GROUNDWATER MONITORING AND SAMPLING REPORT

Pacific Gas and Electric Company
Oakland Power Plant
50 Martin Luther King, Jr. Way
Oakland, California

PG&E Project No. 0530-EC
Alisto Project No. 10-179-01-002

Prepared for:

Pacific Gas and Electric Company
3400 Crow Canyon Road
San Ramon, California

Prepared by:

Alisto Engineering Group
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Walnut Creek, California

January 24, 1994

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Principal

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January 24, 1994

INTRODUCTION

This report presents the results and findings of the December 28, 1993 groundwater monitoring and sampling conducted by Alisto Engineering Group at Pacific Gas and Electric Company's Oakland Power Plant, 50 Martin Luther King Jr. Way, Oakland, California. A site vicinity map is shown in Figure 1.

FIELD PROCEDURES

Field activities were performed in accordance with the procedures and guidelines of the Alameda County Health Care Services Agency and the California Regional Water Quality Control Board, San Francisco Bay Region.

Before purging and sampling, the groundwater level in each well was measured from a permanent mark on top of the casing to the nearest 0.01 foot using an electronic sounder. The depth to groundwater and top of casing elevation data were used to calculate the groundwater elevation in each well. The survey data and groundwater elevation measurements collected to date are presented in Table 1. The field procedures for groundwater monitoring well sampling are presented in Appendix A.

SAMPLING AND ANALYTICAL RESULTS

The results of monitoring and laboratory analysis of the groundwater samples for this and the previous quarter are summarized in Table 1. The potentiometric groundwater elevations as interpreted from the results of this monitoring event are shown in Figure 2. The field procedures for chain of custody documentation, laboratory report, and chain of custody record are presented in Appendix B.

SUMMARY OF FINDINGS

The findings of the December 28, 1993 groundwater monitoring and sampling event are summarized as follows:

- Free product was not observed in any of the groundwater monitoring wells.
- Groundwater elevation data indicate a gradient of 0.005 foot per foot in a northwest direction.
- No detectable concentrations of total petroleum hydrocarbons as diesel (TPH-D) were detected in the samples collected from wells MW-1-3 or MW-2-3 above the reported detection limits. TPH-D was detected at a concentration of 200 micrograms per liter in the sample collected from MW-1-2.
- Benzene, toluene, ethylbenzene, and total xylenes were not detected in any of the groundwater samples collected from the monitoring wells.

TABLE 1 - SUMMARY OF RESULTS OF GROUNDWATER SAMPLING
PACIFIC GAS AND ELECTRIC COMPANY'S OAKLAND POWER PLANT
50 MARTIN LUTHER KING, JR. WAY, OAKLAND, CALIFORNIA

ALISTO PROJECT NUMBER 10-179

WELL ID		DATE OF SAMPLING/ MONITORING	CASING ELEVATION (a) (Feet)	DEPTH TO WATER (Feet)	GROUNDWATER ELEVATION (b) (Feet)	TPH-D (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	LAB
MW-1-2		06/22/93	13.95	5.05	8.90	1500	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-2		09/22/93	13.95	5.91	8.04	240	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-1	(c)	09/22/93	---	---	---	—	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-2		12/28/93	13.95	4.77	9.18	200	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-1	(c)	12/28/93	---	---	---	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-3		06/22/93	14.01	5.15	8.86	160	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-3		09/22/93	14.01	5.57	8.44	430	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-3		12/28/93	14.01	5.13	8.88	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-2-3		06/22/93	13.91	5.00	8.91	560	3.1	ND<0.5	ND<0.5	ND<0.5	CHR
MW-2-3		09/22/93	13.91	5.50	8.41	460	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-2-3		12/28/93	13.91	4.74	9.17	ND<50 (d)	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-2	(e)	06/22/93	---	---	0.00	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-2	(e)	09/22/93	---	---	0.00	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-2	(e)	12/28/93	---	---	0.00	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR

ABBREVIATIONS:

TPH-D	Total petroleum hydrocarbons as diesel
B	Benzene
T	Toluene
E	Ethylbenzene
X	Total xylenes
—	Not analyzed/measured/applicable
ppb	Parts per billion
ND	Not detected at or above reported detection limits
CHR	Chromalab, Inc.

NOTES:

(a)	Top of casing elevations surveyed relative to mean sea level.
(b)	Groundwater elevation in feet above mean sea level.
(c)	Blind duplicate.
(d)	Motor oil at a concentration of 2.9 mg/l detected in sample.
(e)	Travel blank

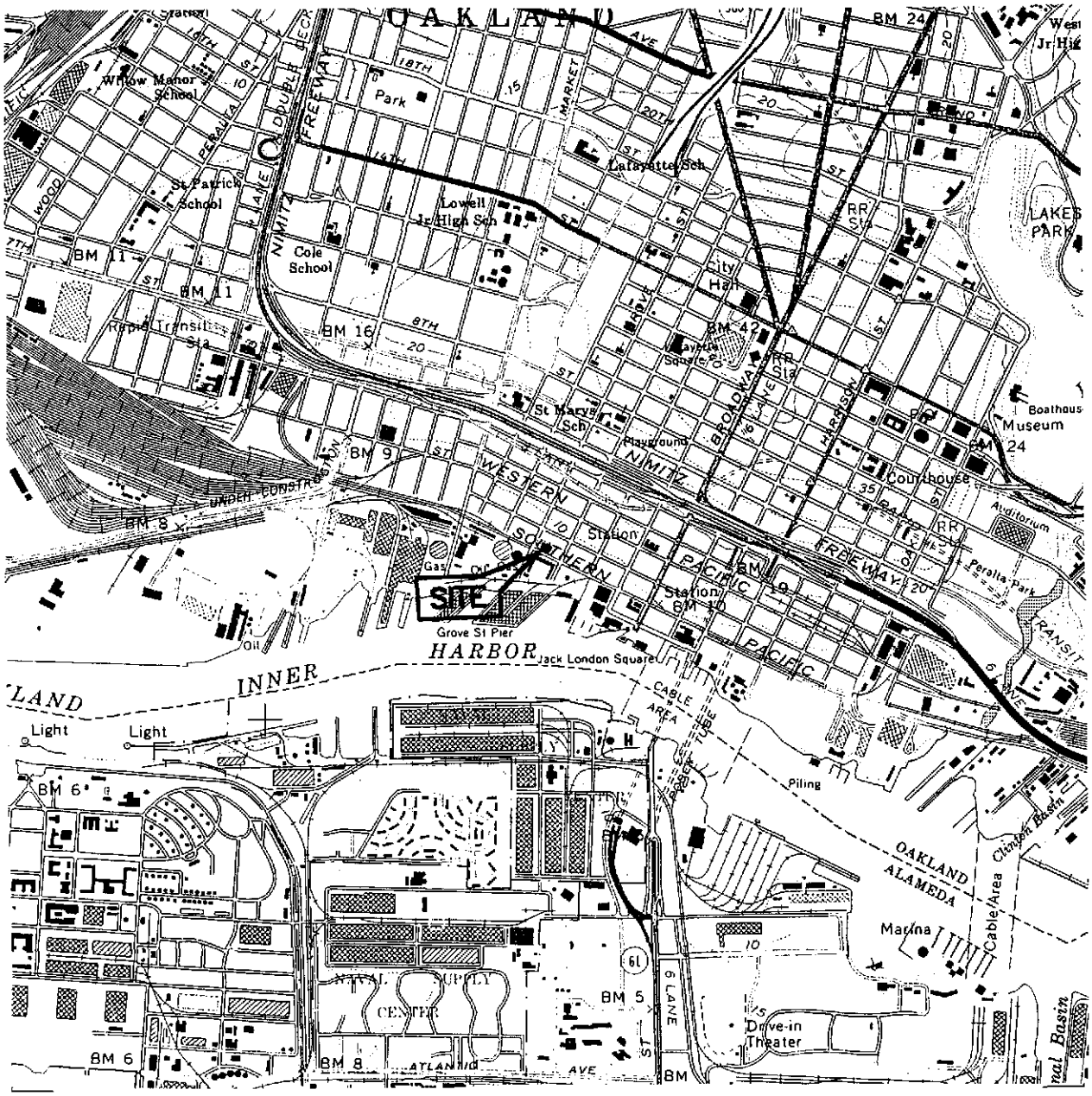

FIGURE 1

SITE VICINITY MAP

PACIFIC GAS AND ELECTRIC
OAKLAND POWER PLANT
50 MARTIN LUTHER KING JR. WAY
OAKLAND, CALIFORNIA

PROJECT NO. 10–179

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

EMBARCADERO WAY

MARTIN LUTHER KING JR. WAY

JEFFERSON STREET

TURBINE #1

TURBINE #2

TURBINE #3

DIESEL DUMP TANK #1

DIESEL DUMP TANK #2

DIESEL DUMP TANK #3

STACK

STACK

CATCH BASIN

CATCH BASIN

TRANSFORMER

MW-1-2
(9.18)

MW-1-3
(8.88)

MW-2-3
(9.17)

8.90

9.00

9.10

0.005

5,000 GALLON GROUNDWATER COLLECTION TANK

10,000 GALLON OILY WATER WASTE TANK

N

0 30 60

SCALE IN FEET

LEGEND

- GROUNDWATER MONITORING WELL
- (8.04) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 8.10 GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (CONTOUR INTERVAL-0.10 FOOT)
- 0.005 CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE IN FOOT PER FOOT

FIGURE 2

POTENTIOMETRIC GROUNDWATER ELEVATION CONTOUR MAP

DECEMBER 28, 1993

PACIFIC GAS AND ELECTRIC
OAKLAND POWER PLANT
50 MARTIN LUTHER KING JR. WAY
OAKLAND, CALIFORNIA

PROJECT NO. 10-179

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

10179D-1.DWG 1-20-94 RRW 1-30

APPENDIX A

FIELD PROCEDURES FOR GROUNDWATER MONITORING WELL SAMPLING AND WATER SAMPLING FIELD SURVEY FORMS

FIELD PROCEDURES
FOR
GROUNDWATER MONITORING WELL SAMPLING

Groundwater Level Measurement

Before commencing groundwater sampling activities, the groundwater level in each well was measured from the marked survey reference point at the top of the well casing. Groundwater in each well was monitored for the presence or absence of free product or sheen. The depth to groundwater was measured to an accuracy of 0.01 foot from the top of the polyvinyl chloride well casing using an electronic sounder.

Groundwater Monitoring Well Sampling

To ensure that the groundwater sample was representative of the aquifer, the wells were purged of 3 well casing volumes before sample collection unless the monitoring well would not produce sufficient groundwater. This purging was accomplished using a clean bailer or pump.

The groundwater samples were collected using a disposable bailer, and then carefully transferred into the appropriate clean, glass, laboratory-supplied containers. Care was taken to avoid turbulence when transferring the water samples, and all volatile analysis vials were filled so that no air bubbles were trapped. The sampling technician wore nitrile gloves at all times during purging and well sampling. The samples were clearly labeled with the well number, site identification, date and time of sample collection, and sampler's initials, and transported in an iced cooler maintained at 4 degrees Centigrade to a California-certified laboratory following proper preservation and chain of custody protocol.

ALISTO ENGINEERING GROUP
GROUNDWATER MONITORING

Client: PGE
Alisto Project No: 10-179-01-002
Service Station No: OAKLAND

Date: 12-28-93
Field Personnel: DJB/RCH
Site Address: 50 M.L.K. JR. WAY

FIELD ACTIVITY:

Groundwater Monitoring
(Groundwater Sampling)
Well Development

QUALITY CONTROL SAMPLES:

MW-1-2 QC-1 Sample Duplicate (Well ID)
X QC-2 Trip Blank
QC-3 Rinsate Blank

Well ID	Well Diam	Order Measured/ Sampled	Total Depth	Depth to Water	Depth to Product	Product Thick-ness	Comments
MW-1-2	4"	3 / 3	13.62	4.77			QC-1 MW-1-2
MW-2-3	4"	1 / 1	13.30	4.74			MW-2-3
MW-1-3	4"	2 / 2	7.24	5.13			MW-1-3

Notes: Ph meter calibrated w/ 7.00 and 10.00 PH solutions at 71°.

ALISTO ENGINEERING GROUP
Groundwater Development and Sampling Form

Client: PGE
Alisto Project No: 10-179-1-2
Service Station No:

Date: 12-28-93
Field Personnel: DJB
Address: 50 MLK JR WAY OAKLAND

Well ID: MW2-3 Field Activity: Well Development Well Sampling Product Bailing

Casing Diameter:

__2 Inch (0.16 Gal/foot)
__3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
__4.5 Inch (0.83 Gal/foot)
__6 Inch (1.47 Gal/foot)

Purge Method:

X Pump (dispos. Poly Tubing)
__Disposable Bailers
__Other
__1.66 PVC Standard Bailer
__3.50 PVC Standard Bailer

Well Data:

____Depth to Product
____Product Thickness
____Depth to Water

Sampling Method:

X Disposable Bailer
____Pump

Decontamination Method:

____ Triple Rinse (Liquinox)
____ Steam Cleaned

MW-2-3

Calculated Purge Volume

13.30 (Total Depth of Well) - 4.74 (Depth to Water) = 8.56 ft (Water Column) X .65 Gal/Ft (Conversion Factor) = 5.5 Gal (Casing Vol) X 3 (Vols to Purge) = 16.7 (Total Volume)

Well Development/Sampling Parameters

Time	Temp °F	pH	Cond. (umhos/cm) X1000	Purge Vol (Gal)	Comments/ Turbidity
1125	65.3	7.98	2.23 ~~65.3~~	5	101.7 NTU
1127	65.9	7.64	2.25	10	51.9 NTU / Purged Dry
1135	61.3	7.26	2.11	11	42.7 NTU / Purged Dry

Analysis Required		Container Type	Preserv.
X	~~TPH-~~ ~~g~~/BTEX	VOA	HCL
X	TPH-Diesel	Amber Liter	Solvent Rinsed
	EPA 601	VOA	
	TOG 5520BF	Amber Liter	H_2SO_4

Purged dry at 10 gallons, 11 gallons allowed recharge before sampling.

ALISTO ENGINEERING GROUP
Groundwater Development and Sampling Form

Client: PGE
Alisto Project No: 10-179-01-002
Service Station No: OAKLAND

Date: 12-28-93
Field Personnel: OVBIRCH
Address: 50 MLK Jr. WAY

Well ID: MW-3 Field Activity: Well Development (Well Sampling) Product Bailing

Casing Diameter:

__2 Inch (0.16 Gal/foot)
__3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
__4.5 Inch (0.83 Gal/foot)
__6 Inch (1.47 Gal/foot)

Purge Method:

X Pump (dispos. Poly Tubing)
__Disposable Bailers
__Other
__1.66 PVC Standard Bailer
__3.50 PVC Standard Bailer

Well Data:

___Depth to Product
___Product Thickness
5.13 Depth to Water

Sampling Method:

X Disposable Bailer
___Pump

Decontamination Method:

___ Triple Rinse (Liquinox)
___ Steam Cleaned

MW-1-3

Calculated Purge Volume

7.24 (Total Depth of Well) - 5.13 (Depth to Water) = 2.11 ft (Water Column) X .65 Gal/Ft (Conversion Factor) = 1.37 Gal (Casing Vol) X 3 (Vols to Purge) = 4.11 (Total Volume)

Well Development/Sampling Parameters

Time	Temp °F	pH	Cond. (umhos /cm)	Purge Vol (Gal)	Comments/ (Turbidity)	Analysis Required	Container Type	Preserv.
1200	68.0	7.29	X 1000 2.12	2	59.1 NTUs	X ~~TPH~~/BTEX	VOA	HCL
1205	69.3	7.19	2.12	4	70.2	X TPH-Diesel	Amber Liter	Solvent Rinsed
1209	59.4	7.17	2.17	5	71.3	EPA 601	VOA	
						TOG 5520BF	Amber Liter	H_2SO_4

Purged dry @ 2 gallons, 4 gallons and 5 gallons.

ALISTO ENGINEERING GROUP
Groundwater Development and Sampling Form

Client: PGE
Alisto Project No: 10-179-1-2
Service Station No:

Date: 12-28-93
Field Personnel: DJB
Address: 50 MLK JR WAY OAKLAND

Well ID: MW1-2 Field Activity: Well Development (Well Sampling) Product Bailing

Casing Diameter:

__2 Inch (0.16 Gal/foot)
__3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
__4.5 Inch (0.83 Gal/foot)
__6 Inch (1.47 Gal/foot)

Purge Method:

X Pump (dispos. Poly Tubing)
__Disposable Bailers
__Other
__1.66 PVC Standard Bailer
__3.50 PVC Standard Bailer

Well Data:

__Depth to Product
__Product Thickness
4.77 Depth to Water

Sampling Method:

X Disposable Bailer
__Pump

Decontamination Method:

__ Triple Rinse (Liquinox)
__ Steam Cleaned

MW-1-2

Calculated Purge Volume

7.24 (Total Depth of Well) - 4.77 (Depth to Water) = 2.47 ft (Water Column) X .65 Gal/Ft (Conversion Factor) = 1.60 Gal (Casing Vol) X 3 (Vols to Purge) = 4.8 (Total Volume)

Well Development/Sampling Parameters

Time	Temp °F	pH	Cond. (umhos /cm)	Purge Vol (Gal)	~~Comments~~ Turbidity NTU's		Analysis Required	Container Type	Preserv.
1215	63.3	7.08	X1000 1.14	5	34.8 NTU's	X	~~TPH-~~ B/BTEX	VOA	HCL
1217	62.9	7.10	1.21	6	39.1	X	TPH-Diesel	Amber Liter	Solvent Rinsed
1219	62.7	7.11	1.21	7	35.4		EPA 601	VOA	
							TOG 5520BF	Amber Liter	H_2SO_4

QC-1

APPENDIX B

FIELD PROCEDURES FOR CHAIN OF CUSTODY DOCUMENTATION, LABORATORY REPORT, AND CHAIN OF CUSTODY RECORD

FIELD PROCEDURES
FOR
CHAIN OF CUSTODY DOCUMENTATION

The samples collected were properly handled in accordance with the California Department of Health Services guidelines. Each sample was properly labeled in the field, and immediately stored in coolers and preserved with blue ice for transport to a California-certified laboratory for analysis.

The official chain of custody record accompanied the samples, and included the site and sample identification, date and time of collection, analysis requested, and the name and signature of the sampling technician. When transferring possession of the samples, the transferee signed and dated the chain of custody record.

CHROMALAB, INC.

Environmental Laboratory (1094)

5 DAYS TURNAROUND

RECEIVED
JAN 20 1994

January 6, 1994

ChromaLab File#: 9312326

ALISTO ENGINEERING GROUP INC

Atten: Bill Howell

Project: PGE-SO MLKJR.WAY **Project#:** 10-179-1-2
Submitted: December 29, 1993

re: 5 samples for BTEX analysis.

Matrix: WATER
Sampled on: December 28, 1993 *Analyzed on:* January 3, 1994
Method: EPA 602 *Run#:* 1955

Lab #	SAMPLE ID	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
40354	MW-1-2	N.D.	N.D.	N.D.	N.D.
40355	MW-2-3	N.D.	N.D.	N.D.	N.D.
40356	MW-1-3	N.D.	N.D.	N.D.	N.D.
40357	QC-1	N.D.	N.D.	N.D.	N.D.
40358	QC-2	N.D.	N.D.	N.D.	N.D.
DETECTION LIMITS		0.5	0.5	0.5	0.5
BLANK		N.D.	N.D.	N.D.	N.D.
BLANK SPIKE RECOVERY(%)		102	101	99	102

ChromaLab, Inc.

Jack Kelly
Chemist

Eric Tam
Laboratory Director

2239 Omega Road,#1 • San Ramon, California 94583
(510) 831-1788 • Facsimile (510) 831-8798
Federal ID #68-0140157

CHROMALAB, INC.

Environmental Laboratory (1094)

5 DAYS TURNAROUND

January 6, 1994 ChromaLab File No.: 9312326

ALISTO ENGINEERING GROUP INC

Attn: Bill Howell

RE: Three water samples for Diesel analysis

Project Name: PGE-SO MLKJR.WAY
Project Number: 10-179-1-2
Date Sampled: December 28, 1993 Date Submitted: December 29, 1993
Date Extracted: January 5, 1994 Date Analyzed: January 5, 1994

RESULTS:

Sample I.D.	Diesel (µg/L)
MW-1-2	200
MW-1-3	N.D.
MW-2-3	N.D.*

* 2.9 mg/L of motor oil found in sample.

BLANK	N.D.
SPIKE RECOVERY	99%
DUP SPIKE RECOVERY	105%
DETECTION LIMIT	50
METHOD OF ANALYSIS	3510/8015

ChromaLab, Inc.

Alex Tam
Analytical Chemist

Eric Tam
Laboratory Director

2239 Omega Road,#1 • San Ramon, California 94583
(510) 831-1788 • Facsimile (510) 831-8798
Federal ID #68-0140157

CHROMALAB, INC.

DOHS 1094

SUBM #: 9312326
CLIENT: ALISTO
DUE: 01/06/94
REF: 14620

14620 336/410354-410358

Chain of Custody

DATE 12-28-93 PAGE 1 OF 1

PROJ. MGR. BILL HOWELL
COMPANY ALISTO ENGINEERING
ADDRESS 1777 OAKLAND BLVD., 200
WALNUT CREEK CA

SAMPLERS (SIGNATURE) (PHONE NO.) 408 459 0714

ANALYSIS REPORT

SAMPLE ID.	DATE	TIME	MATRIX	PRESERV.	TPH - Gasoline (EPA 5030, 8015)	~~TPH - Gasoline (5030, 8015)~~ w/BTEX (EPA 602, 8020)	TPH - Diesel (EPA 3510/3550, 8015)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520, B+F, E+F)	PCB (EPA 608, 8080)	PESTICIDES (EPA 608, 8080)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)		METALS: Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	TOTAL LEAD	EXTRACTION (TCLP, STLC)				NUMBER OF CONTAINERS
MW-1-2	12/28/93		WATER	HCl NONE		X	X																		4
MW-2-3	"		"	"		X	X																		4
MW-1-3	"		"	"		X	X																		4
QC-1	"		"	HCl		X																			3
QC-2	"		"	HCl		X																			1

PROJECT INFORMATION

PROJECT NAME: PGE - SO MLK JR. WAY
PROJECT NUMBER: 10-179-1-2
P.O. # 0530 - EC

SAMPLE RECEIPT

TOTAL NO. OF CONTAINERS	16
HEAD SPACE	
REC'D GOOD CONDITION/COLD	
CONFORMS TO RECORD	

TAT: STANDARD 5-DAY | | | 24 | 48 | 72 | OTHER

SPECIAL INSTRUCTIONS/COMMENTS:

	1.	2.	3.
RELINQUISHED BY	[signature]	Manya Reid 1200	
(SIGNATURE) (TIME)	DANIEL J. BIRCH 0900	Manya Reid 1224	
(PRINTED NAME) (DATE)	12-29-93		
(COMPANY)	BTS	BTS	
RECEIVED BY	Manya Reid		
(SIGNATURE) (TIME)	Manya Reid 0800		[signature] SEAN HALSEY 1200
(PRINTED NAME) (DATE)	BTS		CHROMALAB 12/29
(COMPANY) (LAB)			