

ENVIRONMENTAL
PROTECTION
97 SEP 30 PM 3:41

LETTER OF TRANSMITTAL

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

DATE: 26 September 1997

57104145

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

7867 Redwood Ave.
Oakland
94619
TP

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	9/22/97	Quarterly Progress Report 10, Groundwater Characterization Program at Redwood Regional Park Service Yard Site, Oakland, California

cc: W. Gee, East Bay Regional Parks District

REMARKS:

SIGNED:

Bruce M. Rucker
Bruce M. Rucker, Project Manager

ENVIRONMENTAL
PROTECTION
97 SEP 20 PM 3:41

22 September 1997
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 10, Groundwater Characterization Program at
Redwood Regional Park Service Yard, Oakland, California

Dear Ms. Evans:

INTRODUCTION

This report presents the results of the August 1997 groundwater 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 tenth 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).

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.

Alameda County Health Care Services Agency
22 September 1997
Page 2

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 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 22 August 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.

Alameda County Health Care Services Agency
22 September 1997
Page 3

Groundwater sampling of monitoring wells MW-2, MW-4 and MW-5 was conducted on 22 August 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 the same day to a Cal/EPA ELAP-certified laboratory. Chain-of-custody records for the groundwater samples are included in Attachment B.

Creek Surface Water Sampling

During the current event, creek surface water samples were collected from surface water locations SW-3 and SW-2 (downstream from and in the immediate vicinity of area of discolored soil in the creek bank). Due to low water conditions, surface water was not available for sampling at any point within approximately 1,000 feet upstream of the the discolored soil location. During the current event, petroleum sheen was observed in soil in the vicinity of sampling location SW-2 at multiple locations along an approximately 25-foot wide section of the east creek bank, just above the surface water level. This indicates seepage of capillary fringe groundwater contamination at the creek bank at this location. At each location where petroleum sheen was observed in soil, orange algae was present, suggesting that the petroleum was serving as a carbon source for the algae. At the time of observation of location SW-2, the creek was not flowing perceptibly and had a maximum water depth of 6 inches at that location.

Analytical Results

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

Groundwater

Gasoline- and diesel-range TPH were detected only in well MW-4. Aromatic hydrocarbons were detected in both MW-4 and MW-2 with all maximum concentrations detected in well MW-4, including: benzene (maximum of 8.6 µg/L) toluene (3.5 µg/L), ethylbenzene (85 µg/L) and total xylenes (56.8 µg/L). No contaminants of concern were detected in well MW-5. Detectable groundwater contaminant concentrations reported for the current quarter are within the same order of magnitude as concentrations reported since November 1994 (Parsons ES 1995).

Alameda County Health Care Services Agency
22 September 1997
Page 4

Surface Water

Gasoline- and diesel-range TPH and the four aromatic hydrocarbons were detected only in the surface water sample collected in the immediate vicinity of the groundwater seep in the creek bank. Detectable groundwater contaminant concentrations reported for the current quarter (350 µg/L gasoline, 130 µg/L diesel and 43.6 µg/L total BTEX) are the maximum concentrations detected since surface water sampling was initiated in February 1994 (Parsons ES 1995).

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, neither of which were detected.

One field duplicate sample (identified as MW-0A on the chain of custody record and laboratory report and as MW-4A 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 (10.0%); benzene (4.5%); ethylbenzene (8.6%); total xylenes (7.7%); and toluene (173.3% RPD assuming that toluene was present in the "not detected sample" at a concentration of 0.25 µg/L, equal to one-half the method detection limit). The RPD values for all analytes except toluene are within acceptable QC limits. It is probable that the detected toluene concentration near the method reporting limit resulted in the poor RPD. 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 sample holding times were within the acceptance limits of the methods (Attachment B). Several laboratory QC sample results (surrogate recoveries for bromobenzene) were outside the acceptance limits of the method (Attachment B). As stated in the laboratory report footnotes (Attachment B), this is due to co-elution of non-target hydrocarbons compounds and does not affect data quality of the analytical samples.

Management of Investigation-Derived Waste

A total of approximately 57 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 waste water will be transported for off-site treatment or disposal following conclusion of site monitoring activities or when the tank is full, whichever is sooner.

Alameda County Health Care Services Agency
22 September 1997
Page 5

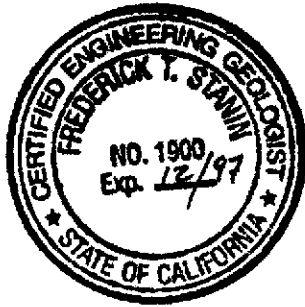
We trust that this submittal meets the needs of your agency. Please call us at our Oakland office (510-891-9085) if you have any questions or require clarification.

Very truly yours,

PARSONS ENGINEERING SCIENCE, INC.

Bruce M. Rucker

Bruce M. Rucker
Project Manager

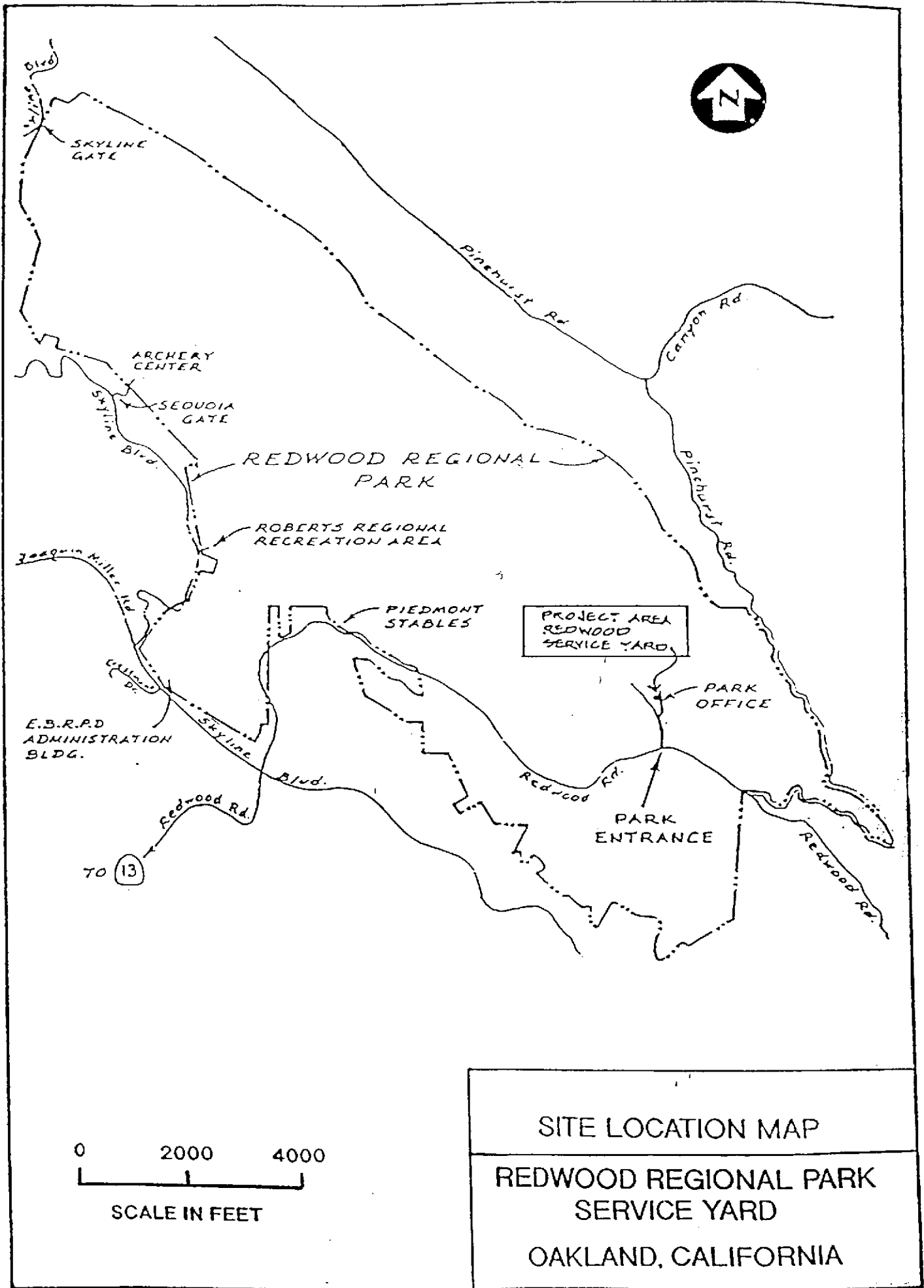


Frederick T. Stanin

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

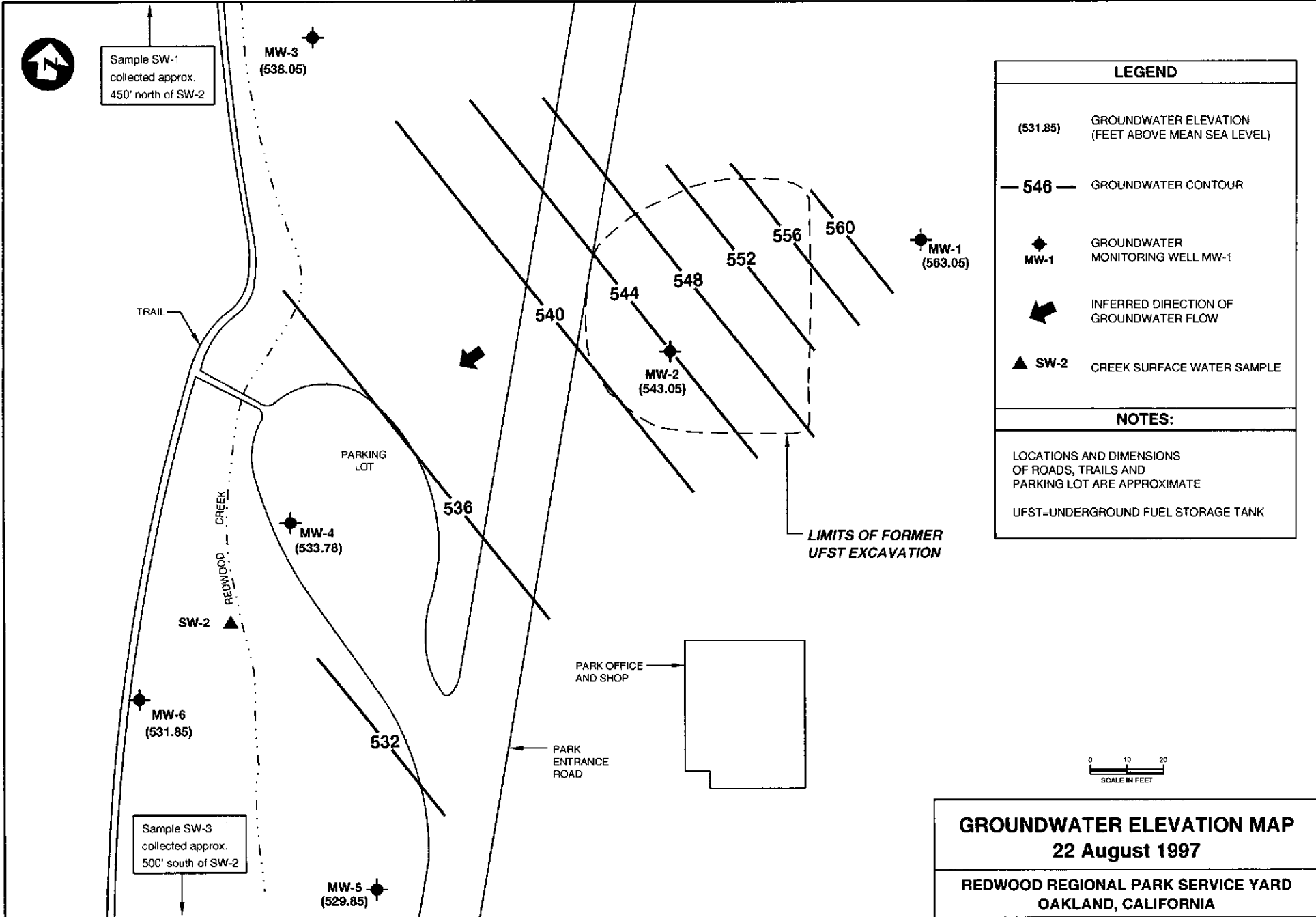


SITE LOCATION MAP

REDWOOD REGIONAL PARK
SERVICE YARD

OAKLAND, CALIFORNIA

FIGURE 2



LEGEND	
(531.85)	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
— 546 —	GROUNDWATER CONTOUR
◆ MW-1	GROUNDWATER MONITORING WELL MW-1
➔	INFERRED DIRECTION OF GROUNDWATER FLOW
▲ SW-2	CREEK SURFACE WATER SAMPLE

NOTES:

LOCATIONS AND DIMENSIONS OF ROADS, TRAILS AND PARKING LOT ARE APPROXIMATE

UFST-UNDERGROUND FUEL STORAGE TANK



GROUNDWATER ELEVATION MAP
22 August 1997
 REDWOOD REGIONAL PARK SERVICE YARD
 OAKLAND, CALIFORNIA

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
22 AUGUST 1997
Redwood Regional Park Service Yard, Oakland, California

Compound:	Concentration ($\mu\text{g/L}$)					
	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	ND	ND	4.5	ND	1.1 ^b	ND
MW-4 ^a	2,100	NA	9	ND	85	56.8 ^b
MW-4	1,900	150 ^c	8.6	3.5 ^b	78	52.6 ^b
MW-5	ND	ND	ND	ND	ND	ND
Surface Water Samples						
SW-2	350	130 ^c	13	0.89 ^b	19	10.68 ^b
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

 $\mu\text{g/L}$ = 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 = Presence of this compound confirmed by second column, however the confirmation concentration differed from the reported result by more than a factor of two.^c = Sample exhibits fuel pattern which is a lighter hydrocarbon range and does not resemble analytical standard

Sample locations are shown on Figure 2.

Surface water sample SW-1 not collected during current event due to dry creek conditions.

PARSONS ENGINEERING SCIENCE, INC.

ATTACHMENT A
GROUNDWATER MONITORING NOTES

WATER LEVEL DATA

PARSONS ENGINEERING SCIENCE

DATE: 22 August 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	2.85	18.0	-2.3	0.6	4	NS	565.9	563.05
MW-2	23.45	36.5	-2.4	21.1	4	8.5	566.5	543.05
MW-3	22.85	45.0	-2.8	20.1	4	NS	560.9	538.05
MW-4	14.32	26.0	-2.1	12.2	4	7.6	548.1	533.78
MW-5	17.65	26.0	-2.3	15.4	4	5.4	547.5	529.85
MW-6	13.75	27.0	-2.3	11.5	4	NS	545.6	531.85

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: 22 August 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	2.85 4"	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	
MW-2	BMR 8/22/97 1430	18.0 23.45 4" 36.5	25.75	8.5	G	1145 1231	1203 1256	20.3 21.9 24.6	600 600 600	7.02 7.07 7.10	2 9 17	B	(a) (b) & (c)	Sampled after 2 casing volumes purged, and well recharged to 80%
MW-3	NS	22.85 4" 45.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	
MW-4	BMR 8/22/97 958	14.32 4" 26.0	19.60	7.6	G	918	953	17.1 15.7 15.7 15.7	440 425 440 430	6.69 6.57 6.65 6.66	1 8 15 23	B	(a) (b) & (c)	Sample had petroleum odor and sheen

NOTES

- * Measured from top of casing in feet
- ** G -- Grundfos Pump; B - Bailor
- 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: 22 August 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	17.65						22.8	600	7.22	2			
	8/22/97	4"	18.7	5.4	G	1318	1352	19.1	400	7.60	6	B	(a) (b) & (c)	Sample had no sheen and no petroleum odor
	1400	26.0						17.5	400	7.44	11			
		13.75						17.1	400	7.36	17			
MW-6	NS	4"	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	
		27.0												
MW-0A	BMR 8/22/97 958	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	B	(b) & (c)	Field duplicate collected at well MW-4
MW-0B	BMR 5/15/97 1545	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

PARSONS ENGINEERING SCIENCE, INC.

ATTACHMENT B

**CHAIN-OF-CUSTODY RECORD
AND ANALYTICAL LABORATORY REPORT**



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710. Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

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

Date: 11-SEP-97
Lab Job Number: 130387
Project ID: 729457
Location: Redwood G. Water & Surface

Reviewed by:

Susan K. Morrison

Reviewed by:

Tracy B. B. 7

This package may be reproduced only in its entirety.



Curtis & Tompkins, Ltd.

Laboratory Number: **130387**
Client: **Parsons Engineering Science, Inc.**
Project#: **729457**
Location: **Redwood G. Water & Surface**

Sample Date: **08/22/97**
Receipt Date: **08/22/97**

CASE NARRATIVE

Curtis & Tompkins received seven water samples from Redwood G. Water & Surface on September 22, 1997. All samples were received cold and intact.

TPH/BTXE: High surrogate recoveries were observed for Bromobenzene in samples MW-4 (C&T# 130387-001) and MW-0A (C&T# 130387-007) due to coelution with hydrocarbon peaks.

High surrogate recoveries were also observed in the matrix spike and matrix spike duplicate of sample (C&T# 130387-007) due to coelution.

No problems were encountered.





TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.	Analysis Method: EPA 8015M
Project#: 729457	Prep Method: EPA 3520
Location: Redwood G.Water & Surface	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
130387-002	MW-4	36104	08/22/97	09/05/97	09/10/97	
130387-003	MW-5	36104	08/22/97	09/05/97	09/10/97	
130387-004	MW-2	36104	08/22/97	09/05/97	09/10/97	
130387-005	SW-3	36104	08/22/97	09/05/97	09/10/97	

Matrix: Water

Analyte	Units	130387-002	130387-003	130387-004	130387-005
Diln Fac:		1	1	1	1
Diesel C12-C22	ug/L	150 YL	<50	<50	<52
Surrogate					
Hexacosane	%REC	94	99	93	82

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. Analysis Method: EPA 8015M
Project#: 729457 Prep Method: EPA 3520
Location: Redwood G. Water & Surface

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
130387-006	SW-2	36104	08/22/97	09/05/97	09/10/97	

Matrix: Water

Analyte	Units	130387-006
Diln Fac:		1
Diesel C12-C22	ug/L	130 YL
Surrogate		
Hexacosane	%REC	88

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

Lab #: 130387

BATCH QC REPORT



Curtis & Tompkins, Inc. 1

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc. Analysis Method: EPA 8015M
Project#: 729457 Prep Method: EPA 3520
Location: Redwood G.Water & Surface

METHOD BLANK

Matrix: Water Prep Date: 09/05/97
Batch#: 36104 Analysis Date: 09/09/97
Units: ug/L
Diln Fac: 1

MB Lab ID: QC53685

Analyte	Result	
Diesel C12-C22	<50	
Surrogate	%Rec	Recovery Limits
Hexacosane	84	60-140



TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc. Analysis Method: EPA 8015M
 Project#: 729457 Prep Method: EPA 3520
 Location: Redwood G.Water & Surface

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water Prep Date: 09/05/97
 Batch#: 36104 Analysis Date: 09/10/97
 Units: ug/L
 Diln Fac: 1

BS Lab ID: QC53686

Analyte	Spike Added	BS	%Rec #	Limits
Diesel C12-C22	2475	1678	69	60-140
Surrogate	%Rec	Limits		
Hexacosane	85	60-140		

BSD Lab ID: QC53687

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel C12-C22	2475	1841	75	60-140	9	35
Surrogate	%Rec	Limits				
Hexacosane	95	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

TVH-Total Volatile Hydrocarbons

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

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
130387-002	MW-4	35937	08/22/97	08/28/97	08/28/97	
130387-003	MW-5	35937	08/22/97	08/28/97	08/28/97	
130387-004	MW-2	35937	08/22/97	08/28/97	08/28/97	
130387-005	SW-3	35937	08/22/97	08/28/97	08/28/97	

Matrix: Water

Analyte	Units	130387-002	130387-003	130387-004	130387-005
Diln Fac:		1	1	1	1
Gasoline C7-C12	ug/L	1900	<50	<50	<50
Surrogate					
Bromobenzene	%REC	DO	DO	DO	DO

DO: Surrogate diluted out



BTXE

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

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
130387-002	MW-4	35937	08/22/97	08/28/97	08/28/97	
130387-003	MW-5	35937	08/22/97	08/28/97	08/28/97	
130387-004	MW-2	35937	08/22/97	08/28/97	08/28/97	
130387-005	SW-3	35937	08/22/97	08/28/97	08/28/97	

Matrix: Water

Analyte	Units	130387-002	130387-003	130387-004	130387-005
Diln Fac:		1	1	1	1
Benzene	ug/L	8.6	<0.5	4.5	<0.5
Toluene	ug/L	3.5C	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	78	<0.5	1.1C	<0.5
m,p-Xylenes	ug/L	49	<0.5	<0.5	<0.5
o-Xylene	ug/L	3.6C	<0.5	<0.5	<0.5
Surrogate					
Trifluorotoluene	%REC	106	94	93	95
Bromobenzene	%REC	117	106	105	105

C: Presence of this compound confirmed by second column,
however, the confirmation concentration differed from the reported
result by more than a factor of two



TVH-Total Volatile Hydrocarbons

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

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
130387-006	SW-2	35937	08/22/97	08/28/97	08/28/97	
130387-007	MW-0A	35937	08/22/97	08/28/97	08/28/97	
130387-008	MW-0B	35937	08/22/97	08/29/97	08/29/97	

Matrix: Water

Analyte	Units	130387-006	130387-007	130387-008
Diln Fac:		1	1	1
Gasoline C7-C12	ug/L	350	2100	<50
Surrogate				
Bromobenzene	%REC	119	134*	108

* Values outside of QC limits



BTXE

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

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
130387-006	SW-2	35937	08/22/97	08/28/97	08/28/97	
130387-007	MW-0A	35937	08/22/97	08/28/97	08/28/97	
130387-008	MW-0B	35937	08/22/97	08/29/97	08/29/97	

Matrix: Water

Analyte	Units	130387-006	130387-007	130387-008
Diln Fac:		1	1	1
Benzene	ug/L	13	9	<0.5
Toluene	ug/L	0.89C	<0.5	<0.5
Ethylbenzene	ug/L	19	85	<0.5
m,p-Xylenes	ug/L	9.9	53	<0.5
o-Xylene	ug/L	0.78C	3.8C	<0.5
Surrogate				
Trifluorotoluene	%REC	97	105	92
Bromobenzene	%REC	111	119	103

C: Presence of this compound confirmed by second column, however, the confirmation concentration differed from the reported result by more than a factor of two

Lab #: 130387

BATCH QC REPORT



TVH-Total Volatile Hydrocarbons

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

METHOD BLANK

Matrix: Water Prep Date: 08/28/97
Batch#: 35937 Analysis Date: 08/28/97
Units: ug/L
Diln Fac: 1

MB Lab ID: QC53103

Analyte	Result	
Gasoline C7-C12	<50	
Surrogate	%Rec	Recovery Limits
Bromobenzene	101	70-122

Lab #: 130387

BATCH QC REPORT



Curtis Baginski & Associates, Inc.

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#: 35937
Units: ug/L
Diln Fac: 1

Prep Date: 08/28/97
Analysis Date: 08/28/97

MB Lab ID: QC53103

Analyte	Result		
Gasoline C7-C12	<50		
Surrogate	%Rec	Recovery Limits	
Bromobenzene	101	70-122	

Lab #: 130387

BATCH QC REPORT



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: 08/28/97
Batch#: 35937 Analysis Date: 08/28/97
Units: ug/L
Diln Fac: 1

MB Lab ID: QC53103

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	89		58-130
Bromobenzene	98		62-131

Lab #: 130387

BATCH QC REPORT



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: 08/28/97
Batch#: 35937 Analysis Date: 08/28/97
Units: ug/L
Diln Fac: 1

LCS Lab ID: QC53101

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	1880	2000	94	80-120
Surrogate	%Rec	Limits		
Bromobenzene	119	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 #: 130387

BATCH QC REPORT



BTXE

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

LABORATORY CONTROL SAMPLE

Matrix: Water Prep Date: 08/28/97
Batch#: 35937 Analysis Date: 08/28/97
Units: ug/L
Diln Fac: 1

LCS Lab ID: QC53102

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	16.26	20	81	80-120
Toluene	17.04	20	85	80-120
Ethylbenzene	18.33	20	92	80-120
m,p-Xylenes	35.6	40	89	80-120
o-Xylene	18.3	20	92	80-120
Surrogate	%Rec	Limits		
Trifluorotoluene	90	58-130		
Bromobenzene	100	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

Lab #: 130387

BATCH QC REPORT



TVH-Total Volatile Hydrocarbons

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

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: MW-0A	Sample Date: 08/22/97
Lab ID: 130387-007	Received Date: 08/22/97
Matrix: Water	Prep Date: 08/28/97
Batch#: 35937	Analysis Date: 08/28/97
Units: ug/L	
Diln Fac: 1	

MS Lab ID: QC53104

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	2000	2102	4206	105	75-125
Surrogate	%Rec	Limits			
Bromobenzene	151*	70-122			

MSD Lab ID: QC53105

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	4194	105	75-125	1	35
Surrogate	%Rec	Limits				
Bromobenzene	149*	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

CHAIN OF CUSTODY RECORD

Project No.: 729457.06000					NO. OF CONTAINERS	ANALYSIS REQUIRED / PRESERVATIVE								Remarks			
Project Name/Location: Redwood Regional Park Service Yard / Oakland, CA						TPH-gasoline (DTSL LUFT-8015)	TPH-diesel (DTSL LUFT-8015)	BTEX (EPA 8000)								TO BE COMPOSITED BY LAB?	TURNAROUND TIME
Project Manager: Bruce Rucker																	
Sampler(s): (Printed Name and Signature) Bruce M. Rucker (Bruce Rucker)																	
Sample ID	Sample Location	Date	Time	Matrix													
Trip Blank	→	8/22/97		H ₂ O	2	Hold	Trip	Blank							5 day		
MW-4	Well MW-4	8/22/97	1000	H ₂ O	3	X	X	X									
					↓												
MW-5	Well MW-5		1400		X	X	X	X								Hold Trip Blank - do not analyze unless requested	
MW-2	Well MW-2		1430		X	X	X	X									
SW-3	Creek, location SW-3		1035 1040 (PR)		X	X	X	X									
SW-2	Creek, location SW-2		1040		X	X	X	X									
MW-ØA	Well MW-ØA				2	X		X									
MW-ØB	Well MW-ØB				2	X		X									

RELINQUISHED BY: (SIGNATURE) Bruce M. Rucker	DATE 8/22/97	TIME 1550	RECEIVED BY: (SIGNATURE) →	NOTES:
RELINQUISHED BY: (SIGNATURE) →	DATE	TIME	RECEIVED FOR LAB BY: (SIGNATURE) 8-22-97 1551	REMARKS/COMMENTS: