LETTER OF TRANSMITTAL

PARSONS ENGINEERING SCIENCE, INC.
2101 Webster Street
Suite 700
Oakland, CA 94612
Phone: (510) 891-9085
Fax: (510) 835-4355

DATE: January 28, 1998

PARSONS ES PROJECT: 729457

TO:
Alameda County Health Care Services Agency
Division of Hazardous Materials
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

ATTN: Ms. Pam Evans

5TTD
4145

RE: Redwood Regional Park Site Investigation, Oakland, California

WE ARE SENDING YOU:

ATTACHED XXX — UNDER SEPARATE COVER ____.

DOCUMENTS XXX — OTHER:_____.

VIA MAIL XXX EXPRESS MAIL ___ FED EX __ OTHER: _____.

QUANTITY	DATE	ITEM
1	1/28/98	Quarterly Progress Report 11, Groundwater and Surface Water Characterization Program at Redwood Regional Park Service Yard, Oakland, California

cc: W. Gee, East Bay Regional Parks District

REMARKS:

SIGNED: B.M. Rucker

Bruce M. Rucker, Project Manager

PARSONS ENGINEERING SCIENCE, INC.

2101 Webster Street • Suite 700 • Oakland, California 94612 • (510) 891-9085 • Fax (510) 835-4355

January 28, 1998
Ref: 729457.07000

Alameda County Health Care Services Agency
Department of Environmental Health
Hazardous Materials Division
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Attention: Ms. Pam Evans, Hazardous Materials Specialist

Subject: Quarterly Progress Report 11, Groundwater and Surface Water Characterization Program at Redwood Regional Park Service Yard, Oakland, California

Dear Ms. Evans:

INTRODUCTION

This report presents the results of the December 1997 groundwater and surface water monitoring event conducted by Parsons Engineering Science, Inc. (Parsons ES) (formerly Engineering-Science, Inc. [ES]) at the East Bay Regional Park District (EBRPD) Redwood Regional Park Service Yard in Oakland, California. This report presents the results of the eleventh quarterly groundwater monitoring event for the site Groundwater Characterization Program, which is designed to evaluate the extent and magnitude of groundwater contamination associated with two former leaking underground fuel storage tanks (UFSTs). A summary of previous site characterization and remedial activities associated with the former UFSTs is presented in the first quarterly progress report (Parsons ES 1994c). Annual summary assessment reports were presented for the first four quarterly monitoring events, November 1994 through August 1995 (Parsons ES 1995) and for the fifth through eighth quarterly monitoring events, September 1995 through February 1997 (Parsons ES 1997). The next annual summary assessment report is scheduled to be submitted following the twelfth monitoring event, scheduled for February 1998.

Site Description

The project site is located at 7867 Redwood Road in Oakland, Alameda County, California. Figure 1 shows the location of the project site. The project site is a service yard for Redwood Regional Park that used two UFSTs (one 2,000-gallon diesel fuel and one 5,000-gallon unleaded gasoline) from the mid-1960's until their removal in 1993. Figure 2 is a site plan which shows the limits of the former UFST remedial excavation and the groundwater monitoring wells which were installed in October 1994 to monitor groundwater impacts associated with the former UFSTs.

Site Stratigraphy and Hydrogeology

Shallow soil stratigraphy beneath the project site consists of a surficial 3 to 10 foot thick clayey silt unit underlain by a 5 to 15 foot thick silty clay unit. In all monitoring well

borings, a 5- to 10-foot thick clayey coarse-grained sand and clayey gravel unit was encountered that laterally grades to a clay or silty clay. This unit overlies a weathered siltstone at the base of the observed soil profile. Soils in the vicinity of MW-1 are inferred to be landslide debris.

Groundwater at the site occurs under predominantly unconfined conditions, as evidenced by the equilibrated static water levels relative to the water level in Redwood Creek and the level of water seepage out of the north face of the former excavation. Groundwater seepage into Redwood Creek is indicated by historical observations of fuel-contaminated capillary fringe soils in the eastern bank of Redwood Creek (Parsons ES 1994c). Figure 2 shows groundwater elevations and inferred direction of groundwater flow during the August 1997 monitoring event, which indicate that the direction of local groundwater flow beneath the project site is approximately from northeast to southwest. This groundwater flow direction is consistent with previously recorded measurements made in site wells since November 1994 (Parsons ES 1995).

PROCEDURES AND CURRENT ACTIVITIES

The current groundwater monitoring program is in accordance with the Workplan for Groundwater Characterization Program (ES 1994b). The Alameda County Health Care Services Agency (ACHCSA) approved discontinuation of hydrochemical monitoring of site wells MW-1, MW-3 and MW-6 following the August 1995 event due to the absence of significant groundwater contamination in these wells over the first four quarters of monitoring (ACHCSA 1996). Creek surface water sampling procedures are in accordance with the 29 March 1994 Parsons ES letter to ACHCSA (ES 1994a).

Laboratory Analyses

All laboratory analyses were conducted by a laboratory certified by the California Environmental Protection Agency (Cal/EPA) Environmental Laboratory Accreditation Program (ELAP) for each required analytical method. All groundwater and surface water samples were analyzed for the following constituents:

- Total volatile and extractable hydrocarbons - gasoline and diesel ranges (TPH-G and TPH-D) by the State of California Department of Toxic Substances Control (DTSC) Leaking Underground Fuel Tank (LUFT) Manual Method (equivalent to modified EPA Method 8015)

- Aromatic hydrocarbons (including benzene, toluene, ethylbenzene, and total xylenes [BTEX]) by EPA Method 8020

Groundwater Monitoring and Sampling

Parsons ES personnel measured static water levels (Attachment A) in all six site wells on December 17, 1997. Water level measurements were made using an electric water level indicator. Initial water level measurements were collected immediately upon removal of the

well casing caps. If either a positive or negative air pressure was observed in the well at the time the casing caps were removed, then water levels were remeasured after a period no less than one-half hour to allow dissipation of air pressure and equilibration of static water levels. No wells displayed an observable pressure release during this event.

Groundwater sampling of monitoring wells MW-2, MW-4 and MW-5 was conducted on December 17, 1997 in accordance with Cal/EPA guidelines (Cal/EPA 1994). Prior to collection of groundwater samples, a pre-cleaned Teflon™ bailer or submersible pump was used to purge a minimum of three casing volumes from each well. Electrical conductivity, pH, and temperature of purge water were measured during well purging to document the presence of stabilized formation-water in the wells. Attachment A includes groundwater monitoring field notes from the current groundwater monitoring event.

Sample containers were filled with sample water from the pre-cleaned bailer. To prevent cross-contamination, groundwater sampling equipment was decontaminated prior to use and between each monitoring well with an Alconox™ wash followed by three deionized water rinses. Following sample collection, sample containers were labeled, placed in a cooler packed with "blue ice," and transported under chain-of-custody (document included in Attachment B) the same day to a Cal/EPA ELAP-certified laboratory.

Creek Surface Water Sampling

During the current event, creek surface water samples were collected from surface water locations SW-2 (in the immediate vicinity of area of discolored soil in the creek bank), and SW-1 and SW-3 (approximately 500 feet upstream and downstream, respectively, from location SW-2). At the time of creek surface water sampling, the creek was flowing briskly and had a water depth of 6 to 12 inches at the sampling locations.

Analytical Results

Analytical results of the December 1997 monitoring event are presented in Table 1 and summarized below for groundwater and surface water samples.

Groundwater

Gasoline-range TPH was detected only in wells MW-2 and MW-4 at 61 and 1,000 µg/L, respectively. Diesel-range TPH was detected only in well MW-4 at 84 µg/L. Aromatic hydrocarbons were detected in both MW-4 and MW-2 with all maximum concentrations detected in well MW-4, except benzene. No contaminants of concern were detected in well MW-5. Detectable groundwater contaminant concentrations reported for the current sampling event are within the same order of magnitude as concentrations reported since November 1994 (Parsons ES 1995).

Surface Water

Neither TPH nor BTEX constituents were detected in any of the creek surface water samples collected during the current sampling event.

Quality Control Samples

Two types of field quality control (QC) samples were used to assess whether field or laboratory procedures affected analytical results of the current groundwater sampling event. One equipment rinsate blank (MW-0B) was collected from the decontaminated bailer following sampling and decontamination activities at well MW-4 to monitor potential cross-contamination in the field due to inadequate decontamination of sampling equipment and/or sample contamination during transport. That sample was analyzed for TPH-G and BTEX constituents, none of which were detected.

One field duplicate sample (identified as MW-0A on the chain of custody record and laboratory report and as MW-4[a] on Table 1) was collected from well MW-4 and analyzed for TPH-G and BTEX to assess whether field procedures produced reproducible results (Table 1). The relative percent differences (RPDs) between the field and field duplicate samples are as follows: gasoline (26.1%); benzene (31.2%); toluene (38.8%); ethylbenzene (24.5%); and, total xylenes (22.1%). Field duplicate samples will continue to be collected and analyzed in future events to evaluate analytical precision.

Laboratory QC samples (e.g., method blanks, matrix spikes, surrogate spikes, etc.) were analyzed by the laboratory in accordance with the requirements of each analytical method. All laboratory QC sample results and sample holding times were within the acceptance limits of the methods (Attachment B).

Management of Investigation-Derived Waste

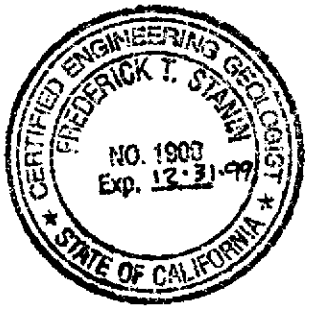
A total of approximately 77 gallons of wastewater (including monitoring well purge water and equipment decontamination rinsate) from the current quarter's groundwater sampling event was containerized on site in a plastic storage tank. It is anticipated that this wastewater will be transported for off-site treatment or disposal following conclusion of site monitoring activities or when the tank is full, whichever is sooner.

We trust that this submittal meets the needs of your agency. Please call us at our Oakland office (510-891-9085) if you have any questions or require clarification.

Very truly yours,

PARSONS ENGINEERING SCIENCE, INC.

Bruce M. Rucker
Project Manager



Frederick T. Stanin, C.E.G.
Principal Geologist

REFERENCES

ACHCSA (Alameda County Health Care Services Agency) 1996, letter from Madhulla Logan, Hazardous Materials Specialist to Ken Berger of EBRPD. 9 January

Cal/EPA (State of California Environmental Protection Agency) 1994, Guidance Manual for Ground Water Investigations. August

ES 1994a, letter to ACHCSA summarizing proposed sampling activities at Redwood Creek, Redwood Regional Park Service Yard, Oakland, California. 27 January

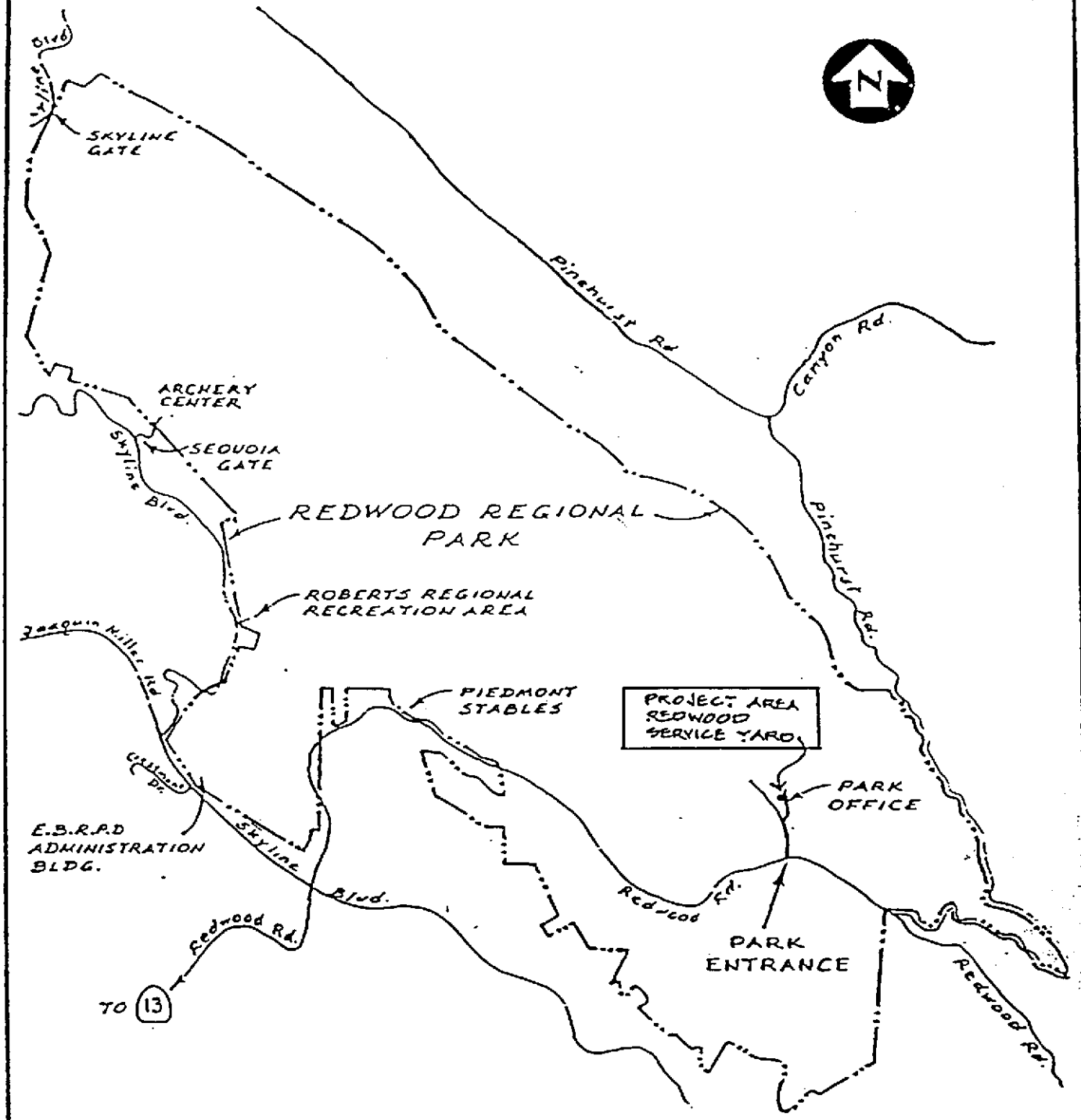
ES 1994b, Workplan for Groundwater Characterization Program at Redwood Regional Park Service Yard, Oakland, California. 17 August

Parsons ES 1994c, Quarterly Progress Report 1 (October - December 1994), Redwood Regional Park Service Yard, Oakland, California. 28 December

Parsons ES 1995, Quarterly Progress Report 4 and Annual Summary Assessment (November 1994 - August 1995), Redwood Regional Park Service Yard, Oakland, California. 13 November

Parsons ES 1997, Quarterly Progress Report 8 and Annual Summary Assessment (September 1995 - February 1997), Redwood Regional Park Service Yard, Oakland, California. 19 March

FIGURE 1

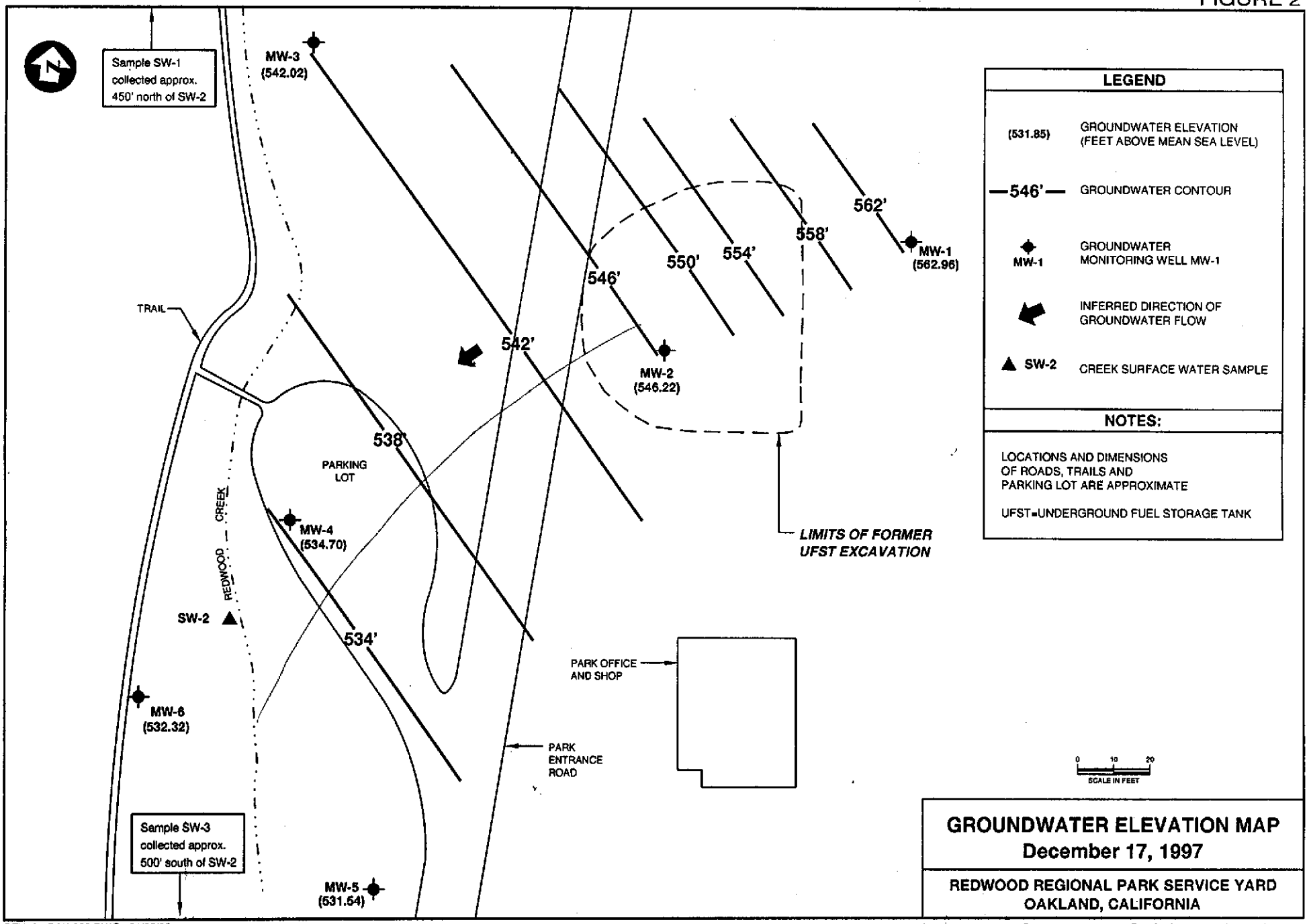


SITE LOCATION MAP

REDWOOD REGIONAL PARK
SERVICE YARD

OAKLAND, CALIFORNIA

FIGURE 2



GROUNDWATER ELEVATION MAP
December 17, 1997

REDWOOD REGIONAL PARK SERVICE YARD
OAKLAND, CALIFORNIA

REV. 0 OAK-003.DWG 01/23/98

PARSONS ENGINEERING SCIENCE, INC.

TABLE 1

GROUNDWATER ANALYTICAL RESULTS
DECEMBER 17, 1997
Redwood Regional Park Service Yard, Oakland, California

	Concentration (µg/L)					
Compound:	TPH-G	TPH-D	Benzene	Toluene	Ethylbenzene	Total Xylenes
Reporting Limit:	50	50	0.5	0.5	0.5	0.5
Monitoring Well Samples						
MW-2	61	ND	21	ND	6.5	3.9
MW-4	1,000	84 [b]	4.6	2.7	61	54.2
MW-4 [a]	1,300	NA	6.3	4	78	67.7
MW-5	ND	ND	ND	ND	ND	ND
Surface Water Samples						
SW-1	ND	ND	ND	ND	ND	ND
SW-2	ND	ND	ND	ND	ND	ND
SW-3	ND	ND	ND	ND	ND	ND

Notes:

TPH-G = Total volatile hydrocarbons - gasoline range

TPH-D = Total extractable hydrocarbons - diesel range

NA = Not analyzed

ND = Not detected above method reporting limit

µg/L = Micrograms per liter, equivalent to parts per billion (ppb)

[a] = Quality control field duplicate sample designated MW-0A on the chain-of-custody and analytical laboratory report

b = Sample exhibits fuel pattern which is a lighter hydrocarbon range and does not resemble analytical standard

Sample locations are shown on Figure 2.

ATTACHMENT A

GROUNDWATER MONITORING NOTES

WATER LEVEL DATA

PARSONS ENGINEERING SCIENCE

DATE: December 17, 1997

PROJECT/LOCATION: Redwood Regional Park Service Yard, Oakland, California

PROJECT No.: 729457

PERSONNEL: Bruce Rucker

Well No	Water Level from T.O.C.	Well Depth From T.O.C	Depth to T.O.C	Water Level from G.S.	Well Casing Dia.	Gallons/ Casing Vol.	T.O.C. Elev. USGS	Water Level USGS
MW-1	2.94	18.0	-2.3	0.6	4	NS	565.9	562.96
MW-2	20.28	36.5	-2.4	17.9	4	10.5	566.5	546.22
MW-3	18.88	45.0	-2.8	16.1	4	NS	560.9	542.02
MW-4	13.40	26.0	-2.1	11.3	4	8.2	548.1	534.70
MW-5	15.96	26.0	-2.3	13.7	4	6.5	547.5	531.54
MW-6	13.28	27.0	-2.3	11.0	4	NS	545.6	532.32

NOTES:

T.O.C.: Top of Casing

Gallons/casing volume for 4" inner diameter casing = 0.65 gallons per linear foot

Negative value for "Depth to T.O.C." indicates that T.O.C. is above ground surface

G.S.: Ground Surface

USGS: U.S. Geological Survey mean sea level (MSL)

NS: Not Sampled

All elevations surveyed by East Bay Regional Parks District relative to USGS Survey Benchmark No. JHF-49

GROUNDWATER SAMPLING FIELD NOTES

PARSONS ENGINEERING SCIENCE

PROJECT/LOCATION REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CA **PERSONNEL:** Bruce Rucker

PROJECT NUMBER: 729457 **DATE:** December 17, 1997

Well ID	*Sampler Date Time*	*Water Level Before, Well Diameter and Depth**	*Water Level After **	*Gallons per Casing Volume*	*Well Purging Method ***	*Pump On*	*Pump Off*	*Temp. (o C)*	*Specific Cond (umhos/cm)*	*pH*	*Total Water Purged (gals)*	*Sample Coll. Method*	*Analysis & Number/type of Containers*	*Comments*
MW-1	NS	2.94 4" 18.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	
MW-2	BMR 12/17/97 1155	20.28 4" 36.5	26.20	10.5	B	NA	NA	14.9 14.7 14.6	650 600 600	7.36 7.36 7.37	1 21 32.5	B	(a) (b) & (c)	Sample semi-turbid; no sheen
MW-3	NS	18.88 4" 45.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	
MW-4	BMR 12/17/97 1240	13.40 4" 26.0	16.76	8.2	B	NA	NA	14.3 14.0 14.0	500 500 500	7.20 6.88 6.90	1 16.4 24.6	B	(a) (b) & (c)	Sample semi-turbid; petroleum odor

NOTES

* Measured from top of casing in feet

** G -- Grundfos Pump; B - Bailer

NA Not Applicable

NR Not Recorded

(a) Total Extractable Hydrocarbons - diesel range (TPH-D), unpreserved {1: 1L amber bottles}.

(b) BTEX, EPA Method 8020, HCl preserved {2: 40ml VOAs}.

(c) Total Volatile Hydrocarbons-gasoline range (TPH-G), HCl preserved {2: 40ml VOAs}.

NS Not sampled

GROUNDWATER SAMPLING FIELD NOTES

PARSONS ENGINEERING SCIENCE

PROJECT/LOCATION REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CA **PERSONNEL:** Bruce Rucker

PROJECT NUMBER: 729457 **DATE:** December 17, 1997

Well ID	*Sampler Date Time*	*Water Level Before, Well Diameter and Depth**	*Water Level After **	*Gallons per Casing Volume*	*Well Purging Method ***	*Pump On*	*Pump Off*	*Temp. (o C)*	*Specific Cond (umhos/cm)*	*pH*	*Total Water Purged (gals)*	*Sample Coll. Method*	*Analysis & Number/type of Containers*	*Comments*
MW-5	BMR 12/17/97 1055	15.96 4" 26.0	17.80	6.5	B	NA	NA	14.2 14.2 14.3	400 400 500	7.60 7.43 7.41	1 13 19.5	B	(a) (b) & (c)	Sample turbid; no petroleum sheen.
MW-6	NS	13.28 4" 27.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	
MW-0A	BMR 12/17/97 1240	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	B	(b) & (c)	Field duplicate collected at well MW-4
MW-0B	BMR 12/17/97 1250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	(b) & (c)	Equipment rinsate blank, collected after decon. at well MW-4

NOTES

* Measured from top of casing in feet

** G -- Grundfos Pump; B - Bailer

NA Not Applicable

NR Not Recorded

(a) Total Extractable Hydrocarbons - diesel range (TPH-D), unpreserved {1: 1L amber bottles}.

(b) BTEX, EPA Method 8020, HCl preserved {2: 40ml VOAs}.

(c) Total Volatile Hydrocarbons-gasoline range (TPH-G), HCl preserved {2: 40ml VOAs}.

NS Not sampled

ATTACHMENT B

CHAIN-OF-CUSTODY RECORD AND ANALYTICAL LABORATORY REPORT

PARSONS ENGINEERING SCIENCE, INC.
[redacted] We[redacted] Str[redacted] Suite[redacted]
Oakland, California 94612
Phone: (510) 891-9085
FAX: (510) 835-4355

CHAIN OF CUSTODY RECORD

[redacted] PAGE [redacted] OF [redacted]

Project No.: 729457.06000

Project Name/Location: Redwood Regional Park / Oakland, CA

Project Manager: Bruce Rucker

Sampler(s): (Printed Name and Signature)

Bruce Rucker B. M. Rucker

Sample ID	Sample Location	Date	Time	Matrix	NO. OF CONTAINERS	TPH-Gasoline → DTSC LUFT/8015	TPH-Diesel → DTSC LUFT/8015	BTEX → EPA 8020					TO BE COMPOSITED BY LAB?	TURNAROUND TIME	Remarks
MW-5	well MW-5	12/17/97	1055	H_2O	3	X	X	X						10	day
MW-2	well MW-2		1155		3	X	X	X							
MW-4	well MW-4		1240		3	X	X	X							
MW-ΦA	QC sample		QC		2	X		X							
MW-ΦB	QC sample		QC		2	X		X							
SW-3	downstream		~~1330~~	1510	3	X	X	X							
SW-2	center		~~1335~~	1525	3	X	X	X							
SW-1	upstream	↓	~~1330~~	1530	3	X	X	X						↓	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	NOTES:
Bruce M. Rucker	12/17/97	4:49	J. GUERRERO 12-17-97 4:50pm	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LAB BY: (SIGNATURE)	DATE	TIME	REMARKS/COMMENTS:

DISTRIBUTION: WHITE: ACCOMPANIES SHIPMENT & RET'N WITH LAB REPORT, CANARY: LAB COPY, PINK: FIELD COPY.

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Parsons Engineering Science, Inc.
2101 Webster Street
Suite 700
Oakland, CA 94612

Date: 02-JAN-98
Lab Job Number: 131760
Project ID: 729457
Location: Redwood G.Water & Surface

Reviewed by: Tag Bibyk

Reviewed by:

TVH-Total Volatile Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: TVH
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
131760-001	MW-5	38270	12/17/97	12/25/97	12/25/97	
131760-002	MW-2	38270	12/17/97	12/25/97	12/25/97	
131760-003	MW-4	38270	12/17/97	12/25/97	12/25/97	
131760-004	MW-0A	38270	12/17/97	12/25/97	12/25/97	

Matrix: Water

Analyte Diln Fac:	Units	131760-001 1	131760-002 1	131760-003 1	131760-004 1
Gasoline C7-C12	ug/L	<50	61	1000	1300
Surrogate					
Bromofluorobenzene	%REC	94	101	94	95

BTXE

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: EPA 8020A
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
131760-001	MW-5	38270	12/17/97	12/25/97	12/25/97	
131760-002	MW-2	38270	12/17/97	12/25/97	12/25/97	
131760-003	MW-4	38270	12/17/97	12/25/97	12/25/97	
131760-004	MW-0A	38270	12/17/97	12/25/97	12/25/97	

Matrix: Water

Analyte Diln Fac:	Units	131760-001 1	131760-002 1	131760-003 1	131760-004 1
Benzene	ug/L	<0.5	21	4.6	6.3
Toluene	ug/L	<0.5	<0.5	2.7	4
Ethylbenzene	ug/L	<0.5	6.5	61	78
m,p-Xylenes	ug/L	<0.5	3.9	50	63
o-Xylene	ug/L	<0.5	<0.5	4.2	4.7
Surrogate					
Trifluorotoluene	%REC	84	88	81	89
Bromofluorobenzene	%REC	72	77	73	76

TVH-Total Volatile Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: TVH
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
131760-005	MW-0B	38270	12/17/97	12/25/97	12/25/97	
131760-006	SW-3	38270	12/17/97	12/25/97	12/25/97	
131760-007	SW-2	38270	12/17/97	12/24/97	12/24/97	
131760-008	SW-1	38270	12/17/97	12/25/97	12/25/97	

Matrix: Water

Analyte Diln Fac:	Units	131760-005 1	131760-006 1	131760-007 1	131760-008 1
Gasoline C7-C12	ug/L	<50	<50	<50	<50
Surrogate					
Bromofluorobenzene	%REC	93	94	102	93

BTXE

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: EPA 8020A
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
131760-005	MW-0B	38270	12/17/97	12/25/97	12/25/97	
131760-006	SW-3	38270	12/17/97	12/25/97	12/25/97	
131760-007	SW-2	38270	12/17/97	12/24/97	12/24/97	
131760-008	SW-1	38270	12/17/97	12/25/97	12/25/97	

Matrix: Water

Analyte Diln Fac:	Units	131760-005 1	131760-006 1	131760-007 1	131760-008 1
Benzene	ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	ug/L	<0.5	<0.5	<0.5	<0.5
Surrogate					
Trifluorotoluene	%REC	84	82	82	82
Bromofluorobenzene	%REC	73	73	72	73

TVH-Total Volatile Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: TVH
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 38270
Units: ug/L
Diln Fac: 1

Prep Date: 12/24/97
Analysis Date: 12/24/97

MB Lab ID: QC61264

Analyte	Result
Gasoline C7-C12	<50

Surrogate	%Rec	Recovery Limits
Bromofluorobenzene	89	70-122

BATCH QC REPORT

Curtis & Tompkins, Ltd.

BTXE

Client:	Parsons Engineering Science, Inc.	Analysis Method:	EPA 8020A
Project#:	729457	Prep Method:	EPA 5030
Location:	Redwood G.Water & Surface		

METHOD BLANK

Matrix:	Water	Prep Date:	12/24/97
Batch#:	38270	Analysis Date:	12/24/97
Units:	ug/L		
Diln Fac:	1		

MB Lab ID: QC61264

Analyte	Result
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
m,p-Xylenes	<0.5
o-Xylene	<0.5

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	81	58-130
Bromofluorobenzene	66	62-131

Lab #: 131760

BATCH QC REPORT

Curtis & Tompkins, Ltd.

TVH-Total Volatile Hydrocarbons

Client:	Parsons Engineering Science, Inc.	Analysis Method:	TVH
Project#:	729457	Prep Method:	EPA 5030
Location:	Redwood G.Water & Surface		

LABORATORY CONTROL SAMPLE

Matrix:	Water	Prep Date:	12/24/97
Batch#:	38270	Analysis Date:	12/24/97
Units:	ug/L		
Diln Fac:	1		

LCS Lab ID: QC61262

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	1818	2000	91	80-120
Surrogate	**%Rec**	**Limits**		
Bromofluorobenzene	100	70-122		

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

Lab #: 131760 BATCH QC REPORT Curtis & Tompkins, Ltd.

BTXE

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: EPA 8020A
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 38270
Units: ug/L
Diln Fac: 1

Prep Date: 12/24/97
Analysis Date: 12/24/97

LCS Lab ID: QC61263

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	17.73	20	89	80-120
Toluene	18.96	20	95	80-120
Ethylbenzene	19.5	20	98	80-120
m,p-Xylenes	39.23	40	98	80-120
o-Xylene	21.29	20	106	80-120

Surrogate	%Rec	Limits
Trifluorotoluene	83	58-130
Bromofluorobenzene	73	62-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 5 outside limits

TVH-Total Volatile Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: TVH
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: SW-2
Lab ID: 131760-007
Matrix: Water
Batch#: 38270
Units: ug/L
Diln Fac: 1

Sample Date: 12/17/97
Received Date: 12/18/97
Prep Date: 12/24/97
Analysis Date: 12/24/97

MS Lab ID: QC61265

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	2000	<50	1966	98	75-125

Surrogate	%Rec	Limits
Bromofluorobenzene	113	70-122

MSD Lab ID: QC61266

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	1972	99	75-125	0	35

Surrogate	%Rec	Limits
Bromofluorobenzene	110	70-122

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: EPA 8015M
Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
131760-001	MW-5	38255	12/17/97	12/23/97	12/24/97	
131760-002	MW-2	38255	12/17/97	12/23/97	12/24/97	
131760-003	MW-4	38255	12/17/97	12/23/97	12/24/97	
131760-006	SW-3	38255	12/17/97	12/23/97	12/24/97	

Matrix: Water

Analyte	Units	131760-001	131760-002	131760-003	131760-006
Diln Fac:		1	1	1	1
Diesel C12-C22	ug/L	<50	<50	84 YL	<50
Surrogate					
Hexacosane	%REC	89	88	83	91

Y: Sample exhibits fuel pattern which does not resemble standard
L: Lighter hydrocarbons than indicated standard

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: EPA 8015M
Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
131760-007	SW-2	38255	12/17/97	12/23/97	12/24/97	
131760-008	SW-1	38255	12/17/97	12/23/97	12/24/97	

Matrix: Water

Analyte	Units	131760-007	131760-008
Diln Fac:		1	1
Diesel C12-C22	ug/L	<50	<50
Surrogate			
Hexacosane	%REC	88	90

BATCH QC REPORT

Curtis & Tompkins, Ltd.

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: EPA 8015M
Prep Method: EPA 3520

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 38255
Units: ug/L
Diln Fac: 1

Prep Date: 12/23/97
Analysis Date: 12/24/97

BS Lab ID: QC61202

Analyte	Spike Added	BS	%Rec #	Limits
Diesel C12-C22	2475	2010	81	60-140
Surrogate	**%Rec**	**Limits**		
Hexacosane	101	60-140		

BSD Lab ID: QC61203

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel C12-C22	2475	1646	66	60-140	20	35
Surrogate	**%Rec**	**Limits**				
Hexacosane	82	60-140				

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: EPA 8015M
Prep Method: EPA 3520

METHOD BLANK

Matrix: Water
Batch#: 38255
Units: ug/L
Diln Fac: 1

Prep Date: 12/23/97
Analysis Date: 12/24/97

MB Lab ID: QC61201

Analyte	Result	
Diesel C12-C22	<50	
Surrogate	**%Rec**	**Recovery Limits**
Hexacosane	93	60-140