laboratory analysis (MB-1 at a depth of 18.5 feet) contained no detectable mineral spirits, indicating that the mineral spirits do not extend below the water table at significant concentrations.



4.3 <u>Mechanical Building Exterior</u>

Five of the 13 borings drilled along the north and east perimeters of the mechanical building encountered soil having detectable VOCs (detected using PID) while the remaining eight borings showed no indication of detectable VOCs. Eleven laboratory confirmation samples were analyzed, and only sample B-12 to a depth of 5.0 feet had a detectable concentration of mineral spirits (34 mg/kg). Benzene, toluene, xylenes, and ethylbenzene were also detected in this sample, with concentrations of 0.6, 0.6, 1.4, and 0.6 mg/kg, respectively. The lateral and vertical extent of affected soil, as shown on Figure 2, includes the area east of the cooling tower and south of the hillside. The vertical extent of detectable mineral spirits in most of the area appears to range from four to seven feet except near boring B-15 at the base of the hillside, where VOCs were detected by the PID to a depth of approximately 17 feet (Figure 5). The volume of affected soil between the mechanical building and the hillside above a depth of seven feet is estimated to be 100 cubic yards. Groundwater was encountered in boring B-15 at a depth of approximately 17 feet, coinciding with the limits of soil affected by mineral spirits.

Five borings drilled just north of the excavation (B-27 through B-31) were screened with the PID. VOCs were not detected in the soil samples tested with a PID from the borings, and it appears that detectable mineral spirits are not present in this area.

4.4 Hillside Area

Two of the eight borings drilled on the hillside above Excavation # 2 (B-20 through B-26 and B-32) encountered soil with detectable concentrations of mineral spirits. In boring B-21 VOCs were detected using the PID to a depth of approximately 12 feet, and samples analyzed in the laboratory from depths of 2.0 and 14.0 feet confirmed the detection of mineral spirits (at 33 mg/kg and <10 mg/kg, respectively). In boring B-24, VOCs were detected using the PID to a depth of approximately 30 feet. A sample analyzed in the laboratory confirmed the limit of soil with detectable mineral spirits ended at a depth of 30.0 feet. The lateral extent of soil having detectable mineral spirit concentrations is shown on Figure 2. Figure 4 is a cross section through the hillside showing the zone of greatest vertical extent of mineral



spirits. Based on these borings and analytical results, the volume of soil in the hillside affected by mineral spirits was estimated to be 500 to 600 cubic yards. The groundwater table appears to be at a depth greater than 30 feet below the top of hillside.

One soil sample was also analyzed for volatile organics, semi-volatile organics, and the 17 California Title 26 (CAM) metals. The sample was from boring B-24 at a depth of 6.0 feet, an area known to be affected by mineral spirits. The laboratory did not detect volatile or semi-volatile organic compounds in this sample, and all metals were within background ranges for soils in the San Francisco Bay area as referenced by Shacklette and Boerngen, 1984.

5.0 REMEDIAL PLAN

Based on data provided by Geomatrix, Kaiser has chosen to excavate soil affected by mineral spirits at concentrations above the limit of detection (10 ppm) on the site. Based on tests completed to-date, the soil removed can be disposed of directly at a Class II facility, or aerated followed by disposal at a Class III facility. Current regulations allow soil affected by mineral spirits with concentrations less than 1,000 ppm to be disposed as designated waste (Class II). Excavation is proposed in two stages to coordinate soil removal and building construction activities currently in progress. The proposed Phase I excavation area located behind the mechanical building is shown in Figure 2 and ranges in depth from four to seven feet. The estimated volume of soil to be removed in this area is 100 cubic yards. Figure 5 shows the area in cross-section. Phase I is estimated to begin within one month.

The Phase II excavation area is located on the hillside and under the mechanical building, and is scheduled to begin within 10 months. Affected soil below the hillside ranges in depth from approximately 30 feet at the top of the slope to 17 feet at the base of the slope. The soil proposed for removal is shown in cross-section on Figure 4, and the volume of soil is approximately 500 to 600 cubic yards. Affected soil below the mechanical building ranges in



depth from the surface to approximately 18 feet, and is shown in cross-section on Figure 3. The estimated yardage of soil to be removed in this area is 120 to 190 cubic yards.

The effect of the mineral spirits on groundwater should also be further evaluated. Samples of soil collected below groundwater level have not detected mineral spirits above 10 ppm it is anticipated that this evaluation will require the installation of monitoring well network, expected to consist of three to four wells. Optimum well locations have not yet been identified. Alameda County Health Department will be advised of the selected locations for approval purposes, prior to installation. We anticipate that the wells would be installed within the same time period as excavation activities.

6.0 REFERENCES

Shacklette and Boerngen, 1984, Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States, U.S. Geological Survey Professional Paper 1270.



TABLE 1

ANALYTICAL RESULTS OF SOIL ASSESSMENT - MINERAL SPIRITS¹

KAISER HOSPITAL

Oakland, California

				Concent	rations in mg	/kg (ppm)	
Sampling	Boring	Sample	Mineral				Ethyl-
Date	No.	Depth	Spirits	<u>Benzene</u>	<u>Toluene</u>	Xylene	<u>benzene</u>
Excavation	Near Med	chanical R	uilding:				
Bacavacion	Tical Ivic	manicai B	unung.				
2/12/90	E-1(floo	or) 4.5	< 10	< 0.3	< 0.3	< 0.3	< 0.3
2/12/90	E-2(wal	1) 3.5	< 10	< 0.3	< 0.3	< 0.3	< 0.3
2/12/90	E-3(wal	1) 3.5	< 10	< 0.3	< 0.3	< 0.3	< 0.3
2/12/90	E-4(wal	1) 3.5	< 10	< 0.3	< 0.3	< 0.3	< 0.3
2/12/90	E-5(wal	1) 4.0	< 10	< 0.3	< 0.3	< 0.3	< 0.3
4/25/90	E-6(floo	or)13.0	< 10	< 0.3	< 0.3	< 0.3	< 0.3
Borings in	Mechanica	al Building	,				
2011igo III		a Danama					
2/27/90	MB-1	18.5	<10	< 0.3	< 0.3	< 0.3	< 0.3
2/28/90	MB-2	10.0	<10	< 0.3	< 0.3	< 0.3	< 0.3
		15.0	Held				
		18.0	<10	< 0.3	< 0.3	< 0.3	< 0.3
2/20/00	MD 2	10.0	-10	-0.0	40.0	40.0	-0.0
2/28/90	MB-3	10.0	<10	< 0.3	< 0.3	< 0.3	< 0.3
2/28/90	MB-4	10.0	<10	< 0.3	< 0.3	< 0.3	< 0.3
2/28/90	MB-5 ²						
3/2/90	MB-6	8.5	<10	< 0.3	< 0.3	< 0.3	< 0.3
		15.0	<10	< 0.3	< 0.3	< 0.3	< 0.3
Borings Bel	hind Mech	anical Bui	lding:				
2/27/00	D O	15.0	- 10	-0.2	-02	-02	-02
2/27/90 2/27/90	B-8 B-9	15.0	<10	< 0.3	< 0.3	< 0.3	< 0.3
		15.0	<10	< 0.3	< 0.3	< 0.3	< 0.3
2/27/90	B-10	15.0	<10	< 0.3	< 0.3	< 0.3	< 0.3
2/27/90	B-11	15.0	<10	< 0.3	< 0.3	< 0.3	< 0.3
3/1/90	B-12	5.0	34	0.6	0.6	1.4	0.6
		15.0	Held				

TABLE 1 (concluded)

ANALYTICAL RESULTS OF SOIL ASSESSMENT - MINERAL SPIRITS

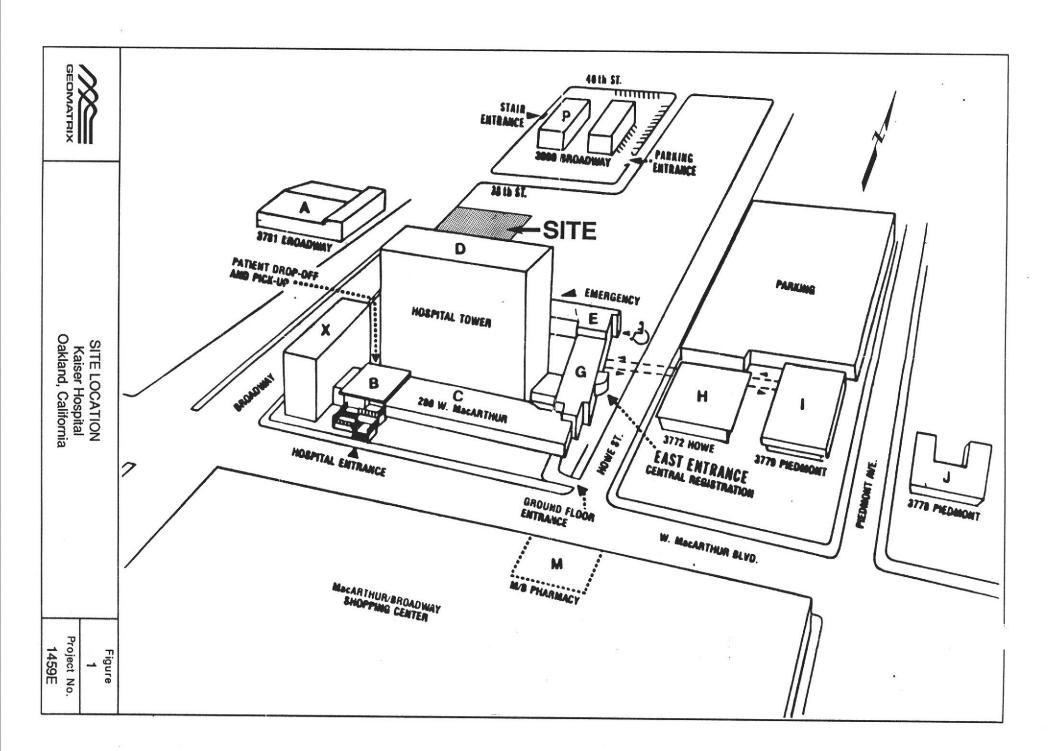
Compling	Boring	Comple	Mineral	Conc	centrations in	mg/kg (ppm	
Sampling _Date	No.	Sample Depth	Spirits	Benzene	Toluene		Ethyl- benzene
Bate		<u>Бериг</u>	Spirits	DCIIZCIIC	Torucie	Aylene	<u>belizelle</u>
Borings Bel	hind Mech	nanical Bu	ilding:				
3/1/90	B-13	5.0	<10	< 0.3	< 0.3	< 0.3	< 0.3
		15.0	Held				
3/1/90	B-14	6.5	<10	< 0.3	< 0.3	< 0.3	< 0.3
3/1/90	B-15	13.5	Held				
		17.5	< 10	< 0.3	< 0.3		< 0.3
3/1/90	B-16	5.5	< 10	< 0.3	< 0.3		< 0.3
3/1/90	B-17	5.5	< 10	< 0.3	< 0.3	< 0.3	< 0.3
3/1/90	B-18	6.0	Held				
3/1/90	B-19	5.5	<10	< 0.3	< 0.3	< 0.3	< 0.3
Borings on	Hillside:						
3/12/90	B-20	10.5 25.5	<10 Held	<0.3	<0.3	<0.3	<0.3
3/12/90	B-21	2.0	33	< 0.3	< 0.3	< 0.3	< 0.3
		14.0	<10	< 0.3	< 0.3		< 0.3
3/12/90	B-22	6.0	<10	< 0.3	<0.3	< 0.3	< 0.3
3/13/90		16.0	Held				
3/13/90	B-23	6.0	< 10	< 0.3	< 0.3	< 0.3	< 0.3
3/13/24	B-24	6.0^{3}	<10/<10	< 0.3	< 0.3	< 0.3/	0.4 < 0.3
		31.0	< 10	< 0.3	< 0.3	< 0.3	< 0.3
3/15/90	B-25	10.5	<10	< 0.3	< 0.3	< 0.3	< 0.3
3/15/90	B-26	6.0	< 10	< 0.3	< 0.3	< 0.3	< 0.3
		23.5	< 10	< 0.3	< 0.3	< 0.3	< 0.3
NOTES:							

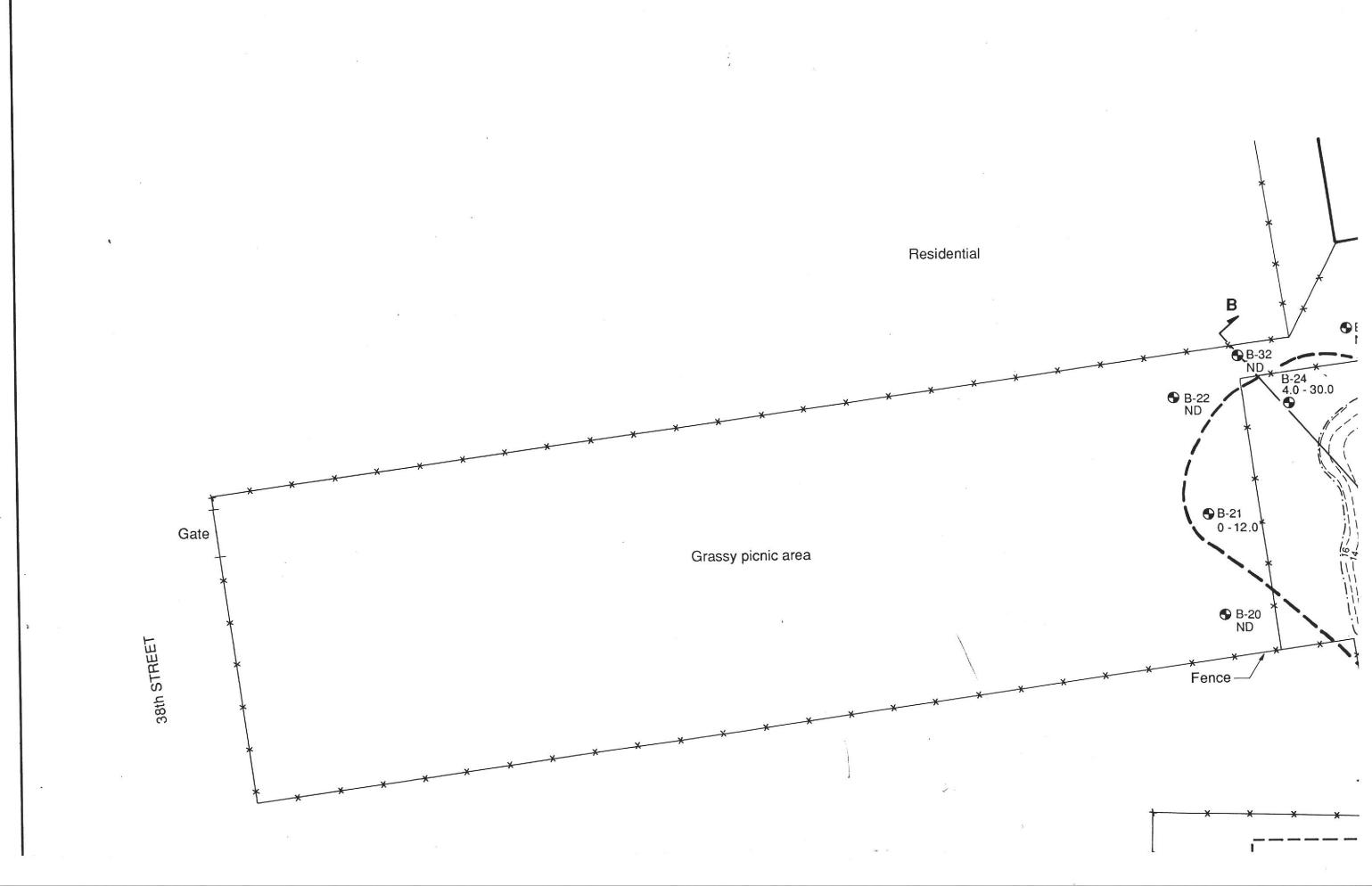
NOTES

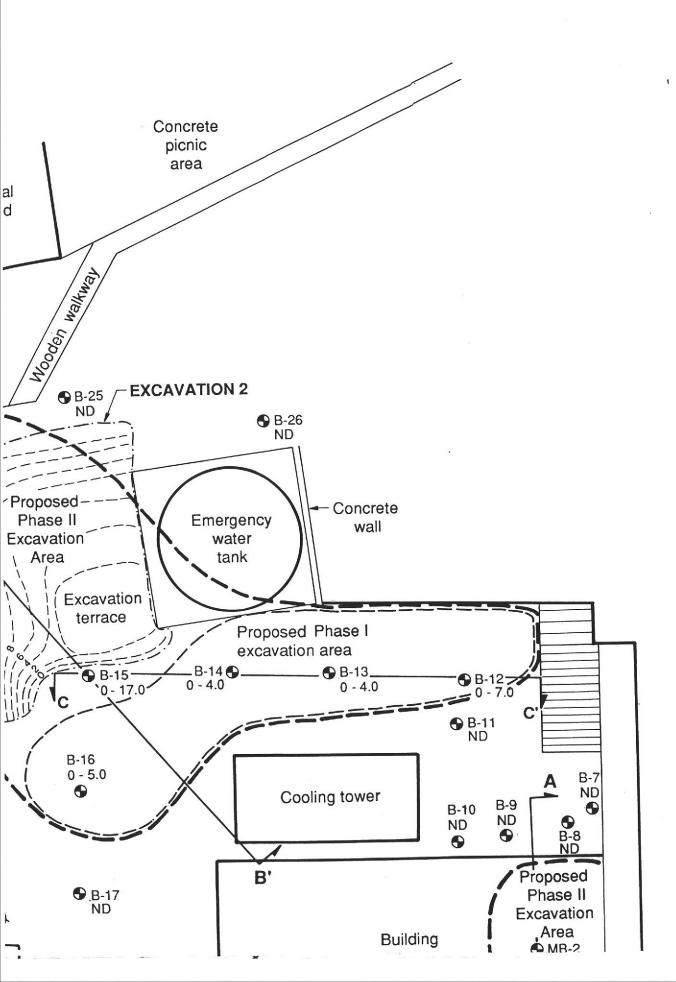
Borings M-5, and B-27 through B-32 - Soil samples read with PID only.

All chemical analysis performed by BC Analytical of Emeryville, California by modified EPA Method 8015/8020 for mineral spirits, benzene, toluene, xylene, and ethylbenzene.

This sample also analyzed by EPA Methods 8240 and 8270 by BC Analytical with no compounds detected, and for the 17 Title 26 metals by EPA Methods 6010, 7060, 7471, and 7740 with no compounds detected above background levels.







EXPLANATION

Approximate extent of area with detectable mineral spirits in the soil (proposed excavation area)

B-12 Soil boring and depth range of soil with detectable mineral spirits

Extent of completed excavation

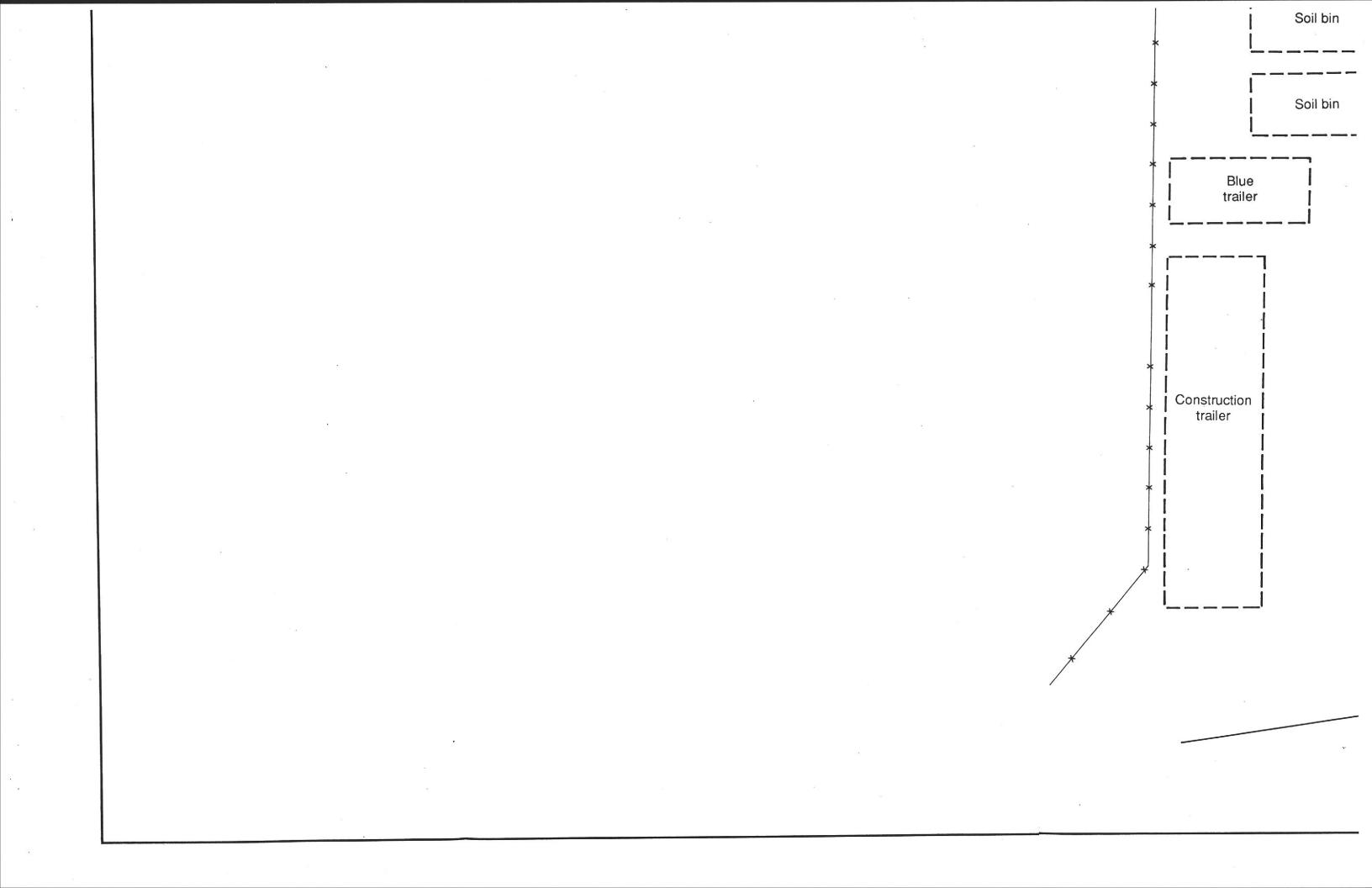
Approximate lines of equal elevation, contour interval = 2 feet

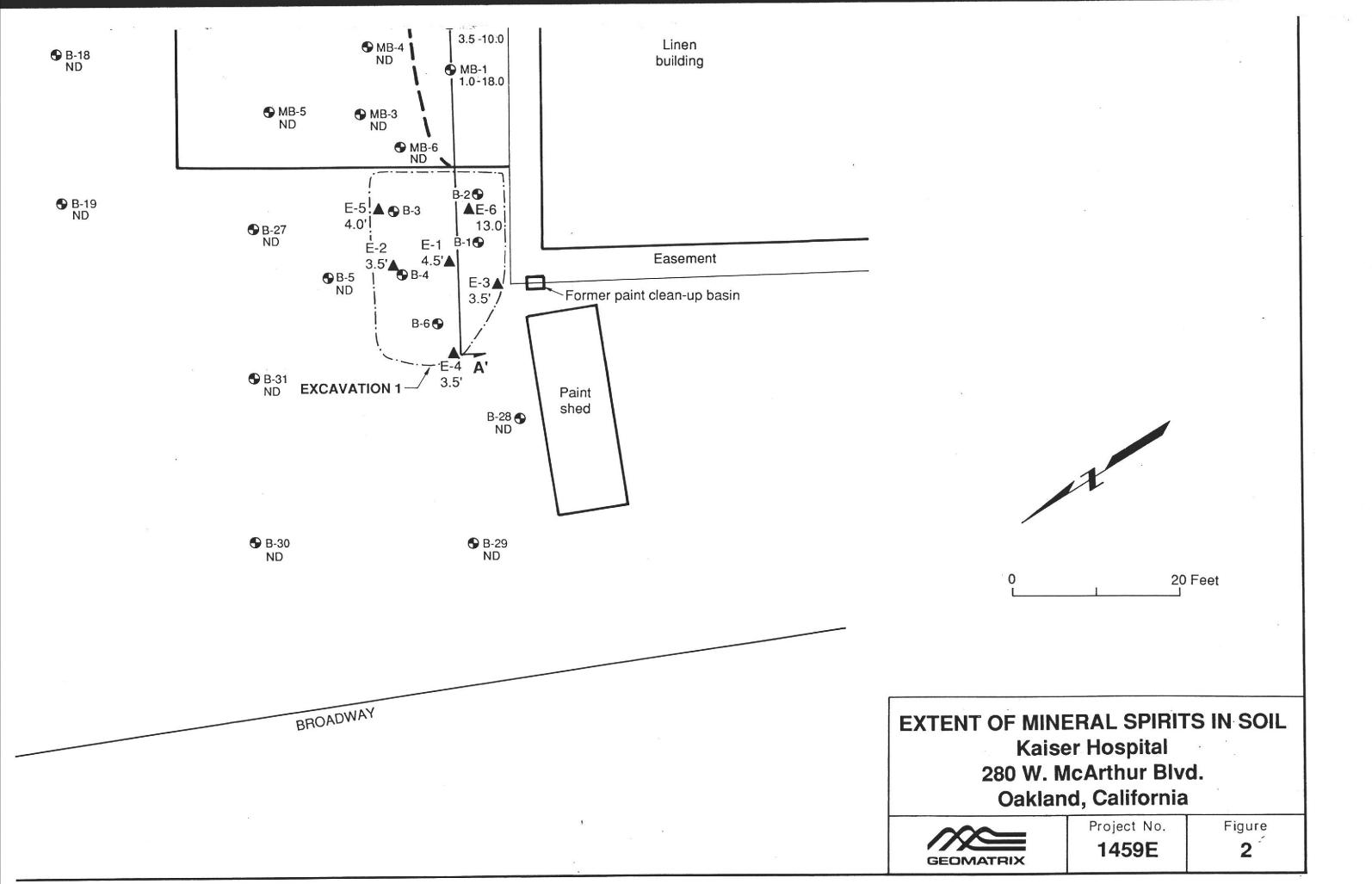
ND Not detected

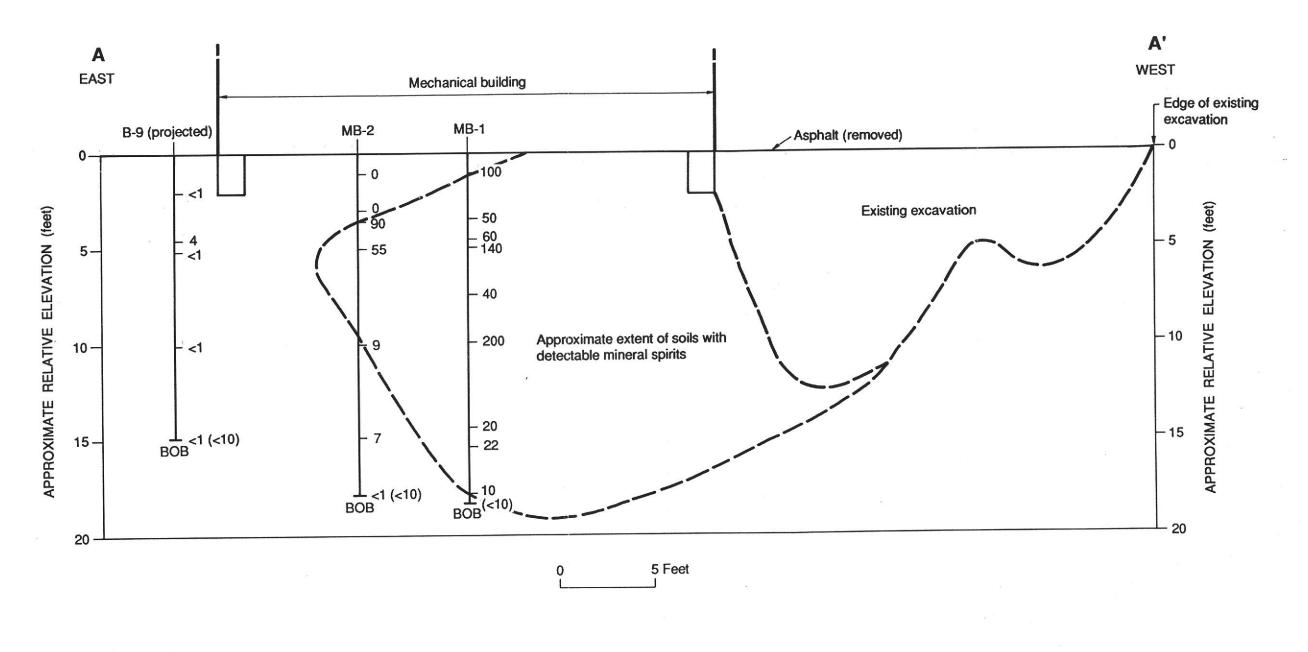
E-1 Excavation soil sample and depth of acquistion

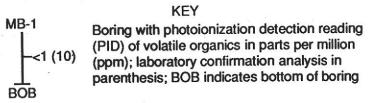
Notes

- Cross section lines show extent of mineral spirits in soil (see following figures).
- 2. All soil borings are approximate.
- 3. Base map source: Oakland Medical Enter, Central Utility Plant, Existing Topography sheet, CI, 8/17/89. Additions approximate.



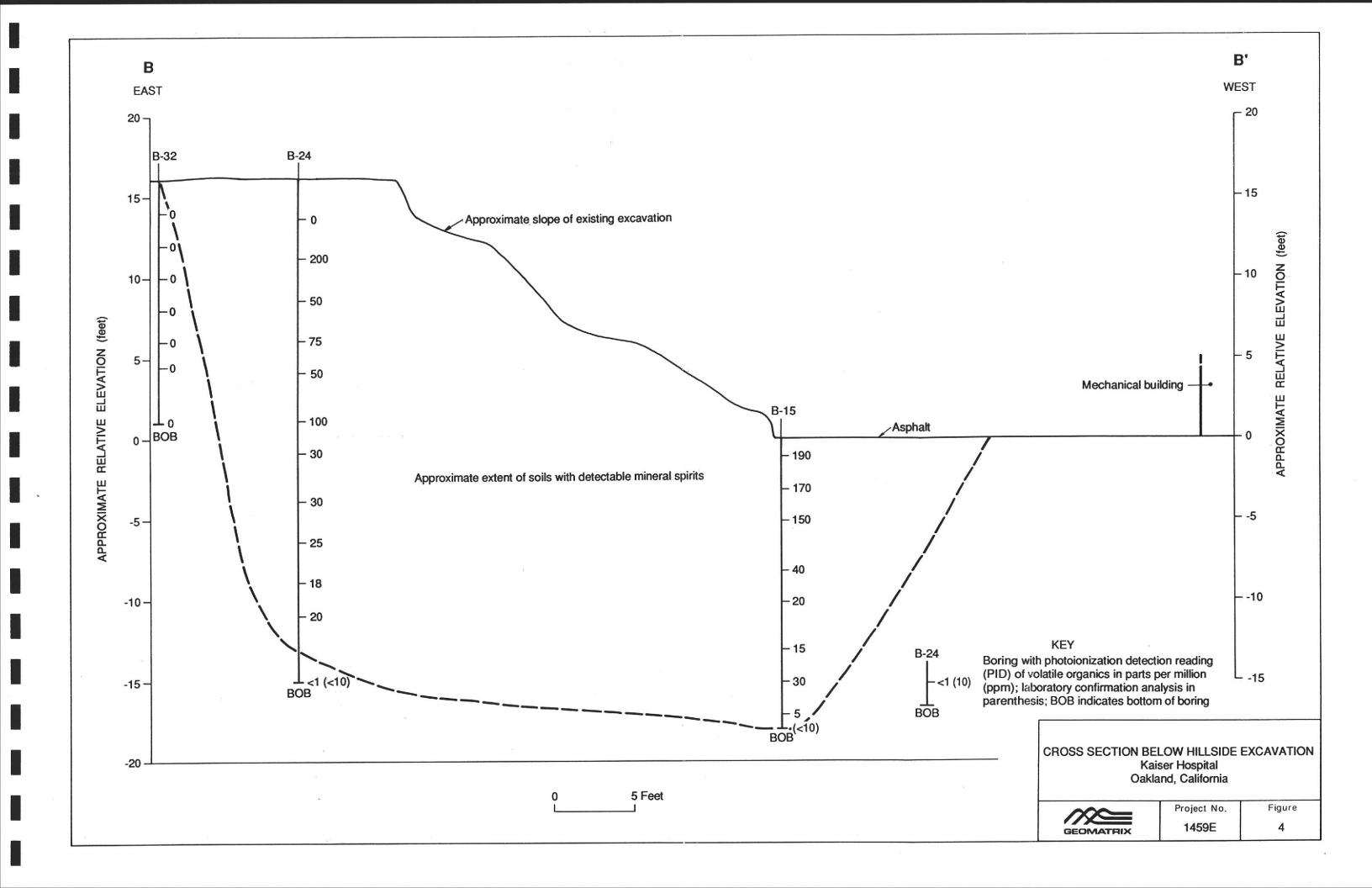


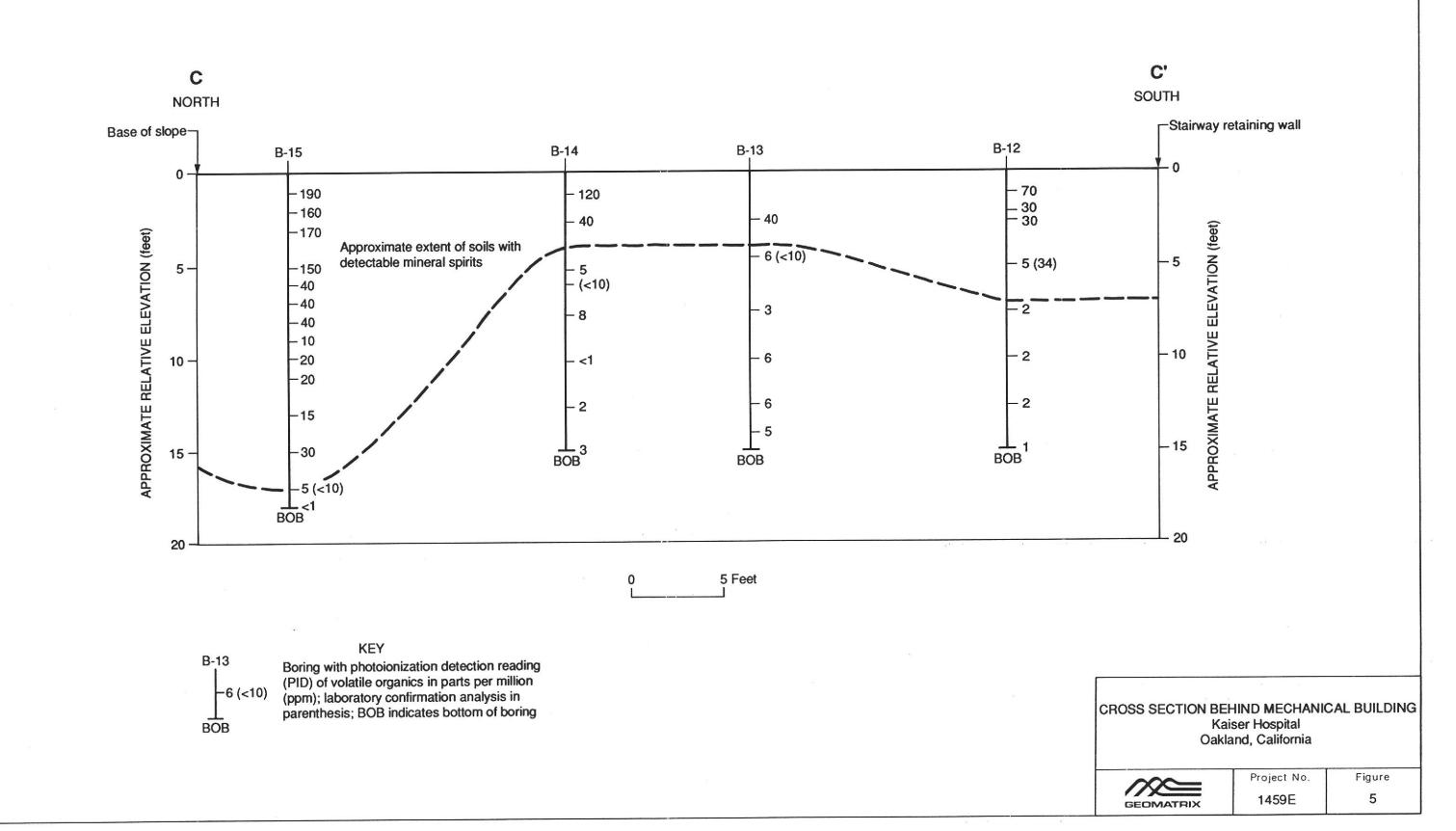




CROSS SECTION BELOW MECHANICAL BUILDING
Kaiser Hospital
Oakland, California

000-	Project No.	Figure
GEOMATRIX	1459E	3





PRO	JECT:		AISE	R d, California			Lo	g of E	3ori	ng No	. MB-1
BORI	NG L	OCA	TION	Inside Mechanic	al building	·-	ELEVATI	ON AND DA	MUT		
DRIL	LING	CON	ITRAC	TOR None			DATE ST 2/27/90			DATE FIN 2/27/90	
DRIL	LING	MET	HOD	Hand auger			TOTAL D 18.5'	EPTH		MEASURI	NG POINT
DRIL	LING	EQL	HPME	NT Hand auger			DEPTH T WATER		ST 18.0	COMPL. 18.2	24 HRS. 16.0
SAMI	PLING	ME	THOO	Direct from aug	jer		LOGGED C.D. Yo				
НАМ	MER \	VEK	SHT		DROP		RESPON J.D. Ga	ISIBLE PRO Ilinatti	FESSI	ONAL	REG. NO. CEG 1335
DEPTH (feet)		Sample	Blows/ Foot	NAME (USCS Sym	DESCRIF nbot): color, moist, % by wt., plast., der Surface Ele	nsity, structure, comentati	ion, react. w/H	CI, geo. inter.		PID Result (ppm)	Analytical IS Results For Mineral Spirits (ppm)
-	┨			CLAÝ					-	<1	·
1-	$\left\{ \right.$			Brown CLAYEY SA	AND (SC)				$\dashv \dashv$	100	
2-					ue-green, dry, medium	sand, some cla	ay	*			
-	1										·
3-											
-	1									50	
4-										60	
5-										140	
-										,	
6-									-		
-	$\mid \mid \mid$										
7-	1			SAND (SP)					┨┨		
-				Brown (som	ne blue-green color to 1	4 feet), dry, fin	e sand, 1	race		40	
8-				clay							
9-											
10-										200	
-											:
11 -											
-											
12-					•						
10									1		
13 -											
14 -											B-1-89/Modified
				Geor	matrix Consultants			Project No.	1459C	:	Figure A-1

PROJECT: KAISER Log of Boring No. MB-1 cont'd. Oakland, California SAMPLES Analytical PID Results DESCRIPTION Results For Mineral Spirits (ppm) NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, cementation, react, w/HCl, ged. inter. (ppm) 20 15 22 Very moist 16 17 18 TMB-1-<10 10 Wet Bottom of boring 18.5 feet 19 20 21 22 23: 24 25 26 27 28 29 30 B-2-89/Modified Project No. 1459C Figure A-2 **Geomatrix Consultants**

PROJ	ECT			R d, California		Log of E	ori	ing No.	MB-2
BORII	NG L	OCA	TION	Inside Mechanical building	ELI	VATION AND DA	TUM		
DRILL	ING	CO	NTRAC	TOR None		TE STARTED 17/90		DATE FINISH 2/28/90	HED
DRILL	ING	MET	HOD	Hand auger		TAL DEPTH		MEASURING	POINT
DRILL	ING	EQL	JIPME	NT Hand auger	DE	PTH TO FIRS		COMFI.	24 HRS.
				Direct from auger	LO	GGED BY	7.5	<u>i</u>	<u>i</u>
HAMN	-	-			RE	D. Young SPONSIBLE PROP	ESSI	ONAL	REG. NO.
I .	SĀ	MPI	.E\$	DESCRIPTION	J.[D. Gallinatti			CEG 1335
DEPTH (feet)	mple. No.	ald E	Blows/ Foot	NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, or	ementation, rea	act. w/HCl, geo. inter.		PID Results (ppm)	Results For Mineral Spirit
	<i>8</i>	ß	<u>a</u>	Surface Elevation:			$\overline{}$	(ppiii)	(ppm)
_				3" asphalt GRAVELLY SAND (SW)			┦┨	٠.	,
1-				Medium brown, dry, medium sand, little coars to 1/2 inch diameter	se sand,	little gravel		<1	
2-								_. <1	
3 -								<1	
ٳ				Some blue-green color				90	
4-				V Some blue-green color				30 ,	
- '				•					
5 -								55	
									İ
6-							┦┨		
4				SILTY SAND (SM) Light brown, dry, fine sand, some silt, little cla	av		14		
7-					-y		14		
4									į.
8-							14		
4		1					-		
9-							-		
	MB-2-						-	9	<10
10 -	10.0						14		
4			ł				14		
11 -			1				1-1		
+		İ	ļ				$ \cdot $		
12-			Ī						
4							-		
13 -			ļ	CLAYEY SILT (ML) Light brown, moist, silt, little clay, low plasticit	y				٠
14 —			<u>.</u>].				1 1		B-1-89/Modified
				Geomatrix Consultants		Project No. 1	459C	Fig	ure A-3

PROJECT: KAISER Log of Boring No. MB-2 cont'd. Oakland, California SAMPLES Analytical DESCRIPTION PID Results Results For (ppm) Mineral Spirits NAME (USCS Symbol); color, moist, % by wt., plast., density, structure, cementation, react, w/HCl, geo. inter. (ppm) 7 Held 15 16 17 Wet 18.0 <10 18 <1 Bottom of boring 18.0 feet 19 20 21 22-23-24 25 26-27 28: 29 -30: B-2-89/Modified **Geomatrix Consultants** Project No. 1459C Figure A-3

PROJEC			R nd, California	Lo	og o	of B	ori	ing No	. MB-3
BORING	LOC	ATION	Inside Mechanical building	ELEVAT	ION A	TAD DI	JM		
DRILLIN	IG CC	NTRA	CTOR None	DATE S' 2/28/90		D		DATE FIN 2/28/90	SHED
DRILLIN	IG ME	THOD	Hand auger	TOTAL (MEASURI	NG POINT
DRILLIN	G EQ	UIPMI	ENT Hand auger	DEPTH WATER		FIRST		COMPL.	24 HRS.
SAMPLI	NG M	ETHO	D Direct from auger	LOGGED C.D. Yo	BY	<u> </u>		.,	· · · · · · · · · · · · · · · · · · ·
HAMMEI	R WE	IGHT	DROP	RESPO	NSIBLE		SSI	ONAL	REG. NO. CEG1335
1 - 1	SAMF		DESCRIPTION NAME (USCS Symbol): color, moist, % by wi., plast., density, structure, cemental	•				PID Result	Analytical
_ \ <u>\</u>	- 3		Surface Elevation: 2" asphalt			•			(ppm)
1-	1		GRAVELLY SAND (SW) Medium brown, dry, medium sand, little coarse so to 1/2 inch diameter	and, little	e grav	rel	1 1		
2-							-		
3-							-	<1	
4-									
5-								<1	
-									
6-									
7-			SILTY SAND (SM) Light brown, dry, fine sand, some silt, little clay						
8-			Light brown, dry, line said, some siit, little day				-		·
9-									
10 -								<1	<10
-									
11 -			OLAVEY OF TARR						·
12-			CLAYEY SILT (ML) Light brown, moist, silt, little clay, low plasticity					21	
13 -								21	
14 —		ł <u>-</u> -	Geomatrix Consultants		Proiec	t No. 14	59C	Ti	B-1-99/Modified

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PROJECT: KAISER Log of Boring No. MB-3 cont'd. Oakland, California SAMPLES DEPTH (feet) Sample No. Analytical DESCRIPTION PID Results Blows/ Foot Results For NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, comertation, react. w/HCl, goo. inter. (ppm) Mineral Spirits (ppm) 15 16-Very moist <1 Bottom of boring 16.5 feet 17-18-19 20 21 -22 23 24 25 26 27 28 29 30 B-2-89/Modified **Geomatrix Consultants** Project No. 1459C Figure A-6

PROJ	ECT:		AISE aklan	र d, California			Log	of Bor	ing No.	MB-4
BORI	NG L	OC/	ATION	Inside Mechanical build	ing		ELEVATION A	ND DATUM		
DRILL	ING	COI	NTRAC	TOR None		· .	DATE STARTE 2/28/90	D	DATE FINIS	IED
DRILL	ING	ME	THOD	Hand auger			TOTAL DEPTH	4	MEASURING	POINT
DRILL	JNG	EQI	JIPME	T Hand auger			DEPTH TO WATER	FIRST	COMPL 12.3	24 HRS. 9.0
				Direct from auger	WATER 1 0.5					3.0
	MMER WEIGHT PROPERTY RESPONSIBLE P							ONAL	REG. NO. CEG1335	
Ι.			LES		J.D. Gallinatti DESCRIPTION				<u>_</u>	Analytical
DEPTH (feet)	NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, cemer					ure, cementati	ion, react. w/HCl, geo	, inter.	PID Results (ppm)	Results For Mineral Spirits
<u> </u>	lö.	8	<u>a -</u>	Off comball Off book	Surface Elevation:				(FF)	(ppm)
_				2" asphalt, 3" baser						
1-			ļ	GRAVELLY SAND			ومسم والمثار فرور			
٠_				to 1/2 inch diameter	medium sand, little o	warse sa	uio, imie grav	/ei _		
2-	[<1	
4-					•				<1	
_								-		
3 -								-		
-								-		
4 -								-		
_								-		
5-] _	<1	
_				× ',						
6-										
_										
7										
7-										
8-								-		
_				── Wet				-		1
9-				†				-		
_	MB-4-									
10 -	10.0								<1	<10
				CLAYEY SAND (SC						
11 -				Brown, moist, media	im sand, some clay					
1.1										
آ پر										
12 -										
-								1-		i i
13 -				Bottom of boring 13	.0 feet			· -	<1	
				3				-		
14 –							1			B-1-89/Modified
				Geomatrix C	onsultant s	Project No. 14			Fig	ure A-7

PRO	JECT		AISE aklan	R d, California			Log	of Bor	ing No.	MB-5
BORI	NG L	OC#	ATION	Inside Mechani	cal building		ELEVATION A	ND DATUM		-
DRIL	LING	COI	NTRAC	TOR None			DATE START	ED	DATE FINIS 2/28/90	HED
DRILL	JNG	MET	THOD	Hand auger			TOTAL DEPTI	H	MEASURIN	G POINT
DRIL	ING	EQL	JIPME	NT Hand auger			DEPTH TO	FIRST	COMPL.	24 HRS.
				Direct from aug			LOGGED BY	<u>i</u>	<u> </u>	<u> </u>
HAMI					DROP		C.D. Young RESPONSIBL		IONAL	REG. NO.
I	SA	MPI	ES		DESCRIPTIO	N	J.D. Gallina	tti	1	CEG1335 Analytical
DEPTH (feet)	Sample No.	ag E	Blows/ Foot	NAME (USCS Syr	nbol): color, moist, % by wt., plast., density, t		ion, react. w/HCl, gec	o, inter.	PID Results (ppm)	Results For Mineral Spirits
	8 -	8	8 "	2" conhalt	Surface Elevation	m;			(14411)	(ppm)
-	ł			2" asphalt					_	
1-	ł				' SAND (SW) wn, dry, medium sand, litt	le coarse sa	and, little gra	vel -		
-				to 1/2 inch o	diameter			-		
2-								-	}	
-								-	<1	
3 -								-	-	
-								-		
4 -								-		
-								-		
5 -								-	<1	
_								-	}	
6 -								-		
- -								-		
7-								-		
8-										
٥_										
9-										
_				•				_		
10 -										
-				CLAYEY S/	AND (SC) st, medium sand, some cla					Î
11 -				Diomii, iio	st, mediam sand, some da	y				
-			ļ					-		
12-			1					-		
	لــــا إا		$\overline{1}$	٦١					1.	
15 -								-		
_			ŀ	Bottom of b	oring 15.5 feet				<1	
16-	<u> </u>					· · · · · · · · · · · · · · · · · · ·			<u> </u>	B-1-89/Modified
				Geor	matrix Consultants		Proje	ct No. 14590	C Fig	gure A-8

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PRO	JECT:			R d, California		Log of Bor	ing No.	MB-6
BORI	NG L	DCA	TION	Inside Mechanical building		ELEVATION AND DATUM		
DRILL	ING	CON	ITRAC	CTOR None		DATE STARTED 2/28/90	DATE FINISH 2/28/90	lED .
DRILL	ING	MET	HOD	Hand auger		TOTAL DEPTH	MEASURING	POINT
DRILL	ING	EQU	IPME	NT Hand auger		DEPTH TO FIRST	24 HRS.	
				Direct from auger		LOGGED BY C.D. Young		1
HAM	/ER \	NEK	SHT	DROP		RESPONSIBLE PROFESS	IONAL	REG. NO.
Ι.,		MPL		DESCRIPTION		J.D. Gallinatti	i i	CEG1335 Analytical
DEPTH (feet)	Sample No.	ample.	Blows/ Foot	NAME (USCS Symbol): color, moiet, % by wt., plast., density, structure,	cemental	tion, react, w/HCl, geo. inter.	PID Results (ppm)	Results For Mineral Spirits
	S)	Š	<u></u>	Surface Elevation: 2" asphalt, 3" baserock			(PP)	(ppm)
- 1- -				CLAYEY SAND (SC) Brown, dry, medium sand, some clay		-	<1	
2-						-	2	
3 - 4 -				– Wet		· -	·	
5-								
6 - 7 -							<1	
8- 9-	MB-6- 8.5						<1	<10
10 -				7.			1 <1 1 <1 (12 ft)	
13 -	MB-6		•	Moist		" - -	<1	
15	15.0			Very moist Bottom of boring 15.0 feet			<1	<10
				Geomatrix Consultants		Project No. 14590	Fia	B-1-89/Modified ure A-9

PROJEC				t I, California				Log	of Bo	ring No	. B-7	
BORING	LO	CAT	ION	Behind Mechani	cal building			ELEVATION A	ND DATUM			
DRILLING	G C	 INC	rac'	TOR Access Soil	Drilling			DATE STARTE 2/27/90	D	DATE FINISI 2/27/90	HED	
				3" diameter solid		•		TOTAL DEPTH	I	MEASURING	POINT	
				T Minuteman			<u></u>	DEPTH TO	FIRST	COMPL.	24 HRS.	
				2.5" OD modifie	ed California	<u> </u>		WATER LOGGED BY	_1	_ 	1	
HAMMER				140 lbs.	DROP			C.D. Young	E PROFESS	IONAL	REG. NO. CEG1335	
- T 2	SAM				- Citor	30 inches DESCRIPTION	DN.	J.D. Gallinat	<u> </u>	<u> </u>	Analytical	
	o S		Foot	NAME (USCS Sym	bel): color, moist, %	by wt., plast., density,		ion, react. w/HCl, geo.	. inter.	PID Results (ppm)	Results For Mineral Spirits	
<u> </u>	_ 8	7 2		2" conhalt		Surface Elevat	ion:			(F4)	(ppm)	
4			ŀ	3" asphalt SANDY CL/	AV /CU\							
1-				Brown, mois		coarse to me	edium sand,	high plasticity	y, _			
4				soft					-			
2-		ı							-			
4									_			
3 -			l						-			
4			ŀ						-			
4-									-			
4									-			
5			- 1						_			
	1				2				-	•		
6-			.				, ,,					
4				Bottem of bi	oring 6.0 fee	d • infectore	e footing to	retaining wall			1	
7-									-			
4									-			
8-] -			
4									_			
9-									_			
4									_			
10 -									· _			
_									_			
11 -									_			
_									_			
12-									_			
									_			
13								•	_			
_]_			
14					* * * * *	,	,				8-1-89/Modified	
-				Geor	natrix Consi	ultants		Proje	et No. 1459	C Fig	gure A-10	

PROJ		Oa	klan	d, California				ring No	. B-8
BORII	NG L	OCA	TION	Behind Mechanical t	puilding	ELEVATION	AND DATUM		
DRILL	ING	CON	TRAC	TOR Access Soil Dril	ling	DATE START 2/27/90	ED	DATE FINISH 2/27/90	lED .
DRILL	ING	MET	HOD	3" diameter solid ster	n auger	TOTAL DEPT 15.0'	H	MEASURING	POINT
DRILL	ING	EQU	PME	NT Minuteman		DEPTH TO WATER	FIRST	COMPL.	24 HRS.
SAMP	LING	ME	THOD	2.5" OD modified Ca	alifornia	LOGGED BY C.D. Young			
HAMN	/ER \	VEIG	НТ	140 lbs. DR	OP 30 inches	RESPONSIBI J.D. Gallina	E PROFESSI tti	ONAL	REG. NO. CEG1335
DEPTH (feet)		MPL 뫒		NAME (USCS Symbol): co	DESCRIPTION for, moist, % by wt.; plast., density, struc	dure perpentation react withCl on	. Inter	PID Results	Analytical Results For
ے ق	Sample No.	Sal	Blows/ Foot		Surface Elevation:			· (ppm)	Mineral Spiri (ppm)
1-					st, clay, few medium sa	nd, high plasticity, so	ft -		
2-				SAND (SP) Red-brown, mois	st, medium sand, little o	oarse sand, trace clay	, - - -	<1	
3 - 4 - -				CLAYEY SAND Light brown, moi	(SC) st, fine sand, some clay				·
5- 6- 7-							-	<1	
8 - 9 - 10 -				SILTY CLAY (CL Light brown, mois) st, clay, firm, low plastic	ity		< 1	
	B-8-		120	7				1	
15 -	15.0			Bottom of boring	15.0 feet			<1	<10
16 土									B-1-89/Modified

PROJECT: KAISEI Oaklan	R d, California		Log of Bo	oring No	. B-9
BORING LOCATION	Behind Mechan	ical building	ELEVATION AND DATUM	1	
DRILLING CONTRAC	TOR Access Soi	l Drilling	DATE STARTED 2/27/90	DATE FINISH 2/27/90	ŧ€D
DRILLING METHOD	3" diameter solic	stem auger	TOTAL DEPTH 15.0'	MEASURING	POINT
DRILLING EQUIPME	NT Minuteman		DEPTH TO FIRST WATER	COMPL.	24 HRS.
SAMPLING METHOD	2.5" OD modifi	ed California	LOGGED BY C.D. Young		L
HAMMER WEIGHT	140 lbs.	DROP 30 inches	RESPONSIBLE PROFES J.D. Gallinatti	SIONAL	REG. NO. CEG1335
(feet) (feet) No. No. Salows/ Salows/ Foot	NAME (USCS Sym	DESCRIPTION rbol): color, moist, % by wt., plast., density, structure, cer	<u> </u>	PID Results	Analytical Results For
OEPT (feet Sample No. Sample Blows/Foot		Surface Elevation:	The second of th	(ppm)	Mineral Spirits (ppm)
1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11-	CLAYEY S. Red-brown, inch diamet	moist, clay, little fine sand, high place. AND (SC) , moist, medium to coarse sand, litter, few clay sand	ttle gravel to 1/2	4 <1	
8-9- 15-0	Bottom of b	oring 15.0 feet		<1	<10
16				1	8-1-89/Modified
	Geoi	matrix Consultants	Project No. 145	9C Fig	ure A-12

PROJECT: KAISER Oakland, California				Log of Boring No. B-10						
BORING I	LOC	ATION	Behind Mechan	nical building	1		ELEVATION A	AND DATUM		
			DATE STARTI 2/27/90							
DRILLING METHOD 2" diameter colid stem surer			TOTAL DEPTI	н	MEASURING	POINT				
DRILLING	3 EQ	UIPME	ENT Minuteman				DEPTH TO WATER	FIRST	COMPL.	24 HRS.
SAMPLIN	IG M	ETHO	D 2.5" OD modifi	ied California	1 .		LOGGED BY C.D. Young		•	
HAMMER	WE	.IGHT	140 lbs.	DROP	30 inches		RESPONSIBL J.D. Gallinat		ONAL	REG. NQ. CEG1335
		PLES	-		DESCRIPTIO				PID Results	Analytical Results For
(feet)	Semp	Foot	NAME (USCS Syr	mbol): color, moist, %	K by wt., plast., density, s Surface Elevation		on, react. w/HCl, geo	o. inter.	(ppm)	Mineral Spirits (ppm)
_	+	+	3" asphalt		SUNSCO CROVAGO	<u></u>				(ppm)
7			CLAY (CH)				44	1		
1-			\		little fine sand,	high plastic	ity, soft	_/		
7			CLAYEY S.		lium to coarse :	little (1+a 1/9	[]		
2			inch diame	ı, moist, medi ter, few clay	IUM (U COarse .	Sano, illie 9	favel to 1/2	-		
4				-				-		
3 -								-		
4			1					14		
4-										
4								14		
5-								11	<1	
		: 1				ing the state of	eres e enserge		~,	
6										
اً										
_]]		
7]]		
								17		
8-	1							11		
†	1							11		1
9-	} '							14		1
1	'		Wet					1-1		1
10 -	'		- "«·					14	<1	
4	1									
11 -			SANDY CL Light brown		, clay, little san	nd, soft, high	plasticity		1	
1	$\frac{1}{1}$		Π'					47	'	
14 -								14]	
- B-10 -15.0		112						14		
15			Bottom of b	oring 15.0 fe	et				<1	<10
16	<u></u>									B-1-89/Modified
			Geor	matrix Consu	ıltants		Proje	ect No. 1459C	Fig	ure A-13

PROJECT: KAISE Oakla	R nd, California	Log of	Bor	ing No.	B-11
BORING LOCATION	Behind Mechanical building	ELEVATION AND D	ATUM		
DRILLING CONTRA	CTOR Access Soil Drilling	DATE STARTED 2/27/90		DATE FINISH 2/27/90	(ED
DRILLING METHO	TOTAL DEPTH		MEASURING	POINT	
DRILLING EQUIPM	ENT Minuteman		RST	COMPL.	24 HRS.
SAMPLING METHO	D 2.5" OD modified California	LOGGED BY C.D. Young			1
HAMMER WEIGHT	140 lbs. DROP 30 inch	RESPONSIBLE PRO	OFESSIO	DNAL	REG. NO. CEG1335
SAMPLES	DESCI	RIPTION	Ţ	PID Results	Analytical Results For
Sample No. Sample Sample Sample No. Sample Sample Sample No. For Fort Sample No. Sample	NAME (USCS Symbol): color, molst, % by wt., plast., density, structure, comentation, react. w/HCl, geo. inter.				Mineral Spirits
	3" asphalt	Elevation:	\dashv	·	(ppm)
1- 2-	CLAYEY SAND (SC) Dark brown, moist, medium sand	d, some clay		<1	
3-	SAND (SP) (FILL) Light brown, moist, medium sand SAND (SP)				
5-	Brown, moist, medium sand, few clay	v coarse sand, trace gravel, trace		<1 <1	
6- - 7- -					
9-	SANDY CLAY (CH)				
13 -	Light brown, moist, clay, little sar	nd, soft, high plasticity		1 <1	
14 - 	SAND (SP) Light brown, moist, fine sand				
15 -15.0	Bottom of boring 15.0 feet			<1	<10
10	Geomatrix Consultants	Project No.	1459C	Fia	B-1-89/Modified UP A-14

PROJECT: KAIS Oakla	ER ınd, California	Log of Bor	ing No.	B-12	
BORING LOCATIO	N Near storm drain basin behind Mechanical building	ELEVATION AND DATUM			
DRILLING CONTR	ACTOR Aqua Science	DATE STARTED 3/1/90	DATE FINISHED 3/1/90		
DRILLING METHO	P Solid stem auger, 6" OD	TOTAL DEPTH	POINT		
DRILLING EQUIPN	IENT B-57	DEPTH TO FIRST	COMPL.	24 HRS.	
SAMPLING METHO	DD 2 1/2" OD California modified	LOGGED BY C.D. Young	<u> </u>	l	
HAMMER WEIGHT	140 lbs. DROP 30"	RESPONSIBLE PROFESSION J.D. Gallinatti	DNAL	REG. NO. CEG1335	
SAMPLES	DESCRIPTION	O.D. Caminati	PID Results	Analytical Results For	
Sample Sample Sample Brows/	NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, cerr Surface Elevation:	entation, react. w/HCt, geo. inter.	(ppm)	Mineral Spirits (ppm)	
1 -	Asphalt 3" CLAYEY SAND Blue-green, moist, medium sand, some clay, s GRAVELLY SAND (SW) Brown, dry, medium and coarse sand, little an clay No hydrocarbon odor	/	50	34	
7- 8- 9- 10- 13- 14-	CLAYEY SAND (SC) Brown, moist, medium and coarse sand, some		2 1 2		
15 - 15.0 20	Bottom of boring 15 feet		1	Heid	
16	Geomatrix Consultants	Project No. 1459C	Fig	8-1-89/Modified ure A-15	

PROJECT: KAISER Oakland,	California	Log of B	orin	g No.	B-13
BORING LOCATION B	ehind cooling tower	ELEVATION AND DAT	UM		
DRILLING CONTRACTO	PR Aqua Science	DATE STARTED 3/1/90		ATE FINISH /1/90	ED
DRILLING METHOD So	olid stem auger, 6" OD	TOTAL DEPTH 15'		EASURING	POINT
DRILLING EQUIPMENT	B-57	DEPTH TO FIRST	- c	OMPL.	24 HRS.
SAMPLING METHOD 2	2 1/2" OD California modified	LOGGED BY C.D. Young			
HAMMER WEIGHT 14	0 lbs. DROP 30"	RESPONSIBLE PROFI	ESSIONA	IL I	REG. NO. CEG1335
SAMPLES (606) No. O.	DESCRIPTION NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, c		PI	ID Results	Analytical Results For
Cfeet, (feet, Sample No. Sample Blows, Foot	Surface Elevation:			(ppm)	Mineral Spirits (ppm)
1- 1- 2- 3- 3- 4- 8-13- 5- 5- 6- -	(no asphalt) GRAVELLY SAND (SW) Brown, moist, medium and coarse sand, littl trace clay, hydrocarbon odor	e angular gravel,		40 6	<10
9-10-	CLAYEY SAND (SC) Brown, moist, medium and coarse sand, sor	ne clay		6	
13 - 14 - - - - - - - - - - - - - - - - - - -	CLAYEY SILT (ML) Light brown, moist, silt, some clay, low plast Bottom of boring 15 feet	icity, soft		5	Held
16	Geomatrix Consultants	Project No. 1	459C	Fig	8-1-89/Modified ure A-16

PROJ	ECT:			R id, California			Log of B	or	ing No.	B-14
BORI	NG LO	CA	TION	Corner of coolin	g tower		ELEVATION AND DAT	JM		
DRILL	ING	CON	ITRAC	CTOR Aqua Scien	ice		DATE STARTED 3/1/90		DATE FINISI 3/1/90	HED
DRILL	ING I	MET	HOD	Solid stem auge	er, 6" OD		TOTAL DEPTH		MEASURING	POINT
DRILL	JNG (QU	IIPME	NT B-57			DEPTH TO FIRST WATER	<u>-</u>	COMPL.	24 HRS.
SAMF	LING	ME	THOD	2 1/2" OD Calif	omia modified		LOGGED BY C.D. Young		<u> </u>	
HAM	/ER V	VEIC	SHT	140 lbs.	DROP 30"		RESPONSIBLE PROFI J.D. Gallinatti	ESSIC	ONAL	REG. NO. CEG1335
DEPTH (feet)		MPL 불		NAME (USCS Syn	DESCRIPTIOn tools: which tooks to the color, moist, % by wt., plast., density,				PID Results	Analytical Results For
₩ ₩	Sample No.	Sample	Blows/ Foot		Surface Elevati				(ppm)	Mineral Spirits (ppm)
1-				(No asphalt SANDY CL Dark blue-g plasticity, se	AY ray, moist, clay, little med	ium sand, n	nedium	1 1	120	
2 - 3 - 4 -				Brown, moi:	' SAND (SW) st, medium and coarse sa nydrocarbon odor	nd, little ang	gular gravel,		40	
5 - 6 - 7 -	B-14- 6.5		37						5	<10
8-				CLAYEY SA			······································	1	8	
9-				Brown, mois	st, medium and coarse sa	nd, some cli	ay L		7 <10 (10 ft)	
13				CLAYEY SI Light brown SILTY SAN	, moist, silt, some clay, lov	w plasticity,	soft		5	
14 -				Light brown	, moist, medium sand, sor	ne silt			3	
16									·	B-1-89/Modified
				Geor	natrix Consultants		Project No. 14	459C	Fig	jure A-17

PRO.	JECT:		AISE aklan	R d, California	Log of	Bor	ing No.	B-15
BORI	NG L	OCA	TION	At base of excavated slope near cooling tower	ELEVATION AND DA	MUTA		
DRIL	ING	CON	NTRAC	CTOR Aqua Science	DATE STARTED 3/1/90		DATE FINISH 3/1/90	IED
DRIL	ING	MET	HOD	Solid stem auger, 6" OD	TOTAL DEPTH		MEASURING	POINT
DRIL	ING	EQU	JIPME	NT B-57	DEPTH TO FIR	ST	COMPL.	24 HRS.
SAME	PLING	ME	THOD	2 1/2" OD California modified	LOGGED BY C.D. Young		.l	
HAM	MER I	WEK	GHT	140 lbs. DROP 30*	RESPONSIBLE PRO J.D. Gallinatti	FESSI	ONAL	REG. NO. CEG1335
<u></u> -		MPL		DESCRIPTION			PID Results	Analytical Results For
DEPTH (feet)	Sample No.	amble	Blows/ Foot	NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, or	ementation, react. w/HCl, geo, inter.		(ppm)	Mineral Spirit
	S	ေ	-	Surface Elevation:	····	- 		(ppm)
-	1			No asphalt SANDY CLAY (CL)		14		
1-		İ		Dark brown with slight blue tinge, moist, clay medium plasticity, soft, strong HC odor	, little medium sand,	-	190	
-				medium plasticity, soit, strong HO odor				
2-	1						160	
_				GRAVELLY SAND (SW)	· · · · · · · · · · · · · · · · · · ·	$\dashv \dashv$		
3 -				Brown, dry, medium and coarse sand, little a clay	ngular gravel, trace		170	
				o.u,				
4 -								
5-							150	
_				ar en en en en en en en en en en en en en	en en en en en en en en en en en en en e			
6-							40	
_								
7-				Trace gravel			40	
_						-		
8-				_		-	40	
_						-		
9-			ļ			$ \cdot $	10	
_						-		
10 -							20	
-								
11 -							20	
- 12								
، د -								
13 -						_		Held
-	B-15- 13.5			CLAYEY SAND (SC)				
14 -								B-1-89/Modified
				Geomatrix Consultants	Project No.	14590	Fig	ure A-18

PROJECT: KAISER Log of Boring No. B-15 cont'd. Oakland, California SAMPLES Analytical DESCRIPTION PID Results Results For Blows/ Mineral Spirits (ppm) NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, cementation, react, wHCl, geo. Inter. (ppm) CLAYEY SAND (SC) Brown, moist, medium and coarse sand, some clay 15-30 16-ATD ▽ <10 5 17-SAND 23 Light brown, wet, medium and coarse sand, few gravel <1 18 Bottom of boring 18.0 feet 191 20 -21 22-23 24 -25: 26 27 28 29

Geomatrix Consultants Project No. 1459C Figure A-19

B-2-89/Modified

PROJECT: KAIS Oaki	SER land, California		Log	of Bor	ing No.	B-16
BORING LOCATION	ON Approximately 1	5' from base of slope	ELEVATION AN	ID DATUM		
DRILLING CONTE	RACTOR Aqua Scien	се	DATE STARTEI 3/1/90	D	DATE FINISH 3/1/90	IED
DRILLING METHO	OD Solid stem auge	er, 6" OD	TOTAL DEPTH 15'		MEASURING	POINT
DRILLING EQUIP	MENT B-57		DEPTH TO WATER	FIRST	COMPL	24 HRS.
SAMPLING METH	OD 2 1/2" OD Calil	ornia modified	LOGGED BY C.D. Young		<u> </u>	-
HAMMER WEIGH	140 lbs.	DROP 30"	RESPONSIBLE J.D. Gallinatti		ONAL I	REG. NO. CEG1335
Samble Sample Sample Blows/		DESCRIPTION nboi): color, moist, % by wt., plast., density, struct	ure, comentation, read, w/HCi, geo.	inter.	PID Results (ppm)	Analytical Results For Mineral Spirits
	···	Surface Elevation:			/bb.ii/	(ppm)
1-) AND (SC) (FILL) , dry, medium sand, some cla	ay	-	150	
2-	SAND (SP) Brown, dry, clay	medium and coarse sand, fe	w angular gravel, trace	e -	90	
3-				-	25	
4-					30	
	27				5	<10
7- 8-					6	
9-	No grave	el			1 7 (10 ft)	
12-	₩ Few clay				2	
13 -	CLAYEY S/ Brown, moi:	AND (SC) st, medium and coarse sand,	some clay	-		
15-	Bottom of b	oring 15 feet			<1	
16						B-1-89/Modified
	Geo	matrix Consultants	Projec	t No. 14590	Fig	ure A-20

PROJ	ECT:			ર d, California			Log	of Bor	ing No.	B-17
BORII	NG LO)CA	TION	Approximately 2	25' from base of s	lope	ELEVATION A	MUTAD DA		
DRILL	ING	CON	TRAC	TOR Aqua Scien	ice		DATE STARTE 3/1/90	D	DATE FINISH 3/1/90	IED
DRILL	ING I	MET	HOD	Solid stem auge	er, 6" OD		TOTAL DEPTH		MEASURING	POINT
DRILL	ING I	ΞQU	IPME	NT B-57			DEPTH TO WATER	FIRST	COMPL.	24 HRS.
SAMP	LING	ME	THOD	2 1/2" OD Cali	fornia modified		LOGGED BY C.D. Young			
HAMN	1ER V	VEIC	SHT	140 lbs.	DROP 30"		RESPONSIBLE J.D. Gallinati		ONAL	REG. NO. CEG1335
DEPTH (feet)	Sample No.	MPL 율	Blows/ Foot	NAME (USCS Syr		ESCRIPTION plast., density, structure, comentar	tion, react. w/HCl, geo.	inter.	PID Results (ppm)	Analytical Results For Mineral Spirits
٥	g z	8	器교		Surf	ace Elevation:			(ppm)	(ppm)
_					AND (SC) (FILL)	nd, dry, little clay, few	, chips brick	-		
1-				SAND (SP)	· · · · · · · · · · · · · · · · · · ·	arse sand, few angul		e -	1	
2-				clay		, 3-		-	2	
3-								-	2	
4-								-	<1	
5-	8-17- 5.5		23	74		at in		-	<1	<10
6-										
7-								-		
8-				Few clay	,			-	2	
9-								-		
12 -				7					4 (10 ft)	
-								-	9	
13 - -								-		
14 - -								-		
15 -				Bottom of b	ooring 15 feet				15	
16-										B-1-89/Modified
				Geo	matrix Consultan	ts	Proje	oct No. 1459	C Fig	jure A-21

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PROJECT: KAISE Oaklan	R d, California	Log of Bo	ring No.	B-18
BORING LOCATION	10' west of B-17	ELEVATION AND DATUM	÷	
DRILLING CONTRAC	CTOR Aqua Science	DATE STARTED 3/1/90	DATE FINISH 3/1/90	
DRILLING METHOD	Solid stem auger, 6" OD	TOTAL DEPTH 15'	MEASURING	
DRILLING EQUIPME	NT B-57	DEPTH TO FIRST WATER	COMPL.	24 HRS.
SAMPLING METHOD	2 1/2" OD California modified	LOGGED BY C.D. Young		
HAMMER WEIGHT	140 lbs. DROP 30"	RESPONSIBLE PROFESS J.D. Gallinatti	IONAL	REG. NO. CEG1335
Samble Sample No. Sample Blows. Foot	DESCRIPTION NAME (USCS Symbol): color, moist, % by wt., plast., density, stru	cture, cementation, react. w/HCl, geo. inter.	PID Results (ppm)	Analytical Results For Mineral Spirits
C	Surface Elevation:		(PP/	(ppm)
	3" asphalt SANDY CLAY (CL) (FILL) Reddish brown, dry, clay, some sand, k	ow plasticity, firm		
1-	SAND (SP)		<1	
2-	Brown, dry, fine grading to medium sand	-	<1	
3-	── Medium sand	-	<1	
	Wiscouri Savia	-		
4-		-	<1	
5-		· . -	<1	
B-18-		-		Held
~	·	-		10.0
7-]-		
8-		-	'	
] -		
9-	7	بالم	L ₁ 1 (10 ft)	
12-		-		
13 -		-	1	
		-		
14 -	Moist, few clay	-		
15	Bottom of boring 15 feet		<1	
16			<u> </u>	B-1-89/Modified
	Geomatrix Consultants	Project No. 1459	C Fig	ure A-22

PRO.	ECT:			R d, California			Log	of Bor	ing No.	B-19
BORI	NG L	OCA	TION	10' west of B-18			ELEVATION A	ND DATUM		
DRILL	ING	CON	TRAC	TOR Aqua Science			DATE START 3/1/90	ED	DATE FINISH 3/1/90	HED
DRILL	.ING	MET	HOD	Solid stem auger, 6" Ol)		TOTAL DEPTI	Н	MEASURING	POINT
DRILL	ING	EQU	IPME	NT B-57			DEPTH TO WATER	FIRST	COMPL.	24 HRS.
SAMF	LING	ME	THOD	2 1/2" OD California m	odified		LOGGED BY C.D. Young			,
HAMN	IER I	VEIC	HT.	140 lbs. DROP	30"		RESPONSIBL J.D. Gallinat		ONAL	REG. NO. CEG1335
E æ	_	MPL • I	$\overline{}$	**************************************	DESCRIPTION		 		PID Results	- Analytical Results For
DEPTH (feet)	Sample No.	Sample	Blows/ Foot	NAME (USCS Symbol): color, (moiel, % by wt., plast., density, str Surface Elevation		tion, react. w/HCI, ged	o. inter.	(ppm)	Mineral Spirits (ppm)
	"			3" asphalt	Surface Elevation	<u>;</u>				(рри)
_				CLAŸEY SAND (S	C) (FILL)			-		
1 -				SAND (SP)					<1	
-				Brown, dry, fine gra	ading to medium san	id		[-		
2-								[-]	<1	
-										
3 -									<1	
-								-		
4 -									<1	
-			ļ							
5-	8-19- 5.5		\dashv						<1	<10
-			29					-		
6 -		-	$\neg \uparrow$							
-								14		<u> </u>
7-										
-		Ì	ŀ	T Few gravel				14		
8~				Y					<1	
-										
9-								14		
ل								1-1		
10 -			ŀ	Moist, trace clay				-		
+				T				-	<1	
11				7					1	
L		7	$\neg \uparrow$	1'				المهم	し1 (12.5 ft)	
14 -								-		
4			ŀ	Few clay				-		
15 -				Bottom of boring 15	 5 feet	· ·			<1	
4				Tomain a worning to						
16	<u>l</u>						·	J <u>l</u>		8-1-89/Modified
				Geomatrix C	onsultants	· - · · · ·	Proje	ct No. 1459C	Fig	ure A-23

PROJECT: KAI	SER land, California		Log of	Bor	ing No.	B-20
BORING LOCATI	ON On grass near	excavation	ELEVATION AND	DATUM		
DRILLING CONT	RACTOR Access Dri	lling	DATE STARTED 3/12/90		DATE FINISH 3/12/90	ÆÐ
DRILLING METH	OD Minuteman		TOTAL DEPTH 25.5'		MEASURING	POINT
DRILLING EQUIF	MENT 3" OD solid s	stem auger	DEPTH TO F	IRST	COMPL.	24 HRS.
SAMPLING METI	10D 2 1/2" OD Cali	fornia modified	LOGGED BY C.D. Young			
HAMMER WEIGH	T 70 lbs.	DROP 30"	RESPONSIBLE PI J.D. Gallinatti	ROFESSIO	ONAL	REG. NO. CEG1335
Sample No.		DESCRIPTION rtbol): color, moist, % by wt., plast., density, strue	sture, comentation, read, wHCl, goo. inter		PID Results	Analytical Results For Mineral Spirits
Sample No.	NAME (USCS Syn	Surface Elevation:			(ppm)	(ppm)
1 2-	SANDY CL Dark gray, soft, no ock	moist, clay, little fine sand, m	edium plasticity, very	-	0	
3-				-		
5 - 6 - 7 - 7 -	SANDY CL Dark brown no odor	AY (CL) n, moist, clay, some fine sand	I, medium plasticity, soft,		0	
8-	<u>Gradationa</u> CLAYEY S Light brown		ne sand, little clay			
11 -	64				0	<10
13	SAND (SP) Light brown	n, dry, medium and fine sand,	trace clay			
14		matrix Consultants		o. 1459E		B-1-89/Modified ure A-24

PROJECT: KAISER Log of Boring No. B-20 cont'd. Oakland, California Analytical SAMPLES Results For PID Results DESCRIPTION Sample No. Sample Blows/ Foot Mineral Spirits (ppm) NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, cementation, react. wHCl, geo. inter. (ррт) 0 15 16-SANDY CLAY (CL) Light brown, dry, clay, some medium and fine sand, low plasticity, firm 17 18 19 0 20: 21 22 Silty 23 -24 Held 25 B-2-66 0 Bottom of boring 25.5 feet 26 27 28 29 30 31 B-2-89/Modified Project No. 1459E Figure A-25 **Geomatrix Consultants**

PROJECT:		R nd, California			Log of	Bor	ing No.	B-21
BORING LO	CATION	On grass near e	excavation		ELEVATION AND I	DATUM		
DRILLING C	ONTRA	CTOR Access Dril	ling		DATE STARTED 3/12/90		DATE FINISH 3/12/90	IED
DRILLING N	METHOD	Minuteman			TOTAL DEPTH 25'		MEASURING	POINT
DRILLING E	QUIPM	ENT 3" OD solid s	tem auger		DEPTH TO FI	RST	COMPL.	24 HRS.
SAMPLING	METHO	D 2 1/2" OD Calif	ornia modified		LOGGED BY C.D. Young		<u> </u>	
HAMMER W	/EIGHT	70 lbs.	DROP 30"		RESPONSIBLE PR	OFESSI	ONAL	REG. NO. CEG1335
CEPTH (feet) Sample No.	Sample Blows Foot	NAME (USCS Sym	DESCRIPTI		·		PID Results	Analytical Results For Mineral Spirits
a g	활동		Surface Eleva	tion:			(ppm)	(ppm)
1 - B-21-2.0 2 - 3 - 4 - 5 - 5 - 6	18	SILTY CLA	gray, moist, clay, some s				18	33
6- 7- 8- 9- 10- 11- 12-		CLAYEY SA	AND (SC) , dry, fine and medium sa	and, some cla	ay :		18	<10
8-21-	56		<u> </u>			_]	J	\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
14		<u> </u>			<u>-</u>			B-1-89/Modified
		Geor	natrix Consultants		Project No	D. 1459E	Fig	ure A-26

PROJECT: KAISER Log of Boring No. B-21 cont'd.

J.D. Gallinatti Oakland, California SAMPLES Analytical Sample Sample Blows, Foot **DESCRIPTION** PID Results Results For Mineral Spirits NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, cementation, react, w/HCl, geo, inter. (ppm) (ppm) SAND (SP) Light brown, dry, medium and fine sand, trace clay 151 16-SANDY CLAY (CL) Light brown, dry, clay, some medium and fine sand, low plasticity, firm 17-18 0 19-0 20 21: 22 Increasing sand 23 24 0 25 Bottom of boring 25.0 feet 26 27 28 29 30 B-2-89/Modified Project No. 1459E Figure A-27 **Geomatrix Consultants**

BORING LOCATION On grass near excavation DRILLING CONTRACTOR Access Drilling DRILLING METHOD Minuteman DRILLING EQUIPMENT 3" OD solid stem auger SAMPLING METHOD 2 1/2" OD California modified HAMMER WEIGHT 70 lbs. DROP 30" SAMPLES SAMPLES SAMPLES SUFface Elevation:	DATE STARTED 3/12/90 TOTAL DEPTH 25' DEPTH TO FIRST WATER LOGGED BY C.D. Young RESPONSIBLE PROFESS J.D. Gallinatti	DATE FINISH 3/12/90 MEASURING COMPL	
DRILLING METHOD Minuteman DRILLING EQUIPMENT 3" OD solid stem auger SAMPLING METHOD 2 1/2" OD California modified HAMMER WEIGHT 70 lbs. DROP 30" SAMPLES DESCRIPTION	3/12/90 TOTAL DEPTH 25' DEPTH TO FIRST WATER LOGGED BY C.D. Young RESPONSIBLE PROFESS	3/12/90 MÉASURING COMPL	POINT
DRILLING EQUIPMENT 3" OD solid stem auger SAMPLING METHOD 2 1/2" OD California modified HAMMER WEIGHT 70 lbs. DROP 30" SAMPLES DESCRIPTION	TOTAL DEPTH 25' DEPTH TO FIRST WATER LOGGED BY C.D. Young RESPONSIBLE PROFESS	MÉASURING COMPL.	
SAMPLING METHOD 2 1/2" OD California modified HAMMER WEIGHT 70 lbs. DROP 30" SAMPLES DESCRIPTION	DEPTH TO FIRST WATER LOGGED BY C.D. Young RESPONSIBLE PROFESS		24 HRS.
HAMMER WEIGHT 70 lbs. DROP 30" SAMPLES DESCRIPTION	LOGGED BY C.D. Young RESPONSIBLE PROFESS	SIONAL	
I SAMPLES DESCRIPTION	RESPONSIBLE PROFESS	SIONAL	
± = UESCRIFICA			REG. NO. CEG1335
	PID Results	Analytical Fleaults For Mineral Spirits	
Surface Elevation:		(ppm)	(ppm)
Dark green-gray, moist, clay, some silt, medium soft SAND Light brown, dry, medium sand, little clay 19 8- 8- 9- 10- 11- 12-	plasticity, very	0	<10
13 -	-		
Geomatrix Consultants	Project No. 1459	1	B-1-89/Modified

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PROJECT: KAISER Log of Boring No. B-22 cont'd. Oakland, California Analytical SAMPLES DESCRIPTION PID Results Results For Blows/ Mineral Spirits (ppm) NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, cementation, react. w/HCl, geo. inter-(ppm) 0 15 49 Held B-22-16.0 16 17 18 SANDY CLAY (CL) Light brown, dry, clay, some medium sand, low plasticity, firm 19-20 0 217 22-23 24 0 **25** Bottom of boring 25.0 feet 26 27 28 29 30 B-2-89/Modified **Geomatrix Consultants** Project No. 1459E Figure A-29

PROJECT: KAISER Oakland, California		Log of	Bor	ing No	. B-23
BORING LOCATION On grass near	excavation	ELEVATION AND DA	ATUM		
DRILLING CONTRACTOR Access Dri	lling	DATE STARTED 3/13/90	•	DATE FINIS 3/13/90	HED
DRILLING METHOD Minuteman		TOTAL DEPTH		MEASURIN	G POINT
DRILLING EQUIPMENT 3" OD solid s	stem auger	DEPTH TO FIR	st	COMPL.	24 HRS.
SAMPLING METHOD 2 1/2" OD Cali		LOGGED BY C.D. Young			.1
HAMMER WEIGHT 70 lbs.	DROP 30"	RESPONSIBLE PRO J.D. Gallinatti	FESSI	ONAL	REG. NO. CEG1335
SAMPLES OE BATT OF STATE OF	DESCRIPTION nbol): color, moist, % by wt., plast., density, structure, cemental			PID Results	Analytical Results For Mineral Spirits
No. Sample Sample Sample Sample Government Cock Sample Sam	Surface Elevation:			(ppm)	(ppm)
	n, moist, clay, some silt, trace coarse s	sand, medium	1		
1 - plasticity, s	oft				
2					
3-				0	
			_	0	
	.AY n, moist, clay, some medium sand, me	dium plasticity,	-		
soft					
B-23- 47	•				
6 - 6.0					
				0	<10
			-		
8 CLAY SAN			$\dashv \dagger$		
9 Light brown	n, dry, medium sand, little clay			•	
10-			.		
			-	0	
11					
			-		
13 -					
<u>, </u>					
14 Geo	matrix Consultants	Project No.	1459E	Fi	B-1-89/Modified gure A-30

PROJECT: KAISER Log of Boring No. B-23 cont'd. Oakland, California SAMPLES Analytical DEPTH (feet)
Sample
No. DESCRIPTION PiD Results Results For Mineral Spirits NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, comentation, react, w/HCl, geo. inter. (ppm) (ppm) 15 0 16 17: Gradational contact SANDY CLAY (CL) 18 Light brown, dry, clay, some medium sand, low plasticity, firm 19-0 20 21 22 23 24 25 Bottom of boring 25.0 feet 26 27 28 29 30 B-2-89/Modified **Geomatrix Consultants** Project No. 1459E Figure A-37

PRO.	JECT:			R d, California		:	Log	of Bo	ori	ng No	o. E	3-24
BORI	NG L	OCA	TION	On grass at top	of excavation behind new fence	ELE	VATION A	ND DATU	М			• "
DRILL	LING	(0)	ITRAC	TOR Access Dril	ling		E STARTE	D		DATE FIN 3/13/90	ISHE	D
DRILL	LING	MET	HOD	Minuteman			AL DEPTH	<u> </u>		MEASURI	NG P	OINT
DRILL	LING	EQL	IIPME	NT 3" OD solid s	tem auger	DEP	TH TO	FIRST		COMPL	12	4 HRS.
				2 1/2" OD Calif		LOG	GED BY Young	<u> </u>		<u> </u>	J	
HAM	MER '	WEI	GHT	70 lbs.	DROP 30"	RES	PONSIBLE D. Gallina	E PROFE	SSIC	NAL		REG. NO. CEG1335
Ŧ.		MP			DESCRIPTION	0.1	. Gannia		T	DID 0		Analytical
DEPTH (feet)	Sample No.	amble	Blows/ Foot	NAME (USCS Syn	fool): color, moist, % by wt., plast., density, structure, cer	mentation, rea	ct. w/HCl, geo.	inler.		PID Resul (ppm)	TES	Results For Mineral Spirits
	is.	Š	60 -	SILTY CLA	Surface Elevation:						_	(ppm)
1- 2- 3- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12-	B-24- 6.0		38	SANDY CL Light brown soft	, moist, clay, some medium sand					0 200 50 50		<10
14 -											8-	1-89/Modified
				Geor	natrix Consultants		Proje	ct No. 14	59E			B A-32

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			NSEI aklan	d, California		Log	g of Bor	ing No.	B-25
BORI	NG L	OCA	TION	Top of excavation	on, southwest corner	ELEVATION	NUTAC DATUM		
DRIL	LING	CON	ITRAC	TOR Access Dril	ling	DATE STAF 3/15/90	RTED	DATE FINISH 3/15/90	I ED
				Minuteman		TOTAL DEF	TH	MEASURING	POINT
				NT 3" OD solid s	tom output	25' DEPTH TO	FIRST	COMPL.	24 HRS.
						WATER LOGGED B	Y		<u></u>
				2 1/2" OD Calif	I	C.D. Youn		ONAI I	REG. NO.
				70 lbs.	DROP 30"	J.D. Galli			CEG133
DEPTH (feet)		MPI 옵		NAME (USCS Swi	DESCRIPTION bol): color, moist, % by wt., plast., density, struc	Silve comentation react w/4Cl	ano inter	PID Results	Analytica Results Fo
7 🛜	E S	Sem	Blows/ Foot	, w and (5555 6)	Surface Elevation:		3 00, mas.	(ppm)	Mineral Spi (ppm)
- 1- -				Dark brown	Y (CL) (FILL) , moist, clay, some silt, little oft, little concrete rubble	medium sand, low			
2 - 3 -			:	SILTY CLA			-	0	
4- 5- 6-				Light blown	, moist, clay, some silt, med	Congression, nem	-	0	
7 - 8 -				SAND (SP) Light brown angular gra	, medium sand, some coarsevel	e sand, some clay, I	ittle -	0	
9 - - 10 -	B-25- 10.5		59	Little clay			-	0	<10
11 - - 12 -							-		
- 13 - -								0	
14 -		1		······································					B-1-89/Modified
				Geor	natrix Consultants	Pr	oject No. 1459E	Fig	ure A-34

PROJECT: KAISER Log of Boring No. B-25 cont'd. Oakland, California Analytical SAMPLES Sample Sample Sample Sample Foot Results For DESCRIPTION PID Results Mineral Spirits (ppm) NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, cementation, react. w/HCl, geo. inter. (ppm) 0 15-Some clay 16-17 0 18-SANDY CLAY Light brown, dry, clay, some medium sand, low plasticity, firm 19-0 20 21 22-23 24-0 25 Bottom of boring 25 feet 26-27 28 29 30 -31 B-2-89/Modified Figure A-35 Project No. 1459E **Geomatrix Consultants**

	(AISER Dakland	, California		Lo	g of Bor	ing No.	B-26
BORING LOC	ATION	East of water tank at t	top of retaining wall	ELEVATIO	N AND DATUM		
DRILLING CO	NTRACT	OR Access Drilling		DATE STA 3/15/90	RTED	DATE FINISH 3/15/90	(E D
DRILLING ME	THOD N	linuteman		TOTAL DE 23.5'	PTH	MEASURING	POINT
DRILLING EC	UIPMEN'	T 3" OD solid stem a	uger	DEPTH TO			24 HRS.
		2 1/2" OD California		LOGGED I		23.0	· · · · · · · · · · · · · · · · · · ·
HAMMER WE			P 30"		IBLE PROFESSI	ONAL	REG. NO.
CAM			DESCRIPTION	J.D. Gal	linatti	<u>. </u>	CEG1335 Analytical
(feet)	Blows/ Foot	NAME (USCS Symbol): colo	r, moist, % by wt., plast., density, struc	ture, comentation, read. w/HC	, geo. inter.	PID Results (ppm)	Results For Mineral Spirits
3 8 8	Ē L	SANDY CLAY (C	Surface Elevation:			(PP***)	(ppm)
1- 2- 3- 4- 5- 8- 6- 7- 8- 9- 10- 11- 12- 13-	29 59	GRAVELLY SAN	medium and coarse sa			<1 2 0 1 0	<10
_							
14				*******			B-1-89/Modified

PROJECT: KAISER Log of Boring No. B-26 cont'd. Oakland, California SAMPLES Analytical DESCRIPTION PID Results Results For Mineral Spirits (ppm) NAME (USCS Symbol); color, moist, % by wt., plast., density, structure, cementation, react, w/HCl, geo. inter. (ppm) Gradational contact CLAYEY SAND (SC) Light brown, dry, medium and fine sand, some clay 15 <1 16 17 1 Little clay 18 19 20 Some clay 0 21 Trace clay 22-Very moist 0 . # " " " ∇ 23 B-26-23.5 <10 Wet 55 Bottom of boring 23.5 feet 24 25~ 26 27 28 29 30 -B-2-89/Modified **Geomatrix Consultants** Project No. 1459E Figure A-37

PROJECT: KAIS Oakla	ER nd, California		Log of Bor	ing No.	B-27
BORING LOCATIO	N West of Mechanical building		ELEVATION AND DATUM		
DRILLING CONTRA	ACTOR Access Drilling		DATE STARTED 3/15/90	DATE FINISH 3/15/90	ED
DRILLING METHO	Minuteman		TOTAL DEPTH	MEASURING POINT	
DRILLING EQUIPM	ENT 3" OD solid stem auger		DEPTH TO FIRST WATER	COMPL.	24 HRS.
SAMPLING METHO	D 2 1/2" OD California modified		LOGGED BY C.D. Young		
HAMMER WEIGHT	70 lbs. DROP 30"'		RESPONSIBLE PROFESSION J.D. Gallinatti	ONAL	REG. NO. CEG1335
Samble Sample Sa	NAME (USCS Symbol): color, molst, % by	DESCRIPTION wt., plast., density, structure, comertati	on, react. w/HCl, geo. inter.	PiD Results (ppm)	Analysical Results Feb Mineral Spirits
		Surface Elevation:		(bb)	(gg)m)
1 2-	* 3" asphalt SAND (SP) Light brown, dry, medium gravel, trace clay	sand, little coarse sand	and subangular -	2	
3-				1	
5-				0	
6- 7- 8-	SANDY CLAY (CL) Light brown, moist, clay, s plasticity, firm	ome medium and fine s	and, low		
9-				0	
13 -	CLAYEY SAND (SC) Light brown, moist, mediu	m sand, little clay		(12.5 ft)	
15 -	Bottom of boring 15 feet			0	,
16	Geomatrix Consults	ants	Project No. 1459E		8-1-89/Modified IFB A-38

PROJECT: KAISE Oaklai	R nd, California		Log	of Bor	ing No.	B-28
BORING LOCATION	West of Mechar	nical building near paint shed	ELEVATION AND DATUM			
DRILLING CONTRA	CTOR Access Drill	ing	DATE STARTS 3/16/90	DATE STARTED DATE 3/16/90 3/16/		
DRILLING METHOD	Minuteman		TOTAL DEPTH	1	MEASURING	POINT
DRILLING EQUIPME	ENT 3" OD solid st	em auger	DEPTH TO WATER	FIRST	COMPL.	24 HRS.
SAMPLING METHO	D 2 1/2" OD Calife	ornia modified	LOGGED BY C.D. Young		·····	
HAMMER WEIGHT	70 lbs.	DROP 30"'	RESPONSIBL J.D. Gallina		ONAL	REG. NO. CEG1335
Samble Sample Blows/ Foot	NAME (USCS Syn	DESCRIPTION bol): color, moist, % by wt., plast., density, structure, or			PID Results	Analytical Results For Mineral Spirits
B S R S S S		Surface Elevation:		·	(ppm)	(ppm)
1- 1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11-	CLAYEY SA Light brown	, moist, clay, some medium sand		ty,	0 4 3 3 (12.0 ft) 0	
-				1		
16	·	- · · · ·				B-1-89/Modified

.

PROJECT:			२ d, California			Log	of Bor	ing No.	B-29
BORING LO	CAT	ION	W. of Mechanic	al building near W.	end of paint shed	ELEVATION A	MUTAG GM		
DRILLING (CONT	RAC	TOR Access Drill	ing		DATE START 3/16/90	ED	DATE FINISH 3/16/90	IE D
DRILLING I	METH	OD	Minuteman			TOTAL DEPTI	Н	MEASURING	POINT
DRILLING E	QUIF	MEI	NT 3" OD solid st	em auger		DEPTH TO WATER	FIRST	COMPL.	24 HRS.
SAMPLING	MET	HOD	2 1/2" OD Califo	ornia modified		LOGGED BY C.D. Young	<u> </u>		
HAMMER V	VEIGH	1T 7	'0 lbs.s.	DROP 30"'		RESPONSIBL J.D. Gallina		ONAL	REG. NO. CEG1335
1 de 1	MPLE	_		DES	CRIPTION	U.D. Gainne	4111	PID Results	Analytical Results For
DEPTH (feet) Sample of	Sample	F00	NAME (USCS Syn	sbol): color, moist, % by wt., plas		on, react. w/HCl, gec	o. inter.	(ppm)	Mineral Spirits
"	0, -		CI AVEV S	· · · · · · · · · · · · · · · · · · ·	Elevation:				(ppm)
-		ĺ	CLAYEY S. Light brown	אואט (SC) ו, dry, fine sand, little	e clav		-		
1-			3	, = , ,	· • • • • • • • • • • • • • • • • • • •		-		
2-		H						0	
			SANDY CL	AY (CL) , dry, clay, some fin	a cand low plactic	eity fizm			
3-			Light blown	, cry, clay, some im	e saild, low plastic	my, min		<i>*</i>	
								0	
4-								U	
│ _╶ ┪ │							~		
5-							~		
							-		
6-							-	0	
							-		
7-		ŀ	CLAYEY SA	AND (SC)				. *	
			Light brown	, dry, fine sand, little	e clay, top 1 foot re	eddish brown	٦ -		
8-		ł					4	0	
								,	
9-					•				
10 -							.]	0	
,		<u>_</u> 	7				ليلل	1 0 (12.0 ft)	
13 -			' -				7]	1 0 (12.0 11)	
``			Sama ala	n.c					
14 -			Some cla	ıy]]	0	
'*		ſ	WIOIST					U	
[]			•				1	_	
15 -		ľ	Bottom of b	oring 15 feet	٠,			0	
16 —			······································			· · · · · · · · · · · · · · · · · · ·			B-1-89/Modified
			Geo	matrix Consultants		Proje	ect No. 1459E	Fig	ure A-40

PROJECT: KAI		California				Log	of Bo	ori	ing No.	B-30
BORING LOCAT		of Mechanical sement excava		comer of pr	posed	ELEVATION AND DATUM				
DRILLING CONT						DATE STARTED 3/16/90			DATE FINISHED 3/16/90	
DRILLING METH	IOD Mini	uteman				TOTAL DEPT	Н	MEASURING POIN		POINT
DRILLING EQUI	PMENT 3	3" OD solid st	em auger		-	DEPTH TO WATER	FIRST		COMPL.	24 HRS.
SAMPLING MET	HOD 2 1	1/2" OD Califo	xnia modifie	d		LOGGED BY C.D. Young	<u> </u>		<u> </u>	
HAMMER WEIG	HT 70 lb	bs.	DROP 30"'			RESPONSIBL J.D. Gallina		SSK	ONAL	REG. NO. CEG1335
E SAMPLE				DESCRIPT	ION .	0.D. <u>0.0</u> ,			PID Results	Analytical Results For
Sample Sa	2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	NAME (USCS Sym	bol); color, moist, %		ly, structure, comentati	on, react. w/HCl, ge	o, inter.	_	(ppm)	Mineral Spirits (ppm)
		SAND (SP)		Surface Eleva	and, few clay					(plan)
1-		Light blown	, ury, meului	III AIRO IRIG S	atiu, i c w ciay]		
4										
2-								$ \cdot $	0	
-								$\mid \dashv$		
3-								$ \cdot $		
1								$\mid \dashv$		
4 -							:	$\mid \dashv$	0	
1								$ \uparrow $		
5-										
					٠				0	
6								$[\]$	0	
7-								$[\]$		
<u> </u>		CLAYEY SA		dium and fin	e sand, some	olov				
8-		neddish bid	wii, dry, mei	JIOH ARO III	ie sanu, some	ciay		$ \downarrow $	0	·
4								┨┨		
9-										
-								$ \cdot $		
10							- f:		0	
4-1-	-TI'		·				ا ا	1	0 (12.0 ft)	
13 -										
								$ \cdot $	_	
14 -]-	Less clay	/						0	
, 1		·							. 0	
15		Bottom of b	oring 15 feet						· U	
16				····						
10		Geo	matrix Consu	Itlants		Proi	ect No. 14	159E	Fig	B-1-89/Modified jure A-41

BORING LOCATION W. of Mechanical building - north side of proposed		9	B-31
basement excavation	ELEVATION AND DATUM		
DRILLING CONTRACTOR Access Drilling	DATE STARTED 3/16/90	0ATE FINISH 3/16/90	€D
DRILLING METHOD Minuteman	TOTAL DEPTH	MEASURING	POINT
DRILLING EQUIPMENT 3" OD solid stem auger	DEPTH TO FIRST	COMPL	24 HRS.
SAMPLING METHOD 2 1/2" OD California modified	LOGGED BY		
HAMMER WEIGHT 70 lbs.s. DROP 30"'	C.D. Young RESPONSIBLE PROFESSI	ONAL	REG. NO. CEG1335
L CAMPLEC :	J.D. Gallinatti		Analytical
DESCRIPTION NAME (USCS Symbol): color, moist, % by wt., plast., density, structure, comental Surface Elevation:	ion, react. w/I-ICI, geo: inter.	PID Results (ppm)	Results For Mineral Spirits
Surface Elevation:	· 1	(PP-17)	(ppm)
SAND (SP) Light brown, dry, medium and fine sand, few clay	, –		
	- - -	0	
3-	-		
4 -		0	
Trace clay		0	
CLAYEY SAND (SC) Light brown, dry, medium and fine sand, some cla	ay -	. 0	
10 -		0 1 ⁷ 0 (12.0 ft)	
SANDY CLAY (CL) Light brown, moist, clay, some fine sand, low plas	sticity, firm		
Bottom of boring 15 feet		0	
16	Project No. 14598		B-1-89/Modified ure A-42

PROJECT:		ER and, California			Log of B	or	ing No.	B-32
BORING L	OCATIC	N Top of excavati	on by residential propert	у	ELEVATION AND DAT	UM		
DRILLING	CONTR	ACTOR Access Dril	ling		DATE STARTED 3/16/90		DATE FINISH 3/16/90	IED
DRILLING	METHO	P Minuteman		:	TOTAL DEPTH		MEASURING	POINT
DRILLING	EQUIPA	MENT 3" OD solid s	tem auger	· · · · ·	DEPTH TO FIRST	-	COMPL.	24 HRS.
SAMPLING	METH	DD 2 1/2" OD Calif	omia modified		LOGGED BY C.D. Young			
HAMMER V	WEIGHT	70 lbs.	DROP 30"'		RESPONSIBLE PROF	ESSK	ONAL !	REG. NO. CEG1335
- ~ —	MPLES		DESCRIPT				PID Results	Analytical Results For
Cfeet) Sample No.	Sample Blows/	NAME (USCS Sy	mboh: color, moist, % by wt., plast., densi Surface Eleva		on, react. w/HCl, geo. inter.		(ppm)	Mineral Spirit (ppm)
1-		SILTY CLA Dark gray,	Y (CL) moist, clay, little silt, med	lium plasticity,	, soft		1	
3-4-						-	0	
5 - 6 - 7 -		SANDY CL Light brown	AY (CL) , moist, clay, some fine s	and, low plast	ticity, firm		0	
8-		Increasir	ng sand	(Gradational contact	- - -	0	
9-		CLAYEY SA Light brown	AND (SC) , dry, medium and fine sa			1	0 ¹ 0 (11.5 ft)	
13 - 14 -		} 						
15 -		Bottom of b	oring 15 feet			-	0	
		Gen	matrix Consultants		Project No. 14	SOF		B-1-89/Modified Ire A-43



APPENDIX B

FIELD METHODS

B.1 Photoionization Detector Quality Assurance

The photoionization detector (PID) was calibrated daily at the onset of this project and weekly after 2 March 1990 with an 80 parts per million isobutylene calibration gas. The PID was adjusted as necessary. The PID was zeroed each morning after a short warm-up period and was rechecked after each sample reading. The PID returned to zero after being allowed sufficient time to purge and did not require re-zeroing during use.

B.2 Excavation No. 1 - Monitoring and Soil Sampling

Excavation near the mechanical building was initiated on 12 February 1990. Excavated soils were screened with a PID for volatile organic compounds (VOCs) as soil was excavated. Soil in the backhoe bucket was screened by scraping away a few inches of soil and immediately bringing the PID probe within 1/4 inch of the soil. Soil affected by mineral spirits were stockpiled and later disposed of by Kaiser at a Class I facility. By midday on 13 February, the extent of detectable mineral spirits in the soil was identified to the north, west, and southwest. Five soil samples were collected from the sides and base of the excavation to confirm the absence of mineral spirits in these areas (Figure 2). Soil samples were collected by driving a clean brass liner into the soil with a hammer sampler, then covering the liner ends with aluminum foil, a plastic cap, and PVC tape. The soil samples were immediately placed on ice, and delivered to BC Analytical at the end of the day under chain-of-custody procedures. At the eastern limit of the excavation at the edge of the mechanical building VOCs were detected. A 12-foot-long horizontal boring was drilled with a hand auger five feet beneath the building to evaluate the lateral extent of affected soils beneath the mechanical building. Because of building stability concerns, the excavation of soil containing mineral spirits was not completed vertically just west of the mechanical building or at the southwest corner of the building beneath the PG&E red concrete-cased utility line.



Shoring for the west side of the mechanical building and soil excavation for the basement area was completed by 25 April 1990. One sample from the floor of the excavation just west of the mechanical building was collected by Geomatrix at this time and delivered to BC Analytical for mineral spirits analysis.

B.3 Soil Borings in Mechanical Building

Between 27 February and 2 March 1990, six soil borings were drilled inside the mechanical building (MB-1 through MB-6). These borings were drilled with a hand auger to depths of 13.0 to 18.5 feet by Kaiser Construction Services personnel under supervision of a Geomatrix geologist. The boring logs are presented in Appendix B. Soil samples were collected in plastic bags from the hand auger approximately every 2.5 feet and were screened with the PID for VOCs. Approximately one undisturbed soil sample per boring was collected in a clean brass liner directly from the hand auger. The undisturbed samples were covered with aluminum foil, capped, taped, placed on ice, and delivered to BC Analytical for chemical analysis. All soil borings were backfilled with cement grout.

B.4 Soil Borings Beside Mechanical Building

Under supervision of a Geomatrix geologist, 13 borings were drilled around the east and north perimeter of the mechanical building between 27 February and 1 March 1990, as shown on Figure 2. Borings B-8 through B-11 were drilled by Access Drilling of San Jose using a portable Minuteman drill rig fitted with 3-inch-diameter solid-stem augers. Borings B-12 through B-19 were drilled by Aqua Science Engineers using a B-57 truck-mounted drill rig equipped with 6-inch-diameter solid-stem augers. Soil samples were collected in plastic bags from the cuttings approximately every 2.5 feet and were screened for VOCs with the PID. Approximately one to two undisturbed soil samples were collected from each boring using a 2.5-inch outter diameter (O.D.), modified California split-spoon sampler lined with clean brass liners, driven by a 140-lb hammer falling 30 inches. The undisturbed soil samples were handled and preserved as described in Section B.3 and delivered to BC



Analytical under chain-of-custody procedures at the end of each day. The boring logs are presented in Appendix A.

Five borings were drilled along the north side of Excavation # 1 to a depth of approximately 15 feet to confirm the absence of mineral spirits in this area. The borings were drilled on 16 March 1990 using a portable Minuteman drill rig fitted with 3-inch-diameter solid-stem augers. Soil samples were collected in plastic bags approximately every 2.5 feet and screened with the PID for VOCs. No confirmation soil samples were acquired in this area for laboratory analysis.

3.6 Soil Borings on Hillside Area

Between 12 and 16 March 1990, eight borings were drilled in the hillside area at the top of Excavation # 2, as shown on Figure 2. Under supervision of a Geomatrix geologist, borings B-20 through B-26 and B-32 were drilled by Access Drilling of San Jose using a portable Minuteman drill rig as described in Section 4.0. Soil samples were collected in plastic bags from the cuttings approximately every 2.5 feet and were screened using the PID for VOCs. Approximately one to two undisturbed soil samples were collected from each boring for laboratory analysis using a 2.5-inch O.D., modified California split-spoon sampler lined with clean brass liners, driven by a 140-lb hammer falling 30 inches. The undisturbed soil samples were preserved as described above (Section B.3) and delivered to BC Analytical under chain-of-custody procedures at the end of each day. The boring logs are presented in Appendix A.



APPENDIX C
Analytical Laboratory Reports and Chain-of Custody Records

Analytical Report

LOG NO: E90-02-369

Received: 12 FEB 90 Reported: 15 FEB 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459C

Page 1

LOG NO	SAMPLE	DESCRIPTION,	SOIL	SAMPL	ES			DATE S	SAMPL	ED
02-369-1 02-369-2 02-369-3 02-369-4 02-369-5	E-1 E-2 E-3 E-4 E-5							12 12 12	FEB FEB FEB FEB	90 90 90
PARAMETER			02-3	369-1	02-369-2	02-369-3	02-369-	4 02	2-369	9-5

REPORT OF ANALYTICAL RESULTS

TPH and BTEX - Modified 8015					
Date Analyzed	02.13.90	02.13.90	02.13.90	02.13.90	02.13.90
Dilution Factor, Times	1	1	1	1	1
Benzene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Ethylbenzene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Total Xylene Isomers, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Total Fuel Hydrocarbons, mg/kg	<10	<10	<10	<10	<10
Other TPH and BTEX - Modified 8	3015				

Sim D. Lessley, Ph.D., Laboratory Director



BROWN AND CALDWELL ANALYTICAL LABORATORIES

BATCH QC REPORT Definitions and Terms

Accuracy:

The ability of a procedure to determine the "true" concentration of an

analyte.

Batch:

A group of samples analyzed sequentially using the same calibration curve,

reagents, and instrument.

Laboratory Control Standard (LCS):

Laboratory reagent water spiked with known compounds and subjected to the same procedures as the samples. The LCS thus indicates the accuracy of the analytical method and, because it is prepared from a different source than the standard used to calibrate the instrument, it also serves to double-

check the calibration.

LC Result:

Laboratory result of an LCS analysis.

LT Result:

Expected result, or true value, of the LCS analysis.

Matrix QC:

Quality control tests performed on actual client samples. For most inorganic analyses, the laboratory uses a pair of duplicate samples and a spiked sample. For most organic analyses, the laboratory uses a pair of spiked samples (duplicate spikes).

Percent Recovery:

The percentage of analyte recovered.

For LCS, the percent recovery calculation is

LC + LT x 100.

For spike recoveries, the percent recovery calculatiion is

(S Bar - Sample Concentration) x 100

Spike Amount

Precision:

The reproducibility of a procedure demonstrated by the agreement between analyses performed on either duplicates of the same sample or a pair of duplicate spikes.

R1, R2 Result:

Result of the analysis of replicate aliquots of a sample, with R1 indicating the first analysis of the sample and R2 its corresponding duplicate; used to determine precision.

Relative Percent Difference (RPD):

Calculated using one of the following:

 $\frac{(R1 - R2) \times 100}{(R1 + R2) \div 2}$

 $\frac{(S1 - S2) \times 100}{(S1 + S2) \div 2}$

S Bar Result:

The average of spike analysis results.

S1, S2 Result:

Result of the analysis of replicate spiked aliquots, with S1 indicating one spike of the sample and S2 the second spike; used to determine precision and accuracy.

True value:

The theoretical, or expected, result of a spike sample analysis.

BC ANALYTICAL

BATCH QC REPORT ORDER E9002369

DATE REPORTED : 02/22/90

Page 1

MATRIX QC PRECISION (DUPLICATE SPIKES)

02.13.90	41 2	1 30 24	1 Times 45 mg/kg	0

BC ANALYTICAL

BATCH QC REPORT ORDER E9002369

DATE REPORTED : 02/22/90

Page 1

MATRIX QC ACCURACY (SPIKES)

DATE	BATCH	SBAR	TRUE	UNIT	PERCENT
ANALYZED	NUMBER	RESULT	VALUE		RECOVERY
02.13.90	41	237.5	250	mg/kg	95

BC ANALYTICAL

BATCH QC REPORT ORDER E9002369

DATE REPORTED : 02/22/90

Page 1

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

	DATE	BATCH	BLANK		
PARAMETER	ANALYZED	NUMBER	RESULT	RDL	UNIT
TPH and BTEX - Modified 8015					
Date Analyzed	02.13.90	41	02.13.90	NA	Date
_ Dilution Factor	02.13.90	41	1	NA	Times
Benzene	02.13.90	41	0	NA	mg/L
Ethylbenzene	02.13.90	41	0	NA	mg/L
Toluene	02.13.90	41	0	NA	mg/L
Total Xylene Isomers	02.13.90	41	0	NA	mg/L
Total Fuel Hydrocarbons	02.13.90	41	0.088	NA	mg/L

: ORDER PLACED FOR CLIENT: Geomatrix Consultants 9002369 :

: BC ANALYTICAL : EMVL LAB : 10:08:45 22 FEB 1990 - P. 1 :

SAMPLES... SAMPLE DESCRIPTION.. DETERM CODE.... DATE.... METHOD...... EQUIP. ID.NO ANALYZED 9002369*1 E-1 FUEL. TOT. BTEX 02.13.90 8015 516-08 7194 9002369*2 E-2 516-08 7194 FUEL. TOT. BTEX 02.13.90 8015 9002369*3 E-3 FUEL. TOT. BTEX 02.13.90 8015 516-08 7194 9002369*4 E-4 FUEL.TOT.BTEX 02.13.90 8015 516-08 7194 9002369*5 E-5 516-08 7194 FUEL.TOT.BTEX 02.13.90 8015

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

m	o S S	SEOMAT NE MARKET PEAR STRE AN FRANCI:	PLAZA ET TOW SCO. CA	ER SUITE	717		ITS	S						,	,		Cu	stody Record
DD0 1			1		_				A A I				4	1	110			PAGE OF
PROJ	ECT N	59C			-			-	NA	AL	YS	ES		1				
					1	METALS						NS						REMARKS
SAMP	LERS:	(SIGNATUR	E)			MET						RBO					ERS	(SAMPLE PRESERVATION,
E	2izal	befor 16	lau	<u>`</u>	MINERAL	POLLUTANT	DD 624	00 625	109 00	3D 602		HYDROCARBON					CONTAINERS	HANDLING PROCEDURES, OBSERVATIONS, ETC.)
DATE	TIME		MPLE		GENERAL	PRIORITY P	EPA METHOD	EPA METHOD	EPA METHOD	EPA METHOD	EPA METHOD	PETROLEUM	BIEX				NUMBER OF	FUEL TOT Brex
2/12	1310	E-(XX				1	4.1 . 5
1	1340	E-2											X_{X}				1	24 mins
	1415	E-3											$\times \times$	4			1	turnaround
242	1445	E-4 E-5			-			-					$\langle \chi \rangle$	1	H		1	24 nour turnaround * modefied 8015,
#12	1500	E 5					-	-					XX	-	H		1	Melecton 245,
														+				limit for
														1	11			
																		Muneral (0)
		_								1	4			-				Spirits 10 ppm
					-			-	4	-	-	-	-	-	H			* leketion
				1			1	4	-	-	+	-	+	-	H			BTEX 0.3 ppm or lower if
											1	1	+	+	H			BIEX 0.3 ppm
				/			7	1							\forall			a lower if
			/						7									possible
		/												L	\sqcup			Young questions to Chehean Ho
					H		-	-	-	-	-	1	1	-	H			Young
					H		+	+	+	+	-	-	+	P	H	-		questions to
/								+	1	1	1	1	+	-	H	Y		Chehean Ho
											TO	ATC	LN	IUN	1BEI	R	5	
RELINO	UISHED	BY:	DATE	RECEIVE	DI	BY:			/	1	RE	LII	NOUIS	HE	DA	3Y:		DATE RECEIVED BY: (LAB)
SIGNATI	IRE		-	SIGNATUR	2F	1	_	/		+	SIG	NAT	FURE					THE BLAZ
J. J. H. H.	/		TIME	3.0.12.101	/	/				1	E	12	ab	th	K	ai	nes	TIME PRINTED NAME
PRINTE	NAME		TIME	PRINTED		ME					PRI	NTE	ED NA	ME				635 Monika Scott
	UISHED	BY:	DATE	RECEIVE		3Y :				METHOD OF SHIPMENT: Hand delivery								
0101117	105	/	1						LABORATORY COMMENTS / OBSERVATIONS									
SIGNATU	JKE /			SIGNATUR	E					Log # E9002369				2369				
	NAME		TIME	PRINTED	NAI	ME				1			l					
POMPAN	Y			COMPANY		-	1			-								

LOG NO: E90-02-842

Received: 27 FEB 90 Reported: 28 FEB 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459C

REPORT	OF	AMAT	YTTCAL.	RESULTS
WELL OUT	OI.	ULIVE	TUTTUT	THOULTS

Page 1

LOG NO SAMPLE DESCRIPTION,	SOIL SAMPI	LES		DA	ATE SAMPLED
02-842-1 B-8-15.0 02-842-2 B-9-15.0 02-842-3 B-10-15.0 02-842-4 B-11-15.0 02-842-5 MB-1-18.5					27 FEB 90 27 FEB 90 27 FEB 90 27 FEB 90 27 FEB 90
PARAMETER	02-842-1	02-842-2	02-842-3	02-842-4	02-842-5
TPH and BTEX - Modified 8015					
Date Analyzed	02.27.90	02.27.90	02.27.90	02.27.90	02.27.90
Dilution Factor, Times	1	1	1	1	1
Benzene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Ethylbenzene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Total Xylene Isomers, mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
Total Fuel Hydrocarbons, mg/kg	<10	<10	<10	<10	<10
Other TPH and BTEX - Modified	8015				

Sim D. Lessley, Ph.D., Laboratory Director



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	(415) 957-95	57									_	27	19t	>	PAGEOF
	T NO. 459 C RS:(signatur	RE)			METALS		AN	AL			BTXE	T	Π	SS	REMARKS (SAMPLE PRESERVATION,
	heir (MINERAL	POLLUTANT	HOD 625	METHOD 601	THOD 602	METHOD 608	PETROLEUM HYDROCARBONS	Mariel Spints, F			OF CONTAINERS	HANDLING PROCEDURES, OBSERVATIONS, ETC.)
DATE TII		AMPLE JMBER		GENERAL	PRIORITY			EPA MET	EPA MET	PETROLE	Mins			NUMBER	
3:0	05 B-10 07 B-11	- 15.0 1- 15.0 1- 15.0 1- 18.5 1- 18.5	5								XXXX				Soil samples Cooled to 4°C *24- how furnaround Pesuets to Chew young Field fax #594- 4832
	IED DV	IDATE LOS							01	F (CON	ΓΑΙ	BER	5	
PRINTED NO COMPANY RELINQUIS	HED BY:	TIME PRIN	NATURE NTED I	NAM D B'	E Y:		(PRI	MPA THO	TURE FL ED N DWI NY	AME OF	SHIP	MENT	DATE RECEIVED BY: (LAB) 2/27 SIGNATURE TIME PRINTED NAME 5:02 BCAC LABORATORY S/OBSERVATIONS

LOG NO: E90-02-895

Received: 28 FEB 90 Reported: 15 MAR 90

3/20/90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459C

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Page 1

02-895-1 MB-2-10.0 28 FEB 90 02-895-2 MB-2-15.0 28 FEB 90 02-895-3 MB-2-18.0 28 FEB 90 02-895-4 MB-3-10.0 28 FEB 90 02-895-5 MB-4-10.0 28 FEB 90 PARAMETER 02-895-1 02-895-2 02-895-3 02-895-4 02-895-5 Sample Held, Not Analyzed HELD TPH-Volatile Hydrocarbons/BTEX Date Analyzed 02.28.90 02.28.90 02.28.90 02.28.90 Dilution Factor, Times 1 1 1 1 Benzene, mg/kg <0.3 <0.3 <0.3 <0.3 Ethylbenzene, mg/kg <0.3 <0.3 <0.3 <0.3 Total Xylene Isomers, mg/kg <0.3 <0.3 <0.3 <0.3 C4 to C12 Hydrocarbons, mg/kg <0.0 <10 <10 <10 Fuel Characterization, .	LOG NO SAMPLE DESCRIPTION,	SOIL SAMPLE	3S		D	ATE SAMPLED
Sample Held, Not Analyzed HELD TPH-Volatile Hydrocarbons/BTEX 02.28.90 02.28.90	02-895-2 MB-2-15.0 02-895-3 MB-2-18.0 02-895-4 MB-3-10.0					28 FEB 90 28 FEB 90 28 FEB 90
TPH-Volatile Hydrocarbons/BTEX Date Analyzed 02.28.90 02.28.90 02.28.90 02.28.90 Dilution Factor, Times 1 1 1 1 Benzene, mg/kg <0.3 <0.3 <0.3 <0.3 Ethylbenzene, mg/kg <0.3 <0.3 <0.3 <0.3 Toluene, mg/kg <0.3 <0.3 <0.3 <0.3 Total Xylene Isomers, mg/kg <0.3 <0.3 <0.3 <0.3 C4 to C12 Hydrocarbons, mg/kg <10 <10 <10 <10 <10	PARAMETER	02-895-1	02-895-2	02-895-3	02-895-4	02-895-5
Date Analyzed 02.28.90 02.28.90 02.28.90 02.28.90 Dilution Factor, Times 1 1 1 1 Benzene, mg/kg <0.3			HELD		11 h +-	
Dilution Factor, Times 1 1 1 1 1 1		02.28.90		02.28.90	02.28.90	02.28.90
Benzene, mg/kg		1		1	1	1
Ethylbenzene, mg/kg		<0.3		<0.3	<0.3	<0.3
Toluene, mg/kg		<0.3		<0.3	<0.3	<0.3
Total Xylene Isomers, mg/kg		<0.3		<0.3	<0.3	<0.3
C4 to C12 Hydrocarbons, mg/kg <10 <10 <10 <10		<0.3		<0.3	<0.3	
		<10		<10	<10	<10



LOG NO: E90-02-895

Received: 28 FEB 90 Reported: 15 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459C

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO SAMPLE DESCRIPTION, SOIL SAMPLES		DATE SAMPLED
02-895-6 H-3		28 FEB 90
PARAMETER	02-895-6	
TPH-Volatile Hydrocarbons/BTEX Date Analyzed Dilution Factor, Times Benzene, mg/kg Ethylbenzene, mg/kg Toluene, mg/kg Total Xylene Isomers, mg/kg C4 to C12 Hydrocarbons, mg/kg Fuel Characterization, .	02.28.90 50 <5 <5 <5 120 1500 MIN.SPIRIT	

This report was revised to correct previously reported detection limits. C. Ho 3/20/90

This Fuel characterization is a qualitative identification based upon a visual comparison of sample chromatograms with those from authentic standards.

Sim D. Lessley, Ph.D., Vaboratory Director



LOG NO: E90-03-041

Received: 01 MAR 90 Reported: 02 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459C

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO SAMPLE DESCRIPTION	, SOIL SAMPI	ES		. D	ATE SAMPLED
03-041-1 B-12-5.0 03-041-2 B-13-5.0 03-041-3 B-14-6.5 03-041-4 B-15-17.5 03-041-5 B-16-5.5			<u>-</u>	· .	01 MAR 90 01 MAR 90 01 MAR 90 01 MAR 90 01 MAR 90
PARAMETER	03-041-1	03-041-2	03-041-3	03-041-4	03-041-5
TPH-Volatile Hydrocarbons/BTEX Date Analyzed Dilution Factor, Times Benzene, mg/kg Ethylbenzene, mg/kg Toluene, mg/kg Total Xylene Isomers, mg/kg C4 to C12 Hydrocarbons, mg/kg Fuel Characterization, .	03.01.90 1 0.6 0.6 0.6 1.4	03.01.90 1 <0.3 <0.3 <0.3 <0.3 <10	03.01.90 1 <0.3 <0.3 <0.3 <0.3 <10	03.01.90 1 <0.3 <0.3 <0.3 <0.3 <10	1 <0.3 <0.3

This Fuel characterization is a qualitative identification based upon a visual comparison of sample chromatograms with those from authentic standards.



LOG NO: E90-03-041

Received: 01 MAR 90 Reported: 02 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459C

REPORT OF ANALYTICAL RESULTS

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LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES		DA	ATE SAMPLED
03-041-6 03-041-7	B-17-5.5 B-19-5.5			01 MAR 90 01 MAR 90
PARAMETER		03-041-6	03-041-7	
TPH-Volatil	e Hydrocarbons/BTEX			
Date Analy	zed	03.01.90	03.01.90	
Dilution F	actor, Times	1	1	
Benzene, m	ng/kg	<0.3	>0.3	
Ethylbenze	ene, mg/kg	<0.3	<0.3	
Toluene, m	g/kg	<0.3	<0.3	
Total Xyle	ne Isomers, mg/kg	<0.3	<0.3	
	Hydrocarbons, mg/kg	<10	<10	
	-Volatile Hydrocarbons/BTEX			



LOG NO: E90-03-041

Received: 01 MAR 90 Reported: 02 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459C

REPORT OF ANALYTICAL RESULTS

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LOG NO	SAMPLE DESCRIPTION,	SOIL SAMPLES			D	ATE SAMPLED
03-041-8 03-041-9 03-041-10 03-041-11	B-12-15.0 B-13-15.0 B-15-13.5 B-18-6.0				м,	01 MAR 90 01 MAR 90 01 MAR 90 01 MAR 90
PARAMETER			03-041-8	03-041-9	03-041-10	03-041-11
Sample Held	, Not Analyzed		HELD	HELD	HELD	HELD

Sim D. Lessley, Ph.D. / Laboratory Director



BROWN AND CALDWELL ANALYTICAL LABORATORIES

BATCH QC REPORT

Definitions and Terms

Accuracy:

The ability of a procedure to determine the "true" concentration of an

analyte.

Batch:

A group of samples analyzed sequentially using the same calibration curve,

reagents, and instrument.

Laboratory Control Standard (LCS):

Laboratory reagent water spiked with known compounds and subjected to the same procedures as the samples. The LCS thus indicates the accuracy

of the analytical method and, because it is prepared from a different source than the standard used to calibrate the instrument, it also serves to double-

check the calibration.

LC Result:

Laboratory result of an LCS analysis.

LT Result:

Expected result, or true value, of the LCS analysis.

Matrix QC:

Quality control tests performed on actual client samples. For most inorganic analyses, the laboratory uses a pair of duplicate samples and a spiked sample. For most organic analyses, the laboratory uses a pair of spiked

samples (duplicate spikes).

Percent Recovery:

The percentage of analyte recovered.

For LCS, the percent recovery calculation is

LC + LT x 100.

For spike recoveries, the percent recovery calculation is

(S Bar - Sample Concentration) x 100

Spike Amount

Precision:

The reproducibility of a procedure demonstrated by the agreement between analyses performed on either duplicates of the same sample or a pair of

duplicate spikes.

R1, R2 Result:

Result of the analysis of replicate aliquots of a sample, with R1 indicating the first analysis of the sample and R2 its corresponding duplicate; used to

determine precision.

Relative Percent Difference (RPD):

Calculated using one of the following:

 $\frac{(R1 - R2) \times 100}{(R1 + R2) \div 2}$

 $\frac{(S1 - S2) \times 100}{(S1 + S2) \div 2}$

S Bar Result:

The average of spike analysis results.

S1, S2 Result:

Result of the analysis of replicate spiked aliquots, with S1 indicating one spike of the sample and S2 the second spike; used to determine precision

and accuracy.

True value:

The theoretical, or expected, result of a spike sample analysis.

BATCH QC REPORT ORDER E9002041

DATE REPORTED: 03/06/90

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MATRIX QC PRECISION (DUPLICATE SPIKES)

_	DATE	BATCH	S1	S2		RELATIVE
PARAMETER	ANALYZED	NUMBER	RESULT	RESULT	UNIT	% DIFF
EPA Method 601					•	
Analyst ID	02.14.90	085	7314	7314	No.	0
Detection Limit	02.14.90	085	0.5	0.5	ug/L	0
Dilution Factor	02.14.90	085	1	1	Times	0
1,1,1-Trichloroethane	02.14.90	085	12	12	ug/L	0
1,1-Dichloroethane	02.14.90	085	12	12	ug/L	0
1,1-Dichloroethene	02.14.90	085	8.4	8.8	ug/L	5
1,2-Dichloroethane	02.14.90	085	14	15	ug/L	7
1,2-Dichloropropane	02.14.90	085	12	13	ug/L	8
Bromodichloromethane	02.14.90	085	12	13	ug/L	8
Bromoform	02.14.90	085	9.0	9.8	ug/L	9
Carbon Tetrachloride	02.14.90	085	12	12	ug/L	0
Chloroform	02.14.90	085	11	12	ug/L	9
Dibromochloromethane	02.14.90	085	11	12	ug/L	9
Methylene chloride	02.14.90	085	. 10	11	ug/L	10
Trichloroethene	02.14.90	085	12	12	ug/L	0
Tetrachloroethene	02.14.90	085	12 .	12	ug/L	0

BATCH QC REPORT ORDER E9002041

DATE REPORTED: 03/06/90

Page 1

MATRIX QC ACCURACY (SPIKES)

		DATE	BATCH	SBAR	TRUE		PERCENT
P.A	RAMETER	ANALYZED	NUMBER	RESULT	VALUE	UNIT	RECOVERY
EF	A Method 601						
	1,1,1-Trichloroethane	02.14.90	085	12	12	ug/L	100
75	l,1-Dichloroethane	02.14.90	085	12	12	ug/L	100
	1,1-Dichloroethene	02.14.90	085	8.6	12	ug/L	72
•	1,2-Dichloroethane	02.14.90	085	14.5	12	ug/L	121
	1,2-Dichloropropane	02.14.90	085	12.5	12	ug/L	104
	Bromodichloromethane	02.14.90	085	12.5	12	ug/L	104
	Bromoform	02.14.90	085	9.4	12	ug/L	78
	Carbon Tetrachloride	02.14.90	085	12	12	ug/L	10 0
	Chloroform	02.14.90	085	11.5	12	ug/L	96
	Dibromochloromethane	02.14.90	085	11.5	. 12	ug/L	96
	Methylene chloride	02.14.90	085	10.5	12	ug/L	88
	Trichloroethene	02.14.90	085	12	5. 12	ug/L	100
	Tetrachloroethene	02.14.90	085	12	12	ug/L	100

BATCH QC REPORT ORDER E9002041

DATE REPORTED: 03/06/90 Page 1

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

PAI	RAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL		UNIT
EP	A Method 601						
	Date Analyzed	02.13.90	085	02.13.90	NA	1.0	Date
	Time Analyzed	02.13.90	085	7314	NA		Hours
	Analyst ID	02.13.90	085	516-21	NA		No.
•	Detection Limit	02.13.90	085	1	99999		ug/L
	Dilution Factor	02.13.90	085	0	NA		Times
•	Instrument ID	02.13.90	. 085	0.5	NA		No.
	l,l,l-Trichloroethane	02.13.90	085	0	0.5		ug/L
•	1,1,2,2-Tetrachloroethane	02.13.90	085	0	0.5		ug/L
1	1,1,2-Trichloroethane	02.13.90	085	0	0.5		ug/L
	1,1-Dichloroethane	02.13.90	085	0	0.5		ug/L
	l, l-Dichloroethene	02.13.90	085	0	0.5	•	ug/L
	1,2-Dichloroethane	02.13.90	085	0	0.5		ug/L
	1,2-Dichlorobenzene	02.13.90	085	0	0.5		ug/L
_	1,2-Dichloroethene (Total)	02.13.90	085	0 .	0.5		ug/L
Í	1,2-Dichloropropane	02.13.90	085	0	0.5		ug/L
	1,3-Dichlorobenzene	02.13.90	085	0	0.5		ug/L
	1,4-Dichlorobenzene	02.13.90	085	0	0.5		ug/L
منت	2-Chloroethylvinylether	02.13.90	085	0	0.5		ug/L
	Bromodichloromethane	02.13.90	085	0	0.5		ug/L
	Bromomethane	02.13.90	085	0	0.5		ug/L
	Bromoform	02,13.90	085	0	0.5		ug/L
	Chlorobenzene	02.13.90	085	0	0.5		ug/L
	Carbon Tetrachloride	02.13.90	085	0	0.5		ug/L
~~	Chloroethane	02.13.90	085	0	0.5	•	ug/L
	Chloroform	02.13.90	085	0	0.5		ug/L
	Chloromethane	02.13.90	085	0	0.5		ug/L
=	Dibromochloromethane	02.13.90	085	0	0.5		ug/L
_	Dichlorodifluoromethane	02.13.90	085	0	0.5		ug/L
	Freon 113	02.13.90	085	0	0.5		ug/L
,	Methylene chloride	02.13.90	085	0.484	0.5		ug/L
-	Trichloroethene	02.13.90	085	0	0.5		ug/L
	Trichlorofluoromethane	02.13.90	085	0	0.5		ug/L
	Tetrachloroethene	02.13.90	085	0	0.5		ug/L
_	Vinyl chloride	02.13.90	085	0	0.5		ug/L
	cis-1,2-Dichloroethene	02.13.90	085	0	0.5		ug/L
	cis-1,3-Dichloropropene	02.13.90	085	Ŏ	0.5		ug/L
	trans-1,2-Dichloroethene	02.13.90	085	Ô	0.5		ug/L

Commence of the second

BATCH QC REPORT ORDER E9002041

DATE REPORTED : 03/06/90

Page 2

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

·4.

→	DATE	BATCH	BLANK		
PARAMETER	ANALYZED	NUMBER	RESULT	RDL	UNIT
trans-1,3-Dichloropropene	02.13.90	085	0	0.5	ug/L

ORDER PLACED FOR CLIENT: UC Lawrence Livermore National Lab 9002041:

SAMPLES... SAMPLE DESCRIPTION.. DETERM CODE.... DATE.... METHOD...... EQUIP. ID.NO

ANALYZED

516-21 7314 9002041*1 W-834-D3 601.UCLL 02.14.90 601

> Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

> > BC Analytical employee identification number of ID.NO analyst.

Chain of Custody Record ONE MARKET PLAZA
SPEAR STREET TOWER SUITE 717 SAN FRANCISCO, CALIFORNIA 94105 (415) 957-9557 DATE 3-1-90 PAGE OF. PROJECT NO. **ANALYSES** 1459 C HETALS REMARKS PETROLEUM HYDROCARBONS SAMPLERS: (SIGNATURE) CONTAINERS (SAMPLE PRESERVATION, HANDLING PROCEDURES. POLLUTAN 602 601 608 608 OBSERVATIONS, ETC.) METH00 METHOD METH 0D METHOD P PRIORITY NUMBER SAMPLE DATE TIME NUMBER EPA EPA EPA 9:45 B-12-50 4:55 B-12-15.0 HOLD 10,20 B-13-50 B-13-15.0 HOLD 10,20 AU seul R-14-65 10:45 cooled to HOLD 11135 <u>B-1</u>5-13.5 <u> B-15-175</u> 40 C B-16-55 12:10 12:20 78-17-55 ¥ 1:50 B-18-60 HOLD 215 B-19-55 Results to FAX # 594-6832 TOTAL NUMBER OF CONTAINERS RELINQUISHED BY: DATE RECEIVED BY: RELINQUISHED BY: DATE RECEIVED BY: (LAB) 3/1 SIGNATURE SIGNATURE SIGNATURE SIGNATURE HEFI TIME TIME PRINTED NAME PRINTED NAME PRINTED NAME PRINTED NAME CHEOMATRIX 500 LABORATORY COMPANY COMPANY COMPANY RELINQUISHED BY: DATE RECEIVED BY : METHOD OF SHIPMENT: Thend delivery LABORATORY COMMENTS / OBSERVATIONS SIGNATURE SIGNATURE TIME PRINTED NAME PRINTED NAME

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COMPANY

COMPANY

LOG NO: E90-03-066

Received: 02 MAR 90 Reported: 06 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459C

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES		DA	TE SAMPLED
03-066-1 03-066-2	MB-6-8.5 MB-6-15.0			02 MAR 90 02 MAR 90
PARAMETER		03-066-1	03-066-2	
Date Analy Dilution F Benzene, m Ethylbenze Toluene, m Total Xyle	actor, Times g/kg ne, mg/kg	03.02.90 1 <0.3 <0.3 <0.3 <0.3 <10	03.02.90 1 <0.3 <0.3 <0.3 <0.3 <10	
Other TPH	-Volatile Hydrocarbons/BTEX			

Sim D. Lessley, Ph.D., Laboratory Director



BROWN AND CALDWELL ANALYTICAL LABORATORIES

BATCH QC REPORTDefinitions and Terms

Accuracy:

The ability of a procedure to determine the "true" concentration of an

analyte.

Batch:

A group of samples analyzed sequentially using the same calibration curve,

reagents, and instrument.

Laboratory Control Standard (LCS):

Laboratory reagent water spiked with known compounds and subjected to the same procedures as the samples. The LCS thus indicates the accuracy of the analytical method and, because it is prepared from a different source

than the standard used to calibrate the instrument, it also serves to double-check the calibration.

LC Result:

Laboratory result of an LCS analysis.

LT Result:

Expected result, or true value, of the LCS analysis.

Matrix QC:

Quality control tests performed on actual client samples. For most inorganic analyses, the laboratory uses a pair of duplicate samples and a spiked

sample. For most organic analyses, the laboratory uses a pair of spiked

samples (duplicate spikes).

Percent Recovery:

The percentage of analyte recovered.

For LCS, the percent recovery calculation is

LC ÷ LT x 100.

For spike recoveries, the percent recovery calculation is

(S Bar - Sample Concentration) x 100

Spike Amount

Precision:

The reproducibility of a procedure demonstrated by the agreement between analyses performed on either duplicates of the same sample or a pair of

duplicate spikes.

R1, R2 Result:

Result of the analysis of replicate aliquots of a sample, with R1 indicating the first analysis of the sample and R2 its corresponding duplicate; used to

determine precision.

Relative Percent Difference (RPD):

Calculated using one of the following:

 $\frac{(R1 - R2) \times 100}{(R1 + R2) \div 2}$

 $\frac{(S1 - S2) \times 100}{(S1 + S2) \div 2}$

S Bar Result:

The average of spike analysis results.

S1, S2 Result:

Result of the analysis of replicate spiked aliquots, with S1 indicating one spike of the sample and S2 the second spike; used to determine precision

and accuracy.

True value:

The theoretical, or expected, result of a spike sample analysis.

BATCH QC REPORT ORDER E9003066

DATE REPORTED : 03/07/90

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LABORATORY CONTROL STANDARDS

DAD AMERICA	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
PARAMETER	ANALIZED	MORIDER	KESOPI	KESULI	OMIT	MOCAPHI
TPH-Volatile Hydrocarbons/BTEX						
Dilution Factor	03.02.90	55	1	1	Times	100
Benzene	03.02.90	55	84.8	100	ug/L	85
Ethylbenzene	03.02.90	55	84.9	100	ug/L	85
Toluene	03.02.90	55	91.1	100	ug/L	91
Total Xylene Isomers	03.02.90	55	186	200	ug/L	93
C4 to C12 Hydrocarbons	03.02.90	55	953	1023	ug/L	93

BATCH QC REPORT ORDER E9003066

DATE REPORTED : 03/07/90

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MATRIX QC PRECISION (DUPLICATE SPIKES)

	DATE	BATCH	S1	S2		RELATIVE
PARAMETER	ANALYZED	NUMBER	RESULT	RESULT	UNIT	% DIFF
TPH-Volatile Hydrocarbons/BTEX						
Dilution Factor	03.02.90	55	1	1	Times	0
Benzene	03.02.90	55	3.30	3.41	mg/kg	3
Ethylbenzene	03.02.90	55	3.33	3.48	mg/kg	4
Toluene	03.02.90	55	3.28	3.42	mg/kg	4
Total Xylene Isomers	03.02.90	55	7.37	7.73	mg/kg	5
C4 to C12 Hydrocarbons	03.02.90	55	43.4	43.6	mg/kg	0

BATCH QC REPORT ORDER E9003066

DATE REPORTED : 03/07/90

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MATRIX QC ACCURACY (SPIKES)

DATE ANALYZED	BATCH NUMBER	SBAR RESULT	TRUE VALUE	UNIT	PERCENT RECOVERY
03.02.90	55	3.355	4.82	mg/kg	70
03.02.90	55	3.405	4.82	mg/kg	71
03.02.90	55	3.35	4.82	mg/kg	70
03.02.90	55	7.55	9.65	mg/kg	78
03.02.90	55	43.5	49.4	mg/kg	88
	ANALYZED 03.02.90 03.02.90 03.02.90 03.02.90	ANALYZED NUMBER 03.02.90 55 03.02.90 55 03.02.90 55 03.02.90 55	ANALYZED NUMBER RESULT 03.02.90 55 3.355 03.02.90 55 3.405 03.02.90 55 3.35 03.02.90 55 7.55	ANALYZED NUMBER RESULT VALUE 03.02.90 55 3.355 4.82 03.02.90 55 3.405 4.82 03.02.90 55 3.35 4.82 03.02.90 55 7.55 9.65	ANALYZED NUMBER RESULT VALUE UNIT 03.02.90 55 3.355 4.82 mg/kg 03.02.90 55 3.405 4.82 mg/kg 03.02.90 55 3.35 4.82 mg/kg 03.02.90 55 7.55 9.65 mg/kg

: ORDER PLACED FOR CLIENT: Geomatrix Consultants 9003066 : : BC ANALYTICAL : EMVL LAB : 16:10:51 O8 MAR 1990 - P. 1 :

SAMPLES... SAMPLE DESCRIPTION.. DETERM CODE.... DATE.... METHOD...... EQUIP. ID.NO ANALYZED

9003066*1 MB-6-8.5 GASOLINE.5030.B 03.02.90 5030/8015 516-19 6366
TEX

9003066*2 MB-6-15.0 GASOLINE.5030.B 03.02.90 5030/8015 516-19 6366
TEX

444

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

B	ONE MARKET PLAZA SPEAR STREET TOWER SUITE 717 SAN FRANCISCO, CALIFORNIA 94105 (415) 957-9557					ITS	3								Cı	ısto	dy Record	
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	145	10]	SI						SE	Щ					REMARKS
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	ten Jamy			MINERAL	PRIORITY POLLUTANT			109 001		909 00	PETROLEUM HYDROCARBONS	25 WE			OF CONTAINERS		NDLING PROCEDURES, SERVATIONS, ETC.)	
DATE	TIME	NU	MPLE	}	GENERAL	PRIORITY	EPA METH	EPA METH	EPA METHOD	EPA METHOD	EPA METH	PETROLEU				NUMBER 0		
3/2	840	MB-	6-8	7.5		Ш	Ц			\square			X	_		11	↓	soil samples poled to 4°C
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LOG NO: E90-03-454

Received: 12 MAR 90 Reported: 14 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459E

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO SAMPLE DESCRIPTION,	SOIL	SAMPLE	ES		DA	ATE SAMPLED
03-454-1 B-20-10.5 03-454-2 B-21-14.0 03-454-3 B-21-2.0 03-454-4 B-22-6.0 03-454-5 B-20-25.5						12 MAR 90 12 MAR 90 12 MAR 90 12 MAR 90 12 MAR 90
PARAMETER	03-4	54-1	03-454-2	03-454-3	03-454-4	03-454-5
Sample Held, Not Analyzed TPH-Volatile Hydrocarbons/BTEX						HELD
Date Analyzed	03.13	3.90	03.13.90	03.13.90	03.13.90	
Dilution Factor, Times		1	1	1	1	
Benzene, mg/kg	•	<0.3	<0.3	<0.3	<0.3	
Ethylbenzene, mg/kg		(0.3	<0.3	<0.3	<0.3	
Toluene, mg/kg	•	<0.3	<0.3	<0.3	<0.3	
Total Xylene Isomers, mg/kg	•	<0.3	<0.3	0.3	<0.3	
C4 to C12 Hydrocarbons, mg/kg		<10	<10	33	<10	
Fuel Characterization, .				MIN.SPIRIT		

This Fuel characterization is a qualitative identification based upon a visual comparison of sample chromatograms with those from authentic standards.

Sim D. Lessley, Ph.D./ Laboratory Director



BROWN AND CALDWELL ANALYTICAL LABORATORIES

BATCH QC REPORT

Definitions and Terms

Accuracy:

The ability of a procedure to determine the "true" concentration of an

analyte.

Batch:

A group of samples analyzed sequentially using the same calibration curve,

reagents, and instrument.

Laboratory Control Standard (LCS):

Laboratory reagent water spiked with known compounds and subjected to the same procedures as the samples. The LCS thus indicates the accuracy of the analytical method and, because it is prepared from a different source than the standard used to calibrate the instrument, it also serves to double-

check the calibration.

LC Result:

Laboratory result of an LCS analysis.

LT Result:

Expected result, or true value, of the LCS analysis.

Matrix QC:

Quality control tests performed on actual client samples. For most inorganic analyses, the laboratory uses a pair of duplicate samples and a spiked sample. For most organic analyses, the laboratory uses a pair of spiked

samples (duplicate spikes).

Percent Recovery:

The percentage of analyte recovered.

For LCS, the percent recovery calculation is

LC ÷ LT x 100.

For spike recoveries, the percent recovery calculation is

(S Bar - Sample Concentration) x 100

Spike Amount

Precision:

The reproducibility of a procedure demonstrated by the agreement between analyses performed on either duplicates of the same sample or a pair of

duplicate spikes.

R1, R2 Result:

Result of the analysis of replicate aliquots of a sample, with R1 indicating the first analysis of the sample and R2 its corresponding duplicate; used to determine precision.

Relative Percent Difference (RPD):

Calculated using one of the following:

 $\frac{(R1 - R2) \times 100}{(R1 + R2) \div 2}$

 $\frac{(S1 - S2) \times 100}{(S1 + S2) \div 2}$

S Bar Result:

The average of spike analysis results.

S1, S2 Result:

Result of the analysis of replicate spiked aliquots, with S1 indicating one spike of the sample and S2 the second spike; used to determine precision

and accuracy.

True value:

The theoretical, or expected, result of a spike sample analysis.

BATCH QC REPORT ORDER E9003454

DATE REPORTED : 03/19/90

Page 1

LABORATORY CONTROL STANDARDS

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
TPH-Volatile Hydrocarbons/BTEX			_			100
Dilution Factor	03.13.90	73	1	1	Times	100
Benzene	03.13.90	73	4.8	5	mg/kg	96
Ethylbenzene	03.13.90	73	4.9	5	mg/kg	98
Toluene	03.13.90	73	4.9	5	mg/kg	98
	03.13.90	73	11	10	mg/kg	110
Total Xylene Isomers C4 to C12 Hydrocarbons	03.13.90	73	47	50	mg/kg	94
TPH-Volatile Hydrocarbons/BTEX	03.13.90	73	1	1	Times	100
Dilution Factor	03.13.90	73 73	4.8	5	mg/kg	96
Benzene Ethylbenzene	03.13.90	73	4.9	5	mg/kg	98
Toluene	03.13.90	73	4.9	5	mg/kg	98
■ Total Xylene Isomers	03.13.90	73	11	. 10	mg/kg	110
C4 to C12 Hydrocarbons	03.13.90	73	47	50	mg/kg	94

BATCH QC REPORT ORDER E9003454

DATE REPORTED : 03/19/90

Page 1

MATRIX QC PRECISION (DUPLICATE SPIKES)

P.	ARAMETER	DATE ANALYZED	BATCH NUMBER	S1 RESULT	S2 RESULT	UNIT	RELATIVE % DIFF
-r	PH-Volatile Hydrocarbons/BTEX						
	Dilution Factor	03.13.90	73	1	1	Times	0
	Benzene	03.13.90	73	4.2	3.7	mg/kg	13
8	Ethylbenzene	03.13.90	73	4.5	4.2	mg/kg	7
	Toluene	03.13.90	73	4.3	3.9	mg/kg	10
_	Total Xylene Isomers	03.13.90	73	10	9.4	mg/kg	6 .
	C4 to C12 Hydrocarbons	03.13.90	73	48	47	mg/kg	2

BATCH QC REPORT ORDER E9003454

DATE REPORTED : 03/19/90

MATRIX QC ACCURACY (SPIKES)

arameter	
PH-Volat	ile Hydrocarbons/BTEX
Benzen	ie
Ethylt	enzene
Toluer	ıe
Total	Xylene Isomers
_ C4 to	C12 Hydrocarbons

DATE ANALYZED	BATCH NUMBER	SBAR RESULT	TRUE VALUE	UNIT	PERCENT RECOVERY	
03.13.90	73	3.95	4.8	mg/kg	82	
		4.35	4.8	mg/kg	91	
03.13.90	73	4.33				
03.13.90	73	4.1	4.8	mg/kg	85	
03.13.90	73	9.7	9.8	mg/kg	99	
02.12.30	75	- · ·		_	99	
03 13 90	73	47.5	48	mg/kg	77	

Page 1

BATCH QC REPORT ORDER E9003454

DATE REPORTED: 03/19/90 Page 1

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT
Date Analyzed Dilution Factor Benzene Ethylbenzene Toluene Total Xylene Isomers C4 to C12 Hydrocarbons	03.13.90 03.13.90 03.13.90 03.13.90 03.13.90 03.13.90 03.13.90	73 73 73 73 73 73 73	03.13.90 1 0.018 0.045 0.031 0.14 0.64	NA NA 0.1 0.1 0.1 0.1	Date Times mg/kg mg/kg mg/kg mg/kg

SAMPLES	SAMPLE DESCRIPTION	DETERM CODE	DATE ANALYZED	METHOD	EQUIP.	ID.NO
9003454*1	B-20-10.5	GASOLINE.5030.B	03.13.90	5030/8015	516-19	7194
9003454*2	B-21-14.0	TEX GASOLINE.5030.B	03.13.90	5030/8015	516-19	7194
9003454*3	B-21-2.0	TEX GASOLINE.5030.B	03.13.90	5030/8015	516-19	7194
9003454*4	B-22-6.0	TEX GASOLINE.5030.B	03.13.90	5030/8015	516-19	7194
9003454 * 5	B-20-25.5	HOLD	03.13.90			7505

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

:	ORDER PLACED FOR	CLIENT: Geomatrix Consultants 9003454;	
•	BC ANALYTICAL:	EMVL LAB: 10:50:27 15 MAR 1990 - P. 1:	:
			_

SAMPLES	SAMPLE DESCRIPTION	DETERM CODE	DATE ANALYZED	METHOD	EQUIP.	ID.NO
9003454*1	B-20-10.5	GASOLINE.5030.B	03.13.90	5030/8015	516-19	7194
9003454*2	B-21-14.0	TEX GASOLINE.5030.B TEX	03.13.90	5030/8015	516-19	7194
9003454*3	B-21-2.0	GASOLINE.5030.B	03.13.90	5030/8015	516-19	7194
9003454*4	B-22-6.0	GASOLINE.5030.B	03.13.90	5030/8015	516-19	7194
9003454*5	B-20-25.5	HOLD	03.13.90			7505

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

00867 GEOMATRIX CONSULTANTS Chain of Custody Record ONE MARKET PLAZA SPEAR STREET TOWER SUITE 717 SAN FRANCISCO, CALIFORNIA 94105 DATE 3/12/90 (415) 957-9557 PAGE OF. PROJECT NO. ANALYSES 1459E REMARKS HYDROCARBONS SAMPLERS: (SIGNATURE) (SAMPLE PRESERVATION, 띺 HANDLING PROCEDURES. POLLUTANT 624 625 601 602 608 OBSERVATIONS, ETC.) METHOD METH00 PETROLEUM 유 GENERAL NUMBER SAMPLE DATE | TIME NUMBER ١ 10:50 B-20-10,5 HOLD 12:05 B-20-25.5 l 2:00 B-21-14,0 2:50 B-21- 2,0 13:50 3-22- 6,0 All Soil samples cooled on ice 24 hu turarou Results to Chui young FAX TO OFFICE E9003454 TOTAL NUMBER OF CONTAINERS DATE RECEIVED BY: (LAB) RELINQUISHÊD BY: DATE RECEIVED BY: RELINQUISHED BY: SIGNATURE SIGNATURE SIGNATURE SIGNATURE HHHAN H HERI TIME TIME PRINTED NAME PRINTED NAME PRINTED NAME PRINTED NAME QEOMATRY 5.10 LABORATORY COMPANY COMPANY COMPANY RELINQUISHED BY: DATE RECEIVED BY : METHOD OF SHIPMENT: hand delivery LABORATORY COMMENTS / OBSERVATIONS SIGNATURE SIGNATURE TIME PRINTED NAME PRINTED NAME COMPANY COMPANY

LOG NO: E90-03-482

Received: 13 MAR 90 Reported: 14 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459E

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, SOIL SAM	IPLES		DA	TE SAMPLED
03-482-1 03-482-2 03-482-3 03-482-4					13 MAR 90 13 MAR 90 13 MAR 90 13 MAR 90
PARAMETER		03-482-1	03-482-2	03-482-3	03-482-4
-	, Not Analyzed e Hydrocarbons/BTEX				HELD
Date Analy	zed	03.13.90	03.13.90	03.13.90	
Dilution F.	actor. Times	1	1	1	
Benzene. m	g/kg	<0.3	<0.3	<0.3	
Ethvlbenze	ne, mg/kg	<0.3	<0.3	<0.3	
Ioluene. m	g/kg	<0.3	<0.3	<0.3	
Total Xyle	ne Isomers, mg/kg	<0.3	<0.3	<0.3	
C4 to C12	Hydrocarbons, mg/kg	<10	<10	<10	
Other TPH	-Volatile Hydrocarbons/BTEX				

Sim D. Lessley, Ph.D., Laboratory Director



BROWN AND CALDWELL ANALYTICAL LABORATORIES

BATCH QC REPORT Definitions and Terms

Accuracy:

The ability of a procedure to determine the "true" concentration of an

analyte.

Batch:

A group of samples analyzed sequentially using the same calibration curve,

reagents, and instrument.

Laboratory Control Standard (LCS):

Laboratory reagent water spiked with known compounds and subjected to the same procedures as the samples. The LCS thus indicates the accuracy of the analytical method and, because it is prepared from a different source than the standard used to calibrate the instrument, it also serves to double-

check the calibration.

LC Result:

Laboratory result of an LCS analysis.

LT Result:

Expected result, or true value, of the LCS analysis.

Matrix QC:

Quality control tests performed on actual client samples. For most inorganic analyses, the laboratory uses a pair of duplicate samples and a spiked

sample. For most organic analyses, the laboratory uses a pair of spiked

samples (duplicate spikes).

Percent Recovery:

The percentage of analyte recovered.

For LCS, the percent recovery calculation is

LC ÷ LT x 100.

For spike recoveries, the percent recovery calculation is

(S Bar - Sample Concentration) x 100

Spike Amount

Precision:

The reproducibility of a procedure demonstrated by the agreement between

analyses performed on either duplicates of the same sample or a pair of

duplicate spikes.

R1, R2 Result:

Result of the analysis of replicate aliquots of a sample, with R1 indicating

the first analysis of the sample and R2 its corresponding duplicate; used to

determine precision.

Relative Percent Difference (RPD):

Calculated using one of the following:

 $\frac{(R1 - R2) \times 100}{(R1 + R2) \div 2}$

 $\frac{(S1 - S2) \times 100}{(S1 + S2) \div 2}$

S Bar Result:

The average of spike analysis results.

S1, S2 Result;

Result of the analysis of replicate spiked aliquots, with S1 indicating one

spike of the sample and S2 the second spike; used to determine precision

and accuracy.

True value:

The theoretical, or expected, result of a spike sample analysis.

BATCH QC REPORT ORDER E9003482

_DATE REPORTED : 03/19/90

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MATRIX QC PRECISION (DUPLICATE SPIKES)

	DATE	BATCH	Sl	S2		RELATIVE	
PARAMETER	ANALYZED	NUMBER	RESULT	RESULT	UNIT	% DIFF	
TPH-Volatile Hydrocarbons/BTEX							
Dilution Factor	03.13.90	73	1	1	Times	0	
Benzene	03.13.90	73	4.2	3.7	mg/kg	13	
Ethylbenzene	03.13.90	73	4.5	4.2	mg/kg	7	
Toluene	03.13.90	73	4.3	3.9	mg/kg	10	
Total Xylene Isomers	03.13.90	73	10	9.4	mg/kg	6	
C4 to C12 Hydrocarbons	03.13.90	73	48	47	mg/kg	2	

BATCH QC REPORT ORDER E9003482

DATE REPORTED : 03/19/90

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MATRIX QC ACCURACY (SPIKES)

	RAMETER H-Volatile Hydrocarbons/BTEX	DATE ANALYZED	BATCH NUMBER	SBAR RESULT	TRUE VALUE	UNIT	PERCENT RECOVERY
	Benzene	03.13.90	73	3.95	4.8	mg/kg	82
Ī	Ethylbenzene	03.13.90	73	4.35	4.8	mg/kg	91
}	Toluene	03.13.90	73	4.1	4.8	mg/kg	85
•	Total Xylene Isomers	03.13.90	73	9.7.	9.8	mg/kg	.99
ÿ	C4 to C12 Hydrocarbons	03.13.90	73	47.5	48	mg/kg	99

BATCH QC REPORT ORDER E9003482

DATE REPORTED: 03/19/90 Page 1

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

ARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT
TPH-Volatile Hydrocarbons/BTEX	00 10 00	70	02 12 00	NA	Date
_ Date Analyzed	03.13.90	73	03.13.90		
Dilution Factor	03.13.90	73	1	NA	Times
Benzene	03.13.90	73	0.018	0.1	mg/kg
Ethylbenzene	03.13.90	73	0.045	0.1	mg/kg
L Toluene	03.13.90	73	0.031	0.1	mg/kg
Total Xylene Isomers	03.13.90	73	0.14	0.1	mg/kg
C4 to C12 Hydrocarbons	03.13.90	73	0.64	5	mg/kg

	: BC ANALY	rical : E	MVL LAB : 12	2:26:02 1	.9 MAR .	1990 - I	2. 1:		
ŀ	+========			.=======	:=====:		======		
	SAMPLES	SAMPLE DE	SCRIPTION	DETERM CO	DE	DATE ANALYZED	METHOD	EQUIP.	ID.NO
ļ	9003482*1	B-23-6.0		GASOLINE.	5030.В	03.13.90	5030/8015	516-19	7194
	9003482*2	B-24-31.0			5030.B	03.13.90	5030/8015	516-19	7194
1	9003482*3	B-24-6.0		GASOLINE.	5030.B	03.13.90	5030/8015	516-19	7194
	9003482*4	B-22-16.0		HOLD		03.14.90		•	6926

: ORDER PLACED FOR CLIENT: Geomatrix Consultants 9003482 :

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

BATCH QC REPORT ORDER E9003482

DATE REPORTED : 03/19/90

Page 1

LABORATORY CONTROL STANDARDS

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
TPH-Volatile Hydrocarbons/BTEX						•
Dilution Factor	03.13.90	73	1	1	Times	100
Benzene	03.13.90	73	4.8	5	mg/kg	96
Benzene Ethylbenzene	03.13.90	73	4.9	5	mg/kg	98
Toluene	03.13.90	73	4.9	5	mg/kg	98
Total Xylene Isomers	03.13.90	73	11	10	mg/kg	110
C4 to C12 Hydrocarbons	03.13.90	73	47	50	mg/kg	94
TPH-Volatile Hydrocarbons/BTEX						
Dilution Factor	03.13.90	73	1	1	Times	100
Benzene	03.13.90	73	4.8	5	mg/kg	96
Benzene Ethylbenzene	03.13.90	73	4.9	5	mg/kg	9 8
Toluene	03.13.90	73	4.9	5	mg/kg	98
Total Xylene Isomers	03.13.90	73		10	mg/kg	110
C4 to C12 Hydrocarbons	03.13.90	73	47	50	mg/kg	94

00860 />>= GEOMATRIX CONSULTANTS Chain of Custody Record ONE MARKET PLAZA SPEAR STREET TOWER SUITE 717 SAN FRANCISCO, CALIFORNIA 94105 (415) 957-9557 DATE 3/13/90 PAGE ___ OF. PROJECT NO. **ANALYSES** 1459F METALS REMARKS HYDROCARBONS CONTAINERS SAMPLERS: (SIGNATURE) (SAMPLE PRESERVATION, HANDLING PROCEDURES. 624 601 602 608 OBSERVATIONS, ETC.) 3-483-1=8240 METHOD METHOD METHOD METHOD EUM 4 8270 Ba40 NUMBER SAMPLE PETROLI 3-484 = CAMTTAC. NUMBER DATE I TIME -HOV 3/13/10:00 B-22-16,0 All soil 3/13 Ju:40 B-23-6,0 somples 3131:45 B-24-6,0 X|Xcooled on ice B-24-31,0 24-hostunaioun Permets to Chen Goun AGAP (48-96hr) 197-for 8240/8210 Metals on STD JUEEKS, E9003482 TOTAL NUMBER OF CONTAINERS RELINQUISHED BY: DATE RECEIVED BY: DATE RECEIVED BY: (LAB) REKTNOUISHED BY: hen l 3/3 SIGNATURE SIGNATURE SIGNATURE SIGNATURE HERIYOUNG TIME TIME PRINTED NAME PRINTED NAME PRINTED NAME PRINTED NAME YEOMATRY 5:20 LABORATORY COMPANY COMPANY RELINQUISHED BY: DATE RECEIVED BY : METHOD OF SHIPMENT: Kond LABORATORY COMMENTS / OBSERVATIONS SIGNATURE SIGNATURE TIME PRINTED NAME PRINTED NAME COMPANY COMPANY

LOG NO: E90-03-483

Received: 13 MAR 90 Reported: 15 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459E

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES		DATE SAMPLED
03-483-1	B-24-6.0		13 MAR 90
PARAMETER		03-483-1	
R/N A Fyt	Pri.Poll. (EPA-8270)		
Date Anal	•	03.15.90	
Date Extr	-	03.14.90	
- -	Factor, Times	1	
	chlorobenzene, mg/kg	<0.03	
	orobenzene, mg/kg	<0.03	
•	nylhydrazine, mg/kg	<0.03	
	orobenzene, mg/kg	<0.03	
	orobenzene, mg/kg	<0.03	
•	chlorophenol, mg/kg	<0.03	
	chlorophenol, mg/kg	<0.03	
	orophenol, mg/kg	<0.03	
	hylphenol, mg/kg	<0.03	
2,4-Dinit	rophenol, mg/kg	<0.3	
2,4-Dinit	rotoluene, mg/kg	<0.03	
2,6-Dinit	rotoluene, mg/kg	<0.03	
2-Chloron	aphthalene, mg/kg	<0.03	
2-Chlorop	henol, mg/kg	<0.03	
2-Methyl-	4,6-dinitrophenol, mg/kg	<0.03	
2-Methyln	aphthalene, mg/kg	<0.03	
2-Methylp	henol, mg/kg	<0.03	
2-Nitroan	iline, mg/kg	<0.2	
2-Nitroph	enol, mg/kg	<0.03	
	lorobenzidine, mg/kg	<0.03	
	iline, mg/kg	<0.2	
•	enylphenylether, mg/kg	<0.03	. F
4-Chloro-	3-methylphenol, mg/kg	<0.03	

1255 Powell Street Emeryville, CA 94608

415/428-2300 Fax: 415/547-3643



LOG NO: E90-03-483

Received: 13 MAR 90 Reported: 15 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459E

REPORT OF ANALYTICAL RESULTS

LOG NO SAMPLE DESCRIPTION, SOIL SAMPLES		DATE SAMPLED
03-483-1 B-24-6.0		13 MAR 90
	03-483-1	
PARAMETER	03-463-1	
	<0.2	
4-Chloroaniline, mg/kg	<0.03	
4-Chlorophenylphenylether, mg/kg 4-Methylphenol, mg/kg	<0.03	•
4-Nitroaniline, mg/kg	<0.2	•
4-Nitrophenol, mg/kg	<0.7	
Acenaphthene, mg/kg	<0.03	
Acenaphthylene, mg/kg	<0.03	
Aniline, mg/kg	<0.03	
Anthracene, mg/kg	<0.03	
Benzidine, mg/kg	<1	•
Benzo(a)anthracene, mg/kg	<0.03	
Benzo(a)pyrene, mg/kg	<0.03	
Benzo(b)fluoranthene, mg/kg	<0.03	•
Benzo(g,h,i)perylene, mg/kg	<0.03	
Benzo(k)fluoranthene, mg/kg	<0.03	
Benzyl alcohol, mg/kg	<0.2	
Benzoic acid, mg/kg	<0.2	
Butylbenzylphthalate, mg/kg	<0.03	
Chrysene, mg/kg	<0.03	
Di-n-octylphthalate, mg/kg	<0.03	
Dibenzo(a,h)anthracene, mg/kg	<0.03	
Dibenzofuran, mg/kg	<0.03	
Dibutylphthalate, mg/kg	<0.03	
Diethylphthalate, mg/kg	<0.03	
Dimethylphthalate, mg/kg	<0.03	
Fluoranthene, mg/kg	<0.03	
Fluorene, mg/kg	<0.03	



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REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES		DATE SAMPLED
03-483-1	B-24-6.0		13 MAR 90
PARAMETER		03-483-1	
Hexachlord Hexachlord Indeno(1,2 Isophorone N-Nitrosod N-Nitrosod Nitrobenze Naphthale Phenanthro Phenol, mp Pentachlor Pyrene, mp Bis(2-chloris) Bis(2-chloris) Bis(2-chloris)	dimethylamine, mg/kg diphenylamine, mg/kg di-n-propylamine, mg/kg ene, mg/kg ne, mg/kg ene, mg/kg ene, mg/kg g/kg rophenol, mg/kg	<0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03 <0.03	



LOG NO: E90-03-483

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Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459E

REPORT OF ANALYTICAL RESULTS

03-483-1 B-24-6.0 13 MAR 9 PARAMETER 03-483-1 Purgeable Priority Pollutants Date Extracted 03.14.90 1,1,1-Trichloroethane, mg/kg <0.1 1,1,2,2-Tetrachloroethane, mg/kg <0.1 1,1,2-Trichloroethane, mg/kg <0.1 1,1-Dichloroethane, mg/kg <0.1 1,2-Dichloroethane, mg/kg <0.1 1,2-Dichloropropane, mg/kg <0.1 1,3-Dichloropropene, mg/kg <0.1 2-Chloroethylvinylether, mg/kg <0.1 2-Heyspone mg/kg <0.1
PARAMETER O3-483-1 Purgeable Priority Pollutants Date Extracted 1,1,1-Trichloroethane, mg/kg 1,1,2-Tetrachloroethane, mg/kg 1,1,2-Trichloroethane, mg/kg 1,1-Dichloroethane, mg/kg 1,1-Dichloroethane, mg/kg 1,2-Dichloroethane, mg/kg 1,2-Dichloropropane, mg/kg 1,3-Dichloropropene, mg/kg 2-Chloroethylvinylether, mg/kg O3.14.90 O3.14.90 O1.1 O1.1 O1.1 O1.1 O3.14.90 O1.1 O1.1 O1.1 O1.1 O1.1 O3.14.90 O1.1 O1.1 O1.1 O1.1 O1.1 O3.14.90 O1.1
Date Extracted 1,1,1-Trichloroethane, mg/kg 1,1,2-Tetrachloroethane, mg/kg 1,1,2-Trichloroethane, mg/kg 1,1-Dichloroethane, mg/kg 1,1-Dichloroethene, mg/kg 1,2-Dichloroethane, mg/kg 1,2-Dichloropropane, mg/kg 1,3-Dichloropropene, mg/kg 2-Chloroethylvinylether, mg/kg 1,3-Dichloropropene, mg/kg 2-Chloroethylvinylether, mg/kg 1,3-Dichloropropene, mg/kg 2-Chloroethylvinylether, mg/kg
Date Extracted 1,1,1-Trichloroethane, mg/kg 1,1,2-Tetrachloroethane, mg/kg 1,1,2-Trichloroethane, mg/kg 1,1-Dichloroethane, mg/kg 1,1-Dichloroethene, mg/kg 1,2-Dichloroethane, mg/kg 1,2-Dichloropropane, mg/kg 1,3-Dichloropropene, mg/kg 2-Chloroethylvinylether, mg/kg 1,3-Dichloropropene, mg/kg 2-Chloroethylvinylether, mg/kg 1,3-Dichloropropene, mg/kg 2-Chloroethylvinylether, mg/kg
1,1,1-Trichloroethane, mg/kg
1,1,2-Tetrachloroethane, mg/kg 1,1,2-Trichloroethane, mg/kg 1,1-Dichloroethane, mg/kg 1,1-Dichloroethane, mg/kg 1,1-Dichloroethane, mg/kg 1,2-Dichloroethane, mg/kg 1,2-Dichloropropane, mg/kg 1,3-Dichloropropene, mg/kg 2-Chloroethylvinylether, mg/kg (0.1
1,1,2-Trichloroethane, mg/kg
1,1-Dichloroethane, mg/kg
1,1-Dichloroethene, mg/kg 1,2-Dichloroethane, mg/kg 1,2-Dichloropropane, mg/kg 1,3-Dichloropropene, mg/kg 2-Chloroethylvinylether, mg/kg (0.1 (0.1 (0.1) (0.1) (0.1)
1,2-Dichloroethane, mg/kg 1,2-Dichloropropane, mg/kg 1,3-Dichloropropene, mg/kg 2-Chloroethylvinylether, mg/kg (0.1 (0.1 (0.1) (0.1)
1,2-Dichloropropane, mg/kg
1,3-Dichloropropene, mg/kg <0.1 2-Chloroethylvinylether, mg/kg <0.1
2-Chloroethylvinylether, mg/kg <0.1
2 0110100111111111111111111111111111111
2-Hexanone, mg/kg <0.1
Acetone, mg/kg <1
Acrolein, mg/kg
Acrylonitrile, mg/kg
Bromodichloromethane, mg/kg <0.1
Bromomethane, mg/kg <0.1
Benzene, mg/kg <0.1 -
Bromoform, mg/kg <0.1
Chlorobenzene, mg/kg <0.1
Carbon Tetrachloride, mg/kg <0.1
Chloroethane, mg/kg <0.1
Chloroform, mg/kg <0.1
Chloromethane, mg/kg <0.1
Carbon Disulfide, mg/kg <0.1
Dibromochloromethane, mg/kg <0.1
Ethylbenzene, mg/kg <0.1

LOG NO: E90-03-483

Received: 13 MAR 90 Reported: 15 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459E

	REPO	ORT OF ANALYTICAL	RESULTS	Page 5
LOG NO	SAMPLE DESCRIPTION,	SOIL SAMPLES		DATE SAMPLED
03-483-1	B-24-6.0			13 MAR 90
PARAMETER			03-483-1	
Freon 113, Methyl ethy Methyl iso Methylene Styrene, my Trichloroe Trichlorof Toluene, my Tetrachloro Vinyl acet Vinyl chlor Total Xyler cis-1,2-Die trans-1,2-l	yl ketone, mg/kg butyl ketone, mg/kg chloride, mg/kg g/kg thene, mg/kg luoromethane, mg/kg g/kg oethene, mg/kg		<pre><0.1 <2 <0.1 <0.1</pre>	

Sim D. Lessley, Ph.D./ Laboratory Director



00860 GEOMATRIX CONSULTANTS Chain of Custody Record ONE MARKET PLAZA SPEAR STREET TOWER SUITE 717 SAN FRANCISCO, CALIFORNIA 94105 (415) 957-9557 DATE 3/13/90 PAGE ____ OF. PROJECT NO. **ANALYSES** 1459F REMARKS SAMPLERS: (SIGNATURE) (SAMPLE PRESERVATION, HANDLING PROCEDURES. 602 608 OBSERVATIONS, ETC.) METHOD METHOD METHOD METHOD 3-483-1 = 8240 PETROLEUM 18340 8340 SAMPLE NUMBER DATE TIME 3 -4/84 = (AM) 7/10 NUMBER 10.00 B-22-16.0 一下でした R-23-6.0 3/13 Ju:40 Allseil B-24-40 40 mples X|X|X|XB-24-31.0 24 traternatural ON TPH Permets to Chair found ASAP (48-96kr) TIT for 8240/8210 Metaly on STD JUECKS, E9003482 TOTAL NUMBER OF CONTAINERS RELINQUISHED BY: DATE RECEIVED BY: REFINQUISHED BY: RECEIVED BY: (LAB), SIGNATURE SIGNATURE 3/3/ SIGNATURE SIGNATURE HITEL YOUN TIME PRINTED NAME TIME PRINTED NAME PRINTED NAME PRINTED NAME - VECIMATRY 520 COMPANY COMPANY COMPANY LABORATORY RELINQUISHED BY: DATE RECEIVED BY : METHOD OF SHIPMENT: LABORATORY COMMENTS / OBSERVATIONS SIGNATURE SIGNATURE TIME PRINTED NAME PRINTED NAME COMPANY

COMPANY

LOG NO: E90-03-484

Received: 13 MAR 90

Reported: 03 APR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459E

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	•	DATE SAMPLED
03-484-1	B-24-6.0		13 MAR 90
PARAMETER		03-484-1	
Silver, m Barium, m Beryllium Cadmium, Cobalt, m Chromium, Copper, m Molybdenu Nickel, m Lead, mg/ Antimony, Thallium, Vanadium, Zinc, mg/ Arsenic, m Mercury, m Selenium,	ng/kg ng/kg ng/kg ng/kg ng/kg ng/kg mg/kg ng/kg ng/kg nm, mg/kg ng/kg kg ng/kg ng/kg ng/kg	 <0.4 76 <0.2 6.2 12 67 40 <2 89 <6 <1 <4 54 61 0.7 0.04 <0.4 03.27.90 	

Sim D. Lessley, Ph.D., Laboratory Director



Brown and Caldwell Analytical Laboratories

BATCH QC REPORT Definitions and Terms

Accuracy:

The ability of a procedure to determine the "true" concentration of an

analyte.

Batch:

A group of samples analyzed sequentially using the same calibration curve,

reagents, and instrument.

Laboratory Control Standard (LCS): Laboratory reagent water spiked with known compounds and subjected to the same procedures as the samples. The LCS thus indicates the accuracy of the analytical method and, because it is prepared from a different source than the standard used to calibrate the instrument, it also serves to double-

check the calibration.

LC Result:

Laboratory result of an LCS analysis.

LT Result:

Expected result, or true value, of the LCS analysis.

Matrix QC:

Quality control tests performed on actual client samples. For most inorganic analyses, the laboratory uses a pair of duplicate samples and a spiked sample. For most organic analyses, the laboratory uses a pair of spiked

samples (duplicate spikes).

Percent Recovery:

The percentage of analyte recovered.

For LCS, the percent recovery calculation is

LC + LT x 100.

For spike recoveries, the percent recovery calculation is

(S Bar - Sample Concentration) x 100

Spike Amount

Precision:

The reproducibility of a procedure demonstrated by the agreement between analyses performed on either duplicates of the same sample or a pair of duplicate spikes.

R1. R2 Result:

Result of the analysis of replicate aliquots of a sample, with R1 indicating the first analysis of the sample and R2 its corresponding duplicate; used to determine precision.

Relative Percent Difference (RPD):

Calculated using one of the following:

 $\frac{(R1 - R2) \times 100}{(R1 + R2) \div 2}$

 $\frac{(S1 - S2) \times 100}{(S1 + S2) \div 2}$

S Bar Result:

The average of spike analysis results.

S1, S2 Result:

Result of the analysis of replicate spiked aliquots, with S1 indicating one spike of the sample and S2 the second spike; used to determine precision

and accuracy.

True value:

The theoretical, or expected, result of a spike sample analysis.

BATCH QC REPORT ORDER E9003484

DATE REPORTED : 04/04/90

MATRIX QC PRECISION (DUPLICATES)

PARAMETER Fourteen CAM Metals by ICAP	DATE ANALYZED	BATCH NUMBER	R1 RESULT	R2 RESULT	UNIT	RELATIVE %DIFF
	03.29.90	64	<0.4	<0.4	mg/kg	NA
Silver	03.29.90	64	76	78	mg/kg	3
Barium	03.29.90	64	<0.2	<0.2	mg/kg	NA
Beryllium		64	6.2	6.4	mg/kg	3
Cadmium	03.29.90					18
Cobalt	03.29.90	64	12	10	mg/kg	
Chromium	03.29.90	64	67	61	mg/kg	9
Copper	03.29.90	64	40	35	mg/kg	13
Molybdenum	03.29.90	64	<2	<2	mg/kg	NA
Nickel	03.29.90	64	89	93	mg/kg	4
Lead	03.29.90	64	<6	<6	mg/kg	NA
Antimony	03.29.90	64	<1	<1	mg/kg	NA
Thallium	03.29.90	64	<4	<4	mg/kg	NA
Vanadium	03.29.90	64	54	53	mg/kg	2
Zinc	03.29.90	64	61	67	mg/kg	9
Arsenic	03.28.90	60	<1	<1	mg/kg	NA
Arsenic	03.28.90	60	12	11	mg/kg	9
Mercury	03.26.90	42	<0.01	<0.01	mg/kg	NA
· · · · · · · · · · · · · · · · · · ·	03.26.90	42	0.0001	<0.0001	mg/L	NA
Mercury		60	0.0001	<0.8	mg/kg	NA
Selenium	03.29.90					NA
Selenium	03.29.90	60	0.9	<0.8	mg/kg	IVA

BATCH QC REPORT ORDER E9003484

DATE REPORTED : 04/04/90

Page 1

MATRIX QC ACCURACY (SPIKES)

s	DATE	BATCH	SBAR	TRUE	RBAR		PERCENT
PARAMETER	ANALYZED	NUMBER	RESULT	RESULT	RESULT	UNIT	RECOVERY
Fourteen CAM Metals by ICAP							
Silver	03.29.90	64	7.3	10	<0.4	mg/kg	73
Barium	03.29.90	64	570	580	<0.4	mg/kg	98
Beryllium	03.29.90	64	9.8	10	<0.2	mg/kg	98
Cadmium	03.29.90	64	50	56	<0.2	mg/kg	88
■ Cobalt	03.29.90	64	56	61	<0.2	mg/kg	90
Chromium	03.29.90	64	150	160	<0.2	mg/kg	90
Copper	03.29.90	64	130	140	<0.2	mg/kg	90
■ Molybdenum	03.29.90	64	73	100	. <2	mg/kg	. 73
Nickel	03.29.90	64	190	190	<2	mg/kg	100
Lead	03.29.90	64	440	500	<6	mg/kg	88 -
Antimony	03.29.90	64	15	50	<1	mg/kg	30
Thallium	03.29.90	64	72	100	<4	mg/kg	72
Vanadium	03.29.90	64	140	150	<4	mg/kg	90
Zinc	03.29.90	64	250	260	<4	mg/kg	95
<pre>Arsenic</pre>	03.28.90	60	92	100	<1	mg/kg	92
Arsenic	03.28.90	60	120	110	11.5	mg/kg	110
Mercury	03.26.90	42	0.18	0.20	<0.01	mg/kg	90
_Selenium	03.29.90	60	43	. 100	0.8	mg/kg	43
Selenium	03.29.90	60	99	100	0.9	mg/kg	99

BATCH QC REPORT ORDER E9003484

_DATE REPORTED : 04/04/90

Page 1

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

	DATE ANALYZED	BATCH	BLANK RESULT	RDL	UNIT
PARAMETER Fourteen CAM Metals by ICAP	MARTIED	NONDER	RESOLI	102	0
Silver	03.29.90	64	0.36	0.4	mg/kg
Barium	03.29.90	64	0	1	mg/kg
Beryllium	03.29.90	64	Ö	0.2	mg/kg
Cadmium	03.29.90	64	0.20	0.8	mg/kg
Cobalt Cobalt	03.29.90	64	0	0.6	mg/kg
Chromium	03.29.90	64	0.38	1	mg/kg
Copper	03.29.90	64	0	2	mg/kg
Molybdenum	03.29.90	64	0.52	2	mg/kg
Nickel	03.29.90	64	0.14	0.6	mg/kg
Lead	03.29.90	64	0	6	mg/kg
Antimony	03.29.90	64	0	1	mg/kg
Thallium	03.29.90	64	1.9	4	mg/kg
Vanadium	03.29.90	64	0.020	0.6	mg/kg
Zinc	03.29.90	64	0	0.2	mg/kg
Fourteen CAM Metals by ICAP	05027070				•
Silver	03.29.90	64	0.012	0.4	mg/kg
Barium	03.29.90	64	0	1	mg/kg
Beryllium	03.29.90	64	0	0.2	mg/kg
Cadmium	03.29.90	64	0.005	0.8	mg/kg
Cobalt	03.29.90	64	0.008	0.6	mg/kg
Chromium	03.29.90	64	0	1	mg/kg
Copper	03.29.90	64	0.020	2	mg/kg
Molybdenum	03.29.90	64	0.011	2	mg/kg
Nickel	03.29.90	64	0	0.6	mg/kg
■ Lead	03.29.90	64	0	6	mg/kg
Antimony	03.29.90	64	0.20	1	mg/kg
Thallium	03.29.90	64	0.18	4	mg/kg
Vanadium	03.29.90	64	0	0.6	mg/kg
Zinc	03.29.90	64	0	0.2	mg/kg
Arsenic	03.28.90	60	0.020	0.4	mg/kg
Arsenic	03.28.90	60	0.010	0.4	mg/kg
ercury	03.26.90	42	0	0.0001	mg/L
dercury	03.26.90	42	0	0.0001	mg/L
Mercury	03.26.90	42	0	0.0001	mg/L
■Selenium	03.28.90	60	0	0.4	mg/kg
Selenium	03.28.90	60	0.026	0.4	mg/kg

SAMPLES	SAMPLE DESCRIPTION	DETERM CODE	DATE ANALYZED	METHOD	EQUIP.	BATCH	ID.NO
9003484*1	B-24-6.0	HG	03.29.90 03.28.90 03.26.90 03.28.90 03.27.90	7060 7471 7740	515-01 514-01 514-02 514-01	64 60 42 60	7036 7379 7753 7379 7553

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

GEOMATRIX CONSULTANTS

ONE MARKET PLAZA SPEAR STREET TOWER SUITE 717 SAN FRANCISCO, CALIFORNIA 94105

Chain of Custody Record

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PROJ	ECT N	10.	- · · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	T				ΔN					-/-						PAGE .		<u> </u>	 -
	459	<u>15</u>			│	METALS							BIXE!							REMA	RKS		
SAMP	SAMPLERS: (SIGNATURE)					POLLUTANT MET	D 624		0 601	D 602		HYDROCARBONS	Section By	-		METALS		CONTAINERS	HA 08	MPLE PRE	ROCEC S, ET	URES.	
DATE	TIME	SA	AMPL JMBE	E	GENERAL MINERAL	PRIORITY PO	EPA METHOD	EPA METHOD	EPA METHOD	EPA METHOD	EPA METHO	PETROLEUM P	Leverine	3240,	8270	CAN W		NUMBER OF		-18421	3.2	76	
3/13	11.40 11.45	R-2 R-2 R-2	<u>3- (</u> <u>4-</u> (e. O									* X X	X	X /	X				All so formp cooled 1-hart N 7/	Celap PH Vis	al or	(Ly
																			Me	HAP(A) That of the contract of	829 829 913	96k 10/8:)
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LOG NO: E90-03-571

Received: 15 MAR 90 Reported: 20 MAR 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Purchase Order: 1459E

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, S	SOIL SAMPLES		D.A	ATE SAMPLED
03-571-1 03-571-2 03-571-3	B-25-10.5 B-26-6.0 B-26-23.5			•	15 MAR 90 15 MAR 90 15 MAR 90
PARAMETER			03-571-1		03-571-3
TPH-Volatile	Hydrocarbons/BTEX	·			
Date Analy	zed		03.15.90	03.15.90	03.15.90
Dilution Fa	actor, Times		1	1	1
Benzene, mg	g/kg		<0.3	<0.3	<0.3
Ethylbenzer	ne, mg/kg		<0.3	<0.3	<0.3
Toluene, mg	g/kg		<0.3	<0.3	<0.3
Total Xyler	ne Isomers, mg/kg		<0.3	<0.3	<0.3
	Hydrocarbons, mg/kg		<10	<10	<10
Other TPH-	-Volatile Hydrocarbons	/BTEX			

Sim D. Lessley, Ph.D.,/Laboratory Director



BROWN AND CALDWELL ANALYTICAL LABORATORIES

BATCH QC REPORT

Definitions and Terms

Accuracy:

The ability of a procedure to determine the "true" concentration of an

analyte.

Batch:

A group of samples analyzed sequentially using the same calibration curve,

reagents, and instrument.

Laboratory Control Standard (LCS):

Laboratory reagent water spiked with known compounds and subjected to the same procedures as the samples. The LCS thus indicates the accuracy

of the analytical method and, because it is prepared from a different source than the standard used to calibrate the instrument, it also serves to double-

check the calibration.

LC Result:

Laboratory result of an LCS analysis.

LT Result:

Expected result, or true value, of the LCS analysis.

Matrix OC:

Quality control tests performed on actual client samples. For most inorganic

analyses, the laboratory uses a pair of duplicate samples and a spiked sample. For most organic analyses, the laboratory uses a pair of spiked

samples (duplicate spikes).

Percent Recovery:

The percentage of analyte recovered.

For LCS, the percent recovery calculation is

LC ÷ LT x 100.

For spike recoveries, the percent recovery calculation is

(S Bar - Sample Concentration) x 100

Spike Amount

Precision:

The reproducibility of a procedure demonstrated by the agreement between

analyses performed on either duplicates of the same sample or a pair of

duplicate spikes.

R1, R2 Result:

Result of the analysis of replicate aliquots of a sample, with R1 indicating

the first analysis of the sample and R2 its corresponding duplicate; used to

determine precision.

Relative Percent Difference (RPD):

Calculated using one of the following:

 $\frac{(R1 - R2) \times 100}{(R1 + R2) \div 2}$

 $\frac{(S1 - S2) \times 100}{(S1 + S2) \div 2}$

S Bar Result:

The average of spike analysis results.

S1, S2 Result:

Result of the analysis of replicate spiked aliquots, with S1 indicating one spike of the sample and S2 the second spike; used to determine precision

and accuracy.

True value:

The theoretical, or expected, result of a spike sample analysis.

BATCH QC REPORT ORDER E9003571

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LABORATORY CONTROL STANDARDS

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	DATE	BATCH	LC	LT		PERCENT
ARAMETER	ANALYZED	NUMBER	RESULT	RESULT	UNIT	RECOVERY
PH-Volatile Hydrocarbons/BTEX						
Dilution Factor	03.18.90	76	1	1	Times	100
■ Benzene	03.18.90	76	100	100	ug/L	100
Ethylbenzene	03.18.90	76	110	100	ug/L	110
Toluene	03.18.90	76	100	100	ug/L	100
Total Xylene Isomers	03.18.90	76	240	200	ug/L	120
C4 to C12 Hydrocarbons	03.18.90	76	1000	1100	ug/L	91

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MATRIX QC PRECISION (DUPLICATE SPIKES)

ARAMETER	DATE ANALYZED	BATCH NUMBER	S1 RESULT	S2 RESULT	UNIT	% DIFF
PH-Volatile Hydrocarbons/BTEX						
Dilution Factor	03.15.90	76	1	1	Times	0
Benzene	03.15.90	76	5.1	5.2	mg/kg	2
Ethylbenzene	03.15.90	76	5.4	5.5	mg/kg	2
Toluene	03.15.90	76	. 5.3	5.4	mg/kg	2
Total Xylene Isomers	03.15.90	76	12	. 12	mg/kg	0
C4 to C12 Hydrocarbons	03.15.90	76	50	50	mg/kg	0

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MATRIX QC ACCURACY (SPIKES)

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ARAMETER PH-Volatile Hydrocarbons/BTEX	DATE ANALYZED	BATCH NUMBER	SBAR RESULT	TRUE VALUE	UNIT	PERCENT RECOVERY
Benzene	03.15.90	76	5.15	5	mg/kg	103
Ethylbenzene	03.15.90	76	5.45	5	mg/kg	109
Toluene	03.15.90	76	5.35	5	mg/kg	107
Total Xylene Isomers	03.15.90	76	12	10	mg/kg	120
C4 to C12 Hydrocarbons	03.15.90	76	50	5 3	mg/kg	94

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METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

PARAMI		DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT
₹PH-Ve	olatile Hydrocarbons/BTEX				••.	. .
Dar	te Analyzed	03.15.90	76	03.15.90	NA	Date
	lution Factor	03.15.90	76	1	NA	Times
Di. Ber	nz e ne	03.15.90	76	0.020	0.1	mg/kg
	hylbenzene	03.15.90	76	0.017	0.1	mg/kg
σ-1	luene	03.15.90	76	0.023	0.1	mg/kg
Tot	tal Xylene Isomers	03.15.90	76	0.075	0.1	mg/kg
C 4	to Cl2 Hydrocarbons	03.15.90	76	0.57	5	mg/kg

BC ANALYTICAL: EMVL LAB: 11:59:39 21 MAR 1990 - F. 1.

SAMPLES	SAMPLE DESCRIPTION	DETERM CODE	DATE ANALYZED	METHOD	EQUIP.	BATCH	ID.NO
9003571*1	B-25-10.5	GASOLINE.5030.B	03.15.90	5030/8015	516-19	76	7194
9003571*2	B-26-6.0	TEX GASOLINE.5030.B TEX	03.15.90	5030/8015	516-19	76	7194
9003571*3	B-26-23.5	GASOLINE.5030.B	03.15.90	5030/8015	516-19	76	7194

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

9003 571

GEOMATRIX CONSULTANTS ONE MARKET PLAZA SPEAR STREET TOWER SUITE 717 SAN FRANCISCO, CALIFORNIA 94105 (415) 957-9557													ha					Cu	ouse1 stody Record
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LOG NO: E90-04-765

Received: 25 APR 90 Reported: 04 MAY 90

Ms. Cheri Young Geomatrix Consultants 1 Market Plaza, Spear Tower, Ste.717 San Francisco, California 94105

Project: 1459E

REPORT OF ANALYTICAL RESULTS

Page 1

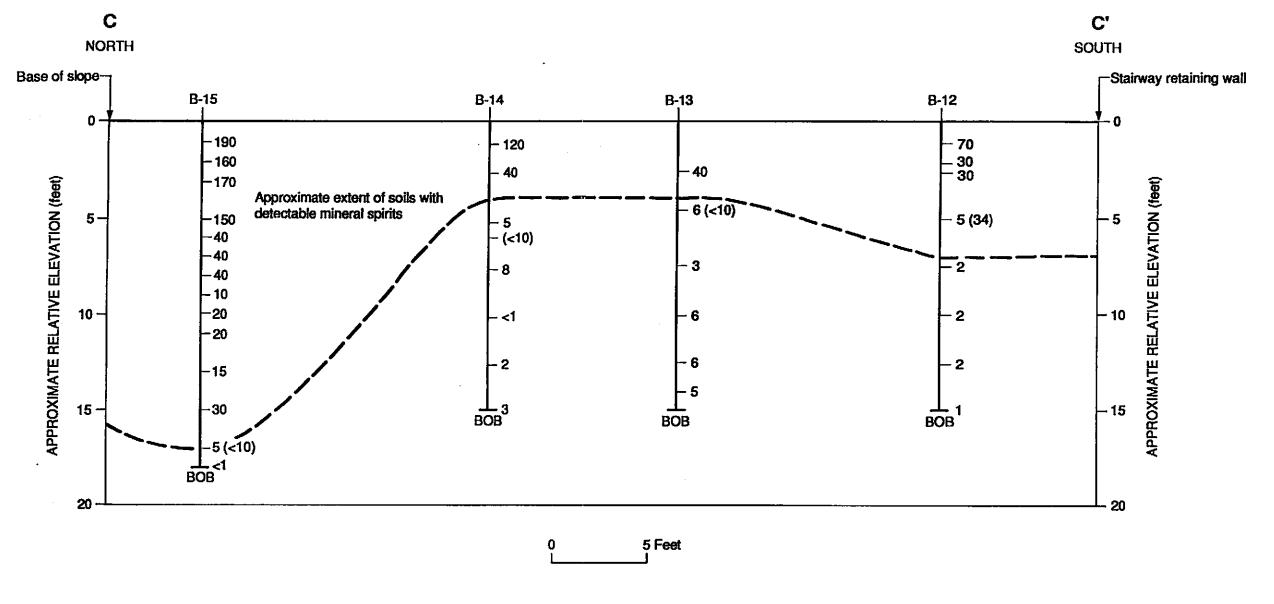
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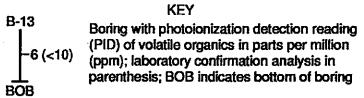
Sim D. Lessley, Ph.D., Laboratory Director



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1200 Pacifico Avenue, Anaheim, CA 92805 (714) 978-0113





CROSS SECTION BEHIND MECHANICAL BUILDING
Kaiser Hospital
Oakland, California

GEOMATRIX

Project No. Figure
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