Date November 8, 1995
Project 20805-131.02

To:

Ms. Juliet Shin
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harborbay Parkway, Suite 250
Alameda, California 94502-6577

We are enclosing:

Copies	Description
1	Status Letter, Additional Site Characterization,
	ARCO service station 6002, Oakland, California

For your:			Sent by:	
	X	Use		Regular Mail
		Approval		Standard Air
		Review		Courier
		Information	X	Other: Cert. Mail

Comments:

The enclosed status letter detailing additional site characterization activities is being sent to you per the request of ARCO Products Company. Please call if you have questions or comments.

Robert K. Davis

Rob Davis
Staff Geologist

cc: Kevin Graves, RWQCB - SFBR
Michael Whelan, ARCO Products Company
John Young, EMCON
File

ARCO Products Company
Environmental Engineering
2155 South Bascom Avenue, Suite 202
Campbell, California 95008

Date: November 9, 1995

Re: ARCO Station # 6002 • 6235 Seminary Avenue • Oakland, CA
Additional Site Characterization

" I declare, that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached proposal or report are true and correct."

Submitted by:

Michael R. Whelan
Environmental Engineer

EMCON
1921 Ringwood Avenue • San Jose, California 95131-1721 • **(408) 453-7300** • Fax (408) 437-9526

November 8, 1995
Project 20805-131.002

Ms. Juliet Shin
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Re: Additional Site Characterization, ARCO service station 6002, 6235 Seminary Avenue, Oakland, California.

Dear Ms. Shin:

EMCON, on behalf of ARCO Products Company (ARCO), is pleased to submit this letter regarding recent site characterization activities conducted at ARCO station 6002, 6235 Seminary Avenue, Oakland, California. The work performed was consistent with the scope of work proposed in EMCON's workplan dated January 12, 1995.

A total of 8 exploratory borings were drilled at the project site on June 26 and 27, 1995. Four borings (SB-1 through SB-4) were drilled onsite beneath the service station's canopy, to assess the extent of petroleum hydrocarbon-impacted soil in the vicinity of the pump islands (Figure 1). These borings were drilled to depths of 15.5 to 21.5 feet below ground surface (BGS) using limited-access drilling equipment. Three additional borings (AS-1, VW-3, and VW-4) were drilled in the area between the UST complex and the pump islands (Figure 1). Borings VW-3 and VW-4 were drilled to 15 feet BGS and completed as vapor extraction (VE) wells, using 4-inch-diameter polyvinyl chloride (PVC) casing and screen. Boring AS-1 was drilled to 31.5 feet BGS and completed as an air-sparge (AS) well using 2-inch-diameter PVC casing and screen. The AS and VE wells will be used to evaluate the feasibility of vapor extraction and air sparging for remediating petroleum hydrocarbon-impacted soil and groundwater at the site. One boring (MW-6) was drilled east of the site to a depth of 32 feet BGS and was completed as a 2-inch-diameter groundwater monitoring well. Well MW-6 was installed to investigate a potential up-gradient source for the impacted groundwater observed at the site.

what data?

Selected soil samples collected from each of the eight borings and groundwater samples collected from wells MW-6, and AS-1 were submitted to a state-certified laboratory and analyzed for total petroleum hydrocarbons as gasoline (TPHG), and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Certified Analytical Reports and exploratory

boring logs are attached. Groundwater analytical results for wells MW-6 and AS-1 and second quarter 1995 analytical results from the existing on-site wells are presented on Figure 2.

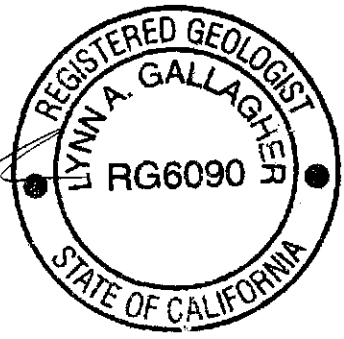
EMCON is currently pursuing encroachment permission with property owners southwest and southeast of the site, along Seminary and Sunnymere Avenues, in order to proceed with the installation of groundwater monitoring wells or temporary monitoring points downgradient of the site. Upon receiving encroachment permission, EMCON will proceed with the installation and sampling of the wells or monitoring points, and prepare a letter report summarizing the findings of the additional on- and off-site characterization work.

Sincerely,

EMCON

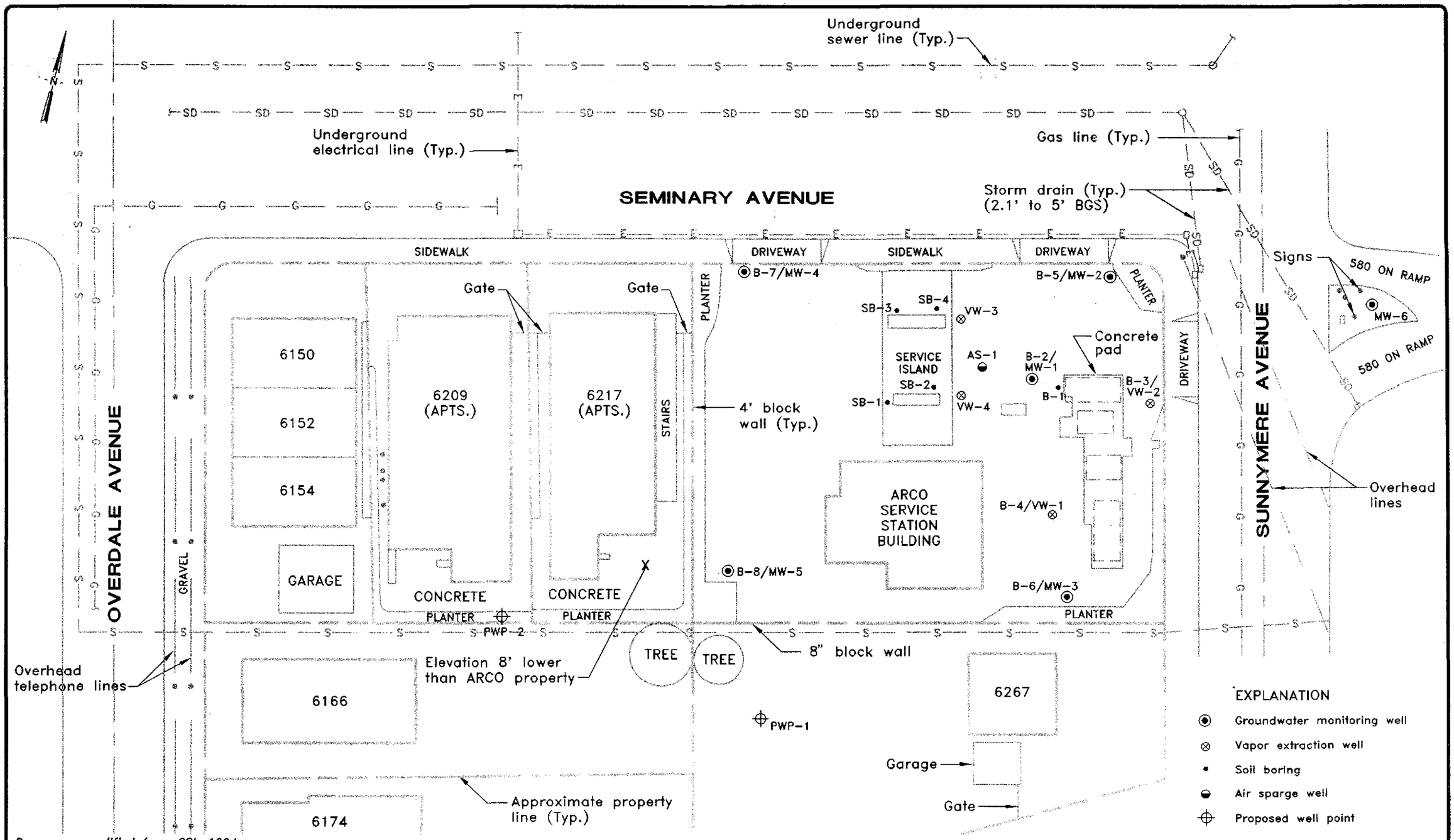
Rob Davis
Staff Geologist

Lynn Gallagher R.G. 6090
Project Geologist



Attachments: Figure 1 - Site Plan
Figure 2 - Groundwater Data
Certified Analytical Reports
Exploratory Boring Logs

cc: Mike Whelan, ARCO
John Young, EMCON



Base map modified from GSI, 1994.

EMCON

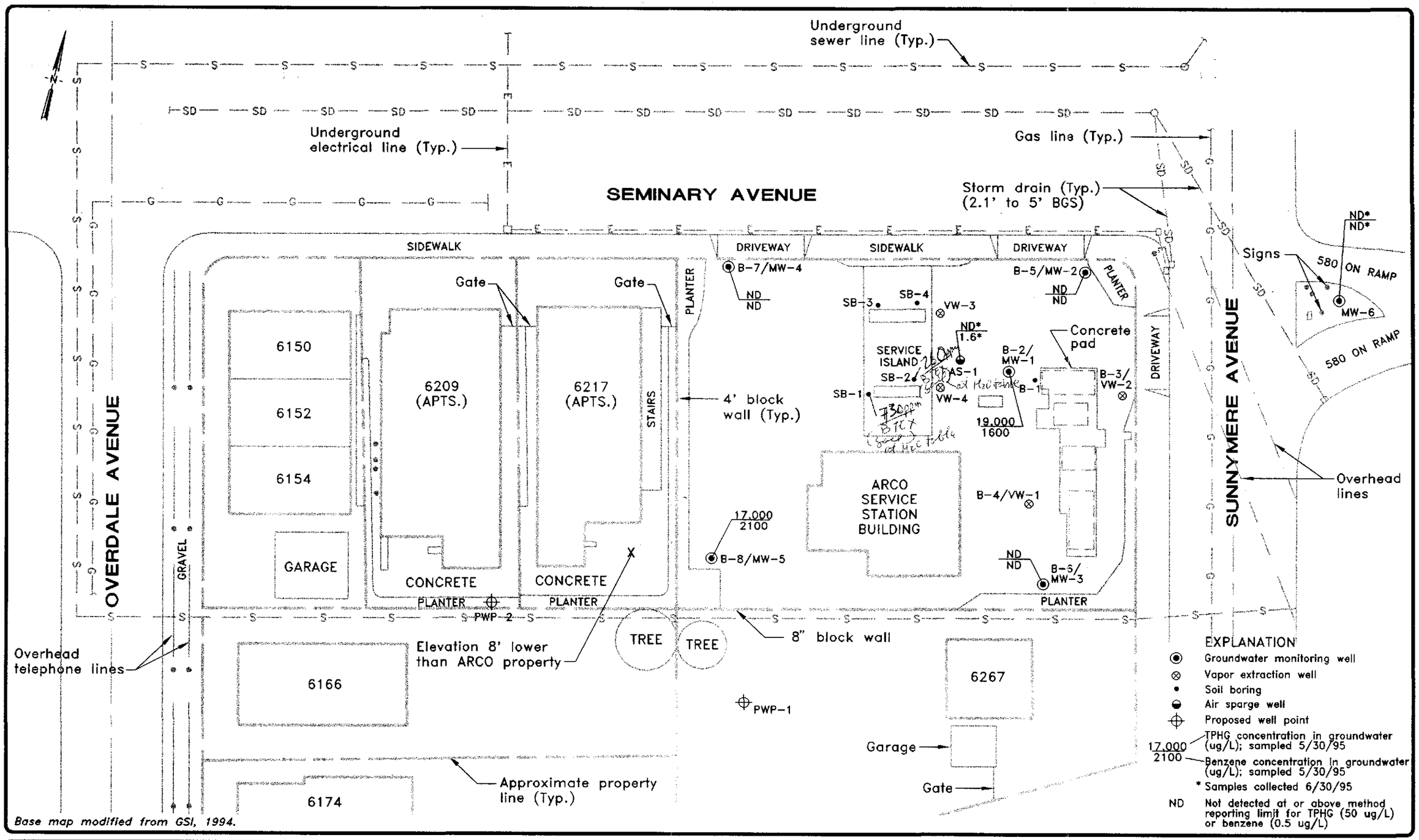
SCALE: 0 30 60 FEET

ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA

SITE PLAN

FIGURE NO.
1
PROJECT NO.
805-131.02

G:\805-131\SITEPLAN REV 0 08/31/95 12:49:24 KAJ DJ



Base map modified from GSI, 1994.

emcon

SCALE: 0 30 60 FEET

ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA

GROUNDWATER ANALYTICAL DATA

FIGURE NO.
2
PROJECT NO.
805-131.02

G:\805-131\GWCHEM REV 0 08/31/95 12:49:24 KAJ DJ

Columbia Analytical Services inc.

July 11, 1995

Service Request No. S950839

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **ARCO Facility No. 6002 / EMCON Project No. 0805-131.03**

Dear Mr. Young:

Attached are the results of the water sample(s) submitted to our lab on June 30, 1995. For your reference, these analyses have been assigned our service request number S950839.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	S950839
Project:	ARCO Facility No. 6002/EMCON Project No.0805-131.03	**Date Collected:**	6/30/95
Sample Matrix:	Water	**Date Received:**	6/30/95
		Date Extracted:	NA
		Date Analyzed:	7/10-11/95

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name / **Lab Code**					
MW-6 (31) / S950839-001	ND	ND	ND	ND	ND
AS-1 (22) / S950839-002	ND	1.6	ND	0.9	0.9
Method Blank / S950710-WB2	ND	ND	ND	ND	ND
Method Blank / S950711-WB1	ND	ND	ND	ND	ND

Approved By: _____ Date: 7/11/95

5ABTXGAS/061694

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	S950839
Project:	ARCO Facility No. 6002/EMCON Project No.0805-131.03	**Date Collected:**	6/30/95
Sample Matrix:	Water	**Date Received:**	6/30/95
		Date Extracted:	NA
		Date Analyzed:	7/10-11/95

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
Units: ug/L (ppb)

Sample Name: Batch QC
Lab Code: S950833-001

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Benzene	25	25	21.2	47.1	46.5	104	101	75-135	1
Toluene	25	25	ND	23.9	23.7	96	95	73-136	1
Ethylbenzene	25	25	ND	24.4	24.2	98	97	69-142	1

Approved By: _____ Date: 7/14/95

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	S950839
Project:	ARCO Facility No. 6002/EMCON Project No.0805-131.03	**Date Collected:**	6/30/95
Sample Matrix:	Water	**Date Received:**	6/30/95
		Date Extracted:	NA
		Date Analyzed:	7/10-11/95

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
MW-6 (31)	S950839-001	88
AS-1 (22)	S950839-002	94
(MS)	S950833-001MS	92
(DMS)	S950833-001DMS	92
Method Blank	S950710-WB2	93
Method Blank	S950711-WB1	89

CAS Acceptance Limits: 69-116

Approved By: Steve Vineer Date: 7/14/95

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	S950839
Project:	ARCO Facility No. 6002/EMCON Project No.0805-131.03	**Date Analyzed:**	7/10/95

Initial Calibration Verification (ICV) Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	26.1	104	85-115
Toluene	25	24.9	100	85-115
Ethylbenzene	25	25.1	100	85-115
Xylenes, Total	75	72.1	96	85-115
Gasoline	250	231	92	90-110

Approved By: _____ Date: 7/11/95

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 17075.00

Chain of Custody

ARCO Facility no. 6002	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 453-0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131		Contract number

Method of shipment: Sampler Will Deliver

	Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA 8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM5030E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
1	MW-6 (31)		2		X		X	HCL	6-30	10:59		X									
2	AS-1 (22)		2		X		X	HCL	6-30	11:48		X									
	~~[illegible]~~		~~2~~		~~X~~		~~X~~	~~HCL~~				~~X~~									

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2 - 40ml HCL VOAs

#0905-131.03

Lab number: 5950839

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Changed 7/5 per John Young

Condition of sample:		Temperature received:	
Relinquished by sampler: Chris Claw	Date 6-30-95 Time 13:20	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory: Joanne Brown	Date 6/30/95 Time 1320

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

APC-3292 (2-91)

Due 7/17

FILE COPY

Columbia Analytical Services inc.

July 6, 1995

Service Request No. S950811

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **ARCO Facility No. 6002 / EMCON Project No. 0805-131.04**

Dear Mr. Young:

Attached are the results of the soil sample(s) submitted to our lab on June 28, 1995. For your reference, these analyses have been assigned our service request number S950811.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	S950811
Project:	ARCO Facilty No. 6002/EMCON Project No.0805-131.04	**Date Collected:**	6/27/95
Sample Matrix:	Soil	**Date Received:**	6/28/95
		Date Extracted:	NA
		Date Analyzed:	6/30 - 7/3/95

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
As Received Basis

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)
Method Reporting Limit:	1	0.005	0.005	0.005	0.005
Sample Name	**Lab Code**				
SB-3, 6'	S950811-001	ND	ND	ND	ND	ND
SB-3, 11'	S950811-002	ND	ND	ND	ND	ND
SB-3, 21'	S950811-004	ND	ND	ND	ND	ND
SB-4, 6'	S950811-005	ND	ND	ND	ND	ND
SB-4, 21.5'	S950811-008	ND	ND	ND	ND	ND
SB-2, 5'	S950811-009	2	0.066	0.028	0.018	0.14
SB-2, 15.5'	S950811-013	ND	ND	ND	ND	ND
SB-1, 5'	S950811-014	ND	0.007	ND	0.028	0.047
SB-1, 9'	S950811-015	2	0.008	ND	0.034	0.14
SB-1, 12.5'	S950811-017	ND	ND	ND	ND	ND
Method Blank	S950630-SB1	ND	ND	ND	ND	ND
Method Blank	S950703-SB1	ND	ND	ND	ND	ND

Approved By: _____ Date: 7/6/95

5ABTXGAS/061694

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	S950811
Project:	ARCO Facilty No. 6002/EMCON Project No.0805-131.04	**Date Collected:**	6/27/95
Sample Matrix:	Soil	**Date Received:**	6/28/95
		Date Extracted:	NA
		Date Analyzed:	6/30 - 7/5/95

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
As Received Basis

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)
Method Reporting Limit:*	5	0.05	0.1	0.1	0.1
Sample Name	**Lab Code**				
SB-4, 11'	S950811-006	10	ND	ND	ND	ND
SB-2, 9.5'	S950811-010	260	<0.5**	2.6	4.3	18
SB-1, 11'	S950811-016	730	<0.5**	4.4	10	49
Method Blank	S950630-SB2	ND	ND	ND	ND	ND
Method Blank	S950630-SB2	ND	ND	ND	ND	ND
Method Blank	S950630-SB2	ND	ND	ND	ND	ND

* Raised MRL due to high analyte concentration requiring methanol extraction of sample.
** Raised MRL due to high analyte concentration requiring methanol extraction and dilution of sample.

Approved By: _____ Date: 7/6/95

5ABTXGAS/061694

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON
Project: ARCO Facilty No. 6002/EMCON Project No.0805-131.04
Sample Matrix: Soil

Service Request: S950811
Date Collected: 6/27/95
Date Received: 6/28/95
Date Extracted: NA
Date Analyzed: 6/30 - 7/3/95

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
SB-3, 6'	S950811-001	92
SB-3, 11'	S950811-002	96
SB-3, 21'	S950811-004	90
SB-4, 6'	S950811-005	97
SB-4, 21.5'	S950811-008	90
SB-2, 5'	S950811-009	79
SB-2, 15.5'	S950811-013	81
SB-1, 5'	S950811-014	95
SB-1, 9'	S950811-015	115
SB-1, 12.5'	S950811-017	95
SB-3, 6' (MS)	S950811-001MS	92
SB-3, 6' (DMS)	S950811-001DMS	85
Method Blank	S950630-SB1	80
Method Blank	S950703-SB1	104

CAS Acceptance Limits: 51-137

Approved By: _____ Date: 7/6/95

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON
Project: ARCO Facilty No. 6002/EMCON Project No.0805-131.04
Sample Matrix: Soil

Service Request: S950811
Date Collected: 6/27/95
Date Received: 6/28/95
Date Extracted: NA
Date Analyzed: 6/30 - 7/5/95

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
SB-4, 11'	S950811-006	92
SB-2, 9.5'	S950811-010	96
SB-1, 11'	S950811-016	99
Method Blank	S950630-SB2	88
Method Blank	S950630-SB2	93
Method Blank	S950630-SB2	95

CAS Acceptance Limits: 59-115

Approved By: _____ Date: 7/6/95

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON
Project: ARCO Facilty No. 6002/EMCON Project No.0805-131.04

Service Request: S950811
Date Analyzed: 6/30/95

Initial Calibration Verification (ICV) Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ppm

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	0.050	0.054	108	85-115
Toluene	0.050	0.052	104	85-115
Ethylbenzene	0.050	0.053	106	85-115
Xylenes, Total	0.15	0.147	98	85-115
Gasoline	1.0	0.96	96	90-110

Approved By: _____ Date: 7/6/95

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	S950811
Project:	ARCO Facilty No. 6002/EMCON Project No.0805-131.04	**Date Collected:**	6/27/95
Sample Matrix:	Soil	**Date Received:**	6/28/95
		Date Extracted:	NA
		Date Analyzed:	6/30/95

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
Units: mg/Kg (ppm)
As Received Basis

Sample Name: SB-3, 6'
Lab Code: S950811-001

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Benzene	0.05	0.05	ND	0.0527	0.0556	105	111	57-154	5
Toluene	0.05	0.05	ND	0.0468	0.0511	94	102	60-142	9
Ethylbenzene	0.05	0.05	ND	0.0492	0.0528	98	106	46-150	7

Approved By: _____ Date: 7/6/95

DMS1S/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 18114.00

Chain of C...

ARCO Facility no. 6002	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name CAS - SJ
ARCO engineer Mike Whelan	Telephone no. (ARCO) (408) 377-8697	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 437-9526
Consultant name EMCON	Address (Consultant) 1921 Ringwood Ave. San Jose, CA		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	HOLD
SB-3, 6'	1		X			X		6/27/95			X										
SB-3, 11'	2										X										
SB-3, 16'	3																				/
SB-3, 21'	4										X										
SB-4, 6'	5										X										
SB-4, 11'	6										X										
SB-4, 16.5'	7																				/
SB-4, 21.5'	8										X										
SB-2, 5'	9										X										
SB-2, 9.5'	10										X										
~~SB-2, 11'~~	~~11~~																				Hold Header
SB-2, 13'	12																				
SB-2, 15.5'	13										X										
SB-1, 5'	14										X										
SB-1, 9'	15										X										
SB-1, 11'	16										X										
SB-1, 12.5'	17		↓			↓		↓			X										

Special detection Limit/reporting

Special QA/QC

Remarks: EMCON Project # 0805-131.04

Lab number: S950811

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☒
- Standard 10 Business Days ☐

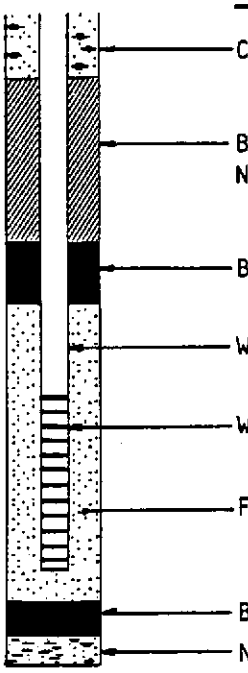
Condition of sample: ok		Temperature received: Cool	
Relinquished by sampler: Robert W. Davis	Date: 6/28/95 Time: 16:15	Received by: —	
Relinquished by: —	Date: Time:	Received by:	
Relinquished by: —	Date: Time:	Received by laboratory: Janet Brown	Date: 6-28-95 Time: 1635

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

Due 7/6

EXPLANATION OF SYMBOLS ON EXPLORATORY BORING LOGS

Well Details Column



Sample Column

BAG/BULK SAMPLES

FIVE-FOOT SPLIT BARREL SAMPLER (CONTINUOUS SAMPLER)

MODIFIED CALIFORNIA SPLIT SPOON

OTHER SAMPLERS (SEE REMARKS FOR TYPE AND SIZE)

PITCHER BARREL

ROCK CORE (SEE REMARKS FOR TYPE AND SIZE)

SHELBY TUBE SAMPLER

STANDARD PENETRATION TEST SPLIT SPOON SAMPLER (2" OD)

(OVER)

EXPLANATION OF SYMBOLS ON
EXPLORATORY BORING LOGS
(CONTINUED)

Ground-Water Level Column

DEPTH TO FIRST OBSERVED GROUND WATER

DEPTH TO STABILIZED GROUND WATER

Miscellaneous

2.5 YR 6/2 — Color as field checked to Munsell Soil Color Chart (1975 Edition)

PENETRATION — Blows required to drive sampler 1 foot into soil.
Standard drive hammer weight: 140 pounds.
Standard drop: 30 inches

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**

BORING NO.: **AS-1**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: **1 of 2**

BY: **R. Davis**

DATE: **6/26/95**

SURFACE ELEVATION: **ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							ASPHALT FILL.	
100%	26	2 4 5		5			CLAYEY SAND (SC), dark grayish brown (2.5Y, 3/3); 50% medium plasticity fines; 20-30% fine to coarse sand; 20-30% fine to coarse gravel, to 2.5 "; damp; product odor.	
60%	156	4 7 7		10			CLAYEY SAND (SC), olive brown (2.5Y, 4/4); 40% medium plasticity fines; 30% fine to coarse sand; 20% fine to coarse gravel, up to 1.5"; medium dense; moist; product odor.	
100%	0	4 6 9	▽	15			SANDY CLAY (CL), dark yellowish brown (10YR, 4/4); 55-60% medium plasticity fines; 30-35% fine to coarse sand; 10% fine gravel; stiff; damp to moist; product odor.	
				20			CLAYEY SAND (SC), 20-30% medium plasticity fines; 70-80% fine to coarse sand; wet; no product odor.	

REMARKS

Boring drilled with 8" diameter hollow-stem augers. Samples were taken using a 2" diameter modified-California split spoon sampler. Boring converted into a 2" diameter polyvinyl chloride (PVC) air-sparge well. See explanation sheet for definition of symbols used in well detail and sample columns of this log. See explanation sheet for definition of symbols on this log.

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**

BORING NO.: **AS-1**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: **2** of **2**

BY: **R. Davis**

DATE: **8/26/85**

SURFACE ELEVATION: **ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
25%	0	2 2 8	▽				CLAYEY SAND (SC), continued.	
100%	0	7 7 7		25			SILTY CLAY (CL), dark olive gray (5Y, 3/2); 75-80% low plasticity fines; 20-25% fine to medium sand; stiff; moist; no product odor.	
100%		2 7 8					@28-28.5': 55-60% low plasticity fines; 40-45% fine to coarse sand; trace fine gravel; damp; no product odor.	
90%		6 14 25		30			CLAYEY SAND (SC), dark olive gray (5y, 3/2); 20-30% low to medium plasticity fines; 70-80% fine to coarse sand; medium dense; moist; no product odor. @30-31.5': dark brown (7.5YR, 4/4); 30% low to medium plasticity fines; 50% fine to coarse sand; 20% fine gravel; damp; no product odor. BORING TERMINATED AT 31.5 FEET BGS.	
				35				
				40				

EMCON ASSOCIATES

REMARKS

Boring drilled with 8" diameter hollow-stem augers. Samples were taken using a 2" diameter modified-California split spoon sampler. Boring converted into a 2" diameter polyvinyl chloride (PVC) air-sparge well. See explanation sheet for definition of symbols used in well detail and sample columns of this log. See explanation sheet for definition of symbols on this log.

LOG OF EXPLORATORY BORING

MW-6

PROJECT NUMBER: **805-131.04**

BORING NO.: **MW-6**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: **1 of 2**

BY: **R. Davis**

DATE: **6/26/95**

SURFACE ELEVATION: **NA ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							CONCRETE	
100%	0	6 14 16		5			FILL - CLAYEY GRAVEL (GC), brown, 20-30% low to medium plasticity fines; 30-40% fine to coarse sand; 40% fine to coarse gravel; damp; no product odor.	
60%	0	3 13 14		10			CLAYEY SAND (SC), dark grayish brown (10YR, 4/2); 40% medium plasticity fines; 40% fine to coarse sand; 20% fine to coarse gravel, up to 1"; medium dense; moist ot wet; no product odor.	
100%	0	4 8 10		15			SANDY CLAY (CL), mottled gray (2.5Y, 5/0) and light olive brown (2.5Y, 5/6); 70% low to medium plasticity fines; 20% fine to coarse sand; 10% fine gravel, subangular; thin (<1mm) organic fragments present; very stiff; damp; no product odor.	
	0	4 7		20			@19.0-20.5': as above at 14.0-15.5'.	

EMCON ASSOCIATES

REMARKS

Boring drilled with 8" diameter hollow-stem augers. Samples were taken using a 2" diameter modified-California split spoon sampler. Boring converted into a 2" diameter polyvinyl chloride (PVC) groundwater monitoring well. See explanation sheet for definition of symbols used in well detail and sample columns of this log. See explanation sheet for definition of symbols on this log.

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**

BORING NO.: **MW-6**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: **2** of **2**

BY: **R. Davis**

DATE: **6/26/95**

SURFACE ELEVATION: **NA ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
		9	▽				SANDY CLAY (CL), continued. @20.5': moist to wet.	
100%	0	9 11 17		25			CLAYEY SAND (SC), strong brown (7.5YR, 4/6); 40-45% low plasticity fines; 50-55% fine to medium sand; 5% fine to coarse gravel, up to 1-in; medium dense; moist to wet; no odor.	
80%	0	7 14 16					@25.5-27': 20% low plasticity fines; 60% fine to coarse sand; 20% fine to coarse gravel, up to 2"; very moist; no odor.	
80%	0	12 14 18					@27.5-28.5': dark brown (10YR, 4/3); moist to wet.	
85%	0	6 16 13		30			@30-31.5': 25-30% low to medium plasticity fines; 65-70% fine to medium sand; 5% fine gravel; wet; no product odor.	
							BORING TERMINATED AT 32.0 FEET BGS.	
				35				
				40				

EMCON ASSOCIATES

REMARKS

Boring drilled with 8" diameter hollow-stem augers. Samples were taken using a 2" diameter modified-California split spoon sampler. Boring converted into a 2" diameter polyvinyl chloride (PVC) groundwater monitoring well. See explanation sheet for definition of symbols used in well detail and sample columns of this log. See explanation sheet for definition of symbols on this log.

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**

BORING NO.: **SB-1**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: 1 of 1

BY: **R. Davis**

DATE: **6/27/85**

SURFACE ELEVATION: **ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							CONCRETE	
							FILL: GRAVELLY CLAYEY SAND (SC).	
95%	6.4	4 5		5			CLAYEY SAND (SC), dark brown (10YR, 3/3); 40% medium plasticity fines; 45% fine to coarse sand (f:m:c=1:1:2); 15% fine to coarse gravel; medium dense; damp; no product odor.	
	2.1	5					@5.8-6.5': very dark grayish brown (2.5Y, 3/2); moist; product odor.	
40%		5					@8-9.5': as above at 5.8'-6.5' with ~30% coarse gravel, up to 2-in.	
	29.1	11 9						
90%		9		10			@10-11.5': dark grayish brown (2.5Y, 4/2); 40 low to medium plasticity fines; 40% fine to coarse sand (f:m:c=2:2:1); 20% fine to coarse gravel; dense; wet; product odor.	
	608	21 18					Sample contained 730ppm TPH-g & BTEX	
80%	36	12					@11.5-12.5': damp; no product odor.	
		11 15						
90%				15			SANDY CLAY (CL), dark yellowish brown (10YR, 4/4); 55-60% low to medium plasticity fines; 35-40% fine to coarse sand; 5% fine to coarse gravel; damp; no product odor.	
	0						BORING TERMINATED AT 16.5 FEET BELOW GROUND SURFACE.	
				20				

EMCON ASSOCIATES

REMARKS

Boring drilled with 6-inch-diameter solid-stem augers. Boring sampled using 2-inch-diameter modified California split spoon samplers. See explanation sheet for definition of symbols on this log.

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**　　BORING NO.: **SB-2**

PROJECT NAME: **ARCO Service Station 6002**　　PAGE: **1 of 1**

BY: **R. Davis**　　DATE: **6/27/95**　　SURFACE ELEVATION: **ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							CONCRETE	
							FILL: GRAVELLY CLAYEY SAND (SC), 30% fines (clay); 40% fine to coarse sand; 30% fine to coarse gravel, up to 3-in.	
70%	8.1	5 8 9		5			CLAYEY SAND (SC), dark brown (10YR, 3/3); 25-30% medium plasticity fines; 55-60% fine to coarse sand (f:m:c=1:1:1); 10-15% fine to coarse gravel, up to 2-in.; medium dense; damp; product odor.	
70%	6.9	7 8 7					@8-9.5': moist to wet; product odor. } Sample contained TPHg & 7.60ppm BTEX	
40%	0	10 10 10		10			@10-11.5': 20% medium plasticity fines; 60% fine to coarse sand (f:m:c=1:1:1); 20% fine to coarse gravel; medium dense; no product odor.	
80%	0	7 8 9					SANDY CLAY (CL), mottled grayish brown (10YR, 5/2) and dark yellowish brown (10YR, 4/4); 55-60% medium plasticity fines; 35-40% fine to coarse sand, poorly graded; 5% fine gravel; moist; no product odor.	
90%	0	6 9 11		15				
							BORING TERMINATED AT 15.5 FEET BELOW GROUND SURFACE.	
				20				

REMARKS

Boring drilled with 6-inch-diameter solid-stem augers. Boring sampled using 2-inch-diameter modified California split spoon samplers. See explanation sheet for definition of symbols on this log.

EMCON
ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**

BORING NO.: **SB-3**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: **1** of **2**

BY: **R. Davis**

DATE: **6/27/95**

SURFACE ELEVATION: **ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							CONCRETE	
							FILL: GRAVELLY CLAYEY SAND (SC), 30% fines (clay); 40% fine to coarse sand; 30% fine to coarse gravel, up to 3-in.	
70%	0	5 6 7		5			CLAYEY SAND (SC), dark brown (10YR, 3/3); 25-30% low to medium plasticity fines; 40% fine to coarse sand, poorly graded; 30-35% fine to coarse gravel, subangular; medium dense; damp; no product odor.	
90%	0	2 3 3		10			@10-11.5': dark olive gray (5Y, 3/2); 15-20% low to medium plasticity fines; 45-50% fine to coarse sand; well sorted; 35% fine to coarse gravel, subangular; loose; wet; product odor.	
60%	0	12 18 27		15			@15-15.3': Sandy Clay (SC), same as SB-2 at 12-13.5'. SANDY CLAY (CL), mottled grayish brown (10YR, 5/2) and dark yellowish brown (10YR, 4/4); 55-60% medium plasticity fines; 35-40% fine to coarse sand, poorly graded; 5% fine gravel; moist; no product odor. CLAYEY GRAVEL (GC), yellowish brown (10YR, 5/4); 15% medium plasticity fines; 35% fine to coarse sand, poorly graded; 50% fine to coarse gravel, up to 2.5-in.; dense; wet; no product odor.	
				20				

EMCON ASSOCIATES

REMARKS

Boring drilled with 6-inch-diameter solid-stem augers. Boring sampled using 2-inch-diameter modified California split spoon samplers. See explanation sheet for definition of symbols on this log. See explanation sheet for definition of symbols on this log.

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**

BORING NO.: **SB-3**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: **2** of **2**

BY: **R. Davis**

DATE: **6/27/85**

SURFACE ELEVATION: **ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
100%	0	12 15 19		25 30 35 40			SANDY CLAY (CL), dark reddish brown (5YR, 3/4); 60% medium plasticity fines; 25% fine to coarse sand; 15% fine to coarse gravel, up to 1-in.; hard; damp; no product odor. BORING TERMINATED AT 21.5 FEET BELOW GROUND SURFACE.	

REMARKS

Boring drilled with 6-inch-diameter solid-stem augers. Boring sampled using 2-inch-diameter modified California split spoon samplers. See explanation sheet for definition of symbols on this log. See explanation sheet for definition of symbols on this log.

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**

BORING NO.: **SB-4**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: **1 of 2**

BY: **R. Davis**

DATE: **6/27/95**

SURFACE ELEVATION: **ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							CONCRETE	
							FILL: GRAVELLY CLAYEY SAND (SC), 30% fines (clay); 40% fine to coarse sand; 30% fine to coarse gravel, up to 3-in.	
100%	0	6 7 9		5			CLAYEY SAND (SC), dark brown (10YR, 3/3); 20-25% low to medium plasticity fines; 40-45% fine to coarse sand, poorly graded; 35% fine to coarse gravel, subangular, moderately weathered; medium dense; damp; no product odor.	
60%	0	5 8 9	▽	10			@10-11.5': dark olive gray (5Y, 3/2); 15-20% low to medium plasticity fines; 45-50% fine to coarse sand; well sorted; 35% coarse gravel, subangular, up to 2-in; loose; wet; faint product odor.	
70%	0	13 8 10		15			CLAYEY GRAVEL (GC), yellowish brown (10YR, 5/4); 10-20% low to medium plasticity fines; 20% fine to coarse sand; 60-70% fine to coarse gravel, up to 2.5-in.; medium dense; wet; no product odor. SANDY CLAY (CL), yellowish brown (10YR, 5/4); 55% medium plasticity fines; 35% fine to coarse sand; 10% fine gravel; firm; moist; no product odor.	
				20				

REMARKS

Boring drilled with 8-inch-diameter solid-stem augers. Boring sampled using 2-inch-diameter modified California split spoon samplers. See explanation sheet for definition of symbols on this log.

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**

BORING NO.: **SB-4**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: **2** of **2**

BY: **R. Davis**

DATE: **6/27/95**

SURFACE ELEVATION: **ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
90%	0	11 18 21		25 30 35 40			@20.0-21.5': dark reddish brown (5YR, 3/4);60% medium plasticity fines; 25% fine to coarse sand; 15% fine to coarse gravel, up to 1-in.;hard; damp; no product odor. BORING TERMINATED AT 21.5 FEET BELOW GROUND SURFACE.	

REMARKS

Boring drilled with 6-inch-diameter solid-stem augers. Boring sampled using 2-inch-diameter modified California split spoon samplers. See explanation sheet for definition of symbols on this log.

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**

BORING NO.: **VW-3**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: **1 of 1**

BY: **R. Davis**

DATE: **6/26/95**

SURFACE ELEVATION: **ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							ASPHALT FILL.	
100%	0.5	2 3 5		5			SANDY CLAY (CL) TO CLAYEY SAND (SC), very dark grayish brown (2.5Y, 3/2); 50% medium plasticity fines; 20-30% fine to coarse sand; 20-30% fine to coarse gravel, up to 2-in; damp; product odor at 5'.	
100%	665	2 3 5	▽	10			@9-10.2': CLAYEY SAND (SC),very dark grayish brown (2.5Y, 3/2); 35-40% medium plasticity fines; 35% fine to coarse sand; 25-30% fine to coarse gravel; loose; wet; product odor. @10.2-10.5': dark brown (10YR, 4/3).	
100%	0	8 13 7		15			CLAYEY GRAVEL (GC), brown (2.5Y, 5/4); 20% medium plasticity fines; 30% fine to coarse sand, subangular; 50% fine to coarse gravel, subangular; medium dense; no product odor. CLAY (CL), mottled brown (7.5YR, 5/2) & (7.5YR, 5/4); 80-85% medium plasticity fines; 15-20% fine to medium sand; very stiff; damp; no product odor. BORING TERMINATED AT 15.0 FEET BELOW GROUND SURFACE.	
				20				

EMCON ASSOCIATES

REMARKS

Boring drilled with 10" diameter hollow-stem augers. Samples were taken using a 2" diameter modified-California split spoon sampler. Boring converted into a 4" diameter polyvinyl chloride (PVC) vapor extraction well. See explanation sheet for definition of symbols used in well detail and sample columns of this log.

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **805-131.04**

BORING NO.: **VW-4**

PROJECT NAME: **ARCO Service Station 6002**

PAGE: **1 of 1**

BY: **R. Davis**

DATE: **8/28/95**

SURFACE ELEVATION: **ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							ASPHALT	
							FILL - SANDY CLAYEY GRAVEL.	
100%	95	1 3 5		5			CLAYEY SAND (SC), very dark grayish brown (2.5Y, 3/2); 30-40% medium plasticity fines; 50-60% fine to coarse sand; 10% fine gravel; loose; damp; product odor.	
100%	698	3 3 4	▽	10			@8-9.5': 30% fines; 50% fine to coarse sand; 20% fine to coarse gravel; moist; product odor.	
25%	0	4 8 9					SANDY CLAY (CL), brown (10YR, 4/3) with grayish brown and black mottling; 70-75% medium plasticity fines; 20-25% fine to coarse sand; 5% fine to coarse gravel; stiff to very stiff; moist; no product odor.	
100%	0	3 5 6		15			@15-15.5': 45-50% low to medium plasticity fines.	
				20			BORING TERMINATED AT 15.5 FEET BELOW GROUND SURFACE.	

EMCON ASSOCIATES

REMARKS

Boring drilled with 10" diameter hollow-stem augers. Samples were taken using a 2" diameter modified-California split spoon sampler. Boring converted into a 4" diameter polyvinyl chloride (PVC) vapor extraction well. See explanation sheet for definition of symbols used in well detail and sample columns of this log.