WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
QC Level: LEVEL 2
Work Order: 1505404
Project: #B11689; 1950 Bay Road
Client Contact: Karen Emery
Date Received: 5/12/2015
Comments:
Contact's Email: kemery@sca-enviro.com

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1505404-021A	B-2W	Water	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	☐	5/11/2015 15:12	5 days	5%+	☐	
1505404-021B	B-2W	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	5/11/2015 15:12	5 days	5%+	☐	
1505404-021C	B-2W	Water	E200.8 (CAM 17) (Dissolved-Field Filtered)	1	250mL HDPE w/ HNO3	☐	5/11/2015 15:12	5 days	5%+	☐	
1505404-022A	B-3W	Water	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	☐	5/11/2015 15:45	5 days	1%+	☐	
1505404-022B	B-3W	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	5/11/2015 15:45	5 days	1%+	☐	
1505404-022C	B-3W	Water	E200.8 (CAM 17) (Dissolved-Field Filtered)	1	250mL HDPE w/ HNO3	☐	5/11/2015 15:45	5 days	None	☐	
1505404-023A	B-6W	Water	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	☐	5/11/2015 16:10	5 days	5%+	☐	
1505404-023B	B-6W	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	5/11/2015 16:10	5 days	5%+	☐	
1505404-023C	B-6W	Water	E200.8 (CAM 17) (Dissolved-Field Filtered)	1	250mL HDPE w/ HNO3	☐	5/11/2015 16:10	5 days	Present	☐	
1505404-024A	B-8W	Water	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	☐	5/11/2015 16:35	5 days	Present	☐	
1505404-024B	B-8W	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	5/11/2015 16:35	5 days	Present	☐	
1505404-024C	B-8W	Water	E200.8 (CAM 17) (Dissolved-Field Filtered)	1	250mL HDPE w/ HNO3	☐	5/11/2015 16:35	5 days	5%+	☐	
1505404-025A	B-9W	Water	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	4	2 VOAs w/HCL + 2-aVOAs (multi-range)	☐	5/11/2015 16:20	5 days	2%+	☐	

NOTES:
- **STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**
- **MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.**

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
Project: #B11689; 1950 Bay Road
Comments:

QC Level: LEVEL 2
Client Contact: Karen Emery
Contact's Email: kemery@sca-enviro.com

Work Order: 1505404
Date Received: 5/12/2015

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1505404-025B	B-9W	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	5/11/2015 16:20	5 days	2%+	☐	
1505404-025C	B-9W	Water	E200.8 (CAM 17) (Dissolved-Field Filtered)	1	250mL HDPE w/ HNO3	☐	5/11/2015 16:20	5 days	Present	☐	

NOTES:
- **STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**
- **MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.**

1505404

SCA
ENVIRONMENTAL, INC.

CHAIN OF CUSTODY

PAGE 1 OF 2

PROJECT NAME: 1950 Bay Road
PROJECT NO.: B11689 LAB: McCampbell
PROJECT CONTACT: Karen Emery TURNAROUND: 5 Day
TSAMPLED BY: TK

LABORATORY I.D. NUMBER	SCA SAMPLE I.D.	MATRIX				CONTAINERS						PRESERVATIVE						SAMPLE COLLECTION INFORMATION		NOTES	ANALYSIS REQUESTED											
		WATER	SOIL	AIR	SLUDGE	VOA	LITER	POLY	TUBE	GLASS JAR		ICE	HCL	H_2SO_4	HNO_3	OTHER	NONE	DATE (MM/DD/YY)	TIME		TPHg	TPHd and TPHmo with silica gel cleanup	VOCs	CAM 17 (soil)	CAM 17 (Water - field filtered)							
	B-1@2		X									X						5/11/15	13:15		X	X	X	X								
	B-1@7		X									X						5/11/15	13:27		X	X	X	X								
	B-2@2		X									X						5/11/15	08:20		X	X	X	X								
	B-2@5		X									X						5/11/15	08:25		X	X	X	X								
	B-3@2		X									X						5/11/15	09:15		X	X	X	X								
	B-3@10		X									X						5/11/15	09:56		X	X	X	X								
	B-4@2		X									X						5/11/15	14:23		X	X	X	X								
	B-4@7		X									X						5/11/15	14:45		X	X	X	X								
	B-5@2		X									X						5/11/15	14:50		X	X	X	X								
	B-5@5		X									X						5/11/15	14:47		X	X	X	X								
	B-6@2		X									X						5/11/15	09:50		X	X	X	X								
	B-6@7		X									X						5/11/15	10:11		X	X	X	X								
	B-7@2		X									X						5/11/15	12:12		X	X	X	X								
	B-7@10		X									X						5/11/15	13:20		X	X	X	X								
	B-8@2		X									X						5/11/15	11:10		X	X	X	X								

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
Karen Emery for TK	5/12/15 13:45		5-12-15 134
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
	5-12-15 1450		5/12/15 1450
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME

COMMENTS & NOTES:

ICE/t° 3.2
GOOD CONDITION____ APPROPRIATE
HEAD SPACE ABSENT____ CONTAINERS____
DECHLORINATED IN LAB____ PRESERVED IN LAB____

PRESERVATION	VOAS	O&G	METALS	OTHER

SCA
ENVIRONMENTAL, INC.

CHAIN OF CUSTODY

PAGE 2 OF 2

PROJECT NAME: 1950 Bay Road
PROJECT NO.: B11689 LAB: McCampbell
PROJECT CONTACT: Karen Emery TURNAROUND: 5 Day
TSAMPLED BY: TK

LABORATORY I.D. NUMBER	SCA SAMPLE I.D.	MATRIX				CONTAINERS						PRESERVATIVE						SAMPLE COLLECTION INFORMATION			ANALYSIS REQUESTED											
		WATER	SOIL	AIR	SLUDGE	VOA	LITER	POLY	TUBE	GLASS JAR		ICE	HCL	H_2SO_4	HNO_3	OTHER	NONE	DATE (MM/DD/YY)	TIME	NOTES	TPHg	TPHd and TPHmo with silica gel cleanup	VOCs	CAM 17 (soil)	CAM 17 (Water - field filtered)							
	B-8@5		X									X						5/11/15	11:15		X	X	X	X								
	B-9@2																	5/11/15	10:32		X	X	X	X								
	B-9@7																	5/11/15	10:44		X	X	X	X								
	B-10@2																	5/11/15	11:37		X	X	X	X								
	B-10@6																	5/11/15	11:55		X	X	X	X								
+5	B-2W +5	X				X		X				X	X		X			5/11/15	15:12		X	X	X		X							
+1	B-3W +	X				X		X				X	X		X			5/11/15	15:45		X	X	X		X							
+5	B-6W +	X				X		X				X	X		X			5/11/15	16:10		X	X	X		X							
+	B-8W +5	X				X		X				X	X		X			5/11/15	16:35		X	X	X		X							
+2	B-9W +	X				X		X				X	X		X			5/11/15	16:20		X	X	X		X							

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) For TK Karen Em 5/12/15	DATE/TIME 1345	RECEIVED BY: (Signature)	DATE/TIME 5-12-15 1345
RELINQUISHED BY: (Signature) 5-12-15 1480	DATE/TIME	RECEIVED BY: (Signature) Maria	DATE/TIME 5/12/15 14
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME

COMMENTS & NOTES:

Sample Receipt Checklist

Client Name: **SCA Enviromental, Inc.**
Date and Time Received: **5/12/2015 3:13:37 PM**
Project Name: **#B11689; 1950 Bay Road**
LogIn Reviewed by: Maria Venegas
WorkOrder №: **1505404**
Matrix: Soil/Water
Carrier: Bernie Cummins (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Sample/Temp Blank temperature	Temp: 3.2°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☑	No ☐	NA ☐
Sample labels checked for correct preservation?	Yes ☑	No ☐	
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?	Yes ☑	No ☐	NA ☐
Samples Received on Ice?	Yes ☑	No ☐	
	(Ice Type: WET ICE)		

UCMR3 Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522?	Yes ☐	No ☐	NA ☑
Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539?	Yes ☐	No ☐	NA ☑

** NOTE: If the "No" box is checked, see comments below.*

Comments:

McCampbell Analytical, Inc.
"When Quality Counts"

Analytical Report

WorkOrder: 1505404 A

Report Created for: SCA Enviromental, Inc.

334 19th Street
Oakland, CA 94612

Project Contact: Karen Emery
Project P.O.:
Project Name: #B11689; 1950 Bay Road

Project Received: 05/12/2015

Analytical Report reviewed & approved for release on 05/27/2015 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

Glossary of Terms & Qualifier Definitions

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Road
WorkOrder: 1505404

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

Analytical Qualifiers

S	spike recovery outside accepted recovery limits
a1	sample diluted due to matrix interference
b1	aqueous sample that contains greater than ~1 vol. % sediment
c2	surrogate recovery outside of the control limits due to matrix interference.
d7	strongly aged gasoline or diesel range compounds are significant in the TPH(g) chromatogram
e2	diesel range compounds are significant; no recognizable pattern
e7	oil range compounds are significant

Glossary of Terms & Qualifier Definitions

Client:	SCA Enviromental, Inc.
Project:	#B11689; 1950 Bay Road
WorkOrder:	1505404

Quality Control Qualifiers

F1	MS/MSD recovery and/or RPD was out of acceptance criteria; LCS validated the prep batch.

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1505404
Project:	#B11689; 1950 Bay Road	**Extraction Method:**	CA Title 22
Date Received:	5/12/15 15:13	**Analytical Method:**	SW6010B
Date Prepared:	5/24/15	**Unit:**	mg/L

STLC Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-1@2	**1505404-001A**	**Soil**	**05/11/2015 13:15**	**ICP-JY**	**105160**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.17**	0.050	1	05/26/2015 16:23

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-2@2	**1505404-003A**	**Soil**	**05/11/2015 08:20**	**ICP-JY**	**105239**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.15**	0.050	1	05/26/2015 16:26

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-4@2	**1505404-007A**	**Soil**	**05/11/2015 14:23**	**ICP-JY**	**105239**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.11**	0.050	1	05/26/2015 16:31

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-7@2	**1505404-013A**	**Soil**	**05/11/2015 12:12**	**ICP-JY**	**105239**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.14**	0.050	1	05/26/2015 16:43

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1505404
Project:	#B11689; 1950 Bay Road	**Extraction Method:**	CA Title 22
Date Received:	5/12/15 15:13	**Analytical Method:**	SW6010B
Date Prepared:	5/24/15	**Unit:**	mg/L

STLC Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-7@10	**1505404-014A**	**Soil**	**05/11/2015 13:20**	**ICP-JY**	**105239**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.052**	0.050	1	05/26/2015 16:45

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-9@2	**1505404-017A**	**Soil**	**05/11/2015 10:32**	**ICP-JY**	**105239**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.16**	0.050	1	05/26/2015 16:48

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-10@2	**1505404-019A**	**Soil**	**05/11/2015 11:37**	**ICP-JY**	**105239**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.086**	0.050	1	05/26/2015 16:50

Analyst(s): DVH

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Road
Date Received: 5/12/15 15:13
Date Prepared: 5/24/15
WorkOrder: 1505404
Extraction Method: CA Title 22
Analytical Method: SW6010B
Unit: mg/L

STLC Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-3@2	1505404-005A	Soil	05/11/2015 09:15	ICP-JY	105239

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.11**	0.050	1	05/26/2015 16:28
Lead	**1.1**	0.20	1	05/26/2015 16:28

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-5@2	1505404-009A	Soil	05/11/2015 14:50	ICP-JY	105239

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.33**	0.050	1	05/26/2015 16:33
Lead	**1.4**	0.20	1	05/26/2015 16:33

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-6@2	1505404-011A	Soil	05/11/2015 09:50	ICP-JY	105239

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.16**	0.050	1	05/26/2015 16:35
Lead	**0.58**	0.20	1	05/26/2015 16:35

Analyst(s): DVH

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1505404
Project:	#B11689; 1950 Bay Road	**Extraction Method:**	SW1311/SW3010
Date Received:	5/12/15 15:13	**Analytical Method:**	SW6010B
Date Prepared:	5/22/15	**Unit:**	mg/L

TCLP Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-1@2	**1505404-001A**	**Soil**	**05/11/2015 13:15**	**ICP-JY**	**105334**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	05/26/2015 17:18

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-2@2	**1505404-003A**	**Soil**	**05/11/2015 08:20**	**ICP-JY**	**105334**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	05/26/2015 17:20

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-4@2	**1505404-007A**	**Soil**	**05/11/2015 14:23**	**ICP-JY**	**105334**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	05/26/2015 17:23

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-7@10	**1505404-014A**	**Soil**	**05/11/2015 13:20**	**ICP-JY**	**105334**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	05/26/2015 17:30

Analyst(s): DVH

(Cont.)

Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1505404
Project:	#B11689; 1950 Bay Road	**Extraction Method:**	SW1311/SW3010
Date Received:	5/12/15 15:13	**Analytical Method:**	SW6010B
Date Prepared:	5/22/15	**Unit:**	mg/L

TCLP Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-9@2	**1505404-017A**	**Soil**	**05/11/2015 10:32**	**ICP-JY**	**105334**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	05/26/2015 17:33

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-10@2	**1505404-019A**	**Soil**	**05/11/2015 11:37**	**ICP-JY**	**105334**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	05/26/2015 17:35

Analyst(s): DVH

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1505404
Project:	#B11689; 1950 Bay Road	**Extraction Method:**	SW1311/SW3010
Date Received:	5/12/15 15:13	**Analytical Method:**	SW6010B
Date Prepared:	5/22/15	**Unit:**	mg/L

TCLP Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-3@2	**1505404-005A**	**Soil**	**05/11/2015 09:15**	**ICP-JY**	**105334**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	05/26/2015 14:27
Lead	ND	0.20	1	05/26/2015 14:27

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-5@2	**1505404-009A**	**Soil**	**05/11/2015 14:50**	**ICP-JY**	**105334**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	05/26/2015 17:25
Lead	ND	0.20	1	05/26/2015 17:25

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
B-6@2	**1505404-011A**	**Soil**	**05/11/2015 09:50**	**ICP-JY**	**105334**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	05/26/2015 17:28
Lead	ND	0.20	1	05/26/2015 17:28

Analyst(s): DVH

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1505404
Date Prepared:	5/21/15	**BatchID:**	105239
Date Analyzed:	5/26/15	**Extraction Method:**	CA Title 22
Instrument:	ICP-JY	**Analytical Method:**	SW6010B
Matrix:	Soil	**Unit:**	mg/L
Project:	#B11689; 1950 Bay Road	**Sample ID:**	MB/LCS-105239 1505864-001AMS/MSD

QC Summary Report for Metals (STLC)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Chromium	ND	1.02	0.050	1	-	102	75-125
Lead	ND	0.963	0.20	1	-	96	75-125

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Chromium	1.10	1.11	1	0.09414	101	102	70-130	0.813	30
Lead	1.05	1.03	1	ND	105	102	70-130	2.31	30

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1505404
Date Prepared:	5/22/15	**BatchID:**	105334
Date Analyzed:	5/26/15	**Extraction Method:**	SW1311/SW3010
Instrument:	ICP-JY	**Analytical Method:**	SW6010B
Matrix:	Soil	**Unit:**	mg/L
Project:	#B11689; 1950 Bay Road	**Sample ID:**	MB/LCS-105334 1505404-005AMS/MSD

QC Summary Report for Metals (TCLP)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Chromium	ND	1.03	0.050	1	-	103	75-125
Lead	ND	1.02	0.20	1	-	102	75-125

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Chromium	1.06	1.01	1	ND	106	101	70-130	5.22	30
Lead	1.05	0.930	1	ND	105	93	70-130	12.4	30

QA/QC Officer

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 1505404 **A** **ClientCode: SCAO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Karen Emery
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
(510) 267-2726 FAX: (510) 839- 6200

Email: kemery@sca-enviro.com
cc/3rd Party:
PO:
ProjectNo: #B11689; 1950 Bay Road

Bill to:
Accounts Payable
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
emuise@sca-ic.com

Requested TAT: **5 days**

Date Received: **05/12/2015**
Date Add-On: **05/21/2015**
Date Printed: **05/22/2015**

					Requested Tests (See legend below)											
Lab ID	**Client ID**	**Matrix**	**Collection Date**	**Hold**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1505404-001	B-1@2	Soil	5/11/2015 13:15	☐	A		A									
1505404-003	B-2@2	Soil	5/11/2015 8:20	☐	A		A									
1505404-005	B-3@2	Soil	5/11/2015 9:15	☐		A		A								
1505404-007	B-4@2	Soil	5/11/2015 14:23	☐	A		A									
1505404-009	B-5@2	Soil	5/11/2015 14:50	☐		A		A								
1505404-011	B-6@2	Soil	5/11/2015 9:50	☐		A		A								
1505404-013	B-7@2	Soil	5/11/2015 12:12	☐	A		A									
1505404-014	B-7@10	Soil	5/11/2015 13:20	☐	A		A									
1505404-017	B-9@2	Soil	5/11/2015 10:32	☐	A		A									
1505404-019	B-10@2	Soil	5/11/2015 11:37	☐	A		A									

Test Legend:

1	**STLC_METALS_S**	**2**	**STLC_PBCR_S**	**3**	**TCLP_METALS_S**	**4**	**TCLP_PBCR_S**	**5**	
6		**7**		**8**		**9**		**10**	
11		**12**							

Prepared by: Maria Venegas

Add-On Prepared By: Maria Venegas

Comments: STLC's & TCLP's added 5/21/15 STAT.

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
Project: #B11689; 1950 Bay Road
Comments: STLC's & TCLP's added 5/21/15 STAT.

QC Level: LEVEL 2
Client Contact: Karen Emery
Contact's Email: kemery@sca-enviro.com

Work Order: 1505404
Date Received: 5/12/2015
Date Add-On: 5/21/2015

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1505404-001A	B-1@2	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	5/11/2015 13:15	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1505404-003A	B-2@2	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	5/11/2015 8:20	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1505404-005A	B-3@2	Soil	SW6010B (Chromium & Lead) (TCLP)	1	8OZ GJ	5/11/2015 9:15	5 days*		☐	
			SW6010B (Chromium & Lead) (STLC)				5 days*		☐	
1505404-007A	B-4@2	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	5/11/2015 14:23	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1505404-009A	B-5@2	Soil	SW6010B (Chromium & Lead) (TCLP)	1	8OZ GJ	5/11/2015 14:50	5 days*		☐	
			SW6010B (Chromium & Lead) (STLC)				5 days*		☐	
1505404-011A	B-6@2	Soil	SW6010B (Chromium & Lead) (TCLP)	1	8OZ GJ	5/11/2015 9:50	5 days*		☐	
			SW6010B (Chromium & Lead) (STLC)				5 days*		☐	
1505404-013A	B-7@2	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	5/11/2015 12:12	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1505404-014A	B-7@10	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	Acetate Liner	5/11/2015 13:20	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1505404-017A	B-9@2	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	5/11/2015 10:32	5 days*		☐	

NOTES: **- STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
Project: #B11689; 1950 Bay Road
Comments: STLC's & TCLP's added 5/21/15 STAT.

QC Level: LEVEL 2
Client Contact: Karen Emery
Contact's Email: kemery@sca-enviro.com

Work Order: 1505404
Date Received: 5/12/2015
Date Add-On: 5/21/2015

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1505404-017A	B-9@2	Soil	SW6010B (Metals) (STLC) <Chromium>	1	8OZ GJ	5/11/2015 10:32	5 days*		☐	
1505404-019A	B-10@2	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	5/11/2015 11:37	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	

NOTES: **- STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

1505404

SCA
ENVIRONMENTAL, INC.

CHAIN OF CUSTODY

PAGE 1 OF 2

PROJECT NAME: 1950 Bay Road
PROJECT NO.: B11689 LAB: McCampbell
PROJECT CONTACT: Karen Emery TURNAROUND: 5 Day
TSAMPLED BY: TK

LABORATORY I.D. NUMBER	SCA SAMPLE I.D.	MATRIX				CONTAINERS						PRESERVATIVE						SAMPLE COLLECTION INFORMATION		NOTES	ANALYSIS REQUESTED											
		WATER	SOIL	AIR	SLUDGE	VOA	LITER	POLY	TUBE	GLASS JAR		ICE	HCL	H_2SO_4	HNO_3	OTHER	NONE	DATE (MM/DD/YY)	TIME		TPHg	TPHd and TPHmo with silica gel cleanup	VOCs	CAM 17 (soil)	CAM 17 (Water - field filtered)	STLC Cr 5/21/15 STAT	STLC Pb	TCLP Cr	TCLP Pb			
	B-1@2		X									X						5/11/15	13:15		X	X	X	X		X		X				
	B-1@7		X									X						5/11/15	13:27		X	X	X	X								
	B-2@2		X									X						5/11/15	08:20		X	X	X	X		X		X				
	B-2@5		X									X						5/11/15	08:25		X	X	X	X								
	B-3@2		X									X						5/11/15	09:15		X	X	X	X		X	X	X	X			
	B-3@10		X									X						5/11/15	09:56		X	X	X	X								
	B-4@2		X									X						5/11/15	14:23		X	X	X	X		X		X				
	B-4@7		X									X						5/11/15	14:45		X	X	X	X								
	B-5@2		X									X						5/11/15	14:50		X	X	X	X		X	X	X	X			
	B-5@5		X									X						5/11/15	14:47		X	X	X	X								
	B-6@2		X									X						5/11/15	09:50		X	X	X	X		X	X	X	X			
	B-6@7		X									X						5/11/15	10:11		X	X	X	X								
	B-7@2		X									X						5/11/15	12:12		X	X	X	X		X		X				
	B-7@10		X									X						5/11/15	13:20		X	X	X	X		X		X				
	B-8@2		X									X						5/11/15	11:10		X	X	X	X								

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
Karen Emery for TK	5/12/15 13:45		5-12-15 134
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
	5-12-15 1450	Maria	5/12/15 1450
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME

COMMENTS & NOTES:

ICE/t° 3.2
GOOD CONDITION____
HEAD SPACE ABSENT____
DECHLORINATED IN LAB____
APPROPRIATE CONTAINERS____
PRESERVED IN LAB____

PRESERVATION	VOAS	O&G	METALS	OTHER

*Cancelled - Not enough Sample. Per K.E. 5/22/15

ADVANCED TECHNOLOGY
LABORATORIES

May 22, 2015

Karen Emery
SCA Environmental
650 Delancey St, #222
San Francisco, CA 94107
Tel: (415) 882-1675
Fax:(415) 962-0736

ELAP No.: 1838
CSDLAC No.: 10196
ORELAP No.: CA300003
TCEQ No. : T104704502

Re: ATL Work Order Number : 1501761
Client Reference : 1950 Bay Road, B11689

Enclosed are the results for sample(s) received on May 15, 2015 by Advanced Technology Laboratories. The sample(s) are tested for the parameters as indicated on the enclosed chain of custody in accordance with applicable laboratory certifications. The laboratory results contained in this report specifically pertains to the sample(s) submitted.

Thank you for the opportunity to serve the needs of your company. If you have any questions, please feel free to contact me or your Project Manager.

Sincerely,

Eddie Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and its absence renders the report invalid. Test results contained within this data package meet the requirements of applicable state-specific certification programs. The report cannot be reproduced without written permission from the client and Advanced Technology Laboratories.

Certificate of Analysis

SCA Environmental		Project Number :	1950 Bay Road, B11689
650 Delancey St, #222		Report To :	Karen Emery
San Francisco , CA 94107		Reported :	05/22/2015

SUMMARY OF SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SV-2	1501761-01	Air	5/13/15 14:23	5/15/15 9:00
SV-3	1501761-02	Air	5/13/15 15:08	5/15/15 9:00
SV-6	1501761-03	Air	5/13/15 15:36	5/15/15 9:00

CASE NARRATIVE

Results were J-flagged. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Certificate of Analysis

SCA Environmental	Project Number :	1950 Bay Road, B11689
650 Delancey St, #222	Report To :	Karen Emery
San Francisco , CA 94107	Reported :	05/22/2015

Client Sample ID SV-2

Lab ID: 1501761-01

Volatile Organic Compounds in AIR by TO-15 (ug/m3) **Analyst: MFR**

Analyte	Result (ug/m³)	PQL (ug/m³)	MDL (ug/m³)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	3.4	1.1	2	B5E0557	05/20/2015	05/20/15 23:28	
1,1,1-Trichloroethane	ND	2.7	1.2	2	B5E0557	05/20/2015	05/20/15 23:28	
1,1,2,2-Tetrachloroethane	ND	3.4	1.5	2	B5E0557	05/20/2015	05/20/15 23:28	
1,1,2-Trichloroethane	ND	3.3	0.90	2	B5E0557	05/20/2015	05/20/15 23:28	
1,1-Dichloroethane	ND	2.0	0.74	2	B5E0557	05/20/2015	05/20/15 23:28	
1,1-Dichloroethene	ND	2.0	0.68	2	B5E0557	05/20/2015	05/20/15 23:28	
1,1-Dichloropropene	ND	2.3	0.73	2	B5E0557	05/20/2015	05/20/15 23:28	
1,2,3-Trichloropropane	ND	3.0	1.2	2	B5E0557	05/20/2015	05/20/15 23:28	
1,2,4-Trichlorobenzene	ND	3.7	1.5	2	B5E0557	05/20/2015	05/20/15 23:28	
1,2,4-Trimethylbenzene	**2.9**	2.5	1.1	2	B5E0557	05/20/2015	05/20/15 23:28	
1,2-Dibromo-3-chloropropane	ND	4.8	2.0	2	B5E0557	05/20/2015	05/20/15 23:28	
1,2-Dibromoethane	ND	3.8	1.5	2	B5E0557	05/20/2015	05/20/15 23:28	
1,2-Dichlorobenzene	ND	3.0	1.1	2	B5E0557	05/20/2015	05/20/15 23:28	
1,2-Dichloroethane	ND	2.0	0.69	2	B5E0557	05/20/2015	05/20/15 23:28	
1,2-Dichloropropane	ND	2.3	0.82	2	B5E0557	05/20/2015	05/20/15 23:28	
1,3,5-Trimethylbenzene	ND	2.5	1.0	2	B5E0557	05/20/2015	05/20/15 23:28	
1,3-Butadiene	ND	1.1	0.78	2	B5E0557	05/20/2015	05/20/15 23:28	
1,3-Dichlorobenzene	ND	3.0	1.1	2	B5E0557	05/20/2015	05/20/15 23:28	
1,4-Dichlorobenzene	ND	3.0	1.0	2	B5E0557	05/20/2015	05/20/15 23:28	
1,4-Dioxane	ND	1.8	1.3	2	B5E0557	05/20/2015	05/20/15 23:28	
2,2,4-Trimethylpentane	**47**	2.3	0.70	2	B5E0557	05/20/2015	05/20/15 23:28	
2-Butanone	**1.5**	1.5	0.49	2	B5E0557	05/20/2015	05/20/15 23:28	
2-Chloroethyl vinyl ether	ND	2.2	0.44	2	B5E0557	05/20/2015	05/20/15 23:28	
2-Chlorotoluene	ND	2.6	1.0	2	B5E0557	05/20/2015	05/20/15 23:28	
2-Hexanone	ND	2.0	0.85	2	B5E0557	05/20/2015	05/20/15 23:28	
2-Propanol	ND	1.2	0.52	2	B5E0557	05/20/2015	05/20/15 23:28	
4-Chlorotoluene	ND	2.6	0.95	2	B5E0557	05/20/2015	05/20/15 23:28	
4-Ethyl Toluene	**7.2**	2.5	0.93	2	B5E0557	05/20/2015	05/20/15 23:28	
4-Methyl-2-pentanone	**3.3**	2.0	0.59	2	B5E0557	05/20/2015	05/20/15 23:28	
Acetone	ND	1.2	0.52	2	B5E0557	05/20/2015	05/20/15 23:28	
Acetonitrile	ND	0.84	0.28	2	B5E0557	05/20/2015	05/20/15 23:28	
Acrolein	ND	1.1	0.44	2	B5E0557	05/20/2015	05/20/15 23:28	
Acrylonitrile	ND	1.1	0.35	2	B5E0557	05/20/2015	05/20/15 23:28	
Benzene	**18**	1.6	0.56	2	B5E0557	05/20/2015	05/20/15 23:28	
Benzyl chloride	ND	2.6	0.74	2	B5E0557	05/20/2015	05/20/15 23:28	
Bromobenzene	ND	3.2	1.2	2	B5E0557	05/20/2015	05/20/15 23:28	
Bromodichloromethane	ND	3.4	1.4	2	B5E0557	05/20/2015	05/20/15 23:28	

Certificate of Analysis

SCA Environmental
650 Delancey St, #222
San Francisco , CA 94107

Project Number : 1950 Bay Road, B11689
Report To : Karen Emery
Reported : 05/22/2015

Client Sample ID SV-2

Lab ID: 1501761-01

Volatile Organic Compounds in AIR by TO-15 (ug/m3)

Analyst: MFR

Analyte	Result (ug/m³)	PQL (ug/m³)	MDL (ug/m³)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Bromoform	ND	5.2	1.8	2	B5E0557	05/20/2015	05/20/15 23:28	
Bromomethane	ND	1.9	0.91	2	B5E0557	05/20/2015	05/20/15 23:28	
Carbon disulfide	**31**	1.6	0.61	2	B5E0557	05/20/2015	05/20/15 23:28	
Carbon tetrachloride	ND	3.1	0.85	2	B5E0557	05/20/2015	05/20/15 23:28	
Chlorobenzene	ND	2.3	0.81	2	B5E0557	05/20/2015	05/20/15 23:28	
Chloroethane	ND	1.3	0.56	2	B5E0557	05/20/2015	05/20/15 23:28	
Chloroform	**4.2**	2.4	1.0	2	B5E0557	05/20/2015	05/20/15 23:28	
Chloromethane	ND	1.0	0.44	2	B5E0557	05/20/2015	05/20/15 23:28	
cis-1,2-Dichloroethene	ND	2.0	0.55	2	B5E0557	05/20/2015	05/20/15 23:28	
cis-1,3-Dichloropropene	ND	2.3	0.65	2	B5E0557	05/20/2015	05/20/15 23:28	
Cyclohexane	**23**	1.7	0.51	2	B5E0557	05/20/2015	05/20/15 23:28	
Dibromochloromethane	ND	4.3	1.7	2	B5E0557	05/20/2015	05/20/15 23:28	
Dibromomethane	ND	3.6	1.1	2	B5E0557	05/20/2015	05/20/15 23:28	
Dichlorodifluoromethane	**2.2**	2.5	1.1	2	B5E0557	05/20/2015	05/20/15 23:28	J
Dichlorotetrafluoroethane	ND	3.5	1.5	2	B5E0557	05/20/2015	05/20/15 23:28	
Ethanol	ND	0.94	0.40	2	B5E0557	05/20/2015	05/20/15 23:28	
Ethylbenzene	**10**	2.2	0.70	2	B5E0557	05/20/2015	05/20/15 23:28	
Freon-113	ND	3.8	1.2	2	B5E0557	05/20/2015	05/20/15 23:28	
Hexachlorobutadiene	ND	5.3	2.6	2	B5E0557	05/20/2015	05/20/15 23:28	
Isopropylbenzene	ND	2.5	1.0	2	B5E0557	05/20/2015	05/20/15 23:28	
m,p-Xylene	**53**	8.7	1.5	2	B5E0557	05/20/2015	05/20/15 23:28	
Methylene chloride	ND	1.7	0.62	2	B5E0557	05/20/2015	05/20/15 23:28	
MTBE	ND	1.8	0.67	2	B5E0557	05/20/2015	05/20/15 23:28	
n-Butylbenzene	ND	2.7	0.84	2	B5E0557	05/20/2015	05/20/15 23:28	
n-Propylbenzene	ND	2.5	0.83	2	B5E0557	05/20/2015	05/20/15 23:28	
Naphthalene	ND	2.6	0.72	2	B5E0557	05/20/2015	05/20/15 23:28	
o-Xylene	**9.1**	2.2	0.79	2	B5E0557	05/20/2015	05/20/15 23:28	
p-Isopropyltoluene	**12**	2.7	1.0	2	B5E0557	05/20/2015	05/20/15 23:28	
sec-Butylbenzene	ND	2.7	1.1	2	B5E0557	05/20/2015	05/20/15 23:28	
Styrene	ND	2.1	0.87	2	B5E0557	05/20/2015	05/20/15 23:28	
tert-Butylbenzene	ND	2.7	1.2	2	B5E0557	05/20/2015	05/20/15 23:28	
Tetrachloroethene	**190**	3.4	0.95	2	B5E0557	05/20/2015	05/20/15 23:28	
Toluene	**58**	1.9	0.56	2	B5E0557	05/20/2015	05/20/15 23:28	
trans-1,2-Dichloroethene	ND	2.0	0.67	2	B5E0557	05/20/2015	05/20/15 23:28	
trans-1,3-Dichloropropene	ND	2.3	0.69	2	B5E0557	05/20/2015	05/20/15 23:28	
Trichloroethene	**2.3**	2.7	0.94	2	B5E0557	05/20/2015	05/20/15 23:28	J
Trichlorofluoromethane	**19**	2.8	1.1	2	B5E0557	05/20/2015	05/20/15 23:28	

Certificate of Analysis

SCA Environmental		Project Number :	1950 Bay Road, B11689
650 Delancey St, #222		Report To :	Karen Emery
San Francisco , CA 94107		Reported :	05/22/2015

Client Sample ID SV-2

Lab ID: 1501761-01

Volatile Organic Compounds in AIR by TO-15 (ug/m3) **Analyst: MFR**

Analyte	Result (ug/m³)	PQL (ug/m³)	MDL (ug/m³)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Vinyl acetate	ND	1.8	0.76	2	B5E0557	05/20/2015	05/20/15 23:28	
Vinyl chloride	ND	1.3	0.41	2	B5E0557	05/20/2015	05/20/15 23:28	
Surrogate: 4-Bromofluorobenzene	*125 %*	*79.2 - 147*			B5E0557	05/20/2015	*05/20/15 23:28*	

Certificate of Analysis

SCA Environmental	Project Number :	1950 Bay Road, B11689
650 Delancey St, #222	Report To :	Karen Emery
San Francisco , CA 94107	Reported :	05/22/2015

Client Sample ID SV-3
Lab ID: 1501761-02

Volatile Organic Compounds in AIR by TO-15 (ug/m3)

Analyst: MFR

Analyte	Result (ug/m^3)	PQL (ug/m^3)	MDL (ug/m^3)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	1.7	0.57	1	B5E0557	05/20/2015	05/20/15 22:46	
1,1,1-Trichloroethane	ND	1.4	0.58	1	B5E0557	05/20/2015	05/20/15 22:46	
1,1,2,2-Tetrachloroethane	ND	1.7	0.77	1	B5E0557	05/20/2015	05/20/15 22:46	
1,1,2-Trichloroethane	ND	1.6	0.45	1	B5E0557	05/20/2015	05/20/15 22:46	
1,1-Dichloroethane	ND	1.0	0.37	1	B5E0557	05/20/2015	05/20/15 22:46	
1,1-Dichloroethene	ND	0.99	0.34	1	B5E0557	05/20/2015	05/20/15 22:46	
1,1-Dichloropropene	ND	1.1	0.37	1	B5E0557	05/20/2015	05/20/15 22:46	
1,2,3-Trichloropropane	ND	1.5	0.58	1	B5E0557	05/20/2015	05/20/15 22:46	
1,2,4-Trichlorobenzene	ND	1.9	0.73	1	B5E0557	05/20/2015	05/20/15 22:46	
1,2,4-Trimethylbenzene	**2.3**	1.2	0.54	1	B5E0557	05/20/2015	05/20/15 22:46	
1,2-Dibromo-3-chloropropane	ND	2.4	1.0	1	B5E0557	05/20/2015	05/20/15 22:46	
1,2-Dibromoethane	ND	1.9	0.73	1	B5E0557	05/20/2015	05/20/15 22:46	
1,2-Dichlorobenzene	ND	1.5	0.54	1	B5E0557	05/20/2015	05/20/15 22:46	
1,2-Dichloroethane	ND	1.0	0.34	1	B5E0557	05/20/2015	05/20/15 22:46	
1,2-Dichloropropane	ND	1.2	0.41	1	B5E0557	05/20/2015	05/20/15 22:46	
1,3,5-Trimethylbenzene	**1.7**	1.2	0.51	1	B5E0557	05/20/2015	05/20/15 22:46	
1,3-Butadiene	ND	0.55	0.39	1	B5E0557	05/20/2015	05/20/15 22:46	
1,3-Dichlorobenzene	ND	1.5	0.56	1	B5E0557	05/20/2015	05/20/15 22:46	
1,4-Dichlorobenzene	ND	1.5	0.50	1	B5E0557	05/20/2015	05/20/15 22:46	
1,4-Dioxane	ND	0.90	0.65	1	B5E0557	05/20/2015	05/20/15 22:46	
2,2,4-Trimethylpentane	**14**	1.2	0.35	1	B5E0557	05/20/2015	05/20/15 22:46	
2-Butanone	**20**	0.74	0.24	1	B5E0557	05/20/2015	05/20/15 22:46	
2-Chloroethyl vinyl ether	ND	1.1	0.22	1	B5E0557	05/20/2015	05/20/15 22:46	
2-Chlorotoluene	ND	1.3	0.50	1	B5E0557	05/20/2015	05/20/15 22:46	
2-Hexanone	ND	1.0	0.43	1	B5E0557	05/20/2015	05/20/15 22:46	
2-Propanol	ND	0.61	0.26	1	B5E0557	05/20/2015	05/20/15 22:46	
4-Chlorotoluene	ND	1.3	0.47	1	B5E0557	05/20/2015	05/20/15 22:46	
4-Ethyl Toluene	ND	1.2	0.47	1	B5E0557	05/20/2015	05/20/15 22:46	
4-Methyl-2-pentanone	**2.6**	1.0	0.30	1	B5E0557	05/20/2015	05/20/15 22:46	
Acetone	**150**	5.9	2.6	10	B5E0425	05/19/2015	05/19/15 16:46	
Acetonitrile	ND	0.42	0.14	1	B5E0557	05/20/2015	05/20/15 22:46	
Acrolein	ND	0.57	0.22	1	B5E0557	05/20/2015	05/20/15 22:46	
Acrylonitrile	ND	0.54	0.18	1	B5E0557	05/20/2015	05/20/15 22:46	
Benzene	**13**	0.80	0.28	1	B5E0557	05/20/2015	05/20/15 22:46	
Benzyl chloride	ND	1.3	0.37	1	B5E0557	05/20/2015	05/20/15 22:46	
Bromobenzene	ND	1.6	0.59	1	B5E0557	05/20/2015	05/20/15 22:46	
Bromodichloromethane	ND	1.7	0.70	1	B5E0557	05/20/2015	05/20/15 22:46	

Certificate of Analysis

SCA Environmental		Project Number :	1950 Bay Road, B11689
650 Delancey St, #222		Report To :	Karen Emery
San Francisco , CA 94107		Reported :	05/22/2015

Client Sample ID SV-3
Lab ID: 1501761-02

Volatile Organic Compounds in AIR by TO-15 (ug/m3)

Analyst: MFR

Analyte	Result (ug/m³)	PQL (ug/m³)	MDL (ug/m³)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Bromoform	ND	2.6	0.90	1	B5E0557	05/20/2015	05/20/15 22:46	
Bromomethane	ND	0.97	0.46	1	B5E0557	05/20/2015	05/20/15 22:46	
Carbon disulfide	**25**	0.78	0.31	1	B5E0557	05/20/2015	05/20/15 22:46	
Carbon tetrachloride	ND	1.6	0.43	1	B5E0557	05/20/2015	05/20/15 22:46	
Chlorobenzene	ND	1.2	0.41	1	B5E0557	05/20/2015	05/20/15 22:46	
Chloroethane	ND	0.66	0.28	1	B5E0557	05/20/2015	05/20/15 22:46	
Chloroform	**4.1**	1.2	0.50	1	B5E0557	05/20/2015	05/20/15 22:46	
Chloromethane	ND	0.52	0.22	1	B5E0557	05/20/2015	05/20/15 22:46	
cis-1,2-Dichloroethene	**1.1**	0.99	0.28	1	B5E0557	05/20/2015	05/20/15 22:46	
cis-1,3-Dichloropropene	ND	1.1	0.33	1	B5E0557	05/20/2015	05/20/15 22:46	
Cyclohexane	**11**	0.86	0.25	1	B5E0557	05/20/2015	05/20/15 22:46	
Dibromochloromethane	ND	2.1	0.83	1	B5E0557	05/20/2015	05/20/15 22:46	
Dibromomethane	ND	1.8	0.55	1	B5E0557	05/20/2015	05/20/15 22:46	
Dichlorodifluoromethane	ND	1.2	0.56	1	B5E0557	05/20/2015	05/20/15 22:46	
Dichlorotetrafluoroethane	ND	1.7	0.76	1	B5E0557	05/20/2015	05/20/15 22:46	
Ethanol	**1.7**	0.47	0.20	1	B5E0557	05/20/2015	05/20/15 22:46	
Ethylbenzene	**3.3**	1.1	0.35	1	B5E0557	05/20/2015	05/20/15 22:46	
Freon-113	ND	1.9	0.58	1	B5E0557	05/20/2015	05/20/15 22:46	
Hexachlorobutadiene	ND	2.7	1.3	1	B5E0557	05/20/2015	05/20/15 22:46	
Isopropylbenzene	ND	1.2	0.52	1	B5E0557	05/20/2015	05/20/15 22:46	
m,p-Xylene	**19**	4.3	0.74	1	B5E0557	05/20/2015	05/20/15 22:46	
Methylene chloride	ND	0.87	0.31	1	B5E0557	05/20/2015	05/20/15 22:46	
MTBE	ND	0.90	0.33	1	B5E0557	05/20/2015	05/20/15 22:46	
n-Butylbenzene	ND	1.4	0.42	1	B5E0557	05/20/2015	05/20/15 22:46	
n-Propylbenzene	ND	1.2	0.41	1	B5E0557	05/20/2015	05/20/15 22:46	
Naphthalene	ND	1.3	0.36	1	B5E0557	05/20/2015	05/20/15 22:46	
o-Xylene	**4.3**	1.1	0.40	1	B5E0557	05/20/2015	05/20/15 22:46	
p-Isopropyltoluene	**5.7**	1.4	0.51	1	B5E0557	05/20/2015	05/20/15 22:46	
sec-Butylbenzene	ND	1.4	0.56	1	B5E0557	05/20/2015	05/20/15 22:46	
Styrene	ND	1.1	0.44	1	B5E0557	05/20/2015	05/20/15 22:46	
tert-Butylbenzene	ND	1.4	0.62	1	B5E0557	05/20/2015	05/20/15 22:46	
Tetrachloroethene	ND	1.7	0.47	1	B5E0557	05/20/2015	05/20/15 22:46	
Toluene	**20**	0.94	0.28	1	B5E0557	05/20/2015	05/20/15 22:46	
trans-1,2-Dichloroethene	ND	0.99	0.34	1	B5E0557	05/20/2015	05/20/15 22:46	
trans-1,3-Dichloropropene	ND	1.1	0.34	1	B5E0557	05/20/2015	05/20/15 22:46	
Trichloroethene	ND	1.3	0.47	1	B5E0557	05/20/2015	05/20/15 22:46	
Trichlorofluoromethane	**2.4**	1.4	0.53	1	B5E0557	05/20/2015	05/20/15 22:46	

Certificate of Analysis

SCA Environmental		Project Number :	1950 Bay Road, B11689
650 Delancey St, #222		Report To :	Karen Emery
San Francisco , CA 94107		Reported :	05/22/2015

Client Sample ID SV-3

Lab ID: 1501761-02

Volatile Organic Compounds in AIR by TO-15 (ug/m3)

Analyst: MFR

Analyte	Result (ug/m³)	PQL (ug/m³)	MDL (ug/m³)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Vinyl acetate	**4.5**	0.88	0.38	1	B5E0557	05/20/2015	05/20/15 22:46	
Vinyl chloride	ND	0.64	0.21	1	B5E0557	05/20/2015	05/20/15 22:46	
Surrogate: 4-Bromofluorobenzene	*132 %*	*79.2 - 147*			B5E0557	05/20/2015	*05/20/15 22:46*	
Surrogate: 4-Bromofluorobenzene	*127 %*	*79.2 - 147*			B5E0425	05/19/2015	*05/19/15 16:46*	

Certificate of Analysis

SCA Environmental		Project Number :	1950 Bay Road, B11689
650 Delancey St, #222		Report To :	Karen Emery
San Francisco , CA 94107		Reported :	05/22/2015

Client Sample ID SV-6
Lab ID: 1501761-03

Volatile Organic Compounds in AIR by TO-15 (ug/m3) **Analyst: MFR**

Analyte	Result (ug/m^3)	PQL (ug/m^3)	MDL (ug/m^3)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	1.7	0.57	1	B5E0557	05/20/2015	05/20/15 22:04	
1,1,1-Trichloroethane	ND	1.4	0.58	1	B5E0557	05/20/2015	05/20/15 22:04	
1,1,2,2-Tetrachloroethane	ND	1.7	0.77	1	B5E0557	05/20/2015	05/20/15 22:04	
1,1,2-Trichloroethane	ND	1.6	0.45	1	B5E0557	05/20/2015	05/20/15 22:04	
1,1-Dichloroethane	ND	1.0	0.37	1	B5E0557	05/20/2015	05/20/15 22:04	
1,1-Dichloroethene	ND	0.99	0.34	1	B5E0557	05/20/2015	05/20/15 22:04	
1,1-Dichloropropene	ND	1.1	0.37	1	B5E0557	05/20/2015	05/20/15 22:04	
1,2,3-Trichloropropane	ND	1.5	0.58	1	B5E0557	05/20/2015	05/20/15 22:04	
1,2,4-Trichlorobenzene	ND	1.9	0.73	1	B5E0557	05/20/2015	05/20/15 22:04	
1,2,4-Trimethylbenzene	**1.5**	1.2	0.54	1	B5E0557	05/20/2015	05/20/15 22:04	
1,2-Dibromo-3-chloropropane	ND	2.4	1.0	1	B5E0557	05/20/2015	05/20/15 22:04	
1,2-Dibromoethane	ND	1.9	0.73	1	B5E0557	05/20/2015	05/20/15 22:04	
1,2-Dichlorobenzene	ND	1.5	0.54	1	B5E0557	05/20/2015	05/20/15 22:04	
1,2-Dichloroethane	ND	1.0	0.34	1	B5E0557	05/20/2015	05/20/15 22:04	
1,2-Dichloropropane	ND	1.2	0.41	1	B5E0557	05/20/2015	05/20/15 22:04	
1,3,5-Trimethylbenzene	ND	1.2	0.51	1	B5E0557	05/20/2015	05/20/15 22:04	
1,3-Butadiene	ND	0.55	0.39	1	B5E0557	05/20/2015	05/20/15 22:04	
1,3-Dichlorobenzene	ND	1.5	0.56	1	B5E0557	05/20/2015	05/20/15 22:04	
1,4-Dichlorobenzene	ND	1.5	0.50	1	B5E0557	05/20/2015	05/20/15 22:04	
1,4-Dioxane	ND	0.90	0.65	1	B5E0557	05/20/2015	05/20/15 22:04	
2,2,4-Trimethylpentane	ND	1.2	0.35	1	B5E0557	05/20/2015	05/20/15 22:04	
2-Butanone	**4.1**	0.74	0.24	1	B5E0557	05/20/2015	05/20/15 22:04	
2-Chloroethyl vinyl ether	ND	1.1	0.22	1	B5E0557	05/20/2015	05/20/15 22:04	
2-Chlorotoluene	ND	1.3	0.50	1	B5E0557	05/20/2015	05/20/15 22:04	
2-Hexanone	ND	1.0	0.43	1	B5E0557	05/20/2015	05/20/15 22:04	
2-Propanol	ND	0.61	0.26	1	B5E0557	05/20/2015	05/20/15 22:04	
4-Chlorotoluene	ND	1.3	0.47	1	B5E0557	05/20/2015	05/20/15 22:04	
4-Ethyl Toluene	ND	1.2	0.47	1	B5E0557	05/20/2015	05/20/15 22:04	
4-Methyl-2-pentanone	ND	1.0	0.30	1	B5E0557	05/20/2015	05/20/15 22:04	
Acetone	**10**	0.59	0.26	1	B5E0557	05/20/2015	05/20/15 22:04	
Acetonitrile	ND	0.42	0.14	1	B5E0557	05/20/2015	05/20/15 22:04	
Acrolein	ND	0.57	0.22	1	B5E0557	05/20/2015	05/20/15 22:04	
Acrylonitrile	ND	0.54	0.18	1	B5E0557	05/20/2015	05/20/15 22:04	
Benzene	**3.8**	0.80	0.28	1	B5E0557	05/20/2015	05/20/15 22:04	
Benzyl chloride	ND	1.3	0.37	1	B5E0557	05/20/2015	05/20/15 22:04	
Bromobenzene	ND	1.6	0.59	1	B5E0557	05/20/2015	05/20/15 22:04	
Bromodichloromethane	ND	1.7	0.70	1	B5E0557	05/20/2015	05/20/15 22:04	

Certificate of Analysis

SCA Environmental		Project Number :	1950 Bay Road, B11689
650 Delancey St, #222		Report To :	Karen Emery
San Francisco , CA 94107		Reported :	05/22/2015

Client Sample ID SV-6

Lab ID: 1501761-03

Volatile Organic Compounds in AIR by TO-15 (ug/m3) **Analyst: MFR**

Analyte	Result (ug/m³)	PQL (ug/m³)	MDL (ug/m³)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Bromoform	ND	2.6	0.90	1	B5E0557	05/20/2015	05/20/15 22:04	
Bromomethane	ND	0.97	0.46	1	B5E0557	05/20/2015	05/20/15 22:04	
Carbon disulfide	**8.6**	0.78	0.31	1	B5E0557	05/20/2015	05/20/15 22:04	
Carbon tetrachloride	ND	1.6	0.43	1	B5E0557	05/20/2015	05/20/15 22:04	
Chlorobenzene	ND	1.2	0.41	1	B5E0557	05/20/2015	05/20/15 22:04	
Chloroethane	ND	0.66	0.28	1	B5E0557	05/20/2015	05/20/15 22:04	
Chloroform	ND	1.2	0.50	1	B5E0557	05/20/2015	05/20/15 22:04	
Chloromethane	ND	0.52	0.22	1	B5E0557	05/20/2015	05/20/15 22:04	
cis-1,2-Dichloroethene	ND	0.99	0.28	1	B5E0557	05/20/2015	05/20/15 22:04	
cis-1,3-Dichloropropene	ND	1.1	0.33	1	B5E0557	05/20/2015	05/20/15 22:04	
Cyclohexane	ND	0.86	0.25	1	B5E0557	05/20/2015	05/20/15 22:04	
Dibromochloromethane	ND	2.1	0.83	1	B5E0557	05/20/2015	05/20/15 22:04	
Dibromomethane	ND	1.8	0.55	1	B5E0557	05/20/2015	05/20/15 22:04	
Dichlorodifluoromethane	**0.94**	1.2	0.56	1	B5E0557	05/20/2015	05/20/15 22:04	J
Dichlorotetrafluoroethane	ND	1.7	0.76	1	B5E0557	05/20/2015	05/20/15 22:04	
Ethanol	**0.96**	0.47	0.20	1	B5E0557	05/20/2015	05/20/15 22:04	
Ethylbenzene	ND	1.1	0.35	1	B5E0557	05/20/2015	05/20/15 22:04	
Freon-113	ND	1.9	0.58	1	B5E0557	05/20/2015	05/20/15 22:04	
Hexachlorobutadiene	ND	2.7	1.3	1	B5E0557	05/20/2015	05/20/15 22:04	
Isopropylbenzene	ND	1.2	0.52	1	B5E0557	05/20/2015	05/20/15 22:04	
m,p-Xylene	**2.3**	4.3	0.74	1	B5E0557	05/20/2015	05/20/15 22:04	J
Methylene chloride	ND	0.87	0.31	1	B5E0557	05/20/2015	05/20/15 22:04	
MTBE	ND	0.90	0.33	1	B5E0557	05/20/2015	05/20/15 22:04	
n-Butylbenzene	ND	1.4	0.42	1	B5E0557	05/20/2015	05/20/15 22:04	
n-Propylbenzene	ND	1.2	0.41	1	B5E0557	05/20/2015	05/20/15 22:04	
Naphthalene	ND	1.3	0.36	1	B5E0557	05/20/2015	05/20/15 22:04	
o-Xylene	ND	1.1	0.40	1	B5E0557	05/20/2015	05/20/15 22:04	
p-Isopropyltoluene	**1.7**	1.4	0.51	1	B5E0557	05/20/2015	05/20/15 22:04	
sec-Butylbenzene	ND	1.4	0.56	1	B5E0557	05/20/2015	05/20/15 22:04	
Styrene	ND	1.1	0.44	1	B5E0557	05/20/2015	05/20/15 22:04	
tert-Butylbenzene	ND	1.4	0.62	1	B5E0557	05/20/2015	05/20/15 22:04	
Tetrachloroethene	ND	1.7	0.47	1	B5E0557	05/20/2015	05/20/15 22:04	
Toluene	**1.7**	0.94	0.28	1	B5E0557	05/20/2015	05/20/15 22:04	
trans-1,2-Dichloroethene	ND	0.99	0.34	1	B5E0557	05/20/2015	05/20/15 22:04	
trans-1,3-Dichloropropene	ND	1.1	0.34	1	B5E0557	05/20/2015	05/20/15 22:04	
Trichloroethene	ND	1.3	0.47	1	B5E0557	05/20/2015	05/20/15 22:04	
Trichlorofluoromethane	**1.5**	1.4	0.53	1	B5E0557	05/20/2015	05/20/15 22:04	

Certificate of Analysis

SCA Environmental		Project Number :	1950 Bay Road, B11689
650 Delancey St, #222		Report To :	Karen Emery
San Francisco , CA 94107		Reported :	05/22/2015

Client Sample ID SV-6

Lab ID: 1501761-03

Volatile Organic Compounds in AIR by TO-15 (ug/m3)

Analyst: MFR

Analyte	Result (ug/m³)	PQL (ug/m³)	MDL (ug/m³)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Vinyl acetate	ND	0.88	0.38	1	B5E0557	05/20/2015	05/20/15 22:04	
Vinyl chloride	ND	0.64	0.21	1	B5E0557	05/20/2015	05/20/15 22:04	
Surrogate: 4-Bromofluorobenzene	*110 %*	*79.2 - 147*			B5E0557	05/20/2015	*05/20/15 22:04*	

QUALITY CONTROL SECTION

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control

Batch B5E0425 - No_Prep_AIR

Blank (B5E0425-BLK1) Prepared: 5/19/2015 Analyzed: 5/19/2015

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	ND	1.7			NR				
1,1,1-Trichloroethane	ND	1.4			NR				
1,1,2,2-Tetrachloroethane	ND	1.7			NR				
1,1,2-Trichloroethane	ND	1.6			NR				
1,1-Dichloroethane	ND	1.0			NR				
1,1-Dichloroethene	ND	0.99			NR				
1,1-Dichloropropene	ND	1.1			NR				
1,2,3-Trichloropropane	ND	1.5			NR				
1,2,4-Trichlorobenzene	ND	1.9			NR				
1,2,4-Trimethylbenzene	ND	1.2			NR				
1,2-Dibromo-3-chloropropane	ND	2.4			NR				
1,2-Dibromoethane	ND	1.9			NR				
1,2-Dichlorobenzene	ND	1.5			NR				
1,2-Dichloroethane	ND	1.0			NR				
1,2-Dichloropropane	ND	1.2			NR				
1,3,5-Trimethylbenzene	ND	1.2			NR				
1,3-Butadiene	ND	0.55			NR				
1,3-Dichlorobenzene	ND	1.5			NR				
1,4-Dichlorobenzene	ND	1.5			NR				
1,4-Dioxane	ND	0.90			NR				
2,2,4-Trimethylpentane	ND	1.2			NR				
2-Butanone	ND	0.74			NR				
2-Chloroethyl vinyl ether	ND	1.1			NR				
2-Chlorotoluene	ND	1.3			NR				
2-Hexanone	ND	1.0			NR				
2-Propanol	ND	0.61			NR				
4-Chlorotoluene	ND	1.3			NR				
4-Ethyl Toluene	ND	1.2			NR				
4-Methyl-2-pentanone	ND	1.0			NR				
Acetone	ND	0.59			NR				
Acetonitrile	ND	0.42			NR				
Acrolein	ND	0.57			NR				
Acrylonitrile	ND	0.54			NR				
Benzene	ND	0.80			NR				
Benzyl chloride	ND	1.3			NR				
Bromobenzene	ND	1.6			NR				
Bromodichloromethane	ND	1.7			NR				
Bromoform	ND	2.6			NR				
Bromomethane	ND	0.97			NR				

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B5E0425 - No_Prep_AIR (continued)									
Blank (B5E0425-BLK1) - Continued				Prepared: 5/19/2015 Analyzed: 5/19/2015					
Carbon disulfide	ND	0.78			NR				
Carbon tetrachloride	ND	1.6			NR				
Chlorobenzene	ND	1.2			NR				
Chloroethane	ND	0.66			NR				
Chloroform	ND	1.2			NR				
Chloromethane	ND	0.52			NR				
cis-1,2-Dichloroethene	ND	0.99			NR				
cis-1,3-Dichloropropene	ND	1.1			NR				
Cyclohexane	ND	0.86			NR				
Dibromochloromethane	ND	2.1			NR				
Dibromomethane	ND	1.8			NR				
Dichlorodifluoromethane	ND	1.2			NR				
Dichlorotetrafluoroethane	ND	1.7			NR				
Ethanol	ND	0.47			NR				
Ethylbenzene	ND	1.1			NR				
Freon-113	ND	1.9			NR				
Hexachlorobutadiene	ND	2.7			NR				
Isopropylbenzene	ND	1.2			NR				
m,p-Xylene	ND	4.3			NR				
Methylene chloride	ND	0.87			NR				
MTBE	ND	0.90			NR				
n-Butylbenzene	ND	1.4			NR				
n-Propylbenzene	ND	1.2			NR				
Naphthalene	ND	1.3			NR				
o-Xylene	ND	1.1			NR				
p-Isopropyltoluene	ND	1.4			NR				
sec-Butylbenzene	ND	1.4			NR				
Styrene	ND	1.1			NR				
tert-Butylbenzene	ND	1.4			NR				
Tetrachloroethene	ND	1.7			NR				
Toluene	ND	0.94			NR				
trans-1,2-Dichloroethene	ND	0.99			NR				
trans-1,3-Dichloropropene	ND	1.1			NR				
Trichloroethene	ND	1.3			NR				
Trichlorofluoromethane	ND	1.4			NR				
Vinyl acetate	ND	0.88			NR				
Vinyl chloride	ND	0.64			NR				
Surrogate: 4-Bromofluorobenzene	*20.26*		*17.8935*		*113*	*79.2 - 147*			
LCS (B5E0425-BS1)				Prepared: 5/19/2015 Analyzed: 5/19/2015					
1,1,1,2-Tetrachloroethane	16.6132	1.7	13.7299		121	70 - 130			

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Batch B5E0425 - No_Prep_AIR (continued)

LCS (B5E0425-BS1) - Continued Prepared: 5/19/2015 Analyzed: 5/19/2015

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
1,1,1-Trichloroethane	13.4767	1.4	10.9123		124	70 - 130			
1,1,2,2-Tetrachloroethane	14.4850	1.7	13.7299		106	70 - 130			
1,1,2-Trichloroethane	9.38459	1.6	10.9123		86.0	70 - 130			
1,1-Dichloroethane	7.60912	1.0	8.09480		94.0	70 - 130			
1,1-Dichloroethene	7.49375	0.99	7.92990		94.5	70 - 130			
1,1-Dichloropropene	9.34954	1.1	9.07722		103	70 - 130			
1,2,3-Trichloropropane	12.1200	1.5	12.0597		100	70 - 130			
1,2,4-Trichlorobenzene	17.2170	1.9	14.8422		116	70 - 130			
1,2,4-Trimethylbenzene	12.2896	1.2	9.83166		125	70 - 130			
1,2-Dibromo-3-chloropropane	17.3020	2.4	19.3319		89.5	70 - 130			
1,2-Dibromoethane	14.5218	1.9	15.3670		94.5	70 - 130			
1,2-Dichlorobenzene	15.7522	1.5	12.0246		131	70 - 130			L5
1,2-Dichloroethane	9.14713	1.0	8.09480		113	70 - 130			
1,2-Dichloropropane	7.71718	1.2	9.24213		83.5	70 - 130			
1,3,5-Trimethylbenzene	11.6505	1.2	9.83166		118	70 - 130			
1,3-Butadiene	4.44666	0.55	4.42454		100	70 - 130			
1,3-Dichlorobenzene	15.5719	1.5	12.0246		130	70 - 130			
1,4-Dichlorobenzene	15.3915	1.5	12.0246		128	70 - 130			
1,4-Dioxane	6.66643	0.90	7.20695		92.5	70 - 130			
2,2,4-Trimethylpentane	7.98902	1.2	9.34388		85.5	70 - 130			
2-Butanone	5.39689	0.74	5.89824		91.5	70 - 130			
2-Chloroethyl vinyl ether	12.6815	1.1	8.71583		146	70 - 130			L5
2-Chlorotoluene	10.7686	1.3	10.3544		104	70 - 130			
2-Hexanone	7.57849	1.0	8.19296		92.5	70 - 130			
2-Propanol	5.35772	0.61	4.91534		109	70 - 130			
4-Chlorotoluene	12.0112	1.3	10.3544		116	70 - 130			
4-Ethyl Toluene	11.3556	1.2	9.83166		116	70 - 130			
4-Methyl-2-pentanone	6.55437	1.0	8.19296		80.0	70 - 130			
Acetone	5.27343	0.59	4.75084		111	70 - 130			
Acetonitrile	3.00544	0.42	3.35804		89.5	70 - 130			
Acrolein	5.04452	0.57	4.58593		110	70 - 130			
Acrylonitrile	3.75456	0.54	4.34053		86.5	70 - 130			
Benzene	5.39915	0.80	6.38953		84.5	70 - 130			
Benzyl chloride	12.7360	1.3	10.3544		123	70 - 130			
Bromobenzene	16.6319	1.6	12.8432		130	70 - 130			
Bromodichloromethane	14.4061	1.7	13.4011		108	70 - 130			
Bromoform	29.0460	2.6	20.6733		140	70 - 130			L5
Bromomethane	7.99895	0.97	7.76597		103	70 - 130			
Carbon disulfide	5.85476	0.78	6.22847		94.0	70 - 130			
Carbon tetrachloride	15.9799	1.6	12.5826		127	70 - 130			
Chlorobenzene	9.52936	1.2	9.20712		104	70 - 130			
Chloroethane	5.06613	0.66	5.27722		96.0	70 - 130			

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B5E0425 - No_Prep_AIR (continued)									
LCS (B5E0425-BS1) - Continued				Prepared: 5/19/2015 Analyzed: 5/19/2015					
Chloroform	10.4485	1.2	9.76499		107	70 - 130			
Chloromethane	3.84073	0.52	4.12982		93.0	70 - 130			
cis-1,2-Dichloroethene	7.13691	0.99	7.92990		90.0	70 - 130			
cis-1,3-Dichloropropene	7.89720	1.1	9.07724		87.0	70 - 130			
Cyclohexane	5.64509	0.86	6.88425		82.0	70 - 130			
Dibromochloromethane	21.7224	2.1	17.0371		128	70 - 130			
Dibromomethane	15.4283	1.8	14.2196		108	70 - 130			
Dichlorodifluoromethane	15.1821	1.2	9.89063		154	70 - 130			L5
Dichlorotetrafluoroethane	16.3580	1.7	13.9812		117	70 - 130			
Ethanol	3.35383	0.47	3.76834		89.0	70 - 130			
Ethylbenzene	8.85794	1.1	8.68425		102	70 - 130			
Freon-113	15.4038	1.9	15.3272		100	70 - 130			
Hexachlorobutadiene	26.1292	2.7	21.3300		122	70 - 130			
Isopropylbenzene	10.4707	1.2	9.83166		106	70 - 130			
m,p-Xylene	37.9502	4.3	34.7370		109	70 - 130			
Methylene chloride	5.52318	0.87	6.94740		79.5	70 - 130			
MTBE	7.31863	0.90	7.21047		102	70 - 130			
n-Butylbenzene	12.6258	1.4	10.9790		115	70 - 130			
n-Propylbenzene	10.3232	1.2	9.83166		105	70 - 130			
Naphthalene	14.5208	1.3	10.4843		138	70 - 130			L5
o-Xylene	9.55268	1.1	8.68425		110	70 - 130			
p-Isopropyltoluene	11.8573	1.4	10.9790		108	70 - 130			
sec-Butylbenzene	12.1318	1.4	10.9790		110	70 - 130			
Styrene	8.60454	1.1	8.51934		101	70 - 130			
tert-Butylbenzene	12.4062	1.4	10.9790		113	70 - 130			
Tetrachloroethene	14.8537	1.7	13.5650		110	70 - 130			
Toluene	6.63246	0.94	7.53688		88.0	70 - 130			
trans-1,2-Dichloroethene	7.29551	0.99	7.92990		92.0	70 - 130			
trans-1,3-Dichloropropene	8.62336	1.1	9.07722		95.0	70 - 130			
Trichloroethene	9.99508	1.3	10.7474		93.0	70 - 130			
Trichlorofluoromethane	14.1019	1.4	11.2366		126	70 - 130			
Vinyl acetate	7.85188	0.88	7.04204		112	70 - 130			
Vinyl chloride	4.95894	0.64	5.11231		97.0	70 - 130			
Surrogate: 4-Bromofluorobenzene	*20.47*		*17.8935*		*114*	*79.2 - 147*			
LCS Dup (B5E0425-BSD1)				Prepared: 5/19/2015 Analyzed: 5/19/2015					
1,1,1,2-Tetrachloroethane	17.0251	1.7	13.7299		124	70 - 130	2.45	20	
1,1,1-Trichloroethane	13.7495	1.4	10.9123		126	70 - 130	2.00	20	
1,1,2,2-Tetrachloroethane	14.3477	1.7	13.7299		104	70 - 130	0.952	20	
1,1,2-Trichloroethane	9.54827	1.6	10.9123		87.5	70 - 130	1.73	20	
1,1-Dichloroethane	7.97338	1.0	8.09480		98.5	70 - 130	4.68	20	

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B5E0425 - No_Prep_AIR (continued)									
LCS Dup (B5E0425-BSD1) - Continued				Prepared: 5/19/2015 Analyzed: 5/19/2015					
1,1-Dichloroethene	7.57305	0.99	7.92990		95.5	70 - 130	1.05	20	
1,1-Dichloropropene	9.25876	1.1	9.07722		102	70 - 130	0.976	20	
1,2,3-Trichloropropane	12.6024	1.5	12.0597		104	70 - 130	3.90	20	
1,2,4-Trichlorobenzene	19.7401	1.9	14.8422		133	70 - 130	13.7	20	L5
1,2,4-Trimethylbenzene	12.2404	1.2	9.83166		124	70 - 130	0.401	20	
1,2-Dibromo-3-chloropropane	19.6218	2.4	19.3319		102	70 - 130	12.6	20	
1,2-Dibromoethane	14.4449	1.9	15.3670		94.0	70 - 130	0.531	20	
1,2-Dichlorobenzene	15.7522	1.5	12.0246		131	70 - 130	0.00	20	L5
1,2-Dichloroethane	9.47092	1.0	8.09480		117	70 - 130	3.48	20	
1,2-Dichloropropane	7.90202	1.2	9.24213		85.5	70 - 130	2.37	20	
1,3,5-Trimethylbenzene	11.8963	1.2	9.83166		121	70 - 130	2.09	20	
1,3-Butadiene	4.62364	0.55	4.42454		104	70 - 130	3.90	20	
1,3-Dichlorobenzene	15.3915	1.5	12.0246		128	70 - 130	1.16	20	
1,4-Dichlorobenzene	15.5719	1.5	12.0246		130	70 - 130	1.16	20	
1,4-Dioxane	6.55833	0.90	7.20695		91.0	70 - 130	1.63	20	
2,2,4-Trimethylpentane	8.26934	1.2	9.34388		88.5	70 - 130	3.45	20	
2-Butanone	5.66231	0.74	5.89824		96.0	70 - 130	4.80	20	
2-Chloroethyl vinyl ether	11.3306	1.1	8.71583		130	70 - 130	11.3	20	
2-Chlorotoluene	11.0275	1.3	10.3544		106	70 - 130	2.38	20	
2-Hexanone	7.49656	1.0	8.19296		91.5	70 - 130	1.09	20	
2-Propanol	5.40687	0.61	4.91534		110	70 - 130	0.913	20	
4-Chlorotoluene	12.3736	1.3	10.3544		120	70 - 130	2.97	20	
4-Ethyl Toluene	11.4047	1.2	9.83166		116	70 - 130	0.432	20	
4-Methyl-2-pentanone	7.25077	1.0	8.19296		88.5	70 - 130	10.1	20	
Acetone	5.22592	0.59	4.75084		110	70 - 130	0.905	20	
Acetonitrile	3.10618	0.42	3.35804		92.5	70 - 130	3.30	20	
Acrolein	5.22796	0.57	4.58593		114	70 - 130	3.57	20	
Acrylonitrile	3.84137	0.54	4.34053		88.5	70 - 130	2.29	20	
Benzene	5.46305	0.80	6.38953		85.5	70 - 130	1.18	20	
Benzyl chloride	12.7360	1.3	10.3544		123	70 - 130	0.00	20	
Bromobenzene	16.6962	1.6	12.8432		130	70 - 130	0.385	20	
Bromodichloromethane	14.8082	1.7	13.4011		111	70 - 130	2.75	20	
Bromoform	29.3561	2.6	20.6733		142	70 - 130	1.06	20	L5
Bromomethane	8.07661	0.97	7.76597		104	70 - 130	0.966	20	
Carbon disulfide	5.91704	0.78	6.22847		95.0	70 - 130	1.06	20	
Carbon tetrachloride	16.6090	1.6	12.5826		132	70 - 130	3.86	20	L5
Chlorobenzene	9.62144	1.2	9.20712		104	70 - 130	0.962	20	
Chloroethane	5.09252	0.66	5.27722		96.5	70 - 130	0.519	20	
Chloroform	10.6438	1.2	9.76499		109	70 - 130	1.85	20	
Chloromethane	3.88203	0.52	4.12982		94.0	70 - 130	1.07	20	
cis-1,2-Dichloroethene	7.57305	0.99	7.92990		95.5	70 - 130	5.93	20	
cis-1,3-Dichloropropene	8.16952	1.1	9.07724		90.0	70 - 130	3.39	20	

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Analyte	Result (ug/m^3)	PQL (ug/m^3)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B5E0425 - No_Prep_AIR (continued)									
LCS Dup (B5E0425-BSD1) - Continued				Prepared: 5/19/2015 Analyzed: 5/19/2015					
Cyclohexane	5.95488	0.86	6.88425		86.5	70 - 130	5.34	20	
Dibromochloromethane	20.2742	2.1	17.0371		119	70 - 130	6.90	20	
Dibromomethane	15.7838	1.8	14.2196		111	70 - 130	2.28	20	
Dichlorodifluoromethane	14.9843	1.2	9.89063		152	70 - 130	1.31	20	L5
Dichlorotetrafluoroethane	16.5677	1.7	13.9812		118	70 - 130	1.27	20	
Ethanol	3.39151	0.47	3.76834		90.0	70 - 130	1.12	20	
Ethylbenzene	8.98820	1.1	8.68425		104	70 - 130	1.46	20	
Freon-113	16.0169	1.9	15.3272		104	70 - 130	3.90	20	
Hexachlorobutadiene	28.6888	2.7	21.3300		134	70 - 130	9.34	20	L5
Isopropylbenzene	10.4707	1.2	9.83166		106	70 - 130	0.00	20	
m,p-Xylene	38.2976	4.3	34.7370		110	70 - 130	0.911	20	
Methylene chloride	5.73161	0.87	6.94740		82.5	70 - 130	3.70	20	
MTBE	7.53494	0.90	7.21047		104	70 - 130	2.91	20	
n-Butylbenzene	12.5160	1.4	10.9790		114	70 - 130	0.873	20	
n-Propylbenzene	10.2249	1.2	9.83166		104	70 - 130	0.957	20	
Naphthalene	13.7345	1.3	10.4843		131	70 - 130	5.57	20	L5
o-Xylene	9.68294	1.1	8.68425		112	70 - 130	1.35	20	
p-Isopropyltoluene	12.0769	1.4	10.9790		110	70 - 130	1.83	20	
sec-Butylbenzene	12.0769	1.4	10.9790		110	70 - 130	0.453	20	
Styrene	8.81752	1.1	8.51934		104	70 - 130	2.44	20	
tert-Butylbenzene	12.4062	1.4	10.9790		113	70 - 130	0.00	20	
Tetrachloroethene	15.3284	1.7	13.5650		113	70 - 130	3.15	20	
Toluene	6.97162	0.94	7.53688		92.5	70 - 130	4.99	20	
trans-1,2-Dichloroethene	7.37480	0.99	7.92990		93.0	70 - 130	1.08	20	
trans-1,3-Dichloropropene	8.57797	1.1	9.07722		94.5	70 - 130	0.528	20	
Trichloroethene	10.4787	1.3	10.7474		97.5	70 - 130	4.72	20	
Trichlorofluoromethane	14.6075	1.4	11.2366		130	70 - 130	3.52	20	
Vinyl acetate	7.99272	0.88	7.04204		114	70 - 130	1.78	20	
Vinyl chloride	4.90782	0.64	5.11231		96.0	70 - 130	1.04	20	
Surrogate: 4-Bromofluorobenzene	*19.90*		*17.8935*		*111*	*79.2 - 147*			
Batch B5E0557 - No_Prep_AIR									
Blank (B5E0557-BLK1)				Prepared: 5/20/2015 Analyzed: 5/20/2015					
1,1,1,2-Tetrachloroethane	ND	1.7			NR				
1,1,1-Trichloroethane	ND	1.4			NR				
1,1,2,2-Tetrachloroethane	ND	1.7			NR				
1,1,2-Trichloroethane	ND	1.6			NR				
1,1-Dichloroethane	ND	1.0			NR				
1,1-Dichloroethene	ND	0.99			NR				
1,1-Dichloropropene	ND	1.1			NR				

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Batch B5E0557 - No_Prep_AIR (continued)

Blank (B5E0557-BLK1) - Continued

Prepared: 5/20/2015 Analyzed: 5/20/2015

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
1,2,3-Trichloropropane	ND	1.5			NR				
1,2,4-Trichlorobenzene	ND	1.9			NR				
1,2,4-Trimethylbenzene	ND	1.2			NR				
1,2-Dibromo-3-chloropropane	ND	2.4			NR				
1,2-Dibromoethane	ND	1.9			NR				
1,2-Dichlorobenzene	ND	1.5			NR				
1,2-Dichloroethane	ND	1.0			NR				
1,2-Dichloropropane	ND	1.2			NR				
1,3,5-Trimethylbenzene	ND	1.2			NR				
1,3-Butadiene	ND	0.55			NR				
1,3-Dichlorobenzene	ND	1.5			NR				
1,4-Dichlorobenzene	ND	1.5			NR				
1,4-Dioxane	ND	0.90			NR				
2,2,4-Trimethylpentane	ND	1.2			NR				
2-Butanone	ND	0.74			NR				
2-Chloroethyl vinyl ether	ND	1.1			NR				
2-Chlorotoluene	ND	1.3			NR				
2-Hexanone	ND	1.0			NR				
2-Propanol	ND	0.61			NR				
4-Chlorotoluene	ND	1.3			NR				
4-Ethyl Toluene	ND	1.2			NR				
4-Methyl-2-pentanone	ND	1.0			NR				
Acetone	ND	0.59			NR				
Acetonitrile	ND	0.42			NR				
Acrolein	ND	0.57			NR				
Acrylonitrile	ND	0.54			NR				
Benzene	ND	0.80			NR				
Benzyl chloride	ND	1.3			NR				
Bromobenzene	ND	1.6			NR				
Bromodichloromethane	ND	1.7			NR				
Bromoform	ND	2.6			NR				
Bromomethane	ND	0.97			NR				
Carbon disulfide	ND	0.78			NR				
Carbon tetrachloride	ND	1.6			NR				
Chlorobenzene	ND	1.2			NR				
Chloroethane	ND	0.66			NR				
Chloroform	ND	1.2			NR				
Chloromethane	ND	0.52			NR				
cis-1,2-Dichloroethene	ND	0.99			NR				
cis-1,3-Dichloropropene	ND	1.1			NR				
Cyclohexane	ND	0.86			NR				
Dibromochloromethane	ND	2.1			NR				

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Analyte	Result (ug/m^3)	PQL (ug/m^3)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B5E0557 - No_Prep_AIR (continued)									
Blank (B5E0557-BLK1) - Continued				Prepared: 5/20/2015 Analyzed: 5/20/2015					
Dibromomethane	ND	1.8			NR				
Dichlorodifluoromethane	ND	1.2			NR				
Dichlorotetrafluoroethane	ND	1.7			NR				
Ethanol	ND	0.47			NR				
Ethylbenzene	ND	1.1			NR				
Freon-113	ND	1.9			NR				
Hexachlorobutadiene	ND	2.7			NR				
Isopropylbenzene	ND	1.2			NR				
m,p-Xylene	ND	4.3			NR				
Methylene chloride	ND	0.87			NR				
MTBE	ND	0.90			NR				
n-Butylbenzene	ND	1.4			NR				
n-Propylbenzene	ND	1.2			NR				
Naphthalene	ND	1.3			NR				
o-Xylene	ND	1.1			NR				
p-Isopropyltoluene	ND	1.4			NR				
sec-Butylbenzene	ND	1.4			NR				
Styrene	ND	1.1			NR				
tert-Butylbenzene	ND	1.4			NR				
Tetrachloroethene	ND	1.7			NR				
Toluene	ND	0.94			NR				
trans-1,2-Dichloroethene	ND	0.99			NR				
trans-1,3-Dichloropropene	ND	1.1			NR				
Trichloroethene	ND	1.3			NR				
Trichlorofluoromethane	ND	1.4			NR				
Vinyl acetate	ND	0.88			NR				
Vinyl chloride	ND	0.64			NR				
Surrogate: 4-Bromofluorobenzene	*20.26*		*17.8935*		*113*	*79.2 - 147*			
LCS (B5E0557-BS1)				Prepared: 5/20/2015 Analyzed: 5/20/2015					
1,1,1,2-Tetrachloroethane	15.3775	1.7	13.7299		112	70 - 130			
1,1,1-Trichloroethane	11.7853	1.4	10.9123		108	70 - 130			
1,1,2,2-Tetrachloroethane	13.2494	1.7	13.7299		96.5	70 - 130			
1,1,2-Trichloroethane	8.72985	1.6	10.9123		80.0	70 - 130			
1,1-Dichloroethane	7.20438	1.0	8.09480		89.0	70 - 130			
1,1-Dichloroethene	7.01796	0.99	7.92990		88.5	70 - 130			
1,1-Dichloropropene	7.30716	1.1	9.07722		80.5	70 - 130			
1,2,3-Trichloropropane	11.0949	1.5	12.0597		92.0	70 - 130			
1,2,4-Trichlorobenzene	16.4748	1.9	14.8422		111	70 - 130			
1,2,4-Trimethylbenzene	11.2081	1.2	9.83166		114	70 - 130			
1,2-Dibromo-3-chloropropane	16.0454	2.4	19.3319		83.0	70 - 130			

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B5E0557 - No_Prep_AIR (continued)									
LCS (B5E0557-BS1) - Continued				Prepared: 5/20/2015 Analyzed: 5/20/2015					
1,2-Dibromoethane	12.9851	1.9	15.3670		84.5	70 - 130			
1,2-Dichlorobenzene	13.8884	1.5	12.0246		116	70 - 130			
1,2-Dichloroethane	7.73054	1.0	8.09480		95.5	70 - 130			
1,2-Dichloropropane	7.39370	1.2	9.24213		80.0	70 - 130			
1,3,5-Trimethylbenzene	10.7165	1.2	9.83166		109	70 - 130			
1,3-Butadiene	4.04845	0.55	4.42454		91.5	70 - 130			
1,3-Dichlorobenzene	13.8884	1.5	12.0246		116	70 - 130			
1,4-Dichlorobenzene	13.7682	1.5	12.0246		114	70 - 130			
1,4-Dioxane	6.45022	0.90	7.20695		89.5	70 - 130			
2,2,4-Trimethylpentane	8.17590	1.2	9.34388		87.5	70 - 130			
2-Butanone	5.07249	0.74	5.89824		86.0	70 - 130			
2-Chloroethyl vinyl ether	9.97962	1.1	8.71583		114	70 - 130			
2-Chlorotoluene	10.0438	1.3	10.3544		97.0	70 - 130			
2-Hexanone	6.92306	1.0	8.19296		84.5	70 - 130			
2-Propanol	4.86618	0.61	4.91534		99.0	70 - 130			
4-Chlorotoluene	11.0275	1.3	10.3544		106	70 - 130			
4-Ethyl Toluene	10.5199	1.2	9.83166		107	70 - 130			
4-Methyl-2-pentanone	6.63630	1.0	8.19296		81.0	70 - 130			
Acetone	4.94087	0.59	4.75084		104	70 - 130			
Acetonitrile	2.83754	0.42	3.35804		84.5	70 - 130			
Acrolein	5.50312	0.57	4.58593		120	70 - 130			
Acrylonitrile	3.51583	0.54	4.34053		81.0	70 - 130			
Benzene	5.20747	0.80	6.38953		81.5	70 - 130			
Benzyl chloride	12.2182	1.3	10.3544		118	70 - 130			
Bromobenzene	14.9623	1.6	12.8432		116	70 - 130			
Bromodichloromethane	12.7980	1.7	13.4011		95.5	70 - 130			
Bromoform	26.1517	2.6	20.6733		126	70 - 130			
Bromomethane	7.14469	0.97	7.76597		92.0	70 - 130			
Carbon disulfide	5.26305	0.78	6.22847		84.5	70 - 130			
Carbon tetrachloride	14.1554	1.6	12.5826		112	70 - 130			
Chlorobenzene	9.06901	1.2	9.20712		98.5	70 - 130			
Chloroethane	4.72311	0.66	5.27722		89.5	70 - 130			
Chloroform	9.37439	1.2	9.76499		96.0	70 - 130			
Chloromethane	3.44840	0.52	4.12982		83.5	70 - 130			
cis-1,2-Dichloroethene	7.05761	0.99	7.92990		89.0	70 - 130			
cis-1,3-Dichloropropene	7.62488	1.1	9.07724		84.0	70 - 130			
Cyclohexane	5.64509	0.86	6.88425		82.0	70 - 130			
Dibromochloromethane	19.4223	2.1	17.0371		114	70 - 130			
Dibromomethane	12.0156	1.8	14.2196		84.5	70 - 130			
Dichlorodifluoromethane	12.7589	1.2	9.89063		129	70 - 130			
Dichlorotetrafluoroethane	14.6103	1.7	13.9812		104	70 - 130			
Ethanol	2.93931	0.47	3.76834		78.0	70 - 130			

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Batch B5E0557 - No_Prep_AIR (continued)

LCS (B5E0557-BS1) - Continued Prepared: 5/20/2015 Analyzed: 5/20/2015

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Ethylbenzene	8.55399	1.1	8.68425		98.5	70 - 130			
Freon-113	14.3309	1.9	15.3272		93.5	70 - 130			
Hexachlorobutadiene	23.0364	2.7	21.3300		108	70 - 130			
Isopropylbenzene	9.58586	1.2	9.83166		97.5	70 - 130			
m,p-Xylene	36.0396	4.3	34.7370		104	70 - 130			
Methylene chloride	5.31476	0.87	6.94740		76.5	70 - 130			
MTBE	6.99416	0.90	7.21047		97.0	70 - 130			
n-Butylbenzene	11.0339	1.4	10.9790		100	70 - 130			
n-Propylbenzene	9.43839	1.2	9.83166		96.0	70 - 130			
Naphthalene	9.27864	1.3	10.4843		88.5	70 - 130			
o-Xylene	8.94478	1.1	8.68425		103	70 - 130			
p-Isopropyltoluene	10.4300	1.4	10.9790		95.0	70 - 130			
sec-Butylbenzene	10.9790	1.4	10.9790		100	70 - 130			
Styrene	8.17857	1.1	8.51934		96.0	70 - 130			
tert-Butylbenzene	11.1437	1.4	10.9790		102	70 - 130			
Tetrachloroethene	14.5145	1.7	13.5650		107	70 - 130			
Toluene	6.82088	0.94	7.53688		90.5	70 - 130			
trans-1,2-Dichloroethene	7.13691	0.99	7.92990		90.0	70 - 130			
trans-1,3-Dichloropropene	7.80641	1.1	9.07722		86.0	70 - 130			
Trichloroethene	9.67266	1.3	10.7474		90.0	70 - 130			
Trichlorofluoromethane	11.9669	1.4	11.2366		106	70 - 130			
Vinyl acetate	7.78146	0.88	7.04204		110	70 - 130			
Vinyl chloride	4.57552	0.64	5.11231		89.5	70 - 130			
Surrogate: 4-Bromofluorobenzene	*19.04*		*17.8935*		*106*	*79.2 - 147*			

LCS Dup (B5E0557-BSD1) Prepared: 5/20/2015 Analyzed: 5/21/2015

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	14.2104	1.7	13.7299		103	70 - 130	7.89	20	
1,1,1-Trichloroethane	11.2397	1.4	10.9123		103	70 - 130	4.74	20	
1,1,2,2-Tetrachloroethane	13.1807	1.7	13.7299		96.0	70 - 130	0.519	20	
1,1,2-Trichloroethane	9.22090	1.6	10.9123		84.5	70 - 130	5.47	20	
1,1-Dichloroethane	7.16390	1.0	8.09480		88.5	70 - 130	0.563	20	
1,1-Dichloroethene	7.13691	0.99	7.92990		90.0	70 - 130	1.68	20	
1,1-Dichloropropene	7.39793	1.1	9.07722		81.5	70 - 130	1.23	20	
1,2,3-Trichloropropane	11.2155	1.5	12.0597		93.0	70 - 130	1.08	20	
1,2,4-Trichlorobenzene	14.9164	1.9	14.8422		100	70 - 130	9.93	20	
1,2,4-Trimethylbenzene	10.6182	1.2	9.83166		108	70 - 130	5.41	20	
1,2-Dibromo-3-chloropropane	17.2054	2.4	19.3319		89.0	70 - 130	6.98	20	
1,2-Dibromoethane	13.3692	1.9	15.3670		87.0	70 - 130	2.92	20	
1,2-Dichlorobenzene	13.2271	1.5	12.0246		110	70 - 130	4.88	20	
1,2-Dichloroethane	7.36627	1.0	8.09480		91.0	70 - 130	4.83	20	
1,2-Dichloropropane	7.30128	1.2	9.24213		79.0	70 - 130	1.26	20	

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Batch B5E0557 - No_Prep_AIR (continued)

LCS Dup (B5E0557-BSD1) - Continued Prepared: 5/20/2015 Analyzed: 5/21/2015

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
1,3,5-Trimethylbenzene	10.3232	1.2	9.83166		105	70 - 130	3.74	20	
1,3-Butadiene	3.87147	0.55	4.42454		87.5	70 - 130	4.47	20	
1,3-Dichlorobenzene	13.3473	1.5	12.0246		111	70 - 130	3.97	20	
1,4-Dichlorobenzene	13.1068	1.5	12.0246		109	70 - 130	4.92	20	
1,4-Dioxane	6.01781	0.90	7.20695		83.5	70 - 130	6.94	20	
2,2,4-Trimethylpentane	7.70870	1.2	9.34388		82.5	70 - 130	5.88	20	
2-Butanone	5.27893	0.74	5.89824		89.5	70 - 130	3.99	20	
2-Chloroethyl vinyl ether	9.71815	1.1	8.71583		112	70 - 130	2.65	20	
2-Chlorotoluene	9.26722	1.3	10.3544		89.5	70 - 130	8.04	20	
2-Hexanone	6.75920	1.0	8.19296		82.5	70 - 130	2.40	20	
2-Propanol	4.74330	0.61	4.91534		96.5	70 - 130	2.56	20	
4-Chlorotoluene	10.8204	1.3	10.3544		104	70 - 130	1.90	20	
4-Ethyl Toluene	10.4216	1.2	9.83166		106	70 - 130	0.939	20	
4-Methyl-2-pentanone	6.88209	1.0	8.19296		84.0	70 - 130	3.64	20	
Acetone	4.27575	0.59	4.75084		90.0	70 - 130	14.4	20	
Acetonitrile	2.92149	0.42	3.35804		87.0	70 - 130	2.92	20	
Acrolein	5.34261	0.57	4.58593		116	70 - 130	2.96	20	
Acrylonitrile	3.53753	0.54	4.34053		81.5	70 - 130	0.615	20	
Benzene	5.20747	0.80	6.38953		81.5	70 - 130	0.00	20	
Benzyl chloride	11.9076	1.3	10.3544		115	70 - 130	2.58	20	
Bromobenzene	15.0908	1.6	12.8432		118	70 - 130	0.855	20	
Bromodichloromethane	11.9270	1.7	13.4011		89.0	70 - 130	7.05	20	
Bromoform	25.0147	2.6	20.6733		121	70 - 130	4.44	20	
Bromomethane	6.83406	0.97	7.76597		88.0	70 - 130	4.44	20	
Carbon disulfide	5.32534	0.78	6.22847		85.5	70 - 130	1.18	20	
Carbon tetrachloride	12.8342	1.6	12.5826		102	70 - 130	9.79	20	
Chlorobenzene	9.11504	1.2	9.20712		99.0	70 - 130	0.506	20	
Chloroethane	4.69672	0.66	5.27722		89.0	70 - 130	0.560	20	
Chloroform	9.22792	1.2	9.76499		94.5	70 - 130	1.57	20	
Chloromethane	3.36580	0.52	4.12982		81.5	70 - 130	2.42	20	
cis-1,2-Dichloroethene	7.05761	0.99	7.92990		89.0	70 - 130	0.00	20	
cis-1,3-Dichloropropene	7.39795	1.1	9.07724		81.5	70 - 130	3.02	20	
Cyclohexane	5.40414	0.86	6.88425		78.5	70 - 130	4.36	20	
Dibromochloromethane	18.4853	2.1	17.0371		108	70 - 130	4.94	20	
Dibromomethane	12.1578	1.8	14.2196		85.5	70 - 130	1.18	20	
Dichlorodifluoromethane	11.7204	1.2	9.89063		118	70 - 130	8.48	20	
Dichlorotetrafluoroethane	13.9812	1.7	13.9812		100	70 - 130	4.40	20	
Ethanol	2.86394	0.47	3.76834		76.0	70 - 130	2.60	20	
Ethylbenzene	8.46715	1.1	8.68425		97.5	70 - 130	1.02	20	
Freon-113	14.3309	1.9	15.3272		93.5	70 - 130	0.00	20	
Hexachlorobutadiene	22.9297	2.7	21.3300		108	70 - 130	0.464	20	
Isopropylbenzene	9.53671	1.2	9.83166		97.0	70 - 130	0.514	20	

Volatile Organic Compounds in AIR by TO-15 (ug/m3) - Quality Control (cont'd)

Analyte	Result (ug/m³)	PQL (ug/m³)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B5E0557 - No_Prep_AIR (continued)									
LCS Dup (B5E0557-BSD1) - Continued				Prepared: 5/20/2015 Analyzed: 5/21/2015					
m,p-Xylene	34.9107	4.3	34.7370		100	70 - 130	3.18	20	
Methylene chloride	5.45371	0.87	6.94740		78.5	70 - 130	2.58	20	
MTBE	6.99416	0.90	7.21047		97.0	70 - 130	0.00	20	
n-Butylbenzene	10.7594	1.4	10.9790		98.0	70 - 130	2.52	20	
n-Propylbenzene	9.43839	1.2	9.83166		96.0	70 - 130	0.00	20	
Naphthalene	9.33106	1.3	10.4843		89.0	70 - 130	0.563	20	
o-Xylene	8.72768	1.1	8.68425		100	70 - 130	2.46	20	
p-Isopropyltoluene	10.7594	1.4	10.9790		98.0	70 - 130	3.11	20	
sec-Butylbenzene	10.7594	1.4	10.9790		98.0	70 - 130	2.02	20	
Styrene	8.22117	1.1	8.51934		96.5	70 - 130	0.519	20	
tert-Butylbenzene	10.9241	1.4	10.9790		99.5	70 - 130	1.99	20	
Tetrachloroethene	14.3111	1.7	13.5650		106	70 - 130	1.41	20	
Toluene	6.44404	0.94	7.53688		85.5	70 - 130	5.68	20	
trans-1,2-Dichloroethene	7.13691	0.99	7.92990		90.0	70 - 130	0.00	20	
trans-1,3-Dichloropropene	7.67025	1.1	9.07722		84.5	70 - 130	1.76	20	
Trichloroethene	9.45771	1.3	10.7474		88.0	70 - 130	2.25	20	
Trichlorofluoromethane	10.8995	1.4	11.2366		97.0	70 - 130	9.34	20	
Vinyl acetate	7.60541	0.88	7.04204		108	70 - 130	2.29	20	
Vinyl chloride	4.37103	0.64	5.11231		85.5	70 - 130	4.57	20	
Surrogate: 4-Bromofluorobenzene	*19.11*		*17.8935*		*107*	*79.2 - 147*			

Notes and Definitions

L5	Laboratory Control Sample high biased. Sample result/s was non-detect (ND) for the target analyte; therefore reanalysis was not necessary.
J	Analyte detected below the Practical Quantitation Limit but above or equal to the Method Detection Limit. Result is an estimated concentration.
ND	Analyte is not detected at or above the Practical Quantitation Limit (PQL). When client requests quantitation against MDL, analyte is not detected at or above the Method Detection Limit (MDL)
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
NR	Not Reported
RPD	Relative Percent Difference
CA2	CA-ELAP (CDPH)
OR1	OR-NELAP (OSPHL)
TX1	TX-NELAP (TCEQ)

Notes:
(1) The reported MDL and PQL are based on prep ratio variation and analytical dilution.
(2) The suffix [2C] of specific analytes signifies that the reported result is taken from the instrument's second column.
(3) Results are wet unless otherwise specified.

SCA
ENVIRONMENTAL, INC.

PAGE 1 of 1

PROJECT NAME: 1950 Bay Road
PROJECT NO.: B11689
PROJECT CONTACT: K. Emery
SAMPLED BY: K. Emery

LAB: ATL
TURNAROUND: 5 Day
EMAIL: kemery@sca-enviro.com

LAB I.D. NUMBER	FIELD SAMPLE I.D.	MATRIX			Sample Container			Flow Controller ID	START SAMPLING DATE		Starting Pressure	END SAMPLING DATE		Final Pressure	ANALYSIS REQUESTED							
		AIR			1.4 L SUMMA				DATE (MM/DD/YY)	TIME		DATE (MM/DD/YY)	TIME		TO-15							
1501761-1	SV-2	X			X			369	5/13/15	2:19 pm	-30	5/13/15	2:23 pm	-4	X							
↓ -2	SV-3	X			X			135	5/13/15	3:03 pm	-30	5/13/15	3:08 pm	-4	X							
↓ -3	SV-6	X			X			223	5/13/15	3:31 pm	-30	5/13/15	3:36 pm	-4	X							

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
Karen Emery 5/14/15	Overnight - Delivery courier	C. Aguila CW	5/15/15 910
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME

COMMENTS & NOTES:

Report results to MDL
Report results in $\mu g/m^3$
Please report Isopropanol in TO-15. (leak check)

Refer to Quote # E15D301

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1506250

Report Created for: SCA Enviromental, Inc.

334 19th Street
Oakland, CA 94612

Project Contact: Karen Emery
Project P.O.:
Project Name: #B11689; 1950 Bay Shallow

Project Received: 06/04/2015

Analytical Report reviewed & approved for release on 06/12/2015 by:

Angela Rydelius,
Laboratory Manager

1534 Willow Pass Rd. Pittsburg, CA 94565 ♦ TEL: (877) 252-9262 ♦ FAX: (925) 252-9269 ♦ www.mccampbell.com
NELAP: 4033ORELAP ♦ ELAP: 1644 ♦ ISO/IEC: 17025:2005 ♦ WSDE: C972-11 ♦ ADEC: UST-098 ♦ UCMR3

Glossary of Terms & Qualifier Definitions

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
WorkOrder: 1506250

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 μm filtered and acidified water sample)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

Analytical Qualifiers

S	spike recovery outside accepted recovery limits
c4	surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
e2	diesel range compounds are significant; no recognizable pattern
e7	oil range compounds are significant

Quality Control Qualifiers

F1	MS/MSD recovery and/or RPD was out of acceptance criteria; LCS validated the prep batch.

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8081A
Date Prepared:	6/4/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0'	**1506250-001A**	**Soil**	**06/03/2015**	**GC40**	**105876**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.020	20	06/09/2015 21:27
a-BHC	ND	0.020	20	06/09/2015 21:27
b-BHC	ND	0.020	20	06/09/2015 21:27
d-BHC	ND	0.020	20	06/09/2015 21:27
g-BHC	ND	0.020	20	06/09/2015 21:27
Chlordane (Technical)	ND	0.50	20	06/09/2015 21:27
a-Chlordane	ND	0.020	20	06/09/2015 21:27
g-Chlordane	ND	0.020	20	06/09/2015 21:27
p,p-DDD	ND	0.020	20	06/09/2015 21:27
p,p-DDE	**0.068**	0.020	20	06/09/2015 21:27
p,p-DDT	**0.11**	0.020	20	06/09/2015 21:27
Dieldrin	ND	0.020	20	06/09/2015 21:27
Endosulfan I	ND	0.020	20	06/09/2015 21:27
Endosulfan II	ND	0.020	20	06/09/2015 21:27
Endosulfan sulfate	ND	0.020	20	06/09/2015 21:27
Endrin	ND	0.020	20	06/09/2015 21:27
Endrin aldehyde	ND	0.020	20	06/09/2015 21:27
Endrin ketone	ND	0.020	20	06/09/2015 21:27
Heptachlor	ND	0.020	20	06/09/2015 21:27
Heptachlor epoxide	ND	0.020	20	06/09/2015 21:27
Hexachlorobenzene	ND	0.20	20	06/09/2015 21:27
Hexachlorocyclopentadiene	ND	0.40	20	06/09/2015 21:27
Methoxychlor	ND	0.020	20	06/09/2015 21:27
Toxaphene	ND	1.0	20	06/09/2015 21:27

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	124	70-130	06/09/2015 21:27

Analyst(s): SS

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8081A
Date Prepared:	6/4/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0'	**1506250-002A**	**Soil**	**06/03/2015**	**GC40**	**105876**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.020	20	06/09/2015 22:03
a-BHC	ND	0.020	20	06/09/2015 22:03
b-BHC	ND	0.020	20	06/09/2015 22:03
d-BHC	ND	0.020	20	06/09/2015 22:03
g-BHC	ND	0.020	20	06/09/2015 22:03
Chlordane (Technical)	ND	0.50	20	06/09/2015 22:03
a-Chlordane	**0.028**	0.020	20	06/09/2015 22:03
g-Chlordane	**0.029**	0.020	20	06/09/2015 22:03
p,p-DDD	ND	0.020	20	06/09/2015 22:03
p,p-DDE	**0.088**	0.020	20	06/09/2015 22:03
p,p-DDT	**0.13**	0.020	20	06/09/2015 22:03
Dieldrin	**0.022**	0.020	20	06/09/2015 22:03
Endosulfan I	ND	0.020	20	06/09/2015 22:03
Endosulfan II	ND	0.020	20	06/09/2015 22:03
Endosulfan sulfate	ND	0.020	20	06/09/2015 22:03
Endrin	ND	0.020	20	06/09/2015 22:03
Endrin aldehyde	ND	0.020	20	06/09/2015 22:03
Endrin ketone	ND	0.020	20	06/09/2015 22:03
Heptachlor	ND	0.020	20	06/09/2015 22:03
Heptachlor epoxide	ND	0.020	20	06/09/2015 22:03
Hexachlorobenzene	ND	0.20	20	06/09/2015 22:03
Hexachlorocyclopentadiene	ND	0.40	20	06/09/2015 22:03
Methoxychlor	ND	0.020	20	06/09/2015 22:03
Toxaphene	ND	1.0	20	06/09/2015 22:03

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	142	S	70-130	06/09/2015 22:03

Analyst(s): SS

Analytical Comments: c4

(Cont.)

Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8081A
Date Prepared:	6/4/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0'	**1506250-003A**	**Soil**	**06/03/2015**	**GC40**	**105876**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.010	10	06/09/2015 22:39
a-BHC	ND	0.010	10	06/09/2015 22:39
b-BHC	ND	0.010	10	06/09/2015 22:39
d-BHC	ND	0.010	10	06/09/2015 22:39
g-BHC	ND	0.010	10	06/09/2015 22:39
Chlordane (Technical)	**0.36**	0.25	10	06/09/2015 22:39
a-Chlordane	**0.028**	0.010	10	06/09/2015 22:39
g-Chlordane	**0.032**	0.010	10	06/09/2015 22:39
p,p-DDD	**0.021**	0.010	10	06/09/2015 22:39
p,p-DDE	**0.074**	0.010	10	06/09/2015 22:39
p,p-DDT	**0.099**	0.010	10	06/09/2015 22:39
Dieldrin	**0.014**	0.010	10	06/09/2015 22:39
Endosulfan I	ND	0.010	10	06/09/2015 22:39
Endosulfan II	ND	0.010	10	06/09/2015 22:39
Endosulfan sulfate	ND	0.010	10	06/09/2015 22:39
Endrin	ND	0.010	10	06/09/2015 22:39
Endrin aldehyde	ND	0.010	10	06/09/2015 22:39
Endrin ketone	ND	0.010	10	06/09/2015 22:39
Heptachlor	ND	0.010	10	06/09/2015 22:39
Heptachlor epoxide	ND	0.010	10	06/09/2015 22:39
Hexachlorobenzene	ND	0.10	10	06/09/2015 22:39
Hexachlorocyclopentadiene	ND	0.20	10	06/09/2015 22:39
Methoxychlor	ND	0.010	10	06/09/2015 22:39
Toxaphene	ND	0.50	10	06/09/2015 22:39

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	125	70-130	06/09/2015 22:39

Analyst(s): SS

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8081A
Date Prepared:	6/4/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0'	**1506250-004A**	**Soil**	**06/03/2015**	**GC40**	**105876**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.020	20	06/09/2015 23:14
a-BHC	ND	0.020	20	06/09/2015 23:14
b-BHC	ND	0.020	20	06/09/2015 23:14
d-BHC	ND	0.020	20	06/09/2015 23:14
g-BHC	ND	0.020	20	06/09/2015 23:14
Chlordane (Technical)	ND	0.50	20	06/09/2015 23:14
a-Chlordane	**0.022**	0.020	20	06/09/2015 23:14
g-Chlordane	**0.023**	0.020	20	06/09/2015 23:14
p,p-DDD	ND	0.020	20	06/09/2015 23:14
p,p-DDE	**0.088**	0.020	20	06/09/2015 23:14
p,p-DDT	**0.12**	0.020	20	06/09/2015 23:14
Dieldrin	ND	0.020	20	06/09/2015 23:14
Endosulfan I	ND	0.020	20	06/09/2015 23:14
Endosulfan II	ND	0.020	20	06/09/2015 23:14
Endosulfan sulfate	ND	0.020	20	06/09/2015 23:14
Endrin	ND	0.020	20	06/09/2015 23:14
Endrin aldehyde	ND	0.020	20	06/09/2015 23:14
Endrin ketone	ND	0.020	20	06/09/2015 23:14
Heptachlor	ND	0.020	20	06/09/2015 23:14
Heptachlor epoxide	ND	0.020	20	06/09/2015 23:14
Hexachlorobenzene	ND	0.20	20	06/09/2015 23:14
Hexachlorocyclopentadiene	ND	0.40	20	06/09/2015 23:14
Methoxychlor	ND	0.020	20	06/09/2015 23:14
Toxaphene	ND	1.0	20	06/09/2015 23:14

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	136	S	70-130	06/09/2015 23:14

Analyst(s): SS

Analytical Comments: c4

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8081A
Date Prepared:	6/4/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0'	**1506250-005A**	**Soil**	**06/03/2015**	**GC23**	**105876**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.050	50	06/10/2015 20:38
a-BHC	ND	0.050	50	06/10/2015 20:38
b-BHC	ND	0.050	50	06/10/2015 20:38
d-BHC	ND	0.050	50	06/10/2015 20:38
g-BHC	ND	0.050	50	06/10/2015 20:38
Chlordane (Technical)	ND	1.2	50	06/10/2015 20:38
a-Chlordane	ND	0.050	50	06/10/2015 20:38
g-Chlordane	ND	0.050	50	06/10/2015 20:38
p,p-DDD	**0.14**	0.050	50	06/10/2015 20:38
p,p-DDE	**0.14**	0.050	50	06/10/2015 20:38
p,p-DDT	**0.22**	0.050	50	06/10/2015 20:38
Dieldrin	ND	0.050	50	06/10/2015 20:38
Endosulfan I	ND	0.050	50	06/10/2015 20:38
Endosulfan II	ND	0.050	50	06/10/2015 20:38
Endosulfan sulfate	ND	0.050	50	06/10/2015 20:38
Endrin	ND	0.050	50	06/10/2015 20:38
Endrin aldehyde	ND	0.050	50	06/10/2015 20:38
Endrin ketone	ND	0.050	50	06/10/2015 20:38
Heptachlor	ND	0.050	50	06/10/2015 20:38
Heptachlor epoxide	ND	0.050	50	06/10/2015 20:38
Hexachlorobenzene	ND	0.50	50	06/10/2015 20:38
Hexachlorocyclopentadiene	ND	1.0	50	06/10/2015 20:38
Methoxychlor	ND	0.050	50	06/10/2015 20:38
Toxaphene	ND	2.5	50	06/10/2015 20:38

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	128	70-130	06/10/2015 20:38

Analyst(s): SS

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8081A
Date Prepared:	6/4/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0'	**1506250-006A**	**Soil**	**06/03/2015**	**GC40**	**105876**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.020	20	06/09/2015 23:50
a-BHC	ND	0.020	20	06/09/2015 23:50
b-BHC	ND	0.020	20	06/09/2015 23:50
d-BHC	ND	0.020	20	06/09/2015 23:50
g-BHC	ND	0.020	20	06/09/2015 23:50
Chlordane (Technical)	ND	0.50	20	06/09/2015 23:50
a-Chlordane	**0.028**	0.020	20	06/09/2015 23:50
g-Chlordane	**0.029**	0.020	20	06/09/2015 23:50
p,p-DDD	**0.024**	0.020	20	06/09/2015 23:50
p,p-DDE	**0.11**	0.020	20	06/09/2015 23:50
p,p-DDT	**0.12**	0.020	20	06/09/2015 23:50
Dieldrin	ND	0.020	20	06/09/2015 23:50
Endosulfan I	ND	0.020	20	06/09/2015 23:50
Endosulfan II	ND	0.020	20	06/09/2015 23:50
Endosulfan sulfate	ND	0.020	20	06/09/2015 23:50
Endrin	ND	0.020	20	06/09/2015 23:50
Endrin aldehyde	ND	0.020	20	06/09/2015 23:50
Endrin ketone	ND	0.020	20	06/09/2015 23:50
Heptachlor	ND	0.020	20	06/09/2015 23:50
Heptachlor epoxide	ND	0.020	20	06/09/2015 23:50
Hexachlorobenzene	ND	0.20	20	06/09/2015 23:50
Hexachlorocyclopentadiene	ND	0.40	20	06/09/2015 23:50
Methoxychlor	ND	0.020	20	06/09/2015 23:50
Toxaphene	ND	1.0	20	06/09/2015 23:50

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	123	70-130	06/09/2015 23:50

Analyst(s): SS

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8081A
Date Prepared:	6/4/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0'	**1506250-007A**	**Soil**	**06/03/2015**	**GC40**	**105876**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.010	10	06/09/2015 10:09
a-BHC	ND	0.010	10	06/09/2015 10:09
b-BHC	ND	0.010	10	06/09/2015 10:09
d-BHC	ND	0.010	10	06/09/2015 10:09
g-BHC	ND	0.010	10	06/09/2015 10:09
Chlordane (Technical)	**0.25**	0.25	10	06/09/2015 10:09
a-Chlordane	**0.020**	0.010	10	06/09/2015 10:09
g-Chlordane	**0.019**	0.010	10	06/09/2015 10:09
p,p-DDD	**0.021**	0.010	10	06/09/2015 10:09
p,p-DDE	**0.20**	0.010	10	06/09/2015 10:09
p,p-DDT	**0.18**	0.010	10	06/09/2015 10:09
Dieldrin	**0.041**	0.010	10	06/09/2015 10:09
Endosulfan I	ND	0.010	10	06/09/2015 10:09
Endosulfan II	ND	0.010	10	06/09/2015 10:09
Endosulfan sulfate	ND	0.010	10	06/09/2015 10:09
Endrin	ND	0.010	10	06/09/2015 10:09
Endrin aldehyde	ND	0.010	10	06/09/2015 10:09
Endrin ketone	ND	0.010	10	06/09/2015 10:09
Heptachlor	ND	0.010	10	06/09/2015 10:09
Heptachlor epoxide	ND	0.010	10	06/09/2015 10:09
Hexachlorobenzene	ND	0.10	10	06/09/2015 10:09
Hexachlorocyclopentadiene	ND	0.20	10	06/09/2015 10:09
Methoxychlor	ND	0.010	10	06/09/2015 10:09
Toxaphene	ND	0.50	10	06/09/2015 10:09

Surrogates	REC (%)	Limits		
Decachlorobiphenyl	106	70-130		06/09/2015 10:09

Analyst(s): SS

(Cont.)

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 19:50
Date Prepared: 6/4/15
WorkOrder: 1506250
Extraction Method: SW3550B
Analytical Method: SW8081A
Unit: mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0'	**1506250-008A**	**Soil**	**06/03/2015**	**GC40**	**105876**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.010	10	06/09/2015 10:44
a-BHC	ND	0.010	10	06/09/2015 10:44
b-BHC	ND	0.010	10	06/09/2015 10:44
d-BHC	ND	0.010	10	06/09/2015 10:44
g-BHC	ND	0.010	10	06/09/2015 10:44
Chlordane (Technical)	ND	0.25	10	06/09/2015 10:44
a-Chlordane	**0.013**	0.010	10	06/09/2015 10:44
g-Chlordane	**0.010**	0.010	10	06/09/2015 10:44
p,p-DDD	ND	0.010	10	06/09/2015 10:44
p,p-DDE	**0.034**	0.010	10	06/09/2015 10:44
p,p-DDT	**0.049**	0.010	10	06/09/2015 10:44
Dieldrin	ND	0.010	10	06/09/2015 10:44
Endosulfan I	ND	0.010	10	06/09/2015 10:44
Endosulfan II	ND	0.010	10	06/09/2015 10:44
Endosulfan sulfate	ND	0.010	10	06/09/2015 10:44
Endrin	ND	0.010	10	06/09/2015 10:44
Endrin aldehyde	ND	0.010	10	06/09/2015 10:44
Endrin ketone	ND	0.010	10	06/09/2015 10:44
Heptachlor	ND	0.010	10	06/09/2015 10:44
Heptachlor epoxide	ND	0.010	10	06/09/2015 10:44
Hexachlorobenzene	ND	0.10	10	06/09/2015 10:44
Hexachlorocyclopentadiene	ND	0.20	10	06/09/2015 10:44
Methoxychlor	ND	0.010	10	06/09/2015 10:44
Toxaphene	ND	0.50	10	06/09/2015 10:44

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	107	70-130	06/09/2015 10:44

Analyst(s): SS

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8081A
Date Prepared:	6/4/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0'	**1506250-009A**	**Soil**	**06/03/2015**	**GC40**	**105899**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.020	20	06/09/2015 11:20
a-BHC	ND	0.020	20	06/09/2015 11:20
b-BHC	ND	0.020	20	06/09/2015 11:20
d-BHC	ND	0.020	20	06/09/2015 11:20
g-BHC	ND	0.020	20	06/09/2015 11:20
Chlordane (Technical)	ND	0.50	20	06/09/2015 11:20
a-Chlordane	**0.035**	0.020	20	06/09/2015 11:20
g-Chlordane	**0.039**	0.020	20	06/09/2015 11:20
p,p-DDD	**0.023**	0.020	20	06/09/2015 11:20
p,p-DDE	**0.049**	0.020	20	06/09/2015 11:20
p,p-DDT	**0.081**	0.020	20	06/09/2015 11:20
Dieldrin	ND	0.020	20	06/09/2015 11:20
Endosulfan I	ND	0.020	20	06/09/2015 11:20
Endosulfan II	ND	0.020	20	06/09/2015 11:20
Endosulfan sulfate	ND	0.020	20	06/09/2015 11:20
Endrin	ND	0.020	20	06/09/2015 11:20
Endrin aldehyde	ND	0.020	20	06/09/2015 11:20
Endrin ketone	ND	0.020	20	06/09/2015 11:20
Heptachlor	ND	0.020	20	06/09/2015 11:20
Heptachlor epoxide	ND	0.020	20	06/09/2015 11:20
Hexachlorobenzene	ND	0.20	20	06/09/2015 11:20
Hexachlorocyclopentadiene	ND	0.40	20	06/09/2015 11:20
Methoxychlor	ND	0.020	20	06/09/2015 11:20
Toxaphene	ND	1.0	20	06/09/2015 11:20

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	121	70-130	06/09/2015 11:20

Analyst(s): SS

(Cont.)

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 19:50
Date Prepared: 6/4/15

WorkOrder: 1506250
Extraction Method: SW3550B
Analytical Method: SW8081A
Unit: mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0'	1506250-010A	Soil	06/03/2015	GC40	105899

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.020	20	06/09/2015 11:56
a-BHC	ND	0.020	20	06/09/2015 11:56
b-BHC	ND	0.020	20	06/09/2015 11:56
d-BHC	ND	0.020	20	06/09/2015 11:56
g-BHC	ND	0.020	20	06/09/2015 11:56
Chlordane (Technical)	ND	0.50	20	06/09/2015 11:56
a-Chlordane	**0.038**	0.020	20	06/09/2015 11:56
g-Chlordane	**0.043**	0.020	20	06/09/2015 11:56
p,p-DDD	**0.023**	0.020	20	06/09/2015 11:56
p,p-DDE	**0.055**	0.020	20	06/09/2015 11:56
p,p-DDT	**0.12**	0.020	20	06/09/2015 11:56
Dieldrin	ND	0.020	20	06/09/2015 11:56
Endosulfan I	ND	0.020	20	06/09/2015 11:56
Endosulfan II	ND	0.020	20	06/09/2015 11:56
Endosulfan sulfate	ND	0.020	20	06/09/2015 11:56
Endrin	ND	0.020	20	06/09/2015 11:56
Endrin aldehyde	ND	0.020	20	06/09/2015 11:56
Endrin ketone	ND	0.020	20	06/09/2015 11:56
Heptachlor	ND	0.020	20	06/09/2015 11:56
Heptachlor epoxide	ND	0.020	20	06/09/2015 11:56
Hexachlorobenzene	ND	0.20	20	06/09/2015 11:56
Hexachlorocyclopentadiene	ND	0.40	20	06/09/2015 11:56
Methoxychlor	ND	0.020	20	06/09/2015 11:56
Toxaphene	ND	1.0	20	06/09/2015 11:56

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	167	S	70-130	06/09/2015 11:56

Analyst(s): SS

Analytical Comments: c4

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0'	**1506250-001A**	**Soil**	**06/03/2015**	**GC18**	**105880**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/08/2015 09:21
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/08/2015 09:21
Benzene	ND	0.0050	1	06/08/2015 09:21
Bromobenzene	ND	0.0050	1	06/08/2015 09:21
Bromochloromethane	ND	0.0050	1	06/08/2015 09:21
Bromodichloromethane	ND	0.0050	1	06/08/2015 09:21
Bromoform	ND	0.0050	1	06/08/2015 09:21
Bromomethane	ND	0.0050	1	06/08/2015 09:21
2-Butanone (MEK)	ND	0.020	1	06/08/2015 09:21
t-Butyl alcohol (TBA)	ND	0.050	1	06/08/2015 09:21
n-Butyl benzene	ND	0.0050	1	06/08/2015 09:21
sec-Butyl benzene	ND	0.0050	1	06/08/2015 09:21
tert-Butyl benzene	ND	0.0050	1	06/08/2015 09:21
Carbon Disulfide	ND	0.0050	1	06/08/2015 09:21
Carbon Tetrachloride	ND	0.0050	1	06/08/2015 09:21
Chlorobenzene	ND	0.0050	1	06/08/2015 09:21
Chloroethane	ND	0.0050	1	06/08/2015 09:21
Chloroform	ND	0.0050	1	06/08/2015 09:21
Chloromethane	ND	0.0050	1	06/08/2015 09:21
2-Chlorotoluene	ND	0.0050	1	06/08/2015 09:21
4-Chlorotoluene	ND	0.0050	1	06/08/2015 09:21
Dibromochloromethane	ND	0.0050	1	06/08/2015 09:21
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/08/2015 09:21
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/08/2015 09:21
Dibromomethane	ND	0.0050	1	06/08/2015 09:21
1,2-Dichlorobenzene	ND	0.0050	1	06/08/2015 09:21
1,3-Dichlorobenzene	ND	0.0050	1	06/08/2015 09:21
1,4-Dichlorobenzene	ND	0.0050	1	06/08/2015 09:21
Dichlorodifluoromethane	ND	0.0050	1	06/08/2015 09:21
1,1-Dichloroethane	ND	0.0050	1	06/08/2015 09:21
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/08/2015 09:21
1,1-Dichloroethene	ND	0.0050	1	06/08/2015 09:21
cis-1,2-Dichloroethene	ND	0.0050	1	06/08/2015 09:21
trans-1,2-Dichloroethene	ND	0.0050	1	06/08/2015 09:21
1,2-Dichloropropane	ND	0.0050	1	06/08/2015 09:21
1,3-Dichloropropane	ND	0.0050	1	06/08/2015 09:21
2,2-Dichloropropane	ND	0.0050	1	06/08/2015 09:21
1,1-Dichloropropene	ND	0.0050	1	06/08/2015 09:21

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0'	**1506250-001A**	**Soil**	**06/03/2015**	**GC18**	**105880**

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/08/2015 09:21
trans-1,3-Dichloropropene	ND	0.0050	1	06/08/2015 09:21
Diisopropyl ether (DIPE)	ND	0.0050	1	06/08/2015 09:21
Ethylbenzene	ND	0.0050	1	06/08/2015 09:21
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/08/2015 09:21
Freon 113	ND	0.0050	1	06/08/2015 09:21
Hexachlorobutadiene	ND	0.0050	1	06/08/2015 09:21
Hexachloroethane	ND	0.0050	1	06/08/2015 09:21
2-Hexanone	ND	0.0050	1	06/08/2015 09:21
Isopropylbenzene	ND	0.0050	1	06/08/2015 09:21
4-Isopropyl toluene	ND	0.0050	1	06/08/2015 09:21
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/08/2015 09:21
Methylene chloride	ND	0.0050	1	06/08/2015 09:21
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/08/2015 09:21
Naphthalene	ND	0.0050	1	06/08/2015 09:21
n-Propyl benzene	ND	0.0050	1	06/08/2015 09:21
Styrene	ND	0.0050	1	06/08/2015 09:21
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/08/2015 09:21
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/08/2015 09:21
Tetrachloroethene	ND	0.0050	1	06/08/2015 09:21
Toluene	ND	0.0050	1	06/08/2015 09:21
1,2,3-Trichlorobenzene	ND	0.0050	1	06/08/2015 09:21
1,2,4-Trichlorobenzene	ND	0.0050	1	06/08/2015 09:21
1,1,1-Trichloroethane	ND	0.0050	1	06/08/2015 09:21
1,1,2-Trichloroethane	ND	0.0050	1	06/08/2015 09:21
Trichloroethene	ND	0.0050	1	06/08/2015 09:21
Trichlorofluoromethane	ND	0.0050	1	06/08/2015 09:21
1,2,3-Trichloropropane	ND	0.0050	1	06/08/2015 09:21
1,2,4-Trimethylbenzene	ND	0.0050	1	06/08/2015 09:21
1,3,5-Trimethylbenzene	ND	0.0050	1	06/08/2015 09:21
Vinyl Chloride	ND	0.0050	1	06/08/2015 09:21
Xylenes, Total	ND	0.0050	1	06/08/2015 09:21

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0'	**1506250-001A**	**Soil**	**06/03/2015**	**GC18**	**105880**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	104	70-130		06/08/2015 09:21
Toluene-d8	100	70-130		06/08/2015 09:21
4-BFB	103	70-130		06/08/2015 09:21
Benzene-d6	132	60-140		06/08/2015 09:21
Ethylbenzene-d10	118	60-140		06/08/2015 09:21
1,2-DCB-d4	92	60-140		06/08/2015 09:21

Analyst(s): KF

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Angela Rydelius, Lab Manager

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 19:50
Date Prepared: 6/4/15

WorkOrder: 1506250
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0'	**1506250-002A**	**Soil**	**06/03/2015**	**GC16**	**105880**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/09/2015 17:46
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/09/2015 17:46
Benzene	ND	0.0050	1	06/09/2015 17:46
Bromobenzene	ND	0.0050	1	06/09/2015 17:46
Bromochloromethane	ND	0.0050	1	06/09/2015 17:46
Bromodichloromethane	ND	0.0050	1	06/09/2015 17:46
Bromoform	ND	0.0050	1	06/09/2015 17:46
Bromomethane	ND	0.0050	1	06/09/2015 17:46
2-Butanone (MEK)	ND	0.020	1	06/09/2015 17:46
t-Butyl alcohol (TBA)	ND	0.050	1	06/09/2015 17:46
n-Butyl benzene	ND	0.0050	1	06/09/2015 17:46
sec-Butyl benzene	ND	0.0050	1	06/09/2015 17:46
tert-Butyl benzene	ND	0.0050	1	06/09/2015 17:46
Carbon Disulfide	ND	0.0050	1	06/09/2015 17:46
Carbon Tetrachloride	ND	0.0050	1	06/09/2015 17:46
Chlorobenzene	ND	0.0050	1	06/09/2015 17:46
Chloroethane	ND	0.0050	1	06/09/2015 17:46
Chloroform	ND	0.0050	1	06/09/2015 17:46
Chloromethane	ND	0.0050	1	06/09/2015 17:46
2-Chlorotoluene	ND	0.0050	1	06/09/2015 17:46
4-Chlorotoluene	ND	0.0050	1	06/09/2015 17:46
Dibromochloromethane	ND	0.0050	1	06/09/2015 17:46
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/09/2015 17:46
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/09/2015 17:46
Dibromomethane	ND	0.0050	1	06/09/2015 17:46
1,2-Dichlorobenzene	ND	0.0050	1	06/09/2015 17:46
1,3-Dichlorobenzene	ND	0.0050	1	06/09/2015 17:46
1,4-Dichlorobenzene	ND	0.0050	1	06/09/2015 17:46
Dichlorodifluoromethane	ND	0.0050	1	06/09/2015 17:46
1,1-Dichloroethane	ND	0.0050	1	06/09/2015 17:46
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/09/2015 17:46
1,1-Dichloroethene	ND	0.0050	1	06/09/2015 17:46
cis-1,2-Dichloroethene	ND	0.0050	1	06/09/2015 17:46
trans-1,2-Dichloroethene	ND	0.0050	1	06/09/2015 17:46
1,2-Dichloropropane	ND	0.0050	1	06/09/2015 17:46
1,3-Dichloropropane	ND	0.0050	1	06/09/2015 17:46
2,2-Dichloropropane	ND	0.0050	1	06/09/2015 17:46
1,1-Dichloropropene	ND	0.0050	1	06/09/2015 17:46

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0'	1506250-002A	Soil	06/03/2015	GC16	105880

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/09/2015 17:46
trans-1,3-Dichloropropene	ND	0.0050	1	06/09/2015 17:46
Diisopropyl ether (DIPE)	ND	0.0050	1	06/09/2015 17:46
Ethylbenzene	ND	0.0050	1	06/09/2015 17:46
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/09/2015 17:46
Freon 113	ND	0.0050	1	06/09/2015 17:46
Hexachlorobutadiene	ND	0.0050	1	06/09/2015 17:46
Hexachloroethane	ND	0.0050	1	06/09/2015 17:46
2-Hexanone	ND	0.0050	1	06/09/2015 17:46
Isopropylbenzene	ND	0.0050	1	06/09/2015 17:46
4-Isopropyl toluene	ND	0.0050	1	06/09/2015 17:46
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/09/2015 17:46
Methylene chloride	ND	0.0050	1	06/09/2015 17:46
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/09/2015 17:46
Naphthalene	ND	0.0050	1	06/09/2015 17:46
n-Propyl benzene	ND	0.0050	1	06/09/2015 17:46
Styrene	ND	0.0050	1	06/09/2015 17:46
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/09/2015 17:46
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/09/2015 17:46
Tetrachloroethene	ND	0.0050	1	06/09/2015 17:46
Toluene	ND	0.0050	1	06/09/2015 17:46
1,2,3-Trichlorobenzene	ND	0.0050	1	06/09/2015 17:46
1,2,4-Trichlorobenzene	ND	0.0050	1	06/09/2015 17:46
1,1,1-Trichloroethane	ND	0.0050	1	06/09/2015 17:46
1,1,2-Trichloroethane	ND	0.0050	1	06/09/2015 17:46
Trichloroethene	ND	0.0050	1	06/09/2015 17:46
Trichlorofluoromethane	ND	0.0050	1	06/09/2015 17:46
1,2,3-Trichloropropane	ND	0.0050	1	06/09/2015 17:46
1,2,4-Trimethylbenzene	ND	0.0050	1	06/09/2015 17:46
1,3,5-Trimethylbenzene	ND	0.0050	1	06/09/2015 17:46
Vinyl Chloride	ND	0.0050	1	06/09/2015 17:46
Xylenes, Total	ND	0.0050	1	06/09/2015 17:46

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0'	1506250-002A	Soil	06/03/2015	GC16	105880

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	104	70-130		06/09/2015 17:46
Toluene-d8	95	70-130		06/09/2015 17:46
4-BFB	90	70-130		06/09/2015 17:46
Benzene-d6	77	60-140		06/09/2015 17:46
Ethylbenzene-d10	81	60-140		06/09/2015 17:46
1,2-DCB-d4	83	60-140		06/09/2015 17:46

Analyst(s): KF

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0'	1506250-003A	Soil	06/03/2015	GC10	105900

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/09/2015 22:55
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/09/2015 22:55
Benzene	ND	0.0050	1	06/09/2015 22:55
Bromobenzene	ND	0.0050	1	06/09/2015 22:55
Bromochloromethane	ND	0.0050	1	06/09/2015 22:55
Bromodichloromethane	ND	0.0050	1	06/09/2015 22:55
Bromoform	ND	0.0050	1	06/09/2015 22:55
Bromomethane	ND	0.0050	1	06/09/2015 22:55
2-Butanone (MEK)	ND	0.020	1	06/09/2015 22:55
t-Butyl alcohol (TBA)	ND	0.050	1	06/09/2015 22:55
n-Butyl benzene	ND	0.0050	1	06/09/2015 22:55
sec-Butyl benzene	ND	0.0050	1	06/09/2015 22:55
tert-Butyl benzene	ND	0.0050	1	06/09/2015 22:55
Carbon Disulfide	ND	0.0050	1	06/09/2015 22:55
Carbon Tetrachloride	ND	0.0050	1	06/09/2015 22:55
Chlorobenzene	ND	0.0050	1	06/09/2015 22:55
Chloroethane	ND	0.0050	1	06/09/2015 22:55
Chloroform	ND	0.0050	1	06/09/2015 22:55
Chloromethane	ND	0.0050	1	06/09/2015 22:55
2-Chlorotoluene	ND	0.0050	1	06/09/2015 22:55
4-Chlorotoluene	ND	0.0050	1	06/09/2015 22:55
Dibromochloromethane	ND	0.0050	1	06/09/2015 22:55
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/09/2015 22:55
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/09/2015 22:55
Dibromomethane	ND	0.0050	1	06/09/2015 22:55
1,2-Dichlorobenzene	ND	0.0050	1	06/09/2015 22:55
1,3-Dichlorobenzene	ND	0.0050	1	06/09/2015 22:55
1,4-Dichlorobenzene	ND	0.0050	1	06/09/2015 22:55
Dichlorodifluoromethane	ND	0.0050	1	06/09/2015 22:55
1,1-Dichloroethane	ND	0.0050	1	06/09/2015 22:55
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/09/2015 22:55
1,1-Dichloroethene	ND	0.0050	1	06/09/2015 22:55
cis-1,2-Dichloroethene	ND	0.0050	1	06/09/2015 22:55
trans-1,2-Dichloroethene	ND	0.0050	1	06/09/2015 22:55
1,2-Dichloropropane	ND	0.0050	1	06/09/2015 22:55
1,3-Dichloropropane	ND	0.0050	1	06/09/2015 22:55
2,2-Dichloropropane	ND	0.0050	1	06/09/2015 22:55
1,1-Dichloropropene	ND	0.0050	1	06/09/2015 22:55

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0'	1506250-003A	Soil	06/03/2015	GC10	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/09/2015 22:55
trans-1,3-Dichloropropene	ND	0.0050	1	06/09/2015 22:55
Diisopropyl ether (DIPE)	ND	0.0050	1	06/09/2015 22:55
Ethylbenzene	ND	0.0050	1	06/09/2015 22:55
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/09/2015 22:55
Freon 113	ND	0.0050	1	06/09/2015 22:55
Hexachlorobutadiene	ND	0.0050	1	06/09/2015 22:55
Hexachloroethane	ND	0.0050	1	06/09/2015 22:55
2-Hexanone	ND	0.0050	1	06/09/2015 22:55
Isopropylbenzene	ND	0.0050	1	06/09/2015 22:55
4-Isopropyl toluene	ND	0.0050	1	06/09/2015 22:55
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/09/2015 22:55
Methylene chloride	ND	0.0050	1	06/09/2015 22:55
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/09/2015 22:55
Naphthalene	ND	0.0050	1	06/09/2015 22:55
n-Propyl benzene	ND	0.0050	1	06/09/2015 22:55
Styrene	ND	0.0050	1	06/09/2015 22:55
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/09/2015 22:55
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/09/2015 22:55
Tetrachloroethene	ND	0.0050	1	06/09/2015 22:55
Toluene	ND	0.0050	1	06/09/2015 22:55
1,2,3-Trichlorobenzene	ND	0.0050	1	06/09/2015 22:55
1,2,4-Trichlorobenzene	ND	0.0050	1	06/09/2015 22:55
1,1,1-Trichloroethane	ND	0.0050	1	06/09/2015 22:55
1,1,2-Trichloroethane	ND	0.0050	1	06/09/2015 22:55
Trichloroethene	ND	0.0050	1	06/09/2015 22:55
Trichlorofluoromethane	ND	0.0050	1	06/09/2015 22:55
1,2,3-Trichloropropane	ND	0.0050	1	06/09/2015 22:55
1,2,4-Trimethylbenzene	ND	0.0050	1	06/09/2015 22:55
1,3,5-Trimethylbenzene	ND	0.0050	1	06/09/2015 22:55
Vinyl Chloride	ND	0.0050	1	06/09/2015 22:55
Xylenes, Total	ND	0.0050	1	06/09/2015 22:55

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0'	**1506250-003A**	**Soil**	**06/03/2015**	**GC10**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	83	70-130		06/09/2015 22:55
Toluene-d8	94	70-130		06/09/2015 22:55
4-BFB	92	70-130		06/09/2015 22:55
Benzene-d6	75	60-140		06/09/2015 22:55
Ethylbenzene-d10	94	60-140		06/09/2015 22:55
1,2-DCB-d4	77	60-140		06/09/2015 22:55

Analyst(s): KBO

(Cont.)

Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0'	1506250-004A	Soil	06/03/2015	GC10	105900

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/09/2015 23:36
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/09/2015 23:36
Benzene	ND	0.0050	1	06/09/2015 23:36
Bromobenzene	ND	0.0050	1	06/09/2015 23:36
Bromochloromethane	ND	0.0050	1	06/09/2015 23:36
Bromodichloromethane	ND	0.0050	1	06/09/2015 23:36
Bromoform	ND	0.0050	1	06/09/2015 23:36
Bromomethane	ND	0.0050	1	06/09/2015 23:36
2-Butanone (MEK)	ND	0.020	1	06/09/2015 23:36
t-Butyl alcohol (TBA)	ND	0.050	1	06/09/2015 23:36
n-Butyl benzene	ND	0.0050	1	06/09/2015 23:36
sec-Butyl benzene	ND	0.0050	1	06/09/2015 23:36
tert-Butyl benzene	ND	0.0050	1	06/09/2015 23:36
Carbon Disulfide	ND	0.0050	1	06/09/2015 23:36
Carbon Tetrachloride	ND	0.0050	1	06/09/2015 23:36
Chlorobenzene	ND	0.0050	1	06/09/2015 23:36
Chloroethane	ND	0.0050	1	06/09/2015 23:36
Chloroform	ND	0.0050	1	06/09/2015 23:36
Chloromethane	ND	0.0050	1	06/09/2015 23:36
2-Chlorotoluene	ND	0.0050	1	06/09/2015 23:36
4-Chlorotoluene	ND	0.0050	1	06/09/2015 23:36
Dibromochloromethane	ND	0.0050	1	06/09/2015 23:36
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/09/2015 23:36
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/09/2015 23:36
Dibromomethane	ND	0.0050	1	06/09/2015 23:36
1,2-Dichlorobenzene	ND	0.0050	1	06/09/2015 23:36
1,3-Dichlorobenzene	ND	0.0050	1	06/09/2015 23:36
1,4-Dichlorobenzene	ND	0.0050	1	06/09/2015 23:36
Dichlorodifluoromethane	ND	0.0050	1	06/09/2015 23:36
1,1-Dichloroethane	ND	0.0050	1	06/09/2015 23:36
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/09/2015 23:36
1,1-Dichloroethene	ND	0.0050	1	06/09/2015 23:36
cis-1,2-Dichloroethene	ND	0.0050	1	06/09/2015 23:36
trans-1,2-Dichloroethene	ND	0.0050	1	06/09/2015 23:36
1,2-Dichloropropane	ND	0.0050	1	06/09/2015 23:36
1,3-Dichloropropane	ND	0.0050	1	06/09/2015 23:36
2,2-Dichloropropane	ND	0.0050	1	06/09/2015 23:36
1,1-Dichloropropene	ND	0.0050	1	06/09/2015 23:36

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0'	1506250-004A	Soil	06/03/2015	GC10	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/09/2015 23:36
trans-1,3-Dichloropropene	ND	0.0050	1	06/09/2015 23:36
Diisopropyl ether (DIPE)	ND	0.0050	1	06/09/2015 23:36
Ethylbenzene	ND	0.0050	1	06/09/2015 23:36
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/09/2015 23:36
Freon 113	ND	0.0050	1	06/09/2015 23:36
Hexachlorobutadiene	ND	0.0050	1	06/09/2015 23:36
Hexachloroethane	ND	0.0050	1	06/09/2015 23:36
2-Hexanone	ND	0.0050	1	06/09/2015 23:36
Isopropylbenzene	ND	0.0050	1	06/09/2015 23:36
4-Isopropyl toluene	ND	0.0050	1	06/09/2015 23:36
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/09/2015 23:36
Methylene chloride	ND	0.0050	1	06/09/2015 23:36
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/09/2015 23:36
Naphthalene	ND	0.0050	1	06/09/2015 23:36
n-Propyl benzene	ND	0.0050	1	06/09/2015 23:36
Styrene	ND	0.0050	1	06/09/2015 23:36
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/09/2015 23:36
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/09/2015 23:36
Tetrachloroethene	ND	0.0050	1	06/09/2015 23:36
Toluene	ND	0.0050	1	06/09/2015 23:36
1,2,3-Trichlorobenzene	ND	0.0050	1	06/09/2015 23:36
1,2,4-Trichlorobenzene	ND	0.0050	1	06/09/2015 23:36
1,1,1-Trichloroethane	ND	0.0050	1	06/09/2015 23:36
1,1,2-Trichloroethane	ND	0.0050	1	06/09/2015 23:36
Trichloroethene	ND	0.0050	1	06/09/2015 23:36
Trichlorofluoromethane	ND	0.0050	1	06/09/2015 23:36
1,2,3-Trichloropropane	ND	0.0050	1	06/09/2015 23:36
1,2,4-Trimethylbenzene	ND	0.0050	1	06/09/2015 23:36
1,3,5-Trimethylbenzene	ND	0.0050	1	06/09/2015 23:36
Vinyl Chloride	ND	0.0050	1	06/09/2015 23:36
Xylenes, Total	ND	0.0050	1	06/09/2015 23:36

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0'	**1506250-004A**	**Soil**	**06/03/2015**	**GC10**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	82	70-130		06/09/2015 23:36
Toluene-d8	95	70-130		06/09/2015 23:36
4-BFB	97	70-130		06/09/2015 23:36
Benzene-d6	77	60-140		06/09/2015 23:36
Ethylbenzene-d10	95	60-140		06/09/2015 23:36
1,2-DCB-d4	80	60-140		06/09/2015 23:36

Analyst(s): KBO

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Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 19:50
Date Prepared: 6/4/15
WorkOrder: 1506250
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0'	**1506250-005A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 02:20
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 02:20
Benzene	ND	0.0050	1	06/10/2015 02:20
Bromobenzene	ND	0.0050	1	06/10/2015 02:20
Bromochloromethane	ND	0.0050	1	06/10/2015 02:20
Bromodichloromethane	ND	0.0050	1	06/10/2015 02:20
Bromoform	ND	0.0050	1	06/10/2015 02:20
Bromomethane	ND	0.0050	1	06/10/2015 02:20
2-Butanone (MEK)	ND	0.020	1	06/10/2015 02:20
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 02:20
n-Butyl benzene	ND	0.0050	1	06/10/2015 02:20
sec-Butyl benzene	ND	0.0050	1	06/10/2015 02:20
tert-Butyl benzene	ND	0.0050	1	06/10/2015 02:20
Carbon Disulfide	ND	0.0050	1	06/10/2015 02:20
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 02:20
Chlorobenzene	ND	0.0050	1	06/10/2015 02:20
Chloroethane	ND	0.0050	1	06/10/2015 02:20
Chloroform	ND	0.0050	1	06/10/2015 02:20
Chloromethane	ND	0.0050	1	06/10/2015 02:20
2-Chlorotoluene	ND	0.0050	1	06/10/2015 02:20
4-Chlorotoluene	ND	0.0050	1	06/10/2015 02:20
Dibromochloromethane	ND	0.0050	1	06/10/2015 02:20
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 02:20
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 02:20
Dibromomethane	ND	0.0050	1	06/10/2015 02:20
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 02:20
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 02:20
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 02:20
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 02:20
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 02:20
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 02:20
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 02:20
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 02:20
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 02:20
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 02:20
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 02:20
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 02:20
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 02:20

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0'	1506250-005A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 02:20
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 02:20
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 02:20
Ethylbenzene	ND	0.0050	1	06/10/2015 02:20
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 02:20
Freon 113	ND	0.0050	1	06/10/2015 02:20
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 02:20
Hexachloroethane	ND	0.0050	1	06/10/2015 02:20
2-Hexanone	ND	0.0050	1	06/10/2015 02:20
Isopropylbenzene	ND	0.0050	1	06/10/2015 02:20
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 02:20
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 02:20
Methylene chloride	ND	0.0050	1	06/10/2015 02:20
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 02:20
Naphthalene	ND	0.0050	1	06/10/2015 02:20
n-Propyl benzene	ND	0.0050	1	06/10/2015 02:20
Styrene	ND	0.0050	1	06/10/2015 02:20
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 02:20
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 02:20
Tetrachloroethene	ND	0.0050	1	06/10/2015 02:20
Toluene	ND	0.0050	1	06/10/2015 02:20
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 02:20
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 02:20
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 02:20
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 02:20
Trichloroethene	ND	0.0050	1	06/10/2015 02:20
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 02:20
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 02:20
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 02:20
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 02:20
Vinyl Chloride	ND	0.0050	1	06/10/2015 02:20
Xylenes, Total	ND	0.0050	1	06/10/2015 02:20

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0'	**1506250-005A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	103	70-130		06/10/2015 02:20
Toluene-d8	96	70-130		06/10/2015 02:20
4-BFB	87	70-130		06/10/2015 02:20
Benzene-d6	74	60-140		06/10/2015 02:20
Ethylbenzene-d10	78	60-140		06/10/2015 02:20
1,2-DCB-d4	80	60-140		06/10/2015 02:20

Analyst(s): KF

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0'	**1506250-006A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 03:03
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 03:03
Benzene	ND	0.0050	1	06/10/2015 03:03
Bromobenzene	ND	0.0050	1	06/10/2015 03:03
Bromochloromethane	ND	0.0050	1	06/10/2015 03:03
Bromodichloromethane	ND	0.0050	1	06/10/2015 03:03
Bromoform	ND	0.0050	1	06/10/2015 03:03
Bromomethane	ND	0.0050	1	06/10/2015 03:03
2-Butanone (MEK)	ND	0.020	1	06/10/2015 03:03
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 03:03
n-Butyl benzene	ND	0.0050	1	06/10/2015 03:03
sec-Butyl benzene	ND	0.0050	1	06/10/2015 03:03
tert-Butyl benzene	ND	0.0050	1	06/10/2015 03:03
Carbon Disulfide	ND	0.0050	1	06/10/2015 03:03
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 03:03
Chlorobenzene	ND	0.0050	1	06/10/2015 03:03
Chloroethane	ND	0.0050	1	06/10/2015 03:03
Chloroform	ND	0.0050	1	06/10/2015 03:03
Chloromethane	ND	0.0050	1	06/10/2015 03:03
2-Chlorotoluene	ND	0.0050	1	06/10/2015 03:03
4-Chlorotoluene	ND	0.0050	1	06/10/2015 03:03
Dibromochloromethane	ND	0.0050	1	06/10/2015 03:03
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 03:03
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 03:03
Dibromomethane	ND	0.0050	1	06/10/2015 03:03
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 03:03
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 03:03
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 03:03
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 03:03
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 03:03
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 03:03
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 03:03
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 03:03
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 03:03
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 03:03
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 03:03
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 03:03
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 03:03

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0'	**1506250-006A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 03:03
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 03:03
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 03:03
Ethylbenzene	ND	0.0050	1	06/10/2015 03:03
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 03:03
Freon 113	ND	0.0050	1	06/10/2015 03:03
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 03:03
Hexachloroethane	ND	0.0050	1	06/10/2015 03:03
2-Hexanone	ND	0.0050	1	06/10/2015 03:03
Isopropylbenzene	ND	0.0050	1	06/10/2015 03:03
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 03:03
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 03:03
Methylene chloride	ND	0.0050	1	06/10/2015 03:03
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 03:03
Naphthalene	ND	0.0050	1	06/10/2015 03:03
n-Propyl benzene	ND	0.0050	1	06/10/2015 03:03
Styrene	ND	0.0050	1	06/10/2015 03:03
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 03:03
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 03:03
Tetrachloroethene	ND	0.0050	1	06/10/2015 03:03
Toluene	ND	0.0050	1	06/10/2015 03:03
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 03:03
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 03:03
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 03:03
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 03:03
Trichloroethene	ND	0.0050	1	06/10/2015 03:03
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 03:03
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 03:03
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 03:03
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 03:03
Vinyl Chloride	ND	0.0050	1	06/10/2015 03:03
Xylenes, Total	ND	0.0050	1	06/10/2015 03:03

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0'	**1506250-006A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	102	70-130		06/10/2015 03:03
Toluene-d8	95	70-130		06/10/2015 03:03
4-BFB	88	70-130		06/10/2015 03:03
Benzene-d6	70	60-140		06/10/2015 03:03
Ethylbenzene-d10	71	60-140		06/10/2015 03:03
1,2-DCB-d4	78	60-140		06/10/2015 03:03

Analyst(s): KF

(Cont.)

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 19:50
Date Prepared: 6/4/15

WorkOrder: 1506250
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0'	1506250-007A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 03:45
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 03:45
Benzene	ND	0.0050	1	06/10/2015 03:45
Bromobenzene	ND	0.0050	1	06/10/2015 03:45
Bromochloromethane	ND	0.0050	1	06/10/2015 03:45
Bromodichloromethane	ND	0.0050	1	06/10/2015 03:45
Bromoform	ND	0.0050	1	06/10/2015 03:45
Bromomethane	ND	0.0050	1	06/10/2015 03:45
2-Butanone (MEK)	ND	0.020	1	06/10/2015 03:45
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 03:45
n-Butyl benzene	ND	0.0050	1	06/10/2015 03:45
sec-Butyl benzene	ND	0.0050	1	06/10/2015 03:45
tert-Butyl benzene	ND	0.0050	1	06/10/2015 03:45
Carbon Disulfide	ND	0.0050	1	06/10/2015 03:45
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 03:45
Chlorobenzene	ND	0.0050	1	06/10/2015 03:45
Chloroethane	ND	0.0050	1	06/10/2015 03:45
Chloroform	ND	0.0050	1	06/10/2015 03:45
Chloromethane	ND	0.0050	1	06/10/2015 03:45
2-Chlorotoluene	ND	0.0050	1	06/10/2015 03:45
4-Chlorotoluene	ND	0.0050	1	06/10/2015 03:45
Dibromochloromethane	ND	0.0050	1	06/10/2015 03:45
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 03:45
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 03:45
Dibromomethane	ND	0.0050	1	06/10/2015 03:45
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 03:45
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 03:45
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 03:45
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 03:45
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 03:45
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 03:45
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 03:45
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 03:45
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 03:45
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 03:45
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 03:45
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 03:45
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 03:45

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0'	**1506250-007A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 03:45
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 03:45
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 03:45
Ethylbenzene	ND	0.0050	1	06/10/2015 03:45
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 03:45
Freon 113	ND	0.0050	1	06/10/2015 03:45
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 03:45
Hexachloroethane	ND	0.0050	1	06/10/2015 03:45
2-Hexanone	ND	0.0050	1	06/10/2015 03:45
Isopropylbenzene	ND	0.0050	1	06/10/2015 03:45
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 03:45
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 03:45
Methylene chloride	ND	0.0050	1	06/10/2015 03:45
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 03:45
Naphthalene	ND	0.0050	1	06/10/2015 03:45
n-Propyl benzene	ND	0.0050	1	06/10/2015 03:45
Styrene	ND	0.0050	1	06/10/2015 03:45
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 03:45
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 03:45
Tetrachloroethene	ND	0.0050	1	06/10/2015 03:45
Toluene	ND	0.0050	1	06/10/2015 03:45
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 03:45
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 03:45
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 03:45
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 03:45
Trichloroethene	ND	0.0050	1	06/10/2015 03:45
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 03:45
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 03:45
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 03:45
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 03:45
Vinyl Chloride	ND	0.0050	1	06/10/2015 03:45
Xylenes, Total	ND	0.0050	1	06/10/2015 03:45

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0'	1506250-007A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	103	70-130		06/10/2015 03:45
Toluene-d8	95	70-130		06/10/2015 03:45
4-BFB	90	70-130		06/10/2015 03:45
Benzene-d6	70	60-140		06/10/2015 03:45
Ethylbenzene-d10	70	60-140		06/10/2015 03:45
1,2-DCB-d4	77	60-140		06/10/2015 03:45

Analyst(s): KF

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0'	**1506250-008A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 04:28
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 04:28
Benzene	ND	0.0050	1	06/10/2015 04:28
Bromobenzene	ND	0.0050	1	06/10/2015 04:28
Bromochloromethane	ND	0.0050	1	06/10/2015 04:28
Bromodichloromethane	ND	0.0050	1	06/10/2015 04:28
Bromoform	ND	0.0050	1	06/10/2015 04:28
Bromomethane	ND	0.0050	1	06/10/2015 04:28
2-Butanone (MEK)	ND	0.020	1	06/10/2015 04:28
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 04:28
n-Butyl benzene	ND	0.0050	1	06/10/2015 04:28
sec-Butyl benzene	ND	0.0050	1	06/10/2015 04:28
tert-Butyl benzene	ND	0.0050	1	06/10/2015 04:28
Carbon Disulfide	ND	0.0050	1	06/10/2015 04:28
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 04:28
Chlorobenzene	ND	0.0050	1	06/10/2015 04:28
Chloroethane	ND	0.0050	1	06/10/2015 04:28
Chloroform	ND	0.0050	1	06/10/2015 04:28
Chloromethane	ND	0.0050	1	06/10/2015 04:28
2-Chlorotoluene	ND	0.0050	1	06/10/2015 04:28
4-Chlorotoluene	ND	0.0050	1	06/10/2015 04:28
Dibromochloromethane	ND	0.0050	1	06/10/2015 04:28
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 04:28
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 04:28
Dibromomethane	ND	0.0050	1	06/10/2015 04:28
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 04:28
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 04:28
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 04:28
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 04:28
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 04:28
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 04:28
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 04:28
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 04:28
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 04:28
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 04:28
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 04:28
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 04:28
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 04:28

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Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0'	1506250-008A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 04:28
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 04:28
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 04:28
Ethylbenzene	ND	0.0050	1	06/10/2015 04:28
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 04:28
Freon 113	ND	0.0050	1	06/10/2015 04:28
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 04:28
Hexachloroethane	ND	0.0050	1	06/10/2015 04:28
2-Hexanone	ND	0.0050	1	06/10/2015 04:28
Isopropylbenzene	ND	0.0050	1	06/10/2015 04:28
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 04:28
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 04:28
Methylene chloride	ND	0.0050	1	06/10/2015 04:28
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 04:28
Naphthalene	ND	0.0050	1	06/10/2015 04:28
n-Propyl benzene	ND	0.0050	1	06/10/2015 04:28
Styrene	ND	0.0050	1	06/10/2015 04:28
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 04:28
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 04:28
Tetrachloroethene	ND	0.0050	1	06/10/2015 04:28
Toluene	ND	0.0050	1	06/10/2015 04:28
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 04:28
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 04:28
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 04:28
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 04:28
Trichloroethene	ND	0.0050	1	06/10/2015 04:28
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 04:28
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 04:28
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 04:28
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 04:28
Vinyl Chloride	ND	0.0050	1	06/10/2015 04:28
Xylenes, Total	ND	0.0050	1	06/10/2015 04:28

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0'	**1506250-008A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	105	70-130		06/10/2015 04:28
Toluene-d8	95	70-130		06/10/2015 04:28
4-BFB	92	70-130		06/10/2015 04:28
Benzene-d6	76	60-140		06/10/2015 04:28
Ethylbenzene-d10	79	60-140		06/10/2015 04:28
1,2-DCB-d4	80	60-140		06/10/2015 04:28

Analyst(s): KF

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0'	**1506250-009A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 05:10
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 05:10
Benzene	ND	0.0050	1	06/10/2015 05:10
Bromobenzene	ND	0.0050	1	06/10/2015 05:10
Bromochloromethane	ND	0.0050	1	06/10/2015 05:10
Bromodichloromethane	ND	0.0050	1	06/10/2015 05:10
Bromoform	ND	0.0050	1	06/10/2015 05:10
Bromomethane	ND	0.0050	1	06/10/2015 05:10
2-Butanone (MEK)	ND	0.020	1	06/10/2015 05:10
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 05:10
n-Butyl benzene	ND	0.0050	1	06/10/2015 05:10
sec-Butyl benzene	ND	0.0050	1	06/10/2015 05:10
tert-Butyl benzene	ND	0.0050	1	06/10/2015 05:10
Carbon Disulfide	ND	0.0050	1	06/10/2015 05:10
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 05:10
Chlorobenzene	ND	0.0050	1	06/10/2015 05:10
Chloroethane	ND	0.0050	1	06/10/2015 05:10
Chloroform	ND	0.0050	1	06/10/2015 05:10
Chloromethane	ND	0.0050	1	06/10/2015 05:10
2-Chlorotoluene	ND	0.0050	1	06/10/2015 05:10
4-Chlorotoluene	ND	0.0050	1	06/10/2015 05:10
Dibromochloromethane	ND	0.0050	1	06/10/2015 05:10
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 05:10
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 05:10
Dibromomethane	ND	0.0050	1	06/10/2015 05:10
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 05:10
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 05:10
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 05:10
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 05:10
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 05:10
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 05:10
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 05:10
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 05:10
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 05:10
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 05:10
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 05:10
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 05:10
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 05:10

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0'	**1506250-009A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 05:10
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 05:10
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 05:10
Ethylbenzene	ND	0.0050	1	06/10/2015 05:10
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 05:10
Freon 113	ND	0.0050	1	06/10/2015 05:10
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 05:10
Hexachloroethane	ND	0.0050	1	06/10/2015 05:10
2-Hexanone	ND	0.0050	1	06/10/2015 05:10
Isopropylbenzene	ND	0.0050	1	06/10/2015 05:10
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 05:10
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 05:10
Methylene chloride	ND	0.0050	1	06/10/2015 05:10
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 05:10
Naphthalene	ND	0.0050	1	06/10/2015 05:10
n-Propyl benzene	ND	0.0050	1	06/10/2015 05:10
Styrene	ND	0.0050	1	06/10/2015 05:10
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 05:10
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 05:10
Tetrachloroethene	ND	0.0050	1	06/10/2015 05:10
Toluene	ND	0.0050	1	06/10/2015 05:10
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 05:10
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 05:10
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 05:10
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 05:10
Trichloroethene	ND	0.0050	1	06/10/2015 05:10
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 05:10
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 05:10
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 05:10
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 05:10
Vinyl Chloride	ND	0.0050	1	06/10/2015 05:10
Xylenes, Total	ND	0.0050	1	06/10/2015 05:10

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0'	**1506250-009A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	102	70-130		06/10/2015 05:10
Toluene-d8	96	70-130		06/10/2015 05:10
4-BFB	90	70-130		06/10/2015 05:10
Benzene-d6	77	60-140		06/10/2015 05:10
Ethylbenzene-d10	80	60-140		06/10/2015 05:10
1,2-DCB-d4	84	60-140		06/10/2015 05:10

Analyst(s): KF

(Cont.)

Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0'	1506250-010A	Soil	06/03/2015	GC18	105900

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/06/2015 13:46
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/06/2015 13:46
Benzene	ND	0.0050	1	06/06/2015 13:46
Bromobenzene	ND	0.0050	1	06/06/2015 13:46
Bromochloromethane	ND	0.0050	1	06/06/2015 13:46
Bromodichloromethane	ND	0.0050	1	06/06/2015 13:46
Bromoform	ND	0.0050	1	06/06/2015 13:46
Bromomethane	ND	0.0050	1	06/06/2015 13:46
2-Butanone (MEK)	ND	0.020	1	06/06/2015 13:46
t-Butyl alcohol (TBA)	ND	0.050	1	06/06/2015 13:46
n-Butyl benzene	ND	0.0050	1	06/06/2015 13:46
sec-Butyl benzene	ND	0.0050	1	06/06/2015 13:46
tert-Butyl benzene	ND	0.0050	1	06/06/2015 13:46
Carbon Disulfide	ND	0.0050	1	06/06/2015 13:46
Carbon Tetrachloride	ND	0.0050	1	06/06/2015 13:46
Chlorobenzene	ND	0.0050	1	06/06/2015 13:46
Chloroethane	ND	0.0050	1	06/06/2015 13:46
Chloroform	ND	0.0050	1	06/06/2015 13:46
Chloromethane	ND	0.0050	1	06/06/2015 13:46
2-Chlorotoluene	ND	0.0050	1	06/06/2015 13:46
4-Chlorotoluene	ND	0.0050	1	06/06/2015 13:46
Dibromochloromethane	ND	0.0050	1	06/06/2015 13:46
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/06/2015 13:46
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/06/2015 13:46
Dibromomethane	ND	0.0050	1	06/06/2015 13:46
1,2-Dichlorobenzene	ND	0.0050	1	06/06/2015 13:46
1,3-Dichlorobenzene	ND	0.0050	1	06/06/2015 13:46
1,4-Dichlorobenzene	ND	0.0050	1	06/06/2015 13:46
Dichlorodifluoromethane	ND	0.0050	1	06/06/2015 13:46
1,1-Dichloroethane	ND	0.0050	1	06/06/2015 13:46
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/06/2015 13:46
1,1-Dichloroethene	ND	0.0050	1	06/06/2015 13:46
cis-1,2-Dichloroethene	ND	0.0050	1	06/06/2015 13:46
trans-1,2-Dichloroethene	ND	0.0050	1	06/06/2015 13:46
1,2-Dichloropropane	ND	0.0050	1	06/06/2015 13:46
1,3-Dichloropropane	ND	0.0050	1	06/06/2015 13:46
2,2-Dichloropropane	ND	0.0050	1	06/06/2015 13:46
1,1-Dichloropropene	ND	0.0050	1	06/06/2015 13:46

(Cont.)

Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0'	**1506250-010A**	**Soil**	**06/03/2015**	**GC18**	**105900**

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/06/2015 13:46
trans-1,3-Dichloropropene	ND	0.0050	1	06/06/2015 13:46
Diisopropyl ether (DIPE)	ND	0.0050	1	06/06/2015 13:46
Ethylbenzene	ND	0.0050	1	06/06/2015 13:46
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/06/2015 13:46
Freon 113	ND	0.0050	1	06/06/2015 13:46
Hexachlorobutadiene	ND	0.0050	1	06/06/2015 13:46
Hexachloroethane	ND	0.0050	1	06/06/2015 13:46
2-Hexanone	ND	0.0050	1	06/06/2015 13:46
Isopropylbenzene	ND	0.0050	1	06/06/2015 13:46
4-Isopropyl toluene	ND	0.0050	1	06/06/2015 13:46
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/06/2015 13:46
Methylene chloride	ND	0.0050	1	06/06/2015 13:46
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/06/2015 13:46
Naphthalene	ND	0.0050	1	06/06/2015 13:46
n-Propyl benzene	ND	0.0050	1	06/06/2015 13:46
Styrene	ND	0.0050	1	06/06/2015 13:46
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/06/2015 13:46
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/06/2015 13:46
Tetrachloroethene	ND	0.0050	1	06/06/2015 13:46
Toluene	ND	0.0050	1	06/06/2015 13:46
1,2,3-Trichlorobenzene	ND	0.0050	1	06/06/2015 13:46
1,2,4-Trichlorobenzene	ND	0.0050	1	06/06/2015 13:46
1,1,1-Trichloroethane	ND	0.0050	1	06/06/2015 13:46
1,1,2-Trichloroethane	ND	0.0050	1	06/06/2015 13:46
Trichloroethene	ND	0.0050	1	06/06/2015 13:46
Trichlorofluoromethane	ND	0.0050	1	06/06/2015 13:46
1,2,3-Trichloropropane	ND	0.0050	1	06/06/2015 13:46
1,2,4-Trimethylbenzene	ND	0.0050	1	06/06/2015 13:46
1,3,5-Trimethylbenzene	ND	0.0050	1	06/06/2015 13:46
Vinyl Chloride	ND	0.0050	1	06/06/2015 13:46
Xylenes, Total	ND	0.0050	1	06/06/2015 13:46

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8260B
Date Prepared:	6/4/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0'	**1506250-010A**	**Soil**	**06/03/2015**	**GC18**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	102	70-130		06/06/2015 13:46
Toluene-d8	101	70-130		06/06/2015 13:46
4-BFB	103	70-130		06/06/2015 13:46
Benzene-d6	134	60-140		06/06/2015 13:46
Ethylbenzene-d10	122	60-140		06/06/2015 13:46
1,2-DCB-d4	95	60-140		06/06/2015 13:46

Analyst(s): KF

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 19:50
Date Prepared: 6/4/15
WorkOrder: 1506250
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0'	**1506250-001A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105864**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.59**	0.50	1	06/10/2015 13:30
Arsenic	**5.4**	0.50	1	06/10/2015 13:30
Barium	**310**	5.0	1	06/10/2015 13:30
Beryllium	ND	0.50	1	06/10/2015 13:30
Cadmium	**0.47**	0.25	1	06/10/2015 13:30
Chromium	**58**	0.50	1	06/10/2015 13:30
Cobalt	**16**	0.50	1	06/10/2015 13:30
Copper	**52**	0.50	1	06/10/2015 13:30
Lead	**21**	0.50	1	06/10/2015 13:30
Mercury	**0.11**	0.050	1	06/10/2015 13:30
Molybdenum	**1.6**	0.50	1	06/10/2015 13:30
Nickel	**72**	0.50	1	06/10/2015 13:30
Selenium	ND	0.50	1	06/10/2015 13:30
Silver	ND	0.50	1	06/10/2015 13:30
Thallium	ND	0.50	1	06/10/2015 13:30
Vanadium	**64**	0.50	1	06/10/2015 13:30
Zinc	**110**	5.0	1	06/10/2015 13:30

Surrogates	REC (%)	Limits	
Terbium	103	70-130	06/10/2015 13:30

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6020
Date Prepared:	6/4/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0'	**1506250-002A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105864**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.82**	0.50	1	06/10/2015 13:36
Arsenic	**7.0**	0.50	1	06/10/2015 13:36
Barium	**460**	5.0	1	06/10/2015 13:36
Beryllium	**0.59**	0.50	1	06/10/2015 13:36
Cadmium	**6.0**	0.25	1	06/10/2015 13:36
Chromium	**75**	0.50	1	06/10/2015 13:36
Cobalt	**17**	0.50	1	06/10/2015 13:36
Copper	**50**	0.50	1	06/10/2015 13:36
Lead	**27**	0.50	1	06/10/2015 13:36
Mercury	**0.15**	0.050	1	06/10/2015 13:36
Molybdenum	**1.4**	0.50	1	06/10/2015 13:36
Nickel	**83**	0.50	1	06/10/2015 13:36
Selenium	**0.71**	0.50	1	06/10/2015 13:36
Silver	ND	0.50	1	06/10/2015 13:36
Thallium	ND	0.50	1	06/10/2015 13:36
Vanadium	**74**	0.50	1	06/10/2015 13:36
Zinc	**120**	5.0	1	06/10/2015 13:36

Surrogates	REC (%)	Limits	
Terbium	104	70-130	06/10/2015 13:36

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6020
Date Prepared:	6/4/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0'	**1506250-003A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105864**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.56**	0.50	1	06/10/2015 13:42
Arsenic	**5.5**	0.50	1	06/10/2015 13:42
Barium	**300**	5.0	1	06/10/2015 13:42
Beryllium	ND	0.50	1	06/10/2015 13:42
Cadmium	**0.41**	0.25	1	06/10/2015 13:42
Chromium	**59**	0.50	1	06/10/2015 13:42
Cobalt	**15**	0.50	1	06/10/2015 13:42
Copper	**41**	0.50	1	06/10/2015 13:42
Lead	**19**	0.50	1	06/10/2015 13:42
Mercury	**0.20**	0.050	1	06/10/2015 13:42
Molybdenum	**1.1**	0.50	1	06/10/2015 13:42
Nickel	**69**	0.50	1	06/10/2015 13:42
Selenium	**0.53**	0.50	1	06/10/2015 13:42
Silver	ND	0.50	1	06/10/2015 13:42
Thallium	ND	0.50	1	06/10/2015 13:42
Vanadium	**66**	0.50	1	06/10/2015 13:42
Zinc	**96**	5.0	1	06/10/2015 13:42

Surrogates	REC (%)	Limits	
Terbium	101	70-130	06/10/2015 13:42

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6020
Date Prepared:	6/4/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0'	**1506250-004A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105863**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.75**	0.50	1	06/10/2015 13:54
Arsenic	**7.1**	0.50	1	06/10/2015 13:54
Barium	**510**	5.0	1	06/10/2015 13:54
Beryllium	**0.56**	0.50	1	06/10/2015 13:54
Cadmium	**0.54**	0.25	1	06/10/2015 13:54
Chromium	**120**	0.50	1	06/10/2015 13:54
Cobalt	**28**	0.50	1	06/10/2015 13:54
Copper	**72**	0.50	1	06/10/2015 13:54
Lead	**28**	0.50	1	06/10/2015 13:54
Mercury	**0.18**	0.050	1	06/10/2015 13:54
Molybdenum	**1.5**	0.50	1	06/10/2015 13:54
Nickel	**170**	0.50	1	06/10/2015 13:54
Selenium	**0.61**	0.50	1	06/10/2015 13:54
Silver	ND	0.50	1	06/10/2015 13:54
Thallium	ND	0.50	1	06/10/2015 13:54
Vanadium	**88**	0.50	1	06/10/2015 13:54
Zinc	**130**	5.0	1	06/10/2015 13:54

Surrogates	REC (%)	Limits	
Terbium	104	70-130	06/10/2015 13:54

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6020
Date Prepared:	6/4/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0'	**1506250-005A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105863**

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	0.50	1	06/10/2015 14:00
Arsenic	**4.6**	0.50	1	06/10/2015 14:00
Barium	**270**	5.0	1	06/10/2015 14:00
Beryllium	ND	0.50	1	06/10/2015 14:00
Cadmium	**0.34**	0.25	1	06/10/2015 14:00
Chromium	**47**	0.50	1	06/10/2015 14:00
Cobalt	**15**	0.50	1	06/10/2015 14:00
Copper	**34**	0.50	1	06/10/2015 14:00
Lead	**17**	0.50	1	06/10/2015 14:00
Mercury	**0.16**	0.050	1	06/10/2015 14:00
Molybdenum	**0.93**	0.50	1	06/10/2015 14:00
Nickel	**98**	0.50	1	06/10/2015 14:00
Selenium	ND	0.50	1	06/10/2015 14:00
Silver	ND	0.50	1	06/10/2015 14:00
Thallium	ND	0.50	1	06/10/2015 14:00
Vanadium	**51**	0.50	1	06/10/2015 14:00
Zinc	**84**	5.0	1	06/10/2015 14:00

Surrogates	REC (%)	Limits	
Terbium	106	70-130	06/10/2015 14:00

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6020
Date Prepared:	6/4/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0'	**1506250-006A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105863**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.51**	0.50	1	06/10/2015 14:06
Arsenic	**4.8**	0.50	1	06/10/2015 14:06
Barium	**240**	5.0	1	06/10/2015 14:06
Beryllium	ND	0.50	1	06/10/2015 14:06
Cadmium	**0.35**	0.25	1	06/10/2015 14:06
Chromium	**50**	0.50	1	06/10/2015 14:06
Cobalt	**12**	0.50	1	06/10/2015 14:06
Copper	**35**	0.50	1	06/10/2015 14:06
Lead	**15**	0.50	1	06/10/2015 14:06
Mercury	**0.084**	0.050	1	06/10/2015 14:06
Molybdenum	**0.95**	0.50	1	06/10/2015 14:06
Nickel	**57**	0.50	1	06/10/2015 14:06
Selenium	ND	0.50	1	06/10/2015 14:06
Silver	ND	0.50	1	06/10/2015 14:06
Thallium	ND	0.50	1	06/10/2015 14:06
Vanadium	**56**	0.50	1	06/10/2015 14:06
Zinc	**80**	5.0	1	06/10/2015 14:06

Surrogates	REC (%)	Limits	
Terbium	104	70-130	06/10/2015 14:06

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6020
Date Prepared:	6/4/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0'	**1506250-007A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105863**

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	0.50	1	06/10/2015 14:24
Arsenic	**4.5**	0.50	1	06/10/2015 14:24
Barium	**250**	5.0	1	06/10/2015 14:24
Beryllium	ND	0.50	1	06/10/2015 14:24
Cadmium	**0.33**	0.25	1	06/10/2015 14:24
Chromium	**38**	0.50	1	06/10/2015 14:24
Cobalt	**9.4**	0.50	1	06/10/2015 14:24
Copper	**24**	0.50	1	06/10/2015 14:24
Lead	**13**	0.50	1	06/10/2015 14:24
Mercury	**0.084**	0.050	1	06/10/2015 14:24
Molybdenum	**0.74**	0.50	1	06/10/2015 14:24
Nickel	**49**	0.50	1	06/10/2015 14:24
Selenium	ND	0.50	1	06/10/2015 14:24
Silver	ND	0.50	1	06/10/2015 14:24
Thallium	ND	0.50	1	06/10/2015 14:24
Vanadium	**39**	0.50	1	06/10/2015 14:24
Zinc	**63**	5.0	1	06/10/2015 14:24

Surrogates	REC (%)	Limits	
Terbium	103	70-130	06/10/2015 14:24

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6020
Date Prepared:	6/4/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0'	**1506250-008A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105863**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.59**	0.50	1	06/10/2015 14:55
Arsenic	**8.9**	0.50	1	06/10/2015 14:55
Barium	**150**	5.0	1	06/10/2015 14:55
Beryllium	ND	0.50	1	06/10/2015 14:55
Cadmium	**0.44**	0.25	1	06/10/2015 14:55
Chromium	**45**	0.50	1	06/10/2015 14:55
Cobalt	**9.6**	0.50	1	06/10/2015 14:55
Copper	**31**	0.50	1	06/10/2015 14:55
Lead	**64**	0.50	1	06/10/2015 14:55
Mercury	**0.12**	0.050	1	06/10/2015 14:55
Molybdenum	**1.5**	0.50	1	06/10/2015 14:55
Nickel	**40**	0.50	1	06/10/2015 14:55
Selenium	**0.51**	0.50	1	06/10/2015 14:55
Silver	ND	0.50	1	06/10/2015 14:55
Thallium	ND	0.50	1	06/10/2015 14:55
Vanadium	**51**	0.50	1	06/10/2015 14:55
Zinc	**150**	5.0	1	06/10/2015 14:55

Surrogates	REC (%)	Limits	
Terbium	101	70-130	06/10/2015 14:55

Analyst(s): DVH

(Cont.)

Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6020
Date Prepared:	6/4/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0'	**1506250-009A**	**Soil**	**06/03/2015**	**ICP-MS1**	**105863**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**3.9**	0.50	1	06/09/2015 04:01
Arsenic	**5.0**	0.50	1	06/09/2015 04:01
Barium	**230**	5.0	1	06/09/2015 04:01
Beryllium	ND	0.50	1	06/09/2015 04:01
Cadmium	**0.46**	0.25	1	06/09/2015 04:01
Chromium	**250**	0.50	1	06/09/2015 04:01
Cobalt	**16**	0.50	1	06/09/2015 04:01
Copper	**48**	0.50	1	06/09/2015 04:01
Lead	**1100**	5.0	10	06/09/2015 11:36
Mercury	**0.12**	0.050	1	06/09/2015 04:01
Molybdenum	**19**	0.50	1	06/09/2015 04:01
Nickel	**84**	0.50	1	06/09/2015 04:01
Selenium	ND	0.50	1	06/09/2015 04:01
Silver	ND	0.50	1	06/09/2015 04:01
Thallium	ND	0.50	1	06/09/2015 04:01
Vanadium	**65**	0.50	1	06/09/2015 04:01
Zinc	**110**	5.0	1	06/09/2015 04:01

Surrogates	REC (%)	Limits	
Terbium	96	70-130	06/09/2015 04:01

Analyst(s): BBO, DB

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6020
Date Prepared:	6/4/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0'	**1506250-010A**	**Soil**	**06/03/2015**	**ICP-MS1**	**105863**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.57**	0.50	1	06/09/2015 04:07
Arsenic	**4.9**	0.50	1	06/09/2015 04:07
Barium	**280**	5.0	1	06/09/2015 04:07
Beryllium	ND	0.50	1	06/09/2015 04:07
Cadmium	**0.41**	0.25	1	06/09/2015 04:07
Chromium	**61**	0.50	1	06/09/2015 04:07
Cobalt	**16**	0.50	1	06/09/2015 04:07
Copper	**49**	0.50	1	06/09/2015 04:07
Lead	**23**	0.50	1	06/09/2015 04:07
Mercury	**0.13**	0.050	1	06/09/2015 04:07
Molybdenum	**1.0**	0.50	1	06/09/2015 04:07
Nickel	**73**	0.50	1	06/09/2015 04:07
Selenium	ND	0.50	1	06/09/2015 04:07
Silver	ND	0.50	1	06/09/2015 04:07
Thallium	ND	0.50	1	06/09/2015 04:07
Vanadium	**68**	0.50	1	06/09/2015 04:07
Zinc	**100**	5.0	1	06/09/2015 04:07

Surrogates	REC (%)	Limits	
Terbium	99	70-130	06/09/2015 04:07

Analyst(s): DB

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	6/4/15	**Unit:**	mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0'	**1506250-001A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 23:31
MTBE	---	0.050	1	06/09/2015 23:31
Benzene	---	0.0050	1	06/09/2015 23:31
Toluene	---	0.0050	1	06/09/2015 23:31
Ethylbenzene	---	0.0050	1	06/09/2015 23:31
Xylenes	---	0.0050	1	06/09/2015 23:31

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	117	70-130	06/09/2015 23:31

Analyst(s): HD

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0'	**1506250-002A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/10/2015 00:32
MTBE	---	0.050	1	06/10/2015 00:32
Benzene	---	0.0050	1	06/10/2015 00:32
Toluene	---	0.0050	1	06/10/2015 00:32
Ethylbenzene	---	0.0050	1	06/10/2015 00:32
Xylenes	---	0.0050	1	06/10/2015 00:32

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	117	70-130	06/10/2015 00:32

Analyst(s): HD

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	6/4/15	**Unit:**	mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0'	**1506250-003A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/10/2015 03:03
MTBE	---	0.050	1	06/10/2015 03:03
Benzene	---	0.0050	1	06/10/2015 03:03
Toluene	---	0.0050	1	06/10/2015 03:03
Ethylbenzene	---	0.0050	1	06/10/2015 03:03
Xylenes	---	0.0050	1	06/10/2015 03:03

Surrogates	REC (%)	Limits	
2-Fluorotoluene	120	70-130	06/10/2015 03:03

Analyst(s): HD

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0'	**1506250-004A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/10/2015 04:04
MTBE	---	0.050	1	06/10/2015 04:04
Benzene	---	0.0050	1	06/10/2015 04:04
Toluene	---	0.0050	1	06/10/2015 04:04
Ethylbenzene	---	0.0050	1	06/10/2015 04:04
Xylenes	---	0.0050	1	06/10/2015 04:04

Surrogates	REC (%)	Limits	
2-Fluorotoluene	114	70-130	06/10/2015 04:04

Analyst(s): HD

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	6/4/15	**Unit:**	mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0'	**1506250-005A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/08/2015 23:43
MTBE	---	0.050	1	06/08/2015 23:43
Benzene	---	0.0050	1	06/08/2015 23:43
Toluene	---	0.0050	1	06/08/2015 23:43
Ethylbenzene	---	0.0050	1	06/08/2015 23:43
Xylenes	---	0.0050	1	06/08/2015 23:43

Surrogates	REC (%)	Limits	
2-Fluorotoluene	107	70-130	06/08/2015 23:43

Analyst(s): HD

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0'	**1506250-006A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 01:49
MTBE	---	0.050	1	06/09/2015 01:49
Benzene	---	0.0050	1	06/09/2015 01:49
Toluene	---	0.0050	1	06/09/2015 01:49
Ethylbenzene	---	0.0050	1	06/09/2015 01:49
Xylenes	---	0.0050	1	06/09/2015 01:49

Surrogates	REC (%)	Limits	
2-Fluorotoluene	102	70-130	06/09/2015 01:49

Analyst(s): HD

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	6/4/15	**Unit:**	mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0'	**1506250-007A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 02:20
MTBE	---	0.050	1	06/09/2015 02:20
Benzene	---	0.0050	1	06/09/2015 02:20
Toluene	---	0.0050	1	06/09/2015 02:20
Ethylbenzene	---	0.0050	1	06/09/2015 02:20
Xylenes	---	0.0050	1	06/09/2015 02:20

Surrogates	REC (%)	Limits	
2-Fluorotoluene	96	70-130	06/09/2015 02:20

Analyst(s): HD

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0'	**1506250-008A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 02:51
MTBE	---	0.050	1	06/09/2015 02:51
Benzene	---	0.0050	1	06/09/2015 02:51
Toluene	---	0.0050	1	06/09/2015 02:51
Ethylbenzene	---	0.0050	1	06/09/2015 02:51
Xylenes	---	0.0050	1	06/09/2015 02:51

Surrogates	REC (%)	Limits	
2-Fluorotoluene	108	70-130	06/09/2015 02:51

Analyst(s): HD

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	6/4/15	**Unit:**	mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0'	**1506250-009A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 03:53
MTBE	---	0.050	1	06/09/2015 03:53
Benzene	---	0.0050	1	06/09/2015 03:53
Toluene	---	0.0050	1	06/09/2015 03:53
Ethylbenzene	---	0.0050	1	06/09/2015 03:53
Xylenes	---	0.0050	1	06/09/2015 03:53

Surrogates	REC (%)	Limits	
2-Fluorotoluene	116	70-130	06/09/2015 03:53

Analyst(s): HD

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0'	**1506250-010A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 06:55
MTBE	---	0.050	1	06/09/2015 06:55
Benzene	---	0.0050	1	06/09/2015 06:55
Toluene	---	0.0050	1	06/09/2015 06:55
Ethylbenzene	---	0.0050	1	06/09/2015 06:55
Xylenes	---	0.0050	1	06/09/2015 06:55

Surrogates	REC (%)	Limits	
2-Fluorotoluene	116	70-130	06/09/2015 06:55

Analyst(s): HD

Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B/3630C
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8015B
Date Prepared:	6/4/15	**Unit:**	mg/Kg

Total Extractable Petroleum Hydrocarbons w/ SG Clean-Up

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0'	**1506250-001A**	**Soil**	**06/03/2015**	**GC11B**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**4.7**	1.0	1	06/07/2015 18:58
TPH-Motor Oil (C18-C36)	**52**	5.0	1	06/07/2015 18:58

Surrogates	REC (%)	Limits	
C9	110	70-130	06/07/2015 18:58

Analyst(s): TK Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0'	**1506250-002A**	**Soil**	**06/03/2015**	**GC11B**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**6.9**	1.0	1	06/07/2015 23:33
TPH-Motor Oil (C18-C36)	**74**	5.0	1	06/07/2015 23:33

Surrogates	REC (%)	Limits	
C9	112	70-130	06/07/2015 23:33

Analyst(s): TK Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0'	**1506250-003A**	**Soil**	**06/03/2015**	**GC2A**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**7.8**	1.0	1	06/07/2015 16:14
TPH-Motor Oil (C18-C36)	**38**	5.0	1	06/07/2015 16:14

Surrogates	REC (%)	Limits	
C9	105	70-130	06/07/2015 16:14

Analyst(s): TK Analytical Comments: e7,e2

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B/3630C
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8015B
Date Prepared:	6/4/15	**Unit:**	mg/Kg

Total Extractable Petroleum Hydrocarbons w/ SG Clean-Up

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0'	**1506250-004A**	**Soil**	**06/03/2015**	**GC2B**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**4.7**	1.0	1	06/07/2015 08:35
TPH-Motor Oil (C18-C36)	**53**	5.0	1	06/07/2015 08:35

Surrogates	REC (%)	Limits	
C9	97	70-130	06/07/2015 08:35

Analyst(s): TK — Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0'	**1506250-005A**	**Soil**	**06/03/2015**	**GC11A**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**4.0**	1.0	1	06/08/2015 05:16
TPH-Motor Oil (C18-C36)	**34**	5.0	1	06/08/2015 05:16

Surrogates	REC (%)	Limits	
C9	115	70-130	06/08/2015 05:16

Analyst(s): TK — Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0'	**1506250-006A**	**Soil**	**06/03/2015**	**GC11A**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**2.8**	1.0	1	06/08/2015 02:59
TPH-Motor Oil (C18-C36)	**30**	5.0	1	06/08/2015 02:59

Surrogates	REC (%)	Limits	
C9	111	70-130	06/08/2015 02:59

Analyst(s): TK — Analytical Comments: e7,e2

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B/3630C
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8015B
Date Prepared:	6/4/15	**Unit:**	mg/Kg

Total Extractable Petroleum Hydrocarbons w/ SG Clean-Up

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0'	**1506250-007A**	**Soil**	**06/03/2015**	**GC11B**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**1.8**	1.0	1	06/09/2015 10:46
TPH-Motor Oil (C18-C36)	**18**	5.0	1	06/09/2015 10:46

Surrogates	REC (%)	Limits	
C9	110	70-130	06/09/2015 10:46

Analyst(s): TK   Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0'	**1506250-008A**	**Soil**	**06/03/2015**	**GC2B**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**2.6**	1.0	1	06/07/2015 13:39
TPH-Motor Oil (C18-C36)	**36**	5.0	1	06/07/2015 13:39

Surrogates	REC (%)	Limits	
C9	98	70-130	06/07/2015 13:39

Analyst(s): TK   Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0'	**1506250-009A**	**Soil**	**06/03/2015**	**GC11A**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**12**	1.0	1	06/06/2015 13:53
TPH-Motor Oil (C18-C36)	**68**	5.0	1	06/06/2015 13:53

Surrogates	REC (%)	Limits	
C9	106	70-130	06/06/2015 13:53

Analyst(s): TK   Analytical Comments: e7,e2

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B/3630C
Date Received:	6/4/15 19:50	**Analytical Method:**	SW8015B
Date Prepared:	6/4/15	**Unit:**	mg/Kg

Total Extractable Petroleum Hydrocarbons w/ SG Clean-Up

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0'	**1506250-010A**	**Soil**	**06/03/2015**	**GC11B**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**11**	1.0	1	06/06/2015 13:53
TPH-Motor Oil (C18-C36)	**78**	5.0	1	06/06/2015 13:53

Surrogates	REC (%)	Limits	
C9	110	70-130	06/06/2015 13:53

Analyst(s): TK

Analytical Comments: e7,e2

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105876
Date Analyzed:	6/5/15	**Extraction Method:**	SW3550B
Instrument:	GC23	**Analytical Method:**	SW8081A
Matrix:	Soil	**Unit:**	mg/kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105876 1506216-003AMS/MSD

QC Summary Report for SW8081A

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Aldrin	ND	0.0560	0.0010	0.050	-	112	70-130
a-BHC	ND	-	0.0010	-	-	-	-
b-BHC	ND	-	0.0010	-	-	-	-
d-BHC	ND	-	0.0010	-	-	-	-
g-BHC	ND	0.0529	0.0010	0.050	-	106	70-130
Chlordane (Technical)	ND	-	0.025	-	-	-	-
a-Chlordane	ND	-	0.0010	-	-	-	-
g-Chlordane	ND	-	0.0010	-	-	-	-
p,p-DDD	ND	-	0.0010	-	-	-	-
p,p-DDE	ND	-	0.0010	-	-	-	-
p,p-DDT	ND	0.0390	0.0010	0.050	-	78	70-130
Dieldrin	ND	0.0573	0.0010	0.050	-	115	70-130
Endosulfan I	ND	-	0.0010	-	-	-	-
Endosulfan II	ND	-	0.0010	-	-	-	-
Endosulfan sulfate	ND	-	0.0010	-	-	-	-
Endrin	ND	0.0608	0.0010	0.050	-	122	70-130
Endrin aldehyde	ND	-	0.0010	-	-	-	-
Endrin ketone	ND	-	0.0010	-	-	-	-
Heptachlor	ND	0.0492	0.0010	0.050	-	98	70-130
Heptachlor epoxide	ND	-	0.0010	-	-	-	-
Hexachlorobenzene	ND	-	0.010	-	-	-	-
Hexachlorocyclopentadiene	ND	-	0.020	-	-	-	-
Methoxychlor	ND	-	0.0010	-	-	-	-
Toxaphene	ND	-	0.050	-	-	-	-
Aroclor1016	ND	-	0.050	-	-	-	-
Aroclor1221	ND	-	0.050	-	-	-	-
Aroclor1232	ND	-	0.050	-	-	-	-
Aroclor1242	ND	-	0.050	-	-	-	-
Aroclor1248	ND	-	0.050	-	-	-	-
Aroclor1254	ND	-	0.050	-	-	-	-
Aroclor1260	ND	-	0.050	-	-	-	-
Surrogate Recovery							
Decachlorobiphenyl	0.0512	0.0502		0.050	102	100	70-130

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105876
Date Analyzed:	6/5/15	**Extraction Method:**	SW3550B
Instrument:	GC23	**Analytical Method:**	SW8081A
Matrix:	Soil	**Unit:**	mg/kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105876 1506216-003AMS/MSD

QC Summary Report for SW8081A

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Aldrin	0.0545	0.0552	0.050	ND	109	110	70-130	1.40	30
g-BHC	0.0512	0.0514	0.050	ND	102	103	70-130	0.477	30
p,p-DDT	0.0379	0.0386	0.050	ND	76	77	70-130	1.79	30
Dieldrin	0.0649	0.0653	0.050	ND	130	131,F1	70-130	0.616	30
Dieldrin	0.0649	0.0653	0.050	ND	130	131,F1	70-130	0.616	30
Endrin	0.0616	0.0638	0.050	ND	123	128	70-130	3.40	30
Heptachlor	0.0483	0.0487	0.050	ND	97	97	70-130	0	30
Surrogate Recovery									
Decachlorobiphenyl	0.0500	0.0515	0.050		100	103	70-130	2.97	30

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105899
Date Analyzed:	6/7/15	**Extraction Method:**	SW3550B
Instrument:	GC23	**Analytical Method:**	SW8081A
Matrix:	Soil	**Unit:**	mg/kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105899 1506250-009AMS/MSD

QC Summary Report for SW8081A

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Aldrin	ND	0.0578	0.0010	0.050	-	116	70-130
a-BHC	ND	-	0.0010	-	-	-	-
b-BHC	ND	-	0.0010	-	-	-	-
d-BHC	ND	-	0.0010	-	-	-	-
g-BHC	ND	0.0548	0.0010	0.050	-	110	70-130
Chlordane (Technical)	ND	-	0.025	-	-	-	-
a-Chlordane	ND	-	0.0010	-	-	-	-
g-Chlordane	ND	-	0.0010	-	-	-	-
p,p-DDD	ND	-	0.0010	-	-	-	-
p,p-DDE	ND	-	0.0010	-	-	-	-
p,p-DDT	ND	0.0515	0.0010	0.050	-	103	70-130
Dieldrin	ND	0.0583	0.0010	0.050	-	117	70-130
Endosulfan I	ND	-	0.0010	-	-	-	-
Endosulfan II	ND	-	0.0010	-	-	-	-
Endosulfan sulfate	ND	-	0.0010	-	-	-	-
Endrin	ND	0.0590	0.0010	0.050	-	118	70-130
Endrin aldehyde	ND	-	0.0010	-	-	-	-
Endrin ketone	ND	-	0.0010	-	-	-	-
Heptachlor	ND	0.0519	0.0010	0.050	-	104	70-130
Heptachlor epoxide	ND	-	0.0010	-	-	-	-
Hexachlorobenzene	ND	-	0.010	-	-	-	-
Hexachlorocyclopentadiene	ND	-	0.020	-	-	-	-
Methoxychlor	ND	-	0.0010	-	-	-	-
Toxaphene	ND	-	0.050	-	-	-	-
Aroclor1016	ND	-	0.050	-	-	-	-
Aroclor1221	ND	-	0.050	-	-	-	-
Aroclor1232	ND	-	0.050	-	-	-	-
Aroclor1242	ND	-	0.050	-	-	-	-
Aroclor1248	ND	-	0.050	-	-	-	-
Aroclor1254	ND	-	0.050	-	-	-	-
Aroclor1260	ND	-	0.050	-	-	-	-
Surrogate Recovery							
Decachlorobiphenyl	0.0432	0.0449		0.050	86	90	70-130

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105899
Date Analyzed:	6/7/15	**Extraction Method:**	SW3550B
Instrument:	GC23	**Analytical Method:**	SW8081A
Matrix:	Soil	**Unit:**	mg/kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105899 1506250-009AMS/MSD

QC Summary Report for SW8081A

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Aldrin	NR	NR		ND<0.02	NR	NR	-	NR	
g-BHC	NR	NR		ND<0.02	NR	NR	-	NR	
p,p-DDT	NR	NR		0.081	NR	NR	-	NR	
Dieldrin	NR	NR		ND<0.02	NR	NR	-	NR	
Endrin	NR	NR		ND<0.02	NR	NR	-	NR	
Heptachlor	NR	NR		ND<0.02	NR	NR	-	NR	
Surrogate Recovery									
Decachlorobiphenyl	NR	NR			NR	NR	-	NR	

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105880
Date Analyzed:	6/5/15	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105880 1506217-038AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	0.10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.0489	0.0050	0.050	-	98	53-116
Benzene	ND	0.0496	0.0050	0.050	-	99	63-137
Bromobenzene	ND	-	0.0050	-	-	-	-
Bromochloromethane	ND	-	0.0050	-	-	-	-
Bromodichloromethane	ND	-	0.0050	-	-	-	-
Bromoform	ND	-	0.0050	-	-	-	-
Bromomethane	ND	-	0.0050	-	-	-	-
2-Butanone (MEK)	ND	-	0.020	-	-	-	-
t-Butyl alcohol (TBA)	ND	0.206	0.050	0.20	-	103	41-135
n-Butyl benzene	ND	-	0.0050	-	-	-	-
sec-Butyl benzene	ND	-	0.0050	-	-	-	-
tert-Butyl benzene	ND	-	0.0050	-	-	-	-
Carbon Disulfide	ND	-	0.0050	-	-	-	-
Carbon Tetrachloride	ND	-	0.0050	-	-	-	-
Chlorobenzene	ND	0.0458	0.0050	0.050	-	92	77-121
Chloroethane	ND	-	0.0050	-	-	-	-
Chloroform	ND	-	0.0050	-	-	-	-
Chloromethane	ND	-	0.0050	-	-	-	-
2-Chlorotoluene	ND	-	0.0050	-	-	-	-
4-Chlorotoluene	ND	-	0.0050	-	-	-	-
Dibromochloromethane	ND	-	0.0050	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.0040	-	-	-	-
1,2-Dibromoethane (EDB)	ND	0.0534	0.0040	0.050	-	107	67-119
Dibromomethane	ND	-	0.0050	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.0050	-	-	-	-
Dichlorodifluoromethane	ND	-	0.0050	-	-	-	-
1,1-Dichloroethane	ND	-	0.0050	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.0499	0.0040	0.050	-	100	58-135
1,1-Dichloroethene	ND	0.0442	0.0050	0.050	-	88	42-145
cis-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
1,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,3-Dichloropropane	ND	-	0.0050	-	-	-	-
2,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,1-Dichloropropene	ND	-	0.0050	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105880
Date Analyzed:	6/5/15	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105880 1506217-038AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Diisopropyl ether (DIPE)	ND	0.0455	0.0050	0.050	-	91	52-129
Ethylbenzene	ND	-	0.0050	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.0479	0.0050	0.050	-	96	53-125
Freon 113	ND	-	0.0050	-	-	-	-
Hexachlorobutadiene	ND	-	0.0050	-	-	-	-
Hexachloroethane	ND	-	0.0050	-	-	-	-
2-Hexanone	ND	-	0.0050	-	-	-	-
Isopropylbenzene	ND	-	0.0050	-	-	-	-
4-Isopropyl toluene	ND	-	0.0050	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.0475	0.0050	0.050	-	95	58-122
Methylene chloride	ND	-	0.0050	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.0050	-	-	-	-
Naphthalene	ND	-	0.0050	-	-	-	-
n-Propyl benzene	ND	-	0.0050	-	-	-	-
Styrene	ND	-	0.0050	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
Tetrachloroethene	ND	-	0.0050	-	-	-	-
Toluene	ND	0.0442	0.0050	0.050	-	88	76-130
1,2,3-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.0050	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.0050	-	-	-	-
Trichloroethene	ND	0.0486	0.0050	0.050	-	97	72-132
Trichlorofluoromethane	ND	-	0.0050	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.0050	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.0050	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.0050	-	-	-	-
Vinyl Chloride	ND	-	0.0050	-	-	-	-
Xylenes, Total	ND	-	0.0050	-	-	-	-
Surrogate Recovery							
Dibromofluoromethane	0.125	0.133		0.12	100	107	70-130
Toluene-d8	0.122	0.116		0.12	98	93	70-130
4-BFB	0.0118	0.0125		0.012	94	100	70-130
Benzene-d6	0.0817	0.0866		0.10	82	87	60-140
Ethylbenzene-d10	0.0826	0.0893		0.10	83	89	60-140
1,2-DCB-d4	0.0873	0.0893		0.10	87	89	60-140

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105880
Date Analyzed:	6/5/15	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105880 1506217-038AMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
tert-Amyl methyl ether (TAME)	0.0344	0.0361	0.050	ND	69,F1	72	70-130	4.60	20
Benzene	0.0413	0.0440	0.050	ND	83	88	70-130	6.15	20
t-Butyl alcohol (TBA)	0.141	0.147	0.20	ND	70	73	70-130	4.03	20
Chlorobenzene	0.0392	0.0413	0.050	ND	78	83	70-130	5.16	20
1,2-Dibromoethane (EDB)	0.0360	0.0376	0.050	ND	72	75	70-130	4.33	20
1,2-Dichloroethane (1,2-DCA)	0.0400	0.0419	0.050	ND	80	84	70-130	4.73	20
1,1-Dichloroethene	0.0404	0.0429	0.050	ND	81	86	70-130	6.05	20
Diisopropyl ether (DIPE)	0.0394	0.0420	0.050	ND	79	84	70-130	6.42	20
Ethyl tert-butyl ether (ETBE)	0.0388	0.0411	0.050	ND	78	82	70-130	5.72	20
Methyl-t-butyl ether (MTBE)	0.0382	0.0403	0.050	ND	76	81	70-130	5.23	20
Toluene	0.0420	0.0450	0.050	ND	84	90	70-130	7.05	20
Trichloroethene	0.0397	0.0422	0.050	ND	79	84	70-130	5.96	20
Surrogate Recovery									
Dibromofluoromethane	0.108	0.109	0.12		86	87	70-130	1.14	20
Toluene-d8	0.112	0.114	0.12		90	91	70-130	1.92	20
4-BFB	0.0103	0.0103	0.012		82	83	70-130	0.0262	20
Benzene-d6	0.0819	0.0863	0.10		82	86	60-140	5.20	20
Ethylbenzene-d10	0.102	0.108	0.10		102	108	60-140	5.51	20
1,2-DCB-d4	0.0739	0.0757	0.10		74	76	60-140	2.33	20

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105892
Date Analyzed:	6/5/15 - 6/8/15	**Extraction Method:**	SW5030B
Instrument:	GC7	**Analytical Method:**	SW8021B/8015Bm
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105892 1506247-001AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	0.571	0.40	0.60	-	95	70-130
MTBE	ND	0.110	0.050	0.10	-	110	70-130
Benzene	ND	0.101	0.0050	0.10	-	101	70-130
Toluene	ND	0.0988	0.0050	0.10	-	99	70-130
Ethylbenzene	ND	0.105	0.0050	0.10	-	105	70-130
Xylenes	ND	0.328	0.0050	0.30	-	109	70-130
Surrogate Recovery							
2-Fluorotoluene	0.108	0.108		0.10	108	108	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	0.524	0.491	0.60	ND	87	82	70-130	6.51	20
MTBE	0.0886	0.0840	0.10	ND	89	84	70-130	5.40	20
Benzene	0.0829	0.0771	0.10	ND	83	77	70-130	7.16	20
Toluene	0.0828	0.0778	0.10	ND	81	76	70-130	6.23	20
Ethylbenzene	0.0894	0.0843	0.10	ND	89	84	70-130	5.89	20
Xylenes	0.281	0.269	0.30	ND	94	90	70-130	4.36	20
Surrogate Recovery									
2-Fluorotoluene	0.0903	0.0854	0.10		90	85	70-130	5.62	20

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105900
Date Analyzed:	6/5/15	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105900 1506250-010AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	0.10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.0510	0.0050	0.050	-	102	53-116
Benzene	ND	0.0488	0.0050	0.050	-	98	63-137
Bromobenzene	ND	-	0.0050	-	-	-	-
Bromochloromethane	ND	-	0.0050	-	-	-	-
Bromodichloromethane	ND	-	0.0050	-	-	-	-
Bromoform	ND	-	0.0050	-	-	-	-
Bromomethane	ND	-	0.0050	-	-	-	-
2-Butanone (MEK)	ND	-	0.020	-	-	-	-
t-Butyl alcohol (TBA)	ND	0.226	0.050	0.20	-	113	41-135
n-Butyl benzene	ND	-	0.0050	-	-	-	-
sec-Butyl benzene	ND	-	0.0050	-	-	-	-
tert-Butyl benzene	ND	-	0.0050	-	-	-	-
Carbon Disulfide	ND	-	0.0050	-	-	-	-
Carbon Tetrachloride	ND	-	0.0050	-	-	-	-
Chlorobenzene	ND	0.0471	0.0050	0.050	-	94	77-121
Chloroethane	ND	-	0.0050	-	-	-	-
Chloroform	ND	-	0.0050	-	-	-	-
Chloromethane	ND	-	0.0050	-	-	-	-
2-Chlorotoluene	ND	-	0.0050	-	-	-	-
4-Chlorotoluene	ND	-	0.0050	-	-	-	-
Dibromochloromethane	ND	-	0.0050	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.0040	-	-	-	-
1,2-Dibromoethane (EDB)	ND	0.0509	0.0040	0.050	-	102	67-119
Dibromomethane	ND	-	0.0050	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.0050	-	-	-	-
Dichlorodifluoromethane	ND	-	0.0050	-	-	-	-
1,1-Dichloroethane	ND	-	0.0050	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.0493	0.0040	0.050	-	99	58-135
1,1-Dichloroethene	ND	0.0429	0.0050	0.050	-	86	42-145
cis-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
1,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,3-Dichloropropane	ND	-	0.0050	-	-	-	-
2,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,1-Dichloropropene	ND	-	0.0050	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105900
Date Analyzed:	6/5/15	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105900 1506250-010AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Diisopropyl ether (DIPE)	ND	0.0468	0.0050	0.050	-	94	52-129
Ethylbenzene	ND	-	0.0050	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.0500	0.0050	0.050	-	100	53-125
Freon 113	ND	-	0.0050	-	-	-	-
Hexachlorobutadiene	ND	-	0.0050	-	-	-	-
Hexachloroethane	ND	-	0.0050	-	-	-	-
2-Hexanone	ND	-	0.0050	-	-	-	-
Isopropylbenzene	ND	-	0.0050	-	-	-	-
4-Isopropyl toluene	ND	-	0.0050	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.0504	0.0050	0.050	-	101	58-122
Methylene chloride	ND	-	0.0050	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.0050	-	-	-	-
Naphthalene	ND	-	0.0050	-	-	-	-
n-Propyl benzene	ND	-	0.0050	-	-	-	-
Styrene	ND	-	0.0050	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
Tetrachloroethene	ND	-	0.0050	-	-	-	-
Toluene	ND	0.0461	0.0050	0.050	-	92	76-130
1,2,3-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.0050	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.0050	-	-	-	-
Trichloroethene	ND	0.0469	0.0050	0.050	-	94	72-132
Trichlorofluoromethane	ND	-	0.0050	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.0050	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.0050	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.0050	-	-	-	-
Vinyl Chloride	ND	-	0.0050	-	-	-	-
Xylenes, Total	ND	-	0.0050	-	-	-	-
Surrogate Recovery							
Dibromofluoromethane	0.128	0.130		0.12	102	104	70-130
Toluene-d8	0.121	0.121		0.12	97	97	70-130
4-BFB	0.0113	0.0118		0.012	90	94	70-130
Benzene-d6	0.0827	0.0856		0.10	83	86	60-140
Ethylbenzene-d10	0.0883	0.0920		0.10	88	92	60-140
1,2-DCB-d4	0.0856	0.0935		0.10	86	94	60-140

(Cont.)

Quality Control Report

Client: SCA Enviromental, Inc.
Date Prepared: 6/4/15
Date Analyzed: 6/5/15
Instrument: GC16
Matrix: Soil
Project: #B11689; 1950 Bay Shallow

WorkOrder: 1506250
BatchID: 105900
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/Kg
Sample ID: MB/LCS-105900
1506250-010AMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
tert-Amyl methyl ether (TAME)	0.0549	0.0528	0.050	ND	110	106	70-130	3.86	20
Benzene	0.0481	0.0462	0.050	ND	96	92	70-130	4.06	20
t-Butyl alcohol (TBA)	0.277	0.274	0.20	ND	138,F1	137,F1	70-130	0.943	20
Chlorobenzene	0.0553	0.0528	0.050	ND	111	106	70-130	4.72	20
1,2-Dibromoethane (EDB)	0.0615	0.0581	0.050	ND	123	116	70-130	5.69	20
1,2-Dichloroethane (1,2-DCA)	0.0581	0.0554	0.050	ND	116	111	70-130	4.69	20
1,1-Dichloroethene	0.0483	0.0462	0.050	ND	97	92	70-130	4.45	20
Diisopropyl ether (DIPE)	0.0518	0.0497	0.050	ND	104	99	70-130	4.28	20
Ethyl tert-butyl ether (ETBE)	0.0597	0.0572	0.050	ND	119	114	70-130	4.27	20
Methyl-t-butyl ether (MTBE)	0.0612	0.0591	0.050	ND	122	118	70-130	3.55	20
Toluene	0.0506	0.0481	0.050	ND	101	96	70-130	5.16	20
Trichloroethene	0.0530	0.0514	0.050	ND	106	103	70-130	3.01	20
Surrogate Recovery									
Dibromofluoromethane	0.128	0.130	0.12		103	104	70-130	1.78	20
Toluene-d8	0.123	0.123	0.12		98	99	70-130	0.282	20
4-BFB	0.0127	0.0127	0.012		102	102	70-130	0	20
Benzene-d6	0.139	0.133	0.10		139	133	60-140	4.25	20
Ethylbenzene-d10	0.128	0.124	0.10		129	125	60-140	3.16	20
1,2-DCB-d4	0.112	0.106	0.10		112	106	60-140	5.28	20

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105863
Date Analyzed:	6/5/15	**Extraction Method:**	SW3050B
Instrument:	ICP-MS2	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105863 1506211-010AMS/MSD

QC Summary Report for Metals

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Antimony	ND	50.6	0.50	50	-	101	75-125
Arsenic	ND	53.9	0.50	50	-	108	75-125
Barium	ND	512	5.0	500	-	102	75-125
Beryllium	ND	50.8	0.50	50	-	102	75-125
Cadmium	ND	50.0	0.25	50	-	100	75-125
Chromium	ND	53.4	0.50	50	-	107	75-125
Cobalt	ND	49.2	0.50	50	-	98	75-125
Copper	ND	54.7	0.50	50	-	109	75-125
Lead	ND	50.4	0.50	50	-	101	75-125
Mercury	ND	1.26	0.050	1.25	-	100	75-125
Molybdenum	ND	50.4	0.50	50	-	101	75-125
Nickel	ND	54.2	0.50	50	-	108	75-125
Selenium	ND	52.0	0.50	50	-	104	75-125
Silver	ND	46.0	0.50	50	-	92	75-125
Thallium	ND	48.7	0.50	50	-	97	75-125
Vanadium	ND	53.9	0.50	50	-	108	75-125
Zinc	ND	546	5.0	500	-	109	75-125
Surrogate Recovery							
Terbium	487	480		500	97	96	70-130

(Cont.)

QA/QC Officer

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105863
Date Analyzed:	6/5/15	**Extraction Method:**	SW3050B
Instrument:	ICP-MS2	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105863 1506211-010AMS/MSD

QC Summary Report for Metals

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Antimony	48.8	54.3	50	ND	97	108	75-125	10.7	20
Arsenic	46.5	50.0	50	2.230	89	96	75-125	7.35	20
Barium	698	773	500	189.6	102	117	75-125	10.2	20
Beryllium	44.7	49.1	50	0.6476	88	97	75-125	9.30	20
Cadmium	49.1	54.3	50	ND	98	108	75-125	10.0	20
Chromium	136	144	50	82.87	105	122	75-125	5.94	20
Cobalt	79.2	78.4	50	31.17	96	94	75-125	1.03	20
Copper	124	130	50	71.65	104	116	75-125	4.81	20
Lead	51.4	57.6	50	1.742	99	112	75-125	11.2	20
Mercury	1.17	1.27	1.25	ND	90	98	75-125	8.10	20
Molybdenum	48.5	54.1	50	ND	96	107	75-125	10.8	20
Nickel	164	163	50	105.7	116	115	75-125	0.490	20
Selenium	44.8	47.5	50	ND	89	94	75-125	5.92	20
Silver	44.5	49.5	50	ND	89	99	75-125	10.7	20
Thallium	45.4	50.7	50	ND	91	101	75-125	11.1	20
Vanadium	142	156	50	95.75	93	122	75-125	9.50	20
Zinc	548	587	500	57.83	98	106	75-125	6.80	20
Surrogate Recovery									
Terbium	473	526	500		95	105	70-130	10.6	20

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105864
Date Analyzed:	6/5/15	**Extraction Method:**	SW3050B
Instrument:	ICP-MS2	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105864 1506212-001AMS/MSD

QC Summary Report for Metals

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Antimony	ND	50.7	0.50	50	-	101	75-125
Arsenic	ND	51.8	0.50	50	-	104	75-125
Barium	ND	517	5.0	500	-	103	75-125
Beryllium	ND	50.5	0.50	50	-	101	75-125
Cadmium	ND	50.6	0.25	50	-	101	75-125
Chromium	ND	51.1	0.50	50	-	102	75-125
Cobalt	ND	48.9	0.50	50	-	98	75-125
Copper	ND	52.7	0.50	50	-	105	75-125
Lead	ND	50.3	0.50	50	-	101	75-125
Mercury	ND	1.20	0.050	1.25	-	95	75-125
Molybdenum	ND	50.2	0.50	50	-	100	75-125
Nickel	ND	52.4	0.50	50	-	105	75-125
Selenium	ND	52.8	0.50	50	-	106	75-125
Silver	ND	46.3	0.50	50	-	93	75-125
Thallium	ND	49.2	0.50	50	-	98	75-125
Vanadium	ND	51.3	0.50	50	-	103	75-125
Zinc	ND	523	5.0	500	-	105	75-125
Surrogate Recovery							
Terbium	543	482		500	109	96	70-130

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105864
Date Analyzed:	6/5/15	**Extraction Method:**	SW3050B
Instrument:	ICP-MS2	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105864 1506212-001AMS/MSD

QC Summary Report for Metals

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Antimony	51.3	49.3	50	ND	102	98	75-125	3.98	20
Arsenic	44.3	42.7	50	2.538	84	80	75-125	3.63	20
Barium	756	681	500	169.9	117	102	75-125	10.4	20
Beryllium	46.2	45.8	50	1.002	90	90	75-125	0	20
Cadmium	51.3	49.4	50	ND	102	99	75-125	3.75	20
Chromium	79.1	72.8	50	40.58	77	64,F1	75-125	8.31	20
Cobalt	72.3	70.7	50	25.79	93	90	75-125	2.34	20
Copper	95.4	89.4	50	41.24	108	96	75-125	6.53	20
Lead	58.4	56.7	50	7.031	103	99	75-125	2.90	20
Mercury	1.23	1.17	1.25	ND	95	90	75-125	5.33	20
Molybdenum	50.3	48.3	50	ND	100	96	75-125	4.06	20
Nickel	97.5	91.6	50	42.78	110	98	75-125	6.27	20
Selenium	42.8	43.5	50	ND	85	86	75-125	1.62	20
Silver	46.8	45.4	50	ND	93	91	75-125	2.99	20
Thallium	47.9	46.6	50	ND	96	93	75-125	2.65	20
Vanadium	NR	NR	50	166.6	NR	NR	75-125	NR	20
Zinc	594	577	500	86.27	102	98	75-125	2.97	20
Surrogate Recovery									
Terbium	507	481	500		101	96	70-130	5.22	20

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/4/15	**BatchID:**	105873
Date Analyzed:	6/5/15	**Extraction Method:**	SW3550B/3630C
Instrument:	GC6B	**Analytical Method:**	SW8015B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105873 1506216-002AMS/MSD

QC Report for SW8015B w/ SG Clean-Up

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH-Diesel (C10-C23)	ND	47.4	1.0	40	-	119	70-130
TPH-Motor Oil (C18-C36)	ND	-	5.0	-	-	-	-
Surrogate Recovery							
C9	28.4	27.1		25	113	108	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	38.8	39.2	40	ND	97	98	70-130	1.17	30
Surrogate Recovery									
C9	27.3	27.8	25		109	111	70-130	1.75	30

QA/QC Officer

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 1506250 **ClientCode: SCAO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☒ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Karen Emery
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
(510) 645-6200 FAX: (510) 839- 6200

Email: kemery@sca-enviro.com
cc/3rd Party:
PO:
ProjectNo: #B11689; 1950 Bay Shallow

Bill to:
Accounts Payable
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
emuise@sca-ic.com

Requested TAT: **5 days**

Date Received: **06/04/2015**
Date Printed: **06/05/2015**

					Requested Tests (See legend below)											
Lab ID	**Client ID**	**Matrix**	**Collection Date**	**Hold**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1506250-001	HA-1@0'	Soil	6/3/2015	☐	A	A	A	A	A							
1506250-002	HA-2@0'	Soil	6/3/2015	☐	A	A	A	A	A							
1506250-003	HA-3@0'	Soil	6/3/2015	☐	A	A	A	A	A							
1506250-004	HA-4@0'	Soil	6/3/2015	☐	A	A	A	A	A							
1506250-005	HA-5@0'	Soil	6/3/2015	☐	A	A	A	A	A							
1506250-006	HA-6@0'	Soil	6/3/2015	☐	A	A	A	A	A							
1506250-007	HA-7@0'	Soil	6/3/2015	☐	A	A	A	A	A							
1506250-008	HA-8@0'	Soil	6/3/2015	☐	A	A	A	A	A							
1506250-009	HA-9@0'	Soil	6/3/2015	☐	A	A	A	A	A							
1506250-010	HA-10@0'	Soil	6/3/2015	☐	A	A	A	A	A							

Test Legend:

1	**8081_S**	**2**	**8260B_S**	**3**	**CAM17MS_S**	**4**	**G-MBTEX_S**	**5**	**TPH(DMO)WSG_S**
6		**7**		**8**		**9**		**10**	
11		**12**							

Prepared by: Jena Alfaro

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
QC Level: LEVEL 2
Work Order: 1506250
Project: #B11689; 1950 Bay Shallow
Client Contact: Karen Emery
Date Received: 6/4/2015
Comments:
Contact's Email: kemery@sca-enviro.com

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1506250-001A	HA-1@0'	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506250-002A	HA-2@0'	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506250-003A	HA-3@0'	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506250-004A	HA-4@0'	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	1	8OZ GJ	☐	6/3/2015	5 days		☐	

NOTES: **- STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
Project: #B11689; 1950 Bay Shallow
Comments:

QC Level: LEVEL 2
Client Contact: Karen Emery
Contact's Email: kemery@sca-enviro.com

Work Order: 1506250
Date Received: 6/4/2015

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1506250-004A	HA-4@0'	Soil	SW8021B/8015Bm (G/MBTEX)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506250-005A	HA-5@0'	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506250-006A	HA-6@0'	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506250-007A	HA-7@0'	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	

NOTES: **- STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**

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WORK ORDER SUMMARY

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Comments:

QC Level: LEVEL 2
Client Contact: Karen Emery
Contact's Email: kemery@sca-enviro.com

Work Order: 1506250
Date Received: 6/4/2015

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1506250-007A	HA-7@0'	Soil	SW6020 (CAM 17)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506250-008A	HA-8@0'	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506250-009A	HA-9@0'	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506250-010A	HA-10@0'	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	

NOTES: **- STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**

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WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
QC Level: LEVEL 2
Work Order: 1506250
Project: #B11689; 1950 Bay Shallow
Client Contact: Karen Emery
Date Received: 6/4/2015
Comments:
Contact's Email: kemery@sca-enviro.com

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De- chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1506250-010A	HA-10@0'	Soil	SW8260B (VOCs)	1	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	

NOTES: **- STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**

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1506230

McCampbell Analytical, Inc.

1534 Willow Pass Rd. / Pittsburg, Ca. 94565-1701
www.mccampbell.com / main@mccampbell.com
Telephone: (877) 252-9262 / Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

5 Day TK

TURN AROUND TIME: RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAY ☒ 10 DAY ☐

GeoTracker EDF ☐ PDF ☒ EDD ☐ Write On (DW) ☐ EQuIS ☐

Effluent Sample Requiring "J" flag ☐ **UST Clean Up Fund Project** ☐; **Claim #**______

Report To: Karen Emory ~~SCA Environmental~~ **Bill To:** SCA Environmental

Company: SCA Environmental

E-Mail: kemory@sca-enviro.com

Tele: (510) 717-3848 **Fax:** ( )

Project #: B11689 **Project Name:** 1950 Bay Shallow

Project Location: 1950 Bay Rd **Purchase Order#**

Sampler Signature:

SAMPLE ID	Location/ Field Point Name	SAMPLING		# Containers	MATRIX								METHOD PRESERVED		
		Date	Time		Ground Water	Waste Water	Drinking Water	Sea \ Water	Soil	Air	Sludge	Other	HCL	HNO_3	Other
HA-1 @ 0'		6/3		1					X						
HA-2 @ 0'		↓		1					X						
HA-3 @ 0'				1					X						
HA-4 @ 0'				1					X						
HA-5 @ 0'				1					X						
HA-6 @ 0'				1					X						
HA-7 @ 0'				1					X						
HA-8 @ 0'				1					X						
HA-9 @ 0'				1					X						
HA-10 @ 0'		↓		1					X						

Analysis Request

SAMPLE ID	BTEX & TPH as Gas (8021/ 8015 or 8260) / MTBE	TPH as Diesel (8015) ~~TPH~~ TPHmo (8015) Silica gel cleanup	Total Petroleum Oil & Grease (1664 / 5520 E/B&F)	Total Petroleum Hydrocarbons (418.1)	MTBE / BTEX ONLY (EPA 8260/ 8021)	EPA ~~505/ 608 / 8081~~ (Cl Pesticides) 8081A	EPA 608 / 8082 PCB's ; Aroclors / Congeners	EPA 507 / 8141 (NP Pesticides)	EPA 515 / 8151 (Acidic Cl Herbicides)	EPA ~~524.2 / 624~~ / 8260 (VOCs)	EPA 525.2 / 625 / 8270 (SVOCs)	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.7 / 200.8 / 6010 / 6020)	LUFT 5 Metals (200.7 / 200.8 / 6010 / 6020)	Metals (200.7 / 200.8 / 6010 / 6020)	Filter sample for DISSOLVED metals analysis	TPHg Method 8015m/8021B	17 Title 22 Metals Method 6020		
HA-1 @ 0'		X				X				X							X	X		
HA-2 @ 0'		X				X				X							X	X		
HA-3 @ 0'		X				X				X							X	X		
HA-4 @ 0'		X				X				X							X	X		
HA-5 @ 0'		X				X				X							X	X		
HA-6 @ 0'		X				X				X							X	X		
HA-7 @ 0'		X				X				X							X	X		
HA-8 @ 0'		X				X				X							X	X		
HA-9 @ 0'		X				X				X							X	X		
HA-10 @ 0'		X				X				X							X	X		

****MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.**

Relinquished By:	Date:	Time:	Received By:
	6/3/	1330	
	6/4	1810	

ICE/t° 3.4
GOOD CONDITION______
HEAD SPACE ABSENT______
DECHLORINATED IN LAB______
APPROPRIATE CONTAINERS______
PRESERVED IN LAB______

VOAS O&G METALS OTHER
PRESERVATION______ pH<2______

HAZARDOUS:

COMMENTS:

PCB
<25 PPM detection limit required.
Authorized to perform cleanup to meet the detection limit

Sample Receipt Checklist

Client Name:	**SCA Enviromental, Inc.**	Date and Time Received:	**6/4/2015 7:50:48 PM**
Project Name:	**#B11689; 1950 Bay Shallow**	LogIn Reviewed by:	Jena Alfaro
WorkOrder №:	**1506250** Matrix: Soil	Carrier:	Benjamin Yslas (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Sample/Temp Blank temperature	Temp: 3.4°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	
	(Ice Type: WET ICE)		
UCMR3 Samples:			
Total Chlorine tested and acceptable upon receipt for EPA 522?	Yes ☐	No ☐	NA ☑
Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539?	Yes ☐	No ☐	NA ☑

** NOTE: If the "No" box is checked, see comments below.*

Comments:

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1506250 A

Report Created for: SCA Enviromental, Inc.

334 19th Street
Oakland, CA 94612

Project Contact: Karen Emery
Project P.O.:
Project Name: #B11689; 1950 Bay Shallow

Project Received: 06/04/2015

Analytical Report reviewed & approved for release on 06/19/2015 by:

Angela Rydelius,
Laboratory Manager

Glossary of Terms & Qualifier Definitions

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
WorkOrder: 1506250

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

Analytical Qualifiers

S	spike recovery outside accepted recovery limits
c4	surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
e2	diesel range compounds are significant; no recognizable pattern
e7	oil range compounds are significant

Quality Control Qualifiers

F1	MS/MSD recovery and/or RPD was out of acceptance criteria; LCS validated the prep batch.

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	CA Title 22
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6010B
Date Prepared:	6/15/15	**Unit:**	mg/L

STLC Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0'	**1506250-001A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.24**	0.050	1	06/18/2015 09:58

Analyst(s): DB

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0'	**1506250-002A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.29**	0.050	1	06/18/2015 10:28

Analyst(s): DB

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0'	**1506250-003A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.23**	0.050	1	06/18/2015 10:23

Analyst(s): DB

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0'	**1506250-004A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.17**	0.050	1	06/18/2015 10:31

Analyst(s): DB

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	CA Title 22
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6010B
Date Prepared:	6/15/15	**Unit:**	mg/L

STLC Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0'	**1506250-006A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.19**	0.050	1	06/18/2015 10:34

Analyst(s): DB

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0'	**1506250-009A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.29**	0.050	1	06/18/2015 10:39
Lead	**0.48**	0.20	1	06/18/2015 10:39

Analyst(s): DB

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0'	**1506250-010A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.22**	0.050	1	06/18/2015 10:41

Analyst(s): DB

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	CA Title 22
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6010B
Date Prepared:	6/15/15	**Unit:**	mg/L

STLC Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0'	**1506250-008A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Lead	**3.4**	0.20	1	06/18/2015 10:36

Analyst(s): DB

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 19:50
Date Prepared: 6/15/15
WorkOrder: 1506250
Extraction Method: SW1311/SW3010
Analytical Method: SW6010B
Unit: mg/L

TCLP Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0'	**1506250-001A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:18

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0'	**1506250-002A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:20

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0'	**1506250-003A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:23

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0'	**1506250-004A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:25

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW1311/SW3010
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6010B
Date Prepared:	6/15/15	**Unit:**	mg/L

TCLP Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0'	**1506250-006A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:28

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0'	**1506250-010A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:35

Analyst(s): DVH

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW1311/SW3010
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6010B
Date Prepared:	6/15/15	**Unit:**	mg/L

TCLP Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0'	**1506250-009A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:33
Lead	ND	0.20	1	06/17/2015 12:33

Analyst(s): DVH

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 19:50
Date Prepared: 6/15/15

WorkOrder: 1506250
Extraction Method: SW1311/SW3010
Analytical Method: SW6010B
Unit: mg/L

TCLP Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0'	**1506250-008A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Lead	ND	0.20	1	06/17/2015 12:30

Analyst(s): DVH

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/15/15	**BatchID:**	106351
Date Analyzed:	6/18/15	**Extraction Method:**	CA Title 22
Instrument:	ICP-JY	**Analytical Method:**	SW6010B
Matrix:	Soil	**Unit:**	mg/L
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-106351 1506250-001AMS/MSD

QC Summary Report for Metals (STLC)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Chromium	ND	0.963	0.050	1	-	96	75-125
Lead	ND	0.950	0.20	1	-	95	75-125

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Chromium	1.16	1.16	1	0.2418	92	92	70-130	0	30
Lead	1.12	1.08	1	ND	113	108	70-130	3.99	30

QA/QC Officer

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Date Prepared:	6/15/15	**BatchID:**	106352
Date Analyzed:	6/17/15	**Extraction Method:**	SW1311/SW3010
Instrument:	ICP-JY	**Analytical Method:**	SW6010B
Matrix:	Soil	**Unit:**	mg/L
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-106352 1506302-001AMS/MSD

QC Summary Report for Metals (TCLP)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Chromium	ND	0.994	0.050	1	-	99	75-125
Lead	ND	1.03	0.20	1	-	102	75-125

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Chromium	1.01	0.979	1	ND	101	98	70-130	3.53	30
Lead	1.03	1.01	1	ND	103	101	70-130	1.96	30

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 1506250 **A** **ClientCode: SCAO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Karen Emery
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
(510) 645-6200 FAX: (510) 839- 6200

Email: kemery@sca-enviro.com
cc/3rd Party:
PO:
ProjectNo: #B11689; 1950 Bay Shallow

Bill to:
Accounts Payable
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
emuise@sca-ic.com

Requested TAT: **5 days**
Date Received: **06/04/2015**
Date Add-On: **06/12/2015**
Date Printed: **06/12/2015**

					Requested Tests (See legend below)											
Lab ID	**Client ID**	**Matrix**	**Collection Date**	**Hold**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1506250-001	HA-1@0'	Soil	6/3/2015	☐	A		A									
1506250-002	HA-2@0'	Soil	6/3/2015	☐	A		A									
1506250-003	HA-3@0'	Soil	6/3/2015	☐	A		A									
1506250-004	HA-4@0'	Soil	6/3/2015	☐	A		A									
1506250-006	HA-6@0'	Soil	6/3/2015	☐	A		A									
1506250-008	HA-8@0'	Soil	6/3/2015	☐		A		A								
1506250-009	HA-9@0'	Soil	6/3/2015	☐	A				A							
1506250-010	HA-10@0'	Soil	6/3/2015	☐	A		A									

Test Legend:

1	**STLC_METALS_S**	**2**	**STLC_PB_S**	**3**	**TCLP_METALS_S**	**4**	**TCLP_PB_S**	**5**	**TCLP_PBCR_S**
6		**7**		**8**		**9**		**10**	
11		**12**							

Prepared by: Jena Alfaro

Add-On Prepared By: Jena Alfaro

Comments: STLCs and TCLPs 6/12/15 5D TAT

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
Project: #B11689; 1950 Bay Shallow
Comments: STLCs and TCLPs 6/12/15 5D TAT

QC Level: LEVEL 2
Client Contact: Karen Emery
Contact's Email: kemery@sca-enviro.com

Work Order: 1506250
Date Received: 6/4/2015
Date Add-On: 6/12/2015

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1506250-001A	HA-1@0'	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506250-002A	HA-2@0'	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506250-003A	HA-3@0'	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506250-004A	HA-4@0'	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506250-006A	HA-6@0'	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506250-008A	HA-8@0'	Soil	SW6010B (Lead) (TCLP)	1	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Lead) (STLC)				5 days*		☐	
1506250-009A	HA-9@0'	Soil	SW6010B (Chromium & Lead) (TCLP)	1	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506250-010A	HA-10@0'	Soil	SW6010B (Metals) (TCLP) <Chromium>	1	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

1506230

McCampbell Analytical, Inc.

1534 Willow Pass Rd. / Pittsburg, Ca. 94565-1701
www.mccampbell.com / main@mccampbell.com
Telephone: (877) 252-9262 / Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

TURN AROUND TIME: RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ ~~5 DAY~~ ☒ 10 DAY ☐ 5 Day TK

GeoTracker EDF ☐ [✓ PDF ☒] EDD ☐ Write On (DW) ☐ EQuIS ☐

Effluent Sample Requiring "J" flag ☐ **UST Clean Up Fund Project** ☐; **Claim #**______

Report To: ~~SCA Environmental~~ Karen Emory **Bill To:** SCA Environmental
Company: SCA Environmental
E-Mail: Kemory@sca-enviro.com
Tele: (510) 717-3848 **Fax:** (   )
Project #: B11689 **Project Name:** 1950 Bay Shallow
Project Location: 1950 Bay Rd **Purchase Order#**
Sampler Signature:

Analysis Request

		SAMPLING			MATRIX								METHOD PRESERVED			Analysis Request																			
SAMPLE ID	Location/ Field Point Name	Date	Time	# Containers	Ground Water	Waste Water	Drinking Water	Sea \ Water	Soil	Air	Sludge	Other	HCL	HNO$_3$	Other	BTEX & TPH as Gas (8021/ 8015 or 8260) / MTBE	TPH as Diesel (8015) TPHmd (8015) Silica gel Cleanup	Total Petroleum Oil & Grease (1664 / 5520 E/B&F)	Total Petroleum Hydrocarbons (418.1)	MTBE / BTEX ONLY (EPA 8260/ 8021)	~~EPA 505/ 608 / 8081~~ (Cl Pesticides) 8081 A	EPA 608 / 8082 PCB's ; Aroclors / Congeners	~~EPA 507 / 8141 (NP Pesticides)~~ STLC Cr TCLP Cr	~~EPA 515 / 8151 (Acidic Cl Herbicides)~~ STLC Pb	~~EPA 524.2 / 624~~ / 8260 (VOCs)	~~EPA 525.2 / 625 / 8270 (SVOCs)~~ TCLP Pb	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.7 / 200.8 / 6010 / 6020)	LUFT 5 Metals (200.7 / 200.8 / 6010 / 6020)	Metals (200.7 / 200.8 / 6010 / 6020)	Filter sample for DISSOLVED metals analysis	TPHg Method 8015m / 8021 B	17 Title 22 Metals Method 6020		
HA-1 @ 0'		6/3		1					X								X				X		⊗		X							X	X		
HA-2 @ 0'		↓		1					X								X				X		⊗		X							X	X		
HA-3 @ 0'				1					X								X				X		⊗		X							X	X		
HA-4 @ 0'				1					X								X				X		⊗		X							X	X		
HA-5 @ 0'				1					X								X				X				X							X	X		
HA-6 @ 0'				1					X								X				X		⊗		X							X	X		
HA-7 @ 0'				1					X								X				X				X							X	X		
HA-8 @ 0'				1					X								X				X			⊗	X	⊗						X	X		
HA-9 @ 0'				1					X								X				X		⊗		X	⊗						X	X		
HA-10 @ 0'		↓		1					X								X				X		⊗		X							X	X		

****MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.**

Relinquished By:	Date:	Time:	Received By:
	6/3	1330	
	6/4	1810	

ICE/t° 3.4
GOOD CONDITION______
HEAD SPACE ABSENT______
DECHLORINATED IN LAB______
APPROPRIATE CONTAINERS______
PRESERVED IN LAB______

VOAS O&G METALS OTHER HAZARDOUS:
PRESERVATION______ **pH<2**______

COMMENTS:
PCB
<25 PPM detection limit required.
Authorized to perform cleanup to meet the detection limit

Analytical Report

WorkOrder: 1506250 B

Report Created for: SCA Enviromental, Inc.

334 19th Street
Oakland, CA 94612

Project Contact: Karen Emery
Project P.O.:
Project Name: #B11689; 1950 Bay Shallow

Project Received: 06/04/2015

Analytical Report reviewed & approved for release on 06/17/2015 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

Glossary of Terms & Qualifier Definitions

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
WorkOrder: 1506250

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

Analytical Qualifiers

S	spike recovery outside accepted recovery limits
c4	surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
e2	diesel range compounds are significant; no recognizable pattern
e7	oil range compounds are significant

Quality Control Qualifiers

F1	MS/MSD recovery and/or RPD was out of acceptance criteria; LCS validated the prep batch.

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506250
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 19:50	**Analytical Method:**	SW6010B
Date Prepared:	6/16/15	**Unit:**	mg/Kg

Lead

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0' Re-Extract	**1506250-009B**	**Soil**	**06/03/2015**	**ICP-JY**	**106384**

Analytes	Result	RL	DF	Date Analyzed
Lead	**33**	5.0	1	06/17/2015 14:46

Surrogates	REC (%)	Limits		
Tb 350.917	102	70-130		06/17/2015 14:46

Analyst(s): BBO

Quality Control Report

Client: SCA Enviromental, Inc.
Date Prepared: 6/16/15
Date Analyzed: 6/17/15
Instrument: ICP-JY
Matrix: Soil
Project: #B11689; 1950 Bay Shallow

WorkOrder: 1506250
BatchID: 106384
Extraction Method: SW3050B
Analytical Method: SW6010B
Unit: mg/Kg
Sample ID: MB/LCS-106384
1506250-009BMS/MSD

QC Summary Report for Lead

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Lead	ND	57.6	5.0	50	-	115	75-125
Surrogate Recovery							
Tb 350.917	526	542		500	105	108	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Lead	74.5	86.0	50	33.30	82	106	75-125	14.4	25
Surrogate Recovery									
Tb 350.917	520	546	500		104	109	70-130	4.78	20

QA/QC Officer

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 1506250 **B** **ClientCode: SCAO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Karen Emery
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
(510) 645-6200 FAX: (510) 839- 6200

Email: kemery@sca-enviro.com
cc/3rd Party:
PO:
ProjectNo: #B11689; 1950 Bay Shallow

Bill to:
Accounts Payable
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
emuise@sca-ic.com

Requested TAT: **5 days**
Date Received: **06/04/2015**
Date Add-On: **06/16/2015**
Date Printed: **06/16/2015**

					Requested Tests (See legend below)											
Lab ID	**Client ID**	**Matrix**	**Collection Date**	**Hold**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1506250-009	HA-9@0' Re-Extract	Soil	6/3/2015	☐	B											

Test Legend:

1	**PB_S**	**2**		**3**		**4**		**5**	
6		**7**		**8**		**9**		**10**	
11		**12**							

Prepared by: Jena Alfaro

Add-On Prepared By: Maria Venegas

Comments: STLCs and TCLPs 6/12/15 5D TAT. RE-Extract Pb added to 009 6/16/15 1 day TAT.

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
QC Level: LEVEL 2
Work Order: 1506250
Project: #B11689; 1950 Bay Shallow
Client Contact: Karen Emery
Date Received: 6/4/2015
Comments: STLCs and TCLPs 6/12/15 5D TAT. RE-Extract Pb added to 009 6/16/15 1 day TAT.
Contact's Email: kemery@sca-enviro.com
Date Add-On: 6/16/2015

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1506250-009B	HA-9@0' Re-Extract	Soil	SW6010B (Lead)	1	8OZ GJ	6/3/2015	1 day		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

1506230

McCampbell Analytical, Inc.
1534 Willow Pass Rd. / Pittsburg, Ca. 94565-1701
www.mccampbell.com / main@mccampbell.com
Telephone: (877) 252-9262 / Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

5 Day TK

TURN AROUND TIME: RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☒ 5 DAY ☒ 10 DAY ☐

GeoTracker EDF ☐ [✓ PDF ☒] EDD ☐ Write On (DW) ☐ EQuIS ☐

Effluent Sample Requiring "J" flag ☐ **UST Clean Up Fund Project** ☐; **Claim #**______

Report To: ~~SCA Environmental~~ Karen Emory
Bill To: SCA Environmental
Company: SCA Environmental
E-Mail: Kemory@sca-enviro.com
Tele: (510) 717-3848
Fax: (   )
Project #: B11689
Project Name: 1950 Bay Shallow
Project Location: 1950 Bay Rd
Purchase Order#
Sampler Signature:

SAMPLE ID	Location/ Field Point Name	SAMPLING		# Containers	MATRIX								METHOD PRESERVED		
		Date	Time		Ground Water	Waste Water	Drinking Water	Sea \ Water	Soil	Air	Sludge	Other	HCL	HNO_3	Other
HA-1 @ 0'		6/3		1					X						
HA-2 @ 0'		↓		1					X						
HA-3 @ 0'				1					X						
HA-4 @ 0'				1					X						
HA-5 @ 0'				1					X						
HA-6 @ 0'				1					X						
HA-7 @ 0'				1					X						
HA-8 @ 0'				1					X						
HA-9 @ 0'				1					X						
HA-10 @ 0'				1					X						

Analysis Request

SAMPLE ID	BTEX & TPH as Gas (8021/ 8015 or 8260) / MTBE	TPH as Diesel (8015) ~~TPH~~ TPHmo (8015) Silica gel Cleanup	Total Petroleum Oil & Grease (1664 / 5520 E/B&F)	Total Petroleum Hydrocarbons (418.1)	MTBE / BTEX ONLY (EPA 8260/ 8021)	~~EPA 505/ 608 / 8081~~ (Cl Pesticides) 8081A	EPA 608 / 8082 PCB's ; Aroclors / Congeners	~~EPA 507 / 8141 (NP Pesticides)~~ STLC Cr TCLP Cr 6/10/15	~~EPA 515 / 8151 (Acidic Cl Herbicides)~~ STLC Pb BD	~~EPA 524.2 / 624~~ / 8260 (VOCs)	~~EPA 525.2 / 625 / 8270 (SVOCs)~~ TCLP Pb	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.7 / 200.8 / 6010 / 6020)	LUFT 5 Metals (200.7 / 200.8 / 6010 / 6020)	Metals (200.7 / 200.8 / 6010 / 6020)	Filter sample for DISSOLVED metals analysis	TPHg Method 8015m/8021B	17 Title 22 Metals Method 6020	RE-Extract Lead 6/16/15 Id	
HA-1 @ 0'		X				X		⊗		X							X	X		
HA-2 @ 0'		X				X		⊗		X							X	X		
HA-3 @ 0'		X				X		⊗		X							X	X		
HA-4 @ 0'		X				X		⊗		X							X	X		
HA-5 @ 0'		X				X				X							X	X		
HA-6 @ 0'		X				X		⊗		X							X	X		
HA-7 @ 0'		X				X				X							X	X		
HA-8 @ 0'		X				X			⊗	X	⊗						X	X		
HA-9 @ 0'		X				X		⊗		X	⊗						X	X	X	
HA-10 @ 0'		X				X		⊗		X							X	X		

****MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.**

Relinquished By:	Date:	Time:	Received By:
	6/3	1330	
	6/4	1810	

ICE/t° 3.4
GOOD CONDITION____
HEAD SPACE ABSENT____
DECHLORINATED IN LAB____
APPROPRIATE CONTAINERS____
PRESERVED IN LAB____

PRESERVATION VOAS O&G METALS OTHER ____ pH<2 ____

HAZARDOUS:

COMMENTS:
PCB
<25 PPM detection limit required.
Authorized to perform cleanup to meet the detection limit

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1506254

Report Created for: SCA Enviromental, Inc.

334 19th Street
Oakland, CA 94612

Project Contact: Karen Emery
Project P.O.:
Project Name: #B11689; 1950 Bay Shallow

Project Received: 06/04/2015

Analytical Report reviewed & approved for release on 06/12/2015 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

1534 Willow Pass Rd. Pittsburg, CA 94565 ♦ TEL: (877) 252-9262 ♦ FAX: (925) 252-9269 ♦ www.mccampbell.com
NELAP: 4033ORELAP ♦ ELAP: 1644 ♦ ISO/IEC: 17025:2005 ♦ WSDE: C972-11 ♦ ADEC: UST-098 ♦ UCMR3

Glossary of Terms & Qualifier Definitions

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
WorkOrder: 1506254

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 μm filtered and acidified water sample)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
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RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

Analytical Qualifiers

S	spike recovery outside accepted recovery limits
c4	surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
e2	diesel range compounds are significant; no recognizable pattern
e7	oil range compounds are significant

Quality Control Qualifiers

F1	MS/MSD recovery and/or RPD was out of acceptance criteria; LCS validated the prep batch.

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8081A
Date Prepared:	6/5/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0.5,1,1.5	**1506254-002A**	**Soil**	**06/03/2015**	**GC40**	**105902**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.050	50	06/09/2015 12:32
a-BHC	ND	0.050	50	06/09/2015 12:32
b-BHC	ND	0.050	50	06/09/2015 12:32
d-BHC	ND	0.050	50	06/09/2015 12:32
g-BHC	ND	0.050	50	06/09/2015 12:32
Chlordane (Technical)	ND	1.2	50	06/09/2015 12:32
a-Chlordane	ND	0.050	50	06/09/2015 12:32
g-Chlordane	ND	0.050	50	06/09/2015 12:32
p,p-DDD	ND	0.050	50	06/09/2015 12:32
p,p-DDE	**0.11**	0.050	50	06/09/2015 12:32
p,p-DDT	**0.15**	0.050	50	06/09/2015 12:32
Dieldrin	ND	0.050	50	06/09/2015 12:32
Endosulfan I	ND	0.050	50	06/09/2015 12:32
Endosulfan II	ND	0.050	50	06/09/2015 12:32
Endosulfan sulfate	ND	0.050	50	06/09/2015 12:32
Endrin	ND	0.050	50	06/09/2015 12:32
Endrin aldehyde	ND	0.050	50	06/09/2015 12:32
Endrin ketone	ND	0.050	50	06/09/2015 12:32
Heptachlor	ND	0.050	50	06/09/2015 12:32
Heptachlor epoxide	ND	0.050	50	06/09/2015 12:32
Hexachlorobenzene	ND	0.50	50	06/09/2015 12:32
Hexachlorocyclopentadiene	ND	1.0	50	06/09/2015 12:32
Methoxychlor	ND	0.050	50	06/09/2015 12:32
Toxaphene	ND	2.5	50	06/09/2015 12:32

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	189	S	70-130	06/09/2015 12:32

Analyst(s): SS

Analytical Comments: c4

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8081A
Date Prepared:	6/5/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0.5,1,1.5	**1506254-003A**	**Soil**	**06/03/2015**	**GC40**	**105902**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.050	50	06/09/2015 13:08
a-BHC	ND	0.050	50	06/09/2015 13:08
b-BHC	ND	0.050	50	06/09/2015 13:08
d-BHC	ND	0.050	50	06/09/2015 13:08
g-BHC	ND	0.050	50	06/09/2015 13:08
Chlordane (Technical)	ND	1.2	50	06/09/2015 13:08
a-Chlordane	ND	0.050	50	06/09/2015 13:08
g-Chlordane	ND	0.050	50	06/09/2015 13:08
p,p-DDD	ND	0.050	50	06/09/2015 13:08
p,p-DDE	**0.13**	0.050	50	06/09/2015 13:08
p,p-DDT	**0.15**	0.050	50	06/09/2015 13:08
Dieldrin	ND	0.050	50	06/09/2015 13:08
Endosulfan I	ND	0.050	50	06/09/2015 13:08
Endosulfan II	ND	0.050	50	06/09/2015 13:08
Endosulfan sulfate	ND	0.050	50	06/09/2015 13:08
Endrin	ND	0.050	50	06/09/2015 13:08
Endrin aldehyde	ND	0.050	50	06/09/2015 13:08
Endrin ketone	ND	0.050	50	06/09/2015 13:08
Heptachlor	ND	0.050	50	06/09/2015 13:08
Heptachlor epoxide	ND	0.050	50	06/09/2015 13:08
Hexachlorobenzene	ND	0.50	50	06/09/2015 13:08
Hexachlorocyclopentadiene	ND	1.0	50	06/09/2015 13:08
Methoxychlor	ND	0.050	50	06/09/2015 13:08
Toxaphene	ND	2.5	50	06/09/2015 13:08

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	134	S	70-130	06/09/2015 13:08

Analyst(s): SS

Analytical Comments: c4

(Cont.)

Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8081A
Date Prepared:	6/5/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0.5,1,1.5	**1506254-006A**	**Soil**	**06/03/2015**	**GC40**	**105902**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.10	100	06/09/2015 13:43
a-BHC	ND	0.10	100	06/09/2015 13:43
b-BHC	ND	0.10	100	06/09/2015 13:43
d-BHC	ND	0.10	100	06/09/2015 13:43
g-BHC	ND	0.10	100	06/09/2015 13:43
Chlordane (Technical)	ND	2.5	100	06/09/2015 13:43
a-Chlordane	ND	0.10	100	06/09/2015 13:43
g-Chlordane	ND	0.10	100	06/09/2015 13:43
p,p-DDD	ND	0.10	100	06/09/2015 13:43
p,p-DDE	**0.20**	0.10	100	06/09/2015 13:43
p,p-DDT	**0.21**	0.10	100	06/09/2015 13:43
Dieldrin	ND	0.10	100	06/09/2015 13:43
Endosulfan I	ND	0.10	100	06/09/2015 13:43
Endosulfan II	ND	0.10	100	06/09/2015 13:43
Endosulfan sulfate	ND	0.10	100	06/09/2015 13:43
Endrin	ND	0.10	100	06/09/2015 13:43
Endrin aldehyde	ND	0.10	100	06/09/2015 13:43
Endrin ketone	ND	0.10	100	06/09/2015 13:43
Heptachlor	ND	0.10	100	06/09/2015 13:43
Heptachlor epoxide	ND	0.10	100	06/09/2015 13:43
Hexachlorobenzene	ND	1.0	100	06/09/2015 13:43
Hexachlorocyclopentadiene	ND	2.0	100	06/09/2015 13:43
Methoxychlor	ND	0.10	100	06/09/2015 13:43
Toxaphene	ND	5.0	100	06/09/2015 13:43

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	119	70-130	06/09/2015 13:43

Analyst(s): SS

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8081A
Date Prepared:	6/5/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0.5,1,1.5	1506254-008A	Soil	06/03/2015	GC40	105902

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.050	50	06/09/2015 14:19
a-BHC	ND	0.050	50	06/09/2015 14:19
b-BHC	ND	0.050	50	06/09/2015 14:19
d-BHC	ND	0.050	50	06/09/2015 14:19
g-BHC	ND	0.050	50	06/09/2015 14:19
Chlordane (Technical)	ND	1.2	50	06/09/2015 14:19
a-Chlordane	ND	0.050	50	06/09/2015 14:19
g-Chlordane	ND	0.050	50	06/09/2015 14:19
p,p-DDD	ND	0.050	50	06/09/2015 14:19
p,p-DDE	**0.23**	0.050	50	06/09/2015 14:19
p,p-DDT	**0.13**	0.050	50	06/09/2015 14:19
Dieldrin	ND	0.050	50	06/09/2015 14:19
Endosulfan I	ND	0.050	50	06/09/2015 14:19
Endosulfan II	ND	0.050	50	06/09/2015 14:19
Endosulfan sulfate	ND	0.050	50	06/09/2015 14:19
Endrin	ND	0.050	50	06/09/2015 14:19
Endrin aldehyde	ND	0.050	50	06/09/2015 14:19
Endrin ketone	ND	0.050	50	06/09/2015 14:19
Heptachlor	ND	0.050	50	06/09/2015 14:19
Heptachlor epoxide	ND	0.050	50	06/09/2015 14:19
Hexachlorobenzene	ND	0.50	50	06/09/2015 14:19
Hexachlorocyclopentadiene	ND	1.0	50	06/09/2015 14:19
Methoxychlor	ND	0.050	50	06/09/2015 14:19
Toxaphene	ND	2.5	50	06/09/2015 14:19

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	145	S	70-130	06/09/2015 14:19

Analyst(s): SS

Analytical Comments: c4

(Cont.)

Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8081A
Date Prepared:	6/5/15	**Unit:**	mg/kg

Organochlorine Pesticides (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0.5,1,1.5	**1506254-009A**	**Soil**	**06/03/2015**	**GC40**	**105902**

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.050	50	06/09/2015 14:55
a-BHC	ND	0.050	50	06/09/2015 14:55
b-BHC	ND	0.050	50	06/09/2015 14:55
d-BHC	ND	0.050	50	06/09/2015 14:55
g-BHC	ND	0.050	50	06/09/2015 14:55
Chlordane (Technical)	ND	1.2	50	06/09/2015 14:55
a-Chlordane	ND	0.050	50	06/09/2015 14:55
g-Chlordane	ND	0.050	50	06/09/2015 14:55
p,p-DDD	ND	0.050	50	06/09/2015 14:55
p,p-DDE	ND	0.050	50	06/09/2015 14:55
p,p-DDT	**0.080**	0.050	50	06/09/2015 14:55
Dieldrin	ND	0.050	50	06/09/2015 14:55
Endosulfan I	ND	0.050	50	06/09/2015 14:55
Endosulfan II	ND	0.050	50	06/09/2015 14:55
Endosulfan sulfate	ND	0.050	50	06/09/2015 14:55
Endrin	ND	0.050	50	06/09/2015 14:55
Endrin aldehyde	ND	0.050	50	06/09/2015 14:55
Endrin ketone	ND	0.050	50	06/09/2015 14:55
Heptachlor	ND	0.050	50	06/09/2015 14:55
Heptachlor epoxide	ND	0.050	50	06/09/2015 14:55
Hexachlorobenzene	ND	0.50	50	06/09/2015 14:55
Hexachlorocyclopentadiene	ND	1.0	50	06/09/2015 14:55
Methoxychlor	ND	0.050	50	06/09/2015 14:55
Toxaphene	ND	2.5	50	06/09/2015 14:55

Surrogates	REC (%)	Limits	Date Analyzed
Decachlorobiphenyl	112	70-130	06/09/2015 14:55

Analyst(s): SS

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0.5,1,1.5	**1506254-001A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/07/2015 03:35
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/07/2015 03:35
Benzene	ND	0.0050	1	06/07/2015 03:35
Bromobenzene	ND	0.0050	1	06/07/2015 03:35
Bromochloromethane	ND	0.0050	1	06/07/2015 03:35
Bromodichloromethane	ND	0.0050	1	06/07/2015 03:35
Bromoform	ND	0.0050	1	06/07/2015 03:35
Bromomethane	ND	0.0050	1	06/07/2015 03:35
2-Butanone (MEK)	ND	0.020	1	06/07/2015 03:35
t-Butyl alcohol (TBA)	ND	0.050	1	06/07/2015 03:35
n-Butyl benzene	ND	0.0050	1	06/07/2015 03:35
sec-Butyl benzene	ND	0.0050	1	06/07/2015 03:35
tert-Butyl benzene	ND	0.0050	1	06/07/2015 03:35
Carbon Disulfide	ND	0.0050	1	06/07/2015 03:35
Carbon Tetrachloride	ND	0.0050	1	06/07/2015 03:35
Chlorobenzene	ND	0.0050	1	06/07/2015 03:35
Chloroethane	ND	0.0050	1	06/07/2015 03:35
Chloroform	ND	0.0050	1	06/07/2015 03:35
Chloromethane	ND	0.0050	1	06/07/2015 03:35
2-Chlorotoluene	ND	0.0050	1	06/07/2015 03:35
4-Chlorotoluene	ND	0.0050	1	06/07/2015 03:35
Dibromochloromethane	ND	0.0050	1	06/07/2015 03:35
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/07/2015 03:35
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/07/2015 03:35
Dibromomethane	ND	0.0050	1	06/07/2015 03:35
1,2-Dichlorobenzene	ND	0.0050	1	06/07/2015 03:35
1,3-Dichlorobenzene	ND	0.0050	1	06/07/2015 03:35
1,4-Dichlorobenzene	ND	0.0050	1	06/07/2015 03:35
Dichlorodifluoromethane	ND	0.0050	1	06/07/2015 03:35
1,1-Dichloroethane	ND	0.0050	1	06/07/2015 03:35
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/07/2015 03:35
1,1-Dichloroethene	ND	0.0050	1	06/07/2015 03:35
cis-1,2-Dichloroethene	ND	0.0050	1	06/07/2015 03:35
trans-1,2-Dichloroethene	ND	0.0050	1	06/07/2015 03:35
1,2-Dichloropropane	ND	0.0050	1	06/07/2015 03:35
1,3-Dichloropropane	ND	0.0050	1	06/07/2015 03:35
2,2-Dichloropropane	ND	0.0050	1	06/07/2015 03:35
1,1-Dichloropropene	ND	0.0050	1	06/07/2015 03:35

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0.5,1,1.5	1506254-001A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/07/2015 03:35
trans-1,3-Dichloropropene	ND	0.0050	1	06/07/2015 03:35
Diisopropyl ether (DIPE)	ND	0.0050	1	06/07/2015 03:35
Ethylbenzene	ND	0.0050	1	06/07/2015 03:35
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/07/2015 03:35
Freon 113	ND	0.0050	1	06/07/2015 03:35
Hexachlorobutadiene	ND	0.0050	1	06/07/2015 03:35
Hexachloroethane	ND	0.0050	1	06/07/2015 03:35
2-Hexanone	ND	0.0050	1	06/07/2015 03:35
Isopropylbenzene	ND	0.0050	1	06/07/2015 03:35
4-Isopropyl toluene	ND	0.0050	1	06/07/2015 03:35
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/07/2015 03:35
Methylene chloride	ND	0.0050	1	06/07/2015 03:35
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/07/2015 03:35
Naphthalene	ND	0.0050	1	06/07/2015 03:35
n-Propyl benzene	ND	0.0050	1	06/07/2015 03:35
Styrene	ND	0.0050	1	06/07/2015 03:35
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/07/2015 03:35
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/07/2015 03:35
Tetrachloroethene	ND	0.0050	1	06/07/2015 03:35
Toluene	ND	0.0050	1	06/07/2015 03:35
1,2,3-Trichlorobenzene	ND	0.0050	1	06/07/2015 03:35
1,2,4-Trichlorobenzene	ND	0.0050	1	06/07/2015 03:35
1,1,1-Trichloroethane	ND	0.0050	1	06/07/2015 03:35
1,1,2-Trichloroethane	ND	0.0050	1	06/07/2015 03:35
Trichloroethene	ND	0.0050	1	06/07/2015 03:35
Trichlorofluoromethane	ND	0.0050	1	06/07/2015 03:35
1,2,3-Trichloropropane	ND	0.0050	1	06/07/2015 03:35
1,2,4-Trimethylbenzene	ND	0.0050	1	06/07/2015 03:35
1,3,5-Trimethylbenzene	ND	0.0050	1	06/07/2015 03:35
Vinyl Chloride	ND	0.0050	1	06/07/2015 03:35
Xylenes, Total	ND	0.0050	1	06/07/2015 03:35

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0.5,1,1.5	**1506254-001A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	102	70-130		06/07/2015 03:35
Toluene-d8	95	70-130		06/07/2015 03:35
4-BFB	93	70-130		06/07/2015 03:35
Benzene-d6	71	60-140		06/07/2015 03:35
Ethylbenzene-d10	77	60-140		06/07/2015 03:35
1,2-DCB-d4	76	60-140		06/07/2015 03:35

Analyst(s): KF

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0.5,1,1.5	**1506254-002A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/07/2015 04:18
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/07/2015 04:18
Benzene	ND	0.0050	1	06/07/2015 04:18
Bromobenzene	ND	0.0050	1	06/07/2015 04:18
Bromochloromethane	ND	0.0050	1	06/07/2015 04:18
Bromodichloromethane	ND	0.0050	1	06/07/2015 04:18
Bromoform	ND	0.0050	1	06/07/2015 04:18
Bromomethane	ND	0.0050	1	06/07/2015 04:18
2-Butanone (MEK)	ND	0.020	1	06/07/2015 04:18
t-Butyl alcohol (TBA)	ND	0.050	1	06/07/2015 04:18
n-Butyl benzene	ND	0.0050	1	06/07/2015 04:18
sec-Butyl benzene	ND	0.0050	1	06/07/2015 04:18
tert-Butyl benzene	ND	0.0050	1	06/07/2015 04:18
Carbon Disulfide	ND	0.0050	1	06/07/2015 04:18
Carbon Tetrachloride	ND	0.0050	1	06/07/2015 04:18
Chlorobenzene	ND	0.0050	1	06/07/2015 04:18
Chloroethane	ND	0.0050	1	06/07/2015 04:18
Chloroform	ND	0.0050	1	06/07/2015 04:18
Chloromethane	ND	0.0050	1	06/07/2015 04:18
2-Chlorotoluene	ND	0.0050	1	06/07/2015 04:18
4-Chlorotoluene	ND	0.0050	1	06/07/2015 04:18
Dibromochloromethane	ND	0.0050	1	06/07/2015 04:18
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/07/2015 04:18
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/07/2015 04:18
Dibromomethane	ND	0.0050	1	06/07/2015 04:18
1,2-Dichlorobenzene	ND	0.0050	1	06/07/2015 04:18
1,3-Dichlorobenzene	ND	0.0050	1	06/07/2015 04:18
1,4-Dichlorobenzene	ND	0.0050	1	06/07/2015 04:18
Dichlorodifluoromethane	ND	0.0050	1	06/07/2015 04:18
1,1-Dichloroethane	ND	0.0050	1	06/07/2015 04:18
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/07/2015 04:18
1,1-Dichloroethene	ND	0.0050	1	06/07/2015 04:18
cis-1,2-Dichloroethene	ND	0.0050	1	06/07/2015 04:18
trans-1,2-Dichloroethene	ND	0.0050	1	06/07/2015 04:18
1,2-Dichloropropane	ND	0.0050	1	06/07/2015 04:18
1,3-Dichloropropane	ND	0.0050	1	06/07/2015 04:18
2,2-Dichloropropane	ND	0.0050	1	06/07/2015 04:18
1,1-Dichloropropene	ND	0.0050	1	06/07/2015 04:18

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0.5,1,1.5	1506254-002A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/07/2015 04:18
trans-1,3-Dichloropropene	ND	0.0050	1	06/07/2015 04:18
Diisopropyl ether (DIPE)	ND	0.0050	1	06/07/2015 04:18
Ethylbenzene	ND	0.0050	1	06/07/2015 04:18
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/07/2015 04:18
Freon 113	ND	0.0050	1	06/07/2015 04:18
Hexachlorobutadiene	ND	0.0050	1	06/07/2015 04:18
Hexachloroethane	ND	0.0050	1	06/07/2015 04:18
2-Hexanone	ND	0.0050	1	06/07/2015 04:18
Isopropylbenzene	ND	0.0050	1	06/07/2015 04:18
4-Isopropyl toluene	ND	0.0050	1	06/07/2015 04:18
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/07/2015 04:18
Methylene chloride	ND	0.0050	1	06/07/2015 04:18
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/07/2015 04:18
Naphthalene	ND	0.0050	1	06/07/2015 04:18
n-Propyl benzene	ND	0.0050	1	06/07/2015 04:18
Styrene	ND	0.0050	1	06/07/2015 04:18
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/07/2015 04:18
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/07/2015 04:18
Tetrachloroethene	ND	0.0050	1	06/07/2015 04:18
Toluene	ND	0.0050	1	06/07/2015 04:18
1,2,3-Trichlorobenzene	ND	0.0050	1	06/07/2015 04:18
1,2,4-Trichlorobenzene	ND	0.0050	1	06/07/2015 04:18
1,1,1-Trichloroethane	ND	0.0050	1	06/07/2015 04:18
1,1,2-Trichloroethane	ND	0.0050	1	06/07/2015 04:18
Trichloroethene	ND	0.0050	1	06/07/2015 04:18
Trichlorofluoromethane	ND	0.0050	1	06/07/2015 04:18
1,2,3-Trichloropropane	ND	0.0050	1	06/07/2015 04:18
1,2,4-Trimethylbenzene	ND	0.0050	1	06/07/2015 04:18
1,3,5-Trimethylbenzene	ND	0.0050	1	06/07/2015 04:18
Vinyl Chloride	ND	0.0050	1	06/07/2015 04:18
Xylenes, Total	ND	0.0050	1	06/07/2015 04:18

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0.5,1,1.5	**1506254-002A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	103	70-130		06/07/2015 04:18
Toluene-d8	96	70-130		06/07/2015 04:18
4-BFB	97	70-130		06/07/2015 04:18
Benzene-d6	78	60-140		06/07/2015 04:18
Ethylbenzene-d10	83	60-140		06/07/2015 04:18
1,2-DCB-d4	84	60-140		06/07/2015 04:18

Analyst(s): KF

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0.5,1,1.5	**1506254-003A**	**Soil**	**06/03/2015**	**GC18**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/06/2015 22:53
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/06/2015 22:53
Benzene	ND	0.0050	1	06/06/2015 22:53
Bromobenzene	ND	0.0050	1	06/06/2015 22:53
Bromochloromethane	ND	0.0050	1	06/06/2015 22:53
Bromodichloromethane	ND	0.0050	1	06/06/2015 22:53
Bromoform	ND	0.0050	1	06/06/2015 22:53
Bromomethane	ND	0.0050	1	06/06/2015 22:53
2-Butanone (MEK)	ND	0.020	1	06/06/2015 22:53
t-Butyl alcohol (TBA)	ND	0.050	1	06/06/2015 22:53
n-Butyl benzene	ND	0.0050	1	06/06/2015 22:53
sec-Butyl benzene	ND	0.0050	1	06/06/2015 22:53
tert-Butyl benzene	ND	0.0050	1	06/06/2015 22:53
Carbon Disulfide	ND	0.0050	1	06/06/2015 22:53
Carbon Tetrachloride	ND	0.0050	1	06/06/2015 22:53
Chlorobenzene	ND	0.0050	1	06/06/2015 22:53
Chloroethane	ND	0.0050	1	06/06/2015 22:53
Chloroform	ND	0.0050	1	06/06/2015 22:53
Chloromethane	ND	0.0050	1	06/06/2015 22:53
2-Chlorotoluene	ND	0.0050	1	06/06/2015 22:53
4-Chlorotoluene	ND	0.0050	1	06/06/2015 22:53
Dibromochloromethane	ND	0.0050	1	06/06/2015 22:53
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/06/2015 22:53
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/06/2015 22:53
Dibromomethane	ND	0.0050	1	06/06/2015 22:53
1,2-Dichlorobenzene	ND	0.0050	1	06/06/2015 22:53
1,3-Dichlorobenzene	ND	0.0050	1	06/06/2015 22:53
1,4-Dichlorobenzene	ND	0.0050	1	06/06/2015 22:53
Dichlorodifluoromethane	ND	0.0050	1	06/06/2015 22:53
1,1-Dichloroethane	ND	0.0050	1	06/06/2015 22:53
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/06/2015 22:53
1,1-Dichloroethene	ND	0.0050	1	06/06/2015 22:53
cis-1,2-Dichloroethene	ND	0.0050	1	06/06/2015 22:53
trans-1,2-Dichloroethene	ND	0.0050	1	06/06/2015 22:53
1,2-Dichloropropane	ND	0.0050	1	06/06/2015 22:53
1,3-Dichloropropane	ND	0.0050	1	06/06/2015 22:53
2,2-Dichloropropane	ND	0.0050	1	06/06/2015 22:53
1,1-Dichloropropene	ND	0.0050	1	06/06/2015 22:53

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0.5,1,1.5	1506254-003A	Soil	06/03/2015	GC18	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/06/2015 22:53
trans-1,3-Dichloropropene	ND	0.0050	1	06/06/2015 22:53
Diisopropyl ether (DIPE)	ND	0.0050	1	06/06/2015 22:53
Ethylbenzene	ND	0.0050	1	06/06/2015 22:53
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/06/2015 22:53
Freon 113	ND	0.0050	1	06/06/2015 22:53
Hexachlorobutadiene	ND	0.0050	1	06/06/2015 22:53
Hexachloroethane	ND	0.0050	1	06/06/2015 22:53
2-Hexanone	ND	0.0050	1	06/06/2015 22:53
Isopropylbenzene	ND	0.0050	1	06/06/2015 22:53
4-Isopropyl toluene	ND	0.0050	1	06/06/2015 22:53
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/06/2015 22:53
Methylene chloride	ND	0.0050	1	06/06/2015 22:53
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/06/2015 22:53
Naphthalene	ND	0.0050	1	06/06/2015 22:53
n-Propyl benzene	ND	0.0050	1	06/06/2015 22:53
Styrene	ND	0.0050	1	06/06/2015 22:53
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/06/2015 22:53
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/06/2015 22:53
Tetrachloroethene	ND	0.0050	1	06/06/2015 22:53
Toluene	ND	0.0050	1	06/06/2015 22:53
1,2,3-Trichlorobenzene	ND	0.0050	1	06/06/2015 22:53
1,2,4-Trichlorobenzene	ND	0.0050	1	06/06/2015 22:53
1,1,1-Trichloroethane	ND	0.0050	1	06/06/2015 22:53
1,1,2-Trichloroethane	ND	0.0050	1	06/06/2015 22:53
Trichloroethene	ND	0.0050	1	06/06/2015 22:53
Trichlorofluoromethane	ND	0.0050	1	06/06/2015 22:53
1,2,3-Trichloropropane	ND	0.0050	1	06/06/2015 22:53
1,2,4-Trimethylbenzene	ND	0.0050	1	06/06/2015 22:53
1,3,5-Trimethylbenzene	ND	0.0050	1	06/06/2015 22:53
Vinyl Chloride	ND	0.0050	1	06/06/2015 22:53
Xylenes, Total	ND	0.0050	1	06/06/2015 22:53

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0.5,1,1.5	**1506254-003A**	**Soil**	**06/03/2015**	**GC18**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	103	70-130		06/06/2015 22:53
Toluene-d8	101	70-130		06/06/2015 22:53
4-BFB	102	70-130		06/06/2015 22:53
Benzene-d6	126	60-140		06/06/2015 22:53
Ethylbenzene-d10	113	60-140		06/06/2015 22:53
1,2-DCB-d4	93	60-140		06/06/2015 22:53

Analyst(s): KF

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0.5,1,1.5	**1506254-004A**	**Soil**	**06/03/2015**	**GC18**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/06/2015 23:31
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/06/2015 23:31
Benzene	ND	0.0050	1	06/06/2015 23:31
Bromobenzene	ND	0.0050	1	06/06/2015 23:31
Bromochloromethane	ND	0.0050	1	06/06/2015 23:31
Bromodichloromethane	ND	0.0050	1	06/06/2015 23:31
Bromoform	ND	0.0050	1	06/06/2015 23:31
Bromomethane	ND	0.0050	1	06/06/2015 23:31
2-Butanone (MEK)	ND	0.020	1	06/06/2015 23:31
t-Butyl alcohol (TBA)	ND	0.050	1	06/06/2015 23:31
n-Butyl benzene	ND	0.0050	1	06/06/2015 23:31
sec-Butyl benzene	ND	0.0050	1	06/06/2015 23:31
tert-Butyl benzene	ND	0.0050	1	06/06/2015 23:31
Carbon Disulfide	ND	0.0050	1	06/06/2015 23:31
Carbon Tetrachloride	ND	0.0050	1	06/06/2015 23:31
Chlorobenzene	ND	0.0050	1	06/06/2015 23:31
Chloroethane	ND	0.0050	1	06/06/2015 23:31
Chloroform	ND	0.0050	1	06/06/2015 23:31
Chloromethane	ND	0.0050	1	06/06/2015 23:31
2-Chlorotoluene	ND	0.0050	1	06/06/2015 23:31
4-Chlorotoluene	ND	0.0050	1	06/06/2015 23:31
Dibromochloromethane	ND	0.0050	1	06/06/2015 23:31
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/06/2015 23:31
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/06/2015 23:31
Dibromomethane	ND	0.0050	1	06/06/2015 23:31
1,2-Dichlorobenzene	ND	0.0050	1	06/06/2015 23:31
1,3-Dichlorobenzene	ND	0.0050	1	06/06/2015 23:31
1,4-Dichlorobenzene	ND	0.0050	1	06/06/2015 23:31
Dichlorodifluoromethane	ND	0.0050	1	06/06/2015 23:31
1,1-Dichloroethane	ND	0.0050	1	06/06/2015 23:31
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/06/2015 23:31
1,1-Dichloroethene	ND	0.0050	1	06/06/2015 23:31
cis-1,2-Dichloroethene	ND	0.0050	1	06/06/2015 23:31
trans-1,2-Dichloroethene	ND	0.0050	1	06/06/2015 23:31
1,2-Dichloropropane	ND	0.0050	1	06/06/2015 23:31
1,3-Dichloropropane	ND	0.0050	1	06/06/2015 23:31
2,2-Dichloropropane	ND	0.0050	1	06/06/2015 23:31
1,1-Dichloropropene	ND	0.0050	1	06/06/2015 23:31

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Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0.5,1,1.5	**1506254-004A**	**Soil**	**06/03/2015**	**GC18**	**105900**

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/06/2015 23:31
trans-1,3-Dichloropropene	ND	0.0050	1	06/06/2015 23:31
Diisopropyl ether (DIPE)	ND	0.0050	1	06/06/2015 23:31
Ethylbenzene	ND	0.0050	1	06/06/2015 23:31
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/06/2015 23:31
Freon 113	ND	0.0050	1	06/06/2015 23:31
Hexachlorobutadiene	ND	0.0050	1	06/06/2015 23:31
Hexachloroethane	ND	0.0050	1	06/06/2015 23:31
2-Hexanone	ND	0.0050	1	06/06/2015 23:31
Isopropylbenzene	ND	0.0050	1	06/06/2015 23:31
4-Isopropyl toluene	ND	0.0050	1	06/06/2015 23:31
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/06/2015 23:31
Methylene chloride	ND	0.0050	1	06/06/2015 23:31
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/06/2015 23:31
Naphthalene	ND	0.0050	1	06/06/2015 23:31
n-Propyl benzene	ND	0.0050	1	06/06/2015 23:31
Styrene	ND	0.0050	1	06/06/2015 23:31
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/06/2015 23:31
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/06/2015 23:31
Tetrachloroethene	ND	0.0050	1	06/06/2015 23:31
Toluene	ND	0.0050	1	06/06/2015 23:31
1,2,3-Trichlorobenzene	ND	0.0050	1	06/06/2015 23:31
1,2,4-Trichlorobenzene	ND	0.0050	1	06/06/2015 23:31
1,1,1-Trichloroethane	ND	0.0050	1	06/06/2015 23:31
1,1,2-Trichloroethane	ND	0.0050	1	06/06/2015 23:31
Trichloroethene	ND	0.0050	1	06/06/2015 23:31
Trichlorofluoromethane	ND	0.0050	1	06/06/2015 23:31
1,2,3-Trichloropropane	ND	0.0050	1	06/06/2015 23:31
1,2,4-Trimethylbenzene	ND	0.0050	1	06/06/2015 23:31
1,3,5-Trimethylbenzene	ND	0.0050	1	06/06/2015 23:31
Vinyl Chloride	ND	0.0050	1	06/06/2015 23:31
Xylenes, Total	ND	0.0050	1	06/06/2015 23:31

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0.5,1,1.5	**1506254-004A**	**Soil**	**06/03/2015**	**GC18**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	101	70-130		06/06/2015 23:31
Toluene-d8	101	70-130		06/06/2015 23:31
4-BFB	101	70-130		06/06/2015 23:31
Benzene-d6	127	60-140		06/06/2015 23:31
Ethylbenzene-d10	115	60-140		06/06/2015 23:31
1,2-DCB-d4	93	60-140		06/06/2015 23:31

Analyst(s): KF

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0.5,1,1.5	**1506254-005A**	**Soil**	**06/03/2015**	**GC10**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 00:17
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 00:17
Benzene	ND	0.0050	1	06/10/2015 00:17
Bromobenzene	ND	0.0050	1	06/10/2015 00:17
Bromochloromethane	ND	0.0050	1	06/10/2015 00:17
Bromodichloromethane	ND	0.0050	1	06/10/2015 00:17
Bromoform	ND	0.0050	1	06/10/2015 00:17
Bromomethane	ND	0.0050	1	06/10/2015 00:17
2-Butanone (MEK)	ND	0.020	1	06/10/2015 00:17
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 00:17
n-Butyl benzene	ND	0.0050	1	06/10/2015 00:17
sec-Butyl benzene	ND	0.0050	1	06/10/2015 00:17
tert-Butyl benzene	ND	0.0050	1	06/10/2015 00:17
Carbon Disulfide	ND	0.0050	1	06/10/2015 00:17
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 00:17
Chlorobenzene	ND	0.0050	1	06/10/2015 00:17
Chloroethane	ND	0.0050	1	06/10/2015 00:17
Chloroform	ND	0.0050	1	06/10/2015 00:17
Chloromethane	ND	0.0050	1	06/10/2015 00:17
2-Chlorotoluene	ND	0.0050	1	06/10/2015 00:17
4-Chlorotoluene	ND	0.0050	1	06/10/2015 00:17
Dibromochloromethane	ND	0.0050	1	06/10/2015 00:17
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 00:17
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 00:17
Dibromomethane	ND	0.0050	1	06/10/2015 00:17
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 00:17
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 00:17
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 00:17
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 00:17
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 00:17
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 00:17
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 00:17
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 00:17
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 00:17
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 00:17
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 00:17
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 00:17
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 00:17

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Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0.5,1,1.5	**1506254-005A**	**Soil**	**06/03/2015**	**GC10**	**105900**

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 00:17
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 00:17
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 00:17
Ethylbenzene	ND	0.0050	1	06/10/2015 00:17
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 00:17
Freon 113	ND	0.0050	1	06/10/2015 00:17
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 00:17
Hexachloroethane	ND	0.0050	1	06/10/2015 00:17
2-Hexanone	ND	0.0050	1	06/10/2015 00:17
Isopropylbenzene	ND	0.0050	1	06/10/2015 00:17
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 00:17
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 00:17
Methylene chloride	ND	0.0050	1	06/10/2015 00:17
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 00:17
Naphthalene	ND	0.0050	1	06/10/2015 00:17
n-Propyl benzene	ND	0.0050	1	06/10/2015 00:17
Styrene	ND	0.0050	1	06/10/2015 00:17
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 00:17
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 00:17
Tetrachloroethene	ND	0.0050	1	06/10/2015 00:17
Toluene	ND	0.0050	1	06/10/2015 00:17
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 00:17
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 00:17
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 00:17
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 00:17
Trichloroethene	ND	0.0050	1	06/10/2015 00:17
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 00:17
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 00:17
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 00:17
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 00:17
Vinyl Chloride	ND	0.0050	1	06/10/2015 00:17
Xylenes, Total	ND	0.0050	1	06/10/2015 00:17

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0.5,1,1.5	**1506254-005A**	**Soil**	**06/03/2015**	**GC10**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	83	70-130		06/10/2015 00:17
Toluene-d8	92	70-130		06/10/2015 00:17
4-BFB	90	70-130		06/10/2015 00:17
Benzene-d6	75	60-140		06/10/2015 00:17
Ethylbenzene-d10	93	60-140		06/10/2015 00:17
1,2-DCB-d4	72	60-140		06/10/2015 00:17

Analyst(s): KBO

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Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 18:10
Date Prepared: 6/5/15
WorkOrder: 1506254
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0.5,1,1.5	1506254-006A	Soil	06/03/2015	GC10	105900

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 00:58
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 00:58
Benzene	ND	0.0050	1	06/10/2015 00:58
Bromobenzene	ND	0.0050	1	06/10/2015 00:58
Bromochloromethane	ND	0.0050	1	06/10/2015 00:58
Bromodichloromethane	ND	0.0050	1	06/10/2015 00:58
Bromoform	ND	0.0050	1	06/10/2015 00:58
Bromomethane	ND	0.0050	1	06/10/2015 00:58
2-Butanone (MEK)	ND	0.020	1	06/10/2015 00:58
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 00:58
n-Butyl benzene	ND	0.0050	1	06/10/2015 00:58
sec-Butyl benzene	ND	0.0050	1	06/10/2015 00:58
tert-Butyl benzene	ND	0.0050	1	06/10/2015 00:58
Carbon Disulfide	ND	0.0050	1	06/10/2015 00:58
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 00:58
Chlorobenzene	ND	0.0050	1	06/10/2015 00:58
Chloroethane	ND	0.0050	1	06/10/2015 00:58
Chloroform	ND	0.0050	1	06/10/2015 00:58
Chloromethane	ND	0.0050	1	06/10/2015 00:58
2-Chlorotoluene	ND	0.0050	1	06/10/2015 00:58
4-Chlorotoluene	ND	0.0050	1	06/10/2015 00:58
Dibromochloromethane	ND	0.0050	1	06/10/2015 00:58
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 00:58
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 00:58
Dibromomethane	ND	0.0050	1	06/10/2015 00:58
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 00:58
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 00:58
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 00:58
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 00:58
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 00:58
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 00:58
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 00:58
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 00:58
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 00:58
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 00:58
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 00:58
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 00:58
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 00:58

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0.5,1,1.5	1506254-006A	Soil	06/03/2015	GC10	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 00:58
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 00:58
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 00:58
Ethylbenzene	ND	0.0050	1	06/10/2015 00:58
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 00:58
Freon 113	ND	0.0050	1	06/10/2015 00:58
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 00:58
Hexachloroethane	ND	0.0050	1	06/10/2015 00:58
2-Hexanone	ND	0.0050	1	06/10/2015 00:58
Isopropylbenzene	ND	0.0050	1	06/10/2015 00:58
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 00:58
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 00:58
Methylene chloride	ND	0.0050	1	06/10/2015 00:58
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 00:58
Naphthalene	ND	0.0050	1	06/10/2015 00:58
n-Propyl benzene	ND	0.0050	1	06/10/2015 00:58
Styrene	ND	0.0050	1	06/10/2015 00:58
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 00:58
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 00:58
Tetrachloroethene	ND	0.0050	1	06/10/2015 00:58
Toluene	ND	0.0050	1	06/10/2015 00:58
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 00:58
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 00:58
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 00:58
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 00:58
Trichloroethene	ND	0.0050	1	06/10/2015 00:58
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 00:58
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 00:58
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 00:58
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 00:58
Vinyl Chloride	ND	0.0050	1	06/10/2015 00:58
Xylenes, Total	ND	0.0050	1	06/10/2015 00:58

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0.5,1,1.5	**1506254-006A**	**Soil**	**06/03/2015**	**GC10**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	83	70-130		06/10/2015 00:58
Toluene-d8	92	70-130		06/10/2015 00:58
4-BFB	88	70-130		06/10/2015 00:58
Benzene-d6	77	60-140		06/10/2015 00:58
Ethylbenzene-d10	95	60-140		06/10/2015 00:58
1,2-DCB-d4	73	60-140		06/10/2015 00:58

Analyst(s): KBO

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Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 18:10
Date Prepared: 6/5/15
WorkOrder: 1506254
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0.5,1,1.5	1506254-007A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 15:11
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 15:11
Benzene	ND	0.0050	1	06/10/2015 15:11
Bromobenzene	ND	0.0050	1	06/10/2015 15:11
Bromochloromethane	ND	0.0050	1	06/10/2015 15:11
Bromodichloromethane	ND	0.0050	1	06/10/2015 15:11
Bromoform	ND	0.0050	1	06/10/2015 15:11
Bromomethane	ND	0.0050	1	06/10/2015 15:11
2-Butanone (MEK)	ND	0.020	1	06/10/2015 15:11
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 15:11
n-Butyl benzene	ND	0.0050	1	06/10/2015 15:11
sec-Butyl benzene	ND	0.0050	1	06/10/2015 15:11
tert-Butyl benzene	ND	0.0050	1	06/10/2015 15:11
Carbon Disulfide	ND	0.0050	1	06/10/2015 15:11
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 15:11
Chlorobenzene	ND	0.0050	1	06/10/2015 15:11
Chloroethane	ND	0.0050	1	06/10/2015 15:11
Chloroform	ND	0.0050	1	06/10/2015 15:11
Chloromethane	ND	0.0050	1	06/10/2015 15:11
2-Chlorotoluene	ND	0.0050	1	06/10/2015 15:11
4-Chlorotoluene	ND	0.0050	1	06/10/2015 15:11
Dibromochloromethane	ND	0.0050	1	06/10/2015 15:11
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 15:11
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 15:11
Dibromomethane	ND	0.0050	1	06/10/2015 15:11
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 15:11
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 15:11
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 15:11
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 15:11
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 15:11
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 15:11
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 15:11
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 15:11
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 15:11
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 15:11
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 15:11
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 15:11
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 15:11

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0.5,1,1.5	1506254-007A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 15:11
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 15:11
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 15:11
Ethylbenzene	ND	0.0050	1	06/10/2015 15:11
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 15:11
Freon 113	ND	0.0050	1	06/10/2015 15:11
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 15:11
Hexachloroethane	ND	0.0050	1	06/10/2015 15:11
2-Hexanone	ND	0.0050	1	06/10/2015 15:11
Isopropylbenzene	ND	0.0050	1	06/10/2015 15:11
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 15:11
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 15:11
Methylene chloride	ND	0.0050	1	06/10/2015 15:11
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 15:11
Naphthalene	ND	0.0050	1	06/10/2015 15:11
n-Propyl benzene	ND	0.0050	1	06/10/2015 15:11
Styrene	ND	0.0050	1	06/10/2015 15:11
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 15:11
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 15:11
Tetrachloroethene	ND	0.0050	1	06/10/2015 15:11
Toluene	ND	0.0050	1	06/10/2015 15:11
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 15:11
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 15:11
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 15:11
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 15:11
Trichloroethene	ND	0.0050	1	06/10/2015 15:11
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 15:11
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 15:11
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 15:11
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 15:11
Vinyl Chloride	ND	0.0050	1	06/10/2015 15:11
Xylenes, Total	ND	0.0050	1	06/10/2015 15:11

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0.5,1,1.5	**1506254-007A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	103	70-130		06/10/2015 15:11
Toluene-d8	94	70-130		06/10/2015 15:11
4-BFB	88	70-130		06/10/2015 15:11
Benzene-d6	74	60-140		06/10/2015 15:11
Ethylbenzene-d10	74	60-140		06/10/2015 15:11
1,2-DCB-d4	79	60-140		06/10/2015 15:11

Analyst(s): KF

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0.5,1,1.5	**1506254-008A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 15:54
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 15:54
Benzene	ND	0.0050	1	06/10/2015 15:54
Bromobenzene	ND	0.0050	1	06/10/2015 15:54
Bromochloromethane	ND	0.0050	1	06/10/2015 15:54
Bromodichloromethane	ND	0.0050	1	06/10/2015 15:54
Bromoform	ND	0.0050	1	06/10/2015 15:54
Bromomethane	ND	0.0050	1	06/10/2015 15:54
2-Butanone (MEK)	ND	0.020	1	06/10/2015 15:54
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 15:54
n-Butyl benzene	ND	0.0050	1	06/10/2015 15:54
sec-Butyl benzene	ND	0.0050	1	06/10/2015 15:54
tert-Butyl benzene	ND	0.0050	1	06/10/2015 15:54
Carbon Disulfide	ND	0.0050	1	06/10/2015 15:54
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 15:54
Chlorobenzene	ND	0.0050	1	06/10/2015 15:54
Chloroethane	ND	0.0050	1	06/10/2015 15:54
Chloroform	ND	0.0050	1	06/10/2015 15:54
Chloromethane	ND	0.0050	1	06/10/2015 15:54
2-Chlorotoluene	ND	0.0050	1	06/10/2015 15:54
4-Chlorotoluene	ND	0.0050	1	06/10/2015 15:54
Dibromochloromethane	ND	0.0050	1	06/10/2015 15:54
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 15:54
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 15:54
Dibromomethane	ND	0.0050	1	06/10/2015 15:54
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 15:54
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 15:54
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 15:54
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 15:54
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 15:54
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 15:54
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 15:54
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 15:54
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 15:54
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 15:54
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 15:54
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 15:54
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 15:54

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0.5,1,1.5	1506254-008A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 15:54
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 15:54
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 15:54
Ethylbenzene	ND	0.0050	1	06/10/2015 15:54
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 15:54
Freon 113	ND	0.0050	1	06/10/2015 15:54
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 15:54
Hexachloroethane	ND	0.0050	1	06/10/2015 15:54
2-Hexanone	ND	0.0050	1	06/10/2015 15:54
Isopropylbenzene	ND	0.0050	1	06/10/2015 15:54
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 15:54
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 15:54
Methylene chloride	ND	0.0050	1	06/10/2015 15:54
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 15:54
Naphthalene	ND	0.0050	1	06/10/2015 15:54
n-Propyl benzene	ND	0.0050	1	06/10/2015 15:54
Styrene	ND	0.0050	1	06/10/2015 15:54
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 15:54
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 15:54
Tetrachloroethene	ND	0.0050	1	06/10/2015 15:54
Toluene	ND	0.0050	1	06/10/2015 15:54
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 15:54
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 15:54
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 15:54
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 15:54
Trichloroethene	ND	0.0050	1	06/10/2015 15:54
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 15:54
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 15:54
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 15:54
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 15:54
Vinyl Chloride	ND	0.0050	1	06/10/2015 15:54
Xylenes, Total	ND	0.0050	1	06/10/2015 15:54

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0.5,1,1.5	**1506254-008A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	104	70-130		06/10/2015 15:54
Toluene-d8	93	70-130		06/10/2015 15:54
4-BFB	85	70-130		06/10/2015 15:54
Benzene-d6	70	60-140		06/10/2015 15:54
Ethylbenzene-d10	73	60-140		06/10/2015 15:54
1,2-DCB-d4	75	60-140		06/10/2015 15:54

Analyst(s): KF

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Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 18:10
Date Prepared: 6/5/15

WorkOrder: 1506254
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0.5,1,1.5	1506254-009A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 16:36
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 16:36
Benzene	ND	0.0050	1	06/10/2015 16:36
Bromobenzene	ND	0.0050	1	06/10/2015 16:36
Bromochloromethane	ND	0.0050	1	06/10/2015 16:36
Bromodichloromethane	ND	0.0050	1	06/10/2015 16:36
Bromoform	ND	0.0050	1	06/10/2015 16:36
Bromomethane	ND	0.0050	1	06/10/2015 16:36
2-Butanone (MEK)	ND	0.020	1	06/10/2015 16:36
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 16:36
n-Butyl benzene	ND	0.0050	1	06/10/2015 16:36
sec-Butyl benzene	ND	0.0050	1	06/10/2015 16:36
tert-Butyl benzene	ND	0.0050	1	06/10/2015 16:36
Carbon Disulfide	ND	0.0050	1	06/10/2015 16:36
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 16:36
Chlorobenzene	ND	0.0050	1	06/10/2015 16:36
Chloroethane	ND	0.0050	1	06/10/2015 16:36
Chloroform	ND	0.0050	1	06/10/2015 16:36
Chloromethane	ND	0.0050	1	06/10/2015 16:36
2-Chlorotoluene	ND	0.0050	1	06/10/2015 16:36
4-Chlorotoluene	ND	0.0050	1	06/10/2015 16:36
Dibromochloromethane	ND	0.0050	1	06/10/2015 16:36
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 16:36
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 16:36
Dibromomethane	ND	0.0050	1	06/10/2015 16:36
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 16:36
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 16:36
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 16:36
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 16:36
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 16:36
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 16:36
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 16:36
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 16:36
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 16:36
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 16:36
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 16:36
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 16:36
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 16:36

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Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 18:10
Date Prepared: 6/5/15

WorkOrder: 1506254
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0.5,1,1.5	1506254-009A	Soil	06/03/2015	GC16	105900

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 16:36
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 16:36
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 16:36
Ethylbenzene	ND	0.0050	1	06/10/2015 16:36
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 16:36
Freon 113	ND	0.0050	1	06/10/2015 16:36
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 16:36
Hexachloroethane	ND	0.0050	1	06/10/2015 16:36
2-Hexanone	ND	0.0050	1	06/10/2015 16:36
Isopropylbenzene	ND	0.0050	1	06/10/2015 16:36
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 16:36
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 16:36
Methylene chloride	ND	0.0050	1	06/10/2015 16:36
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 16:36
Naphthalene	ND	0.0050	1	06/10/2015 16:36
n-Propyl benzene	ND	0.0050	1	06/10/2015 16:36
Styrene	ND	0.0050	1	06/10/2015 16:36
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 16:36
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 16:36
Tetrachloroethene	ND	0.0050	1	06/10/2015 16:36
Toluene	ND	0.0050	1	06/10/2015 16:36
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 16:36
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 16:36
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 16:36
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 16:36
Trichloroethene	ND	0.0050	1	06/10/2015 16:36
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 16:36
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 16:36
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 16:36
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 16:36
Vinyl Chloride	ND	0.0050	1	06/10/2015 16:36
Xylenes, Total	ND	0.0050	1	06/10/2015 16:36

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Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0.5,1,1.5	**1506254-009A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	104	70-130		06/10/2015 16:36
Toluene-d8	94	70-130		06/10/2015 16:36
4-BFB	90	70-130		06/10/2015 16:36
Benzene-d6	80	60-140		06/10/2015 16:36
Ethylbenzene-d10	83	60-140		06/10/2015 16:36
1,2-DCB-d4	83	60-140		06/10/2015 16:36

Analyst(s): KF

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0.5,1,1.5	**1506254-010A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	06/10/2015 17:19
tert-Amyl methyl ether (TAME)	ND	0.0050	1	06/10/2015 17:19
Benzene	ND	0.0050	1	06/10/2015 17:19
Bromobenzene	ND	0.0050	1	06/10/2015 17:19
Bromochloromethane	ND	0.0050	1	06/10/2015 17:19
Bromodichloromethane	ND	0.0050	1	06/10/2015 17:19
Bromoform	ND	0.0050	1	06/10/2015 17:19
Bromomethane	ND	0.0050	1	06/10/2015 17:19
2-Butanone (MEK)	ND	0.020	1	06/10/2015 17:19
t-Butyl alcohol (TBA)	ND	0.050	1	06/10/2015 17:19
n-Butyl benzene	ND	0.0050	1	06/10/2015 17:19
sec-Butyl benzene	ND	0.0050	1	06/10/2015 17:19
tert-Butyl benzene	ND	0.0050	1	06/10/2015 17:19
Carbon Disulfide	ND	0.0050	1	06/10/2015 17:19
Carbon Tetrachloride	ND	0.0050	1	06/10/2015 17:19
Chlorobenzene	ND	0.0050	1	06/10/2015 17:19
Chloroethane	ND	0.0050	1	06/10/2015 17:19
Chloroform	ND	0.0050	1	06/10/2015 17:19
Chloromethane	ND	0.0050	1	06/10/2015 17:19
2-Chlorotoluene	ND	0.0050	1	06/10/2015 17:19
4-Chlorotoluene	ND	0.0050	1	06/10/2015 17:19
Dibromochloromethane	ND	0.0050	1	06/10/2015 17:19
1,2-Dibromo-3-chloropropane	ND	0.0040	1	06/10/2015 17:19
1,2-Dibromoethane (EDB)	ND	0.0040	1	06/10/2015 17:19
Dibromomethane	ND	0.0050	1	06/10/2015 17:19
1,2-Dichlorobenzene	ND	0.0050	1	06/10/2015 17:19
1,3-Dichlorobenzene	ND	0.0050	1	06/10/2015 17:19
1,4-Dichlorobenzene	ND	0.0050	1	06/10/2015 17:19
Dichlorodifluoromethane	ND	0.0050	1	06/10/2015 17:19
1,1-Dichloroethane	ND	0.0050	1	06/10/2015 17:19
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	06/10/2015 17:19
1,1-Dichloroethene	ND	0.0050	1	06/10/2015 17:19
cis-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 17:19
trans-1,2-Dichloroethene	ND	0.0050	1	06/10/2015 17:19
1,2-Dichloropropane	ND	0.0050	1	06/10/2015 17:19
1,3-Dichloropropane	ND	0.0050	1	06/10/2015 17:19
2,2-Dichloropropane	ND	0.0050	1	06/10/2015 17:19
1,1-Dichloropropene	ND	0.0050	1	06/10/2015 17:19

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0.5,1,1.5	**1506254-010A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 17:19
trans-1,3-Dichloropropene	ND	0.0050	1	06/10/2015 17:19
Diisopropyl ether (DIPE)	ND	0.0050	1	06/10/2015 17:19
Ethylbenzene	ND	0.0050	1	06/10/2015 17:19
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	06/10/2015 17:19
Freon 113	ND	0.0050	1	06/10/2015 17:19
Hexachlorobutadiene	ND	0.0050	1	06/10/2015 17:19
Hexachloroethane	ND	0.0050	1	06/10/2015 17:19
2-Hexanone	ND	0.0050	1	06/10/2015 17:19
Isopropylbenzene	ND	0.0050	1	06/10/2015 17:19
4-Isopropyl toluene	ND	0.0050	1	06/10/2015 17:19
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	06/10/2015 17:19
Methylene chloride	ND	0.0050	1	06/10/2015 17:19
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	06/10/2015 17:19
Naphthalene	ND	0.0050	1	06/10/2015 17:19
n-Propyl benzene	ND	0.0050	1	06/10/2015 17:19
Styrene	ND	0.0050	1	06/10/2015 17:19
1,1,1,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 17:19
1,1,2,2-Tetrachloroethane	ND	0.0050	1	06/10/2015 17:19
Tetrachloroethene	ND	0.0050	1	06/10/2015 17:19
Toluene	ND	0.0050	1	06/10/2015 17:19
1,2,3-Trichlorobenzene	ND	0.0050	1	06/10/2015 17:19
1,2,4-Trichlorobenzene	ND	0.0050	1	06/10/2015 17:19
1,1,1-Trichloroethane	ND	0.0050	1	06/10/2015 17:19
1,1,2-Trichloroethane	ND	0.0050	1	06/10/2015 17:19
Trichloroethene	ND	0.0050	1	06/10/2015 17:19
Trichlorofluoromethane	ND	0.0050	1	06/10/2015 17:19
1,2,3-Trichloropropane	ND	0.0050	1	06/10/2015 17:19
1,2,4-Trimethylbenzene	ND	0.0050	1	06/10/2015 17:19
1,3,5-Trimethylbenzene	ND	0.0050	1	06/10/2015 17:19
Vinyl Chloride	ND	0.0050	1	06/10/2015 17:19
Xylenes, Total	ND	0.0050	1	06/10/2015 17:19

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8260B
Date Prepared:	6/5/15	**Unit:**	mg/kg

Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0.5,1,1.5	**1506254-010A**	**Soil**	**06/03/2015**	**GC16**	**105900**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	104	70-130		06/10/2015 17:19
Toluene-d8	95	70-130		06/10/2015 17:19
4-BFB	88	70-130		06/10/2015 17:19
Benzene-d6	79	60-140		06/10/2015 17:19
Ethylbenzene-d10	82	60-140		06/10/2015 17:19
1,2-DCB-d4	82	60-140		06/10/2015 17:19

Analyst(s): KF

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 18:10
Date Prepared: 6/5/15

WorkOrder: 1506254
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0.5,1,1.5	**1506254-001A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105903**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.69**	0.50	1	06/09/2015 09:51
Arsenic	**4.4**	0.50	1	06/09/2015 09:51
Barium	**190**	5.0	1	06/09/2015 09:51
Beryllium	ND	0.50	1	06/09/2015 09:51
Cadmium	**0.34**	0.25	1	06/09/2015 09:51
Chromium	**38**	0.50	1	06/09/2015 09:51
Cobalt	**13**	0.50	1	06/09/2015 09:51
Copper	**31**	0.50	1	06/09/2015 09:51
Lead	**21**	0.50	1	06/09/2015 09:51
Mercury	**0.12**	0.050	1	06/09/2015 09:51
Molybdenum	**0.95**	0.50	1	06/09/2015 09:51
Nickel	**52**	0.50	1	06/09/2015 09:51
Selenium	ND	0.50	1	06/09/2015 09:51
Silver	ND	0.50	1	06/09/2015 09:51
Thallium	ND	0.50	1	06/09/2015 09:51
Vanadium	**41**	0.50	1	06/09/2015 09:51
Zinc	**79**	5.0	1	06/09/2015 09:51

Surrogates	REC (%)	Limits	
Terbium	95	70-130	06/09/2015 09:51

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6020
Date Prepared:	6/5/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0.5,1,1.5	**1506254-002A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105903**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.66**	0.50	1	06/09/2015 09:57
Arsenic	**6.4**	0.50	1	06/09/2015 09:57
Barium	**320**	5.0	1	06/09/2015 09:57
Beryllium	ND	0.50	1	06/09/2015 09:57
Cadmium	**0.49**	0.25	1	06/09/2015 09:57
Chromium	**73**	0.50	1	06/09/2015 09:57
Cobalt	**15**	0.50	1	06/09/2015 09:57
Copper	**47**	0.50	1	06/09/2015 09:57
Lead	**25**	0.50	1	06/09/2015 09:57
Mercury	**0.14**	0.050	1	06/09/2015 09:57
Molybdenum	**1.3**	0.50	1	06/09/2015 09:57
Nickel	**79**	0.50	1	06/09/2015 09:57
Selenium	ND	0.50	1	06/09/2015 09:57
Silver	ND	0.50	1	06/09/2015 09:57
Thallium	ND	0.50	1	06/09/2015 09:57
Vanadium	**61**	0.50	1	06/09/2015 09:57
Zinc	**110**	5.0	1	06/09/2015 09:57

Surrogates	REC (%)	Limits	
Terbium	91	70-130	06/09/2015 09:57

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6020
Date Prepared:	6/5/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0.5,1,1.5	**1506254-003A**	**Soil**	**06/03/2015**	**ICP-MS2**	**105903**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.58**	0.50	1	06/09/2015 10:03
Arsenic	**4.4**	0.50	1	06/09/2015 10:03
Barium	**250**	5.0	1	06/09/2015 10:03
Beryllium	ND	0.50	1	06/09/2015 10:03
Cadmium	**0.45**	0.25	1	06/09/2015 10:03
Chromium	**52**	0.50	1	06/09/2015 10:03
Cobalt	**12**	0.50	1	06/09/2015 10:03
Copper	**38**	0.50	1	06/09/2015 10:03
Lead	**25**	0.50	1	06/09/2015 10:03
Mercury	**0.13**	0.050	1	06/09/2015 10:03
Molybdenum	**0.94**	0.50	1	06/09/2015 10:03
Nickel	**54**	0.50	1	06/09/2015 10:03
Selenium	ND	0.50	1	06/09/2015 10:03
Silver	ND	0.50	1	06/09/2015 10:03
Thallium	ND	0.50	1	06/09/2015 10:03
Vanadium	**55**	0.50	1	06/09/2015 10:03
Zinc	**86**	5.0	1	06/09/2015 10:03

Surrogates	REC (%)	Limits	
Terbium	97	70-130	06/09/2015 10:03

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6020
Date Prepared:	6/5/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0.5,1,1.5	**1506254-004A**	**Soil**	**06/03/2015**	**ICP-MS1**	**105903**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.55**	0.50	1	06/09/2015 06:48
Arsenic	**5.4**	0.50	1	06/09/2015 06:48
Barium	**270**	5.0	1	06/09/2015 06:48
Beryllium	ND	0.50	1	06/09/2015 06:48
Cadmium	**0.38**	0.25	1	06/09/2015 06:48
Chromium	**59**	0.50	1	06/09/2015 06:48
Cobalt	**16**	0.50	1	06/09/2015 06:48
Copper	**47**	0.50	1	06/09/2015 06:48
Lead	**21**	0.50	1	06/09/2015 06:48
Mercury	**0.13**	0.050	1	06/09/2015 06:48
Molybdenum	**1.2**	0.50	1	06/09/2015 06:48
Nickel	**75**	0.50	1	06/09/2015 06:48
Selenium	ND	0.50	1	06/09/2015 06:48
Silver	ND	0.50	1	06/09/2015 06:48
Thallium	ND	0.50	1	06/09/2015 06:48
Vanadium	**63**	0.50	1	06/09/2015 06:48
Zinc	**97**	5.0	1	06/09/2015 06:48

Surrogates	REC (%)	Limits	
Terbium	88	70-130	06/09/2015 06:48

Analyst(s): DB

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6020
Date Prepared:	6/5/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0.5,1,1.5	**1506254-005A**	**Soil**	**06/03/2015**	**ICP-MS1**	**105903**

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	0.50	1	06/09/2015 06:55
Arsenic	**4.2**	0.50	1	06/09/2015 06:55
Barium	**170**	5.0	1	06/09/2015 06:55
Beryllium	ND	0.50	1	06/09/2015 06:55
Cadmium	**0.36**	0.25	1	06/09/2015 06:55
Chromium	**54**	0.50	1	06/09/2015 06:55
Cobalt	**11**	0.50	1	06/09/2015 06:55
Copper	**34**	0.50	1	06/09/2015 06:55
Lead	**23**	0.50	1	06/09/2015 06:55
Mercury	**0.086**	0.050	1	06/09/2015 06:55
Molybdenum	**0.94**	0.50	1	06/09/2015 06:55
Nickel	**58**	0.50	1	06/09/2015 06:55
Selenium	ND	0.50	1	06/09/2015 06:55
Silver	ND	0.50	1	06/09/2015 06:55
Thallium	ND	0.50	1	06/09/2015 06:55
Vanadium	**50**	0.50	1	06/09/2015 06:55
Zinc	**78**	5.0	1	06/09/2015 06:55

Surrogates	REC (%)	Limits	
Terbium	88	70-130	06/09/2015 06:55

Analyst(s): DB

(Cont.)

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 18:10
Date Prepared: 6/5/15

WorkOrder: 1506254
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0.5,1,1.5	**1506254-006A**	**Soil**	**06/03/2015**	**ICP-MS1**	**105903**

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	0.50	1	06/09/2015 07:01
Arsenic	**4.0**	0.50	1	06/09/2015 07:01
Barium	**200**	5.0	1	06/09/2015 07:01
Beryllium	ND	0.50	1	06/09/2015 07:01
Cadmium	**0.40**	0.25	1	06/09/2015 07:01
Chromium	**37**	0.50	1	06/09/2015 07:01
Cobalt	**11**	0.50	1	06/09/2015 07:01
Copper	**28**	0.50	1	06/09/2015 07:01
Lead	**19**	0.50	1	06/09/2015 07:01
Mercury	**0.080**	0.050	1	06/09/2015 07:01
Molybdenum	**0.80**	0.50	1	06/09/2015 07:01
Nickel	**86**	0.50	1	06/09/2015 07:01
Selenium	ND	0.50	1	06/09/2015 07:01
Silver	ND	0.50	1	06/09/2015 07:01
Thallium	ND	0.50	1	06/09/2015 07:01
Vanadium	**39**	0.50	1	06/09/2015 07:01
Zinc	**70**	5.0	1	06/09/2015 07:01

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	93	70-130	06/09/2015 07:01

Analyst(s): DB

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6020
Date Prepared:	6/5/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0.5,1,1.5	**1506254-007A**	**Soil**	**06/03/2015**	**ICP-MS1**	**105903**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.56**	0.50	1	06/09/2015 07:19
Arsenic	**6.1**	0.50	1	06/09/2015 07:19
Barium	**320**	5.0	1	06/09/2015 07:19
Beryllium	ND	0.50	1	06/09/2015 07:19
Cadmium	**0.33**	0.25	1	06/09/2015 07:19
Chromium	**50**	0.50	1	06/09/2015 07:19
Cobalt	**11**	0.50	1	06/09/2015 07:19
Copper	**39**	0.50	1	06/09/2015 07:19
Lead	**21**	0.50	1	06/09/2015 07:19
Mercury	**0.34**	0.050	1	06/09/2015 07:19
Molybdenum	**1.1**	0.50	1	06/09/2015 07:19
Nickel	**58**	0.50	1	06/09/2015 07:19
Selenium	ND	0.50	1	06/09/2015 07:19
Silver	ND	0.50	1	06/09/2015 07:19
Thallium	ND	0.50	1	06/09/2015 07:19
Vanadium	**46**	0.50	1	06/09/2015 07:19
Zinc	**80**	5.0	1	06/09/2015 07:19

Surrogates	REC (%)	Limits	
Terbium	92	70-130	06/09/2015 07:19

Analyst(s): DB

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6020
Date Prepared:	6/5/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0.5,1,1.5	**1506254-008A**	**Soil**	**06/03/2015**	**ICP-MS1**	**105903**

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	0.50	1	06/09/2015 07:26
Arsenic	**4.5**	0.50	1	06/09/2015 07:26
Barium	**270**	5.0	1	06/09/2015 07:26
Beryllium	ND	0.50	1	06/09/2015 07:26
Cadmium	**0.30**	0.25	1	06/09/2015 07:26
Chromium	**46**	0.50	1	06/09/2015 07:26
Cobalt	**9.3**	0.50	1	06/09/2015 07:26
Copper	**30**	0.50	1	06/09/2015 07:26
Lead	**16**	0.50	1	06/09/2015 07:26
Mercury	**0.065**	0.050	1	06/09/2015 07:26
Molybdenum	**1.0**	0.50	1	06/09/2015 07:26
Nickel	**49**	0.50	1	06/09/2015 07:26
Selenium	ND	0.50	1	06/09/2015 07:26
Silver	ND	0.50	1	06/09/2015 07:26
Thallium	ND	0.50	1	06/09/2015 07:26
Vanadium	**42**	0.50	1	06/09/2015 07:26
Zinc	**73**	5.0	1	06/09/2015 07:26

Surrogates	REC (%)	Limits	
Terbium	87	70-130	06/09/2015 07:26

Analyst(s): DB

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6020
Date Prepared:	6/5/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0.5,1,1.5	**1506254-009A**	**Soil**	**06/03/2015**	**ICP-MS1**	**105903**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.74**	0.50	1	06/09/2015 07:32
Arsenic	**5.3**	0.50	1	06/09/2015 07:32
Barium	**680**	5.0	1	06/09/2015 07:32
Beryllium	ND	0.50	1	06/09/2015 07:32
Cadmium	**0.40**	0.25	1	06/09/2015 07:32
Chromium	**89**	0.50	1	06/09/2015 07:32
Cobalt	**18**	0.50	1	06/09/2015 07:32
Copper	**58**	0.50	1	06/09/2015 07:32
Lead	**30**	0.50	1	06/09/2015 07:32
Mercury	**0.16**	0.050	1	06/09/2015 07:32
Molybdenum	**1.4**	0.50	1	06/09/2015 07:32
Nickel	**110**	0.50	1	06/09/2015 07:32
Selenium	ND	0.50	1	06/09/2015 07:32
Silver	ND	0.50	1	06/09/2015 07:32
Thallium	ND	0.50	1	06/09/2015 07:32
Vanadium	**78**	0.50	1	06/09/2015 07:32
Zinc	**140**	5.0	1	06/09/2015 07:32

Surrogates	REC (%)	Limits	
Terbium	89	70-130	06/09/2015 07:32

Analyst(s): DB

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3050B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6020
Date Prepared:	6/5/15	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0.5,1,1.5	**1506254-010A**	**Soil**	**06/03/2015**	**ICP-MS1**	**105903**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**0.62**	0.50	1	06/09/2015 07:38
Arsenic	**5.0**	0.50	1	06/09/2015 07:38
Barium	**280**	5.0	1	06/09/2015 07:38
Beryllium	ND	0.50	1	06/09/2015 07:38
Cadmium	**0.38**	0.25	1	06/09/2015 07:38
Chromium	**54**	0.50	1	06/09/2015 07:38
Cobalt	**14**	0.50	1	06/09/2015 07:38
Copper	**43**	0.50	1	06/09/2015 07:38
Lead	**24**	0.50	1	06/09/2015 07:38
Mercury	**0.15**	0.050	1	06/09/2015 07:38
Molybdenum	**1.1**	0.50	1	06/09/2015 07:38
Nickel	**67**	0.50	1	06/09/2015 07:38
Selenium	ND	0.50	1	06/09/2015 07:38
Silver	ND	0.50	1	06/09/2015 07:38
Thallium	ND	0.50	1	06/09/2015 07:38
Vanadium	**57**	0.50	1	06/09/2015 07:38
Zinc	**96**	5.0	1	06/09/2015 07:38

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	81	70-130	06/09/2015 07:38

Analyst(s): DB

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	6/5/15-6/11/15	**Unit:**	mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0.5,1,1.5	**1506254-001A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/07/2015 02:03
MTBE	---	0.050	1	06/07/2015 02:03
Benzene	---	0.0050	1	06/07/2015 02:03
Toluene	---	0.0050	1	06/07/2015 02:03
Ethylbenzene	---	0.0050	1	06/07/2015 02:03
Xylenes	---	0.0050	1	06/07/2015 02:03

Surrogates	REC (%)	Limits	
2-Fluorotoluene	97	70-130	06/07/2015 02:03

Analyst(s): HD

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0.5,1,1.5	**1506254-002A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/07/2015 03:34
MTBE	---	0.050	1	06/07/2015 03:34
Benzene	---	0.0050	1	06/07/2015 03:34
Toluene	---	0.0050	1	06/07/2015 03:34
Ethylbenzene	---	0.0050	1	06/07/2015 03:34
Xylenes	---	0.0050	1	06/07/2015 03:34

Surrogates	REC (%)	Limits	
2-Fluorotoluene	122	70-130	06/07/2015 03:34

Analyst(s): HD

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	6/5/15-6/11/15	**Unit:**	mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0.5,1,1.5	**1506254-003A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 07:57
MTBE	---	0.050	1	06/09/2015 07:57
Benzene	---	0.0050	1	06/09/2015 07:57
Toluene	---	0.0050	1	06/09/2015 07:57
Ethylbenzene	---	0.0050	1	06/09/2015 07:57
Xylenes	---	0.0050	1	06/09/2015 07:57

Surrogates	REC (%)	Limits		
2-Fluorotoluene	103	70-130		06/09/2015 07:57

Analyst(s): HD

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0.5,1,1.5	**1506254-004A**	**Soil**	**06/03/2015**	**GC3**	**106114**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/11/2015 15:24
MTBE	---	0.050	1	06/11/2015 15:24
Benzene	---	0.0050	1	06/11/2015 15:24
Toluene	---	0.0050	1	06/11/2015 15:24
Ethylbenzene	---	0.0050	1	06/11/2015 15:24
Xylenes	---	0.0050	1	06/11/2015 15:24

Surrogates	REC (%)	Limits		
2-Fluorotoluene	99	70-130		06/11/2015 15:24

Analyst(s): HD

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	6/5/15-6/11/15	**Unit:**	mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0.5,1,1.5	**1506254-005A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 08:27
MTBE	---	0.050	1	06/09/2015 08:27
Benzene	---	0.0050	1	06/09/2015 08:27
Toluene	---	0.0050	1	06/09/2015 08:27
Ethylbenzene	---	0.0050	1	06/09/2015 08:27
Xylenes	---	0.0050	1	06/09/2015 08:27

Surrogates	REC (%)	Limits	
2-Fluorotoluene	98	70-130	06/09/2015 08:27

Analyst(s): HD

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0.5,1,1.5	**1506254-006A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 08:58
MTBE	---	0.050	1	06/09/2015 08:58
Benzene	---	0.0050	1	06/09/2015 08:58
Toluene	---	0.0050	1	06/09/2015 08:58
Ethylbenzene	---	0.0050	1	06/09/2015 08:58
Xylenes	---	0.0050	1	06/09/2015 08:58

Surrogates	REC (%)	Limits	
2-Fluorotoluene	107	70-130	06/09/2015 08:58

Analyst(s): HD

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	6/5/15-6/11/15	**Unit:**	mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0.5,1,1.5	**1506254-007A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 09:28
MTBE	---	0.050	1	06/09/2015 09:28
Benzene	---	0.0050	1	06/09/2015 09:28
Toluene	---	0.0050	1	06/09/2015 09:28
Ethylbenzene	---	0.0050	1	06/09/2015 09:28
Xylenes	---	0.0050	1	06/09/2015 09:28

Surrogates	REC (%)	Limits	
2-Fluorotoluene	102	70-130	06/09/2015 09:28

Analyst(s): HD

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0.5,1,1.5	**1506254-008A**	**Soil**	**06/03/2015**	**GC19**	**105892**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 09:59
MTBE	---	0.050	1	06/09/2015 09:59
Benzene	---	0.0050	1	06/09/2015 09:59
Toluene	---	0.0050	1	06/09/2015 09:59
Ethylbenzene	---	0.0050	1	06/09/2015 09:59
Xylenes	---	0.0050	1	06/09/2015 09:59

Surrogates	REC (%)	Limits	
2-Fluorotoluene	79	70-130	06/09/2015 09:59

Analyst(s): HD

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW5030B
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	6/5/15-6/11/15	**Unit:**	mg/Kg

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0.5,1,1.5	**1506254-009A**	**Soil**	**06/03/2015**	**GC3**	**105907**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/05/2015 14:41
MTBE	---	0.050	1	06/05/2015 14:41
Benzene	---	0.0050	1	06/05/2015 14:41
Toluene	---	0.0050	1	06/05/2015 14:41
Ethylbenzene	---	0.0050	1	06/05/2015 14:41
Xylenes	---	0.0050	1	06/05/2015 14:41

Surrogates	REC (%)	Limits	
2-Fluorotoluene	101	70-130	06/05/2015 14:41

Analyst(s): HD

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0.5,1,1.5	**1506254-010A**	**Soil**	**06/03/2015**	**GC7**	**105907**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	06/09/2015 00:20
MTBE	---	0.050	1	06/09/2015 00:20
Benzene	---	0.0050	1	06/09/2015 00:20
Toluene	---	0.0050	1	06/09/2015 00:20
Ethylbenzene	---	0.0050	1	06/09/2015 00:20
Xylenes	---	0.0050	1	06/09/2015 00:20

Surrogates	REC (%)	Limits	
2-Fluorotoluene	100	70-130	06/09/2015 00:20

Analyst(s): HD

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B/3630C
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8015B
Date Prepared:	6/5/15	**Unit:**	mg/Kg

Total Extractable Petroleum Hydrocarbons w/ SG Clean-Up

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-1@0.5,1,1.5	**1506254-001A**	**Soil**	**06/03/2015**	**GC2B**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**1.2**	1.0	1	06/08/2015 04:54
TPH-Motor Oil (C18-C36)	**8.9**	5.0	1	06/08/2015 04:54

Surrogates	REC (%)	Limits	
C9	97	70-130	06/08/2015 04:54

Analyst(s): TK Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0.5,1,1.5	**1506254-002A**	**Soil**	**06/03/2015**	**GC31B**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**12**	10	1	06/06/2015 00:16
TPH-Motor Oil (C18-C36)	**110**	50	1	06/06/2015 00:16

Surrogates	REC (%)	Limits	
C9	106	70-130	06/06/2015 00:16

Analyst(s): TK Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0.5,1,1.5	**1506254-003A**	**Soil**	**06/03/2015**	**GC31A**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**15**	10	1	06/06/2015 00:16
TPH-Motor Oil (C18-C36)	**130**	50	1	06/06/2015 00:16

Surrogates	REC (%)	Limits	
C9	126	70-130	06/06/2015 00:16

Analyst(s): TK Analytical Comments: e7,e2

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B/3630C
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8015B
Date Prepared:	6/5/15	**Unit:**	mg/Kg

Total Extractable Petroleum Hydrocarbons w/ SG Clean-Up

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0.5,1,1.5	**1506254-004A**	**Soil**	**06/03/2015**	**GC6A**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**7.4**	5.0	5	06/08/2015 17:48
TPH-Motor Oil (C18-C36)	**34**	25	5	06/08/2015 17:48

Surrogates	REC (%)	Limits	
C9	104	70-130	06/08/2015 17:48

Analyst(s): TK   Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0.5,1,1.5	**1506254-005A**	**Soil**	**06/03/2015**	**GC31B**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**12**	10	1	06/05/2015 22:35
TPH-Motor Oil (C18-C36)	**89**	50	1	06/05/2015 22:35

Surrogates	REC (%)	Limits	
C9	107	70-130	06/05/2015 22:35

Analyst(s): TK   Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-6@0.5,1,1.5	**1506254-006A**	**Soil**	**06/03/2015**	**GC31A**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**18**	10	1	06/05/2015 22:35
TPH-Motor Oil (C18-C36)	**140**	50	1	06/05/2015 22:35

Surrogates	REC (%)	Limits	
C9	126	70-130	06/05/2015 22:35

Analyst(s): TK   Analytical Comments: e7,e2

(Cont.)

Analytical Report

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
Date Received: 6/4/15 18:10
Date Prepared: 6/5/15

WorkOrder: 1506254
Extraction Method: SW3550B/3630C
Analytical Method: SW8015B
Unit: mg/Kg

Total Extractable Petroleum Hydrocarbons w/ SG Clean-Up

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0.5,1,1.5	**1506254-007A**	**Soil**	**06/03/2015**	**GC2B**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**1.7**	1.0	1	06/08/2015 06:08
TPH-Motor Oil (C18-C36)	**10**	5.0	1	06/08/2015 06:08

Surrogates	REC (%)	Limits	
C9	96	70-130	06/08/2015 06:08

Analyst(s): TK   Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-8@0.5,1,1.5	**1506254-008A**	**Soil**	**06/03/2015**	**GC2A**	**105873**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**2.4**	1.0	1	06/08/2015 07:24
TPH-Motor Oil (C18-C36)	**21**	5.0	1	06/08/2015 07:24

Surrogates	REC (%)	Limits	
C9	111	70-130	06/08/2015 07:24

Analyst(s): TK   Analytical Comments: e7,e2

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0.5,1,1.5	**1506254-009A**	**Soil**	**06/03/2015**	**GC11B**	**105906**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**12**	1.0	1	06/06/2015 18:51
TPH-Motor Oil (C18-C36)	**120**	5.0	1	06/06/2015 18:51

Surrogates	REC (%)	Limits	
C9	110	70-130	06/06/2015 18:51

Analyst(s): TK   Analytical Comments: e7,e2

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW3550B/3630C
Date Received:	6/4/15 18:10	**Analytical Method:**	SW8015B
Date Prepared:	6/5/15	**Unit:**	mg/Kg

Total Extractable Petroleum Hydrocarbons w/ SG Clean-Up

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0.5,1,1.5	**1506254-010A**	**Soil**	**06/03/2015**	**GC2A**	**105906**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**5.7**	1.0	1	06/06/2015 13:47
TPH-Motor Oil (C18-C36)	**29**	5.0	1	06/06/2015 13:47

Surrogates	REC (%)	Limits	
C9	104	70-130	06/06/2015 13:47

Analyst(s): TK

Analytical Comments: e7,e2

Angela Rydelius, Lab Manager

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/4/15	**BatchID:**	105902
Date Analyzed:	6/6/15	**Extraction Method:**	SW3550B
Instrument:	GC22	**Analytical Method:**	SW8081A
Matrix:	Soil	**Unit:**	mg/kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105902 1506252-032AMS/MSD

QC Summary Report for SW8081A

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Aldrin	ND	0.0453	0.0010	0.050	-	91	70-130
a-BHC	ND	-	0.0010	-	-	-	-
b-BHC	ND	-	0.0010	-	-	-	-
d-BHC	ND	-	0.0010	-	-	-	-
g-BHC	ND	0.0505	0.0010	0.050	-	101	70-130
Chlordane (Technical)	ND	-	0.025	-	-	-	-
a-Chlordane	ND	-	0.0010	-	-	-	-
g-Chlordane	ND	-	0.0010	-	-	-	-
p,p-DDD	ND	-	0.0010	-	-	-	-
p,p-DDE	ND	-	0.0010	-	-	-	-
p,p-DDT	ND	0.0433	0.0010	0.050	-	87	70-130
Dieldrin	ND	0.0549	0.0010	0.050	-	110	70-130
Endosulfan I	ND	-	0.0010	-	-	-	-
Endosulfan II	ND	-	0.0010	-	-	-	-
Endosulfan sulfate	ND	-	0.0010	-	-	-	-
Endrin	ND	0.0446	0.0010	0.050	-	89	70-130
Endrin aldehyde	ND	-	0.0010	-	-	-	-
Endrin ketone	ND	-	0.0010	-	-	-	-
Heptachlor	ND	0.0405	0.0010	0.050	-	81	70-130
Heptachlor epoxide	ND	-	0.0010	-	-	-	-
Hexachlorobenzene	ND	-	0.010	-	-	-	-
Hexachlorocyclopentadiene	ND	-	0.020	-	-	-	-
Methoxychlor	ND	-	0.0010	-	-	-	-
Toxaphene	ND	-	0.050	-	-	-	-
Aroclor1016	ND	-	0.050	-	-	-	-
Aroclor1221	ND	-	0.050	-	-	-	-
Aroclor1232	ND	-	0.050	-	-	-	-
Aroclor1242	ND	-	0.050	-	-	-	-
Aroclor1248	ND	-	0.050	-	-	-	-
Aroclor1254	ND	-	0.050	-	-	-	-
Aroclor1260	ND	-	0.050	-	-	-	-
Surrogate Recovery							
Decachlorobiphenyl	0.0421	0.0478		0.050	84	96	70-130

(Cont.)

Quality Control Report

Client: SCA Enviromental, Inc.
Date Prepared: 6/4/15
Date Analyzed: 6/6/15
Instrument: GC22
Matrix: Soil
Project: #B11689; 1950 Bay Shallow

WorkOrder: 1506254
BatchID: 105902
Extraction Method: SW3550B
Analytical Method: SW8081A
Unit: mg/kg
Sample ID: MB/LCS-105902
1506252-032AMS/MSD

QC Summary Report for SW8081A

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Aldrin	0.0427	0.0408	0.050	ND	85	82	70-130	4.62	30
g-BHC	0.0492	0.0466	0.050	ND	98	93	70-130	5.38	30
p,p-DDT	0.0425	0.0406	0.050	ND	85	81	70-130	4.73	30
Dieldrin	0.0525	0.0493	0.050	ND	105	99	70-130	6.30	30
Endrin	0.0443	0.0422	0.050	ND	89	84	70-130	4.81	30
Heptachlor	0.0404	0.0388	0.050	ND	81	78	70-130	4.11	30
Surrogate Recovery									
Decachlorobiphenyl	0.0397	0.0386	0.050		79	77	70-130	2.86	30

QA/QC Officer

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/4/15	**BatchID:**	105900
Date Analyzed:	6/5/15	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105900 1506250-010AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	0.10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.0510	0.0050	0.050	-	102	53-116
Benzene	ND	0.0488	0.0050	0.050	-	98	63-137
Bromobenzene	ND	-	0.0050	-	-	-	-
Bromochloromethane	ND	-	0.0050	-	-	-	-
Bromodichloromethane	ND	-	0.0050	-	-	-	-
Bromoform	ND	-	0.0050	-	-	-	-
Bromomethane	ND	-	0.0050	-	-	-	-
2-Butanone (MEK)	ND	-	0.020	-	-	-	-
t-Butyl alcohol (TBA)	ND	0.226	0.050	0.20	-	113	41-135
n-Butyl benzene	ND	-	0.0050	-	-	-	-
sec-Butyl benzene	ND	-	0.0050	-	-	-	-
tert-Butyl benzene	ND	-	0.0050	-	-	-	-
Carbon Disulfide	ND	-	0.0050	-	-	-	-
Carbon Tetrachloride	ND	-	0.0050	-	-	-	-
Chlorobenzene	ND	0.0471	0.0050	0.050	-	94	77-121
Chloroethane	ND	-	0.0050	-	-	-	-
Chloroform	ND	-	0.0050	-	-	-	-
Chloromethane	ND	-	0.0050	-	-	-	-
2-Chlorotoluene	ND	-	0.0050	-	-	-	-
4-Chlorotoluene	ND	-	0.0050	-	-	-	-
Dibromochloromethane	ND	-	0.0050	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.0040	-	-	-	-
1,2-Dibromoethane (EDB)	ND	0.0509	0.0040	0.050	-	102	67-119
Dibromomethane	ND	-	0.0050	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.0050	-	-	-	-
Dichlorodifluoromethane	ND	-	0.0050	-	-	-	-
1,1-Dichloroethane	ND	-	0.0050	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.0493	0.0040	0.050	-	99	58-135
1,1-Dichloroethene	ND	0.0429	0.0050	0.050	-	86	42-145
cis-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
1,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,3-Dichloropropane	ND	-	0.0050	-	-	-	-
2,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,1-Dichloropropene	ND	-	0.0050	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/4/15	**BatchID:**	105900
Date Analyzed:	6/5/15	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105900 1506250-010AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Diisopropyl ether (DIPE)	ND	0.0468	0.0050	0.050	-	94	52-129
Ethylbenzene	ND	-	0.0050	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.0500	0.0050	0.050	-	100	53-125
Freon 113	ND	-	0.0050	-	-	-	-
Hexachlorobutadiene	ND	-	0.0050	-	-	-	-
Hexachloroethane	ND	-	0.0050	-	-	-	-
2-Hexanone	ND	-	0.0050	-	-	-	-
Isopropylbenzene	ND	-	0.0050	-	-	-	-
4-Isopropyl toluene	ND	-	0.0050	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.0504	0.0050	0.050	-	101	58-122
Methylene chloride	ND	-	0.0050	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.0050	-	-	-	-
Naphthalene	ND	-	0.0050	-	-	-	-
n-Propyl benzene	ND	-	0.0050	-	-	-	-
Styrene	ND	-	0.0050	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
Tetrachloroethene	ND	-	0.0050	-	-	-	-
Toluene	ND	0.0461	0.0050	0.050	-	92	76-130
1,2,3-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.0050	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.0050	-	-	-	-
Trichloroethene	ND	0.0469	0.0050	0.050	-	94	72-132
Trichlorofluoromethane	ND	-	0.0050	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.0050	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.0050	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.0050	-	-	-	-
Vinyl Chloride	ND	-	0.0050	-	-	-	-
Xylenes, Total	ND	-	0.0050	-	-	-	-
Surrogate Recovery							
Dibromofluoromethane	0.128	0.130		0.12	102	104	70-130
Toluene-d8	0.121	0.121		0.12	97	97	70-130
4-BFB	0.0113	0.0118		0.012	90	94	70-130
Benzene-d6	0.0827	0.0856		0.10	83	86	60-140
Ethylbenzene-d10	0.0883	0.0920		0.10	88	92	60-140
1,2-DCB-d4	0.0856	0.0935		0.10	86	94	60-140

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/4/15	**BatchID:**	105900
Date Analyzed:	6/5/15	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105900 1506250-010AMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
tert-Amyl methyl ether (TAME)	0.0549	0.0528	0.050	ND	110	106	70-130	3.86	20
Benzene	0.0481	0.0462	0.050	ND	96	92	70-130	4.06	20
t-Butyl alcohol (TBA)	0.277	0.274	0.20	ND	138,F1	137,F1	70-130	0.943	20
Chlorobenzene	0.0553	0.0528	0.050	ND	111	106	70-130	4.72	20
1,2-Dibromoethane (EDB)	0.0615	0.0581	0.050	ND	123	116	70-130	5.69	20
1,2-Dichloroethane (1,2-DCA)	0.0581	0.0554	0.050	ND	116	111	70-130	4.69	20
1,1-Dichloroethene	0.0483	0.0462	0.050	ND	97	92	70-130	4.45	20
Diisopropyl ether (DIPE)	0.0518	0.0497	0.050	ND	104	99	70-130	4.28	20
Ethyl tert-butyl ether (ETBE)	0.0597	0.0572	0.050	ND	119	114	70-130	4.27	20
Methyl-t-butyl ether (MTBE)	0.0612	0.0591	0.050	ND	122	118	70-130	3.55	20
Toluene	0.0506	0.0481	0.050	ND	101	96	70-130	5.16	20
Trichloroethene	0.0530	0.0514	0.050	ND	106	103	70-130	3.01	20
Surrogate Recovery									
Dibromofluoromethane	0.128	0.130	0.12		103	104	70-130	1.78	20
Toluene-d8	0.123	0.123	0.12		98	99	70-130	0.282	20
4-BFB	0.0127	0.0127	0.012		102	102	70-130	0	20
Benzene-d6	0.139	0.133	0.10		139	133	60-140	4.25	20
Ethylbenzene-d10	0.128	0.124	0.10		129	125	60-140	3.16	20
1,2-DCB-d4	0.112	0.106	0.10		112	106	60-140	5.28	20

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/4/15	**BatchID:**	105903
Date Analyzed:	6/8/15	**Extraction Method:**	SW3050B
Instrument:	ICP-MS2	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105903 1506252-026AMS/MSD

QC Summary Report for Metals

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Antimony	ND	49.7	0.50	50	-	99	75-125
Arsenic	ND	55.2	0.50	50	-	110	75-125
Barium	ND	532	5.0	500	-	106	75-125
Beryllium	ND	54.5	0.50	50	-	109	75-125
Cadmium	ND	51.9	0.25	50	-	104	75-125
Chromium	ND	54.2	0.50	50	-	108	75-125
Cobalt	ND	53.0	0.50	50	-	106	75-125
Copper	ND	57.8	0.50	50	-	116	75-125
Lead	ND	51.4	0.50	50	-	103	75-125
Mercury	ND	1.20	0.050	1.25	-	96	75-125
Molybdenum	ND	48.9	0.50	50	-	98	75-125
Nickel	ND	56.8	0.50	50	-	114	75-125
Selenium	ND	56.7	0.50	50	-	113	75-125
Silver	ND	50.0	0.50	50	-	100	75-125
Thallium	ND	49.1	0.50	50	-	98	75-125
Vanadium	ND	54.1	0.50	50	-	108	75-125
Zinc	ND	573	5.0	500	-	115	75-125
Surrogate Recovery							
Terbium	509	489		500	102	98	70-130

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/4/15	**BatchID:**	105903
Date Analyzed:	6/8/15	**Extraction Method:**	SW3050B
Instrument:	ICP-MS2	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105903 1506252-026AMS/MSD

QC Summary Report for Metals

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Antimony	53.8	47.2	50	0.51	107	93	75-125	13.3	20
Arsenic	58.5	52.3	50	5.6	106	93	75-125	11.3	20
Barium	778	679	500	180	120	100	75-125	13.6	20
Beryllium	47.5	41.0	50	ND	94	81	75-125	14.7	20
Cadmium	55.7	48.3	50	ND	111	96	75-125	14.1	20
Chromium	NR	NR	50	52	NR	NR	75-125	NR	20
Cobalt	64.5	57.5	50	13	104	90	75-125	11.5	20
Copper	84.2	77.4	50	32	104	90	75-125	8.50	20
Lead	74.3	63.7	50	23.22	102	81	75-125	15.4	20
Mercury	1.24	1.16	1.25	0.062	95	88	75-125	7.33	20
Molybdenum	51.0	44.5	50	1.1	100	87	75-125	13.5	20
Nickel	NR	NR	50	73	NR	NR	75-125	NR	20
Selenium	53.5	47.6	50	ND	106	95	75-125	11.7	20
Silver	47.1	41.8	50	ND	94	84	75-125	12.0	20
Thallium	50.3	44.0	50	ND	101	88	75-125	13.3	20
Vanadium	NR	NR	50	64	NR	NR	75-125	NR	20
Zinc	642	571	500	77	113	99	75-125	11.7	20
Surrogate Recovery									
Terbium	531	458	500		106	92	70-130	14.6	20

QA/QC Officer

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/4/15	**BatchID:**	105892
Date Analyzed:	6/5/15 - 6/8/15	**Extraction Method:**	SW5030B
Instrument:	GC7	**Analytical Method:**	SW8021B/8015Bm
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105892 1506247-001AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	0.571	0.40	0.60	-	95	70-130
MTBE	ND	0.110	0.050	0.10	-	110	70-130
Benzene	ND	0.101	0.0050	0.10	-	101	70-130
Toluene	ND	0.0988	0.0050	0.10	-	99	70-130
Ethylbenzene	ND	0.105	0.0050	0.10	-	105	70-130
Xylenes	ND	0.328	0.0050	0.30	-	109	70-130
Surrogate Recovery							
2-Fluorotoluene	0.108	0.108		0.10	108	108	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	0.524	0.491	0.60	ND	87	82	70-130	6.51	20
MTBE	0.0886	0.0840	0.10	ND	89	84	70-130	5.40	20
Benzene	0.0829	0.0771	0.10	ND	83	77	70-130	7.16	20
Toluene	0.0828	0.0778	0.10	ND	81	76	70-130	6.23	20
Ethylbenzene	0.0894	0.0843	0.10	ND	89	84	70-130	5.89	20
Xylenes	0.281	0.269	0.30	ND	94	90	70-130	4.36	20
Surrogate Recovery									
2-Fluorotoluene	0.0903	0.0854	0.10		90	85	70-130	5.62	20

(Cont.)

QA/QC Officer

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/5/15	**BatchID:**	105907
Date Analyzed:	6/5/15	**Extraction Method:**	SW5030B
Instrument:	GC3	**Analytical Method:**	SW8021B/8015Bm
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105907 1506254-009AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	0.730	0.40	0.60	-	122	70-130
MTBE	ND	0.111	0.050	0.10	-	111	70-130
Benzene	ND	0.104	0.0050	0.10	-	105	70-130
Toluene	ND	0.105	0.0050	0.10	-	105	70-130
Ethylbenzene	ND	0.107	0.0050	0.10	-	107	70-130
Xylenes	ND	0.324	0.0050	0.30	-	108	70-130
Surrogate Recovery							
2-Fluorotoluene	0.106	0.0986		0.10	106	99	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	0.579	0.530	0.60	ND	96	88	70-130	8.70	20
MTBE	0.109	0.114	0.10	ND	109	114	70-130	5.01	20
Benzene	0.0991	0.0963	0.10	ND	99	96	70-130	2.90	20
Toluene	0.0982	0.0957	0.10	ND	98	96	70-130	2.57	20
Ethylbenzene	0.104	0.103	0.10	ND	104	103	70-130	1.13	20
Xylenes	0.331	0.321	0.30	ND	110	107	70-130	2.94	20
Surrogate Recovery									
2-Fluorotoluene	0.106	0.105	0.10		106	105	70-130	1.02	20

(Cont.)

Quality Control Report

Client: SCA Enviromental, Inc.
Date Prepared: 6/10/15
Date Analyzed: 6/11/15 - 6/12/15
Instrument: GC19
Matrix: Soil
Project: #B11689; 1950 Bay Shallow

WorkOrder: 1506254
BatchID: 106114
Extraction Method: SW5030B
Analytical Method: SW8021B/8015Bm
Unit: mg/Kg
Sample ID: MB/LCS-106114
1506447-001AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	0.501	0.40	0.60	-	84	70-130
MTBE	ND	0.0832	0.050	0.10	-	83	70-130
Benzene	ND	0.108	0.0050	0.10	-	108	70-130
Toluene	ND	0.111	0.0050	0.10	-	109	70-130
Ethylbenzene	ND	0.114	0.0050	0.10	-	114	70-130
Xylenes	ND	0.365	0.0050	0.30	-	122	70-130
Surrogate Recovery							
2-Fluorotoluene	0.129	0.114		0.10	129	114	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	0.426	0.490	0.60	ND	71	82	70-130	13.9	20
MTBE	0.0749	0.0745	0.10	ND	75	75	70-130	0	20
Benzene	0.0929	0.0897	0.10	ND	93	90	70-130	3.56	20
Toluene	0.0972	0.0942	0.10	ND	93	90	70-130	3.16	20
Ethylbenzene	0.100	0.0957	0.10	ND	100	96	70-130	4.48	20
Xylenes	0.321	0.310	0.30	ND	107	103	70-130	3.62	20
Surrogate Recovery									
2-Fluorotoluene	0.0963	0.0920	0.10		96	92	70-130	4.52	20

QA/QC Officer

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/4/15	**BatchID:**	105873
Date Analyzed:	6/5/15	**Extraction Method:**	SW3550B/3630C
Instrument:	GC6B	**Analytical Method:**	SW8015B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105873 1506216-002AMS/MSD

QC Report for SW8015B w/ SG Clean-Up

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH-Diesel (C10-C23)	ND	47.4	1.0	40	-	119	70-130
TPH-Motor Oil (C18-C36)	ND	-	5.0	-	-	-	-
Surrogate Recovery							
C9	28.4	27.1		25	113	108	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	38.8	39.2	40	ND	97	98	70-130	1.17	30
Surrogate Recovery									
C9	27.3	27.8	25		109	111	70-130	1.75	30

(Cont.)

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/5/15	**BatchID:**	105906
Date Analyzed:	6/6/15 - 6/8/15	**Extraction Method:**	SW3550B/3630C
Instrument:	GC2A, GC6A	**Analytical Method:**	SW8015B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-105906 1506254-010AMS/MSD

QC Report for SW8015B w/ SG Clean-Up

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH-Diesel (C10-C23)	ND	39.2	1.0	40	-	98	70-130
TPH-Motor Oil (C18-C36)	ND	-	5.0	-	-	-	-
Surrogate Recovery							
C9	26.6	26.1		25	106	104	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	47.6	47.4	40	5.726	105	104	70-130	0.563	30
Surrogate Recovery									
C9	26.0	25.5	25		104	102	70-130	2.24	30

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 1506254 **ClientCode: SCAO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ▨ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Karen Emery
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
(510) 645-6200 FAX: (510) 839- 6200

Email: kemery@sca-enviro.com
cc/3rd Party:
PO:
ProjectNo: #B11689; 1950 Bay Shallow

Bill to:
Accounts Payable
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
emuise@sca-ic.com

Requested TAT: **5 days**

Date Received: **06/04/2015**
Date Printed: **06/05/2015**

					Requested Tests (See legend below)											
Lab ID	**Client ID**	**Matrix**	**Collection Date**	**Hold**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1506254-001	HA-1@0.5,1,1.5	Soil	6/3/2015	☐		A	A	A	A							
1506254-002	HA-2@0.5,1,1.5	Soil	6/3/2015	☐	A	A	A	A	A							
1506254-003	HA-3@0.5,1,1.5	Soil	6/3/2015	☐	A	A	A	A	A							
1506254-004	HA-4@0.5,1,1.5	Soil	6/3/2015	☐		A	A	A	A							
1506254-005	HA-5@0.5,1,1.5	Soil	6/3/2015	☐		A	A	A	A							
1506254-006	HA-6@0.5,1,1.5	Soil	6/3/2015	☐	A	A	A	A	A							
1506254-007	HA-7@0.5,1,1.5	Soil	6/3/2015	☐		A	A	A	A							
1506254-008	HA-8@0.5,1,1.5	Soil	6/3/2015	☐	A	A	A	A	A							
1506254-009	HA-9@0.5,1,1.5	Soil	6/3/2015	☐	A	A	A	A	A							
1506254-010	HA-10@0.5,1,1.5	Soil	6/3/2015	☐		A	A	A	A							

Test Legend:

1	**8081_S**	**2**	**8260B_S**	**3**	**CAM17MS_S**	**4**	**G-MBTEX_S**	**5**	**TPH(DMO)WSG_S**
6		**7**		**8**		**9**		**10**	
11		**12**							

The following SampIDs: 001A, 002A, 003A, 004A, 005A, 006A, 007A, 008A, 009A, 010A contain testgroup.

Prepared by: Maria Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
Project: #B11689; 1950 Bay Shallow
Comments:

QC Level: LEVEL 2
Client Contact: Karen Emery
Contact's Email: kemery@sca-enviro.com

Work Order: 1506254
Date Received: 6/4/2015

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1506254-001A	HA-1@0.5,1,1.5	Soil	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
1506254-002A	HA-2@0.5,1,1.5	Soil	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506254-003A	HA-3@0.5,1,1.5	Soil	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506254-004A	HA-4@0.5,1,1.5	Soil	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
1506254-005A	HA-5@0.5,1,1.5	Soil	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	

NOTES:
- **STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**
- **MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.**

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
QC Level: LEVEL 2
Work Order: 1506254
Project: #B11689; 1950 Bay Shallow
Client Contact: Karen Emery
Date Received: 6/4/2015
Comments:
Contact's Email: kemery@sca-enviro.com

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1506254-005A	HA-5@0.5,1,1.5	Soil	SW6020 (CAM 17)	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
1506254-006A	HA-6@0.5,1,1.5	Soil	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506254-007A	HA-7@0.5,1,1.5	Soil	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
1506254-008A	HA-8@0.5,1,1.5	Soil	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506254-009A	HA-9@0.5,1,1.5	Soil	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	

NOTES: **- STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
Project: #B11689; 1950 Bay Shallow
Comments:

QC Level: LEVEL 2
Client Contact: Karen Emery
Contact's Email: kemery@sca-enviro.com

Work Order: 1506254
Date Received: 6/4/2015

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1506254-009A	HA-9@0.5,1,1.5	Soil	SW8260B (VOCs)	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW8081A (OC Pesticides)			☐		5 days		☐	
1506254-010A	HA-10@0.5,1,1.5	Soil	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	3 / (3:1)	8OZ GJ	☐	6/3/2015	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW8260B (VOCs)			☐		5 days		☐	
1506254-011A	Drum-1,2	Soil		2 / (2:1)	8OZ GJ	☐	6/3/2015			☑	

NOTES:
- **STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**
- **MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.**

1506254

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Telephone: (877) 252-9262 / Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

5 Day TAT

TURN AROUND TIME: RUSH☐ 24 HR☐ 48 HR☐ 72 HR☐ 5 DAY☒ 10 DAY☐

GeoTracker EDF☐ PDF☒ EDD☐ Write On (DW)☐ EQuIS☐

Effluent Sample Requiring "J" flag☐ **UST Clean Up Fund Project**☐**; Claim #**______

Report To: Karen Emory **Bill To:** SCA Environmental
Company: SCA Environmental
E-Mail: kemory@sca-enviro.com
Tele: (510) 717-3848 **Fax:** ( )
Project #: B11689 **Project Name:** 1950 Bay Shallow
Project Location: 1950 Bay Road **Purchase Order#**
Sampler Signature:

SAMPLE ID	Location/ Field Point Name	SAMPLING		# Containers	MATRIX								METHOD PRESERVED			Analysis Request																							
		Date	Time		Ground Water	Waste Water	Drinking Water	Sea \ Water	Soil	Air	Sludge	Other	HCL	HNO_3	Other	BTEX & TPH as Gas (8021/ 8015 or 8260) / MTBE	TPH as Diesel (8015) TPHmo w/ silica gel cleanup	Total Petroleum Oil & Grease (1664 / 5520 E/B&F)	Total Petroleum Hydrocarbons (418.1)	MTBE / BTEX ONLY (EPA 8260/ 8021)	~~EPA 505/ 608 / 8081~~ (Cl Pesticides) ~~[illegible]~~ 8081A	EPA 608 / 8082 PCB's ; Aroclors / Congeners	EPA 507 / 8141 (NP Pesticides)	EPA 515 / 8151 (Acidic Cl Herbicides)	~~EPA 524.2 / 624 /~~ 8260 (VOCs)	EPA 525.2 / 625 / 8270 (SVOCs)	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.7 / 200.8 / 6010 / 6020)	LUFT 5 Metals (200.7 / 200.8 / 6010 / 6020)	Metals (200.7 / 200.8 / 6010 / 6020)	Filter sample for DISSOLVED metals analysis	TPHg Method 8015M/8021B	17 Title 22 Metals Method 6020	Composite 3 to 1	Archive
HA-1@0.5,1,1.5		6/3		3					X								X								X							X	X	X	
HA-2@0.5,1,1.5				3					X								X				X				X							X	X	X	
HA-3@0.5,1,1.5				3					X								X				X				X							X	X	X	
HA-4@0.5,1,1.5				3					X								X								X							X	X	X	
HA-5@0.5,1,1.5				3					X								X								X							X	X	X	
HA-6@0.5,1,1.5				3					X								X				X				X							X	X	X	
HA-7@0.5,1,1.5				3					X								X								X							X	X	X	
HA-8@0.5,1,1.5				3					X								X				X				X							X	X	X	
HA-9@0.5,1,1.5				3					X								X				X				X							X	X	X	
HA-10@0.5,1,1.5				3					X								X								X							X	X	X	
DRUM-1,2		↓		2																															X

****MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.**

Relinquished By:	Date:	Time:	Received By:
	6/4	1330	
	6/4	1810	

ICE/t° 1.0
GOOD CONDITION______
HEAD SPACE ABSENT______
DECHLORINATED IN LAB______
APPROPRIATE CONTAINERS______
PRESERVED IN LAB______

PRESERVATION______ **VOAS O&G METALS OTHER** pH<2______

HAZARDOUS:

COMMENTS:
PCB
<25 PPM detection limit required.
Authorized to perform cleanup to meet the detection limit

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name: **SCA Enviromental, Inc.**

Date and Time Received: **6/4/2015 6:10:00 PM**

Project Name: **#B11689; 1950 Bay Shallow**

LogIn Reviewed by: Maria Venegas

WorkOrder №: **1506254**

Matrix: Soil

Carrier: Bernie Cummins (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Sample/Temp Blank temperature	Temp: 1°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: WET ICE)

UCMR3 Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522?	Yes ☐	No ☐	NA ☑
Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539?	Yes ☐	No ☐	NA ☑

** NOTE: If the "No" box is checked, see comments below.*

Comments:

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1506254 A

Report Created for: SCA Enviromental, Inc.

334 19th Street
Oakland, CA 94612

Project Contact: Karen Emery
Project P.O.:
Project Name: #B11689; 1950 Bay Shallow

Project Received: 06/04/2015

Analytical Report reviewed & approved for release on 06/19/2015 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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NELAP: 4033ORELAP ♦ ELAP: 1644 ♦ ISO/IEC: 17025:2005 ♦ WSDE: C972-11 ♦ ADEC: UST-098 ♦ UCMR3

Glossary of Terms & Qualifier Definitions

Client: SCA Enviromental, Inc.
Project: #B11689; 1950 Bay Shallow
WorkOrder: 1506254

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

Analytical Qualifiers

S	spike recovery outside accepted recovery limits
c4	surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
e2	diesel range compounds are significant; no recognizable pattern
e7	oil range compounds are significant

Quality Control Qualifiers

F1	MS/MSD recovery and/or RPD was out of acceptance criteria; LCS validated the prep batch.

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	CA Title 22
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6010B
Date Prepared:	6/15/15	**Unit:**	mg/L

STLC Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0.5,1,1.5	**1506254-002A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.14**	0.050	1	06/18/2015 10:44

Analyst(s): DB

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0.5,1,1.5	**1506254-003A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.15**	0.050	1	06/18/2015 10:46

Analyst(s): DB

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0.5,1,1.5	**1506254-004A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.20**	0.050	1	06/18/2015 10:26

Analyst(s): DB

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0.5,1,1.5	**1506254-005A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.16**	0.050	1	06/18/2015 10:54

Analyst(s): DB

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	CA Title 22
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6010B
Date Prepared:	6/15/15	**Unit:**	mg/L

STLC Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0.5,1,1.5	**1506254-007A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.14**	0.050	1	06/18/2015 10:56

Analyst(s): DB

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0.5,1,1.5	**1506254-009A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.22**	0.050	1	06/18/2015 10:59

Analyst(s): DB

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0.5,1,1.5	**1506254-010A**	**Soil**	**06/03/2015**	**ICP-JY**	**106351**

Analytes	Result	RL	DF	Date Analyzed
Chromium	**0.19**	0.050	1	06/18/2015 11:01

Analyst(s): DB

Angela Rydelius, Lab Manager

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW1311/SW3010
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6010B
Date Prepared:	6/15/15	**Unit:**	mg/L

TCLP Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-2@0.5,1,1.5	**1506254-002A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:43

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-3@0.5,1,1.5	**1506254-003A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:45

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-4@0.5,1,1.5	**1506254-004A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:48

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-5@0.5,1,1.5	**1506254-005A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:50

Analyst(s): DVH

(Cont.)

Analytical Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Project:	#B11689; 1950 Bay Shallow	**Extraction Method:**	SW1311/SW3010
Date Received:	6/4/15 18:10	**Analytical Method:**	SW6010B
Date Prepared:	6/15/15	**Unit:**	mg/L

TCLP Metals

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-7@0.5,1,1.5	**1506254-007A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:53

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-9@0.5,1,1.5	**1506254-009A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:55

Analyst(s): DVH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
HA-10@0.5,1,1.5	**1506254-010A**	**Soil**	**06/03/2015**	**ICP-JY**	**106352**

Analytes	Result	RL	DF	Date Analyzed
Chromium	ND	0.050	1	06/17/2015 12:58

Analyst(s): DVH

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/15/15	**BatchID:**	106351
Date Analyzed:	6/18/15	**Extraction Method:**	CA Title 22
Instrument:	ICP-JY	**Analytical Method:**	SW6010B
Matrix:	Soil	**Unit:**	mg/L
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-106351 1506250-001AMS/MSD

QC Summary Report for Metals (STLC)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Chromium	ND	0.963	0.050	1	-	96	75-125

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Chromium	1.16	1.16	1	0.2418	92	92	70-130	0	30

QA/QC Officer

Quality Control Report

Client:	SCA Enviromental, Inc.	**WorkOrder:**	1506254
Date Prepared:	6/15/15	**BatchID:**	106352
Date Analyzed:	6/17/15	**Extraction Method:**	SW1311/SW3010
Instrument:	ICP-JY	**Analytical Method:**	SW6010B
Matrix:	Soil	**Unit:**	mg/L
Project:	#B11689; 1950 Bay Shallow	**Sample ID:**	MB/LCS-106352 1506302-001AMS/MSD

QC Summary Report for Metals (TCLP)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Chromium	ND	0.994	0.050	1	-	99	75-125

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Chromium	1.01	0.979	1	ND	101	98	70-130	3.53	30

QA/QC Officer

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 1506254 **A** **ClientCode: SCAO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Karen Emery
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
(510) 645-6200 FAX: (510) 839- 6200

Email: kemery@sca-enviro.com
cc/3rd Party:
PO:
ProjectNo: #B11689; 1950 Bay Shallow

Bill to:
Accounts Payable
SCA Enviromental, Inc.
334 19th Street
Oakland, CA 94612
emuise@sca-ic.com

Requested TAT: **5 days**
Date Received: **06/04/2015**
Date Add-On: **06/12/2015**
Date Printed: **06/19/2015**

					Requested Tests (See legend below)											
Lab ID	**Client ID**	**Matrix**	**Collection Date**	**Hold**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1506254-002	HA-2@0.5,1,1.5	Soil	6/3/2015	☐	A	A										
1506254-003	HA-3@0.5,1,1.5	Soil	6/3/2015	☐	A	A										
1506254-004	HA-4@0.5,1,1.5	Soil	6/3/2015	☐	A	A										
1506254-005	HA-5@0.5,1,1.5	Soil	6/3/2015	☐	A	A										
1506254-007	HA-7@0.5,1,1.5	Soil	6/3/2015	☐	A	A										
1506254-009	HA-9@0.5,1,1.5	Soil	6/3/2015	☐	A	A										
1506254-010	HA-10@0.5,1,1.5	Soil	6/3/2015	☐	A	A										

Test Legend:

1	**STLC_METALS_S**	**2**	**TCLP_METALS_S**	**3**		**4**		**5**	
6		**7**		**8**		**9**		**10**	
11		**12**							

Prepared by: Maria Venegas

Add-On Prepared By: Jena Alfaro

Comments: STLCs and TCLPs added 6/12/15 5D TAT

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

WORK ORDER SUMMARY

Client Name: SCA ENVIROMENTAL, INC.
Project: #B11689; 1950 Bay Shallow
Comments: STLCs and TCLPs added 6/12/15 5D TAT

QC Level: LEVEL 2
Client Contact: Karen Emery
Contact's Email: kemery@sca-enviro.com

Work Order: 1506254
Date Received: 6/4/2015
Date Add-On: 6/12/2015

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1506254-002A	HA-2@0.5,1,1.5	Soil	SW6010B (Metals) (TCLP) <Chromium>	3 / (3:1)	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506254-003A	HA-3@0.5,1,1.5	Soil	SW6010B (Metals) (TCLP) <Chromium>	3 / (3:1)	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506254-004A	HA-4@0.5,1,1.5	Soil	SW6010B (Metals) (TCLP) <Chromium>	3 / (3:1)	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506254-005A	HA-5@0.5,1,1.5	Soil	SW6010B (Metals) (TCLP) <Chromium>	3 / (3:1)	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506254-007A	HA-7@0.5,1,1.5	Soil	SW6010B (Metals) (TCLP) <Chromium>	3 / (3:1)	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506254-009A	HA-9@0.5,1,1.5	Soil	SW6010B (Metals) (TCLP) <Chromium>	3 / (3:1)	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	
1506254-010A	HA-10@0.5,1,1.5	Soil	SW6010B (Metals) (TCLP) <Chromium>	3 / (3:1)	8OZ GJ	6/3/2015	5 days*		☐	
			SW6010B (Metals) (STLC) <Chromium>				5 days*		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

1506254

McCampbell Analytical, Inc.

1534 Willow Pass Rd. / Pittsburg, Ca. 94565-1701
www.mccampbell.com / main@mccampbell.com
Telephone: (877) 252-9262 / Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

5 Day TAT

TURN AROUND TIME: RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ [✓ 5 DAY ☒] 10 DAY ☐

GeoTracker EDF ☐ [✓ PDF ☒] EDD ☐ Write On (DW) ☐ EQuIS ☐

Effluent Sample Requiring "J" flag ☐ **UST Clean Up Fund Project** ☐; **Claim #**______

Report To: Karen Emery **Bill To:** SCA Environmental
Company: SCA Environmental
E-Mail: kemery@sca-enviro.com
Tele: (510) 717-3848 **Fax:** (   )
Project #: B11689 **Project Name:** 1950 Bay Shallow
Project Location: 1950 Bay Road **Purchase Order#**
Sampler Signature:

SAMPLE ID	Location/ Field Point Name	SAMPLING		# Containers	MATRIX								METHOD PRESERVED			Analysis Request																			
		Date	Time		Ground Water	Waste Water	Drinking Water	Sea \ Water	Soil	Air	Sludge	Other	HCL	HNO$_3$	Other	BTEX & TPH as Gas (8021/ 8015 or 8260) / MTBE	TPH as Diesel (8015) TPHmo w/ silica gel cleanup	Total Petroleum Oil & Grease (1664 / 5520 E/B&F)	Total Petroleum Hydrocarbons (418.1)	MTBE / BTEX ONLY (EPA 8260/ 8021)	~~EPA 505/ 608 / 8081~~ (Cl Pesticides) 8081A	EPA 608 / 8082 PCB's ; Aroclors / Congeners	~~EPA 507 / 8141 (NP Pesticides)~~ STLC Cr TCLP Cr	EPA 515 / 8151 (Acidic Cl Herbicides)	~~EPA 524.2 / 624 /~~ 8260 (VOCs)	EPA 525.2 / 625 / 8270 (SVOCs)	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.7 / 200.8 / 6010 / 6020)	LUFT 5 Metals (200.7 / 200.8 / 6010 / 6020)	Metals (200.7 / 200.8 / 6010 / 6020)	Filter sample for DISSOLVED metals analysis	TPHg Method 8015M/8021B	17 Title 22 Metals Method 6020	Composite 3 to 1	Archive
HA-1@0.5, 1, 1.5		6/3		3					X								X								X							X	X	X	
HA-2@0.5, 1, 1.5				3					X								X				X		⊗		X							X	X	X	
HA-3@0.5, 1, 1.5				3					X								X				X		⊗		X							X	X	X	
HA-4@0.5, 1, 1.5				3					X								X						⊗		X							X	X	X	
HA-5@0.5, 1, 1.5				3					X								X						⊗		X							X	X	X	
HA-6@0.5, 1, 1.5				3					X								X				X				X							X	X	X	
HA-7@0.5, 1, 1.5				3					X								X						⊗		X							X	X	X	
HA-8@0.5, 1, 1.5				3					X								X				X				X							X	X	X	
HA-9@0.5, 1, 1.5				3					X								X				X		⊗		X							X	X	X	
HA-10@0.5, 1, 1.5				3					X								X						⊗		X							X	X	X	
DRUM-1, 2				2																															X

****MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.**

Relinquished By:	Date:	Time:	Received By:
	6/4	1330	
	6/4	1810	

ICE/t° 1.0
GOOD CONDITION____
HEAD SPACE ABSENT____
DECHLORINATED IN LAB____
APPROPRIATE CONTAINERS____
PRESERVED IN LAB____

VOAS O&G METALS OTHER HAZARDOUS:
PRESERVATION____ **pH<2**____

COMMENTS:
PCB
<25 PPM detection limit required.
Authorized to perform cleanup to meet the detection limit

ALSF ANALYTICAL LABS SAN FRANCISCO INC.

POLARIZED LIGHT MICROSCOPY ANALYSIS FOR ASBESTOS CONTENT

Client: SCA ENVIRONMENTAL, INC.
650 DELANCEY ST. #222
SAN FRANCISCO, CA 94107

Project No.: B11689
Project: 1950 BAY

Report Number: BF20306
Date: JUNE 10, 2015
Analyst: OLGA KIST
Date Analyzed: JUNE 10, 2015
Sample Collector: TUCKER KALMAN
Collection Date: JUNE 3, 2015

0 Sample(s) containing Asbestos

5 Sample(s) Analyzed
5 Sample(s) Received 6/03/15 15:30

Sample #	Location / Description	**ASBESTOS** Type and Range % or NONE DETECTED	**NONASBESTOS** Other Fibers (%) Balance
1. BRICK-2-1	A) RED BRICK	NONE DETECTED	SILI, IRON OXIDES, OPAQUES, CARB, MISC.
	B) GRAY CONCRETE GROUT	NONE DETECTED	
2. BRICK-2-2	A) RED BRICK	NONE DETECTED	SILI, IRON OXIDES, OPAQUES, CARB, MISC.
	B) OFF-WHITE CONCRETE GROUT	NONE DETECTED	
3. ASPHALT-3-1	A) BROWN SURFACE (SOIL AND ASPHALT)	NONE DETECTED	CELL <1, SILI, IRON OXIDES, OPAQUES, ASPHALT, MISC.
	B) BLACK TAR AND SAND	NONE DETECTED	
4. FLCER-4-1	A) WHITE/OFF-WHITE CERAMIC TILE	NONE DETECTED	SILI, CALCINED CLAY, IRON OXIDES, CELL <1, OPAQUES, GLASS, MISC.
	B) BROWN SOIL DEBRIS ON EDGE	NONE DETECTED	
5. TOILET-5-1	A) WHITE/TAN CERAMIC	NONE DETECTED	SILI, IRON OXIDES, OPAQUES, CALCINED CLAY, GLASS, MISC.
	B) WHITE PLASTER AND SOIL DEBRIS	NONE DETECTED	

060815 LABORATORY BLANK (1866 GLASS FIBERS) NONE DETECTED

ASBESTOS TYPES

CHRYS: Chrysotile
AMOS: Amosite
CROC: Crocidolite
TREM: Tremolite/Actinolite
ANTH: Anthophyllite

NONASBESTOS

CELL: Cellulose
GL: Fiberglass/Mineral Wool
SYN: Synthetic
CARB: Carbonates
SILI: Mixed Silicates
POLY: Polyethylene
FTALC: Fibrous Talc
FGYP: Fibrous Gypsum
FELD: Feldspar
CASI: Calcium Silicates

Bulk samples analyzed in accordance with "Method for the Determination of Asbestos in Bulk Building Materials" EPA 600/R-93/116, July 1993. The detection limit is 1%. Quantitation of asbestos is by calibrated visual estimation. Analytical Labs San Francisco, Inc. (ALSF) is recognized under the National Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 7 code of Federal Regulations and accredited for bulk asbestos fiber analysis (NVLAP lab code: 101909-0). Asbestos fibers less than 0.2 microns cannot be resolved by light microscope. This report must not be reproduced except in full, without the written approval of ALSF and pertains only to the samples analyzed.

AUTHORIZED SIGNATURE

DATE 6/10/15

BF 203061

SCA

CHAIN OF CUSTODY FORM

650 Delancey St. #222, SF, CA 94107
334 19th St. Oakland, CA 94612

Tel
415-8821675
510-6456200

Fax
415-9620736
415-9620736

CALL/TXT with results: 415-378-4188

Email rpt / COC & invoice: tkelman @scaehs.com
Kemory@ sca-envir com

Email Prj Mgr Name:
Chuck Siu Glenn Cass Christina Codeme [✓ Karen Emory]

Accounting Data:

EMAIL HEADING: (Project #) - (Project Manager Initials) - (Site Name/Address) - (Date MMDD)

(Project #)	(Project Manager Initials)	(Site Name/Address)	(Date MMDD)
B11689	KE	1450 Bay	0603

LAB ALSF

COURIER Drop off

LAB REP NOTIFIED —
AIRBILL/FLIGHT NO.: —
EST ARRIVAL DATE: —
Notification DATE/TIME: —
Shipper REFERENCE I.D —
EST ARRIVAL TIME —

Method Reference ~~7400 PCM~~ [✓ PLM (asbestos)] AHERA TEM Flame AA (Lead) CARB-AHERA TEM 0.001 s/cc Detection Limit

Sample Media 25 37 mm 0.45 0.8 micron MCEF [✓ Bulk] Water Wipe

RESULTS DUE: 5 Day ~~AM / PM~~

CHAIN OF CUSTODY DATA:

Sending Info 5 samples submitted by TK (SCA) on 6/3 at 3:27p
Received by Lab: 5 samples received by LG on 6/3 at 15:30
Received by Analyst: 5 samples received by OK on " at "

SAMPLE ID	LITERS	Results	Ins/Blanks/Outs
BRICK-2-1	2	-1,2	
ASPHALT-3-		3	
FLCER-4-		4	
TOILET-5-		5	
	0 LITERS		BLANK
	0 LITERS		BLANK
	0 LITERS		BLANK

INSTRUCTIONS TO LAB (delete items not applicable AND circle items applicable):

~~1. Pickup requested:~~
~~Contact:~~
~~Time of Call~~
~~2. Call SCA's contact to acknowledge receipt of samples.~~
~~3. Analyze samples by PCM only.~~
4. ~~Analyze inside samples by PCM first; if any sample >0.01 f/cc, contact SCA.~~
~~5. If all samples are <0.01 f/cc, proceed with items 6, 7 or 8, as noted.~~
6. ~~Analyze inside samples only; stop if Avg >70 str/mm^2, contact SCA before analyzing outsides or blanks.~~
7. ~~Analyze all samples, including outside samples and blanks.~~
8. ~~Do NOT analyze outside or blank samples.~~
9. ~~Analyze by TEM only the inside air sample with the highest PCM result.~~
[✓ 10. Serial analysis; stop at first positive (>1%); first trace (<0.1%);except sheetrock and plaster samples.]
~~11. Analyze all Bulk samples, unless otherwise indicated.~~

11. :

Report Number: BF 203061

Invoice Number: BF 203061

Supplies /Equipment	Qty
Hi-Vol (3040)	
Lo-Vol (3020)	
TEM / Pb cassettes (3520)	
PCM cassettes (3500)	
Bulk sampling supply (3710)	5

		LEAD			ASBESTOS							
	Units (each)	Wipes	Flame AA		CARB AHERA 10-15 grid openings	CARB AHERA 35-40 grid openings	TEM AHERA	PLM Std Point Count 400	CARB 435 (400 Pt Ct) w/ prep	PLM Bulk	PCM NIOSH 7400	Units (each)
< 6 hours	1 to 9											1 to 9
	10 to 40											10 to 40
	>40											>40
24 hours	1 to 9											1 to 9
	10 to 40											10 to 40
	>40											>40
48 hours	1 to 9											1 to 9
	10 to 40											10 to 40
	>40											>40
3 to 5 days	1 to 9											1 to 9
	10 to 40											10 to 40
	>40											>40
> 6 days	1 to 9											1 to 9
	10 to 40											10 to 40
	>40											>40

ALSF ANALYTICAL LABS SAN FRANCISCO INC.

POLARIZED LIGHT MICROSCOPY ANALYSIS FOR ASBESTOS CONTENT (CARB 435)

Client: SCA ENVIRONMENTAL, INC.
650 DELANCEY ST. #222
SAN FRANCISCO, CA 94107

Project #: B11689
Project: 1950 BAY

Report Number: BF20307
Date: JUNE 10, 2015
Analyst: OLGA KIST
Date Analyzed: JUNE 10, 2015
Sample Collector: TUCKER KALMAN
Collection Date: JUNE 3, 2015
0 Sample(s) containing Asbestos

---

3 Sample(s) Analyzed
3 Sample(s) Received 6/03/15 15:30

Sample #	Location / Description	*ASBESTOS* Type and Range % or NONE DETECTED	NONASBESTOS Other Fibers (%) Balance
1. CONCRETE - 1	A) TAN CONCRETE WITH MULTI-COLORED AGGREGATES (BLACK-BROWN-GRAY)	NONE DETECTED	CELL, WEB <1, SILI, IRON OXIDES, CARB, OPAQUES, MISC.
	B) OCHRE BRICK	NONE DETECTED	
	C) GREEN-GOLD-GRAY ROCKS	NONE DETECTED	
2. CONCRETE - 2	GRAY CONCRETE WITH MULTI-COLORED AGGREGATES (GRAY-BROWN-OCHRE-RED)	NONE DETECTED	SILI, IRON OXIDES, OPAQUES, CARB, MISC.
3. CONCRETE - 3	TAN GRAY CONCRETE WITH MULTI-COLORED AGGREGATES (GRAY-BROWN-WHITE-GREEN)	NONE DETECTED	SILI, IRON OXIDES, CARB, OPAQUES, MISC.
060815	LABORATORY BLANK (1866 GLASS FIBERS)	NONE DETECTED	

ASBESTOS TYPES

CHRYS: Chrysotile
AMOS: Amosite
CROC: Crocidolite
TREM: Tremolite/Actinolite
ANTH: Anthophyllite

NONASBESTOS

CELL: Cellulose
GL: Fiberglass/Mineral Wool
SYN: Synthetic
CARB: Carbonates
SILI: Mixed Silicates

POLY: Polyethylene
FTALC: Fibrous Talc
FGYP: Fibrous Gypsum
FELD: Feldspar
CASI: Calcium Silicates

Bulk samples analyzed in accordance with "Method for the Determination of Asbestos in Bulk Building Materials" EPA 600 R-93 116, July 1993. The detection limit is 1%. Quantitation of asbestos is by calibrated visual estimation. Analytical Labs San Francisco, Inc. (ALSF) is recognized under the National Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 7 code of Federal Regulations and accredited for bulk asbestos fiber analysis (NVLAP lab code: 101909-0). Asbestos fibers less than 0.2 microns cannot be resolved by light microscope. This report must not be reproduced except in full, without the written approval of ALSF and pertains only to the samples analyzed.

AUTHORIZED SIGNATURE ____________ DATE 6/11/15

ALSF ANALYTICAL LABS SAN FRANCISCO INC.
467 Potrero Avenue, San Francisco, CA 94110 (415) 552-4595 FAX 552-0730

QUANTITATION OF ASBESTOS CONTENT USING POINT COUNTING METHOD AND POLARIZED LIGHT MICROSCOPY

Client: SCA ENVIRONMENTAL, INC.
650 DELANCEY ST. #222
SAN FRANCISCO, CA 94107

REPORT #: BF20307.PT
DATE COMPLETED: JUNE 10, 2015
ANALYST: O. KIST

Project #: B11689
Job Name: 1950 BAY

SUPPLEMENTAL TO
PLM BULK REPORT BF20307

SAMPLE NO.	DESCRIPTION ROCK SOIL	TOTAL POINTS	ASBESTOS AREA PERCENT BY POINT-COUNTING	STATISTICAL LIMIT
1. CONCRETE-1		**400**	**<0.25%**	**0.25%**
	A) TAN CONCRETE WITH MULTI-COLORED AGGREGATES (BLACK-BROWN-GRAY) B) OCHRE BRICK C) GREEN-GOLD-GRAY ROCKS	400	<0.25%	0.25%
2. CONCRETE-2				
	GRAY CONCRETE WITH MULTI-COLORED AGGREGATES (GRAY-BROWN-OCHRE-RED)	400	<0.25%	0.25%
3. CONCRETE-3				
	TAN GRAY CONCRETE WITH MULTI-COLORED AGGREGATES (GRAY-BROWN-WHITE-GREEN)	400	<0.25%	0.25%

AUTHORIZED SIGNATURE

DATE 6/11/15

BF 2030 ; -

SCA

CHAIN OF CUSTODY FORM

	Tel	Fax
650 Delancey St. #222, SF, CA 94107	415-8821675	415-9620736
334 19th St. Oakland, CA 94612	510-6456200	415-9620736

EMAIL HEADING: (Project #) - (Project Manager Initials) - (Site Name/Address) - (Date MMDD)

B11689	KE	1950 Bay	0603

LAB ALSF

COURIER Drop off

LAB REP NOTIFIED	–	Notification DATE/TIME:	–
AIRBILL/FLIGHT NO.:	–	Shipper REFERENCE I.D.:	–
EST ARRIVAL DATE:	–	EST. ARRIVAL TIME:	–

Method Reference 7400 PCM AHERA TEM CARB ~~AHERA TEM 0.001~~ s/cc Detection Limit

PLM (asbestos) Flame AA (Lead) CARB-435

Sample Media 25 37 mm 0.45 0.8 micron MCEF [✓ Bulk] Water Wipe

RESULTS DUE: 5 Day ~~AM / PM~~

CHAIN OF CUSTODY DATA:

Sending Info 3 samples submitted by TK (SCA) on 6/13 at 3:27p

Received by Lab: 3 samples received by [illegible] on 6/13 at 15:30

Received by Analyst: 3 samples received by Ch on " at "

SAMPLE ID	LITERS	Results	Ins/Blanks/Outs
CONCRETE-1	-1,2,3	-1,2,3	
	0 LITERS		BLANK
	0 LITERS		BLANK
	0 LITERS		BLANK

INSTRUCTIONS TO LAB (delete items not applicable AND circle items applicable):

1. ~~Pickup requested~~: 11. :

Contact:

Time of Call

2. ~~Call SCA's contact to acknowledge receipt of samples.~~
3. ~~Analyze samples by PCM only.~~
4. ~~Analyze inside samples by PCM first; if any sample >0.01 f/cc, contact SCA.~~
5. ~~If all samples are <0.01 f/cc, proceed with items 6, 7 or 8, as noted.~~
6. ~~Analyze inside samples only; stop if Avg >70 str/mm^2, contact SCA before analyzing outsides or blanks.~~
7. ~~Analyze all samples, including outside samples and blanks.~~
8. ~~Do NOT analyze outside or blank samples.~~
9. ~~Analyze by TEM only the inside air sample with the highest PCM result.~~
10. Serial analysis; stop at first positive (>1%); first trace (<0.1%);except sheetrock and plaster samples
11. ~~Analyze all bulk samples, unless otherwise indicated.~~

Report Number: BF 2030 ; -

Invoice Number: BF 2030 ; -

Supplies /Equipment	Qty
Hi-Vol (3040)	
Lo-Vol (3020)	
TEM / Pb cassettes (3520)	
PCM cassettes (3500)	
Bulk sampling supply (3710)	3

CALL/TXT with results: 415-378-4188

Email rpt / COC & invoice:

tkalman @scaehs.com

kemery@sca-enviro.com

Email Prj Mgr Name:

Chuck Siu Glenn Cass Christina Codemo

Accounting Data: Karen Emery

	Wipes	Flame AA	Units (each)	LEAD			CARB AHERA 10-15 grid openings	CARB AHERA 35-40 grid openings	TEM AHERA	PLM Std Point Count 400	CARB 435 (400 Pt Ct) w/ prep	PLM Bulk	PCM NIOSH 7400	Units (each)	ASBESTOS
			1 to 9	< 6 hours										1 to 9	< 6 hours
			10 to 40											10 to 40	
			>40											>40	
			1 to 9	24 hours										1 to 9	24 hours
			10 to 40											10 to 40	
			>40											>40	
			1 to 9	48 hours										1 to 9	48 hours
			10 to 40											10 to 40	
			>40											>40	
			1 to 9	3 to 5 days										1 to 9	3 to 5 days
			10 to 40											10 to 40	
			>40											>40	
			1 to 9	> 6 days										1 to 9	> 6 days
			10 to 40											10 to 40	
			>40											>40	

ver 2011

SCA Project No: F11689 June 25, 2015

PHASE I ENVIRONMENTAL SITE ASSESSMENT PROPOSED EAST PALO ALTO YOUTH CENTER PROJECT SITE

EAST PALO ALTO, CALIFORNIA

Prepared For:

John & Marcia Goldman Foundation
101 Second Street
San Francisco, California 94105

Prepared By:

SCA
ENVIRONMENTAL, INC.

650 Delancey Street, #222
San Francisco, CA 94097
TEL: (415) 882-1675
FAX: (415) 962-0736

Certifications

This Phase I Environmental Site Assessment is subject to limitations as described in Section 10.0. We declare that, to the best of our professional knowledge and beliefs, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR §312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquires in conformance with the standards and practices set forth in 40 CFR Part 312.

All work performed for this Phase I was performed under the direct supervision of the environmental professionals listed below.

Christina Codemo, CHMM, REPA, CAC
Senior Consultant
REPA 953197 exp 4/25/2016

KAREN A. EMERY
No. 8788
Exp. 10/31/2016

Karen A. Em

Karen A. Emery, P.G., QSD
Senior Geologist
California PG: 8788 Expires 10/31/2016

PROJECT PERSONNEL

John & Marcia Goldman Foundation

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1.0 EXECUTIVE SUMMARY

1.1 SITE SUMMARY

SCA Environmental, Inc. (SCA) conducted a *Phase I Environmental Site Assessment* on behalf of the John & Marcia Goldman Foundation (JMGF) for the proposed East Palo Alto Youth Center project site located in East Palo Alto, California (hereafter referred to as the "Target Property", Figures 1 and 2).

The Target Property is comprised of five addresses and four Assessor Parcel Numbers (APNs) as summarized below:

- 1950 Bay Road, East Palo Alto, CA; APN 063-240-320
- 1952 Bay Road, East Palo Alto, CA; APN 063-240-330
- 2454 Pulgas Avenue, East Palo Alto, CA; APN 063-240-220
- 2456 Pulgas Avenue, East Palo Alto, CA; APN 063-240-210
- 2470 Pulgas Avenue, East Palo Alto, CA (Note that the APN number pertaining to this address is for the property located immediately east of the site which is not included in this assessment).

The *assessment* was performed in accordance with the scope and limitations of American Society of Testing and Materials (ASTM) Practice E1527-13. Any limitations to, or deletions from, this practice are described in Section 2.4. ASTM-defined terms are italicized in this report.

This report pertains only to the addresses/APNs listed above and generally depicted by the outline in red in the figure below:

The Target Property is located in an industrial area in the City of East Palo Alto, California, near the western shore of the San Francisco Bay and is comprised of two properties; 1950 Bay Road and the vacant parcel to the south. The 1950 Bay Road portion of the site, historically known as the Peterson Property or the Curtaccio Property, comprises approximately 2-acres of land. The southern vacant parcel, historically known as the Bains Property, comprises approximately 1 acre of land. The overall Target Property is part of a larger 26-acre project area that includes areas with arsenic concentrations in soil greater than 20 milligrams per kilogram (mg/kg).

The Target Property is currently owned by DKB Homes LLC, who acquired the site in early 2006. The JMGF is considering purchasing the Target Property to construct the East Palo Alto Youth Center and has requested this Phase I ESA as part of their pre-purchase due diligence.

1.2 FINDINGS

SCA has performed this Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 for the Target Property. Any exceptions to, or deletions from, this practice are described in Section 2.4 of this report. The assessment revealed the following:

1. Given the information reviewed as part of the preparation of this Phase I ESA, several facilities upgradient of the site have open-active investigations due to contamination resulting from historic site uses. Additionally, the Target Property was historically used as an auto wrecking/junk yard and truck/trailer parking with some automotive maintenance and repair, and is currently an open-active case with the Regional Water Quality Control Board (RWQCB). SCA conducted an investigation in 2015 which detected low levels of diesel and motor oil range hydrocarbons (TPHd and TPHmo), volatile organic hydrocarbons (VOCs), organochlorine pesticides, and various metals in shallow soil at concentrations below commercial land use and construction worker Environmental Screening Levels (ESLs) with the exception of the following:

    - Slightly elevated concentrations of TPHmo (up to 860 mg/kg) within the upper 2.0 feet of soil in two locations (B-3 and B-6), exceeding commercial land use ESL of 500 mg/kg;
    - Slightly elevated total zinc (2,300 mg/kg) within the upper 2.0 feet at Boring B-5, exceeding the commercial land use ESL of 600 mg/kg; and
    - Slightly elevated Dieldrin concentrations (up to 0.041 mg/kg) at the surface at locations HA-2, HA-3, and HA-7, exceeding commercial land use ESL of 0.0023 mg/kg.

    SCA's investigation also identified slightly elevated concentrations of petroleum hydrocarbons and VOCs in groundwater, which most likely originated from offsite sources. Additionally, low levels of VOCs were detected in soil-vapor samples collected from the site at concentrations below respective commercial California Human Health Screening Levels (CHHSLs) and Tier 1 ESLs, where established. The past uses at, and in the vicinity of the Target Property, the facilities located upgradient of the Target Property that are currently open-active cases, the Target Property being an open-active case at the RWQCB, and the presence of petroleum hydrocarbons, VOCs, pesticides, and metals in shallow soil, groundwater, and/or soil-vapor are considered a *recognized environmental condition*.

2. Various investigations and remedial activities have occurred at the Target Property since the early 1980s. Results of the investigations indicate that arsenic concentrations exceed background levels in a limited zone along the eastern portion of the Curtaccio/Peterson property. Contamination in soil along this portion of the site was most likely a result of arsenic compounds being disposed in a shallow sludge pond on the adjacent 1990 Bay Road facility. The dispersal mechanism appears to have been surface water runoff from 1990 Bay Road to low lying areas on this portion of the Target Property. Other source areas at the adjacent 1990 Bay Road facility include possible leaks from an underground storage tank and releases/spillage along a railroad spur. The Target Property is bordered along the south by a paved asphalt strip that marks a portion of a former railroad easement where arsenic-impacted soil had been encapsulated as a result of the releases/spillage along the railroad spur.

   Soil containing arsenic concentrations ranging from 500 mg/kg to 5,000 mg/kg was excavated from the Bains and Curtaccio/Peterson properties, and moved to the adjacent 1990 Bay Road property for treatment. Following excavation and backfill, an asphalt cap was placed on the eastern side of the Curtaccio/Peterson property in accordance with the Remedial Action Plan (RAP) and Record of Decision (ROD) to encapsulate soil with arsenic concentrations greater than 70 mg/kg. Rhone-Poulenc, the Responsible Party for the 1990 Bay Road facility, worked with the RWQCB and the owner of the Curtaccio property to secure a Land Use Covenant for the site in accordance with Provisions 1d and 1f of RWQCB’s Order No. 92-022. The LUC was recorded on 10/26/93. Although the address listed on the LUC is 2470 Pulgas, the Legal Description presented in Exhibit A of the document pertains to the asphalt capped portion of the 1950 Bay Road portion of the Target Property. The presence of asbestos in soil at concentrations above 70 mg/kg encapsulated below the asphalt cap at the Target Property, and the resulting Land Use Covenant, are considered a *controlled recognized environmental condition.*

The following items were noted, but are not recognized environmental conditions as defined by ASTM methodology, but may be of some significance in future redevelopment activities at the site:

1. Presence of two groundwater monitoring wells onsite.
2. Presence of debris piles on the southern end of the site, as well as the presence of miscellaneous refuse/debris across the site.

Section 8 of this report contains a summary and discussion of the findings and related recommendations.

2.0 INTRODUCTION

2.1 PURPOSE

This *Phase I Environmental Site Assessment* (*Phase I ESA*) was performed by SCA under contract to the John and Marcia Goldman Foundation. The purpose of the Phase I ESA is to identify recognized environmental concerns associated with the past and/or present use, generation, storage, or disposal of hazardous materials and/or wastes at the Target Property, and at nearby properties judged to have a potential to affect the Target Property.

The *Phase I ESA* was performed in accordance with the American Society of Testing and Materials (ASTM) standard E1527-13 which defines good commercial and customary practice in the United States for conducting a *Phase I* of a parcel of commercial real estate with respect to the range of contaminants within the scope of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and petroleum hydrocarbons. As such, ASTM E 1527-13 is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner defense to CERCLA liability: that is, the practices that constitute *"all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice"* as defined in 42 USC [section] 9610(35)(B).

2.2 SCOPE OF SERVICES

The *Phase I ESA* was performed in accordance with the ASTM standard E1527-13. SCA's work included the review of reasonably ascertainable standard historical sources and a site reconnaissance.

2.3 ASSUMPTIONS

In preparing this report, SCA has assumed that all information received from interviewed parties is true and accurate. In addition, SCA has assumed that all records obtained from Others, such as regulatory databases, maps, aerial photos, etc. are accurate and complete. SCA has not independently verified the accuracy or completeness of any data received.

2.4 LIMITATIONS & EXCEPTIONS

Information regarding the Target Property and nearby properties was gathered from a site visit, historical background data and environmental database files. ASTM Standard 1527-13 defines a *Key Site Manager* as the owner or person identified by the owner of a property as having good knowledge of the uses and physical characteristics of the property. SCA interviewed the *Key Site Manager* identified for the Target Property, Mr. Mark Lazzarini with DKB Homes LLC, the current owner of the site, through the completion of an interview questionnaire.

Note that ASTM E1527-13 requires that the property's use be identified at intervals of five years or less, beginning from the first developed use, or 1940, whichever is earlier. SCA was unable to locate information regarding the property during the following intervals: 1903-1939, 1953-1958, 1961-1966, and 1985-1991.

Given the site history and SCA's review of available data, the absence of documentation during these time periods is not considered a significant data gap.

2.5 SPECIAL TERMS AND CONDITIONS

The methodology used was that detailed in the ASTM document E1527-13, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. Site-specific details of this methodology (for example, specific records sources used) are explained in the pertinent sections of this report.

2.6 USER RELIANCE

SCA prepared this *Phase I ESA* specifically for JMGF. No other entity may use or rely on this report without written approval signed by a Principal of SCA Environmental, Inc.

3.0 TARGET PROPERTY DESCRIPTION

3.1 TARGET PROPERTY DESCRIPTION

The Target Property is located in the City of East Palo Alto, San Mateo County, California. The following table presents the address and legal description of the Target Property, as well as its use. This information was obtained from the site reconnaissance, record reviews, and interviews.

Assessor's Parcel No. (APN) & Address	1950 Bay Road, East Palo Alto, CA; APN 063-240-320 1952 Bay Road, East Palo Alto, CA; APN 063-240-330 2454 Pulgas Avenue, East Palo Alto, CA; APN 063-240-220 2456 Pulgas Avenue, East Palo Alto, CA; APN 063-240-210 2470 Pulgas Avenue, East Palo Alto, CA.
Location	East Palo Alto, San Mateo County, California
Topographic Map	1997 Palo Alto, CA/7.5 Quadrangle
Gross Area	Approximately 3.0-acres
Current Use	Vacant

3.2 SITE FEATURES

Information regarding the current site features and site utilities obtained from the site reconnaissance, records review, and interviews is included in the table on the following page. A site diagram is included in Figure 3.

Building Descriptions, Site Features, Roads, etc.	The Target Property is currently vacant, with the exception of an asphalt –paved area on the northeastern portion of the site which demarcates a deed-restricted area where arsenic impacted soils are encapsulated. Two monitoring wells were observed toward the east-central portion of the site and are associated with the well network monitoring contamination originating from the adjacent 1990 Bay Road property. A concrete debris pile (approximately 100 cubic yards) and a brick debris pile (measuring approximately 4 cubic yards) are present toward the southwestern end of the site. Miscellaneous debris/refuse was also observed scattered around the property and include metal, PVC pipe debris, paint containers, and treated wood.
Source of Potable Water	Municipal
Sewage Disposal System	Municipal
Solid Waste Disposal	Municipal

3.3 SITE SETTING

The area surrounding the Target Property consists primarily of commercial/light-industrial properties. The Target Property is situated southeast of the intersection of Bay Road and Pulgas Avenue and is part of a larger 26-acre site that includes areas that have undergone cleanup and abatement of arsenic-impacted soil.

3.3.1 Subsurface Conditions & History

Various investigations and remedial activities have occurred at the Target Property since the early 1980s. A summary of pertinent reports reviewed as part of this Phase I ESA is presented below. Copies of relevant report text, figures, and tables are included in Appendix B.

Geomatrix Consultants and S.S. Papadopulos & Associates, Remedial Investigation Report, 1990 Bay Road Site and Vicinity, East Palo Alto, California, February, 8, 1989.

This report documents the remedial investigation completed on behalf of Rhone-Poulenc at, and in the vicinity of the 1990 Bay Road facility, and includes investigations at the Target Property. Investigations began in 1981 and lasted for seven years in order to define the nature and extent of contamination resulting from activities competed at the 1990 Bay Road facility. The investigation included 1,500 soil samples, 84 groundwater monitoring wells, surface water sampling, air monitoring, and biota investigations.

Although other compounds were found to be present in soil, arsenic was determined to be the main contaminant of concern and served as a reliable indicator of contamination by other metals including, cadmium, copper, lead, mercury, selenium, and zinc.

Investigations conducted at the Target Property indicated that arsenic concentrations exceeded background levels in a limited zone along the eastern portion of the Curtaccio/Peterson property. Arsenic concentrations in samples collected between 1981 and 1988 within this portion of the site detected arsenic at less than 500 mg/kg.

Contamination in soil along this portion of the site was most likely a result of arsenic compounds being disposed in a shallow sludge pond on the adjacent 1990 Bay Road facility. The dispersal mechanism appears to have been surface water runoff from 1990 Bay Road to low lying areas on this portion of the Target Property. Other source areas at the adjacent 1990 Bay Road facility include possible leaks from an underground storage tank and releases/spillage along a railroad spur.

Groundwater in the shallow aquifers below the Target Property was also contaminated with arsenic as a result of historic uses at the adjacent 1990 Bay Road facility.

This report recommended the preparation of a Feasibility Study and Remedial Action Plan (FS/RAP) to address remediation at and in the vicinity of the

1990 Bay Road property.

Letter from the Law Offices of Orrick, Herrington & Sutcliffe to Pamela Kurtz, Esq., dated March 13, 1992.

Rhone-Poulenc completed sampling on offsite properties in accordance with Order 91-016 which required the definition of all offsite properties that will require a deed restriction due to soil containing greater than 70 mg/kg of arsenic. For the sampling effort soil borings were completed on a 20-by-20 foot grid on the eastern portion of the Curtaccio/Peterson Property.

Results identified arsenic at the site as ranging from 10.3 mg/kg to 1,680 mg/kg. The sampling completed at the site was able to delineate the lateral extent of soil containing arsenic concentrations greater than 70 mg/kg. However, the depth was not found in the southeast corner or along most of the eastern fenceline, but was determined to be at least 6 feet deep. It was determined that approximately 1,500 cubic yards (CY) of soil contained arsenic concentrations greater than 70 mg/kg along the eastern portion of the Curtaccio/Peterson property.

Geomatrix Consultants and S.S. Papadopulos & Associates, Pre-Treatment Soil Sampling Report: Upland Operable Unit, 1990 Bay Road Site, East Palo Alto, California, May 1, 1992.

This report summarizes the sampling completed on the Curtaccio/Peterson property discussed above. These results were used to define the volume of soil requiring silicate treatment to achieve a cleanup standard of 500 mg/kg for arsenic. The depth of soil to be treated in each cell was defined as the top of the first sample interval below the deepest soil sample containing an arsenic concentration greater than 500 mg/kg.

The soil sampling results were used to estimate the lateral and vertical extent and volume of soil to be treated on the Curtaccio/Peterson property. Based on the results, affected soil with arsenic concentrations above 500 mg/kg requiring silicate treatment ranged in depth from 1.0 to 3.5 feet, and totaled approximately 250 CY.

Geomatrix Consultants and S.S. Papadopulos & Associates, Remedial Design Report, Upland Operable Unit, May 1, 1992.

This report was prepared for the upland operable unit of the 1990 Bay Road site and was prepared on behalf of Rhone-Poulenc in accordance with Provision 1e of Order No. 92-022 issued by the RWQCB on 2/19/1992 and outlines the design details, schedule, costs, health and safety considerations, as well as presents a sampling plan to remediate the site in accordance with the RAP.

The RAP for the upland operable unit was issued by the RWQCB on 2/19/1992. The Environmental Protection Agency (EPA) issued a ROD for the site on 3/4/1992. Remedial actions identified in the RAP and ROD included the following:

1. Excavate and dispose offsite soil having arsenic concentrations greater than 5,000 mg/kg.
2. Excavate, or cap and obtain a deed restriction, soil having chemical concentrations in excess of 70 mg/kg of arsenic; 250 mg/kg of cadmium, 120 mg/kg of lead, 100 mg/kg of mercury, and/or 2,000 mg/kg of selenium.
3. Treat by means of stabilization, soil having chemical concentrations in excess of 500 mg/kg of arsenic; 1,000 mg/kg of cadmium, 450 mg/kg of lead, 300 mg/kg of mercury, and/or 6,000 mg/kg of selenium so that concentrations in the leachate from the Toxicity Characteristic Leaching Procedure (TCLP) are below TCLP criteria;
    - Arsenic 5.0 mg/L
    - Cadmium 1.0 mg/L
    - Lead 5.0 mg/L
    - Mercury 0.2 mg/L
    - Selenium 1.0 mg/L
4. Install additional monitoring wells and continue monitoring arsenic concentrations in the shallow and deep aquifers as set forth in the Deep Aquifer Monitoring Plan, the revised Sampling and Analysis Plan, and the Aquifer Contingency Plan
5. After implementation of the FS/RAP, install a slurry wall to mitigate outward migration or arsenic concentrations exceeding 0.5 mg/L in the shallow groundwater zone.

The RAP and ROD called for removal of accessible soil that contained arsenic above 5,000 mg/kg. According to the Remedial Design Report, soil meeting this criterion was removed from areas within the Upland Operable Unit as an Early Action Removal in September 1991.

The RAP and ROD also identified that silicate fixation was the preferred method for treating soil containing arsenic greater than 500 mg/kg. According to the Remedial Design Report, sampling conducted previously was used to assess the extent of soil to be treated. At the Target Property, the depth of soil to be treated in each cell was defined as the top of the first sample interval below the deepest soil sample containing an arsenic concentration greater than 500 mg/kg.

The RAP and ROD required the excavation, or paving and deed restriction of soil containing more than 70 mg/kg. The Remedial Design Report presents the design of the paving to occur that will satisfy the following criteria:

- Effectiveness as physical barrier to ingress of water into soil
- Effectiveness as physical barrier to unprotected excavation and entry into the arsenic-affected soil below the cap
- Having a minimal thickness so that more treated material can be accommodated on site
- Strong enough to support anticipated traffic loading
- Ease of construction
- Ease of maintenance

To satisfy the above criteria, the asphalt was designed to consist of a top layer of densely graded asphalt, a middle layer of open-graded asphalt, and a bottom layer of hydraulic asphalt. Each layer was required to have a minimum thickness of three inches. Geofabric was to underlie the bottom layer as an added protective barrier. The asphalt cap was also to be routinely inspected and maintained.

Geomatrix Consultants and S.S. Papadopulos & Associates, 1993, Implementation Report for Remedial Action, Upland Operable Unit, June 30, 1993.

This report was prepared for Rhone-Poulenc in response to Order No. 92-022 issued by the RWQCB on 2/19/1992 and documents the implementation of the first three remedial action items identified in Geosyntec's Remedial Design Report (see above).

Soil containing arsenic concentrations ranging between 500 mg/kg to 5,000 mg/kg was excavated from the Curtaccio/Peterson property and moved to the 1990 Bay Road property for treatment. Approximately 245 CY of soil was removed from cells in the southeast corner of the Curtaccio/Peterson property. Excavated cells were backfilled with imported fill from the Kaiser Permanente Quarry in San Jose, California.

Following excavation and backfill, an asphalt cap was placed on the eastern side of the Curtaccio/Peterson property in accordance with the RAP and ROD to encapsulate soil with arsenic concentrations greater than 70 mg/kg. Rhone-Poulenc worked with the RWQCB and the owner of the Curtaccio property to secure a Land Use Covenant (LUC, also known as a Deed Restriction) for the site in accordance with Provisions 1d and 1f of Order No. 92-022. The LUC was recorded on 10/26/93. Although the address listed on the LUC is 2470 Pulgas, the Legal Description presented in Exhibit A pertains to the asphalt capped portion of the 1950 Bay Road portion of the Target Property.

Lowney Associates, Phase I Environmental Site Assessment, 2470, 2477, 2485 Pulgas Avenue and 1950 Bay Road, East Palo Alto, California, dated June 24, 2004.

Lowney Associates prepared a Phase I ESA for the site and a proposed residential development area located across Pulgas Avenue to the west for Byrd Development Consulting LLC. The report indicates that at that time, the Bains property at 2470 Pulgas Avenue was an undeveloped lot used by Bains Moving & Storage for truck and trailer parking. Two groundwater monitoring wells associated with investigation of contamination at the adjacent property to the east were present on the northeast corner of the Site. The property was bordered along the south by a paved asphalt strip that marked a portion of a former railroad easement where arsenic-impacted soil had been encapsulated under regulatory review and approval.

The Curtaccio/Peterson property at 1950 Bay Road consisted of an undeveloped dirt lot used for truck and trailer parking, with some automotive maintenance and repair performed on Site. An asphalt paved area on the eastern end of the property covers an area where the underlying soil contains elevated levels of arsenic (greater than 70 mg/kg) originating from historic releases on the former Rhone-Poulenc property located adjacent to the site to the east, at 1990 Bay Road.

Lowney's site history review indicates that the site was undeveloped land possibly used for row crops or other agriculture from at least the 1930s through the 1960s. After the 1960s, the site was occupied by auto wrecking yards (Curtaccio/Peterson property, 1960s – 1990s), vacant land (Bains mid-1960s – 1970s), and then truck and trailer parking with some automotive maintenance and repair (Bains from the 1980s, and Curtaccio/Peterson after the 1990s).

Regulatory agency file reviews performed by Lowney indicated a number of San Mateo County Environmental Health Department violations for oil spills, and other hazardous materials and waste storage practices. Chemical storage at the site during this time included petroleum products, waste oils, solvents, used oil filters, batteries, and other materials. Agency records indicated that about 250 gallons of waste oil and 32 gallons of spent solvent could be generated on an annual basis.

The Lowney report also contains summaries of previous environmental investigations performed at the site, including a Phase I ESA performed for the entire Ravenswood Industrial Area in 1993 by Erhler and Kalanowski, Inc., and a Phase I and Phase II ESA performed on the Curtaccio/Peterson Property in 1998 by Environmental Technical Associates (ETS). Shallow soil testing performed by ETS on the Curtaccio/Peterson property reportedly indicated the presence of elevated levels of copper, lead, and zinc, although no specific sample locations were shown.

The Lowney report recommended additional shallow soil sampling at the Curtaccio/Peterson property to evaluate potential impacts related to historic auto wrecking operations, and additional sampling for arsenic if residential development will occur on the site. The report recommended soil sampling on the Bains property to establish baseline conditions prior to any residential development on this portion of the site (at the time of the Lowney report, the Bains property was intended to be residential), with specific additional evaluation of the potential presence of elevated levels of arsenic in shallow soil across the site. The report also recommended that the two existing monitoring wells on the property be abandoned.

Lowney Associates, Soil, Groundwater, and Soil Vapor Quality Evaluation, Peck & O'Connor Trust (Formerly Bishop), Bains, Ravenswood Investments, Chang Properties, and Peterson Property, East Palo Alto, California, dated November 18, 2005.

Lowney Associates performed soil, soil-vapor, and groundwater quality testing on a number of parcels comprising the Pulgas Mixed Use Project portion of the East Palo Alto Industrial Area, for Byrd Development LLC. The report includes the results of subsurface sampling performed on the Bains and Curtaccio/Peterson properties as well as the properties comprising the proposed residential portion of the Pulgas Mixed Use Project located across Pulgas Avenue to the west. The sampling was performed in July 2004, with a report initially submitted in January 2005, and a revised final report issued in November 2005.

Subsurface investigation on the Bains property consisted of advancing four borings to a maximum depth of 10 feet bgs for collecting soil (3) and groundwater (4) samples, advancing two additional borings to a depth of 2 feet bgs adjacent to the asphalt-capped arsenic encapsulation area bordering the property to the south, collecting 15 additional shallow soil samples from 10 locations to evaluate overall shallow soil quality across the Site, and collecting four soil vapor samples from a depth of 5 feet bgs.

The report states that one of eight shallow soil samples analyzed for organochlorine pesticides contained dieldrin at 0.34 mg/kg (EB-5), which exceeded the ESL for dieldrin in commercial land use established by the RWQCB. Metals were found to be within the range of naturally occurring background with the exception of one sample that contained arsenic at 23 ppm. The shallow soil samples contained TPHd at concentrations of 1.8 to 38 mg/kg, and TPHmo at less than 50 to 840 mg/kg.

Groundwater samples collected at the site contained low levels of petroleum hydrocarbons as gasoline (TPHg at 83 micrograms per liter or µg/L) and diesel (84 µg/L), along with other VOCs including trichloroethene (TCE) (up to 8 µg/L), 1,1-dichloroethane (up to 0.75 µg/L), cis-1,2-dichloroethene (up to 0.89 µg/L) and methyl-tert-butyl-ethylene (MTBE) (up to 9.1 µg/L). The 8 µg/L of TCE exceeds the state drinking water standard (the maximum contaminant level, or MCL) of 5 µg/L. No VOCs were present above ESLs developed for evaluating potential impacts to indoor air quality for a commercial land use. The groundwater samples also contained a variety of metals. However, the report indicates that the samples were not filtered prior to analysis, and the results may not be representative of actual site conditions.

Soil vapor samples collected at the site contained a variety of VOCs including, acetone (up to 54 micrograms per cubic meter, or µg/m^3), benzene (up to 26 µg/m^3), TCE (up to 96 µg/m^3), tetrachloroethene (PCE) (up to 4,400 µg/m^3), and others. According to the report, only the 4,400 µg/m^3 of PCE measured in the southern portion of the property exceeds RWQCB ESLs for potential indoor air quality impacts for a commercial land use.

Based on the testing, the report concluded and recommended the following:

1. The arsenic-impacted soil encapsulated along the former rail spur bordering the Site on the south does not appear to impact the Site.
2. Due to the presence of dieldrin reported in one soil sample above commercial land use ESLs, a human health risk assessment should be performed.
3. The report indicates that a deed restriction may be necessary to document the localized presence of pesticides, arsenic, and petroleum hydrocarbons in shallow soil.
4. The report concludes that shallow groundwater beneath the Site is

impacted by petroleum hydrocarbons and VOCs originating from offsite sources. The report recommends analyzing filtered groundwater samples for metals.

5. The report concludes that soil vapor samples collected at the site are below the ESLs for potential impacts to indoor air in commercial land use, with the exception of the 4,400 µg/m^3 of PCE measured in a sample collected from the southern portion of the site.

Subsurface investigation of the Curtaccio/Peterson property included advancing four boring for collecting groundwater samples, advancing three borings for soil sampling adjacent to the arsenic-impacted soil encapsulation area located on the eastern portion of the site, collecting six random shallow soil samples to evaluate surficial soil quality, collecting one composite sample from a soil stockpile on the property, and collecting four soil vapor samples at a depth of five feet bgs.

The report indicates that soil samples collected in the original native soil beneath the overlying fill soil did not contain organochlorine pesticide compounds and that metals were representative of naturally occurring background levels. Testing of the surficial fill soil (approximately 0 - 2.5 feet bgs) indicated the presence of localized areas of elevated lead (individual samples at 190 and 35,000 mg/kg) and TPHd (160 - 3,500 mg/kg) and TPHmo (990 - 9,400 mg/kg).

Test results from three borings (with soil samples at 0 - 0.5 and 1 - 1.5 feet bgs) advanced along the margin of the asphalt paving area on the eastern portion of the site contained arsenic at 1.8 to 7.7 mg/kg and lead at 2.3 to 97 mg/kg, indicating that the arsenic-impacted soil encapsulation area does not appear to extend beyond the boundary of the asphalt cap.

Groundwater samples collected at the site contained TCE (2.2 - 3.4 µg/L), PCE (one sample at 1.6 µg/L), cis-1,2-DCE (three samples at 0.8 µg/L), and MTBE at 7.8 - 29 µg/L). TPHd was reported in the groundwater samples at concentrations of 750 -4,200 µg/L, and TPHg was reported at concentrations of 54 and 100 µg/L.

Soil vapor samples collected at the Site contained benzene (3.4 - 20 µg/m^3), PCE (one sample at 33 µg/m^3), TCE (up to 8.5 µg/m^3), and vinyl chloride (one at 5.9 µg/m^3).

Based on the testing, the report concluded or recommended:

1. The site is covered by 0.25 - 2 feet of fill material that contains local areas of elevated levels of metals or petroleum hydrocarbons. The report concludes that a deed restriction may be required if these soils remain on site.
2. The native soils underlying the artificial fill do not contain organochlorine pesticides. Metals were present at concentrations representative of naturally occurring background.
3. Low levels of VOC and petroleum hydrocarbons are present in groundwater beneath the Site. The report concludes that no further

action appears necessary, but cautions that additional investigation could be required by local regulatory agencies.

TRC Lowney, Remedial Action Plan and Workplan for Initial Phases of Remediation, Pulgas Mixed Use Project, East Palo Alto, California, dated September 7, 2006.

In 2006, TRC Lowney (successor company to Lowney Associates) prepared a RAP outlining proposed remediation measures for several properties associated with the Pulgas Avenue Mixed Use Project, including the subject site, on behalf of Byrd Development LLC.

The RAP summarizes the results of a Health Risk Assessment (HRA) performed for the subject site that concluded that VOCs in soil vapor and groundwater at the site appeared to be the primary concern to human health at the site. However, the excess cancer risk calculated based on existing conditions at the site was well within the acceptable US EPA exposure range for commercial development.

The RAP outlined the following remedial actions and recommendations for the site:

1. New buildings at the site should include a vapor barrier and passive venting system to mitigate potential indoor air quality impacts related to the presence of VOCs in soil vapor and groundwater. A specific design should be submitted to the RWQCB for review and approval.
2. Areas of elevated levels of metals and pesticides identified on the Bains property should be capped by concrete, asphalt, or planter areas as a mitigation measure.
3. Soil on areas of the Curtaccio/Peterson property containing lead above hazardous waste thresholds should be excavated and removed from the site.
4. Additional soil sampling should be performed on the Curtaccio/Peterson property to further identify the possible presence of contaminants in the shallow fill and underlying native soils.
5. Other areas of the Curtaccio/Peterson property containing elevated concentrations of metals should be capped with concrete, asphalt, or landscape.
6. A deed restriction and associated risk-management plan is required for redevelopment of the site. The deed restriction should document existing environmental conditions at the site, and prohibit disturbance of the cap on the site and prohibit use of shallow groundwater at the Site.
7. A Site Management Plan (SMP) should be required to establish management practices for handling impacted soil that may be encountered during site redevelopment.

The RAP was approved by the RWQCB on September 13, 2006.

TRC Lowney, Draft Completion Report for Active Remedial Measures, Pulgas Avenue Mixed Use Project, East Palo Alto, California, dated

January 18, 2007.

TRC Lowney prepared a Completion Report for active remedial measures at the site in January 2007 on behalf of DKB Homes, LLC. The report describes additional subsurface investigation performed on the Curtaccio/Peterson property to better define specific areas of potential impact, and the remedial actions implemented to mitigate those impacts. Additional investigation work performed on the Curtaccio/Peterson property included advancing 12 additional borings to 3 feet bgs to collect samples of the surficial fill soil (0 - 2 feet bgs) and the underlying native soil (2 - 3 feet bgs). Twenty four soil samples were analyzed for petroleum hydrocarbons as gasoline, diesel, and oil; purgeable aromatic compounds (benzene, toluene, ethylbenzene, and xylenes, or BTEX); MTBE; and metals.

The samples contained low levels of TPHd (up to 11.7 mg/kg) and TPHmo (up to 710 mg/kg), but did not contain TPHg, BTEX, or MTBE with the exception of one sample that contained a low level (0.15 mg/kg) of TPHg. The report indicates that all measured concentrations of hydrocarbons were below RWQCB ESLs for residential and commercial land use.

Metals were reported to be within the range of naturally occurring background concentrations with the exception of one sample that contained lead at 250 mg/kg. Approximately 234 tons of lead-impacted soil were excavated to a depth of 2 feet bgs from two areas of the site where testing had indicated the presence of elevated lead. These soils were removed and disposed from the site. Confirmation soil samples collected around the excavation perimeter and base contained lead at 6 to 11 mg/kg.

The report concluded that no further remedial actions appear to be required. The report states that risk management measures such as a planned vapor barrier and passive venting system and property deed restrictions described in the approved RAP would be addressed in a separate report.

The partial completion report for remedial action was approved by the RWQCB on February 28, 2007. The RWQCB’s approval letter indicates that Site redevelopment and grading must adhere to TRC Lowney’s October 27, 2006 SMP. The RWQCB letter states that once all components of the remedy are submitted and approved, including recording deed restrictions covering institutional controls (i.e., vapor mitigation systems and prohibition of shallow groundwater use), the RWQCB will remove the site from existing Site Cleanup Requirement, Order 92-086 (and its predecessor Order 92-037), effectively closing the case.

SCA Environmental, Inc., Phase II Environmental Site Assessment Report, Proposed East Palo Alto Youth Center Project Site, East Palo Alto, California, dated June 25, 2015.

SCA was contracted by JMGF to conduct a limited investigation to evaluate shallow soil, groundwater, and soil-vapor in areas not currently capped with asphalt prior to JMGF’s purchase of the site.

SCA's investigation included the completion of ten borings to a maximum depth of 15 feet bgs and the completion of ten borings to a depth of 2.0 feet bgs at the Site to evaluate shallow fill and grab groundwater conditions, the installation and sampling of temporary soil-vapor probes completed to a maximum depth of 5 feet bgs, and the collection of samples from the concrete and brick debris piles observed at the Site.

During the investigation SCA encountered brown clayey silt with some gravel, underlain by silty clay with some fine gravel, underlain by fat clay to the maximum depth explored. The highest photoionization detector (PID) reading was 8.5 parts per million (ppm) detected in the soil sample from Boring B-5 at a depth of 2.0 feet bgs. Slight hydrocarbon odors of indeterminate nature were encountered in Boring B-5 (between the surface and 7.0 feet bgs). Groundwater was encountered during the investigation in all borings at depths ranging between 5.9 feet bgs (B-6) and 6.9 feet (B-9).

Findings for Shallow Soil

In general, analyses on soil samples collected outside of the asphalt capped area detected low levels of TPHd, TPHmo, VOCs, organochlorine pesticides, and various metals at concentrations below commercial land use and construction worker ESLs with the exception of the following:

- Slightly elevated concentrations of TPHmo (up to 860 mg/kg) within the upper 2.0 feet of soil in two locations (B-3 and B-6), exceeding commercial land use ESL of 500 mg/kg;
- Slightly elevated total zinc (2,300 mg/kg) within the upper 2.0 feet at Boring B-5, exceeding the commercial land use ESL of 600 mg/kg; and
- Slightly elevated Dieldrin concentrations (up to 0.041 mg/kg) at the surface at locations HA-2, HA-3, and HA-7, exceeding commercial land use ESL of 0.0023 mg/kg.

Due to the presence of localized areas of soil where certain analytes exceed commercial land use ESLs, and the presence of elevated arsenic concentrations beneath the asphalt cap, SCA recommended the preparation of a SMP, which should be submitted to the RWQCB for review and approval prior to the start of construction.

The SMP should address potential risks of identified chemicals to human health related to construction workers. SCA recommended that the SMP include provisions for handling soil excavated from the site as part of construction, including but not limited to soil handling, stockpile and/or waste profile characterization, stockpile erosion control on measures, decontamination, and dust control of personnel and equipment. The SMP should also include establishing health and safety training and worker protection objectives for construction workers.

Findings for Groundwater

Analyses on grab groundwater samples detected TPHd and TPHmo, as well as certain metals concentrations that exceed respective Tier 1 ESL criteria.

Detected VOC concentrations were below ESL criteria for a potential vapor intrusion concern (commercial land use).

SCA recommended that if dewatering is planned for the project, due to the presence of detected analytes including dissolved metals concentrations, groundwater generated from dewatering activities may need to be containerized into holding tanks to allow entrained sediments to settle out prior to discharge in accordance with wastewater discharge permit requirements. Additional testing of the groundwater may be required prior to discharge as a condition of the wastewater discharge permit.

Findings for Soil-Vapor
VOC analyses detected 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, 2,2,4-Trimethylpentane, 2-Butanone, 4-Ethyl Toluene, 4-Methyl-2-pentanone, acetone, benzene, carbon disulfide, chloroform, cis-1,2-Dichloroethene, cyclohexane, dichlorofluoromethane, ethanol, ethylbenzene, xylenes, p-Isopropyltoluene, PCE, toluene, TCE, trichlorofluoromethane, and vinyl acetate in some or all of the soil-vapor samples obtained from the Site. All detected VOCs were below respective commercial California Human Health Screening Levels (CHHSLs) and Tier 1 ESLs, where established.

However, since various VOCs were detected during this, as well previous investigations completed by others, SCA recommended JMGF consider the installation of a vapor barrier as part of the design for the new construction to mitigate potential vapor intrusion of VOCs.

Findings for Debris Piles
No asbestos was identified within any of the debris pile samples collected from the site. SCA recommends that the debris piles be removed and disposed as a non-hazardous waste prior to or during the start of construction activities.

See “Subsurface Conditions” in Section 8.0.

3.3.2 Geology and Topography

The Target Property is located in East Palo Alto, San Mateo County, with an elevation of about 13 feet above mean sea level. In the vicinity of the site, topography gently slopes east-northeast, toward San Francisco Bay.

According to the Geologic Map of the Palo Alto and Mountain View Quadrangles[1], the site is mapped as Holocene-aged Surficial Sediments (Qa.1) which is comprised of alluvial sand, fine-grained, silt, and gravel; where differentiated represents alluvial fan deposits at the base of slopes and upper fan areas.

3.3.3 Hydrology

According to the Department of Water Resources, the Target Property is located within the Santa Clara Valley Groundwater Basin, San Mateo

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[1] Dibblee, T.W., and Minch, J.A., 2007, Geologic Map of the Palo Alto and Mountain View Quadrangles, Alameda, San Mateo, and Santa Clara Counties, California. Dibblee Foundation Map DF-350. Available at http://ngmdb.usgs.gov/Prodesc/proddesc_83441.htm

subbasin. The water bearing formations of the San Mateo subbasin are comprised of two groups: the Santa Clara Formation of Plio-Pleistocene age and the Quaternary age alluvial deposits. The Quaternary alluvium constitutes the most important water bearing formation of this basin and basically all larger yielding wells acquire their water from it. The Santa Clara Formation is Plio-Pleistocene age. It underlies the Quaternary alluvium and unconformably overlies non-water bearing formations. It is composed of gravel, sand, silt and clay with various mixtures of grain sizes. The Quaternary alluvium is composed of gravel, sand, silt, and clay with various grain size distributions dependent on the depositional environment. Maximum thickness attained by the Quaternary alluvium is approximately 1250 feet.

The nearest surface water body is San Francisco Bay, located approximately 0.25-miles east-northeast of the site. No standing water bodies or flowing surface water was present on the Target Property at the time of SCA's site reconnaissance.

Based on our review of the EDR reports, no private water wells were identified within 1.0-mile of the Target Property.

SCA reviewed the *2014 Annual Summary and Groundwater Monitoring Report, 1990 Bay Road Site, East Palo Alto, California*, prepared by S.S. Papadopulos & Associates, Inc., and dated January 30, 2015. This report summarizes groundwater monitoring activities for the property located immediately adjacent to the Target Property. As part of the groundwater monitoring network, two wells, W-125U and W-126L, are located on the Target Property. On April 17, 2014 depth to water in those wells measured 4.58 and 4.72 feet respectively, which corresponded with a water level elevation of 2.35 and 2.31 MSL. Groundwater flow direction appears to be toward the southeast.

Depth to water was encountered at the site during SCA's May 2015 Phase II ESA at depths ranging between 5.9 feet bgs and 6.9 feet bgs.

According to information obtained from California's Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR), no oil, gas, or geothermal wells are located within 1,500-feet of the Target Property.

It is typical for local groundwater gradients and directions to vary substantially, due to subsurface soil and rock density, and due to offsite dewatering activities, agricultural / tidal fluctuations, aquifer recharge, etc.

3.4 ADJACENT PROPERTY USES

Adjoining Direction	Name	Use
North	(Across Bay Road) Cal Spray, Inc. 1905-1911 Bay Road	Light Industrial
South	R.E. Borrmann's Steel Co. 2450 Pulgas Avenue	Light Industrial

West	(Across Pulgas Avenue) Eden Bridge Homes 2485 Pulgas Avenue	Residential (under construction)
East	Catalytica Bay View Facility 1990 Bay Road	Vacant – Former Light Industrial / Manufacturing

4.0 USER PROVIDED INFORMATION

4.1 TITLE RECORDS

SCA reviewed a Preliminary Title Report dated May 15, 2015 which lists that tile to the property is vested in DKB Homes LLC, a California Limited Liability Company (Appendix C).

4.2 LIENS OR USE LIMITATIONS

EDR's Lien Search Report (Appendix D) did not find evidence of any Environmental Liens or Activity and Land Use Limitations for the site. However, a LUC has been recorded for the asphalt-paved portion of the site due to the presence of contaminated soil and groundwater resulting from the former herbicide formulation operations at the adjacent 1990 Bay Road property. The LUC restricts development of the property to commercial/industrial use only; specifies that contaminated soil brought to the surface must be managed; and that the cap, remedial measures taken or equipment installed, and the groundwater monitoring system installed on the property shall be preserved.

4.3 SPECIALIZED KNOWLEDGE

The Client has not reported any specialized knowledge or experience pertaining to environmental issues at the Target Property other than what is described herein.

4.4 VALUATION REDUCTION

The Client reported that the price being paid for this property is above the appraised value for the property.

4.5 INFORMATION PROVIDED BY *KEY SITE MANAGER*

SCA interviewed the *Key Site Manager* for the Target Property, Mr. Mark Lazzarini with DKB Homes LLC, the current owner of the site, through the completion of an interview questionnaire. Information obtained from this interview is incorporated by reference.

4.6 REASON FOR PERFORMING PHASE I

SCA's client has notified SCA that the Phase I Environmental Site Assessment is being performed as part of due diligence investigations.

4.7 OTHER

No other information has been provided to SCA at this time, other than that detailed in this report.

5.0 RECORDS REVIEW

5.1 RECORDS SOURCES

The following databases were accessed from the Environmental Data Resources (EDR) report:

5.1.1 Federal Records

- United States Environmental Protection Agency (USEPA) "Superfund" National Priority List (NPL);
- USEPA Proposed NPL sites;
- USEPA Delisted NPL sites;
- USEPA NPL Recovery sites;
- USEPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS);
- USEPA No Further Remedial Action Planned Sites (NFRAP);
- USEPA Corrective Action Report (CORRACTS);
- USEPA Resource Conservation and Recovery Information System - Treatment, Storage, and Disposal Facilities (RCRIS -TSD);
- USEPA Resource Conservation and Recovery Information System - Large Quantity Generators and Small Quantity Generators (RCRIS LG and SG);
- USEPA Emergency Response Notification System (ERNS);
- US Department of Transportation Hazardous Information Reporting System (HMIRS);
- USEPA Engineering Controls Sites List (US ENG CONTROLS);
- USEPA Institutional Controls Sites List (US INST CONTROL);
- USEPA Department of Defense sites (DOD);
- US Army Corps of Engineers (USACE) Formerly Used Defense Sites (FUDS);
- USEPA Brownfields sites (US BROWNFIELDS);
- USEPA Superfund (CERCLA) Consent Decrees (CONSENT);
- USEPA Records Of Decision (ROD);
- Department of Energy (DOE) Uranium Mill Tailings Sites (UMTRA);
- USEPA Open Dump Inventory (ODI);
- USEPA/NTIS Toxic Chemical Release Inventory System (TRIS);
- USEPA /NTIS Toxic Substances Control Act (TSCA);
- FIFRA/TSCA Tracing System (FTTS);
- USEPA Section 7 Tracking System (SSTS);
- USEPA Integrated Compliance Information System (ICIS);
- Drug Enforcement Agency (DEA) Clandestine Drug Labs (CDL);
- Department of the Navy Land Use Control Information System (LUCIS);
- USEPA Radiation Information Database (RADINFO);
- USEPA PCB Activity Database System (PADS);
- US Nuclear Regulatory Commission Material Licensing Tracking System (MLTS);
- Mine Safety & Health Administration (MSHA) Mines Master Index File (MINES);
- USEPA Corrective Facility Index System (FINDS);
- USEPA RCRA Administrative Action Tracking System (RAATS).
- USGS Water Wells;
- Department of Health Services Drinking Water Quality Database.

5.1.2 State Records

- Historical Calsites Database (HIST CAL-SITES)
- California Department of Health Services Bond Expenditure Plan (BEP);
- School Property Evaluation Program (SCH);
- State Water Resources Control Board Toxic Pits (TOXIC PITS);
- California State Landfill Listings (STATE LANDFILL)
- State Water Resources Control Board Waste Discharge System (WDS);
- California Regional Water Quality Control Board San Francisco Bay Region (2) (WMUDS/SWAT);
- Cal/EPA/Office of Emergency Information Cortese (CORTESE);
- California Recycler Database (SWRCY)
- State Water Resources Control Board Leaking Underground Storage Tank Information System (LUST);
- Cal/EPA Facility Database Inventory (CA FID);
- North and South Bay Spills, Leaks, Investigations, and Cleanup Report (SLIC);
- State Water Resources Control Board Hazardous Substance Storage Container Database (UST);
- Historical UST Registered Database (HIST UST);
- State Water Resources Control Board Aboveground Storage Tank Facilities (AST);
- State Water Resources Control Board Statewide Environmental Evaluation and Planning System (SWEEPS UST)
- Office of Emergency Services California Hazardous Material Incident Report System (CHMIRS);
- State Water Resources Control Board Proposition 65 (NOTIFY 65);
- Deed Restriction Listing (DEED);
- Voluntary Cleanup Program Properties (VCP);
- Cal EPA Listed Drycleaners (DRYCLEANERS);
- Well Investigation Program Case List (WIP);
- Clandestine Drug Labs (CDL);
- State Response Sites (RESPONSE);
- Hazardous Waste Facility and Manifest Data (HAZNET);
- Emissions Inventory Data (EMI);
- EnviroStor Database (ENVIROSTOR).

5.1.3 Findings from Regulatory Databases

The following table summarizes findings from the EDR report:

Database	Radius of Search in Miles	Site on list?	Number of Off-Site Facilities on List	Number of Off-Site facilities Which Are at a equal or higher elevation
USEPA NPL	1.000	No	0	0
USEPA PROPOSED NPL	1.000	No	0	0
USEPA DELISTED NPL	1.000	No	0	0
USEPA NPL LIENS	TP*	No	NR	NR
USEPA CERCLIS	0.750	No	2	0
USEPA CERCLIS-NFRAP	0.500	No	2	1
USEPA CORRACTS	1.000	No	2	2
USEPA RCRA TSDF	0.500	No	2	0
USEPA RCRA-LQG	0.250	No	4	0
USEPA RCRA-SQG	0.250	No	12	7
USEPA RCRA-NonGen	0.250	No	6	2
US ROD	1.000	No	1	0
USEPA ERNS	TP	No	NR	NR
USEPA HMIRS	TP	No	NR	NR
USEPA US ENG CONTROLS	0.500	No	1	0
USEPA INST CONTROL	0.500	No	1	0
USACE FUDS	1.00	No	0	0
US BROWNFIELDS	0.500	No	9	7
USEPA CONSENT	1.000	No	0	0
USEPA FINDS	TP	No	NR	NR
STATE HIST CAL-SITES	1.000	No	0	0
STATE BEP	1.000	No	1	0
STATE SCH	0.250	No	0	0
STATE TOXIC PITS	1.000	No	0	0
STATE SWF/LF	0.500	No	1	0
STATE WMUDS/SWAT	0.500	No	0	0
STATE CORTESE	0.500	No	2	1
STATE HIST CORTESE	0.500	No	13	10
STATE SWRCY	0.500	No	0	0
STATE LUST	0.500	No	18	17
STATE FID UST	0.250	No	0	0
STATE SLIC	0.500	Yes	23	13
STATE UST	0.250	No	0	0
STATE HIST UST	0.250	No	6	6
STATE AST	0.250	No	1	0
STATE SWEEPS UST	0.250	No	11	11
WI MANIFEST	0.250	No	1	0
AZ MANIFEST	0.250	No	1	0
NY MANIFEST	0.250	No	1	0
STATE CHMIRS	TP	No	NR	NR
STATE HWP	1.000	No	2	0
CUPA LISTINGS	0.250	No	0	0
STATE NOTIFY 65	1.000	No	0	0
STATE DEED	0.500	No	6	2
STATE VCP	0.500	No	0	0
STATE DRYCLEANERS	0.500	No	1	0
STATE HAZNET	TP	No	NR	NR
STATE EMI	TP	No	NR	NR
STATE WDS	TP	No	NR	NR
STATE RESPONSE	1.000	No	0	0
STATE ENVIROSTOR	1.000	No	8	2
STATE INDIAN VCP	0.500	No	0	0
STATE INDIAN UST	0.250	No	0	0
STATE INDIAN LUST	0.250	No	0	0
STATE RGA LUST	TP	No	NR	NR

2020 COR ACTION	0.250	No	2	0
EDR US HIST AUTO STAT	0.250	No	7	6
EDR US HIST CLEANERS	0.250	No	0	0
SAN MATEO CO BI	0.250	Yes	44	35

TP* = only Target Property searched
NR = not researched

The Target Property is listed on the San Mateo Co. Business Inventory list and the SLIC database. The site is listed in the SLIC database as two difference sites, the Curtaccio/Peterson Property (1950 Bay Road) and as Pulgas and Bay (2470 & 1950 Pulgas Ave. and Bay Road) due to the open GeoTracker case files. The status is listed as Open-Site Assessment, with potential contaminants of concern listed as arsenic, lead, diesel, gasoline, and waste/hydraulic/motor oil. The San Mateo Co. Business Inventory list is a County database that documents whether a facility has a Hazardous Materials Business Plan on file, is a hazardous waste generator, or has any USTs present onsite. The Target Property appears in this database under AA Auto Repair (waste generator of less than 27-gal per year and a generator, storer/recycler of motor vehicle fuels/waste oil/solvents).

Additional Sites within 0.35-miles of the Target Property

SCA researched sites within 0.35 mile of the Target Property with documented leaking underground storage tanks, releases, and documented subsurface contamination. SCA identified the following active or open-inactive facilities:

1990 Bay Road

The 1990 Bay Road property, which is the location of the former operating facility and the source of the arsenic contamination on the Target Property, is located immediately adjacent to the site. The 1990 Bay Road property was originally used to formulate agricultural chemicals. From the 1920s until 1964, the property was owned by Chipman Chemical Company (Chipman) and used for manufacturing arsenic-based products, such as weed control compounds. In 1964, Rhodia Inc. (Rhodia), acquired Chipman and continued operations at the property until the late 1960s. In 1971, Rhodia sold the property to Zoecon Corporation (Zoecon), which began operations in 1972, after expansion of site facilities. Zoecon, which later became Sandoz Agro Inc. (Sandoz), manufactured biorational insect controls at the agrichemical facility. In 1994, Rhône-Poulenc Inc. (Rhône-Poulenc), formerly known as Rhodia, repurchased the real property from Sandoz. Catalytica, Inc. (Catalytica) subsequently purchased some of the property improvements from Sandoz and leased the real property from Rhône-Poulenc for use in the manufacturing of chemicals and pharmaceutical intermediates. Rhone-Poulenc became Aventis CropScience USA Inc. in 2000. Catalytica ceased operations in mid-2001. In 2001, the property and facility ownership was transferred to SLLI. The plant and office facilities were demolished in the spring of 2002 to facilitate site cleanup work. The 1990 Bay Road site currently houses a warehouse that is vacant.

Remedial activities began at this facility in 1981, when an initial investigation of the extent of arsenic in soil and groundwater was conducted. Results of the many investigations indicate that soil and groundwater at, and immediately surrounding, this facility are contaminated with arsenic as a result of past pesticide/herbicide production. In 1985, the facility was proposed for inclusion on the National Priorities List (NPL) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Also in 1985, the California Department of Health Services issued Sandoz, the Facility owner and operator at the time, a permit to store and treat hazardous waste under U.S. Environmental Protection Agency's (U.S. EPA's) Resource Conservation and Recovery Act (RCRA) authority (permit No. CAT000611350). In 1989, U.S. EPA formally removed the facility from consideration for the NPL.

From 1987 to 1991, the facility was under the jurisdiction of Department of Toxic Substance Control (DTSC) pursuant to a Consent Order between DTSC, the RWQCB, and Rhône-Poulenc. Lead agency status changed in January 1991 to the RWQCB and the provisions of the Consent Order were vacated by stipulation, except those referencing cost recovery. Since 1991, the RWQCB has been the lead agency for the facility.

A ROD was issued by the U.S. EPA for the Upland Operable Unit in March 1992, and the selected remedial actions were incorporated into RWQCB Order 92-022. In 1994, RWQCB Order 94-042 addressed certain remedial actions on the Upland Operable Unit Annex. In 1997, remedial actions for the South of Weeks Street Subarea were required by RWQCB Order 97-095. In 2005, the RWQCB issued Order R2-2005-0033 for the Wetland Operable unit. In 2009, the United States, on behalf of U.S. EPA and U.S. Department of the Interior, entered into a Consent Decree with SLLI to, among other things, release and agree to a covenant not to sue with respect to Natural Resource Damages (NRD) and NRD Claims, relating to the facility.

In addition to RWQCB Orders for the 1990 Bay Road Site, various site properties have been subject to separate RWQCB Orders. These include RWQCB Order 92-037, which required environmental investigations of properties within the Ravenswood Industrial Area and RWQCB Order 92-060, which required investigation and remediation of the illegal hazardous waste disposal facility that was discovered on the 1175 Weeks Street Property.

Remedial activities were completed in accordance with several RWQCB cleanup and abatement orders listed above, and included the excavation and removal of accessible impacted soil with arsenic concentrations greater than 5,000 mg/kg, the excavation and treatment (stabilization) of accessible soils with arsenic concentrations greater than 500 mg/kg (but less than 5,000 mg/kg), and the capping with asphalt pavement of arsenic-impacted soil with concentrations greater than 70 mg/kg. In accordance with the cleanup orders, properties that have capped arsenic-impacted soil are to have LUCs (deed restrictions) recorded on those properties. Rhone-Poulenc has also installed 30 monitoring wells (two of which are located on the Target Property) to monitor residual impacts to groundwater. All work is completed under the oversight of the RWQCB, and is listed as open-verification monitoring with a date of 1/1/2005.

Excavation activities have occurred on the Target Property and a LUC has been recorded as a result of historic activities at the Rhone-Poulenc facility.

Refer to Section 3.3.1 for additional information.

965 Weeks Street

This property consists of three adjacent parcels comprising approximately 2.8 acres of agricultural land and a single family home, and is located approximately 0.16-miles southwest and upgradient of the Target Property. Based on historic aerial photographs, the property was used for agricultural purposes, primarily a nursery, from the early 1950's until about 2000. The Olson Company, as part of its process to redevelop the site, conducted an environmental investigation to determine whether or not past agricultural uses had impacted the property. These investigations confirmed that surface soil on this site contained residual levels of pesticides to a depth of about two feet. The pesticides include varieties of DDT (referred to as total DDT), dieldrin and chlordane. A draft workplan was prepared in 2007 to clean up residual pesticide impacted soil at this facility. According to information obtained from GeoTracker, this case is listed as open-inactive with a date of 1/1/2007.

2081 Bay Road

This facility is located 0.15-miles northeast and cross-gradient from the Target Property, and is a permitted RCRA facility and is listed in multiple databases including the RCRA-NonGen/NLR, RCRA-LQG, FINDS, CERCLIS, PRP, SLIC, NPDES, HAZNET, San Mateo Co. Business Inventory, and DRYCLEANERS databases as a generator/storer/handler of large quantities of hazardous waste. Reportedly past uses at this facility included the storage and treatment of hazardous waste in above ground tanks, waste water ponds Contaminants of concern at this facility include chlorinated solvents (PCE, TCE), PCBs, heavy metals including hexavalent chromium, petroleum hydrocarbons, organochlorine pesticides/herbicides. The potential media affected appears to be groundwater. Numerous violations and enforcement actions have been recorded at this facility including compliance violations, manifest/records violations, permit violations, etc. According to a LUC recorded for the site in February 2015, this facility stopped accepting waste in 2007 and started undergoing facility closure. The site is currently undergoing remediation under the oversight of the USEPA pursuant to an Administrative Order on Consent (RCRA-09-88-0015). According to GeoTracker, this site is listed as open-inactive with a date of 6/2/2009; however, according to Envirostor the site is listed as active as of 7/15/2010.

1010 Runnymede Street

This facility is located approximately 0.25-mile southwest and cross-gradient of the Target Property. No evidence of commercial use of this property has been found; rather, it appears the property has only been used for residential purposes. Investigations conducted at this site identified the presence of organochlorine pesticides/herbicides, and lead in shallow soil. A soil remediation work plan has been prepared (dated August 2007), however, it does not appear to have been implemented to date. The San Mateo County Environmental Health Department referred this case to the DTSC in 2011. In a letter to the Responsible Party dated 11/9/2011, the DTSC accepted oversight of the case and requested information regarding the current status of investigations, remediation, or site redevelopment. According to Envirostor, the Responsible Party has failed to respond to the DTSC. This site is listed in

Envirostor as inactive-action required with a date of 11/9/2012.

2100 Bay Road
This facility is located approximately 0.3-mile northeast and downgradient of the Target Property and is listed in multiple databases including US Brownfields, RCRA-SQG, FINDS, SWF/LF, NPDES, SLIC, and HAZNET. A wharf operated on this site from 1848 to the early 1900s. Between 1932 and 1957 San Mateo County operated a municipal landfill on the site. Waste was regularly burned at the landfill. A portion of the site was purchased in the 1960s and utilized for residential and commercial boat building activities until sometime around 1990. A layer of construction debris and other fill was placed on the site sometime after that purchase and measured between 2 and 15 feet thick. This property was purchased in 1999 by the Peninsula Open Space Trust. In March 2006, the City of East Palo Alto took ownership of the middle portion of the site and the Mid-Peninsula Regional Open Space District took ownership of the remaining portion of the site. The site has undergone remedial measures including the placement of an engineered soil cap of the surface of the site, as well as the removal of some impacted soil from the southern side of the site. The site is listed in GeoTracker as open-remediation as of 11/1/2011.

Other facilities within a 0.35-mile radius of the Target Property are listed in various databases including the San Mateo Co. Business Inventory, RCRA-SQG, FINDS, EDR Hist Auto Station, HAZNET, and AST databases. Given the information reviewed in the EDR report, the past uses in the vicinity of the Target Property indicate a potential to have impacted subsurface conditions at the Target Property. SCA completed a Phase II investigation at the Target Property in May/June 2015 to determine if historical uses had adversely affected subsurface conditions at the Target Property. Refer to Section 3.3.1 for additional information.

5.1.4 Unmapped Sites in the EDR Report

Four (4) sites were listed as not mapped due to inadequate address information. These sites are summarized below:

Facility Name/Address	Contamination Type	Distance (if known)	Comments
Calmac Chemical; End of Weeks Street, East Palo Alto, CA 94303	Unknown	0.2 miles southeast of the Target Property	Minimal threat to Target Property due to being downgradient of the Target Property.
Former UPRR Rail Spur; East of Illinois Street, East Palo Alto, CA 94303	Arsenic impacted soil	0.3-miles northwest of the Target Property	Minimal threat to Target Property due to regulatory status and distance. Soil cleanup activities have been completed along the Rail Spur, located behind the homes on Illinois Street. The contaminated soil has been removed and was replaced with clean fill. Site was granted regulatory closure on 6/11/2009.

Peninsula Sportsmen Club; University Avenue, East Palo Alto, CA 94303	Lead and Polycyclic Aromatic Hydrocarbon (PAH) impacted soil	0.8-mile north-northwest of the Target Property	Minimal threat to Target Property due to regulatory status and distance. Although database indicates site is in East Palo Alto, facility is located in the City of Menlo Park. Extensive site cleanup was completed in 2011. Site was granted regulatory closure on 11/30/2011.
Former Rail Spur East Palo Alto; Vicinity of Bay Road, East Palo Alto, CA 94303	Unknown – SLIC Site	Unknown	No additional information provided other than Facility ID SL1825B1165. It is most likely that this facility is the rail spur bordering the southern end of the site where arsenic-impacted soil has been encapsulated under regulatory review and approval. Testing completed on the Target Property in 2005 by Lowney indicates that arsenic impacts from the rail spur do not extend onto the Target Property.

SCA completed a Phase II investigation at the Target Property in May/June 2015 to determine if historical uses had adversely affected subsurface conditions at the Target Property. Refer to Section 3.3.1 for additional information.

5.1.5
Other Sites within a 0.25 mile radius

SCA conducted a visual inspection of neighboring properties within a 0.25-mile radius for landfill sites, gas stations, waste incinerators, hazardous waste disposal sites, etc. and visual evidence of possible contamination. Land use within a 0.25-mile radius of the Target Property is primarily commercial/light industrial properties, open space, and some residential.

The following sites were noted within 0.25 mile of the Target Property and have a likelihood to use, treat, or store hazardous chemicals:

- R.E. Borrmann’s Steel Co. – 2450 Pulgas Avenue (immediately south of the site)
- Infinity Salvage – 2091 Bay Road (0.21-mile northeast)
- Cal-Spray – 1905 Bay Road (immediately north, across Bay Road)
- CED Steel – 2530 Pulgas Avenue (0.10-mile northwest)
- Global Steel Fabricators, Inc. – 255 Demeter Street (0.22-mile northwest)
- Llanos Auto Repair – 1849 Bay Road (0.12-mile southwest)

No visual evidence of contamination, spills, leaks, etc. was observable by SCA from the property boundary.

According to the EDR report, R.E. Borrmann’s Steel Co. is in the San Mateo Co. Business Inventory database, the CA HIST UST, and the CA SWEEPS UST. No violations are listed. Infinity Salvage is listed in the San Mateo Co.

Business Inventory database, the EDR Historical Auto Station database (year 2011), and the RCRA-SQG, FINDS, and HAZNET databases as a small quantity generator. No violations reported for this facility. Cal-Spray is listed in the San Mateo Co. Business Inventory database, and the RCRA-SQG and HAZNET databases as a small quantity generator. No violations are reported. CED Steel and Llanos Auto Repair are both listed in the San Mateo Co. Business Inventory database. No violations are listed. The other site (Global Steel Fabricators) is not listed on other databases, and according to the information contained in the EDR report, no violations are on record for this site. Based on this information, the potential for recognized adverse environmental conditions at the Target Property from these off-site sources is minimal.

SCA completed an investigation in May/June 2015 to evaluate whether historical onsite uses or historical uses at offsite properties have impacted groundwater beneath the site. Refer to Section 3.3.1 for a discussion of the results of this investigation.

5.2 ADDITIONAL RECORDS SOURCES

SCA was provided with the following documents:

- Geomatrix Consultants and S.S. Papadopulos & Associates, Remedial Investigation Report, 1990 Bay Road Site and Vicinity, East Palo Alto, California, February, 8, 1989.
- Letter from the Law Offices of Orrick, Herrington & Sutcliffe to Pamela Kurtz, Esq., dated March 13, 1992.
- Geomatrix Consultants and S.S. Papadopulos & Associates, Pre-Treatment Soil Sampling Report: Upland Operable Unit, 1990 Bay Road Site, East Palo Alto, California, May 1, 1992.
- Geomatrix Consultants and S.S. Papadopulos & Associates, Remedial Design Report, Upland Operable Unit, May 1, 1992.
- Geomatrix Consultants and S.S. Papadopulos & Associates, 1993, Implementation Report for Remedial Action, Upland Operable Unit, June 30, 1993.
- Copy of the LUC for the Curtaccio Property, 2470 Pulgas, dated 10/26/1993, to restrict the use of the property.
- Northgate Environmental Management, Inc. Environmental Review Report for the Pulgas Avenue Commercial Development, Former Bains and Curtaccio/Peterson Properties, East Palo Alto, California, dated 2/6/2015. Includes a Phase I ESA, prepared by Lowney Associates, dated 6/24/2004 for the site.

SCA also obtained various documents from the San Mateo County Environmental Health Department (Refer to Section 7.2.3), and RWQCB's GeoTracker database for the Target Property and the adjacent 1990 Bay Road property.

Information obtained from these documents are incorporated by reference and presented.

No additional records sources, besides those listed in Sections 5.3, 5.4, and 7.0, were used.

5.3 PHYSICAL SETTING SOURCES

The following records sources were used in preparing this report:

- United States Geological Survey (USGS) Palo Alto, CA/7.5 Quadrangle.
- Portions of EDR Report located in Appendices D through G.
- Regulatory reviews as listed in Section 7.

5.4 HISTORICAL DATA

The following sources were researched for site and adjacent property history information. See the Appendices of this report for memoranda and selected excerpts from these historical sources.

- Sanborn Maps - 1968
- Aerial photographs – 1939-2012.
- City Directory –1970-2013.
- Topographic Maps – 1899-1997

5.4.1 Historical Findings

The historical data obtained from aerial photographs, city directories, and topographic maps for the Target Property and surrounding properties is summarized in the following table.

Date	Document	Notes
1899	Topo Map	Shows the overall area of the Target Property and vicinity. Bay Road and Pulgas Avenue are mapped north and west of the site, respectively. No structures are mapped on the Target Property.
1902	Topo Map	Shows the overall area of the Target Property and vicinity. Bay Road and Pulgas Avenue are mapped north and west of the site, respectively. No structures are mapped on the Target Property.
1939	Aerial Photo	The Target Property is primarily vacant. One structure (possible residential) is observed at the far southwestern corner of the site (in the vicinity of the current concrete debris pile). A rail spur is also observed south of the site. Properties immediately surrounding the site are primarily open space/agricultural. Cooley Landing and San Francisco Bay are observed further to the northeast. Areas south/southwest of the site are primarily residential.
1943	Aerial Photo	No change to the Target Property. One structure is observed immediately east of the site on the adjacent 1990 Bay Road property. No other significant changes are observed in the immediate vicinity of the site compared to the 1939 aerial photograph.
1943	Topo Map	Shows the overall area of the Target Property and vicinity. Bay Road and Pulgas Avenue are mapped north and west of the site, respectively. No structures are mapped on the Target Property. Cooley Landing and the San Francisco Bay are mapped northeast of the site. The City of Palo Alto is mapped to the southwest.
1947	Topo Map	Shows no change to the Target Property. No significant changes are observed in the immediate vicinity of the site compared to the 1943 Topographic Map.
1948	Aerial Photo	No significant change to the Target Property. Additional structures are observed on the property located immediately east. Additional infill of residential and commercial/industrial properties is observed.

1948	Topo Map	Shows no change to the Target Property from the previous Topographic Map. A railroad spur is mapped south of the site.
1950	Aerial Photo	No significant change to the Target Property or the immediate vicinity compared to the 1948 aerial photograph.
1953	Topo Map	Shows no change to the Target Property. The site and the immediate vicinity are shaded as urbanized.
1958	Aerial Photo	No significant change to the Target Property from the 1950 aerial photograph. Properties in the vicinity are becoming more industrial. Additional structure are observed on the property located immediately east of the site. A sludge pond is also present on the property immediately east of the site. Auto wrecking/junk yards are observed north of the site across Bay Road. Residential infill is observed further west, northwest, and south of the site. The Cooley Landing Substation is observed further east toward the San Francisco Bay.
1961	Topo Map	Shows no change to the Target Property. The site and the immediate vicinity are shaded as urbanized.
1966	Aerial Photo	An auto wrecking/junk yard is observed on the northern half of the Target Property. The structure located at the southwestern corner of the site is no longer present. The area in the immediate vicinity of the site appears industrialized with numerous auto wrecking/junk yards present. A large warehouse structure is mapped immediately southeast of the site.
1968	Aerial Photo	No significant change to the Target Property or immediate vicinity compared to the 1966 aerial photograph.
1968	Sanborn	Shows the site as occupied by an auto wrecking yard. Chipman Chemical Co. is present immediately east of the site and is listed as the manufacturer of weed killer and insecticide. Various commercial / light industrial properties are mapped north of the site, across Bay Road and include auto wrecking yards, repair shops, and machine shops. Commercial/light industrial properties are also located west (welding & building supplies) and south (can factory and equipment storage yard).
1968	Topo Map	Shows no change to the Target Property. The site and the immediate vicinity are shaded as urbanized.
1970	City Directory	Lists 1950 Bay Road as M&M Auto Wreckers. Lists 2470 Pulgas Avenue as Hunter Container.
1973	Topo Map	Shows no change to the Target Property. The site and the immediate vicinity are shaded as urbanized.
1974	Aerial Photo	One large structure appears present on the Target Property. Additionally, the ground surface appears discolored and may be indicative of hydrocarbon staining resulting from the auto wrecking/junk yard activities that remain on the northern half of the site. The southern portion of the site appears to be a vacant field. The sludge pond on the adjacent eastern property appears dry. Properties in the vicinity remain industrial and appear to be primarily used for auto wrecking/junk yard activities.
1977	City Directory	Lists 1950 Bay Road and 2470 Pulgas Avenue but no names are provided.
1980	City Directory	Lists 1950 Bay Road but no name provided. Lists 2470 Pulgas Avenue as Bains Moving & Storage.
1982	Aerial Photo	No significant change to the Target Property or immediate vicinity.
1985	City Directory	Lists 1950 Bay Road but no name provided. Lists 2470 Pulgas Avenue as Bains Moving & Storage.
1991	Aerial Photo	The northern portion of the Target Property remains an auto wrecking/junk yard. The southern portion that was previously vacant appears to be used as a truck / storage yard. No significant changes are observed in the immediate vicinity of the site.
1991	Topo Map	Shows no change to the Target Property. The site and immediate vicinity are no longer shaded as urbanized. Structures are mapped southeast of the site.
1992	City Directory	Lists 2470 Pulgas Avenue as Bains Moving & Storage and KJC Mfg Corp.
1995	City Directory	Lists 2470 Pulgas Avenue as Bains Moving & Storage Corp.; C & B Auto; KJC Mfg Corp.; and Sam’s Auto Body and Paint.
1997	Topo Map	Shows no change to the Target Property or site vicinity from the 1991 map.
1998	Aerial Photo	Picture resolution is not clear. A large warehouse appears present on the

		adjacent property to the east. Due to resolution, unable to determine if there have been other significant changes to the Target Property or vicinity.
1999	City Directory	Lists 2470 Pulgas Avenue as Alice Hawkins & Bains Moving & Storage Corporation.
2003	City Directory	Lists 2470 Pulgas Avenue as Bains Moving Services Corp. and BFM Inc.
2005	Aerial Photo	The auto wrecking/junk yard portion of the site appears to now be vacant. An asphalt paved area appears on the northeastern part of the site. The southern half of the site appears to still be utilized as a truck/storage yard. The 1990 Bay Road property (immediately east) has undergone remediation and is now capped with asphalt and the currently vacant warehouse building. Properties in the vicinity appear to still be industrialized, however, less auto wrecking/junk yards are observed. A large warehouse is observed immediately south of the site. Large sections of land south/southeast of the site appear to be capped with asphalt.
2008	City Directory	Lists 2470 Pulgas Avenue as Crossroads Relocation Services Inc.
2009	Aerial Photo	No significant change to the Target Property with the exception of a large stockpile is present o the southern half of the site that was previously used as a truck/storage yard. The stockpile appears to be covered with plastic sheeting. No significant change to the vicinity of the site compared to the 2005 aerial photograph.
2010	Aerial Photo	Stockpile is still present on the southern part of the site. No other significant change to the Target Property or near vicinity.
2012	Aerial Photo	Stockpile is no longer present and the Target Property appears vacant. No other significant change to the Target Property or near vicinity.
2013	City Directory	Lists 2470 Pulgas Avenue as Bains Moving & Storage Corp.
June 2015	Site Visit	The Target Property is currently vacant, with the exception of an asphalt – paved area on the northeastern portion of the site which demarcates a deed-restricted area where arsenic impacted soils are encapsulated. Two monitoring wells were observed toward the east-central portion of the site and are associated with the monitoring well network for the adjacent 1990 Bay Road property. A concrete debris pile (approximately 100 cubic yards) and a brick debris pile (measuring approximately 4 cubic yards) are present toward the southwestern end of the site. Miscellaneous debris/refuse was also observed scattered around the property and include metal, PVC pipe debris, paint containers, and treated wood.

Based on our review of this and other available information, historical uses of the Target Property have been undeveloped land possibly used for agriculture from at least the 1930s through the 1960s. After the 1960s, the site was occupied by auto wrecking yards (Curtaccio/Peterson property, 1960s – 1990s), vacant land (Bains mid-1960s – 1970s), and then truck and trailer parking with some automotive maintenance and repair (Bains from the 1980s, and Curtaccio/Peterson after the 1990s).

5.5 HISTORICAL USE INFORMATION

Historically, sites in the immediate area have been used for agriculture and industrial use. Areas surrounding the Target Property were primarily marshland and/or agriculture since the later 1930s/early 1940s. Properties in the vicinity of the site have been primarily industrial since at least the 1940s until the present day.

6.0 SITE RECONNAISSANCE

6.1 LIMITATIONS/ METHODS

The Phase I site visit was conducted by Tucker Kalman, CAC, CDPH, under supervision from Karen Emery, P.G. on June 3, 2015. Ground level photographs taken during the site reconnaissance are presented in Appendix A.

6.2 SITE SETTING

The area surrounding the Target Property consists primarily of commercial / light industrial properties in the City of East Palo Alto. A new residential development is under construction and is located immediately west of the site, across Pulgas Avenue.

6.3 OBSERVATIONS

All observations of site conditions including any identified or non-identified substances have been listed below in accordance with ASTM Practice E-1527-13.

6.3.1 Hazardous Substances from Identified Property Uses

No hazardous substances from identified historic property uses (former auto wrecking yard and trucking operations) were noted to be stored on the Target Property.

6.3.2 Hazardous Substance and Unidentified Containers

No unidentified substances or containers were noted at the Target Property during the site reconnaissance.

6.3.3 Storage Tanks

No aboveground or underground storage tanks were observed onsite at the time of our reconnaissance.

6.3.4 Polychlorinated Biphenyls (PCBs)

PCBs are regulated under Federal and State law. Byproducts of PCB combustion are known carcinogens and respiratory hazards. Consequently, specific handling and disposal of PCB-containing products is required. PCBs are most commonly found in lighting ballasts, wet transformers, and in electrical equipment, which uses dielectric fluids. PCBs are also occasionally found as a contaminant in hydraulic fluids.

No transformers or PCB-containing equipment was noted at the Target Property during the site reconnaissance.

6.3.5 Solid Waste Disposal

No solid waste disposal system was observed on site. Some garbage and debris were present on site, including stockpiles of concrete and brick debris, paint containers, treated wood, PVC pipe debris, and metal debris.

6.3.6
Physical Setting Analysis (re: on-site or off-site migration of hazardous substances)

Based on our site reconnaissance and the findings listed in Sections 3.3.1 and 5.1.3, it is SCA's opinion that adjacent properties have impacted the soil, soil-vapor, or groundwater conditions at the Target Property. No other factors observed at the Target Property during the reconnaissance were relevant to on-site or off-site migration.

6.3.7
Odors

No odors of an unknown nature were noted by SCA at the time of the site investigation.

6.3.8
Pits, Ponds, Lagoons, or Pools of Liquid

No pits, ponds or lagoons of an environmental concern were noted during SCA's site visit.

6.3.9
Stained or Corroded Concrete, Floors, etc.

No stains or discoloration was noted at the Target Property during the site reconnaissance.

6.3.10
Stressed Vegetation

No stressed vegetation was observed on the Target Property.

6.3.11
Wastewater and Stormwater Disposal

Stormwater follows the topographic gradient of the site. No drain inlets were identified as present onsite during the reconnaissance. SCA noted the presence of drain inlets on portions of Bay Road and Pulgas Avenue. Stormwater is collected in these drain inlets and is transported to the stormwater system.

6.3.12
Wells and Septic System

Two monitoring wells (W-125U and W-126L) were observed toward the east-central portion of the site and are associated with the well network used to evaluate residual contamination resulting from historic activities at the adjacent 1990 Bay Road property. Sampling conducted in April 2014 of these two wells identified arsenic concentrations in shallow groundwater at 0.0006 mg/L.

If continued monitoring of these two wells is no longer intended or required by the RWQCB, they should be property abandoned in accordance with applicable local and state regulations.

See "Wells" in Section 8.0.

6.3.13
Drains and Sumps

No drains or sumps were observed on the site.

6.3.14 Asbestos-Containing Materials

Asbestos-containing materials (ACM) are those materials identified as containing >1.0% asbestos. Trace ACM are those materials identified as containing <1.0% but greater than 0.1% asbestos. These materials may exist as construction debris (in which case they fall under CERCLA regulatory requirements), as materials in intact buildings (in which case they fall under TSCA and NESHAPS requirements) or as geological deposits (in which case they are typically regulated by local air pollution control district standards).

During SCA's May 2015 investigation, we observed the presence of a concrete debris pile located at the southern end of the Target Property. SCA's field personnel roughly calculated the volume of the concrete pile, as well as a small brick stockpile. The concrete pile measured about 100 CY and the brick pile measured about 4 CY. Within the debris piles, SCA also observed other miscellaneous debris/refuse including asphalt, a broken toilet, and ceramic floor tiles (unused floor tiles – no grout or mortar applied).

To profile the debris pile for disposal, SCA field personnel collected three (3) samples of the concrete (Concrete 1-1 through Concrete 1-3); two (2) samples of the brick (Brick 2-1 and Brick 2-2); one (1) sample of the asphalt (Asphalt 3-1); one (1) sample of the ceramic floor tile (FLCER 4-1); and one (1) sample from the toilet (Toilet 5-1). Sample locations are shown on Figures 3A through 3C.

The samples were forwarded to Analytical Labs of San Francisco (ALSF) for analysis of asbestos content by EPA's provisional method of dispersion staining/polarized light microscopy (PLM). No asbestos was identified within any of the debris pile samples collected from the site.

See "Debris Piles" in Section 8.0.

6.3.15 Lead-Containing Materials

No structures are present at the Target Property; therefore no lead-containing materials have been identified.

6.3.16 Lead in Water

Lead in drinking water is limited to a 15 parts per billion (ppb) standard under USEPA regulations. The potential sources of lead, and their applicability to the Target Property, are summarized in the following table:

Potential Source of Lead In Water	Applicability to Target Property
Older piping systems with "silver solder" connections.	Not applicable – no piping systems evident on site as the site is vacant (no structures present).
Specific brands of drinking fountain with lead-lined holding tanks.	Not applicable – no drinking fountains of these specific brands observed.
Water provided by local municipality	Not applicable – testing provided by municipality shows that source water is below the USEPA standard.

6.3.17 Mercury Lamps and Control Systems

Elemental mercury is a neurotoxin and bio-accumulative environmental hazard, which is relatively common in building electrical and control systems. No mercury-containing lamps or control systems were observed during our site reconnaissance.

6.3.18 Urea Formaldehyde Foam Insulation

No urea-formaldehyde foam insulation was observed during SCA's visit.

6.3.19 Fiberglass Building Systems

No fiberglass building systems were observed during SCA's site visit.

6.3.20 Chlorofluorocarbons (CFCs)

No potentially CFC-containing equipment was noted at the Target Property.

6.3.21 Radon

No specific information is available concerning radon levels at the Target Property. However, the Federal EPA Radon Zone for San Mateo County is listed in the EDR Report as "2". The zone is defined by radon testing of the basement, first and second floors for various sites in San Mateo County. The zone indicates that the average indoor level of radon is greater than 2 but less than 4 picocuries per liter (pCi/l). This average is below the US EPA's recommended action level of 4 pCi/l.

Based on these survey results SCA does not anticipate radon exposures to exceed the US EPA recommended action level of 4 pCi/l.

6.3.22 Electromagnetic Fields

The Target Property does not appear to be in a particularly high-risk location for electromagnetic field (EMF) or extremely low frequency (ELF) exposure. High voltage lines do not traverse the property. No step-down stations, microwave transmitters, or other typical sources of EMF/ELF were visible on the property or immediately surrounding properties. The Cooley Landing Substation is located approximately 0.1-miles east-northeast of the Target Property.

6.3.23 Mold

No evidence of mold was identified during the site reconnaissance.

6.3.23 Other Environmental Issues

Fill material may have been spread across the site resulting from stockpiles of soil historically placed onsite. The source and quantity of the fill material is unknown. SCA completed limited shallow soil sampling at the site in June 2015. Refer to Section 3.3.1 for additional information.

No other environmental issues were noted.

7.0 INTERVIEWS

7.1 *KEY SITE MANAGER* INTERVIEW

SCA interviewed the *Key Site Manager* for the Target Property, Mr. Mark Lazzarini with DKB Homes LLC, the current owner of the site. Information obtained from this interview is incorporated by reference.

7.2 REGULATORY INTERVIEWS

SCA requested file reviews from the following agencies. A synopsis of agency responses and reviewed data is included below. Copies of documents received are included in Appendix C.

7.2.1 California Regional Water Quality Control Board – San Francisco Bay Region

This agency maintains files regarding sites with underground storage tank removals, stored hazardous materials, permits, violations, etc. dating back to circa 1980. SCA researched the State's GeoTracker website for information regarding LUFT, SLIC, Land Disposal Sites, DOD sites, Wells, and UST sites.

Information obtained from the RWQCB is summarized in Section 3.3.1.

7.2.2 Bay Area Air Quality Management District

This agency maintains files that include sites with air quality violations, permits, etc. SCA researched all addresses associated with the Target Property on the District's on-line database. The agency had no files related to the Target Property.

7.2.3 San Mateo County Environmental Health Department

This Agency maintains files including sites undergoing remediation, underground storage tank removal and installation, hazardous materials business plans (HMBP), permits, inventories, and notices of violations. Copies of files provided by SMCEHD are included in Appendix C.

Records related to the Target Property on file with this Agency include the following:

<u>1950 Bay Road</u>

- Phase I ESA for 2470, 2477, and 2485 Pulgas Avenue and 1950 Bay Road, East Palo Alto, CA, prepared by Lowney Associates, dated 6/24/2004.
- Health Risk Assessment, Peck & O'Connor, O'Connor Trust (Formerly Bishop), Bains, Ravenswood Investments, and Chang Properties, East Palo Alto, CA, prepared by Lowney Associates, dated 1/3/2005.
- Soil, Groundwater, and Soil Vapor Quality Evaluation, Peck & O'Connor, O'Connor Trust (Formerly Bishop), Bains, Ravenswood Investments, and Chang Properties, East Palo Alto, CA, prepared by Lowney Associates, dated 11/8/2005.
- Permit #05-0754, for drilling activities on behalf of Byrd Development Company.
- Various case file notes and email correspondence pertaining to the Ravenswood Industrial Area. Includes copy of CAOs 92-037 and 92-

086 (amends 92-037) A Site Plan is included from Lowney Associates investigation showing boring locations completed on the northern part of the site. Also shows shaded area where stockpiled soil has been spread across part of the site.

- SMEHD Site Data Sheet listing San Mateo County LOP as the Lead Agency, case type S (Soil only affected). Case status is listed as Preliminary Site Assessment underway, date 10/5/2005. Responsible party listed as Carrie Peterson.
- Letter from SMEHD to Carrie Peterson, dated 10/5/2005, indicating that the County has reviewed the soil and groundwater investigation report submitted by Lowney Associates and identified Carrie Peterson as the Responsible Party for the contamination discovered on the property.
- Letter from SMEHD to Carrie Peterson, dated 10/27/2005, clarifying the responsibilities of Carrie Peterson as the Responsible Party for the contamination discovered on the property.
- Letter from SMEHD to Carrie Peterson, dated 2/22/2006, indicating that the County has discussed the property with RWQCB staff and that they understand that the RWQCB is the lead oversight agency for the contamination discovered on the property.
- Letter from SMEHD to Keith Casto, dated 2/22/2006, summarizing the County’s review of various reports for the Byrd Development, LLC Redevelopment Project, which includes the Target Property.
- Notice of Intent from the City of East Palo Alto, received by SMCEHD 4/19/2006.
- Letter from RWQCB to DKB Homes, dated 4/4/2008 approving the 3/31/2008 Soil and Asphalt Management Plan for the Byrd Business Center Project (1950 Bay Road) and Pulgas Mixed Use Project.
- Letter from RWQCB to DKB Homes, dated 5/29/2008 approving the 3/31/2008 Soil and Asphalt Management Plan for the Byrd Business Center Project (1950 Bay Road) 1990 Bay Road Site and Pulgas Mixed Use Project. Soil and Asphalt Management Plan attached to this letter.
- Permit # 15-0933, for drilling activities on behalf of JMGF.
- Email from SCA Environmental, Inc. to SMCEHD, dated May 6, 2015, notifying the County of the dates of the drilling activities for the above referenced permit.

<u>1952 Bay Road</u>

- Permit # 15-0934, for drilling activities on behalf of JMGF.
- Email from SCA Environmental, Inc. to SMCEHD, dated May 6, 2015, notifying the County of the dates of the drilling activities for the above referenced permit.

<u>2454 Pulgas Avenue</u>

- Permit # 15-0935, for drilling activities on behalf of JMGF.
- Email from SCA Environmental, Inc. to SMCEHD, dated May 6, 2015, notifying the County of the dates of the drilling activities for the above referenced permit.

<u>2456 Pulgas Avenue</u>

- Permit # 15-0936, for drilling activities on behalf of JMGF.
- Email from SCA Environmental, Inc. to SMCEHD, dated 5/6/2015, notifying the County of the dates of the drilling activities for the above referenced permit.

<u>2470 Pulgas Avenue</u>

- Facility Information Sheets 8/22/2006; 8/31/2006. Bains Moving Services, Inc. is listed as the facility name.
- Waste Tire & Survey Inspection Report, for B & G Workshop, Inspection date of 12/8/2008. 183 tires noted.
- New Account/Change of Information Form for the Tires program, dated 12/10/2008; changing the owners name to Bill Brenner & Rigo Garcia.
- New Account/Change of Information Form, dated 12/16/2010; deleting B & G Workshops at the site.
- New Account/Change of Information Form, dated 12/17/2010; listing AA Auto Repair at the site.
- New Account/Change of Information Form, dated 9/23/2011; deleting AA Auto Repair at the site. Documents inactive waste generator permits.
- Email correspondence between Michael Rafferty, S.S. Papadopoulos & Associates, Inc. and AEI Consultants regarding site history and upcoming Phase II investigation, August 2011.
- Permit #11-0993, for drilling activities on behalf of Jerry Wang, Receiver Appointed by Superior Court of San Mateo Co. Drilling activities appear to be located on property immediately adjacent (east) to the southern half of the site.
- Phase II Environmental Site Investigation Report for 2470-2480 Pulgas Avenue, prepared by AEI Consultants, dated 10/5/2011. Details the completion of 7 borings on the property located immediately adjacent (east) to the southern half of the site. Investigation identified arsenic (up to 120 mg/kg) and organochlorine pesticides (below ESLs) in shallow soil (3 feet bgs) and TPHd (up to 160 µg/L), TCE (up to 8.4 µg/L), and MTBE (up to 10 µg/L) in groundwater below the site.
- Letter from SMCEHD to AEI Consultants, dated 12/5/2011, indicating that they had not received copies of lab reports, boring logs, or a site plan as required by conditions of permit #11-0993.
- Notice of Violation Letter from SMCEHD to AEI Consultants, dated 2/1/2012, indicating that they still had not received copies of lab reports, boring logs, or a site plan as required by conditions of permit #11-0993.
- Letter from SMCEHD to AEI Consultants, dated 2/1/2012, indicating that they had received the Phase II Investigation Report dated 10/5/2011 which satisfies the conditions of permit #11-0993. This letter also indicates that although the report concludes that pesticides were below ESLs the shallowest sample was collected at 3 feet bgs and therefore, greater pesticide impacts may be at shallower depth.
- Permit #15-1005, for drilling activities on behalf of SLLI care of Sanofi-Aventis for the destruction of two wells (W-108 and W-109)

Drilling activities appear to be located on property immediately adjacent (east) to the southern half of the site.

7.2.6 *Permits, Licenses, and Registrations, etc.*

No registrations, environmentally related permits, or licenses exist or are required for the Target Property under its current use.

7.2.7 *California Department of Conservation, Division of Oil, Gas and Geothermal Resources.*

No oil, gas, or geothermal wells are located within 1,500-feet of the Target Property.

7.3 *INTERVIEWS WITH OTHERS*

The findings of SCA have not warranted any further interviews to be conducted at this time.

8.0 FINDINGS AND RECOMMENDATIONS

8.1 ASTM FINDINGS

The assessment revealed no evidence of *recognized environmental conditions, controlled recognized environmental conditions,* or *historical recognized environmental conditions with the exception of the following:*

8.1.1 Subsurface Conditions

The Target Property was undeveloped land possibly used for row crops or other agriculture from at least the 1930s through the 1960s. After the 1960s, the site was occupied by auto wrecking yards (Curtaccio/Peterson property, 1960s – 1990s), vacant land (Bains mid-1960s – 1970s), and then truck and trailer parking with some automotive maintenance and repair (Bains from the 1980s, and Curtaccio/Peterson after the 1990s).Historically, sites in the immediate area have been used for agriculture and industrial use. Areas surrounding the Target Property were primarily marshland and/or agriculture since the later 1930s/early 1940s. Properties in the vicinity of the site have been primarily industrial since at least the 1940s until the present day.

1. Given the information reviewed as part of the preparation of this Phase I ESA, several facilities upgradient of the site have open-active investigations due to contamination resulting from historic site uses. Additionally, the Target Property was historically used as an auto wrecking/junk yard and truck/trailer parking with some automotive maintenance and repair, and is currently an open-active case with the RWQCB. SCA conducted an investigation in 2015 which detected low levels of TPHd and TPHmo, VOCs, organochlorine pesticides, and various metals in shallow soil at concentrations below commercial land use and construction worker ESLs with the exception of the following:

    - Slightly elevated concentrations of TPHmo (up to 860 mg/kg) within the upper 2.0 feet of soil in two locations (B-3 and B-6), exceeding commercial land use ESL of 500 mg/kg;
    - Slightly elevated total zinc (2,300 mg/kg) within the upper 2.0 feet at Boring B-5, exceeding the commercial land use ESL of 600 mg/kg; and
    - Slightly elevated Dieldrin concentrations (up to 0.041 mg/kg) at the surface at locations HA-2, HA-3, and HA-7, exceeding commercial land use ESL of 0.0023 mg/kg.

    SCA's investigation also identified slightly elevated concentrations of petroleum hydrocarbons and VOCs in groundwater, which most likely originated from offsite sources. Additionally, low levels of VOCs were detected in soil-vapor samples collected from the site at concentrations below respective commercial CHHSLs and Tier 1 ESLs, where established. The past uses at, and in the vicinity of the Target Property, the facilities located upgradient of the Target Property that are currently open-active cases, the Target Property being an open-active case at the RWQCB, and the presence of petroleum hydrocarbons, VOCs, pesticides, and metals in shallow soil, groundwater, and/or soil-vapor are considered a *recognized environmental condition*.

2. Various investigations and remedial activities have occurred at the Target Property since the early 1980s. Results of the investigations indicate that arsenic

concentrations exceed background levels in a limited zone along the eastern portion of the Curtaccio/Peterson property. Contamination in soil along this portion of the site was most likely a result of arsenic compounds being disposed in a shallow sludge pond on the adjacent 1990 Bay Road facility. The dispersal mechanism appears to have been surface water runoff from 1990 Bay Road to low lying areas on this portion of the Target Property. Other source areas at the adjacent 1990 Bay Road facility include possible leaks from an underground storage tank and releases/spillage along a railroad spur. The Target Property is bordered along the south by a paved asphalt strip that marks a portion of a former railroad easement where arsenic-impacted soil had been encapsulated as a result of the releases/spillage along the railroad spur.

Soil containing arsenic concentrations ranging from 500 mg/kg to 5,000 mg/kg was excavated from the Bains and Curtaccio/Peterson properties, and moved to the adjacent 1990 Bay Road property for treatment. Following excavation and backfill, an asphalt cap was placed on the eastern side of the Curtaccio/Peterson property in accordance with the RAP and ROD to encapsulate soil with arsenic concentrations greater than 70 mg/kg. Rhone-Poulenc worked with the RWQCB and the owner of the Curtaccio property to secure a Land Use Covenant for the site in accordance with Provisions 1d and 1f of Order No. 92-022. The LUC was recorded on 10/26/93. Although the address listed on the LUC is 2470 Pulgas, the Legal Description presented in Exhibit A pertains to the asphalt capped portion of the 1950 Bay Road portion of the Target Property. The presence of asbestos in soil at concentrations above 70 mg/kg encapsulated below the asphalt cap at the Target Property, and the resulting Land Use Covenant, are considered a *controlled recognized environmental condition.*

Recommendation: Due to the presence of localized areas of soil where certain analytes exceed commercial land use ESLs, and the presence of elevated arsenic concentrations beneath the asphalt cap, SCA recommends the preparation of a SMP, which should be submitted to the RWQCB for review and approval prior to the start of construction.

The SMP should address potential risks of identified chemicals to human health related to construction workers. SCA recommended that the SMP include provisions for handling soil excavated from the site as part of construction, including but not limited to soil handling, stockpile and/or waste profile characterization, stockpile erosion control on measures, decontamination, and dust control of personnel and equipment. The SMP should also include establishing health and safety training and worker protection objectives for construction workers.

If dewatering is planned for the project, due to the presence of detected analytes including dissolved metals concentrations, groundwater generated from dewatering activities may need to be containerized into holding tanks to allow entrained sediments to settle out prior to discharge in accordance with wastewater discharge permit requirements. Additional testing of the groundwater may be required prior to discharge as a condition of the wastewater discharge permit.

Since various VOCs were detected during this, as well during previous

investigations completed by others, SCA recommends JMGF consider the installation of a vapor barrier as part of the design for the new construction to mitigate potential vapor intrusion of VOCs.

8.2 OTHER FINDINGS

The following items were noted, but are not *recognized environmental conditions* as defined by ASTM methodology. Although not recognized by ASTM, these items may be of some significance in future site operations.

8.2.1 Wells

Two monitoring wells (W-125U and W-126L) were observed toward the east-central portion of the site and are associated with the monitoring well network to evaluate residual contamination resulting from historic activities at the adjacent 1990 Bay Road property. Sampling conducted in April 2014 of these two wells identified arsenic concentrations in shallow groundwater at 0.0006 mg/L.

Recommendation: If continued monitoring of these two wells is no longer intended or required by the RWQCB, they should be property abandoned in accordance with applicable local and state regulations.

8.2.2 Debris Piles

During SCA's May 2015 investigation, we observed the presence of a concrete debris pile located at the southern end of the Target Property. SCA's field personnel roughly calculated the volume of the concrete pile, as well as a small brick stockpile. The concrete pile measured about 100 CY and the brick pile measured about 4 CY. Within the debris piles, SCA also observed other miscellaneous debris/refuse including asphalt, a broken toilet, and ceramic floor tiles. SCA collected and analyzed samples of the piles for asbestos, and no asbestos was identified. Miscellaneous debris/refuse was also observed scattered around the property and include metal, PVC pipe debris, paint containers, and treated wood.

Recommendation: SCA recommends that the debris piles and the miscellaneous debris be removed and disposed as a non-hazardous waste prior to or during the start of construction activities.

9.0 CONCLUSIONS

SCA has performed this Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 for the proposed East Palo Alto Youth Center project site located in East Palo Alto, California, the Target Property. Any exceptions to, or deletions from, this practice are described in Section 2.4 of this report. The assessment revealed the following in connection with the property:

1. Given the information reviewed as part of the preparation of this Phase I ESA, several facilities upgradient of the site have open-active investigations due to contamination resulting from historic site uses. Additionally, the Target Property was historically used as an auto wrecking/junk yard and truck/trailer parking with some automotive maintenance and repair, and is currently an open-active case with the RWQCB. SCA conducted an investigation in 2015 which detected low levels of TPHd and TPHmo, VOCs, organochlorine pesticides, and various metals in shallow soil at concentrations below commercial land use and construction worker ESLs with the exception of the following:

    - Slightly elevated concentrations of TPHmo (up to 860 mg/kg) within the upper 2.0 feet of soil in two locations (B-3 and B-6), exceeding commercial land use ESL of 500 mg/kg;
    - Slightly elevated total zinc (2,300 mg/kg) within the upper 2.0 feet at Boring B-5, exceeding the commercial land use ESL of 600 mg/kg; and
    - Slightly elevated Dieldrin concentrations (up to 0.041 mg/kg) at the surface at locations HA-2, HA-3, and HA-7, exceeding commercial land use ESL of 0.0023 mg/kg.

    SCA's investigation also identified slightly elevated concentrations of petroleum hydrocarbons and VOCs in groundwater, which most likely originated from offsite sources. Additionally, low levels of VOCs were detected in soil-vapor samples collected from the site at concentrations below respective commercial CHHSLs and Tier 1 ESLs, where established. The past uses at, and in the vicinity of the Target Property, the facilities located upgradient of the Target Property that are currently open-active cases, the Target Property being an open-active case at the RWQCB, and the presence of petroleum hydrocarbons, VOCs, pesticides, and metals in shallow soil, groundwater, and/or soil-vapor are considered a *recognized environmental condition*.

2. Various investigations and remedial activities have occurred at the Target Property since the early 1980s. Results of the investigations indicate that arsenic concentrations exceed background levels in a limited zone along the eastern portion of the Curtaccio/Peterson property. Contamination in soil along this portion of the site was most likely a result of arsenic compounds being disposed in a shallow sludge pond on the adjacent 1990 Bay Road facility. The dispersal mechanism appears to have been surface water runoff

from 1990 Bay Road to low lying areas on this portion of the Target Property. Other source areas at the adjacent 1990 Bay Road facility include possible leaks from an underground storage tank and releases/spillage along a railroad spur. The Target Property is bordered along the south by a paved asphalt strip that marks a portion of a former railroad easement where arsenic-impacted soil had been encapsulated as a result of the releases/spillage along the railroad spur.

Soil containing arsenic concentrations ranging from 500 mg/kg to 5,000 mg/kg was excavated from the Bains and Curtaccio/Peterson properties, and moved to the adjacent 1990 Bay Road property for treatment. Following excavation and backfill, an asphalt cap was placed on the eastern side of the Curtaccio/Peterson property in accordance with the RAP and ROD to encapsulate soil with arsenic concentrations greater than 70 mg/kg. Rhone-Poulenc worked with the RWQCB and the owner of the Curtaccio property to secure a Land Use Convenant for the site in accordance with Provisions 1d and 1f of Order No. 92-022. The LUC was recorded on 10/26/93. Although the address listed on the LUC is 2470 Pulgas, the Legal Description presented in Exhibit A pertains to the asphalt capped portion of the 1950 Bay Road portion of the Target Property. The presence of asbestos in soil at concentrations above 70 mg/kg encapsulated below the asphalt cap at the Target Property, and the resulting Land Use Covenant, are considered a *controlled recognized environmental condition.*

The following items were noted, but are not recognized environmental conditions as defined by ASTM methodology, and may be of some significance in future redevelopment activities at the site:

1. Presence of two groundwater monitoring wells onsite.
2. Presence of debris piles on the southern end of the site, as well as the presence of miscellaneous refuse/debris across the site.

10.0 LIMITATIONS

The staff of SCA Environmental, Inc. has prepared this report for the John and Marcia Goldman Foundation under the professional supervision of the principal and staff whose signatures appear hereon. Neither SCA Environmental, Inc., nor any staff member assigned to this investigation has any interest or contemplated interest, financial or otherwise, in the subject or surrounding properties or which may be responsible for environmental issues identified during the course of this investigation, and has no personal bias with respect to the parties involved.

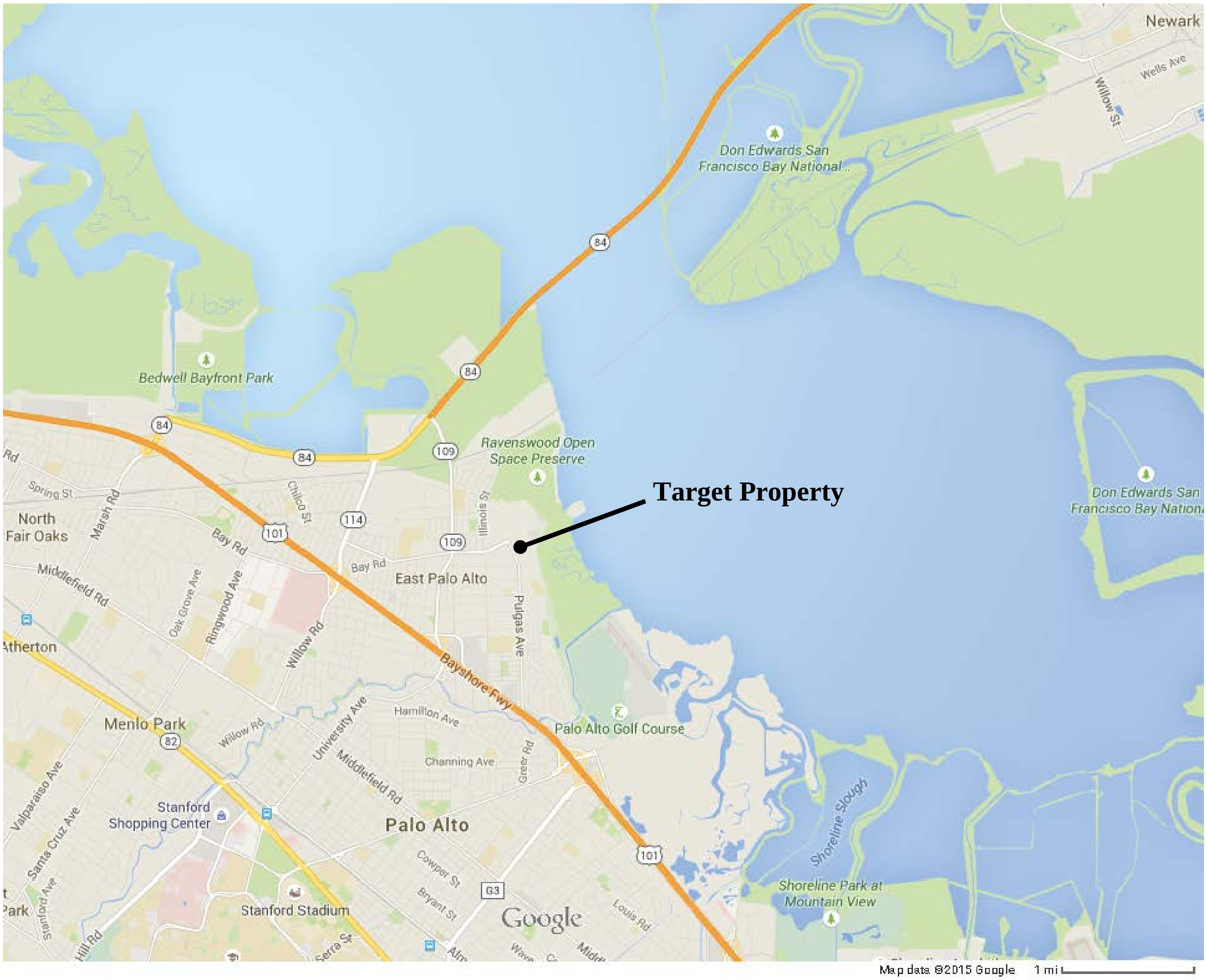
The information contained in this report has received appropriate technical review and approval. The conclusions represent professional judgments and are founded upon the findings of the investigations identified in the report and the interpretation of such data based on our experience and expertise according to the existing standard of care. No other warranty or limitation exists, either express or implied.

The investigation was prepared in accordance with the most current (E-1527-13) American Society of Testing and Materials (ASTM) methods for environmental site assessments. The report is prepared solely for the use and benefit of John and Marcia Goldman Foundation. No other party may use this report, for any purpose, without the written authorization of a Principal of SCA.

In preparing this report, SCA has relied upon information provided by others. SCA has not verified the accuracy or completeness of this information. Should information provided by others prove to be inaccurate or incomplete, SCA's findings, conclusions, and recommendations provided herein may not be valid.

Please note that relevant ASTM standards require re-preparation of Phase I assessments after six months if they are to be used for funding, development, or other decision-making purposes. This document is not to be used for zoning or planning purposes and does not address seismic, aesthetic or noise issues.

FIGURES



Source: Google Maps

N

SCA ENVIRONMENTAL, INC.

VICINITY MAP
Proposed East Palo Alto Youth Center
East Palo Alto, California
SCA Project No.: B11689

Figure
1

LEGEND:

☐ Site Boundary

1- Target Property
2- Vacant
3- 1990 Bay Road (Former Rhône-Poulenc)
4- Cooley Landing Substation
5- Eden Bridge Homes (under construction)
6- R.E. Borrmann's Steel Co.
7- 1175 Weeks Street
8- 965 Weeks Street
9- Llanos Auto Repair
10- Cal Spray Inc.
11- CED Steel
12- 2081 Bay Road
13- Infinity Salvage
14- Global Steel Fabricators, Inc.

C/I- Commercial/Light Industrial Properties
R- Residential Properties

N

Source: Google Earth Pro Imagery

SCA
ENVIRONMENTAL, INC.

SITE MAP
Proposed East Palo Alto Youth Center
East Palo Alto, California
SCA Project No.: B11689

Figure

2

Legend

🟥 Approximate Site Boundary

1 -	Asphalt Cap
2 -	Approximate Location of Monitoring Wells
3 -	55-Gal Drum of Soil (Investigation Derived Waste)
4 -	Approximately 4 CY Stockpile of Brick Debris
5 -	Approximately 100 CY Stockpile of Concrete Debris
6 -	Miscellaneous Debris and Refuse

Source: Google Earth Pro Imagery

SCA
ENVIRONMENTAL, INC.

SITE DIAGRAM
Proposed East Palo Alto Youth Center
East Palo Alto, California
SCA Project No.: B11689

Figure
3

APPENDIX A
SITE PHOTOGRAPHS

Photo 1: View of the site looking southeast.

Photo 2: View from northwest corner looking south.

Photo 3: View of the site looking south across asphalt capped area.

Photo 4: View of asphalt cap located along northeast side of the site.

Photo 5: View looking north from southern portion of the site.

Photo 6: View of debris pile at southern end of site.

SITE PHOTOGRAPHS

Proposed East Palo Alto Youth Center Project Site
East Palo Alto, California

Photo 7: View of paint containers and misc. refuse debris.

Photo 8: View of treated wood debris.

Photo 9: View of investigation derived waste generated from SCA's investigation and misc. refuse.

Photo 10: View of PVC debris on east side of site

Photo 11: View of PVC and metal debris located south of Pulgas Ave. gate.

Photo 12: View of monitoring wells on eastern side of site.

SITE PHOTOGRAPHS

Proposed East Palo Alto Youth Center Project Site
East Palo Alto, California

Photo 13: View of property immediately north of the site.

Photo 14: View of the properties immediately northwest of site.

Photo 15: View of property immediately west of the site at corner of Pulgas Ave. and Bay Rd.

Photo 16: View of construction site immediately west of the site.

Photo 17: View of 1990 Bay Road property located east of the site.

Photo 18: View of property immediately south of the site.

SITE PHOTOGRAPHS

Proposed East Palo Alto Youth Center Project Site
East Palo Alto, California

APPENDIX B
PERTINENT DOCUMENTS

FINAL REMEDIAL INVESTIGATION REPORT

VOLUME 1 OF 4 - REPORT

1990 Bay Road Site and Vicinity
East Palo Alto, California

19 September 1989
Project 1220A

GEOMATRIX CONSULTANTS, INC.
San Francisco, California
in association with
S.S. PAPADOPULOS & ASSOCIATES, INC.
Rockville, Maryland

REMEDIAL INVESTIGATION REPORT
1990 BAY ROAD SITE AND VICINITY
East Palo Alto, California

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EXECUTIVE SUMMARY

Introduction

The 1990 Bay Road site and vicinity, which comprise the study area, is located in an industrial part of the City of East Palo Alto along the western shore of San Francisco Bay. The site has been used for agricultural chemical manufacturing for 60 years or more.

Prior to 1926, the site itself, constituting approximately 5 acres, was occupied by Reed Zinc Company and Reed Zinc Reduction Company. From 1926 to 1964, the site was occupied by Chipman Chemical Company. In 1964, Rhone-Poulenc's predecessor, Rhodia, Inc., acquired Chipman and operations continued under the name of Chipman Chemical Company, Division of Rhodia, Inc. until 1970. In 1971, Rhodia, Inc. sold the property to the Zoecon Corporation, which began manufacturing operations at the site in 1972. Zoecon, now Sandoz Crop Protection Company, manufactures biorational insect controls at an agri-chemical facility using three acres of the five-acre site.

The remaining vicinity consists of undeveloped land to the immediate south and east of the site, including a non-tidal marsh and a Pacific Gas and Electric Co. yard; partially developed commercial properties to the north and west; and a tidal marsh located beyond a levee to the east of the site. Most of the site and vicinity is level and unpaved. The Sandoz plant area, however, is covered with buildings and pavement. Thirteen acres, including the Sandoz site, the PG&E yard, the tidal marsh and a portion of the land directly south of the site are fenced.

A Remedial Investigation has been conducted for the site and vicinity according to the Work Plan for the site dated 15 March 1988. This work concludes seven years of investigations to define the nature and extent of contamination at the site, and includes in excess of 1500 soil samples, 84 monitoring wells, extensive surface water sampling and air monitoring, and biota investigations.

This report describes the results of Remedial Investigation studies and is organized in the RI report format presented in the most recent U.S. EPA guidance documents on the Remedial Investigation/Feasibility Study process. It includes site background information; the findings of this investigation and previous studies concerning the physical characteristics of the site and vicinity; the nature and extent of contamination in soil, groundwater, surface water, air and biota; the fate and transport mechanisms of contaminants; and a baseline risk assessment. A summary of these findings is presented in the following paragraphs.

Site History

The activities conducted at the site prior to 1926 are not documented. Between 1926 and 1964, based on the few documents in existence and interviews with former Chipman employees, it appears that the site was used principally in the formulation of various agricultural pesticides (railroad right-of-way liquid insecticides and arsenic-based products) which began as early as 1929. While these activities continued into the late 1960s, the bulk of the arsenic compounds were formulated prior to the end of World War II. The arsenic raw material was shipped to the facility by rail or by truck. The end products were formulated primarily in an underground tank located near the railroad spur extending along the southern edge of the 1990 Bay Road site. Some products were formulated in small mixing tanks located inside buildings on the site. Arsenic compounds were reportedly disposed of in a shallow sludge pond located on the site. Between 1964 and 1972 the use of arsenic compounds in product formulation was substantially reduced.

Physical Characteristics

The site and vicinity are underlain by fine-grained and coarse-grained alluvial and shallow marine deposits. The uppermost 50 to 60 feet of these deposits is referred to as the shallow groundwater zone, comprised of two water-yielding formations. These formations are referred to throughout this report as the upper shallow groundwater zone, which occurs at a depth of 5 to 15 feet, and the lower shallow groundwater zone, which generally occurs at a depth of 25 to 35 feet. The flow in the shallow zones is generally to the southeast. The water in the shallow zones does not meet current drinking water standards because of its high TDS content, which makes it non-potable.

These shallow zones are underlain by a clay aquitard to a depth of approximately 160 feet, where there is another water-bearing formation, referred to as the deep groundwater zone. Although prior to the 1960s a large number of groundwater wells were in use in the South San Francisco Bay area, pumping was curtailed due to extensive land subsidence, and the deep groundwater zone currently supports only a few local supply wells, all located some distance from the site and vicinity.

Surface water runoff from the site itself is directed toward the lower-lying non-tidal marsh to the immediate south and east. The runoff creates shallow surface ponds during the winter months. A levee runs along the full length of the non-tidal marsh, directly east of the site, separating the tidal and non-tidal areas. The tidal marsh east of the levee is heavily vegetated and subject to tidal action.

Nature and Extent of Contamination

Because of the history of the site arsenic contamination at the site and vicinity is not surprising. Arsenic is a naturally occurring element, widely distributed in the environment, and would be present at the site and vicinity regardless of the site history.

Preliminary investigations in 1980 and 1981 revealed that the soil and shallow groundwater at the site and vicinity contained arsenic at levels in excess of its naturally occurring levels. As a consequence, the Regional Water Quality Control Board and the California Department of Health Services issued Orders requiring that the site be thoroughly investigated to determine the extent of contamination and requiring that a Remedial Action Plan be developed.

The investigation also focused on other elements. Although other compounds were found to be present in soil at the site, arsenic was determined to be the main contaminant of concern, as well as a reliable indicator of contamination by other substances, including cadmium, copper, lead, mercury, selenium and zinc.

The soil and groundwater investigations conducted at the site identified three primary areas where releases of inorganic arsenical compounds occurred. These three areas are the on-site locations of a former underground mixing tank, a former sludge pond, and along a railroad spur.

The arsenic and other contaminants have been redistributed from the source areas by several transport mechanisms. The major dispersal mechanism apparently has been surface water runoff from the site to the adjacent low lying areas to the southeast of the site. This process has concentrated contaminants, primarily arsenic, in the near-surface soil in the low-lying areas west of the levee. After 1955, the levee prevented the surface water run-off from the site from reaching the tidal marsh. It is possible that some contamination was transported to the marsh prior to 1955 by surface water, which is reflected by the low concentrations detected in the subsurface marsh soil.

Soil with an arsenic concentration in excess of the background level for the site (20 mg/kg) covers the 13-acre area of the site and vicinity. This includes the entire Sandoz site (both the developed and undeveloped portions), 2.4 acres south of the site, 3.3 acres east of the site in the non-tidal marsh, 1 acre of the tidal marsh, 0.8 acres west of the site, and 0.6 acres north of the site. The vertical extent of soil with arsenic concentrations in excess of natural background is generally less than 15 feet, except near the former underground mixing tank and sludge pond locations. In these areas the vertical extent is as great as 34 feet below the ground surface. The total volume of soil with arsenic concentrations above 20 mg/kg is estimated to be about 170,000 cubic yards, and the total weight of arsenic in this soil was estimated to be about 88,000 kg.

With respect to groundwater, a total of 84 monitoring wells have been installed in the groundwater zones at the site and vicinity. There is a generally good correlation between contaminated soil and contaminated groundwater. In the upper shallow groundwater zone, water with dissolved arsenic concentrations in excess of natural background (0.01 mg/l), underlies approximately 11 acres of the site and vicinity with arsenic concentrations ranging up to 300 mg/l. Arsenic contamination in the lower shallow groundwater zone is much more limited; arsenic concentrations in the lower shallow zone generally range up to 2 mg/l, with the exception of one well (WCC-1) in the vicinity of the former sludge pond, where a maximum arsenic concentration of 340 mg/l was reported. Concentrations in excess of 0.05 mg/l are generally confined to the area directly under the site and to immediately adjacent land directly south of the site.

The rate of groundwater flow is very slow. It is estimated that the movement of arsenic in groundwater off site is occurring at the rate of 1 to 4 feet per year. Contaminated groundwater is not currently discharging into the tidal marsh channels, nor is it predicted to discharge within the foreseeable future.

Water samples from eleven monitoring wells were also analyzed for all compounds on the Target Compound List, and water samples from all monitoring network wells were analyzed for selenium and cadmium in addition to arsenic. Reported concentrations of selenium in six wells monitored in June 1988 were above the drinking water standard or maximum contaminant level (MCL), and the 1,2-dichloroethane concentration in one well exceeded the MCL. In addition, cadmium concentrations in two off-site wells were above the MCL, and the trichloroethene concentration in one off-site well was above the MCL. However, since the sampling occurred in the shallow groundwater zones, which are high in TDS and are non-potable, these concentrations are not deemed to present any risk to human health.

Extensive sampling has also shown that drinking water supplies have not been contaminated as a result of the shallow groundwater contamination on-site, nor has the deeper groundwater directly below the site been contaminated. Reported arsenic, cadmium, copper, lead, mercury, selenium and zinc concentrations in the deep well, constructed to monitor water quality in the deep zone, are also at background levels.

Ponded surface waters in properties south and east of the site were found to have high concentrations of arsenic, which correlate to surface soil concentrations beneath the ponds. Surface water samples collected in the tidal marsh area appear to be unaffected by site activities.

Several air sampling programs were conducted on the site and vicinity. Monitoring results and modeling studies suggest that airborne dispersion has not been significant. The studies demonstrate that ambient airborne concentrations of arsenic, cadmium, copper, lead, mercury, selenium and zinc as well as several hydrocarbon pesticides and organic compounds, in general, were well below the occupational exposure standards for these elements. In fact, many were not even detected in ambient air samples.

Arsenic concentrations in soil and surface water analyses from the non-tidal marsh are above background concentrations as a result of surface water transport. Few animals live or feed in the non-tidal marsh or on the site, and while seasonally ponded water was tested and shown to exceed periodically the National Ambient Water Quality Criteria, biota studies concluded that birds and other animals were not adversely affected.

In the tidal marsh, surface soil and surface water analyses indicate that arsenic is present at background concentrations and is complexed in biologically unavailable forms such as iron hydroxide and aluminum hydroxide precipitates. As a result, the tidal marsh appears to be healthy and functional and not impacted by contamination.

Baseline Risk Assessment

Based upon concentration, distribution, toxicity and potential routes of exposure five chemicals were identified as the chemicals of concern at the site and vicinity: arsenic, cadmium, lead, mercury, and selenium. The possible risks of adverse health effects resulting from their presence were quantified in the risk assessment.

The major routes of human exposure to any toxic substance are through inhalation, ingestion or skin contact.

Inhalation of contaminant-laden dust presents the most likely possibility of exposure for the site and vicinity. Ingestion of arsenic, other than by consuming contaminated soil or surface water, will occur only if food is contaminated with arsenic-laden dust or if drinking water is contaminated. Since all of the contaminated portions of the site are currently fenced off and well-marked, and since none of the contaminated groundwater is used for agricultural, domestic, or industrial water supplies, no exposure exists at this time through this mechanism. Exposure to arsenic through skin contact does not present a significant danger either, since the skin is an effective barrier to inorganic arsenic.

The human exposure pathways identified for the site and vicinity were inhalation of contaminant-laden dust by on-site Sandoz employees, on-site construction workers, off-site neighboring residents, and off-site recreational tidal marsh visitors; and ingestion of contaminated soil by a child trespassing onto the site. The construction worker exposure scenario is also unlikely since the property owners of the affected sites are aware of proper health and safety precautions to be taken during construction activities.

The potential for non-carcinogenic adverse health effects and incremental carcinogenic risks from the five chemicals of concern were calculated for the identified human exposure pathways.

The calculations for the risk assessment indicate that adverse non-carcinogenic health effects will not occur for the Sandoz employees, neighboring residents, or recreational visitors inhaling contaminant-laden dust from the site. Construction workers breathing dust from the site under extreme or average conditions, who do not follow prescribed health and safety procedures, have a low probability of experiencing adverse effects. The potential for adverse non-carcinogenic health effects presented by the site are highest for a trespassing child ingesting soil with maximum concentrations from within the fenced area.

The incremental exposure cancer risk from breathing contaminant-laden air by an on-site Sandoz employee or the nearest resident was calculated to be less than the risk associated with the natural background concentrations for arsenic in ambient air. Incremental cancer risks for a child who trespasses and ingests surface water or soil with average concentrations are very low. The unprotected construction worker has the highest calculated incremental risk when exposed to extreme conditions at the site.

These risks have been mitigated by maintaining a fence around the contaminated areas. While concern exists for unprotected construction workers breathing contaminant-laden dust under extreme conditions, this route of exposure is also unlikely since the property owners at the site and vicinity are aware of the proper health and safety procedures to be taken during construction activities.

An investigation of arsenic concentrations in vegetation in the non-tidal and tidal marshes indicated that elevated levels in vegetation are limited to the contaminated portions of the non-tidal marsh that have been fenced off. There are no measurable risks to aquatic birds, aquatic grazers, or other animals in the tidal marsh area since arsenic concentrations were not found to be higher than normal in the plants and animals on which they feed. The non-tidal marsh has elevated levels of arsenic in soil and, to a lesser extent, in plant tissues. This area is not a favorable wildlife habitat, however, since it is sparsely vegetated. There are few animals that live and feed in the non-tidal wetlands, so the effect of the arsenic contamination is minimal in this area.

The risk assessment has demonstrated that the risks presented by the site and vicinity have been mitigated by Sandoz health and safety rules requiring protective equipment and by restricting activities and access to the site and vicinity by maintaining a fence around the contaminated areas and posting appropriate notices.

Conclusions

The Remedial Investigation has confirmed the presence of arsenic and other contaminants on the site and vicinity in concentrations above background. The Remedial Investigation reveals the site and vicinity have been thoroughly studied and the nature and extent of contamination is fully defined.

Notwithstanding the presence of arsenic and other contaminants, the potential health risks to the public, nearby residents, and the community of East Palo Alto are virtually non-existent under present conditions.

The Remedial Investigation provides more than adequate data to prepare a feasibility study, assess the remedial action alternatives appropriate for the site and evaluate the risks those remedial alternatives would have on human health and the environment. Upon final approval of this Remedial Investigation, the Feasibility Study and Remedial Action Plan will be prepared and submitted in accordance with existing guidelines and the Consent Order.

1.0 INTRODUCTION

This Remedial Investigation (RI) report summarizes investigations undertaken to develop a remedial action plan for the 1990 Bay Road site and vicinity in East Palo Alto, California, based on the criteria set forth in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Section 300.61, *et seq*.) and the California Health and Safety Code Sections 25350 and 25356.1(c) and (d). This Remedial Investigation report has been prepared in accordance with the Consent Order (dated 27 August 1987) signed by the California Department of Health Services (DHS), the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), and Rhone-Poulenc Inc. This document has also been prepared in accordance with guidelines set forth in the United States Environmental Protection Agency (U.S. EPA) draft guidance document entitled "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (U.S. EPA, 1988a).

1.1 Purpose and Report Organization

The purposes of the Remedial Investigation are to:

(a) Determine the nature and full extent of contamination of air, soil, surface water, and groundwater at the site and adjacent areas.

(b) Identify all existing and potential migration pathways, including the direction, rate, and dispersion of contaminant migration.

(c) Determine the magnitude and probability of actual and potential harm to public health and welfare and to the environment by the threatened or actual release of hazardous materials at the site.

(d) Collect the information necessary to prepare a Remedial Action Plan (RAP) in accordance with the requirements of the California Health and Safety Code Section 25356.1.

This RI report describes the results of Remedial Investigation studies conducted prior to and in accordance with the Remedial Investigation and Feasibility Study (RI/FS) Work Plan prepared by Geomatrix Consultants (Geomatrix) and S.S. Papadopulos and Associates (SSP&A) (Geomatrix and SSP&A, 1988a). The studies conducted prior to 1987 were summarized in the Scoping Document and Preliminary Endangerment Assessment (Geomatrix and SSP&A, 1987a) prepared in accordance with the Consent Order. This report is based on data gathered at the site by Geomatrix, SSP&A, and others.

This report is organized in the RI report format presented in the most recent guidance on the RI/FS process (U.S. EPA, 1988a). Section 1.0 includes information on site background, summaries of remedial response efforts, and

Remedial Investigation studies. Site features are described in Section 2.0, Physical Characteristics of the Site and Vicinity, including surface features, meteorology, surface water hydrology, regional and site geology and hydrogeology, ecology, demography and land use. Data from the RI studies are presented and evaluated in Section 3.0 in terms of source investigation, soil studies, groundwater studies, and surface water, air, and biota investigations. An evaluation of contaminant fate and transport at the site and vicinity based on an evaluation of the RI data is presented in Section 4.0. The baseline risk assessment, consisting of a public health evaluation and an environmental risk assessment, comprises Section 5.0. A summary of the RI and conclusions are presented in Section 6.0.

Volume 2 of the RI report contains appendices of data and calculations in table and figure form related to the RI. Volume 3 contains the laboratory analytical and quality assurance reports for all analyses performed in accordance with the RI/FS Work Plan. Volume 4 consists of the laboratory raw data supporting the analytical reports in Volume 3, and is unbound.

1.2 Site Background Information

The 1990 Bay Road site (Figure 1) is located adjacent to a tidal marsh along the western shore of San Francisco Bay in East Palo Alto, California. Approximately three acres of the five-acre site are developed as an agri-chemical plant. The site has been used for industrial purposes for 60 years or more. Prior to 1926, the site was occupied by Reed Zinc Company and a related entity, Reed Zinc Reduction Company. The activities conducted on-site by these companies are not documented. From 1926 to 1964, the site was occupied by Chipman Chemical Company and Chipman Chemical Engineering Company. In 1964, Rhodia, Inc. acquired Chipman and operations continued under the name of Chipman Chemical Company (1964-1967) and the Chipman Division of Rhodia, Inc. (1967-1970). Operations ceased in 1971, and the property and facilities were sold in 1972 to Zoecon Corporation. Rhodia, Inc. subsequently changed its name to Rhone-Poulenc Inc. From 1972 to the present, Zoecon Corporation has manufactured biorational insect controls at the facility. Zoecon Corporation has been owned by Sandoz Corporation since 1983. On 1 June 1986, Zoecon merged with Velsicol Corporation to form Sandoz Crop Protection Company. The property at 1990 Bay Road is referred to as the Sandoz property in this report.

Little is known about Chipman's activities; however, based upon the few documents in existence and interviews with former employees, it appears that sodium arsenite compounds were formulated at least as early as 1929. While these activities continued into the late 1960s, the bulk of these compounds were formulated prior to the end of World War II. The sodium arsenite compounds were reportedly formulated in an underground tank located near the railroad spur extending along the southern edge of the 1990 Bay Road property. Some of the by-products of this process were reportedly disposed in a shallow sludge pond located on the site.

Discussions of "on-site activities" or "the site" in this report refer to the 1990 Bay Road property presently owned by Sandoz Corporation. The properties adjacent to or near the 1990 Bay Road property are referred to as "adjacent properties" or as "off-site areas." These properties include those owned by William D. and Patricia A. Bains, Borrmann Steel Company, Inc., Ronald G. Rogge, Michael Demeter, Pacific Gas and Electric Company (PG&E), Torres Concrete and Construction Company, Melvin Curtaccio, the City of East Palo Alto, and the City of Palo Alto, as shown on Figure 2.

1.3 Remedial Response Efforts

Investigations of the site and adjacent properties in 1981 revealed that the soil and groundwater were contaminated with inorganic arsenic compounds and other heavy metals. As a consequence, the RWQCB issued Clean-Up and Abatement Order 82-001 dated 15 April 1982 (subsequently amended on 12 October 1982 and 21 December 1983), requiring, in part, that Zoecon and Rhone-Poulenc institute a sampling and analysis program to determine both "on-site and off-site the full lateral and vertical extent of contamination and potential contamination of soil, surface water, and groundwater with heavy metals and organic compounds." Subsequent investigations evaluated the contaminants at the site, confirmed that arsenic was the primary contaminant of concern, and identified the lateral and vertical distribution of arsenic and other contaminants in soil and shallow groundwater. The investigations also demonstrated that (1) the shallow groundwater zone was unusable as a drinking water supply because of its very high dissolved solids content, attributable to saltwater intrusion from the Bay, and (2) the rate of arsenic transport in groundwater at the site is extremely low. Alternative remedial plans were also evaluated.

In August 1987, a Consent Order was entered into between Rhone-Poulenc, DHS and RWQCB, detailing the procedure to be followed in completing the remedial investigation and preparing a feasibility study and remedial action plans. This report was prepared in compliance with the Consent Order.

1.3.1 Groundwater Monitoring Network

Based on available data, the RWQCB established Waste Discharge Requirements for arsenic contamination of the soil and groundwater at the site. The order prohibited (1) the presence of arsenic in excess of the California drinking water standard in the shallow groundwater zones beyond the present area of contamination, and (2) the presence of arsenic in excess of background concentrations in the deeper groundwater zones. The order also directed Rhone-Poulenc to (1) construct and maintain a monitoring well system in the shallow groundwater around the site within 100 feet of the 0.05 mg/l concentration line to monitor the possible migration of arsenic-contaminated groundwater beyond the area of initial contamination, and (2) construct and maintain a monitoring well system in the deep aquifer to enable the RWQCB to determine compliance with the prohibition against the presence of arsenic in excess of background concentrations in the deep aquifer.

Rhone-Poulenc, with the approval of the RWQCB, has installed a groundwater monitoring network of 35 wells at the site and vicinity to ensure compliance with the Order and a subsequent modification to the monitoring schedule of the Order dated 2 November 1988. The location of these monitoring wells is shown on Figure 3.

Groundwater from the monitoring wells is sampled and analyzed for total dissolved arsenic. Field measurements of temperature, pH, and specific conductance of the groundwater are made during each sampling. In the first year of operation of this monitoring system, groundwater samples were also analyzed for cadmium, copper, lead, mercury, selenium, and zinc. The schedule for groundwater monitoring included quarterly sampling for the first year of operation, and semiannual sampling for the following year. Annual sampling for arsenic is scheduled for the next eight years, with sampling of selected wells biennially for selenium. Results from the first six monitoring periods have been reported (Geomatrix 1987a, 1987c, 1987e, 1987f, 1988a and 1988b).

1.3.2 Call-Mac Site Cleanup

A portion of the property located immediately south of the Sandoz property (the Call-Mac site) was used by others for storage of drummed hazardous waste for 20 to 30 years, based on information in DHS files. In January 1981, the DHS counted approximately 1,300 drums on this property. According to the labels, the drums contained allyl alcohol, phosphorus trichloride, isopentane kerosene, benzoyl chloride, acrolein, diethylene triamine, triethylene tetramine, and tetraethylene pentamine. The hazardous waste manifests for their subsequent removal in April 1981 also list isopentane, ketones, oil, titanium dioxide, and styrene.

The material on the easterly portion of the Call-Mac site was determined to have originated from the Shell Development Company research laboratories in Emeryville, California in the late 1950s and early 1960s. The material on the westerly portion of the Call-Mac site was determined to have originated from the Diamond Shamrock Corporation plant in Redwood City, California in the late 1960s and early 1970s.

The drums and approximately 25 cubic yards of soil from the on-site location where empty drums were crushed prior to disposal were removed from the site between 10 March and 29 July 1981. The site cleanup was carried out by Chemical Waste Management, Inc. of Kettleman City, California and International Technologies Corporation of Benicia, California, with some assistance from Romic Chemical Corporation of East Palo Alto, California.

On 16 September 1981, 18 soil samples from depths to 4 feet were collected by DHS on the Call-Mac site; replicate samples were given to Diamond Shamrock for analysis. The approximate locations of the soil samples are shown on Plate 1 and the results are presented in Appendix I. The DHS Hazardous Materials Laboratory analyzed selected samples for oil and grease, solvents, sodium and chloride, selected organic amines, pH, and 30 metals, including arsenic, titanium, lead, mercury, copper, and zinc. Based on these results, the DHS concluded that (1) the major contaminant on the property was arsenic that resulted from Chipman Chemical Company activities, (2) the only soil contamination remaining from the Call-Mac operations was an area contaminated with triethylene tetramine that leaked from drums of waste obtained from the Diamond Shamrock Corporation, and (3) the organic amine contamination was much less widespread and less significant than the arsenic contamination.

1.3.3 Past Remedial Action Planning

Extensive information on the remedial action planning process is contained in the Woodward-Clyde Consultants (WCC) report entitled "Status Report on the Assessment of Remedial Action Alternatives for the 1990 Bay Road Site, East Palo Alto, California" (WCC, 1984b). This report was followed by the WCC report entitled "Evaluation of Corrective Measure Plans for the 1990 Bay Road Site, East Palo Alto, California" (WCC, 1984c). Zoecon Corporation submitted a report entitled "An Analysis of Alternative Remedial Plans for Zoecon/Rhone-Poulenc Property, 1990 Bay Road, East Palo Alto" (Zoecon Corporation, 1984). Rhone-Poulenc subsequently assumed responsibility for remedial action at the site and vicinity, and developed a remedial action plan. A draft Remedial Action Plan (Geomatrix, 1986b) was submitted to the DHS, RWQCB, and the U.S. EPA on 31 January 1986, followed by a final draft (Geomatrix, 1986e) incorporating DHS comments submitted on 31 July 1986. The remedial action plan reports were based on criteria set forth in California Health and Safety Code, Sections 25350 and 25356.1(c) and (d), and the NCP (40 CFR Sections 300.61, et seq.)

Following submittal of the Remedial Action Plan, U.S. EPA expressed the opinion that the Remedial Action Plan and the site characterization work conducted prior to 1987 did not fully satisfy the requirements of the National Contingency Plan and that additional work was needed before a final remedy could be selected and implemented. Subsequently, a Consent Order was entered into among Rhone-Poulenc, the Department of Health Services and the Regional Water Quality Control Board, which required that a Remedial Investigation and Feasibility Study be conducted for the site in accordance with U.S. EPA guidance on the performance of remedial investigations and feasibility studies and the National Contingency Plan.

1.3.4 Fencing

On 27 March 1987, the DHS issued an Order to Post and Fence to J.G. Torres, Inc., PG&E, and Zoecon Corporation. In response to the Order, Rhone-Poulenc installed fencing to enclose contaminated portions of the PG&E and Torres properties and posted signs which read "Caution, Hazardous Substances Area, Unauthorized Persons Keep Out" on new and existing fencing surrounding the contaminated areas. The fence is a 6-foot-high chain link fence topped with three strands of barbed wire. The location of the fence is shown on Figure 2.

1.4 Remedial Investigation Study Summary

1.4.1 Site Studies

Hydrogeologic studies and soil investigations have been conducted at the site and vicinity by Converse/TenEch (CTE), Converse Consultants (Converse), WCC, Geomatrix, and SSP&A since 1980. The locations of monitoring wells are shown on Figure 3 and soil borings sampled for the various programs are identified on Plate 1. A summary of the various studies conducted at the site and vicinity, consultants responsible for the studies, and report references is given in Table 1.

1.4.2 Soil Studies

The vertical and horizontal distribution of contamination in soil at the site and vicinity was established by collecting and analyzing soil samples from 410 shallow (less than about 10-foot depth) borings at the site and vicinity; soil samples obtained for the biota study; soil samples collected from borings drilled for selected monitoring wells; and soil samples from other selected borings. Fifteen deep borings were drilled to depths between 15 and 40 feet, and one boring, at the location of well WCC-1, was drilled to a depth of 56 feet. These deep borings all extended below the zone of contamination.

Selected soil samples collected from all the borings were analyzed for total arsenic concentrations. In addition, soil samples from subsets of these borings were analyzed for the following additional chemical and physical parameters:

(a) Moisture content of the soil samples was measured in samples from borings SB-3 through SB-40 and monitoring wells WCC-5 through WCC-17.

(b) Total lead, pH, and conductivity were measured in samples from the borings for monitoring wells WCC-1 through WCC-4.

(c) Total selenium concentrations were measured in samples from eight borings drilled at the site and vicinity as part of the RI.

(d) Total cadmium, copper, lead, mercury, selenium, and zinc concentrations were measured in samples from 43 borings drilled at the site and vicinity as part of the RI and in soil samples obtained for the biota study.

(e) Target Compound List compounds were quantified in samples from ten borings drilled at the site and vicinity as part of the RI.

(f) Total cadmium, lead, mercury, and selenium concentrations were measured in ten soil samples from a boring drilled in the sludge pond area.

The locations of borings and surface samples for which arsenic concentrations were obtained are shown on Plate 1. The results of the analyses are presented in tables in Appendices D, E, and H.

1.4.3 Groundwater Studies

Groundwater conditions at the site and vicinity were established from geologic logs, water level data, water quality data, and permeability data from monitoring wells in addition to geologic logs from many shallow soil borings, 6 deep test borings, and 25 cone penetration tests. The groundwater monitoring wells were designed to provide data on groundwater levels and quality in three main groundwater zones: an upper shallow groundwater zone between 1 and 14 feet below ground surface, a lower shallow groundwater zone between about 20 and 40 feet below ground surface, and a deep groundwater zone below a depth of about 160 feet below ground surface. The locations of these wells and borings are shown on Figure 3.

Sixty-four wells have been completed in the upper shallow groundwater zone. Nineteen wells have been completed in the lower shallow groundwater zone, and one well has been completed in the deep groundwater zone. The screened intervals of the groundwater monitoring wells at the site are presented in Appendix L.

Eighteen of the upper shallow zone monitoring wells and two of the lower shallow zone montoring wells have been destroyed or are not locatable. At present there are a total of 64 monitoring wells, of which 35 have been incorporated into a long term monitoring network constructed in response to RWQCB Order No. 85-67.

Groundwater samples from all monitoring wells have been analyzed for total arsenic concentration; samples from seven wells have been analyzed for arsenic(III) and arsenic(V) as well as total arsenic. In addition, at least four samples from pre-1988 wells in the monitoring network have been analyzed for cadmium, copper, lead, mercury, selenium, and zinc. Samples from nine wells were analyzed for compounds on U.S. EPA's Target Compound List in 1988 as part of the RI; in 1983 and 1984, samples from five wells were analyzed for priority pollutant organics. In addition, physical and chemical parameters such as temperature, conductivity, pH, and Eh (redox potential) have been measured in many of the monitoring wells. The results of all chemical analyses of groundwater samples are listed in Appendices A and B.

Several studies were conducted to determine the mobility of arsenic at the site. WCC performed arsenic leaching tests (WCC, 1982) and an arsenic sorption study (WCC, 1983) using soil samples collected at the site. The data from these studies are presented in Appendix G, and results are discussed in Chapter 4.1. An arsenic speciation study was performed in 1986 on groundwater samples collected from selected on-site monitoring wells. These data are presented in Appendix B, and results are discussed in Section 3.3.

1.4.4 Surface Water Studies

Ponded surface water samples were collected by Geomatrix in 1986, 1987, and 1988 from seasonal ponds located west of the levee in the PG&E non-tidal marsh and the Torres property (Areas 2 and 3). A total of 29 samples were analyzed for arsenic and 6 of the samples were also analyzed for cadmium, copper, lead, selenium, mercury, and zinc. Sample locations and analytical results are presented in Appendix B.

Tidal channel water samples were collected in 1987 and 1988 from three sampling stations shown on Figure 4. Samples were taken from the same stations at both ebb and flow tides and analyzed for total arsenic to determine the relative sources and concentrations of arsenic moving in and out of the tidal marsh. In 1987, both filtered and unfiltered samples were analyzed to determine the relative percentages of arsenic contained in solution versus suspended sediments. One sample obtained in 1988 from a background location about 1200 feet northeast of the site near the PG&E tidal marsh boardwalk was analyzed for all Target Compound List metals. Analytical results for all surface water samples are presented in Appendix B.

1.4.5 Air Studies

1.4.5.1 Zoecon Air Studies

An industrial hygiene survey was conducted in 1982 at the then Zoecon plant by EAL Corporation, Richmond, California. This program included air monitoring, consisting of personal and areal air sampling within the maintenance building at the plant, and areal air sampling on the Sandoz property.

Areal samples were collected in two locations in the maintenance building and were analyzed for arsenic, selenium, lead, cadmium, mercury, DDT, and Lindane. Personal monitoring was conducted on three maintenance workers who spent at least 50 percent of their shifts in the maintenance building, with the balance of their time spent in the process plant. One worker was monitored for arsenic and selenium, one for lead and cadmium, and one for DDT and Lindane. Three areal air samples were obtained in the unpaved portion of the site. Sample locations and results are presented in Appendix F.

1.4.5.2 PG&E Air Studies

An ambient air survey was conducted at the PG&E Cooley Landing Substation in 1985 by the PG&E Safety, Health and Claims Department. Samples were collected at nine locations throughout the substation and adjacent poleyard, and 'he samples were analyzed for arsenic. Sample locations and results are presented in Appendix F.

1.4.5.3 Geomatrix Air Studies

An air sampling program was developed and implemented at the project site by Robert Spence & Associates during sampling and exploratory fieldwork conducted in 1986. Personal air samples were obtained during several periods of fieldwork for representative activities to evaluate respiratory exposure during the exploratory field program. The head space air in several wells was sampled for arsine gas and hydrocarbon vapors prior to groundwater sampling.

Personal air samples were collected from three employees in 1987 during installation of the chain link fence required by the DHS Order to Post and Fence. Specifically, the air samples were collected during fencepost excavation for construction of the portion of the fence in the area of elevated arsenic concentrations along the boundary between the PG&E non-tidal marsh and the Torres property.

An air sampling program was implemented at the project site during the remedial investigation fieldwork in 1988. Personal and areal samples were collected for analysis of arsenic, cadmium, copper, lead, mercury, and zinc during fieldwork conducted between July and September 1988; the fieldwork included drilling soil borings and installing monitoring wells. Areal samples were collected at several locations on site, and 50 feet downwind of the drill rig in conjunction with personal air monitoring. Four additional areal samples were collected in Area 3 downwind of the Sandoz plant for analysis for organics. Air sample locations and results are presented in Appendix F.

1.4.6 Biota Studies

Vegetation samples in the tidal and non-tidal marshes were obtained to determine the element concentrations in plant tissues. Six vegetation samples were obtained by WCC in 1983 and analyzed for arsenic. In 1987 and 1988, WESCO, Inc. performed a comprehensive biota study including: (1) analysis of 22 vegetation samples for arsenic, cadmium, and lead; (2) analysis of nine soil samples for plant-available element concentrations including arsenic(III), arsenic(V), cadmium, copper, lead, and zinc; (3) analysis of eight benthic organisms for total arsenic concentrations; (4) a population count of benthic organisms in two tidal marsh locations; (5) observance of bird species visiting the seasonally ponded areas during a four-day period; and (6) observance of bird behavior during a four-day period.

Vegetation and biota sample locations are shown on Plate 1; the results are presented in Appendix H.

2.0 PHYSICAL CHARACTERISTICS OF THE SITE AND VICINITY

This section describes the physical characteristics of the site and vicinity, such as surface features, meteorological conditions, surface water hydrology, the regional geology and hydrogeology, ecology of the wetlands, demography of the city and the current and projected land use of the site and vicinity.

2.1 Surface Features

The site and vicinity have been divided into eight separate areas for ease of presentation. These areas, which include properties to the north, south, east, and west of the site are shown in Figure 2, and are described below.

Area 1, the northern portion of the Sandoz property, occupies approximately 2 acres and is generally level at an average elevation of 7 feet above mean sea level (National Geodetic Vertical Datum [NGVD] of 1929). It is undeveloped and partially covered by low, grassy vegetation, with some barren areas. The entire perimeter is enclosed by chain-link or wooden fences. During the rainy season, surface water tends to pond locally to depths of a few inches.

Area 2, the non-tidal marsh owned by Pacific Gas and Electric (PG&E), is a triangular area separated from the tidal marsh to the east by a levee that rises approximately 4 feet above the area. The area is primarily covered by wetland vegetation, with some barren areas, and is generally submerged during the rainy season. The surface elevation in this area varies from 5 to 7 feet along the western boundaries to approximately 3 feet along the levee.

Area 3, which is owned by the J.G. Torres Construction Company, is undeveloped and lies to the south of the site. This area covers approximately 8 acres, the northern portion of which is referred to as the Call-Mac site. In the northwestern portions of the area, elevations range from 3 to 8 feet and the area is largely covered by high, grassy vegetation. During the rainy season, the eastern portion of the area is mostly submerged. The southeastern corner of Area 3 is hummocky, with elevations varying from 3.5 to 10 feet. The low areas between the hummocks are also submerged during the rainy season.

Area 4 consists of an approximately 3-acre area covered by the Sandoz plant buildings and pavement. A railroad spur lies along the southern edge of the plant area at an average elevation of 7 feet. This area is entirely enclosed by fencing.

Area 5, the PG&E poleyard, consists of a fenced rectangular, 3/4-acre plot of unvegetated land that is essentially level at an average elevation of 6.5 feet. Shallow ponding occurs during the rainy season.

Area 6 is a portion of the Curtaccio property immediately west of the site and is mostly covered by a concrete slab. The average elevation of this relatively level area is 6.5 feet.

Area 7 is a former railroad spur now owned by W.D. and P.A. Bains that has been filled to a level grade of approximately 7 feet with gravel.

Area 8 is the tidal marsh which is intermittently submerged throughout the year due to tidal influences. This area is covered with wetland vegetation and marked by a network of tidal channels. This marsh is a portion of the Laumeister Tract owned by the City of Palo Alto.

North of Area 1 is Bay Road, which is partially owned by the City of East Palo Alto, and several properties owned by various persons and business entities. This area is mostly level, and the street is paved.

2.2 <u>Meteorology</u>

The East Palo Alto area has a Mediterranean-type climate with warm, dry summers and cool, wet winters. Climatological data compiled for six weather stations located in the San Francisco mid-peninsula and south bay areas are presented in Table 2.

Mean annual rainfall in the East Palo Alto area is approximately 15 inches, with most of the rainfall occurring between October and April. The mean annual temperature for the area is approximately 60 degrees Fahrenheit, and the average wind speed is approximately 5 miles per hour. Prevailing winds are generally from the northwest, although winds from the south and southwest prevail in December and January.

2.3 Surface Water Hydrology

2.3.1 Surface Water at the Site and Vicinity

Surface water at the site and vicinity includes seasonally ponded water along the west side of the levee, San Francisco Bay water in the tidal marsh, and San Francisco Bay to the east of the marsh. During the rainy season, storm water runs off the site from west to east and ponds against the west side of the levee in areas to the southeast of the site (Areas 2 and 3). Due to the irregular ground surface in Areas 2 and 3, water ponds in isolated low-lying areas to depths of up to approximately three feet. As observed between February and April 1986 and between December 1987 and May 1988, at higher water depths the isolated ponds merge to form a fairly continuous body of water between the non-tidal marsh and the Torres property (Areas 2 and 3 respectively). The ponded water infiltrates or evaporates by early summer. The ponds recede from west to east, with the last water remaining in the southeast corner of the Call-Mac property, the southern corner of Area 2, and localized depressions of the hummocky areas of Area 3 formed by fill materials.

Extensive tidal marshes, over 1,000 feet wide, exist between the levee and San Francisco Bay. The tidal marsh is drained by a network of meandering tidal channels that flow during each tidal cycle. However, the marsh surface within

200 feet of the levee is frequently exposed because the surface elevation is greater than the mean high tide level of 3.64 feet NGVD.

2.3.2 Flood Potential

The site and vicinity are located within the 100-year coastal flood zone classified by the Federal Emergency Management Agency (FEMA) as Zone A. The area is susceptible to flooding because of (1) its location on low-lying lands adjacent to San Francisco Bay and San Francisquito Creek, (2) the possible accumulation of surface runoff from adjacent areas during storms, and (3) the presence of a high water table (City of East Palo Alto, 1986). The FEMA flood elevation for the site and vicinity is 7 feet NGVD (FEMA, 1984). Most of the areas with soil of high arsenic concentrations are situated below the FEMA flood elevation of 7 feet NGVD.

The site and vicinity are located within the San Francisquito Creek Flood Control Subzone, which was formed in 1968 to establish a taxing mechanism in areas not included in other flood control districts. No storm drainage facilities have been constructed in this subzone. At present, the closest subsurface storm drainage system extends along Bay Road from Demeter Street to the intersection of Pulgas Avenue and Bay Road (about 500 feet to the west of the site), where it turns south along Pulgas and connects to storm drains on Weeks and Runnymede Streets.

2.3.3 Surface Drainage

Surface water drainage is discussed below in terms of existing and historical drainage patterns.

2.3.3.1 Existing Drainage Patterns

In the paved area of the site (Area 4), surface water runs off into a lined ditch located along the eastern boundary of the plant (Figure 4). Some surface runoff is directed to the ditch via a central swale, into which an emergency spill sump is incorporated. The fill ports to the sump are manually opened in case of an on-site chemical spill. A gate valve at the southern end of the ditch is occasionally opened to allow runoff collected in the ditch to flow into Area 3.

In the PG&E poleyard (Area 5), surface water appears to pond locally in shallow depressions, and infiltrates or evaporates (Figure 4). The PG&E substation, located directly east of Area 5, is paved and surrounded by a 1 1/2-foot-high asphalt berm. In early 1986, a 2-inch-diameter plastic pipe was installed to discharge water collected in an underground vault in the northern portion of the substation into the non-tidal marsh (Area 2) at the southern perimeter fence. Most of the surface runoff from the substation is directed to the southern fence, where a valve in the berm is periodically opened to discharge runoff into the non-tidal marsh.

Surface water runoff from the site and the PG&E substation collects in ponds in topographic depressions on the landward side of the levee in Areas 2 and 3 during the wet season. The levee acts as an effective barrier to surface water movement between the tidal marsh and Areas 2 and 3. Aerial photos taken in December 1985 indicate that the surface elevation of water ponded in the tidal marsh area was 1 to 1.5 feet higher than that of water ponded in Areas 2 and 3.

2.3.3.2 Historical Surface Drainage Patterns

Surface drainage patterns at the site and vicinity have been affected by levee and pavement construction, earth-moving activities, and fill placement. Prior to construction of the levees along the eastern margins of Areas 2 and 3, drainage at the site and vicinity was presumably towards the tidal marsh to the east. The initial levee was in place by 1939 and separated Area 3 from the tidal marsh. Review of aerial photographs taken between 1939 and 1948 indicates the existence of an elongated topographic depression along the alignment of the northward levee prior to 1939, the date of the earliest aerial photographs reviewed. The northward levee extension, which bisects this elongated depression, was constructed by 1955, apparently in conjunction with development of PG&E's Cooley Landing Substation.

An approximately 10-foot-wide, 1-foot-high ridge of soil is located along the southern half of the boundary between Areas 2 and 3. This ridge is a well-defined feature in aerial photographs dating back to at least 1943, although its form has changed. Prior to 1955, this ridge was continuous to the north along the east side of the plant site (Area 4) and appeared to rise several feet above the surrounding grade, similar to a levee. This ridge, or levee, may have acted as a barrier to the movement of surface water between the non-tidal marsh (Area 2) and Area 3 until it diminished in size by 1955.

2.4 Geology

2.4.1 Regional Geology

The site region overlies an estimated 1200 feet of unconsolidated sediments (California Department of Water Resources, 1967) composed of continental sands, silts, and clays interrupted by thick sequences of marine clays. General trends throughout the southern part of San Francisco Bay indicate that the continental deposits are coarser grained and thicker toward the Santa Cruz Mountains to the southwest. The sequences of marine clays are thicker toward the center of the southern part of San Francisco Bay where Bay inundations have historically been more frequent.

The geology of the uppermost 300 feet of sediments underlying the site region was investigated through the use of (1) water well drillers' logs of off-site wells obtained from state and local agencies, (2) lithologic and geophysical logs of a deep monitoring well drilled on site, and (3) a study of the hydrogeology of the Palo Alto Baylands completed in 1976 (Howland, 1976). The drillers' logs and well construction records collected for the site vicinity were obtained from the

California Department of Water Resources (CDWR), the Santa Clara Valley Water District (SCVWD), local water districts, and private well owners. Those wells for which logs were obtained are identified on Figure 5.

The geologic descriptions contained in the drillers' logs tend to be generalized, but the identification of water-bearing sediments, such as sand and gravel, is probably accurate since locating these horizons is important to the successful development of a water well. Several drillers' logs from wells located within a 9-square-mile area of the site were used to construct two geologic cross sections that trend through or close to the site (Figures 6 and 7). The location of these cross sections is shown on Figure 5. Figure 6 is a geologic cross section that trends in an east-west direction from the Veterans Hospital located southwest of U.S. Highway 101 to Cooley Landing on the edge of San Francisco Bay. Figure 7 is a geologic cross section that trends north-south just to the east of the site.

The deposits underlying the site region are part of an interbedded sequence of alluvial fan deposits and marine clays described in detail by the CDWR (1967). The alluvial fan deposits in the site vicinity predominantly represent a distal facies of the Niles Cone Fan, consisting of sediments shed westward from the Diablo Range into the lowlands presently occupied by San Francisco Bay. West of the site region, the alluvial fan deposits interfinger with alluvium of the San Francisquito Cone, an alluvial fan consisting of sediments shed eastward from the Santa Cruz Mountains. The uppermost alluvial fan deposits in the site vicinity probably represent recent deposits of the San Francisquito Cone. These alluvial deposits consist of a series of sub-horizontal sand and gravel layers separated by extensive clay zones deposited during periodic high sea level stands, while the marine clay deposits contain only minor amounts of coarse-grained deposits.

The site is located in a region that has experienced subsidence since the early 1900s. This subsidence has been caused by the withdrawal of groundwater from the deeper sand and gravel aquifers throughout the south San Francisco Bay area. The site is located near the edge of the affected area. Benchmarks in the site vicinity were resurveyed periodically between 1934 and 1966. The survey data indicate that, during this period, the ground surface subsided approximately 2 feet at the site.

2.4.2 Site and Vicinity Geology

The site and vicinity are underlain by fine-grained and coarse-grained unconsolidated alluvial and shallow marine deposits to a depth of several hundred feet. The uppermost 50 to 60 feet of these deposits is of primary importance in understanding the distribution of arsenic at the site; this zone is referred to herein as the shallow groundwater zone.

The stratigraphy of the shallow groundwater zone underlying the site and vicinity has been interpreted from geologic information acquired from the wells and soil borings completed at the site and vicinity. These boring logs are presented in Appendix L. The wells and borings were primarily completed in the upper 55 feet of soil. The stratigraphy is shown on the hydrogeologic cross sections shown on Figures 8, 9, 10, and 11. The locations of these cross sections are shown on Figure 3.

The shallow groundwater zone consists predominantly of silt and clay with interbedded sand and gravel layers. Six distinct stratigraphic units can be correlated laterally throughout the site and vicinity. Two of the six units consist of coarse-grained deposits that are relatively permeable and are referred to as the upper shallow groundwater zone and the lower shallow groundwater zone. These relatively permeable units are both overlain and underlain by fine-grained units of relatively low permeability. The extent of the upper and lower shallow groundwater zones is designated on the hydrogeologic cross sections (Figures 8, 9, 10 and 11).

A layer of imported fill averaging 3 to 5 feet thick, consisting of a mixture of clay, sand, and gravel, overlies most of the site and vicinity. The fill is underlain by silty clay that extends to a depth of approximately 6 to 9 feet below the ground surface. The silty clay is underlain by the upper shallow groundwater zone, which is generally 3 to 9 feet thick and consists mainly of interbedded silty sand and sandy silt. This unit extends to a depth of approximately 14 feet and is underlain by a silty clay unit that is approximately 4 to 15 feet thick. The silty clay is underlain by the lower shallow groundwater zone, which is a 2- to 18-foot-thick deposit consisting of interbeds of silt, silty sand, sand, and gravel. The lower shallow groundwater zone is underlain by silty clay.

One deep monitoring well installed to approximately 180 feet in 1986 revealed silty clays and clayey silts to a depth of about 160 feet, followed by 5- to 10-foot-thick permeable sand and gravel zones to 180 feet below the ground surface.

2.4.2.1 Upper Shallow Groundwater Zone.

The upper shallow groundwater zone underlies the site and vicinity at depths ranging from approximately 6 to 9 feet below the ground surface. The thickness of this unit ranges from about 3 to 9 feet, averaging about 6 feet thick, and it is composed mainly of silty sand that is locally interbedded with sandy silt and clean sand with occasional gravel. The upper shallow groundwater zone appears to be a laterally continuous unit throughout the site and vicinity.

2.4.2.2 Lower Shallow Groundwater Zone.

The lower shallow groundwater zone underlies the site and vicinity at depths between approximately 25 to 35 feet below the ground surface and varies in thickness from about 2 to 18 feet (Figures 8, 9, 10, and 11). The lower shallow groundwater zone is composed mainly of silty sand,

sand, and gravelly sand. The unit appears to be a laterally continuous unit through the site. The unit may be laterally discontinuous south of the site in the southeastern part of the Torres property. In this area, the lower shallow groundwater zone is comprised of more than one bed of silty sand and gravelly sand. Based on the data from several 50-foot-deep cone penetration tests on the Torres property, only discontinuous silty sand and/or sandy silt lenses up to 2 feet thick appear to be present below a depth of about 40 feet in this area. (A cone penetrometer test is conducted by advancing a 1.5-inch-diameter stainless steel cone into the soil at a steady rate. Profiles of tip resistance, friction resistance, pore pressure, cone inclination, and the cone temperature are recorded during driving to allow interpretation of soil types and properties such as hydraulic conductivity.)

2.5 Hydrogeology

2.5.1 Regional Hydrogeology

Two regional groundwater zones separated by a clay aquitard have been identified in the upper 300 feet: a shallow groundwater zone, and a deep groundwater zone (Figures 6 and 7). These zones are briefly described below.

The shallow groundwater zone extends from the ground surface to a depth of about 60 feet in the vicinity of the site. This zone contains fine-grained sediments (silt and clay) with numerous lenses of silty sand, sandy silt, clean sand, and gravel. These lenses, occurring at variable depths, are generally thin and of limited areal extent.

A clay aquitard zone underlies the shallow groundwater zone and varies from 90 to 105 feet in thickness. In some wells, such as the Cooley Landing (Schoof) well located northeast of the site, the fine-grained sediments of the clay aquitard zone are similar to the fine-grained sediments of the shallow groundwater zone. The clay aquitard zone is uninterrupted in the site region and contains only minor isolated sandy interbeds (Figures 6 and 7). This conclusion is based on logs from all the wells shown on Figure 5, as well as interpretations of the regional geologic conditions that deposited the clay aquitard, as inferred from a review of hundreds of borings in the southern Bay Area (Atwater, et al., 1977).

The clay aquitard zone extends for at least 1.75 miles to the west of the site (Veterans Hospital Well), 0.5 miles to the northeast of the site (Schoof Well), 1 mile to the north of the site (Ravenswood Well 1S), and 0.5 miles to the southeast of the site (Ravenswood Well 15S). Therefore, for several square miles in the vicinity of the site, the shallow groundwater zone is hydraulically isolated from the deep groundwater zone by the clay aquitard. Work completed by Atwater, et al. (1977) supports these conclusions concerning the extent of the fine-grained deposits in this area and suggests that fine-grained materials of the clay aquitard zone are continuous in the upper 180 feet over the entire southern portion of San Francisco Bay.

Underlying the clay aquitard zone is the deep groundwater zone. The top of this zone is encountered at depths varying from 160 feet (at the site) to 200 feet. This zone consists of sand and gravel interbedded with clay and silt. The thickness of the sand and gravel beds appears to increase away from the site toward the west.

2.5.1.1 Regional Groundwater Use

Historically, extensive groundwater pumping has occurred from the alluvial deposits on the perimeter of San Francisco Bay. Groundwater from sand and gravel zones below 160 feet was the main source of water supply for the cities along the western shore of San Francisco Bay until the 1960s. Pumping was curtailed in the 1960s to prevent saltwater intrusion into the aquifers and to thwart land subsidence. Currently, the region including East Palo Alto and Palo Alto uses Hetch Hetchy Reservoir as the primary water supply, supplemented if required by groundwater.

Prior to the 1960s, a large number of groundwater wells were in use in the site vicinity. Approximately 125 wells within a 9-square-mile area surrounding the site have been identified from the files of the CDWR, local water districts, and private well owners (Figure 5). General locations of most of the wells are available, but there is no information on total depth, lithology, and perforated intervals for more than half of the wells.

Water wells completed in aquifers deeper than 160 feet below land surface are used by both public and private parties in the area (Figure 5). The San Mateo County Public Works Department operates a well at Bay Road and Gloria Way, located approximately 3500 feet west of the site, that is pumped only occasionally, most recently for street sweeping usage in August 1988 (Frame, 1989); the Palo Alto Park Mutual Water Company operates five wells at Oakwood and Garden approximately 5400 feet west of the site that together supply about 1300 gallons per minute in summer and about half this amount in winter (Dremann, 1989); and the O'Connor Cooperative Tract operates two wells near the Bayshore Freeway approximately 7500 feet southwest of the site which pump a total maximum of about 525 gallons per minute. The Schoof well at the east end of Bay Road is used exclusively by a boat repair facility, and the Iwasaki well is used by Saturo Iwasaki Greenhouses for agricultural purposes. Pumpage rates for these wells are presented in Appendix B. The Ravenswood line of wells located in the tidal marsh east of the site (Figure 5) were formerly used as water supply wells. These wells were constructed by the Spring Valley Water Company in the early 1900s and were originally artesian. By 1928, the wells were no longer artesian and, because the wells were left uncapped and their casings rusted, saltwater entered many of the wells at high tide. In response to this condition, these wells were filled and sealed (Iwamura, 1980). The method of well sealing and the integrity of the seals is not known (Iwamura, 1989).

2.5.1.2 Regional Groundwater Flow Patterns

Groundwater flow patterns in the shallow and deep groundwater zones are complex because of historical and present pumping from aquifers within the deep groundwater zone a few miles to the south and west of the site. Prior to about 1920, groundwater flow in both the deep and shallow groundwater zones was from the Santa Cruz Mountains on the west toward San Francisco Bay, where groundwater discharged. Extensive pumping of the deep groundwater zone from the 1920s to the 1960s resulted in water level declines of over 100 feet in the deep groundwater zone, and water level declines of several tens of feet in the shallow groundwater zone. These water level declines caused a reversal in the direction of groundwater flow in the site region. Groundwater flow in response to these water level declines was from San Francisco Bay toward the major pumping centers. This resulted in significant movement of Bay waters into the shallow and deep groundwater zones. Water levels have recovered significantly in the site region since heavy pumping was curtailed in the 1960s and groundwater flow is now apparently toward San Francisco Bay in both the shallow and deep groundwater zones, as static water levels in both zones in the site region are now above mean sea level. Water level data collected from wells in the site region suggest that groundwater levels in deep wells have only recently risen above mean sea level.

Water level data collected during 1986, 1987, and 1988 from the on-site deep monitoring well and adjacent shallow wells indicate that water levels for the shallow and deep groundwater zones are generally a few feet above NGVD. During the time of this study, the water level in the deep groundwater zone was generally 0.5 to 1.5 feet above water levels in the shallow groundwater zone.

2.5.1.3 Regional Groundwater Quality

Water quality data obtained between 1979 and the present were compiled for nine wells located in the East Palo Alto region and screened in the deep groundwater zone (refer to Appendix B). Data were compiled from the Schoof well, the Iwasaki well, four Palo Alto Park Mutual Water Company wells, East Palo Alto Water District Well No. 1, and two O'Connor Tract Cooperative Water Company wells. The locations of these wells are shown on Figure 5. The nine wells range in depth from 65 to 550 feet, with six ranging in depth from 230 to 330 feet. The range in total dissolved solids (TDS) was 420 to 630 mg/l, indicating water of relatively good quality. Groundwater from three wells completed in the deep groundwater zone at the Palo Alto Baylands south of the site (depth of 175 to 200 feet) showed TDS concentrations of 546 to 746 mg/l (Howland, 1976). The laboratory detection limits for arsenic

(0.01 and 0.0001 mg/l) were exceeded only four of the seventeen times the analysis was performed. The arsenic concentration was reported to be 0.008 mg/l in 1979 in both East Palo Alto Water District Well No. 1 (located 1 mile west of the site) and O'Connor Tract Cooperative Well No. 1 (located 1.4 miles southwest of the site). An arsenic concentration of 0.014 mg/l was also reported in O'Connor Tract Cooperative Well No. 2 in 1979, and a concentration of 0.0027 mg/l was reported in the Iwasaki well in 1987.

Water quality data for the shallow groundwater zone in the site region are more limited. Water quality data obtained for the shallow groundwater zone for the Palo Alto Baylands (located southeast of the site) between 1972 and 1974 were compiled and presented by Howland (1976). Three wells completed in the shallow groundwater zone (less than 50 feet deep) had TDS concentrations of 12,180 to 28,610 mg/l. These concentrations are similar to those found in some of the shallow monitoring wells on site. Southwest of the Bayshore freeway, near the Palo Alto baylands, TDS levels in the shallow groundwater zone decrease markedly. The high concentrations of TDS in the shallow groundwater zone are believed to have occurred principally by downward leakage of Bay waters through the overlying silty and sandy clays in response to hydraulic gradients induced by pumping from aquifers of the deep groundwater zone. Because of the saltwater intrusion in this area, water in the shallow groundwater zone is not potable.

2.5.2 Site and Vicinity Hydrogeology

2.5.2.1 Hydraulic Characteristics

Slug tests were conducted at 15 monitoring wells to estimate the hydraulic conductivity of the subsurface deposits in the vicinity of these monitoring wells. Two slug tests were conducted at most of the wells in order to check the reproducibility of test results.

Estimated hydraulic conductivities in the upper shallow groundwater zone are in the range of 8.5 ft/day to 28 ft/day, and in the lower shallow groundwater zone are in the range of 20 ft/day to 85 ft/day (refer to Appendix C). These values are within the range of hydraulic conductivities reported by Freeze and Cherry (1979) for silt and silty sand. The hydraulic conductivity of the silty clay found in monitoring well WCC-1, between 35 and 56 feet below ground surface, was not estimated, but the texture of these materials suggests that the horizontal hydraulic conductivity is several orders of magnitude lower than that in the overlying materials and is probably in the range of 3×10^{-3} to 3×10^{-2} ft/day.

The hydraulic conductivity of both the lower and upper shallow groundwater zones is predominantly a function of the abundance and lateral continuity of coarse-grained deposits found in these zones. Because lenses of coarse-grained sediments are found in both zones, it is not surprising that the estimated hydraulic conductivities in both zones are similar. The estimated average hydraulic conductivities in the upper and lower shallow groundwater zones at the site are 23 and 28 ft/day, respectively.

2.5.2.2 Direction and Rate of Groundwater Flow

Groundwater flow rates and directions are derived principally from water-level data obtained from the monitoring wells on and in the vicinity of the site. Water levels have been measured several times since November 1981, when the first set of water-level readings was taken in existing wells. Water levels in the 30 wells then in the monitoring network and 19 additional wells were measured quarterly from September 1986 to June 1987 and semi-annually beginning in December 1987. Water-level data are presented in Appendix C.

Water-level contour maps of levels measured on 15 June 1988 for the upper shallow and lower shallow groundwater zones are shown on Figures 12 and 13, respectively. In addition, water-levels in the upper shallow groundwater zone in late 1986 at both the 1990 Bay Road site and the nearby Romic site are shown on Figure 14 to give a more regional perspective of water level trends. The well locations and corresponding water levels, referenced to NGVD, are indicated on the figures. Because the geologic conditions are not homogeneous and isotropic, the direction of groundwater flow is approximately normal to the water-level contours.

In the upper shallow groundwater zone, the direction of groundwater flow varies from east-southeast toward San Francisco Bay near the non-tidal marsh (Area 2), to southeast on the Torres property (Area 3). Groundwater flow directions are not as well defined on the site (Areas 1 and 4), but are generally toward the southeast. Horizontal hydraulic gradients for groundwater moving away from the site range from 0.0004 to 0.001 ft/ft. Assuming an average hydraulic conductivity of 23 ft/day and an effective porosity of 0.25 for the upper shallow groundwater zone, the pore (interstitial) velocity is estimated to range from 13 to 34 ft/year for groundwater traveling off site. Estimated groundwater velocities for on-site locations are lower due to the lower hydraulic gradients. Groundwater flow rates and directions in the upper shallow groundwater zone have not varied substantially over time, based on the available monitoring data (1981 through 1988).

Water-level data for the lower shallow groundwater zone (Figure 13) are less extensive than for the upper shallow groundwater zone, but indicate that groundwater flow in this zone is principally toward the south in the site vicinity. South of the site, the hydraulic gradient in this zone is an average of 0.001 ft/ft, which is similar to that for the upper shallow groundwater zone. Assuming a hydraulic conductivity of 28 ft/day and effective porosity of 0.25 for the lower shallow groundwater zone, the average pore velocity for this area is 40 ft/year. On the site, hydraulic gradients are smaller than the gradient south of the site.

The direction and magnitude of groundwater movement in the vertical direction can be derived from the water level data described above, if the water levels are adjusted for differences in salinity. Water in the lower shallow groundwater zone is more saline than that in the upper shallow groundwater zone and thus has a higher density. To compare the two water levels, the water levels were adjusted for differences in mid-screen elevation and density. The density of the groundwater was estimated from the specific conductance (measured during sampling) using the standard relationship between specific conductance and seawater density (CRC, 1983).

The results of the analysis indicate that, at all but three well pair locations (W-102, W-103; W-106, W-107; and W-112, W-113), the adjusted water level in the lower shallow groundwater zone is higher than the adjusted water level in the upper shallow groundwater zone, indicating the potential for the upward flow of groundwater. The adjusted water level in the lower shallow groundwater zone ranged from 0.05 feet lower to 0.20 feet higher than the adjusted water level in the upper shallow groundwater zone for thirteen well pairs. The spatial distribution of these water-level differences shows no obvious trends (Figure 15). The vertical hydraulic gradients range from 0.0028 ft/ft downward to 0.0095 ft/ft upward. Assuming a vertical hydraulic conductivity of 3 x 10^{-4}

ft/day (an average value for a silty clay such as that which separates the lower and the upper shallow groundwater zones) and a porosity of 0.40, the vertical velocity component of flow is estimated to average 2 x 10^{-3} ft/year upward. This value represents a very slow rate of vertical flow.

The vertical gradient between the deep and shallow groundwater zones has been upward over the course of this investigation (1981-1988). Between August 1986 and June 1988, the water levels in the deep monitoring well, W-101, ranged from 0.5 to 1.5 feet higher than water levels in nearby monitoring wells completed in the shallow groundwater zone. Thus, the upward vertical hydraulic gradient between the deep and shallow groundwater zone for this period ranged from 0.0031 to 0.009 ft/ft. These gradients are similar to those calculated between the lower shallow and the upper shallow groundwater zones. Assuming a vertical hydraulic conductivity and porosity similar to that presented above for silty clay, the upward vertical flow velocity calculated between the deep and shallow groundwater zones is similar to that between the lower and upper shallow groundwater zones.

Both WCC (1982) and Howland (1976) have collected continuous water-level data from the shallow groundwater zone over short time periods in order to assess whether the shallow groundwater zone is affected by tidal fluctuations. Water levels in the shallow groundwater zone did not vary with the tidal cycle in either study.

The data and analyses discussed above indicate that groundwater in the shallow groundwater zone flows predominantly in a southeasterly direction. On the site, the horizontal direction of flow is not well defined and groundwater velocities are relatively low. Off site to the east and south, the horizontal flow directions are well defined and groundwater velocities are estimated to be no greater than 40 feet per year.

The above observations suggest that groundwater from the shallow groundwater zone may be discharging at a slow rate to the non-tidal marsh, where it evaporates, and/or to the tidal marsh located to the east and south of the site. Groundwater discharge to the tidal marsh is most likely restricted to the tidal channels, as water level data collected by Howland (1976) indicate slight downward gradients between fine-grained surface deposits and the shallow groundwater zone. A relatively large tidal channel along the west side of the tidal marsh located southeast of the site may provide an area of discharge for the shallow groundwater zone (Figure 4).

2.5.2.3. Water Quality

Four indicator parameters, specific conductance, pH, Eh, and temperature, have been measured in groundwater from the monitoring wells in the vicinity of the site to characterize the quality of the groundwater. Specific conductance is used to estimate the TDS concentration in groundwater, which often determines the potential beneficial uses of groundwater; pH is a measure of hydrogen-ion activity; and Eh is a measure of redox potential. The latter two parameters are the major geochemical variables that influence the chemical behavior of trace elements. Temperature affects the rates of chemical reactions.

Specific Conductance -- TDS. An estimate of the TDS concentrations in groundwater was calculated from the specific conductance measurements using the standard seawater conversion factors (CRC, 1983). TDS concentrations in both the upper and lower shallow groundwater zones are generally well above the California Secondary Drinking Water Standard of 1000 mg/l (CAC, 1985 Title 22). In the upper shallow groundwater zone, TDS concentrations in June 1988 ranged from 300 mg/l to 28,000 mg/l; however, concentrations in the upper shallow zone west of the tidal marsh were generally less than 3,000 mg/l. TDS concentrations in June 1988 ranged from 6,000 mg/l to 31,000 mg/l in the lower shallow groundwater zone.

The distribution of TDS concentrations is probably a function of groundwater origin. The high TDS concentrations in the lower shallow groundwater zone and along the levee in the upper shallow groundwater zone are a result of the migration of seawater into these zones. The lower TDS concentrations observed in the upper shallow groundwater zone result from a mixture of surface water infiltration and seawater intrusion from the Bay.

The TDS concentration in the deep monitoring well, W-101, which is screened about 170 feet below land surface, is about 1200 mg/l. This concentration exceeds the concentrations of 400 to 630 mg/l measured in the deep production wells of the Palo Alto Park Mutual Water Company and the O'Connor Tract Cooperative Water Company (Table B-18). These wells, however, are screened at greater depths than monitoring well W-101, and are located within the deposits of the San Francisquito Cone, whereas well W-101 is located within the Niles Cone.

pH and Eh. The pH in the shallow groundwater zone ranged from 6.7 to 8.1 in June 1988 (Table B-10). The pH was generally greater than 7.0 in the upper shallow groundwater zone, and less than 7.0 in the lower shallow groundwater zone. The pH values are within the range expected for groundwater in this area, which indicates that contamination has not affected pH conditions.

Eh was measured in 16 wells in the site vicinity. Measured values ranged from 0.07 to 0.450 volts referenced to the hydrogen redox reaction (Table B-11). The lowest values of Eh, which indicate relatively reducing conditions, were measured in well W-112 in the lower shallow groundwater zone, in tidal marsh wells W-114 and W-115 in the upper shallow groundwater zone, and in wells WCC-8 and W-103 in the upper shallow groundwater zone adjacent to the tidal marsh. The measured Eh values indicate that no free oxygen is present in the groundwater.

Temperature. The temperature of the groundwater in the monitoring wells completed in the lower shallow groundwater zone and in the deep monitoring well, W-101, has generally been in the range of 17° to 19°C (63° to 66°F). The temperature of groundwater in monitoring wells completed in the upper shallow groundwater zone fluctuates seasonally, ranging from 13° to 22°C (55° to 72°F).

2.6 Ecology

The following is a brief description of the ecological environment of the site and vicinity, notably the wetlands.

2.6.1 Wetlands

2.6.1.1 Non-Tidal Marsh

The non-tidal marsh is a disturbed environment that is seasonally flooded. In the low-lying portion of the marsh, seasonally ponded water is accessible to and attracts water-oriented birds during portions of the year. Plant life is very patchy within this area and consists largely of the salt-tolerant salt grass (*Distichlis spicata*) with lesser amounts of sea-blite (*Suaeda californica*) and pickleweed (*Salicornia virginica*). Other species observed in the non-tidal wetland include fathen (*Atriplex patula* var. *hastata*), alkali heath (*Frankenia grandifolia*), ryegrass (*Lolium* spp.), rabbit's-foot grass (*Polypogon elongatus*), sand-spurrey (Spergularia marina), and dock (Rumex spp.). No birds or small mammals were observed at the site during the wildlife inventory conducted during June and July 1987, which coincided with the dry season. The non-tidal marsh has a low habitat value for most of the year, and the area attracts very few birds or small mammals during the dry season since it provides little cover, protection, or food essential to survival. Ground squirrels and king snakes have been observed to inhabit the levees. However, during the winter months when seasonal ponding of the water occurs, some waterfowl were observed. A list of bird species identified in a bird inventory conducted in January 1988 are presented in Appendix H.

2.6.1.2 Tidal Marsh

The tidal marsh east of the levee is a mid- to upper-elevation tidal marsh approximately 1,800 feet west of the tidal mudflats of southern San Francisco Bay. Elevations of the marsh range from about 3.5 to 6.5 feet (NGVD). The marsh floods during higher spring tides and winter storms. The plant community is dominated by pickleweed (Salicornia virginica) and salt grass (Distichlis spicata), with Pacific cord grass (Spartina foliosa) denser in lower elevation areas and tidal channels, and gum-plant (Grindelia humilis), alkali heath (Frankenia grandifolia), fathen (Atriplex patula var. hastata), and jaumea (Jaumea carnosa) in slightly higher elevation areas. The marsh vegetation is classified as estuarine, intertidal, emergent, and persistent in the U.S. Fish and Wildlife Service National Wetlands Classification System (U.S. Fish and Wildlife Service, 1979).

The marsh displays some localized and elevation-dependent diversity in plant groupings and plant assemblages, but delineation of these separate groupings from the larger community, termed the pickleweed community, is of little practical use or importance. Small areas dominated by salt grass and jaumea, jaumea and frankenia, pickleweed, or cordgrass were noted, but generally the study area should be considered a diverse, healthy, vigorous pickleweed community. Other plants observed in the tidal marsh include sea blite (Suaeda californica), sand-spurrey (Spergularia marina), coyote bush (Baccharis pilularis), creeping salt bush (Atriplex semibaccata), seaside arrow-grass (Triglochin maritima), and marsh rosemary (Limonium californicum). Facultative plants on the higher periphery include ryegrass (Lolium spp.), rabbit's-foot grass (Polypogon elongatus), oats (Avena spp.), and dock (Rumex spp.).

The vegetation that occurs in the marsh is not heavily utilized as a food source, but serves more as a base for hiding, roosting, and nesting by birds and small mammals, and as the primary producer of the more accessible and more easily digested detrital matter for the lower animal life forms, or benthic organisms. These benthic organisms in turn are an important food source for fish and birds in the wetland, which are considered higher trophic levels in the food web. Small mammals and birds may lightly browse on young, tender spring growth of the common wetland plants, and song birds may utilize stems for nests or feed on the seeds.

The marsh is flooded and drained by several small tidal channels lined with cordgrass. The sidewalls and bottoms of the channels are rich in benthic organisms, and are typical of many such tidal channels in the south San Francisco Bay. Included among the typical channel bottom benthic organisms are the Baltic clam (Macoma balthica), the ribbed mussel (Ischadium dimissum), and the yellow shore crab (Hemigrapsus oregonensis). The Baltic clam is a deposit feeder, feeding on detrital matter. An introduced species, the ribbed mussel generally occupies a slightly higher-elevation intertidal habitat along the channel banks and low areas dominated by cordgrass. The ribbed mussel, a filter feeder which is reported to live longer than 14 years, is very abundant in the project area. The yellow shore crab is also abundant in the tidal sloughs where it burrows into mudbanks. It commonly scavenges on plant and animal detrital matter at night and remains in its burrow during much of the day (Hopkins, 1986).

The Baltic clam, the ribbed mussel, and the yellow shore crab are important food sources for any waterfowl and shorebirds using the wetland. Other common species that were identified or are expected to occur in the tidal channels include the mud snail (Iiyanassa obsoleta), the amphipod (Orchestia traskiana), a burrowing isopod (Sphaeroma quoyana), several large polychaetes (Capitella capitata, Streblospio benedicti, and Eteone californica), tube-forming amphipods (Corophium spinicorne and Grandidierella japonica), and small bivalves (Gemma gemma and Tapes japonica) (Hopkins, 1986).

A moderately sized benthic population with a diversity and species composition typical of the south Bay was found. Based upon the expert opinion of the ecologist who conducted the study, the tidal marsh is in good health. A list of the benthic organisms found in the tidal marsh is contained in Appendix H.

Shallow tidal channels, such as those at the site and vicinity, also provide food and protection for juvenile fish and other small non-game fish. Species (primarily juvenile) that may drift into the project area on occasion during high tides include topsmelt (Atherinops affinis), arrow goby (Clevelandia ios), stickleback (Gasterosteus aculeatus), and mosquitofish (Gambusia affinis). These fish are a component of the diets of the shorebirds and wading birds inhabiting and utilizing the tidal marsh.

Bird utilization of the marsh is high, and many species were noted during the biota study (Appendix H). The most abundant species expected to use the tidal marsh are the resident songbirds such as the salt marsh yellowthroat

(Geothlypis trichas), the marsh wren (Cistothorus palustris), the salt marsh song sparrow (Melospiza melodia), and the red-winged blackbird (Agelaius phoeniceus). These birds are primarily insectivorous and/or seed-eating. Following in abundance are the heron species, the black-crowned night heron (Nycticorax nycticorax), the snowy egret (Egretta thula), the great egret (Casmerodius albus), the great blue heron (Ardea herodias), and the green heron (Butorides virsecens). While these herons are primarily fish-eaters, their opportunistic feeding habits allow them to take advantage of crabs as well. Also frequenting this area are shorebirds, including the American avocet (Recurvirostra americana), long-billed dowitcher (Limnodromus scolopaceus), marbled godwit (Limosa fedoa), willet (Catoptrophorus semipalmatus), black-necked stilt (Himantopus mexicanus); and killdeer (Charadrius vociferous). These species feed on polychaetes, small bivalves, mollusks, and crustacea benthic organisms, and may occasionally consume young plant shoots.

Migratory waterfowl also frequent the tidal marsh on a seasonal basis. These waterfowl, such as mallards (Anas platyrhynchos) and pintails (A. acuta), are omnivorous. The northern harrier (Circus cyaneus) is the primary raptor (predatory) species found here, feeding on birds and small mammals.

Daylight calling was done for four species of rails, the California clapper rail (Rallus longirostris obsoletus), the California black rail (Laterallus jamaicensis coturniculus), Virginia rail (Rallus limicola), and sora (Porzana carolina). Rail were not observed during the field sampling and did not respond to a taped rail call during an early morning visit to the study area.

2.6.2 Rare and Endangered Species

Mid-elevation tidal marshes in San Francisco Bay provide suitable habitat for a number of rare and endangered species, including the California clapper rail (Rallus longirostris obsoletus), the salt marsh harvest mouse (Reithrodontomys raviventris), and Point Reyes bird's beak (Cordylanthus maritimus palustris), a flowering plant. In addition, the peregrine falcon and the California least tern may frequent the marsh. No systematic studies have been conducted to determine if these endangered species inhabit the marsh, but during the field investigations conducted at the site none of these endangered species were observed.

2.7 Demography

2.7.1 East Palo Alto

The population characteristics of East Palo Alto as a whole are described in the City of East Palo Alto General Plan, A Comprehensive Revision of the 1982 Community Plan and Environmental Impact Report (City of East Palo Alto, 1986). The population of East Palo Alto doubled in the 1950s. The rate of population growth since 1960 has been decreasing, from an overall average of approximately 300 per year between 1960 and 1970 to about 35 per year between 1970 (pop. 17,837) and 1980 (pop. 18,191). The Association of Bay Area Governments estimated the City of East Palo Alto's population to be 18,700 in 1985.

Compared with nearby communities, East Palo Alto has a relatively young population, with a median age of 25.5 years as compared with 36 years for San Mateo County as a whole. Racial and ethnic groups represented in East Palo Alto include blacks (61 percent), whites (25 percent), Asians and Pacific Islanders (6 percent), and other races (8 percent). In addition, 14 percent of the population identified themselves as being of Spanish origin.

There is no residential population directly adjacent to the site due to the predominantly industrial use of the area. Nearby residential areas include three homes to the west of the site on Bay Road at Pulgas Avenue, a small cluster of homes south of Weeks Street, and one home on the northeast corner of the intersection of Weeks Street and Pulgas Avenue, approximately 500 feet from the site.

2.7.2 Vicinity of 1990 Bay Road

The 1990 Bay Road site and immediate vicinity are zoned and used for commercial and industrial purposes. Within a quarter-mile radius of the 1990 Bay Road there are approximately 40 active businesses or services with a total of approximately 450 to 700 employees. The businesses and services within 1/4 mile of the site and the number of employees at each establishment are listed in Table 3. Approximately 29 private residences are also located within 1/4 mile of the site. The closest area zoned for residential use is located approximately 500 feet southeast of the site. The locations of businesses, services, and residences within 1/4 mile of the site are shown in Figure 16. The Ravenswood Children's Center is located 0.27 miles south of the site. About 185 children are cared for by 15 staff members at this center.

2.8 Land Use

The East Palo Alto General Plan (City of East Palo Alto, 1986) establishes land use by zoning. The 1990 Bay Road site and vicinity are part of the Ravenswood Industrial Park, which is zoned as either light industrial (M-1) or heavy industrial (M-2) and encompasses the area south of the site to a line 110 feet north of Weeks Street, north of the site to the Dumbarton Bridge Road (about one mile), and west of the site to the Southern Pacific right-of-way (about two blocks). The majority of this area is already industrial, and the planned use of this area continues to be industrial, with possible future upgrading of the industrial park to attract light industry such as electronics, research, light assembly, or storage facilities. The tidal marsh to the east of the levee is the Palo Alto Wildlife Preserve, presently designated as "publicly-owned conservation land."

Planned land use outside the industrial zone is varied, including high-density housing a number of blocks to the south of the site, recreational use along the levee area, development of Cooley Landing as a marina approximately 1/4 mile to the east, continued use of the tidal marsh as a wildlife and bird-watching habitat, and continued use for medium-density housing in the area 1/4 of a mile to the west.

Plans for recreational use of the levee and tidal marsh include a bicycle/pedestrian trail to be constructed along the levee to Bay Road. The trail will be part of the San Mateo Baylands Bicycle Trail to be constructed under a grant from the Coastal Conservancy to the Mid-peninsula Regional Open Space District and San Mateo County Parks and Recreation Department (State Coastal Conservancy, 1986).

3.0 NATURE AND EXTENT OF CONTAMINATION

The following sections discuss the sources of contamination in terms of the historical manufacturing, storage and disposal practices and the nature and extent of contamination in each of the media: soil, groundwater, surface water, air and biota. Included are descriptions or discussions of background level concentrations of the various chemical compounds found at the site as well as their concentrations and quantities determined to be present at the site based on the results of the field investigations.

3.1 Sources of Contamination

The historical manufacturing, storage, and disposal practices at the site and vicinity, including the types of products manufactured and the locations of releases or disposal of excess or waste products, are described in the following subsections.

3.1.1 Waste Types

The activities conducted at the site prior to 1926 are not documented, and little is known about activities prior to 1964. Between 1926 and 1964, based on the few documents in existence and interviews with former Chipman employees, it appears that the site was used principally for the formulation of various agricultural pesticides including sodium metaborate, sodium chlorate, and sodium arsenite. While these activities continued into the late 1960s, the bulk of the arsenic compounds were formulated prior to the end of World War II.

In general, after 1964, the main products were solid or liquid mixtures of sodium chlorate and sodium metaborate used as a soil sterilant, cotton defoliant, or fire retardant. In addition, sodium arsenite was produced as a potato vine dessicant and antifreeze rust inhibitor. Pesticides were formulated to a limited extent, but the types and amounts are not documented beyond the extent described in Table 4. The site was also used as a warehouse for shipment of products made at other locations.

The chemicals that were handled at the 1990 Bay Road site prior to its sale in 1972 and the locations of their use or disposal were ascertained from review of the few existing documents of on-site operations, aerial photographs, and interviews with present and former Rhone-Poulenc employees who were formerly associated with the Chipman Division of Rhodia. The experience of these employees spans the period between 1959 and 1971, when the plant employees numbered between two and eight, depending on production needs. In 1971, Rhone-Poulenc closed its operation in East Palo Alto. Information on chemical use at the site since 1972, when Zoecon began its operations, is not available to Rhone-Poulenc. It is also understood that arsenic has not been used by Sandoz during its operation of the facility.

3.1.1.1 Formulations and Manufacturing Processes (1964-1971)

Several pesticide and herbicide compounds were apparently formulated at the site during the period 1964 to 1971. The formulations included powder-type materials and liquid materials. The powder materials included Chlorax 40, "Shed-A-Leaf," Chlorax 285, Chlorea 3, Chlorea 125, all of which are mixtures of sodium chlorate and sodium metaborate. The liquid products included the sodium arsenite based compounds Atlas A, Atlas A-6 and Bromicil-5; the sodium chlorate based products "Shed-A-Leaf," Chlorax Liquid S.F.2 (railroad right-of-way treatment liquid), and, to a lesser extent, Atlas Wood Preservative and Cleaner (Atlas WP&C). It appears that all of the products listed above were manufactured on an order basis and did not have regular production schedules. An approximate listing of the active ingredients in these materials, estimated material volumes for a 10-month production period estimate in 1967, and manufacturing locations at the plant are presented in Table 4, with the layout of the plant for this period shown in Figure 17.

Most of the powders were reportedly formulated by batching caustic liquid, water, powder borax, and other additives in 10-cubic-foot mixing blenders located in Building M (Figure 17), followed by bagging and storage in Buildings M and O.

The high volume liquid compounds, including sodium arsenite, were manufactured in the approximately 25,000-gallon underground steel mixing tank by adding raw materials to caustic and water (Tank L in Figure 17). The cooled, final products were either pumped directly to tank cars or stored in above-ground storage tanks (Tanks E and F). Atlas WP&C was reportedly formulated in Tank J, a 1450-gallon above-ground rectangular mixing tank.

The waste characteristics of the main ingredients of these powders and liquids are presented in Table 5 and include toxicity, persistence, mobility and carcinogenicity as listed in CAC, Title 22.

3.1.1.2 Repackaged Materials

In addition to the substances formulated or manufactured at the 1990 Bay Road site, small quantities of several materials were reportedly manufactured at other plants and repackaged at 1990 Bay Road. Repackaging reportedly involved small quantities of materials, but production reports are not available.

3.1.2 Releases

The only disposal area that has been reported is the sludge pond area. However, it is suspected that releases may have occurred at other principal locations (the underground tank [L] and the railroad spur) and to a lesser extent in buildings used for manufacture or storage (e.g., Buildings M, N, O, and P). A drainage ditch extended from west to east in front of buildings C, N, O, and P, connecting to an existing ditch that ran from north to south along the eastern property line and draining into the non-tidal marsh area. The soil and groundwater investigations conducted at the site have identified three areas, the former underground tank location, the former sludge pond location, and the railroad spur, as having elevated arsenic concentrations (Figures 2 and 17).

3.1.2.1 Underground Tank

After liquid compounds were manufactured in the underground mixing tank, the tank was washed and the sludges were removed. A former employee recalls that the water and waste products were transported by pumps and hoses into the sludge pond. Reported tank repair work included seam repair and tank wall section replacement.

3.1.2.2 Sludge Pond

The sludge pond was in existence from at least 1955 until plant closure in 1971, as confirmed by aerial photographs taken between 1955 and 1969. The pond was reportedly a rectangular unlined impoundment surrounded by a 3-foot-high berm. Liquid waste, rinsate from Tank L, and contents of damaged containers are suspected to have been disposed in the sludge pond. The pond was filled in with lime, excavated soil, and berm materials when the plant was closed in 1971.

3.1.2.3 Railroad Spur

Raw materials, including arsenic trioxide were brought onto the site in hopper cars. It is suspected that materials occasionally spilled onto the railroad ballast and that overflows occurred when tank cars were filled with formulated products. On these occasions, the cars were washed with water that drained into the ballast.

3.2 Soil

The results of the soil sampling programs have shown that the concentrations of arsenic and other elements are elevated above background levels in near-surface soil in limited areas on site and to the south and east of the site. Of the elements analyzed in soil samples, total arsenic concentrations were almost always higher than concentrations of other elements. These findings are consistent with the manufacturing and disposal activities that are believed to have occurred at the site between 1929 and 1971, as arsenic was the primary persistent hazardous compound handled at the site.

In addition to arsenic, the priority pollutants that are found at concentrations significantly above background levels in soil are cadmium, copper, lead, mercury, selenium, and zinc. Concentrations of these elements at selected sites are shown in Table 6. Extensive sampling has shown that the concentrations of these elements are correlated with arsenic concentrations in soil, and that arsenic concentrations in soil are almost always significantly greater than the concentrations of the other elements. This is illustrated on Figure 18, which shows plots of arsenic concentration in soil relative to the other elements of concern. Because the source of these elements was impurities in smelter flue dust used as a raw product by Chipman Chemical Company, and because the elements are found in soil containing arsenic, contamination at the site was evaluated primarily on the basis of the extent of arsenic contamination. Furthermore, the extensive and systematic sampling program yielded only a single sample that was found to contain elevated concentrations of organic pesticide compounds, while delineating an area of elevated arsenic levels covering 13 acres of the site and vicinity.

The following sections describe the information used to arrive at a value for the background concentration for arsenic and other trace element priority pollutants found in the soil at the site, followed by an area-by-area description of the vertical and lateral extent of contamination by arsenic and other compounds.

3.2.1 Background Concentrations of Arsenic and Other Trace Element Priority Pollutants

Arsenic is a naturally occurring element found in soils and sediments throughout the world. Background concentrations of arsenic are dependent on the geologic history of the region, and can vary dramatically within small areas. Background arsenic concentrations in the site vicinity were evaluated based on arsenic concentrations of soil samples collected from three 4.5-foot-deep borings in areas that were unlikely to be affected by historical site activities, at least 0.4 miles from the site (WCC 1984a, Figure 2), and arsenic concentrations reported in the literature for San Francisco Bay sediments (E.V.S. Consultants 1988 a, b, c, d; U.S. Corp of Engineers, 1979) and for soils of the western United States (Shacklette and Boerngen, 1984). Total arsenic concentrations in the off-site soil borings averaged 8.5 mg/kg and ranged from 7 to 10 mg/kg. Reported mean arsenic concentrations in 48 groups of sediment samples from the east-central San Francisco Bay near Oakland ranged from 6.2 to 18.0 mg/kg, and mean concentrations in 126 groups of sediment samples from near the Angel Island Buoy ranged from 3.1 to 12.3 mg/kg (Anderlini et al., 1975b).

The arsenic concentrations measured in the off-site borings and in Bay sediments are within the background range of 0.1 to 97 mg/kg reported for western soils by the U.S. Geological Survey (Shacklette and Boerngen, 1984), and the range of 0.2 to 41 mg/kg reported for 12 soil groups nationwide by the National Academy of Sciences (1977). The average arsenic concentrations reported in these studies were 6 mg/kg and 5 to 6 mg/kg, respectively.

Based on these data, it is concluded that the average background arsenic concentration in soil in the site and vicinity is about 9 mg/kg, and that individual samples may vary significantly from the average. Insufficient data were available to calculate the standard error associated with the average, but a qualitative assessment suggests that if the arsenic concentration in a soil sample exceeded 20 mg/kg, it was probably affected by activities at the site.

Cadmium, copper, lead, mercury, selenium, and zinc are the trace element priority pollutants identified at high concentrations at the site. However, the concentrations of these elements, measured in a control tidal marsh sample collected north of Bay Road (Table 6), are within the background ranges reported for western United States soils by the U.S. Geological Survey (Shacklette and Boerngen, 1984) and are comparable to mean values reported for Bay sediments by E.V.S. Consultants (1988a, b, c, and d) and the Corps of Engineers (1979). (Trace elements were not analyzed in soil samples taken from the three 4.5-foot borings located more than 0.4 miles from the site.)

An upper-bound estimate of the background concentration of each of these elements was derived from a qualitative assessment of the available site data for these elements (Figure 18) and the upper bound was defined as the highest value measured in soil samples in which the arsenic concentration was 10 mg/kg or less. The upper-bound estimates of background concentrations are: 1.5 mg/kg for cadmium, 50 mg/kg for copper, 50 mg/kg for lead, 4 mg/kg for mercury, 4 mg/kg selenium, and 200 mg/kg for zinc. When these concentrations are exceeded in soil it is probable that the concentration has been influenced by activities in the site area. Average background concentrations, based on the control sample and the articles cited above, are about one-half these upper bound estimates.

3.2.2 Arsenic Concentrations in Soil

The horizontal and vertical extent of arsenic contamination in soil is illustrated in this section by a discussion of the areal and vertical extent of soil with arsenic concentrations in excess of 20 mg/kg, 500 mg/kg, and 5,000 mg/kg. The areal extent of arsenic contamination is shown on Figure 19, and the vertical extent of soil with arsenic concentration in excess of 20 mg/kg, 500 mg/kg and 5,000 mg/kg is shown on Figures 20, 21, and 22, respectively. The estimated volumes of arsenic-contaminated soil at these and several other levels are listed on Table 7, and the estimated quantities of arsenic in these soils are also listed on Table 7.

Soil with an arsenic concentration in excess of 20 mg/kg covers about 13 acres of the site and vicinity (Figure 19). This area includes about 5 acres on the site, 2.4 acres south of the site, 3.3 acres east of the site in the non-tidal wetland, 1 acre in the tidal marsh, 0.8 acres west of the site, and 0.6 acres north of the site.

The vertical extent of soil with arsenic concentrations greater than 20 mg/kg is generally less than 10 feet except in the vicinity of the former underground mixing tank and sludge pond where the vertical extent is as great as 24 and 34 feet, respectively (Figure 20). In all areas on site and off site where the clayey soils deeper than 35 feet below ground surface were sampled (a total of eight locations), the deeper soil contained arsenic in concentrations at background levels. The total volume of soil with arsenic concentrations greater than 20 mg/kg is estimated to be about 170,000 cubic yards (Table 7). The total weight of arsenic in these soils was estimated to be 88,000 kg.

Soil containing arsenic in excess of 500 mg/kg is confined to on-site areas and topographically low areas (where surface waters seasonally pond) on properties southeast of the site. The total areal extent of these areas is estimated to be approximately 6 acres. In most areas, soil below a depth of 5 feet contains less than 500 mg/kg arsenic; however, in on-site areas near the locations of the former underground mixing tank and sludge pond, arsenic concentrations exceed 500 mg/kg to a maximum depth of about 28 feet (Figure 21). The total volume of soil exceeding 500 mg/kg is estimated to be approximately 25,000 cubic yards (Table 7). The total weight of arsenic in this soil is estimated to be about 64,000 kg.

Soil containing arsenic concentrations in excess of 5000 mg/kg is also confined to onsite areas and low-lying areas to the south of the site. In most areas soil containing arsenic concentrations in excess of 5,000 mg/kg occurs only in the upper one foot, and only in the vicinity of the underground tank does the vertical extent of this soil exceed four feet (Figure 22). The total volume of soil with arsenic concentrations in excess of 5,000 mg/kg is estimated to be 1,300 cubic yards. This soil is estimated to contain about 14,000 kg of arsenic.

3.2.2.1 1990 Bay Road Site (Areas 1 and 4)

Arsenic concentrations in soil exceed background levels throughout the site and exceed 500 mg/kg in the former sludge pond area, the former underground mixing tank area, along the railroad spur, and in the northeast corner of Area 1.

In general, soil containing arsenic in excess of background concentrations is confined to the upper 10 feet below ground surface; however, in areas near the locations of the former underground mixing tank and sludge pond, arsenic concentrations exceed 500 mg/kg to a maximum depth of about 28 feet. The highest arsenic concentration in the vicinity of the sludge pond was reported for a sample from a depth of 1.5-2.0 feet from WCC-2 which had a concentration of 22,000 mg/kg. A maximum total arsenic concentration of 42,000 mg/kg was determined at a depth of 2 feet in a boring located on the railroad spur near the former underground mixing tank.

3.2.2.2 Bains Moving & Storage Co. and Curtaccio Properties (Areas 6 and 7)

Arsenic concentrations exceed background levels in a limited zone within approximately 25 feet west of Area 1 in samples obtained from the Curtaccio property (Area 6), but arsenic concentrations in samples analyzed from this area were below 500 mg/kg.

Arsenic concentrations in four surface samples collected from a narrow strip located between the Sandoz fence and the Bains Moving and Storage Company warehouse ranged from 880 mg/kg to 3,500 mg/kg, although arsenic concentrations from samples collected during the drilling of wells WCC-4 and WCC-13 to the west of the warehouse were at background levels. Arsenic concentrations in samples taken from two borings west of the Bains warehouse were reported at background levels.

Arsenic concentrations along the Bains railroad spur (Area 7) are at a maximum of 4,200 mg/kg in an area of limited areal extent near the Sandoz fence, and decrease to background levels within approximately 300 feet of Area 4, as shown on Figure 19. Arsenic concentrations in excess of background levels are generally within the upper 5 feet of the ground surface.

3.2.2.3 Torres Construction Co. Property (Area 3)

Results of soil arsenic analyses indicate that the most significant quantities of off-site arsenic are in Area 3. The regions of elevated arsenic concentrations extend from the former location of the underground mixing tank southeast to low-lying areas near the levee (Figure 19).

Arsenic concentrations in excess of 10,000 mg/kg were obtained at boring locations within Area 3 between the railroad tracks and the levee (the Call-Mac property). Concentrations in this area generally decrease rapidly with depth, and reach background levels within a depth range of 10 to 15 feet.

The most contaminated portions of Area 3 consist of areas near the former underground tank and railroad spur and the area near the levee where surface water runoff, originating in part from the site, seasonally ponds. Evaporation or infiltration of arsenic-bearing surface water that originated as runoff from the site and contaminated portions of Area 3 is the probable source of the elevated arsenic concentrations that now exist in the area near the levee. A maximum total arsenic concentration of 54,000 mg/kg was determined in a soil sample on the eastern side of Area 3 (54,000 mg/kg is the average of duplicate analyses for this soil sample which had reported concentrations of 61,000 and 48,000 mg/kg). The lateral extent of the arsenic contamination in Area 3 is illustrated in Figure 19.

The distribution of arsenic in soil in Area 3 has been somewhat altered by fill placement, which occurred in the 1950s and 1960s; by earth-moving activities that occurred when a sanitary sewer was installed in this area in the early 1970s; and by earth-moving activities conducted on this property in 1981 in conjunction with site cleanup and in 1985 for site development. The sanitary sewer runs approximately from the southeast corner of the site along the Torres/PG&E property line and then continues in a southerly direction along the west side of the levee.

3.2.2.4 PG&E Poleyard (Area 5)

Arsenic concentrations in Area 5 exceed background levels in the upper 2 feet below ground surface in areas within about 25 feet of the Sandoz property and the PG&E substation. An arsenic concentration in excess of 500 mg/kg (580 mg/kg) was determined only at one boring, located in the southwestern corner of the area near the Sandoz fence.

3.2.2.5 North of the Site

In a very limited area within approximately 35 feet north of Area 1, arsenic concentrations exceed background levels at very shallow depths. The maximum concentration detected north of the site was 380 mg/kg in a boring adjacent to Bay Road.

3.2.2.6 Non-Tidal Marsh (Area 2)

Arsenic concentrations exceed background levels in approximately the upper 5 feet over most of the non-tidal marsh. Arsenic concentrations in excess of 500 mg/kg were generally found only in the low-lying areas adjacent to the levee that are seasonally flooded by surface water. A maximum arsenic concentration of 8800 mg/kg was determined in a boring in a low-lying area near the levee, where background levels are estimated to occur within a depth of about 10 feet.

3.2.2.7 Tidal Marsh (Area 8)

Arsenic concentrations in soil samples from borings drilled in the tidal marsh exceeded background levels in localized areas generally within 100 feet of the levee. Within the same area no samples from the upper one-half foot contained arsenic concentrations in excess of 20 mg/kg. A maximum arsenic concentration of 190 mg/kg was determined in a boring near the levee. The tidal marsh arsenic concentration results strongly suggest that the levee has limited the extent of arsenic contamination to areas toward the east by providing a barrier to surface water runoff.

Prior to the mid-1950s, the levee along Area 2, the PG&E property, did not exist. It is possible that the low levels of soil arsenic contamination that presently exist in the tidal marsh are the result of surface water run-off from the site prior to the 1950s. Because the tidal marsh surface elevation has remained nearly constant during the past 30 years, even though over 1 foot of subsidence has occurred in this area, because of sediment accumulation, contaminated soils from the pre-1950 period are now buried.

3.2.3 Other Compound Concentrations in Soil

Extensive testing was conducted to determine what hazardous inorganic and organic compounds are present at the site in addition to arsenic. Selected soil samples were analyzed for cadmium, copper, lead, mercury, selenium, and/or zinc, and for compounds on U.S. EPA's Target Compound List (TCL).

Arsenic concentrations in the soil are almost always significantly greater than the concentrations of the other priority pollutant inorganic compounds in soil when arsenic concentrations in soil are in excess of 100 mg/kg (Figure 18). Most soil samples that contain arsenic concentrations well above background levels also contain elevated concentrations of cadmium, copper, lead, mercury, selenium, and zinc at shallow elevations. Unlike arsenic, however, these other elements only occur at elevated concentrations in very shallow soil, which suggests that their mobility in soil is significantly less than that of arsenic.

Soil samples taken in the sludge pond area illustrate the limited vertical extent of contamination by cadmium, mercury, lead, and selenium (Table 6). At a depth of 2 feet in this area, the reported arsenic concentration is 23,000 mg/kg, and the concentrations of cadmium, mercury, lead, and selenium are 120 mg/kg, 1900 mg/kg, 2700 mg/kg, and 1000 mg/kg respectively. These concentrations are all more than 100 times the background concentrations for these respective elements.

At a depth of 7 feet in this same location, the reported arsenic concentration is 1200 mg/kg, which is well above the background level. The reported concentrations of cadmium, mercury, lead, and selenium are 0.7 mg/kg, 0.63 mg/kg, 8.9 mg/kg, and less than 0.1 mg/kg. Background levels for these elements are reached by a depth of 7 feet; however, the arsenic concentrations in the soil samples exceed background levels to a depth of about 30 feet. Soil analyses from the non-tidal marsh, the Torres property, and the area just west of the site (Areas 2, 3, and 6) all show that the vertical extent of contamination by cadmium, copper, mercury, lead, selenium, and zinc is much less than that of arsenic.

In an attempt to determine if arsenic was a suitable indicator of contamination, the ratios of the arsenic concentration to the concentrations of cadmium, copper, lead, mercury, selenium and zinc were calculated for all samples for which the required data were available (Figure 18). These ratios were then compared to a derived hazard ratio to determine which compound poses the greater environmental hazard in the soil sample. The hazard ratio used in this analysis was computed from the ratio of the Total Threshhold Limit Concentration (TTLC) of arsenic to the TTLC of each of the other elements. Since the TTLC is used by the California Department of Health Services as the criterion for defining a solid hazardous waste and is derived from the Federal maximum contaminant levels (MCLs), the ratio of TTLCs is a suitable hazard index. For almost all soil samples in which arsenic was present at concentrations in excess of background levels, the calculated ratios from the analytical data were greater than the ratio of the TTLCs, which indicates that arsenic is the greater environmental hazard. For example, the ratio of the arsenic concentration to the lead concentration in the soil sample from a depth of 0 to 0.5 feet in boring W-5 is 5,560/1,470 = 3.8 (Table 6), which is greater than the ratio of the TTLC of arsenic to the TTLC of lead, which is 500/1,000 = 0.5. These analyses strongly suggested that arsenic is a suitable indicator of contamination.

The analytical testing of soils for cadmium, copper, lead, mercury, selenium and zinc was not nearly as extensive as the testing of arsenic because arsenic was used as the indicator of contamination. As a result, the distribution of these elements in soil in the vicinity of the site cannot be delineated as accurately as the arsenic contamination. The available data, though, are sufficient to determine that the soil contaminated with these elements is a subset of the soil contaminated with arsenic. Therefore, any remediation that addresses the soil contaminated with arsenic will also address the soil contaminated with the other elements. Estimates of the quantity of cadmium, copper, lead, mercury, selenium and zinc within the soil containing more than 20 mg/kg of arsenic are 2,000 kg, 7,000 kg, 1,500 kg, 900 kg and 50,000 kg, respectively.

Analyses for the TCL compounds indicated that no inorganic compound other than the seven previously identified is above the level of concern. The only hazardous organic compounds that were detected in soil were DDT, DDD, and DDE. These were detected at very low concentrations in one sample from the property to the south of the site where drums were formerly stored by Call-Mac Transportation Company.

3.3 Groundwater

3.3.1 Site and Vicinity Groundwater Quality

Dissolved arsenic has been found to be the main contaminant in shallow groundwater at the site. As a result, background arsenic concentrations in groundwater are discussed first, followed by a discussion of the present distribution of arsenic in groundwater and of changes in arsenic concentrations during the past seven years. The description of arsenic concentrations is followed by a discussion of trace element and priority pollutant organic concentrations in groundwater.

3.3.2 Arsenic Concentrations in Groundwater

3.3.2.1 Background Arsenic Concentrations

Unlike many synthetic organic compounds that occur in the groundwater in the South Bay area, arsenic is a naturally occurring compound. However, natural concentrations of arsenic in groundwater are very low and conventional analyses of arsenic have been unreliable at such low levels. Therefore there are limited data available for background concentrations of arsenic in groundwater. In records maintained by the SCVWD, only 35 arsenic sampling results are reported with detection limits in the range of 0.001 to 0.01 mg/l. The mean arsenic concentration in those samples is 0.003 mg/l. Limited sampling of groundwater by the U.S.

Geological Survey nationwide has suggested that the mean arsenic concentration in the groundwater in the United States is in the range of 0.002 to 0.02 mg/l (U.S. EPA, 1985a). The mean arsenic concentration in seawater has been estimated to be 0.003 mg/l (Hem, 1985).

The concentrations of arsenic that are reported in the perimeter wells west of the levee most probably reflect natural or background conditions, as reported concentrations in 1987 and 1988 in each well averaged less than 0.004 mg/l. The reported arsenic concentrations in the upper shallow zone monitoring wells in the tidal marsh, which are unlikely to have been affected by activities at the site, are higher than concentrations in the perimeter wells west of the levee. The lowest reported arsenic concentration in an upper shallow zone monitoring well in the tidal marsh was 0.004 mg/l at well M-13. At the background well, M-11, located about 1,400 feet east of the site, the reported arsenic concentration was 0.011 mg/l.

Equilibrium arsenic concentrations in wells in the tidal marsh are apparently higher than those in perimeter wells west of the levee because of geochemical differences. The groundwater west of the levee is generally more oxidizing than that in the tidal marsh. Several research studies have demonstrated that arsenic concentrations in groundwater in equilibrium with soil increase with a decrease in the oxidation potential (Brannon and Patrick, 1987; Matthess, 1981). Groundwater in the tidal marsh can also be expected to contain more dissolved organic matter, and Waslenchuck and Windom (1978) demonstrate that, in saline groundwater, dissolved arsenic concentrations have a linear correlation to dissolved organic carbon content. They further demonstrate that this is the result of a chemical association between dissolved organic carbon and arsenic. Therefore, if soil arsenic concentrations are similar, arsenic concentrations in monitoring wells in the tidal marsh would be expected to be greater than concentrations in monitoring wells west of the levee in which the groundwater is more oxidizing and contains less dissolved organic matter.

3.3.2.2 Total Dissolved Arsenic Concentrations

Total dissolved arsenic concentrations in the shallow groundwater zone in the vicinity of the site ranged from 0.0006 to 320 mg/l in 1988 (Figures 23 and 24). The extent of groundwater with arsenic concentrations in excess of background concentrations is well defined by 15 upper shallow groundwater zone wells and 12 lower shallow groundwater zone wells that encircle the contaminated area; the arsenic concentrations in these wells in 1988 were all less than 0.01 mg/l (Tables 8 and 9).

In the upper shallow groundwater zone, groundwater with arsenic concentrations in excess of 0.05 mg/l, which is the maximum contaminent level (MCL), underlies about 10 acres of the site and vicinity, and groundwater with arsenic concentrations in excess of 0.01 mg/l underlies about 11 acres (Figures 23 and 24). In the upper shallow groundwater zone, arsenic concentrations ranged from 0.0006 mg/l to 180 mg/l in 1988 in the 32 wells completed in this zone, and generally exceeded 0.05 mg/l wherever arsenic contamination was observed in the soil. Reported arsenic concentrations in the upper shallow groundwater zone are highest in the vicinity of the underground tank where a concentration of 180 mg/l was reported in well C-29 in June 1988, and in the sludge pond area where a concentration of 70 mg/l was reported in well WCC-2 in June 1988. Arsenic concentrations in groundwater in excess of background concentration are generally limited to the site and the adjacent low-lying properties south and east of the site, and a narrow strip of the tidal marsh east of the levee.

Arsenic concentrations in the lower shallow groundwater zone in 1988 ranged from 0.0007 mg/l to 320 mg/l and were greater than 0.011 mg/l in only 4 of the 17 lower shallow groundwater wells (WCC-1, WCC-17, WCC-9, and WCC-11) with reported concentrations in June 1988 of 320, 2.0, 0.27 and 0.019 mg/l, respectively. WCC-1 is located within the former sludge pond area, WCC-17 is located adjacent to the underground mixing tank, WCC-9 is located about 200 feet from the underground mixing tank, and WCC-11 is located about 200 feet from the railroad tracks. These data indicate that the extent of arsenic contamination in the lower shallow groundwater zone is generally limited to the area directly under the site and to the northern end of the adjacent property to the south of the site. The zone of contamination does not extend as far as the tidal marsh (Figure 24).

Monitoring well W-101, which is screened in the deep groundwater zone, was reported to contain an arsenic concentration of 0.0011 mg/l in June 1988.

3.3.2.3 Arsenic Speciation

Arsenic exists in natural waters in both the +3 oxidation state, arsenic(III), and in the +5 oxidation state, arsenic(V). At seven selected monitoring wells with total arsenic concentrations in excess of 10 mg/l, the concentrations of arsenic(III) and arsenic(V) were determined in addition to measuring total arsenic (Table B-8). Arsenic(III) was determined to be the dominant species only at wells WCC-3 and C-30, which are located near the former underground mixing tank. At both of these wells, arsenic(III) comprised more than 60 percent of the total arsenic. At the other monitoring wells where the concentrations of arsenic species were measured, arsenic(V) comprised more than 60 percent of the total arsenic. At well WCC-1, which is located within the former sludge pond, arsenic(V) comprised more than 85 percent of the total arsenic. At WCC-10, located about 200 feet from the former underground mixing tank, only arsenic(V) was reported.

The reported distribution of arsenic(III) is consistent with the past operational history of the site and geochemical conditions in the shallow groundwater zone. The primary manufactured arsenic product at the site between at least 1929 and 1964 was sodium arsenite, which is comprised of arsenic(III). Product losses from the underground tank would have introduced arsenic(III) into the soil and/or groundwater.

The pH and Eh conditions in the groundwater at the site are such that arsenic(III) should be almost totally converted to arsenic(V), as the equilibrium ratio of concentrations of arsenic(V) to arsenic(III) is between 10^7 and 10^{17} for the groundwater at the site (Cherry, et al. 1979). This reaction is apparently very slow, but the increase in the measured ratios of arsenic(V) concentration to arsenic(III) with increasing distance from the former underground tank suggests that the conversion from arsenic(III) to arsenic(V) is occurring. Measured and calculated equilibrium arsenic species ratios are presented in Appendix B.

3.3.2.4. Long-Term Changes in Arsenic Concentrations with Time

Arsenic concentrations have been measured in 14 of the monitoring wells in the groundwater monitoring network since at least November 1983 (Tables 8 and 9). The reported arsenic concentrations in most of the wells have not changed significantly over the 4 1/2-year period from November 1983 to

June 1988 and, as a result, there is no evidence to suggest that the zone of contaminated groundwater expanded or moved between 1983 and 1988. The most significant change has occurred at well WCC-07, a lower shallow groundwater zone monitoring well, where the concentration has decreased from 0.1 mg/l in 1983 to 0.011 mg/l in June 1988 (Tables 8 and 9). Decreases in concentrations at this well and at well W-116 may reflect a purging of contamination introduced during well construction.

Reported arsenic concentrations at most wells show considerable variability from sampling event to sampling event. This variability is most likely the result of variations in field and analytical procedures, and some of the variability appears to be related to the salinity of the water.

Variability of arsenic concentrations has been greater in the lower shallow groundwater zone wells than in the upper shallow groundwater zone wells. This apparent variability may be a result of the density stratification in the lower shallow groundwater zone wells. This stratification makes it difficult to obtain a representative sample of the aquifer because the more saline and heavier water sinks to the bottom of the well bore.

3.3.3 Trace Element Concentrations in Groundwater

In addition to arsenic, groundwater from the monitoring wells was analyzed four times during the period of

1986 to 1987 for cadmium, copper, lead, mercury, selenium, and zinc and was analyzed for cadmium and selenium in June 1988. Results of these analyses are presented in Appendix B. Lead and mercury were not detected in any of the samples. Copper was not detected in any of the samples taken in December 1986 and March 1987. Selenium, zinc, and cadmium have been consistently detected at low concentrations in many of the wells in the groundwater monitoring network. Only selenium and cadmium have been detected at concentrations near or above the Primary Drinking Water Standards (Table 10).

Selenium concentrations have exceeded 0.01 mg/l, the Primary Drinking Water Standard, in only six of the monitoring wells. These six wells are all located within the area known to contain elevated arsenic concentrations. Three of the wells (WCC-2, W-111, and W-117) are screened in the upper shallow groundwater zone and three of the wells (WCC-1, WCC-9, and W-116) are screened in the lower shallow groundwater zone. The high selenium concentrations in the vicinity of W-117 are not well explained, as extensive sampling of soils in the vicinity of these wells did not show evidence of selenium contamination in the soils. The highest concentration occurs in well WCC-117, where the reported concentration was 6.3 mg/l in June 1988.

Cadmium has been detected consistently in nine monitoring wells in the groundwater monitoring network. Reported cadmium concentrations, though, have been very low and generally below the Primary Drinking Water Standard of 0.01 mg/l. The maximum reported concentration in June 1988 was 0.024 mg/l in well W-116. However, previous reported concentrations in well W-116 were 0.001 mg/l in September 1986, 0.0052 mg/l in December 1986, 0.015 in March 1987 and 0.009 mg/l in June 1987. Nine of the ten wells in which cadmium has been detected above 0.001 mg/l are completed in the lower shallow groundwater zone. The only upper shallow zone well in which cadmium was detected above 0.001 mg/l was WCC-3, which is located near the underground mixing tank. Six of the nine lower groundwater zone wells with detectable cadmium are perimeter monitoring wells that do not contain elevated concentrations of arsenic.

3.3.4 Priority Pollutant Organic Compound Concentrations

Groundwater samples were collected for priority pollutant organic analyses in October 1982 from wells WCC-1, WCC-2, WCC-3, and WCC-4, and in November 1983 from wells WCC-1, WCC-3 and WCC-16. Wells WCC-1, WCC-2, WCC-3, and WCC-16 are located in suspected source areas, and WCC-4 is located off site. The samples collected in October 1982 were analyzed by U.S. EPA Methods 624 and 625 and the samples collected in November 1983 were analyzed by U.S. EPA Methods 608, 624, and 625. No priority pollutant pesticides were detected in any of the samples. Only trace amounts of a few purgeable and extractable priority pollutants were detected (Appendix A).

Priority pollutants that were identified at levels above 5 ppb TCE in well WCC-8 at a concentration of 110 ppb; PCE in wells WCC-16, WCC-8 and C-29 at concentrations of 42 ppb, 23 ppb, and 18 ppb, respectively; trans-1, 2-dichloroethylene (trans-DCE) in Wells WCC-8 and C-29 at concentrations of 16 ppb and 14 ppb, respectively; and 1,2-dichloroethane (1,2-DCA) in Well C-29 at a concentration of 6 ppb (Table B-13).

Groundwater samples were also collected for organic analysis from nine wells in June 1988. Samples were collected from WCC-1, WCC-2, and C-29, which are located in suspected source areas, as well as from WCC-7, WCC-8, WCC-9, and WCC-10, which are located about 200 feet downgradient of the old underground mixing tank. Samples were also collected from W-117 located in the northeast corner of Area 1, and from WCC-16 at the west end of the railroad tracks. All nine samples were analyzed by U.S. EPA Methods 608, 624, and 625. Priority pollutants that were identified at levels above 5 ppb were as follows: TCE in wells WCC-8 and C-29 at concentrations of 110 ppb and 5 ppb, respectively; PCE in wells WCC-16, WCC-8, and C-29 at concentrations of 42 ppb, 23 ppb, and 18 ppb, respectively; trans-1,2-dichloroethylene (trans-DCE) in wells WCC-8 and C-29 at concentrations of 16 ppb and 14 ppb, respectively; and 1,2-DCA in well C-29 at a concentration of 6 ppb (Table B-13).

3.4 Surface Water

3.4.1 Ponded Surface Water Sampling

The surface water that seasonally ponds in the non-tidal marsh (Area 2) and on the Torres property (Area 3) was sampled in March 1986, and in December 1987, and in January, February, March, and April 1988. Samples from all periods were analyzed for arsenic, and some samples from December 1987 and March 1987 were also analyzed for cadmium, copper, lead, mercury, selenium, and zinc. Arsenic concentrations in samples from surface water in the low-lying part of Area 3 where surface soils contain arsenic concentration in excess of 5,000 mg/kg ranged from 3 to 15 mg/l during the winter of 1987 to 1988. Arsenic concentrations in surface waters from low-lying area parts of Area 2 where soil arsenic concentrations exceed 2,000 mg/kg, ranged from 0.5 to 14 mg/l in the winter of 1987-1988. Arsenic concentrations in surface waters in other parts of Area 2 were below 1 mg/l when the ponds were fairly large.

The other elements were always detected at low concentrations relative to arsenic (Appendix B). The maximum reported concentrations of cadmium, copper, lead, mercury, selenium, and zinc were 0.0023 mg/l, 0.086 mg/l, 0.003 mg/l, 0.0013 mg/l, 0.27 mg/l, and 0.04 mg/l, respectively.

3.4.2 Tidal Marsh Sampling

On 15 June 1987, water samples were taken during flow tide and ebb tide from two tidal channels near the site, and from one tidal channel about 1,200 feet from the site. The latter site was designated the background tidal channel. The samples were analyzed for total and dissolved arsenic, cadmium, copper, lead, mercury, selenium, and zinc. Only arsenic, selenium, and zinc were detected in the samples (Appendix B). Selenium concentrations were less than 0.0004 mg/l and zinc concentrations were 0.03 mg/l or less. Dissolved arsenic concentrations were in the range of 0.004 mg/l to 0.006 mg/l, and total arsenic concentrations ranged from 0.005 mg/l to 0.007 mg/l. Arsenic concentrations in samples from the tidal channels near the site were similar to those samples from the background tidal channel. At all locations, total and dissolved arsenic concentrations were greater during flow tide than during ebb tide.

Tidal channel waters from approximately the same locations were sampled again on 21 June 1988 during ebb and flow tides for analysis of arsenic. Concentrations reported ranged between 0.0012 mg/l and 0.0052 mg/l. The highest concentration was reported from the sample collected during flow tide at the background tidal channel. The arsenic concentrations were higher in the samples taken at flow tide, except at the sampling location near the levee where the concentration reported at flow tide was 0.0052 mg/l, and at ebb tide was 0.006 mg/l.

One water sample was collected on 9 September 1988 for analysis for inorganic elements from the channel approximately 1,200 feet east of the site during flood tide. Priority pollutant metals detected in this sample were antimony (0.003 mg/l), arsenic (0.0073 mg/l), cobalt (0.005 mg/l), copper (0.021 mg/l), nickel (0.029 mg/l), selenium (0.0003 mg/l), silver (0.0008 mg/l), and vanadium (0.036 mg/l). It is unlikely that surface water at this location is affected by site activities, and therefore these concentrations likely represent background concentrations of these elements in the south Bay at this time of year.

On each of the surface water sampling events conducted in the tidal marsh, the concentrations of arsenic and other inorganic elements have been similar at all three sampling locations, including the background tidal channel. These data, in conjunction with the soil and sediment data from the marsh which show no evidence of shallow contamination, suggest that surface water quality in the tidal marsh is unaffected by the contamination at the site and vicinity.

3.5 Air

3.5.1 Ambient Air Sampling

Ambient air sampling programs were conducted on site by Zoecon in 1982 and PG&E in 1985. These studies indicated that ambient airborne concentrations of arsenic, lead, cadmium, copper, mercury, selenium, zinc, and several hydrocarbon pesticides usually were not detected in the samples. The highest arsenic concentrations reported were for two samples at the detection limit of 0.0001 mg/m^3. Cadmium, lead, mercury, and selenium were not detected in the ambient air samples. The analytical results for the ambient air sampling programs are presented in Appendix F.

Average concentrations of arsenic, cadmium, and lead in ambient air as measured by the Bay Area Air Quality Management District in San Jose between 1977 and 1982, are 3×10^{-6} mg/m^3, 2×10^{-6} mg/m^3, and 1×10^{-3} mg/m^3, respectively (U.S. EPA, 1985d).

3.5.2 Air Sampling During Fieldwork

An air sampling program, including well head space, personal, and areal sampling, was developed and implemented at the project site during sampling and exploratory fieldwork conducted in 1986, 1987, and 1988 (Appendix F). Air sampling was performed to evaluate potential exposure to arsenic gas and hydrocarbons in the well head spaces. No arsine gas was detected in well head spaces at the site. Trace concentrations of total hydrocarbons were detected in the head spaces of two of the three well samples.

The airborne arsenic concentrations detected during personal air sampling during field activities ranged from 1.6×10^{-5} to 0.011 mg/kg over short periods of time for field workers wearing respiratory protection. Lead was detected in only two samples at concentrations ranging between 0.003 and 0.007 mg/m^3. The other five elements were not detected in any of the personal air samples.

Areal air samples were also collected during field activities conducted at the site. Arsenic concentrations detected ranged from below the laboratory detection limit to 0.008 mg/m^3. Lead was detected in one sample at a concentration of 0.003 mg/m^3. The other five elements were not detected in any of the areal air samples collected at the site. In August 1988 four areal air samples were collected in Area 3 downwind of the Sandoz plant during drilling operations for analysis for organic compounds. The only compound detected was Freon, which was detected in two samples at concentrations of 0.005 mg/m^3 and 0.01 mg/m^3.

3.6 Biota

3.6.1 Bioavailability and Bioaccumulation

3.6.1.1 Sampling

Vegetation and soils were sampled at four sites in the tidal marsh, a control site with similar vegetation on the north side of Bay Road, and two sites in the non-tidal marsh (Plate 1). A 0- to 6-inch-deep soil sample was obtained at each sampling site. Above-ground plant tissues from cord grass, pickleweed, salt grass, and gum-plant were collected for analysis at each site in the tidal marsh within a 3-meter radius of each soil sample location. These plants were selected because these species were dominant. Soil and salt grass samples were also collected for analysis in the southwest corner of the non-tidal marsh. Control soil and plant tissue samples were collected from an adjacent, presumably unaffected, wetland for comparison purposes. In addition, animal tissue analyses for arsenic were completed on clams, crabs, and mussels from two sampling stations in small channels draining the tidal marsh, and from one control station.

3.6.1.2 Results of Analyses

Non-Tidal Marsh. High levels of arsenic, lead, cadmium, and other metals were found in both the non-tidal marsh soil and the salt grass plant tissues (Appendix H). Reported concentrations in salt grass from the non-tidal marsh ranged from 1.3 to 260 mg/kg, from 2.5 to 6.1 mg/kg, and from 19 to 34 mg/kg for arsenic, cadmium, and lead, respectively. It was observed that most areas with high arsenic (*i.e.*, above about 500 mg/kg) and heavy metals concentrations are largely barren. Samples were collected on the periphery of barren areas to enable inclusion of some plant materials. However, since salt grass is very rhizomatic, the actively growing root system for the above-ground plant tissues sampled may have been up to 3 feet away, presumably in a soil with lower arsenic concentrations.

Tidal Marsh. Plant-available (bicarbonate extractable) forms of arsenic were very low in the marsh soil samples, averaging less than 0.5 mg/kg, or less than 5 percent of total arsenic (Appendix H). Plant-available arsenic in the control sample was relatively high at 8.1 mg/kg, and accounted for nearly 90 percent of the total arsenic. In contrast, control plant tissue arsenic concentrations were very low (0.2-0.4 mg/kg).

Nearly all of the arsenic found in the bicarbonate-extractable form was arsenic(III). In anaerobic sediments, arsenic(III) is more likely to be present since the conditions favor the reduced form of arsenic. Therefore, the speciation analyses performed on the bicarbonate-extractable soil samples suggest that soil conditions at the site are anaerobic.

Plant tissue levels of arsenic were quite low, typically less than 1.0 mg/kg (dry weight basis) and usually less that 0.5 mg/kg (Appendix H). No distinct uptake or accumulation differences were noted among the four plant species evaluated, and there were no significant differences between the plants from the tidal marsh and the control plant tissues. Based on the relatively low total and plant-available (DPTA-extractable) levels of other metals in the tidal marsh soil, additional studies of plant and animal tissue analysis beyond this study were not considered necessary.

Animal wet-tissue arsenic concentrations in organisms sampled in the wetland were also determined to be low relative to both off-site control animals and literature values. Mean measured arsenic values for mussels ranged from 0.5 to 0.7 mg/kg, values for clams ranged from 1.4 to 1.8 mg/kg, and values for crabs ranged from 0.5 to 0.6 mg/kg.

Values reported in the literature for benthic organisms in the San Francisco Bay Area range from about 2 to 56 mg/kg (Anderlini et al., 1975a). The National Marine Fisheries Service reported an average concentration of arsenic in bivalves near the Dumbarton Bridge in 1986 of 1.96 mg/kg (NOAA, 1987).

The apparently low level of biologically available arsenic in the tidal wetland soil and sediments and the low levels of arsenic in the biological tissue are not surprising. The review by Fowler (1983) indicates that calcareous sediments may act as a biological sink for various species of arsenic, tying them up in a biologically unavailable form as calcium arsenites or organo-arsenine complexes, or adsorbed on colloids. These mechanisms greatly reduce the bio-availability of arsenic from tidal sediments.

Bioconcentration factors for arsenic in aquatic organisms range from approximately 1.2 to 350 (U.S. EPA, 1985a). There is, however, no evidence of magnification along the aquatic food chain (Eisler, 1988). This suggests that low arsenic tissue residues should not be a problem to higher trophic level predators.

3.6.2 Impact of Seasonally Ponded Surface Water on Waterfowl

A number of species of waterfowl inhabit the non-tidal marsh when seasonally ponded surface water is present. Because concentrations of arsenic and other metals in the seasonally ponded water are elevated above background levels, a site study as well as a survey of information concerning the toxic effects of arsenic to waterfowl, shorebirds, and wildlife was conducted.

During the four-day field study, the numbers and types of birds visiting Areas 2 and 3, as well as their behavior were observed and recorded. A total of 33 species of shorebirds, waterfowl, songbirds and raptors was observed. Review of the available information (Eisler, 1988) on the toxic effects on these types of wildlife yielded the following facts: 1) animal carcinogenicity tests with organic and inorganic arsenicals have been negative, even when the chemicals were administered for long periods at or near the highest tolerated dosages; 2) no evidence of acute arsenic poisoning were observed in the birds, and no caracasses or sick animals were found during the field study; and 3) calculations based on the LD-50 (lethal dose measurement) for mallard ducks and several other species and on the maximum arsenic concentrations measured in the surface water at the site show that the potential exposure of these birds is well below the lethal doses documented for them.

Camardese et al. (1988) studied the effects of dietary intake of foods with 30, 100 and 300 ppm arsenic for ten weeks. Only minimal effects were observed with an intake of 30 ppm. Based on the highest measured levels of arsenic in water and vegetation at the site, ducks that inhabit the site will have average dietary intakes of much less than 30 ppm.

The results of the field study and a discussion of the toxic effects of arsenic on waterfowl are presented in a report contained in Appendix H.

4.0 CONTAMINANT FATE AND TRANSPORT

The fate and transport of a chemical constituent determine the form and the locations in which the constituent will be found over a period of time following its release. All of the major contaminants at the site are elements and will therefore persist in the environment and their total quantity will remain constant, even while they continue to be distributed and diluted by various mechanisms. It should be noted that the major contaminants are metal salts and are not in elemental form. The solubility of these salts is generally low, due to their binding to soil particles.

The following sections will describe the mobility of arsenic and factors that affect it, such as leaching and sorption characteristics, as well as the transport and dispersal of arsenic and other contaminants by groundwater, air and surface water.

4.1 Contaminant Mobility in Ground Water

The mobility of arsenic in groundwater at the site was evaluated by conducting two laboratory studies. The first study evaluated the extent to which arsenic is leached from the soil at the site by simulated rainwater and groundwater. The second study consisted of measuring the extent to which arsenic in solution is sorbed to the soil at the site and studying the arsenic retardation through sorption. These two studies are described below. The mobility of the other contaminants was not investigated because both the groundwater data and the soil data strongly suggest that arsenic is the most mobile contaminant at the site.

4.1.1 Arsenic Leaching From On-Site Soils

The extent to which arsenic is leached from soils by simulated rainwater and/or groundwater was evaluated by WCC. The tests were conducted on three soil samples with total arsenic concentrations of 5,900 mg/kg, 680 mg/kg, and 240 mg/kg. Each soil sample was divided into at least two equal portions for leaching by simulated rainwater and groundwater solutions. The tests conducted with simulated rainwater solution were conducted under aerobic conditions to simulate rainwater leaching at shallow depths. The studies involving simulated groundwater were run under anaerobic conditions to simulate leaching by a higher ionic strength solution in a less oxygen-rich environment. The leaching tests were performed for an initial 2 days, for an additional 4 days, and, for one soil sample, an additional 24 days. Test procedures and results are presented in Appendix G.

An average of approximately 14 percent of the total arsenic was leached from the soil samples during the initial 2-day test. During the following 4 days of testing, an average of an additional 6 percent of the total arsenic was leached from the soil samples. The percentage of the total arsenic leached from the soil samples during the 2-day tests ranged from 3.7 percent to 22.1 percent and from 2.9 to 8.6 percent for the 6-day tests. In the 30-day test, an additional 6.2 percent of the initial total arsenic in the soil sample was leached.

In all of the tests except one, the percentage of arsenic leached from the soil samples with the simulated rainwater solution was 40 to 70 percent greater than with the simulated groundwater solution. The differences in the amount of arsenic leached were probably due to the lower pH and low TDS content of the simulated rainwater solution.

In one set of 2-day tests, a soil sample was tested under both anaerobic and aerobic conditions. The percentage of arsenic leached in both tests was similar, indicating that within the range tested, the percentage of arsenic leached is not a function of oxidation-reduction conditions.

Results of these tests indicate that arsenic in soils dissolves in both rainwater and groundwater solutions, and is apparently more soluble in the simulated rainwater solution. No relationship between solubility (percent leached) and initial arsenic concentration was observed in these tests.

CTE (1981a) ran leaching tests on six soil samples from the site using the U.S. EPA's EP toxicity test procedure (45 CFR 33127-33128). An average of 19 percent of the total arsenic was leached (Table G-1) in the tests. In the six tests that were run, the percentage of total arsenic leached ranged from 10 to 26 percent. These results are similar to those from the 2-day leaching tests with the simulated

over

rainwater solution, in which an average of 18 percent of the total arsenic was leached. This similarity in results is expected since the simulated rainwater solution is similar to the solution used in the U.S. EPA's EP toxicity test procedure.

4.1.2 Arsenic Sorption to On-Site Soils

Because of the limited data available on arsenic sorption in the literature, arsenic sorption isotherms were experimentally developed by WCC for two soil samples collected at the site. The soil samples consisted of a silty sand from a depth of 30 feet in monitoring well WCC-1, and a silty sand from the same depth with the silt and clay fraction removed. These samples were chosen to provide conservative estimates of arsenic retardation through sorption. The procedure used to develop the isotherms is described in Appendix G.

Based on the results of the sorption study, a relatively conservative estimate of the partition coefficient for materials from the site is 3.0 for sorption at or below an arsenic concentration of 100 mg/l in water. This partition coefficient would result in arsenic migration being retarded relative to groundwater movement by a factor of about 15.

4.2 Contaminant Transport and Dispersal

Activities associated with the manufacturing of sodium arsenite were the probable source of the arsenic and other elements. The contaminants currently in the soil and groundwater originated primarily from spillage of the raw materials and products, possible leakage from the underground tank, and disposal in the sludge pond.

The sources of contamination have been redistributed by several transport mechanisms. The major dispersal mechanism apparently has been surface water runoff from the site to the adjacent low-lying areas to the southeast of the site. This process has concentrated contaminants, primarily arsenic, in the near-surface soil in the low-lying areas west of the levee. After 1955, the levee prevented the contaminants from spreading into the tidal marsh. It is possible that some contamination was transported to the marsh prior to 1955 by surface water, which is reflected by the low concentrations detected in the marsh soil. Dissolved constituents are dispersed by groundwater migration, as shown by the distribution of contaminants in the shallow groundwater zone. Some airborne dispersion has also undoubtedly occurred and this may account for the slightly elevated levels of arsenic observed in soils for some distance to the south and east of the site. Each of these mechanisms is described below.

4.2.1 Contaminant Migration in Groundwater

Limited vertical and lateral migration of contaminants in groundwater has occurred during the last 60 years. The vertical migration in groundwater is demonstrated by the arsenic contamination that is detected in the lower shallow groundwater zone near the sludge pond and underground tank. This migration was probably caused by leakage of fluids from the tank and by fluid releases from the sludge pond. Downward migration of contaminants is no longer occurring in these areas because hydraulic gradients are now upward, and the tank has been removed and the sludge pond is no longer in use.

The present lateral distribution of arsenic in both the upper and lower shallow groundwater zones indicates that contaminated groundwater has moved laterally no more than 200 feet from the sources and probably much less since about 1929. The distribution of the other contaminants appears to follow the distribution of arsenic. This empirical evidence suggests that the rate of migration of arsenic in groundwater during the past 60 years has averaged from 1 foot to less than 4 feet per year.

If no remedial action occurs at the site, the areal extent of the contaminated groundwater in the shallow groundwater zone is expected to expand toward the south at a rate of less than 400 feet in 100 years if future migration rates are similar to past migration rates. Based on the groundwater velocities of 13 to 40 feet per year, which were calculated from existing groundwater gradients, and a retardation coefficient of arsenic relative to water of 15, which was determined from the sorption tests, the calculated rates of arsenic movement in groundwater under existing conditions is only 100 to 250 feet per 100 years. The other contaminants are assumed to move similarly to arsenic. The contaminated groundwater will eventually discharge to the tidal channels and San Francisco Bay, but this is not predicted to occur within the foreseeable future. It is predicted that when and if this discharge occurs, the levels of contaminants will be indistinguishable from natural background levels. This prediction is based on the following assumptions:

1. 500 gallons per day of groundwater with an average arsenic concentration of 10 mg/l will discharge to the tidal channels.
2. The levels will be indistinguishable from background if the discharge increases the arsenic concentration in the tidal channels by less than 0.005 mg/l.
3. The flow in the tidal channels is greater than 1.5 acre-feet per tidal cycle.

4.2.2. Contaminant Transport in Air

Metals and nonvolatile organic contaminants adsorbed onto soil particles can be transported by air when particulate matter becomes airborne. Very small particles, such as clays and silts, can travel greater distances than larger particles which will settle more quickly under the influence of gravity. In general, clays and silts contain more organic matter than the larger particles such as sand. The organic matter tends to adsorb these contaminants, and thus carry the contaminants as they are windblown.

Arsenic and lead have been detected in the airborne dust at the site and vicinity. Various organic compounds such as Freon, Lindane, and petroleum hydrocarbons have been detected in the air as well. These sampling results indicate that airborne dust is a potential migration route which may disperse the contamination from the site.

The dispersion of arsenic-laden dust was modeled using the Industrial Source Complex - Long Term (ISCLT) model, which was originally developed by the U.S. EPA. The input into the model includes descriptive information on the sources of arsenic-laden dust, the type of soils at the site, the meteorological conditions, vegetation, and average arsenic concentrations in the soil. The calculations and input for the model are presented in detail in Appendix J.

The model output consists of annual average arsenic concentrations in the air at the site and vicinity at a receptor height of 1.7 meters (Figure 25). On-site arsenic concentrations in air predicted by the model are approximately 1×10^{-5} mg/m^3. At the location of the nearest residence, a distance of 500 feet southwest of the site, the average arsenic concentrations are predicted to be approximately 2×10^{-6} mg/m^3.

4.2.3 Contaminant Transport in Surface Water

Compounds adsorbed onto soil can be transported by surface water running over the soil through either desorption of the compounds from the soil into the water or by erosion of the soil containing the compounds. When dissolution and erosion occur, the compounds are carried along with the water. The velocity of the water and the size of the eroded particle determines how far the particle will travel. Smaller particles will travel further, and in general, the smaller particles are believed to contain higher concentrations of the contaminants.

Almost all surface water that runs off the site ponds against the west side of the levee in the low-lying areas to the southeast of the site (Areas 2 and 3). The surface waters remain in these low-lying areas until the waters either evaporate or infiltrate. However, infiltration is less of a factor because these low-lying areas are seasonal groundwater discharge areas. Since the surface water runs off from the site ponds and evaporates in these low-lying areas, contaminant transport via this pathway occurs over only a very short distance.

During the past 60 years there has been significant surface transport of arsenic and other inorganic compounds from the site (Area 4) to the low-lying parts of Areas 2 and 3. The high soil concentrations of arsenic, cadmium, copper, lead, mercury, selenium, and zinc that occur in Areas 2 and 3 are the result of transport of these compounds from the site via surface water. Much of the transport likely occurred as the result of erosion of fine materials from the site and subsequent deposition of these materials in the low-lying areas.

5.0 BASELINE RISK ASSESSMENT

This baseline risk assessment evaluates, based on available data, the potential health and environmental risks associated with the site under present conditions in the absence of remedial response actions. The baseline risk assessment was prepared according to guidance presented in the "Superfund Public Health Evaluation Manual," (SPHEM) dated October 1986; the "Superfund Exposure Assessment Manual," dated January 1986; and a U.S. EPA memorandum regarding Region IX Superfund Risk Assessment Guidelines, dated August 18, 1988.

The baseline risk assessment process consists of six major steps: (1) identification of the chemicals of concern at the site and vicinity, (2) assessment of exposure pathways and concentrations, (3) comparison of exposure point concentrations to regulatory criteria and standards, (4) calculation of human intakes at exposure points, (5) in-depth review of the toxicity of the chemicals of concern at the site, and (6) evaluation of human risks, which are characterized by combining the exposure and toxicity information. Each of these steps is described in the sections that follow.

5.1 Identification of Chemicals of Concern

The first step in the baseline risk assessment process is the identification of chemical hazards. This process involves characterizing the site in terms of sources and types of chemicals present at the site and vicinity, their spatial distribution, quantity, and fate, and then identifying which of the chemicals pose potential hazards.

A total of 21 inorganic elements and 11 organic compounds on U.S. EPA's Target Compound List have been identified in groundwater, surface water, air, and/or soil at the site or adjacent properties (Table 12). In a first-cut analysis, the chemicals were reviewed and compared to expected background concentrations, applicable drinking water standards and guidelines, California hazardous waste limits, National Ambient Air Quality Standards and Federal and State Occupational Safety and Health Act (OSHA) PELs. Certain chemicals were eliminated from consideration as potential hazards because the levels detected were within background ranges, or because their distributions were very limited. Chemicals that were not eliminated in the first-cut analysis were evaluated further by factoring toxicity into the analysis. Those chemicals that were not eliminated by this second level of analysis were identified as the chemicals of concern. The hazard identification process is discussed in detail in Appendix K.

The chemicals that were eliminated because they were only detected at background levels were aluminum, calcium, cobalt, magnesium, manganese, nickel, potassium, sodium, and vanadium. The chemicals that were eliminated because their distributions were limited and average concentrations were low were antimony, barium, silver, chloroform, tin, trans-1,2-dichloroethylene, Lindane, Freon 113, DDT and related isomers, dibutylphthalate, n-nitrosodiphenylamine, trichloroethylene, 1,2-dichloroethane, and tetrachloroethylene (Table 12). None of these chemicals are a known human carcinogen or known human teratogen, nor do they present a significant toxicological hazard at the concentrations detected. Trichloroethylene, 1,2-dichloroethane, tetrachloroethylene, chloroform, DDT, and Lindane, though, are suspected human carcinogens.

In at least one well, four compounds, chloroform, 1,2-dichloroethane, trichloroethylene, and tetrachloroethylene, which are classified as probable human carcinogens on the basis of animal experiments, were detected at concentrations that exceed levels corresponding to the one in a million cancer risk level. Even though this criterion was exceeded, these chemicals do not pose a quantifiable hazard because the groundwater in which they were found is saline and non-potable, and therefore would not be consumed as drinking water. Additionally, the maximum concentrations of these compounds in groundwater samples were far below levels that are toxic to aquatic organisms, and these compounds were not detected in air samples.

Arsenic, cadmium, copper, lead, mercury, selenium, and zinc were the chemicals remaining after the first cut analysis. These chemicals are present at concentrations above typical background values and were further evaluated following the SPHEM guidance for selecting indicator chemicals on the basis of toxicity by route of exposure and quantity present at the site. Using the SPHEM Indicator Selection Process, zinc and copper were eliminated from further consideration as human health risks based on their low overall scores for both maximum and average concentrations and lack of carcinogenic potential. The remaining chemicals, arsenic, cadmium, lead, mercury, and selenium, were identified as the chemicals of concern for protection of human health at the site. These chemicals, as well as copper because of its toxicity to marine organisims at very low concentrations, were also identified as chemicals of concern for the protection of environmental quality.

The chemicals of concern at the site are all naturally occurring elements that are persistent in the environment. These chemicals will not biodegrade, nor can they be chemically transformed to another element in nature. Some biological organisms can alter the physical state of these chemicals, as it is possible for arsenic, mercury, and selenium to be released from the site in a gaseous state, but this occurs at an extremely low rate even under favorable environmental conditions.

At high concentrations, all of the chemicals of concern can cause non-carcinogenic adverse health effects in humans if they are inhaled or ingested. In addition, chronic ingestion of arsenic is known to cause skin cancer in humans and inhalation of arsenic is known to cause lung cancer in humans. Cadmium has been determined by the State of California to be a carcinogenic air contaminant, and the concentration of cadmium in air is regulated by the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).

5.2 Exposure Evaluation

The second step in the risk assessment process is an analysis of exposure concentrations of the chemicals of concern. This analysis includes the identification of pathways by which the public and the environment can potentially be exposed to contaminants from the site, selection of the pathways along which the highest exposures occur for a quantitative evaluation of risk, and calculation of chemical concentrations at the points of highest exposure. Each of the steps in the exposure evaluation analysis is discussed in detail below.

5.2.1 Potential Exposure Pathways

An exposure pathway consists of four elements: (1) a source, (2) an environmental transport medium such as air or water, (3) a point of potential human or environmental contact, and (4) an exposure route such as inhalation or ingestion. Each pathway describes a unique mechanism by which a population or an individual may be exposed to contaminants from the site. Only when all four elements are present is the pathway considered to be a route of potential exposure.

Potential pathways of exposure at the site are summarized in Table 13 and are described below.

The present source of chemicals of concern at the 1990 Bay Road site is the soil and groundwater with concentrations of the chemicals of concern above background levels. The source has an areal extent of about 13 acres and includes the entire Sandoz site (Areas 1 and 4) and non-tidal marsh (Area 2), as well as parts of the Torres property (Area 3) and other adjacent properties. The areal extent of the source is defined by the 20 mg/kg arsenic contour on Figure 19, and the vertical extent is approximately defined by the contours of depth on Figure 20.

In addition to direct contact, the chemicals of concern at the source can be released to the environment and transported to potential receptors by the following processes:

1. Airborne transport of chemicals sorbed onto soil;
2. Groundwater transport of chemicals that have leached from the source area;
3. Erosion of soil and subsequent transport of eroded soil via surface water, and transport of dissolved chemicals from contaminated soil by surface water; and
4. Uptake of chemicals by vegetation and their biomagnification through the food chain.

These transport processes and potential receptors are discussed below and are summarized in Table 13.

Any person who comes into direct contact with contaminated soil can potentially be exposed to the chemicals of concern. Most of the contaminated area, though, is fenced and posted as a hazardous waste area, and access is limited to remedial action workers and construction workers. Children and adults using the path along the levee, however, could be exposed to the chemicals of concern through inhalation of contaminated dust, although exposure rates would be highly dependent upon weather conditions and time of year.

Several routes of exposure to the chemicals of concern are possible. These include dermal contact with contaminated soil or water, ingestion of contaminated soil or water, and inhalation of contaminant-laden dust. All of the compounds of concern are poorly absorbed via the dermal route relative to the other routes of exposure; therefore, direct topical contact with contaminated soil or water is not quantitatively considered in this analysis. Incidental ingestion, though, can be a significant exposure route for children up to the age of six (LaGoy, 1987). Inhalation of dust containing contaminants can also be a significant exposure route for humans. Vegetation growing within the contaminated areas and wildlife using the contaminated area may also be directly exposed to the chemicals of concern.

5.2.1.1 Airborne Transport

Air transport of contaminated dust occurs at the site and vicinity because portions of the contaminated areas are unvegetated and susceptible to wind erosion. Therefore, inhalation of contaminant-laden dust was identified as a possible route for human contact with the chemicals of concern at the site. Receptors with the highest potential risk of inhalation exposure to chemicals found at the site are Sandoz employees, contractors engaged in activities at the site and vicinity, and, to a lesser extent, nearby residents and recreational users of the path along the tidal marsh levee.

5.2.1.2 Groundwater Transport

On the basis of the calculated arsenic migration rates, the horizontal extent of the groundwater zone containing the chemicals of concern in excess of background levels is expected to expand very slowly. Due to the hydraulic gradients existing at the site, contaminated groundwater found in the shallow aquifers is not expected to migrate downward to deeper aquifers, which are potential sources for drinking water. Hydraulic gradients are generally upward, and a substantial clay aquitard underlies the site, separating the shallow and deeper aquifers and preventing downward migration of the chemicals of concern into the deeper aquifers. Currently the deeper aquifers are rarely used for drinking water supply, and the uppermost non-contaminated aquifer beneath the site has a total dissolved solids content above the drinking water standard, making it non-potable without treatment. Accordingly, no route exists for potential human exposure to the chemicals of concern through groundwater.

Contaminated groundwater will eventually discharge to the tidal channels and San Francisco Bay. Because this discharge will not occur for a long time, and because the diffuse discharge will produce levels of contaminants that will be indistinguishable from background levels (Section 4.2.1), the effect of this discharge on the environment was not evaluated.

5.2.1.3 Surface Water Transport

Surface water transport is an important mechanism for contaminant dispersion at the site, but surface water transport of arsenic and the other elements of concern is confined primarily to fenced portions of Areas 2 and 3 (the adjacent properties immediately to the southeast). Surface ponding at the site is a seasonal event occurring only during the winter months. Accidental ingestion of ponded surface water is a possible route of exposure for construction workers and recreational visitors. Wildlife using the ponded surface water will be exposed to the contaminated surface water as discussed in Appendix H. Raptors and other predators that may prey on birds and rodents that utilize the non-tidal marsh, may also be exposed to contaminants from the site. Fortunately, though, arsenic does not appear to bioaccumulate in higher trophic levels (Eisler, 1988).

5.2.1.4 Biotic Transport

Uptake of arsenic and the other metals of concern by plants and animals and subsequent bioaccumulation in animals higher in the ecological food chain may occur at the site and vicinity. Arsenic and the other elements of concern have not been detected in excess of expected background levels in water, sediment, and shallow soil samples collected from the tidal marsh. The results of studies indicate that the arsenic concentrations in mussels, clams, and crabs from the tidal marsh are at or below background levels (Appendix H). In addition, fishing has not been observed and fauna were not present in quantities likely to be harvested and consumed by humans. Consequently, consumption of fish or shellfish is not considered a significant route for exposure to the chemicals of concern.

5.2.2 Receptor Points and Exposure Concentrations

The pathway analysis identified the following human exposure pathways for the site: inhalation of dust containing contaminants and ingestion of contaminated soil and ponded surface water by people working, living or recreating on-site or in the vicinity of the site. Although unlikely, a child trespassing onto the site and ingesting soil and surface water and inhaling dust was also considered as an exposure pathway. In addition to these human exposure pathways, environmental exposures might occur to vegetation growing in the contaminated area and to wildlife using ponded surface water at the site. Based on these analyses, the following receptors were chosen for quantitative analysis in the risk assessment: Sandoz plant employees, on-site construction workers, nearby residents, adults recreating on the levee, trespassing children, and wildlife using the ponded surface water.

Risks may be expressed at different levels of certainty depending on the concentrations of constituents used in the calculations. In this risk assessment, three cases were considered for each scenario based on upper-bound, average, and background concentrations in the exposure medium. The receptors, the locations where exposure is assumed to occur for the receptors, and estimated potential upper-bound, average, and background exposure concentrations are discussed below.

5.2.2.1 Workers at Sandoz

The primary route of exposure to the chemicals of concern for the 21 employees of Sandoz is through inhalation of dust while they work at the site. For employees of Sandoz, ingestion exposures were not considered significant because their activities are restricted to the paved portion of the site. Because the employees work with potentially toxic chemicals, they are required to follow strict safety precautions such as routinely washing the hands prior to eating. Inhalation exposure is assumed to occur during the 8 hours that they spend at work, 5 days a week for a working lifetime of 35 years. The upper bound and average annual concentrations of the contaminants of concern in ambient air at the Sandoz facility were estimated using the ISCLT air modeling program and the average concentration ratios of the chemicals of concern to arsenic. The calculated ambient air concentrations predicted by the ISCLT air model are presented below and do not include background concentrations. Background ambient air concentrations are presented in Table 14.

Chemical	Upper Bound Concentration (mg/m^3)	Average Concentration (mg/m^3)
arsenic	4.0×10^{-5}	1.0×10^{-5}
cadmium	9.0×10^{-7}	2.3×10^{-7}
lead	1.0×10^{-5}	2.5×10^{-6}
mercury	2.4×10^{-7}	6.0×10^{-8}
selenium	1.2×10^{-7}	3.0×10^{-8}

These concentrations were used to evaluate the risks from the chemicals of concern to the Sandoz workers presented in Section 5.6. Calculations for the ISCLT air dispersion modeling are presented in Appendix J.

5.2.2.2 On-Site Construction Workers

Site improvements made by Sandoz in the future could possibly involve excavation and movement of soil. During such activities, on-site construction workers will be required to take appropriate steps to minimize exposure. Sandoz currently requires all construction workers to comply with a health and safety plan similar to that used by field workers for the Remedial Investigation. In the unlikely event that the construction workers go on the site unprotected, they would likely be exposed to the chemicals of concern through inhalation of dust and accidental ingestion of soil and ponded surface water while they are working. Exposure to the unprotected worker would likely occur during an 8-hour work day at the site and vicinity where contaminants in soil are elevated above background. The period over which these high concentration exposures would likely occur is assumed to be of limited duration, approximately 10 days total. Contact with dust, soil, and surface water would likely occur during excavation of trenches or while walking, moving materials or equipment, and working on the surface soil. To evaluate the inhalation exposure of an unprotected worker, a very dusty environment was assumed using a concentration of 10 mg/m^3 of dust in air. This exposure scenario probably overestimates exposure, since the extent of contamination is well defined and affected property owners have been notified of the site conditions and have been made aware of proper health and safety precautions that should be taken to avoid exposure.

The air concentrations of the chemicals of concern to which the construction worker is exposed are dependent on the area in which the work is performed, since exposures are dependent on the level of contamination in soil. Average exposure concentrations were calculated based on average conditions at the site, and upper bound conditions were assumed to be five times the average concentrations. The calculated concentrations in air based on the arsenic concentration in soil and calculated ratios for the other chemicals are:

Chemical	Upper Bound Concentration (mg/m^3)	Average Concentration (mg/m^3)
arsenic	5.0×10^{-2}	1.0×10^{-2}
cadmium	1.2×10^{-3}	2.3×10^{-4}
lead	1.3×10^{-2}	2.5×10^{-3}
mercury	3.0×10^{-4}	6.0×10^{-5}
selenium	1.5×10^{-4}	3.0×10^{-5}

As discussed in section 3.5, the maximum air concentrations detected at the site during field investigation activities were 0.011 mg/m^3 for arsenic and 0.007 mg/m^3 for lead. Cadmium, mercury, and selenium were not detected in air samples. The measured average arsenic and lead concentrations are much less than the estimated concentrations for average conditions at the site. The measured maximum arsenic concentration is only slightly above the estimate of average conditions, and less than 25 percent of the estimated concentration for the upper bound condition evaluated, while the measured maximum lead concentration is approximately 50 percent of the estimated upper bound concentration. This suggests that the dust conditions assumed for the construction worker overestimate actual field conditions.

The average soil concentrations to which a construction worker may be exposed were based on average conditions at the site and calculated ratios of the other chemicals to arsenic. Upper bound concentrations were assumed to be five times the average concentrations. These soil concentrations are:

Chemical	Upper Bound Concentration (mg/kg)	Average Concentration (mg/kg)
arsenic	5000	1000
cadmium	115	23
lead	1245	249
mercury	30	6
selenium	15	3

Upper bound and average surface water concentrations which a construction worker may accidentally ingest were based on the maximum detected concentrations and average concentrations in surface water samples collected at the site. These concentrations are:

Chemical	Upper Bound Concentration (mg/l)	Average Concentration (mg/l)
arsenic	15	5
cadmium	0.002	0.001
lead	0.003	0.0007
mercury	0.001	0.0003
selenium	0.3	0.05

The exposure to remedial action workers was not evaluated because OSHA standards for hazardous waste site activities (CFR 29, Section 1900.120) specify training, the use of personal protective equipment and clothing, and air quality monitoring. Therefore, remedial action workers are assumed to be protected against exposure greater than the OSHA PELs and at no significant risk of adverse effects as a result of working at the site and vicinity. A worker health and safety plan will be required for site remediation activities.

5.2.2.3 <u>Neighboring Residents</u>

Approximately 29 private residences are located within a 1/4 mile of the site, with the closest residence located approximately 500 feet southwest of the site. The closest residentially zoned property downwind of the site is also located approximately 500 feet from the site. Assuming an average occupancy rate of 3.5 persons per residence, it is estimated that approximately 102 persons reside within 1/4 mile of the site.

The neighboring residents are assumed to be exposed on a continuous daily basis to ambient dust containing the chemicals of concern at certain estimated concentrations depending on the distance of their residence from the site. For purposes of calculating carcinogenic risks, exposure is assumed to occur over a lifetime; however, a resident is expected to spend 50% of his/her time away from home. An additional scenario was evaluated in which carcinogenic risks were calculated assuming 100% exposure over a lifetime. For purposes of calculating non-carcinogenic risks, it is assumed that residents are exposed 24 hours per day. The maximally impacted resident (MIR) is located approximately 500 feet from the site on the corner of Pulgas Avenue and Weeks Street. At this location, the potential upper bound and average ambient air concentrations in outside air were estimated using the ISCLT air modeling program. The calculated ambient air concentrations are presented below and do not include background concentrations.

Chemical	Upper Bound Concentration (mg/m^3)	Average Concentration (mg/m^3)
arsenic	1.1×10^{-5}	2.0×10^{-6}
cadmium	2.5×10^{-7}	4.6×10^{-8}
lead	2.7×10^{-6}	5.0×10^{-7}
mercury	6.6×10^{-8}	1.2×10^{-8}
selenium	3.3×10^{-8}	6.0×10^{-9}

Ingestion of soil and ingestion of drinking water were also considered as potential exposure routes for neighboring residents. Since the data collected from the site suggests that there is little probability that contaminants have been transported off-site to neighboring residences, background concentrations of soil and drinking water, presented in Table 14, were used in the risk assessment calculations.

5.2.2.4 Children

Children living in the vicinity of the site do not have access to the site because it is fenced and secured. Although it is highly improbable, the risk to a child who may trespass onto the site and ingest soil or surface water and inhale dust was evaluated. The child trespassing onto the site is assumed to represent the maximally exposed individual under a soil ingestion scenario. Exposure was assumed to occur by ingestion of soil accumulated on the hands and face, by splashed surface water from the site, and by inhalation of contaminated particles while playing within the fenced areas of the site. These scenarios are assumed for children ages one to six.

For the upper bound soil ingestion scenario, the concentrations used in the calculations were the maximum detected values. The child in this upper bound soil ingestion scenario represents the maximally exposed individual (MEI). The average arsenic concentrations and the concentration ratios of the other chemicals to arsenic were used for the average soil ingestion scenario. The upper bound and average soil concentrations are given below:

Chemical	Upper Bound Concentration (mg/kg)	Average Concentration (mg/kg)
arsenic	54,000	1,050
cadmium	1,500	24
lead	13,000	261
mercury	1,900	6
selenium	1,000	3

The upper bound and average ponded surface water concentrations are the same as those calculated for the on-site construction worker, and the upper bound and average air concentrations are the same as those calculated for the Sandoz worker.

5.2.2.5 Recreational Levee Users

Recreational use of the tidal marsh and levee is currently quite low based on observations made over the past several years during field activities. Future recreational uses of the levee and tidal marsh could include hiking, bird watching, and bicycling. Based on current and future potential use patterns, it was assumed that a recreational visitor to the adjacent tidal marsh might spend an average of 1 hour in the area, 100 times in a lifetime. The upper bound and average concentrations of the chemicals of concern in ambient air that the recreational user would be exposed to are assumed to be the same concentrations calculated for the Sandoz worker.

Surface soil ingestion and accidental ingestion of surface water were also considered. The soil concentrations used in the calculations were based on arsenic concentrations detected in the upper 1.5 feet of the tidal marsh and levee and average chemical ratios and are given below.

Chemical	Upper Bound Concentration (mg/kg)	Average Concentration (mg/kg)
arsenic	95	38
cadmium	2	0.9
lead	24	9
mercury	0.6	0.2
selenium	0.3	0.1

Surface water concentrations were determined from concentrations detected in tidal slough samples and are given below.

Chemical	Upper Bound Concentration (mg/l)	Average Concentration (mg/l)
arsenic	0.009	0.003
cadmium	0.001	0.0001
lead	0.005	0.00003
mercury	0.004	0.0002
selenium	0.003	0.00009

5.2.2.6 Flora and Fauna in the Non-Tidal Marsh

The non-tidal marsh is inhabited by a number of species of birds during the winter months when seasonal ponding occurs. These wildlife species may take up the chemicals of concern by direct ingestion, by adsorption through the skin, and by consumption of contaminated vegetation and benthic organisms. In addition, the chemicals of concern may be taken up by lower order animals and plants directly via environmental matrices (e.g., soil and water) or as contaminated food items. The concentration of chemicals of concern in the surface water, used to evaluate the effects on the flora and fauna, are the same as those used for the child splash scenario (Section 5.2.2.4).

5.2.2.7 Background Exposure Concentrations

The chemicals of concern for human exposure at the site, arsenic, cadmium, lead, mercury, and selenium, are all naturally occurring elements that are present in ambient air, groundwater, surface water, and soils in the southern San Francisco Bay area. Consistent with Superfund guidelines, when exposure concentrations at receptor points are estimated on the basis of measured data, the exposure concentrations include a contribution both from background and from the site, but when exposure concentrations were estimated using a model, such as the ISCLT model, the exposure concentrations only include an incremental contribution from the site. When using concentrations representing incremental contributions, background concentrations must be added to obtain total exposure concentrations.

Background concentrations of the chemicals of concern are generally small relative to those estimated for the exposure points, but in some cases, such as in air or soil, background concentrations are similar to the concentrations estimated at the exposure points. The average background concentrations of the chemicals of concern used in the risk assessment are presented in Table 14.

5.3 Regulatory Criteria and Standards

There are a number of regulatory criteria and standards that can be used for assessing the contamination of soil, air, groundwater, and surface water at the site and vicinity. A summary of regulatory criteria and standards for the chemicals of concern at the site and vicinity are presented in Table 11.

OSHA, the California Occupational Safety and Health Act (CalOSHA), and the California Safe Drinking Water and Toxic Enforcement Act (CSDWTEA) contain enforceable standards and requirements that specifically cover occupational exposures. CSDWTEA requires that written warning be given if, in the course of business, any individual is exposed to a chemical above a "no significant risk level" if the chemical is known to the State of California to be a carcinogen or above a "no observable effect level" if the chemical is known to the State to be a reproductive toxicant. Although CSDWTEA requires a warning, it does not set an occupational exposure limit. Consequently, the PELs specified by OSHA can be used for evaluating adverse health effects that may be associated with occupational exposure to the chemicals of concern at the site and vicinity.

The CalOSHA PELs for ambient air concentrations of arsenic, cadmium, lead, mercury, and selenium, averaged over any eight-hour period, are 0.01, 0.05, 0.05, 0.05, and 0.2 mg/m^3, respectively. These standards have been exceeded or equaled only at the construction worker receptor point, and, only the arsenic standard has been equaled or exceeded. The calculated arsenic concentration in air is 0.01 mg/m^3 under average conditions for the construction worker, and 0.05 mg/m^3 under upper-bound conditions.

National Ambient Air Quality Standards (NAAQS) enforced by the BAAQMD were developed to protect public health. However, for the chemicals of concern, only lead has an ambient air standard, which is 1.5×10^{-3} mg/m^3. The maximum estimated incremental lead concentration in ambient air at any receptor point is only 1×10^{-5} mg/m^3, which is significantly less than the background concentration of 1×10^{-3} mg/m^3. When the incremental lead concentration is added to the background concentration, the total concentration is less than the NAAQS standard. Only in the case of the unprotected construction worker working under extremely dusty conditions would the ambient lead standard be exceeded.

The Federal Safe Drinking Water Act (SDWA) and the California Program to comply with the SDWA contain enforceable limits for chemicals found in water to be consumed by humans. Maximum contaminant levels (MCLs) are specified for all of the chemicals of concern, and the MCLs can be used for evaluating adverse health effects that may be associated with continuous ingestion of drinking water that may contain chemicals of concern. The MCLs for arsenic, cadmium, lead, mercury, and selenium are 0.05, 0.01, 0.01, 0.002, and 0.01 mg/l, respectively. The concentrations of these elements in groundwater from the first potable aquifer beneath the site are well below their respective MCLs.

The Federal Clean Water Act (CWA) specifies National Ambient Water Quality Criteria (NAWQC) that are used by the RWQCB as limits for surface waters that drain into San Francisco Bay. Criteria exist for all of the chemicals of concern to protect human health, freshwater aquatic life and saltwater aquatic life, and they can be used for evaluating aquatic risks. Criteria exist for both acute and chronic exposure, and these criteria are listed in Table 11. The freshwater chronic criteria are the most appropriate for evaluating the ponded surface water, and these criteria for cadmium, lead, mercury, and selenium are 0.0011, 0.0032, 0.00012, and 0.035 mg/l, respectively. No criterion exists for total arsenic or for arsenic (V), but a standard of 0.190 mg/l exists for arsenic (III). Based on oxidation conditions, all dissolved arsenic in the ponded surface water is assumed to be arsenic (V). The mercury and selenium standards are exceeded at the surface water receptor point under upper bound and average conditions, and the cadmium standard is exceeded at upper bound conditions. Criteria do not exist for arsenic (V) because insufficient data are available to allow derivation of numerical national water quality criteria. Available data show that arsenic (V) is acutely toxic to freshwater aquatic organisms at concentrations as low as 0.850 ppm, and freshwater aquatic plants are affected at concentrations as low as 0.048 ppm. Arsenic (V) in saltwater has been shown to be acutely toxic to animals at concentrations as low as 2.3 ppm, and to plants at concentrations as low as 0.013 to 0.056 ppm (U.S. EPA, 1985a).

5.4 Estimated Human Intakes

An estimated daily intake for each chemical of concern was calculated for a representative member of each receptor group. For each exposure scenario identified for the site and vicinity, assumptions were made regarding exposure route, body weight, inhalation and ingestion rates, and exposure periods. In addition, all exposed individuals were assumed to live for 70 years. These assumptions are listed in Table 15 for each human receptor.

Dermal exposure was not quantified for the following two reasons:

1. ATSDR (Life Systems, 1987a) states:

   > ". . . many reports indicate that dermal exposure to inorganic arsenic compounds leads to dermatitis. However, none of these reports provide quantitative information on dose-duration relationships. No reports indicating that dermal exposure is associated with increased risk of cancer were located."

2. U.S. EPA (1984a) states:

   > "Major routes of adsorption of arsenic in the general population are inhalation and ingestion. The ingestion of arsenic may be either through the direct intake of food and water or through secondary intake via inhalation and swallowing. Arsenic uptake through the skin appears to be a minor route of exposure. Factors affecting the extent of adsorption include chemical form, particle size, and solubility."

Therefore, it was concluded that the magnitude of dermal exposure was much less than the magnitude of exposure via ingestion and inhalation.

Using the assumptions listed in Table 15 together with the receptor point concentrations, the sub-chronic daily intake was calculated for each receptor. These intakes are listed in Table 16. The trespassing child receptor has the highest calculated intake. The average arsenic intake calculated for the trespassing child is 0.02 mg/kg/day, and the upper bound intake is 1.1 mg/kg/day. The calculated lead intakes are 0.005 mg/kg/day for average conditions, and 0.26 mg/kg/day for the upper-bound condition.

The chronic intake for each receptor is calculated by multiplying the daily intakes listed in Table 16 by the fraction of a lifetime over which exposure occurs. This assumes that the receptor point concentrations will not change with time, which is a probable condition for this site unless a remedial action is undertaken.

5.5 Toxicity Evaluation Of Chemicals Of Concern At The Site

Toxicity data were reviewed for each of the chemicals of concern identified in the hazard identification process. Subchronic, chronic, carcinogenic risk and reproductive and developmental data were assembled from the sources listed below:

- U.S. EPA Integrated Risk Information System (IRIS),
- U.S. EPA Carcinogen Assessment Group (CAG),
- U.S. EPA Public Health Risk Evaluation Database (PHRED),
- Agency for Toxic Substances and Disease Registry (ATSDR), and
- Other publicly-available U.S. EPA health assessment documents and scientific literature.

Three numerical values are used by U.S. EPA in the Superfund program to describe the degree of toxicity posed by a chemical: (1) the acceptable intake for chronic exposure (AIC), (2) the acceptable intake for sub-chronic exposure (AIS), and (3) the carcinogenic potency factor. The AIC is an estimate of the maximum intake of a chemical that a sensitive human population can be exposed to over a long period of time without experiencing non-carcinogenic adverse health effects. This dose is dependent on the route of exposure, and a reference dose generally is calculated for ingestion and inhalation, as estimated by U.S. EPA from long-term human or animal studies. The reference dose usually includes an uncertainty factor of 10 to account for extrapolation from animal experiments to human effects and a factor of 10 for intraspecies variability. The AIC is generally expressed in units of mg/kg/day, and in these units, the chemical with the smallest AIC is the most toxic. When the AIC is multiplied by the weight of the individual, the amount of chemical that the individual can be exposed to daily with no adverse health effects is calculated. For example, the oral AIC for cadmium is 0.001 mg/kg/day, and therefore a sensitive 70 kg adult can intake 0.07 mg per day cadmium with no adverse health effects.

The AIS is an estimate of the maximum daily intake of a chemical that a sensitive member of a human population can be exposed to over short periods of time (less than 90 days) without experiencing non-carcinogenic adverse health effects. Generally the AIS is greater than the AIC. However, for all of the chemicals of concern, either the AIS is equal to the AIC or no estimate of the AIS is available. Therefore, for the purposes of this risk assessment, non-carcinogenic toxicity, both subchronic and chronic, is evaluated using the AIC.

The carcinogenic potency factor is an estimate of the cancer risk to an individual from a lifetime exposure to a chemical. The potency factors for the chemicals of concern have been evaluated by U.S. EPA using a model that describes the linear non-threshold dose-response relationship of a chemical at low doses (U.S. EPA, 1986d). This model provides an estimate of the 95% confidence limit, or upper bound of risk, rather than the expected risk. Therefore, the true risk is most likely considerably less than the estimated risk. Carcinogenic potency factors are generally expressed in units of lifetime cancer risk per milligram of chemical per kilogram of body weight per day [$(mg/kg/day)^{-1}$].

For chemicals that are known or suspected carcinogens, the U.S. EPA uses a non-threshold model which results in a calculated risk for any exposure to a carcinogen. Therefore, for a carcinogen the maximum intake of a chemical that a human population can be exposed to over a long period of time without experiencing carcinogenic effects is zero. As a consequence, for carcinogenic effects, there is no concept similar to the AIC for non-carcinogenic effects.

Acceptable cancer risks for environmental exposures are generally defined as calcuated risks in the range of 10^{-4} to 10^{-7}. For arsenic and cadmium, the known or suspected human carcinogens found at the site, the chronic daily exposures for a lifetime that result in calculated carcinogenic risks in the range of 10^{-4} to 10^{-7} are orders of magnitude lower than the chronic exposures that have been observed to cause non-carcinogenic health effects. Therefore, if the calculated exposures result in acceptable carcinogenic risks, there will also be no risk of chronic non-carcinogenic health effects.

For these carcinogenic chemicals, though, it is possible that acute exposures can cause adverse health effects without causing unacceptable calculated carcinogenic risks. Therefore, it is very important that the risk assessment evaluate these acute risks. Because U.S. EPA does not derive AISs or AICs for carcinogenic chemicals, the no observable effect levels (NOELs) for chronic exposure described in the ATSDR Toxicological Profiles for Arsenic and Cadmium were used to evaluate these acute exposures (Life Systems, Inc. 1987a, 1987b). These chronic NOELs are assumed to be protective for acute exposures to sensitive populations, as U.S. EPA has conventionally assumed that AISs are equal to 10 times the AICs when data are lacking, and that chronic NOELs are also equal to ten times the AICs (U.S. EPA, 1984e; U.S. EPA 1986b). To avoid confusion in terminology, the AICs for non-carcinogens and the chronic NOELs for non-carcinogenic effects of carcinogens are referred to as the tolerable daily intakes (TDIs) in this report.

A summary of the non-carcinogenic TDIs and carcinogenic potency factors for the chemicals of concern at the site is listed in Table 17. TDIs have been developed for all of the chemicals of concern for both the ingestion and inhalation routes. However, carcinogenic potency factors are only available for the ingestion and inhalation of arsenic and the inhalation of cadmium, because only these chemicals are known or suspected human carcinogens. The epidemiological data used to derive the non-carcinogenic tolerable daily intake doses and the carcinogenic potency factors are discussed in detail in Appendix M, Toxicological Profiles for the Chemicals of Concern. The toxicities of arsenic and lead are briefly summarized below because the risk associated with these chemicals at the identified receptors is much greater than those for the other chemicals of concern.

5.5.1 Arsenic Toxicity

5.5.1.1 Acute Toxicity

In humans, ingestion of an acute lethal dose of arsenic produces throat constriction, difficulty in swallowing, intense thirst, vomiting, diarrhea, cramps in the arms and legs, a severe fall of blood pressure, restlessness, convulsions, and death due to cardiac failure (U.S. EPA, 1984c). Based on a review of several case studies of arsenic poisonings in workers, ATSDR states that for arsenic "the acute and sublethal dose in humans is about 0.6 mg/kg/day or higher" (Life Systems, Inc., 1987a). ATSDR also concludes that inhalation and dermal exposure are not normally associated with acute lethality in humans or animals.

5.5.1.2 Chronic Toxicity

In humans, oral exposure to arsenic can produce a range of gastrointestinal distress, hematological effects, cardiological and vascular effects, neurological effects, dermatological effects, and hepatic and renal injury. Gastrointestinal symptoms include nausea, vomiting, diarrhea, and thirst. These signs are chiefly associated with oral exposure and are rarely seen following inhalation or dermal contact (Life Systems, Inc., 1987a). Large oral doses of arsenic are reported to cause injury to cardiac tissue and a peripheral vascular disease known as "Blackfoot Disease" (Life Systems, Inc., 1987a). Peripheral nerve damage from chronic arsenic exposure is also well known clinically.

ATSDR states that in most cases of sub-chronic or chronic exposure, many or all of the signs of arsenic toxicity are detected together, indicating that the dose-response relationships for the various systemic end points are fairly similar. Oral doses of around 10 ug/kg/day are not generally observed to cause signs of arsenic toxicity. This oral dosage may then be considered the NOAEL and corresponds to an adult male consuming about 0.7 mg/day of arsenic or drinking 2 liters of water containing 0.35 mg/l of arsenic. Chronic exposure of workers to air containing arsenic at a concentration of 0.10 mg/m^3 was observed to induce some systemic effects. Applying a factor of safety of 10 to convert from this chronic LOAEL to a chronic NOEL and converting from workday to full-time exposure (10 m^3/day vs. 20 m^3/day), this corresponds to an inhalation tolerable daily intake of 1.4×10^{-3} mg/kg/day.

5.5.1.3 Carcinogenicity

Different types of cancer have been associated with different circumstances of arsenic exposure: lung cancer with occupational (inhalation) arsenic exposure, and skin cancer with environmental (ingestion) arsenic exposure.

U.S. EPA's CAG has evaluated a number of epidemiological studies to estimate the lung cancer unit risk for inorganic arsenic in air. The CAG estimates that the lung cancer unit risk for inorganic arsenic in air is 4.3×10^{-3}, where exposure occurs at a concentration of 1 ug/m^3 continuously throughout a lifetime (U.S. EPA, 1984a). This corresponds to a carcinogenic potency factor of 15 $(mg/kg/day)^{-1}$.

A study by Tseng et al. (1968) detected increased frequency of skin cancer and some internal cancers in individuals exposed to water containing elevated concentrations of inorganic arsenic. This study and others indicated an increase in cancers with consumption of water containing 0.3 mg/l or more of inorganic arsenic. Based on the study by Tseng et al. (1968), U.S. EPA established a unit risk for oral ingestion of inorganic arsenic of 5.0×10^{-5} for oral exposure (U.S. EPA, 1988). This unit risk corresponds to a carcinogenic potency factor of 1.8

$(mg/kg/day)^{-1}$. A unit risk estimate for oral exposure is defined as the lifetime cancer risk occurring in a population in which all individuals daily consume 2 liters of water containing a concentration of 1 ug/l of a chemical.

5.5.2 Lead Toxicity

The primary effects associated with lead exposure are alterations in the hematopoietic, nervous, and cardiovascular systems. Impairment of the heme production system has been reported in adults at levels of less than 30 ug/dl lead in blood. Two types of neurotoxic effects are associated with lead exposure. Lead in blood at concentrations over 80 ug/dl in children and over 100 ug/dl in sensitive adults can cause severe, irreversible brain damage and, at higher levels, encephalopathy and death. In children, permanent learning disabilities are seen at the above levels even if no signs of lead intoxication are present (U.S. EPA, 1984b). Other adverse effects associated with exposure to low levels of lead include increased blood pressure at blood lead levels of approximately 30 ug/dl and renal dysfunction at levels as low as 40 ug/dl. In addition, blood lead levels in fetuses of 10 to 20 ug/dl have been associated with neurobehavioral deficits (U.S. EPA, 1984b).

U.S. EPA's RfD Work Group has discussed inorganic lead and considered it inappropriate as of the date of this report to develop an AIC for either inhalation or oral exposure to inorganic lead (Technical Resources, Inc., 1988).

A drinking water maximum contaminant level goal (MCLG) of 20 ug/l was proposed by the U.S. EPA Office of Drinking Water (ODW) to ensure that blood lead levels in children are below 15 ug/dl (U.S. EPA 1985e). The MCLG is based on a daily intake of 0.02 mg/day, which translates to an estimated TDI of 2×10^{-3} mg/kg/day for a 10-kg child, and 0.6×10^{-3} mg/kg/day for a 70-kg adult. The TDI for the adult is designed to protect the fetus in a pregnant woman.

5.6 Health Risk Characterization

There are currently no reports of health problems resulting from either the formulation of arsenic compounds or the presence of arsenic and other chemicals at the site and vicinity. Additionally, during the 16 years since Zoecon and Sandoz have operated a plant on the site, there have been no known reports from employees of health problems related to the chemicals of concern.

The potential for future adverse health effects was assessed by combining the estimates of exposure with information on the toxicity of the chemicals of concern. The risk of cancer from potential or known carcinogens is evaluated separately from non-carcinogenic health risks. The excess risk of developing cancer over a lifetime due to exposure to a carcinogen detected at the site and vicinity under a given exposure scenario is calculated using the calculated scenario-specific chronic daily intake and the route-specific potency factor for the carcinogen. The individual cancer risks are conservatively assumed to be additive, and the total cancer risk for each route of exposure is calculated by summing the individual risks associated with each carcinogen. The overall total cancer risk is then calculated by summing the cancer risks from all of the exposure routes. The assumption of additivity is most properly applied to compounds that have the same mechanism of action and have similar environmental properties. The assumption of additivity is generally overly conservative, since it is very unlikely that all the chemicals of concern will induce the same effect. Thus, the results of the analyses overestimate the potential for cancer risks and adverse non-carcinogenic health effects.

Per U.S. EPA directives regarding carcinogenic risk assessment, it is assumed that there are no threshold effects levels for carcinogenic chemicals. The risk or the probability of developing cancer is dependent on the dose (i.e., the larger the dose, the greater the risk). The risk or probability of developing cancer is generally estimated as the excess risk to an individual or excess incidence of cancer in a population given lifetime exposure. It is usually expressed in such terms as 10^{-6}. This value is interpreted as meaning that, for an individual, the excess risk of developing cancer is one chance in a million as a result of exposure to a given chemical at a given level. For a population, the value is interpreted as meaning one additional person in 1,000,000 persons is expected to develop cancer as a result of exposure to a given chemical at a given level. Similarly, a risk of 10^{-5} represents one additional person in 100,000 and 10^{-7} represents one additional person in 10,000,000.

For non-carcinogenic effects, the daily intake was divided by the TDI to compute a hazard index. If the hazard index is less than one (i.e., the daily intake is less than the TDI), the chemical is considered not to pose a health hazard to individuals within the exposed population under the assumed exposure scenario. If the ratio of the hazard index is summed for all chemicals and all exposure routes and exceeds unity, a potential health hazard is assumed for individuals under the conditions of the exposure scenario. As with calculating total cancer risk, the total risk for non-carcinogens is also conservatively assumed to be additive.

The calculated non-carcinogenic health risks and the carcinogenic health risks for exposure to chemicals of concern from the 1990 Bay Road site are described below for each of the identified receptors. The calculated risks are summarized in Tables 18 and 19, and a complete description of the derivation of the risks is contained in Appendix K.

5.6.1 Sandoz Employee

The ratio of calculated daily intakes to the TDIs for each of the chemicals of concern was much less than one for the Sandoz employee, which indicates that the exposures do not pose a non-carcinogenic health hazard (Table 18). The estimated average incremental cancer risk, due primarily to the inhalation of arsenic, is 7.4 x 10^{-6}. The estimated incremental cancer risk from background concentrations of the chemicals of concern in ambient air in the site area is 2.8 x 10^{-6}. The upper-bound estimate of the excess cancer risk is estimated to be 3.0 x 10^{-5}. The PELs for the chemicals of concern are not exceeded for the Sandoz employee under any scenario.

5.6.2 Construction Worker

Exposure to chemicals of concern in the air at average concentrations do not exceed PELs, although the PEL for arsenic (0.01 mg/m^3) is exceeded for the upper-bound scenario where arsenic concentrations are estimated to be 0.05 mg/m^3. When evaluating non-carcinogenic adverse health effects for the unprotected construction worker, the sum of the hazard indices for all exposure routes exceeds unity for both the average and upper bound scenarios, 2.8 and 13.2 respectively. The TDI used in the hazard index calculations is based on one-tenth of the lowest daily intake observed to cause adverse health effects. Therefore, in the upper-bound scenario, the unprotected construction worker has a slight probability of experiencing adverse health effects.

The major portion of the total incremental cancer risk arises from the inhalation pathway (Table 19). The total incremental carcinogenic risk for all exposure routes in the average scenario is 9.7×10^{-6}. The background risk for continuous inhalation of ambient air in the site area is 1.6×10^{-5}. The estimated upper-bound incremental cancer risk is 4.8×10^{-5}.

5.6.3 Maximally Impacted Resident

The calculated chronic exposure for the nearest resident, who is located about 500 feet south of the site, is far below the tolerable daily intakes for the chemicals of concern, and there probably will not be any non-carcinogenic health effects from the site for this maximally impacted resident. An estimate of the total excess lifetime cancer risk for this resident as a result of incremental exposure to average concentrations of chemicals from the site is 4.3×10^{-6}, while the total cancer risk to this resident due to background chemical concentrations in air, soil, and water is 1.4×10^{-4}. An upper-bound estimate of incremental cancer risk is 2.4×10^{-5}.

5.6.4 Child

The trespassing child receptor, who gains access to the fenced portion of the site and ingests soil containing average concentrations of the chemicals of concern, is calculated to have daily intakes of arsenic and lead in excess of the respective TDIs for a total hazard index of 5.3. Since the TDI is one-tenth the lowest chronic intake observed to cause adverse health effects, the hazard index of 5.3 suggests that adverse health effects are unlikely, especially since this exposure would not be chronic. Ingestion of soil containing background concentrations of the chemicals of concern yields a total hazard index less than one. If soil with the maximum reported soil concentrations is ingested, the tolerable daily intakes are greatly exceeded and adverse health effects are possible. The calculated intake of arsenic for the trespassing child who ingests soil with maximum concentrations is 0.54 mg/kg, which is less than the low limit of estimated lethal doses of arsenic (0.6 mg/kg). However, it is extremely improbable that the child would come in contact with this soil. The calculated hazard indices for a trespassing child ingesting ponded surface water and inhaling dust-laden air under both average and upper-bound scenarios are less than one.

The total incremental cancer risk of a trespassing child exposed to average concentrations in soil, ponded surface water, and dust is 1.7×10^{-6}, while the total risk due to background exposure is 1.3×10^{-8}. The upper-bound estimate of incremental cancer risk is 7.7×10^{-5}.

5.6.5 Recreational Visitor

There are no adverse non-carcinogenic health effects associated with the exposure levels experienced by the recreational user of the levee and the tidal marsh. Hazard indices calculated for the ingestion of soil or ponded surface water, and inhalation of dust by the visitor are less than 1.0. The estimated total incremental cancer risk for this individual as a result of exposure to average concentrations of chemicals from the site through ingestion and inhalation is 3.9×10^{-8}. The carcinogenic risk associated with exposures to background concentrations is 1.3×10^{-8}.

5.7 Environmental Risk

The most likely points of potential environmental exposure to the contamination at the site and vicinity have been determined to be the non-tidal and tidal marsh areas near the site. A number of species of plants and animals, primarily grasses and waterfowl, inhabit the non-tidal marsh when seasonally ponded surface water is present. Because concentrations of arsenic and other metals in the seasonally ponded water are elevated above background levels, a survey of information concerning the toxic effects of arsenic to waterfowl, shorebirds, and wildlife was conducted. An extensive discussion of the toxic effects to animals and plants is contained in Appendix H.

Based on this evaluation, dissolved arsenic in seasonably ponded surface water does not appear to present a risk to birds using the ponds due to the following considerations:

(1) Potential arsenic taken up by birds from ponded surface water with the maximum measured arsenic concentrations at the site is well below documented LD-50 levels for birds, and birds

drink from various areas in the vicinity of the site as well as from the ponded surface water.

(2) No signs of acute toxicity have been observed.

(3) Based on documented studies, it appears that animals are not susceptible to either chronic, toxic, or carcinogenic effects as a result of arsenic ingestion.

(4) The surface water ponds provide a source of water to birds for only part of the year, and arsenic concentrations in the ponds vary depending on the extent of the ponded water.

The surface soil and surface water in the tidal marsh generally are at background concentrations for the chemicals of concern, and are not expected to adversely impact the flora and fauna present.

6.0 SUMMARY AND CONCLUSIONS

A Remedial Investigation has been conducted for the 1990 Bay Road site and vicinity in East Palo Alto, California according to the Work Plan for the site dated 15 March 1988. This work concludes seven years of investigations to define the nature and extent of contamination at the site.

This report presents in detail the findings of the Remedial Investigation including site background information; nature and extent of contamination in soil, groundwater, surface water, air, and biota; contaminant fate and transport mechanisms; and a baseline risk assessment.

6.1 Summary

6.1.1 Nature and Extent of Contamination

6.1.1.1. Sources

The deposition of arsenic and associated trace elements in soil at the site is most likely the result of several processes. The primary means of deposition were spillage of arsenic-containing materials along the railroad track, possible leakage of arsenic-containing materials from the underground storage tank on site, and disposal of wastes containing arsenic in the sludge pond. Secondary processes of deposition of arsenic included redistribution of arsenic from the railroad track and the sludge pond areas by surface water runoff that subsequently collected in low areas on site and off site and, to a lesser extent, downward vertical infiltration.

6.1.1.2 Soil

On the 1990 Bay Road site and immediately adjacent properties, soil with an arsenic concentration in excess of 20 mg/kg covers a surface area of approximately 13 acres. This includes about 5 acres on site and 8 acres off site. The vertical extent of soil with arsenic concentrations greater than 20 mg/kg is generally less than 10 feet, except in the vicinity of the former underground mixing tank and the sludge pond, where the vertical extent is as great as 34 feet. The total volume of soil containing arsenic at a concentration greater than 20 mg/kg is estimated to be approximately 170,000 cubic yards. This soil contains approximately 88,000 kg of arsenic.

The soil on the site and vicinity contains other target elements (cadmium, copper, lead, mercury, selenium, and zinc) at concentrations above background levels. The concentrations of these elements correlate with arsenic concentrations in soil; arsenic concentrations in soil are almost always significantly greater than the concentrations of the other hazardous constituents in soil. The hazardous organic compounds detected in soil were limited to DDT, DDD, and DDE, and were detected in only a single sample, from the property to the south of the site. Their concentrations were reported to be at very low levels, substantially below the TTLC.

6.1.1.3 Groundwater

The site and vicinity overlie three main groundwater zones: an upper shallow groundwater zone, a lower shallow groundwater zone, and a deep groundwater zone. A total of 84 monitoring wells have been installed in the three groundwater zones over the course of the past seven years, and currently 35 wells comprise the long-term groundwater monitoring network for the site. Groundwater samples from all monitoring wells have been analyzed for total arsenic, and samples from selected wells have also been analyzed for other compounds.

The extent of groundwater with arsenic and other contaminant concentrations in excess of background levels has been well defined. In the upper shallow groundwater zone, water with arsenic concentrations in excess of 0.05 mg/l extends over 10 acres under the site and vicinity, while water with arsenic concentrations in excess of 0.01 mg/l extends over 11 acres. As shown in Figure 23, the affected portion of the zone underlies Areas 1 and 4, as well as the northern half of Area 3 and limited portions of the non-tidal and tidal marshes. In the lower shallow zone, groundwater with arsenic concentrations in excess of 0.05 and 0.01 mg/l extends over a more limited area, confined generally to Areas 1 and 4, the Call-Mac property of Area 3, and a very limited portion of the non-tidal marsh (see Figure 24). Well W-101, which monitors the deep groundwater zone, yielded a sample with an arsenic concentration of 0.0011 mg/l in June 1988.

Water samples from ten monitoring wells were analyzed for all compounds on the TCL as part of the Remedial Investigation, and water samples from all monitoring network wells were analyzed for selenium and cadmium in addition to arsenic. Reported concentrations of selenium in eleven on-site wells monitored in June 1988 were above the drinking water standard or maximum contaminant level (MCL), and the 1,2-dichloroethane concentration in one well exceeded the MCL. In addition, cadmium concentrations in two off-site wells were above the MCL, and the trichloroethene concentration in one off-site well was above the MCL.

A deep well was constructed to monitor water quality beneath the site. This well is screened at about 170 feet below ground surface in the first sand unit below the clay aquitard that underlies the shallow groundwater zone. Reported arsenic, cadmium, copper, lead, mercury, selenium and zinc concentrations in this well are at background levels.

6.1.1.4 Surface Water

Seasonally ponded surface water in low-lying areas to the south and east of the site contains elevated concentrations of arsenic, copper, and selenium where the water is ponded over soils containing high concentrations of arsenic. Concentrations of lead, mercury, and zinc were at background levels.

Water quality in the tidal marsh east of the site is apparently not affected by the contamination at the site and vicinity. Arsenic concentrations in water samples from the tidal marsh ranged between 0.004 mg/l and 0.012 mg/l, with higher concentration generally reported for flow tide. The highest concentration was reported at the sampling station located 1200 feet east of the site, which was established as a background sampling location. The reported arsenic concentrations, as well as reported concentration of other inorganic elements in the tidal marsh affect background conditions.

6.1.1.5 Air

Air sampling programs conducted on the site and vicinity indicate that ambient airborne concentrations of arsenic, cadmium, copper, lead, mercury, selenium, and zinc were well below the occupational exposure standards for these elements, and are generally not detected in ambient air samples. The sampling programs also suggested that ambient airborne concentrations of several hydrocarbon pesticides and organic compounds were below the occupational exposure limits and generally not detected in air samples.

6.1.1.6 Biota

Soil and surface water analyses from the non-tidal marsh area of the site indicate that arsenic is potentially biologically available via the surface water pathway, but there are very few animals that live or feed in the non-tidal marsh or on the site. Seasonally ponded water appears to periodically exceed NAWQC criteria for mercury and selenium, and arsenic concentrations have greatly exceeded levels found to cause toxic effects in aquatic plants and animals. However, the birds that used the ponds have not been observed to be adversely affected, and are not expected to be affected by the contamination.

Sampling of surface soil, surface water, and biota in the tidal marsh indicated that concentrations of arsenic and other inorganic elements are at background levels in surface soil, in surface water, and in benthic organisms living in the tidal marsh. The levee that separates the tidal marsh from the site and vicinity has apparently been very effective in isolating the tidal marsh from contamination. As a result, the tidal marsh is healthy and functional.

6.1.2 Fate and Transport

The chemicals of concern at the site can potentially be released to the environment by generation of airborne dust, surface water runoff, and leaching into soil and groundwater. The major pathways by which a potential receptor would be exposed are by airborne transport of chemicals sorbed onto soil, which will create an inhalation exposure via airborne dust, and through ingestion of surface soil and surface water.

The airborne pathway is the most probable exposure route for the site, as air dispersion modelling has suggested the average annual arsenic concentrations in the vicinity of the site are elevated relative to background levels. The soil and surface water pathways to human exposure are less likely because the most heavily contaminated soil and most of the ponded water is contained within the secured fenced area. Exposure to contamination through groundwater is not likely since the contaminated groundwater is saline, rates of contaminant movement in the groundwater in the vicinity of the site are extremely slow, and drinking water aquifers are isolated from the contamination by thick aquitards and upward vertical gradients.

6.1.3. Baseline Risk Assessment

Approximately 32 elements and organic compounds were detected in soil, groundwater, surface water, and/or air at the site and vicinity. After review of sampling results, quantities found at the site, toxicities, and potential routes of exposure, five chemicals emerged from the hazard identification process as the chemicals of concern. Arsenic, cadmium, lead, mercury and selenium were carried through the baseline risk assessment and evaluated to assess the possible risks of adverse health effects resulting from their presence at the site and vicinity.

Based upon concentration, distribution, toxicity and potential routes of exposure five chemicals were identified as the chemicals of concern at the site and vicinity: arsenic, cadmium, lead, mercury, and selenium. The possible risks of adverse health effects resulting from their presence were quantified in the risk assessment.

The major routes of human exposure to any toxic substance are through inhalation, ingestion, or skin contact. Inhalation of contaminant-laden dust presents the most likely possibility of exposure for the site and vicinity. Ingestion of arsenic, other than by consuming contaminated soil or surface water, will occur only if food is contaminated with arsenic-laden dust or if drinking water is contaminated. Since all of the contaminated portions of the site are currently fenced off and well-marked, and since none of the contaminated groundwater is used for agricultural, domestic, or industrial water supplies, no exposure exists at this time through this mechanism. Exposure to arsenic through skin contact does not present a significant danger either, since the skin is an effective barrier to inorganic arsenic.

The following human exposure pathways were identified for the site and vicinity: inhalation of contaminant-laden dust by on-site Sandoz employees, on-site construction workers, off-site neighboring residents, and off-site recreational tidal marsh visitors; and ingestion of contaminated soil and surface water by a child trespassing onto the site. The trespassing child scenario is unlikely because the site is fenced and secured. The construction worker exposure scenario is also unlikely since the property owners of the affected sites are aware of proper health and safety precautions to be taken during construction activities.

The potential for non-carcinogenic adverse health effects and incremental carcinogenic risks from the five chemicals of concern were calculated for the identified human exposure pathways.

The calculations for the risk assessment indicate that adverse non-carcinogenic health effects will not occur for the Sandoz employees, neighboring residents, or recreational visitors inhaling contaminant-laden dust from the site. Construction workers breathing dust from the site under extreme or average conditions, who do not follow prescribed health and safety procedures, have a low probability of experiencing adverse effects. The potential for adverse non-carcinogenic health effects presented by the site are highest for a trespassing child ingesting soil with maximum concentrations from within the fenced area.

The cancer risk from breathing contaminant-laden air by an on-site Sandoz employee or the nearest resident was calculated to be less than the risk associated with the natural background concentrations for arsenic in ambient air. Incremental cancer risks for a child who trespasses and ingests surface water or soil with average concentrations are low. The unprotected construction worker has the highest calculated incremental risk when exposed to extreme conditions at the site.

These risks have been mitigated by maintaining a fence around the contaminated areas. While concern exists for unprotected construction workers breathing contaminant-laden dust under extreme conditions, this route of exposure is also unlikely since the property owners at the site and vicinity are aware of the proper health and safety procedures to be taken during construction activities.

An investigation of arsenic concentrations in vegetation in the non-tidal and tidal marshes indicated that elevated levels in vegetation are limited to the contaminated portions of the non-tidal marsh that have been fenced off. There are no measurable risks to aquatic birds, aquatic grazers, or other animals in the tidal marsh area since arsenic concentrations were not found to be higher than normal in the plants and animals on which they feed. The non-tidal marsh has elevated levels of arsenic in soil and, to a lesser extent, in plant tissues. This area is not a favorable wildlife habitat, however, since it is sparsely vegetated. There are few animals that live and feed in the non-tidal wetlands, so the effect of the arsenic contamination is minimal in this area.

The risk assessment has demonstrated that the risks presented by the site and vicinity have been mitigated by Sandoz health and safety rules requiring protective equipment and by restricting activities and access to the site and vicinity by maintaining a fence around the contaminated areas and posting appropriate notices.

6.2 Conclusions

The National Contingency Plan and the "Guidance Document on Remedial Investigations under CERCLA" direct that a remedial investigation obtain sufficient data to allow a feasibility study of remedial action alternatives and sufficient data to evaluate the nature and extent of the threat presented by the contamination at the site (40 CFR 268d, U.S. EPA 1985e). The Guidance Document also states, ". . . it is not necessary to determine all the site and waste characteristics." The data and analyses presented in Sections 1.0 though 5.0 of this Remedial Investigation Report are adequate for assessing alternatives during the feasibility study, and Section 5.0, the Baseline Risk Assessment, adequately assesses the risks posed by contamination at the site to human health and the environment.

The investigations conducted to date have shown that a large quantity of arsenic and associated elements are present in shallow soil and groundwater on the site and vicinity. The extent of the contamination has been defined by more than 400 soil borings, over 80 monitoring wells, surface water sampling, extensive air monitoring, and a biota investigation. These investigations have shown that contamination is limited to soil and groundwater within 13 acres, to vegetation that grows on the more contaminated soil, and to surface water that runs off contaminated soil and becomes ponded in low-lying areas with contaminated soil to the southeast of the site. Migration of dust resulting in ambient air concentrations in excess of background extends off site.

The risk assessment has demonstrated that the risks presented by the site have been mitigated by restricting activities at the site and restricting access to it by maintaining a fence around the contaminated areas.

Adequate data are available to assess remedial action alternatives appropriate for this site and to assess the risks those actions would have on human health and the environment. Feasibility studies have been conducted and a remedial action plan has been prepared for the site according to guidelines established by the RWQCB and DHS (WCC, 1984b, 1984c; Geomatrix, 1986b and 1986e). Upon approval of this document, a Feasibility Study and Remedial Action Plan will be prepared and submitted according to Federal and State guidelines to address the remediation of the site.

6.3 Recommended Remedial Action Objectives

The primary objective for remedial action at the 1990 Bay Road site and vicinity is to minimize the risk to public health and the environment to the extent technically and economically feasible. This risk may be present as a result of elevated concentrations of selected constituents in surface water, groundwater, soil, and air at the site and vicinity.

For surface water, remedial actions can reduce the risk to public health and the environment by decreasing the potential for ingestion of water containing elevated levels of contaminants. The environmental risk from surface water can be minimized by maintaining surface water at or below Federal Ambient Water Quality Criteria, and reducing rainfall infiltration through soil to limit the migration of contaminated groundwater. Environmental protection from contaminated groundwater can be accomplished by preventing the contamination from migrating beyond the Regional Water Quality Control Board compliance monitoring well network.

The potential risk to public health and the environment posed by soil at the site can be mitigated by reducing the potential for ingestion, inhalation or migration of soil containing elevated levels of contaminants. These remedial action objectives will be addressed in the Feasibility Study.

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TABLE 1

SUMMARY OF SITE STUDIES
1990 Bay Road Site and Vicinity

Consultant	Study Year	Boring or Well Designation(s)	Report Reference
A. HYDROGEOLOGIC STUDIES			
Converse/TenEch	1980-81	C-1 through C-25	CTE, 1981a
Converse/TenEch	1981	C-26 through C-30; ES-1	CTE, 1981b
Woodward-Clyde	1982	WCC-1 through WCC-4; WS-1 through WS-9 (SB-41 through SB-49)	WCC, 1982
Converse	1982	ES-2 through ES-13 (SB-109 through SB-119)	CC, 1983
Woodward-Clyde	1983	WCC-5 through WCC-17; SB-3 through SB-40	WCC, 1984a
Woodward-Clyde	1984	SB-101 through SB-108	OH&S, 1986
Geomatrix	1986	B1-1 through B1-16, B2-1 through B2-68, B3-1 through B3-107, B4-1 through B4-8, B5-1 through B5-25, B6-1 through B6-17, B7-1 through B7-28	Geomatrix, 1987b
Geomatrix	1986	4-BAT-1 through 27-BAT-1 (14 total); 4-WP-1 through 27-WP-2 (15 total)	Geomatrix, 1986c
Geomatrix	1986	W-101	Geomatrix, 1986d
Geomatrix	1986	W-102 through W-119; BAT-TI through BAT-T13 (5 total)	Geomatrix, 1987a
Geomatrix	1987	B1-17 through B1-21, B8-1 through B8-17	Geomatrix and SSP&A, 1987a
Geomatrix	1988	W-120 through W-124	this report

TABLE 1 (cont'd)

SUMMARY OF SITE STUDIES

Consultant	Study Year	Boring or Well Designation(s)	Report Reference
B. SURFACE WATER STUDIES			
Geomatrix	1986	Surface H O#1 through Surface H O#4	Geomatrix and SSP&A, 1987a
Geomatrix	1987	SL-1-UA through SL-6-FA; S-1 through S-3 (15 analyses)	Geomatrix and SSP&A, 1987a this report
Geomatrix	1988	28 analyses, see Table B-17 for sample designations	this report
C. AIR QUALITY MONITORING			
EAL Laboratories	1982	---	EAL, 1982
PG&E	1985	790-799	PG&E, 1985
Robert Spence & Associates	1986	P-1 through P-18; A-1 through A-16; 001 through 006; CT-1 through CT-4	Geometrix and SSP&A, 1987a
Robert Spence & Associates	1986	P-19 through P-28; A-17, A-18	Geomatrix and SSP&A, 1987a
Robert Spence & Associates	1987	GEO1 through GEO3	Geomatrix and SSP&A, 1987a
Geomatrix	1988	P-1 through P-10B; C-1 through C-5, C-7, C-8; A-7, A-8; D-1 through D-6, D-8, D10A; O-1 through O-4	this report
D. BIOTA STUDIES			
Woodward-Clyde	1983	V-1 through V-6	WCC, 1984a
WESCO	1987-88	(W1-W6, B1, B2)	Geomatrix and SSP&A, 1987a
Geomatrix	1988	--	Geomatrix and SSP&A, 1988b

TABLE 1 (cont'd)

SUMMARY OF SITE STUDIES

Consultant	Study Year	Boring or Well Designation(s)	Report Reference
E. OTHER STUDIES			
Woodward-Clyde (arsenic leaching)	1982	WCC-2, SB-4	WCC, 1982
Woodward-Clyde (arsenic sorption)	1982	WCC-1	WCC, 1983
Geomatrix (arsenic speciation)	1987	WCC-1, WCC-2, WCC-3, WCC-10, W-117, C-11, C-30	Geomatrix and SSP&A, 1987a

TABLE 2

CLIMATOLOGICAL DATA
1990 Bay Road Site and Vicinity

WEATHER STATION	PRECIPITATION Total (inches)	TEMPERATURE Annual Mean (°F)	WIND SPEED Annual Mean (mph)	WIND DIRECTION Prevailing
San Jose Weather Station[1]	13.85	59	6.4	NW
San Francisco Int'l Airport[2]	19.71	56.6	10.5	WNW
San Jose (NOAA)[3]	13.86	59.7	--	--
Palo Alto[4]	14.77	57.8	--	--
San Jose (BAAQMD)[5]	--[b]	--	7.2	NW
Moffett Naval Air Station[5]	--	--	5.1	NNW
Montague[5]	--	--	6.2	N

(a) Data Sources:

1 - Office of Emergency Services, City of San Jose
2 - National Oceanic and Atmospheric Administration, National Climatic Data Center, 1985
3 - National Oceanic and Atmospheric Administration, National Climatic Data Center, September 1982
4 - Climates of the States, 3rd edition, 1985
5 - Bay Area Air Quality Management District

(b) Data Not Available

TABLE 3

COMMERCIAL FACILITIES AND SCHOOLS NEAR THE 1990 BAY ROAD SITE

Company Name	Address	Location Relative to Site	Number of Employees	Distance (Miles)
Infinity Salvage	2091 Bay Road	Northeast	4	0.16
Bay Area Towing & Auto Wrecking	2017 and 2065 Bay Road	Northeast	13	0.07
Rogge's Auto Wreckers	1987 Bay Road	North	5	0.06
C-B Bayshore Auto Wreckers	1925 Bay Road	Northwest	10-15	0.08
Rogge's Excavating	150 Tara Road	North	4	0.10
Cal-Spray, Inc.	1905 Bay Road	Northwest	16	0.10
Peck and Hiller Co.	2479 Pulgas Avenue	West	14	0.12
Pitcher Drilling	2411 Pulgas Avenue	Southwest	27	0.15
WDF Investment & Loan	2470 Pulgas Avenue	West	4	0.05
Bain's Moving & Storage	2470 Pulgas Avenue	West	20	0.05
R.E. Borrmann Steel	2450 Pulgas Avenue	Southwest	11	0.11
Ravenswood Children Center	1286 Runnymede Avenue	South	15/185[1]	0.27
Radiator Factory[2]	1985 Bay Road	Northwest	0	0.09
United Auto Wreckers[2]	2005 Bay Road	North	0	0.07
Import Specialities[2]	Bay Road	West	0	0.09
Torres Construction[2]	Weeks Avenue	South	0	0.16
PG&E Cooley Landing Substation and Pole Yard	Bay Road	East	0	0.09
ASM, Inc.	2536 Pulgas Avenue	Northwest	47	0.17

TABLE 3 (cont'd)

COMMERCIAL FACILITIES AND SCHOOLS NEAR THE 1990 BAY ROAD SITE

Company Name	Address	Location Relative to Site	Number of Employees	Distance (Miles)
New Day Drug Rehabilitation Center	2560 Pulgas Avenue	Northwest	55	0.19
John Nuckton, Inc.	2520 Pulgas Avenue	Northwest	10	0.12
Pick & Save Auto Wreckers	101 Tara Road	Northwest	4	0.11
McCreery Design Company	1825 Bay Road	West	6	0.21
Bob Gibson's Bay City Body Shop	1802 Bay Road	West	2	0.23
Merchandising Systems, Inc.	1877 Bay Road	Northwest	8	0.18
Peninsula Charter Lines	260 Demeter Avenue	Northwest	9/22[3]	0.24
Dolan Concrete	Demeter Avenue	Northwest	1-2	0.25
East Palo Alto Sanitary District	2524 Pulgas Avenue	Northwest	6-8	0.14
Sandoz Corporation	1990 Bay Road	Site	21	
	1836-1848 Bay Road	West	14	0.21
HEW Drilling; Garcia Well and Pump Co.; Alluvial Soil Laboratory	1045 Weeks Avenue	Southwest	5/31-35[3]	0.20
Romic	2081 Bay Road	Northwest	70	0.21
Touchalt Trucking	2535 Pulgas Avenue	Northwest	19	0.18
International Health Services Corporation	2493 Pulgas Avenue	West	2	0.12
Mastero Corporation and Labs	2528A Pulgas Avenue	Northwest	2	0.15
A.B.S. Fabricators	1856 Bay Road	West	4	0.22

TABLE 3 (cont'd)

COMMERCIAL FACILITIES AND SCHOOLS NEAR THE
1990 BAY ROAD SITE

Company Name	Address	Location Relative to Site	Number of Employees	Distance (Miles)
E.P.A. Metal Finishers	1856 Bay Road	West	3	0.22
Families In Transition	1841 Bay Road	Northwest	4	
South Brothers Motorcycle Club	1861 Bay Road	Northwest	4	
Bear Paw	2476 Pulgas Avenue	West	4	0.05
Heartwood	2480B Pulgas Avenue	West	4	0.05
Stonehurst Floral Products	Pulgas Avenue	Northwest	4	
Saturo Iwasaki Greenhouses	Pulgas Avenue	Northwest	0	
Creative Montessori Learning Centers	1425 Bay Road	West	70[5]	0.9
OICW Child Development Center	1070 Beech	South	34[5]	0.6
Shule Ya Taifa	321 Bell	West	20[5]	1.1
Brentwood School	2086 Clarke Ave.	Southwest	640[5]	0.7
Costano Schools	2695 Fordham	Northwest	425[5]	0.6
McNair School	2033 Pulgas Ave.	South	390[5]	0.7
Ravenswood Middle School	2450 Ralmar Ave.	West	35/350[1]	1.15

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[1] Number of Staff/Number of children
[2] Inactive businesses
[3] Number of full-time employees on site 8 a.m. to 5 p.m./Total number of full-time employees
[4] Unable to reach a contact person.
[5] Number of children.

TABLE 4

ESTIMATE OF MATERIALS FORMULATED AT 1990 BAY ROAD IN 1967
1990 Bay Road Site

Material	Active Ingredients[1]	Powder or Liquid[2]	Ranking by Volume[2]	Volume[2]	Location of Formulation[3]	Storage Location[3]	Packaging Containers
Chlorax 40 & Shed-A-Leaf	sodium chlorate (40%) sodium metaborate (60%)	Powder	2	422,280 lb	Bdg M	Warehouse 0	50-lb bags
Chlorax 285	sodium chlorate sodium metaborate	Powder	4	34,800 lb	Bdg M	Warehouse 0	50-lb bags
Chlorea 3	sodium chlorate sodium metaborate monuron	Powder	5	3,400 lb	Bdg M	Warehouse 0	50-lb bags
Chlorea 125	sodium chlorate sodium metaborate monuron	Powder	3	154,050 lb	Bdg. M	Warehouse 0	50-lb bags
Sodium Metaborate	sodium metaborate	Powder	1	1,209,600 lb	Bdg M	Warehouse 0	Shipped in bulk to other plants
Atlas A	sodium arsenite	Liquid	3	21,839 gal	Tank L	Tank F	30-gal drums
Atlas A-6	sodium arsenite	Liquid	4	19,300 gal	Tank L	Tank F	not known
Atlas WP&C	water and sodium chloride (inert)	Liquid	5	530 gal	Tank J	not known	5-gal buckets
Bromicil-5 (Brotab)	Bromicil and 2,3,6-Trichlobenzoic acid (<1%)	Liquid	2	138,168 gal	not known	not known	not known
Shed-A-Leaf	sodium chlorate	Liquid	1	139,000 gal	Tank L	Tank E	30-gal drums or 4000-gal tank trucks
Chlorax Liq. S.F.2	sodium chlorate	Liquid	—	150,000 gal/train[4]	Tank L	Tank E	not known

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[1] Active ingredients as listed on container labels in files.

[2] For January 1, 1967 to October 31, 1967 as reported by C.E. Womack.

[3] See Figure 16 for building and tank locations.

[4] Estimated; more than 1 train per year.

TABLE 5

WASTE CHARACTERISTICS OF MAIN INGREDIENTS OF SUBSTANCES FORMULATED AT 1990 BAY ROAD
1990 Bay Road Site

Substance	Listed in CAC Title 22[1]	Potential Hazardous Property[2]	Use	Toxicity[3] (mg/kg)	Persistence[4]	Mobility[5]	Carcinogenicity[6]
Sodium arsenite	Yes	T	Herbicide	10-100	P	L	1
Bromicil	No	—	Herbicide	10^3-10^4	—	—	—
2, 3, 6-Trichlorobenzoic Acid	No	—	Herbicide	10^3-10^4	—	—	—
Sodium chlorate	Yes	T, F	Herbicide	10^3-10^4	VL	H	—
Sodium metaborate	No	—	Herbicide	10^3-10^4	P	H	—
Monuron	No	—	Herbicide	10^3-10^4	L	—	—
Caustic (sodium hydroxide)	Yes	T, C	———	10^2-10^3	VL	H	—

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[1] California Administrative Code, 1985, Title 22, Section 66680.

[2] Hazardous properties used to justify listing in Section 66680: C = corrosive, T = toxic, F = ignitable.

[3] Oral LD50 for mammals from Sax, 1984.

[4] The time required for the material listed to decompose in the environment to a less hazardous substance (Vershueren, 1983): P = Permanent, H = High Persistence (lasting longer than five years), M = Moderate Persistence (lasting longer than one year), L = Low Persistence (lasting longer than one month) and VL = Very Low Persistence (lasting less than 1 month).

[5] Mobility of the listed material in soil and groundwater (Vershueren, 1983): H = High Mobility, M = Moderate Mobility, L = Low Mobility.

[6] Carcinogenicity: 1 = carcinogen per EPA and OSHA, 2 = suspected animal carcinogen with human data available (IARC, 1980); 3 = suspected animal carcinogen (IARC, 1980).

TABLE 6

ELEMENT CONCENTRATIONS IN SOIL SAMPLES
AT SELECTED LOCATIONS
1990 Bay Road Site and Vicinity

Boring Designation	Sample Depth (feet)	Element Concentration (mg/kg)						
		Arsenic	Cadmium	Copper	Lead	Mercury	Selenium	Zinc
Tidal Marsh Background Sample								
Control	0-0.5	9.2	0.8	41	41	0.7	0.3	150
Sludge Pond (Area 1)								
ES-1	2	19000	120	NA	2700	1900	1000	NA
ES-1	7	1200	ND(0.7)	NA	8.9	0.63	ND(0.1)	NA
ES-1	11	1700	0.91	NA	15	0.62	ND(0.1)	NA
Non-Tidal Marsh (Area 2)								
W-5	0-0.5	5560	150	190	1470	27	0.8	2600
B2-50	0-0.5	420	ND(1)	58	2	ND(0.1)	ND(0.5)	420
Torres Property (Area 3)								
B3-11	0-0.5	3400	150	540	1400	51	19	1300
B3-03	3-3.5	2500	ND(1)	57	15	1.2	0.7	78
West of Site (Area 6)								
B6-05	0-0.5	1100	90	100	910	20	13	1200
B6-07	2-2.5	430	ND(1)	30	14	0.28	ND(0.5)	99
Tidal Marsh (Area 8)								
B8-05	0-0.5	77	ND(1)	56	150	9.1	ND(0.5)	130
W-2	0-0.5	18.8	0.85	44	67	ND(0.1)	0.4	170
WCC-47	1-1.5	11	NA	NA	105	NA	NA	NA

NOTES

1. A complete listing of soils analyses is contained in Appendices D, E, and I.

2. Soil sample locations are shown on Plate 1.

3. NA - not analyzed.

4. ND - not detected in concentration at or above value shown in parentheses.

TABLE 7

ESTIMATED VOLUME OF CONTAMINATED SOIL AND QUANTITY OF ARSENIC IN CONTAMINATED SOIL
1990 Bay Road Site and Vicinity

	Volume of Soil (yd^3) with Arsenic Concentrations, mg/kg							
Area	>20	>100	>200	>500	>1000	>2000	>5000	>10000
Sandoz Site (Area 1)	28000	13000	8100	4000	2100	880	75	0
Sandoz Site (Area 4)	60000	38000	28000	14000	8300	4100	1000	200
Non-Tidal Marsh (Area 2)	20000	8500	3500	620	230	75	0	0
South of Site (Area 3)	47000	19000	13000	6600	3300	1400	160	17
PG&E Poleyard (Area 5)	4400	350	35	0	0	0	0	0
Properties North & West of Site (Areas 6&7)	6900	1400	570	150	52	12	0	0
Tidal Marsh (Area 8)	4800	300	50	0		0	0	0
TOTALS	170000	80000	53000	25000	14000	6500	1300	220
<u>Subareas</u>								
Railroad T.	13000	9000	7000	4000	2600	1200	240	17
Sludge Pond (Area 1)	9500	6700	5300	3400	2000	800	64	0
Sludge Pond (Area 4)	6400	4800	4000	2800	1800	860	230	23

TURRES
WETLANDS -

0524B/0773B9

TABLE 7 (cont'd)

ESTIMATED VOLUME OF CONTAMINATED SOIL AND QUANTITY OF ARSENIC IN CONTAMINATED SOIL

	Quantity of Arsenic, kg, in Soil with Arsenic Concentrations, mg/kg							
Area	>20	>100	>200	>500	>1000	>2000	>5000	>100
Sandoz Site (Area 1)	13000	12000	11000	8700	6900	4200	710	320
Sandoz Site (Area 4)	50000	44000	47000	40000	34000	25000	12000	3700
Non-Tidal Marsh (Area 2)	4100	3200	2200	1000	640	310	0	0
South of Site (Area 3)	20000	19000	17000	14000	11000	7200	1700	0
PG&E Poleyard (Area 5)	300	73	13	0	0	0	0	0
Properties North & West of Site (Areas 6&7)	930	590	420	230	130	36	0	0
Tidal Marsh (Area 8)	300	90	30	0	0	0	0	0
TOTALS	88000	83000	77000	64000	53000	37000	14000	4000
<u>Subareas</u>								
Railroad T.	13000	13000	13000	11000	9800	7000	2600	330
Sludge Pond (Area 1)	9200	9000	8700	7800	6300	3800	600	0
Sludge Pond (Area 4)	9200	9100	8900	8300	7100	5200	2500	460

TABLE 7 (cont'd)

ESTIMATED VOLUME OF CONTAMINATED SOIL AND QUANTITY OF ARSENIC IN CONTAMINATED SOIL

Note:

The volume of contaminated soil and the weight of arsenic in soil was calculated as follows:

1. At each boring location a concentration was estimated at one-half foot intervals from the surface to the total depth of the boring by log-linear interpolation, except that the concentration from the surface to the depth of the first sample was set equal to the concentration of the first sample.

2. At all borings with a total depth of four feet or greater, concentrations were estimated at one half foot intervals from the bottom of the boring to 35 feet, the approximate depth of contamination at the site. Concentrations were extrapolated using an empirically derived relationship that states that concentration at a given depth "x" is $C_x=10^{(\log[Cx-1]-0.27)}$ where depth is in feet.

3. Concentrations were then calculated at one-half foot intervals to a depth of 35 feet at the node points of a 12.5-foot square grid that encompassed the site and vicinity. The kriging option on the GRID program developed by Golden Software was used to calculate these concentrations from the randomly spaced boring data. All logarithms of concentrations were input to the GRID program, and the results were subsequently transformed by taking the exponential of the computed concentrations.

4. The volume of soil that contains arsenic concentrations in excess of a given level was then calculated by counting the number of grid points for which the estimated concentration was in excess of the given level. The total volume was then calculated by multiplying this number by the volume corresponding to a grid point (12.5' x 12.5' x 0.5' = 78.125 ft^3).

5. The weight of arsenic in the soils was calculated by determining the average arsenic concentration of the grid points within the volume of interest, and then making the appropriate conversions. The soil was assumed to have a density of 120 lb/ft^3.

TABLE 8

ARSENIC CONCENTRATIONS IN GROUNDWATER IN UPPER SHALLOW ZONE WELLS[1]

1990 Bay Road Site and Vicinity

Arsenic Concentrations (mg/l)

Well Number	October 1982	November 1983	Spring 1986	December 1986	June 1987	December 1987	June 1988	Fall 1988
C-1							0.060	
C-2							0.0017	
C-3							0.066	
C-4							0.14	
C-18		ND(0.001)	ND(0.008)					
C-26		0.03	0.051				0.026	
C-27							0.67	
C-29			300				180	
WCC-02	100		90	65	61	81	70	
WCC-03	150	100	140	120	120	140	120	
WCC-06		0.006	ND(0.008)[2]				0.0015	
WCC-08		23	26	25	25	21	13	
WCC-10		10	19	14	12	17	15	
WCC-12		0.005	ND(0.006)	0.0035	0.003	0.0056	0.0056	
WCC-16		4.8	9.3	13	15	26	12	
W-103				0.0028	0.0002	0.0034	0.0026	
W-105				0.0005	0.0009	0.0002	0.0018	
W-107				0.0003	0.0003	0.0010	0.0011	
W-109				0.0004	0.0008	0.0013	0.0098	
W-111				0.0004	0.0007	0.0007	0.0006	
W-113				0.001	0.0021	0.0032	0.0027	
W-114				0.0085	0.014	0.021	0.015	
W-115				0.017	0.025	0.028	0.018	
W-117				45	42	35	64	
W-118[3]		0.002	ND(0.01)	0.0007	0.0006	0.0010	0.0008	
W-121[4]								0.0006
W-123[5]								0.0078
M-1						0.027		
M-2						0.024		
M-3						0.065		
M-4						1.5		
M-5						0.022		
M-6						0.011		
M-7[4]								0.045
M-8[4]								0.027
M-9[4]								0.0076
M-11[4]								0.011
M-12[4]								0.0086
M-13[4]								0.0046

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[1] Refer to Appendices A and B for additional groundwater data. This table includes all upper shallow zone wells of the monitoring network and all additional upper shallow zone wells analyzed for arsenic since October, 1982.

[2] ND - arsenic not detected at or above value shown in parentheses.

[3] Monitoring well WCC-14 was destroyed and subsequently replaced with monitoring well W-118.

[4] Groundwater samples collected 8 November 1988 by Geomatrix.

[5] Groundwater sample collected 8 September 1988 by Geomatrix.

TABLE 9

ARSENIC CONCENTRATIONS IN GROUNDWATER IN LOWER SHALLOW ZONE WELLS AND THE DEEP WELL[1]
1990 Bay Road Site and Vicinity

Arsenic Concentrations (mg/l)

Well Number	October 1982	November 1983	Spring 1986	December 1986	June 1987	December 1987	June 1988	Fall 1988
WCC-01	120	160	140	340	120	240	320	
WCC-05		0.002	ND(0.008)[3]				0.0028	
WCC-07		0.10	ND(0.008)	0.0095	0.018	0.0088	0.011	
WCC-09		0.62	0.50	0.150	0.42	0.40	0.27	
WCC-11		0.005	ND(0.006)	0.011	0.029	0.021	0.019	
WCC-17		0.83	0.970	0.4	1.1	0.94	2.0	
W-102				0.0006	0.0010	0.0013	0.0011	
W-104				0.0013	0.0056	0.0014	0.0070	
W-106				0.0003	0.0009	0.0006	0.0010	
W-108				0.0005	0.0006	0.0011	0.0014	
W-110				0.0004	0.0005	0.0007	0.0013	
W-112				0.001	0.001	0.0100	0.0012	
W-116[4]		ND(0.001)	0.7	0.012	0.017	0.0040	0.0077	
W-119[4]		0.001	ND(0.01)	0.0004	0.0003	0.0008	0.0008	
W-120[5]								ND(0.00002)
W-122[6]								0.0009
W-124[6]								0.0013
W-101[2]			ND(0.008)	0.0017	0.0011	0.0015	0.0010	

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[1] Refer to Appendices A and B for additional groundwater data.

[2] Well W-101 is the deep groundwater zone monitoring well.

[3] ND - Arsenic not detected at or above value shown in parentheses.

[4] Monitoring wells WCC-13 and WCC-15 were destroyed and subsequently replaced with monitoring wells W-119 and W-116, respectively.

[5] Groundwater sample collected 8 November 1988 by Geomatrix.

[6] Groundwater sample collected 8 September 1988 by Geomatrix.

TABLE 10

QUALITY CRITERIA FOR COMPOUNDS OF INTEREST
1990 Bay Road Site and Vicinity

	SOIL		WATER	AIR
Element	TTLC[1] (mg/kg)	STLC[1] (mg/l)	Primary Drinking Water Standard[2] (mg/l)	PEL[3] (mg/m³)
Arsenic	500	5.0	0.05	0.01
Cadmium	100	1.0	0.01	0.05
Copper	2,500	25	1.0	1.0
Lead	1,000	5.0	0.05	0.05
Mercury	20	0.2	0.002	0.05
Selenium	100	1.0	0.01	0.2
Zinc	5,000	250	5.0	--
DDT, DDE, DDD	1.0	0.1	--	1.0
Lindane	4.0	0.4	0.004	0.5
Arsine	--	--	--	0.2

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[1] California Administrative Code, 1985, Title 22, Section 66700.

[2] Code of Federal Regulations, Title 40, Section 141.11.

[3] CalOSHA Permissible Exposure Limits (PEL's) are legal limits set forth in California Administrative Code Title 8 General Industry Safety Orders for the maximum permitted 8-hour time-weighted average concentration of an airborne contaminant that any worker may be exposed to day after day without adverse effect. The Action Level, which if exceeded would require that a medical monitoring program be implemented, is defined as one-half the PEL.

TABLE 11 CRITERIA

SUMMARY OF REGULATORY CRITERIA AND STANDARDS
1990 Bay Road Site and Vicinity

Occupational Exposure

Statute or Requirement	Description	Enforcing or Advising Agency	Limit
Federal Occupational Safety and Health Act	Permissable Exposure Levels (PEL), as an 8-hour time-weighted average	U.S. Occupational Safety and Health Administration	Arsenic - 0.01 mg/m^3 Cadmium - 0.2 mg/m^3 Copper - 1.0 mg/m^3 Lead - 0.05 mg/m^3 Mercury - 0.1 mg/m^3 (ceiling) Selenium - 0.2 mg/m^3 Zinc - 5 mg/m^3 (zinc oxide fume)
California Occupational Safety and Health Act	Permissable Exposure Levels (PEL) as an 8-hour time-weighted average	California Occupational Safety and Health Administration	Arsenic - 0.01 mg/m^3 Cadmium - 0.05 mg/m^3 Lead - 0.05 mg/m^3 Mercury - 0.05 mg^3 Selenium - 0.2 mg/m^3
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Requires written warning if, during course of business, any individual is exposed above "no significant risk level" (carcinogens); or above "no observable effect" level assuming exposure at 1000 times the published level (reproductive toxicants)	California Health and Welfare Agency	Arsenic - 10 ug/day Cadmium[a] - 1 ug/day Lead - 0.5 ug/day
NIOSH Recommended Exposure Standards	Recommended ceiling limit sampled over 15 minutes; or exposure level as an 8-hour time-weighted average (TWA)	National Institute for Occupational Safety	Arsenic - 0.002 mg/m^3 (ceiling) Cadmium - 0.6 mg/m^3 (ceiling) Lead - <0.1 mg/m^3 (TWA) Mercury - 0.05 mg/m^3 (TWA) Zinc - 5 mg/m^3 (TWA) - 15 mg/m^3 (ceiling for Zinc oxide fume)
Threshold Limit Value	Advisory time weighted average for 8-hour workday, 40-hour workweek of repeated exposure without adverse effect	American Conference of Governmental Industrial Hygienists	Arsenic - 0.2 mg/m^3 Cadmium - 0.05 mg/m^3 (0.01 mg/m^3 proposed) Copper - 1.0 mg/m^3 Lead - 0.15 mg/m^3 Mercury - 0.05 mg/m^3 Selenium - 0.2 mg/m^3 Zinc - 10 mg/m^3

TABLE 11 (cont'd)

SUMMARY OF REGULATORY CRITERIA AND STANDARDS

Drinking Water

Statute or Requirement	Applicability	Enforcing or Advising Agency	Limit
Federal Safe Drinking Water Act	Maximum Contaminant Level (MCL) for drinking water based on health and technical feasibility criteria	U.S. Environmental Protection Agency	Arsenic - 50 ug/l Cadmium - 10 ug/l Copper - 1,300 ug/l (proposed) Lead - 50 ug/l (5.0 ug/l (proposed) Mercury - 2 ug/l Selenium - 10 ug/l
	Recommended Maximum Contaminant Contaminant Level (RMCL) for drinking water based on health criteria only		Arsenic - 50 ug/l (proposed) Cadmium - 5 ug/l (proposed) Copper - 1300 ug/l (proposed) Lead - 20 ug/l (proposed) Mercury - 3 ug/l (proposed) Selenium - 45 ug/l (proposed)
Federal Safe Drinking Water Act - California Program	Maximum Contaminant Levels (MCL) for drinking water, may be more strict than Federal MCLs	California Department of Health Services	Same as Federal MCLs
	Recommended Drinking Water Action Levels	California Department of Health Services	None established
California Safe Drinking Water and Toxic Enforcement (Proposition 65)	Prohibits discharge of listed substance into any potential source of drinking water above "no significant risk" level (carcinogens); or abobe "no observable effect" level assuming exposure at 1000 times the published level (reproductive toxicants)	California Health and Welfare Agency	Arsenic - 10 ug/day Cadmium[a] - 1 ug/day Lead - 0.5 ug/day

TABLE 11 (cont'd)

SUMMARY OF REGULATORY CRITERIA AND STANDARDS

Ambient Water

Statute or Requirement	Description	Enforcing or Advising Agency	Limit
Federal Clean Water Act	National Ambient Water Quality Criteria (NAWQC) not mandatory unless State adopts as enforceable standard (apply to surface water only:	U.S. Environmental Protection Agency	
	Human Health – Cancer (assuming water and fish ingestion)		Arsenic – 0.0022 ug/l
	(assuming fish consumption only)		Arsenic – 0.0175 ug/l
	Human Health – non-cancer (assuming water and fish ingestion)		Cadmium – 10 ug/l Lead – 50 ug/l Mercury – 0.144 ug/l Selenium – 10 ug/l
	(assuming fish consumption only)		Mercury – 0.146 ug/l
	Freshwater Aquatic Life – Acute		Arsenic (pent.)^{b} – 850 ug/l Arsenic (tri) – 360 ug/l Cadmium^{c} – 3.9 ug/l Copper^{c} – 18 ug/l Lead^{c} – 82 ug/l Mercury – 2.4 ug/l Selenium – 260 ug/l Zinc^{c} – 120 ug/l
	Freshwater Aquatic Life – Chronic		Arsenic (pent.)^{b} – 48 ug/l Arsenic (tri) – 190 ug/l Cadmium^{c} – 1.1 ug/l Copper^{c} – 12 ug/l Lead^{c} – 3.2 ug/l Mercury – 0.012 ug/l Selenium – 5 ug/l Zinc^{c} – 110 ug/l

TABLE 11 (cont'd)

SUMMARY OF REGULATORY CRITERIA AND STANDARDS

Ambient Water (cont'd)

Statute or Requirement	Description	Enforcing or Advising Agency	Limit
Federal Clean Water Act (cont'd)	(NAWQC's cont'd)	U.S. Environmental Protection Agency	
	Saltwater Aquatic Life - Acute		Arsenic (pent)[b] - 2,319 ug/l Arsenic (tri) - 69 ug/l Cadmium - 43 ug/l Copper - 2.9 ug/l Lead - 140 ug/l Mercury - 2.1 ug/l Selenium - 410 ug/l Zinc - 95 ug/l
	Saltwater Aquatic Life - Chronic		Arsenic (pent)[b] - 13 ug/l Arsenic (tri) - 36 ug/l Cadmium - 9.3 ug/l Copper - 2.9 ug/l Lead - 5.6 ug/l Mercury - 0.025 ug/l Selenium - 54 ug/l Zinc - 86 ug/l
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prohibits discharge of listed substance into any potential source of drinking water above "no significant risk" level (carcinogens); or above "no observable effect" level assuming exposure at 1000 times the published level (reproductive toxicants)	California Health and Welfare Agency	Arsenic - 10 ug/day Cadmium[a] - 1 ug/day Lead - 0.5 ug/day

TABLE 11 (cont'd)

SUMMARY OF REGULATORY CRITERIA AND STANDARDS

Ambient Air

Statute or Requirement	Description	Enforcing or Advising Agency	Limit
Federal Clean Air Act	National Ambient Air Quality Standards	U.S. Environmental Protection Agency/Bay Area Air Quality Management District	Lead - 0.0015 mg/m^3
Federal Clean Air Act - State Program	Emission standards for hazardous pollutants based on a 24-hour period	Bay Area Air Quality Management District	Lead - 1.0 mg/m^3 Mercury - 3.2 kg (sludge processing limitation)

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[a] According to the State of California, ingestion of cadmium presents no significant risk of cancer, Title 22 of CAC, Division 2, Chapter 3, Article 7, Sec 12707.

[b] Insufficient data to develop criteria, value presented is L.O.E.L. - Lowest observed effect level.

[c] Hardness dependent criteria (100 mg/l used).

TABLE 12

SUMMARY OF CHEMICALS DETECTED[1]
1990 Bay Road Site and Vicinity

Chemical	Groundwater[2](mg/l)		Surface Water[3](mg/l)		Soil (mg/kg)		Air (mg/m^3)	
	Range	Avg	Range	Avg	Range	Avg	Range	Avg
Aluminum	ND-0.4	0.4(1)			8700-16000	13000(11)		
Antimony	ND-0.35	0.1(11)			ND-40	40(1)		
Arsenic	0.0002-340	33(54)	0.26-15	4.9(29)	0.05-54000	1050(1182)	ND0.011	0.001(57)
Barium	ND-0.4	0.33(10)			24-230	124(11)		
Cadmium	ND-0.024	0.0014(22)	ND-0.0023	0.0011(6)	0.1-1500	68(47)	ND	ND
Calcium	26-840	270(12)			1700-27000	11000(11)		
Chloroform	ND-0.0045	0.0025(5)			ND	ND	ND	ND
Cobalt	ND-0.01	0.004(7)			7.2-12	8.9(11)		
Copper	ND-0.11	0.0100(16)	0.0059-0.086	0.026(6)	13-2200	145(51)	ND	ND
DDT, DDE, DDD	ND	ND			ND-0.202	0.202(1)	ND	ND
Dibutylphthalate	ND-0.002	0.002(1)			ND	ND		
Diethylphthalate	ND-0.050	0.05(1)			ND	ND		
1,2-Dichloroethane	ND-0.007	0.006(1)			ND	ND	ND	ND
1,2-Dichloroethylene	ND-0.016	0.015(2)			ND	ND	ND	ND
Freon 113	ND	ND			ND	ND	0.001-0.005	0.003(2)
Iron	ND-29	9.8(6)			14000-22000	17000(11)		
Lead	ND	ND	ND-0.003	0.0007(6)	2-13000	590(85)	ND-0.007	0.004(2)
Lindane	ND	ND			ND	ND	0.000003-0.0000220	0.000012(3)
Magnesium	14-1100	360(12)			4200-6500	5100(11)		
Manganese	0.06-14	2.9(12)			220-390	295(11)		
Mercury	ND	ND	ND-0.0013	0.0003(6)	0.04-1900	(65(61)	ND	ND
Nickel	ND-0.056 0.056	0.02(11)			34-53	39(11)		
Nitrosodiphenylamine	ND-0.002	0.002(1)			ND	ND		
Potassium	0.33-280	68(12)			520-2200	1200(11)		

TABLE 12 (cont'd)

SUMMARY OF CHEMICALS DETECTED [1]

Chemical	Groundwater[2](mg/l)		Surface Water[4](mg/l)		Soil (mg/kg)		Air (mg/m^3)	
	Range	Avg	Range	Avg	Range	Avg	Range	Avg
Selenium	ND-6.4	0.33(22)	0.0013-0.27	0.049(6)	0.01-1000	35(60)	ND	ND
Silver	ND-0.0015	0.0007(8)			ND-0.8	0.8(1)		
Sodium	44-8800	3300(12)			480-6500	1500(11)		
Tetrachloroethylene	ND-0.042	0.017(6)			ND	ND	ND	ND
Tin	ND-0.033	0.03(3)			ND	ND		
Trichloroethylene	ND-0.11	0.0301(5)			ND	ND	ND	ND
Vanadium	ND-0.11	0.03(12)			1.8-41	31.8(11)		
Zinc	ND-0.25	0.0300(16)	ND-0.04	0.02(6)	34-2600	511.0(51)	ND	ND

---

1. Only chemicals on U.S. EPA's Target Compound list and detected at the site are presented.

2. Average concentrations are the calculated mean for the respective media and chemical for results above detection limits. Numbers in parentheses next to average concentration indicate total number of samples used to calculate the mean.

3. Surface water is seasonally ponded in the non-tidal marsh.

4. No entry indicates medium was not analyzed for that chemical.

TABLE 13
POTENTIAL PATHWAYS OF EXPOSURE
1990 Bay Road Site and Vicinity

Exposure Medium	Potential Routes of Exposure	Potential Receptors	Pathway Complete
Soil (surface)	Dermal absorption Incidental ingestion	On-site Workers Trespassers Local Residents Recreational Levee Users	Yes. Dermal absorption a possible route of exposure. Yes. Incidental ingestion a possible route of exposure.
Air	Inhalation of dust	On-site Workers Nearby Facility Workers Trespassers Local Residents Recreational Levee Users	Yes. Measurable levels of As and Pb detected in on-site samples.
Surface Water	Dermal absorption Incidental ingestion	On-site Workers Trespassers	Yes. Dermal absorption a possible route of exposure.
		Recreational Levee Users	Yes. Incidental ingestion a possible route of exposure.
	Uptake	Wildlife	Yes.
Groundwater	Ingestion Dermal absorption	Local Residents	No. Public water supplied primarily by Hetch-Hetchy Reservoir. Contamination limited to shallow aquifers. Local wells screened in deeper aquifers.
Biota	Consumption of fish, shellfish, and game	Local population	No. Fish and shellfish in adjacent tidal marsh not found to contain elevated contaminants. Hunting prohibited.

TABLE 14

BACKGROUND CONCENTRATIONS USED FOR RISK ASSESSMENT CALCULATIONS
1990 Bay Road Site and Vicinity

Medium	Arsenic	Cadmium	Lead	Mercury	Selenium
Soil (mg/kg)[1]	9	0.75	25	2	2
Drinking Water (mg/l)[2]	2×10^{-3}	1×10^{-3}	-[3]	-	-
Seawater (mg/l)[4]	3×10^{-3}	1.1×10^{-4}	3×10^{-5}	2×10^{-4}	9×10^{-5}
Air (mg/m^3)[5]	3×10^{-6}	2×10^{-6}	1×10^{-3}	-	-

---

[1] Background arsenic concentration based concentrations in background soil borings at the site. Background concentrations of other elements are one-half of the upper bound estimates of background concentrations developed in the Remedial Investigation Report.

[2] The background arsenic concentration is from U.S. EPA, 1985, Ambient Aquatic Life Water Quality Criteria for Arsenic, Office of Research and Development, Environment Research Laboratory, Duluth, Minnesota, January. The background cadmium concentration is one tenth of the Federal maximum contaminant level for cadmium.

[3] Not available; assumed to be zero.

[4] Hem, J.D., 1985, Study and Interpretation of the Chemical Characteristics of Natural Water, U.S. Geological Survey Water Supply Paper 2254, 264 pp.

[5] U.S. EPA, 1985, Santa Clara Valley Integrated Environmental Management Project: Draft Stage One Report, Region 9, 11 October.

TABLE 15

ASSUMPTIONS FOR EXPOSURE SCENARIOS
1990 Bay Road Site and Vicinity

Sandoz Employee

• weight	- 70 kg
• air inhaled in workday	- 10 m^3/day
• length of exposure	- 250 days per year for 35 years
• exposure routes	- inhalation of dust

Construction Worker

• weight	- 70 kg
• air inhaled in workday	- 10 m^3/day
• ponded surface water ingestion rate	- 5 ml/day
• soil ingestion rate	- 100 mg/day
• exposure incidence	- 10 days/lifetime
• exposure routes	- inhalation of dust - ingestion of ponded surface water - ingestion of soil

Maximally Impacted Resident

• weight	- 70 kg
• inhalation rate	- 20 m^3/day
• drinking water ingestion rate	- 2 liters/day
• soil ingestion rate	- 100 mg/day
• period of residence	- 70 years
• time spent at home	- 50 percent
• time spent at home for 100% exposure scenario	- 100 percent
• exposure routes	- inhalation of dust - ingestion of drinking water - ingestion of soil

Recreational Visitor

• weight	- 70 kg
• inhalation rate	- 20 m^3/day
• water ingestion rate from ponded surface water	- 5 ml/day
• soil ingestion rate	- 12.5 mg/day
• duration of exposure	- 1 hr/visit
• exposure incidence	- 100 visits/lifetime

TABLE 15 (cont'd)

ASSUMPTIONS FOR EXPOSURE SCENARIOS

Recreational Visitor (cont.)

• exposure routes	- inhalation of dust - ingestion of ponded surface water in tidal marsh - ingestion of surface soil in upper 1.5 foot of tidal marsh and levee

Child

• weight	- 10 kg
• inhalation rate	- 10 m^3/day
• ponded surface water ingestion rate	- 5 ml/day
• soil ingestion rate	- 200 mg/day
• duration of exposure	- 4 hrs/visit
• exposure incidence	- 1 visit/lifetime
• exposure routes	- inhalation of dust - ingestion of ponded surface water - ingestion of soil

TABLE 16

ESTIMATED SUB-CHRONIC DAILY INTAKES
1990 Bay Road Site and Vicinity

Receptor	Exposure Route	Arsenic	Cadmium	Lead	Mercury	Selenium
Sandoz Employee	Inhalation					
	Background[1]	4.29E-07	2.86E-07	1.43E-04	0.00E+00	0.00E+00
	Average[2]	1.86E-06	3.19E-07	1.43E-04	8.57E-09	4.29E-09
	Upper Bound[3]	6.14E-06	4.17E-07	1.44E-04	3.43E-08	1.71E-08
Construction Worker	Inhalation					
	Background	4.29E-07	2.86E-07	1.43E-04	0.00E+00	0.00E+00
	Average	1.43E-03	3.31E-05	4.99E-04	8.57E-06	4.29E-06
	Upper Bound	7.14E-03	1.65E-04	1.92E-03	4.29E-05	2.14E-05
	Ingestion-surface water					
	Background	2.14E-07	7.86E-09	2.14E-09	1.43E-08	6.43E-09
	Average	3.50E-04	7.86E-08	5.00E-08	2.14E-08	3.50E-06
	Upper Bound	1.07E-03	1.43E-07	2.14E-07	9.29E-07	1.93E-05
	Ingestion-soil					
	Background	1.29E-05	1.07E-06	3.57E-05	2.86E-06	2.86E-06
	Average	1.43E-03	3.29E-05	3.56E-04	8.57E-06	4.29E-06
	Upper Bound	7.14E-03	1.64E-04	1.78E-03	4.29E-05	2.14E-05
Maximally Impacted Resident	Inhalation					
	Background	8.57E-07	5.71E-07	2.86E-04	0.00E+00	0.00E+00
	Average	1.43E-06	5.85E-07	2.86E-04	3.43E-09	1.71E-09
	Upper Bound	4.00E-06	6.44E-07	2.86E-04	1.89E-08	9.43E-09

TABLE 16 (cont'd)

ESTIMATED SUB-CHRONIC DAILY INTAKES

Receptor	Exposure Route	Arsenic	Cadmium	Lead	Mercury	Selenium
Maximally Impacted Resident (cont'd)	Ingestion-surface soil					
	Background	1.29E-05	1.07E-06	3.57E-05	2.86E-06	2.86E-06
	Average	1.29E-05	1.07E-06	3.57E-05	2.86E-06	2.86E-06
	Upper Bound	1.29E-05	1.07E-06	3.57E-05	2.86E-06	2.86E-06
	Ingestion-water					
	Background	5.71E-05	2.86E-05	0.00E+00	0.00E+00	0.00E+00
	Average	5.71E-05	2.86E-05	0.00E+00	0.00E+00	0.00E+00
	Upper Bound	5.71E-05	2.86E-05	0.00E+00	0.00E+00	0.00E+00
Child	Ingestion-soil					
	Background	1.80E-04	1.50E-05	5.00E-04	4.00E-05	4.00E-05
	Average	2.10E-02	4.83E-04	5.23E-03	1.26E-04	6.30E-05
	Upper Bound	1.08E+00	3.00E-02	2.60E-01	3.80E-02	2.00E-02
	Ingestion-surface water					
	Background	1.50E-06	5.50E-08	1.50E-08	1.00E-07	4.50E-08
	Average	2.45E-03	5.50E-07	3.50E-07	1.50E-07	2.45E-05
	Upper Bound	7.50E-03	1.00E-06	1.50E-06	6.50E-06	1.35E-04
	Inhalation					
	Background	5.00E-07	3.33E-07	1.67E-04	0.00E+00	0.00E+00
	Average	2.17E-06	3.72E-07	1.67E-04	1.00E-08	5.00E-09
	Upper Bound	7.17E-06	4.87E-07	1.68E-04	4.00E-08	2.00E-09

TABLE 16 (cont'd)

ESTIMATED SUB-CHRONIC DAILY INTAKES

Receptor	Exposure Route	Arsenic	Cadmium	Lead	Mercury	Selenium
Recreational Visitor	Ingestion-surface soil					
	Background	1.61E-06	1.34E-07	4.46E-06	3.57E-07	3.57E-07
	Average	6.79E-06	1.56E-07	1.69E-06	4.07E-08	2.04E-08
	Upper Bound	1.70E-05	3.90E-07	4.22E-06	1.02E-07	5.09E-08
	Ingestion-surface water					
	Background	2.14E-07	7.86E-09	2.14E-09	1.43E-08	6.43E-09
	Average	4.50E-07	3.57E-08	1.79E-07	1.43E-08	1.71E-08
	Upper Bound	6.36E-07	7.14E-08	3.57E-07	2.86E-08	2.29E-08
	Inhalation					
	Background	3.56E-08	2.37E-08	2.86E-04	0.00E+00	0.00E+00
	Average	1.54E-07	2.64E-08	1.19E-05	7.11E-10	3.56E-10
	Upper Bound	5.10E-07	2.46E-08	1.20E-05	2.85E-09	1.42E-09

---

[1] Background risks were calculated based on concentrations and exposure scenarios listed in Tables 14 and 15, respectively, and do not include risks due to exposure to other compounds that are not of concern at the site.

[2] Sub-chronic daily intake calculated using average concentrations in exposure medium.

[3] Sub-chronic daily intake calculated using upper bound concentrations in exposure medium.

TABLE 17

HEALTH-BASED CRITERIA
1990 Bay Road Site and Vicinity

	ORAL ROUTE				INHALATION ROUTE			
Chemical	TDI (mg/kg/day)	Ref	Potency Factor (mg/kg/day)	Ref	TDI (mg/kg/day)	Ref	Potency Factor (mg/kg/day)	Ref
Arsenic	1.0E-02	4	1.8+00	1	1.4E-03	4	1.5E+01	2
Cadmium	1.0E-03	3	NC		2.0E-02	5	6.1E+00	1
Lead	Child 2.0E-03	6	NC		Child 2.0E-03	7	NC	
	Adult 6.0E-04	6	NC		Adult 6.0E-04	7	NC	
Mercury	2.0E-03	3	NC		5.1E-05	7	NC	
Selenium	3.0E-03	3	NC		1.0E-03	3	NC	

NOTES:

TDI = Tolerable Daily Intake
NC = Non-carcinogenic by specific route.

REFERENCES:

1. U.S. EPA, Integrated Risk Information System (IRIS), October 1988.
2. U.S. EPA, Integrated Risk Information System (IRIS), October 1988. Derived from the inhalation unit risk assuming 100% adsorption.
3. U.S. EPA, Public Health Risk Evaluation Database (PHRED), July 1988.
4. ATSDR, Draft Toxicological Profile for Arsenic, November 1987. See Appendix K, Table K-9, for details.
5. ATSDR, Draft Toxicological Profile for Cadmium, November 1987. See Appendix K, Table K-9, for details.
6. U.S. EPA, 1985e, National Primary Drinking Water Regulations, Synthetic Organic Chemicals, Inorganic Chemicals and Microorganisms, proposed rule, FR 50:46936-47025.
7. Same as oral RfD.

TABLE 18

SUMMARY OF RISK ASSESSMENT CALCULATIONS
HAZARD INDICES
1990 Bay Road Site and Vicinity

		Hazard Index					
Receptor	Exposure Route	Arsenic	Cadmium	Lead	Mercury	Selenium	Total
Sandoz Employee	Inhalation						
	Background	<0.1	<0.1	0.2	<0.1	<0.1	0.2
	Average[1]	<0.1	<0.1	0.2	<0.1	<0.1	0.2
	Upper Bound[2]	<0.1	<0.1	0.2	<0.1	<0.1	0.2
Construction Worker	Inhalation						
	Background	<0.1	<0.1	0.2	<0.1	<0.1	0.2
	Average	1.0	<0.1	0.8	0.2	<0.1	2.0
	Upper Bound	5.1	<0.1	3.2	0.8	<0.1	9.2
	Ingestion-surface water						
	Background	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Average	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Upper Bound	0.1	<0.1	<0.1	<0.1	<0.1	0.1
	Ingestion-soil						
	Background	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Average	0.1	<0.1	0.6	<0.1	<0.1	0.8
	Upper Bound	0.7	0.2	3.0	<0.1	<0.1	3.9
	Total[3]						
	Background	<0.1	<0.1	0.2	<0.1	<0.1	0.2
	Average	1.1	<0.1	1.4	0.2	<0.1	2.8
	Upper Bound	5.9	0.2	6.2	0.8	<0.1	13.2

TABLE 18 (cont'd)

SUMMARY OF RISK ASSESSMENT CALCULATIONS
HAZARD INDICES

Receptor	Exposure Route	Arsenic	Cadmium	Lead	Mercury	Selenium	Total
Maximally Impacted Resident	Inhalation						
	Background	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Average	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Upper Bound	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Ingestion-surface soil						
	Background	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Average	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Upper Bound	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ingestion-water						
	Background	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Average	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Upper Bound	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Total						
	Background	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Average	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Upper Bound	<0.1	<0.1	0.5	<0.1	<0.1	0.5
Child	Ingestion-soil						
	Background	<0.1	<0.1	0.3	<0.1	<0.1	0.3
	Average	2.1	0.5	2.6	<0.1	<0.1	5.3
	Upper Bound	108.0	30.0	130.0	19.0	6.7	293.7

TABLE 18 (cont'd)

SUMMARY OF RISK ASSESSMENT CALCULATIONS
HAZARD INDICES

Receptor	Exposure Route	Arsenic	Cadmium	Lead	Mercury	Selenium	Total
Child (cont'd)	Ingestion-surface water						
	Background	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Average	0.2	<0.1	<0.1	<0.1	<0.1	0.3
	Upper Bound	0.8	<0.1	<0.1	<0.1	<0.1	0.8
	Inhalation						
	Background	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Average	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Upper Bound	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Total						
	Background	<0.1	<0.1	0.8	<0.1	<0.1	0.8
	Average	2.3	0.5	3.1	<0.1	<0.1	6.1
	Upper Bound	108.8	30.0	130.5	19.0	6.7	295.0
Recreational Visitor	Ingestion-surface soil						
	Background	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Average	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Upper Bound	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ingestion-surface water						
	Background	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Average	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Upper Bound	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

TABLE 18 (cont'd)

SUMMARY OF RISK ASSESSMENT CALCULATIONS
HAZARD INDICES

Receptor	Exposure Route	Arsenic	Cadmium	Lead	Mercury	Selenium	Total
Recreational Visitor (cont'd)	Inhalation						
	Background	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Average	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Upper Bound	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Total						
	Background	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Average	<0.1	<0.1	0.5	<0.1	<0.1	0.5
	Upper Bound	<0.1	<0.1	0.5	<0.1	<0.1	0.5

---

[1] Hazard index calculated using average concentrations in exposure medium.

[2] Hazard index calculated using upper bound concentrations in exposure medium.

[3] Total hazard index for all exposure routes.

TABLE 19

SUMMARY OF RISK ASSESSMENT CALCULATIONS
CANCER RISKS
1990 Bay Road Site and Vicinity

Receptor	Exposure Route	Incremental Cancer Risk
Sandoz Employee	Inhalation[1]	
	Background	2.8E-06
	Average[2]	7.4E-06
	Upper Bound[3]	3.0E-05
Construction Worker	Inhalation	
	Background	3.2E-09
	Average	8.5E-06
	Upper Bound	4.2E-05
	Ingestion-surface water	
	Background	1.5E-10
	Average	2.5E-07
	Upper Bound	7.6E-07
	Ingestion-soil	
	Background	9.1E-09
	Average	9.9E-07
	Upper Bound	5.0E-06
	Total[4]	
	Background	1.2E-08
	Average	9.7E-06
	Upper Bound	4.8E-05
Maximally Impacted Resident	Inhalation	
	Background	1.6E-05
	Average	4.3E-06
	Upper Bound	2.4E-05
	100% Exposure	8.7E-06
	Ingestion-surface soil	
	Background	2.3E-05
	Average	0.0E+00
	Upper Bound	0.0E+00
	Ingestion-water	
	Background	1.0E-04
	Average	0.0E+00
	Upper Bound	0.0E+00

TABLE 19 (cont'd)

SUMMARY OF RISK ASSESSMENT CALCULATIONS
CANCER RISKS

Receptor	Exposure Route	Incremental Cancer Risk
Maximally Impacted Resident (cont'd)	Total	
	Background	1.4E-04
	Average	4.3E-06
	Upper Bound	2.4E-05
	100% Exposure	8.7E-06
Child	Ingestion-soil	
	Background	1.3E-08
	Average	1.5E-06
	Upper Bound	7.6E-05
	Ingestion-surface water	
	Background	1.1E-10
	Average	1.7E-07
	Upper Bound	5.3E-07
	Inhalation	
	Background	6.2E-11
	Average	1.7E-10
	Upper Bound	6.6E-09
	Total	
	Background	1.3E-08
	Average	1.7E-06
	Upper Bound	7.7E-05
Recreational Visitor	Ingestion-surface soil	
	Background	1.1E-08
	Average	3.7E-08
	Upper Bound	1.1E-07
	Ingestion-surface water	
	Background	1.5E-09
	Average	1.7E-09
	Upper Bound	3.0E-09
	Inhalation	
	Background	1.1E-10
	Average	2.9E-10
	Upper Bound	1.2E-09

TABLE 19 (cont'd)

SUMMARY OF RISK ASSESSMENT CALCULATIONS
CANCER RISKS

Receptor	Exposure Route	Incremental Cancer Risk
Recreational Visitor (cont'd)	Total	
	Background	1.3E-08
	Average	3.9E-08
	Upper Bound	1.1E-07

---

[1] Background risks were calculated based on concentrations and exposure scenarios listed in Tables 14 and 15, respectively, and do not include risks due to exposure to other compounds that are not of concern at the site.

[2] Cancer risk calculated using average concentrations in exposure medium.

[3] Cancer risk calculated using upper bound concentrations in exposure medium.

[4] Total cancer risk for all exposure routes at background concentrations and total incremental cancer risk for all exposure routes at average and upper bound concentrations.

Reference: Palo Alto (1961) and Hayward (1959) Quadrangles, California, 15 minute Series (Topographic), United States Department of the Interior, Geological Survey.

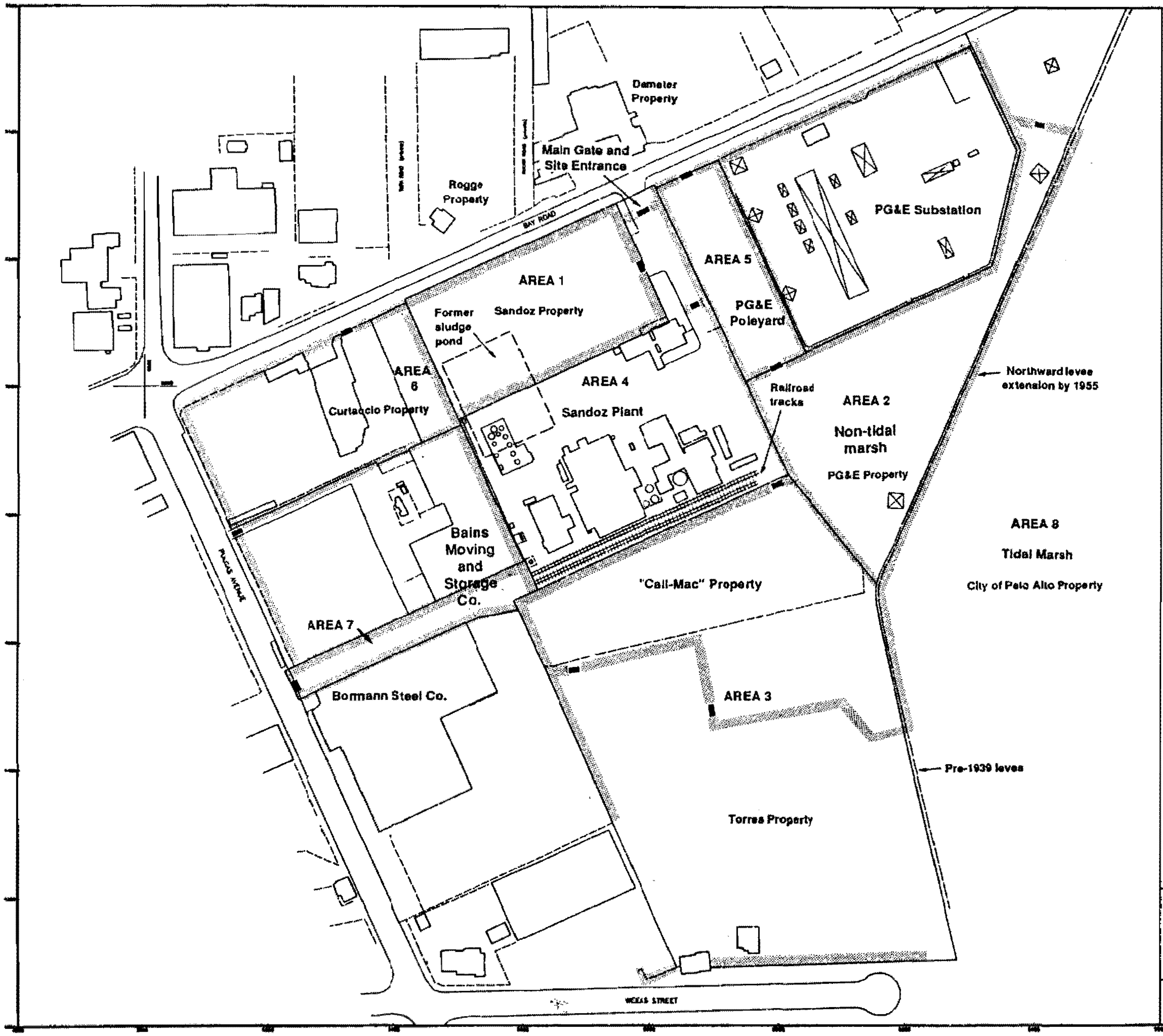
0 3000 6000 12000 Ft.

GEOMATRIX

SITE AND VICINITY LOCATION MAP
1990 Bay Road Site and Vicinity
East Palo Alto, California

Figure
1

Project No.
1220A-1500



EXPLANATION

▨ Security fence and gate

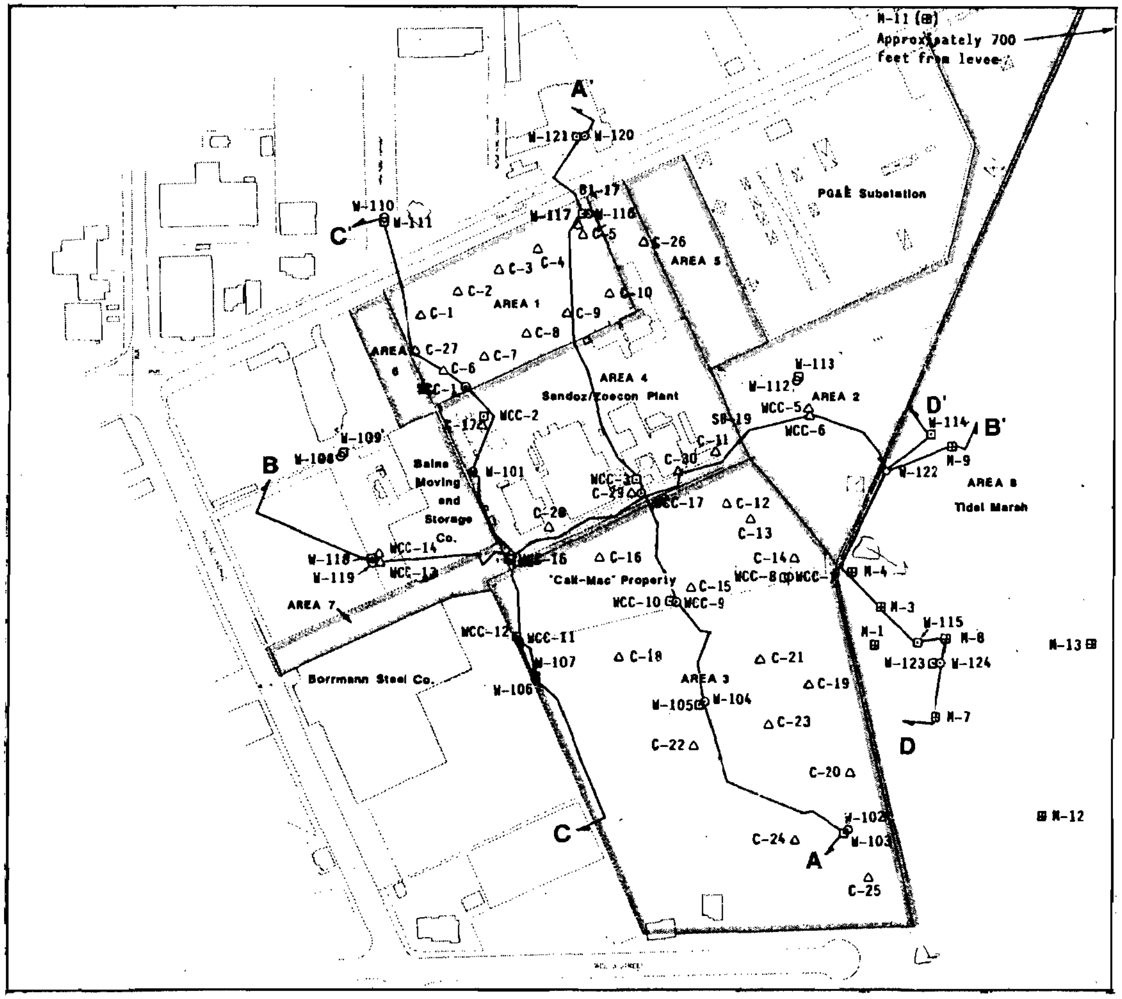
Notes

1. Base map adapted from Aelytek, Inc. map of 1990 Bay Road and Vicinity, based on aerial photographs taken on December 11, 1985 and April 18, 1986, and computer generated by Freeman, Sullivan & Company.
2. Project cooordinate system based on 5000N, 5000E at intersection of Bay Road and Pulgas Avenue.

SITE AREA DESIGNATIONS
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX

Project No.	Figure
1220A-1500	2



EXPLANATION

Monitoring Network Wells:

W-103 ⊡	Upper Shallow Zone monitoring well
W-102 ⊙	Lower Shallow Zone monitoring well
W-101 ○	Deep Zone monitoring well

Other Wells:

M-1 ⊞	Marsh monitoring well
C-11 △	wells sampled at least once during 1981 to 1988 but not part of the monitoring network

Notes

1. Base map adapted from Aelyteck, Inc. map of 1990 Bay Road and Vicinity, based on aerial photographs made on December 11, 1985 and April 18, 1986.
2. Project coordinate system based on 500N, 500E at intersection of Bay Road and Pulgas Avenue.

0 200 Feet

GROUNDWATER MONITORING WELLS
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX

Project No.
1220A-1500

Figure
3

EXPLANATION

4 ——— Topographic contour (feet, NGVD)

➞ Direction of surface drainage

⌜‐‐‐⌝ Outline of topographic feature

▨ Site and vicinity area boundary

E ■ Tidal channel sampling location

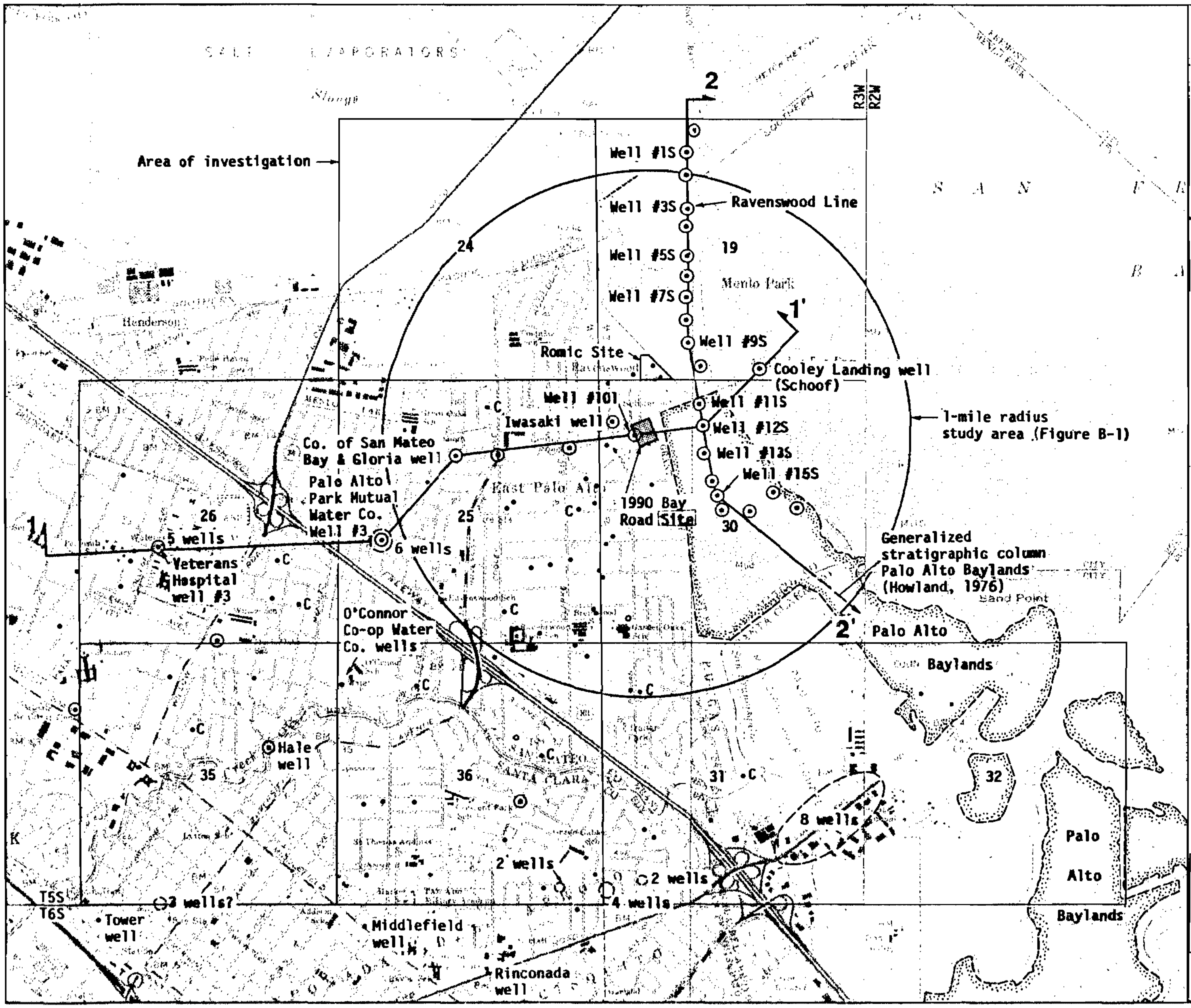
M-11 ⊡ Marsh well

NOTES

1. Base map with contours adapted from Aelytek, Inc. map of 1990 Bay Road and Vicinity, based on aerial photographs taken on December 11, 1985 and April 18, 1986, and computer generated by Freeman, Sullivan & Company.
2. Project coordinate system based on 5000N, 5000E at intersection of Bay Road and Pulgas Avenue.

SURFACE DRAINAGE PATTERNS
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	4



EXPLANATION

⊙	Deep well location (depth <175') with lithologic log available
•	Well location (depth <175' or unknown)
•C	Cathodic protection well
∘	Well locations from California Department of Water Resources, 1975
1 1'	Generalized geologic cross section line
36	Township and range section numbers

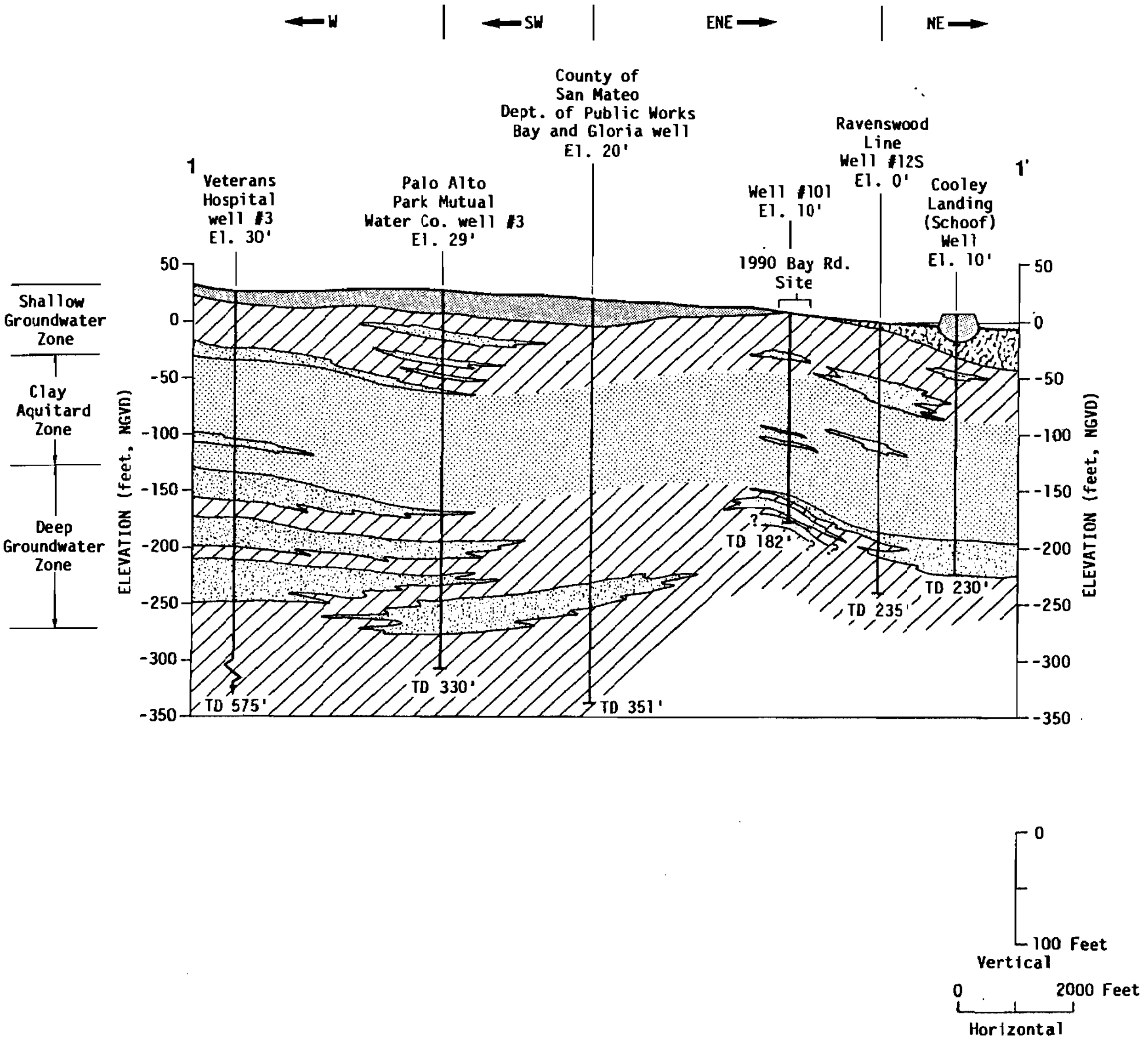
Notes
1. Geologic cross sections shown on Figures 6 and 7.
2. Base map adapted from Mountain View (1961) and Palo Alto (1961) quadrangles, 7.5 minute series (topographic), United States Department of the Interior, Geologic Survey.

0 2000 Feet

LOCATION OF GENERALIZED GEOLOGIC
CROSS SECTIONS AND OFF-SITE WELLS
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX

Project No.	Figure
1200A-1500	5



EXPLANATION

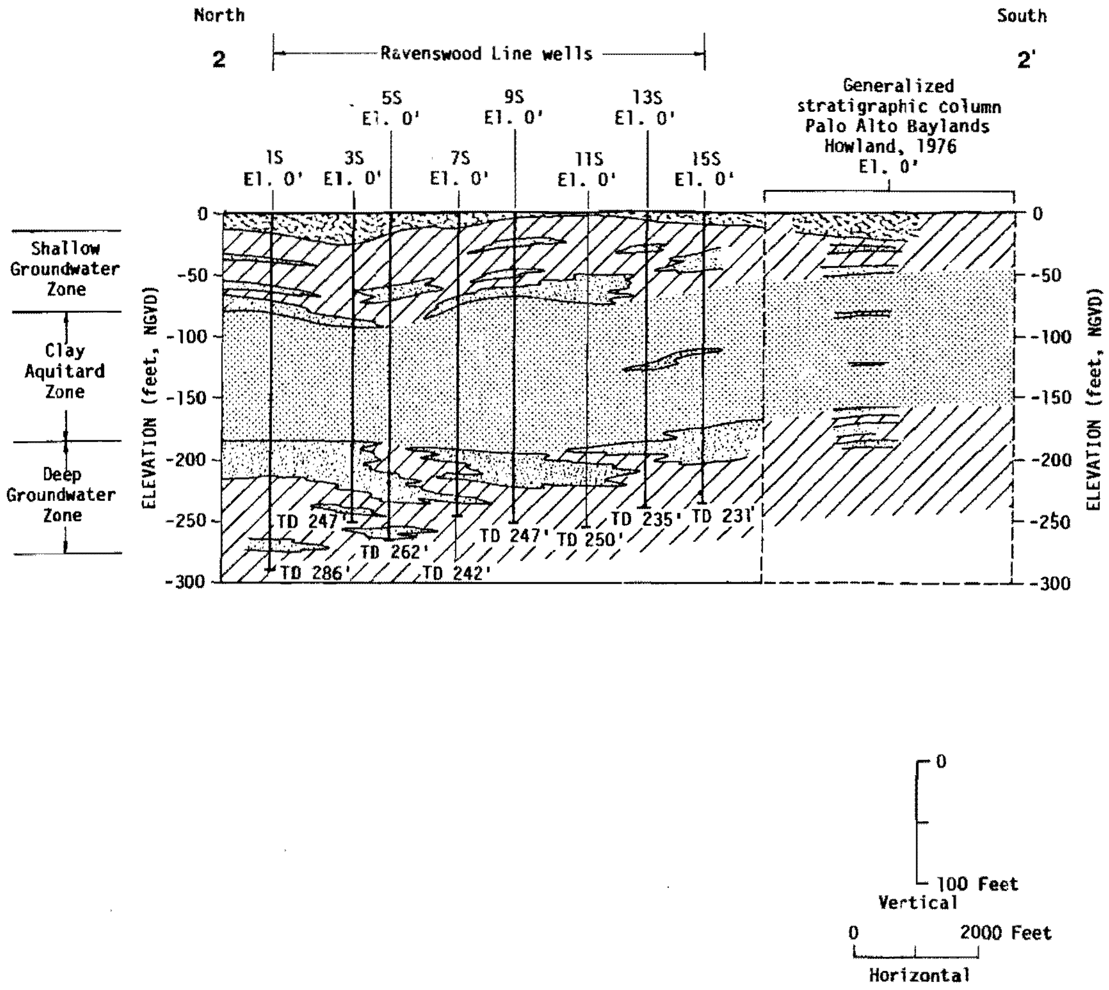
▨	Bay Mud
▒	Concrete, asphalt, fill, and/or "topsoil"
▨	Silty clay, sandy clay, and/or clayey silt
░	Silty/clayey sand and/or clean/gravelly sand
░	Approximate limits of clay aquitard; composed of silty clay, sandy clay, and/or clayey silt
TD 330'	Total reported drill depth of well (feet)

NOTES

1. The geologic units connected between wells have been inferred and are based on interpolation between widely spaced points and interpretation of work performed by others. The contacts between these units are shown as solid lines for clarity and are not meant to imply certainty. Refer to lithologic logs for details of subsurface conditions.
2. Section line shown on Figure 5.

GEOLOGIC CROSS SECTION 1-1'
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	6



EXPLANATION

▨ Bay Mud

▨ Silty clay, sandy clay, and/or clayey silt

▨ Silty/clayey sand and/or clean/gravelly sand

▨ Approximate limits of clay aquitard; composed of silty clay, sandy clay, and/or clayey silt

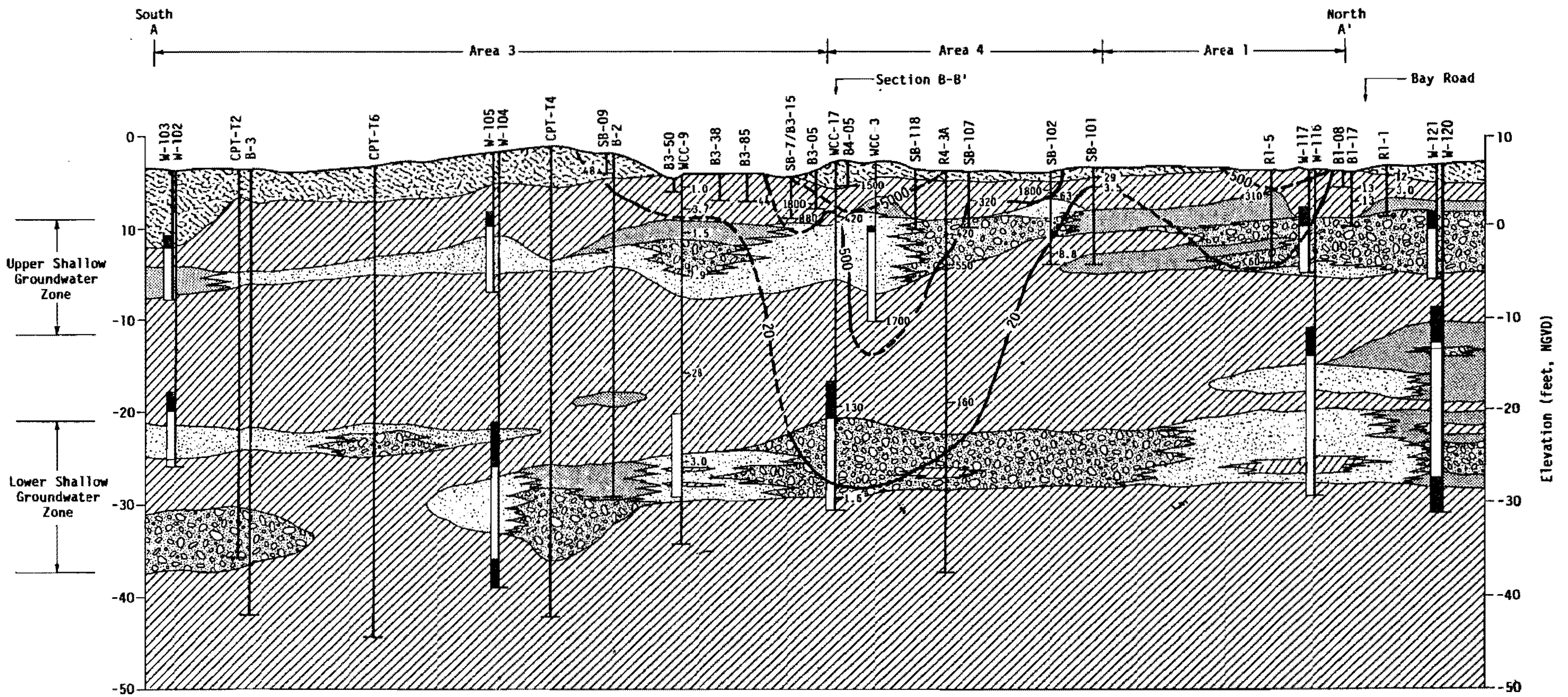
TD 330' Total reported drill depth of well (feet)

NOTES

1. The geologic units connected between wells have been inferred and are based on interpolation between widely spaced points and interpretation of work performed by others. The contacts between these units are shown as solid lines for clarity and are not meant to imply certainty. Refer to lithologic logs for details of subsurface conditions.
2. Section line shown on Figure 5.

GEOLOGIC CROSS SECTION 2-2'
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	7



EXPLANATION

▨	Concrete, asphalt, fill
▨	Clay, silty clay, sandy clay
▨	Sandy silt, clayey sand
▨	Silty sand
▨	Sand, gravel, sandy gravel, gravelly sand
▬ ▬	Contour of arsenic concentrations, dashed where inferred

10	Soil arsenic concentrations in mg/kg
	Sand pack interval
	Perforated interval
	Bottom of boring

Notes

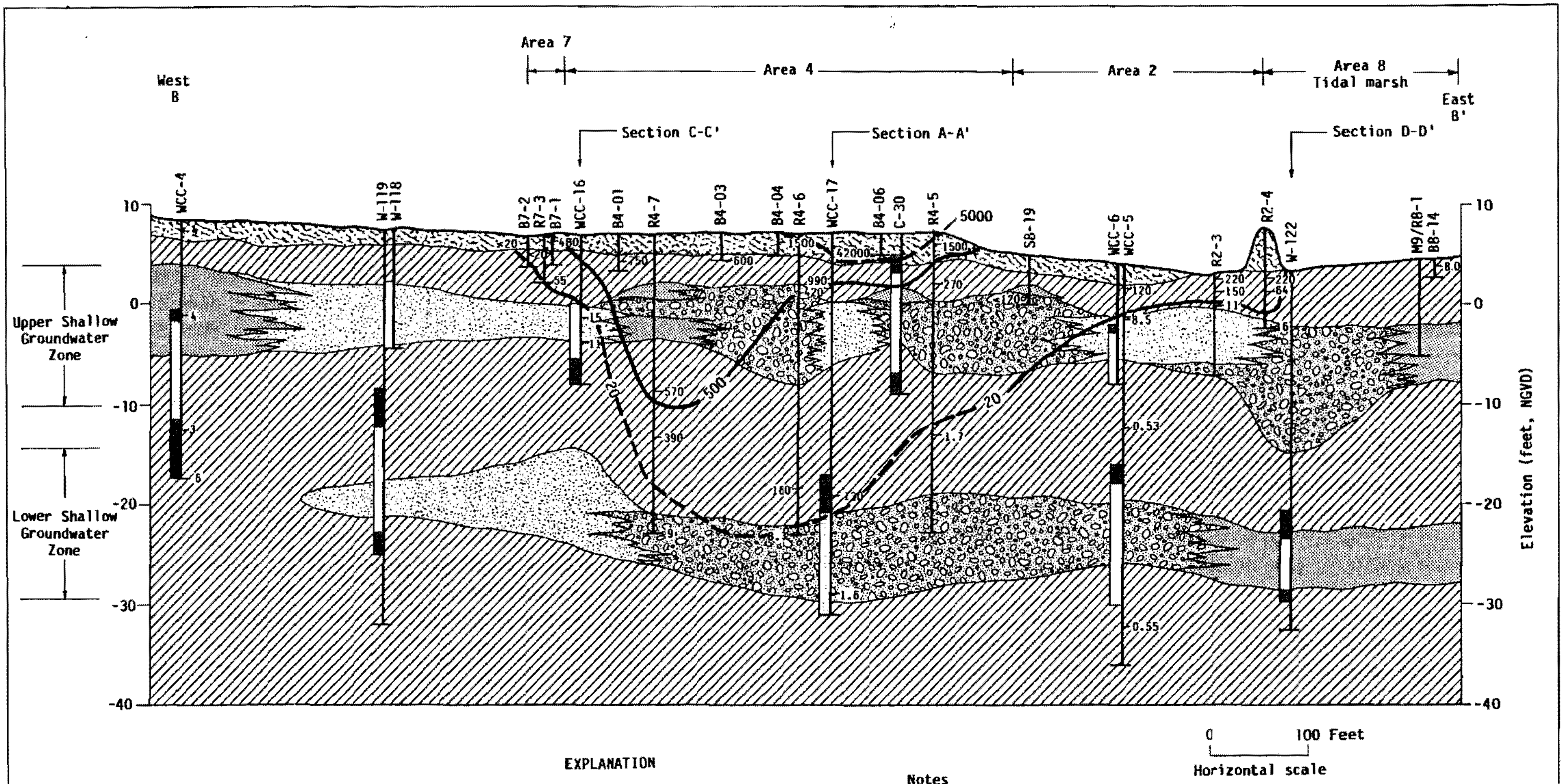
1. The geologic units connected between borings have been inferred and are based on interpolation between widely spaced points and, in part, on work performed by others. The contacts between these units are shown as solid lines for clarity and are not meant to imply certainty. Refer to lithologic logs for details of subsurface conditions.
2. Section line shown on Figure 3.
3. A complete listing of soil arsenic concentrations is presented in Appendices D and E. Only selected values are shown on this figure.

0 100 Feet
Horizontal scale

HYDROGEOLOGIC CROSS SECTION A-A'
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX

Project No.	Figure
1220A-1500	8



EXPLANATION

- ▨ Concrete, asphalt, fill
- ▨ Clay, silty clay, sandy clay
- ▨ Sandy silt, clayey sand
- ▨ Silty sand
- ▨ Sand, gravel, sandy gravel, gravelly sand
- — — Contour of arsenic concentrations, dashed where inferred

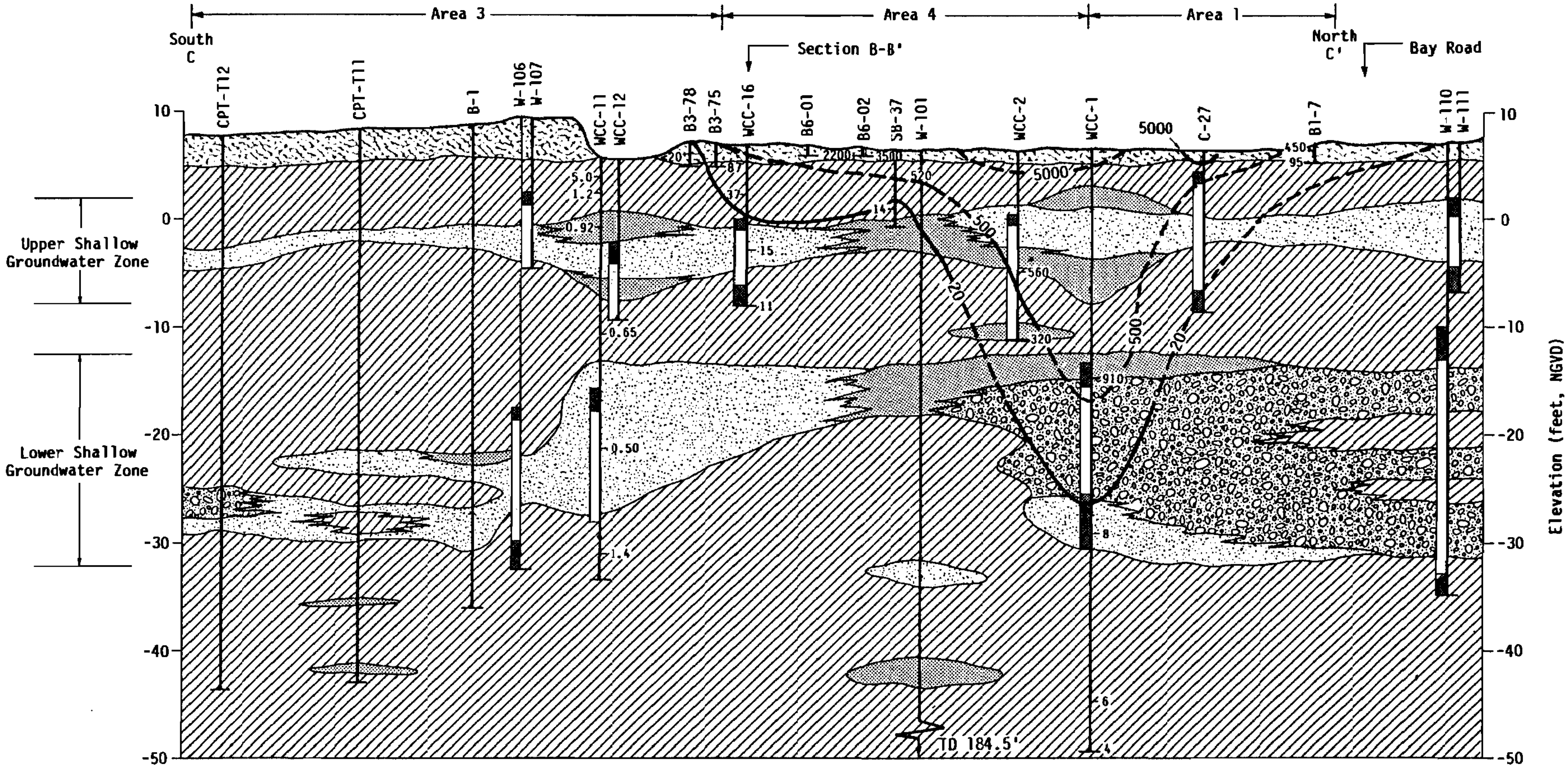
- 10 Soil arsenic concentrations in mg/kg
- Sand pack interval
- Perforated interval
- Bottom of boring

Notes

1. The geologic units connected between borings have been inferred and are based on interpolation between widely spaced points and, in part, on work performed by others. The contacts between these units are shown as solid lines for clarity and are not meant to imply certainty. Refer to lithologic logs for details of subsurface conditions.
2. Section line shown on Figure 3.
3. A complete listing of soil arsenic concentrations is presented in Appendices D and E. Only selected values are shown on this figure.

HYDROGEOLOGIC CROSS SECTION B-B'
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	9



EXPLANATION

▨ Concrete, asphalt, fill

▨ Clay, silty clay, sandy clay

▨ Sandy silt, clayey sand

▨ Silty sand

▨ Sand, gravel, sandy gravel, gravelly sand

— — — Contour of arsenic concentrations, dashed where inferred

10 Soil arsenic concentrations in mg/kg

Sand pack interval

Perforated interval

Bottom of boring

Notes

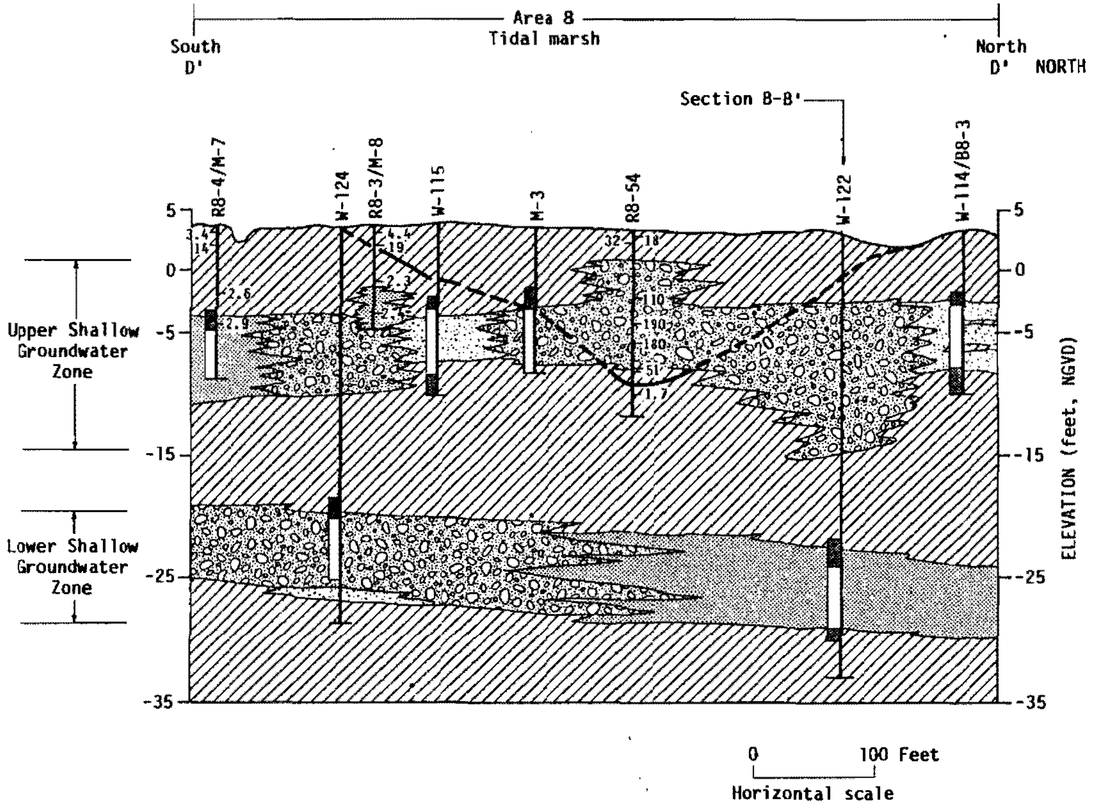
1. The geologic units connected between borings have been inferred and are based on interpolation between widely spaced points and, in part, on work performed by others. The contacts between these units are shown as solid lines for clarity and are not meant to imply certainty. Refer to lithologic logs for details of subsurface conditions.
2. Section line shown on Figure 3.
3. A complete listing of soil arsenic concentrations is presented in Appendices D and E. Only selected values are shown on this figure.

0 100 Feet
Horizontal scale

HYDROGEOLOGIC CROSS SECTION C-C'
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX

Project No.	Figure
1220A-1500	10



EXPLANATION

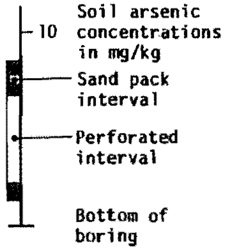
▨ Clay, silty clay, sandy clay

▩ Sandy silt, clayey sand

░ Silty sand

▦ Sand, gravel, sandy gravel, gravelly sand

— — — Contour of arsenic concentrations, dashed where inferred

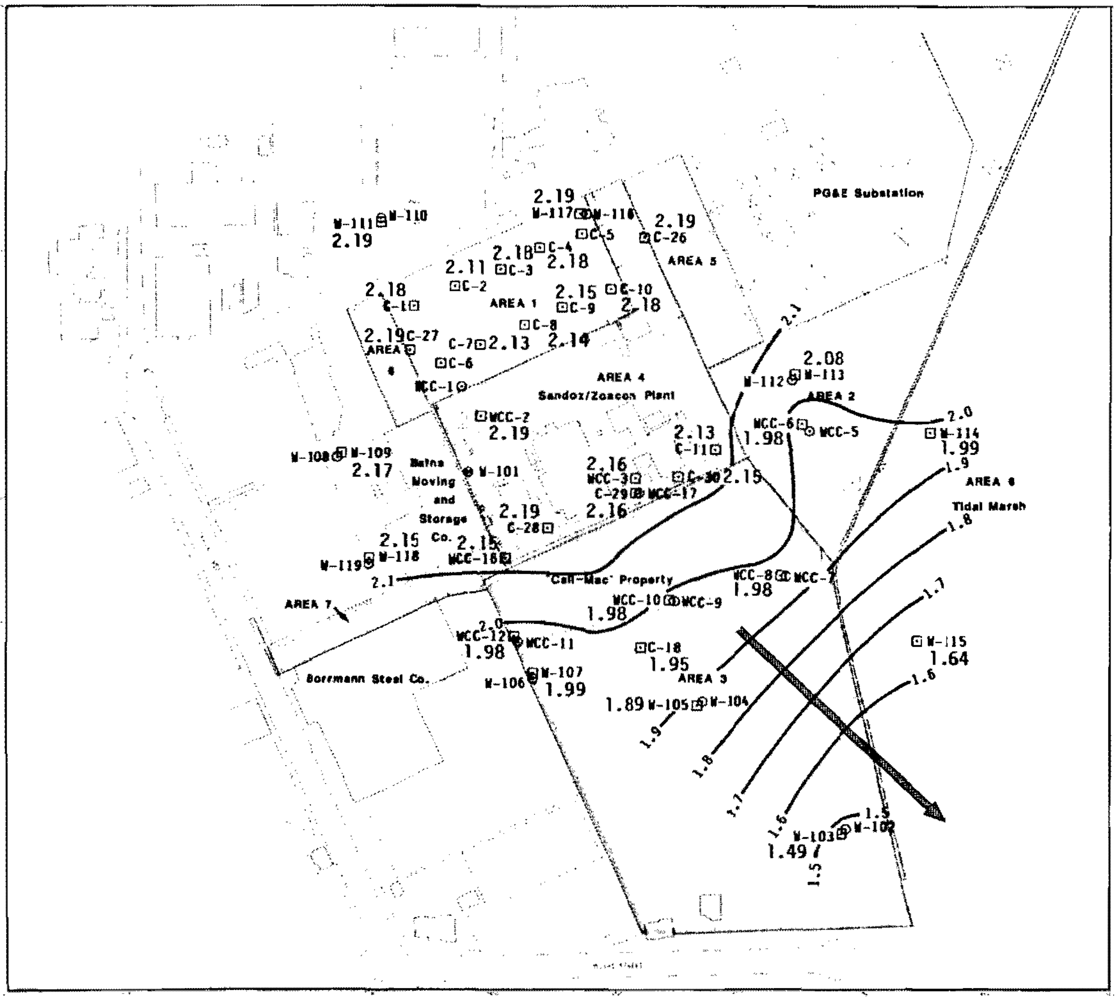


Notes

1. The geologic units connected between borings have been inferred and are based on interpolation between widely spaced points and, in part, on work performed by others. The contacts between these units are shown as solid lines for clarity and are not meant to imply certainty. Refer to lithologic logs for details of subsurface conditions.
2. Section line shown on Figure 3.
3. A complete listing of soil arsenic concentrations is presented in Appendices D and E. Only selected values are shown on this figure.

HYDROGEOLOGIC CROSS SECTION D-D'
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No. 1220A-1500	Figure 11



EXPLANATION

W-103 ⊡	Upper Shallow Zone monitoring well
W-102 ⊙	Lower Shallow Zone monitoring well
W-101 ⊕	Deep Zone monitoring well
2.08	Water level elevation in well, feet
—— 2.0	Line of equal water-level elevation in feet
➡	Approximate direction of groundwater flow

NOTES

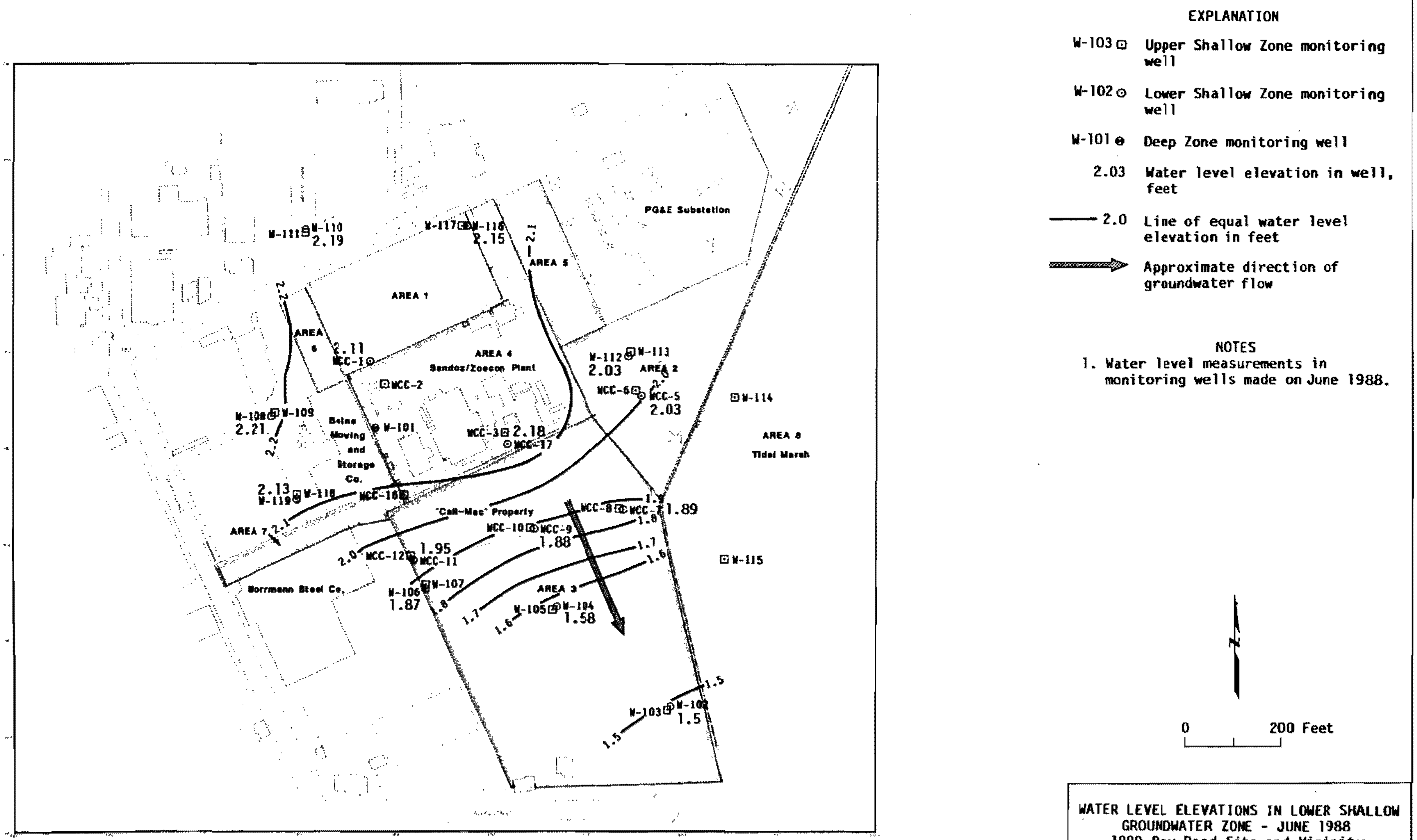
1. Water level measurements in monitoring wells made on June 1988.

N

0 200 Feet

WATER LEVEL ELEVATIONS IN UPPER SHALLOW GROUNDWATER ZONE - JUNE 1988
1990 Bay Road Site and Vicinity
East Palo Alto, California

	Project No.	Figure
GEOMATRIX	1220A-1500	12

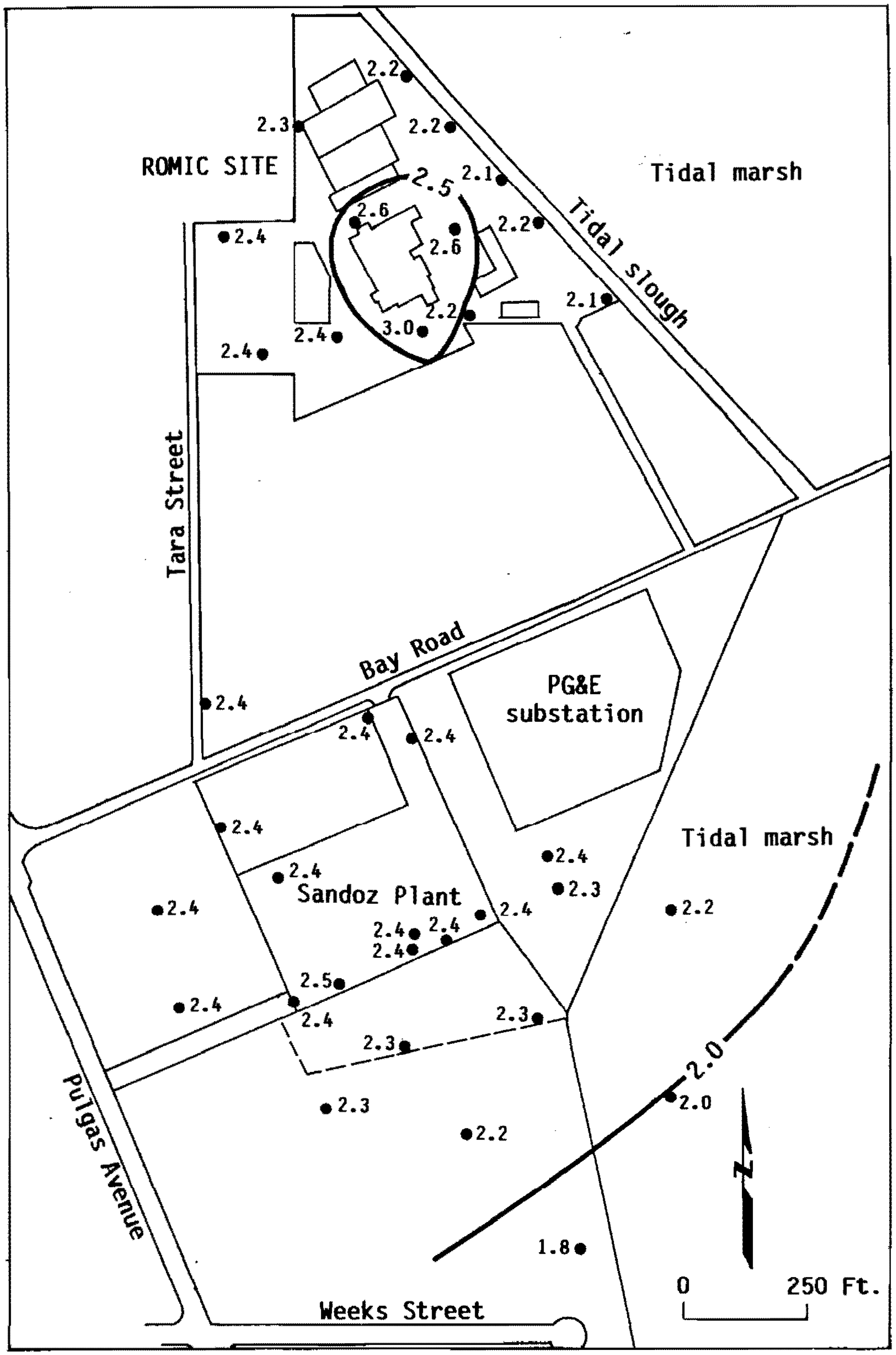


NOTES

1. Water level measurements in monitoring wells made on June 1988.

WATER LEVEL ELEVATIONS IN LOWER SHALLOW
GROUNDWATER ZONE - JUNE 1988
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	13



KEY

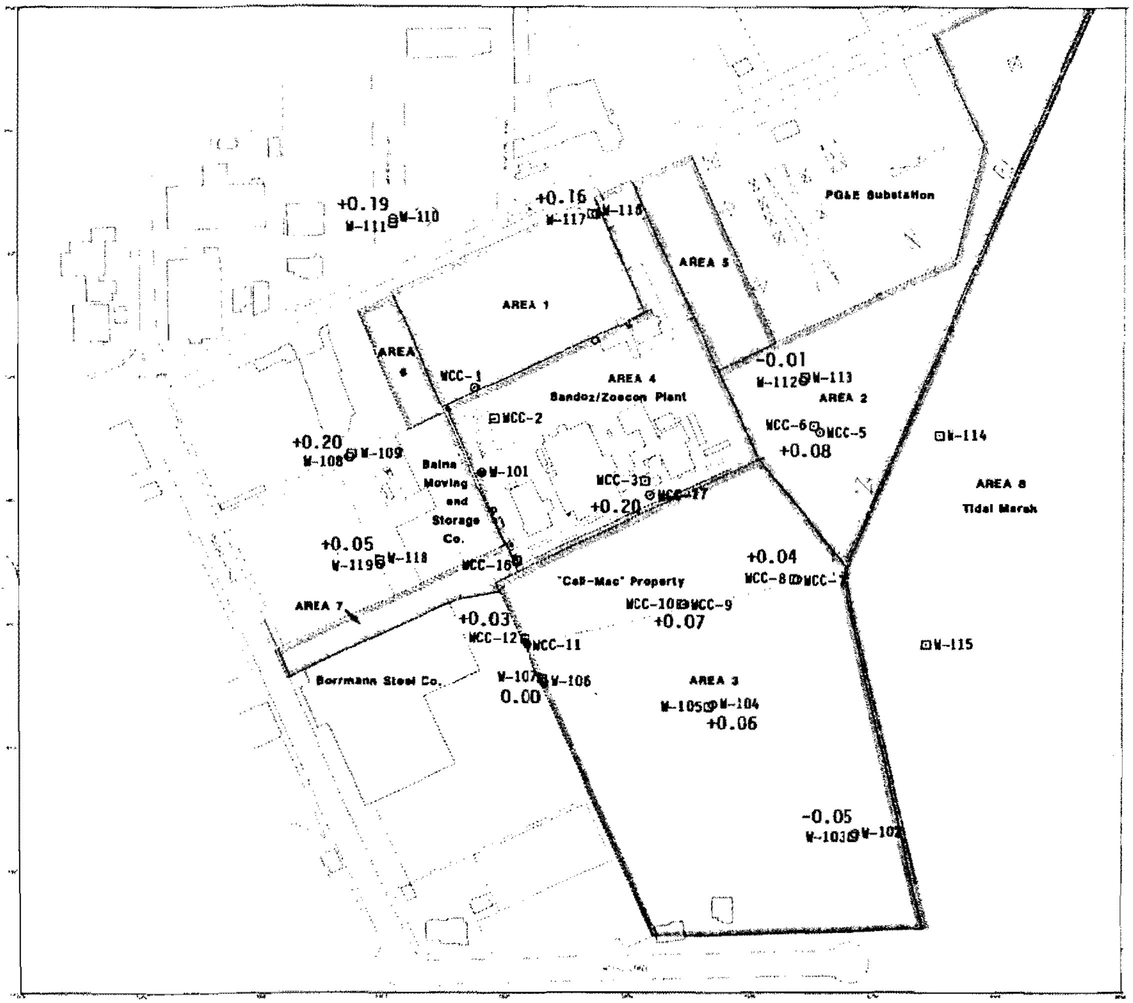
2.4 ● Water-level elevation in well NGVD. Wells on Romic Site measured on November 24, 1986 by Harding Lawson Associates, other wells measured December 8, 1986 by Geomatrix. Data from Romic Site adjusted to NGVD as shown on Table 1.

GEOMATRIX

WATER-LEVEL ELEVATIONS IN THE UPPER SHALLOW
GROUNDWATER ZONE - NOVEMBER-DECEMBER 1986
1990 Bay Road Site and Vicinity
East Palo Alto, California

Figure
14

Project No.
1220A-1500

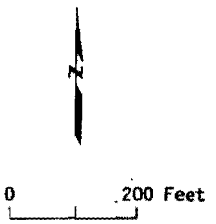


EXPLANATION

W-103⊡	Upper Shallow Zone monitoring well
W-102⊙	Lower Shallow Zone monitoring well
W-101●	Deep Zone monitoring well
-0.12	Difference in adjusted water levels, lower shallow groundwater zone minus upper shallow groundwater zone, in feet

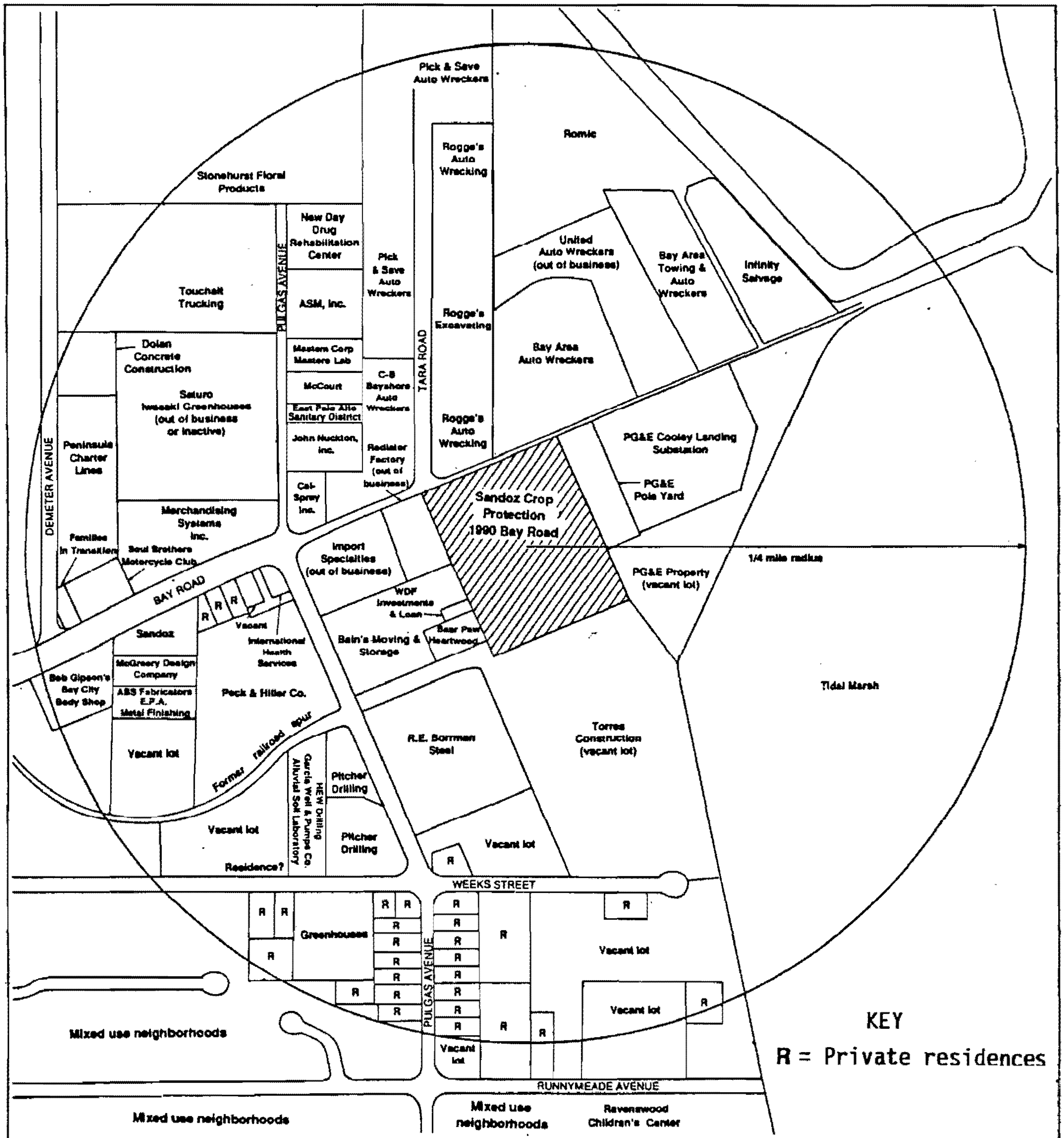
NOTES

1. Water levels were adjusted for density variations.



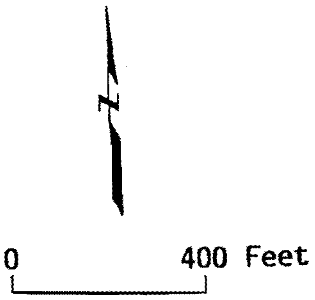
WATER LEVEL DIFFERENCES BETWEEN THE LOWER AND UPPER SHALLOW GROUNDWATER ZONES
JUNE 1988
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No. 1220A-1500	Figure 15



Notes

1. Map of 1990 Bay Road and vicinity based on aerial photographs from Pacific Aerial Photos made on December 11, 1985
2. See Table 12 for number of employees present at the facilities shown based on interviews conducted in October and November 1988.



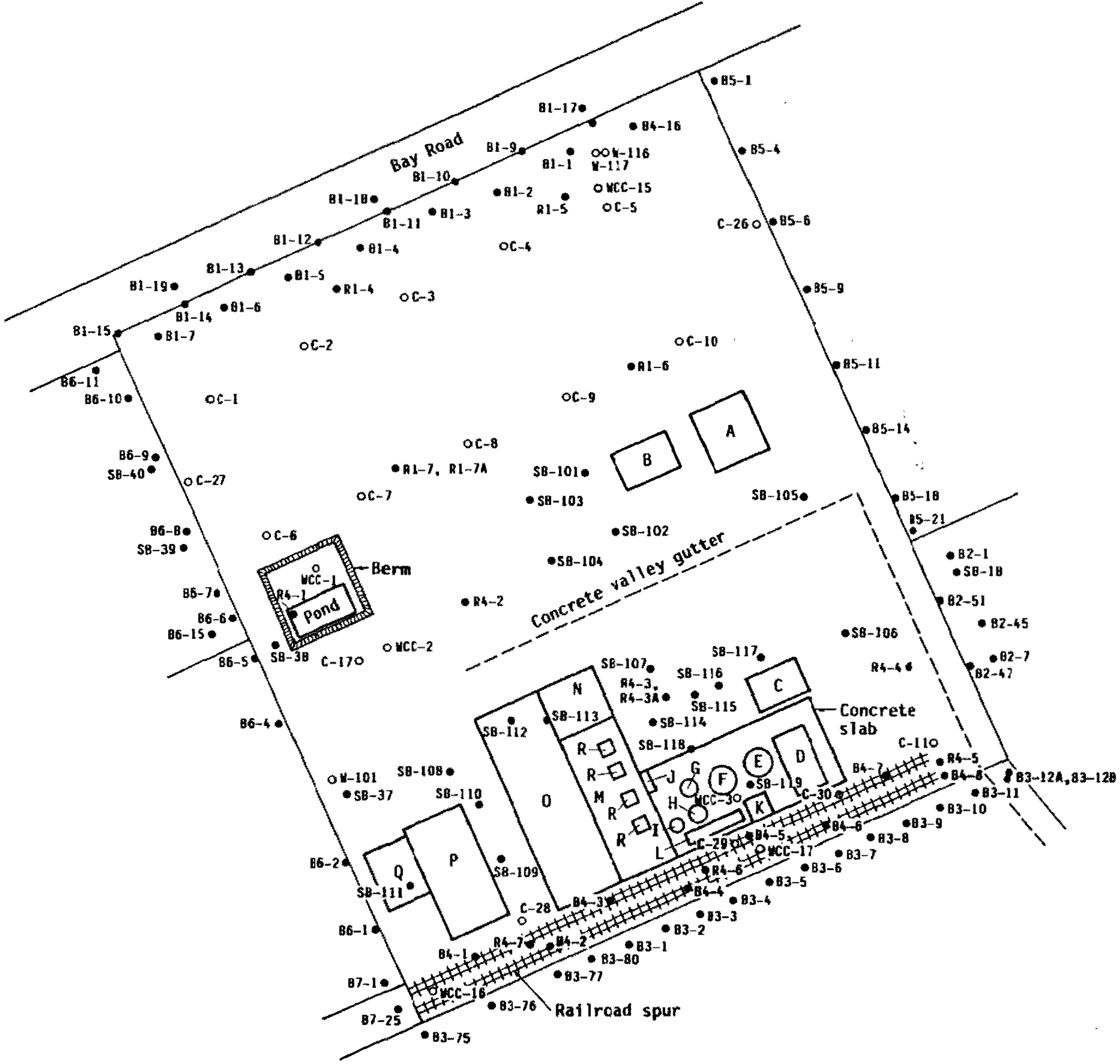
GEOMATRIX

SURVEY OF BUSINESSES AND RESIDENCES WITHIN A 1/4 MILE RADIUS OF THE 1990 BAY ROAD SITE

East Palo Alto, California

Figure 16

Project No. 1220A-1500



EXPLANATION

A = Office
B = Garage
C = Laboratory
D = Locker room and shower
E = 42,000 gallon tank
F = 42,000 gallon tank
G = 10,000 gallon tank
H = 10,000 tank
I = 4,700 gallon tank
J = 1,450 gallon tank
K = Pump house
L = Underground mixing tank ~ 25,000 gallons
M = Manufacturing and warehouse
N = Warehouse
O = Warehouse
P = Warehouse
Q = Raw materials storage
R = Mixing blenders
● Soil boring
○ Monitoring well

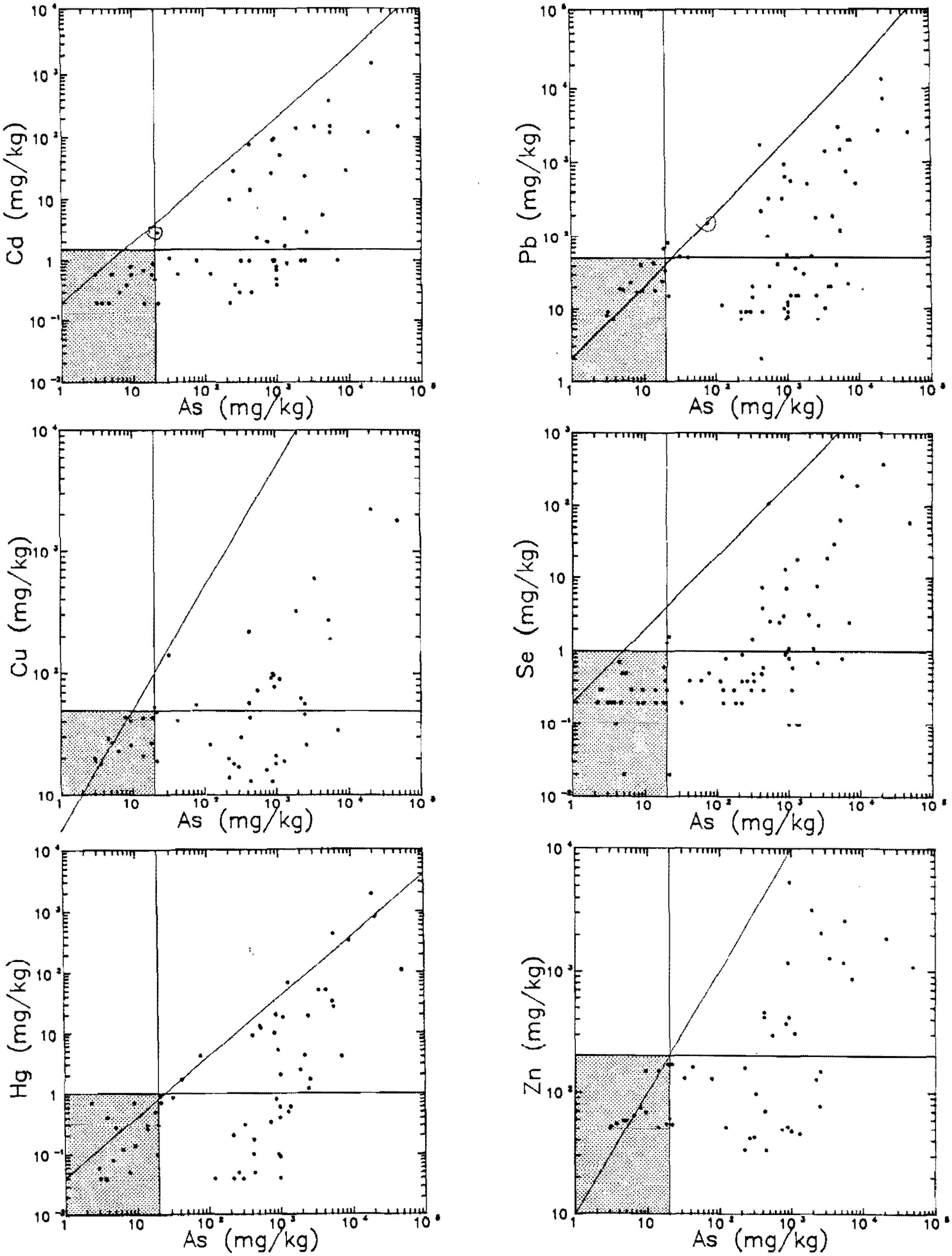
Notes

1. Plant was operated by Chipman Chemical Company, Inc. and Rhodia, Inc. during this period.
2. Layout is based on (a) property appraisal dated 15 April 1971, (b) aerial photos dated 8 June 1955 and 28 October 1969, and (c) employee interviews.

0 80 Feet

APPROXIMATE PLANT LAYOUT, 1955 - 1971;
SOIL BORINGS AND MONITORING WELLS
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	17



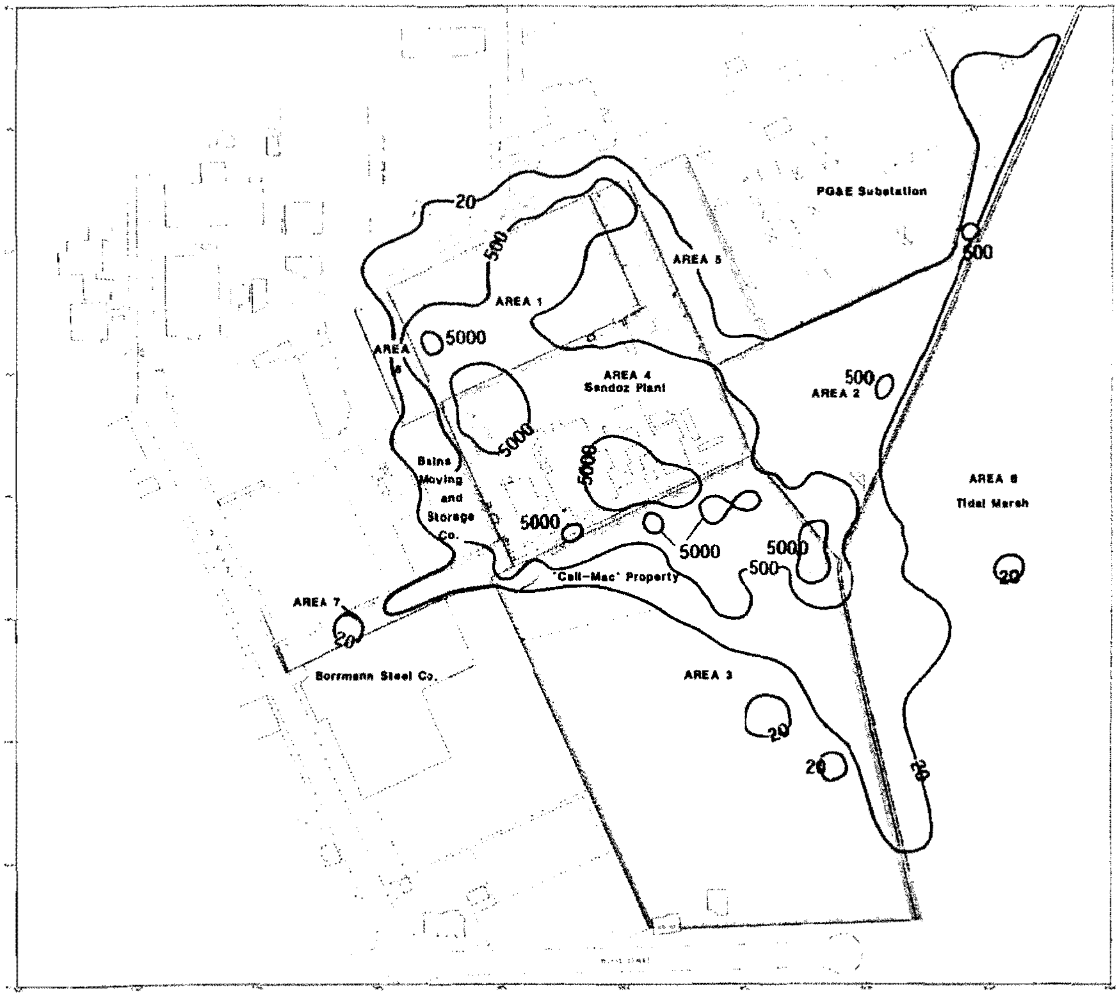
NOTE: The diagonal line on each graph is defined by the ratio of the TTLC of the compound to the TTLC of arsenic. In samples which plot below the line, arsenic poses the greater environmental hazard. In samples which plot above this line, the other element poses the greater hazard. Horizontal and vertical lines represent upper limit of background concentrations at the site. Data points inside the shaded area represent samples at background concentrations.

GEOMATRIX

SOIL CONCENTRATIONS OF SELECTED ELEMENTS
RELATIVE TO SOIL ARSENIC CONCENTRATIONS
1990 Bay Road Site and Vicinity
East Palo Alto, California

Figure
18

Project No.
1220A-1500



KEY

Contours delimiting area containing soil concentrations in excess of labeled concentration (mg/kg)

Note

Contours based on soil boring data presented in Appendices D and E.

215,000 ft^2
7500 [illegible]
1.5 x 15

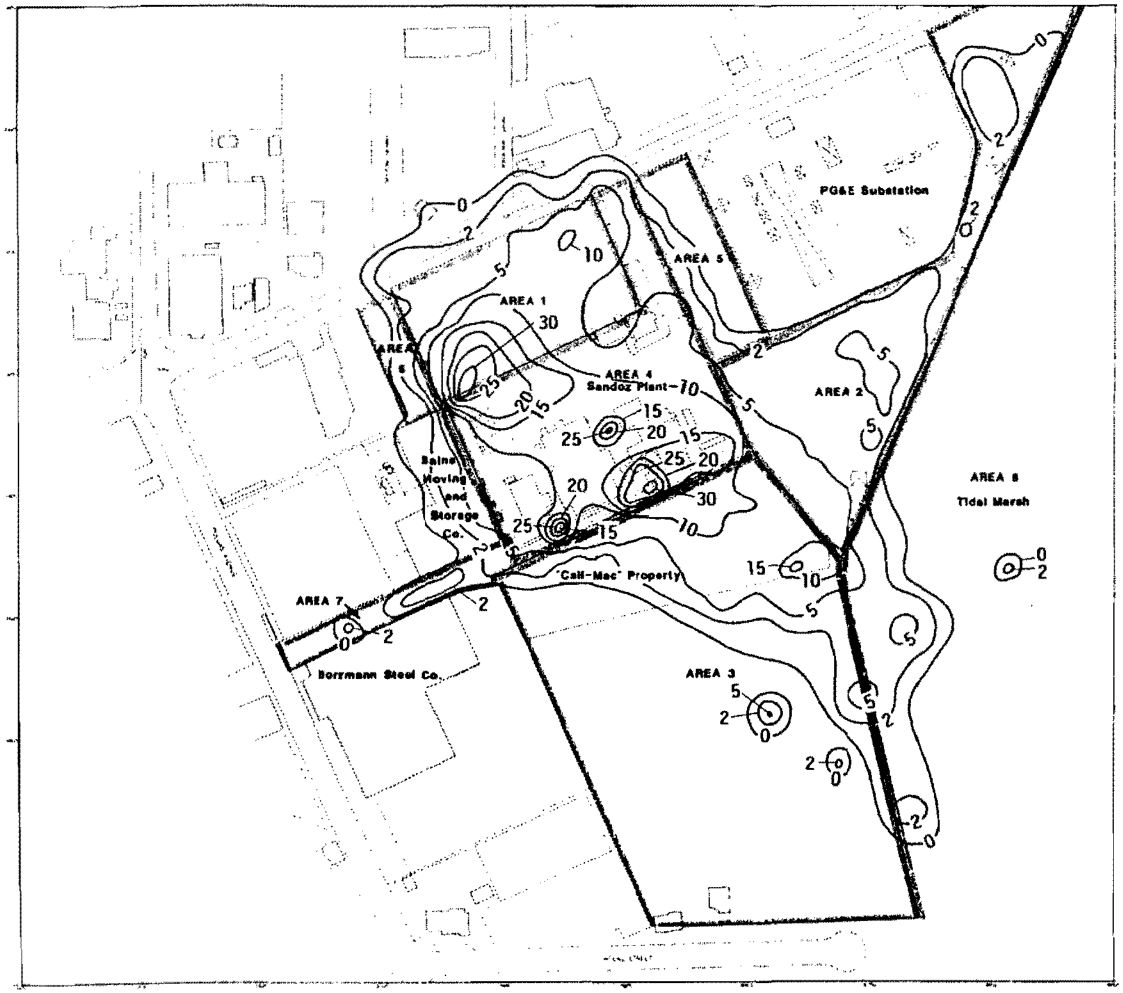
N

0 200 Feet

0.65

CONTOURS OF SOIL ARSENIC CONCENTRATIONS
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	19



KEY

Contour of approximate depth in feet of soil containing greater than 20 mg/kg arsenic

Note

Contours based on soil boring data presented in Appendices D and E.

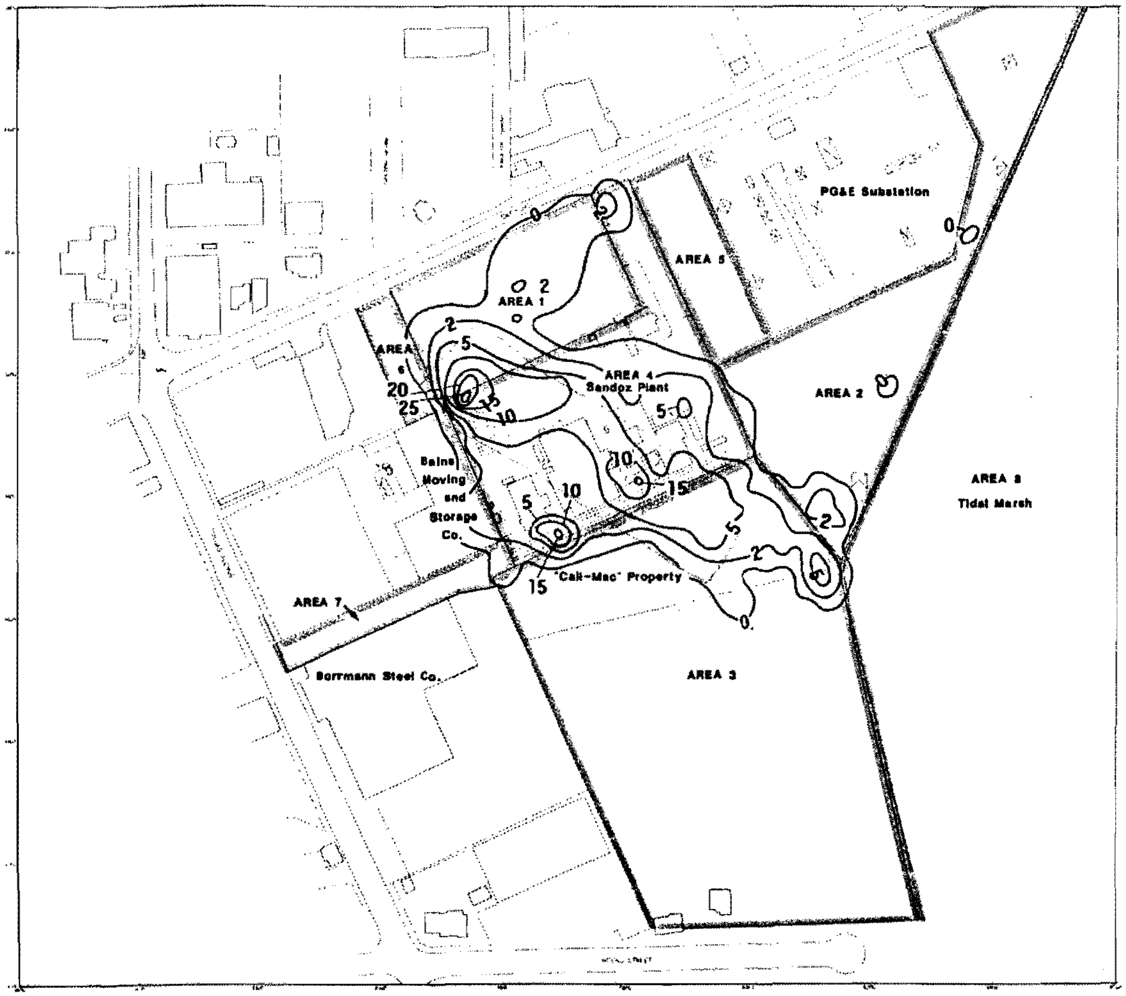
N

0 200 Feet

Revised 2/13/89

VERTICAL EXTENT OF SOIL WITH ARSENIC CONCENTRATIONS GREATER THAN 20 mg/kg
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	20



KEY

—— Contour of approximate depth in feet of soil containing greater than 500 mg/kg arsenic

Note

Contours based on soil boring data presented in Appendices D and E.

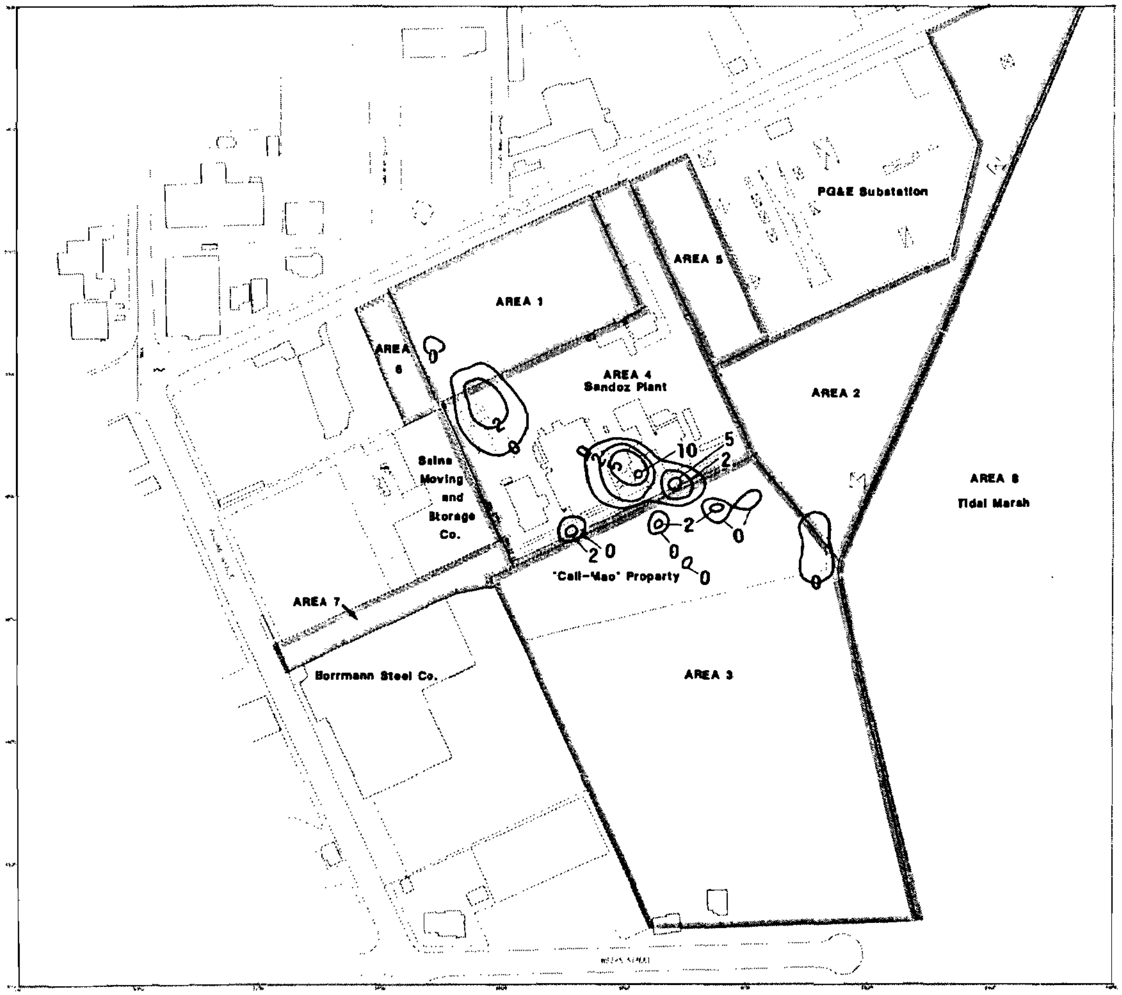
1.8 x 0.5

35,207 ft^2

0 200 Feet

VERTICAL EXTENT OF SOIL WITH ARSENIC
CONCENTRATIONS GREATER THAN 500 mg/kg
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	21



KEY

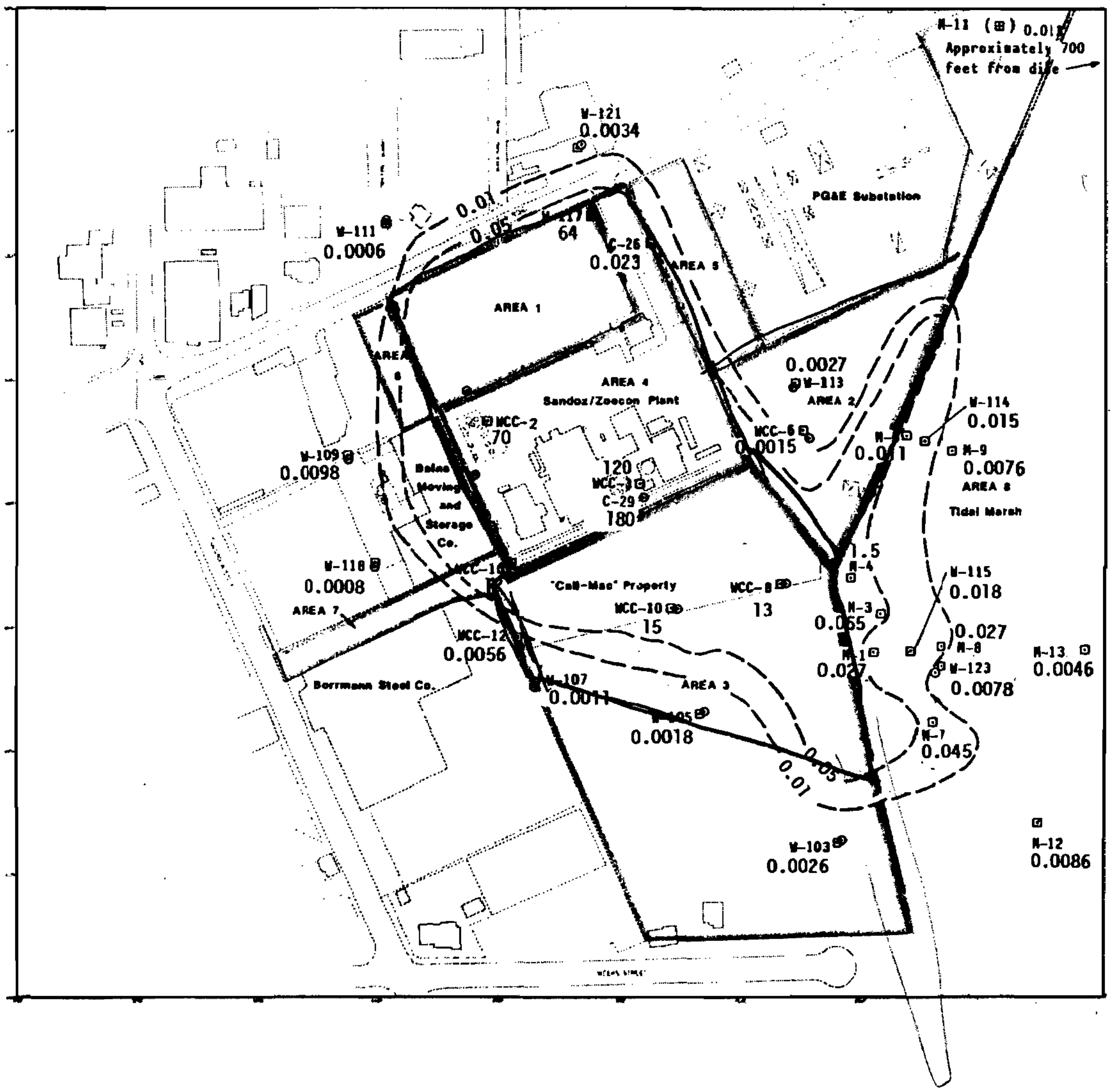
Contour of approximate depth in feet of soil containing greater than 5000 mg/kg arsenic

Note

Contours based on soil boring data presented in Appendices D and E.

VERTICAL EXTENT OF SOIL WITH ARSENIC CONCENTRATIONS GREATER THAN 5000 mg/kg
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	22

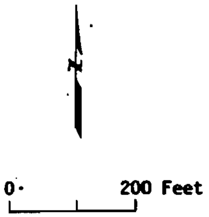


EXPLANATION

W-103⊡	Upper Shallow Zone monitoring well
W-102 ⊙	Lower Shallow Zone monitoring well
W-101●	Deep Zone monitoring well
0.10	Most recent arsenic concentrations, mg/l, sampled in 1988 except for M-1 through M-6 sampled in December 1987
0.05----	Contour of equal concentrations of arsenic in groundwater, mg/l

0.05 mg/l

50 µg/l

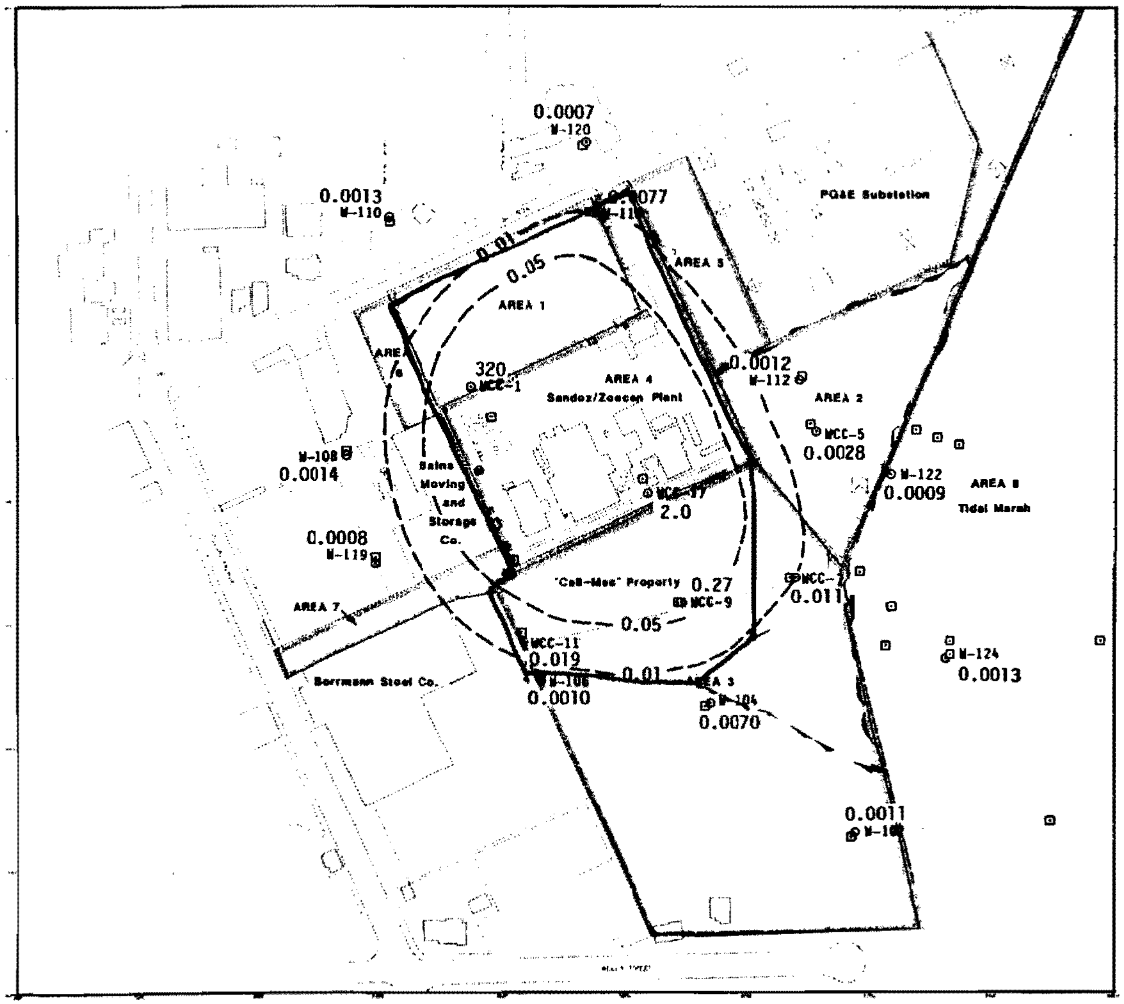


ARSENIC CONCENTRATIONS IN THE UPPER SHALLOW GROUNDWATER ZONE - 1988
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX

Project No.	Figure
1220A-1500	23

Slurry walls



EXPLANATION

W-103 ⊡ Upper Shallow Zone monitoring well

W-102 ⊙ Lower Shallow Zone monitoring well

W-101 ● Deep Zone monitoring well

0.10 Most recent arsenic concentrations, mg/l, sampled in 1988

0.50 - - - Contour of equal concentrations of arsenic in groundwater, mg/l

38' x 2300
15' 1600

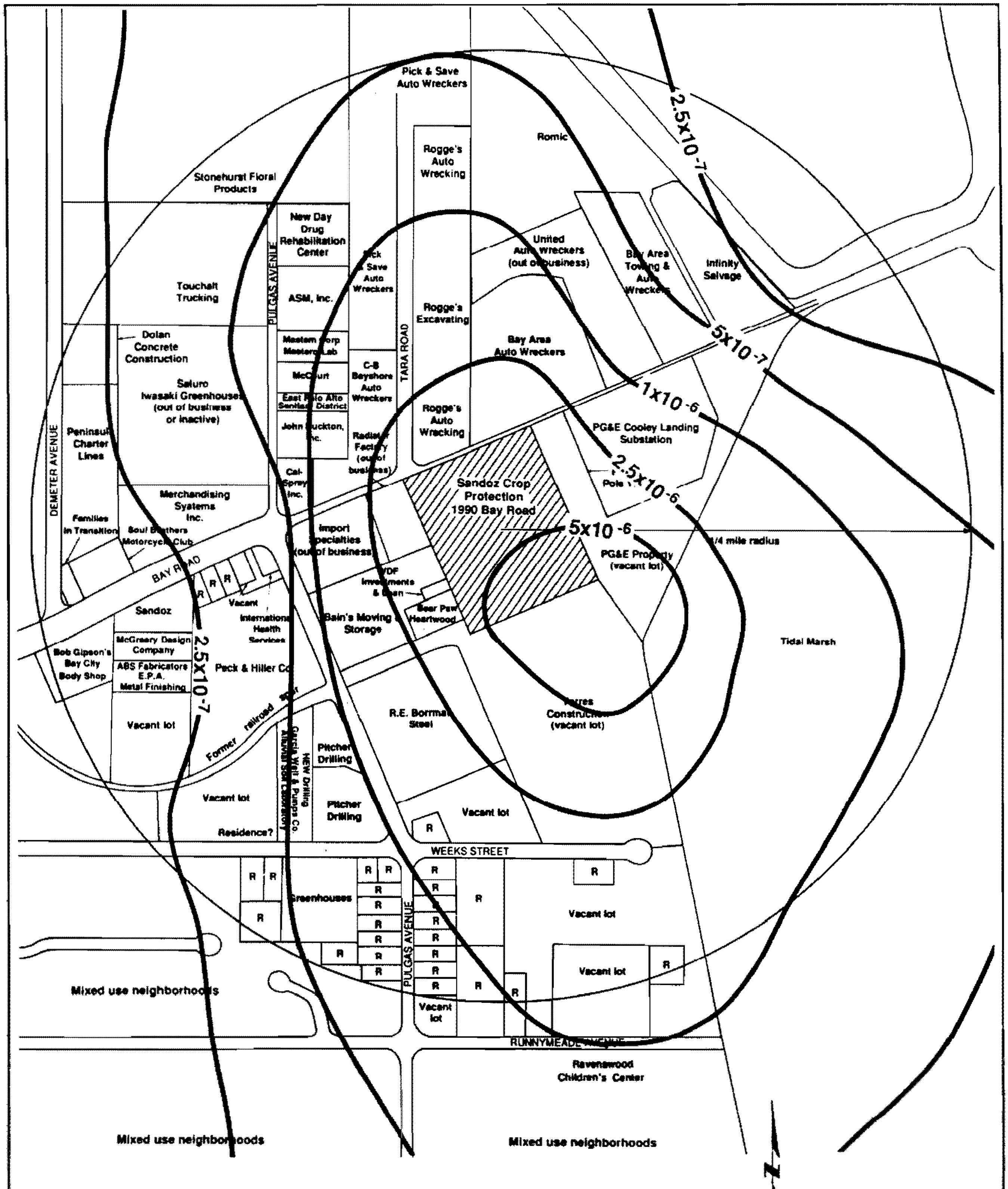
600@38 redundant

N

0 200 Feet

ARSENIC CONCENTRATIONS IN THE LOWER SHALLOW GROUNDWATER ZONE - 1988
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220A-1500	24



KEY

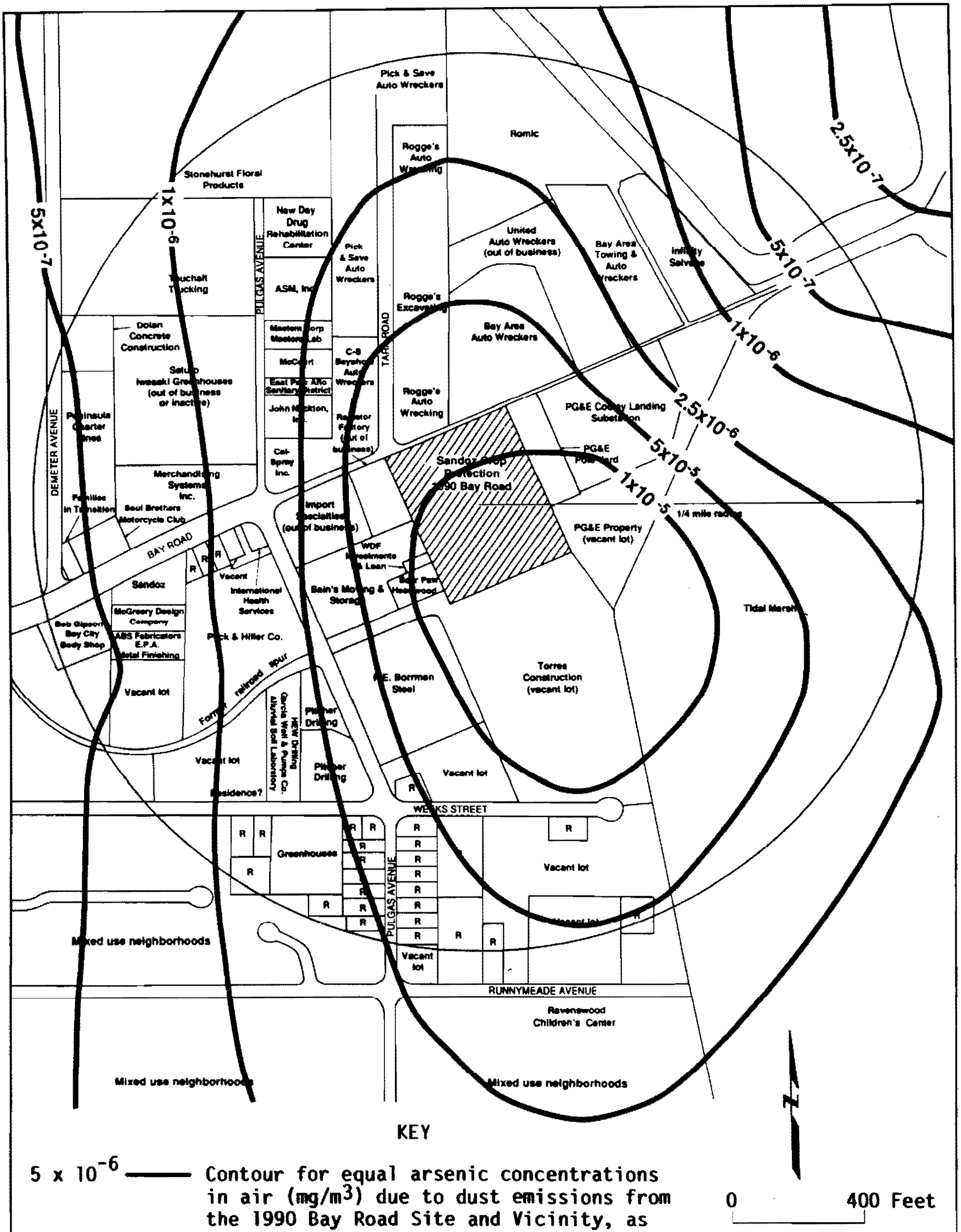
5 x 10^{-6} ——— Contour for equal arsenic concentrations in air (mg/m^3) due to dust emissions from the 1990 Bay Road Site and Vicinity, as modelled by ISCLT

GEOMATRIX

AVERAGE CONCENTRATIONS IN AIR BASED ON ISCLT MODELLING
1990 Bay Road Site and Vicinity
East Palo Alto, California

Figure
25

Project No.
1220A-1500



KEY

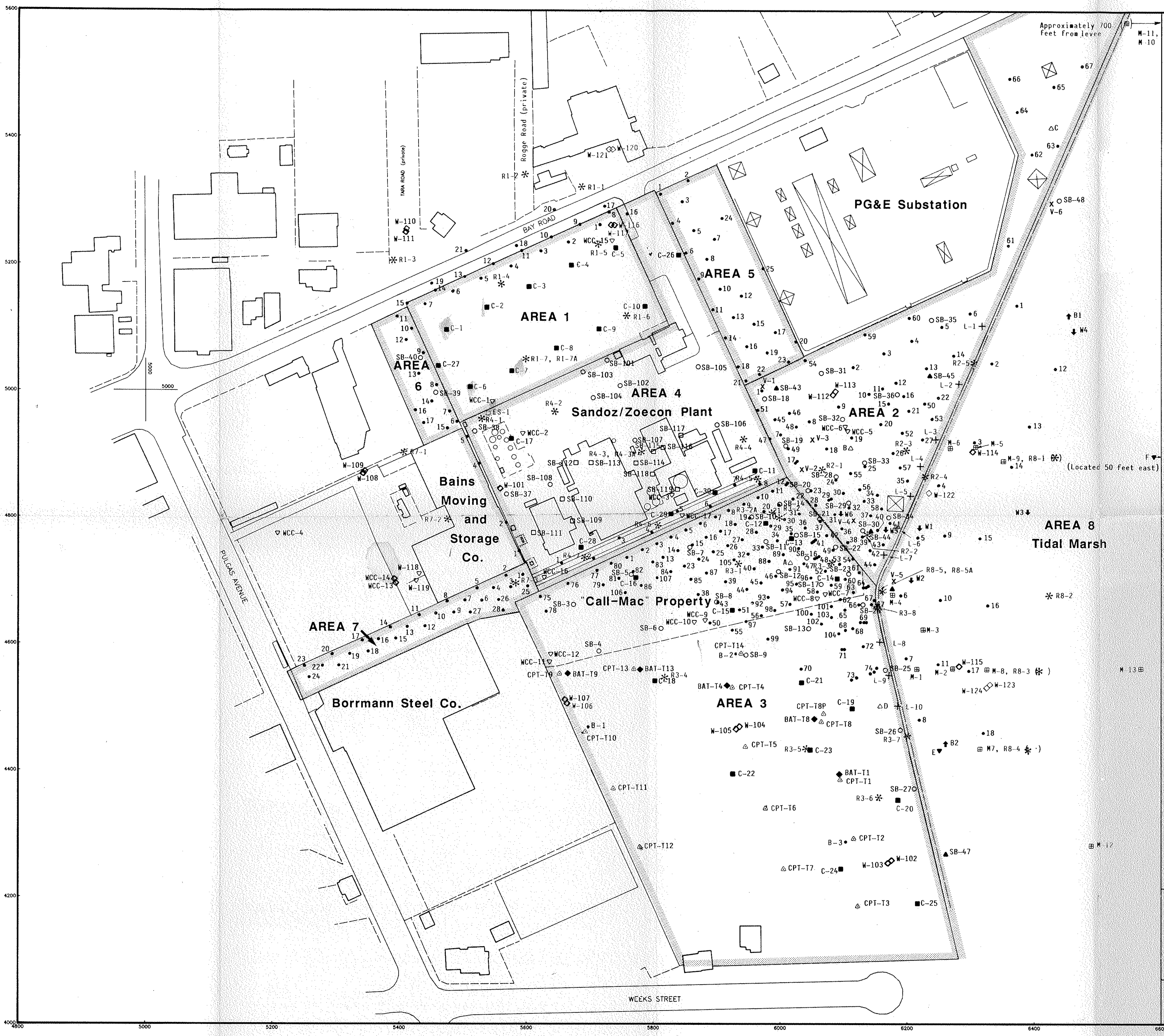
5×10^{-6} ——— Contour for equal arsenic concentrations in air (mg/m^3) due to dust emissions from the 1990 Bay Road Site and Vicinity, as modelled by ISCLT

GEOMATRIX

UPPER BOUND ARSENIC CONCENTRATIONS IN AIR
BASED ON ISCLT MODELLING
1990 Bay Road Site and Vicinity
East Palo Alto, California

Figure
26

Project No.
1220A-1500

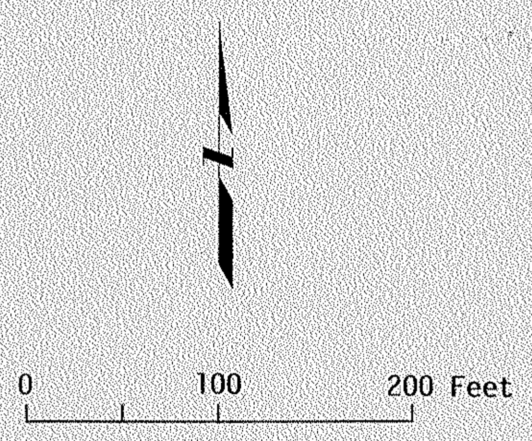


EXPLANATION

■	Converse/TenEch monitoring well
□	Converse Consultants soil boring
▽	Woodward-Clyde Consultants monitoring well
○	Woodward-Clyde Consultants soil boring
x	Woodward-Clyde Consultants vegetation sample
▲	Woodward-Clyde Consultants piezometer
◇	Geomatrix Consultants monitoring well
⊞	Geomatrix Consultants temporary monitoring well
•	Geomatrix Consultants soil boring
✳	Geomatrix Consultants 1988 soil boring
+	Geomatrix Consultants 1988 surface soil sample
◇	Geomatrix Consultants BAT groundwater sample
△	Geomatrix cone pentrometer test (CPT)
△	Geomatrix surface water sample
▼	Geomatrix tidal channel sample
↑	WESCO benthic sample
↓	WESCO soil sample
▨	Site and vicinity area boundary

Notes

1. Geomatrix tidal channel sample G located 320 feet southeast of Bay Road along transmission line boardwalk and 5 feet east of boardwalk.
2. For complete 1987 and 1988 surface water sampling locations see Figures B-2 and B-3.
3. Base map adapted from Aelytek, Inc. map of 1990 Bay Road and Vicinity based on aerial photographs taken on December 11, 1985 and April 18, 1986, and computer generated by Freeman, Sillivan & Company.
4. Project cooordinate system based on 5000N, 5000E at intersection of Bay Road and Pulgas Avenue. Geomatrix Consultants temporary monitoring well



SOIL, WATER, BIOTA, AND VEGETATION SAMPLING LOCATIONS 1981-1988
1990 Bay Road Site and Vicinity
East Palo Alto, California

GEOMATRIX	Project No.	Plate
	1220A-1500	1

613.7

2220.3

BAY ROAD PROJECT
FILE COPY
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777 SOUTH FIGUEROA STREET
TELEPHONE (213) 629-2020

March 13, 1992

VIA FAX

Pamela Kurtz, Esq.
Courthouse Plaza
260 Sheridan Avenue
Suite 302
Palo Alto, California 94306

Re: Rhone-Poulenc: East Palo Alto

Dear Pam:

Rhone-Poulenc has recently completed additional soil sampling on the off-site properties in the Upland Operable Unit at the 1990 Bay Road site. Sampling was conducted to comply with Provision 1.d of the amendment to Order No. 91-016, issued by the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), to Rhone-Poulenc Inc., dated February 19, 1992. Provision 1.d of amended Order No. 91-016 requires the definition of all off-site properties that will require deed restrictions and those where soil containing more than 70 mg/kg of arsenic will be removed. Final results will be presented in a report to the RWQCB due on April 1, 1992.

In this latest sampling effort, soil borings were completed on a 20-by-20 foot grid along both the Curtaccio property north of Bay Road and within the Curtaccio property south of Bay Road. This high density of sampling was conducted to supplement a number of previous soil sampling results.

Sampling was performed between November 18, 1991 and February 3, 1992. A total of 48 borings were completed by S&G Drilling under the direction of Geomatrix pesonnel at the Curtaccio properties. Based on results of previous soil samples, borings initially were advanced 3 feet. Numerous locations were redrilled to greater depths if initial sampling did not identify the vertical extent of soil containing more than 70 mg/kg arsenic. Borings were sampled with a Bob-Cat tractor equipped with a hydraulic hammer attachment used to sequentially advance 2- and 2-1/2-inch-diameter split-spoon samplers 18 to 24 inches in length. After all cores were logged, each 6-inch soil interval was homogenized in a clean stainless steel bowl and placed into a labeled 250-ml glass jar. Surface samples (soil within the upper 1 inch of the ground surface) were generally collected adjacent to each boring location.

Initially, selected soil samples from each boring were sent to Anametrix Laboratory for arsenic analysis by inductively coupled plasma spectroscopy (ICP; EPA Method 6010). Upon receipt of results, additional deeper soil samples were sent to Anametrix if initial analysis did not identify the depth to 70 mg/kg arsenic soil concentrations. Once the lateral and vertical extent of soil containing 70 mg/kg arsenic was defined, samples used to define the 70 mg/kg arsenic limit were analyzed for cadmium, lead, and selenium by EPA Method 6010 and for mercury by EPA Method 7470.

The recent pre-remediation sampling results and results from previous sampling programs have adequately defined soil containing arsenic concentrations greater than 70 mg/kg in the two Curtaccio properties. Analytical results used to define affected soil (soil containing arsenic concentrations greater than 70 mg/kg) on the Curtaccio properties are listed in Table 1. Figure 1 shows all sample locations on the Curtaccio properties. Figure 2 illustrates the lateral and vertical extent of soil containing arsenic concentrations greater than 70 mg/kg for the Curtaccio property.

With respect to the Curtaccio property on the north side of Bay Road, sampling on the property to the north of Bay Road indicates that approximately 75 cubic yards of soil to a depth of up to 3 feet have arsenic concentrations above 70 mg/kg.

Sampling within the Curtaccio property next to Sandoz (south of Bay Road) has been sufficient to delineate the lateral extent of soil containing arsenic concentrations greater than 70 mg/kg. The depth to 70 mg/kg arsenic was not found in the southeast corner or along most of the eastern fence line of the Curtaccio property adjacent to the Sandoz property, but is at least as deep as 6 feet. Figure 3 illustrates the known lateral and approximate vertical extent of soil containing 70 mg/kg arsenic for the Curtaccio property. Approximately 1500 yd^3 of soil contains arsenic concentrations greater than 70 mg/kg in the eastern section of the Curtaccio property. Perimeter samples being used to define the lateral extent of soil containing 70 mg/kg arsenic are currently being analyzed for cadmium, lead, mercury, and selenium. Those results will be included in the April 1, report.

We plan to excavate soil above 70 mg/kg from the property to the north of Bay Road in early April. I am also awaiting word from you with respect to the offer on the deed restriction on the property to the south of Bay Road.

We wanted you and your client to have this information as it develops. Please feel free to call if you have any questions.

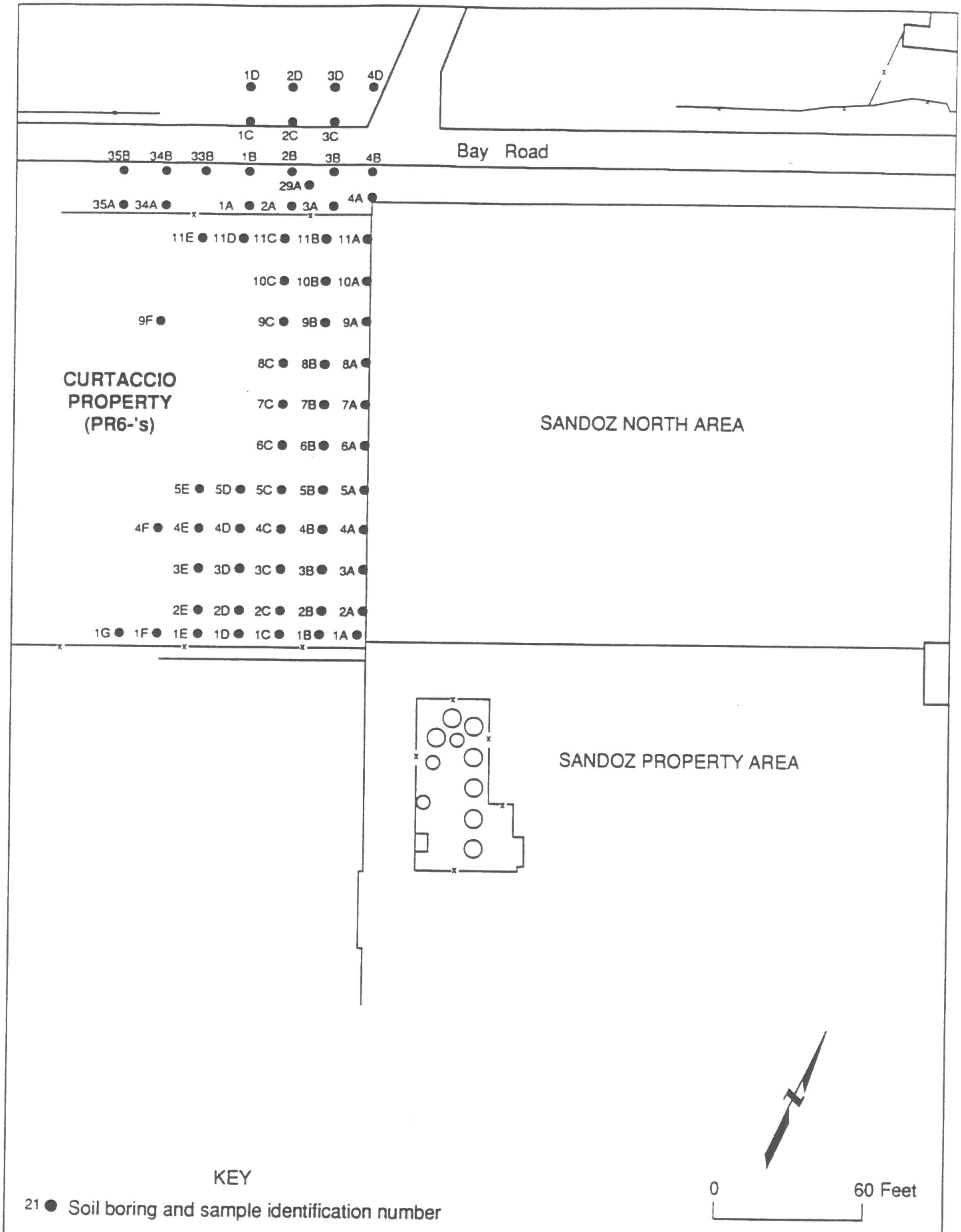
Sincerely,

W. Reece Bader

W. Reece Bader

WRB:beg

cc: Melvin Curtaccio

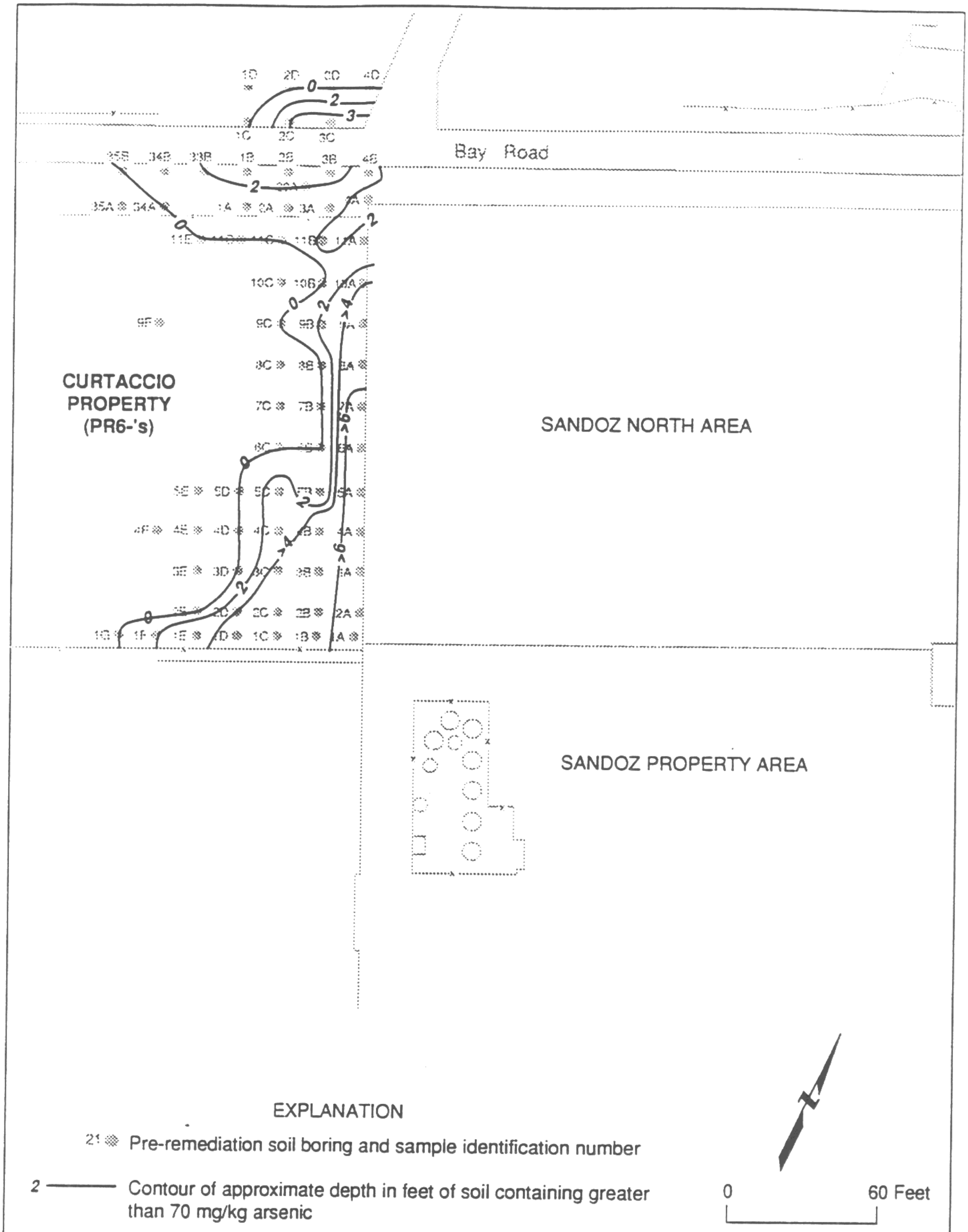


GEOMATRIX

SOIL SAMPLING LOCATIONS
CURTACCIO PROPERTY
1990 Bay Road Site and Vicinity
East Palo Alto, California

Figure 1

Project No. 1220F



EXPLANATION

21 ▨ Pre-remediation soil boring and sample identification number

2 ——— Contour of approximate depth in feet of soil containing greater than 70 mg/kg arsenic

GEOMATRIX

DEPTH OF SOIL CONTAINING >70 mg/kg ARSENIC
CURTACCIO PROPERTY
1990 Bay Road Site and Vicinity
East Palo Alto, California

Figure	2
Project No.	1220F

Table 1
Analytical Results of Pre-Remediation Soil Sampling:
Off-Site Properties, Upland Operable Unit,
1990 Bay Road Site, East Palo Alto, California

BORING	DEPTH	ARSENIC	CADMIUM	LEAD	MERCURY	SELENIUM
PR1-1A	0.1	22.0				
	0.5	26.7				
	1.0	90.4				
	1.5	61.3				
PR1-1B	0.1	49.9				
	0.5	36.3				
	1.5	76.5				
	2.5	31.6				
	3.0	26.1				
PR1-1C	0.1	30.0	0.5	38.6	RNR	RNR
	0.5	34.6				
	1.5	43.2				
	2.0	39.4				
PR1-1D	0.1	35.7				
	0.5	42.4				
	1.5	42.9				
	2.0	49.2				
PR1-2A	0.1	23.9				
	0.5	31.2				
	1.0	60.7				
	1.5	33.7				
PR1-2B	0.1	21.1				
	0.5	25.0				
	1.5	89.8				
	2.5	37.1				
	3.0	49.9				
PR1-2C	0.1	22.2				
	0.5	57.6				
	2.0	34.8				
	2.5	80.0				
	3.0	57.7	ND	5.8	RNR	RNR
PR1-2D	0.1	27.4	0.5	33.7	RNR	RNR
	0.5	40.2				
	1.5	47.6				
	2.0	55.2				
PR1-3A	0.1	26.7				
	0.5	22.3				
	1.0	29.4				
	1.5	80.3				
	2.5	38.1				
PR1-3B	0.1	63.9				
	0.5	107.0				
	1.0	184.0				
	1.5	90.7				
	2.0	38.6				
PR1-3C	0.1	34.8				
	0.5	15.0				
	2.0	85.5				
	2.5	90.6				
	3.0	74.1	1.8	32.7	RNR	RNR
PR1-3D	0.1	14.1	RNR	RNR	RNR	RNR
	0.5	40.9				
	2.5	47.8				
	3.0	35.2				
PR1-4A	0.1	40.9				

Table 1

Analytical Results of Pre-Remediation Soil Sampling:
Off-Site Properties, Upland Operable Unit,
1990 Bay Road Site, East Palo Alto, California

BORING	DEPTH	ARSENIC	CADMIUM	LEAD	MERCURY	SELENIUM
	0.5	76.2				
	1.0	219.0				
	1.5	266.0				
	2.0	145.0				
	2.5	96.3				
	3.0	57.7				
PR1-4B	0.1	60.9				
	0.5	82.5				
	1.0	109.0				
	1.5	37.7				
PR1-4D	0.1	28.8	1.5	170.0	RNR	RNR
	0.5	42.0				
	0.5	37.9				
	0.5	35.8				
	1.5	33.6				
	2.0	36.7				
PR1-33B	0.1	43.6				
	0.5	45.1				
	1.5	79.1				
	2.0	54.6				
	2.5	41.5				
PR1-34A	0.1	36.6	RNR	RNR	RNR	RNR
	0.5	24.0				
	1.5	39.2				
	2.0	41.1				
PR1-34B	0.1	27.7				
	0.5	28.9				
	1.5	96.8				
	2.0	45.7				
PR1-35A	0.1	49.1	RNR	RNR	RNR	RNR
	0.5	57.6				
	1.5	51.8				
	2.0	50.8				
PR1-35B	0.1	31.4	RNR	RNR	RNR	RNR
	0.5	37.0				
	1.0	58.7				
	1.5	61.3				

Table 1
Analytical Results of Pre-Remediation Soil Sampling:
Off-Site Properties, Upland Operable Unit,
1990 Bay Road Site, East Palo Alto, California

BORING	DEPTH	ARSENIC	CADMIUM	LEAD	MERCURY	SELENIUM
PR6-1A	0.1	571.0				
	0.5	1110.0				
	1.0	350.0		16.5		
	1.5	352.0				
	2.5	289.0				
	3.5	364.0				
	4.5	225.0				
	5.5	342.0		6.9		
	6.0	250.0				
PR6-1B	1.0	585.0				
	1.5	516.0				
	2.5	259.0				
	3.0	164.0				
	3.5	199.0				
	4.5	110.0				
PR6-1C	1.0	26.3				
	1.5	369.0				
	2.5	463.0				
	3.0	507.0				
	3.5	354.0				
	4.5	276.0				
	5.5	171.0				
PR6-1D	1.5	343.0				
	3.5	426.0				
	4.5	258.0				
PR6-1E	1.0	74.2				
	2.0	319.0				
	3.0	119.0				
	3.5	57.4				
	4.0	58.0				
PR6-1F	1.0	51.1				
	1.5	87.0				
	2.0	86.3				
	2.5	29.5				
	5.0	24.9				
	5.5	19.7				
PR6-1G	1.0	47.2				
	1.5	37.5				
	2.0	32.5				
	2.5	32.3				
PR6-2A	0.1	770.0				
	0.5	974.0				
	1.0	388.0				
	1.5	335.0				
	2.5	223.0				
	4.0	181.0				
	4.5	193.0				
	5.0	223.0				
	6.0	293.0		7.2		
PR6-2B	1.0	254.0				
	1.5	520.0				
	2.5	136.0				
	3.0	136.0				
	4.0	191.0				
	4.5	217.0				
PR6-2C	1.0	194.0				
	1.5	236.0				
	2.5	167.0				
	3.0	116.0				
	4.0	236.0				
	4.5	273.0				
PR6-2D	1.0	57.0				
	2.0	156.0				
	3.0	26.9				
	4.0	72.6				
	4.5	96.8				

Table 1

Analytical Results of Pre-Remediation Soil Sampling: Off-Site Properties, Upland Operable Unit, 1990 Bay Road Site, East Palo Alto, California

BORING	DEPTH	ARSENIC	CADMIUM	LEAD	MERCURY	SELENIUM
PR6-2E	1.0	66.5	RNR	RNR	RNR	RNR
	2.0	55.6				
	3.0	27.0				
	4.0	33.0				
	4.5	34.5				
PR6-3A	0.1	520.0				
	0.5	483.0				
	0.5	503.0				
	0.5	479.0				
	1.0	1680.0				
	1.5	10.3				
	2.5	404.0				
	3.5	426.0				
	4.5	314.0				
	5.0	255.0				
	6.0	203.0				
PR6-3B	0.1	63.2				
	0.5	20.4				
	1.0	83.2				
	1.5	435.0				
	2.5	306.0				
	3.0	219.0				
	3.5	294.0				
	4.5	225.0				
PR6-3C	1.0	132.0				
	1.5	95.8				
	2.5	55.0				
	3.0	130.0				
	3.5	123.0				
	4.0	88.5				
PR6-3D	1.0	44.4	RNR	RNR	RNR	RNR
	1.0	35.6				
	1.0	33.2				
	1.5	32.8				
	2.5	33.9				
	3.5	29.3				
	4.5	37.3				
PR6-3E	1.0	49.6				
	1.5	31.4				
	2.5	31.0				
	3.5	28.7				
PR6-4A	0.1	728.0				
	0.5	828.0				
	1.0	550.0		40.4		
	1.5	454.0		11.4		
	2.5	308.0				
	3.5	372.0				
	4.5	302.0				
	5.0	244.0				
	6.0	222.0				
PR6-4B	0.1	55.9				
	0.5	45.0				
	1.0	263.0				
	1.5	196.0				
	2.5	448.0				
	3.0	458.0				
	3.5	382.0				
	4.5	314.0				
	5.5	279.0				
PR6-4C	1.0	47.5				
	1.5	123.0				
	2.5	87.4				
	3.0	93.7				
	3.5	49.0				
	4.5	42.2				

Table 1
Analytical Results of Pre-Remediation Soil Sampling: Off-Site Properties, Upland Operable Unit, 1990 Bay Road Site, East Palo Alto, California

BORING	DEPTH	ARSENIC	CADMIUM	LEAD	MERCURY	SELENIUM
PR6-4D	1.0	55.1	RNR	RNR	RNR	RNR
	1.5	32.3				
	2.5	24.7				
	3.0	36.8				
PR6-4E	1.5	25.1				
	2.0	30.3				
	2.5	36.4				
	3.0	37.0				
PR6-4F	5.5	32.9				
PR6-5A	0.1	249.0				
	0.5	77.2				
	1.0	554.0				
	1.5	348.0				
	2.5	289.0				
	4.0	190.0				
	4.5	218.0				
	5.0	239.0				
	6.0	146.0				
PR6-5B	0.1	54.0				
	0.5	47.8				
	1.0	110.0				
	1.5	41.6				
	1.5	47.6				
	1.5	65.3				
PR6-5C	1.0	52.0				
	1.5	81.9				
	2.5	24.4				
PR6-5D	0.5	40.7	RNR	RNR	RNR	RNR
	1.0	38.9				
	2.0	41.1				
	3.0	35.5				
	5.5	33.2				
PR6-5E	1.0	40.2				
	1.5	38.7				
	2.0	39.5				
	2.5	37.5				
PR6-6A	0.1	414.0				
	0.5	218.0				
	1.0	543.0				
	2.0	329.0				
	3.0	232.0				
	4.0	207.0				
	4.5	192.0				
	5.0	206.0				
	6.0	127.0				
PR6-6B	0.1	68.4	RNR	RNR	RNR	RNR
	0.5	39.0				
	1.0	33.4				
	1.5	52.1				
PR6-6C	1.0	35.0	RNR	RNR	RNR	RNR
	1.5	42.2				
PR6-7A	0.1	162.0				
	0.5	326.0		198.0		
	1.0	208.0				
	2.0	176.0				
	3.0	142.0				
	4.0	192.0				
	4.5	121.0				
	5.0	235.0				
	6.0	102.0				

Table 1
Analytical Results of Pre-Remediation Soil Sampling:
Off-Site Properties, Upland Operable Unit,
1990 Bay Road Site, East Palo Alto, California

BORING	DEPTH	ARSENIC	CADMIUM	LEAD	MERCURY	SELENIUM
PR6-7B	1.0	53.1	RNR	RNR	RNR	RNR
	1.5	37.5				
	5.5	33.3				
PR6-7C	1.0	41.3				
	1.5	26.5				
PR6-8A	0.1	132.0				
	0.5	161.0				
	0.5	141.0				
	0.5	169.0				
	1.0	246.0				
	1.5	212.0				
	2.0	250.0				
	3.0	104.0				
	4.0	159.0				
	4.5	175.0				
PR6-8B	0.1	45.5	RNR	RNR	RNR	RNR
	0.5	45.3				
	1.0	33.8				
	1.5	46.1				
PR6-8C	0.5	42.0				
	1.0	44.3				
	1.5	43.4				
	1.5	38.0				
	1.5	20.8				
	2.0	42.6				
PR6-9A	0.1	178.0				
	0.5	138.0				
	1.0	126.0				
	1.5	105.0				
	2.0	132.0				
	3.0	134.0				
	3.5	120.0				
	4.5	207.0				
PR6-9B	0.1	66.3				
	0.5	59.1				
	1.0	41.4				
	1.5	132.0				
	2.0	124.0				
	2.5	52.2				
	3.0	33.3				
PR6-9C	1.0	62.9	RNR	RNR	RNR	RNR
	1.5	29.5				
	5.5	22.7				
PR6-9F						
PR6-10A	0.1	156.0				
	0.5	174.0				
	1.0	206.0				
	1.0	203.0				
	1.0	233.0				
	1.5	167.0				
	2.0	145.0				
	3.0	81.7				
	4.0	99.4				
	4.5	161.0				
PR6-10B	0.1	58.4				

Table 1
Analytical Results of Pre-Remediation Soil Sampling: Off-Site Properties, Upland Operable Unit, 1990 Bay Road Site, East Palo Alto, California

BORING	DEPTH	ARSENIC	CADMIUM	LEAD	MERCURY	SELENIUM
	0.5	64.5				
	1.0	75.1				
	1.5	66.5				
PR6-10C	1.0	48.6	RNR	RNR	RNR	RNR
	1.5	45.6				
PR6-11A	0.1	160.0				
	0.5	119.0				
	1.0	88.3				
	1.5	68.3				
PR6-11B	0.1	113.0				
	0.5	161.0				
	1.0	240.0				
	1.5	256.0				
	2.0	32.6				
	2.5	28.1				
PR6-11C	1.0	32.9	RNR	RNR	RNR	RNR
	1.5	24.6				
	5.5	34.4				
PR6-50		22.2				
PR6-11D	1.5	51.2	RNR	RNR	RNR	RNR
	2.0	37.0				
	2.5	42.9				
	3.0	38.7				
PR6-11E	1.5	48.8	RNR	RNR	RNR	RNR
	2.0	42.3				
	2.5	38.7				
	3.0	38.9				

Notes:

All concentrations in mg/kg
ND = not detected
Sample collected from six inch interval above depth indicated.
RNR = Results not received from lab at date of memorandum.

M. T. RAFFERTY

PRE-TREATMENT SOIL SAMPLING REPORT AND SOIL TREATMENT DEPTHS FOR THE UPLAND OPERABLE UNIT

1990 Bay Road Site
East Palo Alto, California

VOLUME 1 OF 2 - REPORT

Prepared By:

GEOMATRIX CONSULTANTS, INC.
San Francisco, California
in association with
S.S. PAPADOPULOS & ASSOCIATES, INC.
Bethesda, Maryland

1 May 1992
Project No. 1220F

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GEOMATRIX CONSULTANTS, INC.
Consulting Engineers and Earth Scientists
in association with

S.S. PAPADOPULOS & ASSOCIATES, INC.
Consulting Ground-Water Hydrologists

1 May 1992
Project 1220F

Mr. Steven R. Ritchie
Executive Director
California Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, CA 94612

Dear Mr. Ritchie:

On behalf of Rhone-Poulenc Inc., we are submitting the Pre-Treatment Soil Sampling Report and Soil Treatment Depths for the Upland Operable Unit for the 1990 Bay Road Site, East Palo Alto, California. This document is presented in two volumes: Volume 1 of 2 - Report, and Volume 2 of 2 - Appendix A. These two volumes are supplemental to the Remedial Design Report also issued today.

Please contact the undersigned if you have any questions or require additional information.

Sincerely yours,

GEOMATRIX CONSULTANTS, INC.	S.S. PAPADOPULOS & ASSOCIATES, INC.
Michael Rafferty	
Michael T. Rafferty, P.E. Project Manager	Charles B. Andrews, Ph.D., R.G. Project Director

MTR/CBA/lej
A:\PRETREAT.LTR

Enclosure

cc: F. Ellerbusch - Rhone Poulenc Inc.
M. Johnson - RWQCB (3)
R. M. Caraway - EPA (3)
M. Rembaum - DHS
R. Beyer - City of East Palo Alto
J. Stone - San Mateo County Health Department
W. Camp - San Francisco Water Department (Hetch Hetchy Water District)
J. Wright - PRC Seattle

PRE-TREATMENT SOIL SAMPLING REPORT AND SOIL TREATMENT DEPTHS FOR THE UPLAND OPERABLE UNIT

1990 Bay Road Site
East Palo Alto, California

VOLUME 1 OF 2 - REPORT

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1 May 1992
Project No. 1220F

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1.0 INTRODUCTION

The 1990 Bay Road site, located adjacent to San Francisco Bay in East Palo Alto, California (Figure 1), has been the subject of continuing investigation based on elevated concentrations of arsenic and other priority pollutants in site soils. This report summarizes results of pre-remediation soil sampling performed at the upland operable unit of the site (Figure 2) and estimates the quantities of soil that require treatment. Remediation is being conducted in accordance with Order No. 92-022, issued by the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), to Rhone-Poulenc Inc., on 24 February 1992.

The RWQCB selected Alternative E from the Feasibility Study (FS; Geomatrix and SSP&A, 1991b) as the most effective measure to achieve site cleanup goals for protecting human health and the environment. In brief, Alternative E of the FS stipulates the following soil treatment guidelines for properties in the upland operable unit:

- remove soil containing more than 5000 mg/kg arsenic
- treat soil containing more than 500 mg/kg arsenic
- remove or pave soil containing more than 70 mg/kg arsenic
- apply deed restrictions to properties where soil containing more than 70 mg/kg arsenic remains.

Although arsenic has been identified as the primary contaminant of concern at the 1990 Bay Road site, cadmium, lead, mercury, and selenium have also been identified as contaminants. Soil treatment guidelines associated with the 500 mg/kg arsenic level are 450 mg/kg for lead, 1000 mg/kg for cadmium, 300 mg/kg for mercury, and 6000 mg/kg for selenium. Arsenic generally is used as the indicator parameter; when arsenic concentrations are near or below 500 mg/kg, selected samples are analyzed for the other metals to confirm that their target levels also are not exceeded.

This report presents results of the recent sampling program at the Sandoz north area and the former railroad track area south of the Sandoz production facility; most of these data were submitted to the RWQCB in a 20 March 1992 memorandum. The report also summarizes relevant data from the sampling used to estimate the vertical extent of soil containing more than 70 mg/kg arsenic at off-site properties of the upland operable unit (Geomatrix and SSP&A, 1992) and sampling associated with the Remedial Investigation (Geomatrix and SSP&A, 1989). These data have been used to estimate the depths and amounts of soil requiring treatment in the upland operable unit.

2.0 SOIL SAMPLING METHODS

2.1 PRE-TREATMENT SAMPLING

The recent pre-treatment sampling was begun on 6 February 1992 and completed on 3 April 1992. Soil borings typically were advanced on a 20-by-20-foot grid spacing in the Sandoz north area and on a 20-by-15-foot grid spacing along the former railroad tracks south of the Sandoz production facility. A total of 246 borings were completed by All

Terrain Drilling and S&G Drilling under the direction of Geomatrix personnel. Of these borings, 206 were completed in the Sandoz north area (Figure 3), and 40 were completed in the former Sandoz railroad track area (Figure 5).

The initial sampling depths used during the recent pre-treatment sampling program were based on results of previous soil samples. Most of the borings in the north area initially were advanced 3.0 to 4.5 feet. Borings along the east fence of the Sandoz north area initially were advanced to 7.0 feet. Borings in the southwest corner of the Sandoz north area initially were advanced 7.0 to 35.0 feet. Borings in the former railroad track area initially were advanced 4.5 to 25.0 feet. A total of 29 locations in both the north and south areas were redrilled to greater depths because initial sampling did not identify the vertical extent of soil containing more than 500 mg/kg arsenic.

Borings less than 15 feet deep were sampled with a Bob-Cat tractor equipped with a hydraulic hammer attachment used to sequentially advance 2- and 2.5-inch-diameter split-spoon samplers 18 to 24 inches in length. Borings deeper than 15 feet were sampled using hollow-stem auger rigs having 2.5-inch-diameter split-spoon samplers 18 to 24 inches in length. After the cores were logged, 6-inch soil intervals were homogenized in clean stainless steel bowls and placed into labeled 250-ml glass jars. Every 6-inch soil interval was collected to a depth of 4.5 feet. After 4.5 feet, every other 6-inch soil interval was collected. Surface samples (soil within the upper 2 inches of the ground surface) also were collected at selected boring locations to supplement data from previous sampling.

Initially, three to four soil samples from each boring were sent to Anametrix Laboratory of San Jose, California, for arsenic analysis by inductively coupled plasma spectroscopy (ICP; EPA Method 6010). Additional soil samples were sent to Anametrix if initial analysis did not identify the depth to less than 500 mg/kg arsenic in soil. Once the areas of soil containing more than 500 mg/kg arsenic were approximated, selected samples used to approximate the 500 mg/kg arsenic limits were analyzed for cadmium, lead, and selenium by EPA Method 6010 and for mercury by EPA Method 7470.

A total of 1392 soil samples were analyzed for arsenic during the recent sampling program: 1022 from the Sandoz north area and 370 from the former Sandoz railroad track area. Cadmium, lead, mercury, and selenium analyses were performed on 58 of the total samples: 44 from the north Sandoz area and 14 from the former railroad track area. These results are presented in Table 1; analytical laboratory reports are included in Appendix A.

2.2 PREVIOUS DATA

Soil samples collected from 59 borings (20 at the Curtaccio property, 23 at the south side of Bay Road, and 16 at the PG&E Poleyard) completed as part of the investigation of the off-site upland operable unit (Geomatrix and SSP&A, 1992) and soil samples collected from 18 borings (11 at the PG&E Poleyard and 7 at the Bains property) completed as part of the RI (Geomatrix and SSP&A, 1989), were used to estimate the vertical extent of soil containing more than 500 mg/kg arsenic in areas surrounding the Sandoz property. These boring locations are shown on Figures 3 through 5.

Analyses performed on samples collected during the previous sampling programs included: 152 arsenic, 1 cadmium, 7 lead, 1 selenium, and 1 mercury from the Curtaccio property; 135 arsenic and 4 lead from the area south of Bay Road; 152 arsenic and 1 each cadmium, lead, mercury, and selenium from the PG&E poleyard; and 16 arsenic and 1 each cadmium, lead, mercury, and selenium from the former railroad tracks at the Bains property. These results are presented in Tables 2, 3A, and 3B.

3.0 QUALITY ASSURANCE AND QUALITY CONTROL

The following sections discuss results from the quality assurance and quality control (QA/QC) program for pre-remediation sampling. Project QA/QC procedures are described in the Quality Assurance Project Plan (QAPP; Geomatrix and SSP&A, 1991a). Laboratory QA/QC results are included in analytical laboratory reports in Appendix A.

3.1 ANALYTICAL LABORATORY QA/QC

Anametrix QA/QC procedures for EPA Methods 6010 (ICP) and 7471 (AA-mercury) included:

- daily calibration consisting of two replicates of a single-point calibration, with an acceptance limit for the relative standard deviation of ±10%
- continuing calibration with a secondary source standard after every 10 samples or once every two hours, with an acceptance limit of ±10% of the

expected value

- interference check samples analyzed at the beginning and end of each run or once every eight hours, with an acceptance limit of ±20% of the expected value
- method blanks analyzed following each calibration check and once every 20 samples.

3.1.1 Matrix Spike/Matrix Spike Duplicates for ICP Analyses

Of the 1392 samples analyzed for arsenic by ICP from this program, a total of 148 were spiked with arsenic (23 with 5000 mg/kg, 124 with 500 mg/kg, and 1 with 167 mg/kg) and analyzed in duplicate. Recoveries for matrix spike samples ranged from 54% to 218% (average recovery 94%); recoveries for matrix spike duplicates ranged from 68% to 355% (average recovery 95%). Of the 148 samples spiked with arsenic, Anametrix reported that 11 had no recoveries. Matrix spike recoveries from seven samples (54%, 64.6%, 71.2%, 74.6%, 134% 145%, and 218%) and matrix spike duplicate recoveries for six samples (68.6%, 71.4%, 71.7%, 126%, 138%, and 355%) were outside the laboratory control and QAPP spike recovery limits of 75% to 125%. The remaining 130 matrix spike and 131 matrix spike duplicate recoveries were within laboratory and QAPP control limits. The relative percent difference (RPD) for matrix spike duplicates ranged from 0.0% to 84.1% and averaged 7.0%. With the exception of two samples (RPDs equal to 61.4% and 84.1%), all analyses were within the laboratory and QAPP spike duplicate RPD control limit of 50%.

During ICP analysis of 58 samples for cadmium, 18 samples were spiked with 2.5 mg/kg cadmium and analyzed in duplicate. Recoveries for both matrix spike and matrix spike duplicate samples ranged from 38% to 135% and averaged 89.6% and 89.5%, respectively. Anametrix reported that 1 of the 18 spiked samples had no recoveries. Matrix spike recoveries for six samples (38%, 42%, 56%, 64%, 68%, and 72%) and matrix spike duplicate recoveries for four samples (38%, 40%, 60%, and 64%) were outside the laboratory control and QAPP spike recovery limits of 75% to 125%. The RPDs for matrix spike duplicates ranged from 0.0% to 21.4% and averaged 8.2%. All cadmium RPDs were within the laboratory and QAPP control limit of 50%.

A total of 18 samples were spiked with 25 mg/kg lead and analyzed in duplicate by ICP. Recoveries for matrix spike samples ranged from 78% to 113% (average recovery 91%); recoveries for matrix spike duplicate samples ranged from 79.6% to 117% (average recovery 90.9%). The RPDs for matrix spike duplicate samples ranged from 0.5% to 16.1% and averaged 5.9%. All matrix spike/matrix spike duplicate recoveries and RPDs were within laboratory and QAPP control limits (spike recovery limit of 75% to 125% and RPD control limit of 50%).

During ICP analysis of 58 samples for selenium, 18 samples were spiked with 500 mg/kg selenium and analyzed in duplicate. Recoveries for matrix spike samples ranged from 70% to 98% (average recovery 84.4%); recoveries for matrix spike duplicate samples ranged from 69% to 96% (average recovery 84%). Recoveries for two matrix spike (70% and 70.2%) and matrix spike duplicate (69% and 69.4%) samples were outside the laboratory/QAPP control limits of 75% to 125%. The RPDs for selenium spike samples ranged from 0.0% to 20.6% (average RPD 3.4%) and were all within the laboratory/QAPP RPD control limit of 50%.

3.1.2 Reporting Limits for ICP Arsenic Analyses

To counteract potential spectral interferences due to aluminum, chromium, or vanadium during ICP analyses, 63 samples analyzed for arsenic were diluted as follows: 2 samples were diluted at a 1:2 ratio; 59 were diluted at a 1:5 ratio; and 2 were diluted at a 1:10 ratio. Sample reporting limits ranged from 2 to 10 mg/kg, with the exception of the two samples that were diluted at a 1:10 ratio. The samples diluted at a 1:10 ratio had reporting limits of 20 mg/kg, which exceeds the QAPP control reporting limit of 10 mg/kg.

Cadmium reporting limits ranged from 0.25 to 2.5 mg/kg (37 samples at 0.25 mg/kg and 21 samples between 0.3 and 2.5 mg/kg). Undiluted samples had reporting limits of 0.25 mg/kg, which meets the laboratory/QAPP control reporting limit of 0.25 mg/kg for cadmium. Samples that were diluted because of spectral interferences had reporting limits that exceeded 0.25 mg/kg (0.3 to 2.5 mg/kg).

Reporting limits for 56 of 58 lead samples were 2.0 mg/kg, which met the laboratory/QAPP control reporting limit for lead of 2.0 mg/kg. Because of spectral interferences, the remaining two lead samples were diluted at a 1:5 ratio, which resulted in a reporting limit of 10.0 mg/kg.

Reporting limits for the 58 selenium samples were fairly evenly distributed between 4.0 and 170 mg/kg. Dilutions at various ratios were required because of spectral interferences, which accounts for the broad range of reporting limits. No control standards for selenium reporting limits for the ICP analytical method were established in the QAPP.

3.1.3 Mercury Matrix Spike/Matrix Spike Duplicates for Method 7471

Of the 58 soil samples analyzed for mercury by EPA Method 7471, 4 were spiked with 0.68 mg/kg mercury and analyzed in duplicate. Matrix spike and matrix spike duplicate recoveries were reported for only 3 of the spiked samples. Recoveries for matrix spike and matrix spike duplicates ranged from 125% to 250% and 118% to 353%, respectively. The average percent recoveries for matrix spike and matrix spike duplicates were 169.7% and 216.3%, respectively. The matrix spike recovery for 1 sample (250%) and matrix spike duplicate recoveries for 2 samples (353% and 178%) were outside the laboratory/QAPP control spike recovery limits of 75% to 125%. The RPD for matrix spike duplicates ranged from 6.1% to 34.1% and averaged 22.8%, which are within the laboratory/QAPP control limit of 50%.

3.1.4 Reporting Limits for Method 7471 (Mercury)

To counteract spectral interferences during mercury analysis, 3 samples were diluted at a

1:2 ratio; 16 samples were diluted at approximately a 1:2.9 ratio; and one (1) sample was diluted at a 1:5 ratio. Sample reporting limits ranged from 0.14 to 0.70 mg/kg.

4.0 SOIL REQUIRING TREATMENT

The Site Cleanup Requirements for the upland operable unit at the 1990 Bay Road site (RWQCB Order 92-022) specifies the cleanup standard that accessible soils containing more than 500 mg/kg of arsenic be treated by fixation technology. This section describes how the soil sampling data from the upland operable unit were used to define the volume of soil to be treated to achieve the cleanup standard of 500 mg/kg. The procedures described in this section are based on the EPA guidance document titled "Methods for Evaluating the Attainment of Cleanup Standards--Volume 1: Soils and Solid Media" (EPA 230/02-89-042).

4.1 DEFINITION OF A CLEANUP STANDARD

Often cleanup standards are considered absolute; that is, no exceedances of the cleanup standard are allowed. The EPA guidance document indicates that cleanup standards are not absolutes, rather that sites shall be cleaned up "until the sampling program indicates with reasonable confidence that the concentrations of the contaminants at the entire site are statistically less than the cleanup standard." This section discusses statistical procedures that were used to calculate the volume of soil at the site to be treated to achieve the required cleanup standard with a reasonable degree of confidence.

The cleanup standards established for the 1990 Bay Road site are based on considerations of carcinogenic and chronic health effects and long-term average exposure to site contaminants. In these circumstances, the EPA guidance document indicates that the parameter of concern in evaluating attainment of cleanup standards is the mean. In evaluating attainment of a cleanup standard by using the mean concentration, two types of errors can be made: 1) the site can declared clean when in fact the site does not meet the cleanup standard; and 2) the site can declared to not meet the cleanup standard when in fact the site is clean. This document assumes the desired confidence level associated with attainment of the cleanup standard is 95 percent. This implies there is only a 5 percent probability that the site will be declared clean when in fact is does not meet the cleanup standard. In addition, no more than a 20 percent probability of declaring the site does not meet the cleanup standard when in fact the site is clean is desired.

4.2 PROCEDURES USED TO CALCULATE TREATMENT DEPTHS

To estimate volumes of soil to be treated, the upland operable unit was subdivided into two types of areas: those where soil contamination is relatively shallow, and those where soil contamination is relatively deep. The areas having relatively deep soil contamination are the former sludge pond area and the railroad track area.

The volume of soil to be treated was calculated by defining a treatment depth for each cell in a grid system defined for the upland operable unit. The cells generally measure 20 by 20 feet, and typically one soil boring was drilled in each cell. The data from these borings were used to define a treatment depth for each cell.

The procedure used to calculate the treatment depth for a given cell in areas of shallow contamination (outside of the sludge pond area and the railroad track area) was the following:

- The depth of soil to be treated in each cell was defined as the top of the first sample interval below the deepest soil sample containing an arsenic concentrations greater than 500 mg/kg. If more than one boring was located within a cell, the boring location showing the deepest arsenic concentration greater than 500 mg/kg was used to define the depth of treatment.

This procedure, which was used in areas having shallow soil contamination, achieves the cleanup standard with more than a 99.9 percent level of confidence, because it specifies that all soils known contain more than 500 mg/kg are to be treated, and because it is based on a dense sampling grid. Appendix C of the Remedial Design Report discusses in detail the cleanup levels that will be achieved in the areas having shallow soil contamination, and discusses the confidence level associated with achieving the cleanup standard of 500 mg/kg.

The procedure used to calculate the treatment depth in the sludge pond and railroad track areas was the following:

- Step 1

  The treatment depth was specified as at least the depth of the top of the first sampling interval containing an arsenic concentration of 500 mg/kg or less.

- Step 2

  A greater treatment depth was specified if the following conditions were met:

  - If any soil sample from below the depth interval specified in step 1 was reported to contain an arsenic concentration greater than 1000 mg/kg. In that case, the treatment depth was defined as between the top of the next sample (below the interval determined in step 1) containing an arsenic concentration less that 500 mg/kg and the base of the next higher sampling interval (where arsenic concentrations exceeded 500 mg/kg).

  - If the depth determined, in step 1, was based on what appeared to be an anomalously low value relative to values reported for sample intervals both above and below the sample interval containing less than 500 mg/kg. In that case, the treatment depth was defined as between the top of the next sample (below the interval determined in step 1) containing an arsenic concentration less than 500 mg/kg and the base of the next higher sampling interval.

This two-step procedure produced treatment volumes that achieve the desired cleanup standard with better than a 99 percent level of confidence, even though this procedure does not specify the treatment of all soils containing arsenic concentrations in excess of 500 mg/kg. Some isolated pockets of soils having arsenic concentrations slightly greater than 500 mg/kg remain untreated in these areas. The cleanup levels that will be achieved in the areas of deep soil contamination are discussed in detail in Appendix C of the Remedial Design Report.

5.0 RESULTS AND DISCUSSION

Results from recent pre-treatment sampling and previous soil sampling programs were used to approximate the lateral and vertical extent and volume of soil requiring silicate treatment to achieve the cleanup criterion of 500 mg/kg (termed "affected soil") in the north and south areas of the upland operable unit. Analytical results from the pre-treatment soil sampling are listed in Table 1. Analytical results for soil samples collected during the 70 mg/kg arsenic investigation (Geomatrix and SSP&A, 1992) are listed in Table 2. The depths and arsenic concentrations of soil samples collected during the remedial investigation (Geomatrix and SSP&A, 1989) are listed in Tables 3A and 3B. The north and south areas are shown on Figures 3 through 5. For the pre-treatment sampling, one boring was located approximately in the center of each cell (these boring locations are not shown on Figures 3 through 5). One or more boring locations from previous sampling programs were used to approximate the cell depths; these boring locations are shown on Figures 3 through 5.

The approximate areas and volumes of affected soil in the Sandoz north area and the Curtaccio property, the PG&E Poleyard, and the railroad track area and Bains property are described in Sections 5.1, 5.2, and 5.3 respectively.

Analytical results indicated that several soil samples contained more than 5000 mg/kg arsenic (Tables 1 and 2). These samples were from boring locations within the Sandoz north area (PRN-C11, F10, L2, Q9, S3, S8, and T7; Figure 3), south of Bay Road (PR1-21A; Figure 3), and along the former Sandoz railroad track area (PR4-E2, M1, O1, V1, and W1; Figure 5). Remediation of soil contained arsenic concentrations greater than

5000 mg/kg is addressed in Appendix C of the Remedial Design Report.

5.1 SANDOZ NORTH AREA

Based on results of the pre-remediation sampling (Table 1), soil requiring treatment on the Sandoz north area generally is restricted to the upper two feet of soil (Figure 3). The northwest corner of the Sandoz north area appears to be the least affected. Soil is affected to greater depths along the eastern side of the Sandoz north area (to 7 feet) and in the southwest corner, where the former sludge pond was located. The treatment depths for the sludge pond area are presented on Figure 3. Based on the depths presented on Figure 3, the volume of soil to be treated is approximately 5600 cubic yards.

A total of 40 selected samples used to estimate the vertical extent of affected soil and 4 other samples from the Sandoz north area were analyzed for cadmium, lead, mercury, and selenium. Results of these samples are included in Table 1. The analytical results for these samples were all below the respective soil cleanup guidelines for cadmium, mercury, lead, and selenium.

5.2 CURTACCIO PROPERTY AND PG&E POLEYARD

Previous soil sampling results (Tables 2 and 3A) were used to estimate the lateral and vertical extent and volume of soil to be treated on the Curtaccio property and the PG&E Poleyard; the arsenic-affected soil depths are shown on Figures 3 and 4, respectively. Affected soil on the Curtaccio property ranges in depth from 1.0 to 3.5 feet. Affected soil on the PG&E Poleyard area ranges in a depth from 0.5 to 6.0 feet. Approximately 250 cubic yards of affected soil are present at the Curtaccio property and 150 cubic yards at the PG&E Poleyard.

Selected soil samples from boring locations within the Curtaccio and PG&E Poleyard properties were analyzed for cadmium, lead, mercury, and selenium (Tables 2 and 3A). The analytical results for these samples were all below the respective soil cleanup guidelines for the four metals.

5.3 RAILROAD TRACK AREA AND BAINS PROPERTY

The lateral and vertical extent of soil to be treated in the south areas were estimated based on the pre-treatment and other previous soil sampling results (Tables 1 and 3B). Based on these estimates, the volume of affected soil is approximately 2200 cubic yards in the former Sandoz railroad area and approximately 175 cubic yards in the area within the Bains property.

As part of the RI sampling program, one soil sample at the Bains property was tested for arsenic, cadmium, lead, mercury, and selenium (Table 3B). In this sample, arsenic (at 1900 mg/kg as compared to the target of 500 mg/kg) and lead (at 500 mg/kg as compared to the target of 450 mg/kg) exceeded the soil cleanup guidelines. A total of 11 selected samples used to estimate the vertical extent of affected soil and 3 other samples from the former Sandoz railroad area were analyzed for cadmium, lead, mercury, and selenium. The analytical results of these samples are included in Table 1. Results were all below the respective soil cleanup guidelines for the four metals.

6.0 REFERENCES

Geomatrix Consultants and S.S. Papadopulos & Associates, 1989, Remedial Investigation Report, 1990 Bay Road Site and Vicinity, East Palo Alto, California, 8 February.

Geomatrix Consultants and S.S. Papadopulos & Associates, 1991a, Quality Assurance Project Plan, 1990 Bay Road Site, East Palo Alto, California, 22 May.

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Geomatrix Consultants and S.S. Papadopulos & Associates, 1992, Pre-Remediation Soil Sampling Report and Excavation Work Plan for Off-Site Properties: Upland Operable Unit, 1990 Bay Road Site, East Palo Alto, California, 31 March.

TABLES

TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PR4-D1	2.5	884.0				
PR4-D1	3.0	2040.0				
PR4-D1	3.5	1480.0				
PR4-D1	4.0	593.0				
PR4-D1	4.5	750.0				
PR4-D1	6.0	526.0				
PR4-D1	8.0	652.0				
PR4-D1	9.0	369.0				
PR4-D1	10.0	188.0				
PR4-D1	12.0	460.0				
PR4-D1	14.0	519.0				
PR4-D1	15.0	783.0				
PR4-D2	2.5	36.4				
PR4-D2	3.0	872.0				
PR4-D2	3.5	252.0	2.60	22.00	-.14	-60.00
PR4-D2	4.0	153.0				
PR4-E1	2.0	1240.0				
PR4-E1	3.0	1000.0				
PR4-E1	4.0	741.0				
PR4-E1	4.5	361.0	-.25	-2.00	.18	-40.00
PR4-E2	2.5	26100.0				
PR4-E2	3.0	2160.0				
PR4-E2	3.5	680.0				
PR4-E2	4.0	554.0				
PR4-E2	4.5	542.0				
PR4-E2	6.0	318.0				
PR4-E2	7.0	305.0				
PR4-E2	10.0	213.0				
PR4-E2	15.0	341.0				
PR4-F1	3.0	1160.0				
PR4-F1	4.0	972.0				
PR4-F1	5.0	10.2	.26	2.70	-.14	-60.00
PR4-F1	7.0	81.3				
PR4-F1	9.0	200.0				
PR4-F1	10.0	659.0				
PR4-F1	13.0	588.0				
PR4-F1	14.0	991.0				
PR4-F1	15.0	634.0				
PR4-F1	16.0	476.0				
PR4-F1	20.0	485.0				
PR4-F1	23.0	287.0				
PR4-F1	32.0	47.6				
PR4-F1	36.0	-2.0				
PR4-F2	2.0	3580.0				

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[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

[2] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limits.

TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PR4-F2	5.0	1500.0				
PR4-F2	7.0	767.0				
PR4-F2	10.0	605.0				
PR4-G1	2.5	907.0				
PR4-G1	6.0	430.0				
PR4-G1	8.0	446.0				
PR4-G1	10.0	476.0				
PR4-G1	11.0	543.0				
PR4-G1	13.0	550.0				
PR4-G1	14.0	502.0				
PR4-G1	15.0	881.0				
PR4-G1	16.0	516.0				
PR4-G1	18.0	330.0				
PR4-G1	21.0	395.0				
PR4-G1	25.0	88.0				
PR4-G2	4.0	3390.0				
PR4-G2	5.0	3220.0				
PR4-G2	7.0	671.0				
PR4-G2	8.0	426.0	-.25	-2.00	-.14	-10.00
PR4-G2	10.0	434.0				
PR4-G2	11.0	365.0				
PR4-G2	12.0	310.0				
PR4-G2	14.0	391.0				
PR4-G2	15.0	325.0				
PR4-G2	17.0	344.0				
PR4-H1	3.5	154.0				
PR4-H1	6.0	86.8				
PR4-H1	7.0	51.5				
PR4-H1	10.0	332.0				
PR4-H1	13.0	730.0				
PR4-H1	15.0	577.0				
PR4-H1	16.0	419.0	-1.00	5.60	-.14	-170.00
PR4-H1	20.0	334.0				
PR4-H1	23.0	444.0				
PR4-H1	24.0	247.0				
PR4-H2	3.5	4610.0				
PR4-H2	7.0	4010.0				
PR4-H2	8.0	239.0				
PR4-H2	9.0	215.0				
PR4-H2	10.0	598.0				
PR4-H2	11.0	530.0				
PR4-H2	12.0	635.0				
PR4-H2	13.0	791.0				
PR4-H2	14.0	685.0				
PR4-H2	15.0	886.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

[2] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limits.

TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PR4-H2	16.0	631.0				
PR4-H2	17.0	400.0				
PR4-H2	19.0	312.0				
PR4-H2	23.0	208.0				
PR4-I1	5.0	818.0				
PR4-I1	6.0	527.0				
PR4-I1	8.0	255.0				
PR4-I1	11.0	368.0				
PR4-I1	15.0	728.0				
PR4-I1	16.0	1200.0				
PR4-I1	17.0	476.0				
PR4-I1	18.0	511.0				
PR4-I2	6.0	113.0				
PR4-I2	8.0	269.0				
PR4-I2	9.0	450.0				
PR4-I2	10.0	317.0				
PR4-I2	11.0	522.0				
PR4-I2	12.0	575.0				
PR4-I2	13.0	398.0				
PR4-I2	14.0	473.0				
PR4-I2	15.0	520.0				
PR4-I2	17.0	351.0				
PR4-J1	2.5	2930.0				
PR4-J1	5.0	2010.0				
PR4-J1	7.0	712.0				
PR4-J1	10.0	701.0				
PR4-J1	12.0	428.0	-1.00	4.50	-.14	-120.00
PR4-J2	4.5	1790.0				
PR4-J2	5.0	542.0				
PR4-J2	8.0	367.0				
PR4-J2	9.0	1090.0				
PR4-J2	10.0	428.0				
PR4-K1	5.0	2300.0				
PR4-K1	7.0	823.0				
PR4-K1	9.0	586.0				
PR4-K1	10.0	578.0				
PR4-K1	12.0	763.0				
PR4-K1	13.0	150.0				
PR4-K1	14.0	-20.0				
PR4-K1	16.0	106.0				
PR4-K1	20.0	316.0				
PR4-K1	28.0	270.0				
PR4-K1	39.0	17.2				
PR4-K1	47.0	-2.0				
PR4-K2	4.0	1530.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

[2] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limits.

TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PR4-K2	5.0	1030.0				
PR4-K2	6.0	345.0	-.25	2.90	-.14	-50.00
PR4-K2	7.0	314.0				
PR4-K2	9.0	344.0				
PR4-K2	10.0	542.0				
PR4-K2	12.0	566.0				
PR4-K2	14.0	545.0				
PR4-K2	20.0	451.0				
PR4-L1	4.0	504.0				
PR4-L1	4.5	269.0				
PR4-L1	5.0	285.0				
PR4-L1	6.0	407.0				
PR4-L1	8.0	240.0				
PR4-L1	9.0	417.0				
PR4-L1	11.0	282.0				
PR4-L1	12.0	841.0				
PR4-L1	13.0	871.0				
PR4-L1	15.0	750.0				
PR4-L1	16.0	658.0				
PR4-L1	17.0	318.0				
PR4-L1	18.0	234.0				
PR4-L1	19.0	313.0				
PR4-L1	20.0	575.0				
PR4-L1	21.0	388.0				
PR4-L1	22.0	392.0				
PR4-L1	23.0	344.0				
PR4-L1	24.0	491.0				
PR4-L1	25.0	264.0				
PR4-L2	4.5	540.0				
PR4-L2	5.0	510.0				
PR4-L2	8.0	317.0	-.50	4.80	-.14	-50.00
PR4-L2	9.0	337.0				
PR4-M1	3.0	5330.0				
PR4-M1	6.0	1250.0				
PR4-M1	8.0	804.0				
PR4-M1	10.0	868.0				
PR4-M1	12.0	732.0				
PR4-M1	14.0	804.0				
PR4-M1	16.0	854.0				
PR4-M1	17.0	739.0				
PR4-M1	21.0	469.0				
PR4-M1	27.0	297.0				
PR4-M1	35.0	60.3				
PR4-M1	43.0	-4.0				
PR4-M2	4.5	460.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

[2] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limits.

TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PR4-M2	6.0	314.0				
PR4-M2	7.0	458.0				
PR4-M2	9.0	271.0				
PR4-N1	3.5	1140.0				
PR4-N1	7.0	372.0				
PR4-N1	8.0	753.0				
PR4-N1	9.0	751.0				
PR4-N1	10.0	603.0				
PR4-N1	12.0	511.0				
PR4-N1	12.0	562.0				
PR4-N1	15.0	680.0				
PR4-N1	16.0	849.0				
PR4-N1	17.0	856.0				
PR4-N1	18.0	460.0				
PR4-N1	20.0	324.0				
PR4-N1	40.0	9.6				
PR4-N1	41.5	5.3				
PR4-N2	3.5	1000.0				
PR4-N2	4.5	456.0	-1.00	3.00	-.14	-50.00
PR4-N2	5.0	422.0				
PR4-N2	6.0	334.0				
PR4-N2	8.0	363.0				
PR4-N2	9.0	488.0				
PR4-N2	10.0	421.0				
PR4-N2	12.0	760.0				
PR4-N2	13.0	726.0				
PR4-N2	14.0	473.0				
PR4-N2	15.0	428.0				
PR4-N2	17.0	424.0				
PR4-N2	20.0	397.0				
PR4-O1	3.5	6080.0				
PR4-O1	8.0	459.0				
PR4-O1	11.0	430.0				
PR4-O1	12.0	567.0				
PR4-O1	13.0	401.0				
PR4-O1	15.0	690.0				
PR4-O1	17.0	755.0				
PR4-O1	18.0	277.0				
PR4-O1	19.0	517.0				
PR4-O1	20.0	400.0				
PR4-O1	21.0	455.0				
PR4-O1	22.0	334.0				
PR4-O1	25.0	347.0				
PR4-O1	30.0	90.4				
PR4-O1	37.0	20.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

[2] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limits.

TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth 1	Arsenic	Cadmium 2	Lead	Mercury	Selenium
PR4-01	41.0	7.4				
PR4-02	3.5	743.0				
PR4-02	6.0	270.0				
PR4-02	8.0	497.0				
PR4-02	10.0	241.0				
PR4-02	11.0	377.0				
PR4-02	13.0	584.0				
PR4-02	14.0	660.0				
PR4-02	15.0	576.0				
PR4-02	16.0	622.0				
PR4-02	17.0	737.0				
PR4-02	18.0	899.0				
PR4-02	19.0	436.0				
PR4-02	22.0	313.0				
PR4-02	25.0	356.0				
PR4-P1	3.5	1010.0				
PR4-P1	7.0	353.0				
PR4-P1	8.0	254.0				
PR4-P1	11.0	723.0				
PR4-P1	12.0	652.0				
PR4-P1	13.0	534.0				
PR4-P1	16.0	427.0				
PR4-P1	17.0	607.0				
PR4-P1	18.0	394.0				
PR4-P1	20.0	324.0				
PR4-P2	2.0	3370.0				
PR4-P2	4.0	280.0				
PR4-P2	6.0	250.0				
PR4-P2	7.0	198.0				
PR4-P2	8.0	671.0				
PR4-P2	9.0	567.0				
PR4-P2	11.0	399.0				
PR4-P2	16.0	582.0				
PR4-P2	17.0	322.0				
PR4-P2	20.0	250.0				
PR4-Q1	6.0	444.0				
PR4-Q1	8.0	363.0				
PR4-Q1	12.0	194.0				
PR4-Q1	15.0	241.0				
PR4-Q1	17.0	284.0				
PR4-Q2	3.5	358.0	3.00	2.10	-.14	-100.00
PR4-Q2	5.0	323.0				
PR4-Q2	6.0	272.0				
PR4-Q2	8.0	245.0				
PR4-Q2	11.0	135.0				

1 Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PR4-Q2	14.0	258.0				
PR4-R1	4.0	1560.0				
PR4-R1	7.0	5170.0				
PR4-R1	10.0	280.0	-.25	3.50	-.14	-40.00
PR4-R1	12.0	313.0				
PR4-R1	13.0	181.0				
PR4-R1	15.0	360.0				
PR4-R1	17.0	423.0				
PR4-R2	5.0	29.2				
PR4-R2	8.0	241.0				
PR4-R2	11.0	334.0				
PR4-R2	15.0	199.0				
PR4-S1	3.5	1460.0				
PR4-S1	8.0	439.0				
PR4-S1	10.0	780.0				
PR4-S1	11.0	559.0				
PR4-S1	12.0	520.0				
PR4-S1	13.0	552.0				
PR4-S1	15.0	540.0				
PR4-S1	16.0	466.0				
PR4-S1	17.0	684.0				
PR4-S1	18.0	528.0				
PR4-S1	20.0	271.0				
PR4-S1	24.0	136.0				
PR4-S1	39.0	4.6				
PR4-S2	6.0	191.0				
PR4-S2	7.0	587.0				
PR4-S2	8.0	1740.0				
PR4-S2	9.0	960.0				
PR4-S2	10.0	516.0				
PR4-S2	10.0	516.0				
PR4-S2	15.0	296.0				
PR4-S2	15.0	296.0	-.25	6.40	-.14	-70.00
PR4-T1	4.0	295.0				
PR4-T1	8.0	223.0				
PR4-T1	10.0	560.0				
PR4-T1	11.0	471.0	-1.00	4.20	-.14	-130.00
PR4-T1	13.0	51.5				
PR4-T1	14.0	169.0				
PR4-T1	17.0	364.0				
PR4-T2	5.0	270.0				
PR4-T2	8.0	320.0				
PR4-T2	9.0	243.0				
PR4-T2	10.0	238.0				
PR4-T2	13.0	283.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth 1	Arsenic	Cadmium 2	Lead	Mercury	Selenium
PR4-T2	15.0	14.7				
PR4-U1	1.5	762.0				
PR4-U1	2.0	658.0				
PR4-U1	3.0	162.0				
PR4-U1	6.0	162.0				
PR4-U1	9.0	111.0				
PR4-U1	11.0	55.9				
PR4-U2	2.5	2670.0				
PR4-U2	3.0	539.0				
PR4-U2	3.5	119.0				
PR4-U2	5.0	64.6				
PR4-U2	7.0	10.9				
PR4-U2	10.0	187.0				
PR4-V1	4.0	30900.0				
PR4-V1	6.0	4730.0				
PR4-V1	8.0	696.0				
PR4-V1	9.0	570.0				
PR4-V1	10.0	510.0				
PR4-V1	11.0	550.0				
PR4-V1	12.0	721.0				
PR4-V1	14.0	524.0				
PR4-V1	15.0	466.0				
PR4-V1	17.0	419.0				
PR4-V1	18.0	14.0				
PR4-V1	25.0	3.7				
PR4-V2	3.5	2280.0				
PR4-V2	4.5	449.0				
PR4-V2	5.0	387.0				
PR4-V2	7.0	303.0				
PR4-V2	9.0	242.0				
PR4-W1	1.0	1090.0				
PR4-W1	2.0	778.0				
PR4-W1	3.0	-20.0				
PR4-W1	5.0	46.5				
PR4-W1	9.0	43.0				
PR4-W1	12.0	350.0				
PR4-W1	13.0	525.0				
PR4-W1	14.0	427.0				
PR4-W1	15.0	361.0				
PR4-W1	20.0	29.4				
PR4-W2	3.5	41000.0				
PR4-W2	7.0	1940.0				
PR4-W2	8.0	466.0	-.50	6.20	-.14	-50.00
PR4-W2	9.0	262.0				
PRN-A1	.1	126.0				

Run 5' sample

Get Data Base
Abs. elevations

check for

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1 Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-A1	.5	214.0				
PRN-A1	1.0	188.0				
PRN-A10	.5	732.0				
PRN-A10	1.5	347.0				
PRN-A10	2.0	208.0				
PRN-A10	3.5	9.5				
PRN-A10	5.0	132.0				
PRN-A11	.5	601.0				
PRN-A11	1.0	389.0				
PRN-A11	1.5	232.0				
PRN-A11	3.5	62.2				
PRN-A11	5.0	208.0				
PRN-A11	7.0	34.9				
PRN-A3	.1	124.0				
PRN-A3	.5	274.0				
PRN-A4	.1	741.0				
PRN-A4	1.0	1510.0				
PRN-A4	2.0	212.0				
PRN-A5	.1	1530.0				
PRN-A5	1.0	3650.0				
PRN-A5	1.5	254.0	.84	5.30	-.14	-65.00
PRN-A5	2.0	220.0				
PRN-A5	3.0	327.0				
PRN-A6	.5	80.5				
PRN-A6	1.0	88.8				
PRN-A6	1.5	197.0				
PRN-A6	2.0	108.0				
PRN-A7	1.0	348.0				
PRN-A7	1.5	30.0				
PRN-A7	2.0	24.0				
PRN-A7	2.5	19.9				
PRN-A8	1.0	494.0				
PRN-A8	2.5	91.0				
PRN-A8	3.5	136.0				
PRN-A8	4.5	205.0				
PRN-A9	.5	1640.0				
PRN-A9	1.0	508.0				
PRN-A9	1.5	476.0	1.10	5.20	-.14	-40.00
PRN-A9	3.0	139.0				
PRN-A9	4.5	196.0				
PRN-B1	1.0	72.6				
PRN-B10	8.0	712.0				
PRN-B10	9.0	470.0	1.10	4.80	-.14	-50.00
PRN-B10	10.0	500.0				
PRN-B10	13.0	383.0				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-B11	2.5	1240.0				
PRN-B11	7.0	1710.0				
PRN-B11	10.0	3130.0				
PRN-B11	11.0	2570.0				
PRN-B11	12.0	3310.0				
PRN-B11	13.0	1000.0				
PRN-B11	15.0	740.0				
PRN-B11	18.0	260.0				
PRN-B11	19.0	369.0				
PRN-B11	23.0	214.0				
PRN-B11	27.0	513.0				
PRN-B11	29.0	22.4				
PRN-B11	33.0	27.7				
PRN-B2	.1	291.0				
PRN-B2	.5	246.0				
PRN-B2	1.0	141.0				
PRN-B3	1.0	410.0				
PRN-B3	1.5	119.0				
PRN-B4	.1	96.6				
PRN-B4	.5	385.0				
PRN-B4	1.0	118.0				
PRN-B5	.1	539.0				
PRN-B5	.5	741.0				
PRN-B5	1.0	421.0				
PRN-B5	1.5	222.0				
PRN-B6	.1	203.0	2.60	25.00	1.60	-20.00
PRN-B6	.5	186.0				
PRN-B6	1.0	308.0				
PRN-B6	1.5	202.0				
PRN-B6	2.5	64.2				
PRN-B7	.5	675.0				
PRN-B7	1.0	659.0				
PRN-B7	1.5	614.0				
PRN-B7	2.0	575.0				
PRN-B7	2.5	530.0				
PRN-B7	3.5	126.0				
PRN-B8	1.5	1000.0				
PRN-B8	3.0	1200.0				
PRN-B8	4.0	1700.0				
PRN-B8	5.0	281.0				
PRN-B8	6.0	280.0				
PRN-B9	7.0	807.0				
PRN-B9	8.0	617.0				
PRN-B9	9.0	303.0				
PRN-B9	15.0	461.0				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-C1	.1	69.1				
PRN-C1	.5	177.0				
PRN-C1	1.0	36.3				
PRN-C10	7.0	632.0				
PRN-C10	9.0	1450.0				
PRN-C10	10.0	614.0				
PRN-C10	15.0	724.0				
PRN-C10	17.0	496.0				
PRN-C10	19.0	366.0				
PRN-C10	22.0	369.0				
PRN-C10	30.0	250.0				
PRN-C11	15.0	5750.0				
PRN-C11	16.0	5810.0				
PRN-C11	19.0	1050.0				
PRN-C11	22.0	959.0				
PRN-C11	24.0	819.0				
PRN-C11	26.0	376.0	-.25	-2.00	.16	-70.00
PRN-C11	30.0	359.0				
PRN-C11	32.0	597.0				
PRN-C11	33.0	556.0				
PRN-C11	34.0	28.7				
PRN-C11	35.0	29.7				
PRN-C2	.1	220.0				
PRN-C2	.5	115.0				
PRN-C2	1.0	41.9				
PRN-C3	.1	321.0				
PRN-C3	.5	523.0				
PRN-C3	1.5	10.5				
PRN-C4	1.0	151.0				
PRN-C4	2.0	27.2				
PRN-C4	3.0	31.0				
PRN-C4	4.0	9.3				
PRN-C5	1.0	295.0				
PRN-C5	1.5	187.0				
PRN-C5	2.5	105.0				
PRN-C5	3.0	87.8				
PRN-C6	.1	285.0				
PRN-C6	.5	141.0				
PRN-C6	1.0	61.7				
PRN-C6	2.0	66.3				
PRN-C7	.5	1450.0				
PRN-C7	1.5	510.0				
PRN-C7	2.5	408.0				
PRN-C7	3.5	274.0				
PRN-C8	3.5	1310.0				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth 1	Arsenic	Cadmium 2	Lead	Mercury	Selenium
PRN-C8	4.0	651.0				
PRN-C8	5.0	368.0	-.25	3.70	-.14	-10.00
PRN-C8	6.0	87.0				
PRN-C8	7.0	294.0				
PRN-C8	8.0	322.0				
PRN-C8	15.0	307.0				
PRN-C9	5.0	2820.0				
PRN-C9	8.0	412.0				
PRN-C9	9.0	547.0				
PRN-C9	10.0	467.0				
PRN-C9	12.0	436.0				
PRN-C9	15.0	465.0				
PRN-C9	18.0	474.0				
PRN-C9	20.0	289.0				
PRN-C9	25.0	242.0				
PRN-D1	.1	146.0				
PRN-D1	.5	210.0				
PRN-D1	1.0	131.0				
PRN-D10	4.0	1700.0				
PRN-D10	5.0	773.0				
PRN-D10	6.0	540.0				
PRN-D10	7.0	388.0				
PRN-D10	10.0	481.0				
PRN-D10	14.0	528.0				
PRN-D10	17.0	609.0				
PRN-D10	19.0	448.0				
PRN-D10	22.0	294.0				
PRN-D10	25.0	119.0				
PRN-D10	30.0	589.0				
PRN-D10	31.0	353.0				
PRN-D10	32.0	186.0				
PRN-D10	33.0	450.0				
PRN-D10	34.0	18.7				
PRN-D10	35.5	23.1				
PRN-D10	39.0	-3.0				
PRN-D10	41.0	-3.0				
PRN-D11	17.0	4500.0				
PRN-D11	18.0	3250.0				
PRN-D11	19.0	3270.0				
PRN-D11	20.0	1800.0				
PRN-D11	23.0	1960.0				
PRN-D11	25.0	280.0				
PRN-D11	28.0	567.0				
PRN-D11	32.0	540.0				
PRN-D11	33.0	415.0				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-D11	35.0	10.3				
PRN-D2	.1	75.4				
PRN-D2	.5	10.8				
PRN-D2	1.0	28.9				
PRN-D3	.1	139.0				
PRN-D3	.5	71.8				
PRN-D3	1.0	69.1				
PRN-D4	.1	297.0	7.30	141.00	6.40	-120.00
PRN-D4	1.5	92.7				
PRN-D4	2.5	61.5				
PRN-D4	3.5	63.9				
PRN-D5	.1	386.0				
PRN-D5	1.0	178.0				
PRN-D5	2.0	58.7				
PRN-D5	3.0	33.0				
PRN-D5	4.0	30.3				
PRN-D5	7.0	-4.0				
PRN-D6	1.0	152.0				
PRN-D6	2.0	39.2				
PRN-D6	3.0	35.4				
PRN-D6	4.0	40.6				
PRN-D7	1.0	415.0				
PRN-D7	2.0	142.0				
PRN-D7	3.0	44.8				
PRN-D7	3.5	41.6				
PRN-D8	1.0	1390.0				
PRN-D8	2.0	989.0				
PRN-D8	3.0	557.0				
PRN-D8	4.0	467.0	-.25	6.20	.22	-130.00
PRN-D8	5.0	270.0				
PRN-D9	2.5	3040.0				
PRN-D9	3.5	2910.0				
PRN-D9	4.5	1560.0				
PRN-D9	5.0	629.0				
PRN-D9	5.0	632.0				
PRN-D9	8.0	507.0				
PRN-D9	10.0	436.0				
PRN-D9	13.0	289.0				
PRN-D9	15.0	447.0				
PRN-E1	.1	183.0				
PRN-E1	.5	229.0				
PRN-E1	1.0	162.0				
PRN-E10	2.5	2360.0				
PRN-E10	4.0	2500.0				
PRN-E10	5.0	2140.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

[2] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limits.

TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-E10	6.0	727.0				
PRN-E10	7.5	342.0				
PRN-E10	8.0	583.0				
PRN-E10	11.0	341.0				
PRN-E10	14.5	1080.0				
PRN-E10	17.0	691.0				
PRN-E10	19.0	420.0				
PRN-E10	22.0	341.0				
PRN-E10	25.0	142.0				
PRN-E11	2.5	3010.0				
PRN-E11	4.0	4160.0				
PRN-E11	5.0	3400.0				
PRN-E11	7.0	1280.0				
PRN-E11	8.0	381.0				
PRN-E11	11.0	351.0				
PRN-E11	14.5	823.0				
PRN-E11	17.0	772.0				
PRN-E11	19.0	386.0				
PRN-E11	22.0	323.0				
PRN-E11	24.0	222.0				
PRN-E11	30.0	374.0				
PRN-E2	.1	368.0				
PRN-E2	.5	11.9				
PRN-E2	1.0	9.4				
PRN-E3	.1	2370.0				
PRN-E3	.5	252.0				
PRN-E3	1.0	31.4				
PRN-E4	.1	202.0				
PRN-E4	.5	373.0				
PRN-E4	1.0	232.0				
PRN-E4	1.5	180.0				
PRN-E5	.1	486.0				
PRN-E5	.5	348.0				
PRN-E5	1.0	181.0				
PRN-E5	2.0	78.0				
PRN-E5	3.0	65.8				
PRN-E6	.1	138.0	4.90	22.00	.96	-25.00
PRN-E6	1.5	26.8				
PRN-E6	2.0	25.6				
PRN-E6	2.5	23.7				
PRN-E7	.1	261.0				
PRN-E7	.5	314.0				
PRN-E7	1.5	62.7				
PRN-E7	2.0	153.0				
PRN-E7	2.5	27.5				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-E7	3.0	24.1				
PRN-E8	1.0	775.0				
PRN-E8	1.5	1610.0				
PRN-E8	2.0	1710.0				
PRN-E8	2.5	839.0				
PRN-E8	3.0	1560.0				
PRN-E8	3.5	298.0	-.25	4.90	-.14	-120.00
PRN-E8	4.0	1140.0				
PRN-E8	5.0	287.0				
PRN-E8	7.0	235.0				
PRN-E8	9.5	238.0				
PRN-E9	2.0	1990.0				
PRN-E9	3.0	2600.0				
PRN-E9	4.0	2400.0				
PRN-E9	4.5	2500.0				
PRN-E9	5.0	1220.0				
PRN-E9	10.0	3900.0				
PRN-E9	13.0	793.0				
PRN-E9	15.0	1200.0				
PRN-E9	17.0	491.0				
PRN-E9	19.0	820.0				
PRN-E9	22.0	387.0				
PRN-E9	25.0	183.0				
PRN-E9	30.0	160.0				
PRN-F1	.1	860.0				
PRN-F1	.5	494.0				
PRN-F1	1.0	324.0				
PRN-F10	1.5	2780.0				
PRN-F10	3.0	5500.0				
PRN-F10	4.0	4910.0				
PRN-F10	5.0	3000.0				
PRN-F10	8.0	2380.0				
PRN-F10	9.0	1060.0				
PRN-F10	10.0	458.0	-.25	4.60	-.14	-150.00
PRN-F10	11.0	532.0				
PRN-F10	13.0	550.0				
PRN-F10	17.0	540.0				
PRN-F10	18.0	688.0				
PRN-F10	20.0	395.0				
PRN-F10	25.0	144.0				
PRN-F11	6.0	2300.0				
PRN-F11	7.0	314.0	-.50	2.40	-.14	-10.00
PRN-F11	8.0	378.0				
PRN-F11	9.0	326.0				
PRN-F2	.1	246.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-F2	.5	125.0				
PRN-F2	1.0	29.4				
PRN-F3	.1	202.0				
PRN-F3	.5	33.2				
PRN-F4	.1	156.0				
PRN-F4	.5	147.0				
PRN-F5	.1	658.0				
PRN-F5	.5	130.0	5.70	21.80	.49	-50.00
PRN-F6	.1	2920.0				
PRN-F6	.5	1460.0				
PRN-F6	1.0	26.5				
PRN-F6	2.0	18.1				
PRN-F6	3.0	24.1				
PRN-F7	.1	3480.0				
PRN-F7	1.0	695.0				
PRN-F7	1.5	103.0				
PRN-F7	2.5	37.4				
PRN-F7	3.0	69.1				
PRN-F7	3.5	34.3				
PRN-F8	1.0	185.0				
PRN-F8	1.5	331.0				
PRN-F8	2.0	585.0				
PRN-F8	2.5	526.0				
PRN-F8	3.0	391.0				
PRN-F8	4.5	306.0				
PRN-F9	2.5	2070.0				
PRN-F9	3.0	2470.0				
PRN-F9	3.5	2160.0				
PRN-F9	5.0	1960.0				
PRN-F9	6.0	1500.0				
PRN-F9	8.5	455.0				
PRN-F9	10.0	572.0				
PRN-F9	13.0	644.0				
PRN-F9	14.0	739.0				
PRN-F9	17.0	723.0				
PRN-F9	19.0	843.0				
PRN-F9	20.0	449.0				
PRN-F9	25.0	150.0				
PRN-G1	.1	375.0				
PRN-G1	.5	554.0				
PRN-G1	1.0	814.0				
PRN-G1	1.5	757.0				
PRN-G1	2.0	498.0				
PRN-G1	3.0	371.0				
PRN-G1	3.5	288.0				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-G10	1.0	37.1				
PRN-G10	1.5	712.0				
PRN-G10	2.0	1910.0				
PRN-G10	2.5	2200.0				
PRN-G10	4.5	452.0				
PRN-G10	6.0	565.0				
PRN-G10	7.0	430.0	-2.50	2.90	-.14	-170.00
PRN-G10	8.0	580.0				
PRN-G10	11.0	1110.0				
PRN-G10	13.0	622.0				
PRN-G10	15.0	885.0				
PRN-G10	17.0	276.0				
PRN-G10	19.0	434.0				
PRN-G10	25.0	230.0				
PRN-G10	39.0	3.9				
PRN-G11	.1	656.0				
PRN-G11	1.5	1720.0				
PRN-G11	3.0	1830.0				
PRN-G11	4.5	733.0				
PRN-G11	5.0	706.0				
PRN-G11	8.0	1250.0				
PRN-G11	11.0	655.0				
PRN-G11	12.0	584.0				
PRN-G11	13.0	586.0				
PRN-G11	16.0	436.0				
PRN-G11	21.0	381.0				
PRN-G11	40.0	2.1				
PRN-G2	.1	146.0				
PRN-G2	.5	410.0				
PRN-G3	.1	51.7				
PRN-G3	.5	32.7				
PRN-G4	.1	241.0				
PRN-G4	.5	2440.0				
PRN-G4	1.0	244.0				
PRN-G5	.1	684.0				
PRN-G5	.5	531.0				
PRN-G5	1.0	69.3				
PRN-G6	.1	2730.0				
PRN-G6	.5	253.0				
PRN-G6	1.0	26.7				
PRN-G6	2.0	8.3				
PRN-G6	3.0	12.4				
PRN-G7	.1	3320.0				
PRN-G7	.5	2960.0				
PRN-G7	1.0	120.0	7.60	69.70	2.20	-150.00

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-G7	1.5	120.0				
PRN-G7	2.0	28.2				
PRN-G7	2.5	31.5				
PRN-G7	5.0	245.0				
PRN-G8	.1	2980.0				
PRN-G8	2.5	1390.0				
PRN-G8	3.0	415.0				
PRN-G8	3.5	348.0				
PRN-G9	.1	4740.0				
PRN-G9	2.0	1470.0				
PRN-G9	2.5	1490.0				
PRN-G9	3.5	1540.0				
PRN-G9	5.0	484.0				
PRN-G9	6.0	339.0				
PRN-G9	6.0	995.0				
PRN-G9	8.0	381.0				
PRN-H1	.1	229.0				
PRN-H1	1.0	555.0				
PRN-H1	1.5	212.0				
PRN-H10	1.0	1200.0				
PRN-H10	1.5	966.0				
PRN-H10	2.0	677.0				
PRN-H10	2.5	639.0				
PRN-H10	3.0	427.0				
PRN-H10	4.0	226.0				
PRN-H11	.1	622.0				
PRN-H11	1.0	957.0				
PRN-H11	1.5	464.0				
PRN-H11	3.0	408.0				
PRN-H11	4.5	166.0				
PRN-H2	.1	1700.0				
PRN-H2	1.0	2350.0				
PRN-H2	2.0	413.0	2.30	38.90	7.60	-50.00
PRN-H3	.1	2160.0				
PRN-H3	.5	1760.0				
PRN-H3	1.0	354.0				
PRN-H4	.1	2500.0				
PRN-H4	.5	2630.0				
PRN-H4	1.0	255.0				
PRN-H5	.1	1330.0				
PRN-H5	1.0	628.0				
PRN-H5	1.5	104.0				
PRN-H5	2.5	27.8				
PRN-H5	3.5	13.9				
PRN-H6	.1	696.0				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-H6	.5	148.0	1.00	7.20	-.14	-50.00
PRN-H6	1.0	82.1				
PRN-H6	1.5	63.7				
PRN-H6	2.0	129.0				
PRN-H7	.5	192.0				
PRN-H7	1.0	39.6				
PRN-H7	1.5	44.4				
PRN-H7	2.5	34.0				
PRN-H7	3.0	35.6				
PRN-H8	.1	1350.0				
PRN-H8	1.5	838.0				
PRN-H8	2.0	744.0				
PRN-H8	2.5	56.2				
PRN-H8	4.5	143.0				
PRN-H9	.5	938.0				
PRN-H9	1.0	797.0				
PRN-H9	1.5	661.0				
PRN-H9	2.0	1640.0				
PRN-H9	3.0	289.0	-.25	3.70	-.14	-120.00
PRN-I1	.1	324.0	24.20	297.00	15.00	-50.00
PRN-I1	1.0	437.0				
PRN-I1	2.0	19.5				
PRN-I10	.1	318.0	3.60	37.20	4.20	-50.00
PRN-I10	.5	230.0				
PRN-I10	1.0	99.7				
PRN-I10	2.0	64.5				
PRN-I10	3.0	59.0				
PRN-I11	.1	1330.0				
PRN-I11	.5	1170.0				
PRN-I11	1.0	297.0				
PRN-I11	2.0	71.4				
PRN-I11	3.0	5.1				
PRN-I2	.1	380.0				
PRN-I2	1.0	2990.0				
PRN-I2	1.5	2010.0				
PRN-I2	2.0	86.4				
PRN-I3	.1	2520.0				
PRN-I3	.5	2400.0				
PRN-I3	1.0	388.0				
PRN-I3	2.0	56.6				
PRN-I3	3.0	42.5				
PRN-I4	.1	3110.0				
PRN-I4	1.0	835.0				
PRN-I4	1.5	66.5	1.70	16.10	.88	-60.00
PRN-I4	2.0	41.2				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-I5	.1	4200.0				
PRN-I5	.5	1400.0				
PRN-I5	1.0	294.0				
PRN-I5	1.5	228.0				
PRN-I5	2.0	143.0				
PRN-I5	2.5	131.0				
PRN-I6	.1	142.0				
PRN-I6	.5	142.0				
PRN-I6	1.5	19.0				
PRN-I6	2.0	23.9				
PRN-I7	.5	1260.0				
PRN-I7	1.0	155.0				
PRN-I7	1.5	32.6				
PRN-I7	2.5	29.5				
PRN-I8	.1	2060.0				
PRN-I8	.5	1780.0				
PRN-I8	1.0	124.0				
PRN-I8	2.0	31.0				
PRN-I8	3.0	20.3				
PRN-I9	1.0	88.6				
PRN-I9	1.5	44.3				
PRN-I9	2.5	52.6				
PRN-I9	3.0	13.5				
PRN-J1	.1	1010.0				
PRN-J1	1.0	1070.0				
PRN-J1	1.5	533.0				
PRN-J1	2.0	165.0				
PRN-J1	3.0	31.7				
PRN-J10	.1	1570.0				
PRN-J10	.5	504.0				
PRN-J10	1.0	374.0				
PRN-J10	1.5	303.0				
PRN-J10	2.0	61.3				
PRN-J11	.1	528.0				
PRN-J11	.5	987.0				
PRN-J11	1.0	440.0				
PRN-J11	3.0	16.2				
PRN-J11	2.0	271.0				
PRN-J2	.1	4790.0				
PRN-J2	1.5	631.0				
PRN-J2	2.0	107.0	1.20	12.40	-.34	-150.00
PRN-J2	3.0	89.1				
PRN-J3	1.5	726.0				
PRN-J3	2.0	232.0				
PRN-J3	2.5	187.0				

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Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth [1]	Arsenic	Cadmium [2]	Lead	Mercury	Selenium
PRN-J3	3.0	153.0				
PRN-J4	.5	3020.0				
PRN-J4	1.0	195.0				
PRN-J4	1.5	77.7				
PRN-J4	2.0	32.0				
PRN-J4	2.5	31.4				
PRN-J5	.5	1750.0				
PRN-J5	1.0	204.0				
PRN-J5	2.0	74.4				
PRN-J5	2.5	30.6				
PRN-J5	3.0	20.2				
PRN-J5	3.5	21.0				
PRN-J6	.5	256.0	4.10	13.40	1.40	-50.00
PRN-J6	1.0	200.0				
PRN-J6	1.5	165.0				
PRN-J6	2.0	229.0				
PRN-J6	2.5	96.5				
PRN-J7	.5	164.0				
PRN-J7	1.5	37.4				
PRN-J7	2.0	28.6				
PRN-J7	2.5	22.3				
PRN-J7	3.0	26.0				
PRN-J8	.5	219.0	2.40	21.50	-.34	-60.00
PRN-J8	1.0	63.6				
PRN-J8	1.5	33.0				
PRN-J8	2.0	28.9				
PRN-J9	.5	530.0				
PRN-J9	1.0	198.0				
PRN-J9	1.5	147.0				
PRN-J9	2.0	55.5				
PRN-J9	2.5	27.6				
PRN-K1	.1	45.0				
PRN-K1	1.5	1050.0				
PRN-K1	2.0	222.0				
PRN-K1	2.5	75.6				
PRN-K1	3.5	31.7				
PRN-K10	.1	282.0				
PRN-K10	1.5	54.1				
PRN-K10	2.0	26.3				
PRN-K10	2.5	34.8				
PRN-K11	.1	90.0				
PRN-K11	.5	141.0				
PRN-K11	1.5	62.5				
PRN-K11	2.0	45.6				
PRN-K2	.1	4110.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-K2	1.5	1900.0				
PRN-K2	2.0	206.0				
PRN-K2	2.5	81.4				
PRN-K2	4.5	-4.0				
PRN-K3	1.0	1750.0				
PRN-K3	1.5	68.1	-.25	4.80	-.34	-35.00
PRN-K3	2.0	194.0				
PRN-K3	2.5	33.6				
PRN-K4	1.5	668.0				
PRN-K4	2.0	564.0				
PRN-K4	2.5	464.0				
PRN-K4	3.0	336.0				
PRN-K5	.5	736.0				
PRN-K5	1.0	367.0	-.50	6.20	-.34	-65.00
PRN-K5	1.5	213.0				
PRN-K5	2.0	29.0				
PRN-K6	.5	1340.0				
PRN-K6	1.5	463.0				
PRN-K6	2.5	243.0				
PRN-K6	3.5	52.2				
PRN-K7	.1	819.0				
PRN-K7	.5	330.0				
PRN-K7	1.0	80.6				
PRN-K7	1.5	37.2				
PRN-K7	2.0	41.8				
PRN-K8	.1	297.0				
PRN-K8	1.5	103.0				
PRN-K8	2.0	88.3				
PRN-K8	3.0	38.3				
PRN-K8	3.5	35.1				
PRN-K9	.5	2510.0				
PRN-K9	1.0	479.0				
PRN-K9	1.5	188.0				
PRN-K9	2.0	178.0				
PRN-K9	2.5	39.2				
PRN-L1	1.5	454.0				
PRN-L1	2.0	767.0				
PRN-L1	2.5	70.8				
PRN-L1	3.0	24.0				
PRN-L10	.1	690.0				
PRN-L10	.5	309.0				
PRN-L10	1.5	208.0				
PRN-L10	2.0	74.4				
PRN-L11	.1	34.7				
PRN-L11	.5	216.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-L11	1.0	203.0				
PRN-L11	1.5	140.0				
PRN-L2	.1	3960.0				
PRN-L2	1.0	5690.0				
PRN-L2	1.5	1560.0				
PRN-L2	2.0	54.3				
PRN-L2	3.0	25.6				
PRN-L3	1.0	662.0				
PRN-L3	1.5	362.0				
PRN-L3	2.0	297.0				
PRN-L3	2.5	282.0				
PRN-L4	1.0	925.0				
PRN-L4	1.5	532.0				
PRN-L4	2.0	278.0	-1.00	4.20	-.34	-65.00
PRN-L4	2.5	203.0				
PRN-L5	.5	518.0				
PRN-L5	1.0	102.0				
PRN-L5	1.5	66.0				
PRN-L5	2.0	11.4				
PRN-L5	3.0	7.2				
PRN-L6	.5	522.0				
PRN-L6	1.0	417.0				
PRN-L6	1.5	454.0				
PRN-L6	2.0	397.0				
PRN-L7	1.0	449.0				
PRN-L7	1.5	408.0				
PRN-L7	2.0	392.0				
PRN-L7	2.5	254.0				
PRN-L8	1.0	236.0				
PRN-L8	1.5	152.0				
PRN-L8	2.0	98.2				
PRN-L8	2.5	48.4				
PRN-L9	.5	1320.0				
PRN-L9	1.0	467.0				
PRN-L9	1.5	331.0				
PRN-L9	2.0	227.0				
PRN-L9	2.5	150.0				
PRN-L9	3.0	133.0				
PRN-M1	.1	39.6	3.60	33.00	-.34	-40.00
PRN-M1	.5	41.5				
PRN-M1	1.5	70.9				
PRN-M1	2.5	80.1				
PRN-M1	3.0	40.8				
PRN-M10	.1	450.0				
PRN-M10	.5	360.0				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth 1	Arsenic	Cadmium 2	Lead	Mercury	Selenium
PRN-M10	1.0	141.0				
PRN-M10	1.5	89.5				
PRN-M11	.1	250.0				
PRN-M11	.5	5.2				
PRN-M11	1.0	324.0				
PRN-M11	1.5	242.0				
PRN-M2	1.5	648.0				
PRN-M2	2.0	33.6				
PRN-M2	2.5	17.5				
PRN-M2	3.0	12.1				
PRN-M3	.5	2680.0				
PRN-M3	1.0	87.3	2.60	39.60	-.34	-65.00
PRN-M3	1.5	36.8				
PRN-M3	2.0	210.0				
PRN-M4	.5	200.0				
PRN-M4	1.0	61.0				
PRN-M4	1.5	125.0				
PRN-M4	2.0	94.3				
PRN-M5	.5	730.0				
PRN-M5	1.0	565.0				
PRN-M5	1.5	346.0	-1.00	3.20	-.34	-65.00
PRN-M5	2.5	22.2				
PRN-M5	4.5	4.6				
PRN-M6	.5	53.6				
PRN-M6	1.0	23.7				
PRN-M6	1.5	27.5				
PRN-M6	2.0	13.0				
PRN-M7	.5	364.0				
PRN-M7	1.5	239.0				
PRN-M7	2.0	137.0				
PRN-M7	2.5	87.4				
PRN-M7	3.0	14.3				
PRN-M8	.5	150.0				
PRN-M8	1.0	328.0				
PRN-M8	2.0	186.0				
PRN-M8	3.0	13.1				
PRN-M8	4.0	46.2				
PRN-M9	.5	524.0				
PRN-M9	1.0	382.0	-.25	6.20	-.34	-100.00
PRN-M9	1.5	175.0				
PRN-M9	2.5	44.2				
PRN-N1	.1	8.6				
PRN-N1	.5	31.5				
PRN-N1	1.0	97.7				
PRN-N1	1.5	40.1				

1 Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-N1	2.0	30.5				
PRN-N10	.1	114.0	6.60	72.20	1.60	-50.00
PRN-N10	.5	240.0				
PRN-N10	1.0	214.0				
PRN-N10	1.5	181.0				
PRN-N10	2.0	125.0				
PRN-N11	.1	308.0				
PRN-N11	.5	693.0				
PRN-N11	1.0	170.0				
PRN-N11	1.5	161.0				
PRN-N11	2.0	87.0				
PRN-N2	.5	2080.0				
PRN-N2	1.0	249.0				
PRN-N2	1.5	37.8				
PRN-N2	2.5	26.3				
PRN-N2	3.0	23.7				
PRN-N2	3.5	27.5				
PRN-N3	1.0	261.0				
PRN-N3	1.5	70.7				
PRN-N3	2.0	34.9				
PRN-N3	2.5	19.3				
PRN-N4	1.5	555.0				
PRN-N4	2.0	421.0				
PRN-N4	2.5	251.0				
PRN-N4	3.0	283.0				
PRN-N4	3.5	245.0				
PRN-N5	.5	522.0				
PRN-N5	1.5	287.0				
PRN-N5	2.0	177.0				
PRN-N5	2.5	174.0				
PRN-N6	.5	449.0	19.40	213.00	10.20	-10.00
PRN-N6	1.0	41.6				
PRN-N6	1.5	9.4				
PRN-N6	2.0	8.0				
PRN-N7	.5	468.0				
PRN-N7	1.0	222.0				
PRN-N7	2.0	38.8				
PRN-N7	3.0	21.1				
PRN-N7	3.5	23.5				
PRN-N8	.1	371.0				
PRN-N8	.5	89.8				
PRN-N8	1.0	18.2				
PRN-N8	1.5	18.1				
PRN-N8	2.0	16.9				
PRN-N9	.1	1320.0				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-N9	.5	392.0				
PRN-N9	1.0	316.0				
PRN-N9	1.5	225.0				
PRN-N9	2.0	148.0				
PRN-01	1.0	123.0	10.80	-10.00	.60	-150.00
PRN-01	1.5	367.0				
PRN-01	2.0	132.0				
PRN-01	3.5	70.1				
PRN-010	.1	2360.0				
PRN-010	.5	831.0				
PRN-010	1.0	328.0				
PRN-010	1.5	272.0				
PRN-010	2.0	236.0				
PRN-011	.1	264.0	23.90	327.00	10.00	-20.00
PRN-011	.5	327.0				
PRN-011	1.0	163.0				
PRN-011	1.5	127.0				
PRN-03	.5	1010.0				
PRN-03	1.0	383.0				
PRN-03	1.5	347.0				
PRN-03	2.0	207.0				
PRN-03	2.5	266.0				
PRN-03	3.0	257.0				
PRN-04	.5	1220.0				
PRN-04	1.0	683.0				
PRN-04	1.5	521.0				
PRN-04	2.0	400.0				
PRN-05	.5	1730.0				
PRN-05	1.0	850.0				
PRN-05	1.5	518.0				
PRN-05	2.0	333.0	-.25	4.30	-.14	-20.00
PRN-05	3.0	120.0				
PRN-06	.5	361.0				
PRN-06	1.0	85.9				
PRN-06	1.5	80.8				
PRN-06	2.0	39.3				
PRN-07	.5	406.0				
PRN-07	1.0	244.0				
PRN-07	1.5	82.4				
PRN-07	2.5	24.5				
PRN-08	1.5	595.0				
PRN-08	2.0	330.0				
PRN-08	2.5	176.0				
PRN-08	3.0	93.7				
PRN-09	.5	590.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-09	1.0	295.0				
PRN-09	1.5	149.0				
PRN-09	2.0	55.4				
PRN-09	2.5	43.0				
PRN-P1	1.5	363.0				
PRN-P1	2.0	1990.0				
PRN-P1	2.5	3370.0				
PRN-P1	3.0	1940.0				
PRN-P1	4.0	2370.0				
PRN-P1	5.0	137.0				
PRN-P1	6.0	136.0				
PRN-P10	.1	2080.0				
PRN-P10	1.0	1970.0				
PRN-P10	1.5	416.0				
PRN-P10	3.0	88.4				
PRN-P11	.1	357.0				
PRN-P11	1.0	625.0				
PRN-P11	1.5	292.0				
PRN-P11	2.5	96.5				
PRN-P11	3.5	95.6				
PRN-P2	.5	1090.0				
PRN-P2	1.0	364.0				
PRN-P2	1.5	438.0				
PRN-P2	2.0	164.0				
PRN-P2	3.0	102.0				
PRN-P2	4.0	76.5				
PRN-P3	.5	842.0				
PRN-P3	1.0	322.0				
PRN-P3	1.5	284.0				
PRN-P3	2.0	220.0				
PRN-P3	2.5	203.0				
PRN-P4	.5	2230.0				
PRN-P4	1.0	507.0				
PRN-P4	1.5	400.0				
PRN-P4	2.5	180.0				
PRN-P4	3.5	177.0				
PRN-P5	1.0	590.0				
PRN-P5	1.5	502.0				
PRN-P5	2.0	408.0				
PRN-P5	2.5	344.0				
PRN-P6	.5	1090.0				
PRN-P6	1.0	589.0				
PRN-P6	1.5	414.0				
PRN-P6	2.0	1540.0				
PRN-P6	2.5	286.0				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-P6	3.0	253.0				
PRN-P6	4.0	282.0				
PRN-P7	1.0	953.0				
PRN-P7	1.5	466.0				
PRN-P7	2.0	185.0				
PRN-P7	2.5	32.5				
PRN-P8	1.0	415.0	2.00	15.40	.47	-60.00
PRN-P8	1.5	44.0				
PRN-P8	2.0	28.1				
PRN-P8	2.5	22.0				
PRN-P9	.5	3100.0				
PRN-P9	1.0	475.0				
PRN-P9	1.5	336.0				
PRN-P9	2.0	232.0				
PRN-P9	4.5	30.3				
PRN-Q1	1.0	1440.0				
PRN-Q1	1.5	2300.0				
PRN-Q1	2.0	30.9				
PRN-Q1	2.5	22.9				
PRN-Q1	3.0	23.8				
PRN-Q1	3.5	24.3				
PRN-Q1	4.5	12.1				
PRN-Q10	.1	626.0				
PRN-Q10	.5	526.0				
PRN-Q10	1.0	942.0				
PRN-Q10	1.5	263.0				
PRN-Q10	4.0	74.9				
PRN-Q10	5.0	92.6				
PRN-Q10	7.0	48.0				
PRN-Q2	5.0	205.0				
PRN-Q3	1.0	507.0				
PRN-Q3	1.5	414.0	-.25	5.10	-.34	22.50
PRN-Q3	2.5	400.0				
PRN-Q3	4.5	339.0				
PRN-Q3	5.5	136.0				
PRN-Q4	.5	2950.0				
PRN-Q4	1.0	1430.0				
PRN-Q4	1.5	582.0				
PRN-Q4	2.0	383.0				
PRN-Q5	1.0	3260.0				
PRN-Q5	1.5	645.0				
PRN-Q5	2.0	312.0				
PRN-Q5	2.5	358.0				
PRN-Q5	4.5	184.0				
PRN-Q6	1.0	4750.0				

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-Q6	1.5	2110.0				
PRN-Q6	2.0	651.0				
PRN-Q6	2.5	328.0				
PRN-Q7	.5	4170.0				
PRN-Q7	1.0	743.0				
PRN-Q7	1.5	211.0				
PRN-Q7	2.0	46.3				
PRN-Q8	2.5	55.0				
PRN-Q8	3.0	7.8				
PRN-Q8	3.5	6.0				
PRN-Q8	4.0	2.7				
PRN-Q9	1.0	12600.0				
PRN-Q9	2.5	2600.0				
PRN-Q9	3.0	514.0				
PRN-Q9	3.5	1140.0				
PRN-Q9	4.5	319.0	1.30	12.40	1.40	-20.00
PRN-R1	5.5	284.0				
PRN-R10	1.5	650.0				
PRN-R10	3.5	3700.0				
PRN-R10	4.5	2520.0				
PRN-R10	5.5	694.0				
PRN-R10	6.5	452.0				
PRN-R2	4.5	559.0				
PRN-R2	5.0	487.0				
PRN-R2	6.0	318.0				
PRN-R2	7.0	298.0				
PRN-R3	.5	770.0				
PRN-R3	1.0	18.1				
PRN-R3	1.5	9.2				
PRN-R3	2.0	566.0				
PRN-R3	3.0	6.3				
PRN-R3	4.5	254.0				
PRN-R3	5.5	241.0				
PRN-R4	3.5	1420.0				
PRN-R4	5.0	553.0				
PRN-R4	5.5	335.0	-.50	2.30	-.34	-100.00
PRN-R4	6.5	266.0				
PRN-R5	2.0	2060.0				
PRN-R5	3.0	3040.0				
PRN-R5	3.5	1450.0				
PRN-R5	4.0	550.0				
PRN-R5	4.5	254.0				
PRN-R5	6.0	184.0				
PRN-R6	1.5	1010.0				
PRN-R6	2.0	650.0				

< 2 samples 1,5' 2'

1 Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

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TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-R6	2.5	393.0	-.25	4.20	-.34	17.70
PRN-R6	3.0	259.0				
PRN-R7	1.0	3620.0				
PRN-R7	1.5	863.0				
PRN-R7	2.0	650.0				
PRN-R7	2.5	489.0				
PRN-R8	1.0	2210.0				
PRN-R8	1.5	1050.0				
PRN-R8	2.5	688.0				
PRN-R8	3.0	2320.0				
PRN-R8	4.0	1010.0				
PRN-R8	4.5	418.0				
PRN-R9	2.5	1460.0				
PRN-R9	3.5	799.0				
PRN-R9	4.5	2220.0				
PRN-R9	5.0	524.0				
PRN-R9	6.0	411.0				
PRN-R9	7.0	309.0				
PRN-R9	8.0	468.0				
PRN-S1	.1	462.0				
PRN-S1	1.5	536.0				
PRN-S1	2.0	247.0	-.25	6.40	.34	6.30
PRN-S1	2.5	202.0				
PRN-S10	.1	106.0				
PRN-S10	1.5	848.0				
PRN-S10	2.5	97.8	-.25	5.90	.17	-50.00
PRN-S10	3.5	229.0				
PRN-S10	4.5	304.0				
PRN-S10	6.0	209.0				
PRN-S2	1.5	260.0				
PRN-S2	2.5	133.0				
PRN-S2	3.5	75.9				
PRN-S2	4.5	173.0				
PRN-S3	3.5	5270.0				
PRN-S3	6.0	489.0				
PRN-S3	7.0	382.0				
PRN-S7	.1	193.0				
PRN-S7	1.0	344.0				
PRN-S7	1.5	216.0				
PRN-S7	2.5	17.4				
PRN-S7	3.5	36.2				
PRN-S7	4.5	353.0				
PRN-S7	6.0	266.0				
PRN-S8	.1	456.0				
PRN-S8	.5	5590.0				

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[2] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limits.

TABLE 1

Analytical Results of Pre-Remediation Soil Sampling:
On-Site Property, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[1]	Arsenic	Cadmium[2]	Lead	Mercury	Selenium
PRN-S8	1.5	823.0				
PRN-S8	2.0	133.0				
PRN-S8	3.0	277.0				
PRN-S8	4.0	402.0				
PRN-S8	6.0	306.0				
PRN-S9	.1	661.0				
PRN-S9	1.5	287.0				
PRN-S9	3.5	497.0				
PRN-S9	4.5	517.0				
PRN-S9	5.0	331.0				
PRN-S9	7.0	366.0				
PRN-T10	.1	291.0				
PRN-T10	3.0	1110.0				
PRN-T10	4.0	1860.0				
PRN-T10	6.0	464.0				
PRN-T10	7.0	165.0				
PRN-T7	.1	209.0				
PRN-T7	1.5	6250.0				
PRN-T7	4.0	855.0				
PRN-T7	6.0	626.0				
PRN-T7	7.0	292.0	.88	2.90	-.14	-50.00
PRN-T8	.1	597.0				
PRN-T8	3.5	1390.0				
PRN-T8	5.5	1760.0				
PRN-T8	6.0	390.0				
PRN-T8	7.0	273.0				
PRN-T9	.1	44.9				
PRN-T9	3.0	1290.0				
PRN-T9	4.0	725.0				
PRN-T9	6.0	596.0				
PRN-T9	7.0	319.0				

[1] Depth: Samples collected from six inch interval of soil above depth indicated. All depths measured from the ground surface.

[2] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limits.

TABLE 2

Analytical Results of Soil Samples Collected Prior to Pre-Remediation Soil Samples: Off-Site Properties, Upland Operable Unit [1]
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth [2]	Arsenic	Cadmium	Lead	Mercury [3]	Selenium
PR1-4A	.1	40.9				
PR1-4A	.5	76.2				
PR1-4A	1.0	219.0				
PR1-4A	1.5	266.0				
PR1-4A	2.0	145.0				
PR1-4A	2.5	96.3				
PR1-4A	3.0	57.7				
PR1-5A	.1	49.2				
PR1-5A	.5	128.0				
PR1-5A	1.0	292.0				
PR1-5A	1.5	247.0				
PR1-5A	2.0	36.2				
PR1-5A	2.5	47.6				
PR1-6A	.1	49.9				
PR1-6A	.5	60.3				
PR1-6A	1.0	180.0				
PR1-6A	1.0	179.0				
PR1-6A	1.0	200.0				
PR1-6A	1.5	50.0				
PR1-7A	.1	43.2				
PR1-7A	.5	342.0				
PR1-7A	1.5	87.8				
PR1-7A	2.0	45.9				
PR1-8A	.1	30.7				
PR1-8A	.5	74.0				
PR1-8A	1.0	228.0				
PR1-8A	1.5	26.1				
PR1-9A	.1	31.2				
PR1-9A	.5	212.0				
PR1-9A	1.0	87.2				
PR1-9A	1.5	78.6				
PR1-9A	2.0	51.3				
PR1-10A	.1	59.3				
PR1-10A	.5	161.0				
PR1-10A	1.0	164.0				
PR1-10A	1.5	103.0				
PR1-10A	2.0	92.6				
PR1-10A	2.5	55.6				
PR1-10A	3.0	33.9				
PR1-11A	.1	87.0				
PR1-11A	.5	192.0				
PR1-11A	1.5	76.0				

[1] Modified from Table 1, Geomatrix and SSP&A, 1992

[2] Depth: Sample collected from six inch interval of soil above depth indicated. All depths measured from the ground surface in inches.

[3] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limit.

TABLE 2

Analytical Results of Soil Samples Collected Prior to Pre-Remediation
Soil Samples: Off-Site Properties, Upland Operable Unit[1]
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[2]	Arsenic	Cadmium	Lead	Mercury[3]	Selenium
PR1-11A	2.0	34.6				
PR1-12A	.1	61.2				
PR1-12A	.5	162.0				
PR1-12A	1.0	147.0				
PR1-12A	1.5	34.5				
PR1-13A	.1	146.0				
PR1-13A	.5	365.0		290.00		
PR1-13A	1.0	170.0				
PR1-13A	1.5	60.8				
PR1-13A	1.5	42.6				
PR1-13A	1.5	39.2				
PR1-14A	.1	189.0				
PR1-14A	.5	263.0				
PR1-14A	1.0	196.0				
PR1-14A	1.5	32.7				
PR1-15A	.1	139.0				
PR1-15A	.5	304.0				
PR1-15A	1.0	196.0				
PR1-15A	1.5	128.0				
PR1-15A	2.0	115.0				
PR1-15A	2.5	88.9				
PR1-15A	3.0	73.0				
PR1-16A	.1	86.6				
PR1-16A	.5	200.0				
PR1-16A	1.0	247.0				
PR1-16A	1.5	134.0				
PR1-16A	2.0	63.7				
PR1-16A	2.5	38.7				
PR1-17A	.1	103.0				
PR1-17A	.5	146.0				
PR1-17A	1.0	117.0				
PR1-17A	1.5	106.0				
PR1-17A	2.0	67.4				
PR1-18A	.1	44.3				
PR1-18A	.5	136.0				
PR1-18A	1.0	343.0		174.00		
PR1-18A	1.5	235.0				
PR1-18A	2.0	87.7				
PR1-18A	2.5	60.9				
PR1-19A	.1	55.5				
PR1-19A	.5	305.0				
PR1-19A	1.5	246.0				
PR1-19A	2.0	157.0				

1 Modified from Table 1, Geomatrix and SSP&A, 1992

2 Depth: Sample collected from six inch interval of soil above depth indicated.
All depths measured from the ground surface in inches.

3 Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limit.

TABLE 2

Analytical Results of Soil Samples Collected Prior to Pre-Remediation
Soil Samples: Off-Site Properties, Upland Operable Unit[1]
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[2]	Arsenic	Cadmium	Lead	Mercury[3]	Selenium
PR1-19A	2.5	107.0				
PR1-19A	3.0	61.2				
PR1-20A	.1	49.6				
PR1-20A	.5	153.0				
PR1-20A	1.0	87.5				
PR1-20A	1.5	31.2				
PR1-21A	.1	66.4				
PR1-21A	.5	73.4				
PR1-21A	1.5	21400.0				
PR1-21A	2.0	2450.0				
PR1-21A	2.5	1320.0				
PR1-21A	3.0	1290.0				
PR1-21A	3.5	1320.0				
PR1-21A	4.0	2300.0				
PR1-21A	4.5	857.0				
PR1-21A	5.0	506.0				
PR1-21A	6.0	408.0		3.40		
PR1-21A	7.0	453.0				
PR1-21A	7.5	356.0				
PR1-21B	.1	106.0				
PR1-21B	.5	68.5				
PR1-21B	1.5	115.0				
PR1-21B	2.0	46.2				
PR1-22A	.1	77.2				
PR1-22A	.5	281.0				
PR1-22A	1.0	178.0				
PR1-22A	1.5	166.0				
PR1-22A	2.0	122.0				
PR1-22A	2.5	62.4				
PR1-23A	.1	156.0				
PR1-23A	.5	206.0		248.00		
PR1-23A	1.0	158.0				
PR1-23A	1.5	107.0				
PR1-23A	1.5	103.0				
PR1-23A	1.5	109.0				
PR1-23A	2.5	38.6				
PR1-24A	.1	81.9				
PR1-24A	.5	197.0				
PR1-24A	1.0	297.0				
PR1-24A	1.5	196.0				
PR1-24A	2.0	138.0				
PR1-24A	2.5	132.0				
PR1-24A	3.0	106.0				

1 Modified from Table 1, Geomatrix and SSP&A, 1992

2 Depth: Sample collected from six inch interval of soil above depth indicated. All depths measured from the ground surface in inches.

3 Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limit.

TABLE 2

Analytical Results of Soil Samples Collected Prior to Pre-Remediation Soil Samples: Off-Site Properties, Upland Operable Unit [1]
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth [2]	Arsenic	Cadmium	Lead	Mercury [3]	Selenium
PR1-24A	3.5	92.1				
PR1-24A	4.0	65.7				
PR1-25A	.1	26.1				
PR1-25A	.5	77.0				
PR1-25A	1.0	62.6				
PR1-25A	1.5	36.2				
PR1-25A	2.0	43.7				
PR5-2	.1	108.0				
PR5-2	1.0	298.0				
PR5-2	1.5	233.0				
PR5-2	2.0	119.0				
PR5-2	2.5	72.2				
PR5-2	3.0	48.9				
PR5-3	.1	22.3				
PR5-3	.5	30.9				
PR5-3	1.0	41.0				
PR5-3	1.5	89.3				
PR5-3	2.0	39.5				
PR5-4	.1	432.0				
PR5-4	.5	674.0				
PR5-4	1.0	196.0				
PR5-4	1.5	194.0				
PR5-4	2.0	33.3				
PR5-4	2.5	35.7				
PR5-5	.1	69.6				
PR5-5	.5	65.3				
PR5-5	1.0	57.4				
PR5-5	1.5	38.3				
PR5-6	.1	249.0				
PR5-6	.5	238.0				
PR5-6	1.0	364.0				
PR5-6	1.5	179.0				
PR5-6	2.0	107.0				
PR5-6	2.5	110.0				
PR5-6	3.5	118.0				
PR5-6	4.0	51.2				
PR5-6	4.5	38.8				
PR5-7	.1	1170.0				
PR5-7	.5	418.0				
PR5-7	1.0	416.0				
PR5-7	1.5	334.0				
PR5-7	2.0	198.0				
PR5-7	2.5	201.0				

1 Modified from Table 1, Geomatrix and SSP&A, 1992

2 Depth: Sample collected from six inch interval of soil above depth indicated. All depths measured from the ground surface in inches.

3 Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limit.

TABLE 2

Analytical Results of Soil Samples Collected Prior to Pre-Remediation
Soil Samples: Off-Site Properties, Upland Operable Unit[1]
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[2]	Arsenic	Cadmium	Lead	Mercury[3]	Selenium
PR5-7	3.0	218.0				
PR5-7	3.5	175.0				
PR5-7	4.0	150.0				
PR5-7	4.5	91.5				
PR5-7	5.0	168.0				
PR5-7	6.0	160.0				
PR5-8	.1	414.0				
PR5-8	.5	634.0				
PR5-8	1.0	424.0				
PR5-8	1.5	271.0				
PR5-8	2.0	207.0				
PR5-8	2.5	198.0				
PR5-8	3.0	205.0				
PR5-8	3.5	128.0				
PR5-8	4.0	137.0				
PR5-8	4.5	99.8				
PR5-8	5.0	152.0				
PR5-8	6.0	138.0				
PR5-9	.1	103.0				
PR5-9	.5	92.9				
PR5-9	1.0	73.5				
PR5-9	1.5	129.0				
PR5-9	2.0	55.9				
PR5-10	.1	1310.0				
PR5-10	.5	708.0				
PR5-10	1.0	492.0				
PR5-10	1.5	282.0				
PR5-10	2.0	314.0				
PR5-10	2.5	204.0				
PR5-10	3.0	269.0				
PR5-10	3.5	225.0				
PR5-10	4.0	202.0				
PR5-10	4.5	142.0				
PR5-10	5.0	214.0				
PR5-10	6.0	195.0				
PR5-11	.1	94.4				
PR5-11	.5	80.8				
PR5-11	1.0	88.6				
PR5-11	1.5	104.0				
PR5-11	2.0	73.7				
PR5-11	2.5	381.0				
PR5-11	3.0	310.0				
PR5-11	3.5	202.0				

[1] Modified from Table 1, Geomatrix and SSP&A, 1992

[2] Depth: Sample collected from six inch interval of soil above depth indicated.
All depths measured from the ground surface in inches.

[3] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limit.

TABLE 2

Analytical Results of Soil Samples Collected Prior to Pre-Remediation
Soil Samples: Off-Site Properties, Upland Operable Unit[1]
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[2]	Arsenic	Cadmium	Lead	Mercury[3]	Selenium
PR5-11	4.5	263.0				
PR5-12	.1	17.3				
PR5-12	1.5	170.0				
PR5-12	2.0	48.0				
PR5-13	.1	46.1				
PR5-13	.5	37.2				
PR5-13	1.0	273.0				
PR5-13	1.5	82.4				
PR5-13	2.0	49.4				
PR5-14	.5	1360.0				
PR5-14	1.0	409.0				
PR5-14	3.0	263.0				
PR5-14	3.5	243.0				
PR5-14	4.0	232.0				
PR5-14	4.5	224.0				
PR5-14	5.0	226.0				
PR5-14	5.5	185.0				
PR5-14	6.0	120.0				
PR5-17	.1	82.1				
PR5-17	.5	93.8				
PR5-17	1.0	88.6				
PR5-17	1.5	152.0				
PR5-17	2.0	59.4				
PR5-18	.1	727.0				
PR5-18	.5	440.0				
PR5-18	1.5	213.0				
PR5-18	2.0	58.6				
PR5-19	.1	4370.0				
PR5-19	3.5	1520.0				
PR5-19	4.0	847.0				
PR5-19	4.5	541.0				
PR5-19	5.0	1860.0				
PR5-19	6.0	493.0				
PR5-19	7.0	333.0				
PR5-19	7.5	327.0				
PR6-1A	.1	571.0				
PR6-1A	.5	1110.0				
PR6-1A	1.0	350.0		16.50		
PR6-1A	1.5	352.0				
PR6-1A	2.5	289.0				
PR6-1A	3.5	364.0				
PR6-1A	4.5	225.0				
PR6-1A	5.5	342.0		6.90		

1 Modified from Table 1, Geomatrix and SSP&A, 1992

2 Depth: Sample collected from six inch interval of soil above depth indicated.
All depths measured from the ground surface in inches.

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TABLE 2

Analytical Results of Soil Samples Collected Prior to Pre-Remediation
Soil Samples: Off-Site Properties, Upland Operable Unit [1]
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[2]	Arsenic	Cadmium	Lead	Mercury[3]	Selenium
PR6-1A	6.0	250.0				
PR6-1B	1.0	585.0				
PR6-1B	1.5	516.0				
PR6-1B	2.5	259.0				
PR6-1B	3.0	164.0				
PR6-1B	3.5	199.0				
PR6-1B	4.5	110.0				
PR6-1C	1.0	26.3				
PR6-1C	1.5	369.0				
PR6-1C	2.5	463.0				
PR6-1C	3.0	507.0				
PR6-1C	3.5	354.0				
PR6-1C	4.5	276.0				
PR6-1C	5.5	171.0				
PR6-1D	1.5	343.0				
PR6-1D	3.5	426.0				
PR6-1D	4.5	258.0				
PR6-2A	.1	770.0				
PR6-2A	.5	974.0				
PR6-2A	1.0	388.0				
PR6-2A	1.5	335.0				
PR6-2A	2.5	223.0				
PR6-2A	4.0	181.0				
PR6-2A	4.5	193.0				
PR6-2A	5.0	223.0				
PR6-2A	6.0	293.0		7.20		
PR6-2B	1.0	254.0				
PR6-2B	1.5	520.0				
PR6-2B	2.5	136.0				
PR6-2B	3.0	136.0				
PR6-2B	4.0	191.0				
PR6-2B	4.5	217.0				
PR6-2C	1.0	194.0				
PR6-2C	1.5	236.0				
PR6-2C	2.5	167.0				
PR6-2C	3.0	116.0				
PR6-2C	4.0	236.0				
PR6-2C	4.5	273.0				
PR6-3A	.1	520.0				
PR6-3A	.5	483.0				
PR6-3A	.5	503.0				
PR6-3A	.5	479.0				
PR6-3A	1.0	1680.0				

1 Modified from Table 1, Geomatrix and SSP&A, 1992

2 Depth: Sample collected from six inch interval of soil above depth indicated.
All depths measured from the ground surface in inches.

3 Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limit.

TABLE 2

Analytical Results of Soil Samples Collected Prior to Pre-Remediation
Soil Samples: Off-Site Properties, Upland Operable Unit [1]
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[2]	Arsenic	Cadmium	Lead	Mercury[3]	Selenium
PR6-3A	1.5	10.3				
PR6-3A	2.5	404.0				
PR6-3A	3.5	426.0				
PR6-3A	4.5	314.0				
PR6-3A	5.0	255.0				
PR6-3A	6.0	203.0				
PR6-3B	.1	63.2				
PR6-3B	.5	20.4				
PR6-3B	1.0	83.2				
PR6-3B	1.5	435.0				
PR6-3B	2.5	306.0				
PR6-3B	3.0	219.0				
PR6-3B	3.5	294.0				
PR6-3B	4.5	225.0				
PR6-4A	.1	728.0				
PR6-4A	.5	828.0				
PR6-4A	1.0	550.0		40.40		
PR6-4A	1.5	454.0		11.40		
PR6-4A	2.5	308.0				
PR6-4A	3.5	372.0				
PR6-4A	4.5	302.0				
PR6-4A	5.0	244.0				
PR6-4A	6.0	222.0				
PR6-4B	.1	55.9				
PR6-4B	.5	45.0				
PR6-4B	1.0	263.0				
PR6-4B	1.5	196.0				
PR6-4B	2.5	448.0				
PR6-4B	3.0	458.0				
PR6-4B	3.5	382.0				
PR6-4B	4.5	314.0				
PR6-4B	5.5	279.0				
PR6-5A	.1	249.0				
PR6-5A	.5	77.2				
PR6-5A	1.0	554.0				
PR6-5A	1.5	348.0				
PR6-5A	2.5	289.0				
PR6-5A	4.0	190.0				
PR6-5A	4.5	218.0				
PR6-5A	5.0	239.0				
PR6-5A	6.0	146.0				
PR6-5B	.1	54.0				
PR6-5B	.5	47.8				

1 Modified from Table 1, Geomatrix and SSP&A, 1992

2 Depth: Sample collected from six inch interval of soil above depth indicated. All depths measured from the ground surface in inches.

3 Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limit.

TABLE 2

Analytical Results of Soil Samples Collected Prior to Pre-Remediation[1]
Soil Samples: Off-Site Properties, Upland Operable Unit
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[2]	Arsenic	Cadmium	Lead	Mercury[3]	Selenium
PR6-5B	1.0	110.0				
PR6-5B	1.5	41.6				
PR6-5B	1.5	47.6				
PR6-5B	1.5	65.3				
PR6-6A	.1	414.0				
PR6-6A	.5	218.0				
PR6-6A	1.0	543.0				
PR6-6A	2.0	329.0				
PR6-6A	3.0	232.0				
PR6-6A	4.0	207.0				
PR6-6A	4.5	192.0				
PR6-6A	5.0	206.0				
PR6-6A	6.0	127.0				
PR6-6B	.1	68.4	1.30	15.60	-.34	-200.00
PR6-6B	.5	39.0				
PR6-6B	1.0	33.4				
PR6-6B	1.5	52.1				
PR6-7A	.1	162.0				
PR6-7A	.5	326.0		198.00		
PR6-7A	1.0	208.0				
PR6-7A	2.0	176.0				
PR6-7A	3.0	142.0				
PR6-7A	4.0	192.0				
PR6-7A	4.5	121.0				
PR6-7A	5.0	235.0				
PR6-7A	6.0	102.0				
PR6-8A	.1	132.0				
PR6-8A	.5	161.0				
PR6-8A	.5	141.0				
PR6-8A	.5	169.0				
PR6-8A	1.0	246.0				
PR6-8A	1.5	212.0				
PR6-8A	2.0	250.0				
PR6-8A	3.0	104.0				
PR6-8A	4.0	159.0				
PR6-8A	4.5	175.0				
PR6-9A	.1	178.0				
PR6-9A	.5	138.0				
PR6-9A	1.0	126.0				
PR6-9A	1.5	105.0				
PR6-9A	2.0	132.0				
PR6-9A	3.0	134.0				
PR6-9A	3.5	120.0				

[1] Modified from Table 1, Geomatrix and SSP&A, 1992

[2] Depth: Sample collected from six inch interval of soil above depth indicated.
All depths measured from the ground surface in inches.

[3] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limit.

TABLE 2

Analytical Results of Soil Samples Collected Prior to Pre-Remediation
Soil Samples: Off-Site Properties, Upland Operable Unit [1]
1990 Bay Road Site, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth [2]	Arsenic	Cadmium	Lead	Mercury [3]	Selenium
PR6-9A	4.5	207.0				
PR6-10A	.1	156.0				
PR6-10A	.5	174.0				
PR6-10A	1.0	206.0				
PR6-10A	1.0	203.0				
PR6-10A	1.0	233.0				
PR6-10A	1.5	167.0				
PR6-10A	2.0	145.0				
PR6-10A	3.0	81.7				
PR6-10A	4.0	99.4				
PR6-10A	4.5	161.0				
PR6-11A	.1	160.0				
PR6-11A	.5	119.0				
PR6-11A	1.0	88.3				
PR6-11A	1.5	68.3				

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[1] Modified from Table 1, Geomatrix and SSP&A, 1992

[2] Depth: Sample collected from six inch interval of soil above depth indicated.
All depths measured from the ground surface in inches.

[3] Negative concentrations "-" indicate compound was not detected above the method reporting limit. Concentrations preceded by a negative sign are equal to the method reporting limit.

Table 3A

Analytical Results of Soil Samples Collected Prior to Pre-Remediation Soil Samples: PG&E Poleyard Property[1]
1990 Bay Road, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[2]	Arsenic	Cadmium[3]	Copper	Mercury	Lead	Selenium	Zinc
5-01	.30	< 20						
5-01	1.70	37						
5-04	.50	54						
5-04	1.00	88						
5-04	1.50	< 20						
5-05	.50	< 20						
5-05	2.00	< 20						
5-06	.50	350						
5-06	1.00	370						
5-06	1.50	110						
5-06	2.00	< 20						
5-09	.30	< 20						
5-09	1.00	400						
5-09	1.30	320						
5-09	1.70	160						
5-09	2.30	37						
5-09	3.00	25						
5-10	.50	38						
5-10	1.00	< 20						
5-10	1.50	< 20						
5-11	.50	< 20						
5-11	1.00	290						
5-11	1.50	170						
5-11	2.00	130						
5-14	.50	92						
5-14	1.00	260						
5-14	1.50	210						

---

[1] Modified from Table E-1, Appendix E; Geomatrix and SSP&A, 1989

[2] Depth: Sample collected from six inch interval of soil above depth indicated. All depths measured from the ground surface in feet.

[3] Blank concentrations indicate no samples analyzed for the given parameter.

Table 3A

Analytical Results of Soil Samples Collected Prior to Pre-Remediation Soil Samples: PG&E Poleyard Property[1]

1990 Bay Road, East Palo Alto, California

Concentrations in mg/kg

Boring	Depth[2]	Arsenic	Cadmium[3]	Copper	Mercury	Lead	Selenium	Zinc
5-14	3.00	240						
5-18	.50	< 20						
5-18	1.00	110						
5-18	2.00	< 20						
5-21	.30	580	28.00	73.00	12.00	320.00	2.60	300.00
5-21	1.00	250						
5-21	1.70	340						
5-21	3.00	250						
5-21	5.00	130						
5-22	.50	< 20						
5-22	1.50	40						

[1] Modified from Table E-1, Appendix E; Geomatrix and SSP&A, 1989

[2] Depth: Sample collected from six inch interval of soil above depth indicated. All depths measured from the ground surface in feet.

[3] Blank concentrations indicate no samples analyzed for the given parameter.

Table 3B

Analytical Results of Soil Samples Collected Prior to Pre-Remediation Soil Samples: Bains Property[1]
1990 Bay Road, East Palo Alto, Califonia

Concentrations in mg/kg

Boring	Depth[2]	Arsenic	Cadmium[3]	Copper	Mercury	Lead	Selenium	Zinc
7-01	1.00	480						
7-01	1.50	< 20						
7-02	.50	< 20						
7-02	1.00	< 20						
7-03	.50	890						
7-03	1.50	480						
7-03	2.00	380						
7-04	1.00	< 20						
7-04	1.50	< 20						
7-25	.50	4,200						
7-25	1.00	1,900	140.00	320.00	2.40	500.00	3.20	3,200.00
7-25	1.50	1,100						
7-25	2.50	200						
7-26	1.00	< 20						
7-26	2.00	< 20						
7-28	1.00	< 20						

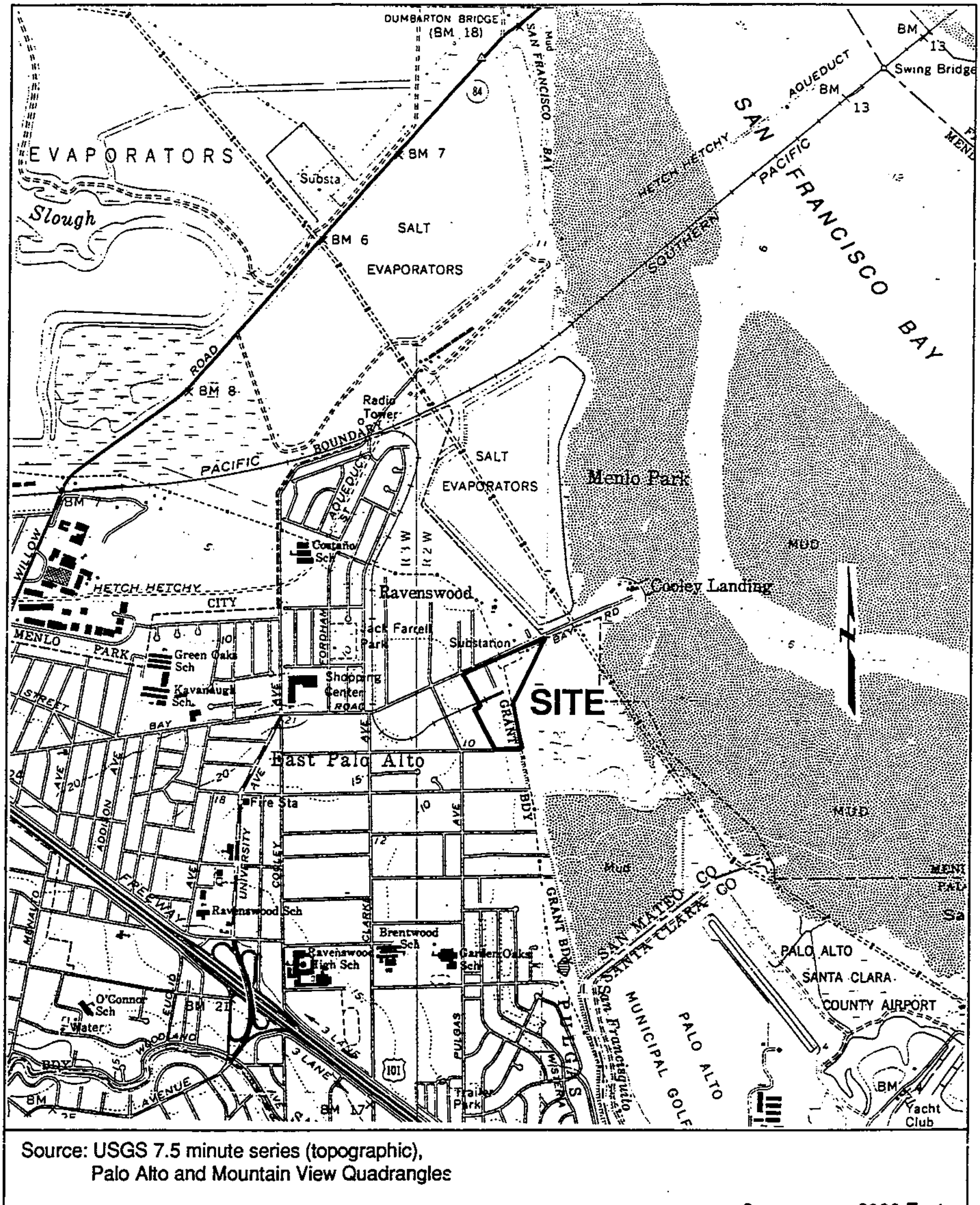
---

1 Modified from Table E-1, Appendix E; Geomatrix and SSP&A, 1989

2 Depth: Sample collected from six inch interval of soil above depth indicated
All depths measured from the ground surface in feet.

3 Blank concentrations indicate no samples analyzed for the given parameter.

FIGURES



Source: USGS 7.5 minute series (topographic),
Palo Alto and Mountain View Quadrangles

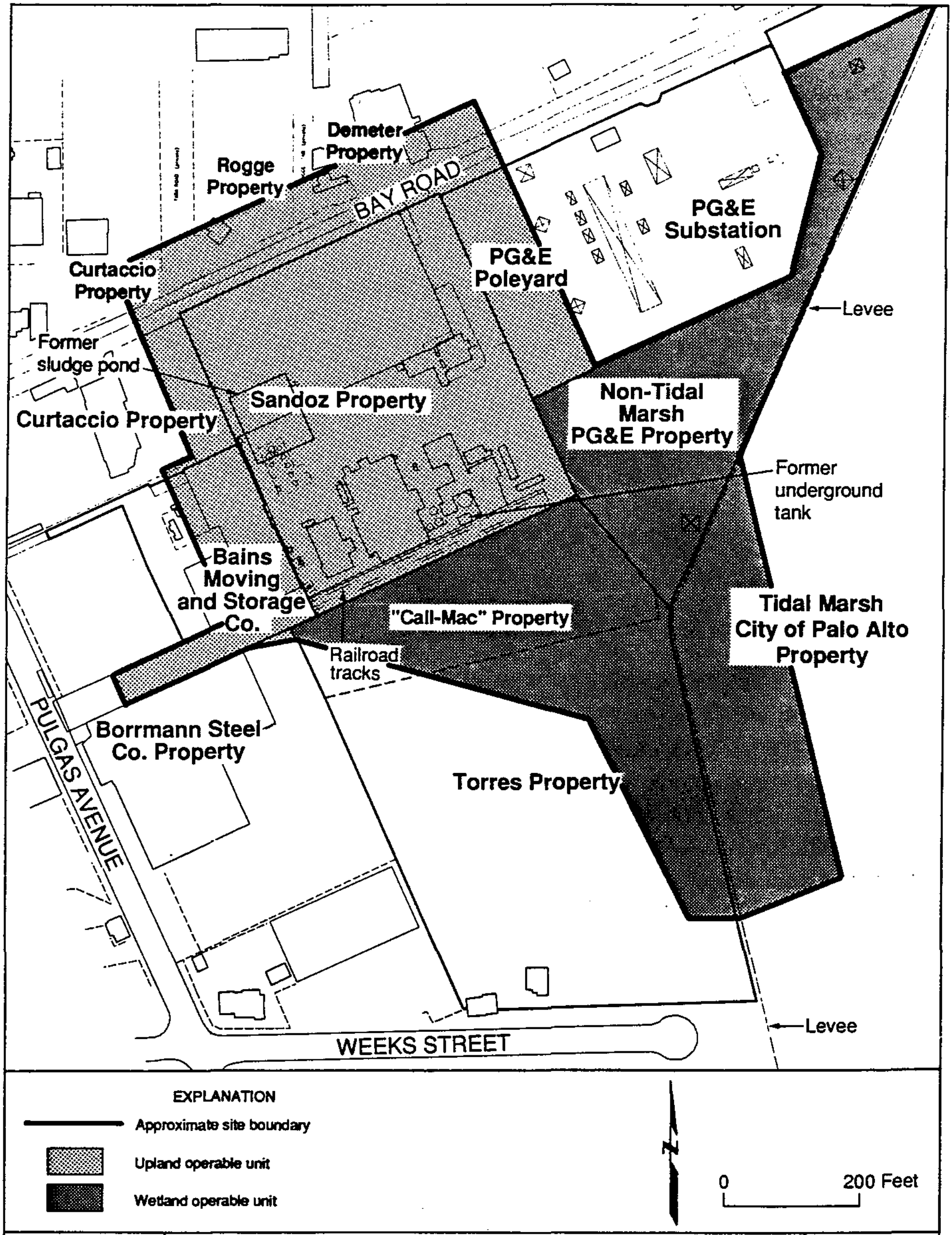
0 2000 Feet

GEOMATRIX

SITE LOCATION MAP
1990 Bay Road Site
East Palo Alto, California

Figure
1

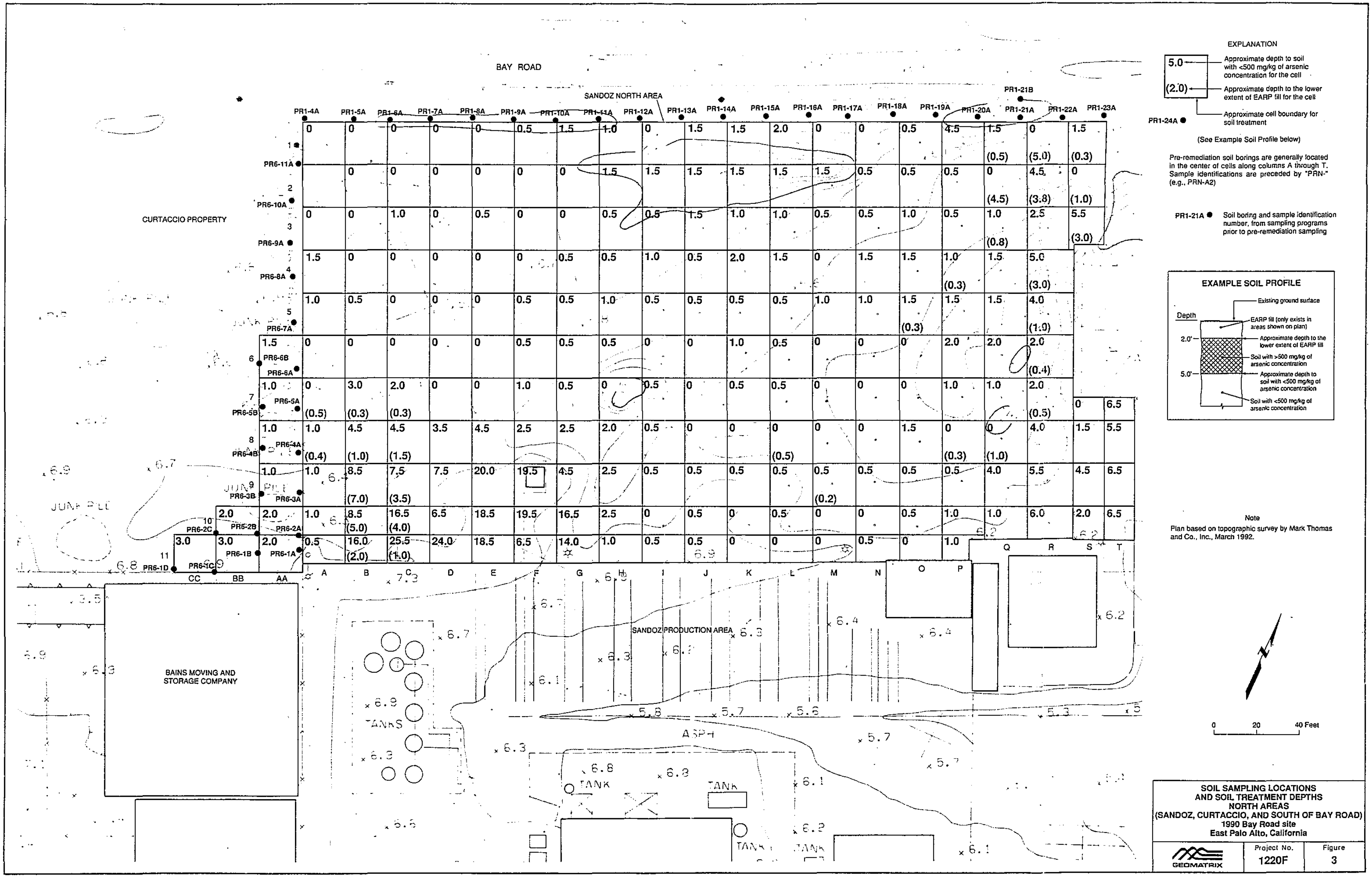
Project No.
1220F



SITE AREA DESIGNATIONS
1990 Bay Road Site
East Palo Alto, California

Figure
2

Project No.
1220F

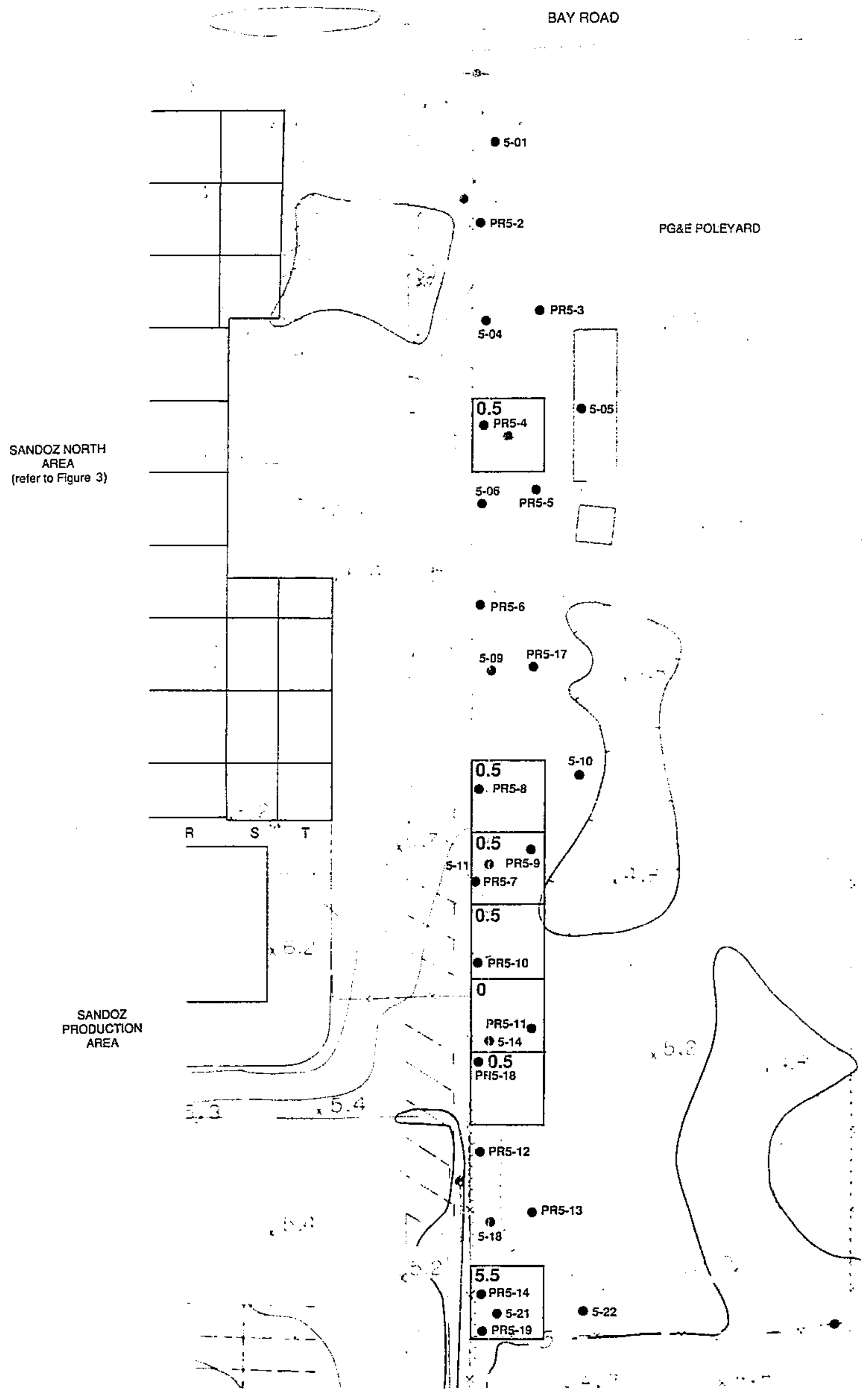


Note
Plan based on topographic survey by Mark Thomas and Co., Inc., March 1992.

SOIL SAMPLING LOCATIONS
AND SOIL TREATMENT DEPTHS
NORTH AREAS
(SANDOZ, CURTACCIO, AND SOUTH OF BAY ROAD)
1990 Bay Road site
East Palo Alto, California

GEOMATRIX

Project No.	Figure
1220F	3



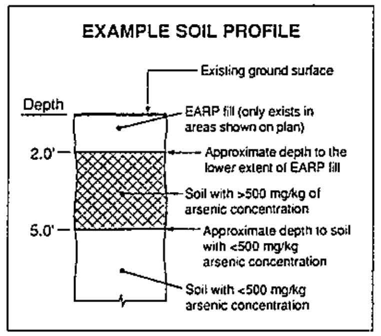
EXPLANATION

5.0 — Approximate depth to soil with <500 mg/kg of arsenic concentration for the cell

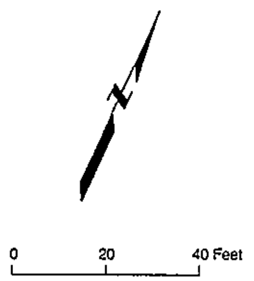
Approximate cell boundary for soil treatment

(See Example Soil Profile below)

5-10 ● Soil boring and sample identification number, from sampling programs prior to pre-remediation sampling

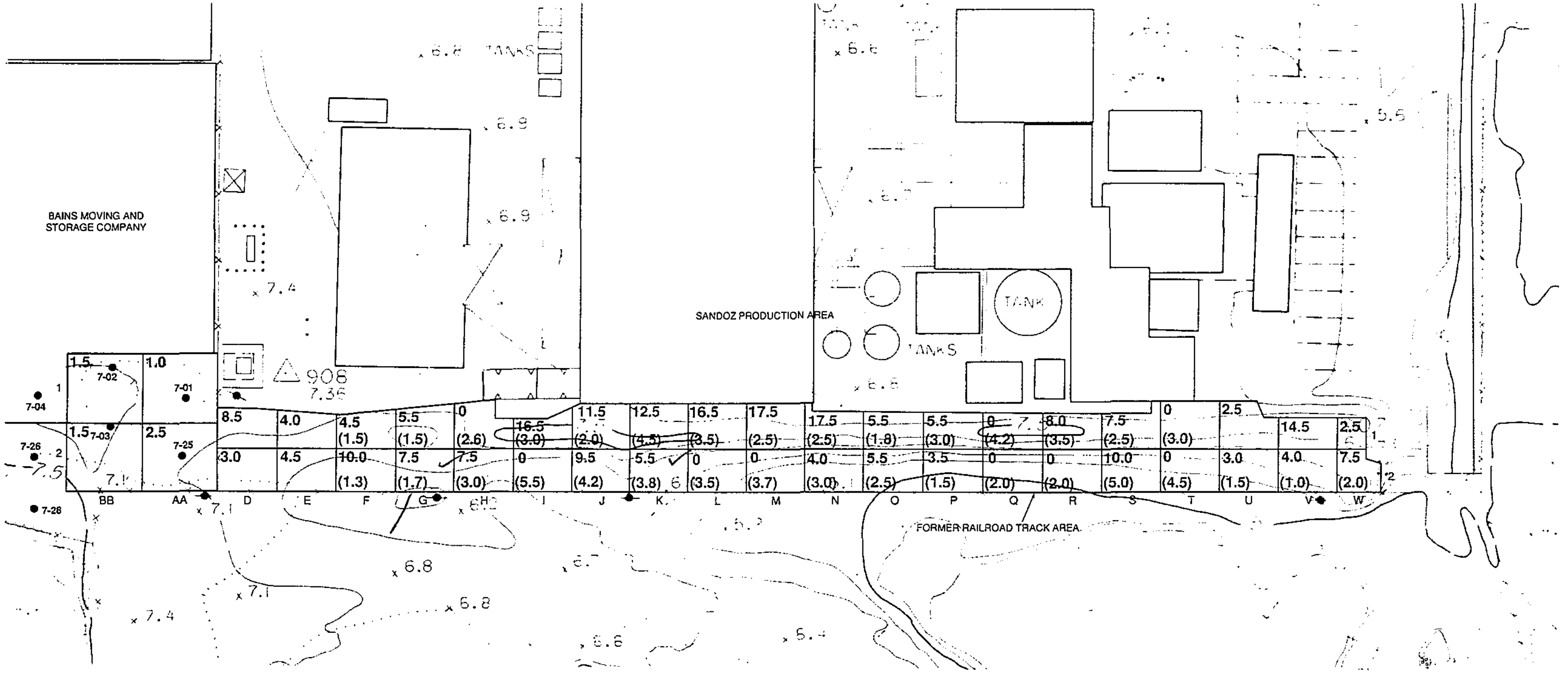


Note
Plan based on topographic survey by Mark Thomas and Co., Inc., March 1992.



SOIL SAMPLING LOCATIONS
AND SOIL TREATMENT DEPTHS
NORTH AREAS
(PG&E POLEYARD)
1990 Bay Road Site
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220F	4



EXPLANATION

5.0 — Approximate depth to soil with <500 mg/kg of arsenic concentration for the cell

(2.0) — Approximate depth to the lower extent of EARP fill for the cell

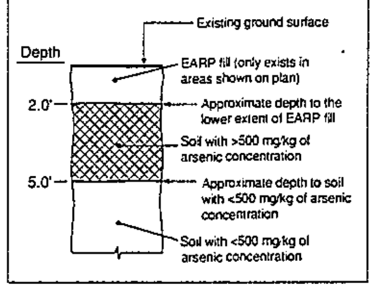
Approximate cell boundary for soil treatment

(See Example Soil Profile below)

Pre-remediation soil borings are generally located in the center of cells D1 through W2. Sample identifications are preceded by "PR4-" (e.g., PR4-D2)

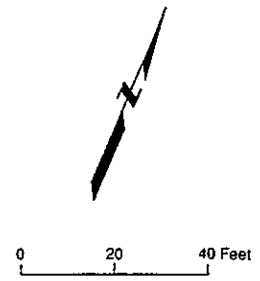
7-26 ● Soil boring and sample identification number, from sampling programs prior to pre-remediation sampling

EXAMPLE SOIL PROFILE



Note

Plan based on topographic survey by Mark Thomas and Co., Inc., March 1992.



SOIL SAMPLING LOCATIONS AND SOIL TREATMENT DEPTHS SOUTH AREAS
1990 Bay Road Site
East Palo Alto, California

GEOMATRIX

GEOMATRIX	Project No. 1220F	Figure 5

MTK

IMPLEMENTATION REPORT FOR REMEDIAL ACTION
UPLAND OPERABLE UNIT

1990 Bay Road Site
East Palo Alto, California

VOLUME 1 OF 3 - REPORT

GEOMATRIX CONSULTANTS, INC.
San Francisco, California
in association with
S.S. PAPADOPULOS & ASSOCIATES, INC.
Bethesda, Maryland

30 June 1993
Project No. 1220F

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Consulting Engineers and Earth Scientists
in association with

S.S. PAPADOPULOS & ASSOCIATES, INC.
Consulting Ground-Water Hydrologists

30 June 1993
Project 1220

Mr. Steven R. Ritchie
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, 5th Floor
Oakland, CA 94612

Subject: Implementation Report for Remedial Action
Upland Operable Unit
1990 Bay Road Site
East Palo Alto, California

Dear Mr. Ritchie:

On behalf of Rhone-Poulenc Inc. and in accordance with provision 1d of the Site Cleanup Requirements Order 92-127, we are submitting the enclosed report.

Should you have any questions regarding this report, please contact either of the undersigned or Fred Ellerbusch at (908) 821-3489.

Sincerely,

GEOMATRIX CONSULTANTS, INC.

for Michael T. Rafferty, P.E.
Project Manager

S.S. PAPADOPULOS & ASSOCIATES, INC.

Mary Sue [illegible] for
Charles B. Andrews, Ph.D., R.G.
Project Director

MTR/lam
1220\IMPLTPT.LTR

cc: Mark Johnson - RWQCB
Rose Marie Caraway - U.S. EPA
Michelle Rembaum - DHS/TSCP
Allan Parker - City of East Palo Alto
William Camp - San Francisco Water District (Hetch Hetchy Water District)
Jennifer Stone - San Mateo County Health Department
F. Ellerbusch - Rhone-Poulenc Inc.
W. Reece Bader - Orrick, Herrington & Sutcliffe

IMPLEMENTATION REPORT FOR REMEDIAL ACTION
UPLAND OPERABLE UNIT

1990 Bay Road Site
East Palo Alto, California

VOLUME 1 OF 3 - REPORT

GEOMATRIX CONSULTANTS, INC.
San Francisco, California
in association with
S.S. PAPADOPULOS & ASSOCIATES, INC.
Bethesda, Maryland

30 June 1993
Project No. 1220F

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Treatment

Grading, Paving, and Drainage

LIST OF APPENDICES

IMPLEMENTATION REPORT FOR REMEDIAL ACTION
UPLAND OPERABLE UNIT

1990 Bay Road Site
East Palo Alto, California

1.0 INTRODUCTION

This implementation report was prepared for Rhone-Poulenc Inc. in response to Provision 1g of Order No. 92-022 issued by the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), on 19 February 1992. This report documents the implementation of the activities identified in the Upland Operable Unit Remedial Design Report, dated 1 May 1992.

1.1 BACKGROUND

The 1990 Bay Road site is located in an industrial area of the city of East Palo Alto, along the western shore of San Francisco Bay (Drawing G-2). The site includes the approximately 13 acres where the Remedial Investigation Report (RI Report) identified soil and groundwater as being contaminated (Geomatrix and SSP&A, 1989). The site was divided into two operable units for investigation and remediation, the upland and the wetland operable units. The site boundary and the limits of the upland operable unit are shown on Drawings G-3 and G-4.

The largest property at the site is the 1990 Bay Road property, which currently is owned by Sandoz Agro, Inc. (Sandoz), and which was used to formulate agricultural chemicals, including arsenic-based pesticides, for more than 60 years. From 1926 to 1964, the site was occupied by Chipman Chemical Company. In 1964, Rhone-Poulenc's predecessor, Rhodia Inc., acquired Chipman, and operations continued under the name Chipman Chemical Company, Division of Rhodia Inc., until 1970, when operations ceased. In 1971, Rhodia sold the property to Zoecon Corporation, which began operations at the site in 1972. Zoecon, now Sandoz, manufactured biorational insect controls at the agrichemical facility, which occupies 3 of the 5 acres of the property, until production was halted in February 1993. The Sandoz property is in the upland operable unit.

The rest of the site consists of undeveloped land immediately south and east of the Sandoz property, including a non-tidal marsh and a PG&E poleyard; partly developed commercial properties to the north and west; and a tidal marsh located beyond a levee east of the 1990 Bay Road property. Fences surround the Sandoz property, the non-tidal marsh, and part of the Torres property directly south of the site. The properties to the north and west of the Sandoz property and the PG&E poleyard are included in the upland operable unit. The Torres property and the tidal and non-tidal marsh areas comprise the wetland operable unit, the subject of a future feasibility study.

The final RI Report, which reflects nine years of investigations to define the nature and extent of contamination at the site, was submitted on 19 September 1989 and was approved by the RWQCB, the California Department of Health Services (DHS), and the U.S. Environmental Protection Agency (EPA). A Feasibility Study Report (FS Report), which evaluated options for remediating the upland operable unit, was submitted to the RWQCB on 1 November 1991 (Geomatrix and SSP&A, 1991a). After the RWQCB approved the FS Report, a remediation plan was selected.

1.2 SUMMARY OF REMEDIAL ACTION PLAN

A Remedial Action Plan (RAP) for the upland operable unit was issued by the RWQCB on 19 February 1992. The EPA issued a Record of Decision (ROD) for the site on 4 March 1992. The RAP and ROD call for the following remedial actions:

1. Excavate and dispose of off-site soil having arsenic concentrations greater than 5,000 milligrams per kilogram (mg/kg).

2. Excavate, or cap and obtain deed restrictions, for soil having chemical concentrations in excess of 70 mg/kg arsenic, 250 mg/kg cadmium, 120 mg/kg lead, 100 mg/kg mercury, and/or 2,000 mg/kg selenium.

3. Treat, by means of a stabilization technology, accessible soil having chemical concentrations in excess of 500 mg/kg arsenic, 1,000 mg/kg cadmium, 450 mg/kg lead, 300 mg/kg mercury, and/or 6,000 mg/kg selenium so that the concentrations in the leachate from the Toxicity Characteristic Leaching Procedure (TCLP, 40 CFR 261, Appendix II) are below the following Toxicity Characteristics (TC):

Metal	TC
Arsenic	5.0 mg/l
Cadmium	1.0 mg/l
Lead	5.0 mg/l
Mercury	0.2 mg/l
Selenium	1.0 mg/l

4. Install additional monitoring wells and continue monitoring arsenic concentrations in the shallow and deep aquifers as set forth in the Deep Aquifer Monitoring Plan, the revised Sampling and Analysis Plan, and the Aquifer Characterization and Contingency Plan.

5. After implementation of the FS/RAP for the Wetland Operable Unit, install a slurry wall to mitigate outward migration of arsenic concentrations exceeding 0.5 mg/l in the shallow groundwater zone.

This report addresses implementation of the first three actions.

Approximately 4,000 cubic yards of soil containing arsenic concentrations greater than 5,000 mg/kg was removed during the Early Removal Action in 1991 (Geomatrix and

SSP&A, 1991b). The remaining remedial actions were the subject of further investigation and detailed design and planning during the first half of 1992. This work is documented in the following reports:

- Pre-Remediation Soil Sampling Report and Excavation Work Plan for Off-Site Properties (Geomatrix and SSP&A, 1992a)
- Pre-Treatment Soil Sampling Report (Geomatrix and SSP&A, 1992b)
- Remedial Design Report (Geomatrix and SSP&A, 1992c).

The first two reports presented extensive soil sampling and analysis data that were used to identify the quantity of soil to be excavated and disposed of off site, the extent of soil to be capped, and the quantity of soil to be treated and left on site. The sampling also identified an additional quantity of soil having an arsenic concentration greater than 5,000 mg/kg.

Soil containing greater than 70 mg/kg arsenic on properties located along the north side of Bay Road was excavated and disposed of off site. Those properties do not require deed restrictions. Soil containing greater than 500 mg/kg arsenic was excavated from the Bains, Curtaccio, and PG&E poleyard properties and moved onto the Sandoz property for treatment. Deed restrictions are being applied to these properties.

The Remedial Design Report, which was approved on 22 June 1992, provided details of the planned remediation. This report identified two methods for the stabilization of soil at the site: post-excavation treatment for shallow soil, and in situ treatment for deeper soil. A three-layer asphalt section was chosen for the cap.

1.3 SUMMARY OF IMPLEMENTATION OF REMEDIAL ACTION

The remedial activities conducted in each area of the site are illustrated on the drawings (G-1 through G-5, T-1 through T-4, and P-1 through P-6) and Figures 1 through 6 included with this report. The drawings are as-built revisions of the drawings included in the

Remedial Design Report and relate chiefly to treatment of soil containing more than 500 mg/kg arsenic, excavation of soil containing more than 5,000 mg/kg arsenic, and capping. The excavation of off-site soil containing more than 70 mg/kg arsenic is not included on these drawings, but is described in Section 4.0 and shown on Figure 2. Table 1 lists the major remedial activities and the total volume or area involved with each activity. These activities were performed from June 1992 to May 1993. Section 2.0, Table 2 and Figure 1 summarize contractors and work schedule. Section 3.0 summarizes preparatory on-site activities.

Sections 5.0 and 6.0 describe the in situ and post-excavation soil treatment programs, respectively. Volumes of soil to be treated were divided into treatment cells which were generally 20 feet by 20 feet and varied in depth according to previous sampling data (Geomatrix and SSP&A, 1992b). Section 7.0 discusses the grading and paving work, and Section 8.0 describes health and safety activities. The implemented remedial actions are described below:

1. The remaining accessible soil having an arsenic concentration greater than 5,000 mg/kg was excavated and treated. Subsequent chemical analysis of this stockpiled treated soil demonstrated that the average concentration of total arsenic was less than 5,000 mg/kg (and the TCLP leachate met TC requirements), so this soil was placed on site.

2. Soil having an arsenic concentration greater than 70 mg/kg on the north side of Bay Road was excavated and disposed of off site. All other untreated or treated soil having an arsenic concentration greater than 70 mg/kg was capped. Deed restrictions are being obtained for all capped properties.

3. Accessible soil, having an arsenic concentration over 500 mg/kg and identified as requiring treatment in the Remedial Design Report, was treated with stabilization reagents. After treatment, the concentrations of metals in the leachate from the TCLP were below the associated TC for all samples tested.

2.0 CONTRACTORS AND SCHEDULE

This section identifies the contractors involved in implementing the remedial action and compares the actual implementation schedule with the schedule presented in the Remedial Design Report.

2.1 CONTRACTORS

Table 2 lists the contractors involved in the project and briefly summarizes work performed by each. Detailed descriptions of the work are included in Sections 3.0 to 7.0 of this report.

2.2 SCHEDULE

Figure 1 compares the actual remedial action implementation schedule with the planned schedule presented in the Remedial Design Report. Table 3 presents a more detailed weekly chronology of activities. Bid documents for the two major soil treatment contracts were issued immediately after the agencies approved the Remedial Design Report. Preliminary work, including preliminary excavation, utility work, and fencing, was performed between late June and mid-August 1992. In situ and post-excavation soil treatment started in late August and mid-September, respectively. In situ treatment was completed by mid-October, and post-excavation treatment by late November 1992. Grading and paving started in early November and was completed in approximately two weeks in all areas except the Sandoz North Area and Curtaccio property. Because the post-excavation soil treatment work was completed in the North Area later than expected, and because the wet season was approaching, paving operations were rescheduled for Spring 1993. To prevent runoff of rainwater-containing contaminants, the Sandoz North Area was covered with a reinforced plastic cover.

3.0 PRELIMINARY WORK

This section describes the activities performed to prepare the site for in situ and post-excavation soil treatment. It explains the arrangement of the site work areas, work associated with the diversion and protection of utilities, monitoring of well abandonment, removal of Early Action Removal Plan (EARP) fill, preliminary excavation of soil containing 500 to 5,000 mg/kg arsenic, and miscellaneous site preparation. Apart from diverting the overhead electrical lines on the Torres property, most of this preliminary work was carried out between late June and mid-August 1992 before the two soil treatment contractors mobilized. The chronology of preliminary activities is summarized as part of Table 3.

3.1 WORK AREAS

Work areas established for remedial activities in the North Area, South Area, and support zones of the site are illustrated on Drawing G-5. Access through the east gate into the North Area was restricted to occasional entry of equipment. Access to and egress from the North Area was through the north gate on Bay Road and through two personnel gates in the fence between the Curtaccio and Sandoz properties. Personnel decontamination stations were established adjacent to these entry/exit points. Support zones for the two treatment contractors were established on the Curtaccio property.

3.2 UTILITIES

Aboveground and buried utilities on site were located, protected, and/or diverted as necessary prior to remedial activities. The 1.25-inch-diameter high-pressure gas line that crosses the Sandoz North Area (Drawing T-1) was exposed at several locations within the treatment area to confirm its depth below minimum treatment cell elevations. All other areas involving excavation (PG&E poleyard, Bains and Curtaccio properties, and Sandoz driveway) were scanned and marked for buried utilities by a private utility locator prior to excavation.

3.2.1 Fire Service Line

A section of the buried 8-inch-diameter transite fire water line that diagonally crossed the North Area was relocated so that it would not interfere with excavation activities (Drawing T-1). A new trench alignment was excavated adjacent to the west fence line from the post-indicator valve to the Sandoz paved area, then east to rejoin the existing line (Drawing T-1). During trenching, several buried small glass bottles and a 5-gallon metal container containing unknown liquids and other debris including drum lids, wood, and cardboard were encountered under the northwest corner of the Sandoz facility. Excavation was temporarily halted until a contractor could complete the trench work using Level B protection. The debris was disposed of as a hazardous waste at the Class I disposal facility operated by ChemWaste Management, Inc. (CWMI), in Kettleman, California. The trench soil was tested and treated on site using stabilization technology. A new 8-inch PVC fire service was installed with concrete thrust blocks at the two tie-in points and the elbow. Following backfill and compaction of the trench, the alignment in the North Area was cordoned off and was used as a personnel pathway between decontamination areas. The abandoned segment of transite pipe was removed and disposed of at the CWMI facility in Kettleman, California, as hazardous waste.

3.2.2 Low-Voltage Electrical Lines

Low-voltage electrical lines in the North Area were replaced outside the treatment area, as shown on Drawing T-1. A 110-volt electric line to the northeast corner light standard, a 220-volt electric line to Sandoz's front gate and light, and a phone line to the gate entry phone-box were diverted to new alignments along the Sandoz driveway. A 110-volt electric line and light standard along Sandoz's wooden fence in the North Area were removed. Two temporary light poles were erected on the Sandoz facility side of the fence.

3.2.3 PG&E High-Voltage Overhead Power Lines

The PG&E high-voltage overhead power supply to Sandoz through the Torres property was diverted to provide working space for the in situ treatment rig. The new alignment was 50 feet to the south and parallel to the old alignment (Drawing G-5). Two new poles and lines were installed and connected by a PG&E crew. The bypassed power lines and power poles were removed.

3.3 WELL ABANDONMENT

Three monitoring wells abandoned and removed prior to remediation activities are shown on Drawing G-5. Wells W-116 and W-117, located in the northeast corner of the North Area, were removed on 8 July 1992 using a hollow-stem auger drill rig. Boreholes were filled with cement-bentonite grout. An excavator was used to remove well WCC-116 (a lower shallow zone well) on the west end of the former railroad track area on 20 July 1992, prior to excavation of cell D-1. Well casings and pipes were disposed of as Class I hazardous waste. These three wells and wells WCC-1 and WCC-117, removed as part of the Early Action Removal Plan, are scheduled for re-installation within three months of completion of the slurry wall, which will be installed after remediation of the wetland operable unit.

3.4 REMOVAL OF EARP FILL

Fill material imported to the site during work performed as part of the Early Action Removal Plan (EARP) was removed from portions of the North and South areas. The approximate extent of EARP fill removed is shown on Drawings T-1 and T-3. Areas of EARP fill too thin to allow practical separation from the arsenic-affected soil were left in place and treated along with affected soil. Wherever possible, the filter fabric (placed as a marker between EARP fill and arsenic-affected soil) was removed and disposed of as Class I hazardous waste prior to treatment of the soil. Approximately 150 cubic yards of EARP fill was removed from the southwest corner of the North Area to prepare the area for in situ treatment. This material was transported to a temporary stockpile on the Torres property. South Area EARP fill on much of the former track area was removed to access treatment cells. Approximately 600 cubic yards of fill was removed and placed in a stockpile on the Torres property. Following excavation of cells containing soil affected by 500 to 5,000 mg/kg arsenic, cells adjacent to in situ treatment cells generally were backfilled and compacted with EARP fill from the stockpile to raise grades to form a working platform for in situ treatment. EARP fill in the northeast corner of the North Area was removed by the post-excavation contractor. Approximately 50 cubic yards of fill was removed from this area and stockpiled separately on the Torres property.

3.5 PRELIMINARY EXCAVATION OF SOIL CONTAINING 500 TO 5,000 MG/KG ARSENIC

Soil containing arsenic in the range of 500 to 5,000 mg/kg was excavated and removed from adjacent properties (Curtaccio, PG&E poleyard, and Bains) and from shallow treatment cells in the South Area, and was stockpiled for treatment on the North Area. The primary purpose was to consolidate post-excavation treatment operations on the North Area. Cell excavation depths, which were confirmed by surveying the bottoms of excavations, are shown in Table 8. Elevations shown on the drawings were confirmed by a registered land surveyor.

Approximately 245 cubic yards of soil was removed from cells in the southeast corner of the Curtaccio property (Drawing T-1). Cell excavations were backfilled to the approximate grades shown on Drawing T-1 with imported fill from Kaiser Permanente Quarry in San Jose, California. This fill was compacted to 95% relative compaction. Approximately 123 cubic yards of soil was removed from six cells in the PG&E poleyard to the approximate elevations shown on Drawing T-4. The deepest cells in the southwest corner of this area were backfilled with 2-inch drainrock (a crushed, poorly-graded gravel) from Kaiser Permanente Quarry in San Jose, California. The excavated cell closest to Bay Road was backfilled with the same imported fill as used for backfilling cells on the Curtaccio property. Approximately 190 cubic yards of soil was removed from the east end of the Bains property (Drawing T-3). This excavation was backfilled during site grading to prepare for paving; refer to Section 7.2.5.

Cells in the South Area were excavated to at least the elevations shown on Drawing T-3. Approximately 500 cubic yards of soil was removed and transported to the North Area stockpile for post-excavation treatment. Cells D-1, O-2, R-1, S-1, and W-2, originally designated for in situ treatment, were excavated during the preliminary work. North walls of excavated cells along the edge of the Sandoz facility were sloped. Cells excavated to depths below groundwater level were backfilled with drainrock to the water table. Cells to be treated by the in situ method were backfilled with 500 to 5,000 mg/kg arsenic-affected soil to raise grades that had been lowered when EARP fill was removed.

Excavation of 500 to 5,000 mg/kg arsenic-affected soil from some cells on the west half of the North Area was completed before the treatment contractors mobilized (Drawing T-1). Cells C-3 and E-3 were excavated in order to provide a larger staging area for the post-excavation contractor. Line A cells along the new alignment of the fire service line were excavated so the treatment contractors would not need to operate heavy equipment in this area. Cells B-5 through B-8, C-7, and C-8, situated west of the fire access road, were also excavated to create additional space for in situ treatment operations and soil stockpiling.

3.6 EXCAVATION OF SOIL CONTAINING MORE THAN 5,000 MG/KG ARSENIC

Before the treatment contractors mobilized, soil containing arsenic concentrations greater than 5,000 mg/kg was excavated at locations shown on Drawings T-1 and T-3. Excavation volumes are presented by cell in Table 9.

On 8 April 1992, approximately 50 cubic yards of soil was excavated using a backhoe from cell T-7 and from a triangular-shaped area designated PR1-21-A on the south shoulder of Bay Road adjacent to the North Area. Analytic results of confirmatory samples collected from the excavation bottom of cell T-7 (sample numbers EXS-1 and EXS-2; Appendix A) indicated less than 1,100 mg/kg arsenic. Confirmatory samples collected from the excavation bottom of area PR-1-21-A (sample numbers EXN-1, EXN-2, and EXN-3; Appendix A) indicated less than 50 mg/kg arsenic. Excavated soil was disposed of as Class I hazardous waste (for waste manifest numbers, refer to Appendix B). Excavations were backfilled with imported fill from Dumbarton Quarry in Fremont, California. The backfill material was compacted to 95% relative compaction.

On 13 July 1992, approximately 30 cubic yards of soil was removed from cell Q-9 in the North Area and stockpiled on plastic sheeting on adjacent cells. Excavations totaling approximately 105 cubic yards were performed in cells E-2, V-1, and W-2 in the South Area on 17 and 20 July 1992. Approximately 10 cubic yards of soil was removed from the non-tidal marsh. Excavated soil was transported to the North Area stockpile. Excavation depths were confirmed for cells Q-9, E-2, V-1, and W-2 by surveying the bottoms of excavations. The stockpile of soil containing more than 5,000 mg/kg arsenic was treated in six batches using the post-excavation method (Batch nos. M021, M022, M023, M049, M050, and M052; see Section 6.6). Analytical testing of this treated soil indicated that total arsenic concentrations were less than 5,000 mg/kg and TCLP leachate was below associated TC requirements for all six batches. Given these analytical results, the treated soil was left on site.

3.7 ADDITIONAL SITE PREPARATION ACTIVITIES

Other site preparation activities included relocation of the fire supply shed, fence work, and minor asphalt paving. The prefabricated metal shed for storing chemical fire fighting foam was moved, with approval of the local fire protection district, from the staging area to the north end of the fire access road (Drawing G-5). The shed was placed on a new concrete slab having a surface elevation approximately 4 inches above the adjacent final paving grade.

Fences around the North Area were maintained with minor changes during remediation. Following removal of the wood and corrugated metal fence along the north side of the Curtaccio property adjacent to Bay Road, a cyclone fence with two vehicle gates was installed along the Bay Road shoulder. A temporary post-driven cyclone fence was erected across the Curtaccio property on the west side of the support zone. Wind screen fabric was installed on this fenceline and on fences along Bay Road. Temporary fence panels were placed in the support zone to separate the in situ and post-excavation contractor areas. Fence work in the South Area consisted of installing temporary fence panels and wind screen fabric immediately behind the Sandoz facility and removing the cyclone fence along the former track area.

Several asphalt patching and paving activities were performed during site preparation (Drawings T-1 and T-3). A portion of the North Area equipment decon pad was replaced following its removal for excavation of underlying soil in cell C-3. The fire service trench on the Sandoz facility was patched after backfilling was completed. At the request of Sandoz, three asphalt containment berms or curbs were installed to maintain the integrity of the Sandoz runoff collection system. Two were installed along the boundary of the Sandoz facility and the South Area, and the third on the southeast corner of the North Area.

4.0 SOIL CONTAINING MORE THAN 70 MG/KG ARSENIC: OFF-SITE PROPERTIES

The approved Remedial Action Plan for the Bay Road site calls for removing or paving all soil containing more than 70 mg/kg arsenic. Deed restrictions will be applied to properties where remaining soil contains more than 70 mg/kg arsenic. Between November 1991 and February 1992, Geomatrix conducted an extensive sampling program to delineate areas of adjacent off-site properties where soil concentrations of arsenic exceeded 70 mg/kg. Results of this sampling program and a work plan for excavating soil containing more than 70 mg/kg arsenic from the north side of Bay Road were presented in the Pre-Remediation Soil Sampling Report and Excavation Work Plan for Off-site Properties: Upland Remedial Unit (Geomatrix and SSP&A, 1992a). As discussed in that report, soil containing more than 70 mg/kg arsenic on properties north of Bay Road was excavated and disposed of off site. Soil containing more than 70 mg/kg arsenic on other off-site properties (Bains, Curtaccio, PG&E poleyard, and the south side of Bay Road) was covered with an asphalt cap, and deed restrictions are being obtained for these properties.

4.1 EXCAVATION AND DISPOSAL: NORTH SIDE OF BAY ROAD

In early July 1992, Geomatrix conducted excavation and backfilling in areas north of Bay Road where soil contained more than 70 mg/kg arsenic. Excavated areas, shown on Figure 2, were those characterized in the Pre-Remediation Soil Sampling Report (Geomatrix and SSP&A, 1992a). Buried utilities near the excavated area were located through Underground Services Alert (USA) and by a private utility locator. Buried gas, sewer, and water lines in this area were manually exposed before excavation. Excavations were carried out to specified depths and were confirmed by licensed surveyors. Once the specified excavation depth was reached, confirmation soil samples were collected from the bottom of the excavation and delivered to the analytical laboratory.

Locations of the 25 confirmation samples collected are shown on Figure 2. Samples were analyzed for arsenic, cadmium, lead, and selenium by inductively coupled plasma emission spectrometry (ICP, EPA Method 6010) and for mercury by cold vapor atomic absorption (EPA Method 7471). Analyses were performed by Anametrix, Inc., of San Jose, California, on a quick turnaround basis, so that results were received before backfilling.

Analytical results are summarized in Table 4 and attached to this report in Appendix A. The primary constituents detected in the confirmation samples were arsenic and lead. Only one sampling location showed concentrations of arsenic greater than 70 mg/kg (triplicate samples C11 through C13, which had an average concentration of 83 mg/kg). An approximately 180-square-foot area around this location was excavated an additional 1.0 foot in depth, and the bottom resampled at the same location (sample C15, arsenic concentration 12.5 mg/kg). Excavated areas were backfilled with imported aggregate base material and compacted to not less than 95% of the maximum dry density.

Approximately 240 cubic yards of soil was excavated from the north side of Bay Road and temporarily stockpiled in the Sandoz North Area. Sixteen samples were collected from the stockpiled soil and composited by the laboratory into two samples. The composite samples were analyzed for Title 22 metals; floride salts; and arsenic, cadmium, and lead by the TCLP. All results were below regulatory limits for hazardous waste, and the stockpiled soil was off-hauled to Kettleman Hills as non-hazardous waste. Analytical reports for the stockpiled soil samples are included in Appendix A.

4.2 DEED RESTRICTIONS: OFF-SITE PROPERTIES

In accordance with Provisions 1d and 1f of RWQCB Order No. 92-022, Rhone-Poulenc is working with the RWQCB and the owners of the Sandoz, PG&E, Curtaccio, and Bains properties to secure deed restrictions. These deed restrictions will prohibit use of identified portions of the site for residences, schools, hospitals, parks, or day-care facilities. As required by the RWQCB, a report will be submitted documenting the final deed restrictions, when in place.

5.0 IN SITU TREATMENT OF SOIL CONTAINING 500 TO 5,000 MG/KG ARSENIC

Approximately 4,000 cubic yards of soil containing 500 to 5,000 mg/kg arsenic was treated using an in situ soil treatment method.

5.1 CONTRACT AND SCHEDULE

The contract documents for the in situ treatment program consisted of specifications, drawings, and an agreement. Minor revisions were made to the specifications and drawings, originally presented in the Remedial Design Report (Geomatrix and SSP&A, 1992c), before incorporation into the contract documents. The arrangements for this contract were generally as described in the Remedial Design Report. Kajima/SMW Seiko of Pasadena, California, was selected as the in situ contractor based on previous experience, information provided by references, the technical content of their proposal, and cost. Rhone-Poulenc contracted directly with Silicate Technology Corporation (STC) to supply reagents to the in situ contractor. The in situ contractor mobilized on site the week of 14 August and completed the work on 23 October. A detailed weekly chronology of the progress of this contract is presented in Table 3; an overall schedule is shown on Figure 1.

5.2 IN SITU TREATMENT METHOD AND METHOD TEST

The contractor demonstrated the effectiveness of his proposed method of in situ soil treatment in a method test before beginning full-scale treatment. This section outlines the treatment method used and describes the method test procedures.

5.2.1 Method of In Situ Treatment

Soil treatment required the addition of three reagents and water. The reagents, S-3, P-1, and P-1A, which are proprietary reagents of Silicate Technology Corporation, of Scottsdale, Arizona, were used in previous bench and pilot-scale studies (Geomatrix and SSP&A, 1992c). The reagents were added sequentially: first S-3, then a mixture of P-1 and P-1A. Reagent quantities were determined as a percentage of in-place soil weight; S-3 was added at 5%, P-1 at 2%, and P-1A at 10%. P-1 and P-1A were delivered to the site premixed, and were added at 12% of the in-place soil weight. To convert in-place soil volume to soil weight, a bulk density of 1.6 tons per cubic yard was assumed. This density corresponds to the average wet density of soil measured during the pilot-scale study (Geomatrix and SSP&A, 1992c).

Soil and reagents were mixed using three, 36-inch-diameter, hollow stem augers supported on a track-mounted base mixing machine. The base machine controlled penetration rate, rotational speed, and position of the augers. The three augers were aligned in the direction of travel of the base machine and were referred to as lead (to the operator's right), middle, and following augers. Reagents were pumped through the hollow stem augers and into the soil while it was mixed. The first reagent to be added to the soil, S-3, was dissolved with water in a 15,000-gallon batching tank that had internal mixers and an external circulating pump. The second reagent to be added to the soil, a mixture of P-1 and P-1A, was mixed with water in a slurry plant. The slurry plant consisted of a computer control unit, batching scales, reagent mixer, reagent agitator, and slurry pump. Both the slurry pump and external tank pump delivered reagent through hoses to the augers, and through the augers to the soil. Addition of reagents was controlled by the reagent pumping and auger penetration rates. Pumping rates were calibrated regularly.

Soil was treated using an overlapping grid pattern (Figures 3 and 4). Each grid location was mixed with two down-and-up auger strokes. During the first stroke, S-3 was pumped through the two outside augers and mixed with the soil. P-1/P-1A was pumped down the same augers during the second stroke. The overlapping grid pattern provided coverage of the entire area to be treated.

5.2.2 Method Test

Before full-scale in situ treatment began, 100 cubic yards (cy) of soil was treated using the procedure outlined above. This method test was performed to demonstrate the effectiveness of the treatment method in meeting the leachability criteria. These criteria required that the leachate of the TCLP test must have concentrations less than 5 mg/l each of arsenic and lead, less than 1 mg/l each of cadmium and selenium, and less than 0.2 mg/l of mercury. The 100 cy of soil was treated in the grid pattern, shown in the upper right corner of Figure 3, for borings PT-1 through PT-8, 11B-1, and 11B-2 to a depth of approximately 16 feet.

Ten randomly located samples, plus two triplicates, were collected from the method test area and tested for leachability and unconfined compressive strength. Analytical results for unconfined compressive strength and leachability are shown in Tables 6 and 7, respectively. The laboratory reports for all analytical results are included in Appendix C. All samples met the ROD's performance objectives for leachability. Thoroughness of mixing was evaluated by collecting samples from several depths and auger positions. The samples were visually inspected and passed through several sieves. The treated soil was of a uniform consistency and color and contained few lumps larger than 0.5 inch.

5.3 FULL-SCALE IN SITU TREATMENT

Full-scale in situ treatment began in the North Area on 27 August 1992, using the treatment method outlined in Section 5.2.1. On 17 September, the percentage by soil weight of P-1 was increased to 3%, and the percentage by soil weight of P-1A was decreased to 9% in order to increase the unconfined compressive strength of the treated soil. This change affected treated soil beginning with Sample IS-37. Strengths increased slightly as a result of a greater percentage of P-1, as shown in Table 6. Treatment of the North Area was completed on 24 September. Figure 3 shows the area treated and boring locations; treatment depths are shown on Drawing T-1.

Treatment in the South Area was begun on 1 October. A second method test was performed in the South Area to test the treatment of soil using a one-pass method (one down-and-up auger stroke). In this method, reagent S-3 was pumped into the soil through the two outside augers during the down stroke, and reagent P-1/P-1A was pumped simultaneously through the center auger during both the down and up strokes. Because the middle auger was several feet shorter than the outer augers, this still allowed sequential mixing of the two reagents. Slower penetration rates were used to provide for mixing that was as effective as in the two-pass method. The sample locations and analytical results for leachability and unconfined compressive strength from this method test are presented in Tables 6 and 7; all samples met the performance criteria for leachability. Treatment in the South Area was completed using the one-pass method on 16 October. Figure 4 presents the area treated and boring locations; treatment depths are shown on Drawing T-3.

The soil increased in volume during treatment, due to mixing and the addition of water and reagents. The excess volume of soil created was sampled and stockpiled separately. Bulking was estimated to be in the range of 60% to 70% of the original in-place volume for soil in the North Area, and in the range of 40% to 50% of the original in-place volume for soil in the South Area.

A total of 3,996 cubic yards of soil was treated using the in situ treatment method: 2,563 cubic yards in the North Area, and 1,433 cubic yards in the South Area. The Remedial Design Report estimated a total of 4,600 cubic yards of soil: 2,800 cubic yards in the North Area, and 1,800 cubic yards in the South Area. The volume difference in the North Area is due to having excavated soil in cells R-10, R-11, T-8, T-9, T-10, and T-11 for post-excavation instead of in situ treatment. In the South Area, cells D-1, O-2, R-1, S-1, and W-2 were excavated for post-excavation treatment instead of in situ treatment, and soil in cell V-2 was treated in situ instead of post excavation.

5.4 CONSTRUCTION QUALITY CONTROL

Monitoring of in situ soil treatment included surveying auger positions, confirming penetration rates and treatment depths, measuring quantities of reagents used, and analytical testing of treated soil.

5.4.1 Monitoring of In Situ Soil Treatment

Before treatment began, a site survey was performed to locate cell boundaries and surface elevations. Volumes of treated soil are shown by cell in Table 5. During soil treatment, the augers were surveyed for position and elevation before drilling at each boring location. Penetration rates were monitored as the drilling progressed, and final drilling depths were confirmed and recorded. Each location was drilled to at least the required treatment depth.

To maintain a constant reagent-to-water ratio, reagent and water mixtures were tested daily for specific gravity before the start of treatment or when a new batch of S-3 and water was mixed. The volume of S-3 and water solution added to each boring location was calculated by measuring the depth to fluid level in the mixing tank before and after drilling each hole. The volume of P-1/P-1A added at each boring location was calculated from the number of batches of P-1/P-1A the slurry plant produced while drilling each hole. Reagents added to each cell are shown as percent of soil weight in Table 5.

5.4.2 Testing of Soil Treated In Situ

A sample was collected for every 100 cubic yards of treated soil at a minimum. The sample location was determined randomly in x, y, and z coordinates. The treated soil sample was collected in a sampling box attached to the end of an 18-foot, steel I-beam. The beam was pushed to the sample depth and the box was opened, allowing soil from the desired depth to fill the box. Four brass tubes were filled with treated soil from the box; one was analyzed for leachability, two were analyzed for unconfined compressive strength (UCS), and one was held as a spare. Triplicates were collected for every fifth sample. Results of these analyses are summarized in Tables 6 and 7. Analytical reports are included in Appendix C. Laboratory quality control procedures are described in Section 5.5. All samples of soil treated in situ met the performance objectives for leachability. The UCS of most samples tested was less than 50 pounds per square inch (psi); however, treated soil strengths and R-values are sufficient for constructing the asphalt cap (Appendix G).

Samples of the excess stockpiled treated soil were collected every 100 cubic yards from three separate locations. Two tubes were filled from each location. The samples were analyzed for leachability only, as shown in Table 7. All samples met the performance objectives for leachability.

5.5 QUALITY CONTROL RESULTS FOR TCLP TESTING

Project-specific quality assurance and quality control procedures for analytical methodologies pertaining to soil treated in situ are described in the Quality Assurance Project Plan (QAPP; Geomatrix and SSP&A, 1991c) and in the Remedial Design Report, Upland Operable Unit (Geomatrix and SSP&A, 1992c). These procedures were followed with one exception. A triplicate set of blind field samples was collected for every five samples, rather than a duplicate set. Triplicate rather than duplicate samples were collected to provide additional data for evaluating the effectiveness of soil treatment. Triplicate samples were collected from the same "box" of treated soil, and were labeled with sequential sample numbers (Tables 6 and 7).

5.5.1 Analytical Laboratory QA/QC

Quality control samples analyzed by the analytical laboratory included laboratory duplicate samples, matrix spike samples, and laboratory control samples. Anametrix analyzed 35 laboratory duplicate TCLP analyses on in situ treated soil samples. All of these were analyzed for arsenic, and 13 were analyzed for all five metals. The relative percent differences (RPD) for the duplicate arsenic analyses ranged from 0% to 59%, with an average RPD of 8.8%. Only one duplicate sample exceeded the quality assurance goal for RPD of 50%. RPDs for the other four metals were all below 40%.

A total of 37 TCLP samples were spiked with 5.0 mg/l arsenic and analyzed as matrix spike samples. Percent recoveries ranged from 71% to 119%, with an average value of 93%. Percent recoveries for 13 samples spiked with the other four metals of concern were all between 75% and 120%. As prescribed in the TCLP methodology, reported sample analytical results were corrected to compensate for matrix spike recoveries less than 100%.

In addition, Anametrix ran 37 laboratory control samples, which were all within the prescribed laboratory limits of 80% to 120% recovery.

5.5.2 Analytical Results for Blind Field Triplicate Samples

Eleven sets of blind triplicate samples of soil treated in situ were submitted to the analytical laboratory for TCLP arsenic analyses. Three of these triplicate sets were not detectible for arsenic. The percent relative standard deviation (%RSD) for the other 10 triplicate sample sets ranged from 17% to 103%, with an average %RSD of 64%.

6.0 POST-EXCAVATION TREATMENT OF SOIL CONTAINING 500 TO 5,000 MG/KG ARSENIC

Approximately 4,300 cubic yards of soil containing 500 to 5,000 mg/kg arsenic was treated by a post-excavation soil treatment method.

6.1 CONTRACT AND SCHEDULE

The contract documents for the post-excavation soil treatment consisted of specifications, drawings, and an agreement. Minor revisions to the specifications and drawings, originally presented in the Remedial Design Report, were made before being incorporated into the contract documents. The arrangements for this contract were generally as described in the Remedial Design Report. Canonie Environmental Services (Canonie) was selected as the post-excavation contractor based on previous experience, comments made by references, the results of bench-scale studies using site soils and proposed reagents, the technical content of their proposal, and cost. Canonie contracted directly with Silicate Technology Corporation to supply reagents. Canonie mobilized on site the week of 28 August and completed the work on 4 December 1992. A detailed weekly chronology of the progress of this contract is presented in Table 3; an overall schedule is shown on Figure 1.

6.2 EXCAVATION AND TREATMENT METHOD

An estimated 5,858 dry tons of soil, or approximately 4,315 in-place cubic yards (cy), was treated by the post-excavation method. About 3,250 cy of this soil was excavated by the post-excavation contractor. The remaining 1,065 cy was excavated by others during preliminary work (Section 3.5) and was stockpiled in the North Area for treatment by the post-excavation contractor. Cell excavation depths and soil volumes generated are presented in Table 8.

Approximately 3,800 cubic yards (cy) of soil was the estimated volume for excavation and treatment by the post-excavation method in the Remedial Design Report (Geomatrix and SSP&A, 1992c). The actual volume of soil excavated and treated was approximately 4,315 cy (Table 8). This volume is larger than the original estimate because of the transfer of cells from the in situ method to the post-excavation method (Section 5.3), and because some cells were excavated slightly deeper than specified on Drawing T-1 (Section 6.2.1).

The post-excavation treatment method involved excavating soil, mixing the soil with reagents and water to a pumpable consistency, then pumping the treated soil into formed cells. This method produced a homogeneous mix of soil and reagents. Concentrations of the metals of concern in leachate from TCLP test results were always below associated TC levels in all samples tested (Table 12).

6.2.1 Excavation Activities

Before excavation activities began, the contractor surveyed elevations and located survey control stakes at the intersections of the grid lines shown on Drawing T-1. Soil excavation performed by the post-excavation contractor began in the North Area on 28 August 1993 and was completed on 21 November 1993. Excavation activities involved excavating affected soil from cells (typically 20-foot-by-20-foot-square grids) to the treatment depths specified on Drawing T-1. Geomatrix and Canonie technical staff monitored excavation depths using laser leveling instruments. Cell excavations were completed to at least the treatment elevations specified on Drawing T-1. Table 8 presents excavation depths and soil volumes by cell.

Excavation started with deeper cells on the east side of the North Area and progressed generally in a westward direction. Excavation typically was carried out using a Caterpillar 235 excavator. Deep cell excavations required sloping of the excavation sides (approximately 1:1 slopes) adjacent to the Sandoz driveway and main office building to conform with California OSHA requirements.

After excavation, soil was placed in the stockpile or transported directly to a screen for downsizing. Soil passing through the screen was then moved to a separate screened stockpile ready for treatment. Soil that did not pass through the screen initially was re-screened until only debris remained. A total of seven 20-yard dumpsters of debris were off-hauled to the CWMI Class I facility at Kettleman, California, as hazardous waste.

6.2.2 Post-Excavation Soil Treatment and Placement

Soil batching for post-excavation treatment was conducted within an approximately 100-foot-by-100-foot area with sides described by cells B-1 through F-1 in the east-west direction and B-1 through B-5 in the north-south direction (Drawing G-5). Figure 5 schematically illustrates the treatment process used for most of the soil treated by the post-excavation treatment method.

The following describes the basic treatment process implemented. A known weight of S-3 reagent and water was added to a mixing bin. A calculated quantity of screened soil was weighed in a backhoe bucket fitted with a "Loadrite" Model No. LR710 hydraulic weighing system, and added to a mixing bin. This soil, S-3 reagent, and water were then thoroughly mixed using a Mitsui MT-1000 soil mixer mounted on a C-235 excavator. Calculated amounts of P-1 reagent and then P-1A reagent were added and mixed in. When uniform consistency and slump of 5 to 7 inches was achieved, the mix typically was pumped to a backfill location. Backfill locations were excavated cells with walls formed using wooden forms where needed. Treated soil remained in forms until firm enough to stand freely, at which point formwork was removed.

Several process changes were implemented during the course of post-excavation treatment.

- The first seven batches of treated soil were approximately 15 cy in volume and were mixed in two roll-off containers. After completion of seven batches, the contractor revised the mixing/batching process to increase batch volume by constructing two new approximately 50-cy-capacity mixing bins using 1-inch-thick steel plates.

- The original method of adding P-1A reagent to each batch was to unload P-1A from a silo into a concrete hopper, then transfer the hopper by forklift to a mixing tank. Later, a cylindrical Baker tank was set up in which pneumatically-loaded P-1A was mixed with water to create a slurry. This slurry was then pumped through a pipeline to the mixing tanks, reducing P-1A dust emissions.

- To accelerate mixing and pumping operations, a fluidizing agent (Polyheed-997) was added during the mixing phase to produce more pumpable treated soil. This admixture was first used in Batch No. M053; approximately 3 gallons per batch was added by the contractor to all successive batches.
- Occasionally, due to equipment breakdowns, mixed batches of treated soil were transferred directly from the mixing bins to cell backfill locations, using the bucket of the hydraulic loader. Although these batches were not pumped, the leachate from TCLP test results were always below applicable toxicity characteristic (TC) levels (Table 12).

The surface elevation of treated soil placed in formed cells initially followed final grades specified on Drawing T-2. Near completion of treatment, however, operating space for treatment activities was reduced. At this time the contractor requested, and was granted permission, to stockpile batches of treated soil above final grades. This allowed the contractor to maintain adequate work space to complete treatment of remaining soil. Beginning with batch number M097, 29 batches (approximately 1,450 to 1,885 cy of treated soil) were placed above proposed final grades. This treated soil was later moved to a stockpile on the Torres property during grading operations to reach final grades.

6.2.3 Treatment of Soil Containing More Than 5,000 mg/kg Arsenic

A small fraction of soil treated by the post-excavation contractor, approximately 185 cubic yards, contained arsenic concentrations in excess of 5,000 mg/kg. This soil was identified in the Pre-Treatment Soil Sampling Report and was excavated and segregated in stockpiles in the North Area during the preliminary work phase. After treatment, the material was isolated in temporary, plastic-lined holding basins while samples from treated soil batches were collected for analytical testing (test results are presented in Table 12). Analytical test results for total arsenic concentrations in composited samples were less than 5,000 mg/kg, and the concentrations of the metals of concern in leachate from TCLP test results were below associated TC levels (Table 12). This treated soil was left on site and placed with other treated soil in the North Area.

6.3 CONSTRUCTION QUALITY CONTROL

Quality control of post-excavation treatment included monitoring of excavation and backfill placement, monitoring of mixing and batch processes, and sampling of treated soil for laboratory testing.

6.3.1 Monitoring of Excavation and Placement

Geomatrix retained a licensed surveyor, Mark Thomas and Co., Inc., of San Jose, California, to verify elevation monuments and locations of cell grid layout stakes used by the contractor. Mark Thomas also conducted periodic surveys of excavation bottoms to verify results of the contractors' surveyors. The contractor retained HMH, Inc., of San Jose, California, to confirm the depth of each cell excavation. Five points were surveyed in each cell (four corners and the center). The average of the five surveyed points is reported as the as-built excavation elevation for the cell on Drawing P-1. The placement location of each treated soil batch was recorded on the batch placement log form. Typically, treated soil batches were pumped into formed cells corresponding to the grid layout on Drawing T-1. At times during the post-excavation treatment process, mixed soil batches were pumped above specified final grade elevations as above-grade stockpiles.

6.3.2 Monitoring of Post-Excavation Mixing Process

Untreated soil samples were collected from each 35 cubic yards (approximately) of untreated soil for analysis of moisture content. Soil was collected from the bucket of the backhoe and packed in 2.5-inch-diameter by 6-inch-long brass tubes. Tubes were sealed with plastic caps and duct tape, then labeled. Soil samples were sent to Cooper Labs of Mountain View, California, for moisture content analyses. Water volumes added to each batch were recorded using a flow meter installed in the water supply pipe. Initially, bulk S-3, P-1A, and P-1 reagents were weighed in concrete hoppers on platform scales. Following the changeover to the larger mixing bins and reagent handling system (refer to Section 6.2.2), only reagent P-1 was weighed by this method. In the new system, reagent S-3 was received in factory-weighed sacks that were emptied directly into mixing bins. Reagent P-1A was premixed with water in a Baker tank resting on platform scales.

Cumulative weights of tank, water, and reagent P-1A for each batch were recorded on the batch log forms, and the dry weight of reagent P-1A was calculated. The composition of reagents for each batch is presented in Table 10.

Slump of treated soil was measured for each batch according to ASTM C-143. When the contractor finished mixing a batch, a slump measurement was made. A batch was approved for placement if it conformed to slump requirements of 5 to 7 inches set forth in the Specifications. A sieve analysis was made for most batches to measure quantity by weight of soil not passing a ¾-inch sieve per standard volume. Qualitative assessments of each batch were made at the time of each batch slump test as an indication of the thoroughness of mixing.

6.3.3 Testing of Post-Excavation Treated Soil

Samples of each treated soil batch were collected in washed 5-gallon buckets at the point of discharge into a cell. Treated soil was transferred to 2.5-inch-diameter by 6-inch-long brass tubes. Tubes were lightly tapped to remove air voids, sealed with plastic caps and duct tape, and labeled. Samples were stored in a plastic cooler and transported daily to the analytical laboratory (Anametrix, Inc., of San Jose, California) or stored on site.

At the beginning of post-excavation treatment, sampling frequency for the first seven mixes (approximately 15 cubic yards each) followed the sampling plan detailed in the Remedial Design Report. Two brass tube samples per mix of treated soil were collected, for a total of 6 tubes per 45-yard batch. Three of these tubes (one from each mix) were used for a TCLP composite sample, one for strength testing, and two were stored on site for future use. Strength testing and analytical results of TCLP and total metals are presented in Tables 11 and 12, respectively.

Sampling frequency and testing of treated soil was modified when the mixing volume was increased to approximately 50 cy of treated soil per batch. A total of four samples were collected per 50-cy batch of treated soil. One sample was collected for TCLP analysis, one was held for possible strength testing, and two were stored on site. The leachate from each TCLP test was analyzed for arsenic by EPA Method 7060. In addition, the leachate from one in ten TCLP tests was also analyzed for the other metals of concern by the following EPA methods: lead and cadmium by 6010, selenium by 7740, and mercury by 7470. Four additional samples were collected from every 10th batch (approximately every 500 cubic yards). Two samples were analyzed for TCLP arsenic as blind triplicates, and two were held on site.

Unconfined compressive strength was tested on two samples from every 10th batch (approximately every 500 cubic yards). Samples were measured at 7 days and 28 days using ASTM Method D-2166. Results of unconfined compressive strength tests are shown in Table 11. Additional samples were later selected for strength tests at other elapsed time intervals.

The UCS of most samples tested was less than 50 psi; however, soil in the treated areas has gained sufficient strength for the intended use (for a detailed discussion, refer to Appendix G).

6.4 QUALITY CONTROL RESULTS FOR TCLP TESTING

As previously stated for the in situ TCLP testing program, quality control procedures followed during post-excavation treatment are described in the QAPP and the Remedial Design Report (Geomatrix and SSP&A, 1991c and 1992c). TCLP testing complied with the QAPP, except that blind triplicate samples rather than blind duplicates were collected at a rate of one set every 10 samples. In addition, Anametrix, Inc., analyzed a laboratory duplicate and a matrix spike sample with each analytical batch.

6.4.1 Analytical Laboratory QA/QC

Anametrix ran 40 laboratory duplicate TCLP analyses on post-excavation treated soil samples. All of these were analyzed for arsenic; 16 were also analyzed for the other four elements of concern. The relative percent differences (RPDs) for the duplicate arsenic analyses ranged from 2% to 48%. RPDs for duplicate analyses for the other metals of concern were all less than 40%. All were within project QA goal for RPD of less than 50%.

A total of 41 TCLP samples were spiked with 5.0 mg/l arsenic and analyzed as matrix spike samples. Percent recoveries ranged from 63% to 119%. The average percent recovery for arsenic was 92.2% ± 10%. Percent recoveries for 16 samples spiked with the four metals of concern were all between 74% and 123%. Analytic results were corrected to compensate for matrix spike recoveries less than 100%.

Anametrix also analyzed a total of 41 laboratory control samples, which were all within the prescribed laboratory limits of 80% to 120%.

6.4.2 Analytical Results for Blind Field Triplicate Samples

Fifteen sets of blind triplicate samples of post-excavation treated soil were submitted to the analytical laboratory for TCLP arsenic analyses. Arsenic was not detected in four of these triplicate sets. The percent relative standard deviation (%RSD) for the remaining eleven sample sets ranged from 2% to 82%, with an average %RSD of 34%.

7.0 GRADING, PAVING, AND FENCING

Remedial actions described in the RAP and ROD included placing a cap over soil identified as containing more than 70 mg/kg of arsenic. The Remedial Design Report concluded that a three-layer asphalt concrete (AC) cap underlain with a geofabric was most appropriate for the site.

The AC cap was placed over portions of the site during the 1992 and 1993 construction seasons. A detailed weekly chronology of construction is presented in Table 3; an overall schedule is shown on Figure 1. This section describes construction of the AC cap, including grading, paving, and fencing. In addition, preparation of the job mix formulas for the three AC pavement types, preparation of the site grading plan, and quality control of grading and earthwork activities are discussed.

7.1 CONSTRUCTION PLANNING

Grading plans were developed for each area, and job mix formulas were designed for each pavement type.

7.1.1 Grading Plan

The objectives of the grading design were to provide adequate surface drainage while minimizing the amount of site grading and providing flexibility for future site use. In areas where soil had been treated, the grading design also considered accommodating the maximum quantity of treated soil practicable. To meet final design grades, approximately 3,000 cy of treated soil from the Sandoz North Area was stockpiled and securely covered on the Call-Mac portion of the Torres property, as described in the Remedial Design Report.

7.1.2 Job Mix Formulas

Job mix formulas were developed for each grade of AC to meet Geomatrix specifications and the requirements of Section 39 of Caltrans Standard Specifications. The job mix formulas for the various AC grades are included in Appendix E.

7.2 SITE GRADING AND PAVING ACTIVITIES

Site construction activities included rough grading, final grading, geofabric installation, and paving. Activities in each area are described below.

7.2.1 Sandoz North Area

Rough grading was performed in this area during the week of 27 November 1992 by Zaccor Corporation (Zaccor) of Menlo Park, California. Final grading and paving was not performed in 1992 because the treated soil did not have sufficient strength to pave prior to the onset of the winter rainy season. A temporary cover was placed over the Sandoz North Area during the week of 4 December to prevent rainwater from contacting the treated soil. The cover consisted of a 3-ply, 12-mil-thick, polyethylene copolymer and nylon yarn laminate.

Final grading and compaction was performed during the weeks of 26 April and 31 May 1993 by O'Grady Paving, Inc. (O'Grady), of Mountain View, California. Final grades were designed to provide adequate surface drainage and to conform with existing grades along Bay Road to the north and the entrance to the Sandoz plant to the east. Paving of the North Area, including installation of the geofabric, was completed by O'Grady during the week ending 21 May 1993. The as-built paving plan for the North Area is shown on Drawing P-1.

7.2.2 Curtaccio

Grading was completed in this area during the week of 3 May 1993. Approximately 1,300 cy of Class II fill material was placed and compacted. Final grades were designed to be compatible with existing grades and to provide adequate drainage. Installation of geofabric and paving of the Curtaccio Area were completed by O'Grady during the week ending 21 May 1993. The as-built paving plan is shown on Drawing P-1.

7.2.3 PG&E Poleyard

Final grading was performed during the weeks of 6 and 13 November 1992. To achieve final grades, approximately 140 cubic yards of Class II fill was used. Final grades on the PG&E poleyard were designed so that surface water runoff flows toward the southeast corner of the poleyard, as was the drainage pattern prior to paving. Geofabric installation and paving of the PG&E poleyard was completed by O'Grady during the week ending 20 November 1992. The as-built paving plan is shown on Drawing P-3.

7.2.4 Sandoz South Area

Grading was completed on the Sandoz South Area by O'Grady during the week ending 13 November 1992. Final grades in this area were designed to accommodate the maximum quantity of treated soil while meeting the requirements of Sandoz for spill containment.

Paving of the Sandoz South Area, including installation of the geofabric, was completed by O'Grady during the week ending 20 November 1992. The as-built paving plan of the area is shown on Drawing P-2.

7.2.5 Bains Property

Grading was completed at the Bains property by O'Grady during the weeks ending 6 and 13 November 1992. Final grades in this area were designed to achieve a balance between cut and fill while providing adequate surface drainage. Paving of the Bains area, including installation of the geofabric, was completed by O'Grady during the week ending 20 November 1992. The as-built paving plan of the area is shown on Drawing P-2.

7.3 QUALITY CONTROL FOR COMPACTION

Quality control of soil compaction involved testing compacted soils and fill for compliance with the specifications. The specifications required that subgrade soils within 6 inches of the asphalt pavement section be compacted to at least 95% of the maximum dry density as determined by ASTM Test Method D-1557. The specified compaction for imported fill material was 90% of the maximum dry density, except for the upper 12 inches of fill, where specified minimum compaction was 95%.

The maximum dry density and optimum moisture content (per ASTM D-1557) of on-site soils and imported fill material were determined by Cooper Testing Labs. Results are included in Appendix E. Field measurements of dry density, moisture content, and relative compaction of the soil were made by Geomatrix personnel using a Troxler 3411 nuclear density gauge.

One week before grading, the temporary cover was removed from the Sandoz North Area. After moving excess soil to the Torres property, subgrade soil was graded, scarified, and allowed to dry to near optimum moisture content, then compacted to specifications. Treated soils within 6 inches of the asphalt were compacted so that the average of five consecutive compaction tests resulted in a relative density of 95% of the maximum dry density as determined by ASTM Test Method D-1557. Treated subgrade soil in the South Area did not achieve the specified compaction requirements; however, proof-rolling indicated that subgrade soil was stable. Where proof-rolling indicated the presence of unstable soil, approximately 12 inches of subgrade was excavated and replaced with hydraulic-grade asphalt prior to paving. The asphalt placed in all areas met the specified compaction requirement.

7.4 QUALITY CONTROL FOR ASPHALT

Quality control of AC pavement included checking grain size and oil content of AC mixes delivered to the site and testing compaction of each AC layer. Terratech, Inc., of San Jose, California, was retained by O'Grady to provide quality control during the asphalt paving operations. Terratech observed the placement and compaction of all layers of AC and performed gradation and oil-content tests on samples of the AC mixes to verify that the AC delivered to the site was within construction tolerances specified for each job mix formula.

In addition, Geomatrix collected samples of the AC mixes for quality assurance testing; this testing, which included gradation and oil-content testing, was performed at Testing Engineers, Inc.'s laboratory in Santa Clara, California. Results of grain-size and oil-content analyses performed on the AC mixes are included in Appendix E. Results of all quality control and quality assurance laboratory analyzes met the construction specifications. Terratech performed field density measurements of the layers of the compacted AC using the Troxler 3411 nuclear density gauges; final field density measurements met the construction specifications.

7.5 FENCING

After completion of the paving, fencing was replaced generally to the pre-remediation configuration, using 6-foot-high cyclone fence fabric topped with three strands of barbed wire. The fencing replaced includes fencing along the south and north property lines of the Sandoz plant, around the PG&E poleyard, and around the east end of the Curtaccio property. Other, non-boundary fences and visual barriers were replaced as agreed with by the property owners.

8.0 HEALTH AND SAFETY

Health and safety procedures followed during remediation work conducted at the site were in accordance with the Site Health and Safety Plan, Revision V (Geomatrix and SSP&A, 1992d). Personnel engaged in on-site activities completed a 40-hour hazardous waste operations training course and had participated in medical monitoring and respiratory training programs, as required by federal and state Occupational Safety and Health Administration (OSHA) regulations. Designated site safety officers for the two soil treatment contractors conducted on-site trainings and daily tailgate meetings.

8.1 SITE CONTROL

The site was divided into three work zone designations (see Figure 6). Designated exclusion zones were the two areas where soil remediation activities were conducted. These were the North Area, located at the front of the Sandoz plant adjacent to Bay Road, and the South Area, located behind the Sandoz plant to the south and including the former railroad track area. Exclusion zones were fenced, and access was restricted. Several decontamination zones were set up at entry/exit points to the exclusion zones. Two personnel decontamination zones were located along the west side of the North Area; a third was located at the east gate between the Sandoz and Torres properties. Two bermed, asphalt drives also were constructed for decontamination of vehicles and large equipment, as shown on Figure 6. Other areas of the site were used as support zones. A portion of the Curtaccio property adjacent to and west of the North Area was used for office trailers for both soil treatment contractors and for the in situ contractor's raw material batch plant. The Geomatrix and Rhone-Poulenc office trailers were located in the PG&E poleyard for the first part of the remediation project and relocated to the Curtaccio property once the in situ contractor demobilized from the site. A portion of the Torres property was used for equipment storage and parking.

8.2 PERSONAL PROTECTIVE EQUIPMENT

All personnel entering the exclusion zones when soil remediation work was in progress were required to wear Tyvek coveralls, rubber or disposable boots, gloves, hardhats, safety glasses, and half-face respirators with combination organic vapor/high-efficiency particulate filter cartridges. Hardhats and safety glasses were also required around the in situ treatment batch plant. On 2 November 1992, after Rhone-Poulenc's review of air sampling data collected by Geomatrix (Section 8.4) and the post-excavation soil treatment contractor, and after notifying the Regional Water Quality Control Board, respiratory protection requirements for personnel working in the North Area exclusion zone were reduced, and no respirators were required, as long as dust levels remained below the 0.2 mg/m^3 action level.

8.3 DECONTAMINATION

Personnel decontamination areas were delineated by astroturf and/or temporary fencing. Decontamination stations consisted of an Alconox wash tub and a tap water rinse tub for boots and gloves. Clean water was available from a hose for washing faces, hands, and respirators. Drinking water and toilet facilities were available at the decontamination stations. Heavy equipment and vehicles were decontaminated in bermed, asphalted areas using high-pressure water spray. Decontamination water was collected, stored in 4,000-gallon Baker tanks, and used for dust control in the exclusion zones.

8.4 AIR MONITORING AND AIR QUALITY

Dust levels in the exclusion zones and at the downwind perimeters were monitored frequently during excavation and soil treatment using a hand-held aerosol monitor (HAM Model 1005 from PPM, Inc.). The action levels for dust were 2.0 mg/m^3 in the exclusion zone where personnel were wearing air purifying respirators and 0.2 mg/m^3 at the perimeter of the exclusion zone. The 0.2 mg/m^3 action level was based on a maximum arsenic concentration of 5,000 mg/kg and the OSHA permissible exposure limit (PEL) for arsenic of 0.01 mg/m^3, with a safety factor of 10. Whenever dust levels exceeded these action levels, dust abatement using water spray was initiated.

Personal and area air samples were collected several times per week for the duration of soil treatment activities. Samples were collected using personal air sampling pumps and MCE membrane filter cassettes. The filter cassettes were analyzed by Quanteq Laboratories in Pleasant Hill, California, using NIOSH method 7300M. Results are shown in Table 13; analytical reports are included in Appendix F. None of the air samples collected exceeded the 0.01 mg/m^3 OSHA PEL.

9.0 REFERENCES

Geomatrix Consultants, Inc., and S.S. Papadopulos & Associates, 1989, Remedial Investigation Report, 1990 Bay Road Site and Vicinity, East Palo Alto, California, 8 February 1989.

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Geomatrix Consultants, Inc., and S.S. Papadopulos & Associates, 1991c, Quality Assurance Project Plan Revision I, 1990 Bay Road Site, East Palo Alto, California, 22 May 1991.

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Geomatrix Consultants, Inc., and S.S. Papadopulos & Associates, 1992b, Pre-Treatment Soil Sampling Report: Upland Operable Unit, 1990 Bay Road Site, East Palo Alto, California, 1 May 1992.

Geomatrix Consultants, Inc., and S.S. Papadopulos & Associates, 1992c, Remedial Design Report: Upland Operable unit, 1990 Bay Road Site, East Palo Alto, California, 1 May 1992.

Geomatrix Consultants, Inc., and S.S. Papadopulos & Associates, 1992d, Site Health and Safety Plan, Revision V, 1990 Bay Road Site, East Palo Alto, California, 20 March 1992.

TABLES

TABLE 1

SUMMARY OF REMEDIAL ACTION

Upland Operable Unit
1990 Bay Road Site
East Palo Alto, California

REMEDIAL ACTION		QUANTITY
Relocated EARP fill to stockpile on Torres property		800 cy
Excavated and treated soil containing >5,000 mg/kg arsenic		185 cy
Treated with chemical stabilizers soil containing >500 mg/kg arsenic	Post-excavation	4,315 cy
	In situ	3,996 cy
	Total	8,311 cy
Excavated and disposed of soil containing >70 mg/kg arsenic		240 cy
Capped with 3-layer asphalt pavement section		164,350 sf

TABLE 2

SUMMARY OF PROJECT CONTRACTORS AND WORK PERFORMED

Contractor Name	Description of Work Performed
A-1 Fence	Fencing and gates.
Anametrix, Inc.	Analytical laboratory that performed all chemical testing of soils, treated soils, and backfill materials.
Browning-Ferris Industries	Supplied non-hazardous waste debris boxes and disposal.
Calcon Systems Inc.	Buried electrical line diversions; installed security lights and support area power supply.
Canonie Environmental Services Corporation	Post-excavation treatment and excavation operations.
Chemical Waste Management, Inc.	Provided Class I hazardous waste roll-off containers, trucking, and disposal of Class I hazardous debris generated on site.
Cooper Testing Laboratory	Geotechnical testing of soil moisture content, treated soil strength, and other parameters.
Cruz Brothers Subsurface Locators	Located buried utilities in areas of excavation.
D&E Steelplate Inc.	Supplied and installed steelplates for construction of temporary fire access road.
Dillard Trucking Inc.	Moved soil during site preparation and hauled 70 mg/kg arsenic soil to Class I hazardous waste landfill.
Driggs and Wood Inc.	Diverted fire service line.
IT Corporation	Completed Level B excavation of portion of fire service line trench.
Kajima/SMW Seiko	Contractor for in situ treatment.
Mark Thomas and Co., Inc.	Surveying services for cell gridwork, confirmation of excavation depths, and final site survey.
O'Grady Paving	Asphalt paving.

TABLE 2

SUMMARY OF PROJECT CONTRACTORS AND WORK PERFORMED

Contractor Name	Description of Work Performed
Pacific Gas & Electric	Diverted overhead electrical lines on Torres property.
Scales Unlimited	Provided calibration service for backhoe hydraulic scale.
Silicate Technology Corporation	Supplied reagents and technical assistance to treatment contractors.
Universal Sweeping Services Inc.	Provided routine cleaning of asphalt surfaces of Sandoz's driveways and parking areas.
Vance Brown and Sons, General Contractors	Relocated fire supply shed onto new concrete slab.
Zaccor Corporation	Performed preliminary excavation, stockpiling, and backfilling. Site restoration, grading, and installation and removal of cover in North Area.

TABLE 3

WEEKLY CHRONOLOGY OF REMEDIAL ACTION ACTIVITIES

1990 Bay Road Site
East Palo Alto, California

Week Ending	Description
26 June 1992	• Agencies approved Remedial Design Report. • Issued in situ treatment bid documents. • Issued post-excavation treatment bid documents. • Development of survey points and grid system for preliminary excavations.
3 July	• Diverted buried electrical utilities in Sandoz North Area. • Buried utilities located north of Bay Road. • Asphalt repair of truck decontamination areas.
10 July	• Excavation, survey, sampling, and backfill of >70 mg/kg soil on north side of Bay Road. • Removal of two monitoring wells in Sandoz North Area. • Temporary security lights installed on the north side of the Sandoz facility. • Backhoe trenching to expose fire water line connections. • Excavation of >500 mg/kg soil in cells C-3 and E-3. Backfilled C-3.
17 July	• Excavation of >500 mg/kg soil in cells in Line A. • Excavation of >5,000 mg/kg soil in cell Q-9. • Excavation of trench for new fire service line begun. Work halted due to buried containers. • Excavation of >500 mg/kg soil in PG&E Poleyard. Backfilled cells. • Fence work in Sandoz South Area. • Prepared stockpile areas on Call-Mac property. • Removal and stockpiling of EARP fill in South Area. • Excavation of >500 mg/kg soil began in South area. • Installation of barrier around wetlands on Call-Mac property. • Construction of North and South personnel decon stations. • Excavation of >5,000 mg/kg soil in South Area begun.

● General
■ In situ Contractor
♦ Post-excavation Contractor

TABLE 3

WEEKLY CHRONOLOGY OF REMEDIAL ACTION ACTIVITIES

Week Ending	Description
24 July 1992	• Excavation of >500 mg/kg soil in South Area continued. • Excavation of >5,000 mg/kg soil in South Area completed. • Removal of two monitoring wells and associated bollards at west end of former track area. • Backfill of deep cells in South Area. • Removal of buried containers in fire line trench and completion of excavation by Level B contractor.
31 July	• Award post-excavation and in situ treatment contracts. • Excavation of >500 mg/kg soil in South Area continued. • Consolidation of >500 mg/kg soil stockpile in North Area. • Excavation of >500 mg/kg soil at east side of Bains property. • Relocation of fire supply shed to northwest corner of North Area. • Installation of security lights on south side of Sandoz facility buildings. • Installation of Rhone-Poulenc office trailer in PG&E Poleyard. • Removal of debris and concrete on Curtaccio property and check for buried utilities. • Demolition of fence between Sandoz and Curtaccio properties. • Placement of new fire service line.
7 August	• Excavation of >500 mg/kg soil in South Area completed. • Backfill of South Area continues. • Excavation of >500 mg/kg soil on Curtaccio property. • Backfill and completion of cells on Curtaccio property. • Demolition of fence on Curtaccio property along Bay Road and replace with new fence and gates. • Installation of temporary fence on west side of Curtaccio property. • Installation of windscreen in North Area and Curtaccio property. • Connection of new fire service line and backfill. • Removal of EARP fill and filter fabric in southwest corner of North Area. • Excavation of >500 mg/kg soil in cells of southwest corner of North Area begun.

• General
■ In situ Contractor
♦ Post-excavation Contractor

TABLE 3

WEEKLY CHRONOLOGY OF REMEDIAL ACTION ACTIVITIES

Week Ending	Description
14 August 1992	• Backfill of South Area cells completed. • Excavation of >500 mg/kg soil in cells of southwest corner of North Area completed. • Removal and disposal of transite pipe of former fire service line. • Backfill and grading of southwest corner of North Area for in-situ treatment. • Loading of trucks and off-haul of >70 mg/kg soil stockpile in North Area. • Installation of fence and two personnel gates between Sandoz and Curtaccio properties. ■ Mobilization of equipment. ■ Assembly of soil treatment rig and batch plant.
21 August	• Set-up of trailer support area. ■ Assembly of drill rig and batch plant. ■ Staking of survey grid for North Area. ■ Delivery of reagents. ♦ Preliminary survey work.
28 August	• Installation of windscreen on temporary fence between former track area and Sandoz facility. ■ Completion of method test section. ■ Commencement of full-scale treatment of soil. ♦ Mobilization of equipment. ♦ Removal of vegetation in North Area.
4 September	• Relocation of East Gate into North Area. ■ Treatment of soil continued in North Area. ♦ Construction of batching/mixing equipment. ♦ Delivery of reagents. ♦ Excavation of EARP fill in northeast corner of site.
11 September	• Augering of holes of new power poles on Call-Mac property. ■ Treatment of soil continued in North Area. ♦ Construction of batching/mixing equipment. ♦ Excavation of cells on east side of North Area.

• General
■ In situ Contractor
♦ Post-excavation Contractor

TABLE 3

WEEKLY CHRONOLOGY OF REMEDIAL ACTION ACTIVITIES

Week Ending	Description
18 September 1992	■ Treatment of soil continued in North Area. ♦ Transfer of in-situ treated soil from North to South Area. ♦ Continued excavation of cells on east side of North Area. ♦ Completion of batching/mixing equipment set-up. ♦ Treatment of >500 mg/kg soil commences. ♦ Backfill of cells with treated soil in southeast corner of North Area. ♦ Construction of forms on east side of North Area.
25 September	• Diversion of electrical power-lines on Call-Mac property. ■ Completion of North Area treatment. ■ Preparation for rig move to South Area. ♦ Partial dismantling of batching/mixing equipment. ♦ Construction of new mixing bins and reagent mixing tank. ♦ Continued excavation of cells on east side of North Area. ♦ Reconstruction of cell formwork.
2 October	■ Rig moved to South Area. ■ Staking of survey grid for South Area. ■ Treatment of soil along former tracks in South Area. ♦ Set-up of new concrete pump. ♦ Treatment started of >500 mg/kg soil with new batching/mixing design. ♦ Excavation, formwork, and backfill continued.
9 October	■ Treatment of soil continued in South Area. ♦ Treatment of three batches of >5,000 mg/kg soil and placement in temporary holding basins. ♦ Treatment of >500 mg/kg soil continued. ♦ Excavation, formwork, and backfill continued.
16 October	■ Completion of South Area treatment. ■ Began rough grading of South Area and demobilization activities. ♦ Repair of mixing/tiller device completed. ♦ Unsuccessful operation of new high-output concrete pump. ♦ Treatment of >500 mg/kg soil continued. ♦ Excavation, formwork, and backfill continued.

• General
■ In situ Contractor
♦ Post-excavation Contractor

TABLE 3

WEEKLY CHRONOLOGY OF REMEDIAL ACTION ACTIVITIES

Week Ending	Description
23 October 1992	■ Completion of rough grading of South Area. ■ Completion of decontamination of equipment and demobilization. ♦ Treatment of >500 mg/kg soil continued. ♦ Addition of cement admixture initiated. ♦ Excavation, formwork, and backfill continued.
30 October	• Removal of cyclone fence around PG&E Poleyard and replacement with temporary fencing. ♦ Treatment of >500 mg/kg soil continued. ♦ Excavation, formwork, and backfill continued.
6 November	• Relocation of GMX and RPI office trailers and storage sheds onto Curtaccio property. • Surveying of PG&E Poleyard, South Area, and Bains properties. • Grading of PG&E Poleyard and Bains property. ♦ Treatment of >500 mg/kg soil continued. ♦ Excavation, formwork, and backfill continued. ♦ Personnel protection level downgrade to Level D.
13 November	• Grading of PG&E Poleyard and Bains property. ♦ Treatment of >500 mg/kg soil continued. ♦ Excavation, formwork, and backfill continued.
20 November	• Paving of three layers of asphalt completed on South Area, PG&E Poleyard, and Bains properties. ♦ Treatment of >500 mg/kg soil continued. ♦ Excavation, formwork, and backfill continued.
27 November	• Excavation and re-establishment of drainage ditch along east side of Call-Mac property. • Excavation of drainage trench from corner of Bains property to low-lying portions of Call-Mac property. • Consolidation of South Area stockpile. • Clean-up of debris in North Area. • Grading of treated soil in North Area begun. ♦ Last batch of >500 mg/kg treated soil completed 21 November. ♦ Decontamination of equipment and demobilization from exclusion zone.

• General
■ In situ Contractor
♦ Post-excavation Contractor

TABLE 3

WEEKLY CHRONOLOGY OF REMEDIAL ACTION ACTIVITIES

Week Ending	Description
4 December 1992	♦ Demobilization of post-excavation contractor from staging area. • Grading of treated soil in North Area completed. • Installation of PG&E Poleyard, Bains, and South Area fence-posts. • North and South personnel decon stations dismantled. • North Area treated soil and South Area stockpile covered with plastic, rope, and tires. • Installation of steel plates on fire access road. • Removal of RPI office trailer. • Removal of two decon wastewater Baker tanks (empty and clean). • Fence visual block cleaned.
11 December	• Installation of cyclone fencing and gates on PG&E Poleyard, Bains, and South Area. • Removal of temporary fence panels from PG&E Poleyard and South Area.
23 April 1993	• Removal of North Area treated soil cover. • Removal of fencing around North Area. • Removal of steel plates on fire access road. • Removal of North Area treated soil cover. • Relocation of support area office trailer and sheds from Curtaccio to PG&E Poleyard. • Installation of temporary fencing. • Removal of 8-foot steel fence on Curtaccio. • Removal of fencing between Sandoz and Curtaccio. • Elevation of fire hydrant and dry standpipe.

- • General
- ■ In situ Contractor
- ♦ Post-excavation Contractor

TABLE 3

WEEKLY CHRONOLOGY OF REMEDIAL ACTION ACTIVITIES

Week Ending	Description
30 April 1993	• Final grading of North Area and Curtaccio. • Removal of Sandoz wood fence. • Removal of concrete from Curtaccio. • Removal of vegetation in North Area and along Bay Road shoulder. • Removal of North Area AC decon pad, retainer boards, and membrane. • Grading of North Area and Curtaccio. • Transportation of treated soil from the North Area to the South Area stockpile. • Placement and compaction of backfill on Curtaccio. • Installation of temporary security light over Sandoz driveway.
7 May	• Removal of fencing around North Area. • Transportation of treated soil from the North Area to the South Area stockpile. • Final grading and compaction of North Area. • Final backfilling, grading, and compaction of Curtaccio. • Removal of four light standards in North Area. • Installation of three concrete vaults around PIV, standpipe, and valves. • Installation of electrical conduits in backfilled trench.
14 May	• Paving of North Area and Curtaccio. • Installation of key cuts on AC edge details. • Installation of geofabric. • Paving of North Area and Curtaccio. • South Area stockpile covered with plastic, rope, and tires.
21 May	• Installation of truck ramp onto Sandoz drum farm. • Installation of three AC curb details in North Area. • Installation of fence posts around Curtaccio and north side of North Area. • Painting of white shoulder stripe along Bay Road and painting power poles yellow. • Installation of light standard footings in North Area.

● General
■ In situ Contractor
♦ Post-excavation Contractor

TABLE 3

WEEKLY CHRONOLOGY OF REMEDIAL ACTION ACTIVITIES

Week Ending	Description
28 May 1993	• Installation of four light standards. • Replacement of fencing around North Area and Curtaccio completed. • Installation of fencing and gate on north side of North Area. • Installation of fencing and gate around Curtaccio. • Removal of temporary fencing. • Installation of four light standards in North Area. • Removal of temporary security light over Sandoz driveway.

● General
■ In situ Contractor
♦ Post-excavation Contractor

TABLE 4

RESULTS OF CONFIRMATION SAMPLES NORTH SIDE OF BAY ROAD EXCAVATION

Sample No.	Date Sampled	Arsenic Concentration (mg/kg)	Lead Concentration (mg/kg)	Cadmium Concentration (mg/Kg)	Mercury Concentration (mg/kg)	Comments
PRSC-S1	7/6/92	15.5	13.0	<1.2	<0.14	
PRSC-S4	7/6/92	<10	<10	<1.2	<0.14	
PRSC-C1	7/6/92	21.9	<10	<1.2	<0.14	
PRSC-C2	7/6/92	<10	<10	<1.2	<0.14	
PRSC-C3	7/6/92	<10	<10	<1.2	<0.14	
PRSC-C4	7/6/92	<10	<10	<1.2	<0.14	
PRSC-S5	7/7/92	9.9	12.1	1.0	<0.14	
PRSC-S6	7/7/92	8.8	6.0	0.57	<0.14	
PRSC-S7	7/7/92	13.6	10.0	1.0	<0.14	
PRSC-S8	7/7/92	37.7	22.6	0.4	<0.14	
PRSC-S9	7/7/92	51.9	167	1.8	1.38	
PRSC-C5	7/7/92	13.9	5.4	0.43	<0.14	Triplicate sample
PRSC-C6	7/7/92	11.2	<10	<1.2	<0.14	Triplicate sample
PRSC-C7	7/7/92	13.2	4.5	.036	<0.14	Triplicate sample
PRSC-C8	7/7/92	15.0	5.3	<0.25	<0.14	
PRSC-C9	7/7/92	9.7	4.9	<0.25	<0.14	
PRSC-C10	7/7/92	10.8	4.3	<0.25	<0.14	
PRSC-S10	7/7/92	29.1	59.6	<1.2	0.25	
PRSC-S2	7/8/92	15.6	9.3	0.47	<0.14	
PRSC-S3	7/8/92	21.8	55.5	0.97	0.29	
PRSC-C11	7/8/92	84.0	8.1	0.38	<0.14	Triplicate sample
PRSC-C12	7/8/92	90.1	<10	<1.2	<0.14	Triplicate sample
PRSC-C13	7/8/92	75.8	7.4	0.31	<0.14	Triplicate sample
PRSC-C14	7/8/92	26.0	12.5			
PRSC-C15	7/9/92	12.5	6.9	<0.25	0.27	Resample of C11 through C13 after exavation to greater depth

Note: Selenium was not detected in any sample. Reporting limits for selenium were 100 to 200 mg/kg.

TABLE 5
IN SITU TREATMENT VOLUMES AND ADDED PERCENT REAGENTS
1990 Bay Road Site
East Palo Alto, California

Area	Cell	Cell Volume (cy)	% P1/P1A	% S3
North	Method Test*		14.0	5.5
	F-9	274	11.8	4.9
	E-9	287	11.7	5.3
	D-9	105	12.5	6.1
	B-9	131	13.2	5.0
	C-9	111	12.2	5.6
	B-10	85	12.8	5.2
	C-10	157	12.4	5.5
	D-10	60	13.5	5.2
	E-10	171	12.4	5.5
	F-10	182	12.7	5.3
	G-10	158	13.2	5.3
	B-11	133	11.7	5.4
	C-11	206	11.8	5.4
	D-11	194	11.8	5.7
	E-11	148	12.9	5.6
	F-11	48	11.7	5.8
	G-11	113	12.2	5.1
South	G-1	45	11.9	5.3
	I-1	126	12.3	4.7
	J-1	89	12.6	4.8
	K-1	97	12.8	4.9
	L-1	125	12.6	5.1
	M-1	128	12.5	5.2
	N-1	133	12.4	4.9
	V-1	116	12.8	6.0
	K-2	66	12.6	5.8
	J-2	109	12.1	5.2
	S-2	105	11.8	5.4
	F-2	106	11.7	4.6
	G-2	81	13.1	5.0
	H-2	82	12.2	5.3
	V-2**	29		
	Total Treated Volume:	3996		

Note:
Percentages represent average for all treated soil elements within a given cell (percentages are based on average bulk weight of soil of 1.6 tons/cy)

* Method Test soil volume accounted for in other North Area cells
** Prior to treatment, soil from cell V-2 was spread over other South Area treatment cells

TABLE 6
STRENGTH TEST RESULTS FOR IN SITU TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

				Unconfined Compressive Strength (psi)		
Sample No.	Cell & Boring Location**	Auger Position	Depth (ft)	7-15 Days	16-29 Days	Long Term (Days)
IS-1	PT-1	M	15.0	0.79	5.24	6.64 (114)
IS-2	PT-2	M	22.0	2.47	23.95	
					7.03	
IS-3	PT-4	F	7.0	1.71	11.13	
IS-4	PT-4	L	4.0	0.96	8.45	
					3.65	
IS-5,6,7	PT-5	M	13.0	3.01	17.42	55.59 (113)
IS-8	PT-6	F	5.0	1.19	8.39	
					5.24	
IS-9	PT-6	M	3.0	0.91	6.64	25.52 (113)
IS-10	PT-7	L	3.0	0.53	1.23	
IS-11	PT-8	L	5.0	0.42	5.40	38.2 (140)
IS-12,13,14	PT-8	L	11.0	1.39	10.78	
IS-15	11E-4	M	16.0	2.74	18.63	35.78 (110)
IS-16	11D-6	L	11.0	1.15	6.88	
IS-17	11B-4	L	8.0	3.88	13.37	
IS-18	11C-6	M	6.0	3.69	1.96	
IS-19,20,21	11D-9	F	4.0	2.00	13.47	28.0 (132)
IS-22	11G-7	L	13.0	2.03	17.19	
IS-23	11E-11	F	7.0	3.75	13.02	
IS-24	11G-17	L	4.0	0.97	8.47	
IS-25	10F-7	F	11.0	2.05	17.22	
IS-26,27,28	11C-14	M	17.0	6.86	31.18	60.1 (125)
IS-29	11B-10	F	16.0	7.33	34.24	
IS-30	10E-6	F	17.0	0.82	8.40	
IS-31	10G-10	F	7.0	1.77	9.85	
IS-32	10G-16	F	11.0	1.89	18.38	
IS-33,34,35	10G-19	L	13.0	1.82	18.93	33.43 (118)
IS-36	10C-20	L	4.0	6.24	10.35	
IS-37	9F-3	F	7.0	2.22	25.29	
IS-38	9E-14	M	13.0	2.53	28.87	
IS-39	9E-19	L	9.0	5.63	28.93	
IS-40,41,42	9D-10	L	6.0	0.50	3.16	29.23 (113)
IS-43	9B-26	F	8.0	3.95	16.96	

Note:
PT - Samples are from the First Method Test
* - Samples are from the Second Method Test
** - Refer to Figures 3 and 4
P1/P1A ratio changed with sample IS-37

(L) = Lead Auger, (M) = Middle Auger, (F) = Following Auger

TABLE 6
STRENGTH TEST RESULTS FOR IN SITU TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Sample No.	Cell & Boring Location**	Auger Position	Depth (ft)	Unconfined Compressive Strength (psi)		
				7-15 Days	16-29 Days	Long Term (Days)
IS-44	9E-25	F	7.0	11.67	4.50	
IS-45	9F-21	M	4.0	6.06	25.36	
IS-46	1V-11	F	5.0	6.94	24.60	
IS-47*	1V-4	F	31.0	5.76	16.98	
IS-48,49,50*	1V-3	M	13.0	8.96	16.86	3.81 (102)
IS-51*	1V-3	L	11.0	4.86	9.15	
IS-52*	1V-1	M	13.0	8.13	20.06	
IS-53*	2S-21	M	5.0	9.79	16.84	
IS-54,55,56*	2S-22	F	8.0	5.07	16.86	32.65 (102)
IS-57*	2S-24	M	9.0	6.11	22.40	
IS-58*	2S-18	F	6.0	4.79	11.99	
IS-59*	2S-19	F	4.0	4.86	15.74	
IS-60*	2S-14	L	5.0	3.13	10.84	
IS-61,62,63	1M-11	M	6.0	8.48	18.22	
IS-64	1L-10	L	10.0	7.60	27.79	
IS-65	1N-11	F	3.0	8.51	14.19	
IS-66	1M-9	F	16.0	9.69	26.90	
IS-67	1I-14	F	3.0	5.03	13.24	
IS-68	1I-7	L	8.0	6.02	18.33	
IS-69,70,71	1I-3	F	1.0	10.81	17.24	24.24 (93)
IS-72	1I-6	F	10.0	4.24		15.49 (32)
IS-73	1N-2	F	13.0	8.39	17.45	
IS-74	2J-14	M	6.0	3.12	12.76	
IS-75	2K-8	L	4.0	9.93	27.03	
IS-76	2J-6	G	9.0	11.20	22.46	
IS-77,78,79	1G-3	M	4.0	11.49	20.63	28.48 (91)
IS-80	2H-24	L	2.0	8.21	21.41	
IS-81	2H-16	M	7.0	3.15	14.56	
IS-82	2F-16	F	6.0	5.97	21.56	
IS-83	2H-11	M	7.0	4.85	14.56	18.15 (90)

Note:
PT - Samples are from the First Method Test
* - Samples are from the Second Method Test
** - Refer to Figures 3 and 4
P1/P1A ratio changed with sample IS-37

(L) = Lead Auger, (M) = Middle Auger, (F) = Following Auger

TABLE 7
IN SITU TREATED SOIL TCLP ANALYTICAL RESULTS
1990 Bay Road Site
East Palo Alto, California

Sample No.	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Mercury (mg/l)	TCLP Lead (mg/l)	TCLP Selenium (mg/l)
IS-1		0.344				
IS-2		0.288				
IS-3		0.015				
IS-4	841	1.07				
IS-5	477	0.226	(0.005)	(0.0003)	(0.040)	(0.005)
IS-6		0.402				
IS-7		0.059				
IS-8		0.225				
IS-9		0.206				
IS-10	1210	0.032				
IS-11		0.546				
IS-12	1280	0.046		(0.0006)	(0.200)	(0.010)
IS-13		0.061				
IS-14		0.175				
IS-15	739	(0.010)				
IS-16	1410	0.514				
IS-17		0.452				
IS-18		0.347				
IS-19	957	1.95	0.005	(0.0002)	(0.200)	(0.080)
IS-20	1470	0.383				
IS-21	1410	1.15				
IS-22		0.145				
IS-23		0.191				
IS-24		0.130				
IS-25		0.042				
IS-26	619	0.046	(0.005)	(0.0002)	(0.200)	(0.005)

TABLE 7
IN SITU TREATED SOIL TCLP ANALYTICAL RESULTS
1990 Bay Road Site
East Palo Alto, California

Sample No.	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Mercury (mg/l)	TCLP Lead (mg/l)	TCLP Selenium (mg/l)
IS-27		0.056				
IS-28		0.102				
IS-29		0.036				
IS-30		0.077				
IS-31		(0.050)				
IS-32		0.143				
IS-33	618	0.514	(0.025)	(0.0002)	(0.200)	(0.025)
IS-34		0.538				
IS-35		0.218				
IS-36		0.097				
IS-37		(0.050)				
IS-38		0.232				
IS-39		0.085				
IS-40	957	0.218	(0.005)	0.0089	(0.200)	(0.005)
IS-41		0.794				
IS-42		0.089				
IS-43		0.125				
IS-44		0.775				
IS-45		0.077				
IS-46		0.050				
IS-47		0.096				
IS-48	156	(0.050)	(0.005)	(0.0002)	(0.200)	(0.025)
IS-49		(0.050)				
IS-50		(0.050)				
IS-51		(0.050)				
IS-52		(0.050)				

TABLE 7
IN SITU TREATED SOIL TCLP ANALYTICAL RESULTS
1990 Bay Road Site
East Palo Alto, California

Sample No.	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Mercury (mg/l)	TCLP Lead (mg/l)	TCLP Selenium (mg/l)
IS-53		(0.050)				
IS-54	271	(0.050)	(0.005)	0.0012	(0.200)	(0.025)
IS-55		(0.050)				
IS-56		(0.050)				
IS-57		(0.050)				
IS-58		0.088				
IS-59		0.120				
IS-60		(0.050)				
IS-61	534	0.308	(0.005)	(0.0002)	(0.200)	(0.005)
IS-62		0.256				
IS-63		0.361				
IS-64		0.253				
IS-65		0.379				
IS-66		0.138				
IS-67		(0.050)				
IS-68		(0.050)				
IS-69	117	(0.050)	(0.005)	(0.0002)	(0.200)	(0.025)
IS-70		(0.050)				
IS-71		(0.050)				
IS-72		(0.050)				
IS-73		(0.050)				
IS-74		(0.050)				
IS-75		0.194				
IS-76		0.053				
IS-77	76.6	0.246	(0.005)	0.0002	(0.200)	(0.025)
IS-78		(0.050)				

TABLE 7
IN SITU TREATED SOIL TCLP ANALYTICAL RESULTS
1990 Bay Road Site
East Palo Alto, California

Sample No.	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Mercury (mg/l)	TCLP Lead (mg/l)	TCLP Selenium (mg/l)
IS-79		(0.050)				
IS-80		(0.050)				
IS-81		0.258				
IS-82		(0.050)				
IS-83		0.199				
ISS-1,2,3		0.109				
ISS-4,5,6		0.303				
ISS-7,8,9		(0.010)				
ISS-10,11,12		0.025				
ISS-13,14,15		(0.010)				
ISS-16,17,18	1090	0.370	0.006	0.015	(0.200)	(0.005)
ISS-19,20,21		0.360				
ISS-22,23,24		0.035				
ISS-25,26,27		0.541				
ISS-28,29,30		0.079				
ISS-32,33,34		0.240				
ISS-35,36,37		(0.050)				
ISS-38,39,40		0.066				
ISS-41,42,43	1060	0.901	(0.005)	0.0050	(0.200)	(0.005)
ISS-44,45,46		0.062				
ISS-47,48,49	1060	0.387	0.005	0.0004	(0.200)	(0.005)
ISS-50,51,52		0.223				
ISS-53,54,55		0.615				
ISS-56,57,58		0.212				
ISS-59,60,61		0.231				
ISS-62,63,64		0.069				

TABLE 7
IN SITU TREATED SOIL TCLP ANALYTICAL RESULTS
1990 Bay Road Site
East Palo Alto, California

Sample No.	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Mercury (mg/l)	TCLP Lead (mg/l)	TCLP Selenium (mg/l)
ISS-65,66,67	422	(0.050)	(0.005)	(0.0002)	(0.400)	(0.005)
ISS-68,69,70		0.111				
ISS-71,72,73		0.069				
ISS-74,75,76		0.301				
ISS-77,78,79		0.086				
ISS-80,81,82		0.164				
ISS-83,84,85		0.318	(0.005)	0.0019	(0.200)	(0.025)
ISS-86,87,88		0.368				
ISS-89,90,91		0.119				
ISS-92,93,94		0.630				
ISS-95,96,97		0.132				

TABLE 8
EXCAVATION DEPTHS AND POST-EXCAVATION TREATMENT FOR 500 MG/KG SOIL
Upland Operable Unit
1990 Bay Road
East Palo Alto, California

Source Area	Cell	Initial Grade (msl)	Design Excavation Grade (msl)	Actual Excavation Grade (msl)	Cell Area (sf)	Excavation Quantity (cy)
NORTH	A-4	6.1	4.6	4.5	400	23.7
	A-5	6.4	5.4	4.6	400	26.7
	A-6	5.6	5.1	4.5	400	16.3
	A-9	6.4	5.4	5.1	400	19.3
	A-10	6.3	5.3	4.8	260	14.4
	A-11	6.5	6.0	5.8	260	6.7
	B-5	5.9	5.4	5.3	400	8.9
	B-6	6.7	6.5	6.1	400	8.9
	B-7	6.1	3.1	3.0	400	45.9
	B-8	6.6	1.6	1.2	400	80.0
	C-3	6.4	5.4	4.9	400	22.2
	C-7	6.4	4.4	4.2	400	32.6
	C-8	6.6	1.8	1.6	400	74.1
	D-8	6.8	3.2	3.2	400	53.3
	E-1	7.3	7.0	6.9	400	5.9
	E-3	6.5	6.0	5.7	400	11.9
	E-8	6.5	2.3	2.2	400	63.7
	F-1	7.4	6.8	6.7	400	10.4
	F-5	6.6	6.1	6.1	400	7.4
	F-6	6.6	6.3	6.3	400	4.4
	F-7	6.7	5.5	5.4	400	19.3
	F-8	6.4	3.7	3.6	400	41.5
	G-1	7.4	5.7	5.5	400	28.1
	G-3	7.4	NT	6.8	400	8.9
	G-4	7.1	6.8	6.7	400	5.9
	G-5	6.8	6.2	6.0	400	11.9
	G-6	6.5	6.1	6.0	400	7.4
	G-7	6.1	5.9	5.7	400	5.9
	G-8	6.3	4.0	3.8	400	37.0
	G-9	7.7	2.5	2.2	400	81.5
	H-1	7.6	6.5	6.5	400	16.3
	H-2	7.7	6.1	5.9	400	26.7
	H-3	7.5	7.0	6.9	400	8.9
	H-4	7.2	6.8	6.7	400	7.4
	H-5	6.8	6.0	6.0	400	11.9
	H-6	6.2	6.0	5.9	400	4.4
	H-8	6.0	4.1	3.9	400	31.1
	H-9	6.6	3.2	2.9	400	54.8
	H-10	7.1	4.0	3.6	260	33.7
	H-11	7.0	5.8	5.5	260	14.4
	I-1	7.8	6.9	6.7	400	16.3
	I-2	7.8	6.4	6.2	400	23.7
	I-3	7.3	6.8	6.6	400	10.4

TABLE 8
EXCAVATION DEPTHS AND POST-EXCAVATION TREATMENT FOR 500 MG/KG SOIL
Upland Operable Unit
1990 Bay Road
East Palo Alto, California

Source Area	Cell	Initial Grade (msl)	Design Excavation Grade (msl)	Actual Excavation Grade (msl)	Cell Area (sf)	Excavation Quantity (cy)
	I-4	7.2	6.2	6.1	400	16.3
NORTH	I-5	6.7	6.2	6.1	400	8.9
	I-7	5.5	4.9	4.7	400	11.9
	I-8	5.9	5.6	5.6	400	4.4
	I-9	6.5	5.9	5.7	400	11.9
	I-10	6.7	NT	6.4	260	2.9
	I-11	6.8	6.5	6.3	260	4.8
	J-1	7.6	6.4	6.2	400	20.7
	J-2	7.7	6.4	6.1	400	23.7
	J-3	7.3	5.9	5.7	400	23.7
	J-4	6.5	5.9	5.8	400	10.4
	J-5	6.8	6.4	6.3	400	7.4
	J-6	6.4	NT	6.3	400	1.5
	J-7	5.9	NT	5.8	400	1.5
	J-8	5.7	NT	5.6	400	1.5
	J-9	6.4	6.0	5.8	400	8.9
	J-10	6.5	6.2	6.1	260	3.9
	J-11	6.7	6.4	6.3	260	3.9
	K-1	7.4	6.9	6.4	400	14.8
	K-2	7.8	6.1	6.0	400	26.7
	K-3	7.1	6.0	5.6	400	22.2
	K-4	6.3	4.1	3.9	400	35.6
	K-5	6.3	5.8	5.8	400	7.4
	K-6	6.1	5.2	5.0	400	16.3
	K-7	5.9	5.2	4.9	400	14.8
	K-8	5.8	NT	5.7	400	1.5
	K-9	6.4	6.0	5.9	400	7.4
	K-10	6.5	NT	6.3	260	1.9
	K-11	6.7	6.5	6.5	260	1.9
	L-1	7.1	5.9	5.9	400	17.8
	L-2	7.6	6.2	6.2	400	20.7
	L-3	6.8	5.6	5.4	400	20.7
	L-4	6.6	4.7	4.5	400	31.1
	L-5	6.1	5.4	5.2	400	13.3
	L-6	5.9	5.1	5.0	400	13.3
	L-7	5.7	5.2	5.0	400	10.4
	L-9	6.1	5.6	5.4	400	10.4
	L-10	6.6	5.4	5.3	260	12.5
	L-11	6.7	6.3	6.1	260	5.8
	M-1	7.1	6.9	6.6	400	7.4
	M-2	7.4	5.2	5.0	400	35.6
	M-3	6.4	5.8	5.7	400	10.4
	M-5	5.9	4.9	4.8	400	16.3

TABLE 8
EXCAVATION DEPTHS AND POST-EXCAVATION TREATMENT FOR 500 MG/KG SOIL
Upland Operable Unit
1990 Bay Road
East Palo Alto, California

Source Area	Cell	Initial Grade (msl)	Design Excavation Grade (msl)	Actual Excavation Grade (msl)	Cell Area (sf)	Excavation Quantity (cy)
	M-8	5.7	NT	5.6	400	1.5
	M-9	6.0	5.3	5.1	400	13.3
NORTH	M-10	5.9	NT	5.8	260	1.0
	M-11	6.0	6.2	6.0	260	0.0
	N-1	7.2	NT	6.8	400	5.9
	N-2	6.4	5.7	5.6	400	11.9
	N-3	6.1	5.7	5.6	400	7.4
	N-4	5.8	4.1	4.0	400	26.7
	N-5	5.8	4.7	4.7	400	16.3
	N-8	5.6	NT	5.3	400	4.4
	N-9	5.6	5.0	5.0	400	8.9
	N-10	5.9	NT	5.8	260	1.0
	N-11	6.1	5.6	5.6	260	4.8
	O-1	6.7	6.4	6.3	400	5.9
	O-2	6.3	5.6	5.5	400	11.9
	O-3	6.0	5.0	5.0	400	14.8
	O-4	5.8	4.1	4.0	400	26.7
	O-5	5.9	4.5	4.4	400	22.2
	O-8	5.7	3.8	3.8	400	28.1
	O-9	5.7	5.0	4.9	400	11.9
	O-10	6.0	5.4	5.3	260	6.7
	O-11	6.1	5.3	5.3	260	7.7
	P-1	6.3	2.6	2.2	400	60.7
	P-2	6.0	5.2	5.1	400	13.3
	P-3	5.8	5.3	5.3	400	7.4
	P-4	5.8	4.4	4.3	400	22.2
	P-5	5.8	4.4	4.3	400	22.2
	P-6	5.6	3.5	3.5	400	31.1
	P-7	5.6	4.6	4.5	400	16.3
	P-9	5.8	5.1	5.0	400	11.9
	P-10	6.1	5.1	5.0	260	10.6
	P-11	5.9	5.1	5.0	161	5.4
	Q-1	6.2	4.5	4.4	400	26.7
	Q-3	5.8	4.5	4.4	400	20.7
	Q-4	5.8	4.3	4.3	400	22.2
	Q-5	5.6	4.4	4.4	400	17.8
	Q-6	5.4	3.4	3.3	400	31.1
	Q-7	5.4	4.3	4.3	400	16.3
	Q-8	5.4	NT	4.9	400	7.4
	Q-9	4.8	2.0	1.7	400	45.9
	Q-10	6.1	5.0	4.7	300	15.6
	R-2	6.0	1.7	1.6	400	65.2
	R-3	5.9	3.3	3.1	400	41.5

TABLE 8
EXCAVATION DEPTHS AND POST-EXCAVATION TREATMENT FOR 500 MG/KG SOIL
Upland Operable Unit
1990 Bay Road
East Palo Alto, California

Source Area	Cell	Initial Grade (msl)	Design Excavation Grade (msl)	Actual Excavation Grade (msl)	Cell Area (sf)	Excavation Quantity (cy)
	R-4	6.2	0.5	0.0	440	101.0
	R-5	6.0	1.6	1.4	440	75.0
	R-6	6.1	3.5	3.4	440	44.0
NORTH	R-7	5.9	3.9	3.6	440	37.5
	R-8	5.8	1.6	1.1	440	76.6
	R-9	5.9	0.5	0.2	440	92.9
	R-10	6.0	-0.1	-1.0	330	85.6
	S-1	6.8	5.2	5.0	340	22.7
	S-3	5.3	0.9	-0.5	306	65.7
	S-7	6.5	5.8	5.5	160	5.9
	S-8	6.3	5.0	4.9	290	15.0
	S-9	6.1	1.7	1.5	290	49.4
	S-10	6.1	4.1	4.0	218	17.0
	T-7	6.4	-0.4	-0.7	160	42.1
	T-8	6.3	0.8	0.1	290	66.6
	T-9	6.2	-0.4	-0.5	290	72.0
	T-10	6.1	0.5	0.1	218	48.4
				Subtotal:		3256.2
SOUTH	D-1	7.1	-1.4	-2.0	220	74.1
	D-2	6.7	3.7	3.5	300	35.6
	E-1	6.7	2.7	1.9	220	39.1
	E-2	3.8	2.0	1.6	300	24.4
	F-1	6.7	2.2	2.0	220	38.3
	N-2	2.3	1.3	1.0	300	14.4
	O-1	5.4	1.7	0.4	220	40.7
	O-2	2.8	-0.2	0.0	300	31.1
	P-1	4.2	1.7	1.7	220	20.4
	P-2	3.5	1.5	1.3	300	24.4
	R-1	4.1	-0.4	-0.6	200	34.8
	S-1	4.6	-0.4	-0.6	200	38.5
	U-1	6.9	4.4	4.2	240	24.0
	U-2	4.3	2.8	2.5	300	20.0
	W-1	7.3	4.8	4.5	111	11.5
	W-2	3.0	-0.4	-0.9	225	32.5
				Subtotal:		504.0
CURTACCIO	AA-6	7.0	5.4	5.4	400	23.0
	AA-7	7.0	5.9	5.7	400	18.5
	AA-8	7.0	5.9	5.7	400	18.5
	AA-9	6.9	5.9	5.6	400	19.6
	AA-10	6.9	4.9	4.7	260	21.4
	AA-11	7.0	4.9	4.6	400	34.8

TABLE 8
EXCAVATION DEPTHS AND POST-EXCAVATION TREATMENT FOR 500 MG/KG SOIL
Upland Operable Unit
1990 Bay Road
East Palo Alto, California

Source Area	Cell	Initial Grade (msl)	Design Excavation Grade (msl)	Actual Excavation Grade (msl)	Cell Area (sf)	Excavation Quantity (cy)
	BB-10	6.9	5.0	4.8	260	20.2
	BB-11	7.0	4.0	3.9	400	45.9
	CC-11	6.9	4.0	4.0	400	43.0
				Subtotal:		244.9
BAINS	AA-1	7.0	5.7	5.6	625	32.4
	AA-2	7.0	4.3	4.2	625	64.8
	BB-1	7.0	5.2	5.0	625	46.3
	BB-2	7.0	5.2	5.1	625	44.0
				Subtotal:		187.5
PG&E	P-1*	5.1	-0.4	-0.2	400	79.0
	P-2	5.3	4.8	4.6	400	10.4
	P-3	5.1	4.6	4.6	400	7.4
	P-4	5.1	4.6	4.6	400	7.4
	P-5	5.0	4.5	4.5	400	7.4
	P-6	5.1	4.6	4.3	400	11.9
				Subtotal:		123.4
				Total Volume:		4315.9

NT - No treatment depth specified, excavated quantity due only to overexcavation
* - As-Built elevation different than treatment elevation due to
excavation sides caving below the water table
Survey data and field data sheets are available in Geomatrix files

TABLE 9
POST-EXCAVATION TREATMENT VOLUMES FOR 5,000 MG/KG SOIL
1990 Bay Road Site
East Palo Alto, California

Source Area	Cell	Excavation Quantity (cy)
North	PR1-21A	13
	T-7	37
	Q-9	30
	Subtotal:	80
South	E-2	28
	V-1	44
	W-2	33
	Subtotal:	105
	Total:	185

TABLE 10
COMPOSITION OF POST-EXCAVATION TREATMENT BATCHES
1990 Bay Road Site
East Palo Alto, California

Batch number	Date	Moisture Content of Untreated Soil (%)	Total Water (%)	%S3	%P1A	%P1	Slump (in.)
M001	15-Sep-92	16.6	48.5	5.0	9.0	3.0	8.3
M002	16-Sep-92	16.2	33.5	5.0	9.0	3.0	10.3
M003	16-Sep-92	17.0	45.3	5.0	9.0	3.0	5.0
M004	16-Sep-92	16.1	39.0	5.0	9.2	3.0	4.5
M005	16-Sep-92	16.7	48.6	5.0	9.0	3.0	6.8
M006	17-Sep-92	14.8	49.2	5.0	9.1	3.0	7.5
M007	17-Sep-92	15.5	49.3	5.0	9.0	3.0	7.3
M008	28-Sep-92	14.2	48.4	5.0	8.7	3.1	9.5
M009	28-Sep-92	14.5	48.7	5.0	9.0	3.0	8.3
M010	29-Sep-92	15.0	49.9	5.0	9.2	3.2	6.3
M011	29-Sep-92	14.6	49.6	5.0	9.2	3.0	9.3
M012	30-Sep-92	15.0	48.8	5.0	9.0	3.1	7.5
M013	30-Sep-92	14.6	48.5	5.0	9.1	3.0	6.5
M014	01-Oct-92	14.0	48.1	5.0	9.2	3.0	6.8
M015	01-Oct-92	13.8	48.0	5.0	8.9	3.0	5.8
M016	01-Oct-92	14.6	48.0	5.0	9.0	3.1	5.0
M017	02-Oct-92	13.8	47.9	5.0	9.1	3.1	6.3
M018	02-Oct-92	14.4	48.6	5.0	9.0	3.2	7.0
M019	02-Oct-92	13.4	47.4	5.0	9.0	3.3	7.0
M020	02-Oct-92	14.5	48.2	5.0	8.5	3.1	7.5
M021	02-Oct-92	22.9	83.3	4.7	10.0	2.0	6.0
M022	05-Oct-92	21.0	47.8	4.8	10.6	2.0	4.8
M023	05-Oct-92	21.1	47.6	4.8	10.0	2.0	6.0
M024	06-Oct-92	14.0	44.3	5.0	9.3	3.1	5.5
M025	06-Oct-92	13.8	44.0	5.0	9.3	3.2	5.8
M026	06-Oct-92	13.8	46.1	5.0	9.4	3.0	5.3
M027	07-Oct-92	14.4	47.0	5.0	9.1	3.0	3.5
M028	06-Oct-92	13.6	48.6	5.0	9.1	3.0	6.3
M029	07-Oct-92	14.0	51.1	5.0	9.5	3.1	5.5
M030	08-Oct-92	15.0	49.1	5.0	9.1	3.0	5.5
M031	08-Oct-92	14.4	48.7	5.0	9.5	3.0	6.0
M032	08-Oct-92	12.2	49.1	5.0	9.3	3.0	5.0
M033	09-Oct-92	13.5	47.5	5.0	9.6	3.0	6.3
M034	09-Oct-92	10.9	45.9	5.0	9.6	3.1	7.0
M035	12-Oct-92	13.6	48.1	5.0	9.2	3.4	7.0

Total water, S3, P-1A, and P1 are given as a percentage of the wet weight of untreated soil.

TABLE 10
COMPOSITION OF POST-EXCAVATION TREATMENT BATCHES
1990 Bay Road Site
East Palo Alto, California

Batch number	Date	Moisture Content of Untreated Soil (%)	Total Water (%)	%S3	%P1A	%P1	Slump (in.)
M036	12-Oct-92	13.7	50.7	5.0	9.0	3.1	7.0
M037	12-Oct-92	13.8	49.1	5.0	9.2	3.0	7.3
M038	12-Oct-92	14.0	50.1	5.0	9.1	3.1	6.0
M039	12-Oct-92	13.0	47.7	5.1	9.1	4.1	8.0
M040	12-Oct-92	13.4	52.2	5.0	9.3	3.0	6.5
M041	13-Oct-92	13.6	47.8	5.0	9.2	3.0	5.3
M042	14-Oct-92	13.2	47.8	5.0	8.8	3.1	7.3
M043	14-Oct-92	11.7	48.3	5.0	9.1	3.1	6.5
M044	14-Oct-92	14.7	51.5	5.0	9.1	3.0	5.0
M045	15-Oct-92	12.0	45.2	5.0	9.1	3.1	7.3
M046	15-Oct-92	14.3	59.0	5.0	9.1	2.9	7.0
M047	16-Oct-92	13.7	50.1	5.0	10.2	3.0	7.0
M048	16-Oct-92	13.6	47.9	5.0	9.4	3.1	7.0
M049	19-Oct-92	16.2	51.4	5.0	10.3	2.0	6.0
M050	19-Oct-92	15.6	46.9	5.0	10.0	2.0	5.5
M051	19-Oct-92	14.6	45.0	5.0	9.3	3.1	6.5
M052	20-Oct-92	16.0	48.4	5.0	10.3	2.0	6.3
M053*	20-Oct-92	12.5	40.3	5.0	9.3	3.2	6.5
M054	20-Oct-92	15.3	40.4	5.0	9.3	3.0	7.0
M055	20-Oct-92	16.2	44.6	5.0	10.1	3.0	7.0
M056	21-Oct-92	13.0	48.5	5.0	9.4	3.0	6.5
M057	21-Oct-92	12.9	47.6	5.1	9.2	3.0	8.0
M058	21-Oct-92	21.2	50.3	5.0	9.5	3.0	6.0
M059	22-Oct-92	12.8	48.4	5.0	8.9	3.0	5.0
M060	22-Oct-92	14.1	51.2	5.0	9.2	3.0	5.0
M061	22-Oct-92	14.3	47.5	5.0	9.2	3.0	6.0
M062	22-Oct-92	13.1	47.7	5.0	8.9	3.0	5.0
M063	23-Oct-92	16.7	53.9	5.0	9.5	3.0	6.0
M064	23-Oct-92	14.5	51.9	5.0	9.3	3.0	6.0
M065	23-Oct-92	13.3	54.9	5.0	9.4	3.0	7.0
M066	23-Oct-92	16.3	53.3	5.0	8.9	3.0	7.0
M067	23-Oct-92	11.8	47.9	5.0	9.1	3.0	7.0
M068	26-Oct-92	11.4	46.3	5.0	9.1	3.0	6.5

* Polyheed-997, 3 gallons/batch, added to M053 and subsequent batches.

Total water, S3, P-1A, and P1 are given as a percentage of the wet weight of untreated soil.

TABLE 10
COMPOSITION OF POST-EXCAVATION TREATMENT BATCHES
1990 Bay Road Site
East Palo Alto, California

Batch number	Date	Moisture Content of Untreated Soil (%)	Total Water (%)	%S3	%P1A	%P1	Slump (in.)
M069	26-Oct-92	16.0	48.2	5.0	9.4	3.0	7.3
M070	26-Oct-92	15.0	51.4	5.0	9.1	3.0	8.5
M071	26-Oct-92	13.9	48.2	5.2	9.1	3.0	7.0
M072	26-Oct-92	15.9	51.2	5.0	9.2	3.0	6.0
M073	27-Oct-92	13.4	48.5	5.0	10.6	3.1	7.0
M074	27-Oct-92	15.5	49.5	5.0	8.8	3.0	6.8
M075	27-Oct-92	17.2	50.2	5.0	9.8	3.0	7.0
M076	27-Oct-92	15.9	49.3	5.0	8.9	3.0	7.0
M077	27-Oct-92	16.3	47.2	5.0	9.1	3.0	7.0
M078	27-Oct-92	13.0	55.6	5.0	9.5	3.0	7.3
M079	28-Oct-92	16.5	60.0	5.0	9.1	3.0	6.0
M080	28-Oct-92	16.8	52.4	5.0	9.1	3.0	5.0
M081	28-Oct-92	14.3	47.0	5.0	8.3	3.0	7.0
M082	28-Oct-92	15.2	53.7	5.0	8.9	3.0	6.5
M083	29-Oct-92	15.5	49.5	5.0	9.1	3.0	7.0
M084	29-Oct-92	15.4	43.6	5.0	9.0	3.1	7.0
M085	02-Nov-92	15.0	41.3	5.0	9.2	3.0	6.3
M086	02-Nov-92	20.6	57.3	4.9	10.7	3.0	7.0
M087	02-Nov-92	15.2	48.3	4.9	11.4	3.0	7.0
M088	29-Nov-92	19.1	51.4	4.9	9.4	3.0	6.3
M089	03-Nov-92	20.5	53.7	4.9	11.4	3.0	7.3
M090	03-Nov-92	17.6	51.6	4.9	8.8	3.0	6.0
M091	03-Nov-92	17.7	52.9	4.9	9.0	3.0	7.0
M092	03-Nov-92	15.2	49.4	4.9	8.9	3.0	7.0
M093	03-Nov-92	18.6	50.1	4.9	9.1	3.5	7.0
M094	04-Nov-92	17.6	52.0	4.9	9.6	3.5	7.0
M095	04-Nov-92	16.3	47.7	4.9	8.7	3.0	6.8
M096	04-Nov-92	18.2	52.9	4.9	8.7	3.0	---
M097	04-Nov-92	17.1	54.1	4.9	9.2	3.0	6.5
M098	04-Nov-92	16.4	51.9	4.9	9.0	3.2	7.0
M099	04-Nov-92	17.8	45.9	4.9	10.7	3.1	7.0
M100	05-Nov-92	15.8	47.4	4.9	8.6	3.0	5.0
M101	05-Nov-92	14.1	44.4	5.0	9.4	3.1	7.0
M102	05-Nov-92	15.0	54.8	5.0	9.2	3.0	5.0
M103	05-Nov-92	15.7	51.4	5.0	9.3	3.0	7.0

Total water, S3, P-1A, and P1 are given as a percentage of the wet weight of untreated soil.

TABLE 10
COMPOSITION OF POST-EXCAVATION TREATMENT BATCHES
1990 Bay Road Site
East Palo Alto, California

Batch number	Date	Moisture Content of Untreated Soil (%)	Total Water (%)	%S3	%P1A	%P1	Slump (in.)
M104	06-Nov-92	14.4	75.1	8.1	14.8	4.5	7.5
M105	06-Nov-92	16.3	52.8	5.0	9.3	3.0	7.0
M106	06-Nov-92	15.2	51.4	5.0	11.1	3.0	7.0
M107	06-Nov-92	12.8	45.1	5.0	9.2	3.0	6.5
M108	09-Nov-92	13.4	52.0	5.0	13.5	3.0	6.8
M109	09-Nov-92	14.8	47.5	5.0	9.0	3.0	6.5
M110	09-Nov-92	13.0	53.0	5.0	9.7	3.0	6.5
M111	09-Nov-92	13.1	45.8	5.0	8.9	3.0	5.8
M112	09-Nov-92	18.1	52.7	5.0	9.1	3.0	7.0
M113	10-Nov-92	18.6	50.0	5.0	8.3	3.0	6.0
M114	10-Nov-92	15.3	53.2	4.9	8.7	2.9	7.0
M115	10-Nov-92	19.8	50.3	5.0	8.7	3.0	7.0
M116	10-Nov-92	15.2	55.5	5.0	9.0	3.0	5.0
M117	10-Nov-92	16.4	54.1	5.0	7.1	3.0	7.0
M118	10-Nov-92	12.8	58.0	5.0	8.4	3.0	6.3
M119	11-Nov-92	12.9	49.0	5.0	7.7	3.0	5.0
M120	11-Nov-92	16.6	54.8	5.0	8.8	3.0	6.0
M121	11-Nov-92	14.4	51.8	5.0	10.5	3.0	6.0
M122	11-Nov-92	13.0	48.5	5.0	8.5	3.0	6.8
M123	11-Nov-92	15.8	49.0	5.0	7.5	3.0	6.0
M124	12-Nov-92	15.6	51.8	4.9	8.1	3.0	6.5
M125	12-Nov-92	14.7	53.8	5.0	9.5	3.0	7.0
M126	12-Nov-92	16.5	54.6	5.0	15.7	3.0	6.8
M127	12-Nov-92	15.2	50.3	4.4	7.8	2.7	6.5
M128	12-Nov-92	16.5	62.1	5.0	9.1	3.0	6.3
M129	13-Nov-92	13.4	57.8	5.0	8.1	3.0	7.0
M130	13-Nov-92	12.6	53.6	5.0	11.4	3.0	7.0
M131	13-Nov-92	12.7	51.8	5.0	9.3	3.0	7.0
M132	13-Nov-92	14.3	54.3	5.0	8.9	3.1	7.0
M133	13-Nov-92	20.9	58.0	5.0	8.1	3.0	6.5
M134	13-Nov-92	16.8	54.7	5.0	8.7	3.0	7.0
M135	16-Nov-92	16.4	58.9	5.0	8.8	3.0	6.0
M136	16-Nov-92	14.1	55.8	5.0	8.2	3.0	6.5
M137	16-Nov-92	21.3	66.6	6.3	13.1	3.8	7.0
M138	16-Nov-92	21.4	60.7	5.0	9.0	3.0	5.0

Total water, S3, P-1A, and P1 are given as a percentage of the wet weight of untreated soil.

TABLE 10
COMPOSITION OF POST-EXCAVATION TREATMENT BATCHES
1990 Bay Road Site
East Palo Alto, California

Batch number	Date	Moisture Content of Untreated Soil (%)	Total Water (%)	%S3	%P1A	%P1	Slump (in.)
M139	16-Nov-92	15.3	59.5	5.0	9.0	3.0	6.0
M140	16-Nov-92	16.3	58.4	5.0	9.0	3.0	7.0
M141	17-Nov-92	18.8	57.1	5.0	9.2	3.0	7.0
M142	17-Nov-92	17.2	56.2	5.0	9.5	3.0	7.0
M143	17-Nov-92	17.8	55.4	5.0	9.2	3.0	7.0
M144	17-Nov-92	17.7	53.6	4.8	8.9	3.0	5.5
M145	17-Nov-92	14.3	54.3	5.0	9.6	2.9	7.0
M146	17-Nov-92	17.6	53.6	4.7	9.5	3.0	6.0
M147	18-Nov-92	15.9	55.2	5.0	9.3	3.0	7.0
M148	18-Nov-92	18.1	54.2	5.0	9.0	3.0	6.0
M149	18-Nov-92	15.8	53.7	5.0	7.9	3.0	6.0
M150	18-Nov-92	15.6	55.1	4.9	10.8	3.0	6.5
M151	19-Nov-92	18.3	55.7	5.0	9.1	3.0	7.0
M152	19-Nov-92	18.4	53.5	4.6	8.8	2.8	7.0
M153	19-Nov-92	18.4	53.1	4.9	9.3	3.0	7.0
M154	19-Nov-92	17.3	53.9	5.0	9.3	3.0	6.0
M155	20-Nov-92	18.7	50.4	4.1	8.6	3.0	6.5
M156	20-Nov-92	16.6	51.1	4.4	9.7	2.9	7.0
M157	20-Nov-92	16.0	49.4	3.0	0.0	11.0	6.0
M158	20-Nov-92	15.7	50.5	3.0	0.0	10.2	5.8
M159	21-Nov-92	15.8	44.8	0.6	0.0	11.4	5.5

Total water, S3, P-1A, and P1 are given as a percentage of the wet weight of untreated soil.

TABLE 11
STRENGTH TEST RESULTS FOR POST-EXCAVATION TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Batch Number	Unconfined Compressive Strength (psi)		
	7-15 Day	16-28 Day	Long Term (Days)
M001			39.56 (76)
M002	1.23	10.09	
M004			62.00 (89)
M005			48.40 (89)
M006			44.82 (117)
M007	7.90	29.77	
M008			5.10 (82)
M009			24.50 (82)
M010			40.30 (81)
M011			18.07 (100)
M012	14.78		
M013	12.12		28.89 (61)
M014	9.96		
M015	4.10	26.88	39.97 (60)
M016			55.30 (98)
M019	11.10	32.34	41.10 (59)
M020	4.93	23.26	29.66 (59)
M021			1.49 (93)
M025	7.21	33.93	
M030			17.33 (90)
M035	5.66	26.61	
M036			29.68 (86)
M040	3.45	24.89	
M042			19.49 (89)
M044			15.39 (84)
M045	15.69	29.98	
M055	7.77	27.20	
M060			33.76 (77)
M065	11.18	29.88	
M070			4.19 (77)
M075	4.20	20.85	
M080			11.55 (75)
M085	3.54	14.28	9.10 (70)
M090			11.20 (41)
M095	2.06	12.68	11.43 (64)
M100			22.90 (39)
M105	4.37	14.78	12.10 (62)

TABLE 11
STRENGTH TEST RESULTS FOR POST-EXCAVATION TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Batch Number	Unconfined Compressive Strength (psi)		
	7-15 Day	16-28 Day	Long Term (Days)
M110			19.10 (35) 22.00 (63)
M115	5.42	8.69	7.02 (58)
M125	4.15	2.95	
M135	2.50	1.94	
M145	3.37	1.78	
M155	2.52	1.39	

TABLE 12
TCLP RESULTS FOR POST-EXCAVATION TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Batch Number	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Lead (mg/l)	TCLP Mercury (mg/l)	TCLP Selenium (mg/l)
M001-4		(0.050)				
M005-7		(0.050)				
M008		1.76				
M009		2.99				
M010		(0.050)				
M011		(0.050)				
M012		3.56				
M013		0.292				
M014		(0.050)				
M015	974	(0.050)	0.187	(0.200)	0.029	(0.025)
K015		(0.050)				
L015		(0.050)				
M016		0.058				
M017		0.431				
M018		0.406				
M019		0.167				
M020		0.292				
M021	5410	1.38				
M021	1990	1.53	(0.010)	(0.040)	0.0021	0.086
M021 (c)	2580					
M022	2880	0.412				
M023	3270	0.796				
M023 (c)	2510					
M024		0.231				

Non-detects are indicated with detection limit in parentheses, (c) = Composite Sample

TABLE 12
TCLP RESULTS FOR POST-EXCAVATION TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Batch Number	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Lead (mg/l)	TCLP Mercury (mg/l)	TCLP Selenium (mg/l)
M025	714	0.193	(0.005)	(0.200)	0.0097	(0.025)
K025		0.172				
L025		0.271				
M026		0.078				
M027		(0.050)				
M028		(0.050)				
M029		(0.050)				
M030		(0.050)				
M031		(0.050)				
M032		(0.050)				
M033		0.142				
M034		0.290				
M035	298	0.475	(0.005)	(0.200)	0.026	(0.025)
K035		0.153				
L035		0.354				
M036		(0.050)				
M037		(0.050)				
M038		(0.050)				
M039		0.930				
M040		1.92				
M041		1.25				
M042		0.317				
M043		0.228				
M044		0.082				

Non-detects are indicated with detection limit in parentheses, (c) = Composite Sample

TABLE 12
TCLP RESULTS FOR POST-EXCAVATION TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Batch Number	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Lead (mg/l)	TCLP Mercury (mg/l)	TCLP Selenium (mg/l)
M045	274	(0.050)	0.272	(0.200)	0.030	(0.025)
K045		(0.050)				
L045		(0.050)				
M046		(0.050)				
M047		0.146				
M048		(0.050)				
M049 (c)	2000					
M049	2700	1.11	(0.010)	(0.040)	0.0057	0.092
M050	927	0.727	0.951	(0.200)	0.0007	(0.025)
M050 (c)	2420					
M051		(0.050)				
M052	1180	3.08	0.019	(0.040)	0.025	0.073
M052 (c)	2320					
M053		0.224				
M053P-1		0.137				
M054	435	0.293	(0.005)	(0.040)	0.0016	(0.025)
M055		0.199				
K055		0.199				
L055		0.164				
M056		0.292				
M057		0.326				
M058		(0.050)				
M059		(0.050)				
M060		(0.050)				

Non-detects are indicated with detection limit in parentheses, (c) = Composite Sample

TABLE 12
TCLP RESULTS FOR POST-EXCAVATION TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Batch Number	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Lead (mg/l)	TCLP Mercury (mg/l)	TCLP Selenium (mg/l)
M061		0.092				
M062		(0.050)				
M063		0.078				
M064		0.030				
M065	529	0.439	0.016	(0.040)	0.023	(0.025)
K065		0.081				
L065		0.159				
M066		0.36				
M067		(0.050)				
M068		(0.050)				
M069		(0.050)				
M070		(0.050)				
M071		0.091				
M072		(0.050)				
M073		(0.050)				
M074		0.238				
M075	398	0.098	0.082	(0.200)	0.061	(0.025)
K075		(0.050)				
L075		(0.050)				
M076		(0.050)				
M077		0.200				
M078		(0.050)				
M079		(0.050)				
M080		(0.050)				

Non-detects are indicated with detection limit in parentheses, (c) = Composite Sample

TABLE 12
TCLP RESULTS FOR POST-EXCAVATION TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Batch Number	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Lead (mg/l)	TCLP Mercury (mg/l)	TCLP Selenium (mg/l)
M081		(0.050)				
M082		0.058				
M083		0.053				
M084		(0.050)				
M085	605	0.066	0.297	(0.040)	0.0012	(0.025)
K085		(0.050)				
L085		(0.050)				
M086		(0.050)				
M087		(0.050)				
M088		(0.050)				
M089		(0.050)				
M090		(0.050)				
M091		(0.050)				
M092		(0.050)				
M093		0.096				
M094		(0.050)				
M095	618	0.244	0.046	(0.040)	0.031	(0.025)
K095		0.107				
L095		(0.050)				
M096		(0.050)				
M097		0.301				
M098		0.073				
M099		(0.050)				
M100		(0.050)				

Non-detects are indicated with detection limit in parentheses, (c) = Composite Sample

TABLE 12
TCLP RESULTS FOR POST-EXCAVATION TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Batch Number	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Lead (mg/l)	TCLP Mercury (mg/l)	TCLP Selenium (mg/l)
M101		0.177				
M102		(0.050)				
M103		(0.050)				
M104		(0.050)				
M105	437	0.105	0.577	(0.200)	0.0006	0.030
K105		(0.050)				
L105		(0.050)				
M106		(0.050)				
M107		0.072				
M108		0.193				
M109		(0.050)				
M110		(0.050)				
M111		(0.050)				
M112		(0.050)				
M113		(0.050)				
M114		(0.050)				
M115	208	0.065	0.024	(0.400)	0.0059	(0.025)
K115		(0.050)				
L115		(0.050)				
M116		(0.050)				
M117		(0.050)				
M118		(0.050)				
M119		(0.050)				
M120		(0.050)				

Non-detects are indicated with detection limit in parentheses, (c) = Composite Sample

TABLE 12
TCLP RESULTS FOR POST-EXCAVATION TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Batch Number	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Lead (mg/l)	TCLP Mercury (mg/l)	TCLP Selenium (mg/l)
M121		(0.050)				
M122		(0.050)				
M123		(0.050)				
M124		(0.050)				
M125	561	0.066	0.274	(0.200)	0.0006	(0.025)
K125		(0.050)				
L125		(0.050)				
M126		(0.050)				
M127		0.054				
M128		(0.050)				
M129		(0.050)				
M130		(0.050)				
M131		(0.050)				
M132		(0.050)				
M133		(0.050)				
M134		(0.050)				
M135	362	(0.050)	0.327	(0.200)	0.0003	(0.025)
K135		(0.050)				
L135		(0.050)				
M136		(0.050)				
M137		(0.050)				
M138		(0.050)				
M139		(0.050)				
M140		(0.050)				

Non-detects are indicated with detection limit in parentheses, (c) = Composite Sample

TABLE 12
TCLP RESULTS FOR POST-EXCAVATION TREATED SOIL
1990 Bay Road Site
East Palo Alto, California

Batch Number	Total Arsenic (mg/kg)	TCLP Arsenic (mg/l)	TCLP Cadmium (mg/l)	TCLP Lead (mg/l)	TCLP Mercury (mg/l)	TCLP Selenium (mg/l)
M141		(0.050)				
M142		(0.050)				
M143		(0.050)				
M144		(0.050)				
M145	428	(0.050)	0.469	(0.040)	0.0091	(0.025)
K145		0.052				
L145		(0.050)				
M146		(0.050)				
M147		(0.050)				
M148		(0.050)				
M149		(0.050)				
M150		(0.050)				
M151		0.081				
M152		(0.050)				
M153		(0.050)				
M154		(0.050)				
M155	819	(0.050)	0.529	(0.200)	0.0004	(0.025)
K155		(0.050)				
L155		(0.050)				
M156		0.108				
M157		0.210				
M158		1.36				
M159		0.126				

Non-detects are indicated with detection limit in parentheses, (c) = Composite Sample

TABLE 13
RESULTS OF AIR SAMPLING FOR ARSENIC
1990 Bay Road Site
East Palo Alto, California

Date/Work Area	Sample ID No.	Sample Location	P/A[1]	Running Time (min.)	Flow Rate (L/min.)	Arsenic Concentration (mg/m^3)
8/3/92 North	1-1	Sandoz Perimeter Fence	A	525	1.10	<0.002
	1-2	Sandoz Perimeter Fence	A	525	1.15	<0.002
	1-3	Sandoz Perimeter Fence	A	525	1.20	<0.002
	1-Blank	--	--	--	--	<0.001 mg
8/25/92 North	2-1	Laborer	P	525	1.15	<0.002
	2-2	Surveyor	P	522	1.17	<0.002
	2-3	Laborer	P	510	1.22	<0.002
	2-Blank	--	--	--	--	<0.001 mg
8/28/92 North	3-1	Laborer	P	430	1.20	0.006[2]
	3-2	Geologist	P	455	1.23	<0.002
	3-3	Laborer	P	375	1.25	<0.003
	3-Blank	--	--	--	--	<0.001 mg
9/2/92 North	4-1	Sandoz Perimeter Fence	A	605	1.22	<0.002
	4-2	Bay Road Perimeter Fence	A	615	1.15	<0.002
	4-3	Laborer	P	540	1.08	<0.002
	5-Blank	--	--	--	--	<0.001 mg
9/8/92 North	5-1	Sandoz Perimeter Fence	A	555	1.20	<0.002
	5-2	Equipment Operator	P	360	1.18	<0.003
	5-3	Site Safety Officer	P	540	1.23	<0.002
	5-Blank	--	--	--	--	<0.001 mg
9/17/92 North	6-1	Support Zone Perimeter Fence	A	465	1.25	<0.002
	6-2	Equipment Operator	P	35	--	NA[3]
	6-3	Site Safety Officer	P	480	1.30	<0.002
	6-Blank	--	--	--	--	<0.001 mg

TABLE 13
RESULTS OF AIR SAMPLING FOR ARSENIC

Date/Work Area	Sample ID No.	Sample Location	P/A[1]	Running Time (min.)	Flow Rate (L/min.)	Arsenic Concentration (mg/m^3)
9/22/92	7-1	Sandoz Perimeter Fence	A	510	1.21	<0.002
North	7-2	Support Zone Perimeter Fence	A	500	1.20	<0.002
	7-3	Laborer	P	510	1.30	<0.002
	7-Blank	--	--	--	--	<0.001 mg
9/24/92	8-1	Sandoz Perimeter Fence	A	490	1.21	<0.002
North	8-2	Sandoz Perimeter Fence	A	470	1.28	<0.002
	8-3	Excavator Operator	P	475	1.26	<0.002
	8-Blank	--	--	--	--	<0.001 mg
9/29/92	9-1	Sandoz Perimeter Fence	A	590	1.21	<0.002
North	9-2	Sandoz Perimeter Fence	A	585	1.22	<0.002
	9-3	Near Soil Treatment Bins	A	545	1.26	<0.002
	9-Blank	--	--	--	--	<0.001 mg
9/30/92	10-1	Excavator	P	540	1.25	<0.002
North	10-2	Laborer	P	645	1.26	<0.002
	10-3	Laborer	P	--	--	NA[3]
	10-Blank	--	--	--	--	<0.001 mg
10/1/92	11-1	Sandoz Perimeter Fence	A	535	1.25	<0.002
North (#2,3)	11-2	Sandoz Perimeter Fence	A	510	1.31	<0.002
South (#1)	11-3	Sandoz Perimeter Fence	A	590	1.26	<0.002
	11-Blank	--	--	--	--	<0.001 mg
10/2/92	12-1	Sandoz Perimeter Fence	A	585	1.24	<0.002
North (#1,3)	12-2	Excavator Operator	P	--	--	NA[3]
South (#2)	12-3	Sandoz Perimeter Fence	A	595	1.26	<0.002
	12-Blank	--	--	--	--	<0.001 mg
10/6/92	13-1	Sandoz Perimeter	A	545	1.26	<0.002
North	13-2	Sandoz Perimeter	A	520	1.30	<0.002
	13-Blank	--	--	--	--	<0.001 mg

TABLE 13
RESULTS OF AIR SAMPLING FOR ARSENIC

Date/Work Area	Sample ID No.	Sample Location	P/A[1]	Running Time (min.)	Flow Rate (L/min.)	Arsenic Concentration (mg/m^3)
10/7/92	14-1	Sandoz Perimeter Fence	A	320	1.23	<0.003
South	14-2	Sandoz Perimeter Fence	A	485	1.26	<0.002
	14-3	Excavator Operator	P	495	1.29	<0.002
	14-Blank	--	--	--	--	<0.001 mg
10/8/92	15-1	Sandoz Perimeter Fence	A	560	1.27	<0.002
North (#1,2)	15-2	Sandoz Perimeter Fence	A	525	1.33	<0.002
South (#3)	15-3	South of Treatment Activity	A	490	1.27	<0.002
	15-Blank	--	--	--		<0.001 mg
10/13/92	16-1	Sandoz Perimeter Fence	A	550	1.24	<0.002
North	16-2	Sandoz Perimeter Fence	A	555	1.24	<0.002
	16-3	Support Zone Perimeter Fence	A	485	1.24	<0.002
	16-Blank	--	--	--	--	<0.001 mg
10/15/92	17-1	Sandoz Perimeter Fence	A	475	1.24	<0.002
South	17-2	Sandoz Perimeter Fence	A	470	1.30	<0.002
	17-3	Sandoz Perimeter Fence	A	470	1.25	<0.002
	17-Blank	--	--	--	--	<0.001 mg
10/20/92	18-1	Sandoz Perimeter Fence	A	525	1.27	<0.002
North	18-2	Sandoz Perimeter Fence	A	520	1.28	<0.002
	18-3	Bay Road Perimeter Fence	A	440	1.25	<0.002
	18-Blank	--	--	--	--	<0.001 mg
10/23/92	19-1	Sandoz Perimeter Fence	A	595	1.25	<0.002
North	19-2	Sandoz Perimeter Fence	A	595	1.23	<0.002
	19-3	Soil Loader Operator	P	465	1.24	<0.002
	19-Blank	--	--	--	--	<0.001 mg
10/27/92	20-1	Sandoz Perimeter Fence	A	435	1.26	<0.002
North	20-2	Sandoz Perimeter Fence	A	435	1.23	<0.002
	20-3	Excavator Operator	P	480	1.22	0.005
	20-Blank	--	--	--	--	<0.001 mg

TABLE 13
RESULTS OF AIR SAMPLING FOR ARSENIC

Date/Work Area	Sample ID No.	Sample Location	P/A[1]	Running Time (min.)	Flow Rate (L/min.)	Arsenic Concentration (mg/m^3)
11/3/92 North	21-1	Sandoz Perimeter Fence	A	540	1.22	<0.002
	21-2	Engineer	P	570	1.26	<0.002
	21-3	Excavator Operator	P	540	1.22	<0.002
	21-Blank	--	--	--	--	<0.001 mg
11/5/92 North	22-1	Sandoz Perimeter Fence	A	510	1.24	<0.002
	22-2	Support Zone Perimeter Fence	A	500	1.22	<0.002
	22-3	Excavator Operator	P	505	1.23	<0.002
	22-Blank	--	--	--	--	<0.001 mg
11/10/92 North	23-1	Sandoz Perimeter Fence	A	510	1.23	<0.002
	23-2	Excavator Operator	P	505	1.20	<0.002
	23-3	Support Zone Perimeter Fence	A	500	1.24	<0.002
	23-Blank	--	--	--	--	<0.001 mg
11/12/92 North	24-1	Sandoz Perimeter Fence	A	545	1.24	<0.002
	24-2	Near Soil Treatment Bins	A	253	1.23	<0.004
	24-3	Support Zone Perimeter Fence	A	545	1.24	<0.002
	24-Blank	--	--	--	--	<0.001 mg
11/17/92 North	25-1	Sandoz Perimeter Fence	A	540	1.24	<0.002
	25-2	Sandoz Perimeter Fence	A	270	1.23	<0.003
	25-3	Decontamination Pad	A	347	1.26	<0.003
	25-Blank	--	--	--	--	<0.001 mg

Notes:

[1] P = Personal (Air sampler is placed on an individual).
A = Area (Air sampler is placed on equipment or on a perimeter fence).

[2] Sample cassette was placed backwards in the air sampler, and so the sample integrity is questionable.

[3] NA = not analyzed.

FIGURES

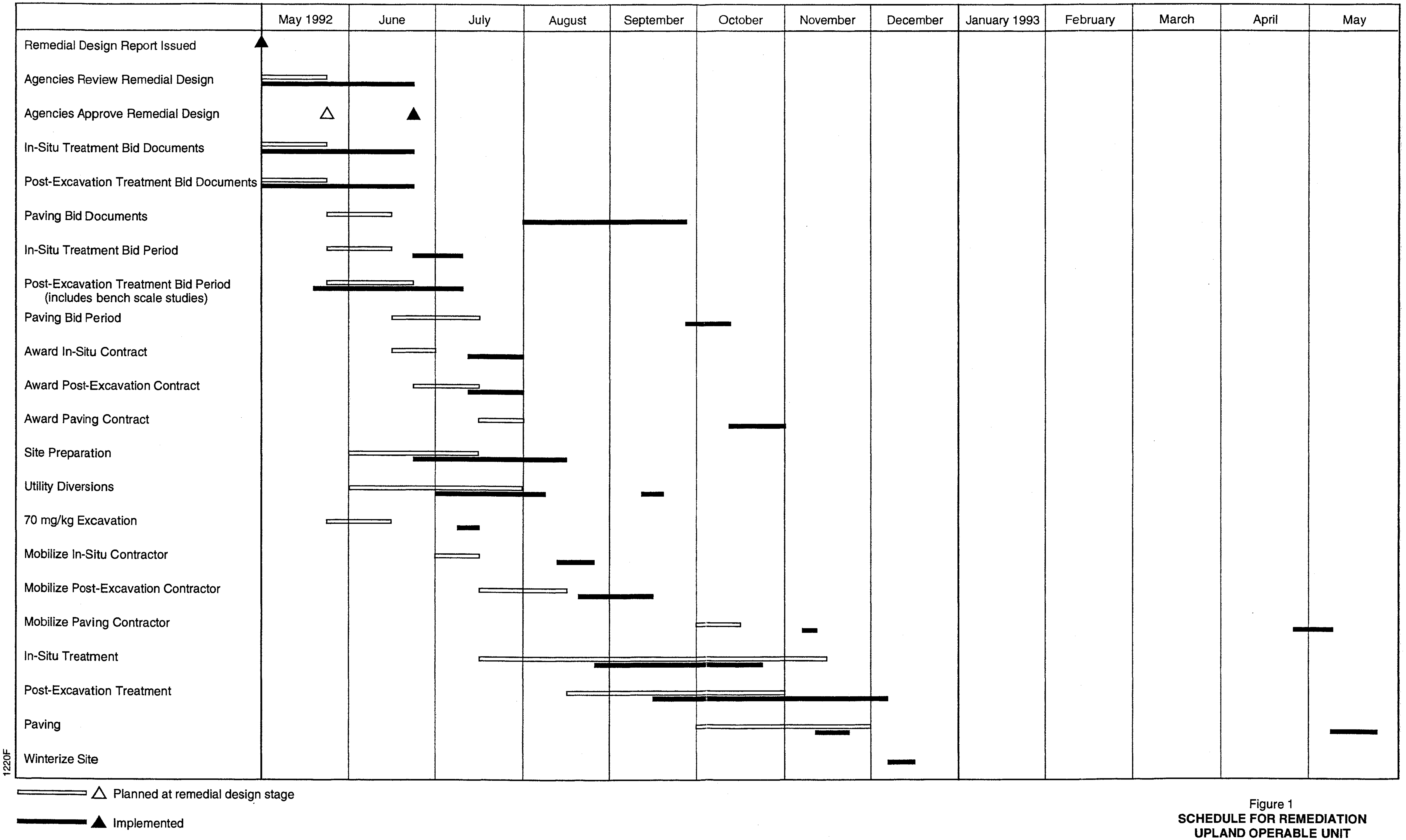
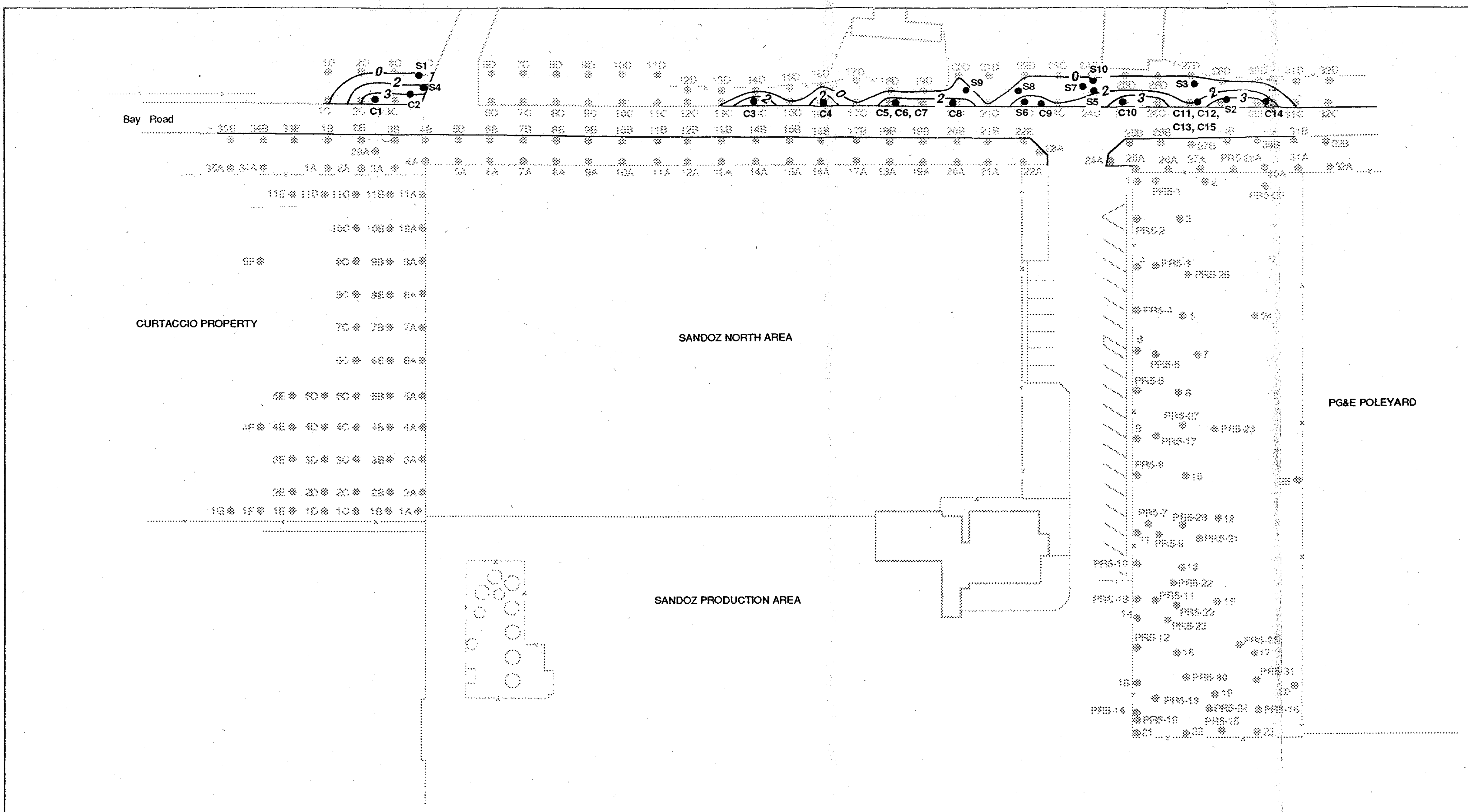


Figure 1
SCHEDULE FOR REMEDIATION
UPLAND OPERABLE UNIT
1990 Bay Road Site
East Palo Alto, California



EXPLANATION

21 ⊛ Pre-remediation soil boring and sample identification number

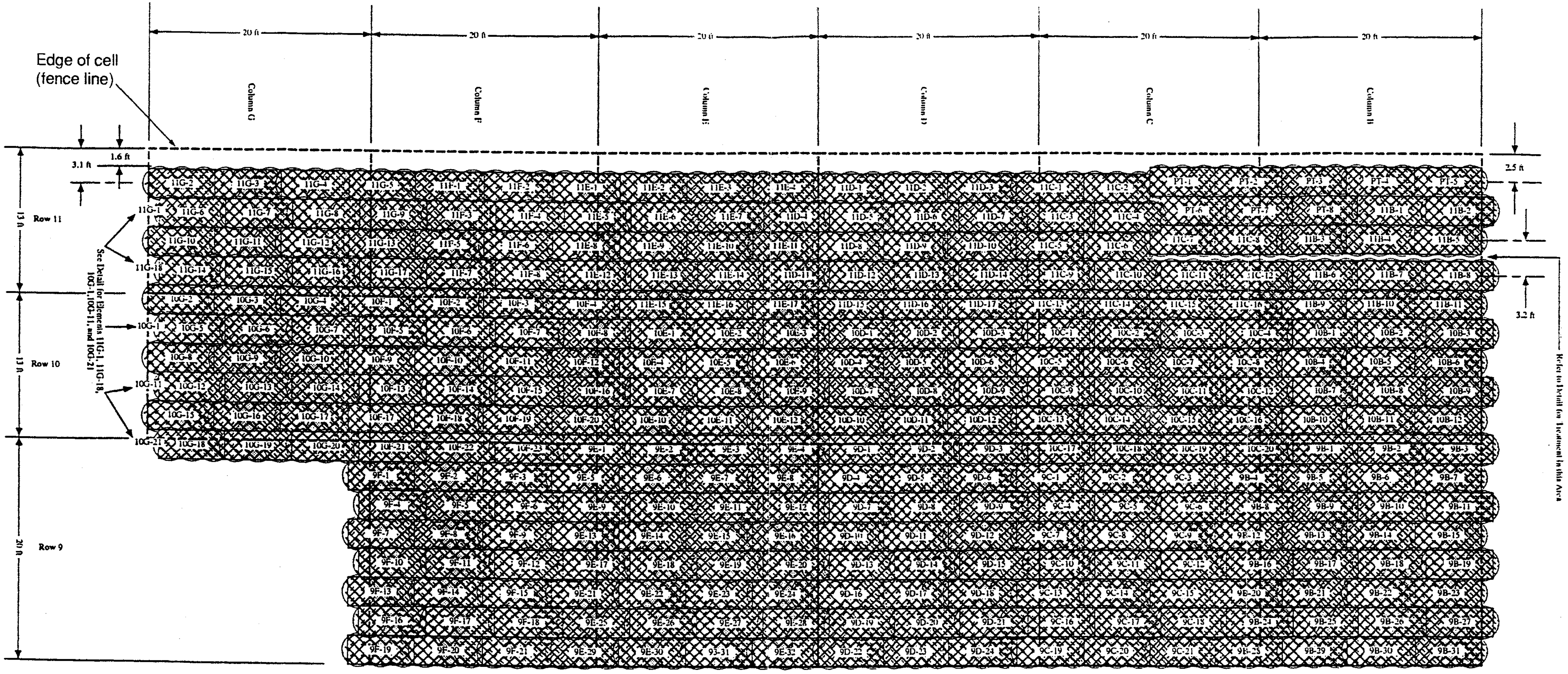
C1 ● Confirmation sampling locations

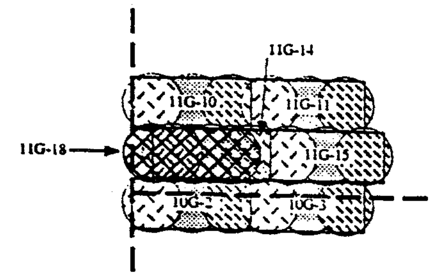
2 ——— Contour of approximate excavation depth in feet

0 60 Feet

AREAS OF EXCAVATION AND SAMPLING
LOCATIONS NORTH OF BAY ROAD
1990 Bay Road Site
East Palo Alto, California

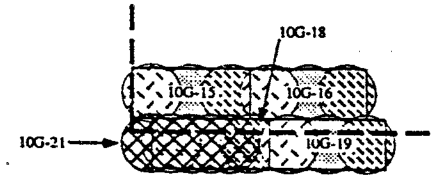
GEOMATRIX	Project No.	Figure
	1220F	2





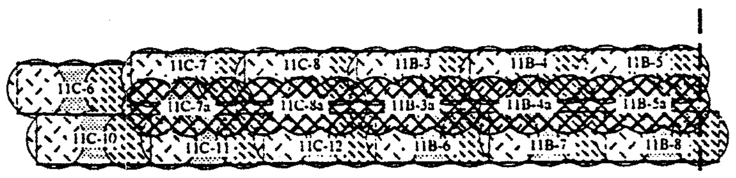
Element 11G-18 offset 1 ft from element 11G-14. One-half of the reagent dose applied for element 11G-18.

Typical Element Layout and Reagent Dose for 11G-1, 11G-18, 10G-1, and 10G-11



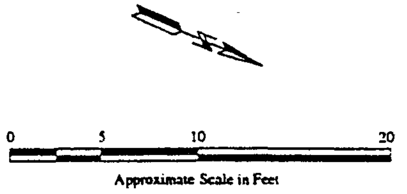
Element 10G-21 offset 1 ft from element 10G-18. No reagents added during drilling of 10G-21.

Element Layout and Reagent Dose for 11G-21



Element designated with an "a" offset ±1.5 ft. No reagents added to these elements.

Element Layout and Reagent Dose for 11C-7a, 11C-8a, 11B-3a, 11B-4a, and 11B-5a

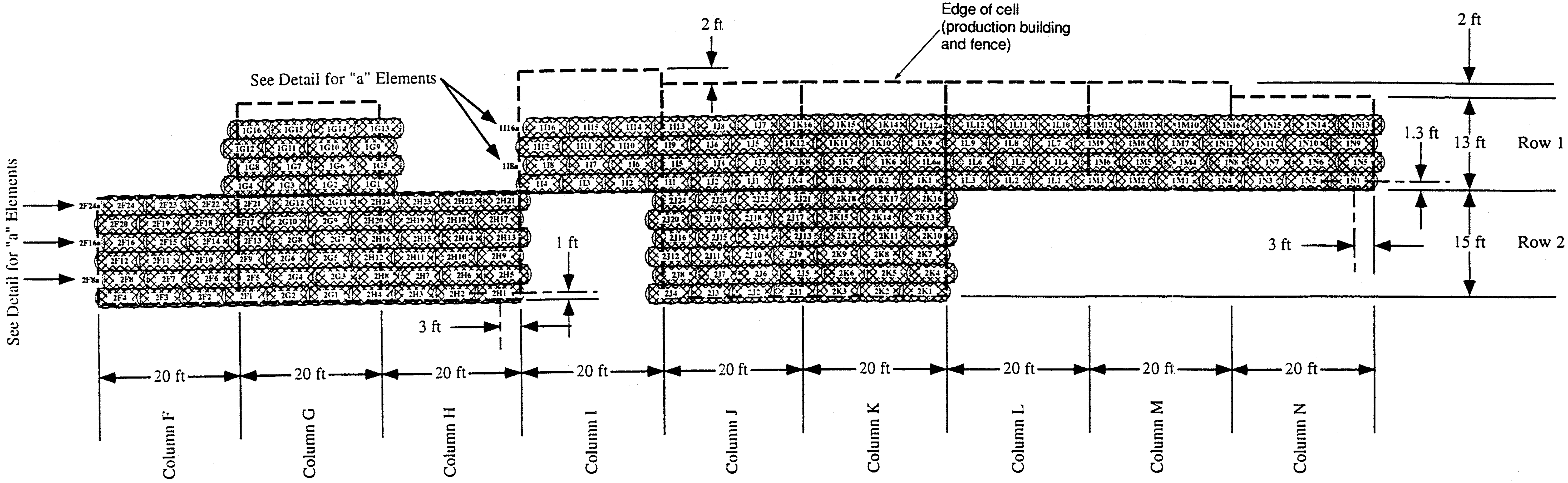


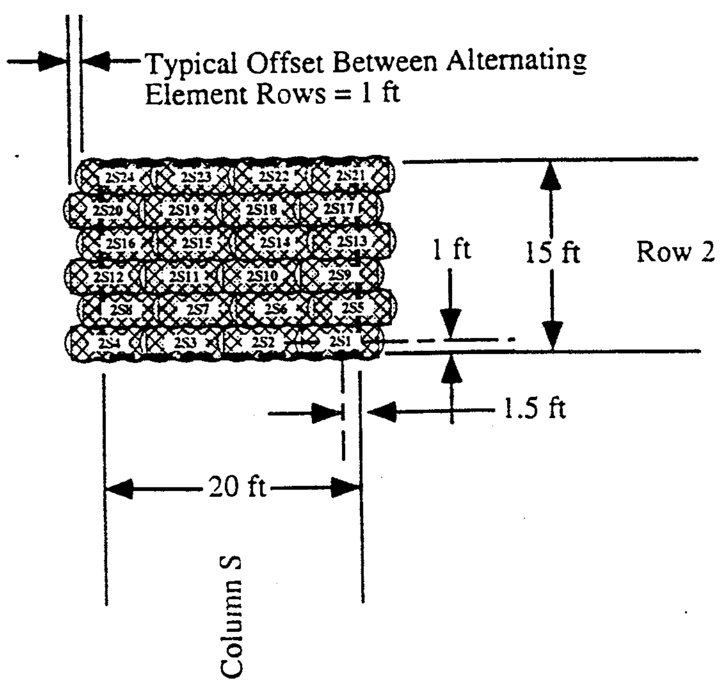
This figure supplied by Kajima/SMW Seiko, Inc.

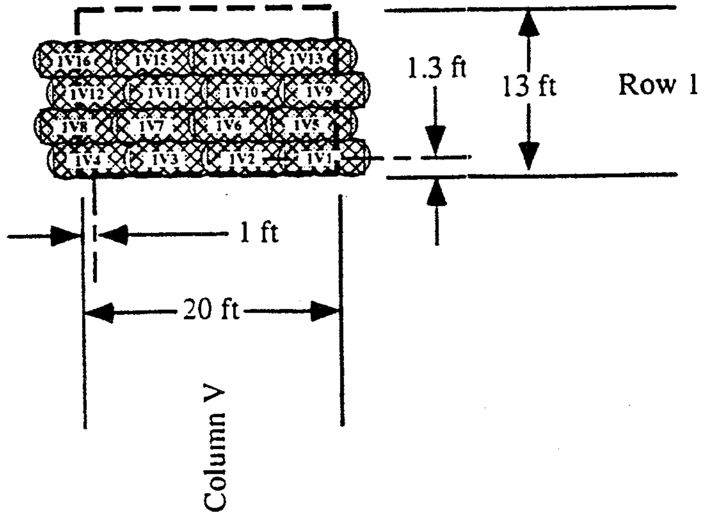
ELEMENT LAYOUT AND IDENTIFICATION
NORTH AREA
1990 Bay Road Site
East Palo Alto, California

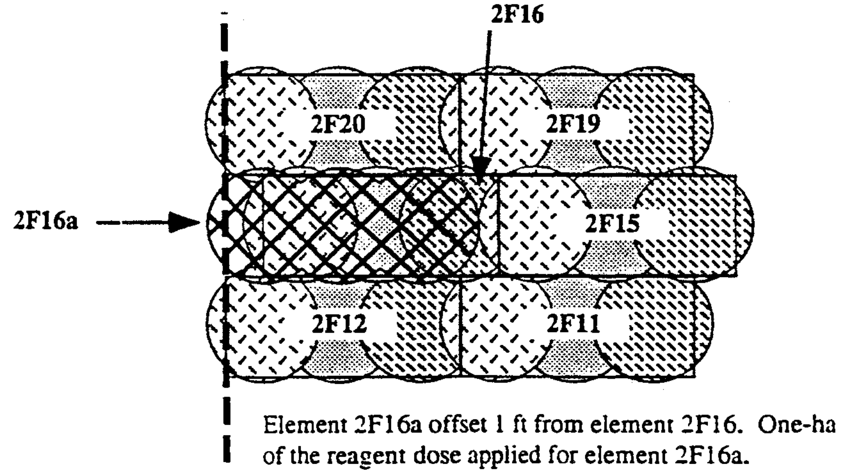
GEOMATRIX

Project No.	Figure
1220F	3





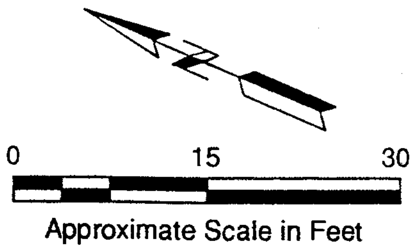




Element 2F16a offset 1 ft from element 2F16. One-ha
of the reagent dose applied for element 2F16a.

Typical Element Layout and Reagent Dose for 2F8a, 2F16a, 2F24a, 1I8a, 1I16a, and 1I24a

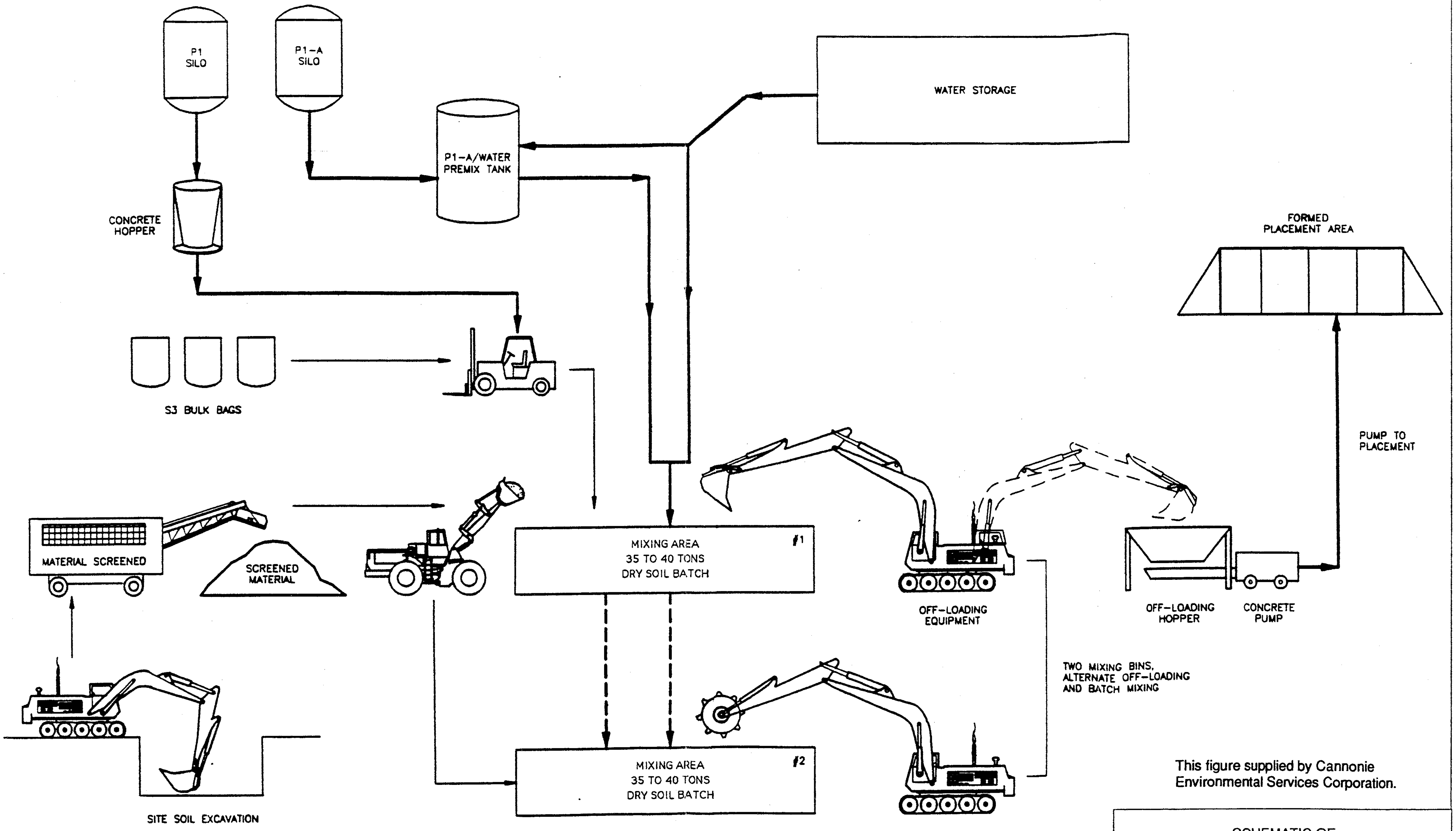
This figure supplied by Kajima/SMW Seiko, Inc.



Note: Soil from cell 2V was excavated to design treatment elevation and placed within other cells (shown above) for insitu treatment. Soil originating from cell 2V was not treated within its original cell location due to the shallow treatment depth.

ELEMENT LAYOUT AND IDENTIFICATION
SOUTH AREA
1990 Bay Road Site
East Palo Alto, California

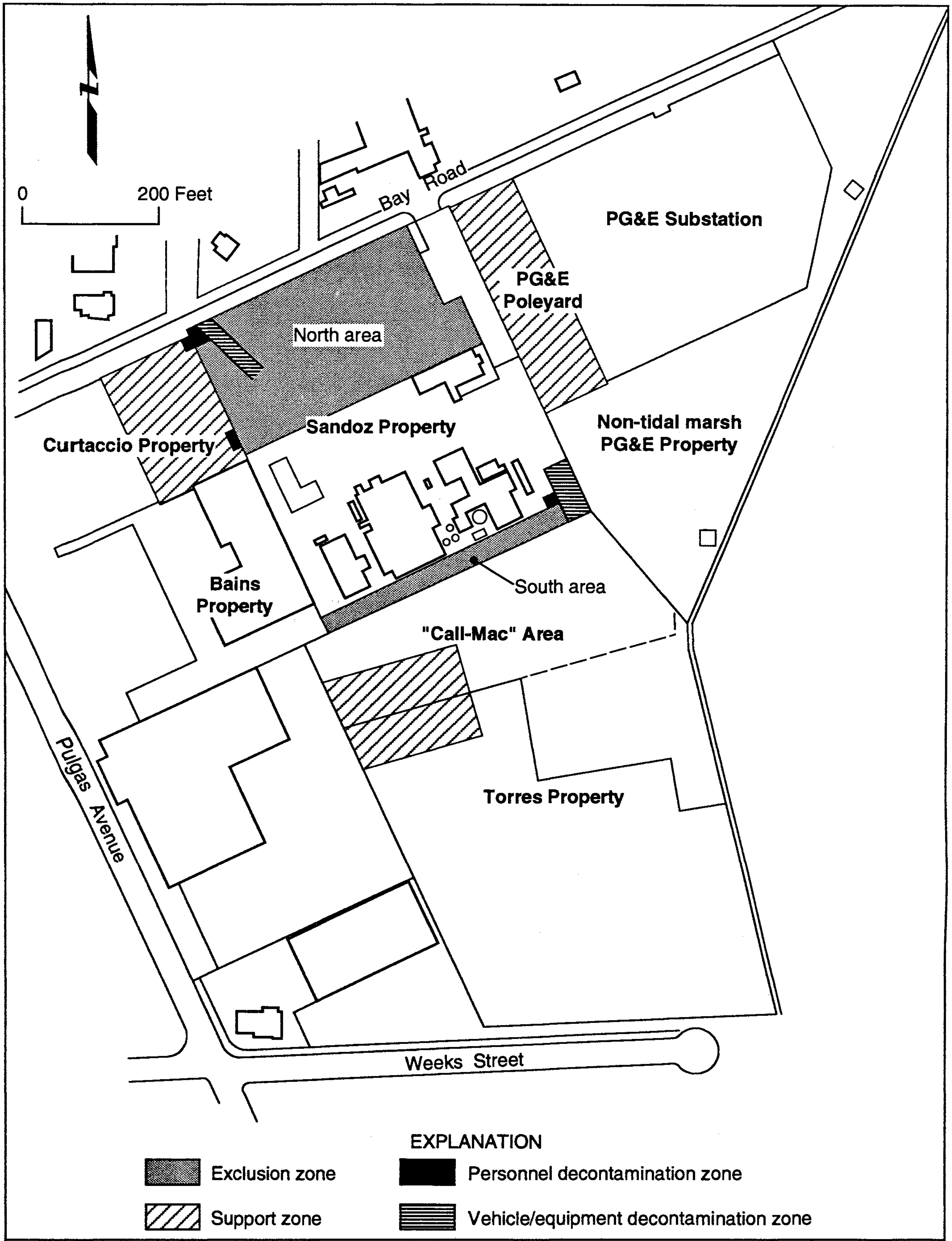
GEOMATRIX	Project No. 1220F	Figure 4



This figure supplied by Cannonie
Environmental Services Corporation.

SCHEMATIC OF
POST-EXCAVATION TREATMENT METHOD
1990 Bay Road Site
East Palo Alto, California

GEOMATRIX	Project No.	Figure
	1220F	5



GEOMATRIX

HEALTH AND SAFETY SITE WORK ZONES
1990 Bay Road Site
East Palo Alto, California

Figure
6

Project No.
1220F

DRAWINGS

UPLAND OPERABLE UNIT REMEDIAL ACTION

1990 BAY ROAD SITE
EAST PALO ALTO, CALIFORNIA
SAN MATEO COUNTY

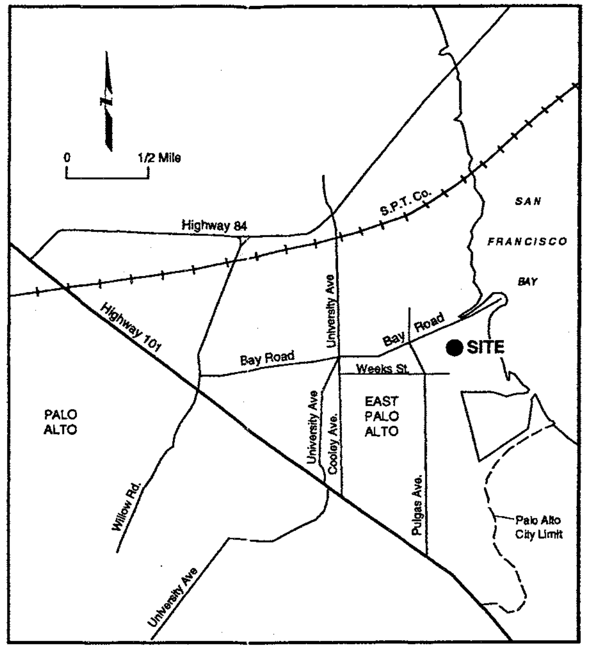
Prepared for:
Rhône-Poulenc Inc.

Prepared by:
Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California 94111
Phone: (415) 434-9400

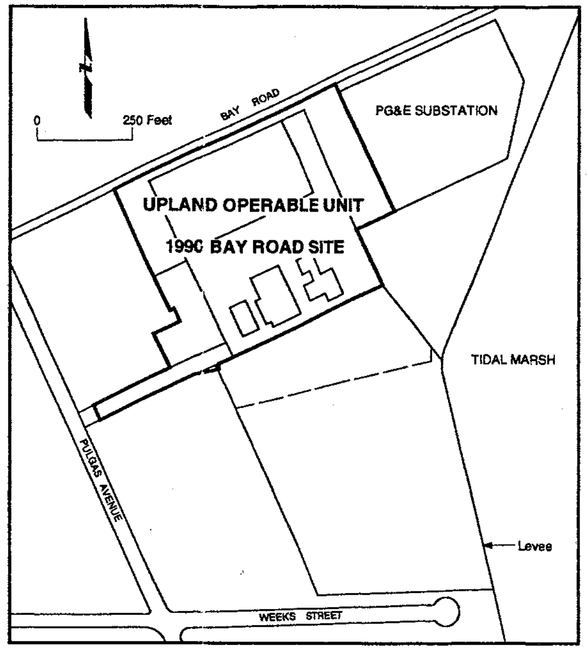
GEOMATRIX

DRAWING G-1

SITE LOCATION



SITE VICINITY MAP



GENERAL SITE PLAN

INDEX OF DRAWINGS

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	6/23/92	Issued for Contractors' proposals					
2	7/27/92	Issued for construction					
3	6/93	As constructed					

Approval:

Date:

GEOMATRIX

Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

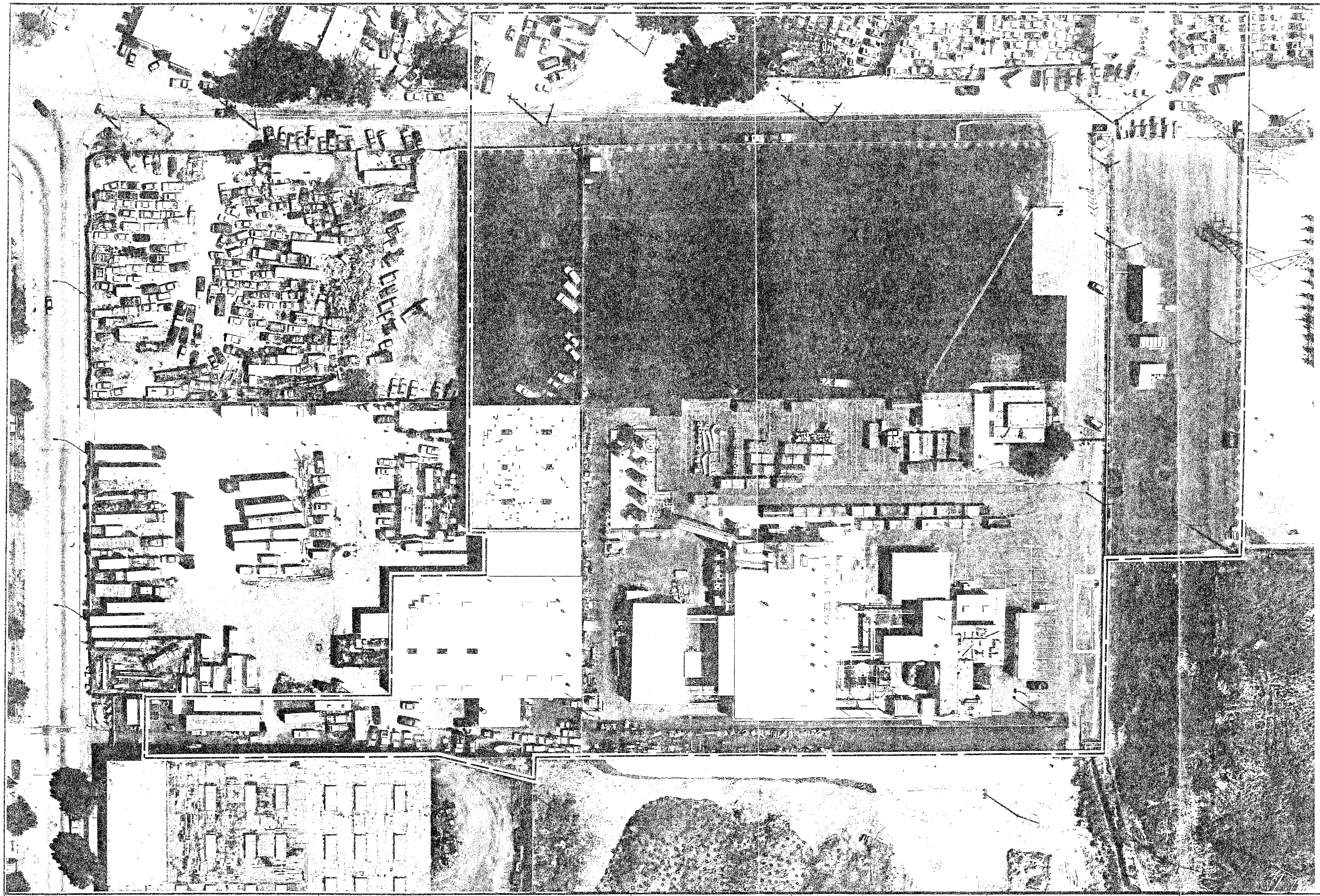
Prepared for:

Rhône-Poulenc Inc.

SITE LOCATION AND
INDEX OF DRAWINGS
Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.

G-2
Drawing



EXPLANATION

Limit of Upland Operable Unit

Note

Photography by Aelyteck, Inc. 17 June 1993.

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	6/23/92	Issued for Contractors' proposals					
2	7/27/92	Issued for construction	LEH				
3	6/93	Rephotographed as constructed					

Approval:

Date:

GEOMATRIX

Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

Prepared for:

Rhône-Poulenc Inc.

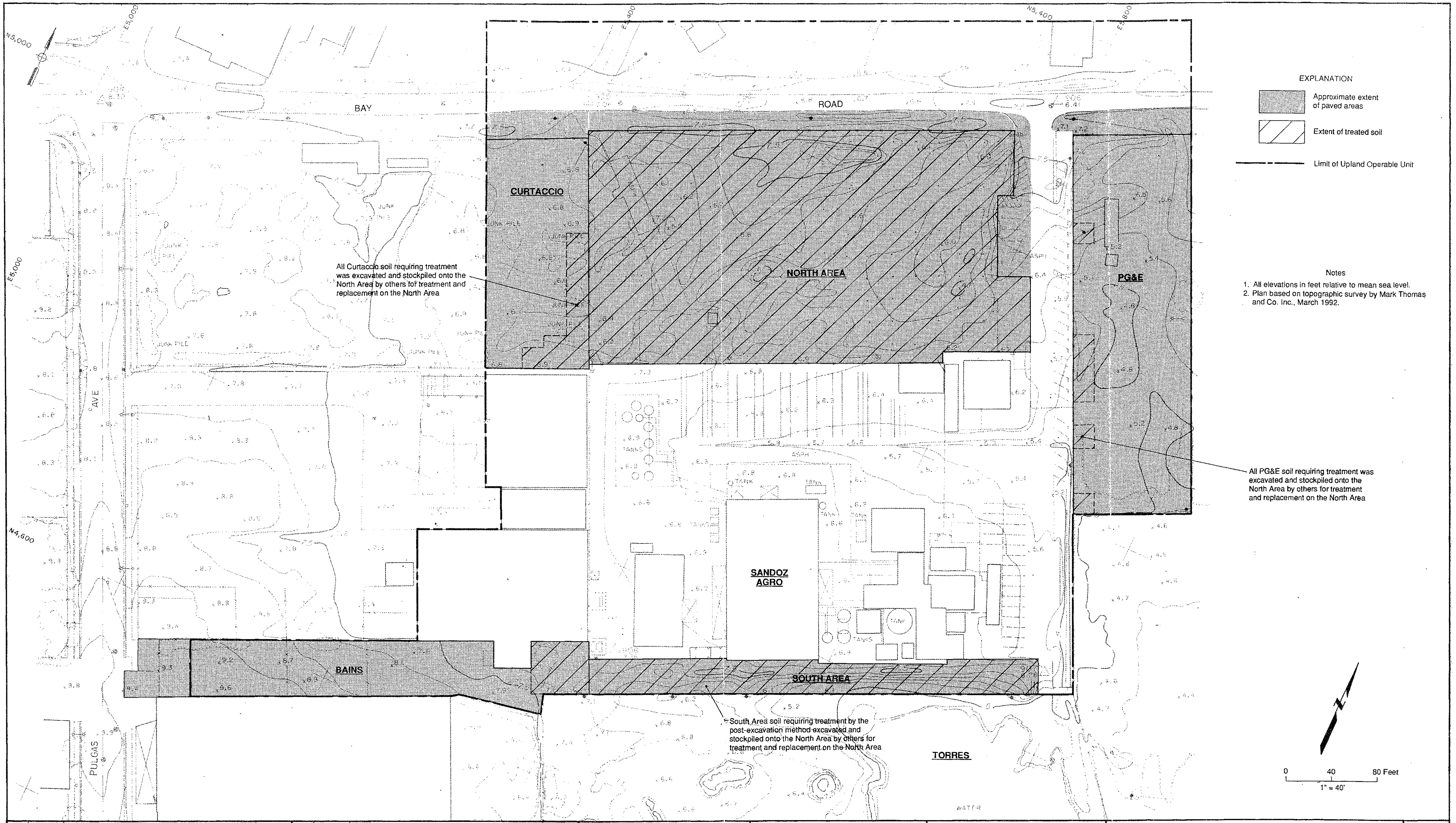
AERIAL PHOTOGRAPH
Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F

Project No.

G-3

Drawing



All Curtaccio soil requiring treatment was excavated and stockpiled onto the North Area by others for treatment and replacement on the North Area

All PG&E soil requiring treatment was excavated and stockpiled onto the North Area by others for treatment and replacement on the North Area

South Area soil requiring treatment by the post-excavation method excavated and stockpiled onto the North Area by others for treatment and replacement on the North Area

EXPLANATION

- ▨ Approximate extent of paved areas
- ▧ Extent of treated soil
- ─ ─ ─ Limit of Upland Operable Unit

Notes

1. All elevations in feet relative to mean sea level.
2. Plan based on topographic survey by Mark Thomas and Co. Inc., March 1992.

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	6/23/92	Issued for Contractors' proposals					
2	7/27/92	Issued for construction	CEH				
3	6/93	As constructed					

Approval:

Date:

GEOMATRIX

Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

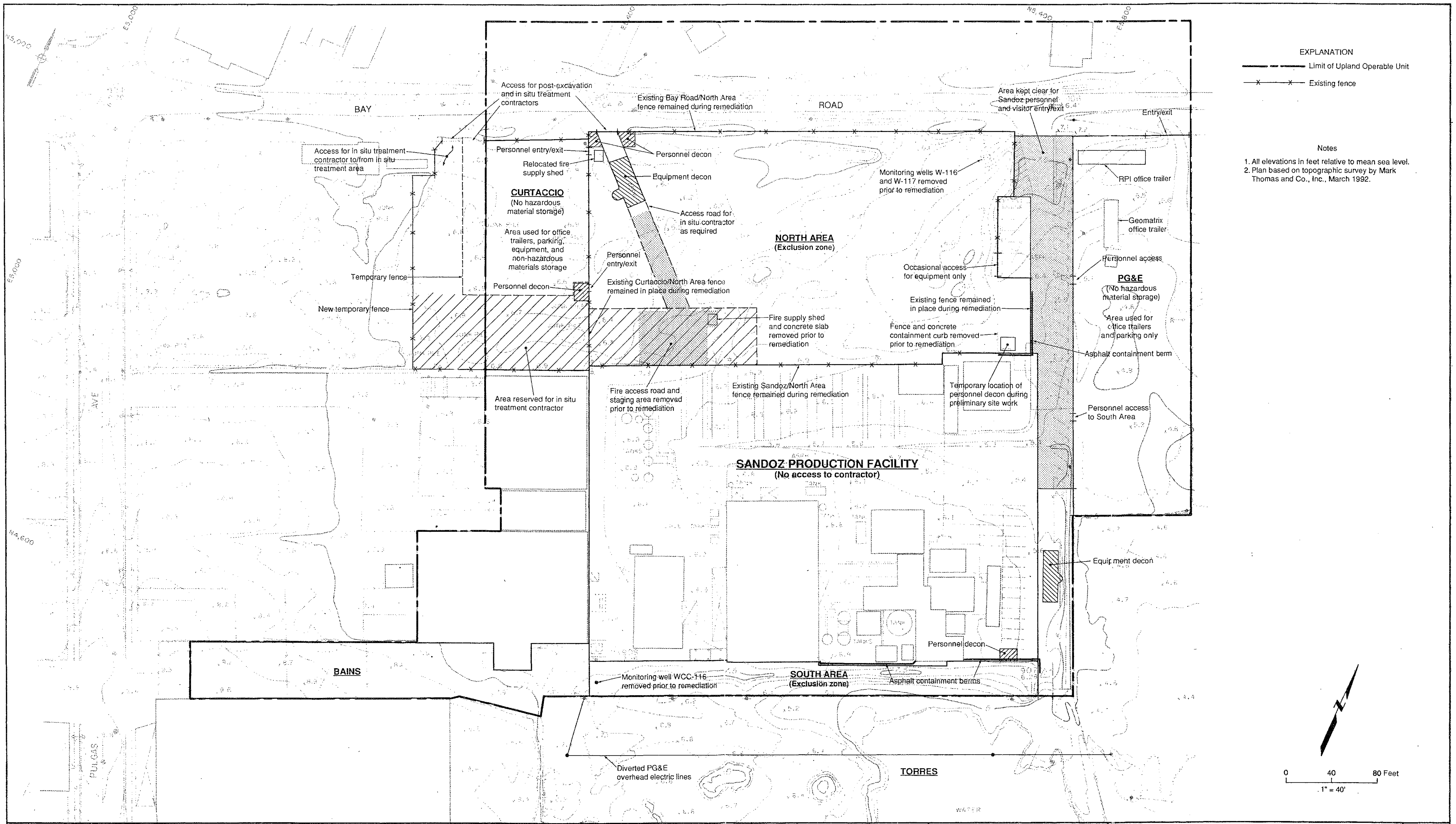
Prepared for:

Rhône-Poulenc Inc.

SITE PLAN
Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.

G-4
Drawing



EXPLANATION

— — — Limit of Upland Operable Unit

—x——x— Existing fence

Notes

1. All elevations in feet relative to mean sea level.
2. Plan based on topographic survey by Mark Thomas and Co., Inc., March 1992.

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
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2	7/27/92	Issued for construction	CEH				
3	6/93	As constructed					

Approval:

Date:

GEOMATRIX

Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

Prepared for:

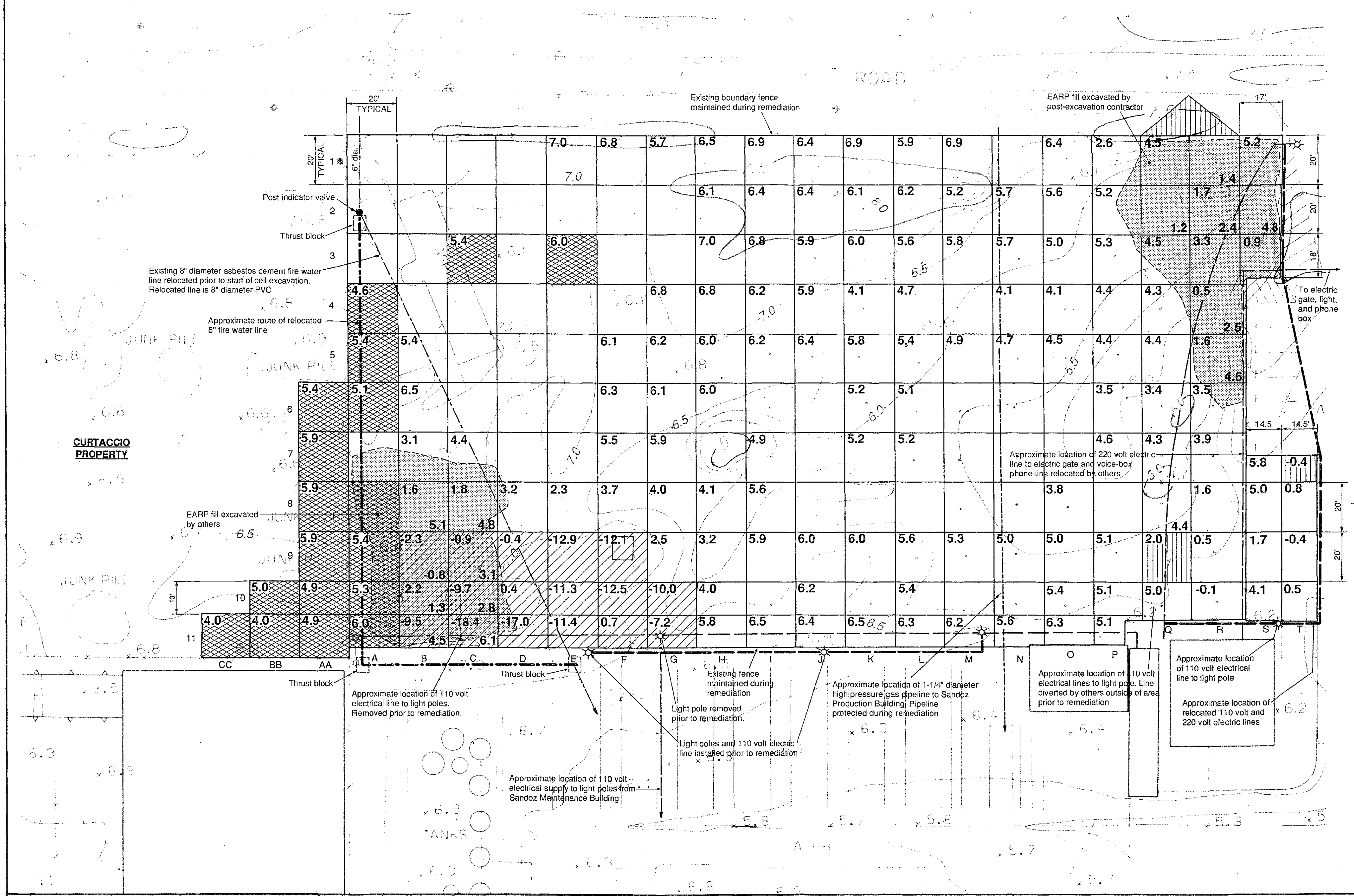
Rhône-Poulenc Inc.

WORKING AREAS DURING REMEDIATION

Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.

G-5
Drawing



EXPLANATION

Treatment Cell

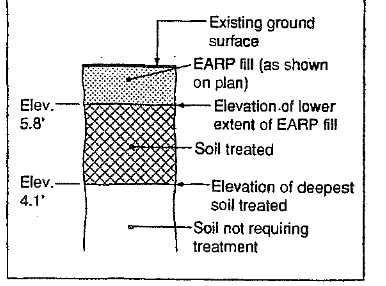
4.1 ← Elevation of minimum treatment depth (MSL) in treatment cell. See note 6

5.8 ← Approximate elevation of lower extent of EARP fill excavated in the treatment cell. See note 4

(See Typical Soil Profile below)

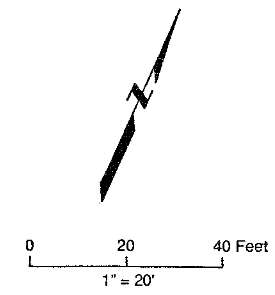
▒	Approximate lateral extent of EARP fill greater than one foot thick
▨	Cell treated by in situ contractor
▩	Cell excavated by others prior to contractors mobilization on site
▥	Area of removal of soil with greater than 5000 mg/kg arsenic (for excavation depths refer to implementation report)

TYPICAL SOIL PROFILE



Notes

1. All elevations in feet relative to mean sea level.
2. Plan based on topographic survey by Mark Thomas and Co., Inc., March 1992.
3. The position, extent of all pipelines, and utilities shown are approximate.
4. EARP fill was placed during the Early Action Removal Plan. EARP fill was removed, where possible, to the elevations shown. Refer to the implementation report for details.
5. Treatment cells have dimensions 20' x 20' unless otherwise shown.
6. All soil was treated to the elevations shown or deeper. Final treatment elevations are tabulated in the implementation report.
7. Excavated soil from the Curtaccio Property was treated and placed on the Sandoz property and Curtaccio treatment cells backfilled with native material or imported fill.



NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	6/23/92	Issued for Contractors' proposals					
2	7/27/92	Issued for construction	LEH				
3	6/93	As constructed					

Approval:

Date:

GEOMATRIX

Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

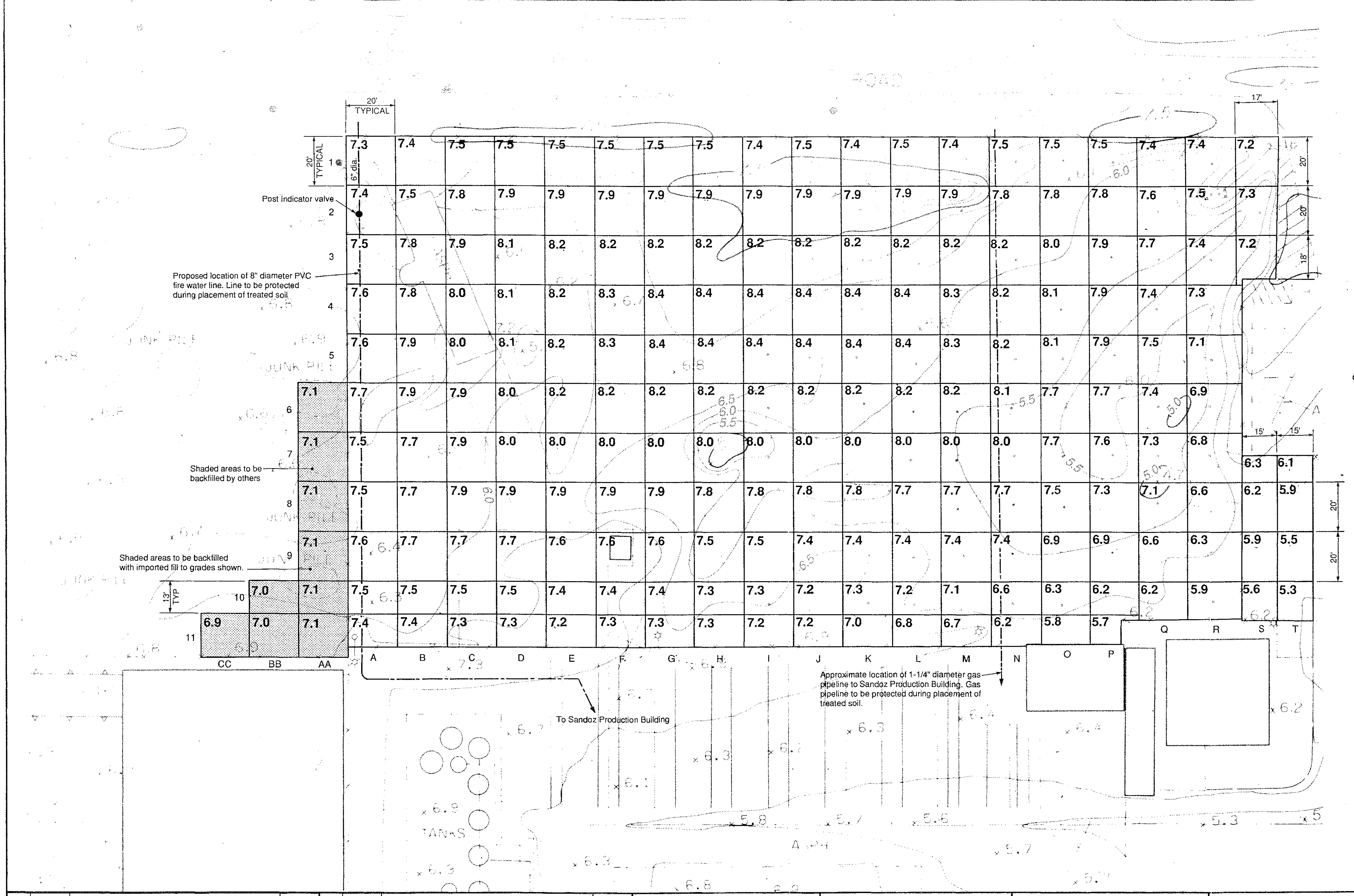
Prepared for:

Rhône-Poulenc Inc.

SILICATE TREATMENT PLAN
NORTH AREA AND CURTACCIO
Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.

T-1
Drawing



	CC	BB	AA	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1				7.3	7.4	7.5	7.5	7.5	7.5	7.5	7.5	7.4	7.5	7.4	7.5	7.4	7.5	7.5	7.5	7.4	7.4	7.2	
2				7.4	7.5	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.6	7.5	7.3	
3				7.5	7.8	7.9	8.1	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.0	7.9	7.7	7.4	7.2	
4				7.6	7.8	8.0	8.1	8.2	8.3	8.4	8.4	8.4	8.4	8.4	8.4	8.3	8.2	8.1	7.9	7.4	7.3		
5				7.6	7.9	8.0	8.1	8.2	8.3	8.4	8.4	8.4	8.4	8.4	8.4	8.3	8.2	8.1	7.9	7.5	7.1		
6			7.1	7.7	7.9	7.9	8.0	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.1	7.7	7.7	7.4	6.9		
7			7.1	7.5	7.7	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.7	7.6	7.3	6.8	6.3	6.1
8			7.1	7.5	7.7	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.5	7.3	7.1	6.6	6.2	5.9
9			7.1	7.6	7.7	7.7	7.7	7.6	7.5	7.6	7.5	7.5	7.4	7.4	7.4	7.4	7.4	6.9	6.9	6.6	6.3	5.9	5.5
10		7.0	7.1	7.5	7.5	7.5	7.5	7.4	7.4	7.4	7.3	7.3	7.2	7.3	7.2	7.1	6.6	6.3	6.2	6.2	5.9	5.6	5.3
11	6.9	7.0	7.1	7.4	7.4	7.3	7.3	7.2	7.3	7.3	7.3	7.2	7.2	7.0	6.8	6.7	6.2	5.8	5.7				

EXPLANATION

Replacement Cell

7.5 ← Final grade of treated soil in a treatment cell

Notes

1. All elevations in feet relative to mean sea level.
2. Plan based on topographic survey by Mark Thomas and Co., Inc., March, 1992.
3. The Contractor shall place the treated soil in the cell configuration shown to a tolerance of plus or minus 0.5 foot in any plan dimension, and plus or minus 0.1 foot in elevation.
4. Final pavement cap grades are shown on Drawing P-1.
5. Replacement cells have dimensions 20' x 20' unless otherwise shown.

△2

6. Treated material will have a minimum placed thickness of 6".

THIS DRAWING SUPERSEDED. FINAL GRADES OF TREATED SOIL ARE 9 INCHES BELOW PAVING GRADES SHOWN ON DRAWING P-1.

0 20 40 Feet
1" = 20'

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
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2	7/27/92	Issued for construction	LEH				
3	6/93	As constructed					

Approval:

Date:

GEOMATRIX

Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

Prepared for:

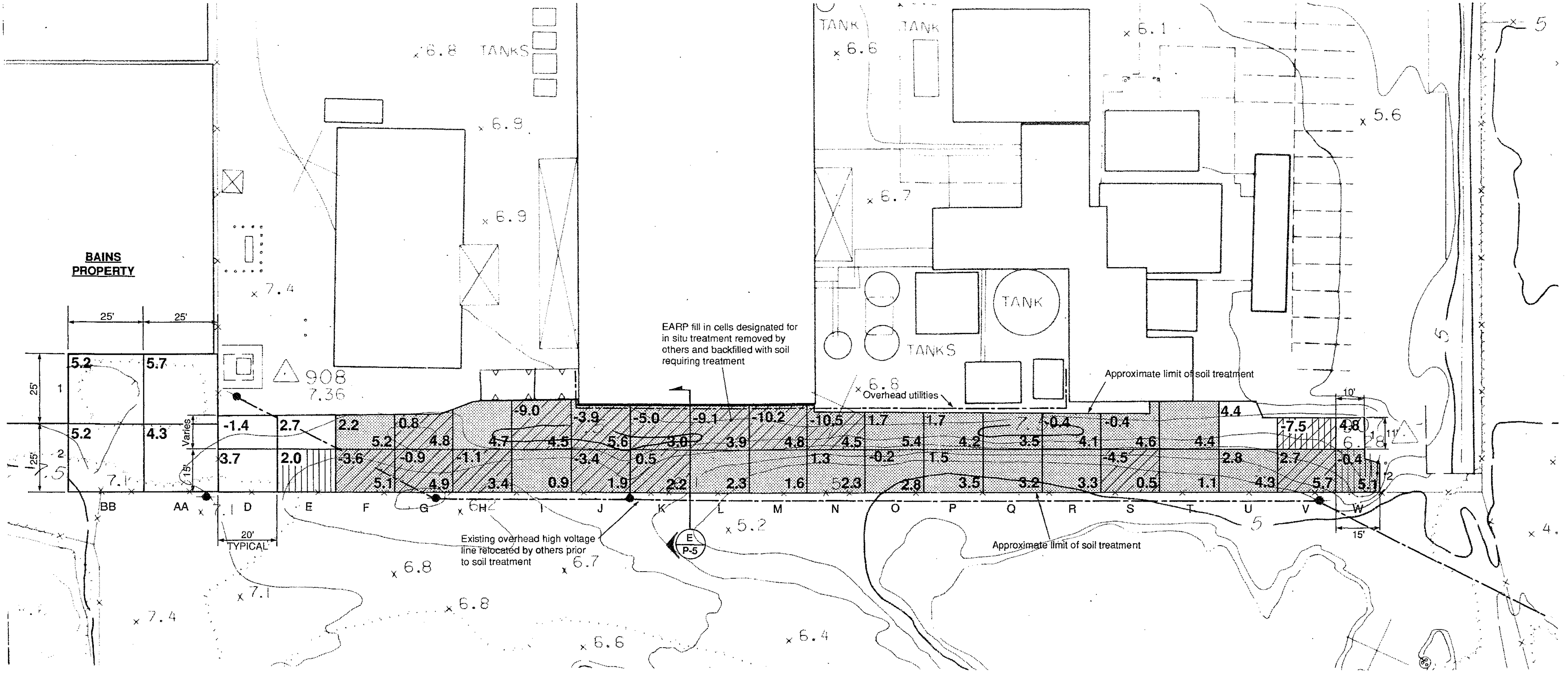
Rhône-Poulenc Inc.

NORTH AREA
FINAL GRADES FOR TREATED SOIL

Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.

T-2
Drawing



EXPLANATION

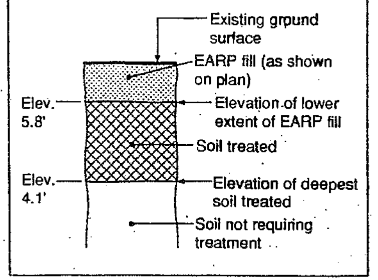
Treatment Cell

4.1	Elevation of minimum treatment depth (MSL) in treatment cell. See note 6
5.8	Approximate elevation of lower extent of EARP fill excavated in the treatment cell. See note 4

(See Typical Soil Profile below)

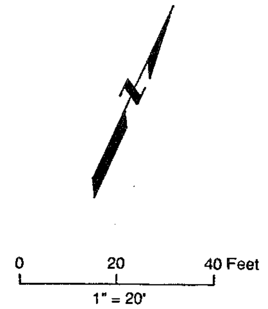
▒	Approximate lateral extent of EARP fill greater than one foot thick
▨	Cell treated by in situ contractor
▥	Area of removal of soil with greater than 5000 mg/kg arsenic (for excavation depths refer to implementation report)

TYPICAL SOIL PROFILE



Notes

1. All elevations in feet relative to mean sea level.
2. Plan based on topographic survey by Mark Thomas and Co., Inc., March 1992.
3. The position, extent of all pipelines, and utilities shown are approximate.
4. EARP fill was placed during the Early Action Removal Plan. EARP fill was removed, where possible, to the elevations shown. Refer to the implementation report for details.
5. Treatment cells have dimensions 15' x 20' unless otherwise shown.
6. All soil was treated to the elevations shown or deeper. Final treatment elevations are tabulated in the implementation report.
7. Excavated soil from the Bains Property was treated and placed on the Sandoz Property and Bains treatment cells backfilled with native material or imported fill.



NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	6/23/92	Issued for Contractors' proposals					
2	7/27/92	Issued for construction	LEH				
3	6/93	As constructed					

Approval:

Date:

GEOMATRIX

Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

Prepared for:

Rhône-Poulenc Inc.

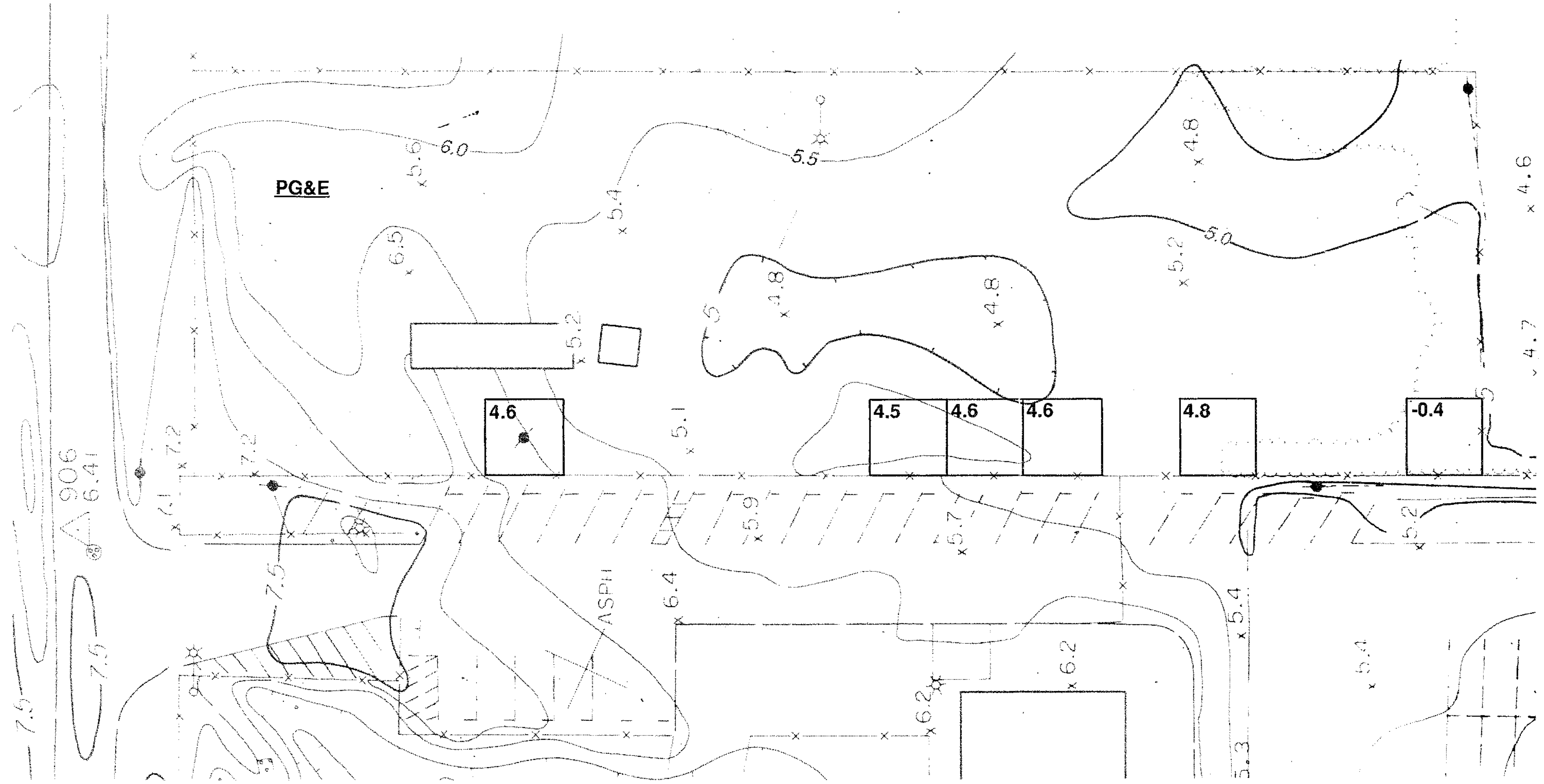
SILICATE TREATMENT PLAN
SOUTH AREA AND BAINS
Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.

T-3
Drawing

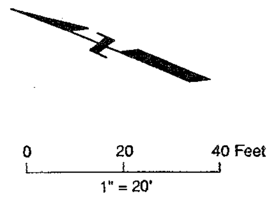
EXPLANATION

Treatment Cell	
4.1	Elevation of minimum treatment depth (MSL) in treatment cell. See note 6



Notes

1. All elevations in feet relative to mean sea level.
2. Plan based on topographic survey by Mark Thomas and Co., Inc., March 1992.
3. The position, extent of all pipelines, and utilities shown are approximate.
4. Cells have dimensions of 20' x 20' unless otherwise shown.
5. Excavated soil was treated and placed on the Sandoz Property and PG&E treatment cells backfilled with native material or imported fill.
6. All soil was treated to the elevations shown or deeper. Final treatment elevations are tabulated in the implementation report.



NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	6/92	Issued for construction					
2	6/93	As constructed					

Approval:

Date:

GEOMATRIX

Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

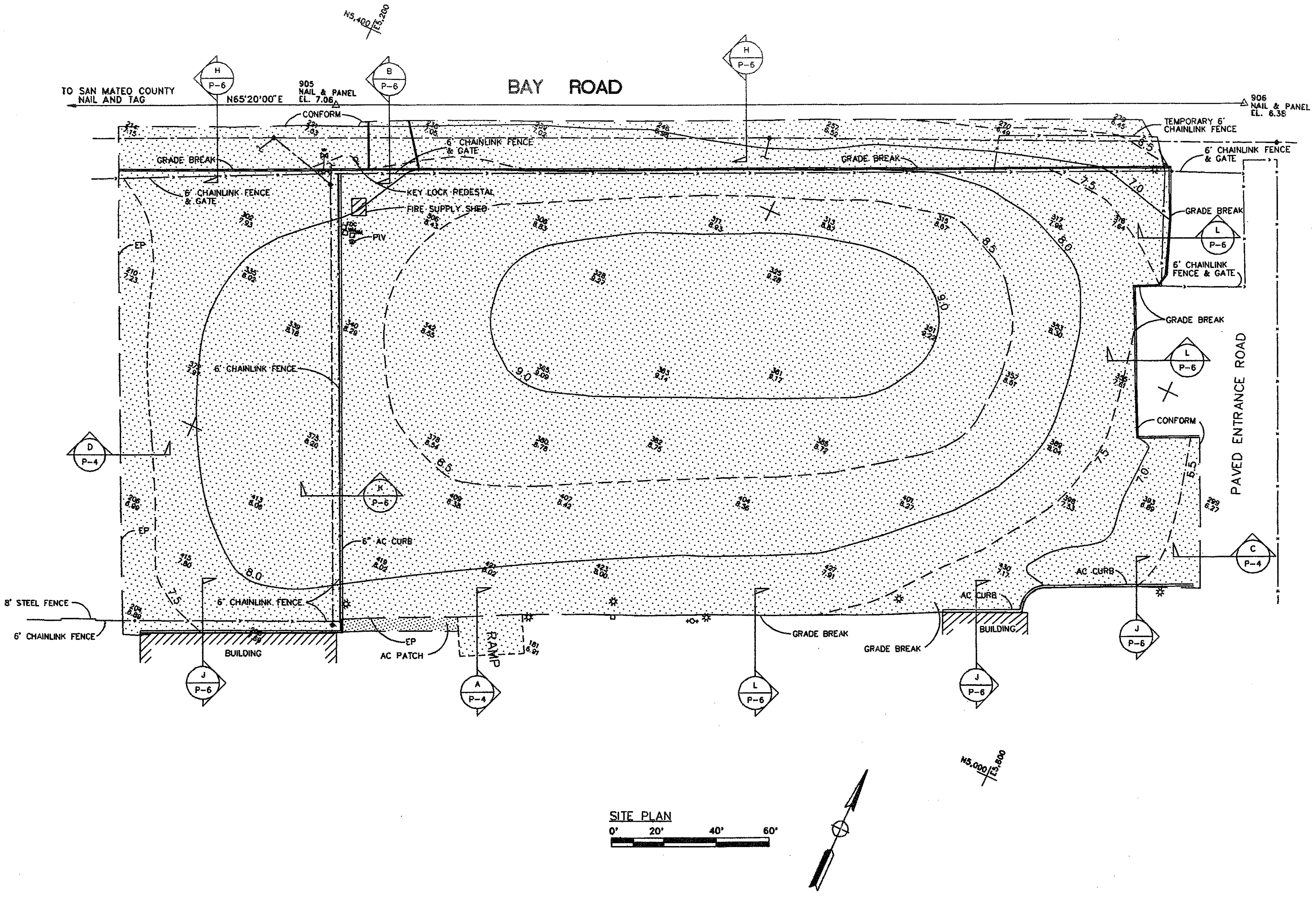
Prepared for:

Rhône-Poulenc Inc.

SILICATE TREATMENT PLAN - PG&E
Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.

T-4
Drawing



SITE PLAN

0' 20' 40' 60'

EXPLANATION

▨	AREA PAVED
7.0	APPROX. FINAL GRADE OF PAVING
■	DRAINAGE INLET
◆	JOINT POLE
☼	ELECTROLIER
□	ELECTRICAL PULL BOX
□FDC	FIRE DEPARTMENT CONNECTION
+O+	FIRE HYDRANT
⋈	WATER VALVE
□WM	WATER METER
✓	GUY WIRE
—— ——	EDGE OF PAVEMENT
——›——	FENCE
—— —— - ——	OVERHEAD POWER LINES
— — — —	.5' CONTOUR LINE
————	1' CONTOUR LINE

NOTES

1. ALL ELEVATIONS IN FEET RELATIVE TO MEAN SEA LEVEL (MSL).
2. PLAN BASED ON TOPOGRAPHIC SURVEYS BY MARK THOMAS AND CO., INC., MARCH 1992, DECEMBER 1992, AND MAY 1993.
3. THE POSITION AND EXTENT OF ALL PIPELINES AND UTILITIES SHOWN ARE APPROXIMATE.

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
4	6/93	REDRAWN AS CONSTRUCTED	ACL				

Approval:

Date:

GEOMATRIX
Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, CA 94111

Prepared for:

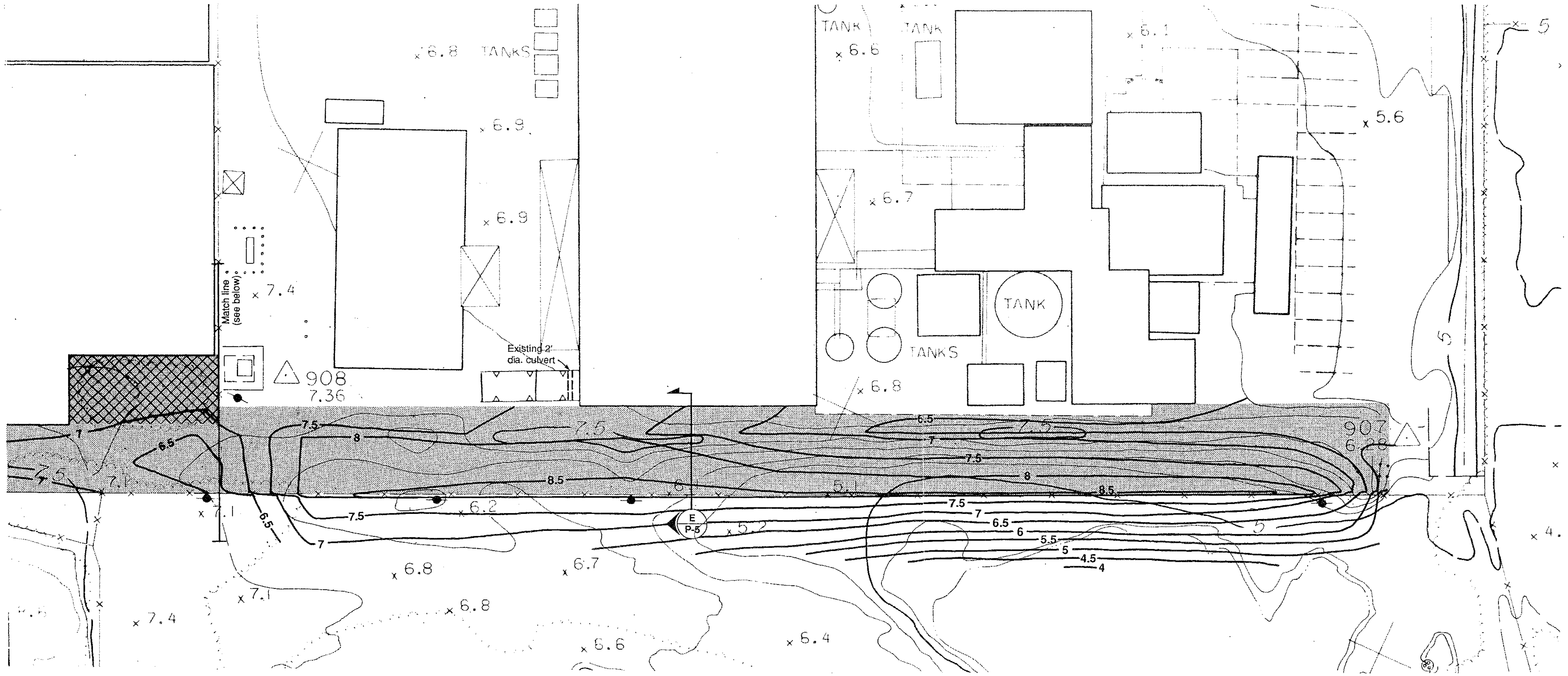
Rhône-Poulenc Inc.

GRADING, PAVING AND DRAINAGE PLAN NORTH AREA & CURTACCIO

Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

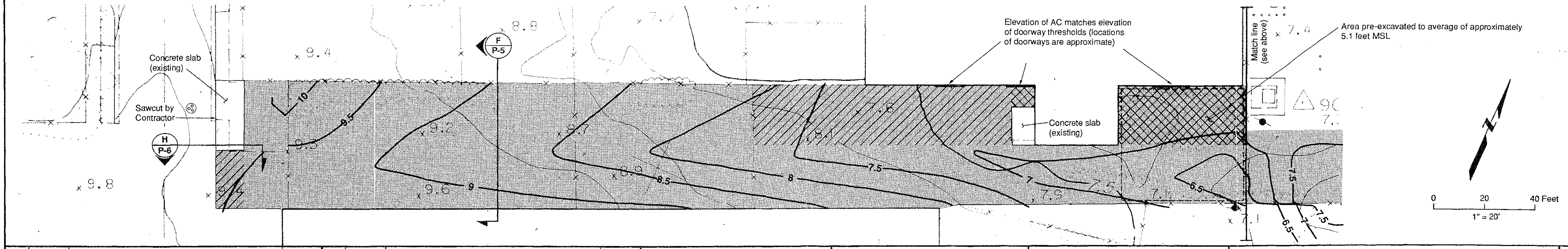
1220F
Project No.

P-1
Drawing



SOUTH AREA

BAINS



EXPLANATION

—9.0— Approximate final grading contour

▒ Area paved

▩ 6 inches dense grade asphalt concrete

▨ 3 inches hydraulic grade asphalt concrete and 3 inches dense grade asphalt concrete

Notes

1. All elevations in feet relative to mean sea level (MSL).
2. Plan based on topographic surveys by Mark Thomas and Co., Inc., March 1992, and November 1992.

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	9/23/92	Issued for Contractor's proposals					
2	10/27/92	Issued for Construction					
3	6/93	As constructed					

Approval:

Date:

GEOMATRIX

Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

Prepared for:

Rhône-Poulenc Inc.

GRADING, PAVING, AND DRAINAGE PLAN
SOUTH AREA AND BAINS

Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.

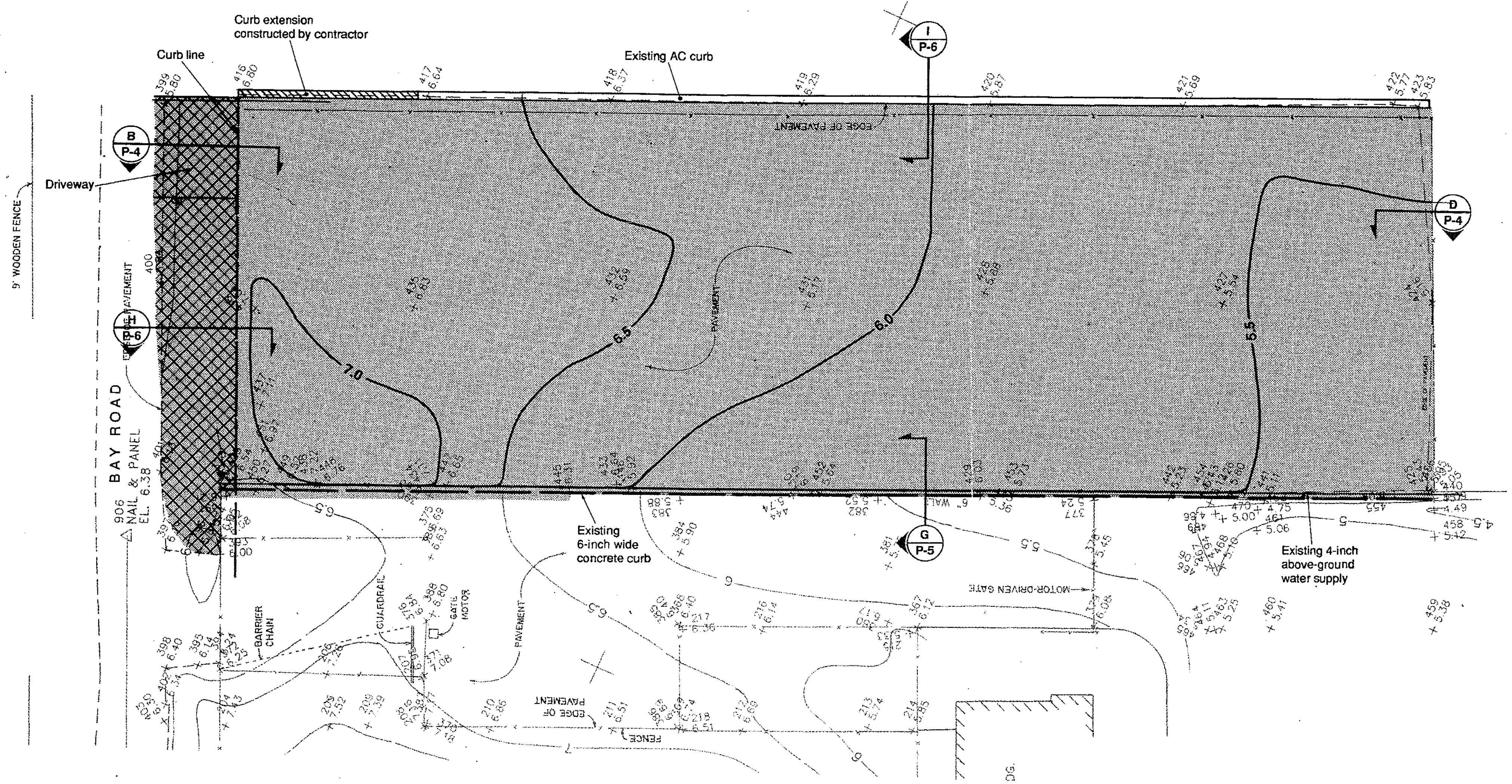
P-2
Drawing

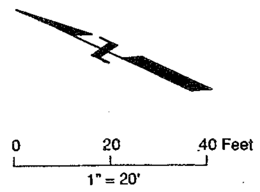
EXPLANATION

—9.0—	Approximate final grading contour
▨	Area paved
▦	6 inches dense grade asphalt concrete

Notes

1. All elevations in feet relative to mean sea level (MSL).
2. Plan based on topographic surveys by Mark Thomas and Co., Inc., March 1992, and November 1992.





NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	9/23/92	Issued for Contractor's proposals					
2	10/27/92	Issued for Construction					
3	6/93	As constructed					

Approval:

Date:

GEOMATRIX

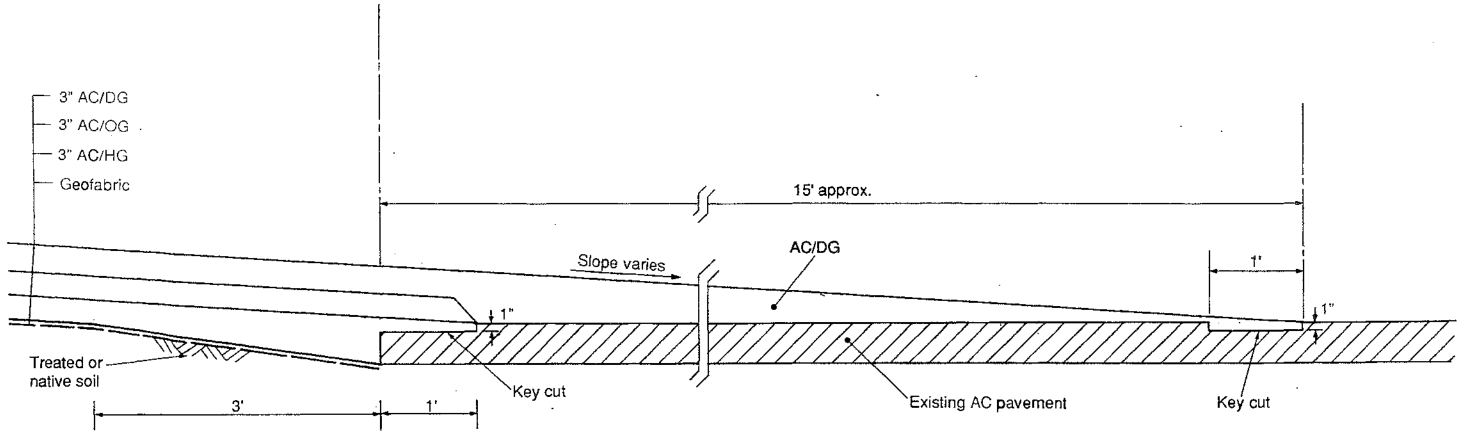
Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

Prepared for:

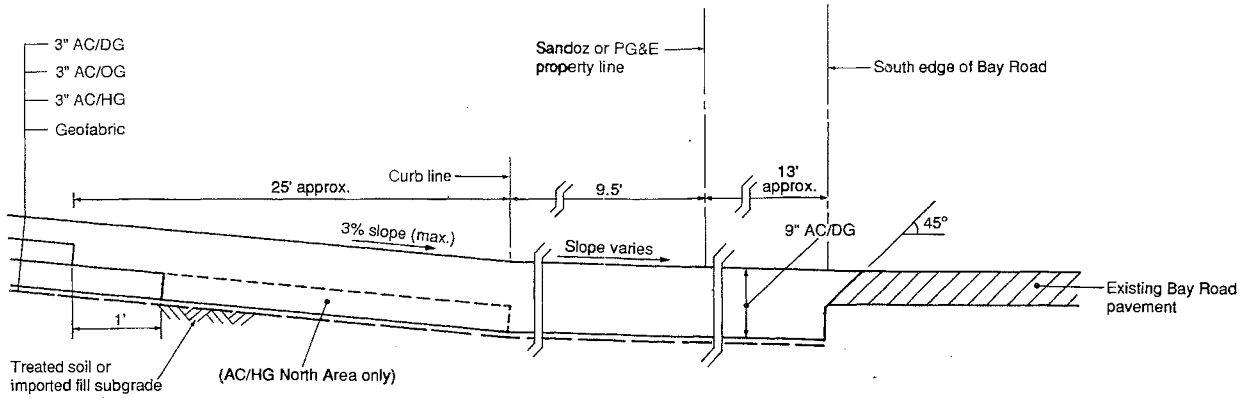
Rhône-Poulenc Inc.

GRADING, PAVING, AND
DRAINAGE PLAN - PG&E
Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.
P-3
Drawing



A AC PAVEMENT SECTION NORTH AREA

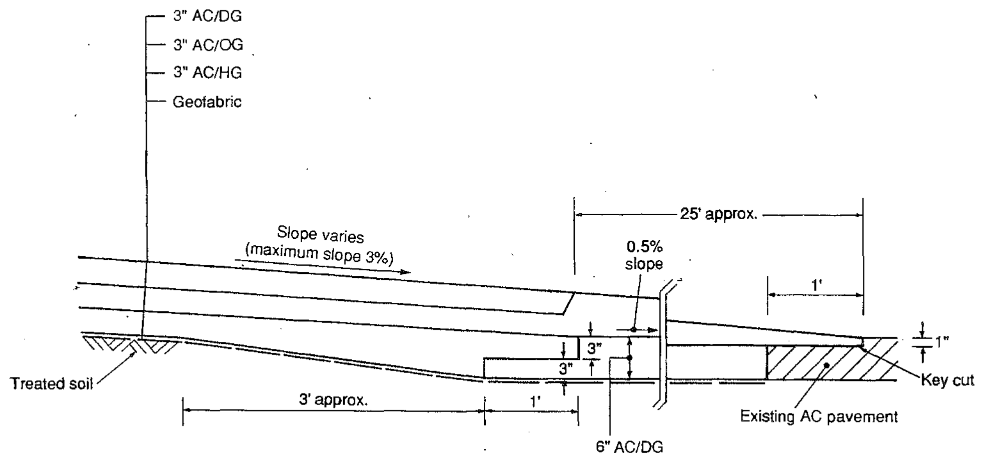


B AC PAVEMENT SECTION NORTH AREA AND PG&E DRIVEWAYS

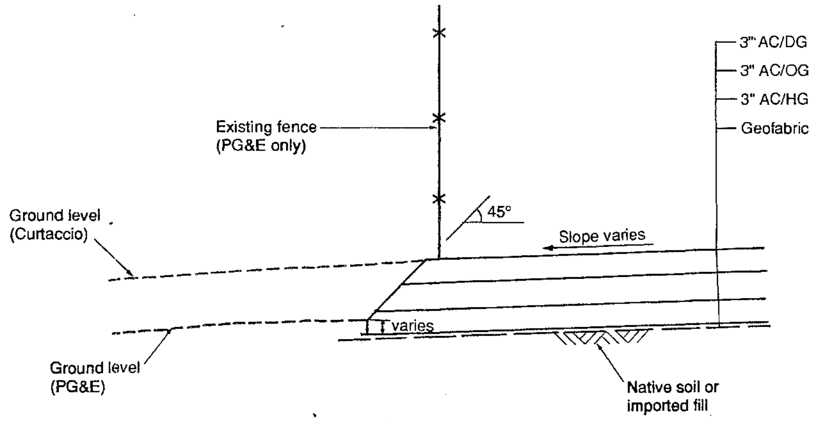
Note

1. AC/DG: Asphalt concrete/dense grade
   AC/OG: Asphalt concrete/open grade
   AC/HG: Asphalt concrete/hydraulic grade

0 1 2 Feet



C AC PAVEMENT SECTION NORTH AREA



D AC PAVEMENT SECTION CURTACCIO AND PG&E

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	9/23/92	Issued for Contractor's proposals					
2	10/27/92	Issued for Construction					
3	4/21/93	Section C revised					
4	6/93	As constructed					

Approval:

Date:

GEOMATRIX

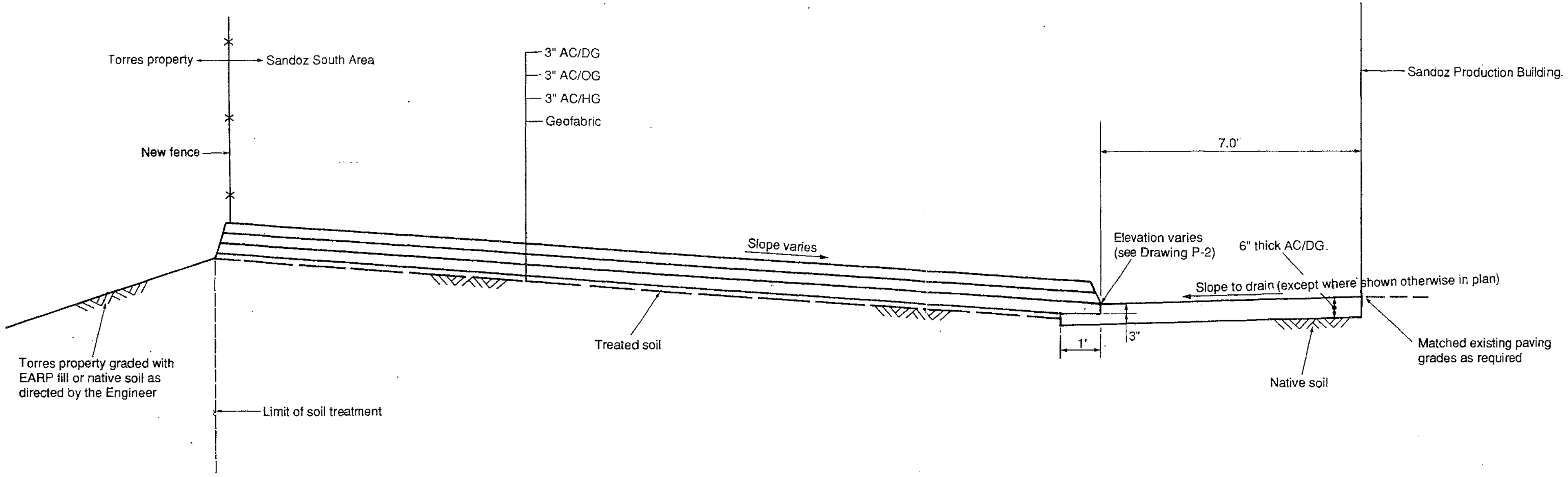
Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

Prepared for:

Rhône-Poulenc Inc.

PAVEMENT DETAILS
(1 of 3)
Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.
P-4
Drawing

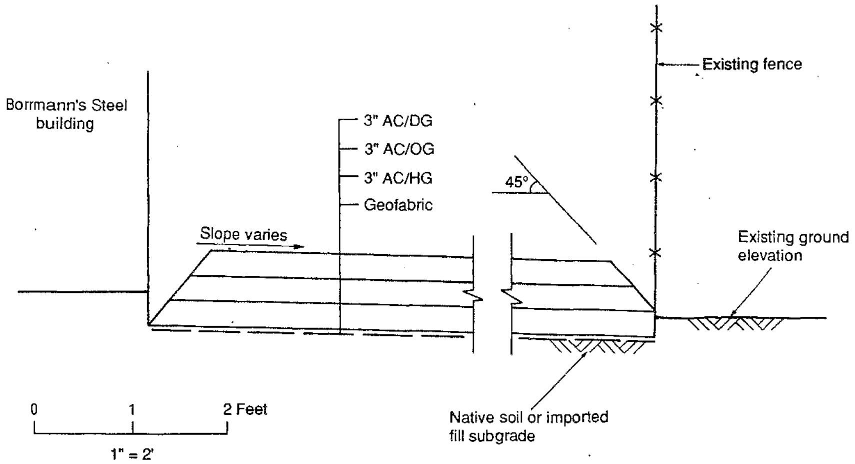


E TYPICAL AC PAVEMENT SECTION
SOUTH AREA

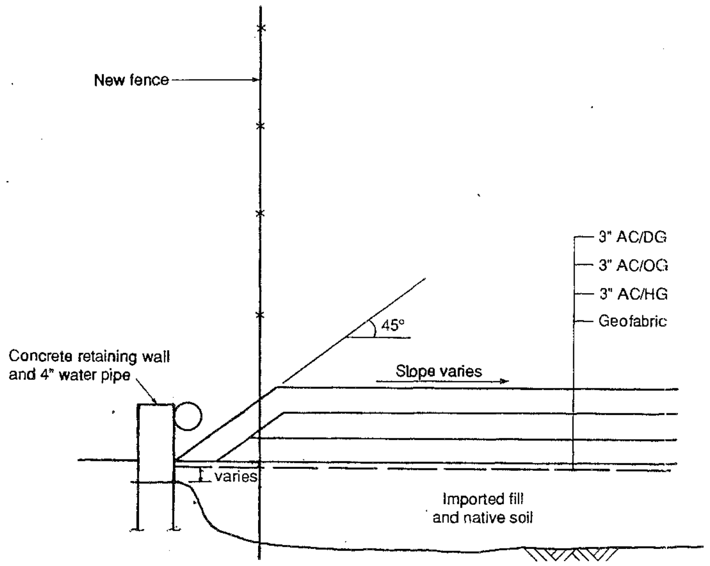
0 2 4 Feet
1" = 2'

Note

1. AC/DG: Asphalt concrete/dense grade
   AC/OG: Asphalt concrete/open grade
   AC/HG: Asphalt concrete/hydraulic grade



F AC PAVEMENT SECTION
BAINS PROPERTY



G AC PAVEMENT SECTION
PG&E PROPERTY

0 1 2 Feet

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	6/23/92	Issued for Contractors' proposals					
2	7/27/92	Issued for construction	LEH				
3	9/23/92	Issued for Contractor's proposals					
4	10/27/92	Issued for Construction					
5	6/93	As constructed					

Approval:

Date:

GEOMATRIX

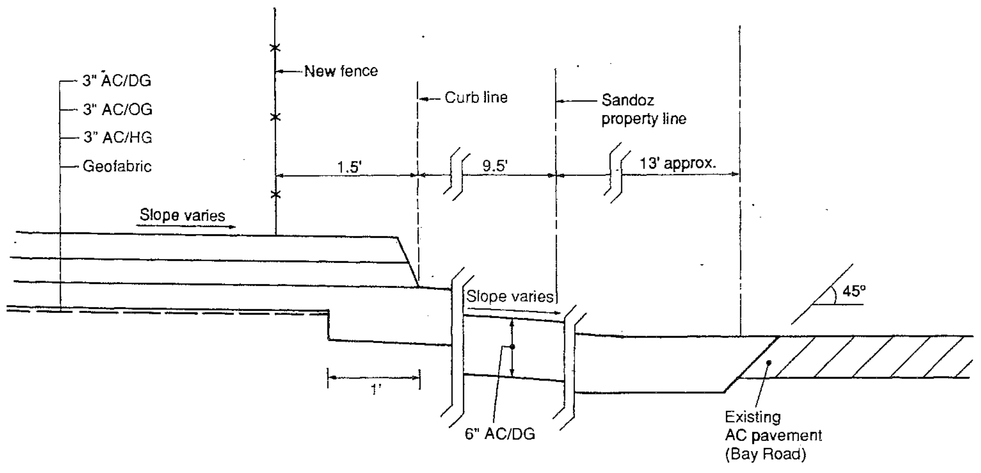
Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

Prepared for:

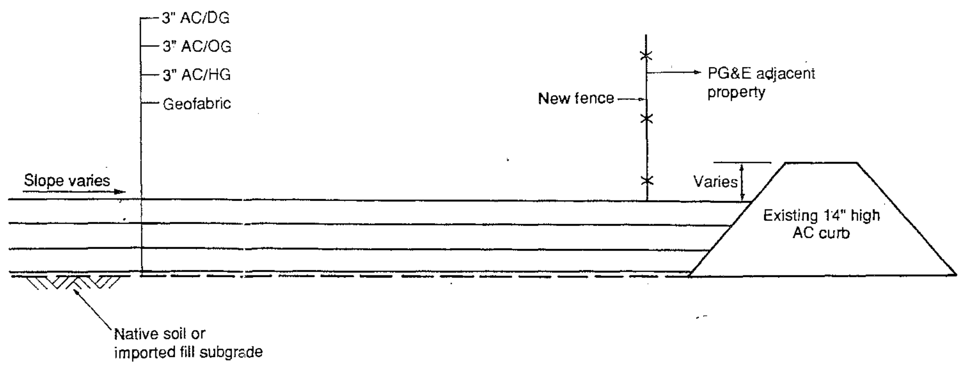
Rhône-Poulenc Inc.

PAVEMENT DETAILS
(2 of 3)
Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.
P-5
Drawing

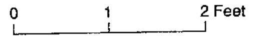


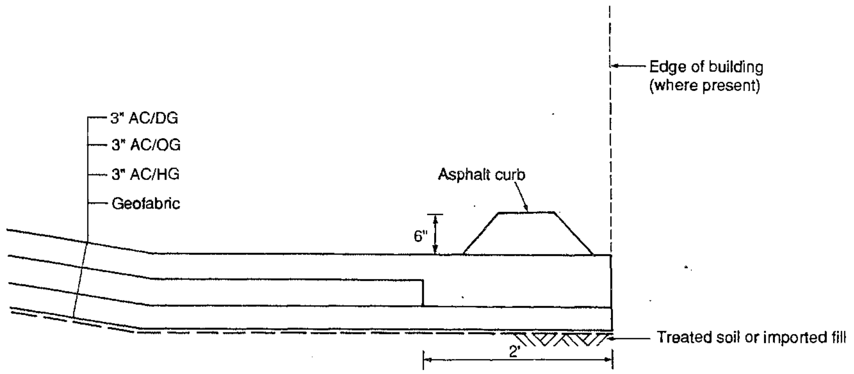
H
AC PAVEMENT SECTION
NORTH AREA AND PG&E



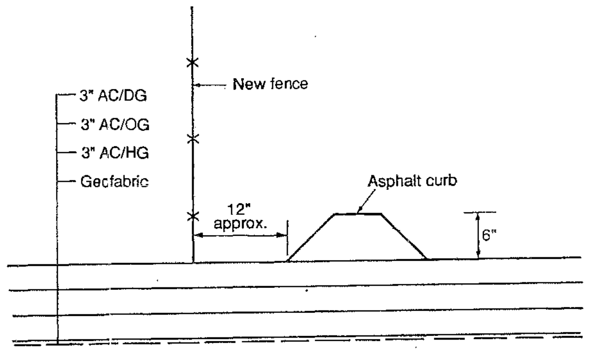
I
AC PAVEMENT SECTION
PG&E PROPERTY

Note
1. AC/DG: Asphalt concrete/dense grade
AC/OG: Asphalt concrete/open grade
AC/HG: Asphalt concrete/hydraulic grade

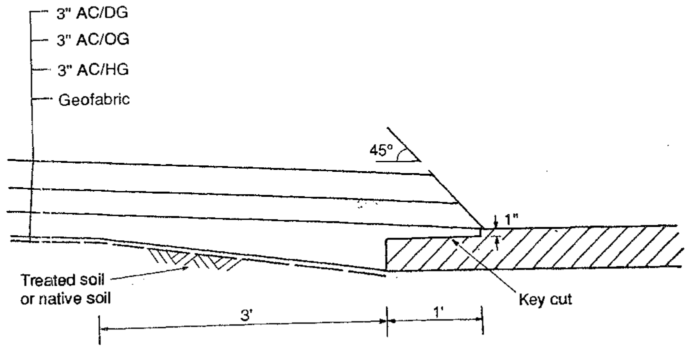




J
PAVEMENT AND CURB DETAIL
NORTH AREA



K
CURB DETAIL
NORTH AREA



L
AC PAVEMENT SECTION
NORTH AREA

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
0	5/1/92	Issued for Agency review					
1	9/23/92	Issued for Contractor's proposals					
2	10/27/92	Issued for Construction					
3	6/93	As constructed					

Approval:

Date:

GEOMATRIX

Geomatrix Consultants, Inc.
100 Pine Street, 10th Floor
San Francisco, California

Prepared for:

Rhône-Poulenc Inc.

PAVEMENT DETAILS
(3 of 3)
Upland Operable Unit Remedial Action
1990 Bay Road Site
East Palo Alto, California

1220F
Project No.

P-6
Drawing

COPY

93216751

RECORDED AT REQUEST OF

Dec 13 2 26 PM '93

SAN MATEO COUNTY
OFFICIAL RECORDS

RECORDER'S OFFICE COUNTY OF SAN MATEO

RF	26
CD	
LM	
	1
AF	24
IC	23
FD	14

COVENANT OF DEED RESTRICTION

Recording Requested By:
Melvin Curtaccio
2470 Pulgas
East Palo Alto, California

~~When Recorded, Mail To:~~
Steven Ritchie, Executive Officer
California Regional Water Quality
Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

COVENANT AND AGREEMENT TO RESTRICT USE OF PROPERTY

Melvin Curtaccio
2470 Pulgas
East Palo Alto, California

This Covenant and Agreement to Restrict Use of Property (this "Covenant") is made as of the 26th day of October, 1993 by Melvin Curtaccio, ("Covenantor") who is the Owner of record of that certain property situated in the City of East Palo Alto, County of San Mateo, State of California, which is described in Exhibit A attached hereto and incorporated herein by this reference (such portion hereinafter referred to as the "Burdened Property"), for the benefit of that certain property situated in the City of East Palo Alto, County of San Mateo, State of California, which is described in Exhibit B attached hereto and incorporated herein by this reference (hereinafter referred to as the "Benefitted Property"), and by the California Regional Water

93216751

Quality Control Board for the San Francisco Bay Region (the "Board") with reference to the following facts:

A. The Burdened Property contains hazardous substances.

B. Description of Facts.

B.1. Contamination of the Burdened Property. Soil and groundwater at the Burdened Property were contaminated by herbicide formulation operations conducted by prior owners of the adjacent property located at 1990 Bay Road, East Palo Alto. These operations resulted in contamination of soil and groundwater with inorganic chemicals including arsenic, lead, cadmium, mercury, and selenium which are believed to have migrated onto the Burdened Property. Contaminated soil containing concentrations of arsenic in excess of 500 parts per million ("ppm") was excavated and removed from the Burdened Property in 1992.

B.2. <u>Exposure Pathways</u>. The contaminants addressed in this Covenant are present in soil and groundwater on the Burdened Property. Without the mitigation measures which have been performed on the Burdened Property, exposure to these contaminants could take place via in-place contact, surface-water runoff, and wind dispersal, resulting in dermal contact, inhalation, or ingestion by humans. The risk of public exposure to the contaminants has been substantially lessened by placement of an impermeable asphalt cap over the buried soils. The purpose of the restrictions on the use of the Burdened Property contained in this Covenant is to eliminate any significant risks to human health and beneficial uses of waters of the State posed by high exposure levels. If exposure pathways are not mitigated, potential human health effects resulting from exposure to arsenic, lead, cadmium, mercury and selenium include birth defects and fetotoxicity; Central Nervous System (CNS) damage including convulsions and permanent brain damage; kidney damage; hepatic injury; blood dysplasia and anemia; and gastro-intestinal disorders.

B.3. Adjacent Land Uses and Population Potentially Affected. The Burdened Property is used for the J & B Wrecking Yard, and is adjacent to other industrial land uses.

C. Full and voluntary disclosure to the Board of the presence of hazardous substances on the Burdened Property has been made and extensive sampling of the Burdened Property has been conducted by a third party.

D. Covenantor desires and intends that in order to benefit the Benefitted Property, and to protect the present and future public health and safety, the Burdened Property shall be used in such a manner as to avoid potential harm to persons or property which may result from hazardous substances which may have been deposited on portions of the Burdened Property.

ARTICLE I

GENERAL PROVISIONS

1.1 Provisions to Run with the Land. This Covenant sets forth protective provisions, covenants, conditions and restrictions (collectively referred to as "Restrictions") upon and subject to which the Burdened Property and every portion thereof shall be improved, held, used, occupied, leased, sold, hypothecated, encumbered, and/or conveyed. Each and all of the Restrictions shall run with the land, and pass with each and every portion of the Burdened Property, and shall apply to, inure to the benefit of, and bind the respective successors in interest thereof, for the benefit of the Benefitted Property, and the successors in interest thereof. Each and all of the Restrictions are imposed upon the entire Burdened Property unless expressly stated as applicable to a specific portion of the Burdened Property. Each and all of the Restrictions are imposed pursuant to Civil Code Section 1468 and Health and Safety Code Section 25356.1 and the Water Code and run with the land pursuant to Health and Safety Code Section 25356.1. All terms, time periods, and provisions not otherwise defined herein shall take the meaning ascribed to them in Health & Safety Code Sections 25233 and 25234 as of the date of this Covenant. Each and all of the Restrictions are enforceable by the Board, and the owner or owners, from time to time, of the Benefitted Property.

1.2 Concurrence of Owners Presumed. All purchasers, lessees, or possessors of any portion of the Burdened Property shall be deemed by their purchase, leasing, or possession of such Burdened Property, to be in accord with the foregoing and to agree for and among themselves, their heirs, successors, and assignees, and the agents, employees, and lessees of such owners, heirs, successors, and assignees, that the Restrictions as herein established must be adhered to for the benefit of the Benefitted Property and the owners and successive owners thereof, and the future Owners and Occupants of the Burdened Property and that the interest of the future Owners and Occupants of the Burdened Property shall be subject to the Restrictions contained herein.

1.3 Incorporation into Deeds and Leases. Covenantor desires and covenants that the Restrictions set out herein shall be incorporated in and attached to each and all deeds and leases of any portion of the Burdened Property. Recordation of this Covenant shall be deemed binding on all successors, assigns, and lessees, regardless of whether a copy of this Covenant and Agreement has been attached to any given deed or lease.

ARTICLE II

DEFINITIONS

2.1 Board. "Board" shall mean the California Regional Water Quality Control Board for the San Francisco Bay Region and shall include its successor agencies, if any.

2.2 Improvements. "Improvements" shall mean all buildings, roads, driveways, regradings, and paved parking areas, constructed or placed upon any portion of the Burdened Property.

2.3 Occupants. "Occupants" shall mean Owners and those persons entitled by ownership, leasehold, or other legal relationship to the exclusive right to occupy any portion of the Burdened Property.

2.4 Owner or Owners. "Owner" or "Owners" shall mean the Covenantor and/or its successors in interest, who hold title to all or any portion of the Burdened Property.

ARTICLE III

DEVELOPMENT, USE AND CONVEYANCE OF THE Burdened Property

3.1 Restrictions on Development and Use. Covenantor promises to restrict the use of the Burdened Property as follows:

a. Development of the Burdened Property shall be restricted to industrial, commercial or office space;

b. No residence for human habitation shall be permitted on the Burdened Property;

c. No hospitals shall be permitted on the Burdened Property;

d. No schools for persons under 21 years of age shall be permitted on the Burdened Property;

e. No day care centers for children or day care centers for Senior Citizens shall be permitted on the Burdened Property;

f. The Burdened Property shall be posted with a bilingual sign in English and Spanish warning against undertaking of any excavation activities on the Burdened Property, and that the Owner and the Board should be contacted for further information;

g. Any contaminated soils brought to the surface by grading, excavation, trenching, or backfilling shall be managed by Covenantor or his agent in accordance with all applicable provisions of state and federal law;

h. All uses and development of the Burdened Property shall be consistent with the Record of Decision issued by the U.S. Environmental Protection Agency, and shall preserve the integrity of any cap, any remedial measures taken or remedial equipment installed, and the groundwater monitoring system installed on the Burdened Property pursuant to the requirements of the Board, unless otherwise expressly permitted in writing by the Board.

i. The Owner shall notify the Board of each of the following: (1) The type, cause, location and date of any disturbance to any cap, any remedial measures taken or remedial equipment installed, and of the groundwater monitoring system installed on the Burdened Property pursuant to the requirements of the Board, which could affect the ability of such cap or remedial measures, remedial equipment, or monitoring system to perform their respective functions and (2) the type and date of repair of such disturbance. Notification to the Board shall be made by registered mail within ten (10) working days of both the discovery of such disturbance and the completion of repairs;

j. The Covenantor agrees that the Board, and/or any persons acting pursuant to Board orders, shall have access to the Burdened Property for the purposes of inspection, surveillance, maintenance, or monitoring, as provided for in Chapter 4 of Division 7 of the Water Code.

k. No Owners or Occupants of the Burdened Property or any portion thereof shall drill, bore, excavate or otherwise construct any well, boring or excavation on or into the Burdened Property for any purpose, except that it shall be permissible to construct wells, borings, or excavations which are (i) required by or reasonably necessary to implement a plan for remediation of groundwater contamination approved by the Board, or (ii) specifically approved in a written decision by the Board or the San Mateo County Department of Health Services. All borings and excavations shall be performed and all wells constructed in conformance with the standards of the San Mateo County Department of Health Services, and shall incorporate practicable efforts to minimize: (a) any significant threat to humans and animals and (b) any significant transfer of contaminants from the lithosphere to the atmosphere or between water-bearing, or potentially water-bearing, soil or rock zones.

3.2 <u>Conveyance of Burdened Property</u>. The Owner or Owners shall provide thirty (30) days advance notice to the Board and the owner or owners, from time to time, of the Benefitted Property, of any sale, lease, or other conveyance of the Burdened Property or an interest in the Burdened Property to a third person. Neither the Board nor the owner or owners, from time to time, of the Benefitted Property shall, by reason of the Covenant, have authority to approve, disapprove, or otherwise affect any sale, lease, or other conveyance of the Burdened

Property except as otherwise provided by law or by reason of this Covenant.

3.3 Enforcement. Failure of the Owner to comply with any of the restrictions, as set forth in paragraph 3.1, shall be grounds for the Board or the owner or owners, from time to time, of the Benefitted Property, by reason of this Covenant, to have the authority to require that the Owner modify or remove any Improvements constructed in violation of that paragraph. Violation of the Covenant shall be grounds for the Board, or the owner or owners, from time to time, of the Benefitted Property, to file civil actions against the Owner as provided by law.

3.4 Notice in Agreements. All Owners and Occupants shall execute a written instrument which shall accompany all purchase, lease, sublease, or rental agreements relating to the Burdened Property. The instrument shall contain the following statement: "The land described herein contains hazardous substances. Such condition renders the land and the owner, lessee, or other possessor of the land subject to requirements, restrictions, provisions and liabilities of Division 7 of the California Water Code and Chapters 6.5 and 6.8 of Division 20 of the California Health and Safety Code, and their successor provisions. This statement is not a declaration that a hazard exists."

ARTICLE IV

VARIANCE AND TERMINATION

4.1 Variance. Any Owner or, with the Owner's consent, any Occupant of the Burdened Property or any portion thereof may apply to the Board for a written variance from the provisions of this Covenant, after having obtained the prior written consent of the owner or owners, from time to time, of the Benefitted Property.

4.2 Termination. Any Owner or, with the Owner's consent, any Occupant of the Burdened Property or a portion thereof may apply to the Board for a termination of the Restrictions as they apply to all or any portion of the Burdened Property, after having obtained the prior written consent of the owner or owners, from time to time, of the Benefitted Property.

4.3 Term. Unless terminated in accordance with paragraph 4.2 above, by law or otherwise, this Covenant shall continue in effect in perpetuity.

ARTICLE V

MISCELLANEOUS

5.1 No Dedication Intended. Nothing set forth herein shall be construed to be a gift or dedication, or offer of a gift or dedication, of the Burdened Property or any portion thereof to the general public.

5.2 Notices. Whenever any person gives or serves any notice, demand, or other communication with respect to this Covenant, each such notice, demand, or other communication shall be in writing and shall be deemed effective (1) when delivered, if personally delivered to the person being served or official of a government agency being served, or (2) three (3) business days after deposit in the mail if mailed by United States mail, postage paid certified, return receipt requested:

If To: "Covenantor"

Melvin Curtaccio
1925 Bay Road
East Palo Alto, California 94303

and

Pamela Kurtz, Esq.
Courthouse Plaza
260 Sheridan Avenue
Suite 302
Palo Alto, California 94306

If To: "Board"

Regional Water Quality Control Board
San Francisco Bay Region
Attention: East Palo Alto Protection Officer
2101 Webster Street
Oakland, California 94612

If To: Owner or Owners of the Benefitted Property:

Sandoz Agro, Inc.
Attention: Robin DeMuth, Esq.
General Counsel
1300 East Touhy Avenue
Des Plaines, Illinois 60018

and

Anthony O. Garvin, Esq.
Brobeck, Phleger & Harrison
Spear Street Tower - 23rd Floor
One Market Plaza
San Francisco, California 94105

If notice is not initiated by the Covenantor or by the Board, copies of such notice shall be sent, in accordance with instructions of this paragraph, to both the Covenantor and the

Board. Copies of all notices, regardless of the identity of the party initiating such notice, shall also be sent to:

General Counsel
Rhone-Poulenc Inc.
Black Horse Lane
Monmouth Junction, N.J. 08852 and to

and

W. Reece Bader, Esq.
Orrick, Herrington & Sutcliffe
400 Sansome Street
San Francisco, CA 94111-3143

5.3 Partial Invalidity. If any portion of the Restrictions or terms set forth herein is determined to be invalid for any reason, the remaining portion shall remain in full force and effect as if such portion had not been included herein.

5.4 Article Headings. Headings at the beginning of each numbered article of this Covenant are solely for the convenience of the parties and are not a part of the Covenant.

5.5 Recordation. This instrument shall be executed by the Covenantor, the Owner of the Burdened Property, and by the Executive Officer of the Board. This instrument shall be recorded by the Covenantor in the County of San Mateo within ten (10) days of the date of execution.

///

///

///

///

5.6 References. All references to Code sections include successor provisions.

IN WITNESS WHEREOF, the parties executa this Covenant as of the date set forth above.

Covenantor: Melvin Curtaccio

By: ____________________

Date: ____________________

Owner of the Benefitted Property: Sandoz Agro, Inc.

By: ____________________

Title: ____________________

Date: ____________________

Agency: State of California
Environmental Protection Agency
Regional Water Quality Board,
San Francisco Bay Region

By: ____________________
Steven Ritchie

Title: Executive Officer

Date: 10/26/93

STATE OF CALIFORNIA)
)
COUNTY OF ALAMEDA)

On October 26, 1993 before me, the undersigned a Notary Public in and for said state, personally appeared Steven Ritchie, personally known to me or proved to me on the basis of satisfactory evidence to be the persons who executed the within instrument as Executive Officer of the Regional Water Quality Control Board for the San Francisco Bay Region, the Agency that executed the within instrument, and acknowledge to me that the such agency executed the same.

WITNESS my hand and official seal.

PAUL C. STEIN
April 11, 1994

Notary Public in and for said County and State

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

32216751

No. 5193

State of California
County of Alameda

On October 26 1993 before me, Paul C. Stein, Notary Public, (NAME, TITLE OF OFFICER - E.G., "JANE DOE, NOTARY PUBLIC")

DATE

personally appeared Steven Ritchie, (NAME(S) OF SIGNER(S))

☐ personally known to me - OR - ☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

OFFICIAL SEAL
PAUL C. STEIN
Notary Public - California
SAN FRANCISCO COUNTY
My Commission Expires
April 11, 1994

WITNESS my hand and official seal.

SIGNATURE OF NOTARY

OPTIONAL SECTION

CAPACITY CLAIMED BY SIGNER

Though statute does not require the Notary to fill in the data below, doing so may prove invaluable to persons relying on the document.

☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLE(S)

☐ PARTNER(S) ☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☒ OTHER: Executive Officer

SIGNER IS REPRESENTING:
NAME OF PERSON(S) OR ENTITY(IES)

State of Calif EPA

OPTIONAL SECTION

THIS CERTIFICATE MUST BE ATTACHED TO THE DOCUMENT DESCRIBED AT RIGHT:

Though the data requested here is not required by law, it could prevent fraudulent reattachment of this form.

TITLE OR TYPE OF DOCUMENT Covenant and Agreement to Restrict Use of Property

NUMBER OF PAGES 22 DATE OF DOCUMENT 10/26/93

SIGNER(S) OTHER THAN NAMED ABOVE —

©1992 NATIONAL NOTARY ASSOCIATION • 8236 Remmet Ave., P.O. Box 7184 • Canoga Park, CA 91309-7184

5.6 __References__. All references to Code sections include successor provisions.

IN WITNESS WHEREOF, the parties execute this Covenant as of the date set forth above.

Covenantor: Melvin Curtaccio
By: Melvin Curtaccio
Date: October 29, 1993

Owner of the
Benefitted Property: Sandoz Agro, Inc.

By:
Title:
Date:

Agency: State of California
Environmental Protection Agency
Regional Water Quality Board,
San Francisco Bay Region

By:
Steven Ritchie
Title: Executive Officer
Date: 10/26/93

STATE OF CALIFORNIA)
)
COUNTY OF ~~SAN MATEO~~ Santa Clara)

On Oct 29, 1993 before me, the undersigned a Notary Public in and for said state, personally appeared Melvin Curtaccio, personally known to me or proved to me on the basis of satisfactory evidence to be the persons who executed the within instrument.

WITNESS my hand and official seal.

Notary Public in and for said
County and State

Franklin Flocks
My Comm. Expires May 21 1995

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

93216751

No. 5193

State of California
County of Santa Clara

On October 24, 1993 before me, Franklin Flocks, Notary Public
DATE — NAME, TITLE OF OFFICER - E.G., "JANE DOE, NOTARY PUBLIC"

personally appeared Melvin Curtaccio.
NAME(S) OF SIGNER(S)

☐ personally known to me - OR - ☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

OFFICIAL SEAL
Franklin Flocks
My Comm. Expires May 21, 1995

WITNESS my hand and official seal.

SIGNATURE OF NOTARY

OPTIONAL SECTION

CAPACITY CLAIMED BY SIGNER

Though statute does not require the Notary to fill in the data below, doing so may prove invaluable to persons relying on the document.

☒ INDIVIDUAL
☐ CORPORATE OFFICER(S)
TITLE(S)
☐ PARTNER(S) ☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER:

SIGNER IS REPRESENTING:
NAME OF PERSON(S) OR ENTITY(IES)

OPTIONAL SECTION

THIS CERTIFICATE MUST BE ATTACHED TO THE DOCUMENT DESCRIBED AT RIGHT:

Though the data requested here is not required by law, it could prevent fraudulent reattachment of this form.

TITLE OR TYPE OF DOCUMENT Covenant of Deed Restriction
NUMBER OF PAGES ______ DATE OF DOCUMENT ______
SIGNER(S) OTHER THAN NAMED ABOVE ______

5.6 <u>References</u>. All references to Code sections include successor provisions.

IN WITNESS WHEREOF, the parties execute this Covenant as of the date set forth above.

Covenantor: Melvin Curtaccio

By: ______________________
Date: ______________________

Owner of the
Benefitted Property: Sandoz Agro, Inc.

By: ______________________
Title: Secretary and General Counsel
Date: November 15, 1993

Agency: State of California
Environmental Protection Agency
Regional Water Quality Board,
San Francisco Bay Region

By: ______________________
Steven Ritchie
Title: Executive Officer
Date: 10/26/93

State of Illinois)
)
County of Cook)

On November 15, 1993 before me, the undersigned a Notary Public in and for said state, personally appeared Robin M. Demouth, personally known to me or proved to me on the basis of satisfactory evidence that he is the Secretary and General Counsel of Sandoz Agro, Inc. and the person who executed the within instrument, and acknowledged to me that he executed the same pursuant to the Sandoz Agro, Inc. bylaws or a resolution of its directors.

WITNESS my hand and official seal.

OFFICIAL SEAL
DENISE T DAIDONE
MY COMMISSION EXPIRES 02/14/97

Denise T. Daidone 11/23/93
Notary Public in and for said County and State

85125-36
6/7/93
THM

LEGAL DESCRIPTION

Being a portion of a parcel of land as conveyed to Melvin Curtaccio by Quitclaim Deed filed July 26, 1989 at Series Number 89097619 in the Office of the Recorder, County of San Mateo, situated in the City of East Palo Alto, County of San Mateo, State of California, being more particularly described as follows:

COMMENCING at a point being in the centerline of Bay Road, distant thereon North 65 deg. 11 min. 00 sec. East, 430.60 feet from the intersection of the centerline of Pulgas Avenue; thence South 24 deg. 49 min. 00 sec. East, 30.00 feet to the Northerly corner of said Curtaccio Parcel and TRUE POINT OF BEGINNING; thence leaving said TRUE POINT OF BEGINNING and the Northerly corner of said Curtaccio Parcel and running along the Northeasterly line of said Curtaccio Parcel South 24 deg. 49 min. 00 sec. East, 212.00 feet to the Easterly corner of said Curtaccio Parcel; thence leaving the Easterly corner of said Curtaccio Parcel and running along the Southeasterly line of said Curtaccio Parcel, South 65 deg. 11 min. 00 sec. West, 100.00 feet; thence leaving the Southeasterly line of said Curtaccio Parcel North 24 deg. 49 min. 00 sec. West, 212.00 feet; to the Southerly right-of-way line of Bay Road; thence running along the Southerly right-of-way line of Bay Road, North 65 deg. 11 min. 00 sec. East, 100.00 feet to the TRUE POINT OF BEGINNING.

Containing 0.487 acres of land, more or less.

The above described parcel is for restricted or conditional use of the parcel and is not intended to create new property lines.

Prepared June 7, 1993 by

MARK THOMAS & CO., INC.

Sam J. Zullo RCE 14392
Registration Expires 3/31/97

85125-36
8/19/93
THM

LEGAL DESCRIPTION

Being all of a parcel of land conveyed to Sandoz Crop Protection Corporation by Grant Deed filed August 7, 1987 at Series Number 87123248 in the Office of the Recorder, County of San Mateo, situated in the City of East Palo Alto, County of San Mateo, State of California, being more particularly described as follows:

BEGINNING at the Northwest corner of said Sandoz Parcel being in the centerline of Bay Road, said point also being distant North 65 deg. 11 min. 00 sec. East 430.60 feet along the centerline of Bay Road from the intersection of Pulgas Avenue; thence North 65 deg. 11 min. 00 sec. East, 430.60 feet to the Northeasterly corner of said Sandoz Parcel; thence running along the Northeasterly line of said Sandoz Parcel South 24 deg. 49 min. 00 sec. East, 525.00 feet to the Easterly corner of said Sandoz Parcel; thence leaving said Easterly corner and running along the Southeasterly line of said Sandoz Parcel South 65 deg. 11 min. 00 sec. West, 430.60 feet to the Southerly corner of said Sandoz Parcel; thence leaving the Southerly corner of said Sandoz Parcel and running along the Southwesterly line of said Sandoz Parcel North 24 deg. 49 min. 00 sec. West, 525.00 to the TRUE POINT OF BEGINNING:

Containing 5.190 acres of land, more or less.

The above described parcel is for restricted and conditional use only, and is not intended to create any new property lines.

Prepared June 7, 1993

MARK THOMAS & CO. INC.

Sam J. Zullo RCE 14392
Registration Expires 3/31/97

ENVIRONMENTAL REVIEW
Pulgas Avenue Commercial Development
Former Bains and Peterson Properties
East Palo Alto, California

Prepared For:

DKB Homes LLC
255 W Julian Street
San Jose, California 95110

Prepared By:

Northgate Environmental Management, Inc.
428 13th Street, 4th Floor
Oakland, California 94612

February 6, 2015

Project No. 1298.01

Environmental Review

Pulgas Avenue Commercial Development
Former Bains and Peterson Properties
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Oakland, California 94612

Dennis Laduzinsky, CEG
Principal

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1.0 SUMMARY

This report presents a summary review of environmental conditions at the Commercial Development portion of the Pulgas Avenue Mixed Use Project in East Palo Alto, California (the Site) performed by Northgate Environmental Management, Inc. (Northgate) for DKB Homes, LLC (DKB). The Site is located along the east side of Pulgas Avenue south of Bay Road, and comprises the former Bains property at 2470 Pulgas Avenue, and the former Peterson property at 1950 Bay Road. The Site consists of about three acres of undeveloped land slated for redevelopment with a 22-unit commercial condominium project. A general Site Plan is shown on Figure 1. The Proposed Redevelopment Plan is shown on Figure 2.

The Pulgas Avenue Mixed Use Project is located within the "Ravenswood Industrial Area," a portion of a designated redevelopment area in the City of East Palo Alto subject to Site Cleanup Requirements Orders 92-037 and 92-086 for the "East Palo Alto Industrial Area" issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB). The East Palo Alto Industrial Area consists of a number of privately owned parcels or properties located in East Palo Alto near the margin of San Francisco Bay historically used for agricultural and industrial purposes that are collectively regulated by the RWQCB for redevelopment.

Our review indicates the Site was used for agriculture until the mid-1960s, and occupied by auto wrecking yards and trucking operations until about 2006. Between 2007 and 2012, additional soil was brought to the Site from the residential development portion of the Pulgas Avenue Mixed Use Project located across Pulgas Avenue to the west, and spread across the Site. The Site currently consists of vacant land, except for an asphalt-paved area on the northeastern portion of the Site that marks a deed-restricted area where arsenic-impacted soils are encapsulated.

The Site is listed on several regulatory agency lists related to the historic use and storage of hazardous materials, and inclusion of the Site within the East Palo Alto Industrial Area. The parcels comprising the Site are variously listed on the California HAZNET database (identifies generators of hazardous wastes), and the San Mateo County Business Inventory database (identifies sites permitted to use or store hazardous materials) related to the former generation of solvents, oil-containing wastes, and motor vehicle fuel wastes by previous Site tenants. The Site is also listed on the RWQCB Spills, Leaks, Investigations, and Cleanup (SLIC) database related to inclusion of the Site within the Pulgas Avenue Mixed Use Project portion of the East Palo Alto Industrial Area. Environmental investigation, cleanup, and redevelopment at the Site is performed under regulatory review and approval of the RWQCB.

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this site from existing Site Cleanup Requirement, Order Nos. 92-037 and 92-086, effectively closing the case.

Should you have any comments or questions, please contact Mark Johnson of my staff at (510) 622-2493, mjohnson@waterboards.ca.gov.

Sincerely,

Bruce H. Wolfe
Executive Officer

cc:

Alvin James, City of EPA, ajames@cityofepa.org
Carlos Martinez, City of EPA, cmartinez@cityofepa.org
Maria Banico, City of EPA, mbanico@cityofepa.org
Debbie Schecter, City of EPA, dschechter@cityofepa.org
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Tom Paulin, SMCDA, tpaulin@co.sanmateo.ca.us
Chuck Walton, DKB Homes, chuckwalton@dkbhomes.com
Patrick Brock, Brock and Co., pppp_94303@yahoo.com

Previous testing performed between 2005 and 2007 indicated the presence of elevated levels of petroleum hydrocarbons and metals in shallow soil in localized areas of the Site. Subsequent investigation resulted in the excavation and removal of soil containing elevated levels of lead from two areas of the Site. The RWQCB approved the completion of these active remedial actions (soil excavation and disposal) on February 28, 2007.

The Site was also found to be impacted by contamination that originates on off-Site adjacent properties, including volatile organic compounds (VOCs) in groundwater thought to originate from an off-Site upgradient source located at 1836 - 1858 Bay Road, and petroleum hydrocarbon compounds in groundwater thought to have originated from the former Peck and O'Connor Property located across Pulgas Avenue to the west. The final Remedial Action Plan (RAP) approved for the Site by the RWQCB requires installation of a vapor barrier system beneath future commercial buildings at the Site and recording a deed restriction on the property memorializing the presence of soil groundwater quality conditions at the Site.

Shallow soil on the northeastern portion of the Site contains elevated levels of arsenic that originated on the StarLink Logistics Property (former Rhone-Poulenc site) located adjacent to the Site on the east. Arsenic-impacted soil has been encapsulated beneath an engineered asphalt cap located on the northeastern portion of the Site as part of a RWQCB-approved mitigation program for the StarLink Logistics site. A deed restriction has already been recorded on this portion of the Site.

The Site is currently subject to RWQCB Site Cleanup Requirements Order 92-086 (which amends Order 92-037) for the East Palo Alto Industrial Area. The Order is the primary document by which the East Palo Alto Industrial Area (a sub-region of the Ravenswood Industrial Area redevelopment area) is regulated by the RWQCB. The RWQCB has issued a letter indicating that the subject Site will be removed from the Orders, effectively closing the case upon completion of remedial activities and the recording of institutional controls (deed restrictions). These additional remedial activities consist of installing vapor barriers and passive venting systems beneath new buildings at the Site and recording deed restrictions to document environmental conditions at the Site, prohibit the use of shallow groundwater, and prohibit modification or damage to the passive venting systems beneath the buildings.

Based on our review, we provide the following recommendations concerning future Site development:

- Our review indicates that excess soil generated during site grading activities at the residential development portion of the Pulgas Avenue Mixed Use Project located across Pulgas Avenue to the west was stockpiled on, and then spread across the subject Site after completion of the active remedial measures approved by the RWQCB. We understand that additional testing performed at the residential development project revealed the presence of organochlorine pesticides in soil not recognized during previous investigations performed at that site. As such, we recommend additional evaluation of shallow soil quality at the subject Site to evaluate the recent fill material, as well provide additional evaluation of the underlying older fill and native soil.

- The most recent groundwater and soil vapor testing for VOCs was performed in 2005. As the approved final Site mitigation activities requires installing vapor barriers and passive venting systems beneath new buildings, you may wish to consider updating groundwater and soil vapor quality information to ensure that appropriate design parameters are incorporated into the vapor mitigation system.
- Our review indicates that a vapor barrier and passive venting system design for the project was approved by the RWQCB in 2007. We recommend that this previous design be reviewed by a qualified engineer to ensure that the system meets current vapor mitigation standards.
- We understand that a Comprehensive Site Management Plan covering management requirements for contamination issues associated with the adjacent StarLink Logistics property was submitted to the RWQCB in April 2014. We recommend that this document be reviewed to evaluate potential impacts to proposed redevelopment at the subject Site as arsenic-impacted soil associated with the StarLink Logistics property is encapsulated on the eastern portion of the former Peterson property, and other deed-restricted properties associated with contamination from the StarLink site border the subject Site on the east and south.

2.0 INTRODUCTION

This report presents the results of an environmental review performed by Northgate at the Commercial Development portion of the Pulgas Avenue Mixed Use Project in East Palo Alto, California. The Site consists of about three acres of undeveloped land. The Site was formerly identified as 2470 Pulgas Avenue (former Bains property) and 1950 Bay Road (former Peterson property). A Site Plan is shown on Figure 1.

The Site is located within a City of East Palo Alto redevelopment area called the Ravenswood Industrial Area, a collection of properties with known or suspected environmental impairments subject to Site Cleanup Requirements Orders 92-037 and 92-086 issued by the San Francisco Bay RWQCB. Proposed redevelopment plans for the Site consist of constructing a new commercial condominium project.

2.1 Purpose

The purpose of this investigation has been to review and update current environmental conditions at the former Bains and Peterson Properties located at 2470 Pulgas Avenue and 1950 Bay Road in East Palo Alto, California to develop a current understanding of Site conditions following Site cleanup actions performed in 2006. Information collected during the investigation was used to evaluate the potential need for additional soil, groundwater, and soil vapor sampling that may be necessary to more fully document potential remedial actions and costs associates with developing the Site for commercial land use. It is understood that DKB intends to develop the Site with an industrial condominium project.

2.2 Detailed Scope of Services

This investigation included the following services:

- Review of readily available information regarding the history of the subject Site, previous environmental investigation reports, and discussions with individuals familiar with the subject Site, as available;
- Review of readily available regulatory agency publications and files, and discussions with regulatory officials, as applicable;
- Updating regional environmental conditions at nearby contaminated sites;
- Development of conclusions, and recommendations, as appropriate; and
- Preparing this report.

2.3 Limitations and Exceptions

The purpose of an environmental review is to reasonably evaluate the potential for, or actual impact of, past practices on a given site. In performing an environmental assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. No investigation is thorough enough to absolutely rule out the presence of hazardous materials at a given site. If hazardous conditions have not been identified during the assessment, such a finding should not be construed as a guarantee of the absence of such materials on the Site, but rather, as the result of the services performed within the scope, limitations, and cost of the work performed. Environmental conditions may exist at the subject Site that cannot be identified by visual observation. Where subsurface work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

Except where there is express concern of our client, or where specific environmental contaminants have been previously reported by others, naturally occurring toxic substances, potential environmental contaminants inside buildings, or contaminant concentrations that are not of current environmental concern may not be reflected in this document.

Where the scope of services is limited to interview and/or review of readily available reports and literature, any conclusions and/or recommendations are necessarily based largely on information supplied by others, the accuracy or sufficiency of which may not be independently reviewed by Northgate.

Any opinions and/or recommendations presented apply to subject Site conditions existing at the time of performance of services. We are unable to report on, or accurately predict, generally unforeseeable events that may impact the subject Site following the performance of services, whether occurring naturally or caused by external forces. Therefore, we cannot assume responsibility for such events or their impact. We also cannot assume responsibility for changes in environmental standards, practices, or regulations.

2.4 User Reliance

Northgate has prepared this report for the exclusive use of DKB and its partners and lenders in assessing environmental impacts related to purchasing and redeveloping the Site. Others may not rely on the information contained in this report without the express written consent of Northgate.

3.0 SITE DESCRIPTION

3.1 Location and Legal Description

The Site currently consists of six individual parcels identified as Assessor's Parcel Numbers (APNs) 063-240-210, 220, 320, 330, 350, and 440 in San Mateo County, California. Recent street addresses for the Site include 2470 Pulgas Avenue and 1950 Bay Road in East Palo Alto.

3.2 Site and Vicinity General Characteristics

The Site currently consists of undeveloped vacant land with an asphalt-paved area on the northeastern portion of the Site. The Site is located in an area of mixed residential, commercial, and industrial land use.

3.3 Geology and Groundwater

Geologic mapping by Dibblee (1966) indicates that the Site is underlain by alluvial deposits of Quaternary age. These deposits consist of stream-laid gravel, sand, and silt up to 200 feet thick (Dibblee, 1966). Borings previously advanced at the Site for geotechnical engineering studies encountered alternating layers of clay and sand with clay to the maximum depth explored of about 50 feet (Lowney Associates, 2004a).

Groundwater has been variously encountered at depths of 7 to 10 feet below the ground surface (bgs) in borings advanced at the Site (Lowney Associates, 2005a). Regional studies (Papadopoulos, 2014) indicate that the general Site area is underlain by two distinct water-bearing zones: a shallow zone that occurs from a depth of about 5 to 40 feet bgs and a deep aquifer zone present below a depth of about 160 feet bgs. The shallow zone reportedly consists of interbedded silts, clayey silts, and sand lenses, with a relatively continuous sand lens encountered at a depth of about 5 to 15 feet, and a second relatively continuous sand lens encountered at a depth of about 20 to 35 feet. The depth interval from about 5 to 15 feet bgs is referred to as the upper shallow groundwater zone, and the depth interval from about 20 to 35 feet bgs is referred to as the lower shallow groundwater zone. On a regional basis, groundwater in the shallow zone generally flows toward the southeast (Papadopoulos, 2014). Due to high salinity, groundwater beneath the Site is not considered to be a drinking water source (Papadopoulos, 2014).

According to the US Geologic Survey Topographic Map of the Palo Alto Quadrangle, the Site is situated at an elevation of approximately 12 – 15 feet above sea level. On a regional basis, surface topography slopes down to the southeast.

3.4 Current Use of the Property

The subject Site consists of undeveloped vacant land.

3.5 Description of Structures, Roads, Sewage, and Potable Water Sources

There are no structures on the Site. Asphalt pavement is present in the northeastern portion of the Site. It is understood that the proposed new development will be supplied by local municipal sewer and water service.

3.6 Current Uses of Adjoining Properties

The Site is bordered on the north by Bay Road, across which are commercial and industrial development. The Site is bordered on the east and south by commercial and industrial development. The Site is bordered on the west by Pulgas Avenue, across which are commercial properties and vacant land slated for new residential development.

4.0 REGULATORY STATUS

The subject Site is listed on several regulatory agency lists related to the historic use and storage of hazardous materials, and inclusion of the Site within the East Palo Alto Industrial Area. There are three historic listings for the Site as 2470 Pulgas Avenue under the CA HAZNET database related to the storage of petroleum products, latex waste, and unspecified-oil-containing waste, and the generation and storage of waste oils, and oxygenated solvents, including acetone, butanol, and ethyl acetate. The Site is also listed on the CA San Mateo County Business Inventory database as El Aguacate, AA Auto Repair, and B&G Workshop related to the former storage of fuels and waste oils.

The Site is also listed on the CA SLIC database as "Pulgas and Bay" related to inclusion of the Site within the Pulgas Avenue Mixed Use Project portion of the East Palo Alto Industrial Area. Environmental investigation and cleanup at the Site are performed under regulatory authority of the RWQCB. The Site is currently subject to RWQCB Site Cleanup Requirements Order 92-086 (which amends Order 92-037) for the East Palo Alto Industrial Area. The Order is intended to be the primary document by which the East Palo Alto Industrial Area (a sub-region of the Ravenswood Industrial Area) will be regulated by the RWQCB.

Copies of RWQCB Site Cleanup Requirements Order 92-037, Order 92-086, and other RWQCB correspondence related to environmental conditions at the Site, including a Fact Sheet prepared for the Site and the proposed residential development portion of the Pulgas Mixed-Use Project in 2006, are attached in Appendix A. Details of the environmental investigation and cleanup work previously performed at the Site, as presented in previous reports, are summarized in the following Section.

5.0 PREVIOUS REPORTS

Northgate reviewed a number of environmental investigation and remediation reports prepared for the Site between 2004 and 2007 by Lowney Associates and its successor company TRC Lowney. These reports also contain reference to earlier investigations at the Site and adjacent areas by others that were not available for review. Summaries of the pertinent reports prepared by Lowney and TRC Lowney are presented below.

5.1 Phase I Environmental Site Assessment, 2470, 2477, 2485 Pulgas Avenue and 1950 Bay Road, East Palo Alto, California. Lowney Associates, June 24, 2004

Lowney Associates prepared a Phase I Environmental Site Assessment (ESA) for the Site and a proposed residential development area located across Pulgas Avenue to the west for Byrd Development Consulting LLC (Lowney, 2004b). A copy of the report text and figures is attached in Appendix B. The report indicates that at that time, the Bains property at 2470 Pulgas Avenue was an undeveloped lot used by Bains Moving & Storage for truck and trailer parking. Two groundwater monitoring wells associated with investigation of contamination at the adjacent property to the east were present on the northeast corner of the Site. The property was bordered along the south by a paved asphalt strip that marked a portion of a former railroad easement where arsenic-impacted soil had been encapsulated under regulatory review and approval.

The Peterson property at 1950 Bay Road consisted of an undeveloped dirt lot used for truck and trailer parking, with some automotive maintenance and repair performed on Site. An asphalt-paved area on the eastern end of the property covers an area where the underlying soil contains elevated levels of arsenic (> 70 parts per million, or ppm) originating from historic releases on the former Rhone-Poulenc property located adjacent to the Site on the east, at 1990 Bay Road.

Lowney’s Site history review indicates that the Site was undeveloped land possibly used for row crops or other agriculture from at least the 1930s through the 1960s. After the 1960s, the Site was occupied by auto wrecking yards (Peterson property, 1960s – 1990s), vacant land (Bains mid-1960s – 1970s), and then truck and trailer parking with some automotive maintenance and repair (Bains from the 1980s, and Peterson after the 1990s).

Regulatory agency file reviews performed by Lowney indicated a number of County Environmental Health Department violations for oil spills, and other hazardous materials and waste storage practices. Chemical storage at the Site during this time included petroleum products, waste oils, solvents, used oil filters, batteries, and other materials. Agency records indicated that about 250 gallons of waste oil and 32 gallons of spent solvent could be generated on an annual basis.

The Lowney report also contains summaries of previous environmental investigations performed at the Site, including a Phase I ESA performed for the entire Ravenswood Industrial Area in 1993 by Erhler and Kalanowski, Inc., and a Phase I and Phase II ESA performed on the Peterson Property in 1998 by Environmental Technical Associates (ETS). Shallow soil testing performed by ETS on the Peterson property reportedly indicated the presence of elevated levels of copper, lead, and zinc, although no specific sample locations were shown.

The Lowney report recommended additional shallow soil sampling at the Peterson property to evaluate potential impacts related to historic auto wrecking operations, and additional sampling for arsenic if residential development will occur on the Site. The report recommended soil sampling on the Bains property to establish baseline conditions prior to any residential development on the Site (at the time of the Lowney report, the Bains property was intended to be residential), with specific additional evaluation of the potential presence of elevated levels of arsenic in shallow soil across the Site. The report also recommended that the two existing monitoring wells on the property be abandoned.

5.2 Soil, Ground Water and Soil Vapor Quality Evaluation, Peck & O'Connor, O'Connor Trust (Formerly Bishop), Bains, Ravenswood Investments, Chang Properties, and Peterson Property, East Palo Alto, California. Lowney Associates, November 18, 2005

Lowney Associates performed soil, soil vapor, and groundwater quality testing on a number of parcels comprising the Pulgas Mixed Use Project portion of the East Palo Alto Industrial Area, for Byrd Development LLC (Lowney, 2005a). The report includes the results of subsurface sampling performed on the Bains and Peterson properties as well as the properties comprising the proposed residential portion of the Pulgas Mixed Use Project located across Pulgas Avenue to the west. The sampling was performed in July 2004, with a report initially submitted in January 2005, and a revised final report issued in November 2005. A copy of the November 2005 report text and figures is attached as Appendix C.

Subsurface investigation on the Bains property consisted of advancing four borings to a maximum depth of 10 feet bgs for collecting soil (3) and groundwater (4) samples, advancing two additional borings to a depth of 2 feet bgs adjacent to the asphalt-capped arsenic encapsulation area bordering the property to the south, collecting 15 additional shallow soil samples from 10 locations to evaluate overall shallow soil quality across the Site, and collecting four soil vapor samples from a depth of 5 feet bgs.

The report states that one of eight shallow soil samples analyzed for organochlorine pesticides contained dieldrin at 0.34 ppm, which exceeds the Environmental Screening Level (ESL) for dieldrin in commercial land use of 0.13 ppm, established by the RWQCB. Metals were found to be within the range of naturally occurring background with the exception of one sample that contained arsenic at 23 ppm. The shallow soil samples contained petroleum hydrocarbons as diesel at concentrations of 1.8 to 38 ppm, and petroleum hydrocarbons as oil at less than 50 to 840 ppm.

Groundwater samples collected at the Site contained low levels of petroleum hydrocarbons as gasoline (83 parts per billion, or ppb) and diesel (84 ppb), along with other VOCs including trichloroethene (TCE) (up to 8 ppb), 1,1-dichloroethane (1,1-DCA) (up to 0.75 ppb), cis-1,2-dichloroethene (cis-1,2-DCE) (up to 0.89 ppb) and methyl-tert-butyl-ethylene (MTBE) (up to 9.1 ppb). The 8 ppb of TCE exceeds the state drinking water standard (the maximum contaminant level, or MCL) of 5 ppb. No VOCs were present above ESLs developed for evaluating potential impacts to indoor air quality in commercial land use. The groundwater samples also contained a variety of metals. However, the report indicates that the samples were not filtered prior to analysis, and the results may not be representative of actual Site conditions.

Soil vapor samples collected at the Site contained a variety of VOCs including, acetone (up to 54 micrograms per cubic meter, or $\mu g/m^3$), benzene (up to 26 $\mu g/m^3$), TCE (up to 96 $\mu g/m^3$), tetrachloroethene (PCE) (up to 4,400 $\mu g/m^3$), and others. According to the report, only the 4,400 $\mu g/m^3$ of PCE measured in the southern portion of the property exceeds RWQCB ESLs for potential indoor air quality impacts in commercial land use.

Based on the testing, the report concludes and recommends:

1. The arsenic-impacted soil encapsulated along the former rail spur bordering the Site on the south does not appear to impact the Site.
2. Due to the presence of dieldrin reported in one soil sample above commercial land use ESLs, a human health risk assessment should be performed.
3. The report indicates that a deed restriction may be necessary to document the localized presence of pesticides, arsenic, and petroleum hydrocarbons in shallow soil.
4. The report concludes that shallow groundwater beneath the Site is impacted by petroleum hydrocarbons and VOCs originating from off-Site sources. The report recommends analyzing filtered groundwater samples for metals.
5. The report concludes that soil vapor samples collected at the Site are below the ESLs for potential impacts to indoor air in commercial land use, with the exception of the 4,400 $\mu g/m^3$ of PCE measured in a sample collected from the southern portion of the Site.

> The report recommends installing a vapor barrier beneath new buildings constructed at the Site.

Subsurface investigation of the Peterson property included advancing four boring for collecting groundwater samples, advancing three borings for soil sampling adjacent to the arsenic-impacted soil encapsulation area located on the eastern portion of the Site, collecting six random shallow soil samples to evaluate surficial soil quality, collecting one composite sample from a soil stockpile on the property, and collecting four soil vapor samples at a depth of five feet bgs.

The report indicates that soil samples collected in the original native soil beneath the overlying fill soil did not contain organochlorine pesticide compounds and that metals were representative of naturally occurring background levels. Testing of the surficial fill soil (approximately 0 - 2.5 feet bgs) indicated the presence of localized areas of elevated lead (individual samples at 190 and 35,000 ppm) and petroleum hydrocarbons as diesel (160 - 3,500 ppm) and oil (990 - 9,400 ppm).

Test results from three borings (with soil samples at 0 - 0.5 and 1 - 1.5 feet bgs) advanced along the margin of the asphalt paving area on the eastern portion of the Site contained arsenic at 1.8 to 7.7 ppm and lead at 2.3 to 97 ppm, indicating that the arsenic-impacted soil encapsulation area does not appear to extend beyond the boundary of the asphalt cap.

Groundwater samples collected at the Site contained TCE (2.2 - 3.4 ppb), PCE (one sample at 1.6 ppb), cis-1,2-DCE (three samples at 0.8 ppb), and MTBE at 7.8 - 29 ppb). Total petroleum hydrocarbons as diesel were reported in the groundwater samples at concentrations of 750 - 4,200 ppb, and hydrocarbons as gasoline were reported at concentrations of 54 and 100 ppb. Soil vapor samples collected at the Site contained benzene (3.4 - 20 $\mu g/m^3$), PCE (one sample at 33 $\mu g/m^3$), TCE (two samples at 8.5 $\mu g/m^3$), and vinyl chloride (one at 5.9 $\mu g/m^3$).

Based on the testing, the report concludes or recommends:

1. The Site is covered by 0.25 - 2 feet of fill material that contains local areas of elevated levels of metals or petroleum hydrocarbons. The report concludes that a deed restriction may be required if these soils remain on Site.
2. The native soils underlying the artificial fill do not contain organochlorine pesticides. Metals were present at concentrations representative of naturally occurring background.
3. Low levels of VOC and petroleum hydrocarbons are present in groundwater beneath the Site. The report concludes that no further action appears necessary, but cautions that additional investigation could be required by local regulatory agencies.

4. Soil vapor samples did not contain VOCs above ESLs indicating potential indoor air quality impacts in commercial land use; however, the developer should still consider installing a vapor barrier system beneath new buildings constructed at the Site.

5.3 Remedial Action Plan and Workplan for Initial Phases of Remediation, Pulgas Mixed Use Project, East Palo Alto, California. TRC Lowney, September 7, 2006

In 2006, TRC Lowney (successor company to Lowney Associates) prepared a RAP outlining proposed remediation measures for several properties associated with the Pulgas Avenue Mixed Use Project, including the subject Site, on behalf of Byrd Development LLC (TRC Lowney, 2006a). A copy of the RAP is attached as Appendix D.

The RAP summarizes the results of a Health Risk Assessment (HRA) performed for the subject Site (Lowney Associates, 2005b) that concluded that VOCs in soil vapor and groundwater at the Site appeared to be the primary concern to human health at the Site. However, the excess cancer risk calculated based on existing conditions at the Site was well within the acceptable US EPA exposure range for commercial development. The HRA is attached as Appendix E.

The RAP outlined the following remedial actions and recommendations for the Site:

1. New buildings at the Site should include a vapor barrier and passive venting system to mitigate potential indoor air quality impacts related to the presence of VOCs in soil vapor and groundwater. A specific design should be submitted to the RWQCB for review and approval.
2. Areas of elevated levels of metals and pesticides identified on the Bains property should be capped by concrete, asphalt, or planter areas as a mitigation measure.
3. Soil on areas of the Peterson property containing lead above hazardous waste thresholds should be excavated and removed from the Site.
4. Additional soil sampling should be performed on the Peterson property to further identify the possible presence of contaminants in the shallow fill and underlying native soils.
5. Other areas of the Peterson property containing elevated concentrations of metals should be capped with concrete, asphalt, or landscape.
6. A deed restriction and associated risk-management plan is required for redevelopment of the Site. The deed restriction should document existing environmental conditions at the Site, and prohibit disturbance of the cap on the Site and prohibit use of shallow groundwater at the Site.
7. A Site Management Plan (SMP) should be required to established management practices for handling impacted soil that may be encountered during Site redevelopment.

The RAP was approved by the RWQCB on September 13, 2006 (RWQCB, 2006). A copy of the approval letter is attached in Appendix A.

5.4 Draft Completion Report for Active Remedial Measures, Pulgas Avenue Mixed-Use Development, East Palo Alto, California. TRC Lowney, January 18, 2007

TRC Lowney prepared a Completion Report for active remedial measures at the Site in January 2007 on behalf of DKB Homes, LLC (TRC Lowney, 2007). The report describes additional subsurface investigation performed on the Peterson property to better define specific areas of potential impact, and the remedial actions implemented to mitigate those impacts. A copy of the report is attached as Appendix F. Additional investigation work performed on the Peterson property included advancing 12 additional borings to 3 feet bgs to collect samples of the surficial fill soil (0 - 2 feet bgs) and the underlying native soil (2 - 3 feet bgs). Twenty four soil samples were analyzed for petroleum hydrocarbons as gasoline, diesel, and oil; purgeable aromatic compounds (benzene, toluene, ethylbenzene, and xylenes, or BTEX); MTBE; and metals.

The samples contained low levels of petroleum hydrocarbons as diesel (up to 11.7 ppm) and oil (up to 710 ppm), but did not contain hydrocarbons as gasoline, BTEX, or MTBE with the exception of one sample that contained a low level (0.15 ppm) of gasoline. The report indicates that all measured concentrations of hydrocarbons were below RWQCB ESLs for residential and commercial land use.

Metals were reported to be within the range of naturally occurring background concentrations with the exception of one sample that contained lead at 250 ppm. Approximately 234 tons of lead-impacted soil were excavated to a depth of 2 feet bgs from two areas of the Site where testing had indicated the presence of elevated lead. These soils were removed from the Site. Confirmation soil samples collected around the excavation perimeter and base contained lead at 6 to 11 ppm.

The report concludes that no further remedial actions appear required. The report states that risk management measures such as the planned vapor barrier and passive venting system and property deed restrictions described in the approved RAP will be addressed in a separate report.

The partial completion report for remedial action was approved by the RWQCB on February 28, 2007 (RWQCB, 2007). The RWQCB's approval letter indicates that Site redevelopment and grading must adhere to the October 27, 2006 SMP (TRC Lowney, 2006b). A copy of the SMP is attached as Appendix G. The RWQCB letter states that once all components of the remedy are submitted and approved, including recording deed restrictions covering institutional controls (i.e., vapor mitigation systems and prohibition of shallow groundwater use), the RWQCB will remove the Site from existing Site Cleanup Requirement, Order 92-086 (and its predecessor Order 92-037), effectively closing the case. A copy of the RWQCB approval letter is attached in Appendix A.

5.5 Vapor Barrier and Passive Venting System Design Report, Pulgas Mixed Use Project, Commercial, East Palo Alto, California. TRC, August 6, 2007

TRC prepared a design report presenting drawings and specifications for the vapor barrier and passive venting system to be installed beneath buildings on the commercial development portion of the Pulgas Mixed Use Project (TRC, 2007). A copy of the design document is attached as Appendix H. In general, the vapor barrier consists of a fluid-applied asphaltic emulsion known as Liquid Boot. The passive venting system consists of a low-profile pressure relief, collection and venting system. The RWQCB approved the system design on July 18, 2007, although it should be noted that the RWQCB approval letter references a June 1, 2007 vapor barrier and passive venting system design report. The RWQCB letter is attached in Appendix A.

5.6 Soil and Asphalt Management Plan, Byrd Business Center Project (1950 Bay Road), 1990 Bay Road Site , East Palo Alto, California, March 31, 2008

On March 31, 2008 DKB Homes submitted a letter to the RWQCB summarizing proposed construction activities in the capped arsenic-impacted soil encapsulation on the northeastern portion of the Site (DKB, 2008). A copy of the letter, along with RWQCB approval of the letter is attached as Appendix I.

5.7 Comprehensive Site Management Plan, StarLink Logistics Site, April 2014

We understand that a Comprehensive Site Management Plan outlining requirements for handling and managing residual contamination associated with the StarLink Logistics site located adjacent to the Peterson property on the east, was submitted to the RWQCB in April 2014 by consultants for StarLink Logistics. Northgate was not able to obtain a copy of this document for review during the time this report was prepared. However, information in the document could potentially impact redevelopment activities at the subject Site, as arsenic-impacted soil associated with the StarLink site has been encapsulated in a deed-restricted portion of the former Peterson property, and other deed-restricted areas associated with contamination from the StarLink site border the former Bains property on the east and south.

6.0 ENVIRONMENTAL REVIEW CONCLUSIONS AND RECOMMENDATIONS

This report presents a summary review of environmental conditions at the Commercial Development portion of the Pulgas Avenue Mixed Use Project in East Palo Alto, California. The Site is located along the east side of Pulgas Avenue south of Bay Road, and comprises the former Bains property at 2470 Pulgas Avenue, and the former Peterson property at 1950 Bay Road. The Site consists of about three acres of undeveloped land slated for redevelopment with a 22-unit commercial condominium project.

The Pulgas Avenue Mixed Use Project is located within the "Ravenswood Industrial Area," a portion of a designated redevelopment area in the City of East Palo Alto subject to Site Cleanup Requirements Orders 92-037 and 92-086 for the "East Palo Alto Industrial Area" issued by the RWQCB. The East Palo Alto Industrial Area consists of a number of privately owned parcels or properties located in East Palo Alto near the margin of San Francisco Bay historically used for agricultural and industrial purposes that are collectively regulated by the RWQCB for redevelopment.

Our review indicates the Site was used for agriculture until the mid-1960s, and occupied by auto wrecking yards and trucking operations until about 2006. Between 2007 and 2012, additional soil was brought to the Site from the residential development portion of the Pulgas Avenue Mixed Use Project located across Pulgas Avenue to the west, and spread across the Site. The Site currently consists of vacant land, except for an asphalt-paved area on the northeastern portion of the Site that marks a deed-restricted area where arsenic-impacted soils are encapsulated.

The Site is listed on several regulatory agency lists related to the historic use and storage of hazardous materials, and inclusion of the Site within the East Palo Alto Industrial Area. The parcels comprising the Site are variously listed on the California HAZNET database (identifies generators of hazardous wastes), and the San Mateo County Business Inventory database (identifies sites permitted to use or store hazardous materials) related to the former generation of solvents, oil-containing wastes, and motor vehicle fuel wastes by previous Site tenants. The Site is also listed on the RWQCB SLIC database related to inclusion of the Site within the Pulgas Avenue Mixed Use Project portion of the East Palo Alto Industrial Area. Environmental investigation, cleanup, and redevelopment at the Site is performed under regulatory review and approval of the RWQCB.

Previous testing performed between 2005 and 2007 indicated the presence of elevated levels of petroleum hydrocarbons and metals in shallow soil in localized areas of the Site. Subsequent investigation resulted in the excavation and removal of soil containing elevated levels of lead from two areas of the Site. The RWQCB approved the completion of these active remedial actions (soil excavation and disposal) on February 8, 2007.

The Site was also found to be impacted by contamination that originates on off-Site adjacent properties, including VOCs in groundwater thought to originate from an off-Site upgradient source located at 1836 - 1858 Bay Road, and petroleum hydrocarbon compounds in groundwater thought to have originated from the former Peck and O'Connor Property located across Pulgas Avenue to the west. The final RAP approved for the Site by the RWQCB requires installation of a vapor barrier system beneath future commercial buildings at the Site and recording a deed restriction on the property memorializing the presence of soil groundwater quality conditions at the Site.

Shallow soil on the northeastern portion of the Site contains elevated levels of arsenic that originated on the StarLink Logistics Property (former Rhone-Poulenc site) located adjacent to the Site on the east. Arsenic-impacted soil has been encapsulated beneath an engineered asphalt cap located on the northeastern portion of the Site as part of a RWQCB-approved mitigation program for the StarLink Logistics site. A deed restriction has already been recorded on this portion of the Site.

The Site is currently subject to RWQCB Site Cleanup Requirements Order 92-086 (which amends Order 92-037) for the East Palo Alto Industrial Area. The Order is the primary document by which the East Palo Alto Industrial Area (a sub-region of the Ravenswood Industrial Area redevelopment area) is regulated by the RWQCB. The RWQCB has issued a letter indicating that the subject Site will be removed from the Orders, effectively closing the case upon completion of remedial activities and the recording of institutional controls (deed restrictions). These additional remedial activities consist of installing vapor barriers and passive venting systems beneath new buildings at the Site and recording deed restrictions to document environmental conditions at the Site, prohibit the use of shallow groundwater, and prohibit modification or damage to the passive venting systems beneath the buildings.

Based on our review, we provide the following recommendations concerning future Site development:

- Our review indicates that excess soil generated during site grading activities at the residential development portion of the Pulgas Avenue Mixed Use Project located across Pulgas Avenue to the west was stockpiled on, and then spread across the subject Site after completion of active remedial measures and approval by the RWQCB. We understand that additional testing performed at the residential development project revealed the presence of organochlorine pesticides in soil not recognized during previous investigations performed at that site. As such, we recommend additional evaluation of shallow soil quality at the subject Site to evaluate the recent fill material, as well provide additional evaluation of the underlying older fill and native soil.

- The most recent groundwater and soil vapor testing for VOCs was performed in 2005. As the approved final Site mitigation activities requires installing vapor barriers and passive venting systems beneath new buildings, you may wish to consider updating groundwater and soil vapor quality information to ensure that appropriate design parameters are incorporated into the vapor mitigation system.
- Our review indicates that a vapor barrier and passive venting system design for the project has been submitted to the RWQCB for review and approval. We recommend that this previous design be reviewed by a qualified engineer to ensure that the system meets current vapor mitigation standards.
- We understand that a Comprehensive Site Management Plan covering management requirements for contamination issues associated with the adjacent StarLink Logistics property was submitted to the RWQCB in April 2014. We recommend that this document be reviewed to evaluate potential impacts to proposed redevelopment at the subject Site as arsenic-impacted soil associated with the StarLink Logistics property is encapsulated on the eastern portion of the former Peterson property, and other deed-restricted properties associated with contamination from the StarLink site border the subject Site on the east and south.

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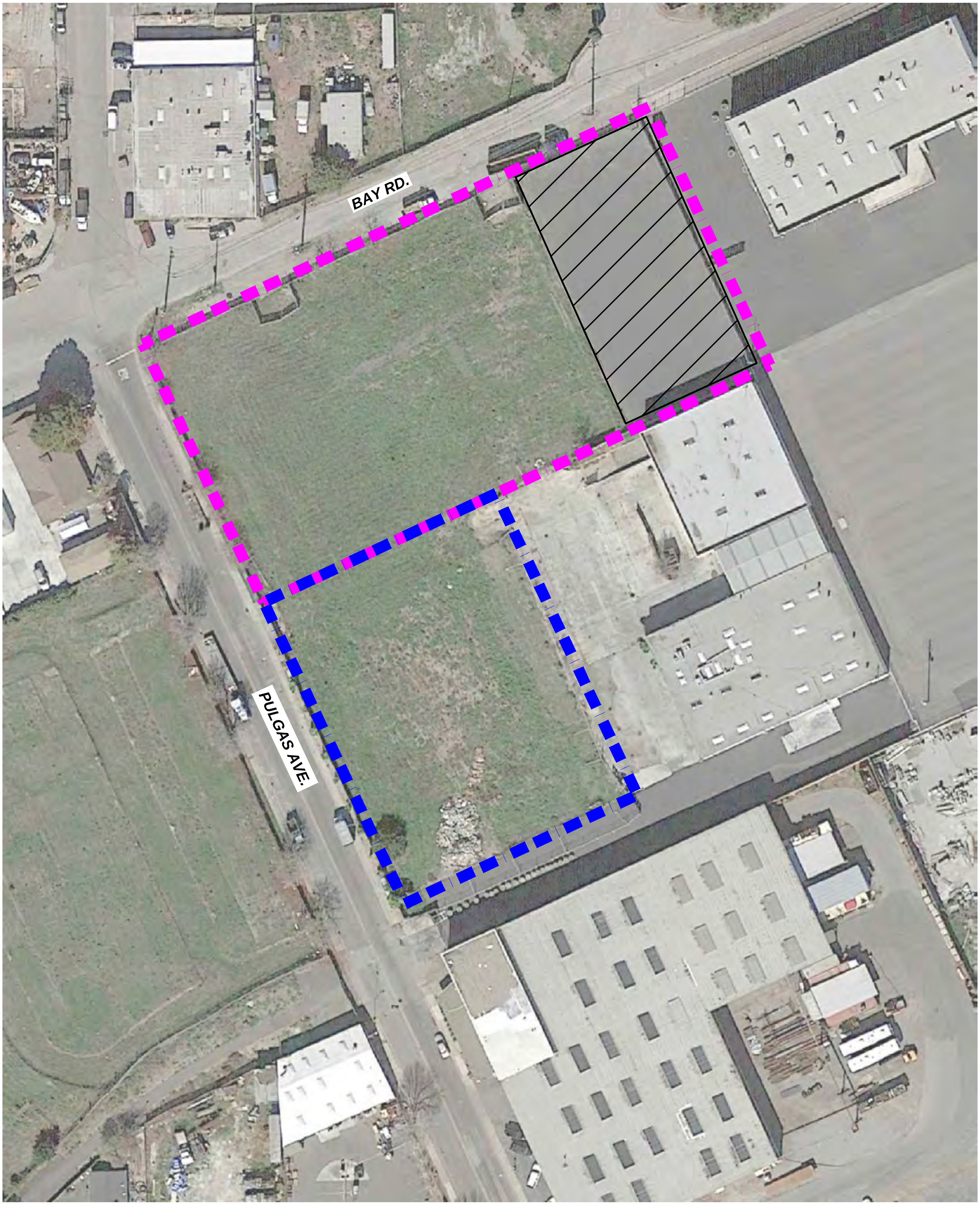
TRC, 2007, *Vapor Barrier and Passive Venting System Design Report, Pulgas Mixed Use Project, Commercial, East Palo Alto, California*, August 6, 2007.

FIGURES



LEGEND:

- ▭ Bains Property
- ▭ Peterson Property
- ▨ Arsenic-Impacted Soil Encapsulation Area

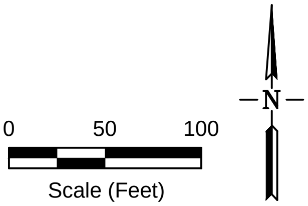


FIGURE 1
Site Plan

Environmental Review
Pulgas Avenue Commercial Development
East Palo Alto, California

northgate environmental management, inc.

Project No. 1298.01

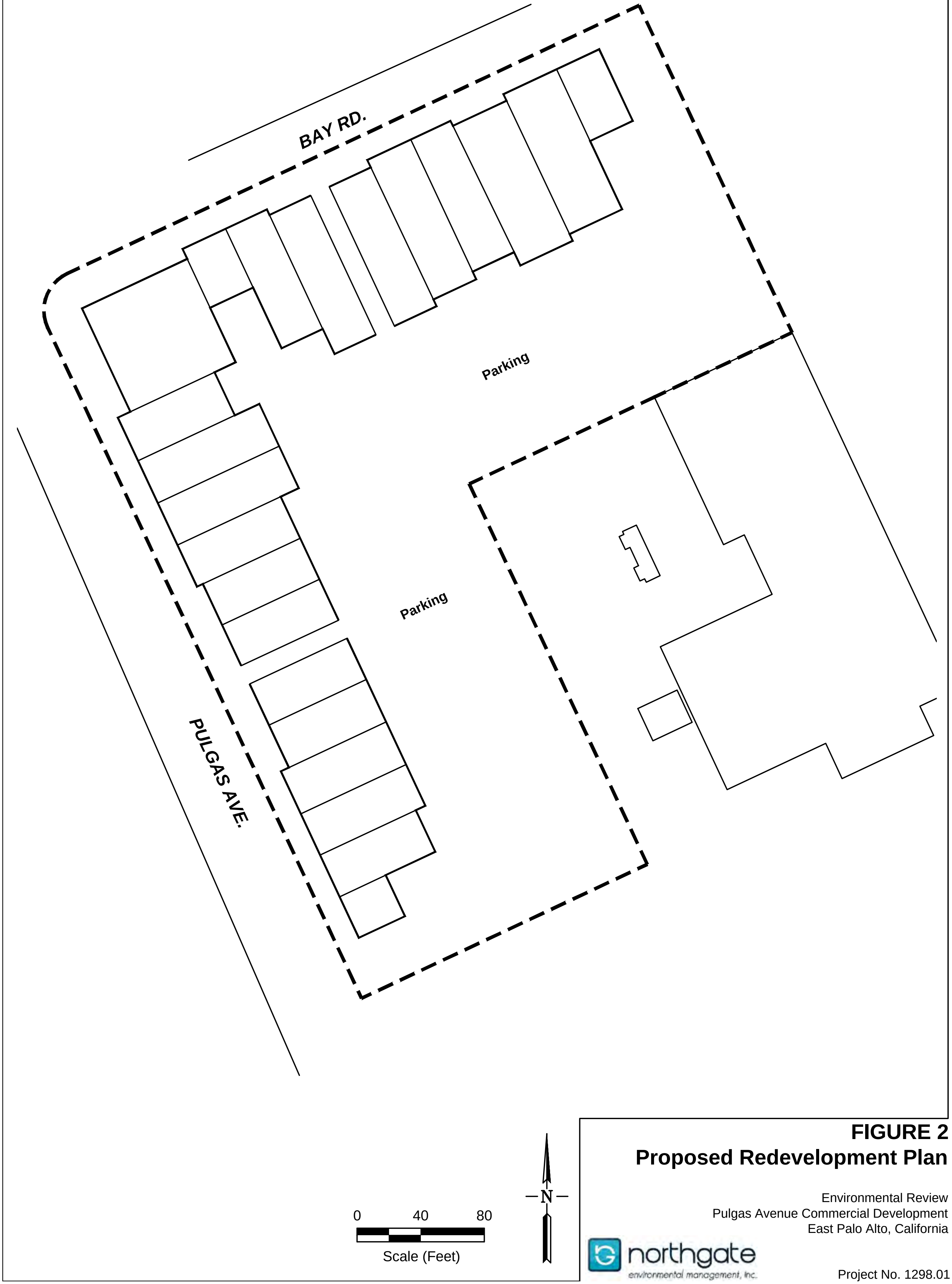


FIGURE 2
Proposed Redevelopment Plan

Environmental Review
Pulgas Avenue Commercial Development
East Palo Alto, California

northgate
environmental management, inc.

Project No. 1298.01

APPENDIX A

RWQCB CLEANUP ORDERS AND CORRESPONDENCE

Proposed Cleanup Plan for the Pulgas Mixed-Use Project Site, East Palo Alto is Available for Public Review

June 2006

SUMMARY

This fact sheet, prepared by the Regional Water Quality Control Board, San Francisco Bay Region (Water Board), describes a proposed environmental cleanup plan for the Pulgas Mixed-Use Project site, located in the Ravenswood Industrial Area of East Palo Alto. The proposed cleanup plan responds in part to site cleanup orders adopted by the Water Board in 1992. The Water Board is now holding a 30-day public comment period, from June 22 through July 22, 2006, on the proposed cleanup plan. An e-copy of the proposed cleanup plan and this fact sheet are available at: http://www.waterboards.ca.gov/sanfranciscobay/pub_notice.htm.

The proposed cleanup plan takes into account, but is not dependent upon, the proposed redevelopment of the property into residential, live-work and industrial uses. It calls for removing polluted soil to stringent cleanup levels that would allow unrestricted use of land within the proposed residential and live-work portions of the project. For the industrial portion of the site, a combination of soil removal and capping with building or asphalt is being proposed to address polluted soil. A groundwater plume originating from offsite is present beneath the majority of the site. The proposed cleanup plan calls for natural processes to degrade this polluted groundwater to eventually restore groundwater quality. As the shallow groundwater beneath the site is not being used for drinking water, it is not necessary to achieve cleanup objectives immediately. In order to insure that the underlying groundwater does not cause any potential health concerns until such time as cleanup objectives have been met, engineering controls will be incorporated into building designs that will prevent vapors from the groundwater moving up into buildings. In addition, an environmental deed restriction will insure that no wells are installed on the site and that the industrial portion of the site is never used for sensitive uses, such as homes, schools, hospitals, etc. The proposed cleanup plan is summarized in more detail below.

INTRODUCTION

This fact sheet has been prepared by the Water Board to inform the community about the environmental impacts and proposed cleanup work that is being done in conjunction with the redevelopment of certain properties within the Ravenswood Industrial Area. The Water Board is a part of the California Environmental Protection Agency and is the regulatory agency responsible for overseeing the environmental investigations and cleanup work of these properties.

We invite all interested parties to be part of a public participation and involvement process for the proposed environmental cleanup activities described in this fact sheet.

A 30-day public comment period on this Proposed Cleanup Plan is being held from June 22 through July 22, 2006. A community meeting to present the Proposed Cleanup Plan, answer questions and solicit public comment will be held at the time and place indicated on the last page of this document.

A glossary of technical terms used in this fact sheet is included on pages 6-7. Words in the glossary are printed in *italics* the first time they appear in this fact sheet.

ABOUT THE PULGAS MIXED-USE PROJECT

The Pulgas Mixed-Use Project site consists of ten parcels that are known as the Peck & O'Connor, O'Connor Trust (formerly Bishop), Chang, Bains, Ravenswood Investments and Peterson properties (some properties contain multiple parcels). The properties total 7.99 acres (approximately 5 acres on the west side of Pulgas Avenue and 3 acres on the east side) and are all currently zoned for light industrial use. The properties can be identified on Figure 1.

The developers of the Pulgas Mixed-Use Project site have submitted a proposal to the City of East Palo Alto to redevelop the properties into 44 single family homes, 7 live-work units and 22 industrial condominiums. The industrial condominiums will be built on the east side of Pulgas Avenue, on the Bains and Peterson properties. The 7 live-work and 44 single family homes will be on the west side of Pulgas Avenue. The proposed development layout is presented on Figure 2. For purposes of environmental investigation and cleanup, the Water Board considers the west side of Pulgas Avenue to be residential use, requiring the highest degree of cleanup, and the east side to be industrial use, which requires a less stringent level.

The proposed cleanup plan described in this fact sheet will protect human health and the environment and will allow for the development to move forward, should the City of East Palo Alto approve of the project.

SITE HISTORY

Residential Portion, West of Pulgas Avenue

The Peck & O'Connor and O'Connor Trust properties consist of three parcels; one is identified as 2477 Pulgas Avenue (O'Connor Trust property) and two are identified as 2485 Pulgas Avenue (Peck & O'Connor property). The Peck and O'Connor portion of the site has been used for storage and concrete form manufacturing by a concrete construction contractor (Peck and Hiller) since 1963. Before that time, the site was used for agricultural purposes with row crops, a vineyard and greenhouses at various times. The O'Connor Trust portion of the site was used by a floor covering company in 1958, a carpet service in 1959-61, and Bishop Insulation from 1963 to 1973. In 1973 the then-existing buildings were torn down and the property has been undeveloped to the present day, with the exception of some Peck & Hiller office trailers. For simplicity, the Peck & O'Connor and O'Connor Trust properties will be referred to collectively as the Peck property for the remainder of this fact sheet.

The Chang property consists of an approximately 1.25-acre undeveloped parcel at 1860 Bay Road, located behind the property at 1836 Bay Road that is commonly known as "People's Plaza." The Chang property was used for agricultural purposes from 1948 to 1963. Then part of it was an auto-wrecking and salvage yard for an unknown period of time, and it has more recently been used for storage for many years.

Industrial Portion, East of Pulgas Avenue

The approximately 1.08-acre Bains and Ravenswood Investments properties consist of three parcels and a portion of a fourth and are located at 2470 Pulgas Avenue. The properties may have been used for agricultural purposes until about 1965, and a residential structure formerly on the properties was removed in the early 1960s. Since 1965, the property has been undeveloped and largely used for truck and trailer parking and storage by Bains Moving and Storage. For simplicity, the Bains and Ravenswood Investments properties will be referred to collectively as the Bains property for the remainder of this fact sheet.

The 1.95-acre Peterson property is located at 1950 Bay Road and is bounded by Bay Road to the northwest, Pulgas Avenue to the southwest, the Bains property to the southeast, and a vacant warehouse to the northeast. It is an undeveloped dirt lot formerly used by a trucking company for parking and storage, and the eastern ¼ of the property is paved. The property may have been used for agricultural purposes in the 1940s and 1950s, and was used intermittently as an auto storage/wrecking yard prior to its use for truck parking and storage.

ENVIRONMENTAL CONDITIONS AND INVESTIGATIONS

The properties in the Pulgas Mixed-Use Project site as well as other properties within the Ravenswood Industrial Area have been in agricultural or industrial uses for 60 or more years. As a result of these uses, residual chemicals have been released to the environment, impacting soil and/or *groundwater*. Environmental investigations of some properties within the Ravenswood Industrial Area began as early as the late 1970s. Since that time investigations and cleanups have been ongoing.

In 2004 and 2005, environmental investigations of all of the properties were conducted on behalf of the developers of the Pulgas Mixed-Use Project. The investigations included background and historical research to identify site uses, on-site chemical releases and known or potential off-site contamination; soil and groundwater sampling and analysis for contaminants from potential on-site and off-site sources, including *organochlorine pesticides*, *arsenic* and other metals, *petroleum hydrocarbons* (also referred to as TPH) and *volatile organic compounds* (also referred to as VOCs); and *soil vapor* sampling and analysis for potential VOC *volatilization* from known area-wide VOC contamination in shallow ground water. *Human Health Risk Assessments* were completed for identified contaminants of concern.

As a result of these investigations, the following substances were detected above applicable residential or commercial screening levels developed by the Water Board:

Residential Portion, West of Pulgas Avenue

Peck Property – TPH and metals in the soil; VOCs and TPH in groundwater, and VOCs in the soil vapor;

Chang Property – VOCs in the groundwater and soil vapor;

Industrial Portion, East of Pulgas Avenue

Bains Property – TPH, metals and *dieldrin* in the soil; VOCs and metals in the groundwater; VOCs in the soil vapor;

Peterson Property – TPH, *lead* and other metals in the fill soil (soil added at some point in time); metals in the soil; metals, VOCs, TPH and *methyl tertiary butyl ether* (MTBE*)* in the groundwater; and VOCs in soil vapor.

CLEANUP GOALS

Data collected from the project properties were compared to applicable *Environmental Screening Levels* (also referred to as ESLs) developed by the Water Board. ESLs have been developed for both industrial and residential uses. The industrial ESLs were used for the east side of Pulgas Avenue and the residential for the west. In addition, ground water analytical data were compared to the *Drinking Water Maximum Contaminant Levels* (also referred to as MCLs).

Soil

As previously mentioned, the soil cleanup goals for the portion of the project west of Pulgas Avenue will be the residential ESLs. This stringent cleanup goal will allow for unrestricted uses of the property. All soil containing pollutants above these cleanup levels will be removed and disposed of offsite at an appropriate disposal facility.

The soil cleanup goal for the east side of Pulgas Ave. will be the less stringent industrial ESLs. A *deed restriction* will be required to insure that the properties are never used for any sensitive uses (residential, school, hospital, etc.). Also in this case certain polluted soil may be left in place and capped with asphalt or buildings to prevent any contact.

Groundwater

The cleanup goal for underlying groundwater is the Drinking Water MCLs. It is noted that shallow groundwater in the Ravenswood Industrial Area is naturally high in salinity, due to the proximity of the Bay. This water is not currently being used as a drinking water supply and is not likely to be used in the future. Municipal drinking water is provided to the Ravenswood

Industrial Area and there is no need to use underlying groundwater for drinking water purposes. This being the case, cleanup objectives do not need to be met in the immediate-term.

REMEDIATION PLAN

Properties West of Pulgas Avenue (Peck and Chang)

The Proposed Cleanup Plan identifies areas of soil pollution with metals, TPH and potentially VOCs on the Peck property. These areas of soil will be further assessed and removed to meet unrestricted use cleanup goals. The soil will be disposed of offsite at an appropriate facility. The Plan also calls for removing any float TPH in groundwater within the area of the former underground fuel storage tank area on the Peck property encountered during the additional assessment.

Properties East of Pulgas Avenue (Bains and Peterson)

The Proposed Cleanup Plan identifies an area of lead impacted soil on the Peterson property. This area will be excavated and disposed offsite at an appropriate disposal facility. If soil contaminated with TPH is encountered, the soil will also be excavated and transported off-site to a disposal facility. Soil impacted with lower concentration metals and pesticides will be left in-place and capped. Based on the current redevelopment plans for the Pulgas Mixed-Use Project, the Bains and Peterson properties, asphalt parking, concrete curbs and walkways, and commercial/industrial buildings will cover nearly 100 percent of the properties. This construction will effectively cap the properties, which will prevent direct contact with impacted soils.

Since this remediation plan calls for leaving impacted soil in-place, an environmental deed restriction and associated *risk-management plan* for the property is required. This will be developed in conjunction with the Water Board and City of East Palo Alto. The restriction will prohibit, at a minimum, disturbance to the cap and intrusion into the impacted soil. In addition, it would also restrict the property to commercial/industrial use and prevent sensitive uses (schools, homes, hospitals, etc.). This document will be incorporated into the *Covenant Condition Restrictions* (also referred to as CCRs) for the project.

Properties on Both East and West Sides of Pulgas Avenue

As previously discussed, most of the Pulgas Mixed-Use Project site is underlain by a groundwater plume polluted with VOCs from offsite and possibly onsite sources. The cleanup plan for this groundwater pollution calls for allowing natural processes to degrade these pollutants, eventually restoring water quality. As this will not occur in the short-term, mitigation measures are needed to eliminate any potential risk posed by this polluted water until such time as the cleanup goals have been met. The primary health risks caused by exposures to these VOCs are: 1) drinking or coming in contact with this groundwater; and, 2) vapors containing VOCs from this groundwater moving up through the soil and collecting in buildings, where they can be inhaled. To address these potential risks, until such time as water quality is restored, *vapor barriers* and *passive venting systems* will be installed beneath buildings and solid structures on these properties. The vapor barriers and passive venting will be designed to inhibit the potential migration of contaminant vapors upward into structures. To address risk caused by direct contact with groundwater, an environmental deed restriction will be applied to the entire project to prevent the installation of wells to extract groundwater or disturb the vapor barriers and passive venting systems.

GLOSSARY

Arsenic – Arsenic is a naturally occurring metal found in the earth's crust. Arsenic and its compounds are commonly used as pesticides, herbicides, insecticides, wood preservatives and various metal alloys. Arsenic is a carcinogen, associated with lung cancer and skin cancer, and may also cause damage to the intestines and liver.

Covenant Condition Restriction (CCR) – The CCR is an agreement, usually included in the deed to a property, restricting the manner in which the property can be used. For example, a deed for a residential property may contain a covenant that the owner won't permit "noxious uses" on the property, or any of a lengthy list of particular offenses such as stables, factories and so forth. Developers may record a document called "covenants and conditions and restrictions" (CC&Rs) to control the nature and character of a property development for the benefit of future owners.

Deed Restriction – A clause in a deed limiting the use of a property.

Risk-Management Plan – The risk management plan contains pratical ways to mitigate risk for occupants and workers presented by exposure to pollutants that are present in soil and/or groundwater on a property. Such measures often engineering controls (i.e. capping with asphalt or buildings) and institutional controls (deed restrictions, preventing certain uses of a property). This document also serves to disclose site conditions and provide public information.

Dieldrin - Dieldrin is an organochlorine pesticide produced for use as a control for insect pests. The chemical Aldrin is closely related to dieldrin, and breaks down to form dieldrin. Dieldrin and Aldrin exposure can affect the nervous system.

Drinking Water Maximum Contaminant Level (MCL) – The MCLs are published in the Title 22 California Code of Regulations, and are enforceable regulatory drinking water standards established by the California Department of Health Services. Primary MCLs take in to account a chemical's health risks and include a high margin of safety.

Environmental Screening Levels (ESLs) – ESLs are risk-based concentrations developed by the Water Board, and are for use as screening levels in determining if further evaluation is warranted, in prioritizing areas of concern, in establishing initial cleanup goals, and in estimation of potential health risks. For carcinogens, the ESLs are based on a target excess cancer risk of

10^{-6}. This represents the upper (most health protective) end of the potentially acceptable range of 10^{-4} to 10^{-6} recommended by the US Environmental Protection Agency.

Groundwater – Groundwater is all water that is below the surface of the ground, and in direct contact with the ground or subsoil, that can be collected with wells, tunnels, or drainage galleries, or that flows naturally to the earth's surface via seeps or springs.

Human Health Risk Assessment (HHRA) – The HHRA is a technical study addressing the potential human health impacts to on-site construction workers and future tenants or residents associated with contaminants detected at a site. The HHRA is typically conducted following various United States Environmental Protection Agency (EPA) guidance documents, and considers compound concentrations, transport and fate of the compounds detected, exposure pathways, and property use.

Lead – Lead is a naturally occurring metal found in the earth's crust. Lead was commonly used in the production of paint and gasoline, and is still used in certain kinds of batteries. It also is used in some kinds of metal products (such as solder, brass and bronze products, and pipes), and in ceramic glazes. Other chemicals containing lead are used in paint. Lead exposure can cause neurological development problems in children, and may cause cancer.

Methyl tertiary butyl ether (MTBE) – MTBE is used as a gasoline additive to increase octane ratings in premium grade fuels, and in higher concentrations (up to 15 percent) to enhance gasoline combustion and reduce tailpipe emissions. MTBE readily dissolves in water, can move rapidly through soils and aquifers, is resistant to microbial decomposition and is difficult to remove in water treatment. The US EPA has classified MTBE as a potential human carcinogen.

Organochlorine Pesticides – Organochlorine pesticides are a group of highly toxic compounds typically used to eliminate insect pests, and include DDT, lindane, chlordane, dieldrin, aldrin, heptachlor and toxaphene. These chemicals persist in the environment long after their original use, they degrade slowly, and accumulate in the food chain. Organochlorine pesticides may be carcinogenic, and may cause neurological, reproductive and developmental harm.

Passive Venting Systems - Passive venting is a non-mechanized system of dissipating vapors that may accumulate beneath structures that cap the soil, such as commercial and residential buildings. It may consist of a series of perforated pipes placed beneath the structure connected to single or multiple vent pipes that vent to the roof or at ground level.

Petroleum hydrocarbons – Total Petroleum Hydrocarbons (TPH) is a term used to describe a broad family of several hundred chemical compounds that originally come from crude oil. TPH can vary in how much of each chemical they contain. TPH-based products include, but are not limited to, gasoline, kerosene, fuel oil, mineral oil, and asphalt.

Soil Vapor – Soil vapor is air existing in void spaces in the soil between the groundwater table and the ground surface that may migrate to the soil surface and be released into the atmosphere.

Vapor Barrier – A vapor barrier is a material that limits the intrusion of vapors into an area or building. Vapor barriers typically consist of either a solid in the form of a thin sheet that is placed beneath the area or structure, or a liquid that can be brushed or rolled on to a hard surface (such as a foundation) that caps the area or structure.

Volatile organic compounds (VOCs) – VOCs are organic liquids, including many common solvents, which readily evaporate at temperatures normally found at ground surface and at shallow depths. Many VOCs are known human carcinogens. Examples of VOC usage include dry cleaning, solvents, carburetor cleaner, brake cleaner, and paint solvents.

Volatilization - The release of gas by substances that are solids or liquids at ordinary atmospheric pressure and temperatures.

GET INVOLVED! - PUBLIC PARTICIPATION OPPORTUNITIES

The public comment period on this Proposed Plan will extend from June 22 through July 22, 2006. Your comments to the Water Board are invited. All written and verbal comments received by the Water Board will be considered prior to the selection of a final cleanup plan.

Copy of Draft Cleanup Plan: A copy of the Draft Cleanup Plan and this Fact Sheet are available at: http://www.waterboards.ca.gov/sanfranciscobay/pub_notice.htm

Written Comments: Written comments must be e-mailed or postmarked no later than July 22, 2006, should be sent to:

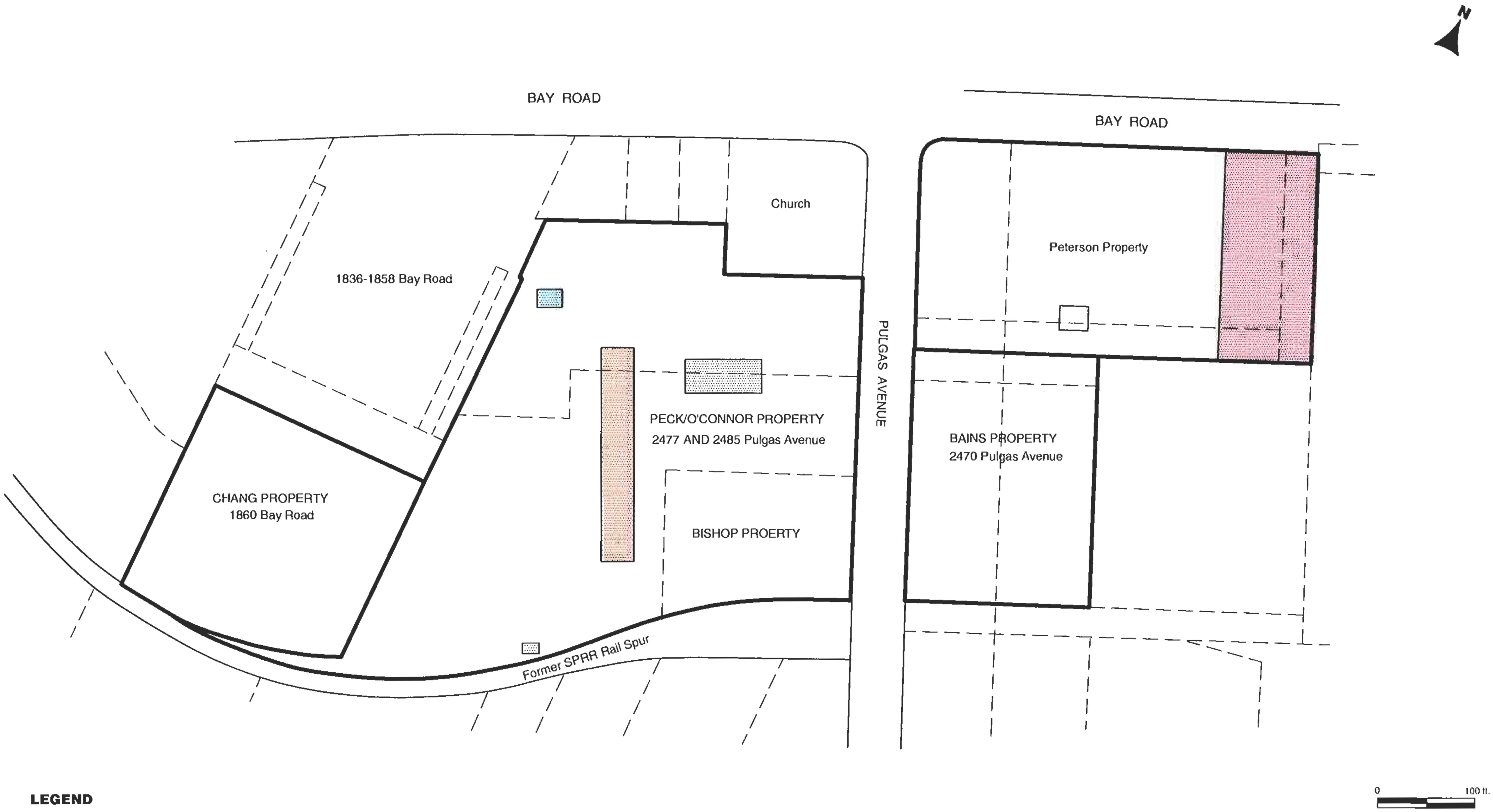
Mark Johnson
RWQCB
1515 Clay Street, Suite 1400
Oakland, CA 94612
mjohnson@waterboards.ca.gov

Community Meeting: A public meeting will be held on the Proposed Plan on:

Date: Wednesday, June 28, 2006
Time: 6:30 to 8:00 P.M.
Address: 2111B University Avenue, East Palo Alto (near Chevron Station)

Additional Information: Documents related to the Pulgas Mixed-Use Project Site are available for public review in the File Room of the Regional Water Quality Control Board's office in Oakland.

For Further Information: If you have questions or comments about the Proposed Cleanup Plan, you may call Mark Johnson at (510) 622-2493.



LEGEND

- 🟦 - Approximate area of elevated chromium
- 🟩 - Approximate area of former underground storage tank excavation
- 🟧 - Approximate area of former saw location with elevated levels of VOCs in soil vapor
- 🟥 - Approximate area of existing asphalt cap for arsenic impacted soil
- 🟨 - Approximate area of lead impacted soil

Base by County Parcel Map.

AREAS OF ENVIRONMENTAL IMPACT
PULGAS MIXED-USE PROJECT
East Palo Alto, California

TRC Lowney

FIGURE 1

2047-1L

5/06'EB

0 ~100 ft.

LEGEND

- 🟦 - Approximate area of elevated chromium
- 🟩 - Approximate area of former underground storage tank excavation
- 🟧 - Approximate area of former saw location with elevated levels of VOCs in soil vapor
- 🟥 - Approximate area of existing asphalt cap for arsenic impacted soil
- 🟨 - Approximate area of lead impacted soil

Base by County Parcel Map.

SITE DEVELOPMENT PLAN
PULGAS MIXED-USE PROJECT
East Palo Alto, California

TRC Lowney

FIGURE 2

2047-1L

5/06*EB

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER 92-037

SITE CLEANUP REQUIREMENTS FOR:

EAST PALO ALTO INDUSTRIAL AREA,
MULTIPLE LANDOWNERS
EAST PALO ALTO
SAN MATEO COUNTY

DISCHARGERS: SEE ATTACHMENT 1

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board) finds that:

I. SITE DESCRIPTION Numerous privately owned parcels or properties comprise the site, located in the Ravenswood Industrial area (RIA) of East Palo Alto, San Mateo County (Figure 1). The site includes about 70 percent of the RIA and is adjacent to wetlands along the western margin of San Francisco Bay. These properties consist generally of agricultural, manufacturing, auto wreckers and, storage facilities for most of their existence with little or no regulation of land-use.

2. SITE HISTORY The site area has been used for agricultural and industrial purposes for at least the past 60 years. All of the properties within the site are currently zoned industrial and the entire RIA is designated a redevelopment area by the East Palo Alto Redevelopment Agency. Some properties within the site are adjacent to the 1990 Bay Road Superfund site and have commingled pollution.

3. REGULATORY STATUS All individual property owners are referred to as dischargers because of their current ownership of the site properties and shall be required to comply with all requirements of this Order for their individual parcels as listed in attachment 1. There may be additional tenants or others who may also be responsible for discharge of pollutants who are not named as dischargers in this Order, but may be included in this Order or other Board action in the future.

4. OTHER REGULATORY ACTION The Sandoz/Rhone Poulenc, 1990 Bay Road site is currently under Board Order. The Romic Chemical site is being handled under the RCRA corrective action program. This Order is not intended to conflict with remedial actions on these sites. Should conflict arise, amendments to this Order may be appropriate.

5. <u>ADJACENT PROPERTIES</u> Adjacent properties in and around the site that comprise the remainder of the RIA, and who are not named in this Board action, may also be sources of pollution. Should investigation by the named dischargers determine that probable contribution of pollution exists from these offsite properties, further Board action may be required.

6. <u>RATIONALE FOR ORDER</u> Regional Board staff are initiating a sub-regional cleanup to address soil and groundwater pollution that pose a threat to surface and groundwater in the Bay margin area of East Palo Alto and also represent potential sources of delay to Board cleanup on adjacent sites. With only few exceptions, properties within the site have not had sufficient investigation to determine the extent of potential soil and groundwater pollution.

   Site inspections by Board staff and local agencies indicate soil pollution exists on many of the parcels within the site area. Pollutants not related to the chemicals of concern at the 1990 Bay Road site have been detected in groundwater samples from monitoring wells at the site. Surface runoff from properties within the RIA drains into the wetland where Board staff have observed hydrocarbon sheens on the surface runoff. Because the extent of soil, surface and groundwater pollution has not been determined and these pollutants are impacting the cleanup operations on other sites within the area as well as wetland and surface waters of the bay, staff consider this site to be of high priority.

7. <u>REDEVELOPMENT AGENCY</u> The East Palo Alto Redevelopment Agency adopted resolution 148, on December 17, 1991 to contract with the Board for oversight under Article 12.5 (commencing with Section 33459) of Chapter 4 of the Community Redevelopment Law (Part 1 of Division 24 of the Health and Safety Code) to remedy or remove a release or hazardous substances from property within a redevelopment area.

   To expedite remedial action the Board shall, through this Order, work directly with the property owners. Requirements of this Order shall be in compliance with Health and Safety Code (HSC) Section 33459.3. However, until such time that the East Palo Alto Redevelopment Agency contracts directly with the Board, approval of this action under Section 33459.3 HSC will not be given.

8. <u>COST RECOVERY</u> The dischargers have been advised that the Regional Board intends to enter into cost recovery pursuant to Section 13304 of the California Water Code. This will entitle the Board to seek reimbursement for, all reasonable costs actually incurred by the Board to investigate unauthorized discharges of wastes and to oversee cleanup of

such waste, abatement of the effects thereof, or other remedial action, required by this Order. The Industrial Property Owners Association, DBA Industrial Development Employment Association (IDEA) shall be the contact for cost recovery billing by the State Water Resources Control Board. IDEA is a privately held corporation for area redevelopment whose membership includes all dischargers named herein. If the City of East Palo Alto Redevelopment Agency becomes involved in this Regional Cleanup Action, the Regional Board intends to continue cost recovery with the dischargers pursuant to requirements of Assembly Bill 3193. Staff began recording time spent on this project beginning February 1, 1992. When billing is initiated, it is anticipated that all time expended on this project beginning on February 1, 1992 shall be recoverable.

9. SCOPE OF THIS ORDER This Order is intended to be the primary document by which a sub-regional cleanup of the Ravenswood Industrial Area will be regulated. The Order contains tasks to submit a site use history, a workplan to determine the extent of soil and groundwater pollution and results of the preliminary investigation, and propose tasks and time schedule for further characterization of pollutants. It is anticipated that this Order shall be updated periodically, as appropriate, and further tasks shall be added which shall lead to the remediation of pollutants within the site or inclusion of additional dischargers.

10. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives and beneficial uses for South San Francisco Bay and contiguous surface and groundwater.

11. The existing and potential beneficial uses of the groundwater underlying and in the vicinity of the site include:

    a. Industrial process water supply
    b. Industrial service water supply
    c. Municipal and Domestic water supply
    d. Agricultural water supply

12. The existing and potential beneficial uses of the surface waters (San Francisco Bay and San Francisquito Creek) and wetland include:

    a. Contact and non-contact water recreation
    b. Warm and cold fresh water habitat
    c. Fish migration and spawning
    d. Commercial and sport fishing
    f. Preservation of rare and endangered species

g. Estuarine habitat
h. Wildlife habitat
i. Salt marsh habitat
j. Navigation
k. Shellfish harvesting
l. Industrial service supply

13. The dischargers have caused or permitted, and threaten to cause or permit, waste to be discharged or deposited where it is or probably will be discharged to waters of the State and create or threaten to create a condition of pollution or nuisance as defined in Section 13050(m) of the California Water Code.

14. This action is an order to enforce the laws and regulations administered by the Board. This action is categorically exempt from the provisions of the CEQA pursuant to Section 15321 of the Resources Agency Guidelines.

15. The Board has notified the dischargers and interested agencies and persons of its intent under California Water Code Section 13304 to prescribe Site Cleanup Requirements for the discharge and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.

16. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the dischargers, their agents, successors and assigns, shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous materials in a manner which will degrade water quality or adversely affect the beneficial uses of the waters of the State, is prohibited.

2. Significant migration of pollutants through surface or subsurface transport to waters of the State, is prohibited.

3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of pollutants, are prohibited.

4. The storage, handling treatment or disposal of soil or groundwater containing pollutants shall not create a

nuisance as defined in Section 13050(m) of the California Water Code.

B. CLEANUP SPECIFICATIONS

1. The dischargers shall conduct site investigation and monitoring activities as needed to define the current local hydrogeologic conditions and the lateral and vertical extent of soil and groundwater pollution. Should monitoring results show evidence of pollutant migration, additional characterization of pollutant extent may be required.

2. The cleanup standards for source-area soils shall be health-based and protective of human health and the environment. A human health risk assessment shall be the basis for establishing soil cleanup standards, and shall follow EPA guidance. If levels higher than those set by health-based parameters for pollutants are proposed, the discharger must demonstrate that cleanup to lower levels is infeasible, that the alternate levels will not threaten the quality of waters of the State, and that human health and the environment are protected. If levels higher than those set by health-based parameters are proposed, institutional controls shall be considered. If any pollutants are left in the soil, a program of continued groundwater monitoring may be required.

3. Final cleanup standards for polluted groundwater, onsite and offsite, shall be in accordance with State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California". Proposed final cleanup standards shall be based on a feasibility study of remedial alternatives that compare implementability, cost, effectiveness, time to achieve cleanup goals and an assessment of risk to determine affect on beneficial uses, human health and the environment. Assessment of human health risk shall follow EPA guidance. Cleanup standards shall also have the goal of reducing the mobility, toxicity, and volume of pollutants.

4. If groundwater extraction and treatment is considered as an alternative, the feasibility of water reuse, reinjection, and disposal to the sanitary sewer must be evaluated. Based on the Regional Board Resolution 88-160, the dischargers shall optimize, with a goal of 100%, the reclamation or reuse of groundwater extracted as a result of cleanup activities. The dischargers shall not be found in violation of the Order if documented factors beyond the discharger's control prevent the dischargers from attaining this goal,

provided the dischargers have made a good faith effort to attain this goal by feasible and practicable means. If reuse or reinjection is part of a proposed alternative, an application for Waste Discharge Requirements may be required. If discharge to waters of the State is part of a proposed alternative, an application for an NPDES permit must be completed and submitted in a timely manner, and must include the evaluation of the feasibility of water reuse, reinjection, and disposal to the sanitary sewer.

C. PROVISIONS

1. The dischargers shall comply with the Prohibitions and Specifications above, in accordance with the following time schedule and tasks.

a. TASK: SUBMIT SITE USE HISTORY
DUE DATE: August 1, 1992

<u>Description</u>: The dischargers shall submit a technical report acceptable to the Executive Officer containing a site use history for each of the properties to include property ownership, use, tenancy, and chemical use, handling storage and disposal practices.

b. TASK: SUBMIT WORKPLAN FOR SITE INVESTIGATION AND SCHEDULE FOR IMPLEMENTATION AND SUBMITTAL OF FINAL REPORT
DUE DATE: September 15, 1992

<u>Description</u>: The dischargers shall submit a technical report acceptable to the Executive Officer containing all elements of the workplan for characterization of soil and groundwater pollution at the site. This workplan shall also include a time schedule for implementation and as well as a Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP) and a Site Health and Safety Plan.

c. TASK: SUBMIT RESULTS OF INVESTIGATION AND PROPOSE FURTHER INVESTIGATION NECESSARY
DUE DATE: as proposed in task C.1.b. and approved by the Executive Officer

<u>Description</u>: The dischargers shall submit a technical report acceptable to the Executive Officer containing the results of the investigation as specified in the Workplan. The dischargers shall also propose further investigation necessary to fully characterize the pollutants. A comprehensive program for groundwater

monitoring and schedule for sampling shall also be proposed.

2. The dischargers shall submit to the Regional Board acceptable reports on compliance with the requirements of this Order that contain descriptions and results of work and analyses performed. It is not Board intent to duplicate any reports due, therefore any reports due concurrently may be combined. These reports prescribed below:

   a. The dischargers shall submit bi-monthly status reports on compliance with this Order. The first report shall be for the months of May and June, 1992 and shall be due on July 15, 1992. Thereafter reports shall be due on the 15th day of every other month to cover the previous 2 months. The report shall include at least the following:

      1) Summary of work completed since submittal of the previous report, and work projected to be completed before submittal of next report.

      2) Identification of any obstacles which may threaten compliance with the schedule of this Order and what actions are being taken to overcome these obstacles.

   b. A program of groundwater monitoring shall be established based on the site investigation report proposal of task C.1.c. The dischargers shall submit reports to the Board on results of groundwater monitoring. Groundwater monitoring reports shall be submitted in accordance with the schedule proposed in Provision C.1.c. and approved by the Executive Officer. All compliance and monitoring reports shall include at least the following:

      1) Cumulative tabulated results of water quality sampling analyses for all wells and groundwater pollution plume maps based on these results.

      2) A cumulative tabulation of all well construction details, water level measurements and updated piezometric maps based on these results.

      3) Reference diagrams and maps including any updated geologic cross sections describing the hydrogeologic setting of the site, and appropriately scaled and detailed base maps showing the location of all monitoring wells and extraction wells, and identifying facilities and structures.

c. The dischargers shall submit annual summary status reports on the progress of compliance with all requirements of this Order and propose modifications which could increase the effectiveness of final cleanup actions. The first report shall be due on January 31, 1993, and would cover the previous calendar year. The report shall include at least: progress on site investigation and remediation, operation and effectiveness of remediation actions and systems, and an evaluation of the feasibility of meeting groundwater and soil cleanup goals.

3. The dischargers may, by written request, seek modifications or revisions of this Order or any program or plan submitted pursuant to this Order at any time. This Order and any applicable program, plan, or schedule may be modified, terminated or revised by the Board.

4. If the dischargers may be delayed, interrupted or prevented from meeting one or more of the completion dates specified in this Order, the dischargers shall promptly notify the Executive Officer. If, for any reason, the dischargers are unable to perform any activity or submit any document within the time required under this Order, the dischargers may make a written request for a specified extension of time. The extension request shall include a justification for the delay, and shall be submitted in advance of the date on which the activity is to be performed or the document is due. The Board staff may propose an amendment to the Order and bring the matter to the Board for consideration.

5. Nothing in this Order is intended or shall be construed to limit or preclude any right the dischargers have or may have to seek administrative and/or judicial review of any orders or determinations of the Board and/or its staff.

6. All hydrogeological plans, specifications, technical reports and documents shall be signed by or stamped with the seal of a State registered geologist, registered civil engineer, or certified engineering geologist.

7. All samples shall be analyzed by State certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories or the consultant shall maintain quality assurance/quality control records for Board review for a period of six years.

8. The dischargers shall maintain in good working order, and operate in the normal standard of care, any facility or control system installed to achieve compliance with the requirements of this Order.

9. Copies of all correspondence, reports, and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order shall be provided to the following agencies:

   a. San Mateo County Health Department
   b. City of East Palo Alto
   c. Cal-EPA, Department of Toxic Substances Control
   d. Regional Water Quality Control Board

10. The dischargers shall permit, within the scope of each of their authorities, the Board or its authorized representative, in accordance with Section 13267 (c) of the California Water Code:

    a. Entry upon dischargers' premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this Order.

    b. Access to copy any records required to be kept under the terms and conditions of this Order.

    c. Inspection of any monitoring equipment or methodology implemented in response to this Order.

    d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.

11. The dischargers shall file a report in a timely manner on any changes in site occupancy and ownership associated with the facility described in this Order.

12. If any hazardous substance is discharged in or on any waters of the State, or discharged and deposited where it is, or probably will be discharged in or on any waters of the State, the dischargers shall report such a discharge to this Board, at (415) 464-1255 on weekdays during office hours from 8 a.m. to 5 p.m., and to the Office of Emergency Services at (800) 852-7550 during non-office hours. A written report shall be filed with the Board within five (5) working days and shall contain information relative to: the nature of the waste or pollutant, quantity involved, duration of incident, cause of spill, Spill Prevention, Control and Countermeasure Plan in effect, if any, estimated size of affected area, nature of effects, corrective measures that have been taken or planned, and a schedule of these activities, and persons notified.

13. Any provisions of this Order substantially identical to provisions which the State Water Board or a court of law

determines to be in excess of the Board's legal authority shall have no force or effect in this Order.

14. This Order is intended to be the primary regulating document by which site cleanup shall proceed on a regional basis for the dischargers and properties named herein, with the Board as lead agency, and IDEA Corporation as the recoverers contact representing the named dischargers.

15. The Board would like to remind dischargers that a General Industrial Storm Water Permit was adopted by the State Water Resources Control Board on November 19, 1991. This permit will apply storm water discharge from many of the industries located within the Ravenswood Industrial Area. The permit requires dischargers to submit a Notice of Intent to the State Water Resources Control Board by March 30, 1992. To determine if this permit applies to your particular operation or if you have not filed a Notice of Intent, please contact the Division of Water Quality at (916) 657-0756 immediately.

16. The Board will review this Order periodically and may revise the requirements when necessary.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on April 15, 1992.

Steven R. Ritchie
Executive Officer

Attachments:
1 - List of Dischargers

Attachment 1

LIST OF LANDOWNERS/DISCHARGERS
EAST PALO ALTO INDUSTRIAL AREA
East Palo Alto, San Mateo County

No.	PROPERTY OWNER	PARCEL NUMBER
1.	Dante Bains P.O. Box 50219 Palo Alto, CA 94303	063-240-350, 063-240-400, 063-240-340
2.	Mike Baker P.O. Box 368 Redwood City, CA 94064	063-121-400, 063-121-410
3.	Bruce Baron 255 Demeter St. East Palo Alto, CA 94303	063-123-070
4.	Michael Berthiaume 2536 Pulgas Ave East Palo Alto, CA 94303	063-132-190
5.	Jennie J. Bishop 220 Emerson St. Palo Alto, CA 94301	063-231-180
6.	Robert Borrman 2450 Pulgas Ave East Palo Alto, CA 94303	063-240-390, 063-240-310
7.	Lee Clemons 1800 Bay Road East Palo Alto, CA 94303	063-231-220
8.	Melvin Curtaccio 1925 Bay Road East Palo Alto, CA 94303	063-121-050, 063-121-060, 063-132-100, 063-132-160, 063-132-170, 063-132-120, 063-132-130, 063-132-110, 063-240-320, 063-240-330
9.	Michael Demeter 160 Demeter St. East Palo Alto, CA 94303	063-121-330, 063-121-340, 063-121-360, 063-121-290, 063-121-430, 063-121-120, 063,121-290, 063-132-090
10.	Robert Facciola P.O. Box 50548 Palo Alto, CA 94303-0548	063-050-030

11.	John Garcia 1905 Bay Road East Palo Alto, CA 94303	063-132-140
12.	Harry Higaki P.O. Box 941 Half Moon Bay, CA 94019	063-121-020, 063-121-200, 063-121-210
13.	Saturo and Emma Iwasaki 2519 Pulgas Ave. East Palo Alto, CA 94303	063-131-220
14.	Richard Lake and Mabel Cordes P.O. Box 50367 Palo Alto, CA 94303	063-122-016, 063-122-015, 063-231-240
15.	Helen Engelbert 615 Glouchester Lane Foster City, CA 94404	063-123-010
16.	Menlo Foods 175 Demeter St. East Palo Alto, CA 94303	063-133-080, 063-133-070, 063-133-100
17.	Russ Peck and Thomas O'Conner 1965 Latham Mountain View, CA 94040	063-231-190, 063-231-200
18.	O.B. Ray 225 Demeter St. East Palo Alto, CA 94303	063-123-030, 063-123-080
19.	Ron Rogge 1987 Bay Road East Palo Alto, CA 94303	063-132-220, 063-121-150
20.	Vincent Romelfanger 2520 Pulgas Ave. East Palo Alto, CA 94303	063-132-150
21.	Philip Wang 5 Miller Court Redwood City, CA 94061	063-133-110, 063-133-110
22.	Richard Russel Brown Wood Products 325 Demeter St. East Palo Alto, CA 94303	063-123-060

23.	Henry Wong 1045 Weeks St. East Palo Alto, CA 94303	063-232-240
24.	Don Sevy 3820 Park Blvd. Palo Alto, CA 94303	063-131-300, 063-131-320, 063-131-330
25.	Denny Sibbert 163 Highland Ave. San Carlos, CA 94070	063-132-210, 063-231-260
26.	Tara Association Ted Thompson 410 Cambridge Ave. East Palo Alto, CA 94303	063-132-060
27.	Jess Torres P.O. Box 1270 Mountain View, CA 94042	063-240-420
28.	Charles Touchatt 2535 Pulgas Ave. East Palo Alto, CA 94303	063-121-370
29.	Edward Green 811 Hamilton Menlo Park, CA 94025	063-231-170

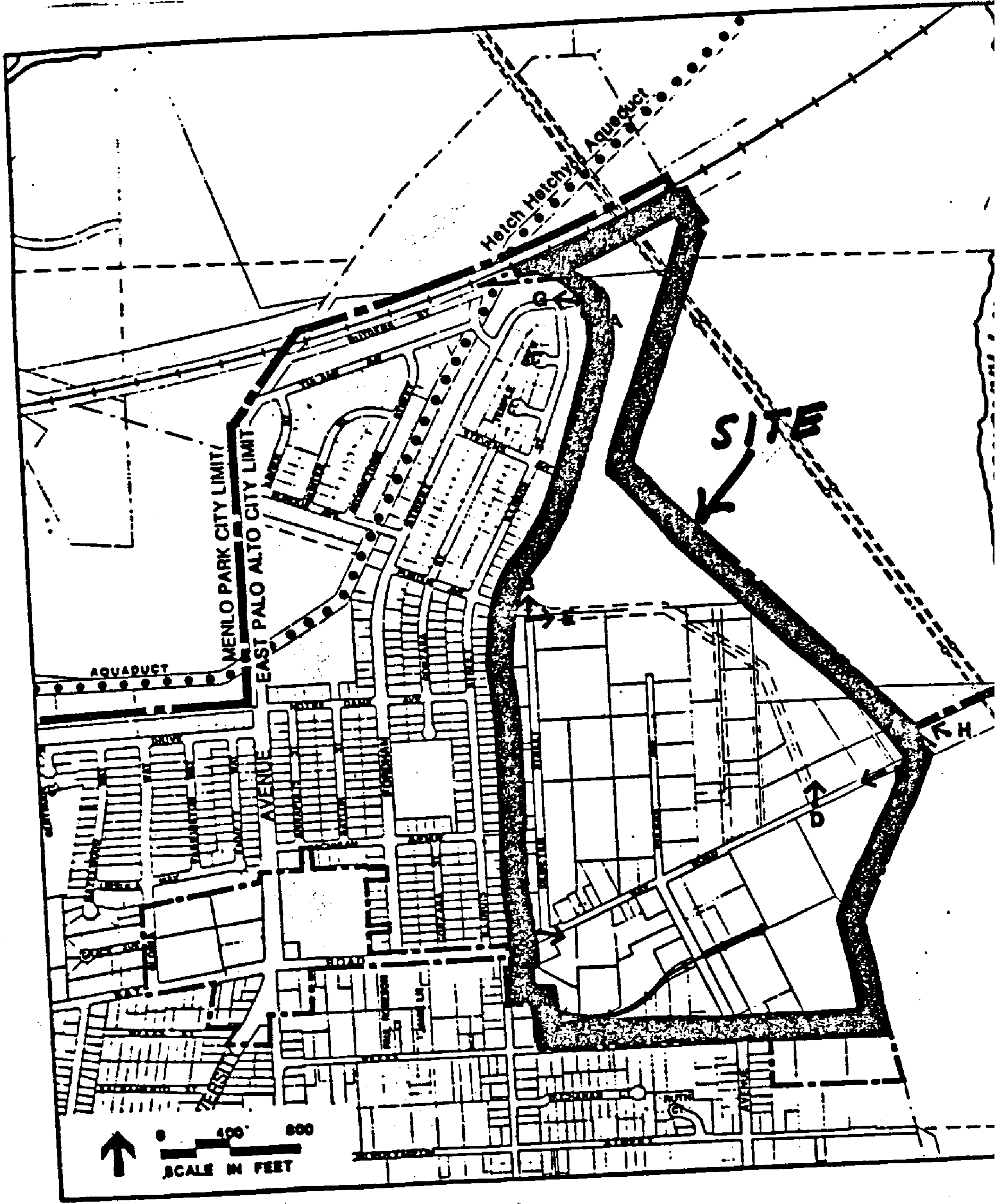


FIGURE 1

PHOTOGRAPH LOCATION
Ravenswood Industri
Redevelopment Plan & GPA Progr
Wallace Roberts

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER 92-086
(AMENDING ORDER 92-037)

SITE CLEANUP REQUIREMENTS FOR:

EAST PALO ALTO INDUSTRIAL AREA,
MULTIPLE LANDOWNERS
EAST PALO ALTO
SAN MATEO COUNTY

DISCHARGERS: SEE ATTACHMENTS 1 AND 1A

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board) finds that:

I. SITE DESCRIPTION The Ravenswood Industrial area (site) of East Palo Alto, consists of numerous privately owned parcels or properties which are located adjacent to wetlands along the western margin of San Francisco Bay (Figure 1). These properties consist generally of agricultural, manufacturing, auto wreckers, and storage facilities for most of their existence with little or no regulation of land-use. The site area has been used for agricultural and industrial purposes for at least the past 60 years.

2. SITE HISTORY On April 15, 1992, the California Regional Water Quality Control Board, San Francisco Bay Region, adopted Site Cleanup Requirements (Order 92-037) for several parcels (Attachment 1) in the Ravenswood Industrial Area. These parcels comprise about 70 percent of the total acreage. The Order contains tasks required to evaluate if soil and or groundwater pollution has occurred by past or present site use activities. The Order named each of the individual property owners as dischargers because of their current ownership of the site properties and required they comply with all requirements of the Order for their individual parcels.

3. RATIONALE FOR ORDER The Regional Board, pursuant to Order 92-037, is initiating a sub-regional cleanup to address soil and groundwater pollution that pose a threat to surface and groundwater in the Bay margin area of East Palo Alto and also represent potential sources of delay to Board cleanup on adjacent sites. As part of this action, Board staff have conducted visual inspections of the site. Board staff have also reviewed the Phase 1 Hazardous Materials Site Assessment that was prepared (in November, 1989) by ERC Environmental and Energy Services Company for the City of

East Palo Alto Redevelopment Agency. From the visual inspections and data presented in the above referenced report, a basis exists for including the remaining 30 percent of the properties located in the Ravenswood Industrial Area to Order 92-037.

4. <u>SCOPE OF ORDER</u> This Order shall amend Order 92-037 to include those property owners (Attachment 1A) in the Ravenswood Industrial area, who are not currently named in the Order, as dischargers. The Order amendment shall require the dischargers listed in Attachments 1 and 1A to comply with all requirements set forth in Order 92-037 as amended by this Order. This Order shall also revise due dates for tasks required by Order 92-037.

Board Order 92-037 is amended as follows:

1. The following property owners are added as named dischargers for their individual parcels:

   See Attachment 1A.

2. Submittal of reports required by Provisions C.1.a. and C.1.b. are revised to October 1, 1992 and November 15, 1992 respectively.

3. Corrections as to ownership and parcel numbers of Attachment 1.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July 15, 1992.

Steven R. Ritchie
Executive Officer

Attachments:

1 - List of Dischargers from Order 92-037
1A - List of Dischargers added by this amendment

Figure:

Figure 1, Site Location Map

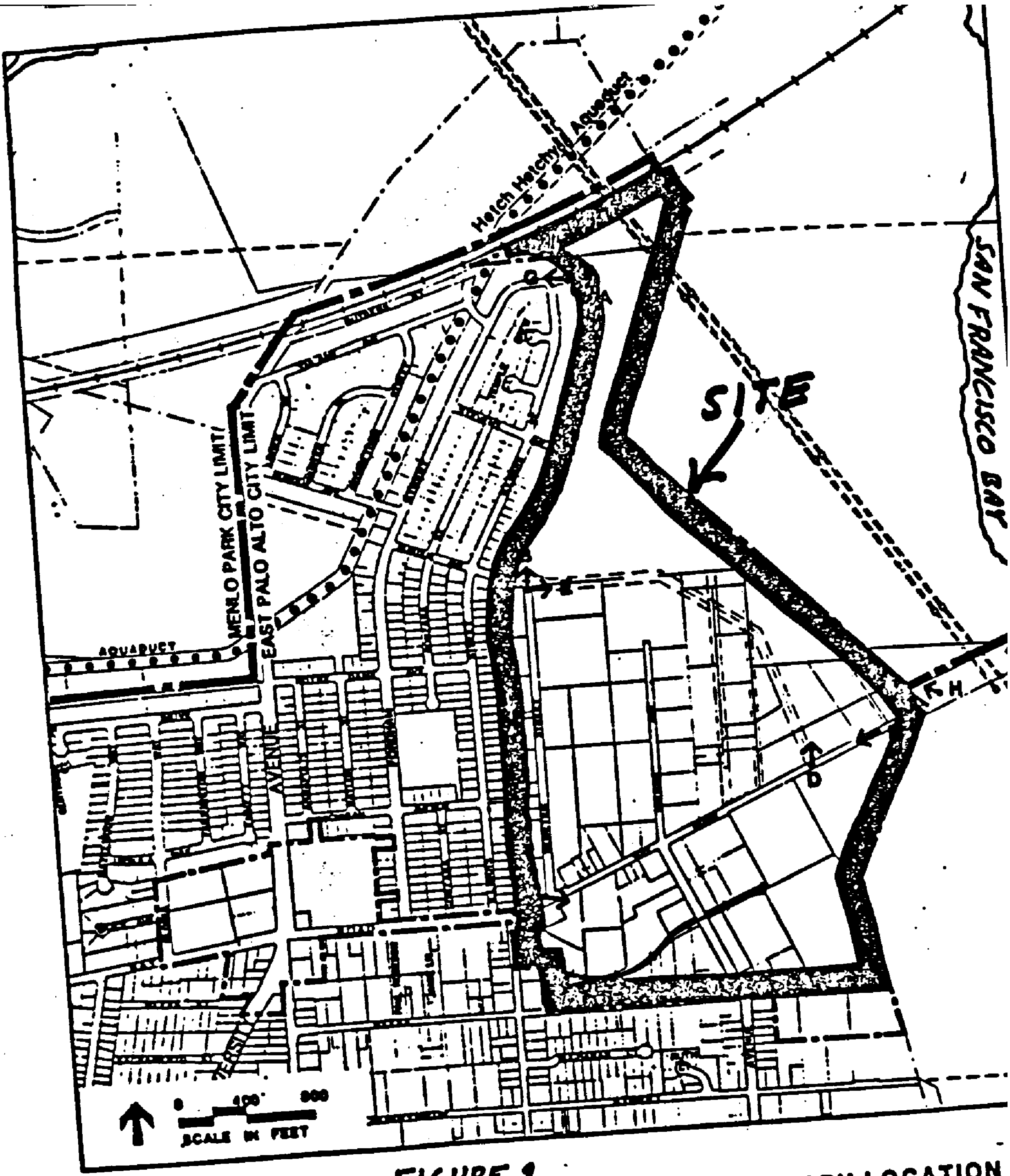


FIGURE 1

PHOTOGRAPH LOCATION
Ravenswood Industrial
Redevelopment Plan & GPA Progra
Wallace Roberts

Attachment 1

LIST OF LANDOWNERS/DISCHARGERS
EAST PALO ALTO INDUSTRIAL AREA
East Palo Alto, San Mateo County

No.	PROPERTY OWNER	PARCEL NUMBER
1.	Dante Bains P.O. Box 50219 Palo Alto, CA 94303	063-240-350, 063-240-400, 063-240-340
2.	Mike Baker P.O. Box 368 Redwood City, CA 94064	063-121-400, 063-121-410
3.	Bruce Baron 255 Demeter St. East Palo Alto, CA 94303	063-123-070
4.	Michael Berthiaume 2536 Pulgas Ave East Palo Alto, CA 94303	063-132-190
5.	Jennie J. Bishop 220 Emerson St. Palo Alto, CA 94301	063-231-180
6.	Robert Borrman 2450 Pulgas Ave East Palo Alto, CA 94303	063-240-390, 063-240-310
7.	Lee Clemons 1800 Bay Road East Palo Alto, CA 94303	063-231-220
8.	Melvin Curtaccio 1925 Bay Road East Palo Alto, CA 94303	063-121-050, 063-121-060, 063-132-100, 063-132-160, 063-132-170, 063-132-120, 063-132-130, 063-132-110, 063-240-320, 063-240-330
9.	Michael Demeter 160 Demeter St. East Palo Alto, CA 94303	063-121-330, 063-121-340, 063-121-360, 063-121-290, 063-121-430, 063-121-120, 063,121-290, 063-132-090
10.	Robert Facciola P.O. Box 50548 Palo Alto, CA 94303-0548	063-050-030

11.	John Garcia 1905 Bay Road East Palo Alto, CA 94303	063-132-140
12.	Harry Higaki P.O. Box 941 Half Moon Bay, CA 94019	063-121-020, 063-121-200, 063-121-210
13.	Saturo and Emma Iwasaki 2519 Pulgas Ave. East Palo Alto, CA 94303	063-131-220
14.	Richard Lake and Mabel Cordes P.O. Box 50367 Palo Alto, CA 94303	063-122-016, 063-122-015, 063-231-240
15.	Helen Engelbert 615 Glouchester Lane Foster City, CA 94404	063-123-010
16.	Menlo Foods 175 Demeter St. East Palo Alto, CA 94303	063-133-080, 063-133-070, 063-133-100
17.	Russ Peck and Thomas O'Conner 1965 Latham Mountain View, CA 94040	063-231-190, 063-231-200
18.	O.B. Ray 225 Demeter St. East Palo Alto, CA 94303	063-123-030, 063-123-080
19.	Ron Rogge 1987 Bay Road East Palo Alto, CA 94303	063-132-220, 063-121-150
20.	Vincent Romelfanger 2520 Pulgas Ave. East Palo Alto, CA 94303	063-132-150
21.	Philip Wang 5 Miller Court Redwood City, CA 94061	063-133-110, 063-133-110
22.	Richard Russel Brown Wood Products 325 Demeter St. East Palo Alto, CA 94303	063-123-060

23.	Henry Wong 1045 Weeks St. East Palo Alto, CA 94303	063-232-240
24.	Don Sevy 3820 Park Blvd. Palo Alto, CA 94303	063-131-300, 063-131-320, 063-131-330
25.	Denny Sibbert 163 Highland Ave. San Carlos, CA 94070	063-132-210, 063-231-260
26.	Tara Association Ted Thompson 410 Cambridge Ave. East Palo Alto, CA 94303	063-132-060
27.	Jess Torres P.O. Box 1270 Mountain View, CA 94042	063-240-420
28.	Charles Touchatt 2535 Pulgas Ave. East Palo Alto, CA 94303	063-121-370
29.	Edward Green 811 Hamilton Menlo Park, CA 94025	063-231-170

Attachment 1A

LIST OF LANDOWNERS/DISCHARGERS
EAST PALO ALTO INDUSTRIAL AREA
East Palo Alto, San Mateo County

No.	PROPERTY OWNER	PARCEL NUMBER
1.	Allen, Robert 1003 Weeks Street East Palo Alto, CA 94303	063-232-090
2.	Barajas Samuel and Maria 1896 Bay Road East Palo Alto, CA 94303	063-231-230
3.	Barajas, Samuel and Ibarr 1896 Bay Road East Palo Alto, CA 94303	063-231-280
4.	Barnes, Jack H. 611 12th Ave Menlo Park, CA 94025	063-133-090
5.	Beer, Deen R. and Jean 1885 Bay Road East Palo Alto, CA 94303	063-133-230, 063-131-240, 063-131-310
6.	Bernard, William 1711 Westport Road Kansas City, MO 64111	063-272-100
7.	County of San Mateo County Government Center Redwood City, CA 94063	063-121-190
8.	Duca and Hanley Properties 19312 Athos Place Saratoga, CA 95070	063-240-210, 063-240-220
9.	East Palo Alto Sanitary District 2524 Pulgas Ave. East Palo Alto, CA 94303	063-232-350
10.	Gheith, Yousef 521 3rd Street San Francisco, CA 94107	063-232-300
11.	Green, Edward and Ann 600 Crane Ave. Foster City, CA 94404	063-231-290

12.	Harmony Investment Co. P.O. Box 186 Half Moon Bay, CA 94019	063-121-020, 063-121-200, 063-121-210
13.	Ingram, Bobbie 325 Hazen Street Milpitas CA, 95035	063-131-250
14.	Iwasaki, Chiyoko and Han 1001 Waverly Ave Palo Alto, CA 94301	063-232-200, 063-232-210, 063-232-220, 063-232-230
15.	Lakeshore Financial 1915 Alum Rock Ave. San Jose, CA 95116	063-271-043, 063-271-430
16.	Marilyn Lemmon 486 Diamond Ct. Palo Alto, CA 94306	063-131-260, 063-131-270
17.	William Leonhart 69 Finger ve Redwood City, CA 94062	063-121-060
18.	Lopez and Guadnecio 1103 Weeks St. East Palo Alto, CA 94303	063-240-270, 063-240-360
19.	M, A & R P.O. Box 50367 Palo Alto, CA 94303	063-232-150, 063-232-160
20.	Mo, Yoke K & Ngoc Uan 2121 Old Page Mill Rd. Palo Alto, CA 94304	063-133-100, 063-133-070 063-133-080
21.	Price, Dallas and Berth 810 Schembri Lane Palo Alto, CA 94303	063-232-340
22.	Park, Ray & Sons 225 Demeter St. East Palo Alto, CA 94303	063-123-030, 063-123-080
23.	Roblake, Inc. P.O. Box 50065 Palo Alto, CA 94303	063-231-240
24.	Salzburg, David 815 N. Humbolt, 303 San Mateo, CA 94401	063-231-210

25.	Joseph Scianacalapore 3390 Alder Ave. Fremont, CA 94536	063-121-030, 063-121-040, 063-121-350, 063-132-020, 063-132-040
26.	Simon, Bertrand A. 57 Edgemont Way Oakland, CA 94605	063-231-270
27.	Tanklage, Don & Carole 1025 Tanklage Rd. San CArlos, CA 94070	063-231-250
28.	Tupou, Takivaha E. 1001 Weeks St. East Palo Alto, CA 94303	063-232-260
29.	Tyson, Herbert P., Jr. 2509 Pulgas Ave. East Palo Alto, CA 94303	063-131-340
30.	Wade, Robert 831 Bay Ave, Suite C Capatola, CA 95010	063-271-220

California Regional Water Quality Control Board
San Francisco Bay Region

Linda S. Adams
Secretary for
Environmental Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.waterboards.ca.gov/sanfranciscobay

Arnold Schwarzenegger
Governor

Date: September 13, 2006
File No. 41S0302 (MEJ)

Mr. Owen Byrd
Byrd Development LLC
418 Florence Street, Suite 100
Palo Alto, CA 94301
obyrd@byrddev.com

Subject: Approval of September 7, 2006, Remedial Action Plan (RAP) and Workplan for Initial Phases of Remedial Action, Pulgas Mixed Use Project, East Palo Alto, San Mateo County

Dear Mr. Byrd:

Water Board staff have reviewed the subject RAP for the Pulgas Mixed Use Project site. A draft RAP was circulated for a 30-day public comment period from June 22 through July 22, 2006. During the comment period, a fact sheet summarizing the proposed remedy was distributed and a community meeting was held to present the proposed cleanup plan and solicit comments. The subject RAP document is a revision of the draft document which takes into consideration comments received during the public comment period and addresses them, as appropriate. In addition, the RAP has been expanded to include a workplan for the initial phases of remedial actions, which are scheduled to begin in September. The RAP report, including the workplan for initial phases of remedial actions, is hereby approved.

Water Board staff finds that the RAP addresses comments received and is an appropriate remedy for the site, considering the planned development. You may move forward with the initial phases of remediation described in the workplan portion of the RAP. As we would like to monitor the remedial process, please submit a schedule for the implementation of remedial measures described in the workplan component of the report, prior to commencing work. As the remedy will require additional submittals for other components of the remedy, please also submit a schedule for these submittals at the soonest possible time. Lastly, prior to the sale of any portions of the development, all components of the remedy must be completed and approved by this office, including the recordation of institutional controls. Any exception to this requirement must be confirmed in writing by this office.

Should you have any comments or questions, please contact Mark Johnson of my staff at (510) 622-2493, mjohnson@waterboards.ca.gov.

Sincerely,

Bruce H. Wolfe
Executive Officer

CC:

Alvin James, City of EPA, ajames@cityofepa.org
Carlos Martinez, City of EPA, cmartinez@cityofepa.org
Maria Banico, City of EPA, mbanico@cityofepa.org
Debbie Schecter, City of EPA, dschechter@cityofepa.org
Fernando Bravo, City of EPA, fbravo@cityofepa.org
Chris Gale, City of EPA, cgale@cityofepa.org
Charles Ice, SMCHD, cice@co.sanmateo.ca.us
Kurt Soenen, TRC Lowney, ksoenen@lowney.com
Chuck Walton, DKB Homes, chuckwalton@dkbhomes.com
Patrick Brock, Brock and Co., pppp_94303@yahoo.com

California Regional Water Quality Control Board
San Francisco Bay Region

Linda S. Adams
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Arnold Schwarzenegger
Governor

Date: February 28, 2007
File No. 41S0302 (MEJ)

Mr. Owen Byrd
Byrd Development LLC
418 Florence Street, Suite 100
Palo Alto, CA 94301
obyrd@byrddev.com

Subject: Approval of January 17, 2007, Partial Completion Report for Remedial Action, Pulgas Mixed Use Project, East Palo Alto, San Mateo County

Dear Mr. Byrd:

Water Board staff have reviewed the subject report for the Pulgas Mixed Use Project site (Site) and find it acceptable. The report documents the completion of active remedial measures for soil and groundwater on the Site, pursuant to the approved September 7, 2006, Remedial Action Plan and Workplan for Initial Phases of Remediation. Water Board staff find that this portion of the remedy has been adequately completed.

The next steps in the redevelopment of the Site are grading and installation of underground utilities. During this process you must adhere to the October 27, 2006, Site Management Plan (SMP), which was approved by Water Board staff via e-mail on October 19, 2006. The SMP sets forth protocols to identify impacted soil which may be encountered during further work at the Site. Please make sure all contractors are provided a copy of this document and briefed appropriately. All contractors must keep an eye out for any undiscovered impacted areas, especially during any earthmoving activities. Additionally, please make sure that an appropriate Storm Water Pollution and Prevention Plan has been developed and proper paperwork filed.

As the remedy will require additional submittals to this office for the remaining components of the remedy, please submit an updated schedule for these submittals at the soonest possible time. We understand that the design for the vapor mitigation system should arrive in the next few weeks. Adequate time should be allowed for review and comment. Lastly, prior to the sale of any portions of the development, all components of the remedy must be completed and approved by this office, including the recordation of institutional controls. At such time, we will remove this site from existing Site Cleanup Requirement, Order Nos. 92-037 and 92-086, effectively closing the case.

Should you have any comments or questions, please contact Mark Johnson of my staff at (510) 622-2493, mjohnson@waterboards.ca.gov.

Sincerely,

Bruce H. Wolfe
Executive Officer

cc:

Alvin James, City of EPA, ajames@cityofepa.org
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Maria Banico, City of EPA, mbanico@cityofepa.org
Debbie Schecter, City of EPA, dschechter@cityofepa.org
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Chuck Walton, DKB Homes, chuckwalton@dkbhomes.com
Patrick Brock, Brock and Co., pppp_94303@yahoo.com

John and Marcia Goldman Foundation
SCA Project No. B11689

Table 1
Summary of Analytical Results - Soil
1950 Bay Road
East Palo Alto, California

		Sample ID										Environmental Screening Levels		California Regulatory Limits
Analyte	**Units**	B-1@2	B-1@7	B-2@2	B-2@5	B-3@2	B-3@10	B-4@2	B-4@7	B-5@2	B-5@5	Commercial Land Use	Construction Worker	TTLC
Sample Depth		2.0	7.0	2.0	5.0	2..0	10	2.0	7.0	2.0	5.0			
Hydrocarbons														
TPHg	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**5.0**	<1.0	500	2,700	NE
TPHd	mg/kg	**16**	<1.0	**6.7**	**1.6**	**46**	<1.0	**14**	<1.0	**52**	<1.0	110	900	NE
TPHmo	mg/kg	**170**	<5.0	**50**	**6.3**	**600**	<5.0	**98**	<5.0	**400**	<5.0	500	28,000	NE
Volatile Organic Compounds														
Tetrachloroethene	mg/kg	<0.005	<0.005	<0.005	**0.0079**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.7	31	NE
Trichloroethene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.46	24	NE
Remaining VOCs	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	varies	varies	NE
Title 22 Metals														
Antimony	mg/kg	**0.65**	<0.5	**0.69**	**0.52**	**1.2**	**0.56**	<0.5	<0.5	**0.88**	<0.5	40	120	500
Arsenic	mg/kg	**6.7**	**4.0**	**6.5**	**5.3**	**5.7**	**6.9**	**3.1**	**7.3**	**6.0**	**5.3**	1.6/11**	10	500
Barium	mg/kg	**220**	**110**	**260**	**220**	**190**	**200**	**160**	**110**	**200**	**160**	1,500	61,000	10,000
Beryllium	mg/kg	<0.5	<0.5	<0.5	**0.54**	<0.5	**0.64**	<0.5	<0.5	<0.5	**0.61**	8.0	180	75
Cadmium	mg/kg	**0.54**	<0.25	**0.52**	**0.37**	**0.87**	**0.32**	**0.44**	**0.25**	**2.7**	**0.29**	12	110	100
Chromium #	mg/kg	**60**	**40**	**53**	**48**	**58**	**49**	**63**	**44**	**67**	**45**	2,500#	460,000+	2,500#
Soluble Chromium (WET)	mg/L	**0.17**	--	**0.15**	--	**0.11**	--	**0.11**	--	**0.33**	--	NE	NE	5.0 (STLC)
Soluble Chromium (TCLP)	mg/L	<0.050	--	<0.050	--	<0.050	--	<0.050	--	<0.050	--	NE	NE	5.0 (TCLP)
Cobalt	mg/kg	**12**	**8.1**	**12**	**9.5**	**14**	**9.6**	**20**	**9.3**	**13**	**9.5**	80	49	8,000
Copper	mg/kg	**34**	**18**	**59**	**27**	**48**	**25**	**60**	**17**	**53**	**24**	230	12,000	2,500
Lead	mg/kg	**29**	**5.3**	**27**	**12**	**70**	**7.9**	**30**	**5.4**	**66**	**7.5**	320	320	1,000
Soluble Lead (WET)	mg/L	--	--	--	--	**1.1**	--	--	--	**1.4**	--	NE	NE	5.0 (STLC)
Soluble Lead (TCLP)	mg/L	--	--	--	--	<0.20	--	--	--	<0.20	--	NE	NE	5.0 (TCLP)
Mercury	mg/kg	**0.091**	<0.05	**0.093**	<0.05	**0.13**	**0.063**	<0.05	**0.052**	**0.43**	<0.05	10	27	20
Molybdenum	mg/kg	**1.4**	**1.2**	**1.2**	**1.5**	**1.1**	**1.9**	**0.68**	**1.2**	**1.7**	**1.4**	40	1,500	3,500
Nickel	mg/kg	**76**	**41**	**55**	**50**	**58**	**53**	**55**	**45**	**60**	**49**	150	6,100	2,000
Selenium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.5**	10	1,500	100
Silver	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	40	1,500	500
Thallium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	10	3.1	700
Vanadium	mg/kg	**62**	**42**	**51**	**48**	**65**	**53**	**55**	**49**	**67**	**52**	200	1,500	2,400
Zinc	mg/kg	**95**	**52**	**93**	**74**	**120**	**69**	**100**	**53**	**2,300**	**72**	600	93,000	5,000

Notes
TPHg = Total Petroleum Hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
Detected concentrations shown in **Bold**
mg/kg = Milligrams per kilogram
< = Not detected at or above laboratory reporting limit
ND = Not Detected; reporting limit varies by analyte
NE = Not Established
-- = Not Analyzed
+ = Chromium III
# = Total Chromium

TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
TCLP = Toxicity Characteristic Leaching Procedure
WET = Waste Extraction Test
ESLs = Environmental Screening Levels, San Francisco Bay Regional Water Quality Control Board's User's Guide:
Derivation and Application of Environmental Screening Levels, Interim Final December 2013
Table A (Commercial ESLs) and Table K-3 (Construction Worker ESLs)
** Background Arsenic Concentration in San Francisco Bay Region soils. Master's Thesis "Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region", dated December 2011.

🟨 Exceeds Commercial Land Use ESLs

Table 1
Summary of Analytical Results - Soil
1950 Bay Road
East Palo Alto, California

		Sample ID										Environmental Screening Levels		California Regulatory Limits
Analyte	**Units**	B-6@2	B-6@7	B-7@2	B-7@10	B-8@2	B-8@5	B-9@2	B-9@7	B-10@2	B-10@6	Commercial Land Use	Construction Worker	TTLC
Sample Type		2.0	7.0	2.0	10	2.0	5.0	2.0	7.0	2.0	6.0			
Hydrocarbons														
TPHg	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	500	2,700	NE
TPHd	mg/kg	**64**	<1.0	**1.1**	<1.0	**9.7**	<1.0	**1.7**	<1.0	**1.4**	<1.0	110	900	NE
TPHmo	mg/kg	**850**	<5.0	**7.8**	<5.0	**56**	<5.0	**6.5**	<5.0	**19**	<5.0	500	28,000	NE
Volatile Organic Compounds														
Tetrachloroethene	mg/kg	<0.005	<0.005	**0.0071**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.7	31	NE
Trichloroethene	mg/kg	<0.005	<0.005	<0.005	**0.0053**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.46	24	NE
Remaining VOCs	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	varies	varies	NE
Title 22 Metals														
Antimony	mg/kg	**0.88**	<0.5	**0.63**	**0.51**	**0.97**	**0.56**	**0.6**	<0.5	**1.0**	<0.5	40	120	500
Arsenic	mg/kg	**7.2**	**5.3**	**7.2**	**6.3**	**11**	**5.6**	**5.6**	**5.1**	**9.3**	**5.6**	1.6/11**	10	500
Barium	mg/kg	**230**	**97**	**300**	**230**	**170**	**160**	**250**	**130**	**220**	**150**	1,500	61,000	10,000
Beryllium	mg/kg	<0.5	**0.54**	<0.5	**0.63**	<0.5	<0.5	**0.51**	<0.5	**0.70**	**0.52**	8.0	180	75
Cadmium	mg/kg	**1.3**	**<0.25**	**0.47**	**0.37**	**0.91**	**0.34**	**0.44**	<0.25	**0.73**	**0.3**	12	110	100
Chromium #	mg/kg	**61**	**44**	**70**	**55**	**49**	**47**	**71**	**39**	**56**	**47**	2,500#	460,000+	2,500#
Soluble Chromium (WET)	mg/L	**0.16**	--	**0.14**	**0.052**	--	--	**0.016**	--	**0.086**	--	NE	NE	5.0 (STLC)
Soluble Chromium (TCLP)	mg/L	<0.050	--	--	<0.050	--	--	<0.050	--	<0.050	--	NE	NE	5.0 (TCLP)
Cobalt	mg/kg	**17**	**8.6**	**14**	**11**	**10**	**9.4**	**20**	**7.7**	**11**	**9.7**	80	49	8,000
Copper	mg/kg	**51**	**20**	**39**	**33**	**34**	**24**	**59**	**17**	**39**	**23**	230	12,000	2,500
Lead	mg/kg	**150**	**6.5**	**37**	**8.7**	**35**	**9.5**	**19**	**5.6**	**30**	**7.1**	320	320	1,000
Soluble Lead (WET)	mg/L	**0.58**	--	--	--	--	--	--	--	--	--	NE	NE	5.0 (STLC)
Soluble Lead (TCLP)	mg/L	<0.20	--	--	--	--	--	--	--	--	--	NE	NE	5.0 (TCLP)
Mercury	mg/kg	**0.11**	<0.05	**0.12**	**0.063**	**0.11**	**0.052**	<0.05	<0.05	**0.13**	<0.05	10	27	20
Molybdenum	mg/kg	**1.1**	**1.6**	**1.2**	**1.3**	**1.3**	**1.5**	**1.2**	**1.3**	**1.6**	**1.5**	40	1,500	3,500
Nickel	mg/kg	**67**	**43**	**96**	**56**	**44**	**47**	**78**	**38**	**54**	**49**	150	6,100	2,000
Selenium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.51**	<0.5	<0.5	<0.5	10	1,500	100
Silver	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	40	1,500	500
Thallium	mg/kg	<0.5	<0.5	<0.5	<0.5	**0.54**	<0.5	<0.5	<0.5	<0.5	<0.5	10	3.1	700
Vanadium	mg/kg	**99**	**46**	**62**	**56**	**54**	**47**	**100**	**40**	**64**	**48**	200	1,500	2,400
Zinc	mg/kg	**130**	**59**	**99**	**93**	**97**	**68**	**100**	**47**	**120**	**66**	600	93,000	5,000

Notes

TPHg = Total Petroleum Hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
Detected concentrations shown in **Bold**
mg/kg = Milligrams per kilogram
< = Not detected at or above laboratory reporting limit
ND = Not Detected; reporting limit varies by analyte
NE = Not Established
-- = Not Analyzed
+ = Chromium III
# = Total Chromium

TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
TCLP = Toxicity Characteristic Leaching Procedure
WET = Waste Extraction Test
ESLs = Environmental Screening Levels, San Francisco Bay Regional Water Quality Control Board's User's Guide: Derivation and Application of Environmental Screening Levels, Interim Final December 2013
Table A (Commercial ESLs) and Table K-3 (Construction Worker ESLs)
** Background Arsenic Concentration in San Francisco Bay Region soils. Master's Thesis "Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region", dated December 2011.

🟨 Exceeds Commercial Land Use ESLs

Table 2
Summary of Analytical Results - Grab Groundwater
1950 Bay Road
East Palo Alto, California

		Sample ID					Screening Critieria	
Analyte	**Units**	B-2W	B-3W	B-6W	B-8W	B-9W	Tier 1 ESLs	ESLs - Evaluation of Potential Vapor Intrusion Concern Commercial Land Use
Hydrocarbons								
TPHg	µg/L	<50	<50	<50	<50	<50	100	NE
TPHd	µg/L	<50	<50	**200**	<50	<50	100	NE
TPHmo	µg/L	<250	<250	**1,600**	<250	<250	100	NE
Volatile Organic Compounds								
Methyl-tert-butyl-ether (MTBE)	µg/L	**1.2**	**0.68**	**4.0**	<0.5	**5.0**	5.0	100,000
cis-1,2-Dichloroethene	µg/L	<0.5	**1.1**	<0.5	<0.5	<0.5	6.0	26,000
Tetrachloroethene	µg/L	**0.56**	<0.5	<0.5	**0.76**	<0.5	5.0	640
Trichloroethene	µg/L	**3.3**	**11**	<0.5	**2.3**	**0.56**	5.0	1,300
Remaining VOCs	µg/L	ND	ND	ND	ND	ND	varies	varies
Title 22 Metals (Dissolved)								
Antimony	µg/L	<10	<0.5	<0.5	<10	<0.5	6.0	NE
Arsenic	µg/L	<10	**0.54**	**1.1**	<10	**1.3**	10	NE
Barium	µg/L	**860**	**260**	**230**	**860**	**200**	1,000	NE
Beryllium	µg/L	<10	<0.5	<0.5	<10	<0.5	0.53	NE
Cadmium	µg/L	<5.0	**0.32**	**0.34**	<5.0	**0.28**	0.25	NE
Chromium #	µg/L	**55**	**0.87**	**2.0**	**31**	**4.2**	50#	NE
Cobalt	µg/L	**26**	**3.8**	**4.4**	**30**	**4.9**	3.0	NE
Copper	µg/L	<40	<2.0	**3.7**	<40	**5.0**	3.1	NE
Lead	µg/L	<10	<0.5	**0.83**	<10	**1.7**	2.5	NE
Mercury	µg/L	<0.5	<0.025	<0.025	<0.5	**0.028**	0.025	NE
Molybdenum	µg/L	**19**	**21**	**19**	**14**	**14**	78	NE
Nickel	µg/L	**97**	**12**	**9.2**	**65**	**11**	8.2	NE
Selenium	µg/L	<10	<0.5	<0.5	<10	**0.61**	5.0	NE
Silver	µg/L	<3.8	<0.19	<0.19	<3.8	<0.19	0.19	NE
Thallium	µg/L	<10	<0.5	<0.5	<10	<0.5	2.0	NE
Vanadium	µg/L	**58**	**1.9**	**4.5**	**49**	**7.2**	19	NE
Zinc	µg/L	<300	<15	<15	<300	<15	81	NE

Notes

TPHg = Total Petroleum Hydrocarbons as gasoline

🟨 Exceeds Tier 1 ESL criteria

TPHd = Total Petroleum Hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
Detected concentrations shown in **Bold**
µg/L= Micrograms per liter
< = Not detected at or above laboratory reporting limit
ND = Not Detected; reporting limit varies by analyte
NE = Not Established
+ = Chromium III
# = Total Chromium
ESLs = Environmental Screening Levels, San Francisco Bay Regional Water Quality Control Board's User's Guide:
Derivation and Application of Environmental Screening Levels, Interim Final December 2013 (Tier 1 ESL Table and Table E-1)

Table 3
Summary of Analytical Results - Soil-Vapor
1950 Bay Road
East Palo Alto, California

		Sample ID			Screening Critieria	
Analyte	**Units**	**SV-2**	**SV-3**	**SV-6**	Tier 1 ESLs	CHHSLs
Sample Depth	(feet)	5.0	5.0	5.0		
Volatile Organic Compounds						
1,2,4-Trimethylbenzene	$\mu g/m^3$	**2.9**	**2.3**	**1.5**	NE	NE
1,3,5-Trimethylbenzene	$\mu g/m^3$	<1.0	**1.7**	<0.51	NE	NE
2,2,4-Trimethylpentane	$\mu g/m^3$	**47**	**14**	<0.35	NE	NE
2-Butanone	$\mu g/m^3$	**1.5**	**20**	**4.1**	NE	NE
2-Propanol (Isopropyl Alcohol)*	$\mu g/m^3$	<0.52	<0.26	<0.26	NE	NE
4-Ethyl Toluene	$\mu g/m^3$	**7.2**	<0.47	<0.47	NE	NE
4-Methyl-2-pentanone	$\mu g/m^3$	**3.3**	**2.6**	<0.30	NE	NE
Acetone	$\mu g/m^3$	<0.52	**150**	**10**	15,000,000	NE
Benzene	$\mu g/m^3$	**18**	**13**	**3.8**	42	280
Carbon Disulfide	$\mu g/m^3$	**31**	**25**	**8.6**	NE	NE
Chloroform	$\mu g/m^3$	**4.2**	**4.1**	<0.50	230	NE
cis-1,2-Dichloroethene	$\mu g/m^3$	<0.55	**1.1**	<0.28	3,700	120,000
Cyclohexane	$\mu g/m^3$	**23**	**11**	<0.25	NE	NE
Dichlorodifluoromethane	$\mu g/m^3$	**2.2**	<0.56	**0.94**	NE	NE
Ethanol	$\mu g/m^3$	<0.40	**1.7**	**0.96**	NE	NE
Ethylbenzene	$\mu g/m^3$	**10**	**3.3**	<0.35	490	3,600
m,p-Xylene	$\mu g/m^3$	**53**	**19**	**2.3**	52,000†	2,100,000
o-Xylene	$\mu g/m^3$	**9.1**	**4.3**	<0.40	52,000†	2,100,000
p-Isopropyltoluene	$\mu g/m^3$	**12**	**5.7**	**1.7**	NE	NE
Tetrachloroethene	$\mu g/m^3$	**190**	<0.47	<0.47	210	1,600
Toluene	$\mu g/m^3$	**58**	**20**	**1.7**	160,000	890,000
Trichloroethene	$\mu g/m^3$	**2.3**	<0.47	<0.47	300	4,400
Trichlorofluoromethane	$\mu g/m^3$	**19**	**2.4**	**1.5**	NE	NE
Vinyl Acetate	$\mu g/m^3$	<0.76	**4.5**	<0.38	NE	NE
Remaining VOCs	$\mu g/m^3$	ND	ND	ND	varies	varies

Notes
Detected concentrations shown in **Bold**
$\mu g/m^3$= Micrograms per cubic meter
< = Not detected at or above laboratory reporting limit
ND = Not Detected; reporting limit varies by analyte
NE = Not Established
* Leak Check Compound
† = Result for Total Xylenes
ESLs = Environmental Screening Levels, San Francisco Bay Regional Water Quality Control Board's User's Guide:
Derivation and Application of Environmental Screening Levels, Interim Final December 2013 (Tier 1 ESL Table)
CHHSLs are Commercial California Human Health Screening Levels issued January 2005 by the California Environmental Protection Agency.
Table 2 Soil-Gas Screening Numbers for Volatile Chemicals Below Buildings Constructed with Engineered Fill Below Sub-Slab Gravel
Updated September 23, 2010 by Office of Environmental Health Hazard Assessment

Table 4
Summary of Analytical Results - Surficial Soil Sampling

1950 Bay Road
East Palo Alto, California

		Sample ID										Environmental Screening Levles		California Regulatory Limits
Analyte	**Units**	HA-1@0	HA-1@0.5,1,1.5	HA-2@0	HA-2@0.5,1,1.5	HA-3@0	HA-3@0.5,1,1.5	HA-4@0	HA-4@0.5,1,1.5	HA-5@0	HA-5@0.5,1,1.5	Commercial Land Use	Construction Worker	TTLC
Sample Type		Discrete	Composite	Discrete	Composite	Discrete	Composite	Discrete	Composite	Discrete	Composite			
Hydrocarbons														
TPHg	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	500	2,700	NE
TPHd	mg/kg	**4.7**	**1.2**	**6.9**	**12**	**7.8**	**15**	**4.7**	**7.4**	**4.0**	**12**	110	900	NE
TPHmo	mg/kg	**52**	**8.9**	**74**	**110**	**38**	**130**	**53**	**34**	**34**	**89**	500	28,000	NE
Volatile Organic Compounds														
Tetrachloroethene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.7	31	NE
Trichloroethene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.46	24	NE
Remaining VOCs	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	varies	varies	NE
Organochlorine Pesticides														
Chlordane (Technical)	mg/kg	<0.50	--	<0.50	<1.2	**0.36**	<1.2	<0.50	--	<1.2	--	1.7	12	2.5
a-Chlordane	mg/kg	<0.020	--	**0.028**	<0.05	**0.028**	<0.05	**0.022**	--	<0.050	--	NE	NE	NE
g-Chlordane	mg/kg	<0.020	--	**0.029**	<0.05	**0.032**	<0.05	**0.023**	--	<0.050	--	NE	NE	NE
4,4-DDD	mg/kg	<0.020	--	<0.020	<0.05	**0.021**	<0.05	<0.020	--	**0.14**	--	10	70	1.0*
4,4-DDE	mg/kg	**0.068**	--	**0.088**	**0.11**	**0.074**	**0.13**	**0.088**	--	**0.14**	--	4.0	50	1.0*
4,4-DDT	mg/kg	**0.11**	--	**0.13**	**0.15**	**0.099**	**0.15**	**0.012**	--	**0.22**	--	4.0	50	1.0*
Dieldrin	mg/kg	<0.020	--	**0.022**	<0.05	**0.014**	<0.05	<0.020	--	<0.050	--	0.0023	0.93	8.0
Remaining Pesticides	mg/kg	ND	--	ND	ND	ND	ND	ND	--	ND	--	varies	varies	varies
Title 22 Metals														
Antimony	mg/kg	**0.59**	**0.69**	**0.82**	**0.66**	**0.56**	**0.58**	**0.75**	**0.55**	<0.50	<0.50	40	120	500
Arsenic	mg/kg	**5.4**	**4.4**	**7.0**	**6.4**	**5.5**	**4.4**	**7.1**	**5.4**	**4.6**	**4.2**	1.6/11**	10	500
Barium	mg/kg	**310**	**190**	**460**	**320**	**300**	**250**	**510**	**270**	**270**	**170**	1,500	61,000	10,000
Beryllium	mg/kg	<0.50	<0.50	**0.59**	<0.50	<0.50	<0.50	**0.56**	<0.50	<0.50	<0.50	8.0	180	75
Cadmium	mg/kg	**0.47**	**0.34**	**6.0**	**0.49**	**0.41**	**0.45**	**0.54**	**0.38**	**0.34**	**0.36**	12	110	100
Chromium #	mg/kg	**58**	**38**	**75**	**73**	**59**	**52**	**120**	**59**	**47**	**54**	2,500#	460,000+	2,500#
Soluble Chromium (WET)	mg/L	**0.24**	--	**0.29**	**0.14**	**0.23**	**0.15**	**0.17**	**0.20**	--	**0.16**	NE	NE	5.0 (STLC)
Soluble Chromium (TCLP)	mg/L	<0.05	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	NE	NE	5.0 (TCLP)
Cobalt	mg/kg	**16**	**13**	**17**	**15**	**15**	**12**	**28**	**16**	**15**	**11**	80	49	8,000
Copper	mg/kg	**52**	**31**	**50**	**47**	**41**	**38**	**72**	**47**	**34**	**34**	230	12,000	2,500
Lead	mg/kg	**21**	**21**	**27**	**25**	**19**	**25**	**28**	**21**	**17**	**23**	320	320	1,000
Soluble Lead (WET)	mg/L	--	--	--	--	--	--	--	--	--	--	NE	NE	5.0 (STLC)
Soluble Lead (TCLP)	mg/L	--	--	--	--	--	--	--	--	--	--	NE	NE	5.0 (TCLP)
Mercury	mg/kg	**0.11**	**0.12**	**0.15**	**0.14**	**0.2**	**0.13**	**0.18**	**0.13**	**0.16**	**0.086**	10	27	20
Molybdenum	mg/kg	**1.6**	**0.95**	**1.4**	**1.3**	**1.1**	**0.94**	**1.5**	**1.2**	**0.93**	**0.94**	40	1,500	3,500
Nickel	mg/kg	**72**	**52**	**83**	**79**	**69**	**54**	**170**	**75**	**98**	**58**	150	6,100	2,000
Selenium	mg/kg	<0.50	<0.50	**0.71**	<0.50	**0.53**	<0.50	**0.61**	<0.50	<0.50	<0.50	10	1,500	100
Silver	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	40	1,500	500
Thallium	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10	3.1	700
Vanadium	mg/kg	**64**	**41**	**74**	**61**	**66**	**55**	**88**	**63**	**51**	**50**	200	1,500	2,400
Zinc	mg/kg	**110**	**79**	**120**	**110**	**96**	**86**	**130**	**97**	**84**	**78**	600	93,000	5,000

🟨 Exceeds Commercial Land Use ESLs

Notes

TPHg = Total Petroleum Hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
Detected concentrations shown in **Bold**
mg/kg = Milligrams per kilogram
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ND = Not Detected; reporting limit varies by analyte
NE = Not Established
-- = Not Analyzed
+ = Chromium III
# = Total Chromium

TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
TCLP = Toxicity Characteristic Leaching Procedure
WET = Waste Extraction Test
ESLs = Environmental Screening Levels, San Francisco Bay Regional Water Quality Control Board's User's Guide: Derivation and Application of Environmental Screening Levels, Interim Final December 2013 Table A (Commercial ESLs) and Table K-3 (Construction Worker ESLs
** Background Arsenic Concentration in San Francisco Bay Region soils. Master's Thesis "Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region", dated December 2011.
† = Initial results reported lead of 1,100 mg/kg. Due to this anomaly, SCA had the sample re-extracted and re-analyzed including the completion of soluble lead analyses to determine total lead concentration.
* Cummulative TTLC threshold of 1.0 mg/kg for DDD, DDE, & DDT

Table 4
Summary of Analytical Results - Surficial Soil Sampling
1950 Bay Road
East Palo Alto, California

		Sample ID										Environmental Screening Levels		California Regulatory Limits
Analyte	**Units**	HA-6@0	HA-6@0.5,1,1.5	HA-7@0	HA-7@0.5,1,1.5	HA-8@0	HA-8@0.5,1,1.5	HA-9@0	HA-9@0.5,1,1.5	HA-10@0	HA-10@0.5,1,1.5	Commercial Land Use	Construction Worker	TTLC
Sample Type		Discrete	Composite	Discrete	Composite	Discrete	Composite	Discrete	Composite	Discrete	Composite			
Hydrocarbons														
TPHg	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	500	2,700	NE
TPHd	mg/kg	**2.8**	**18**	**1.8**	**1.7**	**2.6**	**2.4**	**12**	**12**	**11**	**5.7**	110	900	NE
TPHmo	mg/kg	**30**	**140**	**18**	**10**	**36**	**21**	**68**	**120**	**78**	**29**	500	28,000	NE
Volatile Organic Compounds														
Tetrachloroethene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.7	31	NE
Trichloroethene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.46	24	NE
Remaining VOCs	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	varies	varies	NE
Organochlorine Pesticides														
Chlordane (Technical)	mg/kg	<0.50	<2.5	**0.25**	--	<0.25	<1.2	<0.50	<1.2	<0.50	--	1.7	12	2.5
a-Chlordane	mg/kg	**0.028**	<0.10	**0.020**	--	**0.013**	<0.05	**0.035**	<0.05	**0.038**	--	NE	NE	NE
g-Chlordane	mg/kg	**0.029**	<0.10	**0.019**	--	**0.010**	<0.05	**0.039**	<0.05	**0.043**	--	NE	NE	NE
4,4-DDD	mg/kg	**0.024**	<0.10	**0.021**	--	<0.010	<0.05	**0.023**	<0.05	**0.023**	--	10	70	1.0*
4,4-DDE	mg/kg	**0.11**	**0.20**	**0.20**	--	**0.034**	**0.23**	**0.049**	<0.05	**0.055**	--	4.0	50	1.0*
4,4-DDT	mg/kg	**0.12**	**0.21**	**0.18**	--	**0.049**	**0.13**	**0.081**	**0.080**	**0.12**	--	4.0	50	1.0*
Dieldrin	mg/kg	<0.020	<0.10	**0.041**	--	<0.010	<0.05	<0.020	<0.05	<0.020	--	0.0023	0.93	8.0
Remaining Pesticides	mg/kg	ND	ND	ND	--	ND	ND	ND	ND	ND	--	varies	varies	varies
Title 22 Metals														
Antimony	mg/kg	**0.51**	<0.50	<0.50	**0.56**	**0.59**	<0.50	**3.9**	**0.74**	**0.57**	**0.62**	40	120	500
Arsenic	mg/kg	**4.8**	**4.0**	**4.5**	**6.1**	**8.9**	**4.5**	**5.0**	**5.3**	**4.9**	**5.0**	1.6/11**	10	500
Barium	mg/kg	**240**	**200**	**250**	**320**	**150**	**270**	**230**	**680**	**280**	**280**	1,500	61,000	10,000
Beryllium	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8.0	180	75
Cadmium	mg/kg	**0.35**	**0.40**	**0.33**	**0.33**	**0.44**	**0.30**	**0.46**	**0.40**	**0.41**	**0.38**	12	110	100
Chromium #	mg/kg	**50**	**37**	**38**	**50**	**45**	**46**	**250**	**89**	**61**	**54**	2,500#	460,000+	2,500#
Soluble Chromium (WET)	mg/L	**0.19**	--	--	**0.14**	--	--	**0.29**	**0.22**	**0.22**	**0.19**	NE	NE	5.0 (STLC)
Soluble Chromium (TCLP)	mg/L	<0.05	--	--	<0.05	--	--	<0.05	<0.05	<0.05	<0.05	NE	NE	5.0 (TCLP)
Cobalt	mg/kg	**12**	**11**	**9.4**	**11**	**9.6**	**9.3**	**16**	**18**	**16**	**14**	80	49	8,000
Copper	mg/kg	**35**	**28**	**24**	**39**	**31**	**30**	**48**	**58**	**49**	**43**	230	12,000	2,500
Lead	mg/kg	**15**	**19**	**13**	**21**	**64**	**16**	**33†**	**30**	**23**	**24**	320	320	1,000
Soluble Lead (WET)	mg/L	--	--	--	--	**3.4**	--	**0.48**	--	--	--	NE	NE	5.0 (STLC)
Soluble Lead (TCLP)	mg/L	--	--	--	--	<0.20	--	<0.20	--	--	--	NE	NE	5.0 (TCLP)
Mercury	mg/kg	**0.084**	**0.080**	**0.084**	**0.34**	**0.12**	**0.065**	**0.12**	**0.16**	**0.13**	**0.15**	10	27	20
Molybdenum	mg/kg	**0.95**	**0.80**	**0.74**	**1.1**	**1.5**	**1.0**	**19**	**1.4**	**1.0**	**1.1**	40	1,500	3,500
Nickel	mg/kg	**57**	**86**	**49**	**58**	**40**	**49**	**84**	**110**	**73**	**67**	150	6,100	2,000
Selenium	mg/kg	<0.50	<0.50	<0.50	<0.50	**0.51**	<0.50	<0.50	<0.50	<0.50	<0.50	10	1,500	100
Silver	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	40	1,500	500
Thallium	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	10	3.1	700
Vanadium	mg/kg	**56**	**39**	**39**	**46**	**51**	**42**	**65**	**78**	**68**	**57**	200	1,500	2,400
Zinc	mg/kg	**80**	**70**	**63**	**80**	**150**	**73**	**110**	**140**	**100**	**96**	600	93,000	5,000

Notes
TPHg = Total Petroleum Hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
Detected concentrations shown in **Bold**
mg/kg = Milligrams per kilogram
< = Not detected at or above laboratory reporting limit
ND = Not Detected; reporting limit varies by analyte
NE = Not Established
-- = Not Analyzed
+ = Chromium III
# = Total Chromium

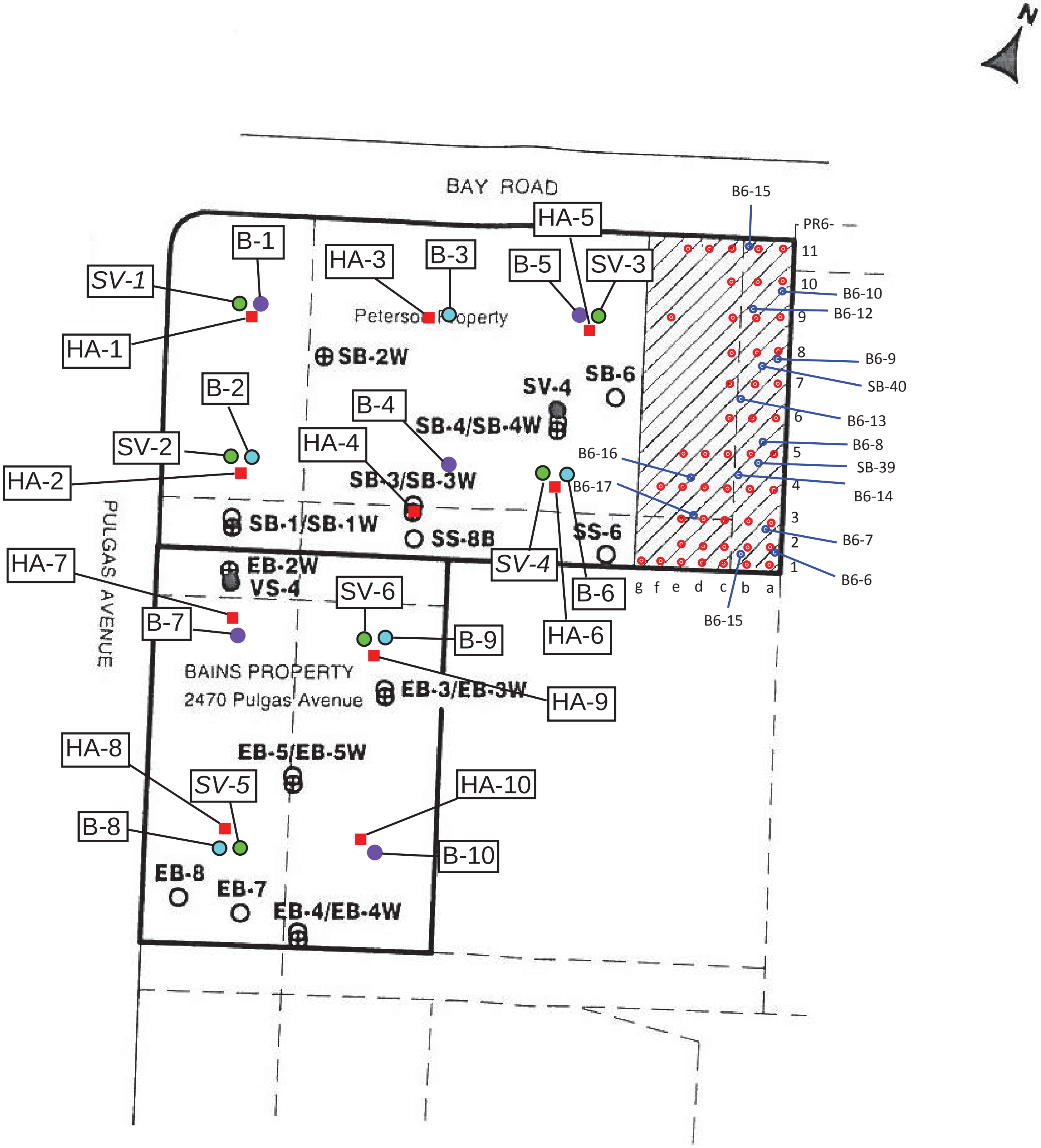
TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
TCLP = Toxicity Characteristic Leaching Procedure
WET = Waste Extraction Test
ESLs = Environmental Screening Levels, San Francisco Bay Regional Water Quality Control Board's User's Guide: Derivation and Application of Environmental Screening Levels, Interim Final December 2013 Table A (Commercial ESLs) and Table K-3 (Construction Worker ESLs
** Background Arsenic Concentration in San Francisco Bay Region soils. Master's Thesis "Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region", dated December 2011.
† = Initial results reported lead of 1,100 mg/kg. Due to this anomaly, SCA had the sample re-extracted and re-analyzed including the completion of soluble lead analyses to determine total lead concentration.
* Cummulative TTLC threshold of 1.0 mg/kg for DDD, DDE, & DDT

🟨 Exceeds Commercial Land Use ESLs

Table 5
Summary of Analytical Results - Debris Piles
1950 Bay Road
East Palo Alto, California

		Sample ID								California Regulatory Limits
Analyte	**Units**	Concrete-1-1	Concrete-1-2	Concrete-1-3	Brick-2-1	Brick-2-2	Asphalt-3-1	FLCER-4-1	Toilet-5-1	TTLC
Sample Type		Concrete	Concrete	Concrete	Brick	Brick	Asphalt	Ceramic Tile	Toilet	
General Chemistry										
Asbestos	%	ND	ND	ND	ND	ND	ND	ND	ND	1.0%*

Notes
< = Not detected at or above laboratory reporting limit
ND = Not Detected; reporting limit varies by analyte
TTLC - Total Threshold Limit Concentration
* Cummulative TTLC threshold of 1.0% for Asbestos



Legend:

▨ Asphalt Cap

● Approximate Location of Soil Boring/Sample – Geomatrix, pre-1989

● Approximate Location of Soil Boring/Sample – Geomatrix, 1991/1992

○ Approximate Location of Soil Boring/Sample – TRC Lowney 2006

⊕ Approximate Location of Groundwater Sample – TRC Lowney 2006

● Approximate Location of Soil- Vapor Sample – TRC Lowney 2006

● Approximate Location of Soil Boring - SCA 2015

● Approximate Location of Soil/Groundwater Boring - SCA 2015

● Approximate Location of Soil-Vapor Boring - SCA 2015

Note: Italicized locations not sampled due to vandalism or vapor lock due to tight formation.

■ Approximate Location of Surficial Soil Sampling - SCA 2015

1” = 100 feet
(Approximate Scale)

Source: TRC Lowney, Site Management Plan, Pulgas Mixed Use Project, Figure 2, Dated October 27, 2006

SCA ENVIRONMENTAL, INC.	**SITE DIAGRAM** 1950 Bay Road East Palo Alto, California SCA Project No.: B11689	Figure 2

← Area Location Map

SCA
ENVIRONMENTAL, INC.

DEBRIS PILE SAMPLE LOCATIONS
1950 Bay Road
East Palo Alto, California
SCA Project No.: B11689

Figure
3A

Area Location Map

SCA ENVIRONMENTAL, INC.	**DEBRIS PILE SAMPLE LOCATIONS** 1950 Bay Road East Palo Alto, California SCA Project No.: B11689	Figure 3A

Area Location Map

SCA ENVIRONMENTAL, INC.

DEBRIS PILE SAMPLE LOCATIONS
1950 Bay Road
East Palo Alto, California
SCA Project No.: B11689

Figure

3C

APPENDIX C
MISCELLANEOUS CORRESPONDENCE AND INTERVIEWS

Amended May 15, 2015

First American Title Company
National Commercial Services

1737 North First Street, Suite 500
San Jose, CA 95112

Michael C. Polentz
Manatt, Phelps & Phillips, LLP
1841 Page Mill Rd, Suite 200
Palo Alto, CA 94304
Phone: (650)812-1300

Escrow Officer:	Carol M. Herrera
Phone:	(408)451-7829
Email:	cmherrera@firstam.com
Title Officer:	Mike D. Hickey
Phone:	(408)451-7905
Property:	Vacant Land, East Palo Alto, CA

PRELIMINARY REPORT

In response to the above referenced application for a policy of title insurance, this company hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage and Limitations on Covered Risks of said policy or policies are set forth in Exhibit A attached. *The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than that set forth in the arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties.* Limitations on Covered Risks applicable to the CLTA and ALTA Homeowner's Policies of Title Insurance which establish a Deductible Amount and a Maximum Dollar Limit of Liability for certain coverages are also set forth in Exhibit A. Copies of the policy forms should be read. They are available from the office which issued this report.

Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit A of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.

It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

Dated as of April 15, 2015 at 7:30 A.M.

The form of Policy of title insurance contemplated by this report is:

ALTA Policy

A specific request should be made if another form or additional coverage is desired.

Title to said estate or interest at the date hereof is vested in:

DKB Homes LLC, a California Limited Liability Company

The estate or interest in the land hereinafter described or referred to covered by this Report is:

Fee

The Land referred to herein is described as follows:

(See attached Legal Description)

At the date hereof exceptions to coverage in addition to the printed Exceptions and Exclusions in said policy form would be as follows:

1. General and special taxes and assessments for the fiscal year 2015-2016, a lien not yet due or payable.

2. Assessment liens, if applicable, collected with the general and special taxes, including but not limited to those disclosed by the reflection of the following on the tax roll:

   1915 Bond for City of East Palo Alto.

3. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

4. An easement for pole line, wires and incidental purposes, recorded August 27, 1917 in Book 268 of Deeds, Page 39.
   In Favor of: Pacific Gas and Electric Company
   Affects: as described therein

5. The terms and provisions contained in the document entitled "Agreement" recorded May 5, 1983 as Instrument No. 83044506 of Official Records.

6. The fact that the land lies within the boundaries of the Ravenswood Industrial Area Redevelopment Project, as disclosed by the document recorded July 17, 1990 as Instrument No. 90095083 of Official Records.

7. The terms and provisions contained in the document entitled "Covenant and Agreement to Restrict Use of Property" recorded December 13, 1993 as Instrument No. 93216751 of Official Records.

   The terms and provisions contained in the document entitled "Notice Regarding Covenant and Agreement to Restrict Use of Property" recorded June 29, 2012 as Instrument No. 2012-092287 of Official Records.

8. The terms, provisions and easement(s) contained in the document entitled "Grant of Temporary, Non-Exclusive Easement for Ingress and Egress and Permanent, Non-Exclusive Utility Easement Agreement" recorded May 23, 2006 as Instrument No. 2006-076921 of Official Records.

   Document(s) declaring modifications thereof recorded August 23, 2006 as Instrument No. 2006-127036 of Official Records.

9. An easement shown or dedicated on the map of 1950 Bay Road East Palo Alto, California recorded November 26, 2008 and on file in Book 136, Page 79 to 80, of Tract Maps.
   For: Private Drive, Emergency Vehicle Access Easements, Public Utility Easement, Private Storm Drainage Easement and Private Sanitary Sewer Easement and incidental purposes.

10. Water rights, claims or title to water, whether or not shown by the public records.

11. Rights of parties in possession.

12. This item has been intentionally deleted.

    (Affects APN: 063-240-320 and 063-240-330)

INFORMATIONAL NOTES

1. Taxes for proration purposes only for the fiscal year 2014-2015.

First Installment:	$9,494.38, PAID
Second Installment:	$9,494.38, PAID
Tax Rate Area:	21-052
APN:	063-240-210

2. Taxes for proration purposes only for the fiscal year 2014-2015.

First Installment:	$9,036.66, PAID
Second Installment:	$9,036.66, PAID
Tax Rate Area:	21-046
APN:	063-240-220

3. Taxes for proration purposes only for the fiscal year 2014-2015.

First Installment:	$30,179.97, PAID
Second Installment:	$30,179.97, PAID
Tax Rate Area:	21-052
APN:	063-240-320

4. Taxes for proration purposes only for the fiscal year 2014-2015.

First Installment:	$8,333.75, PAID
Second Installment:	$8,333.75, PAID
Tax Rate Area:	21-046
APN:	063-240-330

5. Taxes for proration purposes only for the fiscal year 2014-2015.

First Installment:	$1,431.63, PAID
Second Installment:	$1,431.63, PAID
Tax Rate Area:	21-046
APN:	063-240-350

6. Taxes for proration purposes only for the fiscal year 2014-2015.

First Installment:	$1,616.90, PAID
Second Installment:	$1,616.90, PAID
Tax Rate Area:	21-052
APN:	063-240-440

7. The property covered by this report is vacant land.

8. According to the public records, there has been no conveyance of the land within a period of twenty-four months prior to the date of this report, except as follows:

   None

9. This preliminary report/commitment was prepared based upon an application for a policy of title insurance that identified land by street address or assessor's parcel number only. It is the responsibility of the applicant to determine whether the land referred to herein is in fact the land that is to be described in the policy or policies to be issued.

10. Should this report be used to facilitate your transaction, we must be provided with the following prior to the issuance of the policy:

    A. WITH RESPECT TO A CORPORATION:
       1. A certificate of good standing of recent date issued by the Secretary of State of the corporation's state of domicile.
       2. A certificate copy of a resolution of the Board of Directors authorizing the contemplated transaction and designating which corporate officers shall have the power to execute on behalf of the corporation.
       3. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

    B. WITH RESPECT TO A CALIFORNIA LIMITED PARTNERSHIP:
       1. A certified copy of the certificate of limited partnership (form LP-1) and any amendments thereto (form LP-2) to be recorded in the public records;
       2. A full copy of the partnership agreement and any amendments;
       3. Satisfactory evidence of the consent of a majority in interest of the limited partners to the contemplated transaction;
       4. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

    C. WITH RESPECT TO A FOREIGN LIMITED PARTNERSHIP:
       1. A certified copy of the application for registration, foreign limited partnership (form LP-5) and any amendments thereto (form LP-6) to be recorded in the public records;
       2. A full copy of the partnership agreement and any amendment;
       3. Satisfactory evidence of the consent of a majority in interest of the limited partners to the contemplated transaction;
       4. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

    D. WITH RESPECT TO A GENERAL PARTNERSHIP:
       1. A certified copy of a statement of partnership authority pursuant to Section 16303 of the California Corporation Code (form GP-I), executed by at least two partners, and a certified copy of any amendments to such statement (form GP-7), to be recorded in the public records;
       2. A full copy of the partnership agreement and any amendments;
       3. Requirements which the Company may impose following its review of the above material required herein and other information which the Company may require.

    E. WITH RESPECT TO A LIMITED LIABILITY COMPANY:
       1. A copy of its operating agreement and any amendments thereto;
       2. If it is a California limited liability company, a certified copy of its articles of organization (LLC-1) and any certificate of correction (LLC-11), certificate of amendment (LLC-2), or restatement of articles of organization (LLC-10) to be recorded in the public records;

3. If it is a foreign limited liability company, a certified copy of its application for registration (LLC-5) to be recorded in the public records;
4. With respect to any deed, deed of trust, lease, subordination agreement or other document or instrument executed by such limited liability company and presented for recordation by the Company or upon which the Company is asked to rely, such document or instrument must be executed in accordance with one of the following, as appropriate:
    (i) If the limited liability company properly operates through officers appointed or elected pursuant to the terms of a written operating agreement, such documents must be executed by at least two duly elected or appointed officers, as follows: the chairman of the board, the president or any vice president, and any secretary, assistant secretary, the chief financial officer or any assistant treasurer;
    (ii) If the limited liability company properly operates through a manager or managers identified in the articles of organization and/or duly elected pursuant to the terms of a written operating agreement, such document must be executed by at least two such managers or by one manager if the limited liability company properly operates with the existence of only one manager.
5. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

F. WITH RESPECT TO A TRUST:

1. A certification pursuant to Section 18100.5 of the California Probate Code in a form satisfactory to the Company.
2. Copies of those excerpts from the original trust documents and amendments thereto which designate the trustee and confer upon the trustee the power to act in the pending transaction.
3. Other requirements which the Company may impose following its review of the material require herein and other information which the Company may require.

G. WITH RESPECT TO INDIVIDUALS:

1. A statement of information.

The map attached, if any, may or may not be a survey of the land depicted hereon. First American Title Insurance Company expressly disclaims any liability for loss or damage which may result from reliance on this map except to the extent coverage for such loss or damage is expressly provided by the terms and provisions of the title insurance policy, if any, to which this map is attached.

LEGAL DESCRIPTION

Real property in the City of East Palo Alto, County of San Mateo, State of California, described as follows:

LOT 1 AS SHOWN ON THAT CERTAIN MAP ENTITLED 1950 BAY ROAD EAST PALO ALTO, CALIFORNIA, WHICH MAP WAS FILED IN THE OFFICE OF THE RECORDER OF THE COUNTY OF SAN MATEO, STATE OF CALIFORNIA ON NOVEMBER 26, 2008, IN BOOK 136 OF MAPS PAGE(S) 79 TO 80.

APN: 063-240-210, 063-240-220, 063-240-320, 063-240-330, 063-240-350 and 063-240-440

JPN: 063-024-240-21-A; 063-024-240-22-A; 063-024-240-32-A; 063-024-240-33-A; 063-024-240-35-A & 063-024-240-34-01-A

NOTICE I

Section 12413.1 of the California Insurance Code, effective January 1, 1990, requires that any title insurance company, underwritten title company, or controlled escrow company handling funds in an escrow or sub-escrow capacity, wait a specified number of days after depositing funds, before recording any documents in connection with the transaction or disbursing funds. This statute allows for funds deposited by wire transfer to be disbursed the same day as deposit. In the case of cashier's checks or certified checks, funds may be disbursed the next day after deposit. In order to avoid unnecessary delays of three to seven days, or more, please use wire transfer, cashier's checks, or certified checks whenever possible.

If you have any questions about the effect of this new law, please contact your local First American Office for more details.

NOTICE II

As of January 1, 1991, if the transaction which is the subject of this report will be a sale, you as a party to the transaction, may have certain tax reporting and withholding obligations pursuant to the state law referred to below:

In accordance with Sections 18662 and 18668 of the Revenue and Taxation Code, a buyer may be required to withhold an amount equal to three and one-third percent of the sales price in the case of the disposition of California real property interest by either:

1. A seller who is an individual with a last known street address outside of California or when the disbursement instructions authorize the proceeds be sent to a financial intermediary of the seller, OR
2. A corporate seller which has no permanent place of business in California.

The buyer may become subject to penalty for failure to withhold an amount equal to the greater of 10 percent of the amount required to be withheld or five hundred dollars ($500).

However, notwithstanding any other provision included in the California statutes referenced above, no buyer will be required to withhold any amount or be subject to penalty for failure to withhold if:

1. The sales price of the California real property conveyed does not exceed one hundred thousand dollars ($100,000), OR
2. The seller executes a written certificate, under the penalty of perjury, certifying that the seller is a resident of California, or if a corporation, has a permanent place of business in California, OR
3. The seller, who is an individual, executes a written certificate, under the penalty of perjury, that the California real property being conveyed is the seller's principal residence (as defined in Section 1034 of the Internal Revenue Code).

The seller is subject to penalty for knowingly filing a fraudulent certificate for the purpose of avoiding the withholding requirement.

The California statutes referenced above include provisions which authorize the Franchise Tax Board to grant reduced withholding and waivers from withholding on a case-by-case basis.

The parties to this transaction should seek an attorney's, accountant's, or other tax specialist's opinion concerning the effect of this law on this transaction and should not act on any statements made or omitted by the escrow or closing officer.

The Seller May Request a Waiver by Contacting:
Franchise Tax Board
Withhold at Source Unit
P.O. Box 651
Sacramento, CA 95812-0651
(916) 845-4900

Privacy Policy

We Are Committed to Safeguarding Customer Information

In order to better serve your needs now and in the future, we may ask you to provide us with certain information. We understand that you may be concerned about what we will do with such information - particularly any personal or financial information. We agree that you have a right to know how we will utilize the personal information you provide to us. Therefore, together with our parent company, The First American Corporation, we have adopted this Privacy Policy to govern the use and handling of your personal information.

Applicability

This Privacy Policy governs our use of the information which you provide to us. It does not govern the manner in which we may use information we have obtained from any other source, such as information obtained from a public record or from another person or entity. First American has also adopted broader guidelines that govern our use of personal information regardless of its source. First American calls these guidelines its *Fair Information Values*, a copy of which can be found on our website at www.firstam.com.

Types of Information

Depending upon which of our services you are utilizing, the types of nonpublic personal information that we may collect include:

- Information we receive from you on applications, forms and in other communications to us, whether in writing, in person, by telephone or any other means;
- Information about your transactions with us, our affiliated companies, or others; and
- Information we receive from a consumer reporting agency.

Use of Information

We request information from you for our own legitimate business purposes and not for the benefit of any nonaffiliated party. Therefore, we will not release your information to nonaffiliated parties except: (1) as necessary for us to provide the product or service you have requested of us; or (2) as permitted by law. We may, however, store such information indefinitely, including the period after which any customer relationship has ceased. Such information may be used for any internal purpose, such as quality control efforts or customer analysis. We may also provide all of the types of nonpublic personal information listed above to one or more of our affiliated companies. Such affiliated companies include financial service providers, such as title insurers, property and casualty insurers, and trust and investment advisory companies, or companies involved in real estate services, such as appraisal companies, home warranty companies, and escrow companies. Furthermore, we may also provide all the information we collect, as described above, to companies that perform marketing services on our behalf, on behalf of our affiliated companies, or to other financial institutions with whom we or our affiliated companies have joint marketing agreements.

Former Customers

Even if you are no longer our customer, our Privacy Policy will continue to apply to you.

Confidentiality and Security

We will use our best efforts to ensure that no unauthorized parties have access to any of your information. We restrict access to nonpublic personal information about you to those individuals and entities who need to know that information to provide products or services to you. We will use our best efforts to train and oversee our employees and agents to ensure that your information will be handled responsibly and in accordance with this Privacy Policy and First American's *Fair Information Values*. We currently maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard your nonpublic personal information.

CLTA/ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE (02-03-10)
EXCLUSIONS

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of those portions of any law or government regulation concerning:
   - (a) building;
   - (b) zoning;
   - (c) land use;
   - (d) improvements on the Land;
   - (e) land division; and
   - (f) environmental protection.

   This Exclusion does not limit the coverage described in Covered Risk 8.a., 14, 15, 16, 18, 19, 20, 23 or 27.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not limit the coverage described in Covered Risk 14 or 15.
3. The right to take the Land by condemning it. This Exclusion does not limit the coverage described in Covered Risk 17.
4. Risks:
   (a) that are created, allowed, or agreed to by You, whether or not they are recorded in the Public Records;
   (b) that are Known to You at the Policy Date, but not to Us, unless they are recorded in the Public Records at the Policy Date;
   (c) that result in no loss to You; or
   (d) that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.e., 25, 26, 27 or 28.
5. Failure to pay value for Your Title.
6. Lack of a right:
   (a) to any land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   (b) in streets, alleys, or waterways that touch the Land.
   This Exclusion does not limit the coverage described in Covered Risk 11 or 21.
7. The transfer of the Title to You is invalid as a preferential transfer or as a fraudulent transfer or conveyance under federal bankruptcy, state insolvency, or similar creditors' rights laws.

LIMITATIONS ON COVERED RISKS

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows: For Covered Risk 16, 18, 19, and 21 Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.

Your Deductible Amount	**Our Maximum Dollar Limit of Liability**
Covered Risk 16: 1% of Policy Amount or $2,500.00 (whichever is less)	$10,000.00
Covered Risk 18: 1% of Policy Amount or $5,000.00 (whichever is less)	$25,000.00
Covered Risk 19: 1% of Policy Amount or $5,000.00 (whichever is less)	$25,000.00
Covered Risk 21: 1% of Policy Amount or $2,500.00 (whichever is less)	$5,000.00

ALTA RESIDENTIAL TITLE INSURANCE POLICY (6-1-87)
EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning:
   - (a) and use
   - (b) improvements on the land
   - (c) and division
   - (d) environmental protection

   This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at Policy Date.
   This exclusion does not limit the zoning coverage described in Items 12 and 13 of Covered Title Risks.
2. The right to take the land by condemning it, unless:
   (a) a notice of exercising the right appears in the public records on the Policy Date

(b) the taking happened prior to the Policy Date and is binding on you if you bought the land without knowing of the taking

3. Title Risks:
   (a) that are created, allowed, or agreed to by you
   (b) that are known to you, but not to us, on the Policy Date -- unless they appeared in the public records
   (c) that result in no loss to you
   (d) that first affect your title after the Policy Date -- this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks
4. Failure to pay value for your title.
5. Lack of a right:
   (a) to any land outside the area specifically described and referred to in Item 3 of Schedule A OR
   (b) in streets, alleys, or waterways that touch your land
   This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

2006 ALTA LOAN POLICY (06-17-06)

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. a. Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
      i. the occupancy, use, or enjoyment of the Land;
      ii. the character, dimensions, or location of any improvement erected on the Land;
      iii. the subdivision of land; or
      iv. environmental protection;

      or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   b. Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   a. created, suffered, assumed, or agreed to by the Insured Claimant;
   b. not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   c. resulting in no loss or damage to the Insured Claimant;
   d. attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
   e. resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   a. a fraudulent conveyance or fraudulent transfer, or
   b. a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

2006 ALTA OWNER'S POLICY (06-17-06)

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. a. Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   i. the occupancy, use, or enjoyment of the Land;
   ii. the character, dimensions, or location of any improvement erected on the Land;
   iii. the subdivision of land; or
   iv. environmental protection;

   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.

   b.Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   a. created, suffered, assumed, or agreed to by the Insured Claimant;
   b. not Known to the Company, not recorded in the Public Records at Date of Policy, but known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   c. resulting in no loss or damage to the Insured Claimant;
   d. attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
   e. resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.

4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   a. a fraudulent conveyance or fraudulent transfer, or
   b. a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (07-26-10)

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. a. Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
    i. the occupancy, use, or enjoyment of the Land;
    ii. the character, dimensions, or location of any improvement erected on the Land;
    iii. the subdivision of land; or
    iv. environmental protection;

    or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.

    b. Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters

    a. created, suffered, assumed, or agreed to by the Insured Claimant;
    b. not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
    c. resulting in no loss or damage to the Insured Claimant;
    d. attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27 or 28); or
    e. resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law. This Exclusion does not modify or limit the coverage provided in Covered Risk 26.
6. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to Advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching subsequent to Date of Policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11(b) or 25.
8. The failure of the residential structure, or any portion of it, to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6.
9. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
    a. a fraudulent conveyance or fraudulent transfer, or
    b. a preferential transfer for any reason not stated in Covered Risk 27(b) of this policy.

SCA

ENVIRONMENTAL, INC.

Site Name & Address: Proposed East Palo Alto Youth Center Project Site, East Palo Alto, CA

SCA Project Number: B11689

Issue	Yes	No
Environmental Cleanup Liens Filed or Recorded Against the Property Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law? If so, please specify. see preliminary title report		x
Activity & Land Use Limitations That are in Place on the Site or That Have Been Filed or Recorded in a Registry Are you aware of any activity and use limitations, such as engineering controls, land use restrictions, or institutional controls that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state, or local law? See preliminary title report and GeoTracker	x	
Specialized Knowledge or Experience Do you have any specialized knowledge or experience related to the property or nearby properties relevant to identifying conditions indicative of releases or threatened releases at the subject property? If so, please explain. See reports from seller, Water Board and GeoTracker.	x	
Relationship of the Actual Purchase Price of the Property to the Estimated Fair Market Value of the Property with No Contamination Does the purchase price being paid for this property reasonably reflect the fair market value of the property? If you conclude that there is a difference, have you considered whether the lower purchase price is due to contamination that is known or believed to be present at the property? If so, please explain. Purchase price is over appraised value.	x	
Commonly-Known or Reasonably-Ascertainable Information About the Property Are you aware of commonly-known or reasonably-ascertainable information about the property that would help identify conditions indicative of releases or threatened releases? For example, do you know of any: • Past uses of the property? If so, please specify. • Specific chemicals affecting the property? If so, please specify. • Spills or other chemical releases affecting the property? If so, please specify. • Any environmental cleanups affecting the property? If so, please specify. See reports from Seller, Water Board and GeoTracker.	x	
The Degree of Obviousness of the Presence or Likely Presence of Contamination at the Property, and the Ability To Detect the Contamination by Appropriate Investigation Based on your knowledge and experience related to the property, are there any obvious indicators that point to the presence or likely presence of contamination at the property? If so, please specify. See reports from Seller, Water Board and GeoTracker.	x	

Amy Lyons

Signature

Amy Lyons

Printed Name

6/5/15

Date

PHASE I ENVIRONMENTAL SITE ASSESSMENT
PROPERTY AND HISTORICAL USE QUESTIONNAIRE

Project Name: Proposed EPAYC Project Site, East Palo Alto, CA Project No.: B11689

Facility / Owner Representative: Position:

PROPERTY LOCATION

Property/Facility vacant land

Street Address: 1950 Bay Road

City: East Palo Alto

County/State: San Mateo, CA

PROPERTY CHARACTERISTICS

Property Size: Approx 3.0 acres

No. of Structures on Property: N/A

Building Size(s): N/A

Building Usage(s): N/A

Terrain: relatively flat

Site Drainage: public storm

Water Bodies: N/A

Soil Type: See: Lowney(6/24/04)/Northgate Reports (2/6/15)

Groundwater Depth: See: Lowney(6/24/04)/Northgate Reports (2/6/15)

Groundwater Flow: See: Lowney(6/24/04)/Northgate Reports (2/6/15)

Fill Material: loose un-engineered fill

Rock Outcropping: N/A

FACILITY CHARACTERISTICS

Building Construction: N/A

Foundation: N/A

Building Age: N/A

Building Additions and Age: N/A

Insulation Materials: N/A

Drinking Water Source: public

Drinking Water Pipes (type): N/A

Sewage Disposal: public sanitary

Electrical Service: N/A

HVAC System: N/A

Condition of Paints: N/A

Lighting Ballasts: N/A

Suspect Asbestos-Containing Materials: N/A

Drinking Fountain Names & Models: N/A

DOCUMENTATION

1.0 Do any of the following exist for the property? If yes, please provide copies of documents.

a. Environmental Site Assessment Reports Yes. Previously provided to buyer.
See: Lowney(6/24/04)/Northgate Reports (2/6/15)

b. Environmental Compliance Audit Reports Yes. Previously provided to buyer
See: Lowney(6/24/04)/Northgate Reports (2/6/15)

c. Environmental permits (for example, solid waste disposal permits, NPDES or discharge permits, underground injection permits, etc.) N/A

d. Registrations for underground or above-ground storage tanks N/A

e. Registrations for underground injection systems N/A

f. Reports regarding hydrogeologic conditions on the property or surrounding area
See: Lowney(6/24/04)/Northgate Reports (2/6/15) ; See also report for 2 ground watering wells by ISS Papadopolous & Associates dated 1/30/15.

g. Notices or other correspondence from any government agency relating to past or current violations of environmental laws with respect to the property See Northgate Report of 2/6/15.

h. Environmental liens on the property

N/A

i. Hazardous waste generator notices or reports

N/A

j. Risk assessments

See Northgate Report of 2/6/15

k. Recorded activity or use limitations (AULs) for the property

N/A

l. Material Safety Data Sheets

N/A

m. Community Right to Know Plan

N/A

n. Safety Plans; preparedness and prevention plans; spill prevention, countermeasure & control plans

N/A

2.0 Do any of the following exist for the property, and if yes, please provide a detailed explanation.

a. Pending, threatened or past litigation relevant to hazardous substances or petroleum products in, on or from the property

No.

b. pending, threatened or past administrative proceedings relevant to hazardous substances or petroleum products in, on or from the property

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

c. any notices from any governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

OPERATIONS

1.0 Describe the facility (including the age and date of construction of the facility or its structures) and each of its operations or processes.

N/A

2.0 Describe all known former uses of the facility, whether carried out under the current ownership, or any prior ownership.

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

3.0 Does any person, firm or corporation other than the owner occupy the site or any part of it? If yes, identify them and describe their use of the property.

No.

CURRENT LAND USE

4.0 Is the property or any adjoining property currently used for industrial or manufacturing use?

Yes: X No:

5.0 List current uses of the property and adjoining properties.

Property: Vacant Land

Adjoining Property North: Public Street/Commercial/ Industrial

Adjoining Property South: Commercial/ Industrial

Adjoining Property East: Commercial Industrial

Adjoining Property West: Public Street/Residential

HISTORICAL LAND USES

6.0 Has the property or any adjoining property been used for industrial or manufacturing use in the past?

7.0 List historical uses of the property and adjoining properties.

For responses to these questions please refer to the following reports:

Lowney(6/24/04)/Northgate Reports (2/6/15)

	Owner	Use	Dates
Previous Use of Property:			
Previous Use of Property to North			
Previous Use of Property to South			
Previous Use of Property to East			
Previous Use of Property			

See Lowney & Northgate Reports.

to West ______________ ____________________________ _______

8.0 Are any of the following items are noted on the property or at the facility, and if yes, state their significance:

a. pesticides, automotive or industrial batteries, paints or other chemicals being stored other than undamaged containers of consumer products of under five gallons in total volume

No.

b. plastic or metal industrial drums (typically, 55 gallon)

No.

c. fill dirt brought on the property that could be contaminated

Northgate Reports (2/6/15) & Northgate soil mitigation report of 12/5/14 for contaminant potential from fill and stockpile operations from 2485 Pulgas Residential site.

d. process tanks, vats, pits, ponds, or lagoons

No

e. stained or discolored ground

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

f. absence of vegetation or dead vegetation

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

g. hills, mounds, or depressions

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

h. liquids (flowing, standing, ponded) discolored or odorous

No.

i. odors (solvent, petroleum, etc.)

No.

j. vent or fill pipes protruding from the ground at the property or adjacent to any structure on the property

No

k. fuel storage or transfer lines

No

l. roads, paths, trails, railroad tracks or railroad track bedding

No

m. sewer access holes, drainage, ditches, culverts, gullies

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

n. stockpiled materials (road salt, coal, etc.)

N/A

o. unpaved parking lots

N/A

p. pollution control equipment

Lowney(6/24/04)/Northgate Reports (2/6/15) (2 ea monitoring wells.)

q. raw material receiving and storage areas

No

r. sanitary, process waste and storm sewers and pump stations

No

s. waste disposal areas
No.

t. flooring, drains or walls located within the facility that are stained with substances other than water
N/A

u. opened or damaged containers identified as containing hazardous substances or containing unidentified materials
N/A

9.0 Does the owner of the property or operator of the facility have any knowledge of environmental liens or governmental notification relating to violations of environmental laws with respect to the property or any facility located on the property?
See: Lowney(6/24/04)/Northgate Reports (2/6/15)

10.0 Has the owner or the property or operator of the facility been informed of the presence of hazardous substances or environmental violations with respect o the property or facility located on the property?

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

11.0 Are you aware of any environmental assessments of the property that indicated the presence of hazardous substances on the site or recommended further assessment of the property?

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

12.0 Are there any past, current, or pending lawsuits or administrative proceedings for alleged environmental damages involving the property, or any owner or tenant of the property?

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

13.0 Have there been any complaints from neighbors or citizens, either individuals or groups, regarding any uses or operations on the property that may be related to hazardous substances?

No

WATER/WASTEWATER

1.0 If the property is served by a private well or non-public water system, has the well or system been designated as contaminated by any government environmental/health agency?
No

2.0 Does the property discharge waste water (other than storm water) directly to a ditch or stream on or adjacent to the property?

No

3.0 Identify all facility wastewater discharges (including discharges of wastewater, process water, contact or non-contact cooling water, storm water) and attach all permits.

N/A

4.0 Attach copies of the facility's Discharge Monitoring Reports for the last two years if relevant.
N/A

5.0 Are there any groundwater monitoring wells installed around the facility? Has the facility ever tested the groundwater? If yes, attach all results.

Yes. See Lowney(6/24/04)/Northgate Reports (2/6/15)

6.0 Have any questionnaires been completed and submitted to any federal, state, or local agencies relating to water, including industrial pre-treatment questionnaires? If yes, please attach.

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

AIR DISCHARGES

1.0 Are there any air emission sources which emit contaminants from the facility? If so, describe each such source (stationary combustion installation, process source, exhaust or ventilation system, incinerator, or other), contaminants and quantities.

No

2.0 Are any of these sources permitted? If so, attach copies of each permit.

N/A

3.0 Have any of these sources been tested? If yes, describe results, reference report.

N/A

STORAGE TANKS/RELEASES

1.0 List and describe all petroleum or chemical (above ground and underground) storage tanks. List the contents and capacity of each tank.

N/A

2.0 Have these tanks been properly registered (federal/state/local)? Attach copies of the permit or registration forms.

N/A

3.0 List all former or removed underground storage tanks on site. State whether any notification has been filed with the local, state, or federal government concerning existence of those tanks. (N/A)

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

4.0 Have there been any leaks, spills, releases or other discharges (including loss of inventory) associated with any of these tanks? If yes, give full details, including the response taken, analytical results and reports and the agencies which may have been involved. (N/A)

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

5.0 Have the tanks been precision tested? Is this in compliance with appropriate regulations? (N/A)

HAZARDOUS WASTE/SUBSTANCES

1.0 Does the facility generate any solid or hazardous waste?

No

2.0 Does the facility have any RCRA Hazardous Waste Permits? If yes, provide ID numbers for generator, transporter or TSDF.

No

3.0 Have any of the facility's solid or hazardous wastes been analyzed? If yes, attach results.

No

4.0 Identify the transporter's of the facility's hazardous wastes and the transporter's permit numbers.

N/S

5.0 Identify the solid or hazardous waste disposal or treatment facilities which receive the facility's wastes, and their respective TSDF Permit ID Numbers.

N/A

6.0 Does the facility treat or dispose of any wastes on site (including without limitation, incineration, reclamation, neutralization or recovery)? If yes, describe in full and attach all applicable permits.

No

7.0 Does the facility accumulate and store any hazardous wastes on site for disposal for longer than 90 day? If yes, identify the substance, the quantity, and describe how it is stored.

No

8.0 Describe quantities and characteristics of hazardous wastes generated for the last two years. Attach copies of the hazardous waste manifests and all annual/biennial reports.

N/A

9.0 Does the facility transfer, incinerate, process or store any non-hazardous solid wastes or hazardous waste, other than refuse-derived fuel or waste oil, which is generated off-site? If yes, describe.

No

10.0 Have any construction debris, substances identified as hazardous, unidentified waste materials, tire, automotive or industrial batteries or any other waste materials been dumped above grade, buried and/or burned on the site?

See Lowney(6/24/04)/Northgate Reports (2/6/15). some concrete debris on site. (const. demo from residential site as previously referenced.

11.0 Has any trash, debris or refuse been buried on the site?
See: Lowney(6/24/04)/Northgate Reports (2/6/15)

12.0 Have there been any spills, leaks, releases (accidental or not) of hazardous substances on the property, including, but not limited to fuels and oils? If yes, describe.

See: Lowney(6/24/04)/Northgate Reports (2/6/15)

13.0 Describe use of pesticides and/or insecticides including types used, approximate frequency of use and duration of use. Describe where pesticide or insecticide containers over five gallons in total volume were or are stored on the property.

N/A See: Lowney(6/24/04)/Northgate Reports (2/6/15) for history

14.0 Are there any industrial cleaning solvents used on the property? If yes, identify types of solvents used and where they are stored.

N/A

PCBs

1.0 Is there now or has there been in the past any electrical equipment (such as transformers or capacitors) on the property known to contain PCBs. If yes, describe equipment, identify location, approximate dates of use of the equipment, and whether registered as PCB-containing material.

Not to our knowledge
See: Lowney(6/24/04)/Northgate Reports (2/6/15)

2.0 If equipment containing PCBs has been removed, provide approximate dates of removal, location removed to, and name of removal contractor.

Not to our knowledge
See: Lowney(6/24/04)/Northgate Reports (2/6/15)

3.0 Have there ever been any fires on the property involving PCBs? If yes, describe and provide dates, describe remediation, etc.

Not to our knowledge

THIS QUESTIONNAIRE WAS COMPLETED BY:

NAME: Mark D. Lazzarini

TITLE: Member

FIRM: DKB Homes LLc

PREPARER REPRESENTS THAT TO THE BEST OF THE PREPARER'S KNOWLEDGE THE ABOVE STATEMENTS AND FACTS ARE TRUE AND CORRECT AND THAT TO THE BEST OF THE PREPARER'S KNOWLEDGE NO MATERIAL FACTS HAVE BEEN SUPPRESSED OR MISSTATED.

Signed Date 6/8/15

SAN MATEO COUNTY
ENVIRONMENTAL HEALTH
DEC 2 9 2005
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LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

Phase I Environmental Site Assessment

2470, 2477, and 2485 Pulgas Avenue and
1950 Bay Road
East Palo Alto, California

This report has been prepared for:

Byrd Development Consulting, LLC
418 Florence Street, Suite 100, ~~Palo Alto~~, California 94301-1705

June 24, 2004
Project No. 2047-1

James P. Kiernan
Senior Staff Engineer

Stason I. Foster, P.E.
Principal Environmental Engineer

Ron L. Helm, R.E.A. II, C.E.G.
Senior Principal Geologist
Quality Assurance Reviewer

STASON I. FOSTER
No. 051495
EXP. 6-30-06

Mountain View *Oakland* *[illegible]* *Fullerton* *San Ramon*

405 Clyde Avenue Mountain View, CA 94043-2209 Tel: 650.967.2365 Fax: 650.967.2785
P.O. Box 1388 Mountain View, CA 94042-1388 http://www.lowney.com

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

Mountain View
Fairfield
Oakland
San Ramon
Fullerton

SAN MATEO COUNTY
ENVIRONMENTAL HEALTH
DEC 29 2005
RECEIVED

June 24, 2004
2047-1

Mr. Owen Byrd
BYRD DEVELOPMENT CONSULTING, LLC
418 Florence Street, Suite 100
Palo Alto, California 94301-1705

RE: PHASE I ENVIRONMENTAL SITE ASSESSMENT
2470, 2477, AND 2485 PULGAS AVENUE AND 1950 BAY ROAD
EAST PALO ALTO, CALIFORNIA

Dear Mr. Byrd:

As requested, we have performed a Phase I environmental site assessment at 2470, 2477, and 2485 Pulgas Avenue and 1950 Bay Road in East Palo Alto, California. This report was prepared in accordance with our agreement dated May 21, 2004.

We refer you to the text of the report for details regarding this study. To help us continue to add value to your projects, please visit the feedback section on our web site at http://www.Lowney.com/feedback. Your opinion is important to us. Thank you for choosing us to assist you. If you have any questions, please call and we will be glad to discuss them with you.

Very truly yours,

LOWNEY ASSOCIATES

James P. Kiernan
Senior Staff Engineer

Stason I. Foster, P.E.
Principal Environmental Engineer

SIF:JPK:cah

Copies: Addressee (2)

MV, 2047-1 Phase I rpt.DOC

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
2470, 2477, AND 2485 PULGAS AVENUE AND
1950 BAY ROAD
EAST PALO ALTO, CALIFORNIA

1.0 INTRODUCTION

1.1 Purpose

This Phase I environmental site assessment was performed for Byrd Development Consulting, LLC, who we understand is considering the purchase and redevelopment of the site shown on Figures 1 and 2. The planned development includes mainly three-story, wood-framed, single-family town homes and approximately a ½-acre retail store area at the southeast corner of the intersection of Bay Road and Pulgas Avenue. The homes are planned to have slabs on grade or possibly one-half level of below-grade parking. Ownership of the northeast portion of the project study area reportedly will be transferred to Dante Bains following the purchase of the site for use as a parking lot.

The purpose of this study was to strive to document recognized environmental conditions at the site related to current and historic use of hazardous substances and petroleum products. The term "recognized environmental conditions" means the presence or likely presence of hazardous substances or petroleum products on a property under conditions that indicate a significant release or significant threat of a release into the ground, ground water, or surface water.

1.2 Scope of Work

As requested, the scope of work for this study was performed in general accordance with the American Society for Testing and Materials (ASTM) Designation E 1527-00 as outlined in our agreement dated May 21, 2004. The scope of work included the following tasks.

- Reconnaissance of the site and limited drive-by survey of adjacent properties for readily observable indications of current or historic activities that have or could significantly impact the site.

- Review of readily available topographic maps and reports to evaluate local hydrogeologic conditions including anticipated ground water depth and flow direction.

- Review of readily available documents, maps, and aerial photographs, and interviews with knowledgeable persons to evaluate past land uses.

- Acquisition and review of a regulatory agency database report to evaluate potential impacts to the site from reported contamination incidents at nearby facilities.

- Review of available regulatory agency files to obtain information about the use and storage of hazardous materials at the site.

Our scope of services did not include sampling or analysis of on-site building materials, air, soil, or ground water. The limitations of this Phase I environmental site assessment are presented in Section 6; the terms and conditions of our agreement are presented in Appendix A.

2.0 SITE RECONNAISSANCE

2.1 Site Location and Ownership

The site is located at 2470 (Bains property), 2477 (Bishop property), and 2485 Pulgas Avenue (Peck & O'Connor property) and 1950 Bay Road (Peterson property) within the Ravenswood Industrial Area (RIA) of East Palo Alto. The Peck & O'Connor property is bounded by industrial buildings and a vacant lot to the west, residential development and a church to the northwest, Pulgas Avenue to the northeast, and a former rail spur and the Bishop property to the southeast. The Bishop property is bounded by the Peck & O'Connor property to the northwest and southwest, the former rail spur to the southeast, and Pulgas Avenue to the northeast. The Bains property is bounded by the Peterson property to the northwest, Pulgas Avenue to the southwest, the former rail spur to the southeast, and a parking lot and warehouse building to the northeast. The Peterson property is bounded by Bay Road to the northwest, Pulgas Avenue to the southwest, the Bains property and a warehouse building to the southeast, and a vacant warehouse building to the northeast.

The southeast portion of the Bains property (parcels 063-240-210 and -220) is owned by Dante Bains Sr., who purchased the property in 1990, and the northwest portion of the property (parcel 063-240-350 and a portion of -340) is owned by Dante Bains, Jr., who acquired the property in 2003. The Bishop property is owned by Tom O'Connor, who purchased the property in 2003. The Peck & O'Connor property is owned by the Peck & O'Connor Holding Company, who purchased parcel 063-231-190 in 1963 and parcel 063-231-200 in 1967. The Peterson property is owned by Carrie Peterson, who purchased the property in 1999. The site location and ownership information is shown in Table 1.

Table 1. Site Information

Site Address	APN	Acreage	Site Owner	Sq. Footage of Building (s)
2470 Pulgas Avenue (Bains Property)	063-240-210	0.4867	Dante Bains, Sr.	none
	063-240-220	0.457		
	A portion of 063-240-340	0.07	Dante Bains, Jr.	
	063-240-350	0.066		
2477 Pulgas Avenue (Bishop Property)	063-231-180	0.57	Tom O'Connor	none
2485 Pulgas Avenue (Peck & O'Connor Property)	063-231-190	1.26	Peck & O'Connor Holding Company	5,400; 2,500; 3,650
	063-231-200	2.14		
1950 Bay Road (Peterson Property)	063-240-320	1.54	Carrie Peterson	none
	063-240-330	0.415		

2.2 Topographic Features and Hydrogeology

Based on U.S. Geological Survey (USGS) topographic maps, the site's elevation ranges from approximately 10 to 12 feet above mean sea level. Topography in the vicinity of the site slopes gently to the east toward the San Francisco Bay. Based on previous work performed by others, the shallow water-bearing zone likely is encountered at depths of approximately 5 to 10 feet. Based on our conversations with Mr. Mark Johnson of the California Regional Water Quality Control Board (RWQCB), ground water beneath the site likely flows to the southeast.

2.3 Site Visit

To observe current site conditions, our representative, environmental engineer James Kiernan, visited the properties on June 1 and 3, 2004. Our observations at each of the four properties are discussed individually below.

2.3.1 Peck & O'Connor Property

During our site visit, we were accompanied part-time by Tom O'Connor, one of the property owners and Vice-President of the Peck & Hiller Company (Peck & Hiller). At the time of our site visit, the subject property was occupied by Peck & Hiller, who utilizes the property for the fabrication and storage of concrete forming materials used in construction. In the northeast portion of the property near Pulgas Avenue, storage of lumber and wood forms was observed. Three dumpsters (one wood, one rubbish, and one scrap metal) were observed in this area. In the northeast corner of the site, a steel storage container was observed that contained sandblast debris.) A small stockpile (approximately 20 cubic yards) of sandblast debris was observed adjacent to the container. According to Mr. O' Connor, sandblasting of concrete off of steel forms is occasionally performed. A mobile office trailer was also observed in the northeast portion of the property; several employee vehicles were parked next to the trailer. The remnants of a destroyed monitoring well were also observed in the northeast corner of the property; the well reportedly had been destroyed. According to Mr. O'Connor, two additional on-site monitoring wells reportedly have also been destroyed.

The main office and warehouse building was observed in the northwest portion of the property. Adjacent to the northeast of the main building, several recreational vehicles and a pile of wood debris were observed. The main building is utilized mainly for miscellaneous storage. Minor staining, likely due to vehicle leaks, was observed on the concrete floor of the building. The office area is located in the southeast corner of the main building on the bottom floor of a two-story wood structure constructed inside the building. A janitors closet was observed in the northwest corner of the office area that contained several small cans of paint, a 1-gallon bottle of adhesive, two 1-gallon containers of sheetrock compound, a 2½-gallon gasoline can, and small amounts of miscellaneous cleaning products. The second floor above the office area was utilized for miscellaneous storage; a kitchen, restroom, and a dining area also were observed on the second floor. On the southwest side of the main building, wood storage cabinets were observed. One of the cabinets was observed to contain hazardous materials including three 5-gallon buckets of hydraulic oil, three gallons of antifreeze, four 1-gallon containers of gear oil, two 1-gallon containers of kerosene, and one gallon of antifreeze. Three 1-gallon containers and several small cans and spray cans of various auto fluids (brake fluid, transmission fluid, etc.) also were observed in the cabinet. Moderate staining and evidence of leakage was observed on the floor of the cabinet.

An additional two-story wood structure was observed in the northwest corner of the building. The bottom floor was a tool room and workshop. The tool room contained various tools and parts, two portable generators, a battery charger, and various quantities of wire and cable. A small amount of chemicals were observed in the tool room including a 5-gallon bucket of motor oil, five 1-gallon containers of parts cleaner and body filler, one quart of oil, two 1-gallon containers of concrete bond compound, and several spray cans of auto fluids and cleaning products. The second floor above the tool room was utilized for miscellaneous storage (plans, furniture, etc.).

The remainder of the main building was utilized for storage. Along the southwest wall of the building, storage of tools, nails, parts, and bags of sand, cement, and grout was observed. Three 5-gallon buckets of form release compound were observed adjacent to the hazardous materials cabinet along with an oxygen gas cylinder. Adjacent to the tool room, eight 5-gallon buckets of form release compound on a wooden pallet were observed along with an air compressor (not in use). A wooden crate was also observed adjacent to the tool room that contained two bags of cement, two 5-gallon buckets of form release compound, a 2-gallon gasoline can, and one gallon of concrete bond compound. The middle portion of the building was utilized for wood storage. In the northeast portion of the building, furniture, wood, tires, several vehicles, and two boats were stored. Along the northeast wall of the building, one gallon of denatured alcohol, a 5-gallon bucket and a small open tub of waste oil, and several small containers of various auto fluids were observed. To the northwest of the offices, four auto batteries, a battery charger, and miscellaneous auto parts were stored. Small quantities of chemicals including four 1-gallon containers of adhesive and degreaser, several spray cans of paint and auto fluids, two 5-gallon gasoline cans, two small cans of paint remover, two gallons of antifreeze, and a 5-gallon can of sealer.

To the southeast of the main building, a long rectangular open canopy structure was observed. The northwest portion of the structure was utilized as a wood working and storage area. The middle portion of the structure was an enclosed area utilized as a metal shop. The metal shop contained various pieces of equipment including a grinder, saw, drill press, and a welding unit. Small amounts of chemicals were also observed in the metal shop including a 5-gallon bucket of oil, 1½ gallon of cutting oil, and four cylinders of acetylene. The southeast portion of the structure was utilized for wood storage. The concrete slab of the structure was observed to extend to the southeast but the canopy had been removed. Wood, metal, and various parts were stored on the slab. The southeast corner of the property adjacent to the canopy structure was utilized for metal storage.

The southwest portion of the property also was used as a storage yard for wood forms, lumber, and steel. Along the southern side of the property, two 5-gallon buckets of concrete stripping agent and 22 empty 55-gallon drums without lids on wooden pallets were observed. According to Mr. O'Connor, he allowed construction contractors to store equipment in this area of the property, and the drums were used by contractors as rubbish cans. In the southwest corner of the property, miscellaneous junk, old equipment, two office trailers, two steel storage containers, concrete rubble, and bricks were observed. A soil stockpile (approximately 15 to 20 cubic yards) was also observed in this area. Four empty 55-gallon drums, one labeled "Hazardous Waste Liquid", one labeled "Wastewater", one labeled "County Well Water Sample", and one labeled "Crete-Lease" were observed. Three unlabeled 55-gallon drums, two containing soil and one containing an unknown liquid, also were observed in this area. One 55-gallon drum of soil labeled "County Soil Samples" also was observed. Reportedly, some of these drums are from previous sampling activities at the property. Two additional large steel storage containers were observed along the southwest side of the property; one was locked and one contained an auto battery, two gallons of paint, and several small containers of oil.

An additional open canopy structure was present in the northwest portion of the property that was utilized as another wood working and storage area. A large saw, a portable generator, and two auto batteries were observed in the structure along with a small amount of chemicals including a 5-gallon can of concrete form sealer and a 5-lb bottle of marking chalk.

The area to the north of the structure was also utilized for storage. Adjacent to the structure, along the property line in the northwest corner, two wooden storage sheds were observed that were utilized for steel storage. Two 5-gallon buckets of unknown liquid, a 5-gallon bucket of concrete curing compound, and a 5-gallon gasoline container were observed in and next to the sheds. Two mobile office trailers were observed to the north of the sheds. Adjacent to the trailers, 16 5-gallon buckets of Form Release Agent were observed on the ground and a wooden pallet; evidence of minor leakage was observed on the soil. To the north of the office trailers, a wooden shed was observed that was utilized for chemical storage. The chemicals stored inside the shed included approximately 35 gallons of paint, eight 1-gallon containers of ammonium hydroxide, 19 5-gallon buckets of Form Release Agent and Concrete Curing Compound, 19 1-gallon cans of paint thinner, coating, epoxy bonder, cement, and lacquer, two 5-gallon buckets of oil, five gallons of weed killer, five 2-gallon and one 5-gallon gasoline cans, six 1-gallon containers of concrete patch, and a small tray of an unknown powdery solid. Two lawn sprayers and three 3-gallon steel sprayers were also observed in the shed. Moderate staining was observed on the floor of the shed. Adjacent to the shed, a wooden bin containing 18 steel sprayers, an empty plastic 55-gallon drum, and an empty 55-gallon drum labeled "Hazardous Waste Liquid" were observed.

To the north of the chemical storage shed, an additional wooden storage shed that appeared to be a former workshop area was observed. The shed contained two sandblasting machines, several pieces of furniture, various tools and parts, hose, wire, cable, nails, nuts and bolts, a generator, and a gas-powered forklift. The equipment inside the shed was not in use. A flammable storage cabinet also was observed inside the shed. The cabinet contained approximately 15 gallons of paint, sealer, and adhesive, three 5-gallon gasoline cans, a 5-gallon can of Release Agent, and one gallon of rust dissolver. Minor staining was observed on the floor of the shed.

A concrete slab was present between the shed and the main building. Two vehicles, an auto trailer, miscellaneous junk (ladders, wood, etc.) and equipment, a propane-powered forklift, a battery charger, and an air compressor (not in use) were observed stored on the slab. A small gasoline tank with a dispenser, designed to be mounted in the back of a pickup truck, on a wooden pallet was also observed on the slab. Reportedly, the tank is used to fill tools and one gasoline-powered forklift in operation. No significant staining or signs of leakage were observed in the area of the tank. Small amounts of chemicals also were observed stored on the slab including four 5-gallon buckets of Form Release Agent, six propane canisters, and a wooden box containing a 5-gallon bucket of Crete-Lease and a propane canister. The bucket in the wooden box appeared to be leaking. The propane canisters are to power the several forklifts in operation at the property. Adjacent to the southwest wall of the main building, a wooden enclosure was observed that contained a 5-gallon bucket of grease and a 5-gallon can of resin. A steel secondary containment tub was also observed in the enclosure that contained eight 5-gallon buckets of waste oil and several used oil filters. Reportedly, waste oil is picked up periodically for recycling and/or disposal. Moderate staining was observed on the floor of the enclosure. Adjacent to the enclosure, a small shed was observed that contained an air compressor (in operation). The shed was locked at the time of our site visit. Adjacent to the southwest corner of the main building, two 5-gallon buckets of Form Release Agent and 48 spray paint cans on a wooden pallet were observed.

2.3.2 Bishop Property

At the time of our site visit, the subject property was an undeveloped dirt lot. Three mobile office trailers were present on the northern side of the property that were being utilized as office space for the Peck & Hiller Company. Small quantities of miscellaneous cleaning products were observed in a closet in one of the trailers. Gravel had been placed on the property from Pulgas Avenue into the middle portion of the property for use as a parking area. Several employee vehicles were observed parked on the property. A truck trailer was observed parked in the northwest corner of the property; the trailer was locked at the time of our site visit but reportedly contained personal items.

2.3.3 Bains Property

At the time of our site visit, the subject property was an undeveloped lot utilized by Bains Moving & Storage mainly for truck and trailer parking and storage. Numerous trucks and trailers were observed parked along the southwest and southeast sides of the property. Minor staining, likely due to vehicle leaks, was observed across the property. The northwest portion of the property (parcel 063-240-350 and a small portion of parcel 063-240-340), which is owned by Dante Bains, Jr., was occupied by a concrete drive. A 20-foot wide strip on the northeast side of the property was paved with asphalt and used as a vehicle parking area. Two ground water monitoring wells (identified as W-125 and W-126) were observed in the northeast corner of the property. In the southeast corner of the property, miscellaneous auto parts and a mobile air compressor were observed. No staining was observed in this area. On the southwest side of the property, a rubbish dumpster and a trash pile were observed. Also in the southwest portion of the property, wood debris, tires, auto parts, and seven ½-gallon paint cans were observed. A 5-foot wide strip on the southwest side of the property adjacent to Pulgas Avenue consisted of rocks and planter boxes. Four PG&E transformers on concrete pads were observed within this area.

The southwest corner of the property also was paved with asphalt and was fenced (Figure 4). This portion of the property was rented out to Luis Guzman (Guzman

Ornamental Iron), who reportedly performs metal bending and welding and fabrication of iron gates in this area. Mr. Guzman reportedly has rented out this portion of the property for approximately 1½ years. Inside this area, two campers, a backhoe, an air compressor, several generators, a storage trailer, miscellaneous auto parts, junk, and metal working equipment were observed. A wooden shed was also observed that contained miscellaneous metal working equipment, tools, and a welding unit. A small quantity of chemicals also was observed within the fenced area including numerous 1-gallon paint cans, several 5-gallon buckets of unknown liquid, several 1-gallon cans of paint thinner, and one cylinder of unknown gas. Minor staining was observed on the asphalt within the fenced area.

A small strip of the southeast side of the property was fenced off and paved with asphalt (Figure 4). Signage indicating that this area was part of the capped area for arsenic impacted soil was observed (discussed in Section 5.2.1). This portion of the property also was used for storage. Minor staining, likely from vehicle leaks, was observed across this area of the property. A mobile trailer was present on the northeast side of this area that reportedly served as a residence. Miscellaneous vehicles, auto parts, steel, wood, and junk were observed stored within this portion of the property. Seven forklifts also were observed in this area; moderate staining was observed in the area of the forklifts. A small wood shed was observed that contained numerous small paint cans, several tubes of caulking, numerous cans of various auto fluids, and one gallon of naphtha. No staining was observed in the shed. A metal shelving unit also was observed on which approximately 25 1-gallon cans of paint, six 5-gallon buckets of paint, a propane canister, and several gallons of unknown liquids were stored. The southwest portion of this area of the property was part of the area rented by Mr. Guzman and was covered by a concrete slab. A large portable generator, fencing, miscellaneous tools and equipment, and an empty 20-gallon drum of gear oil were observed stored in this area.

2.3.4 Peterson Property

At the time of our site visit, the subject property was generally an undeveloped dirt lot (approximately the eastern ¼ of the property was paved) and was being utilized by Touchatt Trucking as a truck parking and storage area. Scattered aggregate base material and gravel had been placed across the unpaved portion of the property. Touchatt Trucking is a construction materials hauling company. Trucks, trailers, and miscellaneous vehicles were observed parked across the entire property. Scattered minor staining was observed on the soil across the property, likely from truck and vehicle leaks. Light truck maintenance reportedly is also performed on the property. Various vehicle and truck parts were observed across the property. According to an employee of Touchatt Trucking, all used vehicle fluids are transported to their main yard nearby for disposal and/or recycling.

Miscellaneous other items (wood beams, chain link fencing, used tires) and junk (auto parts, rubbish) were observed around the perimeter of the property. Five steel storage containers were observed in the southeast corner of the property. These containers reportedly are rented for personal storage use by employees and are kept locked. An empty 55-gallon drum and an empty 20-gallon plastic drum labeled "alkaline cleaner" were also observed in the southeast corner of the property. A camper, which served as a temporary residence for one employee, was also present in the southeast corner of the property. Small quantities of miscellaneous cleaning products, lighter fluid, and several propane canisters were observed near the camper. Two steel storage containers were observed in the southwest corner of the property. The containers were locked at the time of our site visit. A stockpile (approximately 40 to 50 cubic yards) of aggregate base, asphalt, and soil was also observed in the southwest corner of the property. In the northwest corner of the property, an additional storage trailer was observed. Beneath the trailer, a 1-gallon bottle of unknown liquid, an empty 5-gallon can of oil, and an empty, approximately 100-gallon, steel tank were observed. In the northeast corner of the property, an additional storage container (locked) and an empty oil tank on a trailer were observed.

As mentioned above, approximately the eastern ¼ of the property was paved (Figure 5). This portion of the property was capped with asphalt due to elevated arsenic concentrations in soil present resulting from the operations at adjacent 1990 Bay Road. This area of the property is discussed further in Section 5.2.1.

Additional observed site features are listed in Table 2.

Table 2. Additional Readily Observable Site Features

Site Features			Comments
Heating/Ventilation/Air Conditioning System	☒ Natural Gas and/or Electrical ☐ Fuel Oil		
Potable Water Supply	☒ Municipal	☐ On-Site Well	
Sewage Disposal Syst.	☒ POTW	☐ On-Site Septic	

Note: An unchecked box does not warrant that these features are not present on-site; it only states that these features were not readily observed during our site visit.

2.4 Site Vicinity Drive-By Survey

To evaluate adjacent land use, we performed a limited drive-by survey. Our observations are presented in Table 3.

Table 3. Adjacent Properties

Business Name and Address	Direction from Site	Observations
Residences 1890, 1894, and 1896 Bay Road	Northwest of Peck & O'Connor property	
Union Star Missionary Baptist Church 1898 Bay Road/2493 Pulgas Avenue	Northwest of Peck & O'Connor property	
Vacant lot	West of Peck & O'Connor property	
Vacant lot 1860 Bay Road	West of Peck & O'Connor property	Auto storage

continued

Table 3. Adjacent Properties
(Continued)

Business Name and Address	Direction from Site	Observations
The People's Plaza 1836-1858 Bay Road	West/northwest of Peck & O'Connor property	Two industrial buildings; numerous businesses
Former S.P.R.R. rail spur	Southeast of Bains, former Bishop, and Peck & O'Connor properties	Capped with asphalt southeast of Bains property due to arsenic impacted soil
Bains Moving & Storage 2470 Pulgas Avenue	Northeast of Bains property	Warehouse building/storage
Spiral Tubes 2476/2480 Pulgas Avenue	Northeast of Bains property	Warehouse building/storage
Catalytica 1990 Bay Road	Northeast of Peterson property	Paved lot/vacant warehouse building.
Cal-Spray Inc. 1905 Bay Road	Northwest of Peterson property	Placard indicating use of hazardous materials.
Vacant building/lot	Northwest of Peterson property	
Auto storage lot	Northwest of Peterson property	

2.5 Environmental Questionnaires/Interviews

During our study, we contacted the respective property owners, Tom O'Connor, Dante Bains, Sr., and Carrie Peterson, for general information regarding past and current site usage. The property owners were asked to complete an environmental questionnaire. The information presented on the questionnaires is used to obtain general information regarding past and current site usage. Information contained in the questionnaires is summarized below. Copies of the completed questionnaires are presented in Appendix B.

2.5.1 Tom O'Connor

Peck & O'Connor Property: Based on the questionnaire and interview, the two parcels are owned by the Peck & O'Connor Holding Company. The -190 parcel was purchased in 1963, and the -200 parcel was purchased in 1967 from John Demeter. The Peck & Hiller Company has occupied the property since 1963, and performs fabrication and storage of concrete forming materials used for cast-in-place concrete structures. The prior use of the property was as a vineyard. Three structures are present on the property; the main building was constructed approximately 25 years ago, the larger canopy structure was constructed approximately 15 years ago, and Mr. O'Connor did not provide the construction date of the smaller canopy structure. Historical property addresses include 2479 and 2483 Pulgas Avenue.

Hazardous materials are stored and used on the property. Water-based form release agent, received in 5-gallon containers, is applied to wooden forms. Used oil and gasoline reportedly are stored in 55-gallon drums within secondary containment consisting of two 100-gallon containers. Chemical waste reportedly is taken to an off-site recycler. A hazardous materials business plan reportedly has been prepared for Peck & Hiller. According to the questionnaire, Peck & Hiller has received a violation regarding hazardous materials usage, storage, or disposal practices. This is discussed further in Section 4.1.1. A Phase I environmental site assessment was performed for the property by Erler & Kalinowski, Inc. (EKI) and the report was dated March 14, 1993. The findings of this report are discussed in Section 5.1.

Bishop Property: Based on the questionnaire and interview with Mr. O'Connor, the address of the former Bishop property was identified as 2475 Pulgas Avenue and is owned by Tom O'Connor who purchased the property from Jennie Bishop in 2003. According to Mr. O'Connor, an insulation business previously occupied the property until the structure burned down; the property was been vacant since. The Peck & Hiller office trailers have been on the property since 1996, when the property was rented by Mr. O'Connor from Ms. Bishop. It was indicated on the questionnaire that the property previously was used for agricultural purposes. According to Mr. O'Connor, following the fire the property was used by the Bishops to grow vegetables. A Phase I environmental site assessment was performed for the property by EKI and the report was dated March 14, 1993. The findings of this report are discussed in Section 5.1.

2.5.2 Carrie Peterson

Based on the questionnaire, the Peterson property is currently owned by Carrie Peterson, who purchased the property from Melvin Curtaccio in 1999. Reportedly, the property has never been developed.

2.5.3 Dante Bains

Based on the questionnaire and interview with Mr. Bains, parcels 063-240-210 and -220 are owned by Mr. Bains, who purchased the parcels from Duca & Hanley in 1990. Parcels 063-240-340 and -350 were purchased by Mr. Bains in approximately 1976, but they are currently owned by Dante Bains, Jr. who acquired the parcels in 2003. Reportedly, the property has not been developed for at least 40 years. The questionnaire indicated that stockpiles of soil or debris are present on the property. According to Mr. Bains, Bains Moving & Storage will occasionally unload trucks of office and warehouse furnishing that sometimes is demolished for disposal. Environmental reports reportedly were prepared for the property; however, no copies were readily available. Dante Bains, Jr. was also interviewed and he indicated that Bains Moving used the property as a truck parking and storage lot.

3.0 HISTORICAL AERIAL PHOTOGRAPH AND MAP REVIEW

To evaluate the site history, we reviewed:

- Stereo-paired aerial photographs (dated 1939, 1956, 1965, 1982, and 1993) from Environmental Data Resources, Inc. in Southport, Connecticut.
- USGS 15-minute and 7.5-minute topographic maps (1939, 1948, 1953, 1961, 1968, 1973, 1991, and 1997).

- Historic Sanborn fire insurance map (dated 1968) obtained from EDR in Southport, Connecticut.

The above maps and photographs commonly provide historical information regarding a site including land uses and changes in development over time. Copies of these maps and photographs are presented in Appendix C. The following is a summary of our observations for each individual property and the site vicinity.

3.1.1 Peck & O'Connor Property

1939: In the 1939 aerial photograph, the property appears to be undeveloped, possibly planted with row crops. The 1939 topographic map showed the property as undeveloped.

1948 through 1953: On the 1948 topographic map, a commercial structure was shown on the property. The 1953 topographic map showed the property as being in a built-up area; no structures were shown on the property.

1956 through 1961: In the 1956 aerial photograph, two large greenhouse-type structures appear present on the property along with two small greenhouse-type structures (one on the north side and one in the southwest corner). A smaller structure, possibly a trailer, appears present in the northwest corner of the property. The 1961 topographic map showed the property as being in a built-up area; no structures were shown on the property.

1965: In the 1965 aerial photograph, the two large greenhouse-type structures on the property along with the two small greenhouse-type structures no longer appear present. The smaller structure in the northwest corner of the property still appears present. The property appears to have been divided into the current two parcels (063-231-190 [northwest] and -200 [southeast]). The -200 parcel appears to be undeveloped; a dirt road traverses the parcel from southwest to northeast and appears to connect the adjacent property to the west to Pulgas Avenue. The -190 parcel appears mainly as an open storage yard. Two structures appear present on the -190 parcel: one in the northwest corner shown in the 1956 aerial photograph, and one in the southwest corner. Stockpiled material and storage sheds appear scattered throughout the yard. Several vehicles/trucks also appear parked across the -190 parcel.

1968 through 1973: On the 1968 Sanborn map, one small structure with an attached smaller structure is shown in the northwest corner of the property. The structure is identified as a one-story, metal clad structure, and appears to be identified as a private auto garage. The purpose of the smaller structure is unknown. The remainder of the property is shown as undeveloped. The 1968 and 1973 topographic maps show the site as a built-up area; no structures are shown on-site.

1982: In the 1982 aerial photograph, the existing warehouse structure appears present in the northwest corner of the property. An additional structure appears present adjacent to the southeast of the warehouse structure. A smaller structure appears present in the northwest corner of the property. Numerous stockpiles of material appear present across the property.

1991: On the 1991 topographic map, a long rectangular structure is shown in the central portion of the property and appears to be the existing canopy structure. The northwest portion of the property is shown as a built-up area and the southeast portion of the property is shown as undeveloped.

1993: In the 1993 aerial photograph, the existing warehouse structure appears present in the northwest corner of the property. The existing canopy structure also appears present to the southeast of the warehouse. An additional structure appears present to the southwest of the canopy structure and appears to be the third existing on-site structure. Several small storage sheds appear to be present in the northwest corner of the property. Several vehicles appear to be parked on the property and numerous stockpiles of material appear to be scattered across the property.

1997: On the 1997 topographic map, a long rectangular structure is shown in the central portion of the property and appears to be the existing canopy structure. The northwest portion of the property is shown as a built-up area and the southeast portion of the property is shown as undeveloped.

3.1.2 Bishop Property

1939: In the 1939 aerial photograph, two structures appear to be present in the southeast corner of the property. The structures appear to be connected. Several storage sheds also appear present adjacent to the structures. The remainder of the property appears to be undeveloped, possibly occupied with row crops. The 1939 topographic map showed the property as undeveloped.

1948 through 1953: On the 1948 topographic map, the two structures that appeared present in the 1939 aerial photograph were not shown and the property was shown as undeveloped. The 1953 topographic map showed the property as being in a built-up area; no structures were shown on the property.

1956 through 1961: In the 1956 aerial photograph, the two connected structures appear present in the southeast corner of the property. However, an addition appears to have been made to the southwest end of the structures and the connected structures appear to occupy nearly the entire southeast side of the property. Several smaller structures also appear present along the northwest and southwest sides of the property. The 1961 topographic map showed the property as being in a built-up area; no structures were shown on the property.

1965 through 1973: In the 1965 aerial photograph, the property appears similar to that shown in the 1956 aerial photograph, with the exception that the small structures on the northwest side of the property no longer appear present. On the 1968 Sanborn map, the structure on the southeast side of the property is shown. The structure is identified as divided into three connected sections. The section adjacent to Pulgas Avenue is identified as a two-story, metal clad structure on a wooden frame; the address is identified as 2477 Pulgas Avenue. This section and the middle section of the structure are identified as "building supplies." The southwest section is identified as a one-story, metal clad warehouse on a wooden frame. The address of this section is identified as 2475 Pulgas Avenue. The northwest portion of the property is identified as "parking." The 1968 and 1973 topographic maps show the site as a built-up area; no structures are shown on-site.

1982 through 1997: In the 1982 aerial photograph, the structures on the southeast side of the property no longer appear present and the property appears undeveloped. In the 1993 aerial photograph, several vehicles appear to be parked on the property. The 1991 and 1997 topographic maps show the property as undeveloped.

3.1.3 Bains Property

1939: In the 1939 aerial photograph, one structure appeared present in the southwest corner of the property. Two smaller structures appeared present to the northwest of the structure. The remainder of the property appeared to be undeveloped land, possibly occupied with row crops. The 1939 topographic map showed the property as undeveloped.

1948 through 1953: On the 1948 topographic map, one structure appeared present in the southwest corner of the property; the remainder of the property was shown as undeveloped. The 1953 topographic map showed the property as being in a built-up area; no structures were shown on the property.

1956 through 1961: In the 1956 aerial photograph, one structure appeared present in the southwest corner of the property. The two smaller structures to the northwest of the structure no longer appeared present. The remainder of the property appeared to be undeveloped land, possibly occupied with row crops. The 1961 topographic map showed the property as being in a built-up area; no structures were shown on the property.

1965 through 1997: In the 1965 aerial photograph, the structure in the southwest corner of the property no longer appears present and the property appears undeveloped. The current easement that borders the northwest side of the property appears as a dirt access road. On the 1968 Sanborn map, the property is shown as undeveloped. The 1968 and 1973 topographic maps show the site as a built-up area; no structures are shown on-site. In the 1982 aerial photograph, the property appears undeveloped; however, in the 1993 aerial photograph, several trucks and trailers appear to be parked on the property. The 1991 and 1997 topographic maps show the property as undeveloped.

3.1.4 Peterson Property

1939 through 1961: In the 1939 and 1956 aerial photographs, the property appeared to be undeveloped land, possibly occupied with row crops. The 1939 and 1948 topographic maps showed the property as undeveloped. The 1953 and 1961 topographic maps showed the property as being in a built-up area; no structures were shown on the property.

1965 through 1973: In the 1965 aerial photograph, the property appears occupied by an auto-wrecking yard; numerous vehicles are parked across the property. Two structures appear present on the northwest side of the property. The current easements on the northeast and southeast sides of the property appear to be undeveloped. On the 1968 Sanborn map, the property is identified as occupied by two auto-wrecking yards. The first yard is shown to occupy approximately the southwest 2/3 of the property, and the second yard is shown to occupy approximately the northeast 1/3 of the property. The address of the southwest yard is identified as

1950 Bay Road. The structure on the northwest side of the southwest yard is shown on the map and identified as a one-story office/auto parts building. An area to the southwest of the structure is identified as "wheel warehouse" but no structure is distinguishable on the map. The address of the northeast yard is identified as 1970 Bay Road. The 1968 and 1973 topographic maps show the site as a built-up area; no structures are shown on-site.

1982 through 1991: In the 1982 aerial photograph, a lesser number of vehicles appear to be parked on the property, and one of the structures on the northwest side of the property no longer appears present. The 1991 topographic map shows the property as undeveloped.

1993 through 1997: In the 1993 aerial photograph, the property appears to be occupied by an auto-wrecking yard; numerous vehicles and trailers are parked across the property. The 1997 topographic map shows the property as undeveloped.

3.1.5 Site Vicinity

1939 through 1953: In the 1939 aerial photograph, the site vicinity appeared to be mainly agricultural land (row crops) with scattered residential and farm-related structures. The 1939 topographic map showed the site vicinity as undeveloped. Bay Road appears to be present as.a light-duty road on the 1939 map and aerial photograph. Pulgas Avenue appears to be present as an unimproved road on the 1939 aerial photograph. The rail spur appears to be present to the southeast of the Peck & O'Connor, Bishop, and Bains properties. The 1948 and 1953 topographic maps show an increase in development, mainly residential, in the site vicinity. The rail spur, Pulgas Avenue, and Bay Road are shown on the maps.

1956 through 1961: In the 1956 aerial photograph, an increase in residential and industrial development in the site vicinity is apparent. A large greenhouse-type structure appears to be present to the west of the Peck & O'Connor property. Four residential structures appear present to the north of the Peck & O'Connor property. The property adjacent to the northeast of the Peterson property also appears partially developed; a pond appears to be adjacent to the southeast corner of the property. The 1990 Bay Road site appears developed to the southeast of the Peterson property. Structures also appear present across the rail spur adjacent to the Bains and Bishop properties. The 1961 topographic map also shows an increase in residential and industrial development in the site vicinity. .

1965 through 1973: In the 1965 aerial photograph, an increase in residential and industrial development in the site vicinity is apparent. The industrial development is mainly to the north of the site. An industrial building appears present adjacent to the northwest corner of the Peck & O'Connor property. Three residential structures and the three church structures appear present to the northwest of the Peck & O'Connor property. Agricultural land (row crops) appear present adjacent to the southwest portion of the Peck & O'Connor property. A pond appears to be present adjacent to the southeast corner of the Peterson property. A warehouse-type structure appears present adjacent to the southeast portion of the Bains property. The existing R.E. Borrmann building appears present across the rail spur adjacent to the southeast of the Bains property. The 1968 and 1973 topographic maps showed slight increases in development in the site vicinity.

1982 through 1997: The 1982 aerial photograph showed a slight increase in industrial development in the site vicinity. An additional industrial structure appeared adjacent to the northwest of the Peck & O'Connor property, and an additional warehouse-type structure appeared present to the northeast of the Bains property. The 1991 topographic map shows the area adjacent to the southwest portion of the Peck & O'Connor property as undeveloped; the area to the northeast of the Peterson property is also shown as undeveloped. In the 1993 aerial photograph, the site vicinity appeared similar to that in the 1982 photograph with the exception that a structure no longer appeared present across the rail spur from the southeast corner of the Bishop property. The 1997 topographic map showed the site vicinity as it was shown on the 1991 map.

4.0 REGULATORY RECORDS

4.1 City and County Agencies File Review

To obtain information on hazardous materials usage and storage, we reviewed readily available information at the East Palo Alto Building Department (EPABD), Menlo Park Fire Protection District (MPFPD), and San Mateo County Environmental Health Department (SMCEHD) pertaining to 2470, 2477, 2479, 2483, and 2485 Pulgas Avenue and 1950 Bay Road.

4.1.1 Peck & O'Connor Property

The information made available to us for 2479, 2483, and 2485 Pulgas Avenue is summarized in Table 4; key documents are included in Appendix D.

Table 4. Available File Review Information-Peck & O'Connor Property

Agency	Date	Entity	Remarks
EPABD	July 1, 1964	Peck & Hiller Company	Permit for construction of 800-square-foot open building for saw cover at 2485 Pulgas (parcel -019).
EPAFD	May 13, 1976	Peck & Hiller Company	Permit for construction of new warehouse building at 2483 Pulgas.
SMCEHD	April 8, 1985	Peck & Hiller Company	UST permit application for 1,000-gallon gasoline UST at 2483 Pulgas; indicates UST installed in 1975.
SMCEHD	November 12, 1986	Peck & Hiller Company	Permit to operate 1,000-gallon unleaded UST at 2483 Pulgas.
MPFPD	July 1, 1991	Peck & Hiller Company	Permit application to remove 2,000-gallon unleaded gasoline UST at 2479 Pulgas.

Continued

Table 4. Available File Review Information-Peck & O'Connor Property
(Continued)

Agency	Date	Entity	Remarks
SMCEHD	July 1, 1991	Peck & Hiller Company	Hazardous Materials Management Plan for 2479 Pulgas; indicates storage of small amounts of motor oil, waste oil, form oil, welding gases, auto fluids and paint; also indicates 1,500-gallon diesel AST in outside yard.
SMCEHD	August 7, 1991	Peck & Hiller Company	UST closure inspection sheet for removal of 2,000-gallon unleaded UST at 2479 Pulgas; stained soil/odors noted in native soil in tank excavation.
SMCEHD	October 9, 2002	Peck & Hiller Company	Site inspection document; violations noted for unlabeled containers, lack of accumulation start dates, and open containers.

In addition to the items listed above, the SMCEHD files contained various documents dated between 1985 and 1990 pertaining to testing and inspections of the UST and dispenser at 2479/2483 Pulgas; an undated note was present in the file indicating the presence of two diesel aboveground storage tanks (ASTs) on the property. The MPFPD file contained a site plan showing the diesel ASTs were located adjacent to the UST and fuel pump. In addition, the MPFPD file contained various documents dated between 1990 and 2003 indicating the storage of flammable and combustible liquids and liquefied petroleum gas by the Peck & Hiller Company (2479 Pulgas) on the property, along with welding and cutting operations. The Peck & O'Connor Holding Company was identified as the property owner on the documents. In addition to the items listed above, the EPABD files contained various documents dated between 1976 and 1998 identifying Peck & Hiller Company as the tenant; Peck & O'Connor was identified as the property owner.

4.1.2 Bishop Property

The EPABD files contained various documents dated 1995 and 1996 regarding the installation of three job trailers on the property; permits to install the trailers were applied for by Tom O'Connor.

4.1.3 Bains Property

The EPABD files contained two permits dated 1986 pertaining to 2470 Pulgas. The first permit was to excavate approximately 30,000 square feet in the former rail spur area and install a 6-inch thick concrete slab. The second permit was to clean soil, shrubbery, weeds, and debris from the lot in front of the building, and also to level and grade the lot. Dante Bains was identified as the property owner on the permits.

Table 5. Available File Review Information-Bains Property

Agency	Date	Entity	Remarks
SMCEHD	September 10, 1991	Bains Moving & Storage	Site inspection document; violations noted to discontinue spillage of used oil on ground outside and storage of used oil outside without secondary containment.
SMCEHD	June 29, 1999	Bains Moving & Storage	Site inspection document; violation noted to remove and dispose two waste oil drums located in yard.
SMCEHD	August 15, 2001	Bains Moving & Storage	Storm Water Inspection Form; violation noted to discontinue performing oil changes outside and leaving oily containers open and oil filters draining uncovered.
SMCEHD	August 15, 2001	Bains Moving & Storage	Site inspection document; violation noted to not store hazardous materials and wastes loosely on ground or so close to fenceline.
SMCEHD	October 9, 2002	Bains Moving & Storage	Site inspection document; violation noted to dispose of oil in 55-gallon drum in storage yard.

The documents listed above in Table 5 were present in the SMCEHD file for 2470 Pulgas Avenue and identify violations regarding chemical use and handling. However, it is unclear whether these documents pertain to the adjacent parcel occupied by the Bains warehouse building or the subject property (which is also identified as 2470 Pulgas).

In addition to the items listed above, the SMCEHD and MPFPD files contained various documents dated between 1990 and 2004 indicating that waste oil, spent solvent, and used oil filters and batteries are generated by Bains Moving & Storage and stored on the property. A Hazardous Materials Business Plan (HMBP) dated 2004 indicates that approximately 250 gallons of waste oil are generated each year. An inspection report dated 2002 indicates that approximately 32 gallons of spent solvent are generated each year. The waste oil and solvent are indicated as being stored in several drums and are periodically recycled. Dante Bains is identified as the property owner on the documents.

4.1.4 Peterson Property

The EPABD files contained various documents dated June through September 1999 that identified Carrie Peterson as the property owner. A police report dated February 1999 identified the property owner as Melvin Curtaccio. The site use was identified as a scrap yard, and a wood/tin Quonset hut was identified as present on the property. A building permit dated September 1999 was present in the file for the demolition of a metal building with no sewer. A Bay Area Air Quality Management District (BAAQMD)

Acknowledgement of Asbestos Demolition/Renovation Plan at 1950 Bay Road, dated August 1999, also was present in the file. Several photos of the property also were present in the file, dated July 1999, that showed derelict vehicles and trailers, dumpsters, and junk piles on the property.

4.2 Regulatory Agency Database Report

During this study, a regulatory agency database report was obtained and reviewed to help establish whether contamination incidents have been reported in the site vicinity. A list of the database sources reviewed, a detailed description of the sources, and a radius map indicating the location of the reported facilities relative to the project site are presented in Appendix E.

The Peck & Hiller Company (2483 Pulgas Avenue) is listed in the report in the San Mateo County Business Index (BI) database; which lists facilities that have submitted HMBPs, facilities that generate hazardous waste, or facilities with USTs. Peck & Hiller is listed as generating less than 27 gallons per year of hazardous waste. Peck & Hiller (2479 Pulgas Avenue) is also listed on the State Water Resources Control Board (SWRCB), RWQCB, and San Mateo County Leaking Underground Storage Tank (LUST) databases. A gasoline leak was identified during tank closure in September 1991 and ground water quality was impacted. The case was closed by the RWQCB in March 1997. Peck & Hiller is also listed on the CORTESE Hazardous Waste & Substances Site List maintained by the EPA. Sites for the list are designated by the SWRCB (LUST), the Integrated Waste Board, and the Department of Toxic Substances Control (DTSC). Finally, Peck & Hiller (2479 Pulgas Avenue) is listed in the report on the Hazardous Waste Information System (HAZNET) database maintained by the California EPA. The HAZNET database identifies facilities that generate and dispose of hazardous waste; the information is extracted from copies of hazardous waste manifests received by the DTSC. Peck & Hiller is listed as disposing of 0.68 tons of unspecified oil-containing waste to a recycler.

Bains Moving Services, Inc. (2470 Pulgas Avenue) is listed in the report in the San Mateo County BI database as a facility that stores motor vehicle fuels or waste and generates and recycles waste oil/solvent.

Nearby reported hazardous materials spills and releases considered to have a moderate or high potential to impact the site are presented in Table 6. The potential for site impact was evaluated based on information in the database records regarding the type of release, current case status, and distance and direction from the site.

Table 6. Nearby Reported Hazardous Materials Spills and Releases

Facility	Map ID No.	Address	Distance and Direction From Site	Remarks
Sandoz Agro Inc./Zoecon/ Rhone-Poulenc Inc.	E18 E19 E20 E21 E22 E25	1990 Bay Road	Adjacent to northeast of Peterson property	Historic manufacturing, storage, and distribution of insecticides and sodium arsenite herbicide and pesticide products. Soil and ground water at and adjacent to site contaminated with arsenic. Impacted soil capped with asphalt on the Peterson and Bains properties. Discussed further in Section 5.2.

5.0 SUMMARY OF PREVIOUS ENVIRONMENTAL REPORTS

Numerous environmental investigations have been performed at the properties by various parties, mainly related to off-site sources. A summary of the information presented in the reports that were obtained from you, the RWQCB, and the Environmental Protection Agency (EPA) is presented below. Copies of key documents are presented in Appendix F.

5.1 Site History and Use

In March 1993, a Site Use History and Workplan for Additional Investigations report was prepared by Erler & Kalinowski, Inc. (EKI) as part of a preliminary environmental assessment of the RIA, including the subject properties (except the Peterson property). This investigation represented a screening level assessment of the RIA to identify potential environmental concerns associated with past and present site uses and provide recommendations for additional investigations.

A Phase I and II environmental assessment was prepared for the Peterson property by Environmental Technical Associates (ETS) and presented in their report dated September 4, 1998.

A summary of the information regarding site history and use in the reports for the subject properties is presented below.

5.1.1 Peck & O'Connor Property

Based on a review of historic aerial photographs, the property appeared to be vacant and in agricultural use as of 1943. By 1948, a large greenhouse-type structure was present in the central and northwest portion of the property along with a smaller structure along the north side of the greenhouse. By 1956, two large and one small greenhouse structures were present on the property along with three small buildings and several smaller structures in the northwest portion of the property. By 1960, the greenhouse structures had been removed but the property remained in agricultural use. By 1968, the property appeared to be an open storage yard with scattered piles of material and storage sheds, with the exception of the southern portion of the property, which remained in agricultural use. By 1974, the entire property appeared to be part of the storage yard. By 1979, a warehouse-type structure had been constructed at the northwest corner of the property, and by 1983 a long, rectangular building occupied the central portion of the property. By 1988, three main buildings were present on the property.

A 1,000-gallon unleaded gasoline UST was removed from the property on August 7, 1991; the former UST is discussed further in Section 5.2.

At the time of the investigation, the property was occupied by Peck & Hiller. The principal activities conducted on the property were vehicle, equipment, and materials storage. Storage of waste oil and small amounts of other chemicals (petroleum hydrocarbon products, paints, thinners, methylene chloride) was noted to the west of and inside the main building. The potential for releases of chemicals due to current operations was determined to be low. However, the extent of impacted ground water due to the former UST, chemical storage to the west of the main building, and the past agricultural use of the property were identified as potential environmental concerns.

5.1.2 Bishop Property

Based on a review of historic aerial photographs, by 1943 until at least 1948, two buildings with some adjacent storage sheds were present along the southern edge of the property; the remainder of the property appeared vacant and in agricultural use. By 1955, several small storage sheds were present to the west of the main buildings and the property no longer appeared in agricultural use. By 1956, an addition had been constructed to the west of the main building, and by 1960 several additional storage sheds were present on the western portion of the property. By 1974, the two main buildings are no longer present, and by 1992 the storage shed on the western portion and a trailer in the center were the only remaining structures on the property.

At the time of the investigation, the property was not in use. A semi-trailer, several 55-gallon drums, and several debris piles were observed on the property. A small "chicken coop" type structure, filled with papers and debris, was present on the west side of the property. An area immediately to the north of the former warehouse building appeared to have been excavated.

An interview with Jennie Bishop, the property owner, indicated that Bishop Insulation, a residential and industrial insulation company, moved to the property in 1963. At that time, there were three connected buildings on the property utilized to store insulation and tools. The building was rented to a waterbed manufacturing company in the early 1970s. The buildings burned and were demolished in 1973. Mrs. Bishop reportedly had no knowledge of chemical use or storage on the property, including any USTs.

Historic telephone listings indicated that past occupants of the property included Forrest Bauder Floor Coverings (1958), D&M Carpet Service (1959-1961), and Bishop Insulation (1963-1973).
Based on the information obtained, previous chemical use, storage, and disposal practices on the property, the past agricultural use of the property, and the possibility that a UST was located on the property were identified as potential environmental concerns.

5.1.3 Bains Property

Based on a review of historic aerial photographs, by 1943 until at least 1960, a small residential structure was present on the southwest corner of the property; the remainder of the property appeared vacant and in agricultural use. By 1963, the residential structure was no longer present. Scattered debris was present on the property in the early to late 1960s. A diagonal line of fill was present on the property in the late 1960s. Scattered mounds of fill were present on the property in 1973 and 1974 that appeared to have been removed by 1975. Heavy staining, originating from the adjacent property to the north, was observed along the northern edge of the property in the late 1970s/early 1980s. Trucks and a small amount of debris were noted on the property in 1983 and 1984. By 1988, stored material as well as parked trucks and cars were present on the property. Light surface staining was observed in the southwest portion of the property in 1992.

At the time of the investigation, the property was utilized for vehicle and trailer parking. The area of the former railroad tracks along the southern edge of the property had been recently paved. The fenced area in the southwest corner of the property was occupied by a wooden sign company, which used this portion of the property as a work area to cut, paint, and assemble wooden signs.

An interview with Dante Bains indicated that he acquired the property in 1976 and reportedly had limited knowledge of previous uses of the property. Mr. Bains indicated that the property had previously been used for container storage. Chemical use by Bains Moving & Storage reportedly is for vehicle maintenance activities.

Historic telephone listings indicated that past occupants of the property include Hunter Container Corporation (1963-1972 and 1989), Bains Moving & Storage (1979-1989), K.E. Smith (1988), Yellow Cab (1989), and Wm. and R.A. Bains (1989). The property was listed on the CAL-SITES database (Hunter Container Company), maintained by the Department of Toxic Substances Control (DTSC), which identifies potential or known hazardous waste sites. The status of the property was identified as no further action required.

Three sites adjacent to the property have known releases of chemicals to soil and ground water. The Peck & Hiller site to the west and the R.E. Borrmann site to the south had releases of petroleum hydrocarbon products from USTs. The Peck & Hiller site is located up-gradient of the property and the extent of ground water contamination had not been fully defined (see Section 4.1.1). Based upon soil and ground water data currently available, it appeared that the release from the R.E. Borrmann site had not impacted soil or ground water beneath the property. Releases of arsenic from pesticide manufacturing activities at the 1990 Bay Road site to the east of the property have impacted soil and ground water in the southern portion of the property. In addition, volatile organic compounds (VOCs) were detected in ground water at the 1990 Bay Road site; the source of the VOCs is unknown and may be up-gradient of the property. The 1990 Bay Road site is discussed further in Section 5.2.

Based on the information obtained, the past agricultural use of the property, the lack of information regarding previous chemical use and handling practices on the property, the nearby 1990 Bay Road site and associated rail spur, and the adjacent Peck & Hiller site were identified as potential environmental concerns.

5.1.4 Peterson Property

A review of historical city directories identified past occupants of the property as Palo Alto Auto Wrecking Company (1960), General Auto Wreckers (1962), Carl's Auto Wrecking (1963), M&M Auto Wreckers (1965-1975), and Import Specialties (1976-1978). The property was listed as vacant in 1961. A former property owner, Ms. Ingrid Smithhart, indicated that the existing car recycling and parts sales facility had occupied the property since the mid-1980s, and the previous occupant was All Foreign/Foreign Car Parts.

At the time of the ETS investigation, the site was occupied by an auto dismantling yard and was covered with cars and trucks. A small wooden structure was present on the property that was utilized as an office and storage area. The majority of the property was covered with concrete paving; approximately 50-75 cubic yards of soil was stockpiled on the property.

5.2 Previous Environmental Investigations

5.2.1 1990 Bay Road Site

The 1990 Bay Road site, adjacent to the northeast of the Peterson property, was utilized to formulate agricultural chemicals, including arsenic-based pesticides and insecticides, for more than 60 years. The former rail spur to the south of the Peck & O'Connor, Bishop, and Bains properties was utilized to transport raw pesticide products to the site. Soil and ground water at the site and along the former rail spur contain elevated levels of arsenic, cadmium, lead, mercury, and selenium. Arsenic is the primary constituent of concern. Soil on the northeast portion of the Peterson property and the southeast portion of the Bains property (in the former rail spur area) also were impacted with arsenic. Ground water impacted with arsenic (greater than 10 ppb) also is present on the northeast portion of the Peterson property. However, shallow ground water is not considered a potential drinking water source due to naturally high salinity.

Remedial activities conducted in the early 1990s on the southeast portion of the Peterson property have included treatment of approximately 250 cubic yards of soil with arsenic concentrations greater than 500 ppm using silicate fixation, this involved excavation of the soil, mixing the soil with silicate reagents, and placing the treated soil into the excavation. In addition, soil with arsenic concentrations greater than 70 ppm was capped with asphalt and a deed restriction was placed on this portion of the property.

A small strip (approximately 20 feet) along the southeast side of the Bains property, with the exception of approximately 50 feet at the southwest corner of the property, also was capped with asphalt and a deed restriction placed on this portion of the property in the early 1990s.

A system of perimeter monitoring wells was installed surrounding the site in 1986 to monitor arsenic concentrations in ground water. The two existing wells (W-125 and W-126) on the Bains property were installed in 1991 as part of this network. Recent sampling of the two wells in April 2003 did not detect arsenic in ground water.

Soil sampling along the rail spur to the south of the Peck & O'Connor and former Bishop properties also was conducted in September 1997. Arsenic concentrations up to 186 ppm were detected in surface samples.

5.2.2 Action Associates Property (1836-1858 Bay Road)

Numerous investigations have identified VOC impacted ground water originating from the Action Associates Property located at 1836-1858 Bay Road to the west of the Peck & O'Connor property. The impacted ground water subsequently migrated onto the adjacent Peck & O'Connor property and appears to have migrated onto the Bishop and Bains properties as well.

Ground water sampling conducted in 2000 on the Peck & O'Connor and former Bishop properties by Dugan Associates detected trichloroethylene (TCE) up to 180 ppb on the Peck & O'Connor property and at 280 ppb on the former Bishop property. Lower concentrations of other VOC compounds also were detected.

A human health risk assessment was prepared by Exponent in August 2000 to evaluate potential human health risks associated with residual chemicals in soil and ground water at the 1836-1858 Bay Road site and the adjacent vacant lot to the south (also adjacent to the west of the Peck & O'Connor property). A residential scenario was evaluated and potential exposure pathways considered were incidental ingestion, dermal contact with soil, and inhalation of vapors or dust. The total hazard index (non-cancer) was calculated to be 0.2 and the cancer risk was calculated to be 2×10^{-6}, which are below or within the levels considered acceptable by regulatory agencies for non-cancer and cancer risk (1.0 and 1×10^{-6} to 1×10^{-4}, respectively). However, the assessment addressed only the 1836-1858 Bay Road site and the adjacent vacant lot and not down-gradient properties. As the release reportedly occurred near the property line between this property and the Peck & O'Connor property, a higher level of risk may be present on the Peck & O'Connor property.

Petroleum hydrocarbons also have been detected in ground water at the 1836-1858 Bay Road property. Ground water sampling in 2000 by Dugan Associates on the 1836-1858 Bay Road property detected total recoverable petroleum hydrocarbons (TRPH) up to 17,000 ppb within 25 feet of the property line with the Peck & O'Connor property.

5.2.3 Former Peck & Hiller UST

As mentioned above, a 1,000-gallon unleaded UST was removed from the Peck & O'Connor property in August 1991. Confirmation soil samples collected from the excavation detected gasoline range petroleum hydrocarbons (TPHg) at 1,100 parts per million (ppm) in a sample collected from the west end of the excavation. Benzene, toluene, ethylbenzene, and xylenes (BTEX compounds) also were detected. The excavation was subsequently enlarged in all directions and additional soil samples detected TPHg up to 150 ppm. A ground water sample collected from the excavation detected TPHg at 110,000 parts per billion (ppb). Three monitoring wells (MW-1, -2, and -3) were installed on the property in December 1991 to the northeast, northwest, and within the tank excavation, respectively. Four ground water sampling events were conducted from January 1992 until September 1992; ground water was measured to flow to the southeast. TPHg was only detected in wells MW-1 and MW-3 up to 220 ppb, and benzene was only detected in well MW-3 up to 1.1 ppb.

According to Mr. Mark Johnson, the staff person in charge of this area at the RWQCB, further work was performed and the case was closed in approximately 1996 or 1997. The monitoring wells were recently destroyed.

5.2.4 EPA Soil and Ground Water Investigation of RIA

In 1996, the EPA conducted a screening level soil and ground water investigation of the properties in the RIA. The results were compared to maximum contaminant levels (MCLs) for ground water and the EPAs preliminary remediation goals (PRGs) for industrial site use. A ground water sample was collected from well MW-1 in the northeast corner of the Peck & O'Connor property. TCE, 1,1-DCA, and 1,2-EDB were detected in the sample at 105 ppb, 9.5 ppb, and 0.4 ppb, respectively. Three shallow soil samples also were collected at the property and analyzed for metals, pesticides, and VOCs. A chromium concentration of 133 ppm detected in a sample collected in the northwest portion of the property was the only identified concern. Based on our conversations with staff at the RWQCB, chromium detected within the RIA has been shown to occur mainly as chromium III, which has a low toxicity and is not of particular concern. Two shallow soil samples were also collected on each of the former Bishop and Peterson properties, and one on the Bains property. The Bishop samples were analyzed for the constituents listed above, the Bains sample was analyzed for metals and VOCs only, and the Peterson samples were analyzed for metals only. No concerns were identified on the three properties.

5.2.5 Soil Sampling Peterson Property, ETS, July 1998

As part of the ETS Phase I and II investigation of the property, and described in their report dated September 4, 1998, soil sampling of native soil (½ to 1 foot) beneath the concrete slab at four locations was performed. Elevated levels of copper (820 ppm), lead (1,300 ppm), and zinc (1,200 ppm) were detected at one location (3A). The lead concentration detected exceeded the California hazardous waste criteria of 1,000 ppm. The sample location is unknown.

5.2.6 Romic Environmental Technologies Corporation Site

Romic Environmental Technologies Corporation (Romic) is located at 2081 Bay Road, approximately 1,100 feet northeast of the Peterson property. Romic operates as a hazardous waste storage and treatment facility; operations include recycling of waste solvents and antifreeze, and treating industrial wastewater.

A human health and ecological risk assessment was prepared by ENVIRON to evaluate potential adverse effects to human and ecological receptors that are at or near the site and could be exposed to chemical emissions from the facility. Only volatile emissions from liquid waste handling and processing were evaluated in the risk assessment. The results were presented in their report dated February 19, 2001. The estimated cancer risks were calculated to be less than 1×10^{-5}, and the non-cancer risks were calculated to be less than 1.0 for all populations evaluated. Thus, no significant health effects are expected for off-site populations.

6.0 CONCLUSIONS

6.1 Historical Summary

6.1.1 Peck & O'Connor Property

Based on the information reviewed, the property was planted with row crops as early as 1939. Property information prior to 1939 was unavailable from sources researched, but based on our experience, property use prior to 1939 likely was either agricultural or undeveloped land. By 1956, several greenhouse-type structures appeared present on the property. By 1960, the greenhouses had been removed and the property appeared to remain in agricultural use. Reportedly, prior to 1963, the property was utilized as a vineyard. By 1968, the property appeared to be a storage yard. The existing warehouse building appears to have been constructed in the mid-1970s. The existing larger canopy structure appears to have been constructed in the early 1980s, and the smaller canopy structure sometime later.

Other addresses of the property include 2479 and 2483 Pulgas Avenue. The Peck & O'Connor Holding Company purchased the -190 parcel in 1963 and the -200 parcel in 1967, both from John Demeter. The Peck & Hiller Company has occupied the property since 1963.

6.1.2 Bishop Property

Based on the information reviewed, by 1939 two connected buildings and several storage sheds appeared present in the southeast portion of the property and the remainder of the property appeared to be planted with row crops. Property information prior to 1939 was unavailable from sources researched, but based on our experience, property use prior to 1939 likely was either agricultural or undeveloped land. By 1956, an addition had been made to the southwest of the buildings and the remainder of the property no longer appeared to be in agricultural use. The 1968 Sanborn map identified the uses of the buildings as "building materials" and "warehouse" and the addresses of the buildings are 2475 and 2477 Pulgas Avenue. The buildings reportedly burned and were demolished in 1973 and the property has since remained generally a vacant lot. The Peck & Hiller office trailers were placed on the property in 1996.

Based on available information, past occupants of the property have included Forrest Bauder Floor Coverings (1958), D&M Carpet Service (1959-1961), and Bishop Insulation (1963-1973). According to Jennie Bishop, the previous property owner, Bishop Insulation, a residential and industrial insulation company, moved to the property in 1963. At that time, the three connected buildings on the property were utilized to store insulation and tools. The building was rented to a waterbed manufacturing company in the early 1970s. The property was purchased by Tom O'Connor from Ms. Bishop in 2003.

6.1.3 Bains Property

Based on the information reviewed, by 1939 the property appeared planted with row crops and a residential structure appeared present in the southwest corner. Property information prior to 1939 was unavailable from sources researched, but based on our experience, site use prior to 1939 likely was either agricultural or undeveloped land. The residential structure appeared to have been removed by the early 1960s. By 1965 the property appeared to be no longer in agricultural use and was undeveloped. Scattered debris and fill appeared to be present on the property in the 1960s and 1970s. Trucks appear to have been parked on the property since at least the early 1980s to the present.

Parcels 063-240-210 and -220 are currently owned by Dante Bains, Sr., who reportedly purchased the parcels from Duca & Hanley in 1990. Parcels 063-240-340 and -350 were purchased by Mr. Bains in approximately 1976, and are currently owned by Dante Bains, Jr. who acquired the parcels in 2003. Previous ownership of these parcels is unknown. The current occupant of the property, Bains Moving & Storage, appears to have occupied the property since the mid-1970s. Based on available information, past occupants of the property have included Hunter Container Corporation (1963-1972 and 1989), Bains Moving & Storage (1979-1989), K.E. Smith (1988), Yellow Cab (1989), and Wm. and R.A. Bains (1989). However, it is unclear whether these past occupants, with the exception of Bains Moving & Storage, utilized the subject property or the 2470 building. The fenced area in the southwest portion of the property reportedly has been occupied by Guzman Ornamental Iron for the past 1½ years. This area appears to have been previously occupied by a wooden sign company.

6.1.4 Peterson Property

Based on the information reviewed, the property appeared to be planted with row crops by 1939 until at least 1956. Property information prior to 1939 was unavailable from sources researched, but based on our experience, property use prior to 1939 likely was either agricultural or undeveloped land. By the early 1960s, the property appeared to be occupied by an auto wrecking yard and two small structures appear present in the northwest portion of the property. By 1968, the property appears to be occupied by two separate wrecking yards (1950 and 1970 Bay Road), and an auto parts building appears present in the middle of the property. The property appears to have been used as an auto wrecking yard until the late 1990s. A small Quonset hut also appears to have been on the property as of 1999. The property is currently utilized by Touchatt Trucking as a truck parking and storage lot.

Based on available information, past occupants of the property have been identified as Palo Alto Auto Wrecking Company (1960), General Auto Wreckers (1962), Carl's Auto Wrecking (1963), M&M Auto Wreckers (1965-1975), Import Specialties (1976-1978), All Foreign/Foreign Car Parts (unknown until the mid-1980s), and an unnamed car recycling and parts sales facility (mid-1980s until at least 1998). The property was listed as vacant in 1961. The property is currently owned by Carrie Peterson, who acquired the property from Melvin Curtaccio in 1999. A previous property owner is identified as Ingrid Smithhart.

6.2 Agricultural Use

The site was used for agricultural purposes for several decades. During the course of agricultural use, pesticides, such as DDT, likely were applied to crops in the normal course of farming operations. There is no indication of any uncontrolled release of pesticides to the site. Five shallow soil samples were collected on the Peck & O'Connor and Bishop properties and analyzed for pesticides as part of the EPA 1996 investigation. No pesticide concerns were identified; however, the results were compared to screening levels for continued industrial site use. Therefore, because redevelopment of the site for residential use is planned, soil sampling and analyses should be performed to evaluate the residual pesticide concentrations, if any, and potential health risks to future residents.

6.3 Chemical Storage and Use

6.3.1 Bishop Property

No information was found indicating that significant quantities of hazardous materials historically have been used or stored at the property. Chemical storage and use observed involved only routine janitorial and maintenance supplies in the office trailers. These materials do not appear to pose a significant hazard to the property, provided they continue to be used as designed, are properly handled, and all regulations regarding their use are followed. Due to the past use as an insulation business, shallow soil should be evaluated for the presence of asbestos.

6.3.2 Peterson Property

No information was found indicating that significant quantities of hazardous materials historically have been used or stored at the property. Chemical storage and use observed involved mainly routine janitorial and maintenance supplies. These materials do not appear to pose a significant hazard to the property, provided they continue to be used as designed, are properly handled, and all regulations regarding their use are followed.

The property historically has been used as an auto wrecking yard, and light vehicle maintenance reportedly is currently performed at the property. Minor staining, likely from vehicle leaks, was observed across the property. Used vehicle fluids reportedly are transported off-site for recycling and/or disposal. Chemicals of concern associated with auto wrecking include heavy metals and automotive chemicals. Limited shallow soil sampling conducted by ETS at the property in 1998 detected elevated levels of copper, lead, and zinc at one location (3A). The lead concentration detected (1,300 ppm) exceeded the California hazardous waste criteria of 1,000 ppm. The sample location is unknown. Based on the results of this limited soil sampling and the historical property use, soil in other areas of the property may be impacted with heavy metals and other automotive chemicals. Additional soil sampling should be performed to further evaluate shallow soil quality at the property. Additional research should also be performed to attempt to determine the location of previous sample 3A, where a hazardous waste concentration of lead was detected.

6.3.3 Bains Property

Reported chemical storage and use at 2470 Pulgas Avenue has involved small quantities of chemicals, mainly for vehicle maintenance (oil and solvents). Bains Moving & Storage is listed as a small quantity generator of hazardous waste. Reportedly waste oil and spent solvent is periodically recycled. Several violations have historically been issued for improper chemical use and storage practices. However, it is assumed that the majority of the chemical use and storage takes place within the warehouse building and mechanic shop to the northeast of the subject property. The unpaved portion of the subject property is mainly used for truck and trailer parking; observed chemical storage in this portion of the property consisted of only a small quantity of paint. Only minor staining, likely from vehicle leaks, was observed across the unpaved portion of the property. Thus, the potential for soil or ground water to have been significantly impacted by these chemicals appears low.

Small quantities of chemicals and numerous pieces of equipment were observed stored in the paved areas on the southeast side of the property and included paint and miscellaneous vehicle fluids. Moderate staining was observed in this area of the property that appeared to be due to vehicle and equipment leaks. However, the potential for soil or ground water to have been significantly impacted by these chemicals appears low to moderate. As residential redevelopment of this property is under consideration, sampling should be performed to establish baseline conditions.

6.3.4 Peck & O'Connor Property

Current chemical storage and use by Peck & Hiller at the property involved moderate quantities of form release agent, oils, paint, various vehicle fluids, gasoline, and propane. The quantity of chemicals stored generally was small (generally 5 gallons or less per container). Chemical storage was mainly confined to the northwest portion of the property in the warehouse building and adjacent storage sheds. Staining and evidence of leakage was observed inside the hazardous material cabinet inside the warehouse building, and minor to moderate staining was observed on the floors of the storage sheds in the northwest corner of the property. Evidence of minor leakage of form release agent was observed on the soil in the northwest portion of the property. Peck & Hiller is listed as a small quantity generator of hazardous waste. A waste oil storage shed with secondary containment was observed outside the southwest wall of the warehouse building. Waste oil is reportedly picked up periodically for off-site recycling and/or disposal. Minor violations have been reported regarding chemical storage and use. Based on our observations, the potential for soil or ground water to have been significantly impacted by these chemicals appears low to moderate. As residential redevelopment of this property is under consideration, soil sampling should be performed to establish baseline conditions. Several empty 55-gallon drums labeled "Hazardous Wastewater Liquid ", "Wastewater", and "County Well Water Sample", three unlabeled drums of soil and unknown liquid, and a drum of soil labeled "County Soil Samples" were observed in the southwest corner of the property. Reportedly, some of these drums are from previous investigations at the property. However, since detailed information regarding the source and contents of the drums was not available, soil sampling should be performed in this area to evaluate if the drums have impacted soil quality.

A 1,000-gallon unleaded gasoline UST was present on the property from approximately 1975 until 1991. During removal of the UST, TPHg was detected in a ground water sample collected from the excavation at 110,000 ppb. Three monitoring wells were installed on the property to the northeast, northwest, and within the tank excavation in late 1991, and ground water was measured to flow to the southeast. Quarterly monitoring was conducted in 1992 and only low concentrations of petroleum hydrocarbons were detected. According to staff at the RWQCB, additional work was performed and the case was closed in 1996 or 1997. However, we understand that the case was closed based on continued industrial use of the property. Files regarding this additional work and the case closure were not available for review at the time of this investigation. Therefore, due to the planned residential development of the property, additional research should be performed to review the results of the additional work and evaluate the extent of contamination. If warranted, additional soil and ground water sampling should be performed to evaluate the current soil and ground water quality at the property prior to residential development.

Two diesel ASTs (totaling 1,500 gallons) appear to have been present on the property adjacent to the gasoline UST. The period during which the ASTs were present on the property is unknown; however, available records indicate that they were at least present in 1991. No other information regarding the ASTs was available in the information reviewed. Due to the lack of readily available information, there is insufficient information upon which to base a conclusion regarding the likelihood that the ASTs may have impacted the property. No evidence of significant hazardous material impact in this area was observed during our site visit. We recommend that soil and ground water quality be evaluated in this area.

6.3.5 General Recommendations

To help mitigate potential environmental issues that may arise from the ongoing hazardous materials practices at the site prior to property transfer, we recommend the following:

- The aboveground storage tanks and hazardous materials containers should be consolidated in one area on each property. Secondary containment for outdoor containers and ASTs that store hazardous materials must be used. This secondary containment may consist of a berm or dike with an impervious surface, but it must be large enough to hold 10 percent of the volume of all containers or 110 percent of the volume of the largest container, whichever is larger. The floor of the containment area must be an impervious surface that does not show any cracks or gaps. This area must be kept neat. Storage of hazardous materials must comply with the regulations established in California.
- Containers must be kept closed, in good condition and compatible with the waste or material accumulated; the containers must be properly labeled. The containers must be handled in a manner to avoid ruptures. Containers must be inspected to make sure containers are in good condition, free of cracks, punctures and leaks, with little or no rust. Containers that are leaking or deteriorating must be replaced.
- Tanks must be properly labeled, in good condition and free from leaks. Tanks and ancillary equipment must be compatible with the hazardous materials they

contain. Tanks must be operated in a manner to prevent spills and overflows. Inspections of the tanks must be conducted to evaluate corrosion and signs of releases. Leaking or corroding tanks must be repaired or replaced.

- Hazardous waste may accumulate on-site only up to 180 days.
- Leaks or spills of hazardous materials must be immediately cleaned to comply with California regulations.
- The storage area must be secure against unauthorized entry. Clearly post a sign reading "HAZARDOUS MATERIALS" in capital letters at least 1-inch high, no smoking signs in English and Spanish, and a NFPA fire diamond.
- Material Safety Data Sheets for each chemical product must be stored in a central file location.

At the time of the property transfer, we recommend the removal and appropriate disposal of all hazardous waste and hazardous materials, including their containers.

6.4 Additional On-Site Soil and Ground Water Quality Concerns

Potential concerns identified during this investigation regarding on-site soil and ground water quality, in addition to those mentioned in Sections 5.2 and 5.3, are described below.

6.4.1 Former Rail Spur

The former rail spur adjacent to the south of the Peck & O'Connor, Bishop, and Bains properties was utilized to transport raw pesticide products to 1990 Bay Road. Soil along the rail spur has been contaminated with arsenic. The former rail spur area to the south of the Bains property was capped with asphalt and a deed restriction placed on this portion of the property due to arsenic concentrations in soil greater than 70 ppm. The capped area includes a small strip (approximately 20 feet in width) along the southeast side of the Bains property (Figure 4). Based on our conversations with Mr. Mark Johnson of the RWQCB, concentrations of arsenic less than 20 ppm would be suitable for residential development. Soil with arsenic concentrations between 20 ppm and 70 ppm may be present in the southeast portion of the Bains property. Sampling for arsenic reportedly was performed in this area; however, the results were not available at the time of this investigation. Due to the planned residential development of the Bains property, the previous sampling performed in this area and the concentrations detected should be reviewed. If warranted, additional sampling should be performed to evaluate the extent of arsenic impacted soil near the former rail spur, and to identify areas that require remediation prior to residential development.

Soil sampling along the rail spur to the south of the Peck & O'Connor and Bishop properties was conducted in September 1997. Arsenic concentrations up to 186 ppm were detected in surface samples. It is not known if soil sampling within the project site boundaries to evaluate the extent of arsenic contamination was performed. Due to the planned residential development of the Peck & O'Connor and Bishop properties, the previous sampling performed in this area and the concentrations detected should be reviewed. If warranted, additional sampling should be performed to evaluate the extent of arsenic impacted soil near the former rail spur, and to identify areas that require remediation prior to residential development.

6.4.2 1990 Bay Road

1990 Bay Road, adjacent to the northeast of the Peterson property, was utilized to formulate agricultural chemicals, including arsenic-based pesticides and insecticides, for more than 60 years. Soil and ground water at the site contain elevated levels of arsenic, cadmium, lead, mercury, and selenium. Arsenic is the primary constituent of concern. Soil on the northeast portion of the Peterson property also was impacted with arsenic. Ground water impacted with arsenic (greater than 10 ppb) also is present on the northeast portion of the Peterson property. However, shallow ground water is not considered a potential drinking water source due to naturally high salinity.

Soil on the Peterson property with arsenic concentrations greater than 70 ppm was capped with asphalt and a deed restriction was placed on this portion of the property. Soil with arsenic concentrations between 20 ppm and 70 ppm may be present on the Peterson property. Sampling for arsenic reportedly was performed in this area; however, the results were not available at the time of this investigation. Ownership of approximately the northeastern half of the Peterson property is planned to be transferred to Bains for use as a truck parking and storage lot and will not be residentially developed. However, due to the planned residential development of the southwestern half of the property, the previous sampling performed in this area and the concentrations detected should be reviewed. If warranted, additional sampling should be performed to evaluate the extent of arsenic impacted soil and to identify areas that require remediation prior to residential development.

6.4.3 1836-1858 Bay Road

Numerous investigations have identified VOC impacted ground water originating from 1836-1858 Bay Road located adjacent to the west of the Peck & O'Connor property. The impacted ground water subsequently migrated down-gradient onto the Peck & O'Connor property and appears to have migrated onto the Bishop and Bains properties as well.

Ground water sampling conducted in 2000 on the Peck & O'Connor and Bishop properties by Dugan Associates detected TCE up to 180 ppb on the Peck & O'Connor property and at 280 ppb on the former Bishop property. Lower concentrations of other VOC compounds also were detected.

Based on the planned residential development of the site, ground water and soil vapor sampling should be conducted to evaluate the extent of the on-site contamination and to evaluate current concentrations of VOCs in ground water. A health risk assessment will also be required to evaluate potential health risks to future residents due to the impacted ground water and soil vapor.

Residences constructed on the Peck & O'Connor property may require a passive ventilation system or vapor barriers to help prevent the migration of contaminated gases into livable areas.

Petroleum hydrocarbons also have been detected in ground water at the 1836-1858 Bay Road property. Ground water sampling in 2000 by Dugan Associates on the 1836-1858 Bay Road property detected total recoverable petroleum hydrocarbons (TRPH) up to 17,000 ppb within 25 feet of the property line with the Peck & O'Connor property. However, ground water samples collected by Dugan Associates in 2000 on the Peck & O'Connor and Bishop properties were not analyzed for TRPH. Based on the planned residential development of the site, ground water sampling should be performed to evaluate if petroleum hydrocarbon impacted ground water has migrated onto the site from the 1836-1858 Bay Road property.

6.5 Monitoring Wells

The two monitoring wells on the Bains property are part of the perimeter network to monitor arsenic concentrations in ground water from 1990 Bay Road. If continued use of the wells is no longer intended, they should be properly abandoned in accordance with applicable regulations.

6.6 Asbestos

Due to the age of the on-site buildings on the Peck & O'Connor property, asbestos-containing materials (ACMs) may be present. If demolition, renovation, or re-roofing of the buildings is under consideration, an asbestos survey must be conducted under National Emissions Standards for Hazardous Air Pollutants (NESHAP) guidelines. In addition, NESHAP guidelines require that all potentially friable ACM be removed prior to building demolition or renovation that may disturb the ACM.

6.7 Lead-Based Paint

In 1978, the Consumer Product Safety Commission banned the use of lead as an additive in paint. Currently, the U.S. EPA and U.S. Department of Housing and Urban Development are proposing additional lead-based paint regulations. Based on the age of the buildings on the Peck & O'Connor property, lead-based paint may be present. If lead-based paint is still bonded to the building materials, its removal is not required prior to demolition. It will be necessary, however, to follow the requirements outlined by Cal/OSHA Lead in Construction Standard, Title 8, California Code of Regulations (CCR) 1532.1 during demolition activities; these requirements include employee training, employee air monitoring, and dust control. If lead based paint is peeling, flaking or blistered, it should be removed prior to demolition. It is assumed that such paint will become separated from the building components during demolition activities; thus, it must be managed and disposed as a separate waste steam. Any debris or soil containing lead paint or coating must be disposed at landfills that are permitted to accept the waste being disposed.

6.8 Transformers

Four transformers, owned by PG&E, were observed on the southwest side of the Bains property. These transformers may contain transformer oil. The transformers appeared to be in good condition and no oil leaks were observed. Although oil is typically not highly toxic or mobile in the environment, transformer oil may contain polychlorinated biphenyls (PCBs). If the transformers are to be removed or if leaks are observed, testing of the oil for PCBs should be performed. The manufacturer may also be able to provide information regarding the PCB content, if any.

6.9 Urban Runoff Pollution Prevention Program

The Urban Runoff Pollution Prevention Program, also called the Non-Point Source Program, was developed in accordance with the requirements of the 1986 San Francisco Bay Basin Water Quality Control Plan to reduce water pollution associated with urban storm water runoff. This program was also designed to fulfill the requirements of the Federal Clean Water Act, which mandated that the EPA develop National Pollution Discharge Elimination system (NPDES) Permit application requirements for various storm water discharges, including those from municipal storm drain systems and construction sites.

Construction activity resulting in a land disturbance of 1 acre or more, or less than 1 acre but part of a larger common plan of development or sale, must obtain a Construction Activities Storm Water General Permit. A Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) must be prepared prior to commencement of construction.

6.10 Fill

Fill material may have been placed on-site. The source and quality of the fill material are unknown. If a higher degree of comfort is desired, consideration should be given to evaluating fill quality.

6.11 Export Soil and Dewatering

We understand that the site will be developed with residential and retail structures generally encompassing the entire site. We understand that below-grade parking is being considered. During construction activities, soil may need to be transported to other nearby developments or a nearby landfill. The receptors of this material may require analytical testing. Because the soil may contain contaminants, the cost to dispose of the soil may be increased.

Dewatering may be required during construction to maintain ground water below the floor of the garage if below-grade parking is planned. Since the extracted ground water may contain petroleum hydrocarbons, VOCs, or arsenic, disposal costs may be increased. Depending on the water quantity, disposal options may include discharge to the sanitary sewer system (if approved), off-site disposal at a treatment/recycling facility, or on-site treatment and subsequent discharge to the storm sewer system under a NPDES permit.

The cost to treat extracted ground water can vary substantially and is dependent on the ground water extraction rate, discharge requirements, and the levels and types of contaminants present.

6.12 Potential Environmental Concerns Within the Site Vicinity

Based on the information obtained during this study, with the exception of the adjacent sites (1990 Bay Road and 1836-1858 Bay Road) discussed above, no hazardous material incidents have been reported in the site vicinity that would be likely to significantly impact the site. However, as is typical to many industrial areas, several facilities in the vicinity were reported as hazardous materials users. If leaks or spills occur at these facilities, contamination could impact the site, depending upon the effectiveness of cleanup efforts.

6.13 Soil Management Plan

Based on the long agricultural/industrial history of the site, buried structures, debris or impacted soil may be encountered during site development activities; these materials may require special handling and disposal. To limit construction delays, we recommend that a Soil Management Plan (SMP) be developed to establish management practices for handling these materials/structures if encountered.

6.14 Environmental Insurance

Due to the lengthy industrial use of the site, contaminated materials may be encountered during site development. Consideration should be given to purchasing insurance to help protect against these liabilities. There are two primary insurance policies that provide significant protection against environmental liability risks:

- Pollution Legal Liability protects against third party claims for personal injury and property damage, and related risks;
- Cleanup Cost-Cap protects against increases in cleanup costs due to unknown or changing conditions, including more stringent requirements than currently exist.

Other environmental insurance coverages are available to protect financial institutions lending money for the purchase of distressed assets, contractors working on environmental projects, and underground storage tank closure liability. Generally, if the risk is related to environmental conditions, it is likely that an insurance product can be adapted to protect against risk.

6.15 Environmental Attorney

We recommend contacting an environmental attorney to assess the liabilities and reporting requirements associated with the contamination detected and to explore liabilities associated with residential redevelopment.

6.16 Deed Restriction

A copy of the deed restrictions should be obtained and reviewed in order to determine the regulatory restrictions that have been placed on the properties.

7.0 LIMITATIONS

As with all site assessments, the extent of information obtained is a function of client demands, time limitations, and budgetary constraints. Our conclusions and recommendations regarding the site are based on readily observable site conditions, review of readily available documents, maps, aerial photographs, and data collected and/or reported by others. Due to poor or inadequate address information, the regulatory agency database report listed several sites that may be inaccurately mapped or could not be mapped; leaks or spills from these or other facilities, if nearby, could impact the site. As directed by you, we are relying on information presented in reports provided to us by you or your representative. We are not responsible for the accuracy of information or data presented by others.

Because publicly available information often cannot affirm the presence of recognized environmental conditions, there is the possibility that such conditions exist. Our conclusions and recommendations in this site assessment are qualified in that no soil, ground water, air, or building material analyses were performed. Sampling and analysis lead to a more reliable assessment of environmental conditions, conditions that often cannot be noted from typical Phase I activities. Should you desire a greater degree of confidence, these samples should be obtained and analyzed to further evaluate environmental conditions.

This report was prepared for the sole use of Byrd Development Consulting, LLC. We make no warranty, expressed or implied, except that our services have been performed in accordance with environmental principles generally accepted at this time and location.

8.0 REFERENCES

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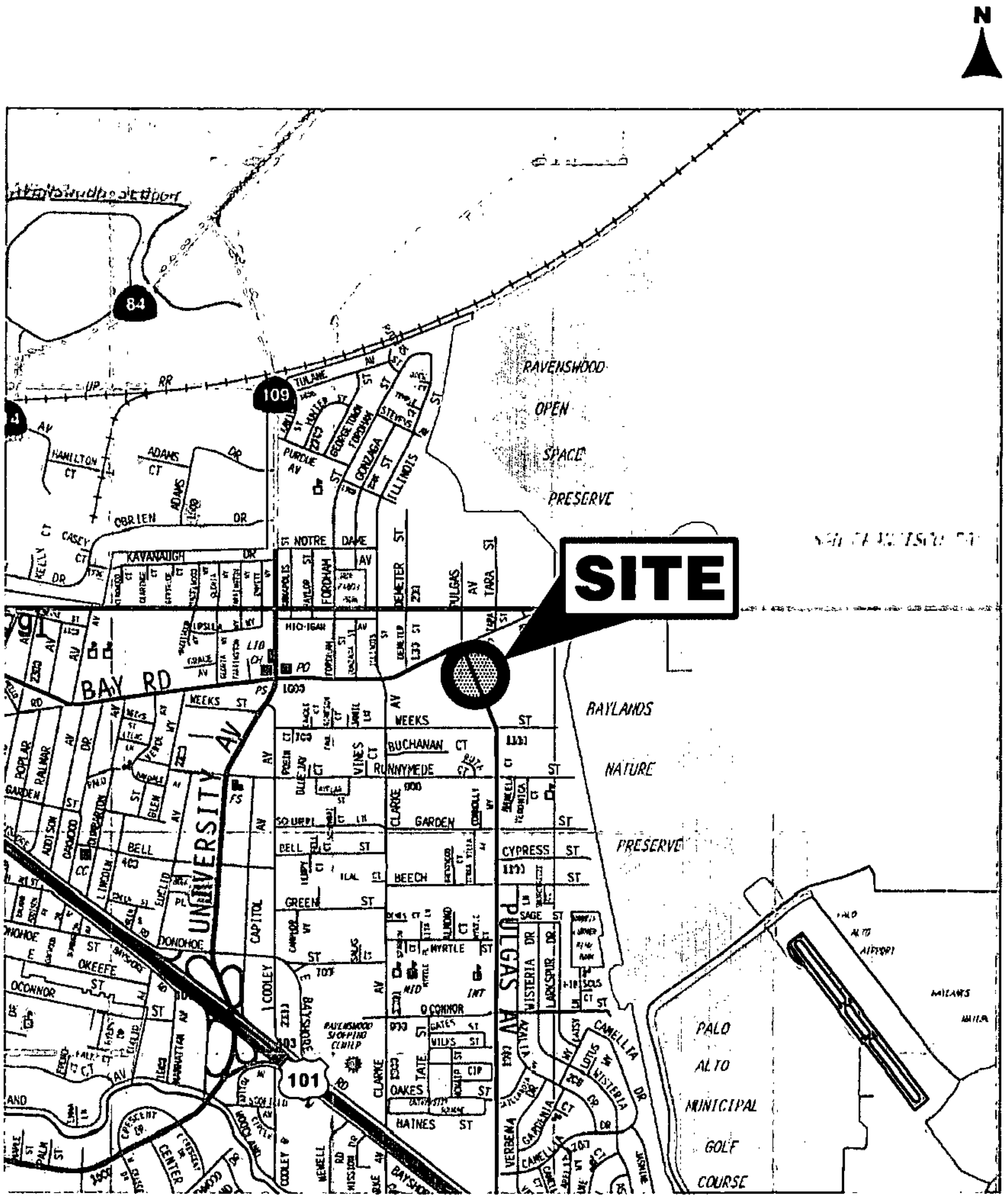

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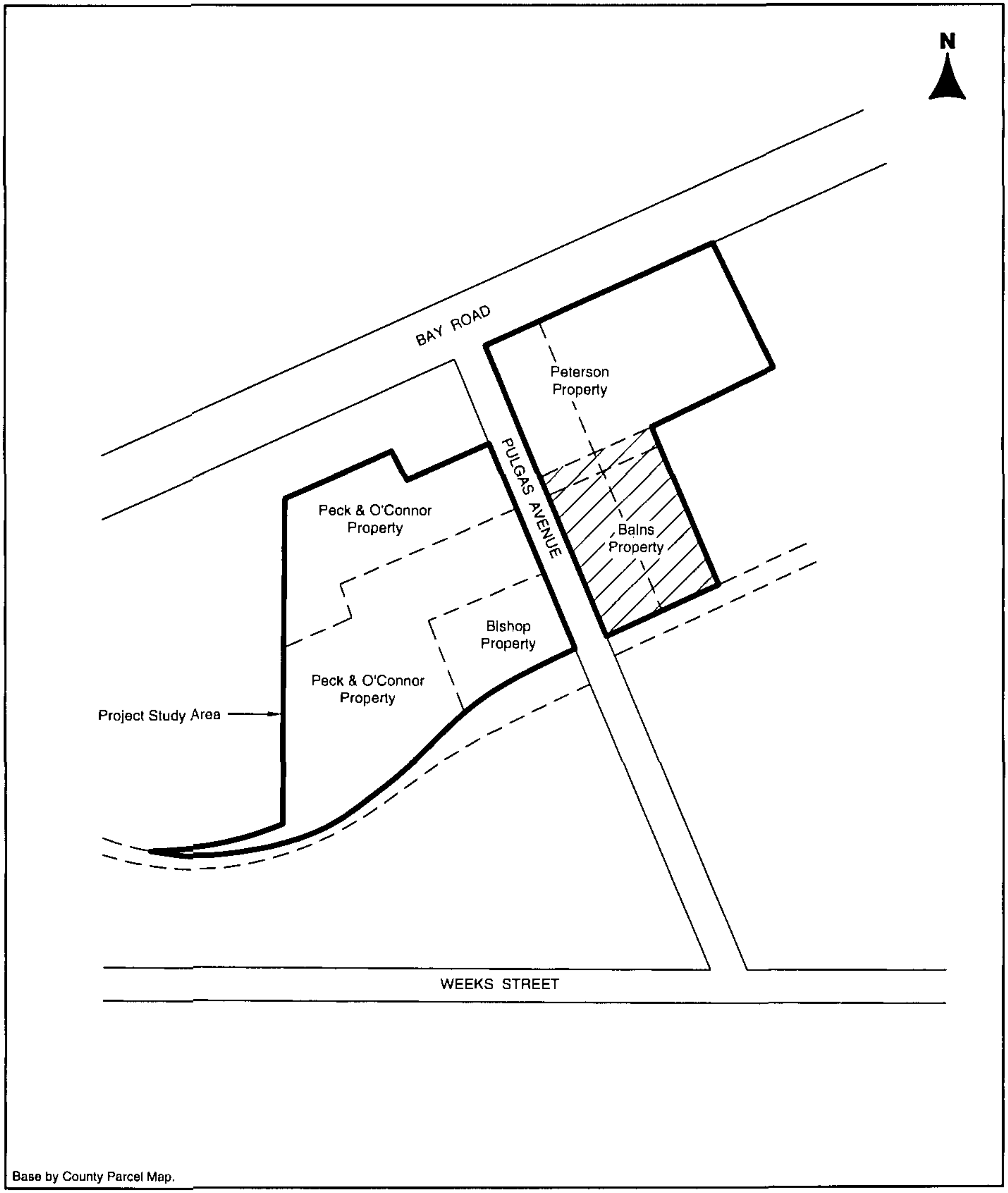
6/04 EB

VICINITY MAP

PULGAS AVENUE/BAY ROAD PHASE I
East Palo Alto, California

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

FIGURE 1
2047-1



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PROJECT STUDY AREA

PULGAS AVENUE/BAY ROAD PHASE I
East Palo Alto, California

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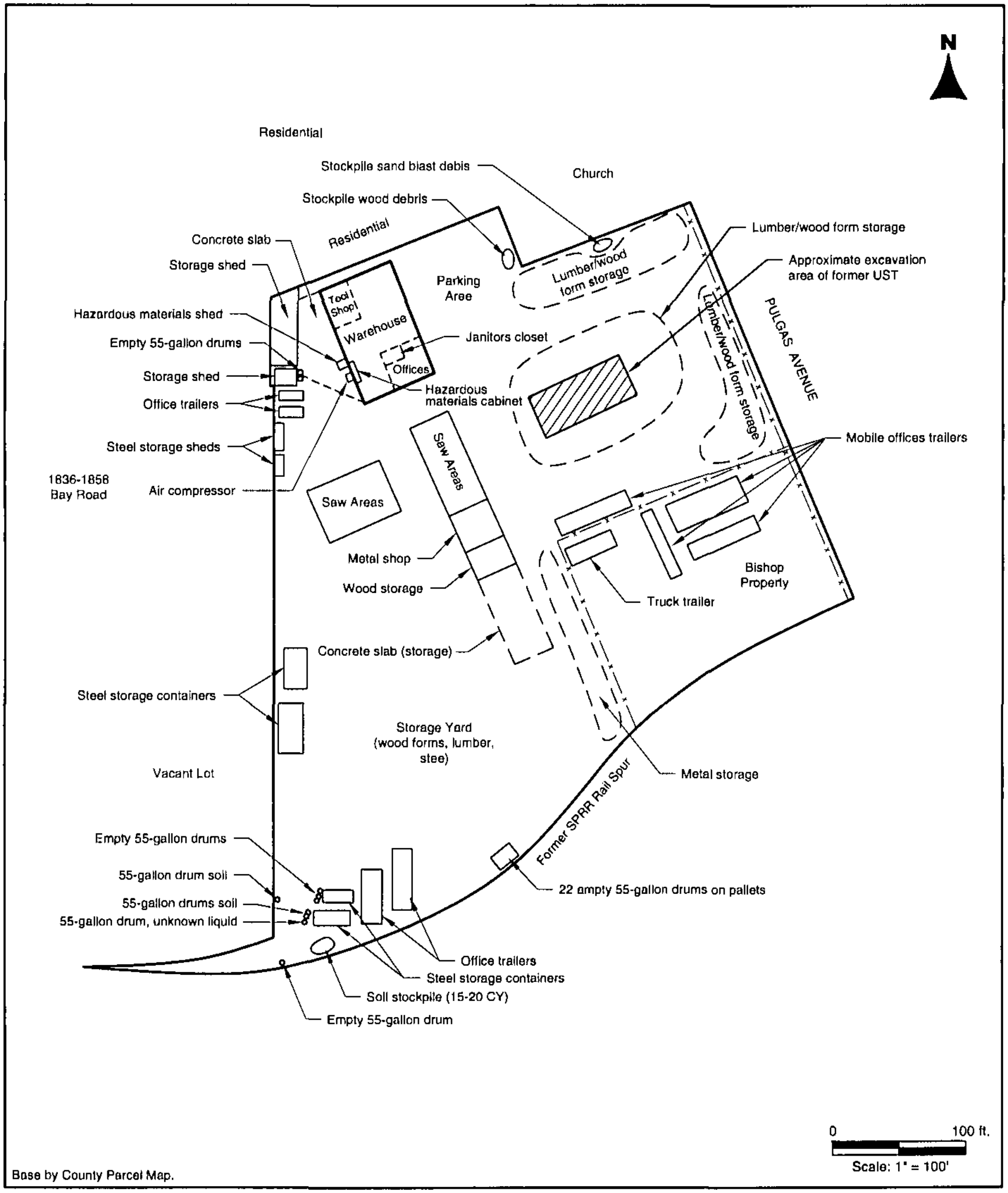
FIGURE 2
2047-1



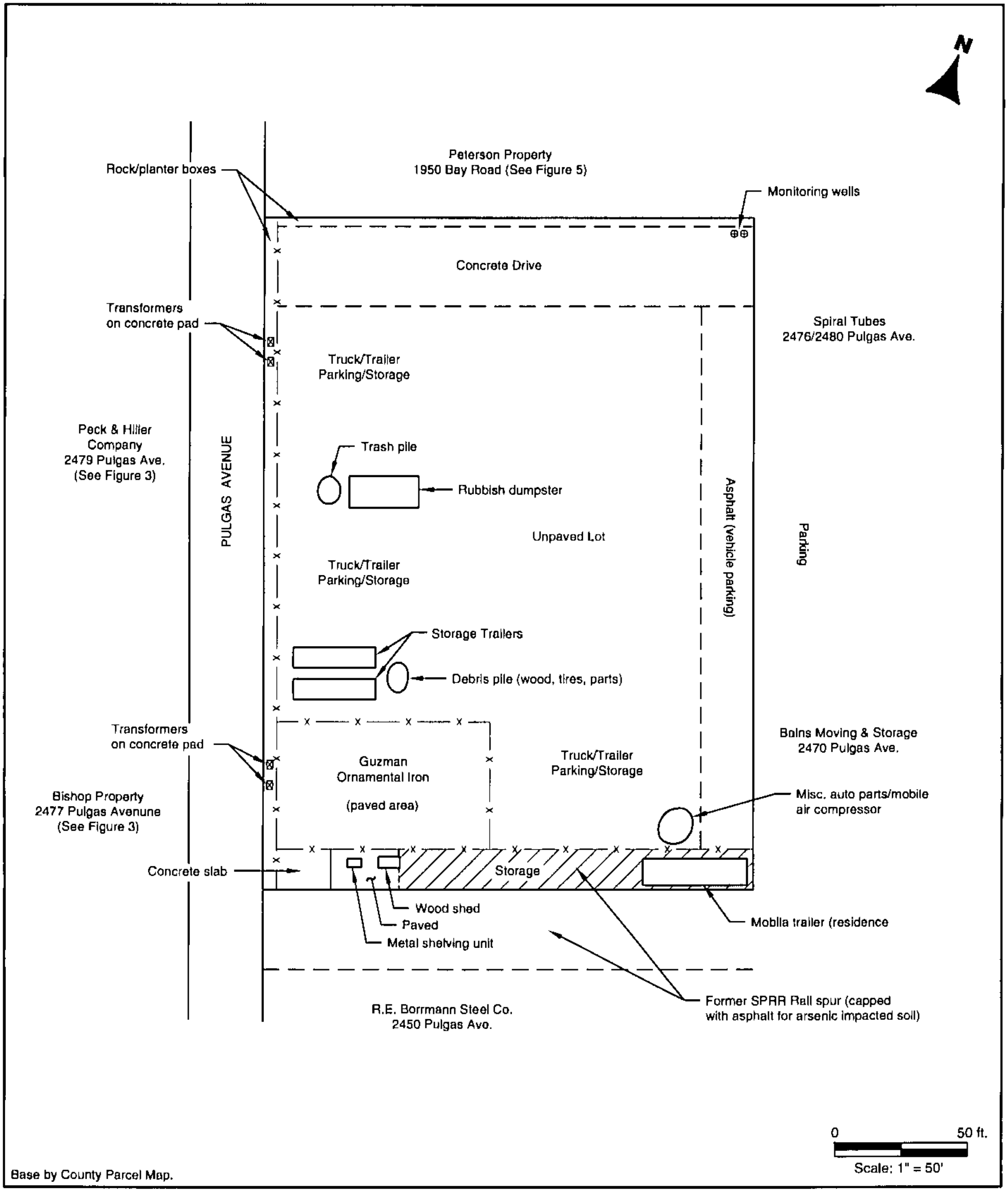
Base by County Parcel Map.

SITE PLAN-PECK/O'CONNOR AND BISHOP PROPERTIES (2485 & 2477 PULGAS AVENUE)

PULGAS AVENUE/BAY ROAD PHASE I
East Palo Alto, California

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

FIGURE 3
2047-1



SITE PLAN-BAINS PROPERTY (2470 PULGAS AVENUE)

PULGAS AVENUE/BAY ROAD PHASE I
East Palo Alto, California

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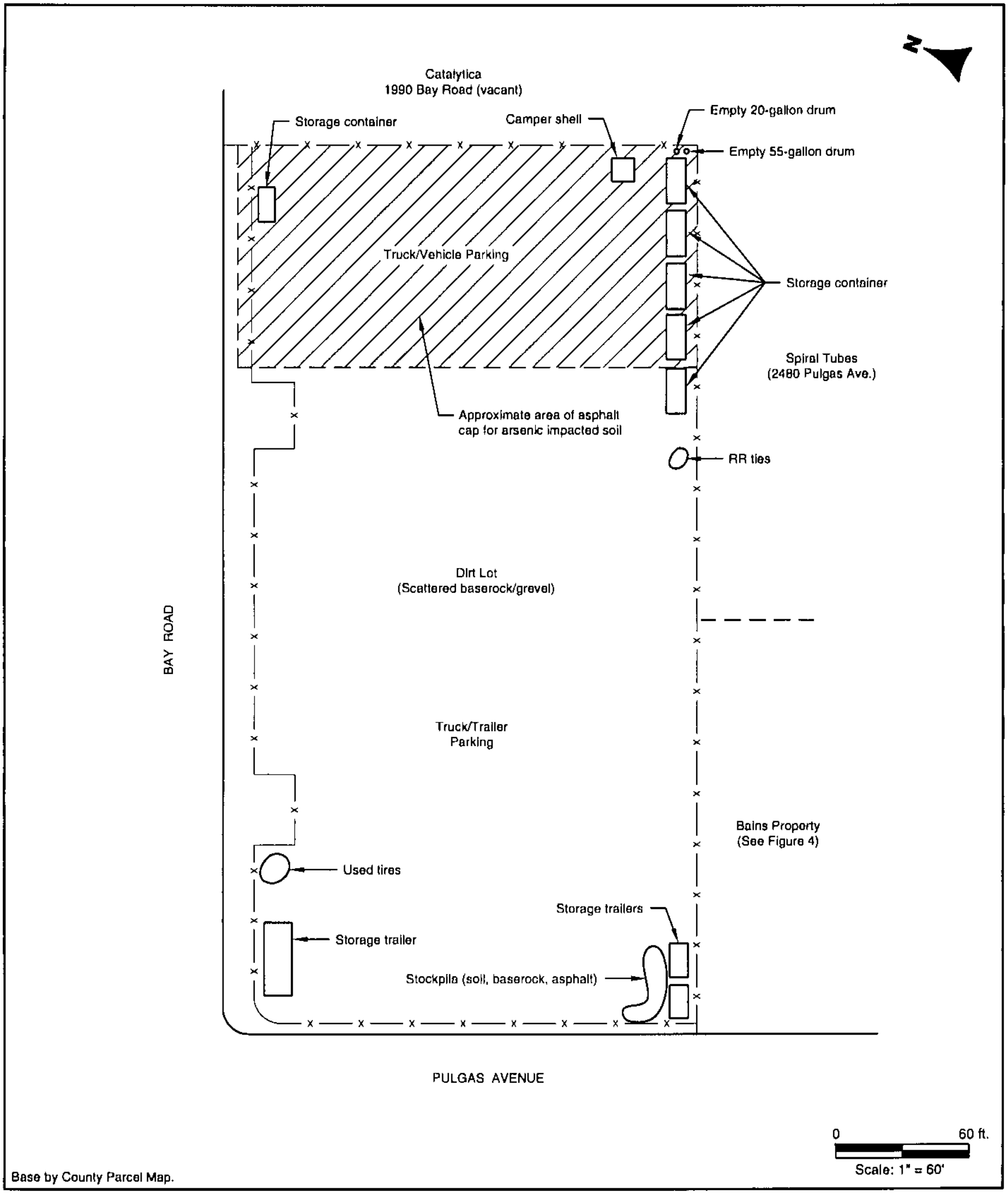
FIGURE 4
2047-1



Base by County Parcel Map.

SITE PLAN-PETERSON PROPERTY (1950 BAY ROAD)

PULGAS AVENUE/BAY ROAD PHASE I
East Palo Alto, California

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FIGURE 5
2047-1

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SAN MATEO COUNTY
ENVIRONMENTAL HEALTH

DEC 29 2005

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Health Risk Assessment

Peck & O'Connor, O'Connor Trust (Formerly Bishop), Bains,
Ravenswood Investments, and Chang Properties
East Palo Alto, California

This report has been prepared for:

Byrd Development, LLC
418 Florence Street, Suite 100, Palo Alto, California 94301-1705

January 3, 2005
Project No. 2047-1D

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SAN MATEO COUNTY
ENVIRONMENTAL HEALTH
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HEALTH RISK ASSESSMENT
PECK & O'CONNOR, O'CONNOR TRUST (FORMERLY BISHOP), BAINS, RAVENSWOOD INVESTMENTS, AND CHANG PROPERTIES
EAST PALO ALTO, CALIFORNIA

1.0 INTRODUCTION AND SITE BACKGROUND

This report describes the evaluation of human health risks associated with detected compounds at the above referenced properties. One risk estimate is provided for the combined Peck & O'Connor and O'Connor Trust (formerly Bishop) properties, and one risk estimate is provided for the Bains and Ravenswood Investments properties. In this report, the O'Connor Trust property is referred to as the Bishop property; and the Bains and Ravenswood Investments properties are collectively referred to as the Bains property. An evaluation of potential human health risks associated with detected compounds at both sites is discussed below. The general approach used to develop the risk estimates was taken from the Cal/EPA Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities (Cal/EPA 1996). Although the Chang property is part of the overall planned residential development (Pulgas Avenue Homes Project), previous sampling work, as described in our January 2005 Phase II report, did not detect contaminants at concentrations that would warrant the preparation of a health risk estimate; thus, no risk estimate is provided for the Chang property.

The properties are located within the Ravenswood Industrial Area (RIA) of East Palo Alto, California. We understand that Byrd Development, LLC plans to purchase the properties for residential redevelopment. We further understand that the planned development consists of mainly two-story, wood-framed, single-family, slab-on-grade homes.

Health risks for selected chemicals were calculated for a residential exposure scenario, and the exposure pathways evaluated included incidental ingestion of soil, dermal contact with soil, and inhalation of particulates and vapors as applicable. Methods of calculation, exposure assumptions, parameter values used, and results are described in the following sections.

1.1 Peck & O'Connor and Bishop Properties

The Peck & O'Connor and Bishop Properties consist of three parcels; one (Assessor's Parcel Number [APN] 063-231-180) is identified as 2477 Pulgas Avenue (Bishop property [currently owned by O'Connor Trust]), and two (APNs 063-231-190 and -200) are identified as 2485 Pulgas Avenue (Peck & O'Connor property). The site is occupied by the Peck & Hiller Company, a concrete construction contractor.

Lowney Associates recently completed a Phase I environmental site assessment for several properties, including the subject site (Lowney 2004). Based on information obtained during our Phase I investigation and due to the planned residential development of the site, several areas of potential environmental concern were identified at the site that appeared to warrant additional investigation. These potential concerns, as discussed in our Phase I report dated June 24, 2004, are summarized below.

Previous site investigations indicated that ground water impacted with volatile organic compounds (VOCs) had migrated onto the site from the adjacent up-gradient 1836-1858 Bay Road property that borders the northwest side of the site. Ground water sampling conducted at the project site by Dugan Associates in 2000 detected trichloroethylene (TCE) in ground water up to 280 parts per billion (ppb). In addition, total recoverable petroleum hydrocarbons (TRPH) were detected in ground water at the 1836-1858 Bay Road property up to 17,000 ppb within 25 feet of the property line of the Peck & O'Connor site. The possibility that ground water impacted with petroleum hydrocarbons has migrated onto the site from the 1836-1858 Bay Road property and the presence of VOC impacted ground water were identified as potential concerns.

A former gasoline underground storage tank (UST) was present on-site that was removed in 1991. A ground water sample collected from the UST excavation detected gasoline range petroleum hydrocarbons (TPHg) at 110,000 ppb. Three monitoring wells were installed at the site, and quarterly monitoring was performed from January 1992 until September 1992. TPHg was only detected in two of the three wells; the detected concentrations ranged up to 220 ppb. Two diesel aboveground storage tanks (ASTs) also appeared to be on-site in at least 1991.

The site is bordered to the south by a former rail spur historically used to deliver arsenic-based pesticide products to 1990 Bay Road. As a result, soil in the former rail spur area is contaminated with arsenic. Soil sampling along the rail spur to the south of the site was conducted in September 1997 by Geomatrix Consultants, Inc. Arsenic concentrations up to 186 parts per million (ppm) were detected in surface soil samples collected in the off-site rail spur area. Due to the site's proximity to the rail spur, potential contamination of on-site soil adjacent to the rail spur was identified as a concern.

In addition, the site was historically used for agricultural purposes. Five shallow soil samples were collected on-site and analyzed for pesticides as part of an Environmental Protection Agency (EPA) 1996 investigation. No significant pesticide contamination was identified; however, the results were compared to screening levels for continued industrial site use and copies of the analytical results were not available for review. Therefore, soil sampling to further evaluate residual pesticide concentrations, if any, and potential health risks to future residents was recommended.

Several chemical and drum storage areas were identified on the Peck & O'Connor property. The Peck & Hiller Company has occupied this property for industrial use for approximately 40 years. Although the potential for soil or ground water to have been significantly impacted by these chemicals appeared low to moderate, due to the long industrial history of the site, and because residential development of the site is under consideration, soil quality in the storage areas was identified as a potential concern.

During July of 2004, Lowney Associates conducted a subsurface exploration program that included the completion of 13 borings (EB-1 through EB-13) to an approximate depth of 12 feet. Soil and groundwater samples were collected from selected borings to evaluate soil and groundwater quality. Near surface and surface soil samples were also collected to evaluate the soil quality in the vicinity of on-site chemical storage areas and in the vicinity of the former off-site railroad spur. Finally, soil vapor samples were collected at five on-site locations (VS-1 through VS-5) from a depth of approximately 5 feet. The purpose of the soil vapor samples was to help evaluate the potential for indoor air impacts associated with VOCs that may be volatilizing from impacted soils and/or ground water beneath the site. During November of 2004, additional investigation at the site was conducted that included the completion of three soil vapor probes to a depth of 5 feet, and four additional soil borings to an approximate depth of 12 feet. The purpose of the additional work was to further investigate the extent of TCE soil vapor impact at the site. Soil and ground water samples also were collected. The results of the additional investigation indicated that the likely source of TCE detected in soil vapor was volatilization from impacted ground water beneath the property. Additional details concerning the investigations and the results are presented in our Phase II Soil, Ground Water, and Soil Vapor Quality Evaluation report dated January 3, 2005 (Lowney 2005b).

1.2 Bains Property

The approximately 1.08-acre Bains site consists of three parcels (APNs 063-240-210, -220, and -350) and a portion (approximately 0.07 acres) of an additional parcel (APN 063-240-340), located on the east side of Pulgas Avenue, across Pulgas Avenue from the Peck & O'Connor and Bishop properties. Although referred to as the Bains property in this report, Ravenswood Investments owns the small 063-240-350 parcel and the portion of the -340 parcel included as part of this study area. The site is currently used as a parking and storage lot by Bains Moving & Storage; the southwest corner of the site is utilized by Guzman Ornamental Iron as a work area.

Lowney Associates recently completed a Phase I environmental site assessment for several properties, including the Bains site (Lowney 2004). Based on information obtained during the Phase I investigation and due to the planned residential development of the site, several areas of potential environmental concern were identified that warranted additional investigation. Briefly, the primary concerns identified included prior agricultural use of the site, up-gradient sources of groundwater contamination, and the presence on-site of small quantities of chemicals and numerous pieces of equipment that were observed stored in the paved areas in the southeast portion of the site. During November of 2004, Lowney Associates conducted an investigation of the site that included the completion of seven soil borings, four of which were advanced to the depth of groundwater, and the completion of four soil vapor probes to an approximate depth of 5 feet. Shallow soil samples were collected at approximate depths from ½ foot to 1½ feet, and analyzed for VOCs, metals, organochlorine pesticides, and total petroleum hydrocarbons including benzene, toluene, ethylbenzene, and xylenes (BTEX). From selected borings, grab groundwater samples were collected and analyzed for VOCs, metals, and total petroleum hydrocarbons including BTEX compounds. Finally, the soil vapor samples were analyzed for VOCs. The results of the investigation indicated the presence of low levels of petroleum hydrocarbons and pesticides in the shallow soil, and the presence of VOCs in soil vapor. Additional details concerning the investigation and results of the investigation are presented in our Phase II Soil, Ground Water, and Soil Vapor Quality Evaluation Report dated January 3, 2005 (Lowney 2005b).

2.0 CHEMICALS OF POTENTIAL CONCERN

The calculation of risks relies upon the chemical data contained in our Phase II report (Lowney 2005b). The analytical results contained in this report indicated the presence of metals, organochlorine pesticide compounds, and petroleum hydrocarbons in site soil, and VOCs in soil vapor.

With respect to the chemical constituents detected in site soils, all chemicals were initially screened to select chemicals to be included in risk calculations. As a conservative measure, the screening process included comparison of the maximum detected soil concentrations to California Regional Water Quality Control Board (RWQCB) Residential Environmental Screening Levels (ESLs) for direct exposure.

ecotox, indoor air, leaching

A similar screening process was used for chemicals detected in soil vapor. Maximum concentrations of chemicals detected in soil vapor were compared to residential ESLs that were derived for the protection of indoor air quality (i.e., soil vapor ESLs represent concentrations in the subsurface below which significant indoor air impacts are unlikely). Residential ESLs are risk-based screening concentrations that are primarily calculated assuming a 30-year residential exposure period via incidental ingestion, dermal contact, and inhalation of airborne chemical constituents from affected media. The ESLs are based on a target cancer risk for carcinogenic chemicals of 1×10^{-6} and a target hazard index (HI) for non-carcinogenic chemicals of 0.2.

For detected chemicals with no established soil vapor ESL, the maximum detected concentration was compared to the respective U.S. EPA Ambient Air Preliminary Remediation Goal (PRG). Where the maximum detected concentration in soil vapor was greater than the PRG by a factor of 1000, the chemical was included for further evaluation. This is consistent with the RWQCB screening level soil vapor ESLs, which typically exceed the screening level indoor air ESLs by a factor of 1000.

Non-carcinogenic chemicals were eliminated from further consideration (inclusion in the risk calculations) if their maximum detected concentration was below the respective residential ESL concentration. Carcinogenic chemicals were eliminated from further consideration (inclusion in the risk calculations) if they were infrequently detected and if the maximum concentrations detected were 1/10 or less of the respective ESL concentration. Any chemicals eliminated using this screening process will not significantly contribute to site risks.

defined as?

2.1 Peck & O'Connor and Bishop Properties

2.1.1 Chemicals Detected in Site Soil and Soil Vapor

Chemical concentrations detected in soil and soil vapor during the recent investigation of the Peck & O'Connor and Bishop properties are summarized and compared to residential ESLs in Tables 1A and 2A.

Table 1A. Soil Analytical Summary
Peck & O'Connor and Bishop Properties

using Jul '03 ESL

	Chemical	Frequency of Detection	Range of Concentrations (mg/kg)	Average Concentration (mg/kg)	Location of the Maximum	95% UCL^b (mg/kg)	Direct Exposure Residential ESLs (mg/kg)	
✓	DDT(total)	11/12	<0.002 – 0.916	0.15	EB-11	0.28	1.6 1.7	
✓	Chlordane (total)	7/12	<0.002-0.24	0.05	EB-2	0.09	0.44	
	Dieldrin	1/12	<0.002 -0.0034	NM	EB-13	NM	0.03	
	Endosulfan Sulfate	2/12	<0.002 – 0.14	0.083	EB-11	NM	73 as endosulfan	
	Endrin	5/12	<0.002 – 0.12	0.016	EB-11	NC	4.1 3.7	
✓	BHC (total)	4/12	<0.002 – 0.177	0.023	EB-11	0.049	NE (0.32 = beta-BHC PRG)	
	Heptachlor Epoxide	1/12	<0.002 -0.0046	NM	EB-6	NM	0.08	
max>1/10 ESL ✗	TPHd^a	10/10	2.8 – 140	49.9	SS-9	75.3	400 500	
✓	TPHo^a	7/10	<50-720	302	SS-9	468	1000 500 (as residual fuel)	
	Arsenic	25/25	2.4 - 9.3	4.2	SS-9	4.9	5.5	
max>1/10 ESL ✗	Barium	11/11	57 - 710	179	SS-8	NC	1000 1,100	
✓	Cadmium	3/25	<0.5 – 4.0	0.52	SS-7	0.82	1.7	
max>ESL ?	Chromium	25/25	22 - 160	49	SS-9	NC	58 23,000 (Cr3)	bad assumption
avg>ESL ?	Cobalt	11/11	5.9 - 29	13.8	EB-13	NC	10 94	
max>1/10 ESL ✗	Copper	25/25	15 - 240	43.6	SS-9	NC	610 630	
✓	Nickel	25/25	26 - 200	54.3	SS-9	67.9	310	
max>1/10 ESL ✗	Mercury	17/25	<0.05 – 1.4	0.16	EB-15	NC	3.7 2.5	
max>1/10 ESL ✗	Molybdenum	4/11	<1.0 – 15	2.1	SS-9	NC	76 78	
avg>1/10 ESL ✗	Lead	25/25	5.5 – 95	22.7	SS-9	30.1	150 255	
max≃ESL	Selenium	1/25	<2.0 – 2.0	NM	SS-8	NC	76 78	
✗	Vanadium	11/11	27 – 97	48.5	SS-4	NC	110	
max>1/10 ESL ✗	Zinc	25/25	38 – 660	158	SS-12	NC	1600 4,700	
✓	Chloroform	1/14	0.018	NM	EB-19	NC	.88 0.098	
✓	TCE	2/14	<0.005 - 0.026	NM	EB-19	NC	29 0.26	

< Constituent not detected at or above stated laboratory detection limits
a Maximum concentrations (at SS-11) eliminated from the data set since the area of impact will be excavated.
b For non-detect data, the 95% UCL is calculated by assuming that the chemical was present at ½ the detection limit.
NC Not calculated - non-carcinogenic compound with maximum detected concentration below the ESL concentration.
NM Not meaningful due to low frequency of detection.
NE Not established.

Table 2A. Soil Vapor Sampling Results
Peck & O'Connor and Bishop Properties

Chemical	Frequency of Detection	Range of Detected Concentrations (ug/m^3)	Average Concentration (ug/m^3)	Location of the Maximum	95% UCL^b (ug/m^3)	Soil Vapor Residential ESLs (ug/m^3)
✓ Benzene	5/8	3.2 - 74	23.3	VS-2	44.5	85 84
Toluene	7/8	4.4 - 120	34.7	VS-2	65.6	63,000 83,000
Ethyl-benzene	2/8	1.6 - 3.7	6.7	VS-2	14.13	420,000 2,200
Xylenes	2/8	4.9 - 10.8	20.1^a	VS-2	42.5	150,000 21,000
MTBE	1/8	260	75.2	VS-2	220.87	9,400
✓ TCE	7/8	26 - 46,000	9198	VS-2	22,086	1,200
PCE	1/8	2.0	10.35^a	VS-2	22.2	410
cis-1,2-DCE	2/8	16 - 47	16.3	VS-2	41.8	7,300
1,1-DCA	2/8	61 - 160	33.3	VS-2C	77.4	1,500
1,1,1-TCA	6/8	2.8 - 1,900	437	VS-2C	997	160,000 46,000
✓ Chloroform	4/8	4.5- 26,000	4179	VS-2C	11,301	450 460
✓ 1,3 Butadiene	5/8	4.5- 17.5	20.2^a	VS-2B	30.2	0.0069^c
Carbon Disulfide	1/3	2.8	NC	VS-2B	NC	730^c
Hexane	2/3	11 - 30	NC	VS-2A	NC	210^c
2-Butanone	2/3	18 - 27	NC	VS-2A	NC	210,000
Cyclohexane	1/3	5.8	NC	VS-2A	NC	NE
Heptane	2/3	8.4 - 31.0	NC	VS-2A	NC	NE

a	Average concentration exceeds the range of detected concentrations due to elevated detection limits. For non-detect data, the average concentration was calculated by assuming that the chemical was present at ½ the detection limit.
b	For non-detect data, the 95% UCL is calculated by assuming that the chemical was present at ½ the detection limit.
NC	Not calculated - non-carcinogenic compound with maximum detected concentration below the ESL concentration
c	Soil Vapor ESL is not established, value represents the ambient air PRG.
NE	Not established

2.1.2 Chemicals Detected in Ground Water

With respect to chemicals detected in ground water at the Peck & O'Connor and Bishop properties, Tables 3A and 4A summarize the analytical results. Since future residents at the site will have no contact with groundwater, these analytical results provide information relative to the potential presence of volatile contaminants that may migrate to the surface. Since volatilization of contaminants from the groundwater is a potential exposure pathway of concern, soil vapor results are preferred since they are direct measurements of the vapor phase contaminants.

Table 3A. Analytical Results of Ground Water Samples-VOCs Peck & O'Connor and Bishop Properties

(concentrations in ug/L)

Sample	TCE	1,1-DCA	1,1-DCE	cis-1,2-DCE	1,1,1-TCA	Trichloro-trifluoroethane	Chloroform
EB-1W	330	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
EB-2W	20	0.85	<0.50	<0.50	<0.50	1.1	<0.50
EB-3W	58	2.9	<0.50	14	0.71	<0.50	1.8
EB-6W	11	0.62	<0.50	<0.50	<0.50	<0.50	<0.50
EB-7W	22	0.51	<0.50	<0.50	1.3	<0.50	<0.50
EB-8W	110	5.9	1.3	3.8	<1.0	<1.0	<1.0
EB-9W	21	0.52	0.58	0.53	<0.50	<0.50	<0.50
EB-10W	78	0.79	0.60	1.6	1.6	<0.50	12
EB-11W	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
EB-12W	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
EB-13W	5.6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
EB-17W	370	4.3	<2.5	3.6	<2.5	<2.5	<2.5
EB-18W	43	2.0	<1.0	27	<1.0	<1.0	<1.0
EB-19W	58	1.5	<0.50	1.4	<0.50	<0.50	14
Frequency	13/14	10/14	3/14	7/14	3/14	1/14	4/14

< Indicates that the compound was not detected at or above stated laboratory detection limits

Table 4A. Analytical Results of Ground Water Samples-Petroleum Hydrocarbons Peck & O'Connor and Bishop Properties

(concentrations in ug/L)

Sample	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	TPHd	TPHo
EB-1W	<50	<0.50	<0.50	<0.50	<1.0	0.67	260	520
EB-2W	50	<0.50	<0.50	<0.50	<1.0	<0.50	190	<500
EB-3W	76	<0.50	<0.50	1.4	5.6	5.2	250	<500
EB-4W	<1,000	<10	<10	<10	<20	<10	250,000	<25,000
EB-5W	<50	<0.50	<0.50	<0.50	<1.0	0.90	71	<500
EB-6W	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<50	<500
EB-7W	54	<0.50	<0.50	<0.50	<1.0	<0.50	67	<500
EB-8W	<50	<0.50	<0.50	<0.50	<1.0	0.84	64	<500
EB-9W	<50	<0.50	<0.50	<0.50	<1.0	<0.50	180	<500
EB-10W	<50	<0.50	<0.50	<0.50	<1.0	0.80	57	<500
EB-11W	<50	<0.50	<0.50	<0.50	<1.0	0.60	1,800	1,200
EB-12W	<50	<0.50	<0.50	<0.50	<1.0	<0.50	150	<500
EB-13W	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<50	<500
Frequency	3/13	0/13	0/13	1/13	1/13	6/13	11/13	2/13

< Indicates that the constituent was not detected at or above the stated laboratory detection limit

2.2 Bains Property

2.2.1 Chemicals Detected in Site Soil and Soil Vapor

Chemical concentrations detected in soil and soil vapor during the recent investigation of the Bains property are summarized and compared to residential ESLs in Tables 1B and 2B.

Table 1B. Soil Analytical Summary - Bains Property

Chemical	Frequency of Detection	Range of Concentrations (mg/kg)	Average Concentration (mg/kg)	Location of the Maximum	95% UCL^a (mg/kg)	Direct Exposure Residential ESLs (mg/kg)
DDT(total)	5/8	<0.002 - 0.037	0.011	EB-5	0.019	1.7
✓ Dieldrin	5/8	<0.002 -0.34	0.05	EB-5	0.125	0.03
TPHd	7/7	7 - 38	15.7	EB-8	26.5	400 500
✓ TPHo	5/7	<50 - 840	250	EB-8	465	1000 500
Xylenes	1/7	<0.005 - .01	NM	EB-8	NC	54
Arsenic	11/11	1.3 - 23	5.9	EB-3	9.2	5.5
Barium	7/7	31-170	113	EB-2	NC	1000 1,100
✓ Cadmium	8/11	<0.5 - 2.8	0.7	EB-3	1.1	1.7
Chromium	11/11	28 - 45	34.2	EB-7	NC	58 23,000 (Cr3)
avg>ESL Cobalt	7/7	7.3 - 16	10.21	EB-7	NC	10 94
Copper	11/11	21 - 49	29.5	EB-8	35.2	610 630
✓ Nickel	11/11	26 - 43	33.8	EB-2	36.5	310
Molybdenum	1/7	<1 - 1.1	NM	EB-3	NC	3.7 78
Mercury	9/11	<0.05 - 0.48	0.12	EB-3	0.19	2.5
Lead	11/11	4.4 - 49	17	EB-3	24.3	150 255
Vanadium	7/7	34-97	54.1	EB-7	72.2	110
Zinc	11/11	50 - 74	61.5	EB-4	NC	4600 4,700

< Indicates that the constituent was not detected at or above stated laboratory detection limits

a For non-detect data, the 95% UCL is calculated by assuming that the chemical was present at ½ the detection limit.

NC Not calculated - non-carcinogenic compound with maximum detected concentration below the ESL concentration.

NM Not meaningful due to low frequency of detection.

Table 2B. Soil Vapor Sampling Results - Bains Property

Chemical	Frequency of Detection	Range of Detected Concentrations (ug/m^3)	Average Concentration (ug/m^3)	Location of the Maximum	95% UCL^a (ug/m^3)	Soil Vapor Residential ESLs (ug/m^3)
✓ Benzene	3/4	7.3 - 26	10.8	VS-1	22.9	85 84
Toluene	3/4	10 - 51	NC	VS-1	NC	83,000
Ethyl-benzene	2/4	3.8 - 28	NC	VS-1	NC	2,200
Xylenes	3/4	8.3 - 50	NC	VS-1	NC	21,000
✓ TCE	4/4	12 - 96	42.7	VS-4	82.4	1,200
✓ PCE	2/4	9 - 4,400	2,198	VS-4	3,689	410
Acetone	4/4	32 - 58	NC	VS-1	NC	73,000
Freon 11	1/4	10	NM	VS-2	NC	730^b
Ethyl toluene	2/4	8.9 - 16	NC	VS-1	NC	NE
Trimethylbenzene	2/4	7.7 - 12	NC	VS-1	NC	6.2^b
Trimethyl-pentane	1/4	6.6	NC	VS-1	NC	NE
Methyl pentanone	2/4	3.8 - 4.3	NC	VS-2	NC	NE
Tetrahydrofuran	1/4	16	5.4	VS-1	13.8	0.99^b
✓ 1,3 Butadiene	3/4	6.9 - 20	8.8	VS-1	18.2	0.0069^b
Carbon Disulfide	1/4	5.5	NC	VS-3	NC	730^b
Hexane	4/4	7 - 44	NC	VS-3	NC	210^b
2-Butanone	4/4	14 - 260	NC	VS-1	NC	210,000
Cyclohexane	3/4	6.2 - 18	NC	VS-3	NC	NE
Heptane	3/4	13 - 27	NC	VS-1	NC	NE
Styrene	2/4	3.9 - 69	NC	VS-1	NC	21,000

a For non-detect data, the 95% UCL is calculated by assuming that the chemical was present at ½ the detection limit.

b Soil Vapor ESL is not established, value represents the ambient air PRG.

2.2.2 Chemicals Detected in Ground Water

Table 3B summarizes the analytical results obtained from ground water samples collected from the Bains property. Since future residents at the site will have no contact with ground water, these results provide information relative to the potential presence of contaminants that may migrate to the surface. Since volatilization of contaminants from the groundwater is a potential exposure pathway of concern, soil vapor results are preferred since they are direct measurements of the vapor phase contaminants.

Table 3B. Analytical Results of Selected Ground Water Samples Bains Property
(concentrations in ug/L)

Sample	TCE	1,1-DCA	cis-1,2-DCE	TPHg	TPHd	MTBE
EB-2W	8.0	0.75	0.89	<50	<50	3.7
EB-3W	1.5	<0.5	<0.5	NA	NA	NA
EB-4W	4.2	<0.5	<0.5	83	84	9.1
EB-5W	2.0	<0.5	<0.5	NA	NA	NA

< Indicates that the compound was not detected at or above stated laboratory detection limits
NA Not analyzed

2.3 Chemicals Selected and Eliminated

2.3.1 Peck & O'Connor and Bishop Properties

Chemicals Selected

The chemicals selected for further risk evaluation included three organochlorine pesticide compounds, oil range petroleum hydrocarbons (TPHo), four volatile organic compounds, and two inorganic compounds. The final list of chemicals includes the organochlorine pesticide compounds total DDT (as DDE, DDD, DDT), chlordane, and benzene hexachloride (BHC) (total), TPHo, and four volatile organic compounds detected in soil vapor (chloroform, 1,3-butadiene, benzene, and TCE). Benzene, TCE, and chloroform were selected since they were detected at maximum concentrations greater than 1/10 of their respective ESLs. 1,3-butadiene was selected since the maximum detected soil vapor concentration exceeded the ambient air PRG by at least a factor of 1000. In addition, two carcinogenic inorganic compounds (cadmium and nickel) were selected for further risk evaluation.

Chemicals Eliminated

The non-carcinogenic organochlorine pesticide compounds and pesticide breakdown products that were eliminated from further evaluation (endrin and endosulfan sulfate) were eliminated due to low concentrations detected. The carcinogenic organochlorine pesticide compounds and pesticide breakdown products eliminated from consideration (dieldrin and heptachlor epoxide) were eliminated due to their low frequency of detection and the low concentrations detected in the samples.

With respect to other organic compounds, diesel range petroleum hydrocarbons (TPHd) were eliminated due to the low concentrations detected.

Non-carcinogenic VOCs detected in soil vapor including toluene, xylenes, cis-1,2-DCE, and 1,1,1-TCA were eliminated due to low frequency of detection and/or due to the low concentrations detected (maximum detected concentration well below the ESL). Similarly, detected carcinogenic VOCs including ethylbenzene, MTBE, 1,1-DCA, and PCE were eliminated due to low frequency of detection and the maximum concentration detected was less than 1/10 the ESL concentration.

Two non-carcinogenic compounds detected in soil vapor (heptane, a straight chain aliphatic hydrocarbon, and cyclohexane, a cyclical aliphatic hydrocarbon) have no established ambient air PRGs or soil vapor ESLs. The detected soil vapor concentrations of these compounds were conservatively compared to the hexane ambient air PRG. Hexane, a potent neurotoxin, has an unusual toxicity that no other alkanes or cyclical alkanes share. Hexane is metabolized to hexanediol, which is the compound responsible for its neurotoxicity. Other alkanes and cyclical alkanes are not metabolized to this compound. Hexane is considered far more toxic than either heptane or cyclohexane.

This comparison shows that these compounds were detected at insignificant concentrations. Therefore, hexane, heptane, and cyclohexane were eliminated from further consideration due to the low concentrations detected and low frequency of detection.

For inorganic compounds, arsenic was eliminated since the detected concentrations are representative of naturally occurring background concentrations in the San Francisco Bay Area. Additionally, soil samples collected on the project site adjacent to the off-site former rail spur indicate that the project site has not been impacted with arsenic above typical background levels due to historic use of the former adjacent rail spur. All other inorganic compounds were also eliminated due to the low concentrations detected.

Finally, the high concentrations of petroleum hydrocarbons (TPHd and TPHo) detected in soil sample SS-11 were eliminated since the soil from this area will be excavated and disposed off-site prior to site development (see Table 1A notes).

2.3.2 Bains Property

Chemicals Selected

The chemicals selected for further risk evaluation included one organochlorine pesticide compound, TPHo, three volatile organic compounds, and two inorganic compounds. The final list of chemicals includes the organochlorine pesticide compound dieldrin, TPHo, and four volatile organic compounds detected in soil vapor (benzene, 1,3-butadiene, TCE, and PCE). Benzene, and PCE were selected since the maximum concentrations detected were greater than 1/10 of their respective ESLs. TCE was also selected as a conservative measure since it was detected in soil at a concentration near 1/10 of its ESL. 1,3-butadiene was selected since the maximum detected soil vapor concentration exceeded the ambient air PRG by at least a factor of 1000. This is consistent with the RWQCB screening soil vapor ESLs, which exceed the screening level indoor air ESLs by a factor of 1000. In addition, two carcinogenic inorganic compounds (cadmium and nickel) were selected for further risk evaluation.

Chemicals Eliminated

The organochlorine pesticide compounds DDT and DDE, were eliminated from further evaluation due to the low concentrations detected. TPHd was also eliminated due to the low concentrations detected.

Non-carcinogenic VOCs detected in soil vapor including toluene, ethylbenzene, xylenes, acetone, methyl ethyl ketone, and styrene were eliminated due to low frequency of detection and/or due to the low concentrations detected (maximum detected concentration well below the ESL).

Two alkyl aromatic compounds, ethyl toluene and trimethyl benzene, have no established ESLs. However these compounds are similar in toxicity to ethylbenzene and xylenes. A comparison of their maximum detected concentrations in soil vapor to the ethylbenzene ESL shows that these compounds were detected at insignificant concentrations in soil vapor. Accordingly, these compounds were eliminated from further risk evaluation.

Three non-carcinogenic compounds detected in soil vapor (heptane, a straight chain aliphatic hydrocarbon, trimethyl pentane, a branched aliphatic, and cyclohexane, a cyclical aliphatic hydrocarbon) have no established ambient air PRGs or soil vapor ESLs. The concentrations of these compounds detected in soil vapor were conservatively (for reasons described previously) compared to the hexane ambient air PRG. This comparison shows that these compounds were detected at insignificant concentrations. Therefore, hexane, heptane, trimethyl pentane, and cyclohexane were eliminated from further risk evaluation due to the low concentrations detected and low frequency of detection. Tetrahydrofuran was eliminated from further consideration due to low frequency of detection and the low level of detection. Finally, Freon 11 (Trichlorofluoromethane) and carbon disulfide were eliminated due to the low soil vapor concentrations detected in comparison to their ambient air PRGs.

Arsenic, a carcinogenic inorganic compound, was eliminated since the detected concentrations are representative of naturally occurring background concentrations in the San Francisco Bay Area. Additionally, the results of soil sampling performed by others indicated that soil on the project site was not impacted with arsenic above typical background levels due to historic use of the former adjacent rail spur. All other inorganic compounds were also eliminated due to the low concentrations detected.

3.0 EXPOSURE ASSESSMENT

Exposure assessment is the process of identifying human populations that could potentially come into contact with site-related chemicals and the route(s) of potential exposure. For risk calculations, exposure assessment includes characterizing the exposure setting and identifying potentially exposed populations, identifying exposure pathways, and quantifying exposure.

3.1 Exposure Pathways

An exposure pathway is the course a chemical takes from a source to an exposed organism. Exposure pathways include the following four elements: (1) a source; (2) a mechanism for release, retention, or transport of a chemical in a given medium (e.g., air, water, soil); (3) a point of contact with the affected medium; and (4) an exposure route at the point of contact (e.g., ingestion, inhalation). If any of these elements is missing, the pathway is considered "incomplete" (i.e., it does not present a means of exposure).

For a residential receptor, this appraisal will address inhalation of wind blown dust, inhalation of vapors migrating from the subsurface and into enclosed spaces, and dermal and ingestion exposure to selected chemicals detected in soil at the site.

3.2 Exposure Estimation

Exposure estimates (intakes or administered doses) are defined as the mass of a substance taken into the body, per unit of body weight, per unit of time. Exposures are quantified by calculating the dose or chronic daily intake (CDI) of a chemical using exposure assumptions and calculation methods provided in regulatory guidance.

Chemical intakes are calculated for the residential exposure scenarios using algorithms and exposure variables that are based on assumptions about exposure conditions. The chemical intake calculations were adapted from EPA Risk Assessment Guidance (RAGS, US EPA 1989) and/or the Cal/EPA Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities (Cal/EPA 1996).

The following paragraphs describe the parameters and assumptions used to calculate CDIs for each receptor.

3.3 Residential Exposure Scenario

Taken from RWQCB 2003, this exposure scenario assumes that exposure to surface soil occurs 350 days per year for a 30-year exposure duration, 6 years as a child and 24 years as an adult. Exposure parameters include a soil ingestion rate of 200 milligrams per day (mg/day) as a child and 100 mg/day as an adult. For the dermal exposure pathway, an exposed skin surface area (SA) of 2,800 square centimeters (cm^2) is assumed for a child and 5,700 cm^2 for an adult. In addition, a soil adherence factor (AF) of 0.2 milligram per square centimeter (mg/cm^2) is assumed for the child receptor and for the adult the AF is assumed to be 0.07 mg/cm^2. The soil-to-skin adherence factor refers to the amount of soil that remains deposited on the skin after contact.

For the inhalation exposure pathway, risk calculations assume that a hypothetical residential receptor breathes 10 cubic meters (m^3) of air per day as a child and 20 m^3 of air per day as an adult. The frequency of exposure is assumed to be 350 days per year, and the exposure duration is 6 years for a child and 24 years as an adult. Finally, for all exposure pathways, the body weight of a child is assumed to be 15 kg, and the adult body weight is assumed to be 70 kg.

3.4 Exposure Assumptions by Pathway

3.4.1 Soil Ingestion

The exposure algorithm for soil ingestion is presented in Table A-1 in Appendix A. The algorithm represents incidental ingestion of surface soil as a result of direct contact with soil on hands, followed by hand-to-mouth activity (either inadvertent or associated with eating or smoking). For this exposure pathway, 100% absorption of the ingested contaminant is assumed.

3.4.2 Dermal Contact with Soil

The exposure algorithm for dermal contact (Table A-2 in Appendix A) presents the method for calculating dermal dose. Dermal exposure is expressed as an absorbed dose by incorporating a chemical-specific absorption factor (ABS) into the exposure equation. Dermal absorption values for the chemicals of concern are from Cal/EPA Preliminary Endangerment Assessment (PEA) Guidance and from US EPA preliminary remediation goals (PRGs). A 5% ABS factor is assumed for organochlorine pesticide compounds, a 10% ABS factor is assumed for TPHo, and a 0.1% ABS factor is assumed for cadmium. For this screening level appraisal, oral slope factors or reference doses are not adjusted to account for "absorbed versus administered doses".

3.4.3 Inhalation

Table A-3 in Appendix A contains the exposure algorithm for inhalation of chemical contaminants. Inhalation of wind blown ambient dusts containing chemical compounds is estimated using particulate emission factors (PEFs) from U.S EPA 2001 and RWQCB 2003. The PEF relates the contaminant concentration in soil with the concentration of respirable particles in the air due to fugitive dust emissions from contaminated soils. The equation for calculating ambient air concentrations and the default parameters used are presented in Appendix A. For residential exposure scenarios, the U.S. EPA default PEF value of 1.316×10^9 cubic meters per kilogram (m^3/kg) is used. Inhalation of vapor phase contaminants is calculated similarly; however, the exposure concentration is estimated using a fate and transport model described in Section 3.5.1 below.

Default breathing rates for all receptors are used. An adult is assumed to breathe 20 m^3 of air daily and a child is assumed to breathe 10 m^3 of air daily. Frequency and duration of exposures are described above. In addition, 100% absorption through the inhalation route is assumed. Table 5 below provides a summary of exposure parameters used in this assessment.

Table 5. Receptor Specific Exposure Parameters

Exposure Scenario	Bwt	SA (cm^2)	AF (mg/cm^2)	IR (mg/day)	BR (m^3/day)	Exposure Frequency and Duration
Child	15 kg	2800	0.2	200	10	350 days per year for 6 years
Adult	70 kg	5700	0.07	100	20	350 days per year for 24 years

Default exposure parameters from U.S. EPA PRGs 2001 and RWQCB 2003. Bwt= body weight; SA= exposed skin surface area; AF= soil adherence factor; IR= soil ingestion rate; BR = breathing rate

3.5 Exposure Point Concentrations (EPCs)

The concentration term in the exposure equation is meant to reflect the average concentration contacted at the exposure point(s) over the exposure period (U.S. EPA 1989a). This means that the selected exposure point concentrations used to calculate CDIs are assumed to remain constant over the exposure period of 30 years.

For a typical and conservative reasonable maximum exposure (RME) residential exposure case, 95% upper confidence limits (UCLs) of soil and soil vapor concentrations are used to estimate potential risks.

For the RME exposure case on the Peck O'Connor and Bishop Properties, the soil vapor data set used to calculate the 95% UCL did not include vapor sample VS-5. Sample VS-5 contained 600 ppm of isopropyl alcohol (IPA) vapor. IPA was used as the tracer chemical to determine if significant short-circuiting occurred during the sampling event. Briefly, IPA soaked cloth was placed around fittings of the soil vapor sampling train to test the tightness of the fittings. Since the vapor saturation concentration of IPA is approximately 43,000 ppm, the detection of IPA at 600 ppm in sample VS-5 did not indicate that significant dilution of the soil vapor occurred during the sampling event. However, as a conservative measure, sample VS-5 was eliminated from the data set.

3.5.1 Indoor Air EPCs

To evaluate the indoor air exposure pathway, the Johnson and Ettinger Model Version 1.0 SG-ADV (U.S. EPA 2001) was used to evaluate potential exposures. The Johnson and Ettinger Models relate the chemical concentration in soil, soil vapor, and/or ground water to the indoor air concentration (exposure point concentration) of the chemical contaminant. The model is a one-dimensional analytical solution to convective and diffusive vapor transport into indoor air spaces and provides an attenuation coefficient that relates the vapor concentration in the indoor space to the vapor concentration at the source of contamination. The attenuation coefficient ($\propto$) is defined as the ratio of the indoor air concentration to the source (vapor) concentration in the soil matrix. Inputs to the model include the measured soil vapor concentrations at depth, chemical properties, soil properties, and the structural properties of the building.

Exposure point concentrations were calculated using the Johnson and Ettinger (J&E) Model SG-ADV with default parameters and coarse-grained soil conditions. Based on recent subsurface investigations, sandy clays are predominant below the site. Sandy clays are more resistive to vapor transport than course-grained soils.

Table 6. Model Parameters

Parameter (units)	Value / Reference
Soil Type	LS (Loamy Sand)
Total Porosity (unitless)	0.43 / RWQCB Default
Soil water- filled porosity (cm^3/cm^3)	0.15 / RWQCB Default
Average Soil Temperature (8 degrees Celsius)	20 / RWQCB Default
Source separation from enclosed space floor (cm)	152.4 / Site Specific Measurement
Soil Building Pressure Differential ($g/cm\text{-}s^2$)	40 / RWQCB Default
Enclosed Space Floor Width (cm)	961 / RWQCB Default
Enclosed Space Floor Length (cm)	961 / RWQCB Default
Enclosed Space Ceiling Height (cm)	244 / RWQCB Default
Floor-wall Seam Crack (cm)	0.1 / RWQCB Default
Volumetric Air Exchange Rate (1/hr)	1.0 / RWQCB Default

Tables 7A and 7B below summarizes exposure point concentrations used in this appraisal. Appendix A contains data input sheets and intermediate calculation sheets from the J&E Model.

Table 7A. Exposure Point Concentrations
Peck & O'Conner and Bishop Properties

Chemical	RME Scenario
DDT(t)	0.28 mg/kg
Chlordane	0.09 mg/kg
BHC(t)	0.049 mg/kg
Benzene	0.0072 ug/m^3
TCE	3.48 ug/m^3
1,3-Butadiene	0.0057 ug/m^3
Chloroform	1.89 ug/m^3
Cadmium	0.82 mg/kg
Nickel	67.9 mg/kg
TPHo	468 mg/kg

Table 7B. Exposure Point Concentrations Bains Property

Chemical	RME Scenario
Dieldrin	0.125 mg/kg
Benzene	0.0037 ug/m^3
TCE	0.013 ug/m^3
1,3-Butadiene	0.0034 ug/m^3
PCE	0.567 ug/m^3
Cadmium	1.1 mg/kg
Nickel	36.5 mg/kg
TPHo	465 mg/kg

4.0 TOXICITY VALUES

Toxicity values are used to quantify the relationship between the extent of exposure to a chemical and the likelihood of adverse health consequences. EPA-derived toxicity values used in risk assessments are termed slope factors and reference doses (RfDs). Slope factors are used to estimate the incremental lifetime risk of developing cancer corresponding to CDIs calculated in the exposure assessment. The potential for non-cancer health effects is evaluated by comparing estimated daily intakes with reference doses (RfDs) or reference concentrations (RfCs), which represent daily intakes at which no adverse effects are expected to occur over a lifetime of exposure. Both slope factors and RfDs are specific to the route of exposure [e.g., inhalation, or ingestion (oral) exposure]. California values are used where available in this evaluation of potential health risks.

Toxicity parameters (slope factors and reference doses) used in the risk calculations are summarized in Table 8 below.

Table 8. Chemical Specific Toxicity and Dermal Absorbance Factors

Chemical	ABS	SFi (mg/kg-day)$^{-1}$	Sfo (mg/kg-day)$^{-1}$	RfDi (mg/kg-day)	RfDo (mg/kg-day)
DDT(t)	0.05	0.34	0.34	0.0005	0.0005
Chlordane	0.05	1.2	1.3	0.0002	0.0005
BHC(t)	0.05	1.5	1.5	0.0002	0.0002
Dieldrin	0.05	16	16	0.00005	0.00005
Benzene	NA	0.1	NA	0.0017	NA
TCE	NA	0.007	NA	0.01	NA
PCE	NA	0.021	NA	0.17	NA
Cadmium	0.001	15	0.38	NE	0.0005
Nickel	NA	0.091	NA	NE	0.02
TPHo[a]	0.1	NA	NA	0.03	0.03
1,3-Butadiene	NA	0.6	NA	NE	NE
Chloroform	NA	0.019	NA	0.00086	NA

Table notes: a. Reference dose information represents RWQCB assumption that TPHo is represented by pyrene. ABS = dermal absorption factors from Cal/EPA 1999 PEA Guidance. Slope Factors (SFs) are from Cal EPA, reference dose (RfD) information from U.S. EPA PRGs 2002. NA= not available, not applicable, or not applicable for the exposure pathways considered in this assessment. NE= not established.

5.0 RISK CHARACTERIZATION

Exposure point concentrations were used to calculate chronic daily intakes (dose). The resultant doses, for the exposure conditions examined were then multiplied by slope factors for carcinogenic risks or compared to reference doses for non-carcinogenic hazards. Estimated risks and hazards are summarized in Table 9 below. Detailed hazard calculations by pathway and chemical are presented in the Risk Presentation Tables (Appendix A).

Table 9. Risk Summary

Residential Exposure Scenario	Risk	Hazard (HI)
Peck & O'Connor and Bishop Properties	1.1×10^{-5}	0.75
Bains Property	8.8×10^{-6}	0.34

A 1×10^{-6} cancer risk represents a one-in-one-million additional probability that an individual may develop cancer over a 70-year lifetime as a result of the exposure conditions evaluated. Because cancer risks are assumed to be additive, risks associated with simultaneous exposure to more than one carcinogen are aggregated to determine a total pathway cancer risk. Total cancer risks for each pathway are summed to determine the total cancer risk for the population of concern.

Unlike carcinogenic effects, non-cancer effects are not expressed as a probability. Instead, these effects are expressed as the ratio of the estimated exposure over a specified time period to the RfD derived for a similar exposure period. This ratio is termed a hazard quotient. If the CDI exceeds the RfD (i.e., hazard quotient greater than 1), there may be concern for non-cancer adverse health effects. Exposures resulting in a hazard quotient that is less than unity are unlikely to result in non-cancer adverse health effects. In accordance with Cal EPA 1999, hazard quotients for individual chemicals are conservatively summed for each exposure pathway for the child receptor to determine a total hazard index (HI).

5.1 Peck & O'Connor and Bishop Properties

Assuming that a residential receptor is exposed to on-site surface soil and subsurface vapors that migrate into enclosed spaces 350 days per year for a duration of 30 years, the carcinogenic risk is estimated at 1.1×10^{-5} at the Peck & O'Connor and Bishop Properties. With respect to non-carcinogenic hazards, the HI is estimated at 0.75. The primary risk drivers are chloroform and TCE in soil vapor.

5.2 Bains Property

For the Bains property, the carcinogenic risk is estimated at 8.8×10^{-6} and the non-carcinogenic HI is estimated at 0.34. The primary risk drivers are PCE in soil vapor, and dieldrin and cadmium in soil.

5.3 Conclusions and Recommendations

In order to place the risk estimates in perspective, the EPA National Contingency Plan (40 CFR 300.430) states "For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an upper bound lifetime cancer risk to an individual of between 10^{-4} to 10^{-6}". The predicted risk levels for both sites are near the middle of this range.

Remediation or risk management is rarely warranted at sites where the estimated cancer risk does not exceed 10^{-6}. For sites where the estimated risk is between 10^{-4} and 10^{-6}, the need for active remediation or risk management is evaluated on a site-specific basis by the overseeing regulatory agency (i.e., risks within this range are "potentially acceptable", depending on site-specific considerations). We recommend that the need for remedial or risk reduction measures for the proposed residential development at the sites be discussed with the RWQCB.

The primary contaminants of concern are VOCs detected in soil vapor including chloroform and TCE at the Peck & O'Connor site and PCE at the Bains site. Sub-slab passive ventilation systems or vapor barriers designed to help limit the migration of contaminant vapors into livable areas may be warranted depending on site development plans. With the inclusion of such risk mitigation measures, if they are required by the overseeing regulatory agency, the site appears suitable for residential development. Note that the arsenic present in soil located on off-site properties (some of which are deed-restricted) resulting from off-site pesticide production and off-site transportation of pesticide production materials does not appear to have impacted soil quality on the project site above typical background levels. The presence of this off-site arsenic-impacted soil and the deed-restricted properties should not pose a significant health threat to occupants of the project site under the planned residential use scenario.

6.0 UNCERTAINTY

As with any risk assessment, there is considerable uncertainty inherent in the risk appraisal process. It is common in risk assessment reports to provide a discussion of these factors. Uncertainties are further discussed below.

The primary uncertainties associated with the risk estimates provided are related to assumptions concerning the degree of soil contact, the migration of vapor phase chemicals into indoor enclosed spaces, and the unintentional or intentional elimination of chemicals of concern.

Risk estimates were derived from conservative exposure parameters and assume constant exposure points over a 30-year period. With respect to the vapor phase primary risk drivers (TCE, PCE, chloroform), the constant exposure assumption is conservative and likely contributes to risk overestimation. Because of mass loss (volatilization), concentrations will likely decay over time. In addition, the EPCs are biased due to a few high concentration soil vapor data points.

There is also uncertainty associated with the subsurface environment. Calculations assume conservative soil porosity and moisture content values for coarse-grained media. Moisture content is a sensitive parameter in the prediction of vapor migration through the vadose zone soil. High moisture content diminishes vapor transport. In this assessment, the moisture content parameter of 15% was assigned. In addition, calculations conservatively assumed coarse-grained soils beneath the site (loamy sand). Fine-grained media are more resistive to vapor transport than the coarse-grained media assigned for the modeling.

Finally, the chemical selection process eliminated arsenic compounds that were assumed to be background and eliminated chemicals that were detected at concentrations substantially below ESL criteria. Chemical elimination contributes to risk underestimation. Oil range hydrocarbons were assumed to be equipotent to pyrene, a polycyclic aromatic hydrocarbon (PAH) compound. This is likely a conservative assumption, however, there is uncertainty regarding the toxicity and chemical composition of the detected hydrocarbons.

7.0 LIMITATIONS

This report was prepared for the sole use of Byrd Development, LLC in evaluating potential health risks at the time of this study. We make no warranty, expressed or implied, except that our services have been performed in accordance with environmental principles generally accepted at this time and location.

The accuracy and reliability of geo- or hydrochemical studies are a reflection of the number and type of samples taken and extent of the analyses conducted, and are thus inherently limited and dependent upon the resources expended. The chemical and other data presented in this report can change over time and are applicable only to the time this study was performed. We are not responsible for the data presented by others.

8.0 REFERENCES

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APPENDIX A
EXPOSURE ALGORITHMS
PARTICULATE EMISSION FACTOR CALCULATIONS
J&E MODEL INPUT AND INTERMEDIATE CALCULATION SHEETS
RISK PRESENTATION TABLES

SOIL INGESTION EXPOSURE ALGORITHM

$$\text{Intake (mg/ kg-day)} = \frac{CSxIRxCFxFIxEFxED}{BWxAT}$$

where:

CS = chemical concentration in soil (mg/kg)
IR = ingestion rate (mg soil/day)
CF = conversion factor (10^{-6} kg/mg)
FI = fraction ingested from contaminated source (unitless)
EF = exposure frequency (days/years)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time
– carcinogenic effects: 70-year lifetime x 365 days/year
– non-carcinogenic effects: ED x 365 days/year

Exposure Assumptions[a]

Parameter		Commercial Scenario	Residential Scenario
CS		Chemical Specific	Chemical Specific
IR		50 adult	100 (adult) 200 (child)
FI		1.0	1.0
EF		250	350
ED		25	24 (adult) 6 (child)
BW		70	70 (adult), 15 Child See text

[a] All exposure assumptions from RWQCB 2003 unless otherwise noted.

SOIL DERMAL EXPOSURE ALGORITHM

$$\text{Absorbed dose (mg/kg- day)} = \frac{(CSxCFxAFxABS)xEFxEDxEVxSA}{BWxAT}$$

where:

CS = chemical concentration in soil (mg/kg)
CF = conversion factor (10^{-6} kg/mg)
AF = soil-to-skin adherence factor (mg/cm^2)
ABS= absorption fraction (unitless)
EF= exposure frequency (days/year)
EV = Event frequency (events/day)
ED = Exposure duration (years)
SA= skin surface area available for contact (cm^2/event)
BW = body weight (kg)
AT = averaging time
– carcinogenic effects: 70-year lifetime x 365 days/year
– non-carcinogenic effects: ED x 365 days/year

Exposure Assumptions[a]

Parameter		Commercial Scenario	Residential Scenario
CS		Chemical Specific	Chemical Specific
SA		3300	Adult - 5,700, child- 2800
AF		0.2	Adult – 0.07, 0.2 - child
ABS		See text	See text
EF		250	Adult – 100, child - 350
EV		1	1
ED		25	Adult – 24, Child - 6
BW		70	Adult – 70, Child - 15

[a] All exposure assumptions from RWQCB 2003 unless otherwise noted.

DUST INHALATION EXPOSURE ALGORITHM

Fugitive Dust Inhalation

$$Intake(mg/kg\text{ - }day) = \frac{CsxIRxEDxEFx\dfrac{1}{PEF}}{BWxAT}$$

where:

Cs = chemical concentration in soil (mg/kg)
IR = inhalation rate (m^3/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time
– carcinogenic effects: 70-year lifetime x 365 days/year
– non-carcinogenic effects: ED x 365 days/year
PEF = particulate emission factor (m^3/kg)

Exposure Assumptions[a]

Parameter	Residential Scenario
Cs	Chem specific
IR	20 adult, 10 child
EF	350
ED	24 adult, 6 child
BW	70 adult, 15 child
PEF	1.316×10^9

[a] All exposure assumptions from RWCQB 2003 unless otherwise noted.

VAPOR INHALATION EXPOSURE ALGORITHM

Vapor Inhalation

$$Intake(mg/kg - day) = \frac{AcxIRxEDxEF}{BWxAT}$$

where:

Ac = chemical concentration in air (mg/m^3)
IR = inhalation rate (m^3/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time
- carcinogenic effects: 70-year lifetime x 365 days/year
- non-carcinogenic effects: ED x 365 days/year

Exposure Assumptions[a]

Parameter	Residential Scenario
Ac	Chem specific
IR	20 adult, 10 child
EF	350
ED	24 adult, 6 child
BW	70 adult, 15 child

a. All exposure assumptions from RWCQB 2003 unless otherwise noted.

SOIL-TO-AIR PARTICULATE EMISSION FACTOR (PEF)

Derivation of the Particulate Emission Factor

$$PEF(m^3/kg) = Q/C\ x\ \frac{3600s/h}{0.036\ x\ (1-V)\ x\ (U_m/U_t)^3\ x\ F(x)}$$

Parameter	Definition (units)	Default
PEF	Particulate emission factor (m^3/kg)	1.316×10^9
Q/C	Inverse of the mean concentration at the center of a 0.5-acre-square source (g/m^2-s per kg/m^3)	90.80
V	Fraction of vegetative cover (unitless)	0.5
U_m	Mean annual windspeed (m/s)	4.69
U_t	Equivalent threshold value of windspeed at 7 m (m/s)	11.32
F(x)	Function dependent on U_m/U_t derived using Cowherd (1985) (unitless)	0.194

DATA ENTRY SHEET
Peck O'Connor
Chloroform

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
67663	1.13E+04			Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Totals must add up to value of Ls (cell C24)	ENTER	ENTER	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)			
15	152.4	20	152.4	0	0	LS		

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.15	1.5	0.43	0.25	1.7	0.34	0.26

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm \cdot s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	244	0.1	1

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Peck O'Connor

Chloroform

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (µg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	137.4	0.280	0.180	0.080	0.265	1.65E-08	0.824	1.36E-08	3,844	1.13E+04	6.26E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	7,450	2.95E-03	1.23E-01	1.78E-04	8.11E-03	0.00E+00	0.00E+00	8.11E-03	137.4

Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF (µg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	1.13E+04	0.10	1.29E+01	8.11E-03	3.84E+02	9.78E+26	1.67E-04	1.89E+00	2.3E-05	NA

END

INTERMEDIATE CALCULATIONS SHEET

Peck O'Connor

TCE

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	137 4	0.280	0.180	0.080	0.265	1.65E-08	0.824	1.36E-08	3,844	2.21E+04	6.26E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	8,433	8.08E-03	3.36E-01	1.78E-04	6.16E-03	0.00E+00	0.00E+00	6.16E-03	137.4

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	2.21E+04	0.10	1.29E+01	6.16E-03	3.84E+02	3.42E+35	1.57E-04	3.48E+00	1.7E-06	NA

END

DATA ENTRY SHEET
Peck O'Connor
TCE

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
79016	2.21E+04			Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Totals must add up to value of Ls (cell C24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
15	152.4	20	152.4	0	0	LS		

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.15	1.5	0.43	0.25	1.7	0.34	0.26

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	244	0.1	1

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

DATA ENTRY SHEET
Peck O'Connor
Benzene

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.45E+01			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Totals must add up to value of Ls (cell C24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
15	152.4	20	152.4	0	0	LS		

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.15	1.5	0.43	0.25	1.7	0.34	0.26

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	244	0.1	1

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Peck O'Connor

Benzene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	137.4	0.280	0.180	0.080	0.265	1.65E-08	0.824	1.36E-08	3,844	4.45E+01	6.26E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	8,019	4.41E-03	1.83E-01	1.78E-04	6.86E-03	0.00E+00	0.00E+00	6.86E-03	137.4

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
15	4.45E+01	0.10	1.29E+01	6.86E-03	3.84E+02	7.91E+31	1.61E-04	7.18E-03	7.8E-06	NA

END

DATA ENTRY SHEET
Peck O'Conner
Butadiene

	Soil Gas Concentration Data			
ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
106990	3.02E+01			1,3-Butadiene

MORE ↓

			Totals must add up to value of Ls (cell C24)					
ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
15	152.4	15	152.4	0	0	LS		

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.15	1.5	0.43	0.25	1.7	0.34	0.26

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	244	0.1	1

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Peck O'Connor

Butadiene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum 8 soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	137.4	0.280	0.180	0.080	0.265	1.64E-08	0.824	1.35E-08	3,844	3.02E+01	6.26E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	5,124	5.44E-02	2.30E+00	1.77E-04	1.94E-02	0.00E+00	0.00E+00	1.94E-02	137.4

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	3.02E+01	0.10	1.29E+01	1.94E-02	3.84E+02	1.88E+11	1.88E-04	5.67E-03	1.7E-04	2.0E-02

END

DATA ENTRY SHEET
Bain's
TCE

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)		ENTER Soil gas conc., C_g (ppmv)	Chemical
		OR		
79016	8.24E+01			Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Totals must add up to value of Ls (cell C24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined stratum A soil vapor permeability, k_v (cm²)
							OR	
15	152.4	20	152.4	0	0	LS		

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm³/cm³)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)
1.5	0.43	0.15	1.5	0.43	0.25	1.7	0.34	0.26

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	244	0.1	1

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET
Bain's
TCE

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	137.4	0.280	0.180	0.080	0.265	1.65E-08	0.824	1.36E-08	3,844	8.24E+01	6.26E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}{}_A$ (cm^2/s)	Stratum B effective diffusion coefficient, $D^{eff}{}_B$ (cm^2/s)	Stratum C effective diffusion coefficient, $D^{eff}{}_C$ (cm^2/s)	Total overall effective diffusion coefficient, $D^{eff}{}_T$ (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	8,433	8.08E-03	3.36E-01	1.78E-04	6.16E-03	0.00E+00	0.00E+00	6.16E-03	137.4

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	8.24E+01	0.10	1.29E+01	6.16E-03	3.84E+02	3 42E+35	1.57E-04	1.30E-02	1.7E-06	NA

END

DATA ENTRY SHEET
Bain's
Benzene

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	2.29E+01			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Totals must add up to value of Ls (cell C24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
15	152.4	20	152.4	0	0	LS		

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.15	1.5	0.43	0.25	1.7	0.34	0.26

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	244	0.1	1

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET
Bain's
Benzene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (µg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	137.4	0.280	0.180	0.080	0.265	1.65E-08	0.824	1.36E-08	3,844	2.29E+01	6.26E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	8,019	4.41E-03	1.83E-01	1.78E-04	6.86E-03	0.00E+00	0.00E+00	6.86E-03	137.4

Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF (µg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	2.29E+01	0.10	1.29E+01	6.86E-03	3.84E+02	7.91E+31	1.61E-04	3.69E-03	7.8E-06	NA

END

DATA ENTRY SHEET
Bain's
Butadiene

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
106990	1.82E+01			1,3-Butadiene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Totals must add up to value of Ls (cell C24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
15	152.4	15	152.4	0	0	LS		

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.15	1.5	0.43	0.25	1.7	0.34	0.26

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm{\cdot}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	244	0.1	1

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Bain's

Butadiene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	**Soil gas** conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	137.4	0.280	0.180	0.080	0.265	1.64E-08	0.824	1.35E-08	3.844	1.82E+01	6.26E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	5,124	5.44E-02	2.30E+00	1.77E-04	1.94E-02	0.00E+00	0.00E+00	1.94E-02	137.4

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	1.82E+01	0.10	1.29E+01	1.94E-02	3.84E+02	1.88E+11	1.88E-04	3.42E-03	1.7E-04	2.0E-02

END

DATA ENTRY SHEET
Bain's Property
PCE

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
127184	3.69E+03			Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Totals must add up to value of Ls (cell C24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
15	152.4	20	152.4	0	0	LS		

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.15	1.5	0.43	0.25	1.7	0.34	0.26

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	244	0.1	1

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET
Bain's PCE

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	137.4	0.280	0.180	0.080	0.265	1.65E-08	0.824	1.36E-08	3,844	3.69E+03	6.26E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	9,451	1.40E-02	5.83E-01	1.78E-04	5.62E-03	0.00E+00	0.00E+00	5.62E-03	137.4

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	3.69E+03	0.10	1.29E+01	5.62E-03	3.84E+02	9.75E+38	1.54E-04	5.67E-01	5.9E-06	NA

END

Risk Presentation
Bain's Property
30-yr Residential RME
Exposure Scenario

30-year Receptor - RME

child(ingestion)	CF	IR		ET	FI		#/yr	ED	BW-1	AT-1	EF
car	1.00E-06	200		12.000	0.083		350	6	6.67E-02	3.91E-05	1.10E-06
ncar	1.00E-06	200		12.000	0.083		350	6	6.67E-02	4.57E-04	1.27854E-05
child(dermal)	CF	SA	AF	ET	FI	ABS	#/yr	ED	BW-1	AT-1	
car.	1.00E-06	2800	0.2	12	0.083	1	350	6	6.67E-02	3.91E-05	3.07E-06
ncar	1.00E-06	2800	0.2	12	0.083	1	350	6	6.67E-02	4.57E-04	3.58E-05
inhalation	PEF^-1 or VF	IR		ET	FI		#/yr	ED	BW^1	AT^-1	
car	1.00E+00	10		12	0.083		350	6	6.67E-02	3.91E-05	5.48E-02
ncar	1.00E+00	10		12	0.083		350	6	6.67E-02	4.57E-04	6.39E-01
vapor	1.00E+00	10		12	0.083		350	. 6	6.67E-02	4.57E-04	6.39E-01
Adult(ingestion)	CF	IR		ET	FI		#/yr	ED	BW-1	AT-1	
car	1.00E-06	100		16	0.063		350	24	1.43E-02	3.91E-05	4.69667E-07
ncar	1.00E-06	100		16	0.063		350	24	1.43E-02	1.14E-04	1.36986E-06
adult dermal	CF	SA	AF	ET	FI	ABS	#/yr	ED	BW-1	AT-1	
car	1.00E-06	5700	1	16	0.063	1	350	24	1.43E-02	3.91E-05	2.68E-05
ncar	1.00E-06	5700	1	16	0.063	1	350	24	1.43E-02	1.14E-04	7.81E-05
inhalation	PEF^-1 or VF	IR		ET	FI		#/yr	ED	BW^1	AT^-1	
car	1.00E+00	20		16	0.063		350	24	1.43E-02	3.91E-05	9.39E-02
ncar	1.00E+00	20		16	0.063		350	24	1.43E-02	1.14E-04	2.74E-01
vapor	1.00E+00	20		16	0.063		350	24	1.43E-02	1.14E-04	0.273972603

Child/6 yr resident	Soil conc. mg/kg	CDI (mg/kg-day)	SF (kg-day/mg)	ABS	Carcinogenic Risk	CDI (mg/kg-day)	RFD (mg/kg-day)	Hazard Quotient
Ingestion								
Dieldrin	0.125	1.37E-07	16	1	2.19E-06	1.59817E-06	5.00E-05	3.20E-02
Chlordane	0	0.00E+00	1.3	1	0.00E+00	0	5.00E-04	0.00E+00
Cadmium	1.1	1.21E-06	0.38	1	4.58E-07	1.40639E-05	5.00E-04	2.81E-02
Nickel	36.5	4.00E-05	0	1	0.00E+00	0.000466667	0.02	2.33E-02
TCE	0	0.00E+00	0	1	0.00E+00	0	0.00E+00	
Benzene	0	0.00E+00	0	1	0.00E+00	0	0.00E+00	
bhc	0	0.00E+00	1.5	1	0.00E+00	0	2.00E-04	0.00E+00
TPHo	465	5.10E-04	0	1	0.00E+00	0.005945205	3.00E-02	1.98E-01
Dermal								
Dieldrin	0.125	3.84E-07	16	0.05	3.07E-07	2.24E-07	5.00E-05	4.47E-03
Chlordane	0	0.00E+00	1.3	0.05	0.00E+00	0.00E+00	5.00E-04	0.00E+00
Cadmium	1.1	3.38E-06	0.38	0.001	1.28E-09	3.94E-08	5.00E-04	7.88E-05
Nickel	36.5	1.12E-04	0	0	0.00E+00	0.00E+00	2.00E-02	0.00E+00
TCE	0	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	
Benzene	0	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	
bhc	0	0.00E+00	1.5	0.05	0.00E+00	0.00E+00	2.00E-04	0.00E+00
TPHo	465	1.43E-03	0	0.1	0.00E+00	1.66E-03	3.00E-02	5.55E-02
Inhalation								
Dieldrin	0.125	5.20E-12	16	1	8.33E-11	6.07E-11	5.00E-05	1.21E-06
Chlordane	0	0.00E+00	1.2	1	0.00E+00	0.00E+00	2.00E-04	0.00E+00
Cadmium	1.1	4.58E-11	15	1	6.87E-10	5.34E-10	0.00E+00	
Nickel	36.5	1.52E-09	0.091	1	1.38E-10	1.77E-08	0.00E+00	
TCE	1.30E-05	7.12E-07	0.007	1	4.99E-09	8.31E-06	1.00E-02	8.31E-04
Benzene	3.70E-06	2.03E-07	0.1	1	2.03E-08	2.37E-06	1.70E-03	1.39E-03
PCE	5.67E-04	3.11E-05	0.021	1	6.52E-07		1.70E-01	
Butadiene	3.40E-06	1.86E-07	0.6	1	1.12E-07			
bhc	0	0.00E+00	1.5	1	0 00E+00	0.00E+00	2.00E-04	0.00E+00
TPHo	468	1.95E-08	0	1	0.00E+00	2.27E-07	3.00E-02	7.58E-06
							Total Child	3.44E-01

Risk Presentation
Bain's Property
30-yr Residential RME
Exposure Scenario

adult/		CDI (mg/kg-day)	SF (kg-day/mg)	ABS	Carcinogenic Risk	CDI (mg/kg-day)	RFD (mg/kg-day)	Hazard Quotient
Ingestion	mg/kg							
Dieldrin	0.125	5.87E-08	16	1	9.39E-07	1.71233E-07	5.00E-05	3.42E-03
Chlordane	0	0.00E+00	1.3	1	0.00E+00	0	5.00E-04	0.00E+00
Cadmium	1.1	5.17E-07	0.38	1	1.96E-07	1.50685E-06	5.00E-04	3.01E-03
Nickel	36.5	1.71E-05	0	1	0.00E+00	0.00005	2.00E-02	2.50E-03
TCE	0	0.00E+00	0	1	0.00E+00	0	0.00E+00	
Benzene	0	0.00E+00	0	1	0.00E+00	0	0.00E+00	
bbc	0	0.00E+00	1.5	1	0.00E+00	0	2.00E-04	0.00E+00
Dermal								
Dieldrin	0.125	3.35E-06	16	0.05	2.68E-06	4.88E-07	5.00E-05	9.76E-03
Chlordane	0	0.00E+00	1.3	0.05	0.00E+00	0.00E+00	5.00E-04	0.00E+00
Cadmium	1.1	2.94E-05	0.38	0.001	1.12E-08	8.59E-08	5.00E-04	1.72E-04
Nickel	36.5	9.77E-04	0	0	0.00E+00	0.00E+00	2.00E-02	0.00E+00
TCE	0	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	
Benzene	0	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	
bbc	0	0.00E+00	1.5	0.05	0.00E+00	0.00E+00	2.00E-04	0.00E+00
inhalation								
Dieldrin	0.125	8.92E-12	16	1	1.43E-10	2.60E-11	5.00E-05	5.20E-07
Chlordane	0	0.00E+00	1.2	1	0.00E+00	0.00E+00	2.00E-04	0.00E+00
Cadmium	1.1	7.85E-11	15	1	1.18E-09	2.29E-10	0.00E+00	
Nickel	36.5	2.60E-09	0.091	1	2.37E-10	7.60E-09	0.00E+00	
TCE	1.30E-05	1.22E-06	0.007	1	8.55E-09	3.56E-06	1.00E-02	3.56E-04
Benzene	3.70E-06	3.48E-07	0.1	1	3.48E-08	1.01E-06	1.70E-03	5.96E-04
PCE	5.67E-04	5.33E-05	0.019	1	1.01E-06			
Butadiene	3.40E-06	3.19E-07	0.6	1	1.92E-07			
bbc	0	0.00E+00	1.5	1	0.00E+00	0.00E+00	2.00E-04	0.00E+00
TPHo	465	3.32E-08				9.68E-08		
		Total Receptor			8.82E-06		Total Adult	0.020
PEF								
	Q/C	s/h	0.036 1-v		UM/UV^3	F(x)		
	90.8	3600	0.036	0.5	0.071117953	0.194		
	PEF=	1.32E+09						