SEVERN TRENT STL

STL Los Angeles
1721 South Grand Avenue
Santa Ana, CA 92705

Tel: 714 258 8610 Fax: 714 258 0921
www.stl-inc.com

February 10, 2005

STL LOT NUMBER: **E5A280317**
PO/CONTRACT: GEM-62109

SCOTT ROBINSON
URS Corporation
1333 Broadway
Suite 800
Oakland, CA 94612

Dear SCOTT ROBINSON,

This report contains the analytical results for the six samples received under chain of custody by STL Los Angeles on January 27, 2005. These samples are associated with your ARCO #5387 project. Preliminary data was provided on February 7, 2005.

STL Los Angeles certifies that the test results provided in this report meet all the requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of the report. NELAP Certification Number for STL Los Angeles is 01118CA/E87652.

Any matrix related anomaly is footnoted within the report. A cooler receipt temperature between 2-6 degrees Celsius is within EPA acceptance criteria. The temperature(s) of the coolers received for this project can be found on the Project Receipt Checklist.

000025

This report contains _____ pages.

CASE NARRATIVE

Historical control limits for the LCS are used to define the estimate of uncertainty for a method.

All applicable quality control procedures met method-specified acceptance criteria except as noted on the following page.

URS personnel provided the Enfos number and other additional information regarding this project on January 27, 2005. This information was not indicated on the chain of custody.

If you have any questions, please feel free to call me at 714.258.8610.

Sincerely,

Sabina Sudoko
Project Manager
CC: Project File

LOT NUMBER E5A280317

Nonconformance 05-11380

Affected Samples:
E5A280317 (1): SG-5-P-4.5
E5A280317 (2): SG-5-P-8.5
E5A280317 (3): SG-9-P-5.5
E5A280317 (4): SG-9-P-9.0
E5A280317 (5): SG-10-P-5.5
E5A280317 (6): SG-10-P-9.0

Affected Methods:
160.3 MOD, WALKLEY-BLACK

Details:
Please note that the samples were collected on 12/10/05.

E5A280317

~~E5A~~ 280317

97742 Page 1 of 1

bp Chain of Custody Record

Project Name: ARCO 5387-SVS Investigation
BP BU/AR Region/Enfos Segment:
State or Lead Regulatory Agency: Alameda County Health Care Services
Requested Due Date (mm/dd/yy):

On-site Time:		Temp:	
Off-site Time:		Temp:	
Sky Conditions:	OVERCAST		
Meteorological Events:			
Wind Speed:		Direction:	

Name:	URS - PLEASANT HILL
ress:	3440 VINCENT ROAD, SUITE C
	PLEASANT HILL, CA 94523
PM:	SAM CAPPS
/Fax:	925-974-1550
AR PM Contact:	Paul Supple
ress:	P.O. Box 6549
	Moraga, CA 94549
/Fax:	
Bottle Order No:	

BP/AR Facility No.:	ARCO 5387
BP/AR Facility Address:	20200 Hesperian Blvd., Hayward, CA
Site Lat/Long:	
California Global-ID No.:	T0600101368
Enfos Project No.:	
Provision or RCOP (circle one)	
Phase/WBS:	
Sub Phase/Task:	
Cost Element:	

Consultant/Contractor:	URS Corporation
Address:	1333 Broadway, Suite 800
	Oakland, CA 94612
Consultant/Contractor Project No.:	38486988.0063601
Consultant/Contractor PM:	Scott Robinson
Tele/Fax:	510-874-3280
Report Type & QC Level:	
E-mail EDD To:	
Invoice to: Consultant or BP or Atlantic Richfield Co. (circle one)	

Item No.	Sample Description	Time	Date	Matrix: Soil/Solid	Water/Liquid	Air	Laboratory No.	No. of Containers	Preservative: Unpreserved	H_2SO_4	HNO_3	HCl	Methanol		Requested Analysis: BTEX 8021	BTEX/TPH	BTEX/Oxy/TPH	EPA 8260	[redacted]	[redacted]	ORGANIC CARBON * CONTENT	[redacted]	[redacted]	[redacted]	Sample Point Lat/Long and Comments
1	SG-5-P-4.5	0815	12/10/06	X															[redacted]	[redacted]	X	[redacted]	[redacted]	[redacted]	* ORGANIC CARBON
2	SG-5-P-8.5	0820	"	X															[redacted]	[redacted]	↓	[redacted]	[redacted]	[redacted]	CONTENT BY WALKEE
3	SG-9-P-5.5	1130	"	X															[redacted]	[redacted]	↓	[redacted]	[redacted]	[redacted]	BLACK METHOD
4	SG-9-P-9.0	1145	"	X															[redacted]	[redacted]	↓	[redacted]	[redacted]	[redacted]	send
5	SG-10-P-5.5	0915	"	X															[redacted]	[redacted]	↓	[redacted]	[redacted]	[redacted]	~~Sub~~ To STL-LA
6	SG-10-P-9.0	0930	"	X															[redacted]	[redacted]	X	[redacted]	[redacted]	[redacted]	AS.
7																									
8																									
9																									
10																									

ORGANIC CARBON CONTENT BY WALKEE BLACK METHOD

pler's Name:	KEVIN UNO
pler's Company:	URS CORPORATION - OAKLAND
ment Date:	12/15/06
ment Method:	
ment Tracking No:	

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] / URS Corporation	12/15/06		Joan Mullen	12-20-06	1310
			[signature]	12/21/06	103[illegible]

ial Instructions:

tody Seals In Place Yes No   Temp Blank Yes No   Cooler Temperature on Receipt 17 °F/C   Trip Blank Yes No

Distribution: White Copy - Laboratory / Yellow Copy - BP/Atlantic Richfield Co. / Pink Copy - Consultant/Contractor

BP COC Rev. 4 10/1/04

STL LOS ANGELES - PROJECT RECEIPT CHECKLIST Date: 01/28/05

LIMS Lot #: E5A280317 Quote #: 62676

Client Name: STLSF Project:

Received by: AB Date/Time Received: 01/27/05 @1630

Delivered by : ☐ Client ☐ STL ☐ DHL ☒ Fed Ex ☐ UPS ☐ Other

	Initial / Date
Custody Seal Status Cooler: ☒ Intact ☐ Broken ☒ None	01/27/05
Custody Seal Status Samples: ☐ Intact ☐ Broken ☒ None	
Custody Seal #(s): 571715 ☐ No Seal #	
Sampler Signature on COC ☐ Yes ☐ No ☐ N/A	
IR Gun # A Correction Factor 0.2 °C IR passed daily verification ☒ Yes ☐ No	
Temperature - BLANK 2.9 °C (0.2) CF = 2.7 °C	
Temperature – COOLER (___°C ___°C ___°C ___°C) = ___ avg °C +/- ___ CF = ___ °C	
Samples outside temperature criteria but received within 6 hours of final sampling ☐ Yes ☒ N/A	MD 01/28/05
Sample Container(s): ☐ STL-LA ☒ Client	
One COC/Multiple coolers: ☐ Yes- # coolers ___ All within temp criteria ☐ Yes ☐ No ☒ N/A	
One or more coolers with an anomaly: ☐ Yes – (fill out PRC for each) ☒ N/A	
Samples: ☒ Intact ☐ Broken ☐ Other	
pH measured: ☐ Yes ☐ Anomaly (if checked, notify lab and file NCM) ☒ N/A	
Anomalies: ☐ No ☒ Yes – complete CUR and Create NCM NCM #	
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times. ☐ Yes ☒ N/A	
Labeled by: AB Labeling checked	
Turn Around Time: ☐ RUSH–24HR ☐ RUSH–48HR ☐ RUSH–72HR ☒ NORMAL	
Short-Hold Notification: ☐ pH ☐ Wet Chem ☐ Metals (Filter/Pres) ☐ Encore ☐ >1/2 HT expired...	✓
Outside Analysis(es) (Test/Lab/Date Sent Out) :	

********** LEAVE NO BLANK SPACES ; USE N/A **********

Headspace Anomaly ☒ N/A MD 01/28/05

Lab ID	Container(s) #	Headspace	Lab ID	Container(s) #	Headspace
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm

LIMS Lot # TSH 280317

PROJECT RECEIPT CHECKLIST Cont'd

Fraction	IC													
VOAH/ *														
SL	1													

* VOA with headspace/bubbles < 6mm

H: HCL, S: H2SO4, N: HNO3, V: VOA, SL, Sleeve, E: Encore, PB: Poly Bottle, CGB: Clear Glass Bottle, AGJ: Amber Glass Jar, T: Terracore AGB: Amber Glass Bottle, n/f/l:HNO3-Lab filtered, n/f:HNO3-Field filtered, znna: Zinc Acetate/Sodium Hydroxide, Na2s2o3: sodium thiosulfate

Condition Upon Receipt Anomaly Form

☐ N/A _____

COOLERS
- Not Received (received COC only)
- Leaking
- Other:

CUSTODY SEALS (COOLER(S))
- None
- Not Intact
- Other

CONTAINER(S)
- None
- Not Intact
- Other

TEMPERATURE (SPECS 4 ± 2°C)
- Cooler Temp(s)
- Temperature Blank(s)

CHAIN OF CUSTODY (COC)
- Not relinquished by Client; No date/time relinquished
- Incomplete information provided
- Other
- COC not received – notify PM

CONTAINERS
- Leaking
- Voa Vials with Bubbles > 6mm
- Broken
- Extra
- Without Labels
- Other:

LABELS
- Not the same ID/info as in COC
- Incomplete Information
- Markings/Info illegible
- Torn

SAMPLES
- Samples NOT RECEIVED but listed on COC
- Samples received but NOT LISTED on COC
- Logged based on Label Information
- Logged based on info from other samples on COC
- Logged according to Work Plan
- Logged on HOLD UNTIL FURTHER NOTICE

- Will be noted on COC--Client to send samples with new COC
- Mislabeled as to tests, preservatives, etc.
- Holding time expired -- list sample ID and test
- Improper container used
- Not preserved/Improper preservative used
- Improper pH _____ Lab to preserve sample and document
- Insufficient quantities for analysis
- Other

Comments:

_____

_____

_____

_____

_____

- Corrective Action Implemented:
- Client Informed: verbally on _____ By: _____ In writing on _____ By: _____
- Sample(s) on hold until: _____ Sample(s) processed "as is."

Logged by/Date: BJ 1/28/05

PM Review/Date: 1/29 SL

ANALYTICAL REPORT

PROJECT NO. 38486988.0063601

ARCO #5387

Lot #: E5A280317

SCOTT ROBINSON

URS Corporation

SEVERN TRENT LABORATORIES, INC.

Sabina Sudoko
Project Manager

February 10, 2005

METHODS SUMMARY

E5A280317

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Percent Moisture	MCAWW 160.3 MOD	MCAWW 160.3 MOD
Total Organic Carbon	MSA WALKLEY-BLA	WALKLEY WALKLEY

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

MSA "Methods of Soil Analysis, Chemical and Microbiological Properties", Part 2, 2nd Ed., 1982 and Subsequent Revisions.

SAMPLE SUMMARY

E5A280317

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
G3FCQ	001	SG-5-P-4.5	12/10/04	08:15
G3FC5	002	SG-5-P-8.5	12/10/04	08:20
G3FC8	003	SG-9-P-5.5	12/10/04	11:30
G3FDA	004	SG-9-P-9.0	12/10/04	11:45
G3FDC	005	SG-10-P-5.5	12/10/04	09:15
G3FDE	006	SG-10-P-9.0	12/10/04	09:30

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

URS Corporation

Client Sample ID: SG-5-P-4.5

General Chemistry

Lot-Sample #...: E5A280317-001 Work Order #...: G3FCQ Matrix.....: SO
Date Sampled...: 12/10/04 08:15 Date Received..: 01/27/05 10:30
% Moisture.....: 14

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Moisture	13.7	0.10	%	MCAWW 160.3 MOD	02/03-02/04/05	5034420
	Dilution Factor: 1			Analysis Time..: 18:00	Analyst ID.....: 021088	
	Instrument ID..: W15			MS Run #.....: 5034238	MDL.....:	
Total Organic Carbon (TOC)	0.11	0.058	%	MSA WALKLEY-BLACK	02/07/05	5035515
	Dilution Factor: 1			Analysis Time..: 08:40	Analyst ID.....: 0000228	
	Instrument ID..: NO INST			MS Run #.....: 5038094	MDL.....: 0.023	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

URS Corporation

Client Sample ID: SG-5-P-8.5

General Chemistry

Lot-Sample #...: E5A280317-002 **Work Order #...:** G3FC5 **Matrix.....:** SO
Date Sampled...: 12/10/04 08:20 **Date Received..:** 01/27/05 10:30
% Moisture.....: 14

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Moisture	**14.4**	**0.10**	**%**	**MCAWW 160.3 MOD**	**02/03-02/04/05**	**5034420**
		Dilution Factor: 1		Analysis Time..: 18:00ST	Analyst ID.....: 0210884	
		Instrument ID..: W15		MS Run #.....: 5034238	MDL.....:	
Total Organic Carbon (TOC)	ND	0.058	%	MSA WALKLEY-BLACK	02/07/05	5035515
		Dilution Factor: 1		Analysis Time..: 08:45	Analyst ID.....: 0000228	
		Instrument ID..: NO INST		MS Run #.....: 5038094	MDL.....: 0.023	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

URS Corporation

Client Sample ID: SG-9-P-5.5

General Chemistry

Lot-Sample #...: E5A280317-003 **Work Order #...:** G3FC8 **Matrix.....:** SO
Date Sampled...: 12/10/04 11:30 **Date Received..:** 01/27/05 10:30
% Moisture.....: 14

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Moisture	13.5	0.10	%	MCAWW 160.3 MOD	02/03-02/04/05	5034420
		Dilution Factor: 1		Analysis Time..: 18:00ST	Analyst ID.....: 0210884	
		Instrument ID..: W15		MS Run #.....: 5034238	MDL.....:	
Total Organic Carbon (TOC)	0.25	0.058	%	MSA WALKLEY-BLACK	02/07/05	5035515
		Dilution Factor: 1		Analysis Time..: 08:50	Analyst ID.....: 0000228	
		Instrument ID..: NO INST		MS Run #.....: 5038094	MDL.....: 0.023	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

URS Corporation

Client Sample ID: SG-9-P-9.0

General Chemistry

Lot-Sample #...: E5A280317-004 **Work Order #...:** G3FDA **Matrix.....:** SO
Date Sampled...: 12/10/04 11:45 **Date Received..:** 01/27/05 10:30
% Moisture.....: 14

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Moisture	13.6	0.10	%	MCAWW 160.3 MOD	02/03-02/04/05	5034420
	Dilution Factor: 1			Analysis Time..: 18:00ST	Analyst ID.....: 0210894	
	Instrument ID..: W15			MS Run #.....: 5034238	MDL.....:	
Total Organic Carbon (TOC)	0.056 FX	0.058	%	MSA WALKLEY-BLACK	02/07/05	5035515
	Dilution Factor: 1			Analysis Time..: 08:55	Analyst ID.....: 0000228	
	Instrument ID..: NO INST			MS Run #.....: 5038094	MDL.....: 0.023	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

FX This analyte is present in the associated method blank.

URS Corporation

Client Sample ID: SG-10-P-5.5

General Chemistry

Lot-Sample #...: E5A280317-005 **Work Order #...:** G3FDC **Matrix.....:** SO
Date Sampled...: 12/10/04 09:15 **Date Received..:** 01/27/05 10:30
% Moisture.....: 18

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Moisture	17.5	0.10	%	**MCAWW 160.3 MOD**	**02/03-02/04/05**	**5034420**
		Dilution Factor: 1		Analysis Time..: 18:00ST	Analyst ID.....: 0210084	
		Instrument ID..: W15		MS Run #.....: 5034238	MDL.....:	
Total Organic Carbon (TOC)	0.25	0.061	%	**MSA WALKLEY-BLACK**	**02/07/05**	**5035515**
		Dilution Factor: 1		Analysis Time..: 09:00	Analyst ID.....: 0000228	
		Instrument ID..: NO INST		MS Run #.....: 5038094	MDL.....: 0.024	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

URS Corporation

Client Sample ID: SG-10-P-9.0

General Chemistry

Lot-Sample #...: E5A280317-006 **Work Order #...:** G3FDE **Matrix.....:** SO
Date Sampled...: 12/10/04 09:30 **Date Received..:** 01/27/05 10:30
% Moisture.....: 16

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Moisture	**16.4**	**0.10**	**%**	**MCAWW 160.3 MOD**	**02/03-02/04/05**	**5034420**
		Dilution Factor: 1		Analysis Time..: 18:00ST	Analyst ID.....: 0210884	
		Instrument ID..: W15		MS Run #.....: 5034238	MDL.....:	
Total Organic Carbon (TOC)	ND	0.060	%	MSA WALKLEY-BLACK	02/07/05	5035515
		Dilution Factor: 1		Analysis Time..: 09:05	Analyst ID.....: 0000228	
		Instrument ID..: NO INST		MS Run #.....: 5038094	MDL.....: 0.024	

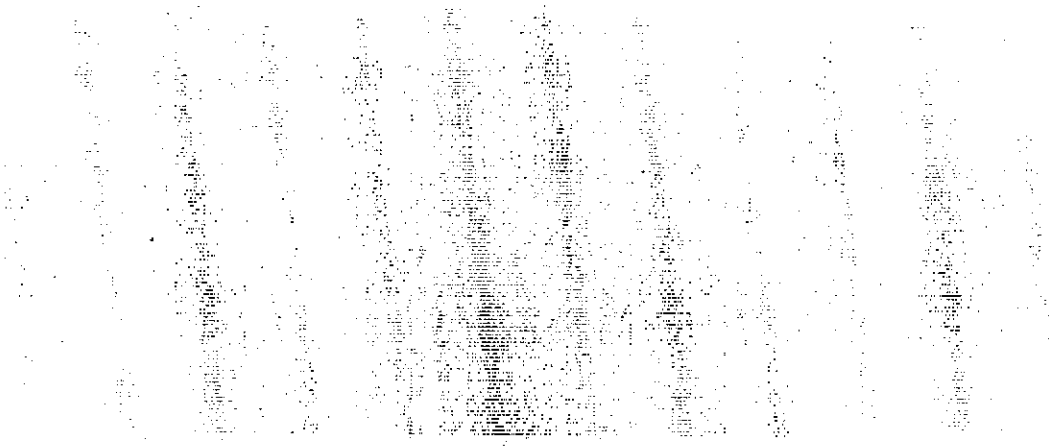
NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

SEVERN TRENT STL

QA/QC



QC DATA ASSOCIATION SUMMARY

E5A280317

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	SO	MSA WALKLEY-BLACK		5035515	5038094
	SO	MCAWW 160.3 MOD		5034420	5034238
002	SO	MSA WALKLEY-BLACK		5035515	5038094
	SO	MCAWW 160.3 MOD		5034420	5034238
003	SO	MSA WALKLEY-BLACK		5035515	5038094
	SO	MCAWW 160.3 MOD		5034420	5034238
004	SO	MSA WALKLEY-BLACK		5035515	5038094
	SO	MCAWW 160.3 MOD		5034420	5034238
005	SO	MSA WALKLEY-BLACK		5035515	5038094
	SO	MCAWW 160.3 MOD		5034420	5034238
006	SO	MSA WALKLEY-BLACK		5035515	5038094
	SO	MCAWW 160.3 MOD		5034420	5034238

METHOD BLANK REPORT

General Chemistry

Client Lot #...: E5A280317 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Organic Carbon (TOC)		Work Order #: G3W5H1AA		MB Lot-Sample #:	E5B040000-515	
	ND	0.050	%	MSA WALKLEY-BLACK	02/07/05	5035515
		Dilution Factor: 1				
		Analysis Time..: 08:30		Analyst ID.....: 000022	Instrument ID..: NO	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: E5A280317 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Organic Carbon (TOC)		Work Order #: G3W5H1AC	LCS Lot-Sample#: E5B040000-515		
	104	(80 - 130)	MSA WALKLEY-BLACK	02/07/05	5035515

Dilution Factor: 1 Analysis Time..: 08:30 Analyst ID.....: 000022
Instrument ID..: NO INST

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

General Chemistry

Client Lot #...: E5A280317 **Matrix.....:** SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Organic Carbon (TOC)		Work Order #: G3W5H1AC		LCS Lot-Sample#: E5B040000-515			
	0.470	0.488	%	104	MSA WALKLEY-BLACK	02/07/05	5035515
		Dilution Factor: 1		Analysis Time..: 08:30		Analyst ID.....: 000022	
		Instrument ID..: NO INST					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: E5A280317 **Matrix.....:** SO
Date Sampled...: 12/10/04 09:30 **Date Received..:** 01/27/05 10:30

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Organic Carbon (TOC)	WO#: G3FDE1AD-MS/G3FDE1AE-MSD					MS Lot-Sample #: E5A280317-006	
	102	(80 - 130)			MSA WALKLEY-BLACK	02/07/05	5035515
	104	(80 - 130)	2.0	(0-25)	MSA WALKLEY-BLACK	02/07/05	5035515

Dilution Factor: 1
Analysis Time..: 09:10 Instrument ID..: NO INST Analyst ID.....: 000022
MS Run #.....: 5038094

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE DATA REPORT

General Chemistry

Client Lot #...: E5A280317 **Matrix.....:** SO
Date Sampled...: 12/10/04 09:30 **Date Received..:** 01/27/05 10:30

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Organic Carbon (TOC)	WO#: G3FDE1AD-MS/G3FDE1AE-MSD MS Lot-Sample #: E5A280317-006								
	ND	0.562	0.571	%	102		MSA WALKLEY-B	02/07/05	5035515
	ND	0.562	0.583	%	104	2.0	MSA WALKLEY-B	02/07/05	5035515

Dilution Factor: 1
Analysis Time..: 09:10 Instrument ID..: NO INST Analyst ID.....: 000022
MS Run #.....: 5038094

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: E5A280317 **Work Order #...:** G3FCQ-SMP G3FCQ-DUP **Matrix.....:** SO

Date Sampled...: 12/10/04 08:15 **Date Received..:** 01/27/05 10:30

% Moisture.....: 14

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Moisture						SD Lot-Sample #: E5A280317-001		
	13.7	13.6	%	0.73	(0-10)	MCAWW 160.3 MOD	02/03-02/04/05	5034420

Dilution Factor: 1 Analysis Time..: 18:00 Analyst ID.....: 021088

Instrument ID..: W15 MS Run Number..: 5034238

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

APPENDIX C

Canister Sampling Field Data Sheet

Page ___ of ___

SUMMA AIR SAMPLING WORK SHEET

Site: 5387 Site#: ____________

Samplers: KEVIN UNO AND SRIJESH [illegible] Work Assignment Manager: ____________

Date: 12/21/04 Project Leader: ____________

Sample #	SG-6-5.5	SG-9-5.5	SG-6-9.5	SG-9-9.5	
Location	SG-6	SG-9	SG-6	SG-9	
SUMMA ID	A-283	~~IT-208~~ 12277	A-315	#0101	
Orifice Used	QR-5471	IT-208	HT-07	SR16	
Analysis/Method					
Time (Start)	0848	1000	1334	1359	
Time (Stop)	1005	1106	1533	1448	
Total Time	77	66	119	49	
SUMMA WENT TO AMBIENT	YES/NO (NO circled)	YES/NO (NO circled)	YES/NO (NO circled)	YES/NO (NO circled)	YES/NO
Pressure Gauge	30" Hg	30" Hg	30" Hg	30" Hg	
Pressure Gauge	2" Hg	5" Hg	6" Hg.	5" Hg.	
Flow Rate (Pre)					
Flow Rate (Post)					
Flow Rate (Average)					

MET Station On-site? Y / N

General Comments:

APPENDIX C

Canister Sampling Field Data Sheet

Page 2 of ___

SUMMA AIR SAMPLING WORK SHEET

Site: ARCO 5387 | Site#: ___
Samplers: S. THAPA + K. UNG | Work Assignment Manager: ___
Date: 12/10/09 | Project Leader: SCOTT ROBINSON

Sample #	SG-8-9.0	SG-5-8.5	SG-5-8.5DUP		
Location	SG-8	SG-5	SG-5		
SUMMA ID	92458	A-275	4536BB		
Orifice Used	RT-218	SR16	QR 6959		
Analysis/Method					
Time (Start)	1709	1738	1831		
Time (Stop)	1754	1815	1928		
Total Time	45 min	37	57		
SUMMA WENT TO AMBIENT	YES/NO (NO circled)	YES/NO (NO circled)	YES/NO (NO circled)	YES/NO	YES/NO
Pressure Gauge	30" Hg	30" Hg	30" Hg		
Pressure Gauge	5" Hg	5" Hg	5" Hg		
Flow Rate (Pre)					
Flow Rate (Post)					
Flow Rate (Average)					

MET Station On-site? Y / N

General Comments:

APPENDIX C

Canister Sampling Field Data Sheet

Page 1 of ___

SUMMA AIR SAMPLING WORK SHEET

Site: ARCO
Samplers: S. THAPA & KEVIN UNO
Date: 12/10/04

Site#: #5387
Work Assignment Manager: ___
Project Leader: SCOTT ROBINSON

Sample #	SG-5-4.5	SG-4-4.5	SG-5-8.5	SG-4-5.0	SG-8-5.0
Location	SG-5	SG-4	SG-5	SG-4	SG-8
SUMMA ID	A-270	A-279	0089	A152	GLO155
Orifice Used	STL-003	SR-24	HF IT-114	SR24	SR10
Analysis/Method					
Time (Start)	9:37	1116	1228	1259	1502 ~~1445~~
Time (Stop)	1045	1204	1307	1616	1611
Total Time	68 min	48 min	39 min		
SUMMA WENT TO AMBIENT	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO
Pressure Gauge	30 "Hg	30 "HG	30" Hg	30"Hg	30"Hg
Pressure Gauge	5.5 "Hg	5" Hg	5 "Hg	5.5"Hg	5 "Hg
Flow Rate (Pre)					
Flow Rate (Post)					
Flow Rate (Average)					

MET Station On-site? Y / N

General Comments:

APPENDIX C

Canister Sampling Field Data Sheet

SUMMA AIR SAMPLING WORK SHEET

Site: 5387
Samplers: S Thapa, S. Robinson, R. Lindsell
Date: 12/6/2014

Site#: 5387
Work Assignment Manager:
Project Leader: Scott Robinson

Sample #	SG-1-7.0	SG-3-7.0 Dup			
Location	SG-1	SG-3			
SUMMA ID	93153	93109			
Orifice Used	SR-24	STL-003			
Analysis/Method					
Time (Start)	15:47	16:07			
Time (Stop)	16:45	16:53			
Total Time	58 min	46 min			
SUMMA WENT TO AMBIENT	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO
Pressure Gauge	30" Hg	30" Hg			
Pressure Gauge	5" Hg	5" Hg			
Flow Rate (Pre)					
Flow Rate (Post)					
Flow Rate (Average)					

MET Station On-site? Y / N

General Comments:

APPENDIX C

Canister Sampling Field Data Sheet

SUMMA AIR SAMPLING WORK SHEET

Site: 5387 Site#: AR Co # 5387

Samplers: S. THAPA / SCOTT ROBINSON / RAPHAEL LINDVALL Work Assignment Manager: ____________

Date: 12/06/04 Project Leader: SCOTT ROBINSON

Sample #	SG-3-4.0	SG-2-4.0	SG-1-4.0	SG-2-8.5	SG-3-7.0
Location	SG-3	SG-2	SG-1	SG-2	SG-3
SUMMA ID	12156 ~~12168~~	12168	9149B	11419	12469
Orifice Used	STL-003 ~~SR-24~~	SR-24	STL-003	SR 24	STL-003
Analysis/Method					
Time (Start)	1109 ~~0840~~	1047	1150	14:09	15:08
Time (Stop)	1355	1123	14:45	14:50	15:50
Total Time	2hr 47min	36 min	~2hr 55 min	41 min	42 min
SUMMA WENT TO AMBIENT	YES/NO (NO circled)	YES/NO (NO circled)	YES/NO (NO circled)	YES/NO (NO circled)	YES/NO (NO circled)
Pressure Gauge	29" HG	29" HG	29" HG	30" Hg	29" Hg
Pressure Gauge	25" HG	5" HG	25" HG	5" Hg	5" Hg
Flow Rate (Pre)					
Flow Rate (Post)					
Flow Rate (Average)					

MET Station On-site? Y / N

General Comments:

Appendix D

Well Survey Results

(Including internal correspondence dated June 7, 2001, documenting performance of well survey)

APPENDIX C

Canister Sampling Field Data Sheet

Page ___ of ___

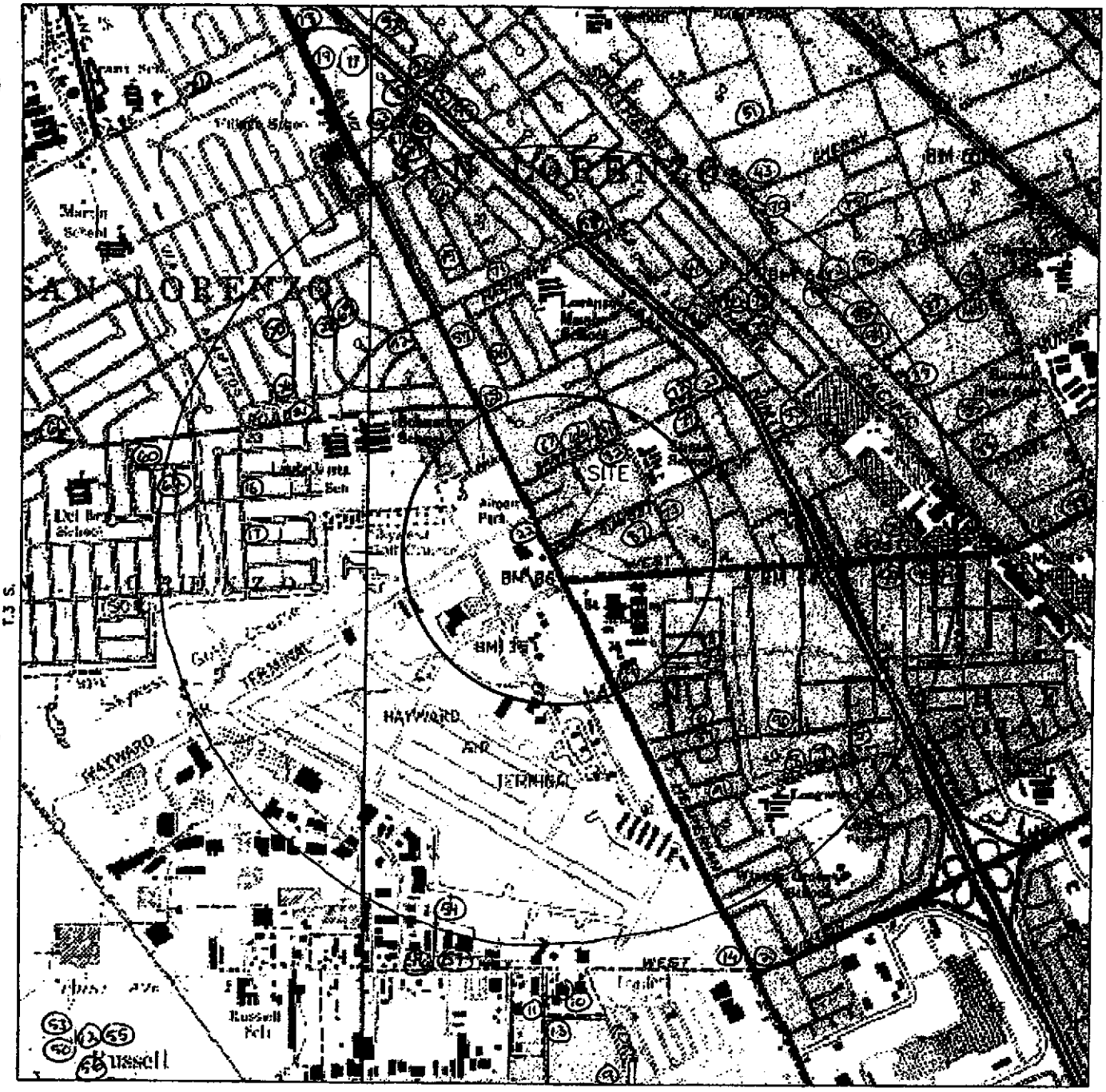
SUMMA AIR SAMPLING WORK SHEET

Site: ARCO 5387 Site#: 5387
Samplers: KEVIN UNO, [illegible] THAMA Work Assignment Manager: ___
Date: 12/03/04 Project Leader: SCOTT ROBINSON

Sample #	SG-10-5.5	SG-7-5.5	SG-10-9	SG-7-10	
Location	SG-10	SG-7	SG-10	SG-7	
SUMMA ID	93040	92020	93137	12475	
Orifice Used	SR-24	SR-24	SR-24	SR-24	
Analysis/Method					
Time (Start)	1305	1415	1510	1600	
Time (Stop)	1325	1433	1528	1633	
Total Time	20 min	18 min	18 min	33 min	
SUMMA WENT TO AMBIENT	YES/(NO)	YES/(NO)	YES/(NO)	YES/(NO)	YES/NO
Pressure Gauge	30" HG	30" HG	30" HG	29 ~~30~~" HG	
Pressure Gauge	5" HG	5" HG	5" HG	5" HG	
Flow Rate (Pre)					
Flow Rate (Post)					
Flow Rate (Average)					

MET Station On-site? Y / N

General Comments:



North

GENERAL NOTES:
BASE MAP FROM U.S.G.S.
SAN LEANDRO & HAYWARD, CA.
7.5 MINUTE TOPOGRAPHIC
PHOTOREVISED 1980

QUADRANGLE LOCATION

0 2000 FT

SCALE 1:24,000

FIGURE 1
SITE TOPOGRAPHIC MAP
ARCO SERVICE STATION NO. 05387
20200 HESPERIAN BOULEVARD
HAYWARD, CA.

PROJECT NO. D000-318	DRAWN BY M.L. 8/8/00
FILE NO. D000318A	PREPARED BY JWS
REVISION NO. 1	REVIEWED BY

Delta Environmental Consultants, Inc.

TABLE 1

INVENTORY OF WATER WELLS WITHIN 5,280 FEET OF SITE

Arco Service Station No. 05387
20200 Hesperian Boulevard
Hayward, California

Site Map Location	State Well I.D.	Well Location	Date Drilled	Well Type	Total Depth (ft)	Screened Interval(s) (ft)	Notes
1	3S/2W-7M3	754 Grant Avenue	06/01/77	Domestic	31	10.5-30	outside boundary
2	3S/2W-20L	N of W Winton, E of Hesperian	03/09/93	Other	670		outside boundary
3	3S/2W-20C1	776 Barker Avenue	05/05/77	Irrigation	29	20-29	
4	3S/2W-20B3	21979 Thelma Street	07/11/77	Irrigation	28.5	20-28	
5	3S/2W	622 Fifth Street	05/23/53	Domestic	72	52-72	
6	3S/2W-20D	849 Lester Avenue	09/30/77	Irrigation	42	22-42	
7	3S/2W-20G1	22920 Lilla Road	07/14/77	Irrigation	52	15-50	
8	3S/2W-20G2	22917 Lilla Road	08/08/77	Irrigation	50	34-50	
9	3S/2W-19R1	Eden Avenue	03/01/49		80		outside boundary
10	3S/2W-19R2	Saklin Road			96	35-92	outside boundary
11	3S/2W-19R3	Saklin Road	09/14/38		125		outside boundary
12	3S/2W-19R4	Russel City Road			112		
13	3S/2W-19R6	3431 Brookdale Blvd	06/21/99	Domestic	148	128-144	outside boundary
14	3S/2W-19R	1401 West Winton	08/29/85	Other	848		outside boundary
15	3S/2W-18M2	1304 Via Madera	06/04/77	Domestic	27		
16	3S/2W-18M3	17252 Via Estrella	04/09/77	Irrigation	20		
17	3S/2W-18N2	17356 Via-Alamitos	06/11/77	Irrigation	25		
18	3S/2W-18J2	21626 Hesperian			91		outside boundary
19	3S/2W-18J3	Hesperian Blvd			100	80-96	outside boundary
20	3S/2W-18J	Royal Avenue	09/01/48		69	60-65	outside boundary
21	3S/2W-18J8	1266 Bartlett Avenue			75		
22	3S/2W-18K3	Kennedy park, Hesperian Blvd	03/25/78	Irrigation	155	35-155	
23	3S/2W-18	1238 Bartlett Avenue		Domestic	202		
24	3S/2W-18G1	18451 Robscott Avenue	05/07/77	Domestic	26	15-25	
25	3S/2W-18F4	17061 Via Perdido	05/01/89	Irrigation	25		
26	3S/2W-18F3	840 Hacienda Avenue	07/19/77	Domestic		15-29.5	
27	3S/2W	700 Hathaway	02/26/53	Domestic	100	40-60, 80-100	
28	3S/2W-18C1	17127 Via Flores	03/13/77	Irrigation	25	25-Dec	outside boundary
29	3S/2W-18B6	19578 Via Primero	06/24/89	Domestic	30	20-30	outside boundary
30	3S/2W-18B1	16138 Via Segundo		Irrigation	34		

TABLE 1

INVENTORY OF WATER WELLS WITHIN 5,280 FEET OF SITE

Arco Service Station No. 05387
20200 Hesperian Boulevard
Hayward, California

Site Map Location	State Well I.D.	Well Location	Date Drilled	Well Type	Total Depth (ft)	Screened Interval(s) (ft)	Notes
31	3S/2W-17M1	1230 Bartlett Avenue	10/01/48			66	
32	3S/2W/17M2	130 feet sw of Garden Avenue			72	45-63	
33	3S/2W/-17K2	Corner of West A St. and Hathaway	07/01/65	Industrial	680	480-510	
34	3S/2W-17K3	West A St. and Hathaway	07/22/65	Industrial	680		
35	3S/2W-17J2	746 Poplar Avenue	03/08/54	Domestic	74	50-70	outside boundary
36	3S/2W-17H	Willow Avenue	04/28/42		128	105-107	outside boundary
37	3S/2W-17G3	21455 Meekland	10/05/77	Irrigation	82	40-80	outside boundary
38	3S/2W-17G1	Meekland and Willow	05/15/35		93	56-93	outside boundary
39	3S/2W-17F3	Florence and Hathaway	06/12/31		201		
40	3S/2W-17D3	Highway 17 and Hathaway			68	48-60	
41	3S/2W-17D1	Highway 17 and Hathaway			67	48-60	
42	3S/2W-17C4	21005 Meekland Avenue	07/27/77	Irrigation	77	20-77	
43	3S/2W-17C3	163 Cherry Way	05/17/77	Irrigation	63	25-66	outside boundary
44	3S/2W-17A3	21671 Haviland Avenue	05/19/77	Irrigation	80	40-72	outside boundary
45		1330 Solano	04/11/53	Domestic	61	40-61	
46		1338 Solano	04/18/53	Domestic	61	41-61	
47	3S/2W-17R6	West A St. and Hathaway	07/16/65	Industrial	510		
48	3S/2W-17Q5	2601 A Street		Domestic	63		outside boundary
49	3S/2W-17Q2	Hathaway and A Street	07/15/58		541	533-541	
50	3S/2W-17Q1	Russel City Road	03/03/38		47	33-43	
51	3S/2W-8P3	219 Medford Avenue	01/31/78	Irrigation	83	53-83	outside boundary
52		15881 Via Granada		Domestic	70		outside boundary
53	3S/2W-19Q1	Russel City Road	05/25/26		81	70-80	outside boundary
54	3S/2W-19P5	1844 West Winton Avenue	05/25/77	Domestic	100	57-96	
55	3S/2W-19N	Russell City	04/17/53	Industrial	97	41-51	outside boundary
56	3S/2W-19N3	Washington Avenue	03/26/43		89		outside boundary
57	3S/2W-19L02	1900 West Winton Avenue	04/23/92	Industrial	160	150-160	outside boundary
58	3S/2W-18	17061 Via Perdido	07/01/77	Irrigation	29		
59	3S/2W-18	840 Hacienda Avenue	05/01/89	Irrigation	25		

TABLE 1

INVENTORY OF WATER WELLS WITHIN 5,280 FEET OF SITE

Arco Service Station No. 05387
20200 Hesperian Boulevard
Hayward, California

Site Map Location	State Well I.D.	Well Location	Date Drilled	Well Type	Total Depth (ft)	Screened Interval(s) (ft)	Notes
60	3S/2W	17166 Via Del Ray		Irrigation	30		outside boundary
61	3S/2W	1580 Bockman Road	01/01/53	Irrigation	42		outside boundary
62	3S/2W	1316 Via Madera	02/01/89	Irrigation	29		outside boundary
63	3S/2W-18	16138 Via Segundo	09/01/50	Irrigation	34		
64	3S/22-18	17162 Via Primero	02/01/78	Irrigation	40		
65	3S/2W-18	17127 Via Flores	03/01/77	Irrigation	25		
66	3S/2W-18	657 Bartlett Avenue	02/01/18	Irrigation	90		
67	3S/2W-18	713 Bartlett Avenue	01/01/46	Irrigation	95		
68	3S/2W-18	18600 Hesperian Blvd	01/01/29	Irrigation	65		
69	3S/2W-18	21626 Hesperian Blvd	12/01/41	Irrigation	91		
70	3S/2W-17	19288 Medford Ct	12/01/55	Irrigation	45		
71	3S/2W-18	396 Hacienda Avenue	11/01/77	Irrigation	31		
72	3S/2W-17	421 Bartlett Street	11/28/01	Irrigation	44		outside boundary
73	3S/2W-17	20859 Royal Avenue	11/01/53	Irrigation	45		
74	3S/2W-17	20555 Garden Avenue	11/01/60	Irrigation	44		outside boundary
75	3S/2W-17	854 Blossom Way	05/01/77	Irrigation	72		outside boundary
76	3S/2W-17	204 Grove Way	06/01/33	Irrigation	100		
77	3S/2W-17	294 Grove Way	06/01/86	Irrigation	23		
78	3S/2W-17	21005 Meekland Avenue	07/01/77	Irrigation	77		
79	3S/2W-17	20161 Times Avenue	12/01/52	Irrigation	55		
80	3S/2W-17	20165 Hathaway	06/01/31	Irrigation	200		
81	3S/2W-17	21568 Meekland Avenue	05/01/34	Irrigation	92		
82	3S/2W-17	21455 Meekland	10/01/77	Irrigation	80		
83	3S/2W-17	21335 Hathaway Avenue	10/01/51	Irrigation	70		
84	3S/2W-17	193 Laurel Avenue	10/01/54	Irrigation	85		outside boundary
85	3S/2W-17	351 A Street		Irrigation	63		
86	3S/2W-19	1655 West Winton Avenue	06/01/46	Irrigation	65		outside boundary
87	3S/2W	21367 Garden Avenue	09/18/01	Irrigation	85		
88	3S/2W-20	776 Barker Avenue	05/01/77	Irrigation	29		

TABLE 1

INVENTORY OF WATER WELLS WITHIN 5,280 FEET OF SITE

Arco Service Station No. 05387
20200 Hesperian Boulevard
Hayward, California

Site Map Location	State Well I.D.	Well Location	Date Drilled	Well Type	Total Depth (ft)	Screened Interval(s) (ft)	Notes
89	3S/2W-20	849 Lester Avenue	09/01/77	Irrigation	42		
90	3S/2W-20	716 Marin Avenue	08/01/35	Irrigation	60		
91	3S/2W-20	22719 Corkwood Street	07/01/77	Irrigation	40		
92	3S/2W-20	Via Arriba & Hacienda	07/01/91	Irrigation	595		

"Supple, Paul V"
<SUPPLPV@bp.com>
09/14/2004 10:41 AM

To: <scott_robinson@URSCorp.com>
cc:
Subject: FW: Well inventory from DWR and Alameda County Public Works Combined for ARCO 5387, Hayward CA

-----Original Message-----
From: smeeks@deltaenv.com [mailto:smeeks@deltaenv.com]
Sent: Thursday, June 07, 2001 9:57 AM
To: SUPPLPV@bp.com
Subject: Well inventory from DWR and Alameda County Public Works Combined for ARCO 5387, Hayward CA

Paul,
Here are the wells that were listed. As you can see some of the wells fell outside the one mile area after plotting them. However, there are still approximately 59 wells within the 1 mile radius of which 9 are domestic; 38 are irrigation; 9 are unknown; and 3 are industrial.

<<Well Inventory ARCO 5387.pdf>>

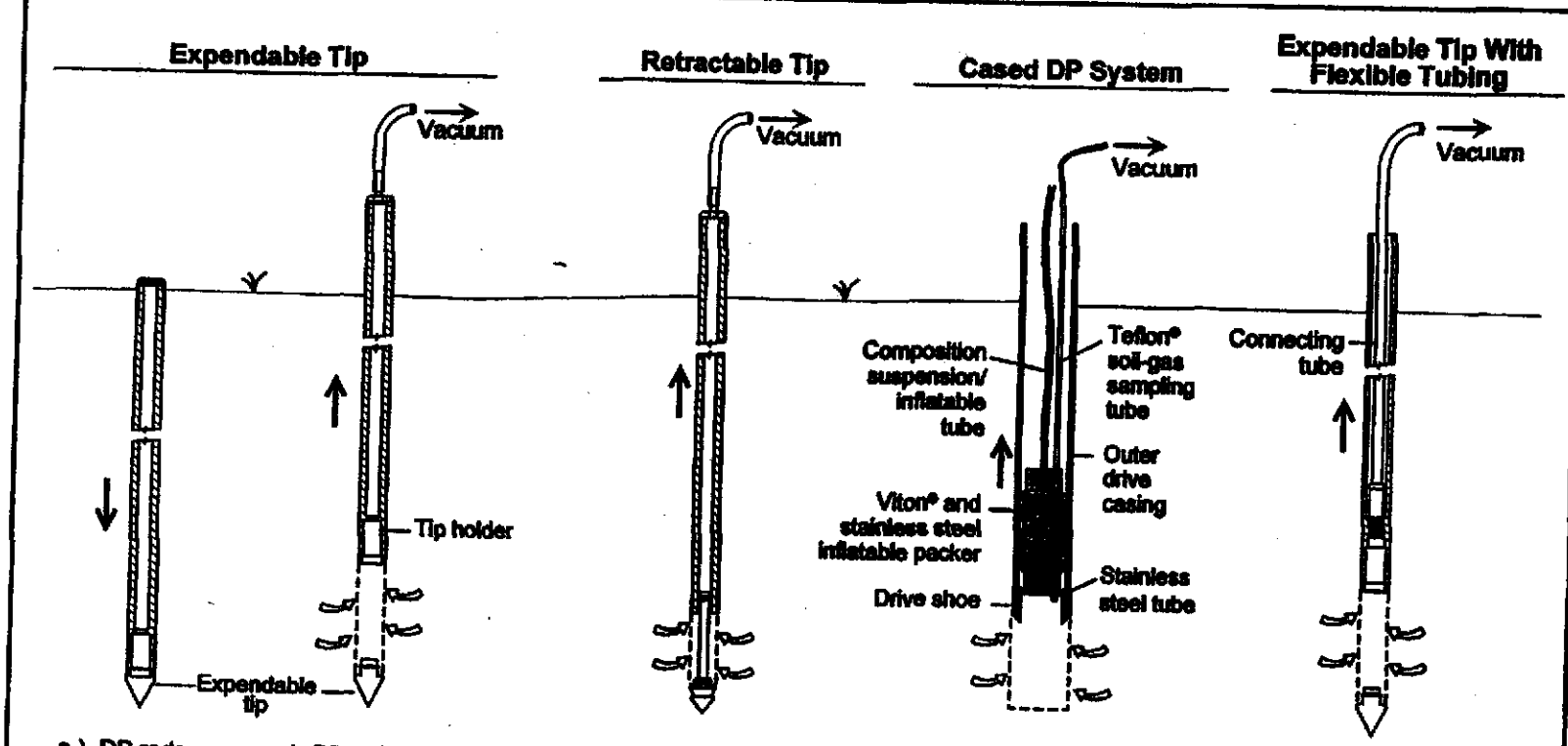
Thanks,
Steven Meeks, P.E.
Project Manager
Delta Environmental Consultants, Inc.
Phone: (916) 536-2613
Fax: (916) 638-8385


Well Inventory ARCO 5387.p

Appendix E

Typical Soil Vapor Sampling Apparatus

Exhibit V-7
Types Of Direct Push Soil Gas Sampling Tools



a_1) DP rods equipped with expendable tip pushed to target depth.

a_2) DP rods withdrawn to expose target interval. Soil-gas sample collected through probe rods.

b) Soil-gas samples are collected through probe rods. Tip is removed with probe rods.

c) Soil-gas samples are collected through small-diameter tubing.

d) Soil-gas samples are collected through inner tubing.

Source: Geoprobe Systems and Precision Sampling, Inc.

Appendix F

Technical Memorandum On The Evaluation Of Vapor Intrusion Concerns At Sites Underlain By Fine-Grained Soils, California Regional Water Quality Control Board, San Francisco Bay Region, February 23, 2004

California Regional Water Quality Control Board
San Francisco Bay Region

Terry Tamminen
Secretary for Environmental Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.swrcb.ca.gov/rwqcb2

Arnold Schwarzenegger
Governor

To: Interested Parties

File No. 1210.40 (RDB)

From: Roger Brewer, EG,
Toxics Cleanup Division

Date: February 23, 2004

Technical Memorandum: Evaluation of Vapor Intrusion Concerns at Sites Underlain by Fine-Grained Soils

Concur: _____
Stephen Hill, Chief
Toxics Cleanup Division Chief

This memo addresses issues regarding the intrusion of volatile organic compounds into buildings that overly predominantly clayey or silty, "fine-grained" soils. The information provided is not intended to serve as regulatory "guidance." It does, however, reflect Regional Water Board staff's current understanding of and approaches to these issues. To summarize:

- The Regional Water Board's July 2003 Environmental Screening Levels document contains updated screening levels and information for evaluation of vapor intrusion concerns;
- The use of shallow soil gas data is preferred at sites where potential vapor intrusion concerns have been identified, followed by sampling of indoor air if needed;
- A minimum soil gas-to-indoor air attenuation factor of 0.0001 (1/10,000) is recommended for use at sites underlain by silty or clayey soils (i.e., assumed maximum ten-thousand-fold dilution of soil gas in indoor air).

Additional information is provided in our technical document *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater* (July 2003 and updates). Our office is assisting staff of the Department of Toxics Substances Control in preparation of guidance on vapor intrusion and indoor-air impact issues (due later this year). Your comments and suggestions regarding this subject are appreciated.

Revisions to 2001 RBSL Document

The December 2001 edition of our Environmental Screening Levels document (ESLs, formerly called "Risk-Based Screening Levels") was peer reviewed by the University of California in early 2003. Several reviewers commented that the vapor flow rate predicted under the silty clay or "fine-grained" soil scenario (now referred to as "low/moderate permeability" soils) may not be adequately conservative for some Bay area soils. Based on their experience, secondary features such as plant root structures, desiccation cracks, stratigraphic heterogeneities (e.g., thin stringers of sand), underground utilities, disturbance and recompaction during redevelopment, etc., could

significantly increase the vapor permeability of shallow, clayey and silty soils over that predicted for homogeneous, undisturbed soils. Assuming these soil types in vapor intrusion models without taking this into account could cause the models to under predict vapor flux into buildings and subsequently under predict impacts to indoor air.

Due to the above concerns, soil screening levels for vapor intrusion concerns included in the July 2003 ESL document are based on an assumption that shallow soils have a high vapor permeability, regardless of the soil type (refer to Volume 1, Section 2.7). At sites where significant releases of volatile chemicals has occurred, the use of soil gas data in conjunction with soil data is strongly recommended.

Primary groundwater screening levels presented in the ESL document for vapor intrusion concerns are similarly based on an assumption that overlying vadose-zone soils are highly permeable to volatile chemicals (refer to Volume 1, Section 2.7 and Appendix 1, Section 2.4 of ESL document). Groundwater screening levels for a low/moderate permeability site scenario are also included in Appendix 1 of the ESL document (refer to Table E-1a). However, the model used to develop the screening levels is more conservative than the model used in the December 2001 version of the document (refer to Appendix 1, Section 2.4). The assumed vadose-zone soil in the groundwater vapor-emission model was changed from silty clay (SICL) to a mix of loamy sand (LS) overlying silt (SI). This increased the calculated vapor flux into buildings overlying lower permeability soils from 0.23 cm^3/sec to 13 cm^3/sec (see Appendix 4 of July 2003 ESL document) with a correlative decrease in groundwater screening levels for this concern. For comparison, the calculated vapor flux into buildings overlying "high-permeability" soils is 67 cm^3/sec. The of soil gas data in conjunction with groundwater data is strongly recommended at sites where the groundwater screening levels based on low/moderate permeability vadose-zone soils are applied.

Shallow Soil Gas Screening Levels

In 2003, the emphasis for evaluation of vapor intrusion and indoor-air impact concerns in our ESL document progressed to the use of shallow soil gas data (refer to Volume 1, Section 2.7). At sites where screening levels for soil or groundwater are approached or exceeded, it is recommended that shallow soil gas data be collected and compared to screening levels for vapor intrusion concerns (e.g., refer to Table E in Volume 1). Soil gas data from immediately beneath the building footprint are preferable. At sites where no buildings are present, samples should be collected from a depth of approximately five feet below ground surface. These data should then be assumed to reflect the concentration of volatile chemicals in soil gas immediately beneath any future buildings (e.g., depth to source in models = 15cm). Acceptable protocols for the collection of soil gas samples are discussed in the joint DTSC-LA Regional Water Board document *Soil Gas Advisory* (DTSC 2003).

Soil gas screening levels presented in Table E of our July 2003 ESL document are based on an assumed soil gas-to-indoor air attenuation factor of either 0.001 for residential settings (i.e., 1,000 times the indoor air goal) or 0.0005 for commercial/industrial settings (i.e., 2,000 times the indoor air goal). These attenuation factors are based on vapor intrusion models that assume

highly permeable, near-surface soils and are within the range of attenuation factors identified in radon studies (refer to Appendix 1, Chapter 4 of the ESL document).

Note that attenuation factors as high as 0.1 have been reported in basements or buildings that have been abandoned or temporarily shut-in. Such locations would likely be uninhabitable do to very poor ventilation and these attenuation factors are not considered to be representative of occupied spaces.

Interim Actions At Sites With Existing Buildings

Sampling of indoor air is generally recommended at sites where concentrations of volatile chemicals in soil gas exceed screening levels for vapor intrusion concerns. Acceptable guidance on the collection of indoor air samples is provided in the Massachusetts Department of Environmental Protection document *Indoor Air Sampling And Evaluation Guide* (MADEP 2002), among other sources. In some cases it may be prudent to collect indoor air samples at the same time that soil gas samples are collected.

Interim Actions At Sites Being Redeveloped

For sites that are being redeveloped, it can reasonably be assumed that significant impacts to indoor air will not occur if concentrations of volatile chemicals in soil gas do not exceed screening levels for vapor intrusion concerns. If more than three carcinogenic chemicals or five chemicals with similar noncarcinogenic health effects are present, cumulative health risk concerns may need to be further evaluated (refer to Volume 1, Section 2.10 in July 2003 ESL document).

At sites where concentrations of volatile chemicals in shallow soil gas exceed default or site-specific screening levels for vapor intrusion concerns, additional evaluation is needed. Vapor intrusion concerns should be considered to be especially significant at sites where the concentrations of volatile chemicals in shallow soil gas exceed 10,000 times the indoor air goal, regardless of the result of more "site-specific" models based on soil type data alone. Aggressive remediation is likely to be recommended prior to construction of new residences or buildings overlying these areas. If redevelopment of a site is to take place prior to final cleanup, the inclusion of passive or active vapor mitigation measures in building designs should be considered (podium parking, impermeable membranes, subslab venting, etc.).

Site-Specific Attenuation Factors

"Site-specific" soil gas-to-indoor air attenuation factors were discussed in length at the "Subsurface Vapor Intrusion to Indoor Air" symposiums held in San Jose and Long Beach, California, in 2003 (sponsored by the Groundwater Resources Association, in cooperation with the USEPA, DTSC and the Regional Water Board). Dr. Paul Johnson of the Arizona State University and Dr. Ron Mosely of the USEPA stressed that attenuation factors based on field data typically ranged from 0.01 (one-hundred-fold dilution) to 0.0001 (ten-thousand-fold dilution), with 0.001 being a reasonable value for screening purposes. In contrast, vapor intrusion models presented with the USEPA document *User's Guide For The Johnson and Ettinger (1991) Model For Subsurface Vapor Intrusion Into Buildings* (USEPA 2003 and

updates) can be manipulated to predict soil gas-to-indoor air attenuation factors as low as 0.00001 (1/100,000) for silty and clayey soils. Dr. Johnson stressed these attenuation factors may be under-conservative for many sites, due to secondary features mentioned above that enhance the vapor permeability of these types of soils.

It is likely that the silty, clayey nature of shallow soils in many parts of the Bay Area will inhibit vapor flow into buildings more effectively than in areas underlain by sandier and more permeable soils. Until additional field data can be collected and compiled, however, it is prudent to assume that secondary features in silty, clayey soils could enhance vapor flow well above model predictions based on these soil types. "Site-specific" soil gas-to-indoor air attenuation factors should be based on field data from that site, where feasible. At sites where both soil gas and indoor air data are not available, modeled attenuation factors lower than 0.0001 should be avoided in the absence of field based, in-situ studies of soil vapor permeability and vapor flux under advective flow conditions.

If you have any questions, comments or suggestions, please contact Roger Brewer at (510) 622-2374 (e-mail rdb@rb2.swrcb.ca.gov).

References:

DTSC, 2003, *Soil Gas Advisory* (January 2003): Department of Toxic Substances Control and Los Angeles Regional Water Quality Control Board; www.dtsc.ca.gov/PolicyAndProcedures/SiteCleanup/SMBR_ADV_activesoilgasinvst.pdf

MADEP, 2003, *Indoor Air Sampling And Evaluation Guide* (2002): Massachusetts Department of Environmental Protection, Office of Research and Standards, WSC Policy #02-430; www.state.ma.us/dep/bwsc/finalpol.htm

RWQCBSF, 2003, *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater* (Interim Final - July 2003 and updates): California Environmental Protection Agency, Regional Water Quality Control Board, San Francisco Bay Area Region, www.swrcb.ca.gov/rwqcb2/esl.htm

USEPA, 2003, *User's Guide For The Johnson and Ettinger (1991) Model For Subsurface Vapor Intrusion Into Buildings:* U.S. Environmental Protection Agency Office of Emergency and Remedial Response, March 2003 (and updates), www.epa.gov/oerrpage/superfund/programs/risk/airmodel/johnson_ettinger.htm

Other Useful References:

Annual Toxics Summaries: California Air Resources Board, (includes concentrations of common volatile chemicals in outdoor air), www.arb.ca.gov/aqd/toxics/sitesubstance.html

Chlorinated Chemicals in Your Home (May 2001): California Air Resources Board, (includes concentrations of selected volatile chemicals in indoor air), www.arb.ca.gov/research/indoor/clguide.pdf

Appendix G
Waste Disposal Manifests

Dillard Trucking, Inc.
dba Dillard Environmental Services

№ 18934

Daily Work Report

Customer: ARCO 5337 Day & Date: 1-10-05

Jobsite: Hayward 20,200 Hesperian Blvd Job #: 1-308

Scope: Preload One Sand with One (1) Water Down

ENTERED ENTERED

Labor – Travel To Site/Load Gear Name	Time Worked	Classification	Straight Time Hours	Straight Time Rate	Overtime Hours	Overtime Rate
1)						
2) N. Eckles	8:00Am - 10:00Am	Tech				
3)						
4)						

Labor – Onsite Name	Time Worked	Classification	Straight Time Hours	Straight Time Rate	Overtime Hours	Overtime Rate
1)			5	40		
2) N. Eckles	10:00Am - 10:30Am	Tech				
3)						
4)						

Labor – Travel From Site//Unload Gear Name	Time Worked	Classification	Straight Time Hours	Straight Time Rate	Overtime Hours	Overtime Rate
1)						
2) N. Eckles	10:30 - 1:00pm	Tech				
3)						
4)						

Equipment Equip. No.	Description	Number Used	Usage	Rental Rate
TK60				

RECEIVED JAN 11 2005

Materials	Number	Price

Materials	Number	Price

Subcontractor's Notes/Comments

MANIFEST NUMBERS:

Prepared By: Nick Eckles Date: 1-10-05

Customer Signature:

ENTERED

Dillard Environmental Services
PO Box 579
Byron, CA 94514
Telephone No. (925) 634-6850
Facsimile No. (925) 634-0569

TAG NO. 14010

Date 1 / 10 / 05

JOB NUMBERS(S)	JOB NUMBERS(S)	JOB NUMBERS(S)	JOB NUMBERS(S)
# 1/308	#	#	#
#	#	#	#

TRUCK NO. 60 TRAILER NO. N/A
SUB. HAULER N/A
PRIME CARRIER (Dillard)
GENERATOR(S) Arco # 5387
20200 Hesperian Blvd
CITY Hayward

CONSIGNEE
DESTINATION
CITY
BEGINNING MILEAGE 279573
ENDING MILEAGE 279693

NO.	MATERIALS: MANIFEST NO.	MATERIALS: YARDS OR WEIGHT	LOADING: TIME ARRIVE	LOADING: TIME LEAVE	UNLOADING: TIME ARRIVE	UNLOADING: TIME LEAVE
1	9967		8:00	8:30	10:00	10:30
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

RECEIVED JAN 10 2005 FAX

FUEL - GALLONS #1	FUEL - GALLONS #2	FUEL - VENDOR #1	FUEL - VENDOR #2

COMMENTS: PRELOAD Drums
Waiting for Approval from Land-Fill

OFFICE USE ONLY	
TNS / (HRS) / LDS / YDS	
TRANSPORTATION UNITS:	5 @
TRANSPORTATION RATE:	76
SUBTOTAL:	$
DISPOSAL UNITS:	
DISPOSAL RATE:	
SUBTOTAL:	$
BRIDGE-TOLL:	
MATERIALS:	
TOTAL CHARGES:	$

START	STOP	DEDUCT TIME	NET TIME
8:00	1:00	0	5

DRIVER Cary L Chestnut II
RECEIVED DATE APPROVED BY

TERMS and CONDITIONS

Payment terms are net thirty (30) days subject to a charge of 1.5% per month on all past due balances. In the event the account becomes delinquent and it is necessary to institute legal proceedings, CUSTOMER agrees to pay DES' attorney's fees incurred in such proceeding, action or suit or in any appeal thereon. The parties agree that actions or proceedings arising in connection with this agreement shall be tried and litigated exclusively in the courts located in Contra Costa County, California.

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Document No. 9967 | 2. Page 1 of 1

3. Generator's Name and Mailing Address
ARCO #5387
20200 HESPERIAN BLVD
HAYWARD, CA

MAIL: BP WEST COAST PRODUCTS, LLC
PO BOX 80249
R. SANTA MARGARITA, CA 92688
ATTN: KYLE CHRISTIE

4. Generator's Phone ( ) (714) 670-5303

5. Transporter 1 Company Name
DILLARD ENVIRONMENTAL SVCS.

6. US EPA ID Number
CAD982523433

A. State Transporter's ID
HYBT36010205

B. Transporter 1 Phone (925) 634-6850

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address
REPUBLIC
4001 N. VASCO ROAD
LIVERMORE, CA 94551

10. US EPA ID Number

E. State Facility's ID

F. Facility's Phone (925) 447-0491

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. NON HAZ SOIL, NOS, (pf:)	1	D M	25	P
b.				
c.				
d.				

G. Additional Descriptions for Materials Listed Above
11a.
11b.
11c.
11d.

H. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
Emergency Contact(925) 634-6850 DILLARD
Job # 1-308 PO# ARCO 2005

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: K. CHRISTIE AS AGENT FOR BP | Signature | Date: Month 01 Day 07 Year 05

GENERATOR

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Larry L Chapman II | Signature | Date: Month 1 Day 10 Year 05

TRANSPORTER

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Date: Month Day Year

19. Discrepancy Indication Space

FACILITY

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name | Signature | Date: Month Day Year

NON-HAZARDOUS WASTE

CF14 © 2002 LABELMASTER® (800) 621-5808 www.labelmaster.com

ENTERED

Dillard Environmental Services
PO Box 579
Byron, CA 94514
Telephone No. (925) 634-6850
Facsimile No. (925) 634-0569

TAG NO. 14017

Date 1 / 13 / 05

JOB NUMBERS(S)	JOB NUMBERS(S)	JOB NUMBERS(S)	JOB NUMBERS(S)
# 1/308	#	#	#
#	#	#	#

TRUCK NO. 60 TRAILER NO. N/A
SUB. HAULER N/A
PRIME CARRIER Dillard
GENERATOR(S) Arco # 5387
20200 Hesperian Blvd
CITY Hayward

CONSIGNEE Instvat (Republic C.L.F.)
DESTINATION Airport Rd / N. Vasco RD
CITY Rio Vista / livermore
BEGINNING MILEAGE 280350
ENDING MILEAGE 280510

NO	MATERIALS: MANIFEST NO	YARDS OR WEIGHT	LOADING: TIME ARRIVE	LOADING: TIME LEAVE	UNLOADING: TIME ARRIVE	UNLOADING: TIME LEAVE
1		+ Preloaded			7:30	8:30
2					10:30	11:30
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

FUEL - GALLONS #1	FUEL - GALLONS #2	FUEL - VENDOR #1	FUEL - VENDOR #2
34 gal		Rio Vista CFN	

COMMENTS:

OFFICE USE ONLY	
TNS / HRS / LDS / YDS	
TRANSPORTATION UNITS:	80 76
TRANSPORTATION RATE:	10 86
SUBTOTAL:	$
DISPOSAL UNITS:	
DISPOSAL RATE:	
SUBTOTAL:	$
BRIDGE-TOLL:	
MATERIALS:	
TOTAL CHARGES:	$

START 6:00 | STOP 3:00 | DEDUCT TIME 0 | NET TIME 9

DRIVER Larry L Chesterman II

RECEIVED DATE

APPROVED BY

TERMS and CONDITIONS

Payment terms are net thirty (30) days subject to a charge of 1.5% per month on all past due balances. In the event the account becomes delinquent and it is necessary to institute legal proceedings, CUSTOMER agrees to pay DES' attorney's fees incurred in such proceeding, action or suit or in any appeal thereon. The parties agree that actions or proceedings arising in connection with this agreement shall be tried and litigated exclusively in the courts located in Contra Costa County, California.

REPUBLIC SERVICES VASCO ROAD, LLC 259305
4001 N. Vasco Road, Livermore, California 94551 • (925) 447-0491

TICKET:
CUSTOMER:
TRUCK:
ACCT#:
PROFILE #:

DATE: 01/13/2005
TIME:

GENERATOR: ORIG # 05387
ORIGIN:
LICENSE:
COMMENT:

GROSS: 0 LBS
TARE: 0 LBS
NET: 0 LBS

WASTE:	QUANTITY	UNIT	RATE	AMOUNT
	1.00	U		

Tax

Total:

I certify that I have not disposed of any liquid or hazardous waste.

Weighmaster: Raymond Yulo

DRIVER

RECYCLING

WARNING: Transporting any unauthorized hazardous waste to this facility for disposal is prohibited by law. Persons violating this prohibition are subject to civil and criminal prosecution. All children must remain in vehicles. Absolutely no scavenging allowed.

WEIGHMASTER CERTIFICATE
THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food & Agriculture.

InStrat, Inc.
A liquid waste disposal company
P.O. Box 2279
Davis, CA 95617
(530) 753-1829

№ 3046

CUSTOMER P.O. APO 2003
DATE 1/13/05
DAY OF WEEK THUES
CHARGE TO DILLARD
ADDRESS BYRON
ORIGIN HAYWARD #5387
DESTINATION RIO VISTA

	DESCRIPTION			QTY / HRS	RATE	CHARGES
	Monitoring well dewatering / pump test			100	MIN	250 —
	Auger rinsate		Underground storage tank (UST)			
	Spill/ release (not UST related)		Surface Impoundment			
✓	Drums		Above ground storage tank			
	Solids					
	Washout					
Color	BROWN		Sani-chlor			
Odor	0		Filters			
Solids	0 %		Powersorb Sheet			
Other			Powersorb Boom			
Transporter						

THIS TOTAL WILL STAND AS CORRECT UNLESS NOTIFIED OF CORRECTION WITHIN FIVE DAYS

TERMS NET 30 DAYS. THE CUSTOMER AGREES TO PAY A FINANCE CHARGE OF 2% PER MONTH, WHICH IS AN ANNUAL RATE OF 24% ON PAST DUE ACCOUNTS.

SIGNED BY X

SALES TAX
TOTAL TO 250 —