EA Engineering, Science, and Technology

EA Western Regional Operations
41 Lafayette Circle
Lafayette, CA 94549
Telephone: 415-283-7077
Fax: 415-283-3894

12/4/89

22 January 1990

Mr. John Randall
Chevron U.S.A. Inc.
P.O. Box 5004
2410 Camino Ramon
San Ramon, California 94583-0804

JAN 24 '90 H.C.H.

RE: Quarterly Sampling and Analysis
of Groundwater
Former Chevron SS 9-1153 FILE
3126 Fernside Boulevard
Alameda, California

Dear John:

As requested by Chevron U.S.A. Inc., EA has sampled the groundwater in the two monitoring wells at former Chevron SS 9-1153 in Alameda, California.

On 4 December 1989, groundwater was collected from two monitoring wells (C-1 and C-3). These samples were submitted under chain of custody to Pace Laboratories, Inc., Novato, California, where they were analyzed for total petroleum hydrocarbons (TPH) by DHS-modified EPA Method 8015, for the aromatic petroleum hydrocarbons, benzene, toluene, ethylbenzene, and xylenes, by EPA Method 8020, for specific conductance, and for dissolved iron. Copies of the laboratory-originated analytical results are included in Appendix A, and the analytical results are summarized in Table 1. These results are compared with the analytical results of previous samplings in Table 2. A map of the site with monitoring well locations appears in Figure 1.

As seen in Table 2, the concentrations of petroleum hydrocarbons in the groundwater have not changed significantly since May 1989 in C-1. Concentrations of petroleum hydrocarbons in the groundwater monitored by C-3 are less than method detection limits. The minor fluctuations seen in the groundwater at C-1 do not indicate a change in conditions on or off the site.

Samples were analyzed for specific conductivity and for dissolved iron to gather data pertinent to remediation of the site. Specific conductivity is a rapid estimation of the amount of dissolved solids contained in a given volume of water (Sawyer and McCarty, Chemistry for Environmental Engineering, 3rd Edition, 1978, McGraw-Hill, NY), useful in determining the salinity of the groundwater. The specific conductivity of distilled water should be less than 1 umhos/cm at a temperature of 25 C, and state water

quality standards for drinking water require a specific conductivity of not over 900 umhos/cm. Levels of specific conductance in the groundwater at the site are 1,000 to 1,400 umhos/cm at 25 C. This is just slightly over drinking water quality standards, indicating that this water is not highly saline (i.e., not sea water).

The analytical results of iron concentrations for C-1 and C-3 were 35,000 ug/L and 16,000 ug/L, respectively. Secondary drinking water standards limit the iron content to at or below 300 ug/L. This limit is based on taste of water and iron deposition but not on toxicity. The high concentration levels may affect the remediation approach and equipment to be used.

Depth to groundwater has decreased by 0.3 feet in C-1 and has increased in C-3 by 0.09 feet since May 1989 (Table 3). This does not necessarily indicate a change in groundwater flow direction from southeast to northwest but may be the result of the intensive watering of landscaping on the site. There is probably a mounding effect occurring in the groundwater table beneath the site, increasing the rate of flow to the southwest. However, with only two wells on the site it is not possible to determine groundwater flow direction. Monitoring well purge and sampling information is enclosed as Appendix B.

If you have any questions, please contact me or Terry Winsor.

Sincerely,

Carolyn L. Boyles
Geologist

CLB:ds
Enclosures

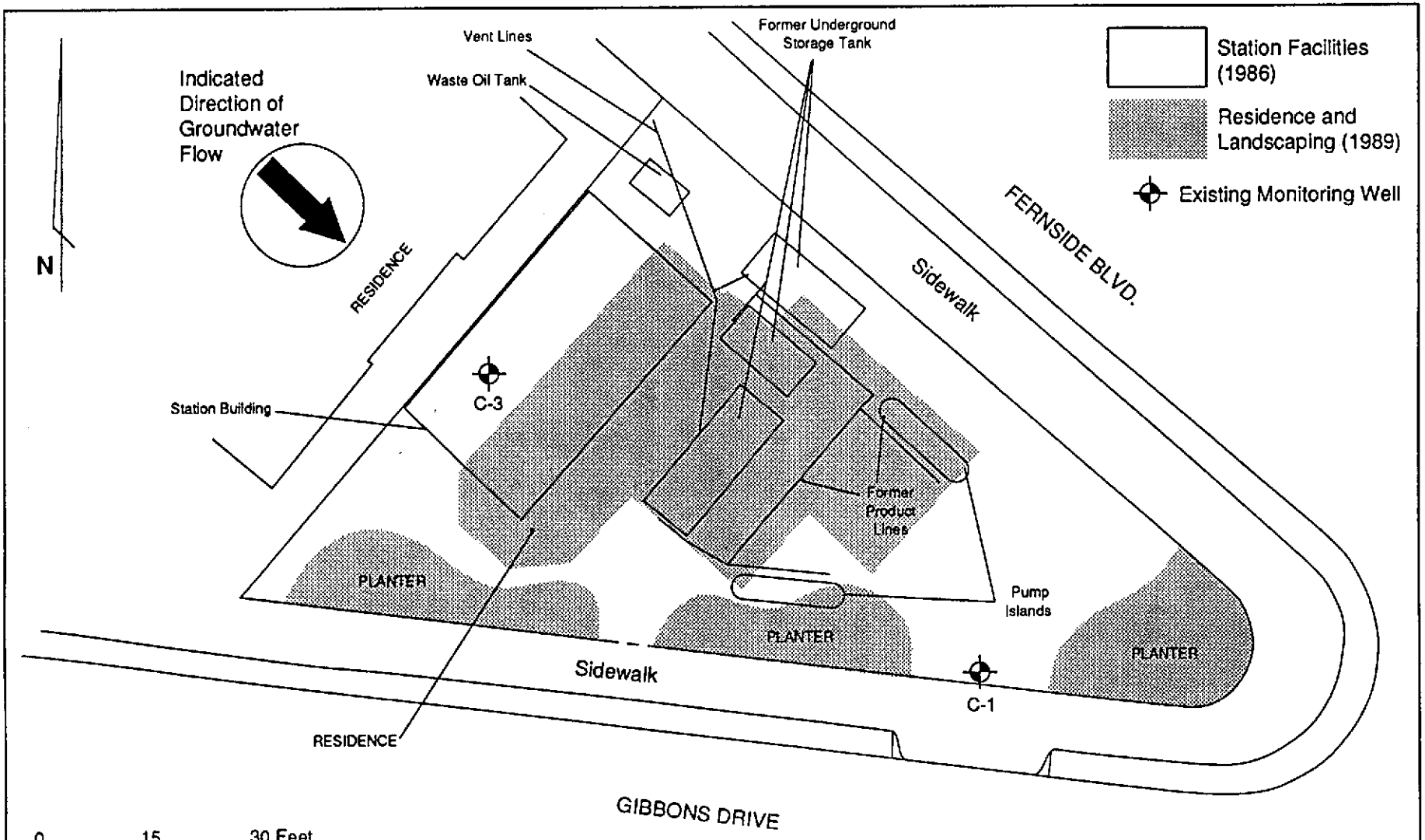

Figure 1. Groundwater monitoring wells with direction of groundwater flow, former Chevron SS 9-1153, Alameda, California, August 1986.

Drawn	Date
Reviewed CLB	Date 1-23-90

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
41 Lafayette Circle
Lafayette, CA. 94549

TABLE 1 CONCENTRATIONS (ug/L) OF PETROLEUM HYDROCARBONS IN THE GROUNDWATER AT FORMER CHEVRON SS 9-1153, ALAMEDA, CALIFORNIA, 4 DECEMBER 1989

Well No.	Specific Conductance (umhos/cm @ 25 C)	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH (as gasoline)	Dissolved Iron
C-1	1,500	8,000	490	100	370	17,000	35,000
C-3	1,000	<0.5	<0.5	<0.5	<0.5	<250	16,000
Rinse Blank	*	<0.5	<0.5	<0.5	<0.5	<250	*

* = Not analyzed for this constituent.

TABLE 2 CONCENTRATIONS (ug/L) OF PETROLEUM HYDROCARBONS IN THE GROUNDWATER AT FORMER CHEVRON SS 9-1153, ALAMEDA, CALIFORNIA, 1986-1989

Well No.	Date	Benzene	Toluene	Ethylbenzene and Xylenes	TPH (as gasoline)
C-1	09/04/86	760	820	1,500	15,000
	07/22/87	250	7	40	1,100
	05/03/89	3,800	190	229	6,900
	12/04/89	8,000	490	470	17,000
C-2	09/04/86	49	18	84	1,100
	07/22/87	1.8	<1.0	<4.0	<50
	05/03/89	well not found			
C-3	09/04/86	3.2	5.4	5.8	50
	07/22/87	<0.5	<1.0	<4.0	<50
	05/03/89	<0.5	<1.0	<2.0	<50
	12/04/89	<0.5	<0.5	<0.5	<250

TABLE 3 DEPTH TO GROUNDWATER IN MONITORING WELLS, FORMER CHEVRON SS 9-1153, ALAMEDA, CALIFORNIA, AUGUST 1986 AND DECEMBER 1989

Well No.	Date	Depth to Water (feet)
C-1	08/18/86	4.1
	05/03/89	4.46
	12/04/89	4.16
C-3	08/18/86	4.0
	05/03/89	4.15
	12/04/89	4.24

APPENDIX A

Results of Analysis and Chain-of-Custody Record
December 1989

pace laboratories, inc.

REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa
Novato, California
Leawood, Kansas
Irvine, California
Asheboro, North Carolina

December 28, 1989

Mr. Terry Winsor
EA Engineering, Science and Technology, Inc.
41 A Lafayette Circle
Lafayette, CA 94549

RE: PACE Project No. 491204.501

Dear Mr. Winsor:

Enclosed is the report of laboratory analyses for samples received 12/04/89.

We have also provided, in Table 1, a summary of sampling, receipt and analysis dates.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Stephen Nackord

Stephen F. Nackord
Director, Sampling and Analytical Services

Douglas E. Oram

Douglas E. Oram, Ph.D.
Project Manager

DEO/1150
enclosure

pace laboratories, inc.

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EA Engineering, Science and Technology, Inc.
PACE Project No. 491204.501
PACE WP Number: LAB 1150
December 28, 1989

Table 1

Lab ID No.	Client ID No.	Date Sampled	Date Analyzed	Date Received	Sampled By	Matrix
799070	C-1	12/04/89	12/11/89	12/04/89	J.DOWDAKIN	WATER
799080	C-3	12/04/89	12/11/89	12/04/89	J.DOWDAKIN	WATER
799090	Rinse Blank	12/04/89	12/11/89	12/04/89	J.DOWDAKIN	WATER
799100	QC Batch #	12/04/89	12/11/89	12/04/89	J.DOWDAKIN	WATER

pace laboratories, inc.

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Asheboro, North Carolina

EA Engineering
41 A Lafayette Circle
Lafayette, CA 94549

December 27, 1989
PACE Project
Number: 491204501

Attn: Mr. Terry Winsor

CHSS91153/EA80201.04

PACE Sample Number:			799070	799080	799090
Date Collected:			12/04/89	12/04/89	12/04/89
Date Received:			12/04/89	12/04/89	12/04/89
Parameter	Units	MDL	C-1	C-3	RINSE BLANK
INORGANIC ANALYSIS					
INDIVIDUAL PARAMETERS					
Iron	mg/L	0.02	35	16	-
Specific Conductance, umhos/cm @ 25oC	umhos/cm	1.0	1500	1000	-
ORGANIC ANALYSIS					
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-	-
Purgeable Fuels, as Gasoline (EPA 8015)	mg/L	0.25	17	ND	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-	-
Benzene	mg/L	0.0005	8.0	ND	ND
Ethylbenzene	mg/L	0.0005	LT 0.10	ND	ND
Toluene	mg/L	0.0005	0.49	ND	ND
Xylenes, total	mg/L	0.0005	0.37	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.
LT Less than.

pace laboratories, inc.

REPORT OF LABORATORY ANALYSIS

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Irvine, California
Asheboro, North Carolina

Mr. Terry Winsor
Page 2

December 27, 1989
PACE Project
Number: 491204501

CHSS91153/EA80201.04

Parameter	Units	MDL	QC Batch #
PACE Sample Number:			799100
Date Collected:			By Client
Date Received:			12/04/89
INORGANIC ANALYSIS			
INDIVIDUAL PARAMETERS			
Iron	mg/L	0.02	N1413/M650
Specific Conductance, umhos/cm @ 25oC	umhos/cm	1.0	I-789
ORGANIC ANALYSIS			
PURGEABLE FUELS AND AROMATICS			
TOTAL FUEL HYDROCARBONS, (LIGHT):			Q2014
Purgeable Fuels, as Gasoline (EPA 8015)	mg/L	0.25	-
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-
Benzene	mg/L	0.0005	-
Ethylbenzene	mg/L	0.0005	-
Toluene	mg/L	0.0005	-
Xylenes, total	mg/L	0.0005	-

MDL Method Detection Limit

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

Stephen F. Nackord
Director, Sampling and Analytical Services

Douglas E. Oram, Ph.D.
Organic Chemistry Manager

Dec 28,89 17:17 P.06

TEL No.

491204·501

Chain-of-Custody Record

Chevron U.S.A. Inc.
P.O. Box 5004
San Ramon, CA 94583
FAX (415) 842-9591

Chevron Facility Number SS 9-1153
Consultant Release Number
Consultant Project Number 80201.04
Consultant Name EA Engineering
Address 41 Lafayette Circle, Lafayette
Fax Number 283-3894
Project Contact (Name) Terry Winsor
(Phone) 283-7077

Chevron Contact (Name) John Randall
(Phone) 842-9625
Laboratory Name PACE
Contract Number
Samples Collected by (Name) J. DOWDAKIN
Collection Date 12/4/89
Signature John Dowdakin

Sample Number	Lab Number	Number of Containers	Matrix S = Soil W = Water A = Air C = Charcoal	Type G = Grab C = Composite	Time	Sample Preservation	Iced	Analyses To Be Performed: Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline	Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline + Diesel	503 Oil and Grease	Arom. Volatiles - BTXE Soil: 8020/Wtr.: 602	Arom. Volatiles - BTXE Soil: 8240/Wtr.: 624	Total Lead DHS-Luft	EDB DHS-AB 1803	Fe	Salinity	Remarks
G-1	79907	3	W	G	11:15	HCl	Y	X			X						VOAs - 5/2
G-1	79907	1				HNO_3									X		Utilities - 1/2
G-1	79907	1				—										X	
G-3	79908	3			10:45	HCl		X			X						
G-3	79908	1				HNO_3									X		
G-3	79908	1				—										X	
RINSE BL	79909	3		BLANK	11:10	HCl		X			X						
* GC Batch#	79910																

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
X Millie Bott	EA	12/4 1:45			
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
	PACE	12/4 2:45		PACE LABS	12/4/89 14:45
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time

Turn Around Time (Circle Choice)
24 Hrs
48 Hrs
5 Days
10 Days

APPENDIX B

Groundwater Purge and Sample Forms
December 1989

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

MONITORING WELL DATA FORM

Project Number 80201.04 Station Number 9-1153

Client Chevron Samplers JD Date 12/4/89

Site Location Fernside | Gibbons, Alameda

MONITORING WELL NUMBER	ELEVATION TOP OF CASING	DEPTH TO WATER	DEPTH TO PRODUCT	ELEVATION TOP OF GROUNDWATER	APPARENT PRODUCT THICKNESS	STICK UP (+) DOWN (-)	DEPTH TO BOTTOM
C-1		4.16					19.20
C-3		4.24					20.40

Date: 12/4/89

GROUNDWATER PURGE AND SAMPLE FORM

PROJECT NAME: Chevron 9-1153 WELL NUMBER: C-1

PROJECT NUMBER: 80201.04 PERSONNEL: JD

STATIC WATER LEVEL: 4.16

WATER LEVEL MEASUREMENT METHOD: GWT Probe

TIME START PURGE: 10:19

TIME END PURGE: 11:00

TIME SAMPLED: 11:15

MEASURING POINT DESCRIPTION: TOC

PURGE METHOD: Honda Pump

PURGE DEPTH: ~18'

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (ft)	−	DEPTH TO WATER (ft)	=	WATER COLUMN (ft)	X	MULTIPLIER FOR CASING DIAMETER (in)			=	CASING VOLUME (gal)
							2	(3)	4	6	
	19.20		4.16		15.04		0.16	0.64	1.44		5

TIME	10.19	10.22	10.25	1052	10:55	11:00	
VOLUME PURGED (gal)	0	4	10	13	15	18	
PURGE RATE (gpm)	1.5 →					→	
TEMPERATURE (°C)	21.0	21.0	20.0	20.5	22.0	21.5	
pH	6.5	6.5	6.4	6.6	6.6	6.6	
SPECIFIC CONDUCTIVITY (uncorrected) (µmhos)	1260	1330	1300	1280	1340	1300	
~~DISSOLVED OXYGEN (mg/l)~~ Salinity: °/oo	~1‰	1‰	1‰	1‰	1‰	1‰	
eH (MV) Pt-AgCl ref.	NOT MEASURED						
TURBIDITY / COLOR	MED BLACK	HIGH BLACK →		LOW GREY	MED GREY →		
ODOR	HC	HC →				→	
DEPTH TO WATER DURING PURGE (ft)	NOT MEASURED						
NUMBER OF CASING VOLUMES REMOVED	0	.8	2	2.6	3	3.6	
DEWATERED?	NO	NO	YES	NO	NO	YES	

Comments: Dewatered Twice

Date: 12

GROUNDWATER PURGE AND SAMPLE FORM

PROJECT NAME: Chevron 9-1153 WELL NUMBER: C-3

PROJECT NUMBER: 180201.04 PERSONNEL: JD

STATIC WATER LEVEL: 4.24

WATER LEVEL MEASUREMENT METHOD: GWT Probe

TIME START PURGE: 9:54

TIME END PURGE: 10:08

TIME SAMPLED: 10:45

MEASURING POINT DESCRIPTION: TOC

PURGE METHOD: Honda Pump

PURGE DEPTH: ~19.5

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (ft)	−	DEPTH TO WATER (ft)	=	WATER COLUMN (ft)	X	MULTIPLIER FOR CASING DIAMETER (in)			=	CASING VOLUME (gal)
							2	3	4	6	
	20.40		4.24		16.16		0.16		0.64	1.44	5.4

TIME	19:54	19:56	1000	10:03	10:08		
VOLUME PURGED (gal)	0	6	10	15	17.5		
PURGE RATE (gpm)	1.5	→	→	→	→		
TEMPERATURE (°C)	16.0	17.0	17.5	17.5	18.5		
pH	6.2	6.3	6.6	6.6	6.6		
SPECIFIC CONDUCTIVITY (uncorrected) (µmhos)	810	880	870	830	860		
~~DISSOLVED OXYGEN~~ SALINITY % (mg/l)	.5‰	.5	.5	.5	.5		
eH (MV) Pt-AgCl ref.	NOT MEASURED						
TURBIDITY / COLOR	HIGH BRN	MED BRN	→	→	→		
ODOR	NONE	→	→	→	→		
DEPTH TO WATER DURING PURGE (ft)	NOT MEASURED						
NUMBER OF CASING VOLUMES REMOVED	0	1.1	1.8	2.7	3.3		
DEWATERED?	NO	→	→	→	→		

Comments: None