GROUND WATER CONTAMINATION

Safety & Environmental Solutions, Inc.

ARCO PERMIAN
South Justis Unit F-230

Work Plan
Investigation of Possible Groundwater Impact
Lea County, New Mexico

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240

TABLE OF CONTENTS

Purpose

The purpose of this Work Plan is to propose a scope of work to systematically confirm or deny possible groundwater contamination at the South Justis Unit F-230 in Unit C of Section 25 Township 25S Range 37E in Lea County, New Mexico. This plan will also make provisions for the accurate determination of the size and location of any plume of contamination found in the groundwater. The source of the possible contamination is an old pit site on location.

Background

In October of 1997, Arco Permian secured the services of Safety and Environmental Solutions, Inc. to determine the vertical and horizontal extent of the abandoned pit site on the specified location. The surface area of the pit is 111' X 90' or 9990 square feet. The depth of the pit is currently approximately 8'. A bore hole was drilled in the center of the pit area to a depth of 55'and split-spoon soil samples taken every 5'. Total Petroleum Hydrocarbon (TPH) field tests were run on-site with the following results:

Sample Depth	Results
5'	Strong Smell
10'	Strong Smell
15'	Strong Smell
20'	10,027 ppm
27'	17,333 ppm
30'	13,333 ppm
35'	9,600 ppm
40'	10,933 ppm
45'	10,667 ppm
50'	Saturated Soil Sample
57'	Oil/Water Emulsion

Knowledge of process indicates that the material in the pit is exempt oil field waste.

Method

Arco Permian proposes to install three (3) monitor wells around the pit area. These wells will be used to determined the gradient of the water table under the pit area. In addition these wells will provide initial indications of the extent of any groundwater contamination. One well will be installed up gradient of the pit and the other wells will be installed down gradient south and southeast of the pit.(See Diagram) After the installation of the initial wells, a drilling program will be initiated in the area indicated by the gradient of the water table to determine the extent of the contamination. After delineation of the contamination is complete, Arco Permian will submit another work plan which will address the appropriate methods and scope of work for the remediation of any groundwater contamination as well as vadose zone remediation.

The physical description of the monitor well installations is as follows:

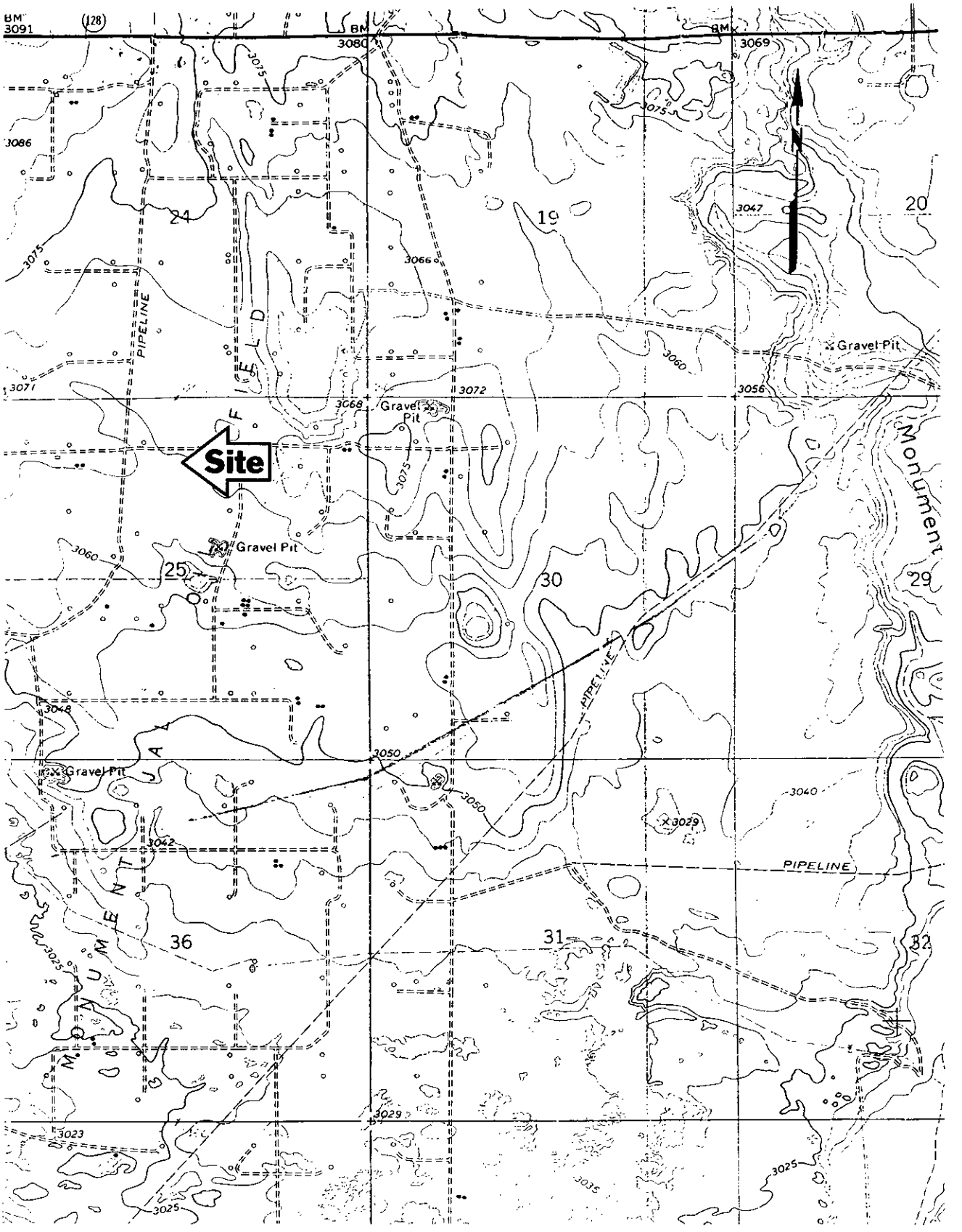
> Each well will be drilled to a depth of ten (10) feet below the water table. Split spoon samples will collected at five (10') foot intervals and analyzed for TPH, and BTEX. A driller's log noting sample points and changes in lithology will be kept. The wells will cased with 2" PVC pipe with a minimum of fifteen (15) feet of well screen on the bottom. (Five (5) feet above the water table and ten (10) feet below the water table) Screen will gravel packed to a point 2-3 feet above the screen, with a bentonite plug set above the gravel pack. The remainder of the casing annulus to surface will grouted with cement containing 5% bentonite. Each well will be equipped with a locking well cap. (See monitor well diagram)

Monitoring Parameters

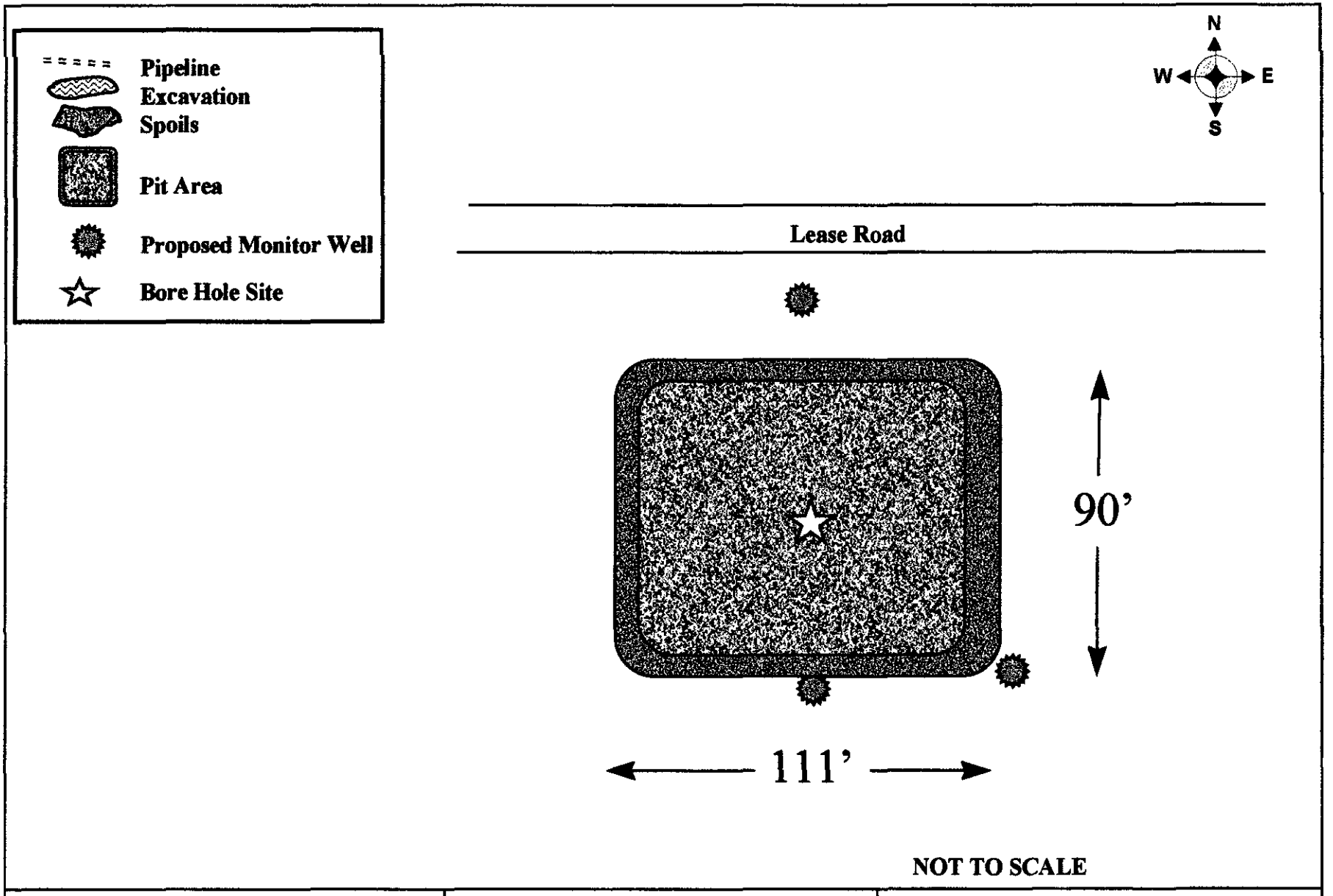
The monitor wells will initially be sampled and analyzed for TPH, BTEX, Chlorides, major Cations and Anions, and Total Dissolved Solids with results filed with the OCD Santa Fe and Hobbs District offices.

Maps and Figures

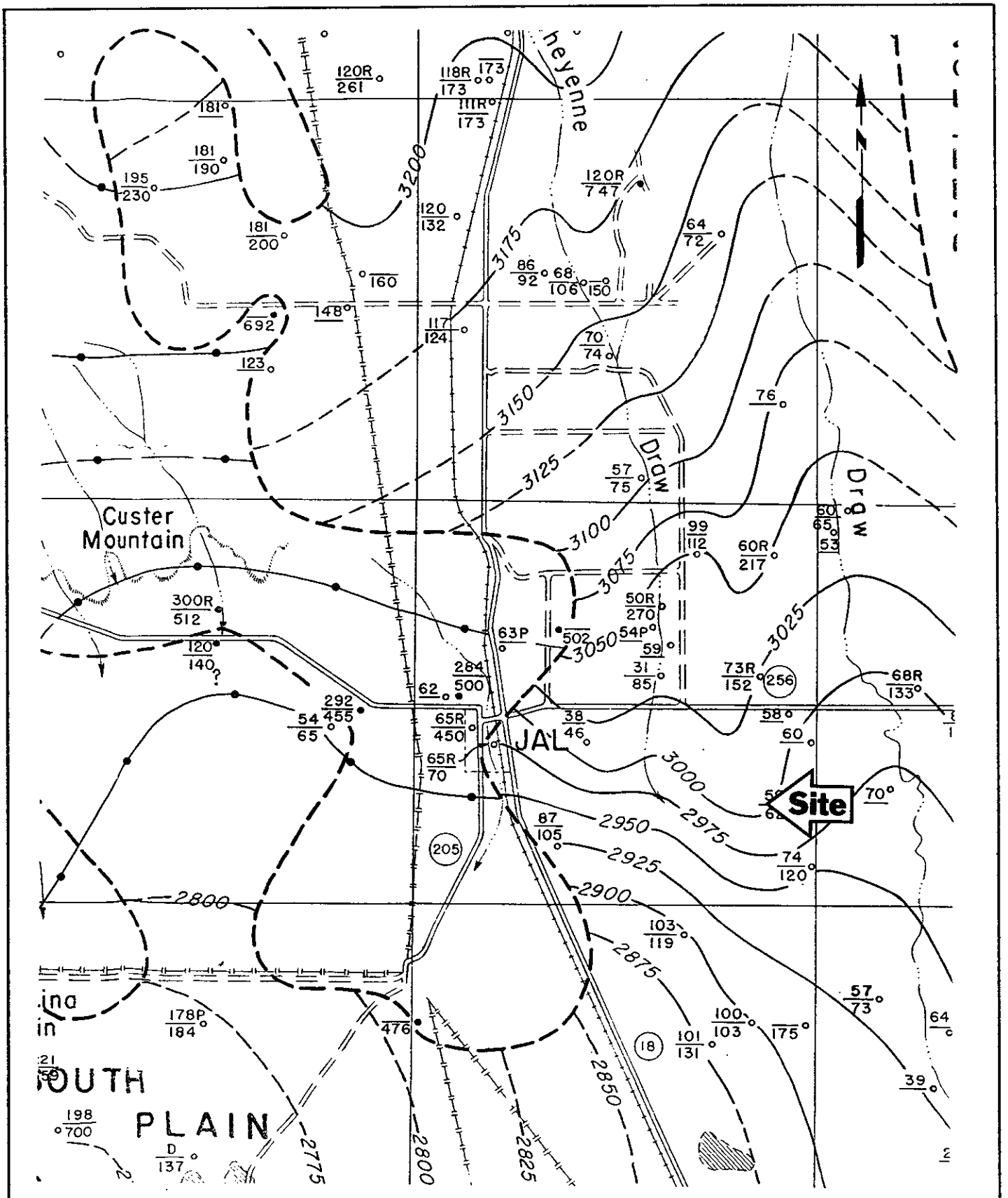
Vicinity Map
Site Plan
Water Resource Map
Ground Water Monitor Well Plat
Photo Exhibits
Chain of Custody for Samples
Analytical Results



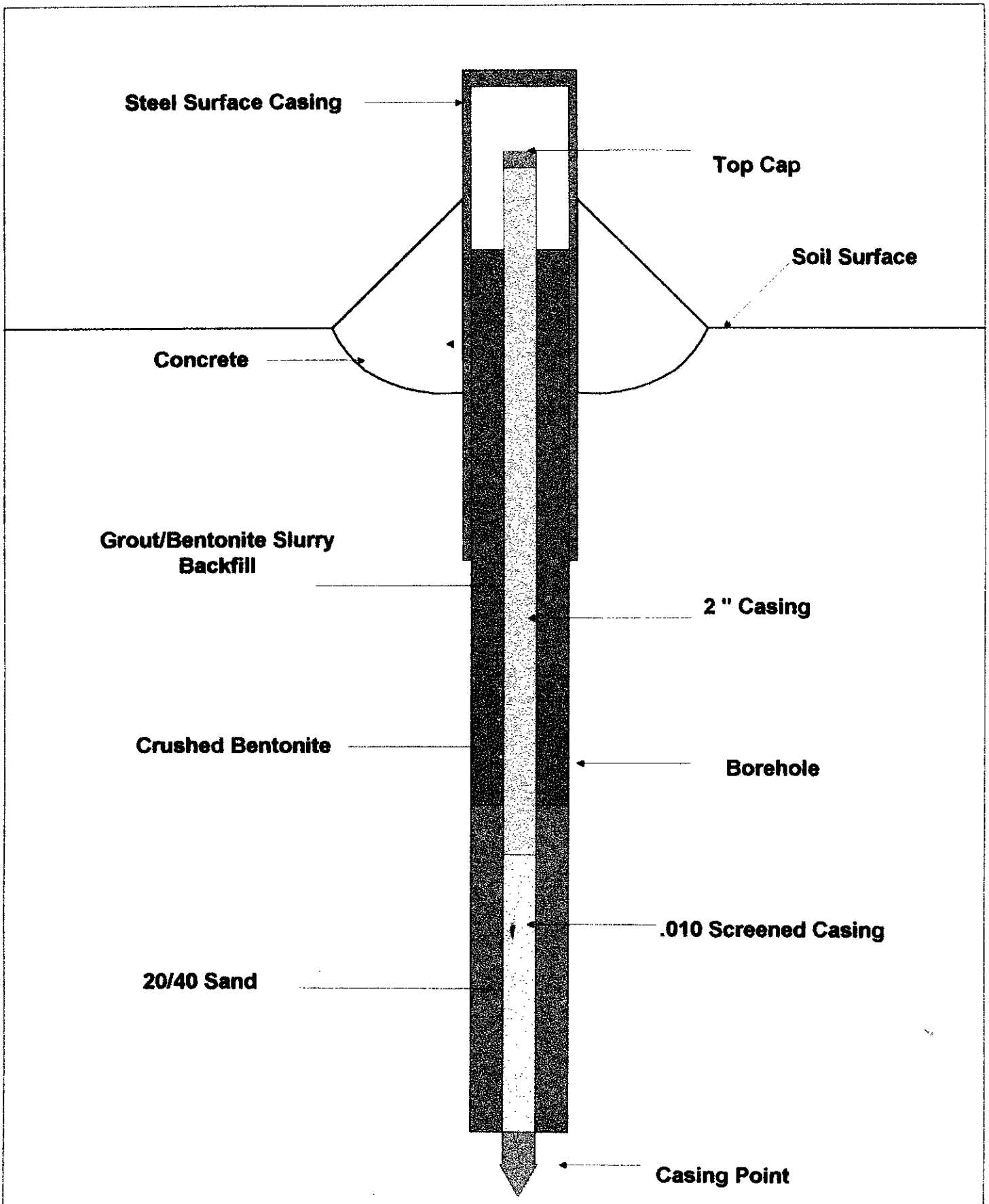
ARCO Permian	**South Justis Unit F-230** **Vicinity Map**	*Safety & Environmental Solutions, Inc.* *Hobbs, NM*



Arco Permian **Ida Wimberly Pit**	**Site Plan** **Proposed Monitor Wells**	Safety & Environmental Solutions, Inc. Hobbs, New Mexico



ARCO Permian	**South Justis Unit F-230** **Water Resource Map**	*Safety & Environmental Solutions, Inc.* *Hobbs, NM*



Arco Permian	Ground Water Monitor Well	Safety & Environmental Solutions, Inc.

Photo #1 View of Pit Facing South

Photo #2 View of Pit Facing North

Photo #3 View of Pit Facing East

Photo #4 View of Pit Facing West

Safety & Environmental Solutions, Inc.

703 E. Clinton, Suite 103, Hobbs, New Mexico 88240
(505)397-0510

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Dee Whatley

Phone #: 397-0510 (505)

FAX #: (505) 393 4388

Company Name & Address: SESI 703 E. Clinton Hobbs, NM 88240 PO Box 1613

Project #:

Project Name:

Project Location: Ida Wimberly Arco Permian

Sampler Signature: [illegible]

ANALYSIS REQUEST

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI
H3256	Hole #1 55' depth	1						✓			✓			10-3-97	4:00pm							X	

Relinquished by:	Date:	Time:	Received by:
[illegible]	10-6-97	4:00pm	Beck Aldrich
Relinquished by:	Date:	Time:	Received by: GAP
Relinquished by:	Date:	Time:	Received by Laboratory:

REMARKS

please retain the oil!

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: 505-393-4388

Receiving Date: 10/08/97
Reporting Date: 10/13/97
Project Number: NOT GIVEN
Project Name: NOT GIVEN
Project Location: IDA WIMBERLY ARCO PERMIAN

Sampling Date: 10/03/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH

LAB NUMBER	SAMPLE ID	TDS (mg/L)	Cl (mg/L)
ANALYSIS DATE:		10/08/97	10/08/97
H3256-1	HOLE #1, 55' DEPTH	6760	3499
Quality Control		NR	484
True Value QC		NR	500
% Accuracy		NR	96.8
Relative Percent Difference		NR	0

METHODS: EPA 600/4-79-02	160.1	325.3

Chemist

10/13/97
Date

Safety & Environmental Solutions, Inc.

RECEIVED
MAR 02 1998
Environmental Bureau
Oil Conservation Division

Arco Permian
South Justis Unit F-230

Installation of Monitor Wells and Investigation Results
Lea County, New Mexico

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

In October 1997 Arco Permian secured the services of Safety and Environmental Solutions, Inc. to determine the vertical and horizontal extent of the abandoned pit site on the specified location. A work plan was formulated to drill three monitor wells around the pit area for definition of the extent of the pit area and to provide initial indications of the extent of any groundwater contamination.

II. Work Performed

Three monitor wells were drilled at the Arco Permian South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, NM according to the Approved Work Plan (GW-202 Pit Closure). SES contracted Eades Drilling and Pump Service of Hobbs, NM to drill these wells on December 8 and 9, 1997. Cardinal Laboratories of Hobbs, NM was also contracted to perform the laboratory analytical testing required for this project.

SES sampled the monitor well hole soils at intervals of ten (10') feet using SOPs found in **Environmental Protection Agency, 1984, Characterization of Hazardous Waste Site - A Methods Manual: Vol II.** The composite soil samples along with Chain of Custody were delivered to the laboratory for testing. The composite samples were analyzed for Total Petroleum Hydrocarbons (EPA Method 418.1) and BTEX (EPA Method 8020). The last sample taken from each well was also analyzed for Chlorides (EPA Method 600/4-79-020). The results of the BTEX, TPH and Chlorides were compared to the regulatory limits found in **"Guidelines for Remediation of Leaks, Spills and Releases"** *New Mexico Oil Conservation Division* - August 13, 1993. A summary of the laboratory analysis and correlated test hole data is represented in the following tables:

Well #1

Monitor Well #1 was drilled on the north side of the lease road north of the pit area with 14' surface casing was set to prevent cave-ins, total depth of 66' (could not drill deeper - bit refusal).

ID/Depth	Lithology	TPH	Cl	Benzene	Toluene	Ethyl Benzene	Total Xylenes
1-1 10'	Caliche	146		<0.020	<0.020	<0.020	<0.060
1-2 20'	No sample taken						

1-3 30'	Red Sand	109		<0.020	<0.020	<0.020	<0.060
1-4 40'	Red sand/ Coarse gravel	173		<0.020	<0.020	<0.020	<0.060
1-5 50'	Fine sand/ gravel	<10		<0.020	<0.020	<0.020	<0.060
1-6 60'	Pea gravel/ sand	200	128	<0.020	<0.020	<0.020	<0.060

Well #2

Monitor Well #2 was drilled south of Well #1 south of the pit area with top of casing at 63.3' and total depth of 71'.

ID/Depth	Lithology	TPH	Cl	Benzene	Toluene	Ethyl Benzene	Total Xylenes
2-1 10'	Caliche	<10		<0.020	<0.020	<0.020	<0.060
2-2 20'	Caliche w/ sandstone	<10		<0.020	<0.020	<0.020	<0.060
2-3 30'	Red Sand	<10		<0.020	<0.020	<0.020	<0.060
2-4 40'	Fine Sand	<10		<0.020	<0.020	<0.020	<0.060
2-5 50'	Sand with gravel	<10		<0.020	<0.020	<0.020	<0.060
2-6 60'	Sand/gravel - wet	<10	192	<0.020	<0.020	<0.020	<0.060

Well #3

Monitor Well #3 was drilled east and slightly north of Well #2, nearer the pit area with top of casing at 63.6' and total depth of 71'.

ID/Depth	Lithology	TPH	Cl	Benzene	Toluene	Ethyl Benzene	Total Xylenes
3-1 10'	Caliche	146		<0.020	<0.020	<0.020	<0.060

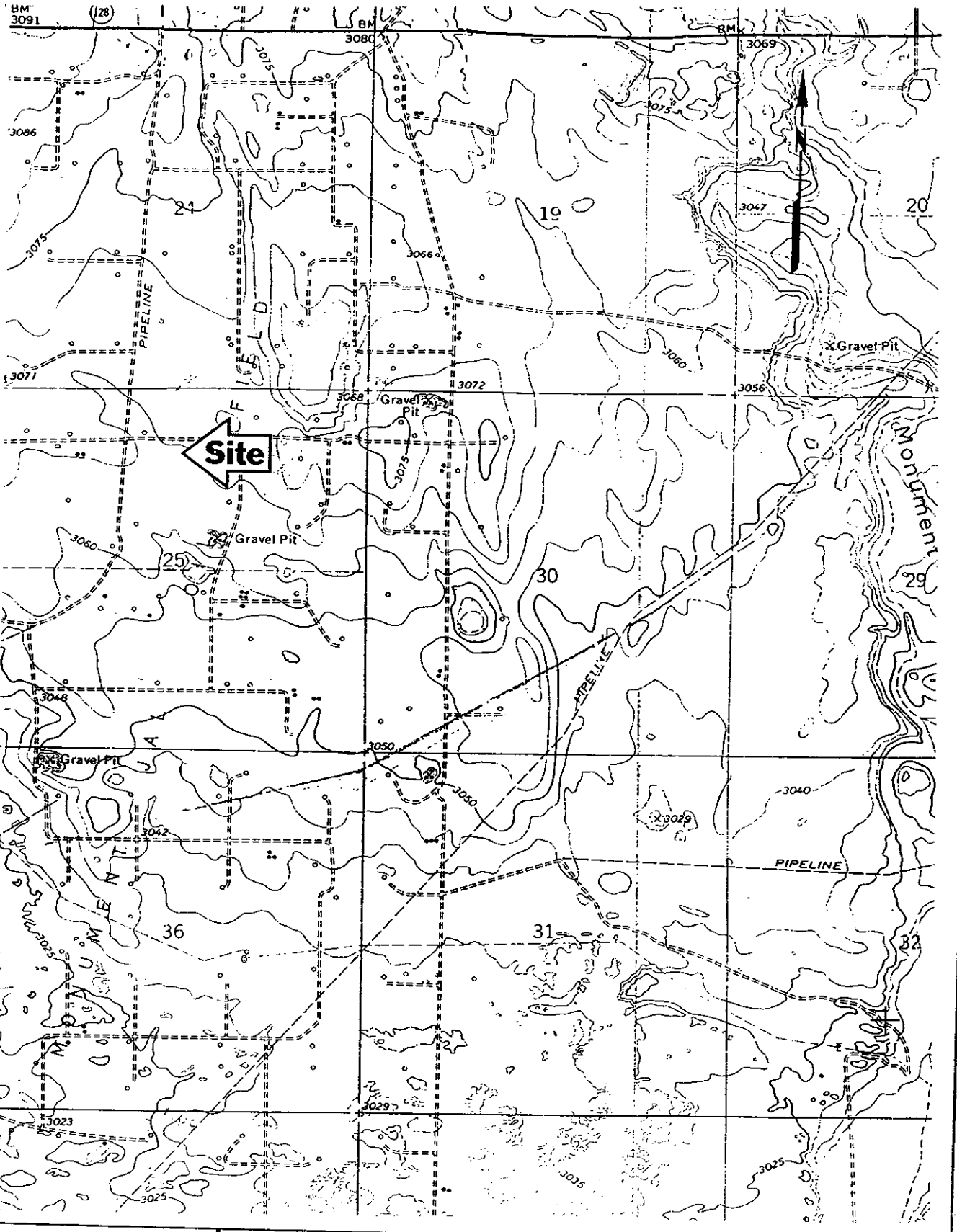
3-2 20'	Caliche	<10		<0.020	<0.020	<0.020	<0.060
3-3 30'	Red Sand	<10		<0.020	<0.020	<0.020	<0.060
3-4 40'	Red Sand	<10		<0.020	<0.020	<0.020	<0.060
3-5 50'	Sand with gravel	<10		<0.020	<0.020	<0.020	<0.060
3-6 60'	Sand/gravel	<10	96	<0.020	<0.020	<0.020	<0.060

III. Monitor Well Testing

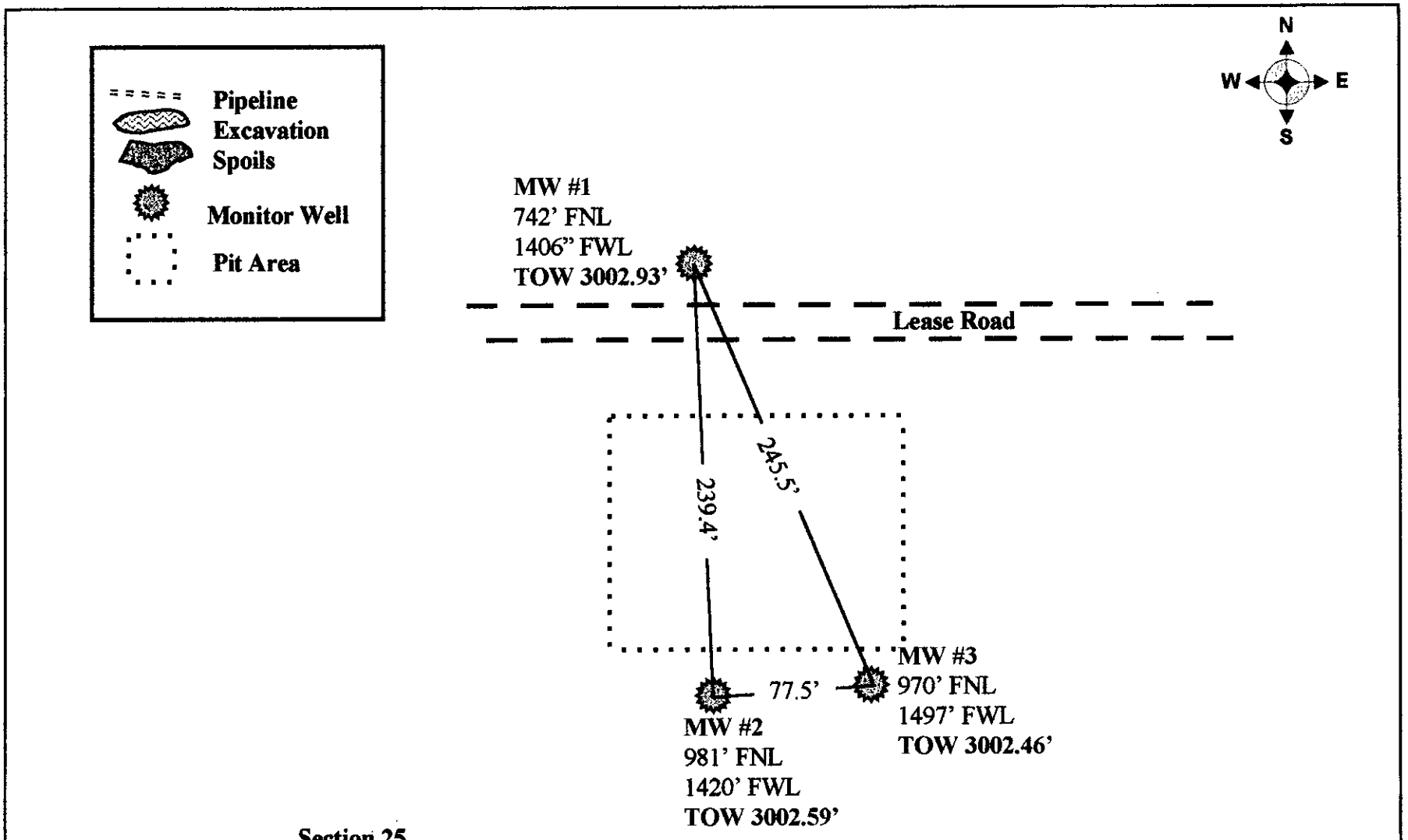
Initial water sampling from each of the three wells was performed on December 17, 1997 and the samples along with Chain of Custody were delivered to the laboratory for testing. The water samples were analyzed for BTEX (EPA Method 8020, 5030) as well as NMWQAC testing (Methods 625, 600/4-79-020, -206.2, -272.1,-213.1,-208.1, -218.1,-239.1,-245.1,-270.2, 600/4-78-020,-202.1,-220.1,-236.1,-243.1,-249.1,-289.1, 600/4-91-010,-212.1,-219.1,-246.1, SM4500-Cl-B, 375.4, 310.1, 150.1, 160.1, 120.1, 8049, 3500-Mg E, SM3500-Ca-D). **(See Analytical Reports attached)**

IV. Maps and Figures

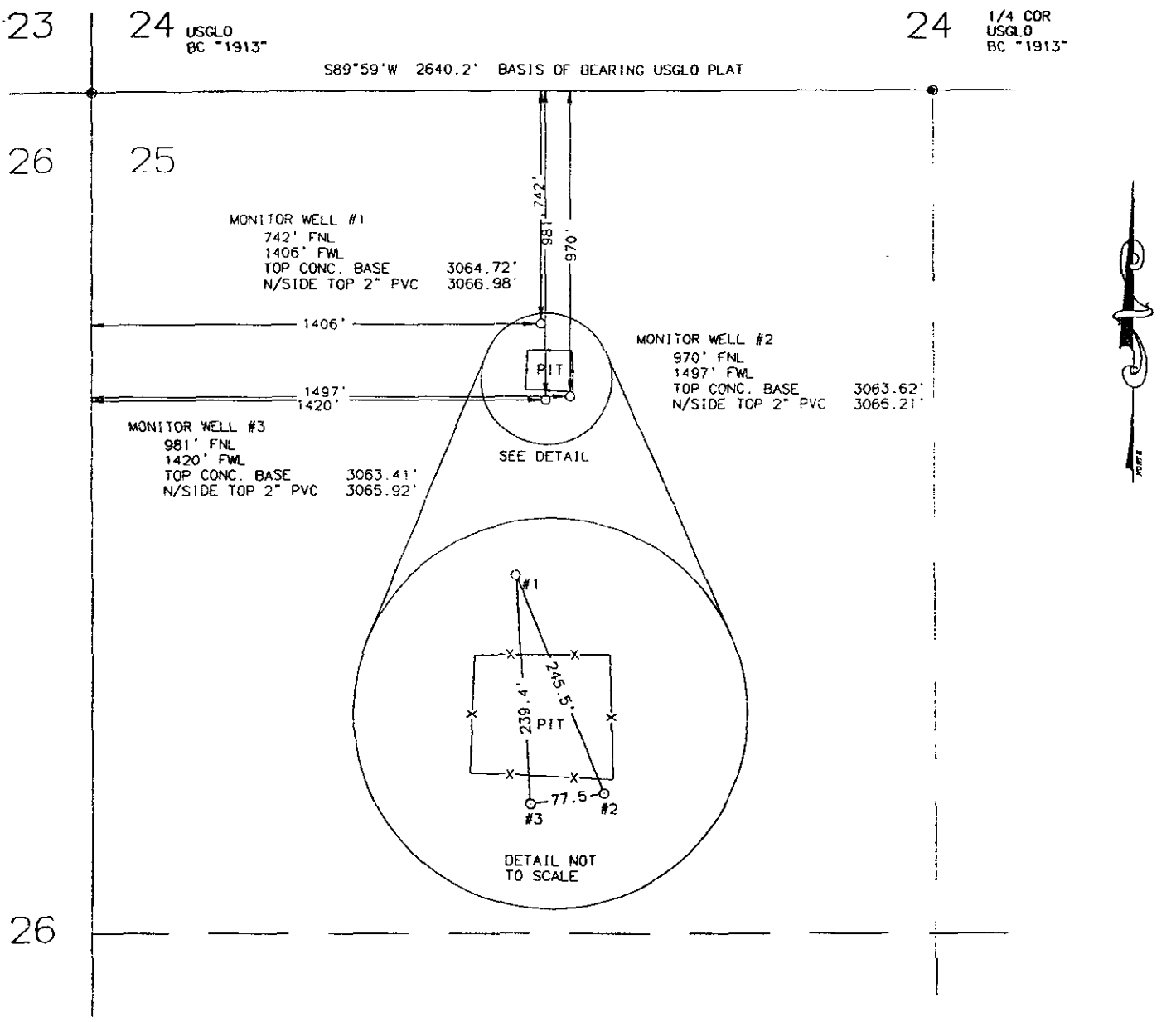
Vicinity Map
Site Plan
Survey Plat
Chain of Custody for Samples
Analytical Results



ARCO Permian	**South Justis Unit F-230** **Vicinity Map**	*Safety & Environmental Solutions, Inc.* *Hobbs, NM*



ARCO Permian	**Site Plan** **Ida Wimberly Monitor Wells**	**Safety & Environmental Solutions, Inc.** **Hobbs, New Mexico**



I HEREBY CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

Ronald J. Eidson 12-17-97

RONALD J. EIDSON N.M. P.S. No. 3239
GARY G. EIDSON N.M. P.S. No. 12641

JOHN W. WEST ENGINEERING COMPANY
CONSULTING ENGINEERS & SURVEYORS – HOBBS, NEW MEXICO

SAFETY & ENVIRONMENTAL SOLUTIONS, INC.

ELEVATIONS AND TIES ON ARCO PERMIAN
MONITOR WELLS #1, #2 AND #3,
IN SECTION 25,
TOWNSHIP 25 SOUTH,
RANGE 37 EAST, N.M.P.M.,
LEA COUNTY, NEW MEXICO

Survey Date: 12/11/97		Sheet 1 of 1 Sheets	
W.O. Number: 97-11-2003		Drawn By: D.McCARLEY	
Date: 12/16/97	SAFETY	SESI2003	Scale:1"=500'

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/09/97
Reporting Date: 12/12/97
Project Number: NOT GIVEN
Project Name: ARCO PERMIAN MONITOR WELLS
Project Location: SOUTH JUSTIS FIELD

Sampling Date: 12/09/97
Sample Type: SOIL
Sample Condition: COOL, INTACT
Sample Received By: GP
Analyzed By: BC

LAB NUMBER	SAMPLE ID	TPH (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		12/11/97	12/12/97	12/12/97	12/12/97	12/12/97
H3364-1	MW 1-1	146	<0.020	<0.020	<0.020	<0.060
H3364-2	MW 1-3	109	<0.020	<0.020	<0.020	<0.060
H3364-3	MW 1-4	173	<0.020	<0.020	<0.020	<0.060
H3364-4	MW 1-5	<10	<0.020	<0.020	<0.020	<0.060
H3364-5	MW 1-6	200	<0.020	<0.020	<0.020	<0.060
Quality Control		184	0.091	0.088	0.087	0.266
True Value QC		200	0.100	0.100	0.100	0.300
% Recovery		92.1	91.0	88.2	87.4	88.6
Relative Percent Difference		2.7	4.8	3.9	0.3	0.7

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW-846-8260

Burgess J. A. Cooke, Ph. D.

12/12/97
Date

H3364.XLS

CARDINAL LABORATORIES

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/09/97
Reporting Date: 12/12/97
Project Number: NOT GIVEN
Project Name: ARCO PERMIAN MONITOR WELLS
Project Location: SOUTH JUSTIS FIELD

Analysis Date: 12/10/97
Sampling Date: 12/09/97
Sample Type: SOIL
Sample Condition: COOL, INTACT
Sample Received By: GP
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Cl^- (mg/Kg)
H3364-5	MW 1-6	128
Quality Control		500
True Value QC		500
% Recovery		100
Relative Percent Difference		4.0

METHOD: EPA 600/4-79-020,	325.3

Chemist

12/12/97
Date

H3364C.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page ___ of ___

Company Name:	SESI	BILL TO	PO #:
Project Manager:		Company:	
Address:	703 E. Clinton #103	Attn:	Same
City:	Hobbs State: NM Zip: 88240	Address:	
Phone #:		City:	
Fax #:		State:	Zip:
Project #:		Phone #:	
Project Name:	Area Permian Monitor Wells	Fax #:	
Project Location:	South Justis Field		

LAB I.D. #	Sample I.D.	COMP(C) OR GRAB(G)	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRESERVATION: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	TPH	BTEX	Chlorides
H3364-1	MW 1-1	C				X					X		12-9	831	X	X	
-2	MW 1-3	C				X					X		12-9	1110	X	X	
-3	MW 1-4	C				X					X		12-9	1130	X	X	
-4	MW 1-5	C				X					X		12-9	1230	X	X	
-5	MW 1-6	C				X					X		12-9	130	X	X	X
	~~MW 1-2~~																

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.

Sampler Relinquished:	Date: 12-9-97	Received By:	Phone Result: ☐ Yes ☐ No Additional Fax #:
	Time: 2:00 p		Fax Results: ☐ Yes ☐ No
Relinquished By:	Date:	Received By: (Lab Staff)	REMARKS:
	Time:		* MW 1-5, MW 1-6 no samples from split spoon (Chloride cuttings) just cuttings
Delivered By: (Circle One) UPS - Fed Ex - Bus - Other:		Sample Condition: Cool ☒ Yes ☐ No; Intact ☒ Yes ☐ No	CHECKED BY: (Initials)

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/09/97
Reporting Date: 12/12/97
Project Number: MONITOR WELL INSTALLATION #2
Project Name: ARCO PERMIAN IDA WIMBERLY
Project Location: SOUTH JUSTIS FIELD

Sampling Date: 12/08/97
Sample Type: SOIL
Sample Condition: COOL, INTACT
Sample Received By: GP
Analyzed By: BC

LAB NUMBER	SAMPLE ID	TPH (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		12/11/97	12/12/97	12/12/97	12/12/97	12/12/97
H3365-1	MW 2-1	<10	<0.020	<0.020	<0.020	<0.060
H3365-2	MW 2-2	<10	<0.020	<0.020	<0.020	<0.060
H3365-3	MW 2-3	<10	<0.020	<0.020	<0.020	<0.060
H3365-4	MW 2-4	<10	<0.020	<0.020	<0.020	<0.060
H3365-5	MW 2-5	<10	<0.020	<0.020	<0.020	<0.060
H3365-6	MW 2-6	<10	<0.020	<0.020	<0.020	<0.060
Quality Control		184	0.091	0.088	0.087	0.266
True Value QC		200	0.100	0.100	0.100	0.300
% Recovery		92.1	91.0	88.2	87.4	88.6
Relative Percent Difference		2.7	4.8	3.9	0.3	0.7

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW-846-8260

Burgess J. A. Cooke, Ph. D.

12/12/97
Date

H3365.XLS

CARDINAL LABORATORIES

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/09/97
Reporting Date: 12/12/97
Project Number: MONITOR WELL INSTALLATION #2
Project Name: ARCO PERMIAN IDA WIMBERLY
Project Location: SOUTH JUSTIS FIELD

Analysis Date: 12/10/97
Sampling Date: 12/08/97
Sample Type: SOIL
Sample Condition: COOL, INTACT
Sample Received By: GP
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Cl (mg/Kg)
H3365-6	MW 2-6	192
Quality Control		500
True Value QC		500
% Recovery		100
Relative Percent Difference		4.0

METHOD: EPA 600/4-79-020,	325.3

Chemist

Date 12/12/97

Safety & Environmental Solutions, Inc.

703 E. Clinton, Suite 103, Hobbs, New Mexico 88240
(505)397-0510

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

12-8-97

Project Manager: SESI

Phone #:

FAX #:

Company Name & Address: ARCO Permian / IRA Wimberly

Project #: Monitor Well Installation #2

Project Name: Jal

Project Location: South Justis Field

Sampler Signature:

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI	Chloride
11 3365-1	MW-2-1	1			✓						✓			12-8	10:35	X	X							
-2	MW-2-2	1			✓						✓			12-8	10:45	X	X							
-3	MW-2-3	1			✓						✓			12-8	11:08	X	X							
-4	MW-2-4	1			✓						✓			12-8	11:25	X	X							
-5	MW-2-5	1			✓						✓			12-8	11:40	X	X							
-6	MW-2-6	1			✓						✓			12-8	1:00	X	X							X

Relinquished by:	Date:	Time:	Received by:	REMARKS
	12-8-97			
Relinquished by:	Date:	Time:	Received by:	
Relinquished by:	Date:	Time:	Received by Laboratory: 12/09/97	

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/09/97
Reporting Date: 12/12/97
Project Number: MONITOR WELL INSTALLATION #3
Project Name: ARCO PERMIAN IDA WIMBERLY
Project Location: SOUTH JUSTIS FIELD

Sampling Date: 12/08/97
Sample Type: SOIL
Sample Condition: COOL, INTACT
Sample Received By: GP
Analyzed By: BC

LAB NUMBER	SAMPLE ID	TPH (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		12/11/97	12/12/97	12/12/97	12/12/97	12/12/97
H3366-1	MW 3-1	146	<0.020	<0.020	<0.020	<0.060
H3366-2	MW 3-2	<10	<0.020	<0.020	<0.020	<0.060
H3366-3	MW 3-3	<10	<0.020	<0.020	<0.020	<0.060
H3366-4	MW 3-4	<10	<0.020	<0.020	<0.020	<0.060
H3366-5	MW 3-5	<10	<0.020	<0.020	<0.020	<0.060
H3366-6	MW 3-6	<10	<0.020	<0.020	<0.020	<0.060
Quality Control		184	0.091	0.088	0.087	0.266
True Value QC		200	0.100	0.100	0.100	0.300
% Recovery		92.1	91.0	88.2	87.4	88.6
Relative Percent Difference		2.7	4.8	3.9	0.3	0.7

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW-846-8260

Burgess J. A. Cooke, Ph. D.

12/12/97
Date

H3366.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/09/97
Reporting Date: 12/12/97
Project Number: MONITOR WELL INSTALLATION #3
Project Name: ARCO PERMIAN IDA WIMBERLY
Project Location: SOUTH JUSTIS FIELD

Analysis Date: 12/10/97
Sampling Date: 12/08/97
Sample Type: SOIL
Sample Condition: COOL, INTACT
Sample Received By: GP
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Cl^- (mg/Kg)
H3366-6	MW 3-6	96
Quality Control		500
True Value QC		500
% Recovery		100
Relative Percent Difference		4.0

METHOD: EPA 600/4-79-020,	325.3

Chemist

12/12/97
Date

Safety & Environmental Solutions, Inc.

703 E. Clinton, Suite 103, Hobbs, New Mexico 88240
(505)397-0510

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

12-8-97

Project Manager: | Phone #: | FAX #:

Company Name & Address: ARCO Permian — Ida Wimberly

Project #: #3 | Project Name: Monitor Well Installation

Project Location: South Justis Field | Sampler Signature:

ANALYSIS REQUEST

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI	Chlorides
H) 3366-1	MW 3-1	1			✓									12-8	2:20	X	X							
-2	MW 3-2	1			✓									12-8	2:36	X	X							
-3	MW 3-3	1			✓									12-8	2:55	X	X							
-4	MW 3-4	1			✓									12-8	3:20	X	X							
-5	MW 3-5	1			✓									12-8	3:48	X	X							
-6	MW 3-6	1			✓									12-8	4:20	X	X							X

Relinquished by:	Date:	Time:	Received by:	REMARKS
	12-8-97			
Relinquished by:	Date:	Time:	Received by:	
Relinquished by:	Date:	Time:	Received by Laboratory:	

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/19/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: GP

LAB NUMBER	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		12/18/97	12/18/97	12/18/97	12/18/97
H3384-1	MW-#1	<0.002	<0.002	<0.002	<0.006
H3384-2	MW-#2	<0.002	<0.002	<0.002	<0.006
H3384-3	MW-#3	<0.002	<0.002	<0.002	<0.006
Quality Control		0.095	0.093	0.094	0.282
True Value QC		0.100	0.100	0.100	0.300
% Accuracy		94.8	92.8	93.7	93.9
Relative Percent Difference		5.4	4.3	4.3	4.0

METHOD: EPA SW 846-8020, 5030, Gas Chromatography

Chemist

12/19/97
Date

CARDINAL LABORATORIES

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/23/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP

LAB NUMBER	SAMPLE ID	CN^- (mg/L)	F^- (mg/L)	NO_3^- (mg/L)
ANALYSIS DATE		12/22/97	12/18/97	12/18/97
H3384-1	MW-#1	<0.02	1.62	3.75
H3384-2	MW-#2	<0.02	2.13	0.20
H3384-3	MW-#3	<0.02	2.30	0.70
Quality Control		0.105	1.00	5.15
True Value QC		0.100	1.00	5.00
% Accuracy		105	100	103
Relative Percent Difference		4.8	3.0	1.4
METHODS: EPA 600/4-79-020		335.2	340.1	353.2

Chemist

12/23/97
Date

CARDINAL LABORATORIES

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/19/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY
Lab Number: H3384-1
Sample ID: MW-#1

Analysis Date: 12/19/97
Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: BC

POLYNUCLEAR AROMATIC HYDROCARBONS - 625 (mg/L)	Sample Result H3384-1	Method Blank	QC	% Recov.	True Value QC
1 Naphthalene	<0.001	<0.001	0.039	78	0.050
2 2-Methylnaphthalene	<0.002	<0.002	0.043	86	0.050
3 1-Methylnaphthalene	<0.002	<0.002	NR	NR	NR
4 Acenaphthylene	<0.001	<0.001	0.040	80	0.050
5 Acenaphthene	<0.001	<0.001	0.042	84	0.050
6 Fluorene	<0.001	<0.001	0.048	96	0.050
7 Phenanthrene	<0.001	<0.001	0.053	106	0.050
8 Anthracene	<0.001	<0.001	0.049	98	0.050
9 Fluoranthene	<0.001	<0.001	0.049	98	0.050
10 Pyrene	<0.001	<0.001	0.048	96	0.050
11 Benzo(a)anthracene	<0.001	<0.001	0.046	92	0.050
12 Chrysene	<0.001	<0.001	0.048	96	0.050
13 Benzo(b)fluoranthene	<0.001	<0.001	0.038	76	0.050
14 Benzo(k)fluoranthene	<0.001	<0.001	0.044	88	0.050
15 Benzo(a)pyrene	<0.0007	<0.0007	0.045	90	0.050
16 Indeno(1,2,3-cd)pyrene	<0.002	<0.002	0.042	84	0.050
17 Dibenzo(a,h,)anthracene	<0.002	<0.002	0.049	98	0.050
18 Benzo(g,h,i)perylene	<0.002	<0.002	0.050	100	0.050

	% Recovery
19 Nitrobenzene-d5	58
20 2-Fluorobiphenyl	79
21 Terphenyl-d14	102

METHODS: EPA 625

Burgess J. A. Cooke, Ph. D.

12/19/97
Date

H3384-1.XLS

CARDINAL LABORATORIES

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/19/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY
Lab Number: H3384-2
Sample ID: MW-#2

Analysis Date: 12/19/97
Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: BC

POLYNUCLEAR AROMATIC HYDROCARBONS - 625 (mg/L)

		Sample Result H3384-2	Method Blank	QC	% Recov.	True Value QC
1	Naphthalene	<0.001	<0.001	0.039	78	0.050
2	2-Methylnaphthalene	<0.002	<0.002	0.043	86	0.050
3	1-Methylnaphthalene	<0.002	<0.002	NR	NR	NR
4	Acenaphthylene	<0.001	<0.001	0.040	80	0.050
5	Acenaphthene	<0.001	<0.001	0.042	84	0.050
6	Fluorene	<0.001	<0.001	0.048	96	0.050
7	Phenanthrene	<0.001	<0.001	0.053	106	0.050
8	Anthracene	<0.001	<0.001	0.049	98	0.050
9	Fluoranthene	<0.001	<0.001	0.049	98	0.050
10	Pyrene	<0.001	<0.001	0.048	96	0.050
11	Benzo(a)anthracene	<0.001	<0.001	0.046	92	0.050
12	Chrysene	<0.001	<0.001	0.048	96	0.050
13	Benzo(b)fluoranthene	<0.001	<0.001	0.038	76	0.050
14	Benzo(k)fluoranthene	<0.001	<0.001	0.044	88	0.050
15	Benzo(a)pyrene	<0.0007	<0.0007	0.045	90	0.050
16	Indeno(1,2,3-cd)pyrene	<0.002	<0.002	0.042	84	0.050
17	Dibenzo(a,h,)anthracene	<0.002	<0.002	0.049	98	0.050
18	Benzo(g,h,i)perylene	<0.002	<0.002	0.050	100	0.050

		% Recovery
19	Nitrobenzene-d5	53
20	2-Fluorobiphenyl	69
21	Terphenyl-d14	88

METHODS: EPA 625

Burgess J. A. Cooke, Ph. D.

12/19/97
Date

H3384-2.XLS

CARDINAL LABORATORIES

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/19/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY
Lab Number: H3384-3
Sample ID: MW-#3

Analysis Date: 12/19/97
Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: BC

POLYNUCLEAR AROMATIC HYDROCARBONS - 625 (mg/L)	Sample Result H3384-3	Method Blank	QC	% Recov.	True Value QC
1 Naphthalene	<0.001	<0.001	0.039	78	0.050
2 2-Methylnaphthalene	<0.002	<0.002	0.043	86	0.050
3 1-Methylnaphthalene	<0.002	<0.002	NR	NR	NR
4 Acenaphthylene	<0.001	<0.001	0.040	80	0.050
5 Acenaphthene	<0.001	<0.001	0.042	84	0.050
6 Fluorene	<0.001	<0.001	0.048	96	0.050
7 Phenanthrene	<0.001	<0.001	0.053	106	0.050
8 Anthracene	<0.001	<0.001	0.049	98	0.050
9 Fluoranthene	<0.001	<0.001	0.049	98	0.050
10 Pyrene	<0.001	<0.001	0.048	96	0.050
11 Benzo(a)anthracene	<0.001	<0.001	0.046	92	0.050
12 Chrysene	<0.001	<0.001	0.048	96	0.050
13 Benzo(b)fluoranthene	<0.001	<0.001	0.038	76	0.050
14 Benzo(k)fluoranthene	<0.001	<0.001	0.044	88	0.050
15 Benzo(a)pyrene	<0.0007	<0.0007	0.045	90	0.050
16 Indeno(1,2,3-cd)pyrene	<0.002	<0.002	0.042	84	0.050
17 Dibenzo(a,h,)anthracene	<0.002	<0.002	0.049	98	0.050
18 Benzo(g,h,i)perylene	<0.002	<0.002	0.050	100	0.050

	% Recovery
19 Nitrobenzene-d5	43
20 2-Fluorobiphenyl	76
21 Terphenyl-d14	89

METHODS: EPA 625

Burgess J. A. Cooke, Ph. D.

12/19/97
Date

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/24/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH/GP

RCRA METALS

LAB NUMBER	SAMPLE ID	As ppm	Ag ppm	Ba ppm	Cd ppm	Cr ppm	Pb ppm	Hg ppm	Se ppm
ANALYSIS DATE:		12/22/97	12/22/97	12/23/97	12/22/97	12/22/97	12/19/97	12/23/97	12/22/97
H3384-1	MW-#1	<0.1	<0.1	<1	<0.01	<0.05	<0.05	<0.02	<0.1
H3384-2	MW-#2	<0.1	<0.1	<1	<0.01	<0.05	<0.05	<0.02	<0.1
H3384-3	MW-#3	<0.1	<0.1	<1	<0.01	<0.05	<0.05	<0.02	<0.1
Quality Control		0.049	5.01	20.2	0.992	0.99	4.97	0.0093	0.091
True Value QC		0.050	5.00	20.0	1.000	1.00	5.00	0.0100	0.100
% Recovery		98	100	101	99	99	99	93	91
Relative Percent Difference		3.7	0.1	1.7	0.5	0.4	0.4	3.2	5.4
METHODS: EPA 600/4-79-020		206.2	272.1	208.1	213.1	218.1	239.1	245.1	270.2

Chemist

12/24/97
Date

H3384M1.XLS

CARDINAL LABORATORIES

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/19/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity ($mgCaCO_3/L$)
ANALYSIS DATE:		12/18/97	12/18/97	12/18/97	12/18/97	12/18/97	12/18/97
H3384-1	MW-#1	1007	296	112	22.5	6116	100
H3384-2	MW-#2	3700	426	193	90.0	17028	404
H3384-3	MW-#3	4875	629	302	118	23846	316
Quality Control		NR	60	53	NR	1445	NR
True Value QC		NR	50	50	NR	1413	NR
% Accuracy		NR	120	106	NR	102	NR
Relative Percent Difference		NR	0	0	NR	0.3	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

		Cl^- (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		12/18/97	12/18/97	12/18/97	12/18/97	12/18/97	12/19/97
H3384-1	MW-#1	1580	1050	0	122	5.58	3480
H3384-2	MW-#2	6200	1160	0	404	7.84	10490
H3384-3	MW-#3	8500	1280	0	316	7.77	15300
Quality Control		496	101	NR	NR	6.99	NR
True Value QC		500	100	NR	NR	7.00	NR
% Accuracy		99.2	101	NR	NR	100	NR
Relative Percent Difference		0.8	0	NR	NR	0	0.3
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Chemist

12/19/97
Date

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/24/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH/GP

TOTAL METALS

LAB NUMBER	SAMPLE ID	Al (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Ni (mg/L)	Zn (mg/L)
ANALYSIS DATE:		12/23/97	12/19/97	12/19/97	12/19/97	12/19/97	12/19/97
H3384-1	MW-#1	<0.2	<0.1	0.388	0.345	<0.2	<0.2
H3384-2	MW-#2	<0.2	<0.1	<0.2	0.343	<0.2	<0.2
H3384-3	MW-#3	0.300	<0.1	<0.2	0.440	<0.2	<0.2
Quality Control		19.8	3.992	1.006	1.998	1.995	0.499
True Value QC		20.0	4.000	1.000	2.000	2.000	0.500
% Accuracy		99	100	101	100	100	100
Relative Percent Difference		0.5	0.5	0.6	0.4	0.5	0.6
METHODS: EPA 600/4-78-020		202.1	220.1	236.1	243.1	249.1	289.1

Chemist

12/24/97
Date

file: h3384M2.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/24/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH/GP

LAB NUMBER	SAMPLE ID	B (mg/L)	Co (mg/L)	Mo (mg/L)
ANALYSIS DATE		12/23/97	12/23/97	12/23/97
H3384-1	MW-#1	<0.75	<0.05	<0.2
H3384-2	MW-#2	<0.75	<0.05	<0.2
H3384-3	MW-#3	<0.75	<0.05	<0.2
Quality Control		1.0	5.00	4.90
True Value QC		1.0	5.00	5.00
% Accuracy		100	100	98
Relative Percent Difference		1.7	0.1	0

METHODS: EPA 600/4-91-010,	212.1	219.1	246.1

Chemist

12/24/97
Date

H3384M3.XLS

Safety & Environmental Solutions, Inc.

703 E. Clinton, Suite 103, Hobbs, New Mexico 88240
(505)397-0510

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: SESI

Phone #:

FAX #:

Company Name & Address:

Project #:

Project Name: Arco Monitor Wells

Project Location: South Justis Eda Wimberly

Sampler Signature: Dan Whitley

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME
	MW - #1	2		✓							✓			12-17-97	2:00pm
	MW - #2	2		✓							✓			12-17-97	2:00pm
	MW - #3	2		✓							✓			12-17-97	2:00pm

ANALYSIS REQUEST

BTEX 8120/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI	WQCC Metals	Cations	Anions	Polynuclear Aromatic Hydrocarbons	BTEX	EC	CN
✓								✓	✓	✓	✓	✓	1	1
✓								✓	✓	✓	✓	✓	1	1
✓								✓	✓	✓	✓	✓	1	1

Relinquished by:	Date:	Time:	Received by:
Dee Whatley	12-17-97	2:00pm	Dan Whitley
Relinquished by:	Date:	Time:	Received by:
Relinquished by: Dan Whitley	Date:	Time: 12/17/97 7:15 PM	Received by Laboratory:

REMARKS

Safety & Environmental Solutions, Inc.

RECEIVED
MAY 01 1998
Environmental Bureau
Oil Conservation Division

ARCO PERMIAN
South Justis Unit F-230

Amended Work Plan
Investigation of Possible Groundwater Impact
Lea County, New Mexico

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

Purpose

The purpose of this Amended Work Plan is to propose a scope of work to further delineate the extent of horizontal contamination from the old pit site and systematically confirm or deny possible groundwater contamination at the South Justis Unit F-230 in Unit C of Section 25 Township 25S Range 37E in Lea County, New Mexico. This plan will also make provisions for the accurate determination of the size and location of any plume of contamination found in the groundwater.

Background

In December of 1997, Safety and Environmental Solutions, Inc. contracted the services of Eades Drilling for the installation of three monitor wells. The three monitor wells were sampled and found to have elevated levels of Chlorides and Total Dissolved Solids as noted below: (See Analytical Results)

Monitor Well	TDS Results
#1	3,480ppm
#2	10,490ppm
#3	15,300ppm

Monitor Well	Chlorides Results
#1	1,580ppm
#2	6,200ppm
#3	8,500ppm

Method

Arco Permian proposes to drill another borehole to determine the extent of the pit area in a southeasterly direction from the current monitor wells. Northwest to southeast is the prevailing direction of the fluid flow of the water table.

Once the extent of the pit area is determined, an additional four (4) monitor wells will be drilled to determine the possible extent of groundwater contamination. One well will be installed up gradient of the existing monitor wells and the other wells will be installed down gradient south and southeast of the pit and the existing monitor wells.(See Diagram)

After delineation of the contamination is complete, Arco Permian will submit another work plan which will address the appropriate methods and scope of work for the remediation of any groundwater contamination as well as vadose zone remediation.

The physical description of the monitor well installations is as follows:

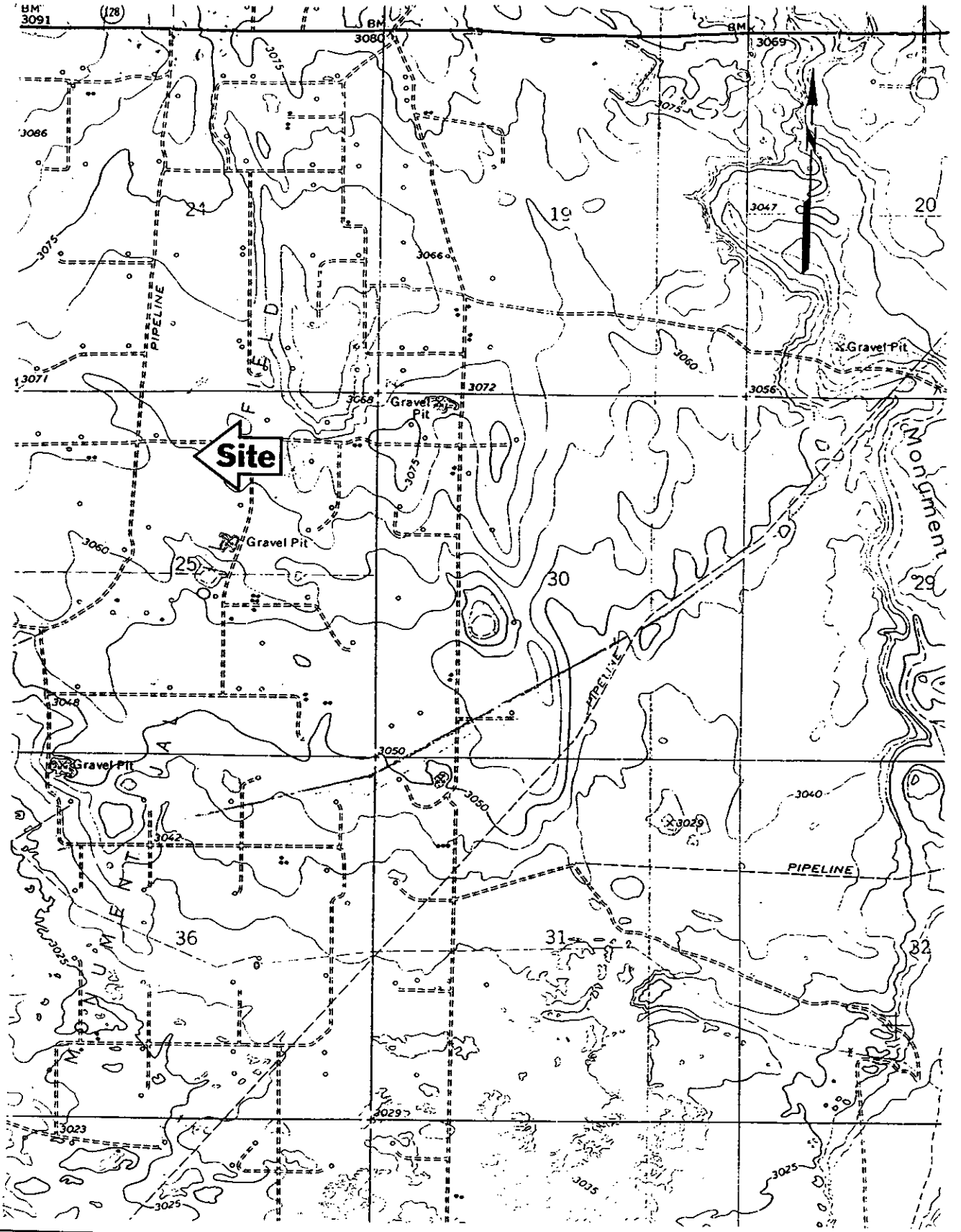
> Each well will be drilled to a depth of ten (10) feet below the water table. Split spoon samples will collected at five (10') foot intervals and analyzed for TPH, and BTEX. A driller's log noting sample points and changes in lithology will be kept. The wells will cased with 2" PVC pipe with a minimum of fifteen (15) feet of well screen on the bottom. (Five (5) feet above the water table and ten (10) feet below the water table) Screen will gravel packed to a point 2-3 feet above the screen, with a bentonite plug set above the gravel pack. The remainder of the casing annulus to surface will grouted with cement containing 5% bentonite. Each well will be equipped with a locking well cap. (See monitor well diagram)

Monitoring Parameters

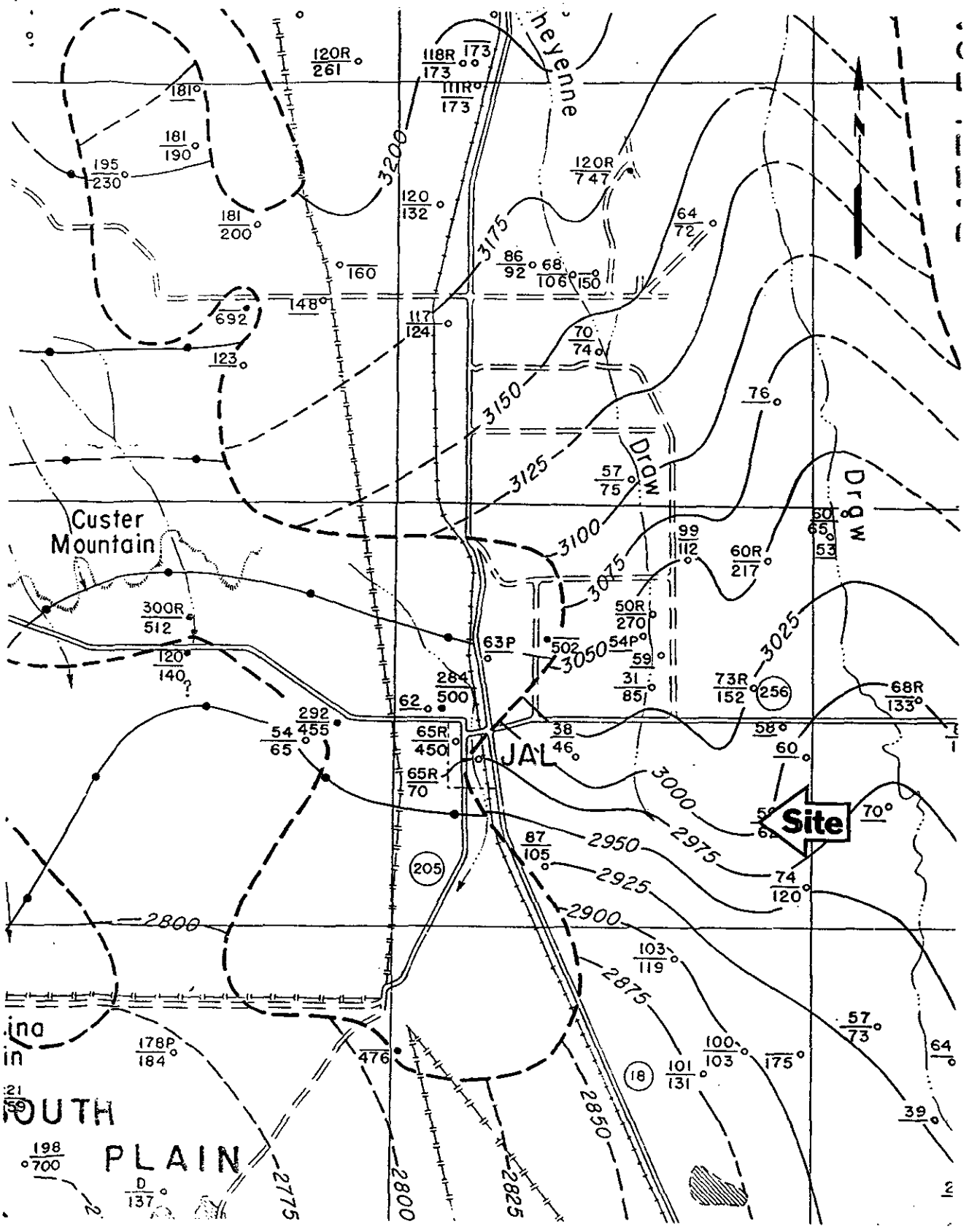
The additional monitor wells will initially be sampled and analyzed for TPH, BTEX, Chlorides, major Cations and Anions, and Total Dissolved Solids with results filed with the OCD Santa Fe and Hobbs District offices.

Maps and Figures

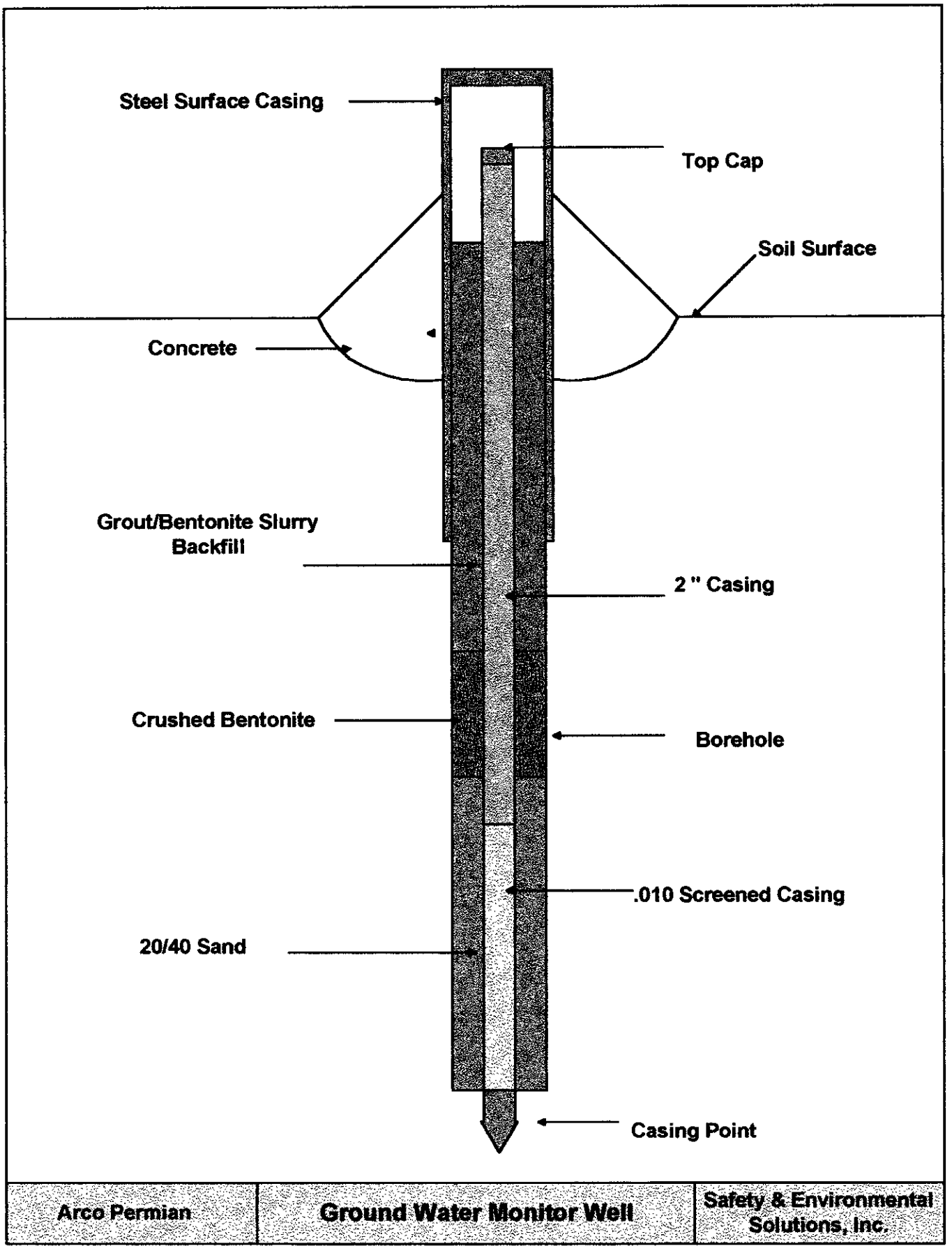
Vicinity Map
Site Plan
Water Resource Map
Ground Water Monitor Well Plat
Chain of Custody for Samples
Analytical Results



ARCO Permian	**South Justis Unit F-230** **Vicinity Map**	*Safety & Environmental Solutions, Inc.* *Hobbs, NM*



ARCO Permian	**South Justis Unit F-230** **Water Resource Map**	*Safety & Environmental Solutions, Inc.* *Hobbs, NM*



Arco Permian	Ground Water Monitor Well	Safety & Environmental Solutions, Inc.

Safety & Environmental Solutions, Inc.

703 E. Clinton, Suite 103, Hobbs, New Mexico 88240
(505)397-0510

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: SESI

Phone #:

FAX #:

Company Name & Address:

Project #:

Project Name: Arco Monitor Wells

Project Location: South Justis Ida Wimberly

Sampler Signature:

ANALYSIS REQUEST

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	MATRIX: SOIL	MATRIX: AIR	MATRIX: SLUDGE	MATRIX: OTHER	PRESERVATIVE METHOD: HCL	PRESERVATIVE METHOD: HNO3	PRESERVATIVE METHOD: ICE	PRESERVATIVE METHOD: NONE	PRESERVATIVE METHOD: OTHER	SAMPLING: DATE	SAMPLING: TIME	BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI	WQCC Metals	Cations	Anions	Polynuclear Aromatic Hydrocarbons	BTEX	FL	CN
	MW - #1	2		✓							✓			12-17-97	2:00pm	✓								✓	✓	✓	✓	✓	✓	✓
	MW - #2	2		✓							✓			12-17-97	2:00pm	✓								✓	✓	✓	✓	✓	✓	✓
	MW - #3	2		✓							✓			12-17-97	2:00pm	✓								✓	✓	✓	✓	✓	✓	✓

Relinquished by:	Date:	Time:	Received by:
Dee Whatley	12-17-97	2:00pm	
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time: 12/17/97 2:15 PM	Received by Laboratory:

REMARKS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/19/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: GP

LAB NUMBER	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		12/18/97	12/18/97	12/18/97	12/18/97
H3384-1	MW-#1	<0.002	<0.002	<0.002	<0.006
H3384-2	MW-#2	<0.002	<0.002	<0.002	<0.006
H3384-3	MW-#3	<0.002	<0.002	<0.002	<0.006
Quality Control		0.095	0.093	0.094	0.282
True Value QC		0.100	0.100	0.100	0.300
% Accuracy		94.8	92.8	93.7	93.9
Relative Percent Difference		5.4	4.3	4.3	4.0

METHOD: EPA SW 846-8020, 5030, Gas Chromatography

Chemist

12/19/97
Date

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/23/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP

LAB NUMBER	SAMPLE ID	CN^- (mg/L)	F^- (mg/L)	NO_3^- (mg/L)
ANALYSIS DATE		12/22/97	12/18/97	12/18/97
H3384-1	MW-#1	<0.02	1.62	3.75
H3384-2	MW-#2	<0.02	2.13	0.20
H3384-3	MW-#3	<0.02	2.30	0.70
Quality Control		0.105	1.00	5.15
True Value QC		0.100	1.00	5.00
% Accuracy		105	100	103
Relative Percent Difference		4.8	3.0	1.4
METHODS: EPA 600/4-79-020		335.2	340.1	353.2

Chemist

12/23/97
Date

H3384MC.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/19/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY
Lab Number: H3384-1
Sample ID: MW-#1

Analysis Date: 12/19/97
Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: BC

POLYNUCLEAR AROMATIC HYDROCARBONS - 625 (mg/L)	Sample Result H3384-1	Method Blank	QC	% Recov.	True Value QC
1 Naphthalene	<0.001	<0.001	0.039	78	0.050
2 2-Methylnaphthalene	<0.002	<0.002	0.043	86	0.050
3 1-Methylnaphthalene	<0.002	<0.002	NR	NR	NR
4 Acenaphthylene	<0.001	<0.001	0.040	80	0.050
5 Acenaphthene	<0.001	<0.001	0.042	84	0.050
6 Fluorene	<0.001	<0.001	0.048	96	0.050
7 Phenanthrene	<0.001	<0.001	0.053	106	0.050
8 Anthracene	<0.001	<0.001	0.049	98	0.050
9 Fluoranthene	<0.001	<0.001	0.049	98	0.050
10 Pyrene	<0.001	<0.001	0.048	96	0.050
11 Benzo(a)anthracene	<0.001	<0.001	0.046	92	0.050
12 Chrysene	<0.001	<0.001	0.048	96	0.050
13 Benzo(b)fluoranthene	<0.001	<0.001	0.038	76	0.050
14 Benzo(k)fluoranthene	<0.001	<0.001	0.044	88	0.050
15 Benzo(a)pyrene	<0.0007	<0.0007	0.045	90	0.050
16 Indeno(1,2,3-cd)pyrene	<0.002	<0.002	0.042	84	0.050
17 Dibenzo(a,h,)anthracene	<0.002	<0.002	0.049	98	0.050
18 Benzo(g,h,i)perylene	<0.002	<0.002	0.050	100	0.050

	% Recovery
19 Nitrobenzene-d5	58
20 2-Fluorobiphenyl	79
21 Terphenyl-d14	102

METHODS: EPA 625

Burgess J. A. Cooke, Ph. D.

12/19/97
Date

H3384-1.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/19/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY
Lab Number: H3384-2
Sample ID: MW-#2

Analysis Date: 12/19/97
Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: BC

POLYNUCLEAR AROMATIC HYDROCARBONS - 625 (mg/L)	Sample Result H3384-2	Method Blank	QC	% Recov.	True Value QC
1 Naphthalene	<0.001	<0.001	0.039	78	0.050
2 2-Methylnaphthalene	<0.002	<0.002	0.043	86	0.050
3 1-Methylnaphthalene	<0.002	<0.002	NR	NR	NR
4 Acenaphthylene	<0.001	<0.001	0.040	80	0.050
5 Acenaphthene	<0.001	<0.001	0.042	84	0.050
6 Fluorene	<0.001	<0.001	0.048	96	0.050
7 Phenanthrene	<0.001	<0.001	0.053	106	0.050
8 Anthracene	<0.001	<0.001	0.049	98	0.050
9 Fluoranthene	<0.001	<0.001	0.049	98	0.050
10 Pyrene	<0.001	<0.001	0.048	96	0.050
11 Benzo(a)anthracene	<0.001	<0.001	0.046	92	0.050
12 Chrysene	<0.001	<0.001	0.048	96	0.050
13 Benzo(b)fluoranthene	<0.001	<0.001	0.038	76	0.050
14 Benzo(k)fluoranthene	<0.001	<0.001	0.044	88	0.050
15 Benzo(a)pyrene	<0.0007	<0.0007	0.045	90	0.050
16 Indeno(1,2,3-cd)pyrene	<0.002	<0.002	0.042	84	0.050
17 Dibenzo(a,h,)anthracene	<0.002	<0.002	0.049	98	0.050
18 Benzo(g,h,i)perylene	<0.002	<0.002	0.050	100	0.050

	% Recovery
19 Nitrobenzene-d5	53
20 2-Fluorobiphenyl	69
21 Terphenyl-d14	88

METHODS: EPA 625

Burgess J. A. Cooke, Ph. D.

12/19/97
Date

H3384-2XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/19/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY
Lab Number: H3384-3
Sample ID: MW-#3

Analysis Date: 12/19/97
Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: BC

POLYNUCLEAR AROMATIC HYDROCARBONS - 625 (mg/L)	Sample Result H3384-3	Method Blank	QC	% Recov.	True Value QC
1 Naphthalene	<0.001	<0.001	0.039	78	0.050
2 2-Methylnaphthalene	<0.002	<0.002	0.043	86	0.050
3 1-Methylnaphthalene	<0.002	<0.002	NR	NR	NR
4 Acenaphthylene	<0.001	<0.001	0.040	80	0.050
5 Acenaphthene	<0.001	<0.001	0.042	84	0.050
6 Fluorene	<0.001	<0.001	0.048	96	0.050
7 Phenanthrene	<0.001	<0.001	0.053	106	0.050
8 Anthracene	<0.001	<0.001	0.049	98	0.050
9 Fluoranthene	<0.001	<0.001	0.049	98	0.050
10 Pyrene	<0.001	<0.001	0.048	96	0.050
11 Benzo(a)anthracene	<0.001	<0.001	0.046	92	0.050
12 Chrysene	<0.001	<0.001	0.048	96	0.050
13 Benzo(b)fluoranthene	<0.001	<0.001	0.038	76	0.050
14 Benzo(k)fluoranthene	<0.001	<0.001	0.044	88	0.050
15 Benzo(a)pyrene	<0.0007	<0.0007	0.045	90	0.050
16 Indeno(1,2,3-cd)pyrene	<0.002	<0.002	0.042	84	0.050
17 Dibenzo(a,h,)anthracene	<0.002	<0.002	0.049	98	0.050
18 Benzo(g,h,i)perylene	<0.002	<0.002	0.050	100	0.050

	% Recovery
19 Nitrobenzene-d5	43
20 2-Fluorobiphenyl	76
21 Terphenyl-d14	89

METHODS: EPA 625

Burgess J. A. Cooke, Ph. D.

12/19/97
Date

H3384.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/24/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH/GP

RCRA METALS

LAB NUMBER	SAMPLE ID	As ppm	Ag ppm	Ba ppm	Cd ppm	Cr ppm	Pb ppm	Hg ppm	Se ppm
ANALYSIS DATE:		12/22/97	12/22/97	12/23/97	12/22/97	12/22/97	12/19/97	12/23/97	12/22/97
H3384-1	MW-#1	<0.1	<0.1	<1	<0.01	<0.05	<0.05	<0.02	<0.1
H3384-2	MW-#2	<0.1	<0.1	<1	<0.01	<0.05	<0.05	<0.02	<0.1
H3384-3	MW-#3	<0.1	<0.1	<1	<0.01	<0.05	<0.05	<0.02	<0.1
Quality Control		0.049	5.01	20.2	0.992	0.99	4.97	0.0093	0.091
True Value QC		0.050	5.00	20.0	1.000	1.00	5.00	0.0100	0.100
% Recovery		98	100	101	99	99	99	93	91
Relative Percent Difference		3.7	0.1	1.7	0.5	0.4	0.4	3.2	5.4
METHODS: EPA 600/4-79-020		206.2	272.1	208.1	213.1	218.1	239.1	245.1	270.2

Chemist

12/24/97
Date

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/19/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity (mgCaCO3/L)
ANALYSIS DATE:		12/18/97	12/18/97	12/18/97	12/18/97	12/18/97	12/18/97
H3384-1	MW-#1	1007	296	112	22.5	6116	100
H3384-2	MW-#2	3700	426	193	90.0	17028	404
H3384-3	MW-#3	4875	629	302	118	23846	316
Quality Control		NR	60	53	NR	1445	NR
True Value QC		NR	50	50	NR	1413	NR
% Accuracy		NR	120	106	NR	102	NR
Relative Percent Difference		NR	0	0	NR	0.3	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl⁻ (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		12/18/97	12/18/97	12/18/97	12/18/97	12/18/97	12/19/97
H3384-1	MW-#1	1580	1050	0	122	5.58	3480
H3384-2	MW-#2	6200	1160	0	404	7.84	10490
H3384-3	MW-#3	8500	1280	0	316	7.77	15300
Quality Control		496	101	NR	NR	6.99	NR
True Value QC		500	100	NR	NR	7.00	NR
% Accuracy		99.2	101	NR	NR	100	NR
Relative Percent Difference		0.8	0	NR	NR	0	0.3
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Chemist

12/19/97
Date

H3384ANAL

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/24/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH/GP

TOTAL METALS

LAB NUMBER	SAMPLE ID	Al (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Ni (mg/L)	Zn (mg/L)
ANALYSIS DATE:		12/23/97	12/19/97	12/19/97	12/19/97	12/19/97	12/19/97
H3384-1	MW-#1	<0.2	<0.1	0.388	0.345	<0.2	<0.2
H3384-2	MW-#2	<0.2	<0.1	<0.2	0.343	<0.2	<0.2
H3384-3	MW-#3	0.300	<0.1	<0.2	0.440	<0.2	<0.2
Quality Control		19.8	3.992	1.006	1.998	1.995	0.499
True Value QC		20.0	4.000	1.000	2.000	2.000	0.500
% Accuracy		99	100	101	100	100	100
Relative Percent Difference		0.5	0.5	0.6	0.4	0.5	0.6
METHODS: EPA 600/4-78-020		202.1	220.1	236.1	243.1	249.1	289.1

Chemist

12/24/97
Date

file: h3384M2.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 12/17/97
Reporting Date: 12/24/97
Project Number: NOT GIVEN
Project Name: ARCO MONITOR WELLS
Project Location: SOUTH JUSTIS IDA WIMBERLY

Sampling Date: 12/17/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH/GP

LAB NUMBER	SAMPLE ID	B (mg/L)	Co (mg/L)	Mo (mg/L)
ANALYSIS DATE		12/23/97	12/23/97	12/23/97
H3384-1	MW-#1	<0.75	<0.05	<0.2
H3384-2	MW-#2	<0.75	<0.05	<0.2
H3384-3	MW-#3	<0.75	<0.05	<0.2
Quality Control		1.0	5.00	4.90
True Value QC		1.0	5.00	5.00
% Accuracy		100	100	98
Relative Percent Difference		1.7	0.1	0
METHODS: EPA 600/4-91-010,		212.1	219.1	246.1

Chemist

12/24/97
Date

H3384M3.XLS

Safety & Environmental Solutions, Inc.

RECEIVED
FEB 0 8 1999
ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Arco Permian
South Justis Unit F-230

Installation of Additional Monitor Wells and Investigation Results

Lea County, New Mexico

Error Report

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

In October 1997 Arco Permian secured the services of Safety and Environmental Solutions, Inc. to determine the vertical and horizontal extent of the abandoned pit site on the specified location. A work plan was formulated to drill three monitor wells around the pit area for definition of the extent of the pit area and to provide initial indications of the extent of any groundwater contamination. Upon completion of these wells, it was determined that the water showed elevated Chlorides and Total Dissolved Solids (TDS). Further delineation was required to determine the extent of elevated Chlorides and TDS levels. To this end, a new Work Plan was formulated to drill up to four additional monitor wells.

II. Work Performed

Four additional monitor wells were drilled at the Arco Permian South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, NM according to the Approved Work Plan (GW-202 Pit Closure). SES contracted Atkins Engineering of Roswell, NM to drill these wells on August 7 to August 12, 1998. Cardinal Laboratories of Hobbs, NM was also contracted to perform the laboratory analytical testing required for this project.

SES sampled the first two additional monitor well hole soils (MW #4 & MW #5) at intervals of ten (10') feet using SOPs found in **Environmental Protection Agency, 1984, Characterization of Hazardous Waste Site - A Methods Manual: Vol II.** Field testing was performed on these samples for TPH, BTEX and Chlorides. The composite soil samples along with Chain of Custody were then delivered to the laboratory for confirmatory testing. The composite samples were analyzed for Total Petroleum Hydrocarbons (EPA Method 418.1), BTEX (EPA Method 8020) and Chlorides (EPA Method 600/4-79-020). The results of the BTEX, TPH and Chlorides were compared to the regulatory limits found in **"Guidelines for Remediation of Leaks, Spills and Releases"** *New Mexico Oil Conservation Division* - August 13, 1993. A summary of the laboratory analysis and correlated test hole data is represented in the following tables:

Well #4

Monitor Well #4 was drilled between Monitor Wells #2 and #3, upgradient of MW #3 on the south berm of the pit area with to a total depth of 80'.

ID/Depth	Lithology	TPH	CL	Benzene	Toluene	Ethyl Benzene	Total Xylenes
4-1 10'	Caliche	<10	223	<0.002	<0.002	<0.002	<0.006
4-2 20'	Sandy Caliche	<10	490	<0.002	<0.002	<0.002	<0.006
4-3 30'	Sand	<10	1462	<0.002	<0.002	<0.002	<0.006
4-4 40'	Red Sand	<10	1337	<0.002	<0.002	<0.002	<0.006
4-5 50'	Silty Sand w/gravel	<10	1257	<0.002	<0.002	<0.002	<0.006
4-6 60'	Silty Clayey Sand	44.7	1195	<0.002	<0.002	<0.002	<0.006
4-7 70'	Sandy Gravel	<10	1498	<0.002	<0.002	<0.002	<0.006
4-8 80'	Red Clay	<10	2283	<0.002	<0.002	<0.002	<0.006
TD 80'	Ground water	<1.0	9641	<0.033	<0.002	<0.007	<0.006

The groundwater sampled at total depth (80') on Monitor Well #4, in addition to testing as shown above, was tested for Cations, Anions and Total Dissolved Solids (TDS). These results indicated no elevated levels except on Chlorides and TDS. (See Attached Analytical Results)

Well #6

Monitor Well #6 was drilled southeast of Monitor Wells #3 and #4, approximately 50 feet down-gradient of an existing produced water line, to a total depth of 80'. Testing was performed on the groundwater sampled at total depth (80') only.

ID/Depth	Lithology	TPH	CL	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes
6-1 TD 80'	Ground water	<1.0	29600	58260	0.044	0.004	<0.002	0.009

Well #7

Monitor Well #7 was drilled southwest of Monitor Wells #6 to a total depth of 75'. Testing was performed on the groundwater sampled at total depth (75') only.

ID/Depth	Lithology	TPH	CL	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes
7-1 TD 75'	Ground water	48.7	5015	13496	0.013	0.002	<0.002	<0.006

III. Monitor Well Testing

Initial water sampling from each of the four wells was performed on August 25, 1998 according to SW- 846 methods and transported under Chain of Custody to the laboratory for analysis. The water samples were analyzed for BTEX (EPA Method 8020, 5030) as well as NMWQAC testing (Methods 625, 600/4-79-020, -206.2, -272.1,-213.1,-208.1, -218.1,-239.1,-245.1,-270.2, 600/4-78-020,-202.1,-220.1,-236.1,-243.1,-249.1,-289.1, 600/4-91-010,-212.1,-219.1,-246.1, SM4500-Cl-B, 375.4, 310.1, 150.1, 160.1, 120.1, 8049, 3500-Mg E, SM3500-Ca-D). **(See Analytical Reports attached)**
On August 25, 1998, the groundwater in all seven monitor wells were sampled again according to SW - 846 methods and transported under Chain of Custody to the laboratory for analysis. The water was analyzed for TPH, BTEX and major cations, anions, and TDS. The results indicated high levels of Chlorides and TDS in all wells. Monitor well # 4 exhibited small amounts of Benzene and Ethyl Benzene and monitor well # 7 exhibited a small amount of Benzene. The TPH in all wells was very low.

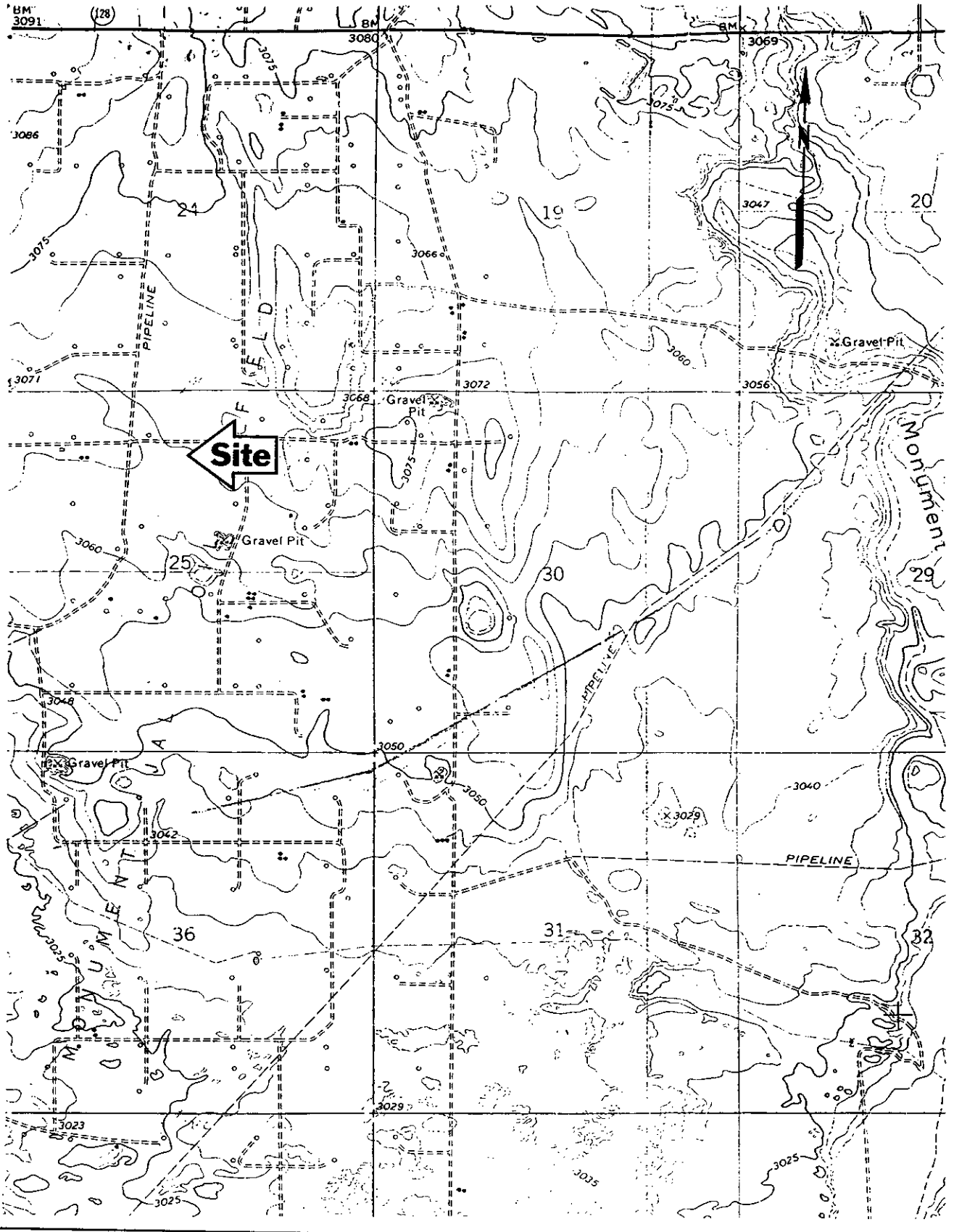
Monitor well # 6 exhibits extremely high levels of Chlorides and TDS. These levels are 5.8 and 6.5 times higher than monitor well # 3 which is only 55' upgradient. The uncharacteristically high levels of Chlorides and TDS may indicate another source of contamination other than the subject site. There is a saltwater disposal line that is located between monitor well #3 and monitor well #6. (See Analysis Results - August 25, 1998).

IV. Conclusions

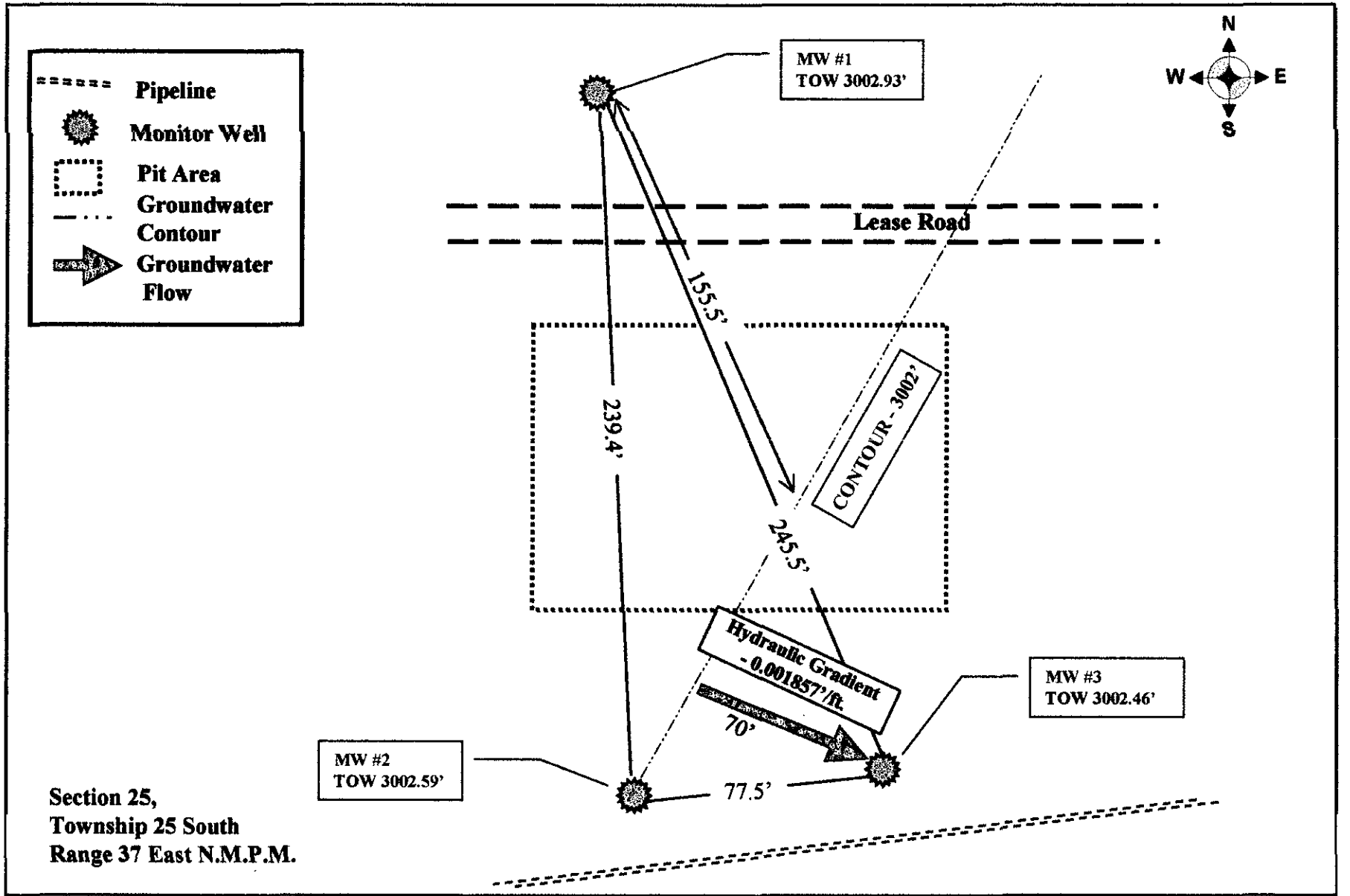
The gradient of the water table is established to be relatively flat but sloping slightly from the Northwest to the Southeast. The entire group of monitor well exhibits high levels of Chlorides and TDS indicates the water in the whole area is not of very high quality. The horizontal extent of the contamination plume that results from the subject pit area appears to extent downgradient to monitor wells # 6 and #7. However, the extremely high levels of contaminants in well # 6 appears to indicate an additional source of contamination between well # 3 and well #6. It is our opinion that the completion of this phase of the plume investigation has satisfactorily delineated the plume caused by the subject pit.

V. Maps and Figures

Vicinity Map
Water Contour and Flow Plan
Survey Plat
Driller's Log
Analysis Results - August 25, 1998
Chain of Custody for Samples
Analytical Results



ARCO Permian	**South Justis Unit F-230** **Vicinity Map**	*Safety & Environmental Solutions, Inc.* *Hobbs, NM*

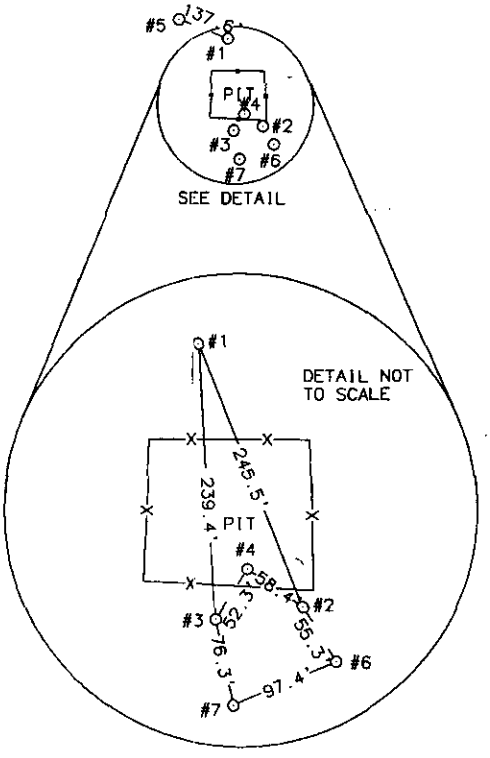


ARCO Permian	Water Contour and Flow South Justis F-230 Monitor Wells	Safety & Environmental Solutions, Inc. Hobbs, New Mexico

23 | 24 USGLO BC "1913" | 24 1/4 COR USGLO BC "1913"

S89°59'W 2640.2' BASIS OF BEARING USGLO PLAT

26 | 25



26

MONITOR WELL #1
742' FNL 1406' FWL
TOP CONC. BASE 3064.72'
N/SIDE TOP 2" PVC 3066.98'

MONITOR WELL #2
970' FNL 1497' FWL
TOP CONC. BASE 3063.62'
N/SIDE TOP 2" PVC 3066.21'

MONITOR WELL #3
981' FNL 1420' FWL
TOP CONC. BASE 3063.41'
N/SIDE TOP 2" PVC 3065.92'

MONITOR WELL #4
937' FNL 1449' FWL
TOP CONC. BASE 3065.64'
N/SIDE TOP 2" PVC 3067.93'

MONITOR WELL #5
693' FNL 1277' FWL
TOP CONC. BASE 3064.36'
N/SIDE TOP 2" PVC 3066.56'

MONITOR WELL #6
1017' FNL 1526' FWL
TOP CONC. BASE 3063.14'
N/SIDE TOP 2" PVC 3065.33'

MONITOR WELL #7
1056' FNL 1436' FWL
TOP CONC. BASE 3062.43'
N/SIDE TOP 2" PVC 3064.64'

500 0 500 1000 FEET

Scale:1"=500'

I HEREBY CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

GARY G. EIDSON 12641 REGISTERED PROFESSIONAL SURVEYOR

8/24/98

RONALD J. EIDSON, N.M. P.S. No. 3239
GARY G. EIDSON N.M. P.S. No. 12641

JOHN W. WEST ENGINEERING COMPANY
CONSULTING ENGINEERS & SURVEYORS – HOBBS, NEW MEXICO

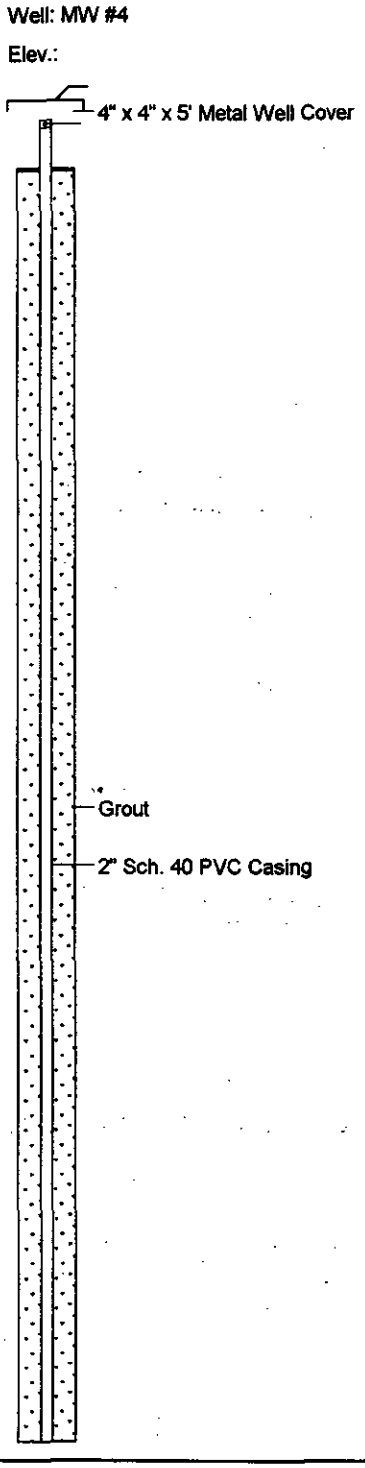
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.

ELEVATIONS AND TIES ON ARCO PERMIAN
MONITOR WELLS #1, #2, #3, #4, #5, #6 AND #7.
IN SECTION 25,
TOWNSHIP 25 SOUTH,
RANGE 37 EAST, N.M.P.M.,
LEA COUNTY, NEW MEXICO

Survey Date: 8/19/98		Sheet 1 of 1 Sheets	
W.O. Number: 98-11-1164		Drawn By: D.McCARLEY	
Date: 8/24/98	SAFETY	SESI1164	Scale:1"=500'

Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #4 (Page 1 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-7-98/8-10-98 Drill Start : 11:45 A.M. 8-7-98 Drill End : 10:00 A.M. 8-10-98 Boring Location : S. Bank of Pit Site Location : 5 miles E. of Jal Auger Type : Hollow Stem Logged By : Mort Bates
Contact: Mr. Bob Allen	
Job #98280.20	

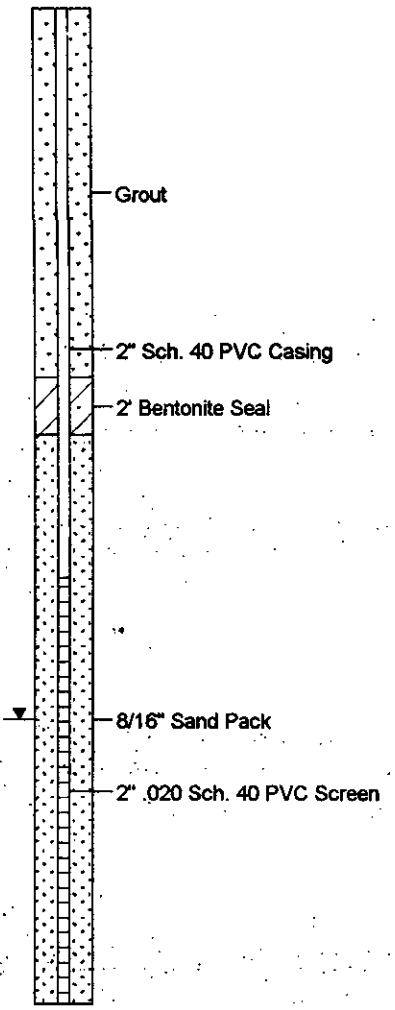
Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
0		CL		Silty Clay w/Caliche, Tan, Loose, Dry
5				Caliche, Tan, Firm, Dry
10			1	
15				
20			2	Sandy Caliche, Tan, Firm, Dry
25		SP		Sand, Tan, Soft, Dry
30			3	
35		SP		Sand, Red, Firm, Dry
40			4	
		CL		Silty Sandy Clay, Red, Soft, Dry
45		SM		Silty Sand w/small Gravel, Reddish-Tan, Stiff, Damp



08-17-1998 c:\mtech46\arco\mw-4.bor

Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #4 (Page 2 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-7-98/8-10-98 Drill Start : 11:45 A.M. 8-7-98 Drill End : 10:00 A.M. 8-10-98 Boring Location : S. Bank of Pit Site Location : 5 miles E. of Jal Auger Type : Hollow Stem Logged By : Mort Bates
Contact: Mr. Bob Allen	
Job #98280.20	

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
45				
50		SM	5	
55				Silty Clayey Sand w/Gravel, Tan, Loose, damp
60		SM	6	
65				
70		GP	7	Cemented Sandy Gravel, Tan, Firm, Wet to Saturated WL @ 70 ft.
75				
80			8	TD = 80 ft. Below 80' - Clay, Red, Firm, Saturated
85				
90				



08-17-1998 c:\mtech46\arco\mw-4.bor

Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #5 (Page 1 of 2)

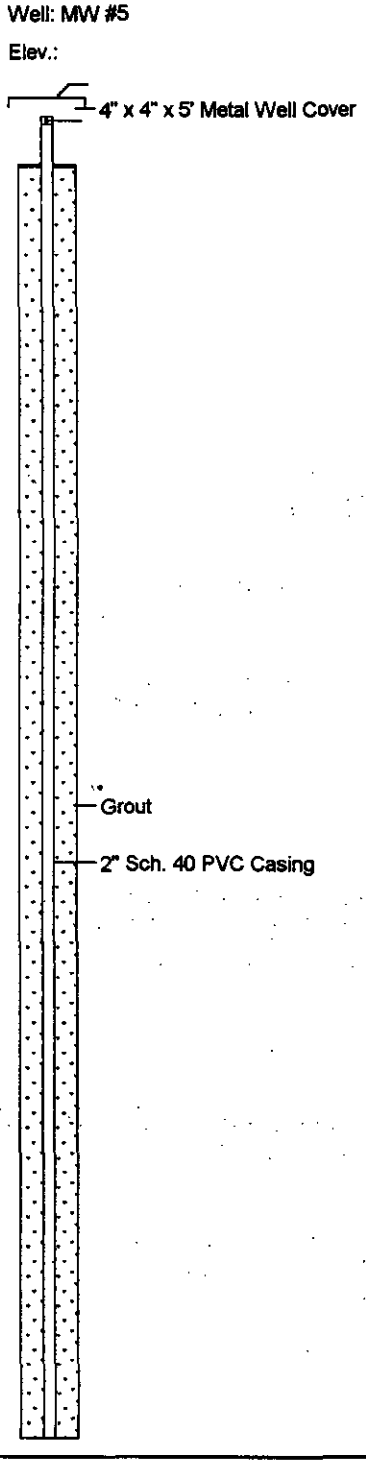
ARCO Oil Co.
Jal, New Mexico

Contact: Mr. Bob Allen

Job #98280.20

Date	: 8-11-98	Site Location	: 5 miles E. & 2 miles S. of Jal
Drill Start	: 10:15 A.M.	Auger Type	: Hollow Stem
Drill End	: 6:00 P.M.	Logged By	: Mort Bates
Boring Location	: N.W. of Pit, N. of Road		

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
0		CL		Silty Clay w/Caliche, Tan, Loose, Dry
5				
				Silty Caliche, Tan, Loose, Dry
10			1	Silty Caliche Clay w/Gravel, Tan, Loose, Dry
15		CL		
20			2	Caliche, White, Loose, Dry
25				
30		SC	3	Silty Clayey Sand, Pink, Loose, Dry
35				
40		SC	4	Silty Clayey Sand w/small Caliche, Pink, Loose, Dry
		SC		Silty Clayey Sand w/trace of Caliche, Tan, Loose, Dry
45				



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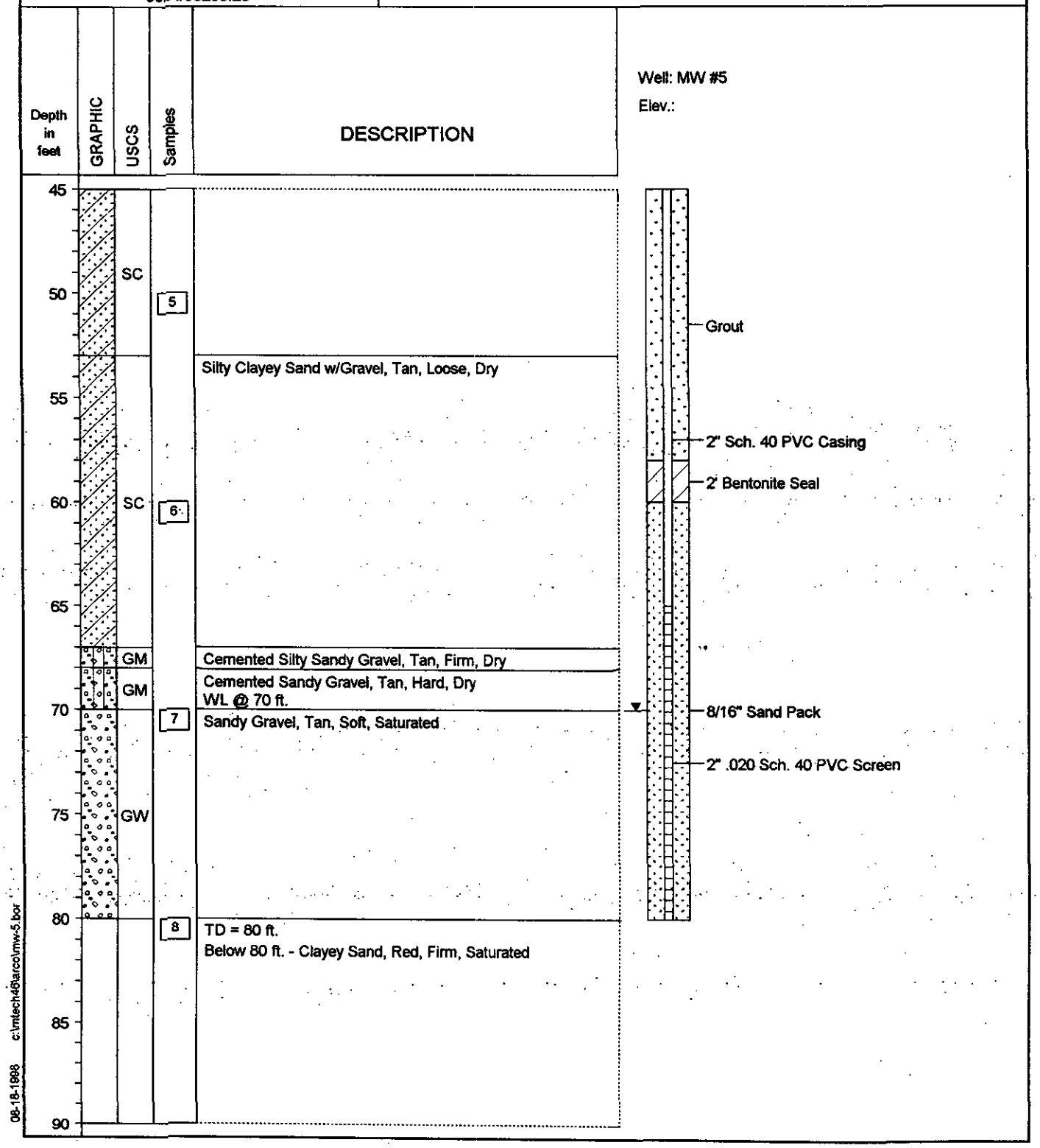
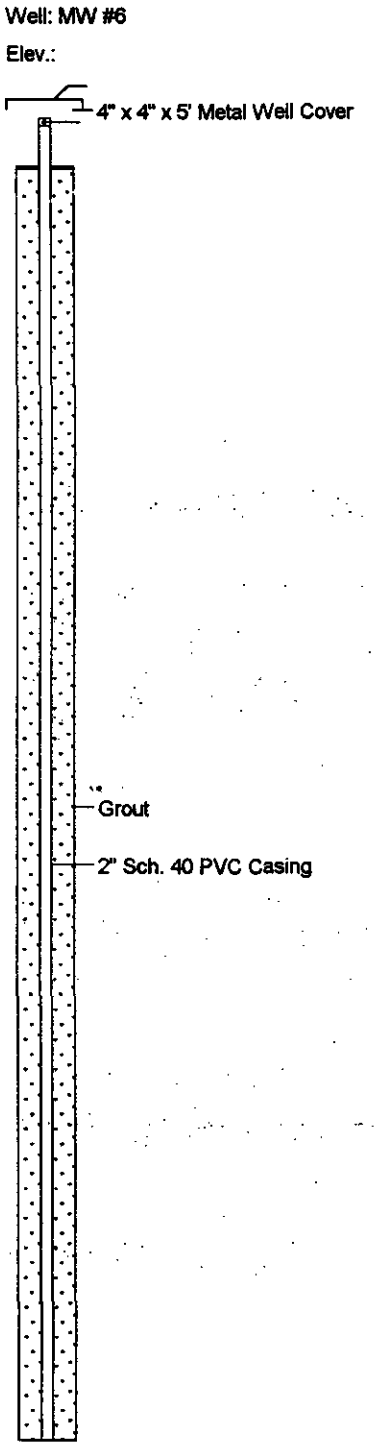
Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #5 (Page 2 of 2)
ARCO Oil Co. Jal, New Mexico Contact: Mr. Bob Allen Job #98280.20	Date : 8-11-98 Drill Start : 10:15 A.M. Drill End : 6:00 P.M. Boring Location : N.W. of Pit, N. of Road Site Location : 5 miles E. & 2 miles S. of Jal Auger Type : Hollow Stem Logged By : Mort Bates



08-18-1998 c:\mtech46\arco\mw-5.bor

Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #6 (Page 1 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-11-98 Drill Start : 7:20 A.M. Drill End : 1:45 P.M. Boring Location : S.E. of Pit
Contact: Mr. Bob Allen	Site Location : 5 miles E. & 2 miles S. of Jal Auger Type : Hollow Stem Logged By : Mort Bates
Job #98280.20	

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
0		CL		Silty Clay w/Caliche, Tan, Loose, Dry
		CL		Silty Clay, Tan, Loose, Dry
5				Caliche w/Silty Clay, Tan, Loose, Dry
10				
15				
20				Caliche Rock, White, Firm, Dry
25		SC		Silty Clayey Sand w/Caliche, Tan, Firm, Dry
30				
35				
40				
45				



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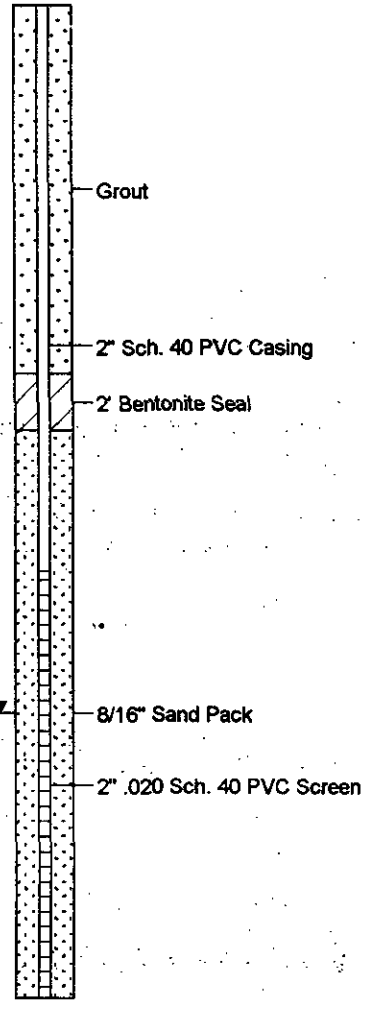
Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #6 (Page 2 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-11-98 · Site Location : 5 miles E. & 2 miles S. of Jal Drill Start : 7:20 A.M. · Auger Type : Hollow Stem Drill End : 1:45 P.M. · Logged By : Mort Bates Boring Location : S.E. of Pit
Contact: Mr. Bob Allen	
Job #98280.20	

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
45		SC		
		SP		Sand, Tan, Loose, Moist
		GM		Cemented Gravel w/Sand, Tan, Stiff, Dry
50		SW		Sand w/Gravel, Tan, Soft, Wet
55		GW		Gravel w/sand, Tan, Loose, Dry
60		SP		Sand, Reddish-Tan, Loose, Damp
65				
70		SP		WL @ 70 ft. Sand, Reddish-Tan, Loose, Saturated
75		CL		Clay, Red, Stiff, Saturated
80				TD = 80 ft.
85				
90				

Well: MW #6
Elev.:



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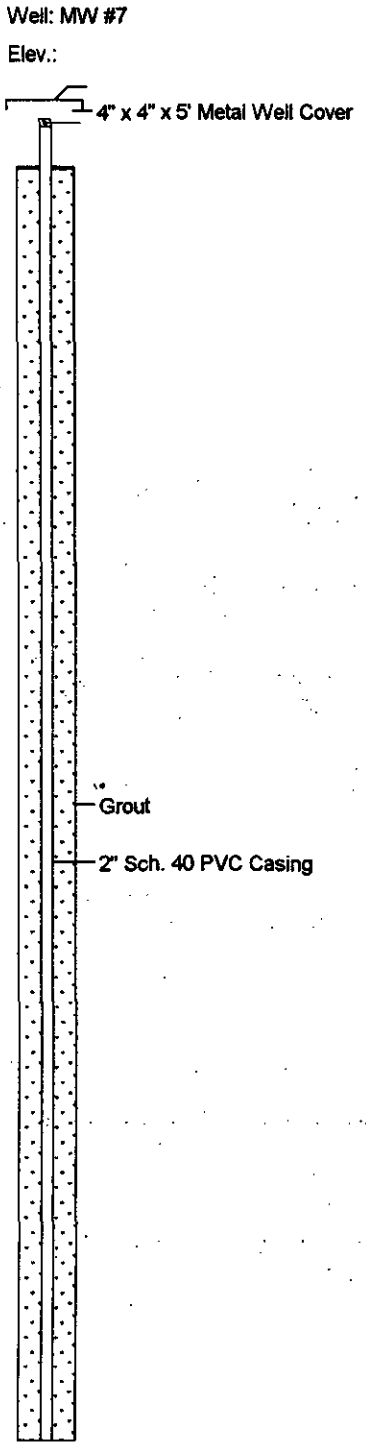
Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #7 (Page 1 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-11-98 Drill Start : 1:55 P.M. Drill End : 6:45 P.M. Boring Location : 75 ft. S. of Pit Site Location : 5 miles E. & 2 miles S. of Jal Auger Type : Hollow Stem Logged By : Mort Bates
Contact: Mr. Bob Allen	
Job #98280.20	

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
0		CL		Silty Clay w/Caliche, Tan, Loose, Dry
5				
10				Caliche, Tan, Loose, Dry
15				
20				Caliche Rock, White, Hard, Dry
25				Caliche w/Silty Clay, Tan, Loose, Dry
		SC		Clayey Sand, Reddish-Tan, Loose, Dry
30		GW		Gravel w/Sand, Tan, Firm, Dry
35		CL		Sandy Clay, Tan, Loose, Damp
40		SM		Silty Sand, Tan, Loose, Damp
45		SW		Sand w/Gravel, Tan, Loose, Dry

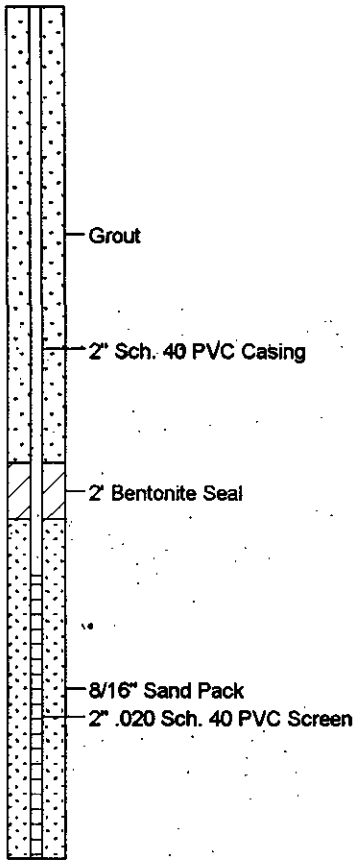


08-18-1998 c:\mtech46\arco\mw-7.bor

Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #7 (Page 2 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-11-98 Drill Start : 1:55 P.M. Drill End : 6:45 P.M. Boring Location : 75 ft. S. of Pit Site Location : 5 miles E. & 2 miles S. of Jal Auger Type : Hollow Stem Logged By : Mort Bates
Contact: Mr. Bob Allen Job #98280.20	

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
45		SW		
50		SM		Cemented Silty Sand, White, Hard, Dry
55		SC		Clayey Sand, Tan, Loose, Dry
60		SC		Clayey Sand w/Gravel, Tan, Firm, Dry
65		SM		Cemented Sand w/Gravel, Hard, Gray, Dry
70		SP		Sand, Tan, Loose, Saturated
75				TD = 75 ft. Below 75 ft. - Clay w/Gravel, Red, Firm, Wet
80				
85				
90				

Well: MW #7
Elev.:



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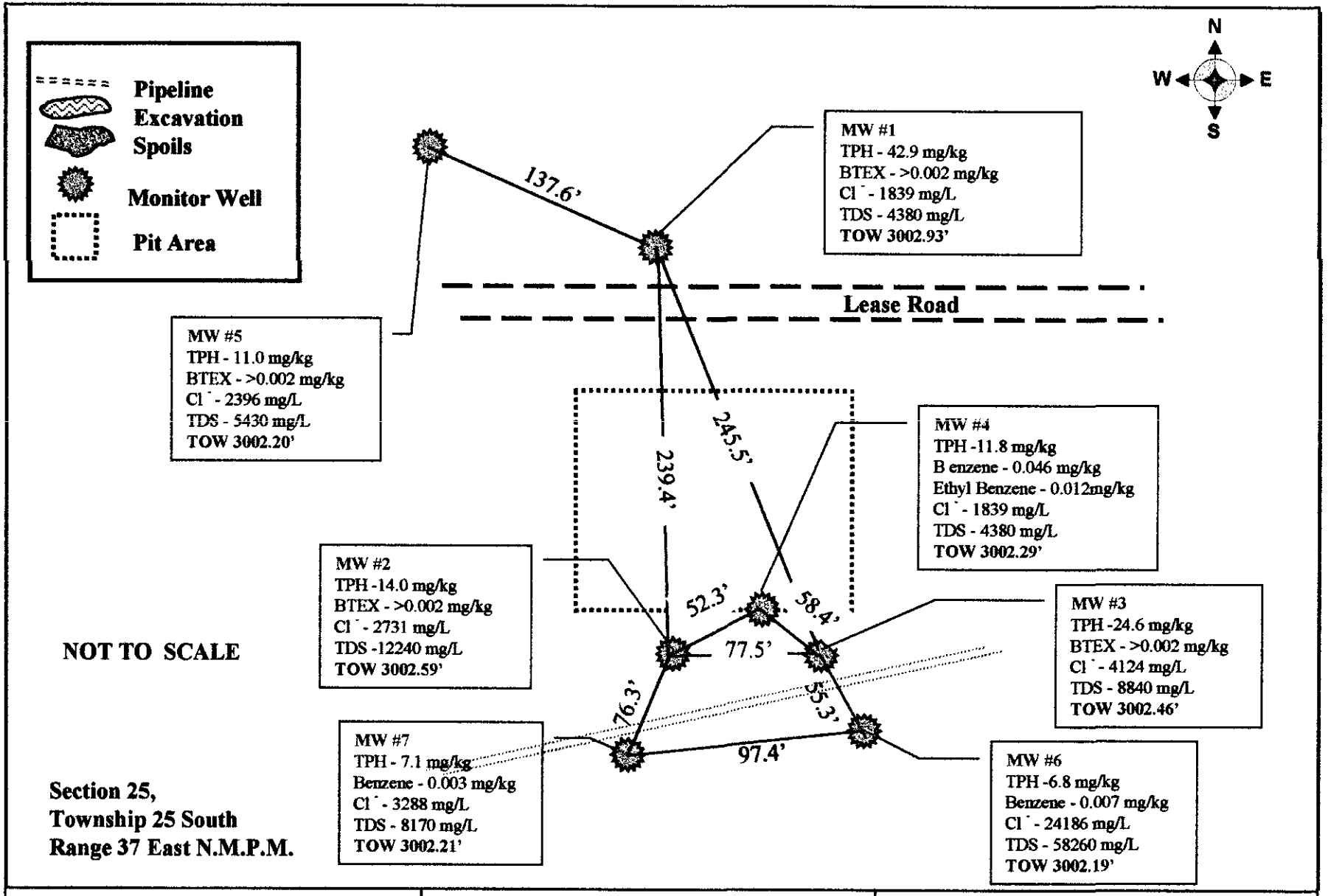
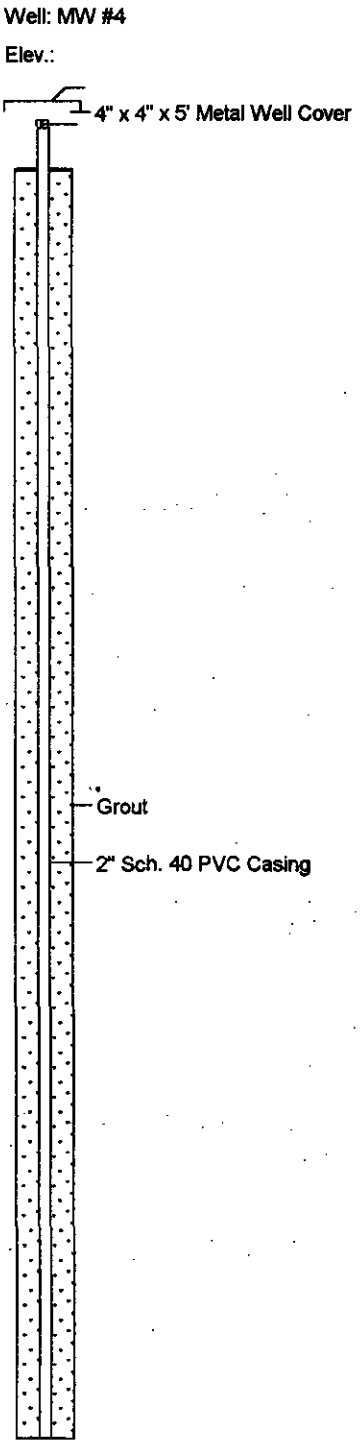


ARCO Permian	**Analysis Results Aug. 25, 1998** **South Justis F-230** **Monitor Wells**	**Safety & Environmental Solutions, Inc.** **Hobbs, New Mexico**

Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #4 (Page 1 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-7-98/8-10-98 Drill Start : 11:45 A.M. 8-7-98 Drill End : 10:00 A.M. 8-10-98 Boring Location : S. Bank of Pit Site Location : 5 miles E. of Jal Auger Type : Hollow Stem Logged By : Mort Bates
Contact: Mr. Bob Allen	
Job #98280.20	

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
0		CL		Silty Clay w/Caliche, Tan, Loose, Dry
5				
10			1	Caliche, Tan, Firm, Dry
15				
20			2	Sandy Caliche, Tan, Firm, Dry
25		SP		Sand, Tan, Soft, Dry
30			3	
35		SP		Sand, Red, Firm, Dry
40			4	
		CL		Silty Sandy Clay, Red, Soft, Dry
45		SM		Silty Sand w/small Gravel, Reddish-Tan, Stiff, Damp



08-17-1998 c:\mtech46\arcolmw-4.bor

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: SESI	BILL TO
Project Manager:	P.O. #:
Address: 703 E Clinton PO Box 1613	Company: SESI
City: Hobbs State: NM Zip: 88240	Attn: Beth Aldrich
Phone #: 397-0510 Fax #: 393-4380	Address: PO Box 1611
Project #: Project Owner:	City: Hobbs
Project Name: SJU F230	State: NM Zip: 88240
Project Location: JAL	Phone #: 505-397-0510
Sampler Name: Beth Aldrich	Fax #: 505-393-4380

ANALYSIS REQUEST: BTEX, TPH

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER :	PRESERV: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING: DATE	TIME
H3775-1	MW#4 TD					X							8/7	7:20
-2	MW #4 10'					X							8/7	12:45
-3	MW #4 20'					X							8/7	1:45
-4	MW #4 30'					X							8/7	2:15
-5	MW #4 40'					X							8/7	3:10
-6	MW #4 50'					X							8/7	4:40
-7	MW #4 60'					X							8/7	6:00
-8	MW #4 70'					X							8/7	6:50

Sampler Relinquished: Beth Aldrich	Date: 8/10/98	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
	Time: 10:15a		Fax Result: ☐ Yes ☐ No Add'l Fax #:
Relinquished By:	Date: 8/10/98	Received By: (Lab Staff)	REMARKS:
	Time: 10:15		
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition: Cool ☑ Yes ☐ No; Intact ☐ Yes ☐ No	CHECKED BY: (Initials)	

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476.

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/12/98
Project Number: NOT GIVEN
Project Name: SJU F230
Project Location: JAL

Sampling Date: 08/07/98
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NUMBER	SAMPLE ID	TPH (mg/Kg)	Cl (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		08/10/98	08/11/98	08/10/98	08/10/98	08/10/98	08/10/98
H3775-1	MW # 4 TD	<10	2283	<0.002	<0.002	<0.002	<0.006
H3775-2	MW # 4 10'	<10	223	<0.002	<0.002	<0.002	<0.006
H3775-3	MW # 4 20'	<10	490	<0.002	<0.002	<0.002	<0.006
H3775-4	MW # 4 30'	<10	1462	<0.002	<0.002	<0.002	<0.006
H3775-5	MW # 4 40'	<10	1337	<0.002	<0.002	<0.002	<0.006
H3775-6	MW # 4 50'	<10	1257	<0.002	<0.002	<0.002	<0.006
H3775-7	MW # 4 60'	44.7	1195	<0.002	<0.002	<0.002	<0.006
H3775-8	MW # 4 70'	<10	1498	<0.002	<0.002	<0.002	<0.006
Quality Control		269	1209	0.103	0.093	0.098	0.301
True Value QC		273	1319	0.100	0.100	0.100	0.300
% Accuracy		97.4	91.7	103	92.7	98.4	100
Relative Percent Difference		6.1	4.4	12.6	5.9	2.5	1.9

METHODS: TRPHC-EPA 600/4-79-020, 418.1;Cl-EPA 600/4-79-020 325.3 BTEX-EPA SW-846-8020

Burgess J. A. Cooke, Ph. D.

8/13/98
Date

H3775-1.XLS

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page____ of____

Company Name:	SESI	BILL TO	PO #:
Project Manager:	B Aldrich	Company:	
Address:	703 E Clinton #103	Attn:	Same
City:	Hobbs State: NM Zip: 88240	Address:	
Phone #:	505-397-0510	City:	
Fax #:	505-393-4388	State: Zip:	
Project #:	— Project Owner: Arco Permian	Phone #:	
Project Name:	Monitor Well #4	Fax #:	
Project Location:	South First F 230		

FOR LAB USE ONLY				MATRIX						PRES.			SAMPLING		ANALYSIS REQUEST											
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	OTHER:	DATE	TIME	TDS	Metals	Cations	Anions	PAH — TPH	BTEX						
H3776-1	MW #4	C	4	X							✓		8-10-98	1000	X	X	X	X	X	X						

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Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date: 8/10/98	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time: 11am		Fax Result: ☐ Yes ☐ No
Relinquished By:	Date: 8/10/98	Received By: (Lab Staff)	REMARKS:
	Time:		
Delivered By: (Circle One)	Sample Condition Cool ☑ Yes ☐ No Intact ☐ Yes ☐ No	CHECKED BY: (Initials)	
Sampler - UPS - Bus - Other:			

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: MONITOR WELL # 4
Project Location: SOUTH JUSTIS F-230

Sampling Date: 08/10/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: JS
Analyzed By: AH

LAB NUMBER SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity (mgCaCO3/L)
ANALYSIS DATE:	08/13/98	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98
H3776-1 MW #4	5252	480	340	68	18190	360
Quality Control	NR	48.0	52.0	3.05	1402	NR
True Value QC	NR	50.0	50.0	3.00	1413	NR
% Accuracy	NR	96	104	102	99.2	NR
Relative Percent Difference	NR	4.2	3.8	1.6	0.1	NR
METHODS:		SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

	Cl^- (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98
H3776-1 MW #4	9641	159	0	439	6.69	13580
Quality Control	1209	48.92	112	221	7.00	NR
True Value QC	1319	50.00	124	259	7.00	NR
% Accuracy	91.7	98	90	85	100	NR
Relative Percent Difference	4.4	3.1	-	-	0.6	2.3
METHODS:	SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Chemist

8/13/98
Date

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: MONITOR WELL # 4
Project Location: SOUTH JUSTIS F-230

Sampling Date: 08/10/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: JS
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/kg)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)
ANALYSIS DATE:		08/10/98	08/10/98	08/10/98	08/10/98	08/10/98
H3776-1	MW #4	<1.0	0.033	<0.002	<0.007	<0.006
Quality Control		209	0.103	0.093	0.098	0.301
True Value QC		200	0.100	0.100	0.100	0.300
% Recovery		105	103	92.7	98.4	100
Relative Percent Difference		1.2	12.6	5.4	2.5	1.4

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW846-8020, 8260

Chemist

8/13/98
Date

H3776-1.XLS

CARDINAL LABORATORIES, INC.

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101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1

Company Name: SESI	**BILL TO** PO #:
Project Manager: B. Aland	Company:
Address: 703 E. Clinton #103	Attn: XXXX
City: Hobbs State: NM Zip: 88240	Address:
Phone #: 505 397 0510	City:
Fax #: 505 393 4388	State: Zip:
Project #: Project Owner: Dorco Repman	Phone #:
Project Name: South Justis F240 - 25 All man. Frml	Fax #:
Project Location:	

LAB I.D. (FOR LAB USE ONLY)	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	MATRIX: WASTEWATER	MATRIX: SOIL	MATRIX: OIL	MATRIX: SLUDGE	MATRIX: OTHER:	PRES.: ACID:	PRES.: ICE / COOL	PRES.: OTHER:	SAMPLING: DATE	SAMPLING: TIME	TPH	BTEX	Chlorides	Cations	Anions	[illegible]	[illegible]	TDS					
H3777-1	MW#5 10'	G	1			X							9/3/98	1050	X	X	X										
-2	20'		1			X								1115	X	X	X										
-3	30'		1			X								1140	X	X	X										
-4	40'					X								1200	X	X	X										
-5	50'					X								1240	X	X	X										
-6	60'					X								120	X	X	X										
-7	70'					X								200	X	X	X										
-8	80'					X					X			230	X	X	X										
-9	MW #5			X							X			445	X	X	X	X	X	[illegible]	[illegible]	X					

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Sampler Relinquished: [signature]	Date: 9-10-98 Time: [illegible]	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
Relinquished By:	Date: 9/10/98 Time: 8:05	Received By: (Lab Staff) [signature]	Fax Result: ☐ Yes ☐ No
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition Cool ☒ Yes ☐ No Intact ☒ Yes ☐ No	CHECKED BY: (Initials)	REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

CARDINAL LABORATORIES

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SOUTH JUSTIS F230 MONITOR WELL
Project Location: NOT GIVEN

Sampling Date: 08/07/98
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NUMBER	SAMPLE ID	TPH (mg/Kg)	Cl (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		08/11/98	08/12/98	08/11/98	08/11/98	08/11/98	08/11/98
H3777-1	MW # 5 10'	<10	71	<0.002	<0.002	<0.002	<0.006
H3777-2	MW # 5 20'	<10	196	<0.002	<0.002	<0.002	<0.006
H3777-3	MW # 5 30'	<10	178	<0.002	<0.002	<0.002	<0.006
H3777-4	MW # 5 40'	<10	134	<0.002	<0.002	<0.002	<0.006
H3777-5	MW # 5 50'	<10	98	<0.002	<0.002	<0.002	<0.006
H3777-6	MW # 5 60'	<10	107	<0.002	<0.002	<0.002	<0.006
H3777-7	MW # 5 70'	<10	285	<0.002	<0.002	<0.002	<0.006
H3777-8	MW # 5 80'	<10	874	<0.002	<0.002	<0.002	<0.006
Quality Control		267	1209	0.094	0.096	0.100	0.308
True Value QC		278	1319	0.100	0.100	0.100	0.300
% Accuracy		97.9	91.7	94.3	95.6	100	103
Relative Percent Difference		6.1	4.4	9.0	3.0	1.8	2.3

METHODS: TRPHC-EPA 600/4-79-020, 418.1;Cl-EPA 600/4-79-020 325.3 BTEX-EPA SW-846 8260

Burgess J. A. Cooke, Ph. D.

8/13/98
Date

H3777-1.XLS

CARDINAL LABORATORIES

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SOUTH JUSTIS F230 MONITOR WELL
Project Location: NOT GIVEN

Sampling Date: 08/07/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		08/10/98	08/10/98	08/10/98	08/10/98	08/10/98
H3777-9	MW # 5	<1.0	<0.002	<0.002	<0.002	<0.006
Quality Control		209	0.103	0.093	0.098	0.301
True Value QC		200	0.100	0.100	0.100	0.300
% Recovery		105	103	92.7	98.4	100
Relative Percent Difference		1.2	12.6	5.9	2.5	1.5

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

8/13/98
Date

H3777-2.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SOUTH JUSTIS F230 MONITOR WELL
Project Location: NOT GIVEN

Sampling Date: 08/07/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: AH

LAB NUMBER SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity (mgCaCO3/L)
ANALYSIS DATE:	08/13/98	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98
H3777-9 MW #5	850	264	127	19	5740	164
Quality Control	NR	48.0	52.0	3.05	1402	NR
True Value QC	NR	50.0	50.0	3.00	1413	NR
% Accuracy	NR	96	104	102	99.2	NR
Relative Percent Difference	NR	4.2	3.8	1.6	0.1	NR
METHODS:		SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER SAMPLE ID	Cl (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98
H3777-9 MW #5	1950	138	0	200	7.14	3790
Quality Control	1209	48.92	112	221	7.00	NR
True Value QC	1319	50.00	124	259	7.00	NR
% Accuracy	91.7	98	90	85	100	NR
Relative Percent Difference	4.4	3.1	-	-	0.6	2.3
METHODS:	SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Chemist

8/13/98
Date

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Bath 370-8490 369-9239-Bob

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240

(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

Company Name: SESI	BILL TO PO #:
Project Manager:	Company:
Address: 708 E Chisum 103	Attn: Joe
City: Hobbs State: NM Zip: 8241	Address:
Phone #:	City:
Fax #:	State: Zip:
Project #: Project Owner: Ana Reyes	Phone #:
Project Name: SJU Winkler	Fax #:
Project Location:	

FOR LAB USE ONLY				MATRIX							PRES.			SAMPLING		ANALYSIS REQUEST														
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	OTHER:	DATE	TIME	TDS	BTEX	TPH	Chlorides												
H3780-1	Fed #6 #1	G	2	X							X		7-11-98	1300	X	X	X	X												

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished: B. Aldrich	Date: 8/11 Time:	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #: Fax Result: ☐ Yes ☐ No REMARKS:
Relinquished By: Dana Owen	Date: 8/11 Time: 2:35p	Received By: (Lab Staff) Amy Hill	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition Cool: ☒ Yes ☐ No Intact: ☒ Yes ☐ No	CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

CARDINAL LABORATORIES

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 08/11/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SJU WIMBERLY
Project Location: NOT GIVEN

Sampling Date: 08/11/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Cl (mg/L)	TDS (mg/L)	Conductivity (uS/cm)
ANALYSIS DATE		08/11/98	08/12/98	08/11/98
H3780-1	TEST HOLE #1	29600	58260	61900
Quality Control		1209	NR	1402
True Value QC		1319	NR	1413
% Accuracy		91.7	NR	99.2
Relative Percent Difference		4.4	2.3	0.1
METHODS:	EPA 600/4-79-020	SM4500-CL-B	160.1	120.1

Chemist

8/13/98
Date

H3780-2.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 08/11/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SJU WIMBERLY
Project Location: NOT GIVEN

Sampling Date: 08/11/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		08/11/98	08/11/98	08/11/98	08/11/98	08/11/98
H3780-1	TEST HOLE #1	<1.0	0.044	0.004	<0.002	0.009
Quality Control		207	0.094	0.096	0.1	0.308
True Value QC		200	0.1	0.1	0.1	0.3
% Recovery		104	94.3	95.6	100	103
Relative Percent Difference		0.1	9	3	1.8	2.3

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW846-8020, 8260

Burgess J. A. Cooke, Ph. D.

8/13/98
Date

H3780-1.XLS

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: SESI
Project Manager: Bill [illegible]
Address: 703 E Clinton #103
City: Hobbs State: NM Zip: 88240
Phone #: 505 397-0510
Fax #: 505 393-4388
Project #: Project Owner: Amo Remain [illegible]
Project Name: South Justis C 230 Unit [illegible]
Project Location:

BILL TO PO #:
Company:
Attn: [illegible]
Address:
City:
State: Zip:
Phone #:
Fax #:

LAB I.D. (FOR LAB USE ONLY)	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	ANALYSIS REQUEST: TPH	BTEX	Chlorides	TDS
H 3787-1	MW #7	G	2	X									8.12.98	200p	X	X	X	X

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished: Bill [illegible] Date: 8-12-98 Time:
Received By:
Relinquished By: Date: 8/12/98 Time: 4:45
Received By: (Lab Staff) [illegible]
Delivered By: (Circle One)
Sampler - UPS - Bus - Other:
Sample Condition: Cool ☒ Yes ☐ No; Intact ☒ Yes ☐ No
CHECKED BY: (Initials)

Phone Result ☐ Yes ☐ No Additional Fax #:
Fax Result: ☐ Yes ☐ No
REMARKS:

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 W. CLINTON SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/12/98
Reporting Date:08/13/98
Project Number: NOT GIVEN
Project Name: SOUTH JUSTIS F-230 UNIT IDA W.
Project Location: NOT GIVEN

Sampling Date: 08/12/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: AH/GP

LAB NUMBER	SAMPLE ID	TDS (mg/L)	Cl (mg/L)
ANALYSIS DATE:		08/13/98	08/12/98
H3787-1	MW #7	13496	5015
Quality Control		NR	1209
True Value QC		NR	1319
% Recovery		NR	91.7
Relative Percent Difference		2.3	4.4
METHODS: EPA 600/4-79-02		160.1	325.3

Chemist

Date 8/13/98

H3787-1.XLS

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 W. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/12/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SOUTH JUSTIS F-230 UNIT IDA W.
Project Location: NOT GIVEN

Sampling Date: 08/12/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		08/13/98	08/12/98	08/12/98	08/12/98	08/12/98
H3787-1	MW #7	48.7	0.013	0.002	<0.002	<0.006
Quality Control		200	0.088	0.088	0.092	0.281
True Value QC		200	0.100	0.100	0.100	0.300
% Recovery		100	88.2	88.5	91.6	93.7
Relative Percent Difference		2.6	6.9	8.0	9.4	9.6

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW846-8020, 8260

Chemist

8/13/98
Date

H3787-2.XLS

CARDINAL LABORATORIES, INC.

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CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

H3812

Page ____ of ____

Company Name:	Safety + Environmental	BILL TO	PO #:
Project Manager:	Doc Watley	Company:	SESI
Address:	703 E. Clinton Suite 103	Attn:	
City:	Hobbs State: NM Zip: 88240	Address:	
Phone #:	(505) 397-0510	City:	
Fax #:	(505) 393-4388	State:	Zip:
Project #:	17 Project Owner: Arco	Phone #:	
Project Name:	Eds Wimberly Pit	Fax #:	
Project Location:	South Just 3		

FOR LAB USE ONLY LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	ANALYSIS REQUEST: Cations	Anions	TDS	BTEX	TPH
H3812-1	MW #1		3	✓							✓		8-25	2:30pm	✓	✓	✓	✓	✓
-2	MW #2		3	✓							✓				✓	✓	✓	✓	✓
-3	MW #3		3	✓							✓				✓	✓	✓	✓	✓
-4	MW #4		3	✓							✓				✓	✓	✓	✓	✓
-5	MW #5		3	✓							✓				✓	✓	✓	✓	✓
-6	MW #6		3	✓							✓				✓	✓	✓	✓	✓
-7	MW #7		3	✓							✓				✓	✓	✓	✓	✓

Sampler Relinquished:	Date: 8-25-98	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time: 2:45pm		Fax Result: ☐ Yes ☐ No
Relinquished By:	Date:	Received By: (Lab Staff)	REMARKS:
	Time:		
Delivered By: (Circle One)	Sample Condition: Cool ☒ Yes ☐ No; Intact ☐ Yes ☒ No	CHECKED BY: (Initials)	
Sampler - UPS - Bus - Other:			

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS,INC.
ATTN: DEE WHATLEY
703 E. CLINTON , SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 08/25/98
Reporting Date: 09/01/98
Project Number: 17
Project Name: IDA WIMBERLY PIT
Project Location: SOUTH JUSTIS

Sampling Date: 08/25/98
Sample Type: GROUNDWATER
Sample Condition: COOL AND INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity (mgCaCO3/L)
ANALYSIS DATE:		08/31/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98
H3812-1	MW #1	850	317	112	8.8	6273	204
H3812-2	MW #2	1202	476	214	42.3	19010	448
H3812-3	MW #3	2229	360	187	31.7	13960	455
H3812-4	MW #4	3921	472	248	50.5	21750	708
H3812-5	MW #5	1094	320	153	10.0	7877	159
H3812-6	MW #6	11269	2120	1239	101	68740	180
H3812-7	MW #7	1763	460	175	25.0	11910	236
Quality Control			48	52	3.05	1402	NR
True Value QC		NR	50	50	3	1413	NR
% Accuracy		NR	96	104	102	99.2	NR
Relative Percent Difference		NR	4.2	3.8	1.6	0.1	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl- (mg/L)	SO4 (mg/L)	CO3 (mg/L)	HCO3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98
H3812-1	MW #1	1839	305	0	249	6.384	4380
H3812-2	MW #2	2731	426	0	547	6.303	12240
H3812-3	MW #3	4124	279	0	556	6.402	8840
H3812-4	MW #4	6910	335	0	864	6.64	13960
H3812-5	MW #5	2396	274	0	195	7.216	5430
H3812-6	MW #6	24186	750	0	220	6.829	58260
H3812-7	MW #7	3288	832	0	288	7.326	8170
Quality Control		1209	48.92	112	221	6.979	NR
True Value QC		1319	50.00	124	259	7.000	NR
% Accuracy		91.7	97.8	90.3	85.4	100	NR
Relative Percent Difference		4.4	3.1	-	-	0.1	2.3
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Chemist

Date 9/1/98

H3812-1XLS

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS,INC.
ATTN: DEE WHATLEY
703 E. CLINTON , SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 08/25/98
Reporting Date: 09/01/98
Project Number: 17
Project Name: IDA WIMBERLY PIT
Project Location: SOUTH JUSTIS

Sampling Date: 08/25/98
Sample Type: GROUNDWATER
Sample Condition: COOL AND INTACT
Sample Received By: AH
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/kg)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)
ANALYSIS DATE:		08/28/98	08/25/98	08/25/98	08/25/98	08/25/98
H3812-1	MW #1	42.9	<0.002	<0.002	<0.002	<0.006
H3812-2	MW #2	14.0	<0.002	<0.002	<0.002	<0.006
H3812-3	MW #3	24.6	0.002	<0.002	<0.002	<0.006
H3812-4	MW #4	11.8	0.046	<0.002	0.012	<0.006
H3812-5	MW #5	11.0	<0.002	<0.002	<0.002	<0.006
H3812-6	MW #6	6.8	0.007	<0.002	<0.002	<0.006
H3812-7	MW #7	7.1	0.003	<0.002	<0.002	<0.006
Quality Control		158	0.106	0.102	0.098	0.297
True Value QC		150	0.1	0.1	0.1	0.3
% Recovery		105	106	102	98.1	99.0
Relative Percent Difference		1.1	0.5	2.0	0.4	0.4

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW846-8020, 8260

Burgess J.R. Cooke
Chemist

9/1/98
Date

H3812-2.XLS

Safety & Environmental Solutions, Inc.

ARCO PERMIAN
South Justis Unit F-230
IdaWimberly Lease

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ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Work Plan
Vadose Zone Remediation
Lea County, New Mexico

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

Work Plan
Vadose Zone Remediation
Ida Wimberly Pit
ARCO Permian

Purpose

The purpose of this Work Plan is to cause the closure of the abandoned pit located at the Ida Wimberly lease in a manner that will protect the population, environment and groundwater of the area surrounding the subject location. The Ida Wimberly lease is located at the ARCO Permian (ARCO) South Justis Unit F-230 in Unit C, Section 25, T25S, R37E, Lea County, New Mexico.

Background

In October 1997, ARCO secured the services of Safety and Environmental Solutions, Inc. to complete all necessary sampling and testing of the area covered by the abandoned pit located at the Ida Wimberly lease. ARCO owns the surface rights to Section 25 as well as part of the adjacent sections. ARCO owns the mineral rights in the NW 1/4 and the SW 1/4 NE 1/4. The remaining portion of the NE 1/4 are state mineral rights. The mineral rights of the south half of Section 25 are federal. ARCO controls the traffic on the surface of the property and also controls the disposition of the ground water under this property. (See Exhibit A- South Justis Unit Plat)

In the initial investigation, a borehole was drilled at the bottom of the pit area. The field analytical results indicated an elevated level of Total Petroleum Hydrocarbons (TPH). Knowledge of process indicates that the material in this area would be exempt oil field waste. Based upon this information, a work plan for installation of monitor wells to delineate contamination was developed. This information was reported to the New Mexico Oil Conservation Division in the report dated November 6, 1997, ***ARCO Permian Work Plan Investigation of Possible Groundwater Impact, Section 25 Township 25S Range 37 E, Lea County, New Mexico.***

Upon approval of the work plan, three monitor wells were installed. The results revealed elevated levels of Chlorides and Total Dissolved Solids (TDS). This information was submitted to the New Mexico Oil Conservation Division in a report dated December 1997, ***ARCO Permian Installation of Monitor Wells and Investigative Results, Section 25 Township 25S Range 37 E, Lea County, New Mexico.***

After review of these results, further delineation was deemed necessary. The installation of additional monitor wells was proposed and submitted to the New Mexico Oil Conservation Division in a report dated April 28, 1998, ***ARCO Permian Amended Work Plan Investigation of Possible Groundwater Impact, Section 25 Township 25S Range 37 E, Lea County, New Mexico.*** The results from this phase of the investigation are submitted under separate cover.

Shallow protectable groundwater in the area is scarce. There are two water wells within a one-mile radius of the pit. The water from these wells is currently used for livestock.

This pit has not been used since before 1991 when ARCO acquired the lease. During this time, the hydrocarbon has not migrated beyond the pit boundaries. It is reasonable to presume that the hydrocarbon will not migrate in the future.

Method

ARCO proposes to cause the closure of this pit by installing an impermeable liner at the bottom of the existing excavation to shield the soils left in place from contact with any surface water. The liner will be covered with new clean soil to the grade of the surrounding property

Source Removal

ARCO proposes to leave the source contamination in the subject pit area in place and limit the public exposure to this area through normal security measures in place at the lease. A liner will be installed to isolate the contaminated soils from influence from the surface. Any movement in the groundwater contamination will be monitored by ARCO as set out below.

Liner System

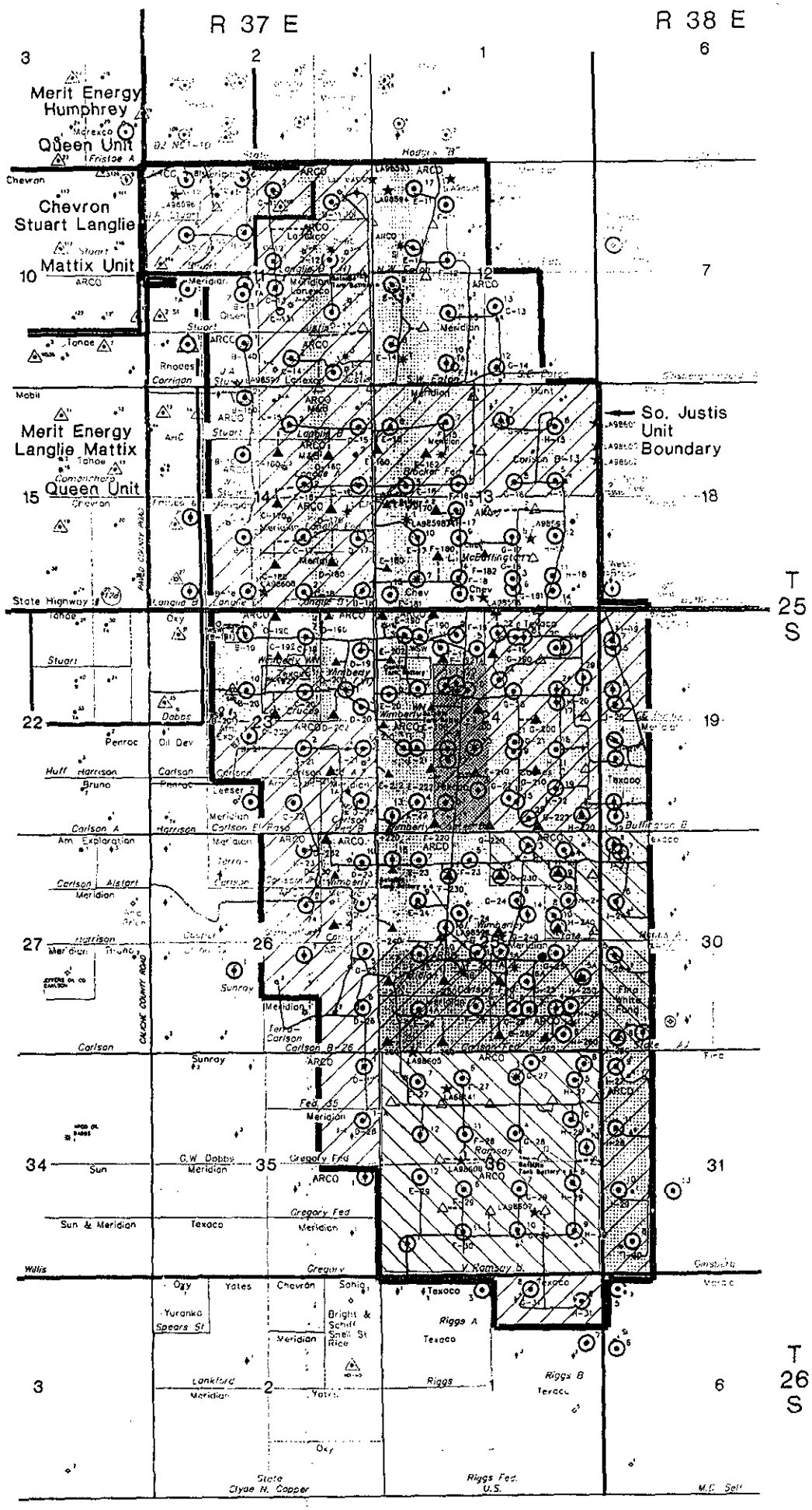
The bottom of the existing excavation will be prepared in such a manner that will provide a smooth surface for the liner to rest upon. The liner will be made of 20 mil polyethylene plastic with seams, if any, bound together with heat or adhesive methods in such a manner to prevent leakage or separation of the liner.

The liner will be installed at the bottom of the excavation and new clean soil will be back-filled over the liner to grade. This liner system will effectively encapsulate the stabilized source material and prevent the material from coming in contact with any surface moisture. The liner will extend past the horizontal extent of the contamination and form an umbrella, which will protect the stabilized material and the soil left in place from surface moisture.

Groundwater Monitoring Program

ARCO agrees to sample existing groundwater monitor wells 2, 3, and 4 quarterly for a period of 18 months. Samples from these three monitor wells will be analyzed based upon initial analytical results. The initial samples will be analyzed for TPH, BTEX, Chlorides, major Cations and Anions, and Total Dissolved Solids with results filed with the NMOCD Santa Fe and Hobbs District offices. The quarterly samples will be analyzed for only contaminates identified in the initial sampling.

In the event, the hydrocarbon contamination is found to have migrated outside of the pit area, an appropriate plan for plume investigation and remediation will be developed at that time.


R 37 E
R 38 E
Merit Energy
Humphrey
Queen Unit
Chevron
Stuart Langlie
Mattix Unit
Merit Energy
Langlie Mattix
Queen Unit
So. Justis
Unit
Boundary
State Highway
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Federal Surface
State Mineral
ARCO Owned Surface
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ARCO Owned
Proposed Existing Phase I
South Justis Unit Wells
Langlie Mattix
Glorieta Gas
Well Penetrating
Blinebry and Tubb/Drinkard
Proposed Phase I
South Justis Unit Wells
Proposed Phase II
South Justis Unit Wells
Proposed Roads
Existing Roads
Arch. Sites
ARCO Oil and Gas Company
JUSTIS BLINEBRY
JUSTIS TUBB/DRINKARD
Lea Co., New Mexico
South Justis Unit Plat
Scale 1" = 1000'

Safety & Environmental Solutions, Inc.

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ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Arco Permian
South Justis Unit F-230

Installation of Additional Monitor Wells and Investigation Results
Lea County, New Mexico

Corrected Report

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

In October 1997 Arco Permian secured the services of Safety and Environmental Solutions, Inc. (SESI) to determine the vertical and horizontal extent of the abandoned pit site on the specified location. A work plan was formulated to drill three monitor wells around the pit area for definition of the extent of the pit area and to provide initial indications of the extent of any groundwater contamination. Upon completion of these wells, it was determined that the water showed elevated Chlorides and Total Dissolved Solids (TDS). Further delineation was required to determine the extent of elevated Chlorides and TDS levels. To this end, a new Work Plan was formulated to drill up to four additional monitor wells.

II. Work Performed

Four additional monitor wells were drilled at the Arco Permian South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, NM according to the Approved Work Plan (GW-202 Pit Closure). SESI contracted Atkins Engineering of Roswell, NM to drill these wells on August 7 to August 12, 1998. Cardinal Laboratories of Hobbs, NM was also contracted to perform the laboratory analytical testing required for this project.

SESI sampled the first two additional monitor well hole soils (MW #4 & MW #5) at intervals of ten (10') feet using SOPs found in **Environmental Protection Agency, 1984, Characterization of Hazardous Waste Site - A Methods Manual: Vol II.** Field testing was performed on these soil samples for TPH, BTEX and Chlorides. The composite soil samples along with Chain of Custody were then delivered to the laboratory for confirmatory testing. The composite samples were analyzed for Total Petroleum Hydrocarbons (EPA Method 418.1), BTEX (EPA Method 8020) and Chlorides (EPA Method 600/4-79-020). The results of the BTEX, TPH and Chlorides were compared to the regulatory limits found in **"Guidelines for Remediation of Leaks, Spills and Releases"** *New Mexico Oil Conservation Division* - August 13, 1993.

Well #4

Monitor Well #4 was drilled between Monitor Wells #2 and #3, upgradient of MW #3 on the south berm of the pit area with to a total depth of 80'.

A summary of the laboratory analyses of the soil samples for the well borehole is presented in the following table in **black** text; the laboratory analysis of the groundwater sample for the well borehole is presented in the following table in **blue** text:

ID/Depth	Lithology	TPH	CL	Benzene	Toluene	Ethyl Benzene	Total Xylenes
4-1 10'	Caliche	<10	223	<0.002	<0.002	<0.002	<0.006
4-2 20'	Sandy Caliche	<10	490	<0.002	<0.002	<0.002	<0.006
4-3 30'	Sand	<10	1462	<0.002	<0.002	<0.002	<0.006
4-4 40'	Red Sand	<10	1337	<0.002	<0.002	<0.002	<0.006
4-5 50'	Silty Sand w/gravel	<10	1257	<0.002	<0.002	<0.002	<0.006
4-6 60'	Silty Clayey Sand	44.7	1195	<0.002	<0.002	<0.002	<0.006
4-7 70'	Sandy Gravel	<10	1498	<0.002	<0.002	<0.002	<0.006
4-8 80'	Red Clay	<10	2283	<0.002	<0.002	<0.002	<0.006
TD 80'	Ground water	<1.0	9641	<0.033	<0.002	<0.007	<0.006

The groundwater sampled at total depth (80') on Monitor Well #4, in addition to testing as shown above, was tested for Cations, Anions and Total Dissolved Solids (TDS). These results indicated no elevated levels except on Chlorides and TDS. (See Attached Analytical Results)

Well #5

Monitor Well #5 was drilled northwest of Well #1 north of the pit area with total depth of 80'.

A summary of the laboratory analyses of the soil samples for the well borehole is presented in the following table in **black** text; the laboratory analysis of the groundwater sample for the well borehole is presented in the following table in **blue** text:

ID/Depth	Lithology	TPH	CL	Benzene	Toluene	Ethyl Benzene	Total Xylenes
S-1 10'	Silty Caliche	<10	71	<0.002	<0.002	<0.002	<0.006
S-2 20'	Caliche	<10	196	<0.002	<0.002	<0.002	<0.006
S-3 30'	Silty Clayey Sand	<10	178	<0.002	<0.002	<0.002	<0.006
S-4 40'	Silty Clayey Sand	<10	134	<0.002	<0.002	<0.002	<0.006
S-5 50'	Silty Clayey Sand	<10	98	<0.002	<0.002	<0.002	<0.006
S-6 60'	Silty Clayey Sand	<10	107	<0.002	<0.002	<0.002	<0.006
S-7 70'	Sandy Gravel	<10	285	<0.002	<0.002	<0.002	<0.006
S-8 80'	Red Clayey Sand	<10	874	<0.002	<0.002	<0.002	<0.006
TD 80'	Ground water	<1.0	1950	<0.002	<0.002	<0.002	<0.006

The groundwater sampled at total depth (80') on Monitor Well #5, in addition to testing as shown above, was tested for Cations, Anions and Total Dissolved Solids (TDS). These results indicated no elevated levels except on Chlorides and TDS. (See Attached Analytical Results)

Well #6

Monitor Well #6 was drilled southeast of Monitor Wells #3 and #4, approximately 50 feet down-gradient of an existing produced water line, to a total depth of 80'. Testing was performed on the groundwater sampled at total depth (80') only.

A summary of the laboratory analysis of the groundwater sample for the well borehole is presented in the following table in **blue** text:

ID/Depth	Lithology	TPH	CL	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes
6-1 TD 80'	Ground water	<1.0	29600	58260	0.044	0.004	<0.002	0.009

Well #7

Monitor Well #7 was drilled southwest of Monitor Wells #6 to a total depth of 75'. Testing was performed on the groundwater sampled at total depth (75') only.

A summary of the laboratory analyses of the groundwater sample for the well borehole is presented in the following table in **blue** text:

ID/Depth	Lithology	TPH	CL	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes
7-1 TD 75'	Ground water	48.7	5015	13496	0.013	0.002	<0.002	<0.006

III. Monitor Well Testing

Initial water sampling from each of the four wells was performed on August 25, 1998 according to SW- 846 methods and transported under Chain of Custody to the laboratory for analysis. The water samples were analyzed for BTEX (EPA Method 8020, 5030) as well as NMWQAC testing (Methods 625, 600/4-79-020, -206.2, -272.1,-213.1,-208.1, -218.1,-239.1,-245.1,-270.2, 600/4-78-020,-202.1,-220.1,-236.1,-243.1,-249.1,-289.1, 600/4-91-010,-212.1,-219.1,-246.1, SM4500-Cl-B, 375.4, 310.1, 150.1, 160.1, 120.1, 8049, 3500-Mg E, SM3500-Ca-D). **(See Analytical Reports attached)**

On August 25, 1998, the groundwater in all seven monitor wells were sampled again according to SW - 846 methods and transported under Chain of Custody to the laboratory for analysis. The water was analyzed for TPH, BTEX and major cations, anions, and TDS.

The results indicated high levels of Chlorides and TDS in all wells. The TPH in all wells was very low. Monitor well # 4 exhibited small amounts of Benzene and Ethyl Benzene and Monitor well # 7 exhibited a small amount of Benzene. Monitor well # 6 exhibits extremely high levels of Chlorides and TDS. These levels are 5.8 and 6.5 times higher than Monitor well # 3 which is only 55' upgradient. The uncharacteristically high levels of Chlorides and TDS may indicate another source of contamination other than the subject site. There is a saltwater disposal line that is located between Monitor well #3 and Monitor well #6. **(See Monitor Wells Analytical Results - August 25, 1998 Diagram)**

A summary of the laboratory analyses of the groundwater samples for all seven monitor wells is presented in the following table. The results that are in excess of NMWQCC Standards are presented in **red** text:

Analyte	MW #1	MW #2	MW #3	MW #4	MW #5	MW #6	MW #7
TPH	42.9ppm	14.0ppm	24.6ppm	11.8ppm	11.0ppm	6.8ppm	7.1ppm
Benzene	<.002ppm	<.002ppm	.002ppm	.046ppm	<.002ppm	.002ppm	.003ppm
Toluene	<.002ppm	<.002ppm	<.002ppm	<.002ppm	<.002ppm	<.002ppm	<.002ppm
E Benzene	<.002ppm	<.002ppm	<.002ppm	.012ppm	<.002ppm	<.002ppm	<.002ppm
Xylenes	<.006ppm	<.006ppm	<.006ppm	<.006ppm	<.006ppm	<.006ppm	<.006ppm
Sodium	850ppm	1202ppm	2229ppm	3921ppm	1094ppm	11269ppm	1763ppm
Calcium	317ppm	476ppm	360ppm	472ppm	320ppm	2120ppm	460ppm
Magnesium	112ppm	214ppm	187ppm	248ppm	153ppm	1239ppm	175ppm
Potassium	8.8ppm	42.3ppm	31.7ppm	50.5ppm	10.0ppm	101ppm	25.0ppm
Chlorides	1839ppm	2731ppm	4124ppm	6910ppm	2396ppm	24186ppm	3288ppm
SO_4	305ppm	426ppm	279ppm	335ppm	274ppm	750ppm	832ppm
CO_3	0ppm	0ppm	0ppm	0ppm	0ppm	0ppm	0ppm
HCO_3	249ppm	547ppm	556ppm	864ppm	195ppm	220ppm	288ppm
TDS	4380ppm	12240ppm	8840ppm	13960ppm	5430ppm	58260ppm	8170ppm
pH	6.384	6.303	6.402	6.64	7.216	6.829	7.326

IV. Conclusions

The gradient of the water table is established to be relatively flat but sloping slightly from the Northwest to the Southeast. The entire group of monitor well exhibits high levels of Chlorides and TDS indicates that the water in the whole area is not of very high quality. The horizontal extent of the contamination plume that results from the subject pit area appears to extend downgradient to monitor wells # 6 and #7. However, the extremely high levels of contaminants in well # 6 appears to indicate an additional source of contamination between well # 3 and well #6. It is our opinion that the completion of this phase of the plume investigation has satisfactorily delineated the plume caused by the subject pit.

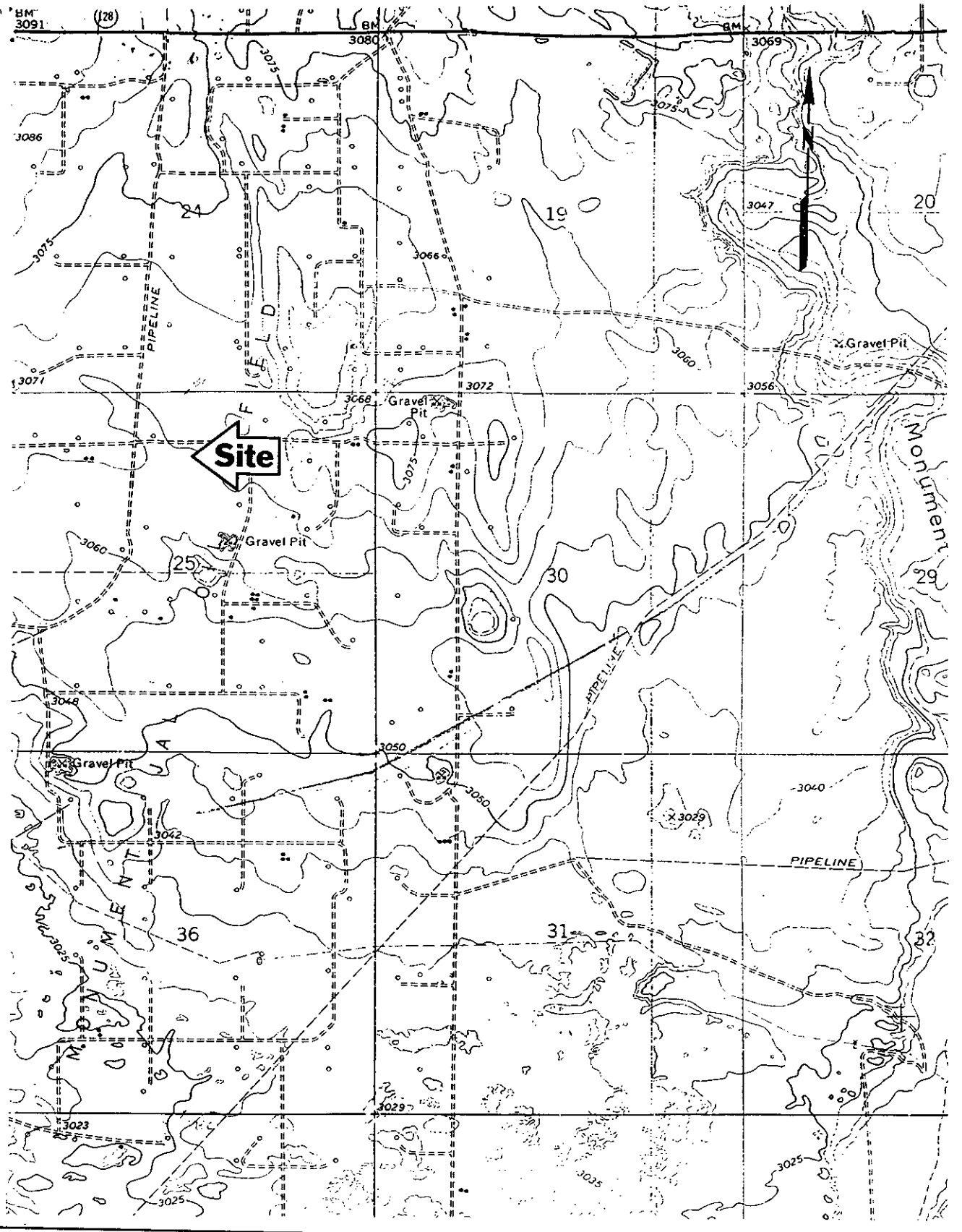
V. Figures and Appendices

Figures:

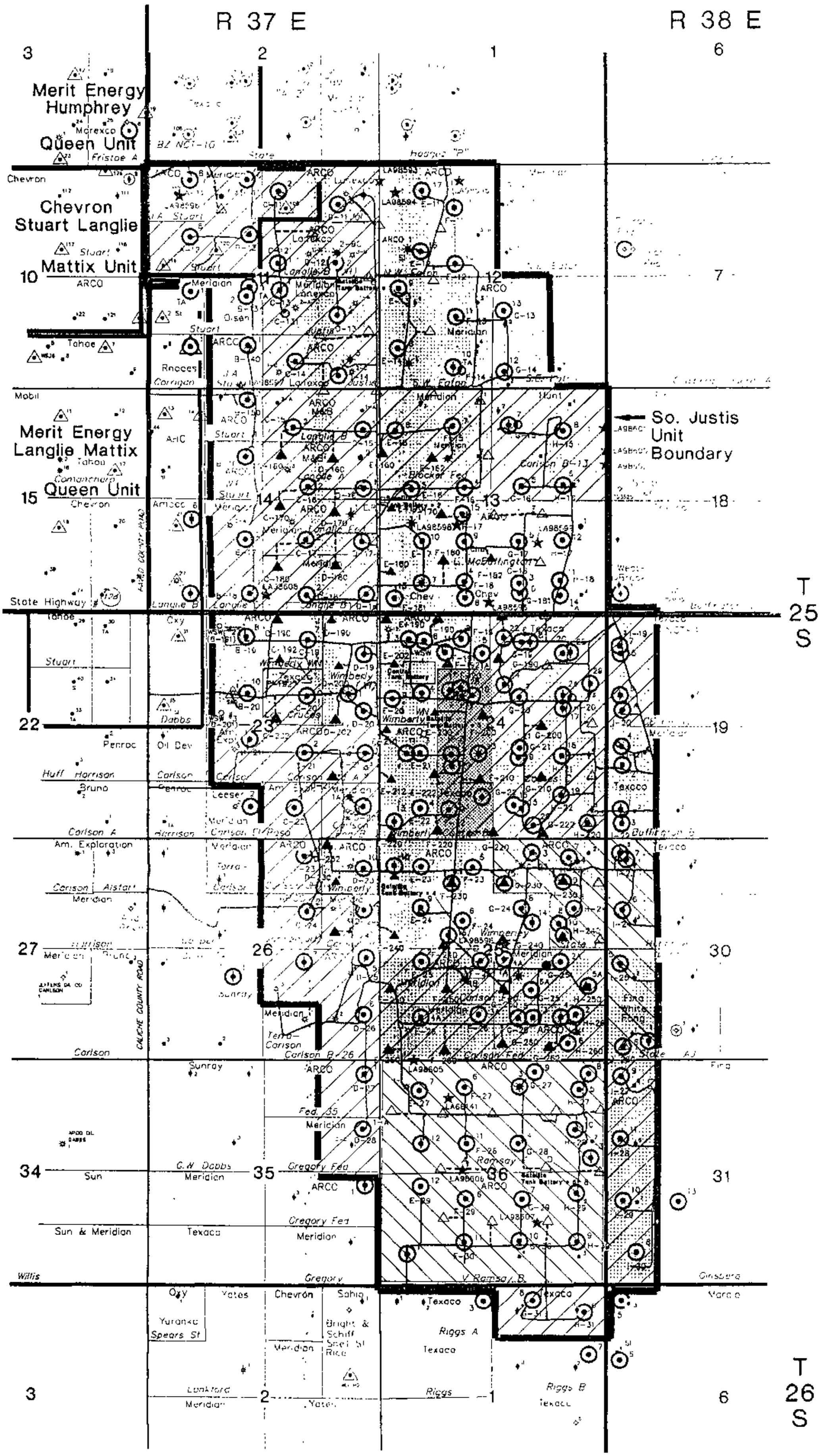
Figure 1: Vicinity Map
Figure 2: South Justis Unit Plat
Figure 3: Survey Plat
Figure 4: Driller's Log
Figure 5: Monitor Wells Analytical Results - August 25, 1998 Diagram
Figure 6: Water Contour and Flow Plan

Appendices:

Appendix 1: Monitor Well #4 Chain of Custody and Analytical Results
Appendix 2: Monitor Well #5 Chain of Custody and Analytical Results
Appendix 3: Monitor Well #6 Chain of Custody and Analytical Results
Appendix 4: Monitor Well #7 Chain of Custody and Analytical Results
Appendix 5: All Monitor Wells Groundwater Chain of Custody and Analytical Results



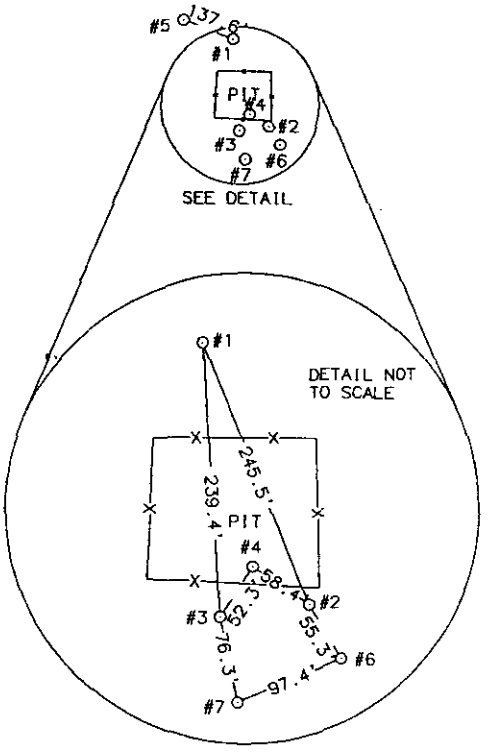
ARCO Permian	**South Justis Unit F-230** **Vicinity Map**	*Safety & Environmental Solutions, Inc.* *Hobbs, NM*


R 37 E
R 38 E
T 25 S
T 26 S
Merit Energy Humphrey Queen Unit
Chevron Stuart Langlie Mattix Unit
Merit Energy Langlie Mattix Queen Unit
So. Justis Unit Boundary
State Highway
Chevron
ARCO
Meridian
Texaco
Mobil
Tahoe
Stuart
Langlie B
Carlson
Carlson A
Wimberly
Riggs A
Riggs B
Gregory Fed
Sun & Meridian
Sunray
Penroc
Am. Exploration
Oil Dev
Yates
Oxy
Willis
Gregory
Lankford
Caliche County Road
3
2
1
6
10
11
12
7
14
13
15
18
22
23
24
19
27
26
25
30
34
35
36
31

23 | 24 USGLO BC "1913" | 24 1/4 COR USGLO BC "1913"

S89°59'W 2640.2' BASIS OF BEARING USGLO PLAT

26 | 25



26

MONITOR WELL #1
742' FNL 1406' FWL
TOP CONC. BASE 3064.72'
N/SIDE TOP 2" PVC 3066.98'

MONITOR WELL #2
970' FNL 1497' FWL
TOP CONC. BASE 3063.62'
N/SIDE TOP 2" PVC 3066.21'

MONITOR WELL #3
981' FNL 1420' FWL
TOP CONC. BASE 3063.41'
N/SIDE TOP 2" PVC 3065.92'

MONITOR WELL #4
937' FNL 1449' FWL
TOP CONC. BASE 3065.64'
N/SIDE TOP 2" PVC 3067.93'

MONITOR WELL #5
693' FNL 1277' FWL
TOP CONC. BASE 3064.36'
N/SIDE TOP 2" PVC 3066.56'

MONITOR WELL #6
1017' FNL 1526' FWL
TOP CONC. BASE 3063.14'
N/SIDE TOP 2" PVC 3065.33'

MONITOR WELL #7
1056' FNL 1436' FWL
TOP CONC. BASE 3062.43'
N/SIDE TOP 2" PVC 3064.64'

500 0 500 1000 FEET

Scale:1"=500'

I HEREBY CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

GARY G. EIDSON 12641 REGISTERED PROFESSIONAL SURVEYOR

8/24/98

RONALD J. EIDSON, N.M. P.S. No. 3239
GARY G. EIDSON N.M. P.S. No. 12641

JOHN W. WEST ENGINEERING COMPANY
CONSULTING ENGINEERS & SURVEYORS – HOBBS, NEW MEXICO

SAFETY & ENVIRONMENTAL SOLUTIONS, INC.

ELEVATIONS AND TIES ON ARCO PERMIAN
MONITOR WELLS #1, #2, #3, #4, #5, #6 AND #7,
IN SECTION 25,
TOWNSHIP 25 SOUTH,
RANGE 37 EAST, N.M.P.M.,
LEA COUNTY, NEW MEXICO

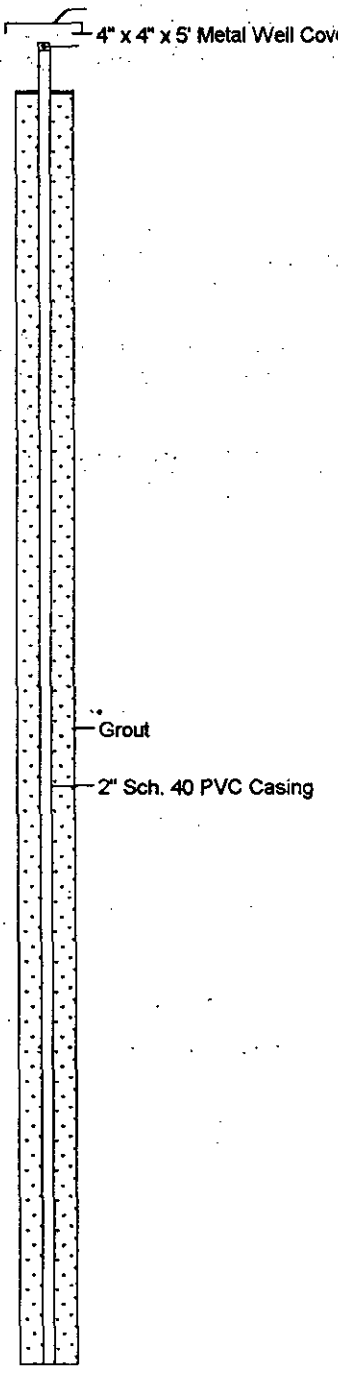
Survey Date: 8/19/98		Sheet 1 of 1 Sheets	
W.O. Number: 98-11-1164		Drawn By: D.McCARLEY	
Date: 8/24/98	SAFETY	SESI1164	Scale:1"=500'

Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #4 (Page 1 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-7-98/8-10-98 Drill Start : 11:45 A.M. 8-7-98 Drill End : 10:00 A.M. 8-10-98 Boring Location : S. Bank of Pit
Contact: Mr. Bob Allen	Site Location : 5 miles E. of Jal Auger Type : Hollow Stem Logged By : Mort Bates
Job #98280.20	

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
0		CL		Silty Clay w/Caliche, Tan, Loose, Dry
5				
			1	Caliche, Tan, Firm, Dry
10				
15				
			2	Sandy Caliche, Tan, Firm, Dry
20				
		SP		Sand, Tan, Soft, Dry
25				
			3	
30				
		SP		Sand, Red, Firm, Dry
35				
			4	
40		CL		Silty Sandy Clay, Red, Soft, Dry
		SM		Silty Sand w/small Gravel, Reddish-Tan, Stiff, Damp
45				

Well: MW #4

Elev.:



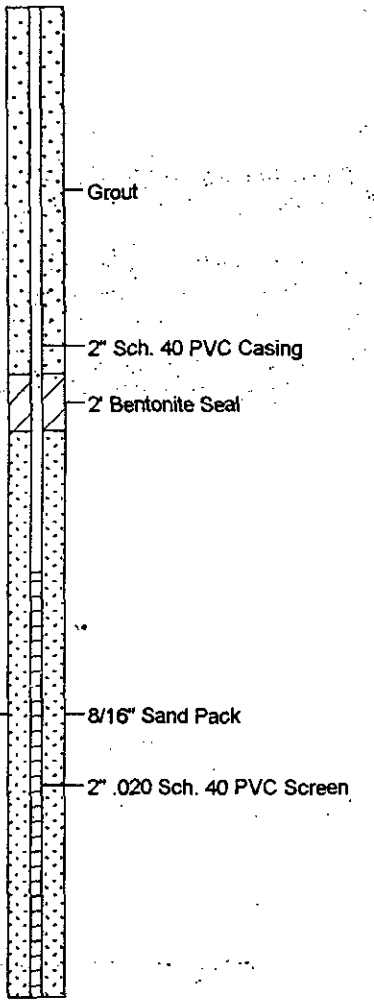
08-17-1998 c:\mtech46\arco\mw-4.bor

Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #4 (Page 2 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-7-98/8-10-98 ; Site Location : 5 miles E. of Jal Drill Start : 11:45 A.M. 8-7-98 Auger Type : Hollow Stem Drill End : 10:00 A.M. 8-10-98 Logged By : Mort Bates Boring Location : S. Bank of Pit
Contact: Mr. Bob Allen	
Job #98280.20	

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
45				
50		SM	5	
55				Silty Clayey Sand w/Gravel, Tan, Loose, damp
60		SM	6	
65				
70		GP	7	Cemented Sandy Gravel, Tan, Firm, Wet to Saturated WL @ 70 ft.
75				
80			8	TD = 80 ft. Below 80' - Clay, Red, Firm, Saturated
85				
90				

Well: MW #4

Elev.:



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Atkins Engineering Associates, Inc.
P.O. Box 3156
Roswell, New Mexico 88202

LOG OF BORING South Justice FT 30 MW #5

ARCO Oil Co.
Jal, New Mexico

Contact: Mr. Bob Allen

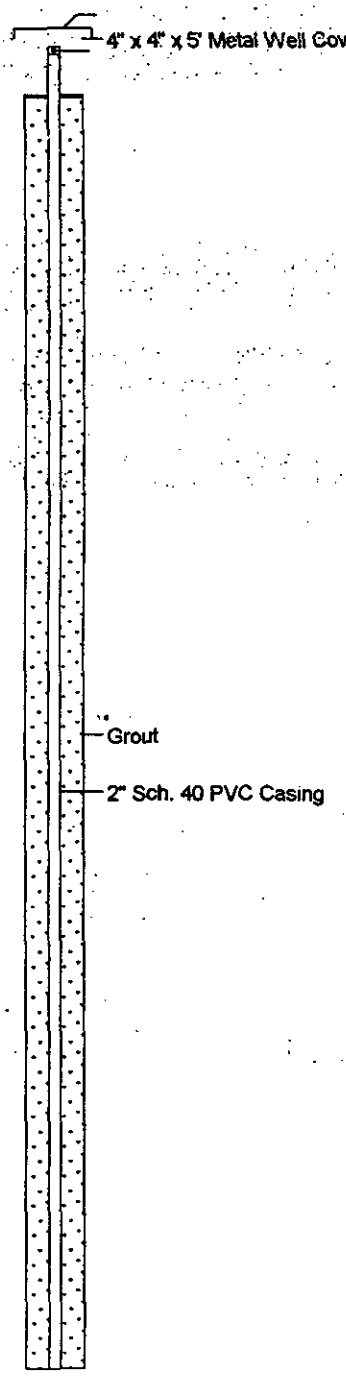
Job #98280.20

Date	: 8-11-98	Site Location	: 5 miles E. & 2 miles S. of Jal
Drill Start	: 10:15 A.M.	Auger Type	: Hollow Stem
Drill End	: 6:00 P.M.	Logged By	: Mort Bates
Boring Location	: N.W. of Pit, N. of Road		

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
0		CL		Silty Clay w/Caliche, Tan, Loose, Dry
5				
				Silty Caliche, Tan, Loose, Dry
10			1	Silty Caliche Clay w/Gravel, Tan, Loose, Dry
15		CL		
20			2	Caliche, White, Loose, Dry
25				
				Silty Clayey Sand, Pink, Loose, Dry
30			3	
35		SC		
40		SC	4	Silty Clayey Sand w/small Caliche, Pink, Loose, Dry
		SC		Silty Clayey Sand w/trace of Caliche, Tan, Loose, Dry
45				

Well: MW #5

Elev.:



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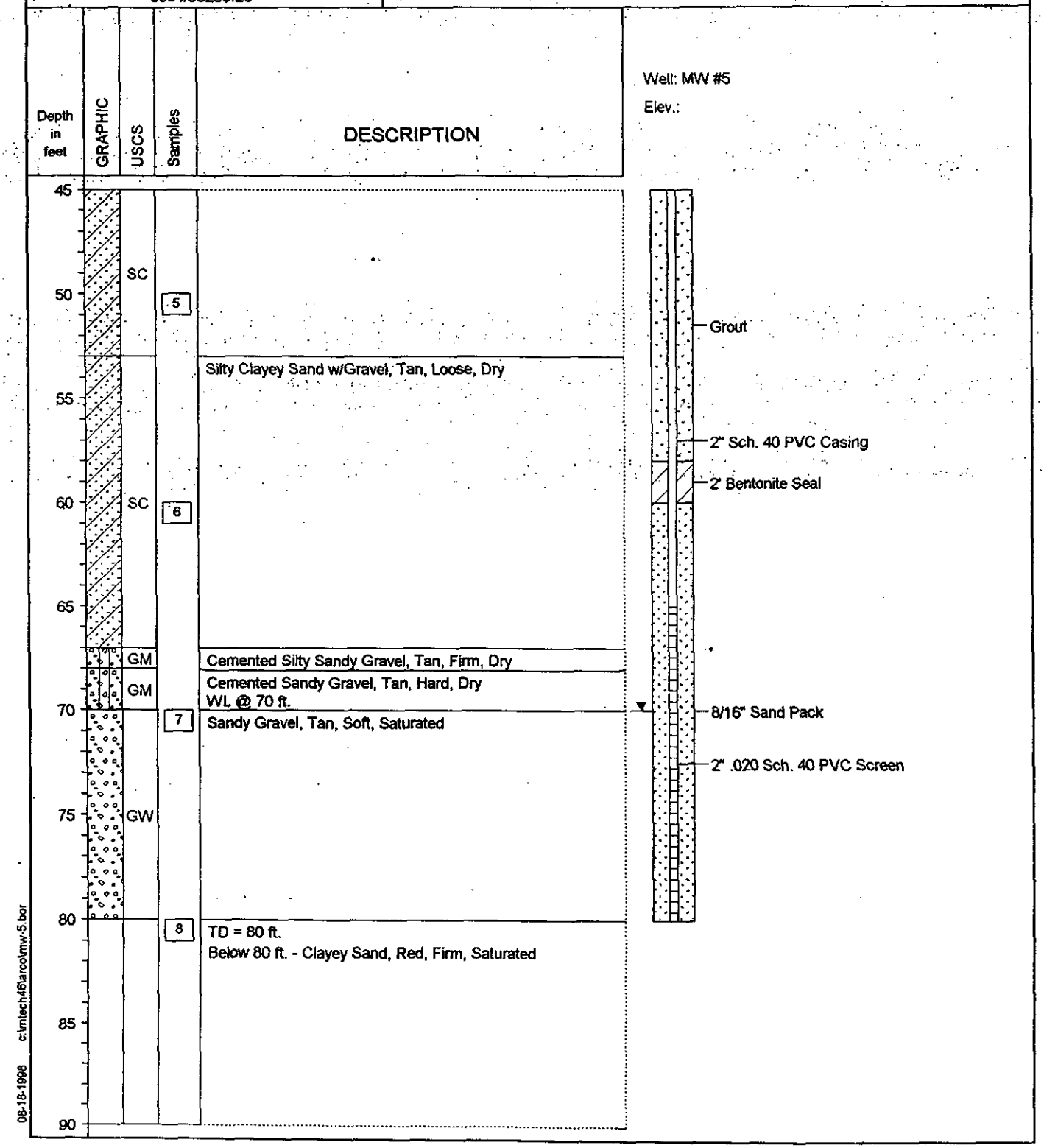
Atkins Engineering Associates, Inc.
P.O. Box 3156
Roswell, New Mexico 88202

LOG OF BORING South Justice FT 30 MW #5

ARCO Oil Co.
Jal, New Mexico

Contact: Mr. Bob Allen
Job #98280.20

Date	: 8-11-98	Site Location	: 5 miles E. & 2 miles S. of Jal
Drill Start	: 10:15 A.M.	Auger Type	: Hollow Stem
Drill End	: 6:00 P.M.	Logged By	: Mort Bates
Boring Location	: N.W. of Pit, N. of Road		



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Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #6 (Page 1 of 2)

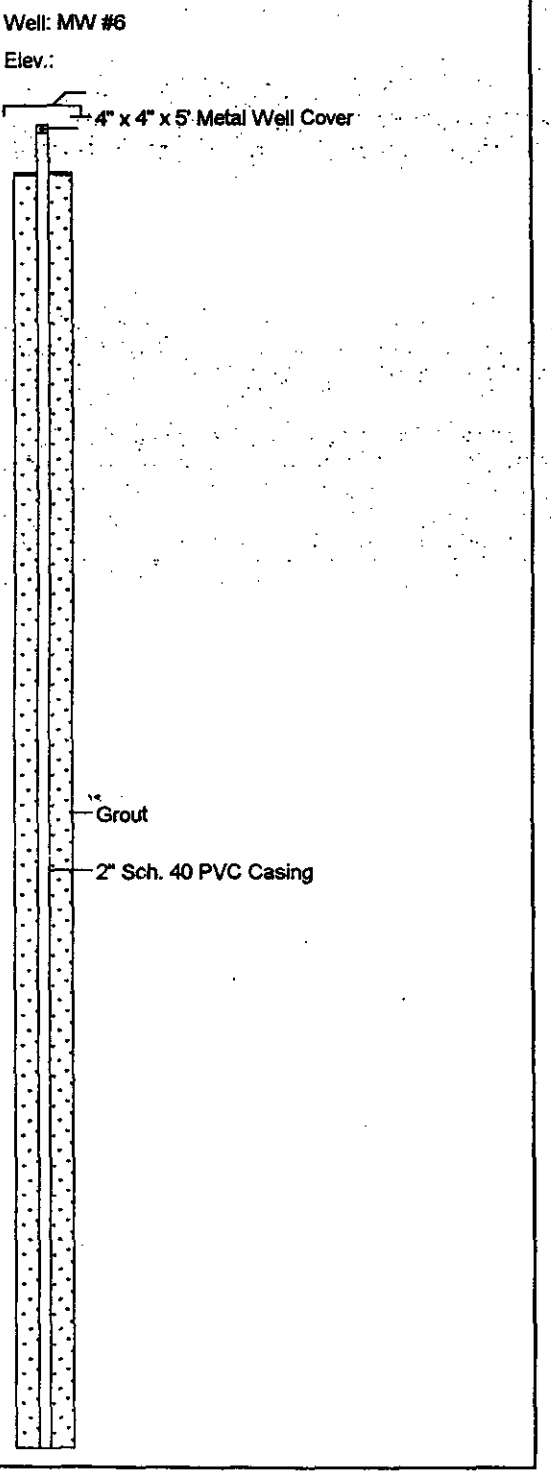
ARCO Oil Co.
Jal, New Mexico

Contact: Mr. Bob Allen

Job #98280.20

Date	: 8-11-98	Site Location	: 5 miles E. & 2 miles S. of Jal
Drill Start	: 7:20 A.M.	Auger Type	: Hollow Stem
Drill End	: 1:45 P.M.	Logged By	: Mort Bates
Boring Location	: S.E. of Pit		

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
0		CL		Silty Clay w/Caliche, Tan, Loose, Dry
		CL		Silty Clay, Tan, Loose, Dry
5				Caliche w/Silty Clay, Tan, Loose, Dry
10				
15				
20				Caliche Rock, White, Firm, Dry
25				Silty Clayey Sand w/Caliche, Tan, Firm, Dry
30				
35		SC		
40				
45				



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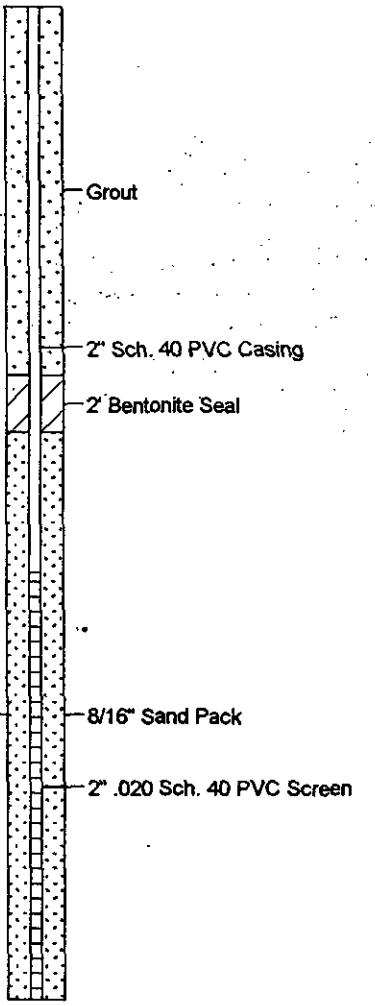
Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #6 (Page 2 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-11-98 Drill Start : 7:20 A.M. Drill End : 1:45 P.M. Boring Location : S.E. of Pit
Contact: Mr. Bob Allen Job #98280.20	Site Location : 5 miles E. & 2 miles S. of Jal Auger Type : Hollow Stem Logged By : Mort Bates

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
45		SC		
		SP		Sand, Tan, Loose, Moist
		GM		Cemented Gravel w/Sand, Tan, Stiff, Dry
50		SW		Sand w/Gravel, Tan, Soft, Wet
55		GW		Gravel w/sand, Tan, Loose, Dry
		SP		Sand, Reddish-Tan, Loose, Damp
60				
65				
70		SP		WL @ 70 ft. Sand, Reddish-Tan, Loose, Saturated
75		CL		Clay, Red, Stiff, Saturated
80				TD = 80 ft.
85				
90				

Well: MW #6
Elev.:



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Atkins Engineering Associates, Inc.
P.O. Box 3156
Roswell, New Mexico 88202

LOG OF BORING South Justice FT 30 MW #7

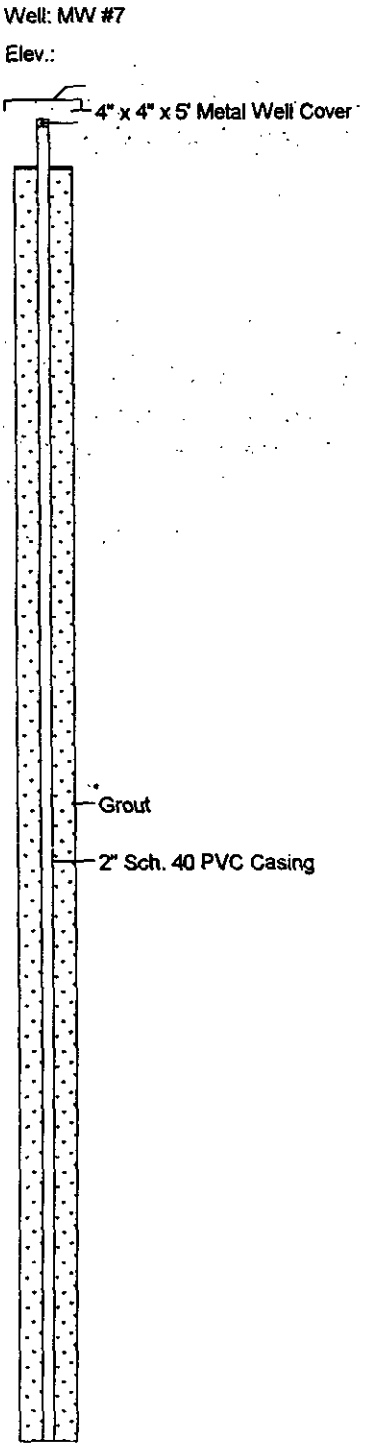
ARCO Oil Co.
Jal, New Mexico

Contact: Mr. Bob Allen

Job #98280.20

Date	: 8-11-98	Site Location	: 5 miles E. & 2 miles S. of Jal
Drill Start	: 1:55 P.M.	Auger Type	: Hollow Stem
Drill End	: 6:45 P.M.	Logged By	: Mort Bates
Boring Location	: 75 ft. S. of Pit		

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
0		CL		Silty Clay w/Caliche, Tan, Loose, Dry
5				
				Caliche, Tan, Loose, Dry
10				
15				
20				Caliche Rock, White, Hard, Dry
				Caliche w/Silty Clay, Tan, Loose, Dry
25		SC		Clayey Sand, Reddish-Tan, Loose, Dry
		GW		Gravel w/Sand, Tan, Firm, Dry
30				
35		CL		Sandy Clay, Tan, Loose, Damp
		SM		Silty Sand, Tan, Loose, Damp
40		SW		Sand w/Gravel, Tan, Loose, Dry
45				



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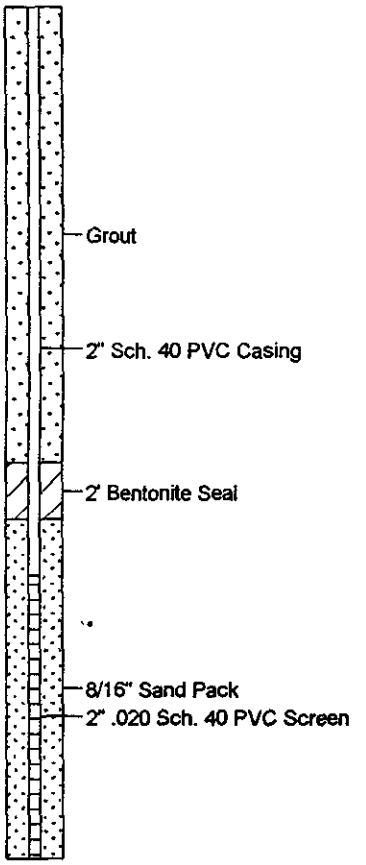
Atkins Engineering Associates, Inc. P.O. Box 3156 Roswell, New Mexico 88202	LOG OF BORING South Justice FT 30 MW #7 (Page 2 of 2)
ARCO Oil Co. Jal, New Mexico	Date : 8-11-98 Drill Start : 1:55 P.M. Drill End : 6:45 P.M. Boring Location : 75 ft. S. of Pit
Contact: Mr. Bob Allen	Site Location : 5 miles E. & 2 miles S. of Jal Auger Type : Hollow Stem Logged By : Mort Bates
Job #98280.20	

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION
45				
50		SW		
		SM		Cemented Silty Sand, White, Hard, Dry
55		SC		Clayey Sand, Tan, Loose, Dry
60		SC		Clayey Sand w/Gravel, Tan, Firm, Dry
65		SM		Cemented Sand w/Gravel, Hard, Gray, Dry
70		SP		Sand, Tan, Loose, Saturated
75				TD = 75 ft. Below 75 ft. - Clay w/Gravel, Red, Firm, Wet
80				
85				
90				

Well: MW #7

Elev.:



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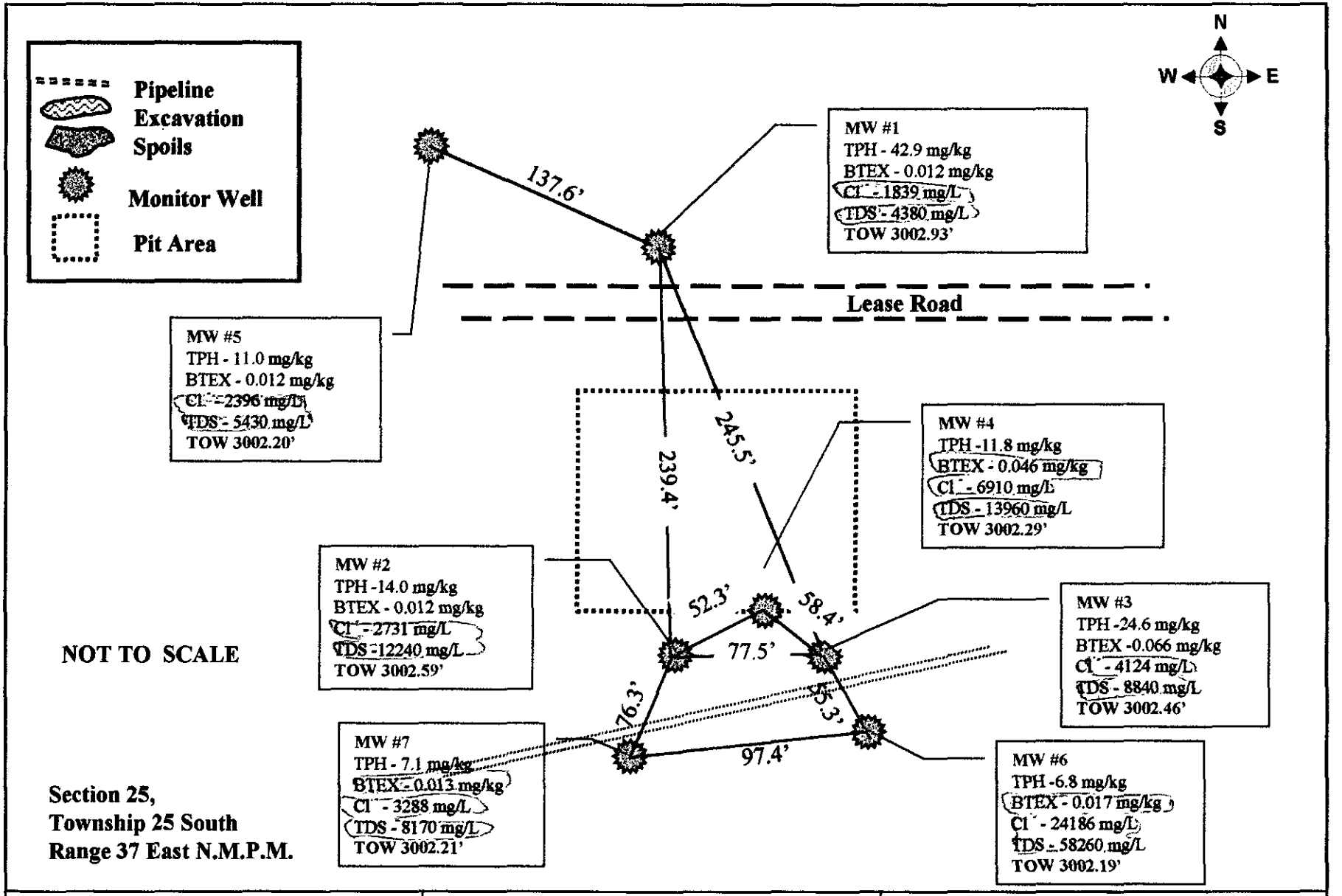
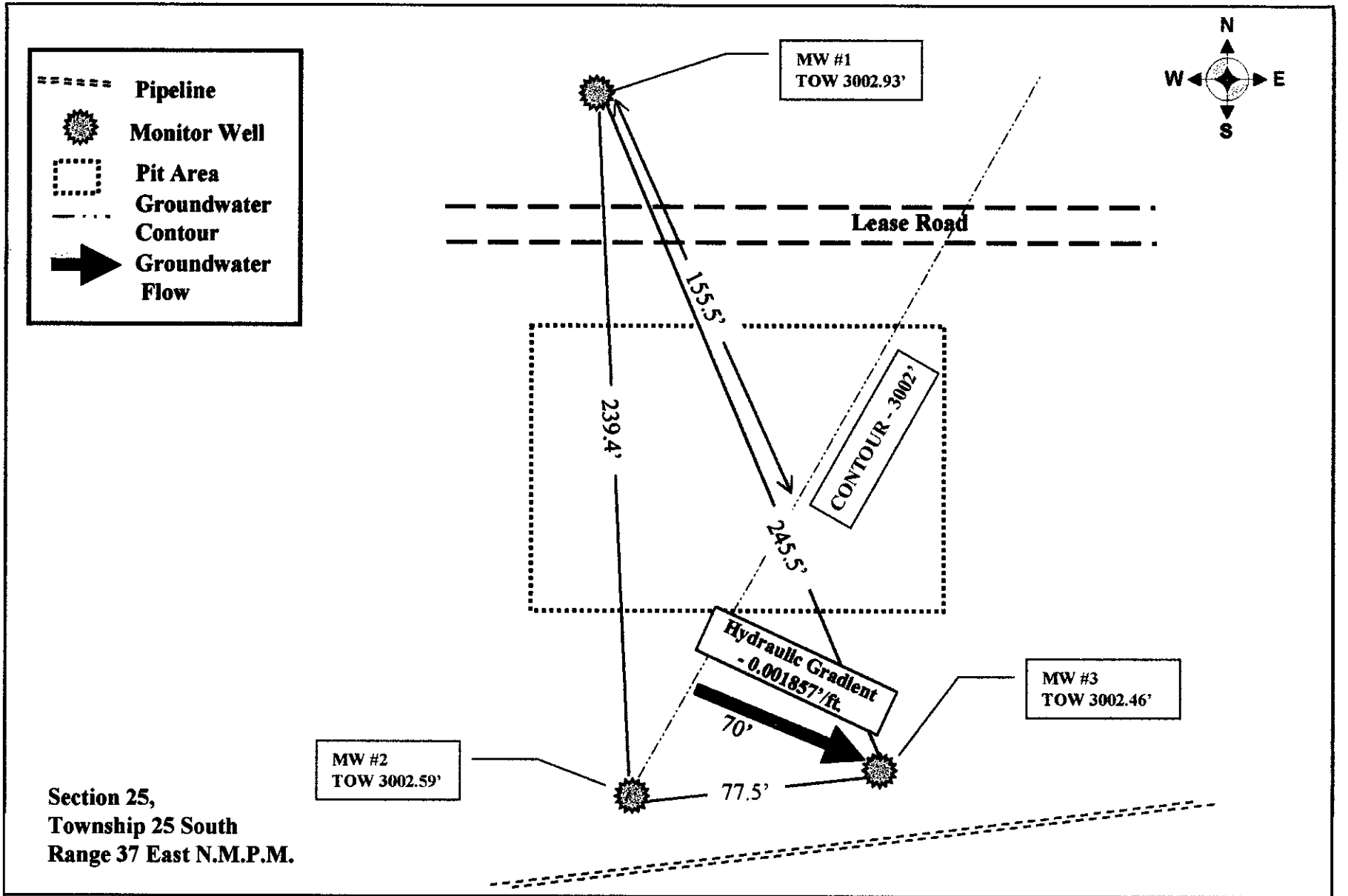


ARCO Permian	**Monitor Wells Analytical Results** **Aug. 25, 1998** **South Justis F-230**	**Safety & Environmental Solutions, Inc.** **Hobbs, New Mexico**



ARCO Permian	Water Contour and Flow South Justis F-230 Monitor Wells	Safety & Environmental Solutions, Inc. Hobbs, New Mexico

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240

(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

Company Name: SESI	**BILL TO**
Project Manager:	P.O. #:
Address: 703 E Clinton PO Box 1613	Company: SESI
City: Hobbs State: NM Zip: 88240	Attn: Beth Aldrich
Phone #: 397-0510 Fax #: 393-4380	Address: PO Box 1611
Project #: Project Owner:	City: Hobbs
Project Name: SJU F230	State: NM Zip: 88240
Project Location: JAL	Phone #: 505-397-0510
Sampler Name: Beth Aldrich	Fax #: 505-393-4380

ANALYSIS REQUEST

BTEX, TPH, Cl

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER:	PRESERV: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME
H37751	MW#4 TD					X							8/7	7:20
-2	MW #4 10'					X							8/7	12:45
-3	MW #4 20'					X							8/7	1:45
-4	MW #4 30'					X							8/7	2:15
-5	MW #4 40'					X							8/7	3:10
-6	MW #4 50'					X							8/7	4:40
-7	MW #4 60'					X							8/7	6:00
-8	MW #4 70'					X							8/7	6:50

Sampler Relinquished: Beth Aldrich	Date: 8/10/98 Time: 10:15a	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: 8/10/98 Time: 10:15	Received By: (Lab Staff)	Fax Result: ☐ Yes ☐ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☒ Yes ☐ No Intact: ☐ Yes ☐ No	CHECKED BY: (Initials)	REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476.

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/12/98
Project Number: NOT GIVEN
Project Name: SJU F230
Project Location: JAL

Sampling Date: 08/07/98
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NUMBER	SAMPLE ID	TPH (mg/Kg)	Cl (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		08/10/98	08/11/98	08/10/98	08/10/98	08/10/98	08/10/98
H3775-1	MW # 4 TD	<10	2283	<0.002	<0.002	<0.002	<0.006
H3775-2	MW # 4 10'	<10	223	<0.002	<0.002	<0.002	<0.006
H3775-3	MW # 4 20'	<10	490	<0.002	<0.002	<0.002	<0.006
H3775-4	MW # 4 30'	<10	1462	<0.002	<0.002	<0.002	<0.006
H3775-5	MW # 4 40'	<10	1337	<0.002	<0.002	<0.002	<0.006
H3775-6	MW # 4 50'	<10	1257	<0.002	<0.002	<0.002	<0.006
H3775-7	MW # 4 60'	44.7	1195	<0.002	<0.002	<0.002	<0.006
H3775-8	MW # 4 70'	<10	1498	<0.002	<0.002	<0.002	<0.006
Quality Control		269	1209	0.103	0.093	0.098	0.301
True Value QC		273	1319	0.100	0.100	0.100	0.300
% Accuracy		97.4	91.7	103	92.7	98.4	100
Relative Percent Difference		6.1	4.4	12.6	5.9	2.5	1.9

METHODS: TRPHC-EPA 600/4-79-020, 418.1;Cl-EPA 600/4-79-020 325.3 BTEX-EPA SW-846-8020

Burgess J. A. Cooke, Ph. D.

8/13/98
Date

H3775-1.XLS

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page ____ of ____

Company Name:	SESI	BILL TO	PO #:
Project Manager:	B Aldrich	Company:	
Address:	703 E Clinton Rd 103	Attn:	Steve
City:	Hobbs State: NM Zip: 88240	Address:	
Phone #:	505-397-0510	City:	
Fax #:	505-393-4388	State:	Zip:
Project #:	— Project Owner: Apache	Phone #:	
Project Name:	Monitor Well #4	Fax #:	
Project Location:	South Justis F 23 30		

FOR LAB USE ONLY				MATRIX							PRES.			SAMPLING		ANALYSIS REQUEST										
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	OTHER:	DATE	TIME	TDS	Chlorides	Cations	Anions	TPH	BTEX						
H3776-1	MW #4	G	4	X							✓		8-10-98	10:00	X	X	X	X	X	X						

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Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date: 8/11/98	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time: 10am		Fax Result: ☐ Yes ☐ No
Relinquished By:	Date: 8/10/98	Received By: (Lab Staff)	REMARKS:
	Time:		
Delivered By: (Circle One)		Sample Condition Cool ☑ Yes ☐ No Intact ☐ Yes ☐ No	CHECKED BY: (Initials)
Sampler - UPS - Bus - Other:			

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: MONITOR WELL # 4
Project Location: SOUTH JUSTIS F-230

Sampling Date: 08/10/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: JS
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity ($mgCaCO_3/L$)
ANALYSIS DATE:		08/13/98	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98
H3776-1	MW #4	5252	480	340	68	18190	360
Quality Control		NR	48.0	52.0	3.05	1402	NR
True Value QC		NR	50.0	50.0	3.00	1413	NR
% Accuracy		NR	96	104	102	99.2	NR
Relative Percent Difference		NR	4.2	3.8	1.6	0.1	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl^- (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		08/11/98	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98
H3776-1	MW #4	9641	159	0	439	6.69	13580
Quality Control		1209	48.92	112	221	7.00	NR
True Value QC		1319	50.00	124	259	7.00	NR
% Accuracy		91.7	98	90	85	100	NR
Relative Percent Difference		4.4	3.1	-	-	0.6	2.3
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Chemist

8/13/98
Date

H3776-2.XLS

CARDINAL LABORATORIES

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: MONITOR WELL # 4
Project Location: SOUTH JUSTIS F-230

Sampling Date: 08/10/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: JS
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/kg)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)
ANALYSIS DATE:		08/10/98	08/10/98	08/10/98	08/10/98	08/10/98
H3776-1	MW #4	<1.0	0.033	<0.002	<0.007	<0.006
Quality Control		209	0.103	0.093	0.098	0.301
True Value QC		200	0.100	0.100	0.100	0.300
% Recovery		105	103	92.7	98.4	100
Relative Percent Difference		1.2	12.6	5.4	2.5	1.4

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW846-8020, 8260

Chemist

8/13/98
Date

H3776-1.XLS

CARDINAL LABORATORIES, INC.

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101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1

Company Name: SESI	**BILL TO** PO #:
Project Manager: B. Blanch	Company:
Address: 703 E. Clinton #103	Attn: Same
City: Hobbs State: NM Zip: 88240	Address:
Phone #: 505 397-0510	City:
Fax #: 505 393-4388	State: Zip:
Project #: Project Owner: Pogo Permian	Phone #:
Project Name: South Justis F240	Fax #:
Project Location:	

LAB I.D. (FOR LAB USE ONLY)	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	OTHER:	DATE	TIME	TPH	BTEX	Chlorides	Cations	Anions	[illegible]	[illegible]	TDS
H3777-1	MW #5 10'	G	1			X							5-7-98	1050	X	X	X					
-2	20'		1			X								1115	X	X	X					
-3	30'		1			X								1130	X	X	X					
-4	40'					X								12:00	X	X	X					
-5	50'					X								1230	X	X	X					
-6	60'					X								120	X	X	X					
-7	70'					X								200	X	X	X					
-8	80'					X					X			230	X	X	X					
-9	MW #5			X							X			445	X	X	X	X	X	X		X

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Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished: [signature]	Date: 5-10-98 Time:	Received By:	Phone Result: ☐ Yes ☐ No Additional Fax #:
Relinquished By:	Date: 5/10/98 Time: 8:05	Received By: (Lab Staff) [signature]	Fax Result: ☐ Yes ☐ No
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition Cool ☒ Yes ☐ No Intact ☒ Yes ☐ No	CHECKED BY: (Initials)

REMARKS:

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PHONE (505) 393-2326 · 101 E. MARLAND · HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SOUTH JUSTIS F230 MONITOR WELL
Project Location: NOT GIVEN

Sampling Date: 08/07/98
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NUMBER	SAMPLE ID	TPH (mg/Kg)	Cl (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		08/11/98	08/12/98	08/11/98	08/11/98	08/11/98	08/11/98
H3777-1	MW # 5 10'	<10	71	<0.002	<0.002	<0.002	<0.006
H3777-2	MW # 5 20'	<10	196	<0.002	<0.002	<0.002	<0.006
H3777-3	MW # 5 30'	<10	178	<0.002	<0.002	<0.002	<0.006
H3777-4	MW # 5 40'	<10	134	<0.002	<0.002	<0.002	<0.006
H3777-5	MW # 5 50'	<10	98	<0.002	<0.002	<0.002	<0.006
H3777-6	MW # 5 60'	<10	107	<0.002	<0.002	<0.002	<0.006
H3777-7	MW # 5 70'	<10	285	<0.002	<0.002	<0.002	<0.006
H3777-8	MW # 5 80'	<10	874	<0.002	<0.002	<0.002	<0.006
Quality Control		267	1209	0.094	0.096	0.100	0.308
True Value QC		278	1319	0.100	0.100	0.100	0.300
% Accuracy		97.9	91.7	94.3	95.6	100	103
Relative Percent Difference		6.1	4.4	9.0	3.0	1.8	2.3

METHODS: TRPHC-EPA 600/4-79-020, 418.1;Cl-EPA 600/4-79-020 325.3 BTEX-EPA SW-846 8260

Burgess J. A. Cooke, Ph. D.

8/13/98
Date

H3777-1.XLS

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SOUTH JUSTIS F230 MONITOR WELL
Project Location: NOT GIVEN

Sampling Date: 08/07/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: AH

LAB NUMBER SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity (mgCaCO3/L)
ANALYSIS DATE:	08/13/98	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98
H3777-9 MW #5	850	264	127	19	5740	164
Quality Control	NR	48.0	52.0	3.05	1402	NR
True Value QC	NR	50.0	50.0	3.00	1413	NR
% Accuracy	NR	96	104	102	99.2	NR
Relative Percent Difference	NR	4.2	3.8	1.6	0.1	NR
METHODS:		SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER SAMPLE ID	Cl (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98	08/11/98
H3777-9 MW #5	1950	138	0	200	7.14	3790
Quality Control	1209	48.92	112	221	7.00	NR
True Value QC	1319	50.00	124	259	7.00	NR
% Accuracy	91.7	98	90	85	100	NR
Relative Percent Difference	4.4	3.1	-	-	0.6	2.3
METHODS:	SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Chemist

8/13/98
Date

H3777-3 XLS

CARDINAL LABORATORIES

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
P.O. BOX 1613
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/10/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SOUTH JUSTIS F230 MONITOR WELL
Project Location: NOT GIVEN

Sampling Date: 08/07/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		08/10/98	08/10/98	08/10/98	08/10/98	08/10/98
H3777-9	MW # 5	<1.0	<0.002	<0.002	<0.002	<0.006
Quality Control		209	0.103	0.093	0.098	0.301
True Value QC		200	0.100	0.100	0.100	0.300
% Recovery		105	103	92.7	98.4	100
Relative Percent Difference		1.2	12.6	5.9	2.5	1.5

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

8/13/98
Date

H3777-2.XLS

Beth 370-8490 ... 9234 - Bob

CARDINAL LABORATORIES, INC.

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101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: SESI
Project Manager:
Address: 703 E Clinton 103
City: [illegible] State: NM Zip: 88241
Phone #:
Fax #:
Project #: Project Owner: Ana Romero
Project Name: SJU Wimberly
Project Location:

BILL TO PO #:
Company:
Attn:
Address:
City:
State: Zip:
Phone #:
Fax #:

LAB I.D. (FOR LAB USE ONLY)	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	ANALYSIS REQUEST: TDS	BTEX	TPH	Chlorides
H3780-1	Test hole #1	G	2	X							✓		7-11-98	130p	✓	✓	✓	X

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Sampler Relinquished: B. Aldrich — Date: 8/11 — Time: — Received By:

Relinquished By: Dona Oliver — Date: 8/11 — Time: 2:35p — Received By: (Lab Staff) Amy Hill

Delivered By: (Circle One) Sampler - UPS - Bus - Other:

Sample Condition: Cool ☒ Yes ☐ No; Intact ☒ Yes ☐ No

CHECKED BY: (Initials)

Phone Result ☐ Yes ☐ No Additional Fax #:
Fax Result: ☐ Yes ☐ No
REMARKS:

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CARDINAL LABORATORIES

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 08/11/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SJU WIMBERLY
Project Location: NOT GIVEN

Sampling Date: 08/11/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		08/11/98	08/11/98	08/11/98	08/11/98	08/11/98
H3780-1	TEST HOLE #1	<1.0	0.044	0.004	<0.002	0.009
Quality Control		207	0.094	0.096	0.1	0.308
True Value QC		200	0.1	0.1	0.1	0.3
% Recovery		104	94.3	95.6	100	103
Relative Percent Difference		0.1	9	3	1.8	2.3

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW846-8020, 8260

Burgess J. A. Cooke, Ph. D.

8/13/98
Date

H3780-1.XLS

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 08/11/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SJU WIMBERLY
Project Location: NOT GIVEN

Sampling Date: 08/11/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Cl (mg/L)	TDS (mg/L)	Conductivity (uS/cm)
ANALYSIS DATE		08/11/98	08/12/98	08/11/98
H3780-1	TEST HOLE #1	29600	58260	61900
Quality Control		1209	NR	1402
True Value QC		1319	NR	1413
% Accuracy		91.7	NR	99.2
Relative Percent Difference		4.4	2.3	0.1

METHODS:	EPA 600/4-79-020	SM4500-CL-B	160.1	120.1

Chemist

8/13/98
Date

H3780-2.XLS

CARDINAL LABORATORIES, INC.
2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240
(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: SESI		BILL TO	PO #:
Project Manager: Bob Aldous		Company:	
Address: 703 E Clinton #103		Attn: Jane	
City: Hobbs	State: NM Zip: 88240	Address:	
Phone #: 505 397-0510		City:	
Fax #: 505 393-4388		State:	Zip:
Project #:	Project Owner: Arco Permian	Phone #:	
Project Name: South Justis F 23 Unit Tide W.		Fax #:	
Project Location:			

ANALYSIS REQUEST

LAB I.D. (FOR LAB USE ONLY)	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	TPH	BTEX	Chloride	TDS
H3787-1	MW #7	G	2	X									8-12-98	200p	X	X	X	X

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished: Bob Aldous	Date: 8-12-98 Time:	Received By:	Phone Result: ☐ Yes ☐ No Additional Fax #:
Relinquished By:	Date: 8/12/98 Time: 4:45	Received By: (Lab Staff) Burgess Cooke	Fax Result: ☐ Yes ☐ No
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition: Cool ☒ Yes ☐ No; Intact ☒ Yes ☐ No. CHECKED BY: (Initials)	REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

CARDINAL LABORATORIES

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 W. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/12/98
Reporting Date: 08/13/98
Project Number: NOT GIVEN
Project Name: SOUTH JUSTIS F-230 UNIT IDA W.
Project Location: NOT GIVEN

Sampling Date: 08/12/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		08/13/98	08/12/98	08/12/98	08/12/98	08/12/98
H3787-1	MW #7	48.7	0.013	0.002	<0.002	<0.006
Quality Control		200	0.088	0.088	0.092	0.281
True Value QC		200	0.100	0.100	0.100	0.300
% Recovery		100	88.2	88.5	91.6	93.7
Relative Percent Difference		2.6	6.9	8.0	9.4	9.6

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW846-8020, 8260

Chemist

8/13/98
Date

H3787-2.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 W. CLINTON SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4380

Receiving Date: 08/12/98
Reporting Date:08/13/98
Project Number: NOT GIVEN
Project Name: SOUTH JUSTIS F-230 UNIT IDA W.
Project Location: NOT GIVEN

Sampling Date: 08/12/98
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: AH/GP

LAB NUMBER	SAMPLE ID	TDS (mg/L)	Cl (mg/L)
ANALYSIS DATE:		08/13/98	08/12/98
H3787-1	MW #7	13496	5015
Quality Control		NR	1209
True Value QC		NR	1319
% Recovery		NR	91.7
Relative Percent Difference		2.3	4.4
METHODS: EPA 600/4-79-02		160.1	325.3

Chemist

9/13/98
Date

H3787-1.XLS

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

H3812

Page____ of ____

Company Name: Safety + Environmental	BILL TO PO #:
Project Manager: Dee Whatley	Company: SESI
Address: 703 E. Clinton Suite 103	Attn:
City: Hobbs State: NM Zip: 88240	Address:
Phone #: (505) 397-0510	City:
Fax #: (505) 393-4398	State: Zip:
Project #: 17 Project Owner: Arco	Phone #:
Project Name: Ida Wimberly Pit	Fax #:
Project Location: South Justis	

LAB I.D. (FOR LAB USE ONLY)	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	ANALYSIS REQUEST: Cations	Anions	TDS	BTEX	TPH
H3812-1	MW #1		3	✓							✓		8-25	2:30pm	✓	✓	✓	✓	✓
-2	MW #2		3	✓							✓		"	"	✓	✓	✓	✓	✓
-3	MW #3		3	✓							✓		"	"	✓	✓	✓	✓	✓
-4	MW #4		3	✓							✓		"	"	✓	✓	✓	✓	✓
-5	MW #5		3	✓							✓		"	"	✓	✓	✓	✓	✓
-6	MW #6		3	✓							✓		"	"	✓	✓	✓	✓	✓
-7	MW #7		3	✓							✓		"	"	✓	✓	✓	✓	✓

Sampler Relinquished: [signature] Date: 8-25-98 Time: 2:45pm Received By:

Relinquished By: Date: Time: Received By: (Lab Staff) [signature]

Delivered By: (Circle One) Sampler - UPS - Bus - Other:

Sample Condition: Cool ☒ Yes ☐ No; Intact ☒ Yes ☐ No

CHECKED BY: (Initials)

Phone Result ☐ Yes ☐ No Additional Fax #:
Fax Result: ☐ Yes ☐ No
REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS,INC.
ATTN: DEE WHATLEY
703 E. CLINTON , SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 08/25/98
Reporting Date: 09/01/98
Project Number: 17
Project Name: IDA WIMBERLY PIT
Project Location: SOUTH JUSTIS

Sampling Date: 08/25/98
Sample Type: GROUNDWATER
Sample Condition: COOL AND INTACT
Sample Received By: AH
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/kg)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)
ANALYSIS DATE:		08/28/98	08/25/98	08/25/98	08/25/98	08/25/98
H3812-1	MW #1	42.9	<0.002	<0.002	<0.002	<0.006
H3812-2	MW #2	14.0	<0.002	<0.002	<0.002	<0.006
H3812-3	MW #3	24.6	0.002	<0.002	<0.002	<0.006
H3812-4	MW #4	11.8	0.046	<0.002	0.012	<0.006
H3812-5	MW #5	11.0	<0.002	<0.002	<0.002	<0.006
H3812-6	MW #6	6.8	0.007	<0.002	<0.002	<0.006
H3812-7	MW #7	7.1	0.003	<0.002	<0.002	<0.006
Quality Control		158	0.106	0.102	0.098	0.297
True Value QC		150	0.1	0.1	0.1	0.3
% Recovery		105	106	102	98.1	99.0
Relative Percent Difference		1.1	0.5	2.0	0.4	0.4

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW846-8020, 8260

Chemist

9/1/98
Date

H3812-2.XLS

Safety & Environmental Solutions, Inc.

ARCO Permian

Ida Wimberly
South Justis Unit F-230
Monitor Well Report

Lea County, New Mexico

June 17, 1999

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

The subject property is located at the Arco Permian South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, New Mexico. Safety & Environmental Solutions, Inc. (SESI) performed sampling and data collection on the seven (7) ground water monitor wells previously installed the site (See Vicinity Map). The casing size in all wells is 2".

II. Work Performed

On June 17, 1999, SESI environmental technician W. Dee Whatley arrived at the site. Ground water samples were taken from each well after a hand bailer was used to develop the wells. Three to five casing volumes of water were removed from each well until pH and temperature of the water were stabilized. The water that was removed was placed in appropriate drums for disposal. The samples were obtained and placed in appropriate containers, preserved and transported under chain of custody to Cardinal Laboratories of Hobbs, New Mexico for analysis of the contaminants identified in the initial sampling. (See Analytical Data)

In addition to the sampling, SESI also measured the depth to the top of the water table and the total depth of each well. The depth to the top of ground water was measured using a Solinst water level indicator. The total depth of each well was measured in order to compute the proper casing volumes. A summary of this data follows:

ID	Date	Depth to Water	Well Total Depth	Free Product Thickness
MW – 1	6/17/99	64.43'	66'	0.00
MW – 2	6/17/99	63.63'	71'	0.00
MW – 3	6/17/99	63.98'	71'	0.00
MW – 4	6/17/99	65.65'	82'	0.00
MW – 5	6/17/99	63.88'	80'	0.00
MW – 6	6/17/99	63.29'	75'	0.00
MW – 7	6/17/99	62.51'	75'	0.00

III. Analytical Results

The analysis of the groundwater samples performed by Cardinal Laboratories are summarized as follows:

Contaminant	WQCC Standard	MW #1	MW #2	MW #3	MW #4
Chloride	250.0 ppm	1610ppm	3890ppm	7570ppm	4680ppm
SO_4	600 ppm	N/A	N/A	N/A	N/A
TDS	1000 ppm	4560ppm	7490ppm	15180ppm	9400ppm

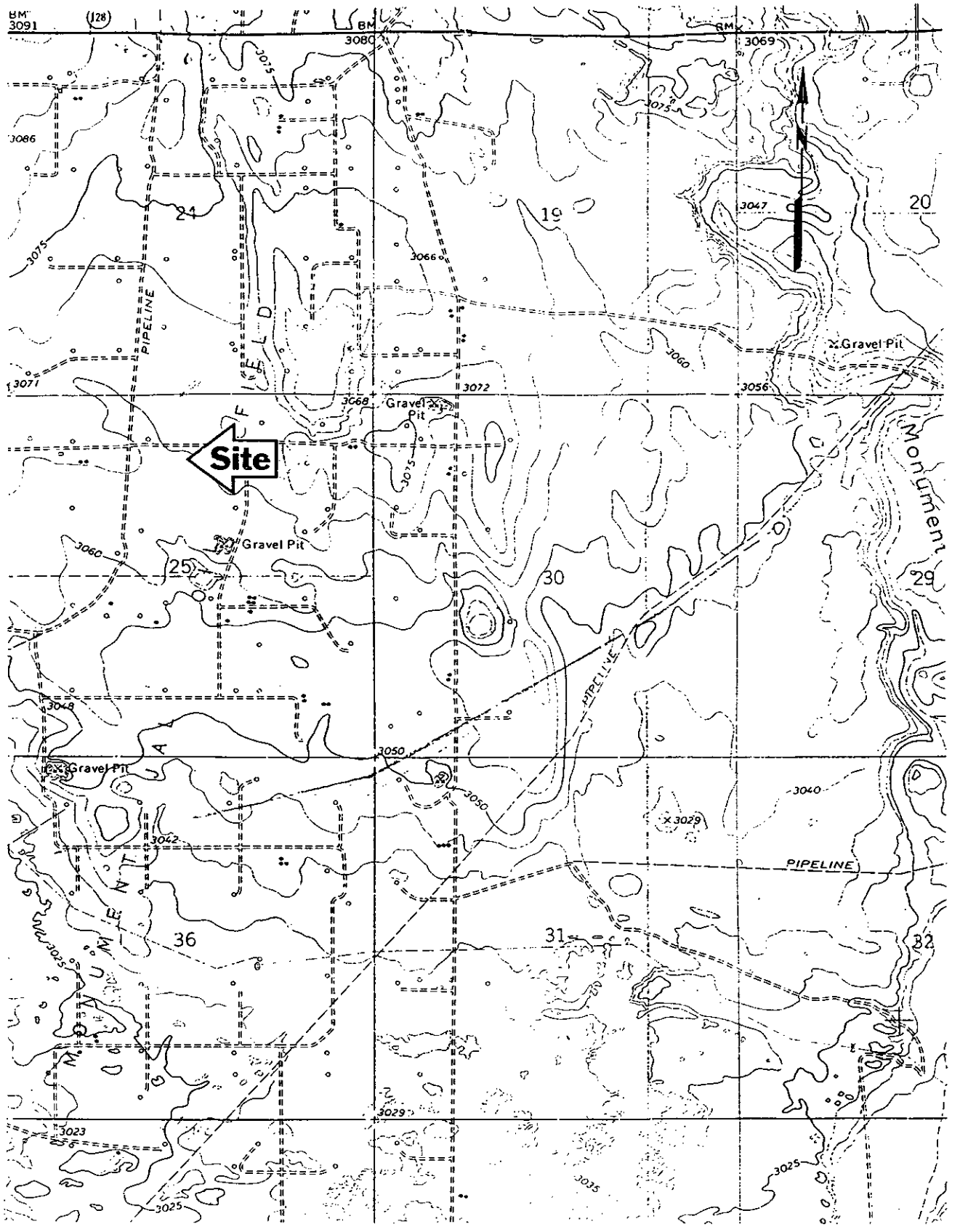
Benzene	0.01 ppm	N/A	N/A	N/A	0.003ppm
Toluene	0.75 ppm	N/A	N/A	N/A	<.002ppm
Ethyl Benzene	0.75 ppm	N/A	N/A	N/A	<.002ppm
Total Xylenes	0.62 ppm	N/A	N/A	N/A	<.006ppm

Contaminant	WQCC Standard	MW #5	MW #6	MW #7
Chloride	250.0 ppm	2090ppm	25500ppm	5380ppm
SO_4	600 ppm	N/A	1200ppm	142ppm
TDS	1000 ppm	5300ppm	53980ppm	10580ppm
Benzene	0.01 ppm	N/A	N/A	N/A
Toluene	0.75 ppm	N/A	N/A	N/A
Ethyl Benzene	0.75 ppm	N/A	N/A	N/A
Total Xylenes	0.62 ppm	N/A	N/A	N/A

IV. Figures and Appendices

Figures:
Vicinity Map

Appendices:
Analytical Results



ARCO Permian	**South Justis Unit F-230** **Vicinity Map**	*Safety & Environmental Solutions, Inc.* *Hobbs, NM*

Figure 1
Vicinity Map

Appendix A
Analytical Results

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 06/17/99
Reporting Date: 06/21/99
Project Owner: ARCO
Project Name: ARCO PERMIAN
Project Location: IDA WIMBERLY

Sampling Date: 06/17/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NO.	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		06/18/99	06/18/99	06/18/99	06/18/99
H4186-4	MW #4	0.003	<0.002	<0.002	<0.006
Quality Control		0.086	0.097	0.101	0.301
True Value QC		0.100	0.100	0.100	0.300
% Recovery		86.0	97.4	101	100
Relative Percent Difference		0.1	1.1	1.8	2.7

METHOD: EPA SW 846-8021B, 5030, 5021 Gas Chromatography

JUL 06 1999

Burgess J. A. Cooke
Chemist

6/21/99
Date

H4186B.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 06/17/99
Reporting Date: 06/21/99
Project Owner: ARCO
Project Name: ARCO PERMIAN
Project Location: IDA WIMBERLY

Analysis Date: 06/18/99
Sampling Date: 06/17/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	$SO_4^=$ (mg/L)
H4186-6	MW #6	1200
H4186-7	MW #7	142
Quality Control		46.4
True Value QC		50.0
% Recovery		93
Relative Percent Difference		2.8

METHOD: EPA 600/4-79-020 375.4

Chemist

6/21/99
Date

H4186C.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 06/17/99
Reporting Date: 06/21/99
Project Owner: ARCO
Project Name: ARCO PERMIAN
Project Location: IDA WIMBERLY

Sampling Date: 06/17/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	TDS (mg/L)	Cl (mg/L)
ANALYSIS DATE:		06/18/99	06/18/99
H4186-1	MW #1	4560	1610
H4186-2	MW #2	7490	3890
H4186-3	MW #3	15180	7570
H4186-4	MW #4	9400	4680
H4186-5	MW #5	5300	2090
H4186-6	MW #6	53980	25500
H4186-7	MW #7	10580	5380
Quality Control		NR	1325
True Value QC		NR	1319
% Recovery		NR	101
Relative Percent Difference		NR	1.5

METHODS: EPA 600/4-79-02	160.1	4500-ClB*

*Std. Methods

Chemist

6/21/99
Date

H4186A.XLS

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1

Company Name:	SESI	BILL TO	PO #:
Project Manager:	Dee Whatley	Company:	
Address:	703 E. Clinton #103	Attn:	
City:	Hobbs State: NM Zip: 88240	Address:	Same
Phone #:	505-397-0510	City:	
Fax #:	505-393-4388	State:	Zip:
Project #:	Project Owner: ARCO	Phone #:	
Project Name:	Arco Permian	Fax #:	
Project Location:	Ida Wimberly		

FOR LAB USE ONLY				MATRIX							PRES.			SAMPLING		ANALYSIS REQUEST												
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	OTHER:	DATE	TIME	TDS	Chlorides	BTEX	SO4											
H41810-1	MW #1		1	✓							✓		6-17-99	3:30pm	✓	✓												
-2	MW #2		1	✓							✓		6-17-99		✓	✓												
-3	MW #3		1	✓							✓				✓	✓												
-4	MW #4		3	✓							✓				✓	✓	✓											
-5	MW #5		1	✓							✓				✓	✓												
-6	MW #6		2	✓							✓				✓	✓		✓										
-7	MW #7		2	✓							✓				✓	✓		✓										

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished: Dee Whatley	Date: 6-17-99 Time: 3:30pm	Received By: Beth Aldred	Phone Result ☐ Yes ☐ No Additional Fax #:
Relinquished By: Beth Aldred	Date: 6/17/99 Time: 23:50	Received By: (Lab Staff) Jerry Hall	Fax Result: ☐ Yes ☐ No
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☐ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials)	REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

Safety & Environmental Solutions, Inc.

ARCO Permian

Ida Wimberly
South Justis Unit F-230
Monitor Well Report

Lea County, New Mexico

September 28, 1999

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

The subject property is located at the Arco Permian South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, New Mexico. Safety & Environmental Solutions, Inc. (SESI) performed sampling and data collection on the seven (7) ground water monitor wells previously installed the site (See Vicinity Map). The casing size in all wells is 2".

II. Work Performed

On September 24, 1999, SESI environmental technician W. Dee Whatley arrived at the site. Ground water samples were taken from each well after a hand bailer was used to develop the wells. Three to five casing volumes of water were removed from each well until pH and temperature of the water were stabilized. The water that was removed was placed in appropriate drums for disposal. The samples were obtained and placed in appropriate containers, preserved and transported under chain of custody to Cardinal Laboratories of Hobbs, New Mexico for analysis of the contaminants identified in the initial sampling. (See Analytical Data)

In addition to the sampling, SESI also measured the depth to the top of the water table and the total depth of each well. The depth to the top of ground water was measured using a Solinst water level indicator. The total depth of each well was measured in order to compute the proper casing volumes. A summary of this data follows:

ID	Date	Depth to Water	Well Total Depth	Free Product Thickness
MW – 1	9/24/99	64.43'	66'	0.00
MW – 2	9/24/99	63.94'	71'	0.00
MW – 3	9/24/99	63.57'	71'	0.00
MW – 4	9/24/99	65.61'	82'	0.00
MW – 5	9/24/99	63.99'	80'	0.00
MW – 6	9/24/99	63.26'	75'	0.00
MW – 7	9/24/99	62.40'	75'	0.00

III. Analytical Results

The analysis of the groundwater samples performed by Cardinal Laboratories are summarized as follows:

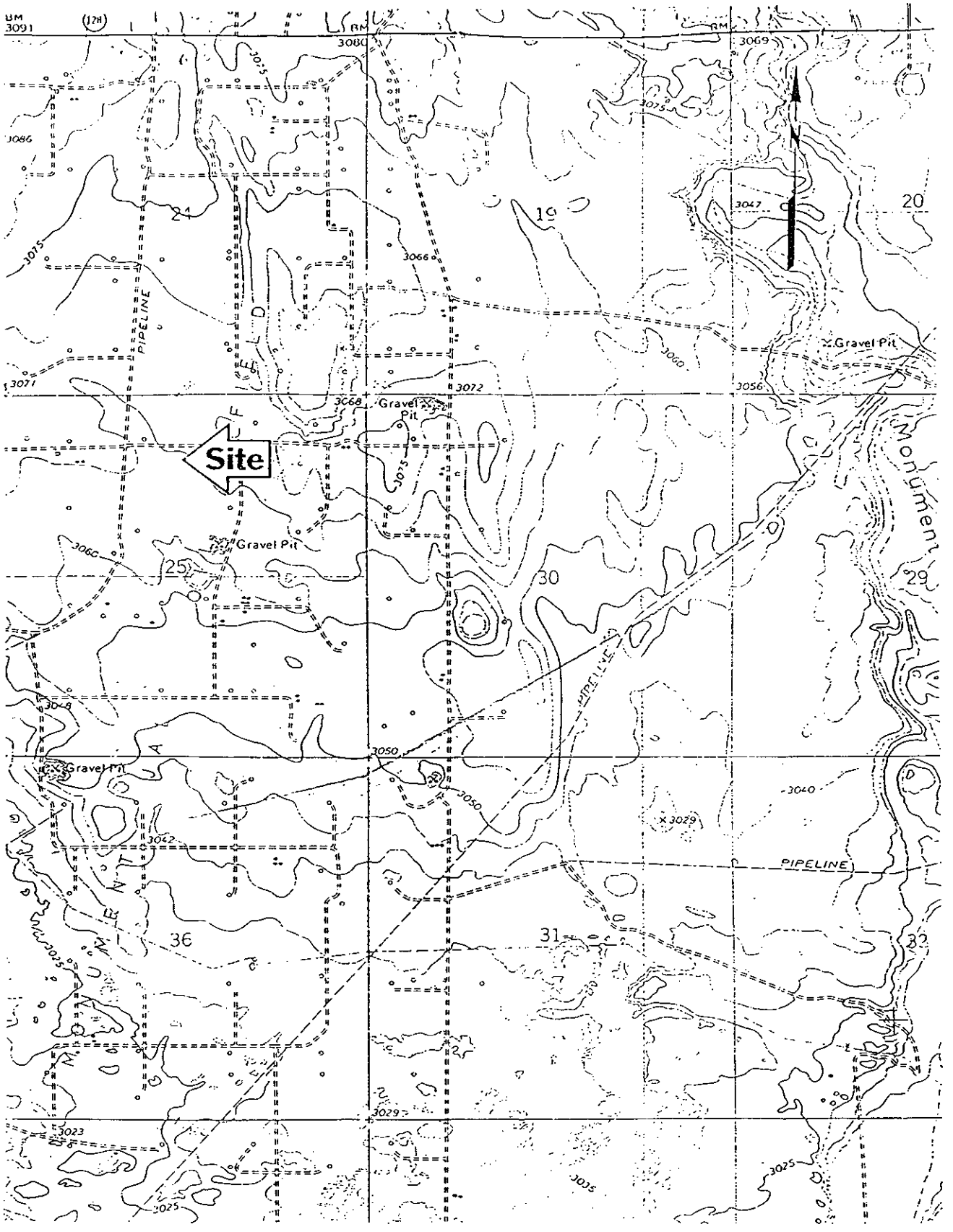
Contaminant	MW #1	MW #2	MW #3	MW #4	MW #5	MW #6	MW #7
Sodium	1157 ppm	3611 ppm	2892 ppm	8521 ppm	1355 ppm	22692ppm	3553 ppm
Calcium	296 ppm	544 ppm	448 ppm	736 ppm	312 ppm	2480 ppm	600 ppm
Magnesium	126 ppm	258 ppm	214 ppm	272 ppm	112 ppm	1458 ppm	97 ppm
Potassium	24 ppm	62 ppm	55 ppm	76 ppm	20 ppm	98 ppm	66 ppm
Conductivity	1978 ppm	1715 ppm	1679 ppm	1603 ppm	1657 ppm	1482 ppm	1523 ppm
T-Alkalinity	188 ppm	376 ppm	376 ppm	508 ppm	196 ppm	192 ppm	136 ppm
Chlorides	2231 ppm	6590 ppm	5374 ppm	14600ppm	2535 ppm	42583ppm	6387 ppm
Sulfate (SO_4)	455 ppm	666 ppm	397 ppm	488 ppm	429 ppm	1428 ppm	553 ppm
Carbonate	0 ppm	0 ppm	0 ppm	0 ppm	0 ppm	0 ppm	0 ppm
HCO_3	229 ppm	459 ppm	459 ppm	620 ppm	239 ppm	234 ppm	166 ppm
TDS	4520 ppm	14270ppm	10330ppm	20020ppm	5100 ppm	71000ppm	12140ppm
pH	7.19	6.88	6.91	7.04	7.28	6.74	7.59
TPH	2.76 ppm	4.27 ppm	1.52 ppm	3.27 ppm	1.26 ppm	1.88 ppm	1.32 ppm
Benzene	<.002 ppm	0.003 ppm	0.005 ppm	0.033 ppm	<.002 ppm	0.003 ppm	0.008 ppm
Toluene	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
E. Benzene	<.002 ppm	<.002 ppm	<.002 ppm	0.006 ppm	<.002 ppm	<.002 ppm	<.002 ppm
T. Xylenes	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm

IV. Figures and Appendices

Figures:
Vicinity Map
Water Flow Diagram

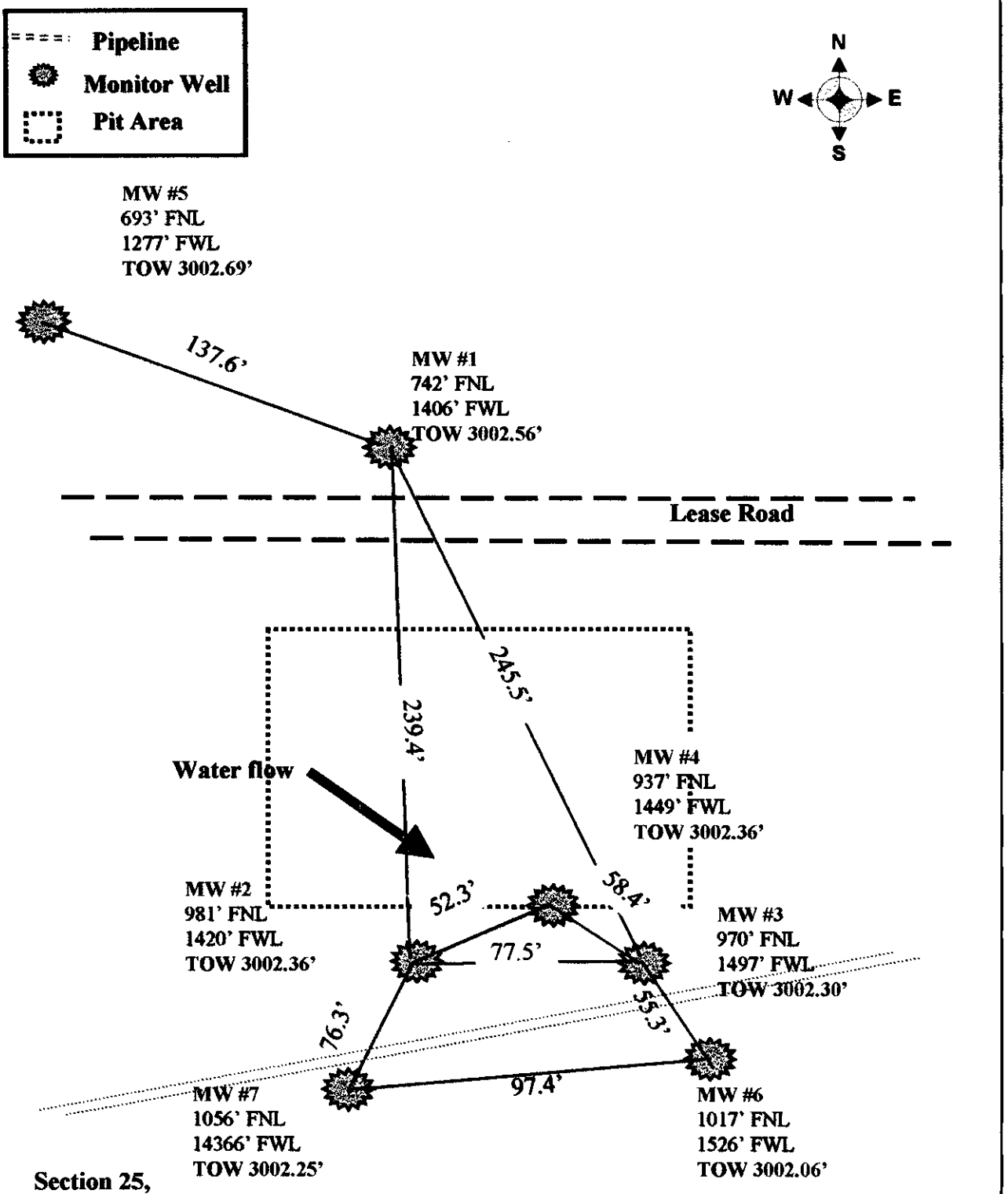
Appendices:
Cumulative Well Data
Analytical Results

Figure 1
Vicinity Map



ARCO Permian	**South Justis Unit F-230** **Vicinity Map**	*Safety & Environmental Solutions, Inc.* *Hobbs, NM*

Figure 2
Water Flow Diagram



ARCO Permian	**Water Flow Diagram South Justis F-230 Monitor Wells**	**Safety & Environmental Solutions, Inc. Hobbs, New Mexico**

Appendix A
Cumulative Well Data

Ida Wimberly Cumulative Well Data

Monitor Well #1

Contaminant	WQCC Standard	Initial Test 12/17/97	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99
Aluminum	5.0 ppm	<0.2 ppm	n/a	n/a	n/a
Arsenic	0.1 ppm	<0.1 ppm	n/a	n/a	n/a
Barium	1.0 ppm	<1.0 ppm	n/a	n/a	n/a
Boron	0.75 ppm	<0.75 ppm	n/a	n/a	n/a
Cadmium	0.01 ppm	<0.01 ppm	n/a	n/a	n/a
Chloride	250.0 ppm	1580 ppm	1839 ppm	1610 ppm	2231 ppm
Chromium	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Cobalt	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Copper	1.0 ppm	<0.1 ppm	n/a	n/a	n/a
Iron	1.0 ppm	.388 ppm	n/a	n/a	n/a
Lead	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Manganese	0.2 ppm	0.345 ppm	n/a	n/a	n/a
Mercury	0.002 ppm	<0.02 ppm	n/a	n/a	n/a
Molybdenum	1.0 ppm	<0.2 ppm	n/a	n/a	n/a
Nickel	0.2 ppm	<0.2 ppm	n/a	n/a	n/a
Selenium	0.05 ppm	<0.1 ppm	n/a	n/a	n/a
Silver	0.05 ppm	<0.1 ppm	n/a	n/a	n/a
Sulfate	600 ppm	1050 ppm	305 ppm	n/a	455 ppm
Zinc	10.0 ppm	<0.2 ppm	n/a	n/a	n/a
TDS	1000 ppm	3480 ppm	4380 ppm	4560 ppm	4520 ppm
pH	> 6 & <9	5.58	6.384	n/a	7.19 ppm
TPH	N/A	n/a	42.9 ppm	n/a	2.76 ppm
Benzene	0.01 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm
Toluene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm	n/a	<.006 ppm

Monitor Well #2

Contaminant	WQCC Standard	Initial Test 12/17/97	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99
Aluminum	5.0 ppm	<0.2 ppm	n/a	n/a	n/a
Arsenic	0.1 ppm	<0.1 ppm	n/a	n/a	n/a
Barium	1.0 ppm	<1.0 ppm	n/a	n/a	n/a
Boron	0.75 ppm	<0.75 ppm	n/a	n/a	n/a
Cadmium	0.01 ppm	<0.01 ppm	n/a	n/a	n/a
Chloride	250.0 ppm	6200 ppm	2731 ppm	3890 ppm	6590 ppm
Chromium	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Cobalt	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Copper	1.0 ppm	<0.1 ppm	n/a	n/a	n/a
Iron	1.0 ppm	<.2 ppm	n/a	n/a	n/a
Lead	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Manganese	0.2 ppm	0.343 ppm	n/a	n/a	n/a
Mercury	0.002 ppm	<0.02 ppm	n/a	n/a	n/a
Molybdenum	1.0 ppm	<0.2 ppm	n/a	n/a	n/a
Nickel	0.2 ppm	<0.2 ppm	n/a	n/a	n/a
Selenium	0.05 ppm	<0.1 ppm	n/a	n/a	n/a
Silver	0.05 ppm	<0.1 ppm	n/a	n/a	n/a
Sulfate	600 ppm	1160 ppm	426 ppm	n/a	666 ppm
Zinc	10.0 ppm	<0.2 ppm	n/a	n/a	n/a
TDS	1000 ppm	10490 ppm	12240 ppm	7490 ppm	14270 ppm
pH	> 6 & <9	7.84	6.303	n/a	6.88
TPH	N/A	n/a	14.0 ppm	10.3 ppm	4.27 ppm
Benzene	0.01 ppm	<.002 ppm	<.002 ppm	<.002 ppm	.003 ppm
Toluene	0.75 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm

Monitor Well #3

Contaminant	WQCC Standard	Initial Test 12/17/97	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99
Aluminum	5.0 ppm	<0.3 ppm	n/a	n/a	n/a
Arsenic	0.1 ppm	<0.1 ppm	n/a	n/a	n/a
Barium	1.0 ppm	<1.0 ppm	n/a	n/a	n/a
Boron	0.75 ppm	<0.75 ppm	n/a	n/a	n/a
Cadmium	0.01 ppm	<0.01 ppm	n/a	n/a	n/a
Chloride	250.0 ppm	8500 ppm	4124 ppm	7570 ppm	5374 ppm
Chromium	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Cobalt	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Copper	1.0 ppm	<0.1 ppm	n/a	n/a	n/a
Iron	1.0 ppm	<.2 ppm	n/a	n/a	n/a
Lead	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Manganese	0.2 ppm	0.440 ppm	n/a	n/a	n/a
Mercury	0.002 ppm	<0.02 ppm	n/a	n/a	n/a
Molybdenum	1.0 ppm	<0.2 ppm	n/a	n/a	n/a
Nickel	0.2 ppm	<0.2 ppm	n/a	n/a	n/a
Selenium	0.05 ppm	<0.1 ppm	n/a	n/a	n/a
Silver	0.05 ppm	<0.1 ppm	n/a	n/a	n/a
Sulfate	600 ppm	1280 ppm	279 ppm	n/a	397 ppm
Zinc	10.0 ppm	<0.2 ppm	n/a	n/a	n/a
TDS	1000 ppm	15300 ppm	8840 ppm	15180 ppm	10330 ppm
pH	> 6 & <9	7.77	6.64	n/a	6.91
TPH	N/A	n/a	24.6 ppm	n/a	n/a
Benzene	0.01 ppm	<.002 ppm	<.002 ppm	<.002 ppm	.005 ppm
Toluene	0.75 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm

Monitor Well #4

Contaminant	WQCC Standard	Initial Test 8/10/98	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99
Aluminum	5.0 ppm	<0.3 ppm	n/a	n/a	n/a
Arsenic	0.1 ppm	<0.1 ppm	n/a	n/a	n/a
Barium	1.0 ppm	<1.0 ppm	n/a	n/a	n/a
Boron	0.75 ppm	<0.75 ppm	n/a	n/a	n/a
Cadmium	0.01 ppm	<0.01 ppm	n/a	n/a	n/a
Chloride	250.0 ppm	9641 ppm	6910 ppm	4680 ppm	14600 ppm
Chromium	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Cobalt	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Copper	1.0 ppm	<0.1 ppm	n/a	n/a	n/a
Iron	1.0 ppm	<.2 ppm	n/a	n/a	n/a
Lead	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Manganese	0.2 ppm	0.440 ppm	n/a	n/a	n/a
Mercury	0.002 ppm	<0.02 ppm	n/a	n/a	n/a
Molybdenum	1.0 ppm	<0.2 ppm	n/a	n/a	n/a
Nickel	0.2 ppm	<0.2 ppm	n/a	n/a	n/a
Selenium	0.05 ppm	<0.1 ppm	n/a	n/a	n/a
Silver	0.05 ppm	<0.1 ppm	n/a	n/a	n/a
Sulfate	600 ppm	159 ppm	335 ppm	n/a	488 ppm
Zinc	10.0 ppm	<0.2 ppm	n/a	n/a	n/a
TDS	1000 ppm	13580 ppm	13960 ppm	9460 ppm	20020 ppm
pH	> 6 & <9	6.69	6.64	n/a	7.04
TPH	N/A	<1.0 ppm	11.8 ppm	n/a	3.27 ppm
Benzene	0.01 ppm	0.033 ppm	0.046 ppm	0.003 ppm	0.033 ppm
Toluene	0.75 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
E. Benzene	0.75 ppm	<.007 ppm	.012 ppm	<.002 ppm	0.006 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm

Monitor Well #5

Contaminant	WQCC Standard	Initial Test 8/10/98	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99
Aluminum	5.0 ppm	<0.3 ppm	n/a	n/a	n/a
Arsenic	0.1 ppm	<0.1 ppm	n/a	n/a	n/a
Barium	1.0 ppm	<1.0 ppm	n/a	n/a	n/a
Boron	0.75 ppm	<0.75 ppm	n/a	n/a	n/a
Cadmium	0.01 ppm	<0.01 ppm	n/a	n/a	n/a
Chloride	250.0 ppm	1950 ppm	2396 ppm	2090 ppm	2535 ppm
Chromium	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Cobalt	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Copper	1.0 ppm	<0.1 ppm	n/a	n/a	n/a
Iron	1.0 ppm	<.2 ppm	n/a	n/a	n/a
Lead	0.05 ppm	<0.05 ppm	n/a	n/a	n/a
Manganese	0.2 ppm	0.440 ppm	n/a	n/a	n/a
Mercury	0.002 ppm	<0.02 ppm	n/a	n/a	n/a
Molybdenum	1.0 ppm	<0.2 ppm	n/a	n/a	n/a
Nickel	0.2 ppm	<0.2 ppm	n/a	n/a	n/a
Selenium	0.05 ppm	<0.1 ppm	n/a	n/a	n/a
Silver	0.05 ppm	<0.1 ppm	n/a	n/a	n/a
Sulfate	600 ppm	138 ppm	274 ppm	n/a	429 ppm
Zinc	10.0 ppm	<0.2 ppm	n/a	n/a	n/a
TDS	1000 ppm	3790 ppm	5430 ppm	5300 ppm	5100 ppm
pH	> 6 & <9	7.14	7.216	n/a	7.28
TPH	N/A	<1.0 ppm	11.0 ppm	n/a	1.26 ppm
Benzene	0.01 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm
Toluene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm	n/a	<.006 ppm

Monitor Well #6

Contaminant	WQCC Standard	Initial Test 8/11/98	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99
Aluminum	5.0 ppm	n/a	n/a	n/a	n/a
Arsenic	0.1 ppm	n/a	n/a	n/a	n/a
Barium	1.0 ppm	n/a	n/a	n/a	n/a
Boron	0.75 ppm	n/a	n/a	n/a	n/a
Cadmium	0.01 ppm	n/a	n/a	n/a	n/a
Chloride	250.0 ppm	29600 ppm	24186 ppm	25500 ppm	42583 ppm
Chromium	0.05 ppm	n/a	n/a	n/a	n/a
Cobalt	0.05 ppm	n/a	n/a	n/a	n/a
Copper	1.0 ppm	n/a	n/a	n/a	n/a
Iron	1.0 ppm	n/a	n/a	n/a	n/a
Lead	0.05 ppm	n/a	n/a	n/a	n/a
Manganese	0.2 ppm	n/a	n/a	n/a	n/a
Mercury	0.002 ppm	n/a	n/a	n/a	n/a
Molybdenum	1.0 ppm	n/a	n/a	n/a	n/a
Nickel	0.2 ppm	n/a	n/a	n/a	n/a
Selenium	0.05 ppm	n/a	n/a	n/a	n/a
Silver	0.05 ppm	n/a	n/a	n/a	n/a
Sulfate	600 ppm	n/a	750 ppm	1200 ppm	1428 ppm
Zinc	10.0 ppm	n/a	n/a	n/a	n/a
TDS	1000 ppm	58260 ppm	58260 ppm	53980 ppm	71000 ppm
pH	> 6 & <9	n/a	6.829	n/a	6.74
TPH	N/A	<1.0 ppm	6.8 ppm	n/a	1.88 ppm
Benzene	0.01 ppm	0.044 ppm	0.007 ppm	n/a	0.003 ppm
Toluene	0.75 ppm	0.004 ppm	<.002 ppm	n/a	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm
Total Xylenes	0.62 ppm	0.009ppm	<.006 ppm	n/a	<.006 ppm

Monitor Well #7

Contaminant	WQCC Standard	Initial Test 8/12/98	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99
Aluminum	5.0 ppm	n/a	n/a	n/a	n/a
Arsenic	0.1 ppm	n/a	n/a	n/a	n/a
Barium	1.0 ppm	n/a	n/a	n/a	n/a
Boron	0.75 ppm	n/a	n/a	n/a	n/a
Cadmium	0.01 ppm	n/a	n/a	n/a	n/a
Chloride	250.0 ppm	5015 ppm	3288 ppm	5380 ppm	6387 ppm
Chromium	0.05 ppm	n/a	n/a	n/a	n/a
Cobalt	0.05 ppm	n/a	n/a	n/a	n/a
Copper	1.0 ppm	n/a	n/a	n/a	n/a
Iron	1.0 ppm	n/a	n/a	n/a	n/a
Lead	0.05 ppm	n/a	n/a	n/a	n/a
Manganese	0.2 ppm	n/a	n/a	n/a	n/a
Mercury	0.002 ppm	n/a	n/a	n/a	n/a
Molybdenum	1.0 ppm	n/a	n/a	n/a	n/a
Nickel	0.2 ppm	n/a	n/a	n/a	n/a
Selenium	0.05 ppm	n/a	n/a	n/a	n/a
Silver	0.05 ppm	n/a	n/a	n/a	n/a
Sulfate	600 ppm	n/a	832 ppm	142 ppm	553 ppm
Zinc	10.0 ppm	n/a	n/a	n/a	n/a
TDS	1000 ppm	13496 ppm	8170 ppm	10580 ppm	12140 ppm
pH	> 6 & <9	n/a	7.326	n/a	7.59
TPH	N/A	48.7 ppm	7.1 ppm	n/a	1.32 ppm
Benzene	0.01 ppm	0.013 ppm	0.003 ppm	n/a	0.008 ppm
Toluene	0.75 ppm	0.002ppm	<.002 ppm	n/a	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm
Total Xylenes	0.62 ppm	0.009ppm	<.006 ppm	n/a	<.006 ppm

Appendix B
Analytical Results

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 09/24/99
Reporting Date: 09/28/99
Project Number: NOT GIVEN
Project Name: IDA WIMBERLY
Project Location: ARCO SOUTH JUSTIS

Sampling Date: 09/24/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC/GP/JP

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		09/27/99	09/24/99	09/24/99	09/24/99	09/24/99
H4360-1	MW #1	2.76	<0.002	<0.002	<0.002	<0.006
H4360-2	MW #2	4.27	0.003	<0.002	<0.002	<0.006
H4360-3	MW #3	1.52	0.005	<0.002	<0.002	<0.006
H4360-4	MW #4	3.27	0.033	<0.002	0.006	<0.006
H4360-5	MW #5	1.26	<0.002	<0.002	<0.002	<0.006
H4360-6	MW #6	1.88	0.003	<0.002	<0.002	<0.006
H4360-7	MW #7	1.32	0.008	<0.002	<0.002	<0.006
Quality Control		41.3	0.092	0.100	0.100	0.304
True Value QC		40.0	0.100	0.100	0.100	0.300
% Recovery		103	92.1	100	99.6	101
Relative Percent Difference		0.6	2.9	6.0	6.7	5.3

METHODS: TRPHC - EPA 600/4-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

9/28/99
Date

H4360A.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 09/24/99
Reporting Date: 09/28/99
Project Number: NOT GIVEN
Project Name: IDA WIMBERLY
Project Location: ARCO SOUTH JUSTIS

Sampling Date: 09/24/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity (mgCaCO3/L)
ANALYSIS DATE:		09/24/99	09/27/99	09/27/99	09/27/99	09/27/99	09/24/99
H4360-1	MW #1	1157	296	126	24	1978	188
H4360-2	MW #2	3611	544	258	62	1715	376
H4360-3	MW #3	2892	448	214	55	1679	376
H4360-4	MW #4	8521	736	272	76	1603	508
H4360-5	MW #5	1355	312	112	20	1657	196
H4360-6	MW #6	22692	2480	1458	98	1482	192
H4360-7	MW #7	3553	600	97	66	1523	136
Quality Control		NR	48	49	4.96	1443	NR
True Value QC		NR	50	50	5.00	1413	NR
% Accuracy		NR	96	98	99	102	NR
Relative Percent Difference		NR	6.3	5.1	0	0.4	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl⁻ (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		09/27/99	09/27/99	09/27/99	09/27/99	09/27/99	09/28/99
H4360-1	MW #1	2231	455	0	229	7.19	4520
H4360-2	MW #2	6590	666	0	459	6.88	14270
H4360-3	MW #3	5374	397	0	459	6.91	10330
H4360-4	MW #4	14600	488	0	620	7.04	20020
H4360-5	MW #5	2535	429	0	239	7.28	5100
H4360-6	MW #6	42583	1428	0	234	6.74	71000
H4360-7	MW #7	6387	553	0	166	7.59	12140
Quality Control		1024	47.47	112	221	6.99	NR
True Value QC		1000	50.00	124	259	7.00	NR
% Accuracy		102	94.9	90.3	85.4	99.9	NR
Relative Percent Difference		9.8	5.2	-	-	1.4	NR
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Chemist

9/28/99
Date

H4360B.XLS

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240

(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

Page ____ of ____

Company Name: SESI	BILL TO PO #:
Project Manager: Dee Wheatley	Company: SAME
Address: 703 E. CLINTON, #103	Attn:
City: HOBBS State: NM Zip: 88240	Address:
Phone #: (505) 397-0510	City:
Fax #: (505) 393-4388	State: Zip:
Project #: Project Owner:	Phone #:
Project Name: Ida Wimberly	Fax #:
Project Location: Arco South Justis	

FOR LAB USE ONLY				MATRIX						PRES.			SAMPLING		ANALYSIS REQUEST		
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	OTHER:	DATE	TIME	BTEX	TPH 418	Cations + Anions
H4360-1	MW #1	G	4	✓							✓		9-24-99	1:00pm	✓	✓	✓
-2	MW #2	G	4	✓							✓				✓	✓	✓
-3	MW #3	G	4	✓							✓				✓	✓	✓
-4	MW #4	G	4	✓							✓				✓	✓	✓
-5	MW #5	G	4	✓							✓				✓	✓	✓
-6	MW #6	G	4	✓							✓				✓	✓	✓
-7	MW #7	G	4	✓							✓				✓	✓	✓

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date: 9-24-99	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time: 1:00pm		Fax Result: ☐ Yes ☐ No
Relinquished By:	Date: 9/24/99	Received By: (Lab Staff)	REMARKS:
	Time: 1:00		
Delivered By: (Circle One)	Sample Condition Cool ☑ Yes ☐ No / Intact ☑ Yes ☐ No	CHECKED BY: (Initials)	
Sampler - UPS - Bus - Other:			

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

ARCO Permian
Monitor Well Report
Ida Wimberly

South Justis Unit F-230
Unit C, Section 25, T25S, R37E
Lea County, New Mexico

September19, 2000

Prepared for:

ARCO Permian
P.O. Box 1610
Midland, Texas 79702

By:

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

The subject property is located at the Arco Permian South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, New Mexico. Safety & Environmental Solutions, Inc. (SESI) performed sampling and data collection on the eight (8) ground water monitor wells previously installed at the site (See Vicinity Map). The casing size in all wells is 2".

II. Work Performed

On September 19, 2000 SESI environmental technician, Sergio Contreras, Jr., arrived at the site. Ground water samples were taken from each well after a hand bailer was used to develop the wells. Three to five casing volumes of water were removed from each well until pH and temperature of the water were stabilized. The water that was removed was placed in appropriate drums for disposal. The samples were obtained and placed in appropriate containers, preserved and transported under chain of custody to Cardinal Laboratories of Hobbs, New Mexico for analysis of the contaminants identified in the initial sampling. (See Analytical Data)

In addition to the sampling, SESI also measured the depth to the top of the water table and the total depth of each well. The depth to the top of ground water was measured using a Solinst water level indicator. The total depth of each well was measured in order to compute the proper casing volumes. A summary of this data follows:

ID	DATE	TOP OF CASING ELEVATION	DEPTH TO WATER	POTENTIOMETRIC ELEVATION	TOTAL WELL DEPTH	FREE PRODUCT THICKNESS
MW – 1	9-19-00	3,066.98'	64.53'	3,002.45'	66'	0.00
MW – 2	9-19-00	3,065.92'	63.72'	3,002.20'	71'	0.00
MW – 3	9-19-00	3,066.21'	64.07'	3,002.14'	71'	0.00
MW – 4	9-19-00	3,067.93'	65.73'	3,002.20'	82'	0.00
MW – 5	9-19-00	3,066.56'	63.99'	3,002.57'	80'	0.00
MW – 6	9-19-00	3,065.33'	63.37'	3,001.96'	75'	0.00
MW – 7	9-19-00	3,064.64'	62.55'	3,002.09'	75'	0.00
MW – 8	9-19-00	3,062.68'	60.69'	3,001.99'	72'	0.25'

III. Analytical Results

The analysis of the groundwater samples performed by Cardinal Laboratories are summarized as follows:

CONTAMINANT	MW #1	MW #2	MW #3	MW #4
Sodium	913ppm	2382ppm	6027ppm	3714ppm
Calcium	235ppm	288ppm	676ppm	300ppm
Magnesium	78ppm	126ppm	224ppm	135ppm
Potassium	5.29ppm	26.94ppm	49.62ppm	38.70ppm
Conductivity	5753ppm	12374ppm	29779ppm	17935ppm
T-Alkalinity	205ppm	461ppm	441ppm	738ppm
Chlorides	1651ppm	4274ppm	10490ppm	5925ppm
Sulfate (SO_4)	369ppm	218ppm	540ppm	332ppm
Carbonate	0ppm	0ppm	0ppm	0ppm
HCO_3	250ppm	563ppm	538ppm	900ppm
TDS	4290ppm	8080ppm	21050ppm	11220ppm
pH	7.26	6.97	6.89	7.26
TPH	<1.0ppm	<1.0ppm	<1.0ppm	<1.0ppm
Benzene	<.002ppm	<.002ppm	<.002ppm	0.024ppm
Toluene	<.002ppm	<.002ppm	<.002ppm	<.002ppm
E. Benzene	<.002ppm	<.002ppm	<.002ppm	0.011ppm
T. Xylenes	<.006ppm	<.006ppm	<.006ppm	<.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	MW #5	MW #6	MW #7
Sodium	1953ppm	13658ppm	1859ppm
Calcium	350ppm	1792ppm	344ppm
Magnesium	134ppm	695ppm	102ppm
Potassium	6.32ppm	104ppm	13.54ppm
Conductivity	10547ppm	66214ppm	10129ppm
T-Alkalinity	205ppm	267ppm	297ppm
Chlorides	3691ppm	25352ppm	3303ppm
Sulfate (SO_4)	265ppm	1143ppm	373ppm
Carbonate	0ppm	0ppm	0ppm
HCO_3	250ppm	325ppm	363ppm
TDS	7680ppm	50260ppm	7210ppm
pH	7.41	6.75	7.18
TPH	<1.0ppm	<1.0ppm	<1.0ppm
Benzene	<.002ppm	0.011ppm	<.002ppm
Toluene	<.002ppm	<.002ppm	<.002ppm
E. Benzene	<.002ppm	<.002ppm	<.002ppm
T. Xylenes	<.006ppm	<.006ppm	<.006ppm

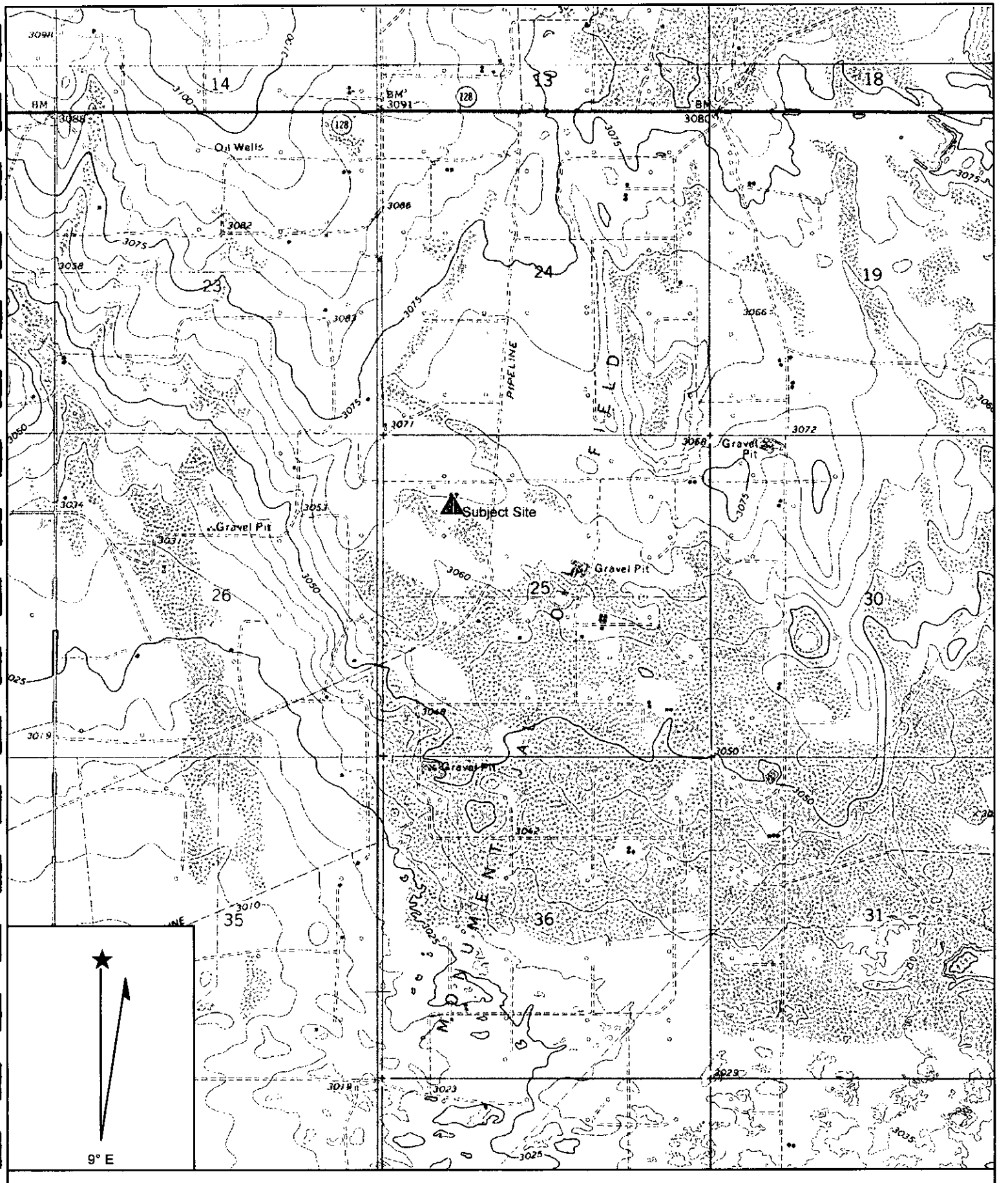
*Red exceeds NM WQCC Ground Water Standards
MW #8 not sampled due to Free Product

IV. Figures and Appendices

Figures:
Vicinity Map
Potentiometric Map

Appendices:
Cumulative Well Water Quality Data
Analytical Results
Water Analysis Validation

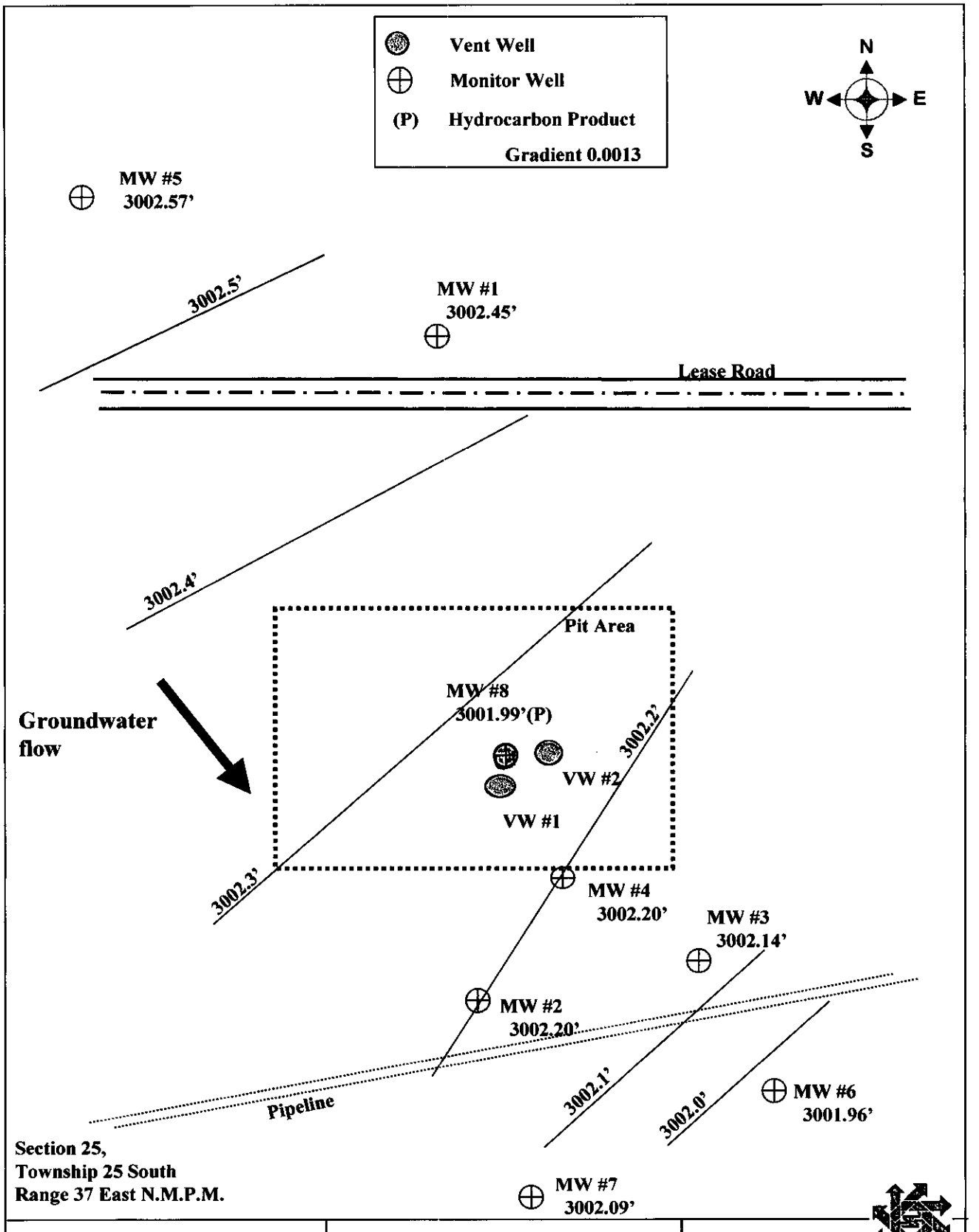
Figure 1
Vicinity Map



Name: JAL SE
Date: 11/8/2000
Scale: 1 inch equals 2000 feet

Location: 032° 06' 05.2" N 103° 07' 06.9" W
Caption: Arco Permian
Ida Wimberly Monitor Wells
Vicinity Map

Figure 2
Potentiometric Map



ARCO Permian September 19, 2000	Water Flow Diagram Ida Wimberly South Justis F-230 Monitor Wells	**Safety & Environmental Solutions, Inc.**

Appendix A
Cumulative Well Water Quality Data

Ida Wimberly Cumulative Well Data

Monitor Well #1

CONTAMINANT	WQCC STANDARD	INITIAL TEST 12/17/97	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	<0.2ppm	n/a	n/a	n/a	n/a
Arsenic	0.1ppm	<0.1ppm	n/a	n/a	n/a	n/a
Barium	1.0ppm	<1.0ppm	n/a	n/a	n/a	n/a
Boron	0.75ppm	<0.75ppm	n/a	n/a	n/a	n/a
Cadmium	0.01ppm	<0.01ppm	n/a	n/a	n/a	n/a
Calcium	n/a	296ppm	317ppm	n/a	296ppm	320ppm
Carbonate	n/a	0ppm	0ppm	n/a	0ppm	0ppm
Chloride	250.0ppm	1580ppm	1839ppm	1610ppm	2231ppm	1686ppm
Chromium	0.05ppm	<0.05ppm	n/a	n/a	n/a	n/a
Cobalt	0.05ppm	<0.05ppm	n/a	n/a	n/a	n/a
Conductivity (umhos/cm)	n/a	6116	6273	n/a	1978	6187
Copper	1.0ppm	<0.1ppm	n/a	n/a	n/a	n/a
HCO_3	n/a	122ppm	249ppm	n/a	229ppm	239ppm
Iron	1.0ppm	.388ppm	n/a	n/a	n/a	n/a
Lead	0.05ppm	<0.05ppm	n/a	n/a	n/a	n/a
Magnesium	n/a	112ppm	112ppm	N/A	126ppm	126ppm
Manganese	0.2ppm	0.345ppm	n/a	n/a	n/a	n/a
Mercury	0.002ppm	<0.02ppm	n/a	n/a	n/a	n/a
Molybdenum	1.0ppm	<0.2ppm	n/a	n/a	n/a	n/a
Nickel	0.2ppm	<0.2ppm	n/a	n/a	n/a	n/a
Potassium	n/a	22.5ppm	8.8ppm	n/a	24ppm	66ppm
Selenium	0.05ppm	<0.1ppm	n/a	n/a	n/a	n/a
Silver	0.05ppm	<0.1ppm	n/a	n/a	n/a	n/a
Sodium	n/a	1007ppm	850ppm	n/a	1157ppm	738ppm
Sulfate	600ppm	1050ppm	305ppm	n/a	455ppm	423ppm
T-Alkalinity ($MgCaCO_3$/L)	n/a	100	204	n/a	188	192
TDS	1000ppm	3480ppm	4380ppm	4560ppm	4520ppm	2910ppm
Zinc	10.0ppm	<0.2ppm	n/a	n/a	n/a	n/a
pH	> 6 & <9	5.58	6.384	n/a	7.19ppm	7.22ppm
TPH	n/a	n/a	42.9ppm	n/a	2.76ppm	<1.00ppm
Benzene	0.01ppm	<.002ppm	<.002ppm	n/a	<.002ppm	<.002ppm
Toluene	0.75ppm	<.002ppm	<.002ppm	n/a	<.002ppm	<.002ppm
E. Benzene	0.75ppm	<.002ppm	<.002ppm	n/a	<.002ppm	<.002ppm
Total Xylenes	0.62ppm	<.006ppm	<.006ppm	n/a	<.006ppm	<.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00
Aluminum	5.0ppm	n/a	n/a	n/a
Arsenic	0.1ppm	n/a	n/a	n/a
Barium	1.0ppm	n/a	n/a	n/a
Boron	0.75ppm	n/a	n/a	n/a
Cadmium	0.01ppm	n/a	n/a	n/a
Calcium	n/a	301ppm	321ppm	235ppm
Carbonate	n/a	0ppm	0ppm	0ppm
Chloride	250.0ppm	1570ppm	1973ppm	1651ppm
Chromium	0.05ppm	n/a	n/a	n/a
Cobalt	0.05ppm	n/a	n/a	n/a
Conductivity (umhos/cm)	n/a	6155	5770	5753
Copper	1.0ppm	n/a	n/a	n/a
HCO_3	n/a	229ppm	229ppm	250ppm
Iron	1.0ppm	n/a	n/a	n/a
Lead	0.05ppm	n/a	n/a	n/a
Magnesium	n/a	n/a	n/a	78ppm
Manganese	0.2ppm	n/a	n/a	n/a
Mercury	0.002ppm	n/a	n/a	n/a
Molybdenum	1.0ppm	n/a	n/a	n/a
Nickel	0.2ppm	n/a	n/a	n/a
Potassium	n/a	104.0ppm	49ppm	5.29ppm
Selenium	0.05ppm	n/a	n/a	n/a
Silver	0.05ppm	n/a	n/a	n/a
Sodium	n/a	995ppm	904ppm	913
Sulfate	600ppm	1180ppm	351ppm	369ppm
T-Alkalinity ($MgCaCO_3$/L)	n/a	188	188	205
TDS	1000ppm	3930ppm	4640ppm	4290ppm
Zinc	10.0ppm	n/a	n/a	n/a
pH	> 6 & <9	7.15	7.13	7.26
TPH	n/a	<1.0	<1.0	<1.0
Benzene	0.01ppm	<0.002ppm	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #2

CONTAMINANT	WQCC STANDARD	INITIAL TEST 12/17/97	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	<0.2ppm	n/a	n/a	n/a	n/a
Arsenic	0.1ppm	<0.1ppm	n/a	n/a	n/a	n/a
Barium	1.0ppm	<1.0ppm	n/a	n/a	n/a	n/a
Boron	0.75ppm	<0.75ppm	n/a	n/a	n/a	n/a
Cadmium	0.01ppm	<0.01ppm	n/a	n/a	n/a	n/a
Calcium	n/a	426ppm	476ppm	n/a	544ppm	760ppm
Carbonate	n/a	0ppm	0ppm	n/a	0ppm	0ppm
Chloride	250.0ppm	6200ppm	2731ppm	3890ppm	6590ppm	9552ppm
Chromium	0.05ppm	<0.05ppm	n/a	n/a	n/a	n/a
Cobalt	0.05ppm	<0.05ppm	n/a	n/a	n/a	n/a
Conductivity (umhos/cm)	n/a	17028	19010	n/a	1715	27600
Copper	1.0ppm	<0.1ppm	n/a	n/a	n/a	n/a
HCO_3	n/a	404ppm	547ppm	n/a	459ppm	425ppm
Iron	1.0ppm	<.2ppm	n/a	n/a	n/a	n/a
Lead	0.05ppm	<0.05ppm	n/a	n/a	n/a	n/a
Magnesium	n/a	193ppm	214ppm	n/a	258ppm	389ppm
Manganese	0.2ppm	0.343ppm	n/a	n/a	n/a	n/a
Mercury	0.002ppm	<0.02ppm	n/a	n/a	n/a	n/a
Molybdenum	1.0ppm	<0.2ppm	n/a	n/a	n/a	n/a
Nickel	0.2ppm	<0.2ppm	n/a	n/a	n/a	n/a
Potassium	n/a	90ppm	42.3ppm	n/a	62ppm	132ppm
Selenium	0.05ppm	<0.1ppm	n/a	n/a	n/a	n/a
Silver	0.05ppm	<0.1ppm	n/a	n/a	n/a	n/a
Sodium	n/a	3700ppm	1202ppm	n/a	3611ppm	4979ppm
Sulfate	600ppm	1160ppm	426ppm	n/a	666ppm	663ppm
T-Alkalinity ($MgCaCO_3$/L)	n/a	404	448	n/a	376	348
TDS	1000ppm	10490ppm	12240ppm	7490ppm	14270ppm	16260ppm
Zinc	10.0ppm	<0.2ppm	n/a	n/a	n/a	n/a
pH	> 6 & <9	7.84	6.303	n/a	6.88	7.00
TPH	n/a	n/a	14.0ppm	10.3ppm	4.27ppm	<1.00ppm
Benzene	0.01ppm	<0.002ppm	<0.002ppm	<0.002ppm	.003ppm	.010ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00
Aluminum	5.0ppm	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a
Calcium	N/a	681ppm	373ppm	288ppm
Carbonate	N/a	0ppm	0ppm	0ppm
Chloride	250.0ppm	9000ppm	3758ppm	4274ppm
Chromium	0.05ppm	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	26494	11250	12374
Copper	1.0ppm	N/a	N/a	N/a
HCO_3	N/a	395ppm	488ppm	563ppm
Iron	1.0ppm	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a
Magnesium	N/a	437ppm	175ppm	126ppm
Manganese	0.2ppm	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a
Molybdenum	1.0ppm	<0.2ppm	N/a	N/a
Nickel	0.2ppm	<0.2ppm	N/a	N/a
Potassium	N/a	90ppm	1920ppm	26.94ppm
Selenium	0.05ppm	<0.1ppm	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a
Sodium	N/a	3700ppm	1920ppm	2382ppm
Sulfate	600ppm	1080ppm	222ppm	218ppm
T-Alkalinity ($MgCaCO_3$/L)	N/a	324	400	461
TDS	1000ppm	17610ppm	8440ppm	8080ppm
Zinc	10.0ppm	N/a	N/a	N/a
pH	> 6 & <9	6.88	7.04	6.97
TPH	N/A	<1.0	<1.0	<1.0
Benzene	0.01ppm	.004ppm	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #3

CONTAMINANT	WQCC STANDARD	INITIAL TEST 12/17/97	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	<0.3ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	<0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	<1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	<0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	<0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	629ppm	360ppm	N/a	448ppm	640ppm
Carbonate	N/a	0ppm	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	8500ppm	4124ppm	7570ppm	5374ppm	8316ppm
Chromium	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	23846	13960	N/a	1679	22885
Copper	1.0ppm	<0.1ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	316ppm	556ppm	N/a	459ppm	434ppm
Iron	1.0ppm	<.2ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	302ppm	187ppm	N/a	214ppm	316ppm
Manganese	0.2ppm	0.440ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	<0.02ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	<0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	118ppm	31.7ppm	N/a	55ppm	78ppm
Selenium	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Sodium	N/a	4875ppm	2229ppm	N/a	2892ppm	4441ppm
Sulfate	600ppm	1280ppm	279ppm	N/a	397ppm	562ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	316	455	N/a	376	356
TDS	1000ppm	15300ppm	8840ppm	15180ppm	10330ppm	13260ppm
Zinc	10.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	7.77	6.64	N/a	6.91	6.84
TPH	N/a	N/a	24.6ppm	N/a	N/a	<1.00ppm
Benzene	0.01ppm	<0.002 ppm	<0.002ppm	<0.002ppm	.005ppm	<0.002ppm
Toluene	0.75ppm	<0.002 ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75 ppm	<0.002 ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62 ppm	<0.006 ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00
Aluminum	5.0ppm	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a
Calcium	N/a	321ppm	581ppm	676ppm
Carbonate	N/a	0ppm	0ppm	0ppm
Chloride	250.0ppm	5300ppm	7140ppm	10490ppm
Chromium	0.05ppm	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	15760	20220	29779
Copper	1.0ppm	N/a	N/a	N/a
HCO_3	N/a	459ppm	449ppm	538ppm
Iron	1.0ppm	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a
Magnesium	N/a	292ppm	238ppm	224ppm
Manganese	0.2ppm	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a
Potassium	N/a	88.0ppm	114ppm	49.62ppm
Selenium	0.05ppm	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a
Sodium	N/a	3071ppm	3808ppm	6027ppm
Sulfate	600ppm	913ppm	414ppm	540ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	376	368	441
TDS	1000ppm	10310ppm	15316ppm	21050ppm
Zinc	10.0ppm	N/a	N/a	N/a
pH	> 6 & <9	6.99	7.24	6.89
TPH	N/a	<1.0	<1.0	<1.0
Benzene	0.01ppm	.002ppm	.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #4

CONTAMINANT	WQCC STANDARD	INITIAL TEST 8/10/98	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	<0.3ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	<0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	<1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	<0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	<0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	480ppm	472ppm	N/a	736ppm	1160ppm
Carbonate	N/a	0ppm	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	9641ppm	6910ppm	4680ppm	14600ppm	16295ppm
Chromium	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	18190	21750	N/a	1603	44620
Copper	1.0ppm	<0.1ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	439ppm	864ppm	N/a	620ppm	476ppm
Iron	1.0ppm	<.2ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	340ppm	248ppm	N/a	272ppm	559ppm
Manganese	0.2ppm	0.440ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	<0.02ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	<0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	68ppm	50.5ppm	N/a	76ppm	144ppm
Selenium	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Sodium	N/a	5252ppm	3921ppm	N/a	8521ppm	8529ppm
Sulfate	600ppm	159ppm	335ppm	N/a	488ppm	562ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	360	708	N/a	508	390
TDS	1000ppm	13580ppm	13960ppm	9460ppm	20020ppm	30010ppm
Zinc	10.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	6.69	6.64	N/a	7.04	7.01
TPH	N/a	<1.0ppm	11.8ppm	N/a	3.27ppm	<1.00ppm
Benzene	0.01ppm	0.033ppm	0.046ppm	0.003ppm	0.033ppm	0.026ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.007ppm	0.012ppm	<0.002ppm	0.006ppm	0.012ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00
Aluminum	5.0ppm	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a
Calcium	N/a	277ppm	733ppm	3714ppm
Carbonate	N/a	0.0ppm	0.0ppm	0.0ppm
Chloride	250.0ppm	4500ppm	9958ppm	5925ppm
Chromium	0.05ppm	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	13818	27980	17935ppm
Copper	1.0ppm	N/a	N/a	N/a
HCO_3	N/a	761ppm	600ppm	900ppm
Iron	1.0ppm	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a
Magnesium	N/a	165ppm	328ppm	135ppm
Manganese	0.2ppm	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a
Potassium	N/a	107.0ppm	141ppm	38.7ppm
Selenium	0.05ppm	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a
Sodium	N/a	2929ppm	5367ppm	3714ppm
Sulfate	600ppm	877ppm	492ppm	332ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	624	492	738
TDS	1000ppm	8810ppm	21688ppm	11220ppm
Zinc	10.0ppm	N/a	N/a	N/a
pH	> 6 & <9	7.19	7.37	7.26
TPH	N/a	<1.0	<1.0	<1.0
Benzene	0.01ppm	0.029ppm	0.021ppm	0.024ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	0.017ppm	0.010ppm	0.011ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #5

CONTAMINANT	WQCC STANDARD	INITIAL TEST 8/10/98	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	<0.3ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	<0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	<1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	<0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	<0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	264ppm	320ppm	N/a	312ppm	320ppm
Carbonate	N/a	0ppm	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	1950ppm	2396ppm	2090ppm	2535ppm	2472ppm
Chromium	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	5740	7877	N/a	1657	7211
Copper	1.0ppm	<0.1ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	200ppm	195ppm	N/a	239ppm	220ppm
Iron	1.0ppm	<.2ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	127ppm	153ppm	N/a	112ppm	219ppm
Manganese	0.2ppm	0.440ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	<0.02ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	<0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	19ppm	10ppm	N/a	20ppm	69ppm
Selenium	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Sodium	N/a	850ppm	1094ppm	N/a	1355ppm	1078ppm
Sulfate	600ppm	138ppm	274ppm	N/a	429ppm	452ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	164	159	N/a	196	180
TDS	1000ppm	3790ppm	5430ppm	5300ppm	5100ppm	4530ppm
Zinc	10.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	7.14	7.216	N/a	7.28	7.25
TPH	N/a	<1.0ppm	11.0ppm	N/a	1.26ppm	<1.00ppm
Benzene	0.01ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	N/a	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00
Aluminum	5.0ppm	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a
Calcium	N/a	286ppm	329ppm	350ppm
Carbonate	N/a	0.0ppm	0.0ppm	0.0ppm
Chloride	250.0ppm	2400ppm	2161ppm	3691ppm
Chromium	0.05ppm	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	6966ppm	6400ppm	10547ppm
Copper	1.0ppm	N/a	N/a	N/a
HCO_3	N/a	229ppm	229ppm	250ppm
Iron	1.0ppm	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a
Magnesium	N/a	141ppm	134ppm	134ppm
Manganese	0.2ppm	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a
Potassium	N/a	78.0ppm	23ppm	6.32ppm
Selenium	0.05ppm	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a
Sodium	N/a	1466ppm	1008ppm	1953ppm
Sulfate	600ppm	974ppm	348ppm	265ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	188	188	205
TDS	1000ppm	4380ppm	5176ppm	7680ppm
Zinc	10.0ppm	N/a	N/a	N/a
pH	> 6 & <9	7.28ppm	7.18ppm	7.41ppm
TPH	N/a	<1.0ppm	<1.0ppm	<1.0ppm
Benzene	0.01ppm	<0.002ppm	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #6

CONTAMINANT	WQCC STANDARD	INITIAL TEST 8/11/98	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	N/a	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a	N/a
Calcium	N/a	N/a	2120ppm	N/a	2480ppm	2760ppm
Carbonate	N/a	N/a	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	29600ppm	24186ppm	25500ppm	42583ppm	26521ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	61900	68740	N/a	1482	68310
Copper	1.0ppm	N/a	N/a	N/a	N/a	N/a
HCO_3	N/a	N/a	220ppm	N/a	234ppm	232ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a	N/a
Magnesium	N/a	N/a	1239ppm	N/a	1458ppm	1045ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a	N/a	N/a
Potassium	N/a	N/a	101ppm	N/a	98ppm	201ppm
Selenium	0.05ppm	N/a	N/a	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a	N/a
Sodium	N/a	N/a	11269ppm	N/a	22692ppm	12550ppm
Sulfate	600ppm	N/a	750ppm	1200ppm	1428ppm	1149ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	N/a	180	N/a	192	240
TDS	1000ppm	58260ppm	58260ppm	53980ppm	71000ppm	47980ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a	N/a
pH	> 6 & <9	N/a	6.82	N/a	6.74	6.82
TPH	N/a	<1.0ppm	6.8ppm	N/a	1.88ppm	<1.00ppm
Benzene	0.01ppm	0.044ppm	0.007ppm	N/a	0.003ppm	0.007ppm
Toluene	0.75ppm	0.004ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	0.009ppm	<0.006ppm	N/a	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00
Aluminum	5.0ppm	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a
Calcium	N/a	2610ppm	2325ppm	1792ppm
Carbonate	N/a	0.0ppm	0.0ppm	0.0ppm
Chloride	250.0ppm	26300ppm	23580ppm	25352ppm
Chromium	0.05ppm	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	69660ppm	63460ppm	66214ppm
Copper	1.0ppm	N/a	N/a	N/a
HCO_3	N/a	244ppm	268ppm	325ppm
Iron	1.0ppm	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a
Magnesium	N/a	1190ppm	1118ppm	695ppm
Manganese	0.2ppm	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a
Potassium	N/a	216.0ppm	211ppm	104ppm
Selenium	0.05ppm	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a
Sodium	N/a	12560ppm	11940ppm	13658ppm
Sulfate	600ppm	1690ppm	757ppm	1143ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	200	220	267
TDS	1000ppm	49130ppm	59776ppm	50260ppm
Zinc	10.0ppm	N/a	N/a	N/a
pH	> 6 & <9	6.81	7.38	6.75
TPH	N/a	<1.0ppm	<1.0ppm	<1.0ppm
Benzene	0.01ppm	0.007ppm	0.007ppm	0.011ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #7

CONTAMINANT	WQCC STANDARD	INITIAL TEST 8/12/98	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	N/a	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a	N/a
Calcium	N/a	N/a	460ppm	N/a	600ppm	440ppm
Carbonate	N/a	N/a	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	5015ppm	3288ppm	5380ppm	6387ppm	4328ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	N/a	11910	N/a	1523	10580
Copper	1.0ppm	N/a	N/a	N/a	N/a	N/a
HCO_3	N/a	N/a		N/a	166ppm	293ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a	N/a
Magnesium	N/a	N/a	175ppm	N/a	97ppm	219ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a	N/a	N/a
Potassium	N/a	N/a	25ppm	N/a	66ppm	54ppm
Selenium	0.05ppm	N/a	N/a	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a	N/a
Sodium	N/a	N/a	1763ppm	N/a	3553ppm	2219ppm
Sulfate	600ppm	N/a	832ppm	142ppm	553ppm	536ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	N/a	236	N/a	136	240
TDS	1000ppm	13496ppm	8170ppm	10580ppm	12140ppm	7240ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a	N/a
pH	> 6 & <9	N/a	7.326	N/a	7.59	7.16
TPH	N/a	48.7ppm	7.1ppm	N/a	1.32ppm	<1.00ppm
Benzene	0.01ppm	0.013ppm	0.003ppm	N/a	0.008ppm	<0.002ppm
Toluene	0.75ppm	0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	0.009ppm	<0.006ppm	N/a	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00
Aluminum	5.0ppm	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a
Calcium	N/a	2610ppm	425ppm	344ppm
Carbonate	N/a	0.0ppm	0.0ppm	0.0ppm
Chloride	250.0ppm	4100ppm	3194ppm	3303ppm
Chromium	0.05ppm	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	11305ppm	9330ppm	10129ppm
Copper	1.0ppm	N/a	N/a	N/a
HCO_3	N/a	254ppm	298ppm	363ppm
Iron	1.0ppm	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a
Magnesium	N/a	267ppm	185ppm	102ppm
Manganese	0.2ppm	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a
Potassium	N/a	88.0ppm	46ppm	13.54ppm
Selenium	0.05ppm	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a
Sodium	N/a	2.246ppm	1312ppm	1859ppm
Sulfate	600ppm	1070ppm	369ppm	373ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	208	244	297ppm
TDS	1000ppm	8140ppm	7780ppm	7210ppm
Zinc	10.0ppm	N/a	N/a	N/a
pH	> 6 & <9	7.16	7.15	7.18
TPH	N/a	<1.0ppm	<1.0ppm	<1.0ppm
Benzene	0.01ppm	<0.002ppm	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Appendix B
Analytical Results

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 09/19/00
Reporting Date: 09/21/00
Project Number: NOT GIVEN
Project Name: IDA WIMBERLY
Project Location: JAL, NM

Sampling Date: 09/19/00
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (mS/cm)	T-Alkalinity ($mgCaCO_3/L$)
ANALYSIS DATE:		09/19/00	09/20/00	09/20/00	09/20/00	09/20/00	09/20/00
H5187-1	MONITOR WELL #1	913	235	78	5.29	5753	205
H5187-2	MONITOR WELL #2	2382	288	126	26.94	12374	461
H5187-3	MONITOR WELL #3	6027	676	224	49.62	29779	441
H5187-4	MONITOR WELL #4	3714	300	135	38.70	17935	738
H5187-5	MONITOR WELL #5	1953	350	134	6.32	10547	205
H5187-6	MONITOR WELL #6	13658	1792	695	104	66214	267
H5187-7	MONITOR WELL #7	1859	344	102	13.54	10129	297
Quality Control		1.829	42.0	45.0	5.05	1368	NR
True Value QC		2.000	50.0	50.0	5.00	1413	NR
% Recovery		91.5	84.0	90.9	101	96.7	NR
Relative Percent Difference		0.4	0	2.4	0	0.2	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

		Cl^- (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		09/20/00	09/20/00	09/20/00	09/20/00	09/20/00	09/21/00
H5187-1	MONITOR WELL #1	1651	369	0	250	7.26	4290
H5187-2	MONITOR WELL #2	4274	218	0	563	6.97	8080
H5187-3	MONITOR WELL #3	10490	540	0	538	6.89	21050
H5187-4	MONITOR WELL #4	5925	332	0	900	7.26	11220
H5187-5	MONITOR WELL #5	3691	265	0	250	7.41	7680
H5187-6	MONITOR WELL #6	25352	1143	0	325	6.75	50260
H5187-7	MONITOR WELL #7	3303	373	0	363	7.18	7210
Quality Control		964	51.5	NR	1088	7.03	NR
True Value QC		1000	50.0	NR	1000	7.00	NR
% Recovery		96.4	103	NR	109	100	NR
Relative Percent Difference		6.3	1.5	NR	8.1	0	NR
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Chemist

09/22/2000
Date

H5187AXLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, #103
HOBBS, NM 88240
FAX TO: (5050 393-4388

Receiving Date: 09/19/00
Reporting Date: 09/21/00
Project Number: NOT GIVEN
Project Name: IDA WIMBERLY
Project Location: JAL, NM

Sampling Date: 09/19/00
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		09/20/00	09/20/00	09/20/00	09/20/00	09/20/00
H5187-1	MONITOR WELL #1	<1.0	<0.002	<0.002	<0.002	<0.006
H5187-2	MONITOR WELL #2	<1.0	<0.002	<0.002	<0.002	<0.006
H5187-3	MONITOR WELL #3	<1.0	<0.002	<0.002	<0.002	<0.006
H5187-4	MONITOR WELL #4	<1.0	0.024	<0.002	0.011	<0.006
H5187-5	MONITOR WELL #5	<1.0	<0.002	<0.002	<0.002	<0.006
H5187-6	MONITOR WELL #6	<1.0	0.011	<0.002	<0.002	<0.006
H5187-7	MONITOR WELL #7	<1.0	<0.002	<0.002	<0.002	<0.006
Quality Control		10.6	0.099	0.105	0.104	0.314
True Value QC		12.0	0.100	0.100	0.100	0.300
% Recovery		88.7	99.3	105	104	105
Relative Percent Difference		9.0	2.5	1.2	1.2	1.9

METHODS: TRPHC - EPA 600/4-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

9/21/00
Date

H5187B.XLS

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: SESI	BILL TO PO #:
Project Manager:	Company: SAME
Address: 703 E. CLINTON, #103	Attn:
City: HOBBS State: NM Zip: 88240	Address:
Phone #: (505) 397-0510	City:
Fax #: (505) 393-4388	State: Zip:
Project #: Project Owner:	Phone #:
Project Name: Ida Wimberly	Fax #:
Project Location: Jal N.M.	

ANALYSIS REQUEST: BTEX; Cations & Anions; TPH

FOR LAB USE ONLY LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRES.: ACID:	ICE / COOL	OTHER :	SAMPLING: DATE	TIME
H5187-1	MW #1	G	4	X							X		9-19-00	
-2	MW #2	G	4	X							X			
-3	MW #3	G	4	X							X			
-4	MW #4	G	4	X							X			
-5	MW #5	G	4	X							X			
-6	MW #6	G	4	X							X			
-7	MW #7	G	4	X							X			

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date:	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time:		Fax Result: ☐ Yes ☐ No
Relinquished By:	Date: 9-19-00	Received By: (Lab Staff)	REMARKS:
	Time:		
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition Cool Intact ☐ Yes ☐ Yes ☐ No ☐ No	CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

Appendix C
Water Analysis Validation

Cations and Anions Calculation Check								
	Sample Name	H5187-1	H5187-2	H5187-3	H5187-4	H5187-5	H5187-6	H5187-7
	Well Number	MW1	MW2	MW3	MW4	MW5	MW6	MW7
	Date	09/19/00	09/19/00	09/19/00	09/19/00	09/19/00	09/19/00	09/19/00
Equivalent Weight:	Lab	Cardinal	Cardinal	Cardinal	Cardinal	Cardinal	Cardinal	Cardinal
22.99	Sodium (mg/L)	913	2,382	6,027	3,714	1,953	13,658	1,859
20.04	Calcium (mg/L)	235	288	676	300	350	1,792	344
12.15	Magnesium (mg/L)	78	126	224	135	134	695	102
39.09	Potassium (mg/L)	5.3	26.9	49.6	38.7	6.3	104.0	13.5
35.45	Chloride (mg/L)	1,651	4,274	10,490	5,925	3,691	25,352	3,303
48.04	Sulfate (mg/L)	369	218	540	332	265	1,143	373
30.00	Carbonate (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61.01	Bicarbonate (mg/L)	250	563	538	900	250	325	363
50.04	Alkalinity (mg/L CaCO3)	205	461	441	738	205	267	297
62.00	Nitrate (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sum Cations (meq/L)	58.0	129.0	315.6	188.6	113.6	743.4	106.8
	Sum Anions (meq/L)	58.4	134.3	316.0	188.8	113.7	744.3	106.9
	Percent Difference	0.3	2.0	0.1	0.0	0.1	0.1	0.0
	Measured TDS (evap., mg/L)	4,290	8,080	21,050	11,220	7,680	50,260	7,210
	TDS (calc. USGS sum, mg/L)	3,374	7,592	18,271	10,888	6,522	42,904	6,173
	TDS (meas.) / TDS (calc. USGS)	1.3	1.1	1.2	1.0	1.2	1.2	1.2
	TDS (calc. sum, mg/L)	3,501	7,878	18,545	11,345	6,649	43,069	6,358
	Elect. Conductivity (umhos/cm)	5,753	12,374	29,779	17,935	10,547	66,214	10,129
	TDS (C*0.7, mg/L)	4,027	8,662	20,845	12,555	7,383	46,350	7,090
	TDS (calc. USGS) / Conductivity	0.59	0.61	0.61	0.61	0.62	0.65	0.61
Test Criteria								
1. Anion-Cation Balance:			Anion Sum	Max % diff.				
			0 - 3.0	± 0.2				
			3.0 - 10.0	± 2				
			10.0 - 800	± 5				
2. TDS, Measured to Calculated:			1.0 < (measured TDS/calculated TDS) < 1.2					
3. TDS (calculated USGS) to EC Ratio:			Calculated TDS/conductivity = 0.55 - 0.7					

Safety & Environmental Solutions, Inc.

Arco Permian
South Justis Unit F-230

Installation of Additional Monitor Well and Vent Wells and Investigation Results

Lea County, New Mexico
March 10, 2000

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

In October 1997 Arco Permian secured the services of Safety and Environmental Solutions, Inc. (SESI) to determine the vertical and horizontal extent of the abandoned pit site on the specified location. To date, seven monitor wells have been drilled to delineate the extent of any groundwater contamination, namely the elevated levels of Total Dissolved Solids (TDS) and Chlorides which was identified in the initial monitor well sampling program. The New Mexico Oil Conservation Division on December 30, 1999 approved a revised Work Plan dated November 15, 1999, to drill an additional monitor well in the bottom center of the existing pit area and two vent wells. The vent wells were drilled inside the pit area, one south of the new monitor well and one east of the new monitor well (See Monitor Well #8/Vent Well Site Plan) for passive venting.

II. Work Performed

An additional monitor well was drilled at the Arco Permian South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, NM according to the Approved Work Plan. SESI contracted Atkins Engineering of Roswell, NM to drill this well on December 3, 1999. Cardinal Laboratories of Hobbs, NM was also contracted to perform the laboratory analytical testing required for this project.

SESI sampled the additional monitor well hole soils (MW #8) at intervals of ten (10') feet using SOPs found in **Environmental Protection Agency, 1984, Characterization of Hazardous Waste Site - A Methods Manual: Vol II.** Field testing was performed on these soil samples for Total Petroleum Hydrocarbons (TPH). The composite soil samples along with Chain of Custody were then delivered to the laboratory for confirmatory testing. The composite samples were analyzed for TPH (EPA Method 418.1), BTEX (EPA Method 8020) and Major Cations and Anions. The results of the BTEX, TPH and Chlorides were compared to the regulatory limits found in **"Guidelines for Remediation of Leaks, Spills and Releases"** *New Mexico Oil Conservation Division* - August 13, 1993.

Monitor Well #8

Monitor Well #8 was drilled in the approximate center of the existing pit area to a total depth of 73'. (See Monitor Well #8/Vent Wells Site Plan) The monitor well was completed by Atkins Engineering as per the approved work plan. (See Log of Boring)

The field test results for TPH in the soil samples are presented in the following table in **black** text; the laboratory analysis of the soil samples for the well borehole is presented in the following table in blue text. The test results are reported in parts per million (ppm):

ID/ Depth	Lithology	TPH	CL	Benzene	Toluene	Ethyl Benzene	Total Xylenes
8-1 10'	Sandy Caliche	8800					
8-2 20'	Sandy Caliche	14500 15600	180	0.014	<0.010	4.19	8.73
8-3 30'	Clay Sand	13600 12300	135	0.417	<0.010	3.85	6.46
8-4 40'	Tan Sand	6160 10700	180	<0.010	<0.010	0.743	1.69
8-5 50'	Sand w/gravel	3200 12200	180	0.003	0.005	0.042	0.076
8-6 60'	Tan Sand	1240 8990	225	0.004	0.005	0.075	0.089
8-7 70'	Reddish Sand	404					
TD 73'	Red Clay Sand	98 98.0	2787	0.007	<0.002	0.035	0.033

Vent Wells

On January 7, 2000 SESI personnel W. Dee Whatley and Sergio Contreras, Jr. returned to the site to install the passive vapor extraction vent wells. These wells were completed over a two day period. The wells were completed with 15' of slotted screen for aeration, then packed with 20' of pea gravel and a 5' bentonite plug with grout to surface.

The soils in each borehole were sampled at 5' intervals. Field testing was performed on these samples at 5' intervals for TPH (EPA Method 418.1).

These results are as follows:

Vent Well #1

ID/ Depth	Lithology	TPH
#1 - 5'	Stained Grey Sand	2090ppm
#1 - 10'	Grey Clayey Sand	3630ppm
#1 – 15'	Grey Sand/Caliche	2310ppm
#1 – 20'	Greyish White Caliche	2970ppm
#1 – 25'	Caliche to 23'/ Red Sand to 25'	1350ppm
#1 – 30'	Red Sand	5160ppm
#1 – 35'	Red Sand	4900ppm
#1 – 40'	Red Sand	4000ppm
#1 – 45'	Red Sand w/Gravel	5670ppm

Vent Well #2

ID/ Depth	Lithology	TPH
#2 - 5'	Stained Grey Sand	11430ppm
#2 - 10'	Grey Clayey Sand	8820ppm
#2 – 15'	Grey Caliche to 12'/ Grey Sand/Caliche to 15'	4630ppm
#2 – 20'	Grey Caliche/Sand	6470ppm
#2 – 25'	Caliche/Red Sand	7290ppm
#2 – 30'	Red Sand	8240ppm
#2 - 35'	Red Sand	7130ppm
#2 – 40'	Red Sand	6820ppm
#2 – 45'	Red Sand w/Gravel	6090ppm

As per a discussion with Margaret Lowe of ARCO Permian, the 30' and bottom (45') field samples from each vent well were taken under Chain of Custody to Cardinal Laboratories for Chlorides testing. These results are as follows:

ID/ Depth	Chlorides
#1 - 30'	727ppm
#1 - 45'	162ppm
#2 – 30'	194ppm
#2 – 45'	145ppm

III. Monitor Well Testing

After a recovery period, Monitor Well #8 was sampled on December 11, 1999. Samples were taken both before the well was purged and after purging to check for any free product within the well bore and transported under Chain of Custody to the laboratory for analysis. The groundwater at Monitor Well #8 was tested for TPH, BTEX, Cations and Anions. (See Analytical Results)

The results indicated high levels of Chlorides and TDS in both samples. The TPH in the monitor well was very low with the results lower after purging. Monitor well # 8 exhibited small amounts of Benzene and Ethyl Benzene both before and after purging. As noted with the prior monitor wells, the uncharacteristically high levels of Chlorides and TDS may indicate another source of contamination other than the subject site. There is a saltwater disposal line that is located between Monitor Well #3 and Monitor Well #6. A summary of the laboratory analyses of the groundwater samples for Monitor Well #8 is presented in the following table. The results that are in excess of NMWQCC Standards are presented in red text:

Analyte	MW #8-Before Purging	MW #8-After Purging
TPH	15.4ppm	2.61ppm
Benzene	.052ppm	.072ppm
Toluene	<.002ppm	<.002ppm
E. Benzene	.012ppm	.007ppm
Xylenes	<.006ppm	<.006ppm
Sodium	2746ppm	6157ppm
Calcium	142ppm	550ppm
Magnesium	116ppm	265ppm
Potassium	63.0ppm	65.9ppm
Chlorides	4240ppm	10800ppm
SO_4	130ppm	407ppm
CO_3	0ppm	0ppm
HCO_3	946ppm	366ppm
TDS	7968ppm	21772ppm
pH	7.87	7.39

IV. Conclusions

The gradient of the water table is established to be relatively flat but sloping slightly from the Northwest to the Southeast. This monitor well as well as the entire group of prior monitor wells exhibits high levels of Chlorides and TDS which indicates that the water in the entire area is not of very high quality.

V. Figures and Appendices

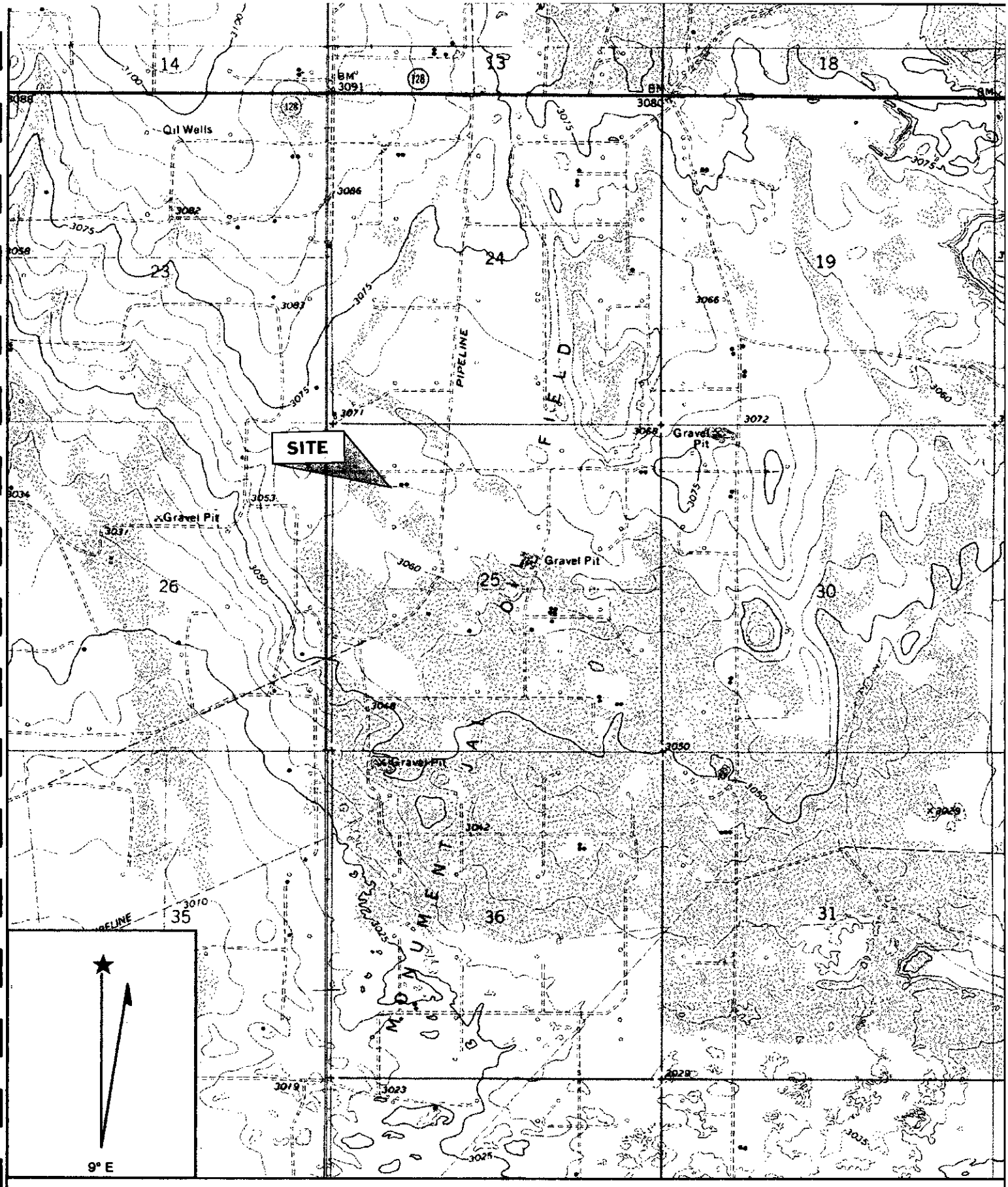
Figures:

Figure 1: Vicinity Map
Figure 2: Monitor Well #8/Vent Wells Site Plan
Figure 3: Driller's Log of Boring

Appendices:

Appendix A: Monitor Well #8 Analytical Results
Appendix B: Vent Wells Analytical Results

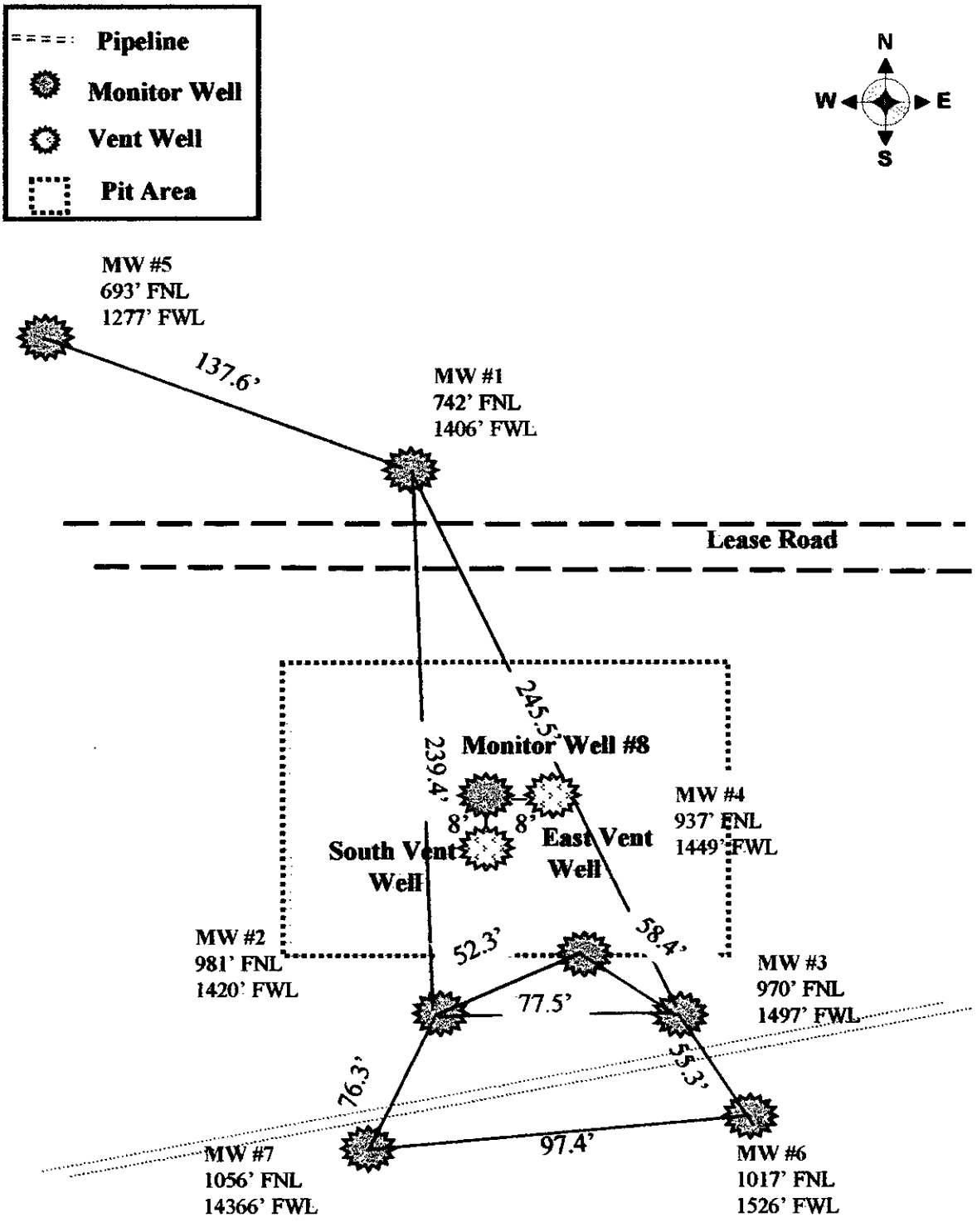
Figure 1
Vicinity Map



Name: JAL SE
Date: 3/31/100
Scale: 1 inch equals 2000 feet

Location: 032° 06' 03.6" N 103° 06' 56.5" W
Caption: ARCO Permian Ida Wimberly South Justis F-230 Vicinity Map

Figure 2
Monitor Well #8/Vent Wells
Site Plan



ARCO Permian March 10, 2000	**Monitor Well #8/ Vent Wells Site Plan South Justis F-230**	**Safety & Environmental Solutions, Inc.** Hobbs, New Mexico

Figure 3
Driller's Log of Boring

Atkins Engineering Associates, Inc.
P.O. Box 3156
Roswell, New Mexico 88202

LOG OF BORING South Justice Pit MW

(Page 1 of 2)

Co. Name: Arco Oil Co.
Co. Address: Jal. New Mexico
Contact: Bob Allen
Job #: 99360

Date: 12-3-99
Drill Start: 0900
Drill End: 1630
Boring Location: Center of Pit North of MW #4

Site Location: 5 miles E. of Jal
Auger Type: Hollow Stem
Logged By: Mort Bates

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v	Blows/Ft
0				Started drilling inside of Pit 8 ft deep			
5							
				Caliche w/clay Tan Firm Dry			
10				Sandy Caliche tan to gray Loose Dry			
15							
20							
25				Clay sand Tan Loose Dry			
30							
35				Sandy Clay Tan Loose Damp			
				Sand Tan Loose Damp			
40							

Top of 53 ft 4" PVC casing

41 Ft of Grout

c:\mtech\blank\blank.bor 05-05-1998

Atkins Engineering Associates, Inc.
P.O. Box 3156
Roswell, New Mexico 88202

LOG OF BORING South Justice Pit m/w

Co. Name: ARCO Oil Co
Co. Address: JAL, NEW MEXICO

Contact: Bob ALLEN
Job #: 99360

Date : 12/3/99
Drill Start : 0930
Drill End : 1630
Boring Location : Center of Pit, N. of MW-4

Site Location : 5 mi E of JAL
Auger Type : Hollow Stem
Logged By : Mort Bates

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v	Blows/Ft
40				Sand Tan Loose Damp			
45							
50				Sand & Gravel Tan Fram Damp			
55							
60				Sand Tan Loose Damp			
65				Sand Reddish Tan Soft wet			
70				Clay sand Red Stiff moist			
				T/D 73 Ft W/L 57.40			
75							
80							

Bentonite Plug

Top of 8/16 Sand pack

Top of 20ft 4" .010 slot screen

05-05-1998 c:\mtech\blank\blank.bor

Appendix A
Monitor Well #8 Analytical Results

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 12/03/99
Reporting Date: 12/07/99
Project Owner: ARCO
Project Name: NOT GIVEN
Project Location: IDA WIMBERLY-PIT BOTTOM

Sampling Date: 12/03/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/Kg)	Ca (mg/Kg)	Mg (mg/Kg)	K (mg/Kg)	Conductivity (u mhos/cm)	T-Alkalinity (mgCaCO3/Kg)
ANALYSIS DATE:		12/07/99	12/06/99	12/06/99	12/06/99	12/06/99	12/06/99
H4492-1	BH #1-20'	0	272	68	35	555	336
H4492-2	BH #2-30'	0	96	68	56	412	336
H4492-3	BH #3-40'	555	80	87	4	139	1504
H4492-4	BH #4-50'	265	64	78	9	153	800
H4492-5	BH #5-60'	201	0	68	9	285	400
H4492-6	BH #6-75'	1506	144	107	51	2321	128
Quality Control		NR	48	49	4.96	1443	NR
True Value QC		NR	50	50	5.00	1413	NR
% Accuracy		NR	96	98	99	102	NR
Relative Percent Difference		NR	6.3	5.1	0	0.4	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl⁻ (mg/Kg)	SO_4 (mg/Kg)	CO_3 (mg/Kg)	HCO_3 (mg/Kg)	pH (s.u.)
ANALYSIS DATE:		12/06/99	12/06/99	12/06/99	12/06/99	12/06/99
H4492-1	BH #1-20'	180	10	0	410	7.83
H4492-2	BH #2-30'	135	11	0	410	8.25
H4492-3	BH #3-40'	180	10	154	1523	9.31
H4492-4	BH #4-50'	180	13	173	625	9.24
H4492-5	BH #5-60'	225	12	134	215	9.84
H4492-6	BH #6-75'	2787	82	0	156	8.25
Quality Control		978	50.06	112	221	7.03
True Value QC		1000	50.00	124	259	7.00
% Accuracy		98	100	90	85	100
Relative Percent Difference		2.2	5.2	-	-	0.1
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1

NOTE: Analyses performed on 1:4 w:v aqueous extracts.

Gayle A. Potter, Chemist

12/08/99
Date

H4492BAL

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE #103
HOBBS, NM 88240
FAX TO: (505)

Receiving Date: 12/03/99
Reporting Date: 12/07/99
Project Owner: ARCO
Project Name: NOT GIVEN
Project Location: IDA WIMBERLY-PIT BOTTOM

Sampling Date: 12/03/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/kg)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)
ANALYSIS DATE:		12/06/99	12/04/99	12/04/99	12/04/99	12/04/99
H4492-1	BH #1-20'	15600	0.014	<0.010	4.19	8.73
H4492-2	BH #2-30'	12300	0.417	<0.010	3.85	6.46
H4492-3	BH #3-40'	10700	<0.010	<0.010	0.743	1.69
H4492-4	BH #4-50'	12200	0.003	0.005	0.042	0.076
H4492-5	BH #5-60'	8990	0.003	0.005	0.075	0.089
H4492-6	BH #6-75'	98.0	0.007	<0.002	0.035	0.033
Quality Control		231	0.088	0.100	0.094	0.288
True Value QC		240	0.100	0.100	0.100	0.300
% Recovery		96.3	88.0	100	94.2	95.9
Relative Percent Difference		2.9	0.6	2.8	2.0	1.4

METHODS: TRPHC - EPA 600/4-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

12/7/99
Date

H4492A.XLS

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1

Company Name: SESI		BILL TO	PO #:
Project Manager:		Company: SAME	
Address: 703 E. CLINTON, #103		Attn:	
City: HOBBS State: NM Zip: 88240		Address:	
Phone #: (505) 397-0510		City:	
Fax #: (505) 393-4388		State: Zip:	
Project #: Project Owner: ARCO		Phone #:	
Project Name:		Fax #:	
Project Location: Eda Wimberly #17 Battery			

FOR LAB USE ONLY				MATRIX							PRES.			SAMPLING		ANALYSIS REQUEST		
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	OTHER:	DATE	TIME	TPH 418.1	BTEX	MAJOR Cations & Anions
H6492-1	BH #1 - 20'	C				X					X		12-3-99	10:15a	X	X	X
-2	BH #2 - 30'	C				X					X			11:00a	X	X	X
-3	BH #3 - 40'	C				X					X			11:35a	X	X	X
-4	BH #4 - 50'	C				X					X			12:15p	X	X	X
-5	BH #5 - 60'	C				X					X			12:42p	X	X	X
-6	BH #6 - 75'	C				X					X			1:55pm	X	X	X

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished: Beth Ranch	Date: 12.3.99	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time: 5:35pm		Fax Result: ☐ Yes ☐ No
Relinquished By:	Date: 12/03/99	Received By: (Lab Staff)	REMARKS:
	Time: 5:45Pm		
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☒ Yes ☐ No Intact: ☒ Yes ☐ No	CHECKED BY: (Initials)	

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 12/13/99
Reporting Date: 12/15/99
Project Owner: ARCOPERMIAN
Project Name: IDA WIMBERLY
Project Location: EAST OF JAL

Sampling Date: 12/11/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		12/13/99	12/14/99	12/14/99	12/14/99	12/14/99
H4505-1	MW #8-1	15.4	0.052	<0.002	0.012	<0.006
H4505-2	MW #8-2	2.61	0.072	<0.002	0.007	<0.006
Quality Control		3.93	0.089	0.101	0.099	0.302
True Value QC		4.00	0.100	0.100	0.100	0.300
% Recovery		98.1	88.7	101	99.1	101
Relative Percent Difference		5.6	1.2	9.6	7.3	5.6

METHODS: TRPHC - EPA 600/4-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

12/15/99
Date

H4505A.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 12/13/99
Reporting Date: 12/17/99
Project Owner: ARCO PERMIAN
Project Name: IDA WIMBERLY
Project Location: EAST OF JAL

Sampling Date: 12/11/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: GP

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity (mgCaCO3/L)
ANALYSIS DATE:		12/17/99	12/14/99	12/14/99	12/14/99	12/15/99	12/14/99
H4505-1	MW #8-1	2746	142	116	63.0	11800	775
H4505-2	MW #8-2	6157	550	265	65.9	27900	300
Quality Control		NR	80	49	4.96	1392	NR
True Value QC		NR	80	50	5.00	1413	NR
% Accuracy		NR	100	98	99	99	NR
Relative Percent Difference		NR	0	2.0	0	0.2	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl⁻ (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		12/14/99	12/15/99	12/14/99	12/14/99	12/15/95	12/15/99
H4505-1	MW #8-1	4240	130	0	946	7.87	7968
H4505-2	MW #8-2	10800	407	0	366	7.39	21772
Quality Control		1010	48.63	NR	971	7.02	NR
True Value QC		1000	50.00	NR	1000	7.00	NR
% Accuracy		101	97	NR	97	100	NR
Relative Percent Difference		2.0	2.9	NR	-	0.1	NR
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Gayle A. Potter, Chemist

12/20/99
Date

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020

101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

Page____ of ____

Company Name: SESI	BILL TO PO #:
Project Manager:	Company: SAME
Address: 703 E. CLINTON, #103	Attn:
City: HOBBS State: NM Zip: 88240	Address:
Phone #: (505) 397-0510	City:
Fax #: (505) 393-4388	State: Zip:
Project #: Project Owner: Arco Permian	Phone #:
Project Name: Ida Wimberly	Fax #:
Project Location: East of Jal	

FOR LAB USE ONLY				MATRIX							PRES.			SAMPLING		ANALYSIS REQUEST												
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:		ACID:	ICE / COOL	OTHER:	DATE	TIME	BTEX	TPH 418	Major Cations & Anions											
H4505-1	MW #8-1	C	3	X								X		12-11-99	10:15	X	X	X										
-2	MW #8-2	C	3													X	X	X										

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date:	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time:		Fax Result: ☐ Yes ☐ No
Relinquished By:	Date: 12/13/99	Received By: (Lab Staff)	REMARKS:
	Time:		
Delivered By: (Circle One)	Sample Condition: Cool: ☒ Yes ☐ No; Intact: ☒ Yes ☐ No	CHECKED BY: (Initials)	
Sampler - UPS - Bus - Other:			

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

Appendix B
Vent Wells Analytical Results

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 01/13/00
Reporting Date: 01/14/00
Project Number: NOT GIVEN
Project Name: IDA WIMBERLY-ARCO
Project Location: EAST OF JAL

Analysis Date: 01/14/00
Sampling Date: 01/13/00
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: GP

LAB NUMBER	SAMPLE ID	Cl^- (mg/L)
H4577-1	B.H. #1 30'	727
H4577-2	B.H. #1 45'	162
H4577-3	B.H. #2 30'	194
H4577-4	B.H. #2 45'	145
Quality Control		1010
True Value QC		1000
% Recovery		101
Relative Percent Difference		10.0
METHOD: Standard Methods		4500-Cl^-B

NOTE: Analyses performed on 1:4 w:v aqueous extracts.

Chemist

1/14/00
Date

H4577.XLS

CARDINAL LABORATORIES, INC.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

Page____ of____

Company Name:	SESI	BILL TO	PO #:
Project Manager:		Company:	
Address:	703 E. Clinton #103	Attn:	
City:	Hobbs State: NM Zip: 88240	Address:	
Phone #:	(505) 397-0510	City:	
Fax #:	(505) 393-4388	State: Zip:	
Project #:	Project Owner:	Phone #:	
Project Name:	Ida Wimberly - Arco	Fax #:	
Project Location:	East of Jal		

FOR LAB USE ONLY LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	ANALYSIS REQUEST: Chlorides
H45774	B.H. #1 30'	G	1			X					X		1-13-00	11:50am	X
-2	B.H. #1 45'	G	1			X					X		"	"	X
-3	B.H. #2 30'	G	1			X					X				X
-4	B.H. #2 45'	G	1			X					X				X

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date:	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time:		Fax Result: ☐ Yes ☐ No
Relinquished By: Sergio Contreras Jr.	Date: 1-13-00 Time: 2:50	Received By: (Lab Staff)	REMARKS:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition: Cool ☑ Yes ☐ No; Intact ☑ Yes ☐ No	CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

Safety & Environmental Solutions, Inc.

RECEIVED
APR 0 7 2000
ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

ARCO Permian

COPY

Ida Wimberly
South Justis Unit F-230
Monitor Well Report

Lea County, New Mexico

For Year Ending December 31, 1999

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

The subject property is located at the Arco Permian South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, New Mexico. Safety & Environmental Solutions, Inc. (SESI) performed sampling and data collection on the seven (7) ground water monitor wells previously installed at the site (See Vicinity Map). An additional monitor well was installed on December 3, 1999. The casing size in all wells is 2".

II. Work Performed

Beginning in the second quarter of 1999, SESI environmental personnel sampled the seven monitor wells on a quarterly basis. In addition, in December of 1999, an eighth monitor well was installed in the bottom of the pit area and sampled. Ground water samples were taken from each well after a hand bailer was used to develop the wells. Three to five casing volumes of water were removed from each well until pH and temperature of the water were stabilized. The water that was removed was placed in appropriate drums for disposal. The samples were obtained and placed in appropriate containers, preserved and transported under chain of custody to Cardinal Laboratories of Hobbs, New Mexico for analysis of the contaminants identified in the initial sampling, namely Total Petroleum Hydrocarbons (TPH), Major Cations and Anions and BTEX (Benzene, Toluene, Ethyl Benzene and Xylenes). (See Analytical Data)

In addition to the sampling, SESI also measured the depth to the top of the water table and the total depth of each well. The depth to the top of ground water was measured using a Solinst water level indicator. The total depth of each well was measured in order to compute the proper casing volumes. (See Cumulative Depth to Water Table)

III. Summary

The analysis of the groundwater samples performed by Cardinal Laboratories indicated elevated levels of Chlorides and Total Dissolved Solids (TDS) in **all** wells as well as elevated levels of Sulfate in Monitor Wells #2 and #6 throughout the test period. Additionally, Monitor Well #4 and the new Monitor Well #8 exhibited elevated levels of Benzene throughout the period when sampling was done. (See Cumulative Well Data)

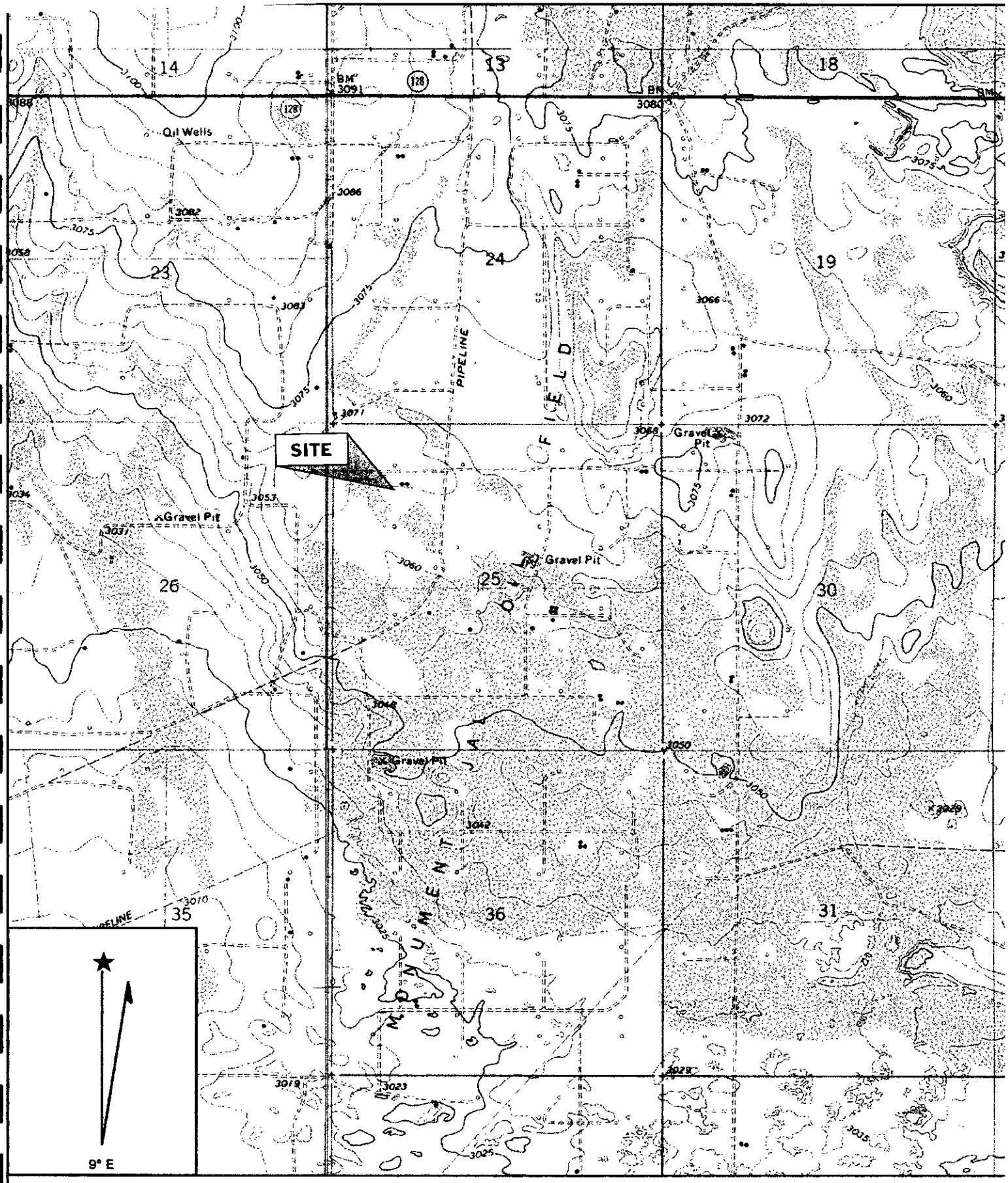
Based on these results, the elevated levels of both TDS and Chlorides appear to be indigent to the waters of this area and the elevated levels of Benzene are found only within the pit area boundaries, in Monitor Well #4 on the south berm of the pit area and in Monitor Well #8, in the center of the excavated pit area.

IV. Figures and Appendices

Figures:
Vicinity Map
Water Flow Diagrams

Appendices:
Cumulative Water Elevation Table
Cumulative Well Data
Analytical Results

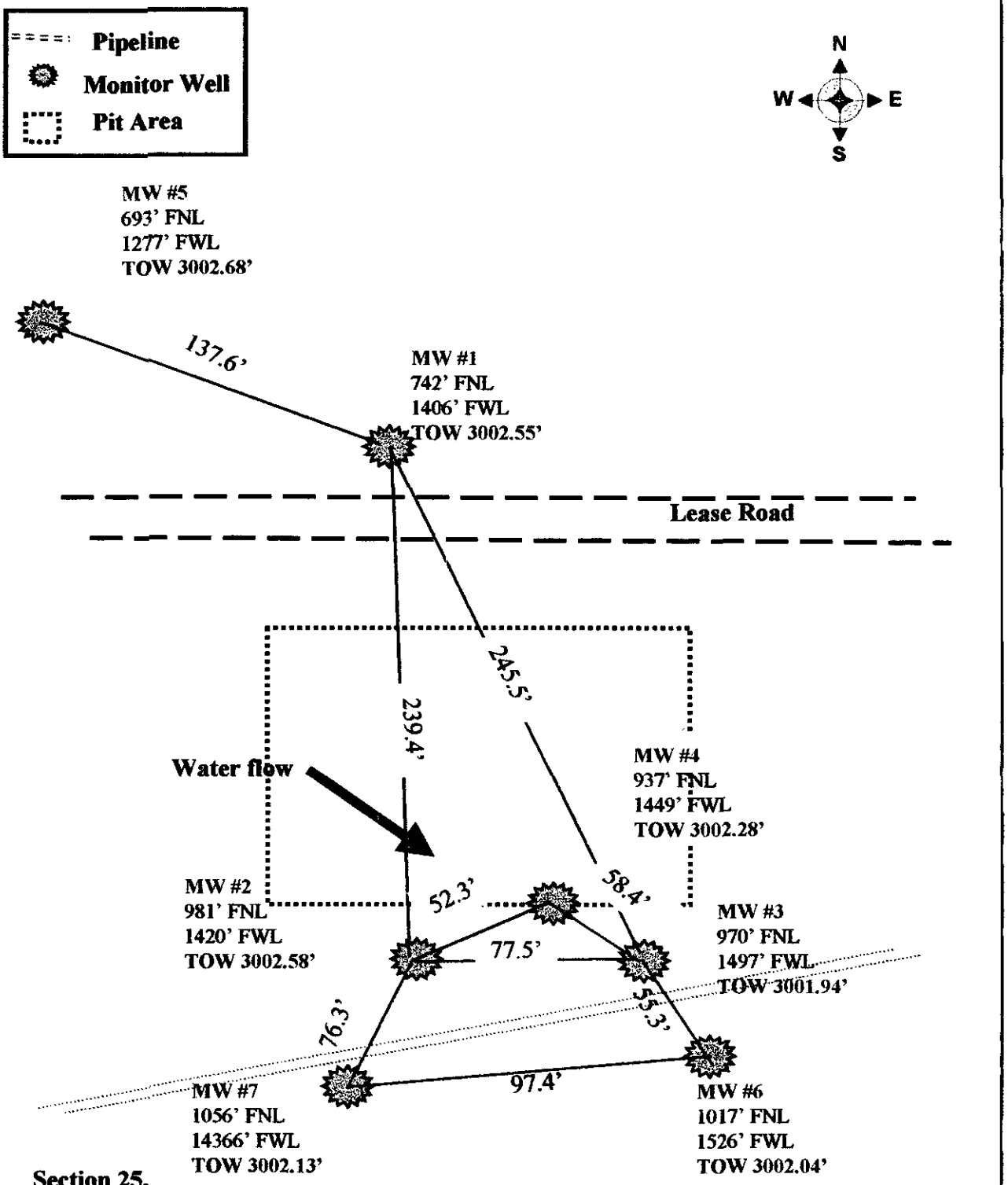
Figure 1
Vicinity Map



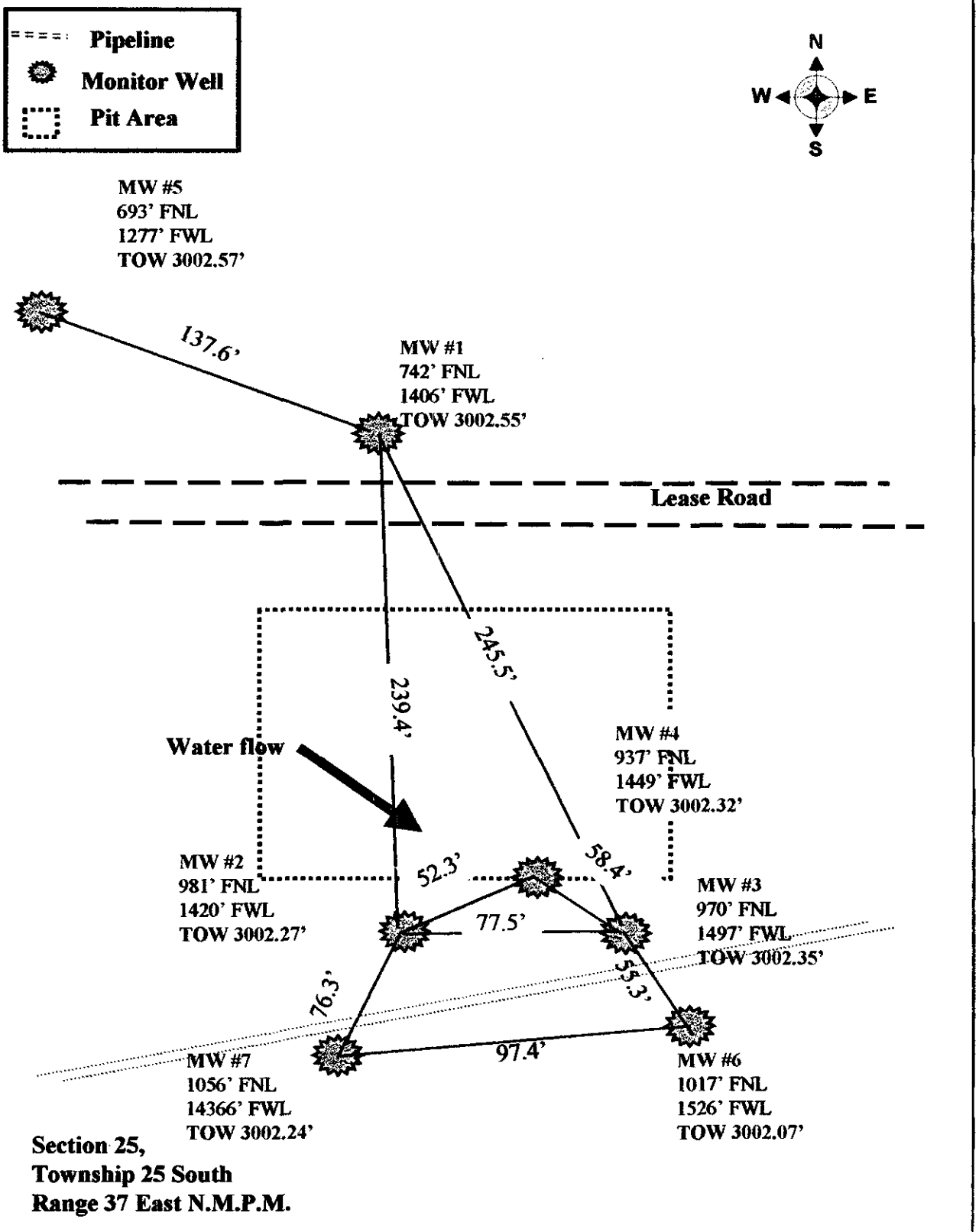
Name: JAL SE
Date: 3/31/100
Scale: 1 inch equals 2000 feet

Location: 032° 06' 03.6" N 103° 06' 56.5" W
Caption: ARCO Permian Ida Wimberly South Justis F-230 Vicinity Map

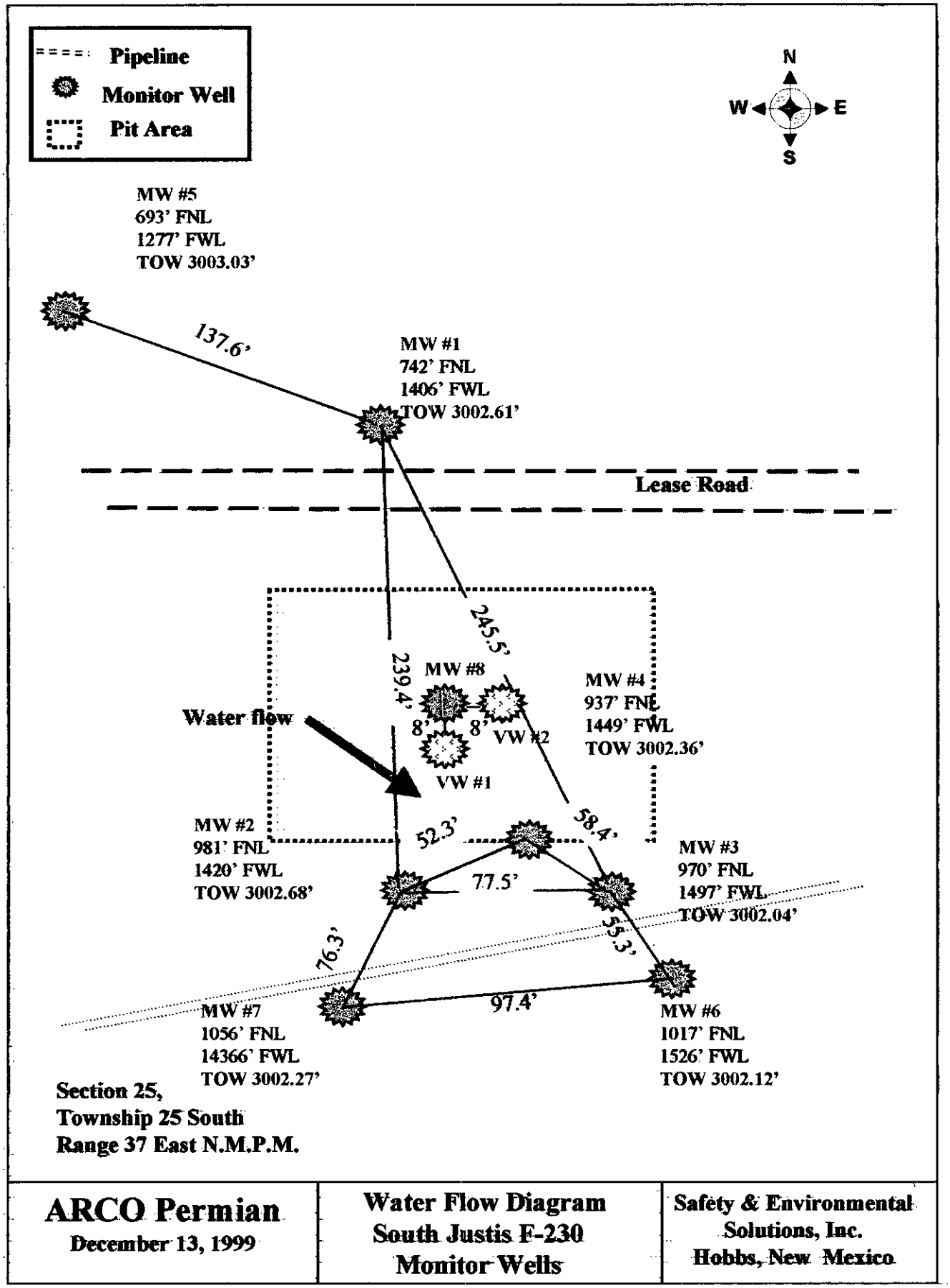
Figure 2
Water Flow Diagram



ARCO Permian June 17, 1999	**Water Flow Diagram** **South Justis F-230** **Monitor Wells**	**Safety & Environmental Solutions, Inc.** **Hobbs, New Mexico**



ARCO Permian September 24, 1999	**Water Flow Diagram** **South Justis F-230** **Monitor Wells**	**Safety & Environmental Solutions, Inc.** **Hobbs, New Mexico**



ARCO Permian December 13, 1999	**Water Flow Diagram** **South Justis F-230** **Monitor Wells**	**Safety & Environmental Solutions, Inc.** **Hobbs, New Mexico**

Appendix A
Cumulative Water Elevation Table

Ida Wimberly Cumulative Water Elevation Table

Monitor Well	Casing Elevation	Water Elevation 6/17/99	Water Elevation 9/24/99	Water Elevation 12/03/99	Water Elevation 12/11/99
#1	3066.98'	3002.55'	3002.55'	3002.61'	n/a
#2	3066.21'	3002.58'	3002.27'	3002.68'	n/a
#3	3065.92'	3001.94'	3002.35'	3002.04'	n/a
#4	3067.93'	3002.28'	3002.32'	3002.36'	n/a
#5	3066.56'	3002.68'	3002.57'	3003.03'	n/a
#6	3065.33'	3002.04'	3002.07'	3002.12'	n/a
#7	3065.64'	3002.13'	3002.24'	3002.27'	n/a
#8*	TD - 73'	n/a	n/a	n/a	TOW - 60.31'

*Monitor Well #8 has not been surveyed, therefore only Total Depth of the well and the Top of Water in the well are available.

Appendix B
Cumulative Well Data

Ida Wimberly Cumulative Well Data

Monitor Well #1

Contaminant	WQCC Standard	Initial Test 12/17/97	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99	Test Date 12/03/99
Aluminum	5.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Arsenic	0.1 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Barium	1.0 ppm	<1.0 ppm	n/a	n/a	n/a	n/a
Boron	0.75 ppm	<0.75 ppm	n/a	n/a	n/a	n/a
Cadmium	0.01 ppm	<0.01 ppm	n/a	n/a	n/a	n/a
Calcium	n/a	296 ppm	317 ppm	n/a	296 ppm	320 ppm
Carbonate	n/a	0 ppm	0 ppm	n/a	0 ppm	0 ppm
Chloride	250.0 ppm	1580 ppm	1839 ppm	1610 ppm	2231 ppm	1686 ppm
Chromium	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Cobalt	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Conductivity (*u*mhos/cm)	n/a	6116	6273	n/a	1978	6187
Copper	1.0 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
HCO_3	n/a	122 ppm	249 ppm	n/a	229 ppm	239 ppm
Iron	1.0 ppm	.388 ppm	n/a	n/a	n/a	n/a
Lead	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Magnesium	n/a	112 ppm	112 ppm	n/a	126 ppm	126 ppm
Manganese	0.2 ppm	0.345 ppm	n/a	n/a	n/a	n/a
Mercury	0.002 ppm	<0.02 ppm	n/a	n/a	n/a	n/a
Molybdenum	1.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Nickel	0.2 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Potassium	n/a	22.5 ppm	8.8 ppm	n/a	24 ppm	66 ppm
Selenium	0.05 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Silver	0.05 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Sodium	n/a	1007 ppm	850 ppm	n/a	1157 ppm	738 ppm
Sulfate	600 ppm	1050 ppm	305 ppm	n/a	455 ppm	423 ppm
T-Alkalinity ($MgCaCO_3$/L)	n/a	100	204	n/a	188	192
TDS	1000 ppm	3480 ppm	4380 ppm	4560 ppm	4520 ppm	2910 ppm
Zinc	10.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
pH	> 6 & <9	5.58	6.384	n/a	7.19 ppm	7.22 ppm
TPH	N/A	n/a	42.9 ppm	n/a	2.76 ppm	<1.00 ppm
Benzene	0.01 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm	<.002 ppm
Toluene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm	<.002 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm	n/a	<.006 ppm	<.006 ppm

Monitor Well #2

Contaminant	WQCC Standard	Initial Test 12/17/97	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99	Test Date 12/03/99
Aluminum	5.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Arsenic	0.1 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Barium	1.0 ppm	<1.0 ppm	n/a	n/a	n/a	n/a
Boron	0.75 ppm	<0.75 ppm	n/a	n/a	n/a	n/a
Cadmium	0.01 ppm	<0.01 ppm	n/a	n/a	n/a	n/a
Calcium	n/a	426 ppm	476 ppm	n/a	544 ppm	760 ppm
Carbonate	n/a	0 ppm	0 ppm	n/a	0 ppm	0 ppm
Chloride	250.0 ppm	6200 ppm	2731 ppm	3890 ppm	6590 ppm	9552 ppm
Chromium	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Cobalt	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Conductivity (*u*mhos/cm)	n/a	17028	19010	n/a	1715	27600
Copper	1.0 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
HCO_3	n/a	404 ppm	547 ppm	n/a	459 ppm	425 ppm
Iron	1.0 ppm	<.2 ppm	n/a	n/a	n/a	n/a
Lead	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Magnesium	n/a	193 ppm	214 ppm	n/a	258 ppm	389 ppm
Manganese	0.2 ppm	0.343 ppm	n/a	n/a	n/a	n/a
Mercury	0.002 ppm	<0.02 ppm	n/a	n/a	n/a	n/a
Molybdenum	1.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Nickel	0.2 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Potassium	n/a	90 ppm	42.3 ppm	n/a	62 ppm	132 ppm
Selenium	0.05 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Silver	0.05 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Sodium	n/a	3700 ppm	1202 ppm	n/a	3611 ppm	4979 ppm
Sulfate	600 ppm	1160 ppm	426 ppm	n/a	666 ppm	663 ppm
T-Alkalinity ($MgCaCO_3$/L)	n/a	404	448	n/a	376	348
TDS	1000 ppm	10490 ppm	12240 ppm	7490 ppm	14270 ppm	16260 ppm
Zinc	10.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
pH	> 6 & <9	7.84	6.303	n/a	6.88	7.00
TPH	N/A	n/a	14.0 ppm	10.3 ppm	4.27 ppm	<1.00 ppm
Benzene	0.01 ppm	<.002 ppm	<.002 ppm	<.002 ppm	.003 ppm	.010 ppm
Toluene	0.75 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm

Monitor Well #3

Contaminant	WQCC Standard	Initial Test 12/17/97	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99	Test Date 12/03/99
Aluminum	5.0 ppm	<0.3 ppm	n/a	n/a	n/a	n/a
Arsenic	0.1 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Barium	1.0 ppm	<1.0 ppm	n/a	n/a	n/a	n/a
Boron	0.75 ppm	<0.75 ppm	n/a	n/a	n/a	n/a
Cadmium	0.01 ppm	<0.01 ppm	n/a	n/a	n/a	n/a
Calcium	n/a	629 ppm	360 ppm	n/a	448 ppm	640 ppm
Carbonate	n/a	0 ppm	0 ppm	n/a	0 ppm	0 ppm
Chloride	250.0 ppm	8500 ppm	4124 ppm	7570 ppm	5374 ppm	8316 ppm
Chromium	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Cobalt	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Conductivity (*u*mhos/cm)	n/a	23846	13960	n/a	1679	22885
Copper	1.0 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
HCO_3	n/a	316 ppm	556 ppm	n/a	459 ppm	434 ppm
Iron	1.0 ppm	<.2 ppm	n/a	n/a	n/a	n/a
Lead	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Magnesium	n/a	302 ppm	187 ppm	n/a	214 ppm	316 ppm
Manganese	0.2 ppm	0.440 ppm	n/a	n/a	n/a	n/a
Mercury	0.002 ppm	<0.02 ppm	n/a	n/a	n/a	n/a
Molybdenum	1.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Nickel	0.2 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Potassium	n/a	118 ppm	31.7 ppm	n/a	55 ppm	78 ppm
Selenium	0.05 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Silver	0.05 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Sodium	n/a	4875 ppm	2229 ppm	n/a	2892 ppm	4441 ppm
Sulfate	600 ppm	1280 ppm	279 ppm	n/a	397 ppm	562 ppm
T-Alkalinity ($mgCaCO_3/L$)	n/a	316	455	n/a	376	356
TDS	1000 ppm	15300 ppm	8840 ppm	15180 ppm	10330 ppm	13260 ppm
Zinc	10.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
pH	> 6 & <9	7.77	6.64	n/a	6.91	6.84
TPH	N/A	n/a	24.6 ppm	n/a	n/a	<1.00 ppm
Benzene	0.01 ppm	<.002 ppm	<.002 ppm	<.002 ppm	.005 ppm	<.002 ppm
Toluene	0.75 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm

Monitor Well #4

Contaminant	WQCC Standard	Initial Test 8/10/98	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99	Test Date 12/03/99
Aluminum	5.0 ppm	<0.3 ppm	n/a	n/a	n/a	n/a
Arsenic	0.1 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Barium	1.0 ppm	<1.0 ppm	n/a	n/a	n/a	n/a
Boron	0.75 ppm	<0.75 ppm	n/a	n/a	n/a	n/a
Cadmium	0.01 ppm	<0.01 ppm	n/a	n/a	n/a	n/a
Calcium	n/a	480 ppm	472 ppm	n/a	736 ppm	1160 ppm
Carbonate	n/a	0 ppm	0 ppm	n/a	0 ppm	0 ppm
Chloride	250.0 ppm	9641 ppm	6910 ppm	4680 ppm	14600 ppm	16295 ppm
Chromium	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Cobalt	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Conductivity (*u*mhos/cm)	n/a	18190	21750	n/a	1603	44620
Copper	1.0 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
HCO_3	n/a	439 ppm	864 ppm	n/a	620 ppm	476 ppm
Iron	1.0 ppm	<.2 ppm	n/a	n/a	n/a	n/a
Lead	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Magnesium	n/a	340 ppm	248 ppm	n/a	272 ppm	559 ppm
Manganese	0.2 ppm	0.440 ppm	n/a	n/a	n/a	n/a
Mercury	0.002 ppm	<0.02 ppm	n/a	n/a	n/a	n/a
Molybdenum	1.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Nickel	0.2 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Potassium	n/a	68 ppm	50.5 ppm	n/a	76 ppm	144 ppm
Selenium	0.05 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Silver	0.05 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Sodium	n/a	5252 ppm	3921 ppm	n/a	8521 ppm	8529 ppm
Sulfate	600 ppm	159 ppm	335 ppm	n/a	488 ppm	562 ppm
T-Alkalinity ($mgCaCO_3/L$)	n/a	360	708	n/a	508	390
TDS	1000 ppm	13580 ppm	13960 ppm	9460 ppm	20020 ppm	30010 ppm
Zinc	10.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
pH	> 6 & <9	6.69	6.64	n/a	7.04	7.01
TPH	N/A	<1.0 ppm	11.8 ppm	n/a	3.27 ppm	<1.00 ppm
Benzene	0.01 ppm	0.033 ppm	0.046 ppm	0.003 ppm	0.033 ppm	0.026 ppm
Toluene	0.75 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm	<.002 ppm
E. Benzene	0.75 ppm	<.007 ppm	0.012 ppm	<.002 ppm	0.006 ppm	0.012 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm	<.006 ppm

Monitor Well #5

Contaminant	WQCC Standard	Initial Test 8/10/98	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99	Test Date 12/03/99
Aluminum	5.0 ppm	<0.3 ppm	n/a	n/a	n/a	n/a
Arsenic	0.1 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Barium	1.0 ppm	<1.0 ppm	n/a	n/a	n/a	n/a
Boron	0.75 ppm	<0.75 ppm	n/a	n/a	n/a	n/a
Cadmium	0.01 ppm	<0.01 ppm	n/a	n/a	n/a	n/a
Calcium	n/a	264 ppm	320 ppm	n/a	312 ppm	320 ppm
Carbonate	n/a	0 ppm	0 ppm	n/a	0 ppm	0 ppm
Chloride	250.0 ppm	1950 ppm	2396 ppm	2090 ppm	2535 ppm	2472 ppm
Chromium	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Cobalt	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Conductivity (*u*mhos/cm)	n/a	5740	7877	n/a	1657	7211
Copper	1.0 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
HCO_3	n/a	200 ppm	195 ppm	n/a	239 ppm	220 ppm
Iron	1.0 ppm	<.2 ppm	n/a	n/a	n/a	n/a
Lead	0.05 ppm	<0.05 ppm	n/a	n/a	n/a	n/a
Magnesium	n/a	127 ppm	153 ppm	n/a	112 ppm	219 ppm
Manganese	0.2 ppm	0.440 ppm	n/a	n/a	n/a	n/a
Mercury	0.002 ppm	<0.02 ppm	n/a	n/a	n/a	n/a
Molybdenum	1.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Nickel	0.2 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
Potassium	n/a	19 ppm	10 ppm	n/a	20 ppm	69 ppm
Selenium	0.05 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Silver	0.05 ppm	<0.1 ppm	n/a	n/a	n/a	n/a
Sodium	n/a	850 ppm	1094 ppm	n/a	1355 ppm	1078 ppm
Sulfate	600 ppm	138 ppm	274 ppm	n/a	429 ppm	452 ppm
T-Alkalinity ($mgCaCO_3/L$)	n/a	164	159	n/a	196	180
TDS	1000 ppm	3790 ppm	5430 ppm	5300 ppm	5100 ppm	4530 ppm
Zinc	10.0 ppm	<0.2 ppm	n/a	n/a	n/a	n/a
pH	> 6 & <9	7.14	7.216	n/a	7.28	7.25
TPH	N/A	<1.0 ppm	11.0 ppm	n/a	1.26 ppm	<1.00 ppm
Benzene	0.01 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm	<.002 ppm
Toluene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm	<.002 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm	n/a	<.006 ppm	<.006 ppm

Monitor Well #6

Contaminant	WQCC Standard	Initial Test 8/11/98	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99	Test Date 12/03/99
Aluminum	5.0 ppm	n/a	n/a	n/a	n/a	n/a
Arsenic	0.1 ppm	n/a	n/a	n/a	n/a	n/a
Barium	1.0 ppm	n/a	n/a	n/a	n/a	n/a
Boron	0.75 ppm	n/a	n/a	n/a	n/a	n/a
Cadmium	0.01 ppm	n/a	n/a	n/a	n/a	n/a
Calcium	n/a	n/a	2120 ppm	n/a	2480 ppm	2760 ppm
Carbonate	n/a	n/a	0 ppm	n/a	0 ppm	0 ppm
Chloride	250.0 ppm	29600 ppm	24186 ppm	25500 ppm	42583 ppm	26521 ppm
Chromium	0.05 ppm	n/a	n/a	n/a	n/a	n/a
Cobalt	0.05 ppm	n/a	n/a	n/a	n/a	n/a
Conductivity (*u*mhos/cm)	n/a	61900	68740	n/a	1482	68310
Copper	1.0 ppm	n/a	n/a	n/a	n/a	n/a
HCO_3	n/a	n/a	220 ppm	n/a	234 ppm	232 ppm
Iron	1.0 ppm	n/a	n/a	n/a	n/a	n/a
Lead	0.05 ppm	n/a	n/a	n/a	n/a	n/a
Magnesium	n/a	n/a	1239 ppm	n/a	1458 ppm	1045 ppm
Manganese	0.2 ppm	n/a	n/a	n/a	n/a	n/a
Mercury	0.002 ppm	n/a	n/a	n/a	n/a	n/a
Molybdenum	1.0 ppm	n/a	n/a	n/a	n/a	n/a
Nickel	0.2 ppm	n/a	n/a	n/a	n/a	n/a
Potassium	n/a	n/a	101 ppm	n/a	98 ppm	201 ppm
Selenium	0.05 ppm	n/a	n/a	n/a	n/a	n/a
Silver	0.05 ppm	n/a	n/a	n/a	n/a	n/a
Sodium	n/a	n/a	11269 ppm	n/a	22692 ppm	12550 ppm
Sulfate	600 ppm	n/a	750 ppm	1200 ppm	1428 ppm	1149 ppm
T-Alkalinity ($mgCaCO_3/L$)	n/a	n/a	180	n/a	192	240
TDS	1000 ppm	58260 ppm	58260 ppm	53980 ppm	71000 ppm	47980 ppm
Zinc	10.0 ppm	n/a	n/a	n/a	n/a	n/a
pH	> 6 & <9	n/a	6.829	n/a	6.74	6.82
TPH	N/A	<1.0 ppm	6.8 ppm	n/a	1.88 ppm	<1.00 ppm
Benzene	0.01 ppm	0.044 ppm	0.007 ppm	n/a	0.003 ppm	0.007 ppm
Toluene	0.75 ppm	0.004 ppm	<.002 ppm	n/a	<.002 ppm	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm	<.002 ppm
Total Xylenes	0.62 ppm	0.009ppm	<.006 ppm	n/a	<.006 ppm	<.006 ppm

Monitor Well #7

Contaminant	WQCC Standard	Initial Test 8/12/98	Test Date 8/25/98	Test Date 6/17/99	Test Date 9/24/99	Test Date 12/03/99
Aluminum	5.0 ppm	n/a	n/a	n/a	n/a	n/a
Arsenic	0.1 ppm	n/a	n/a	n/a	n/a	n/a
Barium	1.0 ppm	n/a	n/a	n/a	n/a	n/a
Boron	0.75 ppm	n/a	n/a	n/a	n/a	n/a
Cadmium	0.01 ppm	n/a	n/a	n/a	n/a	n/a
Calcium	n/a	n/a	460 ppm	n/a	600 ppm	440 ppm
Carbonate	n/a	n/a	0 ppm	n/a	0 ppm	0 ppm
Chloride	250.0 ppm	5015 ppm	3288 ppm	5380 ppm	6387 ppm	4328 ppm
Chromium	0.05 ppm	n/a	n/a	n/a	n/a	n/a
Cobalt	0.05 ppm	n/a	n/a	n/a	n/a	n/a
Conductivity (*u*mhos/cm)	n/a	n/a	11910	n/a	1523	10580
Copper	1.0 ppm	n/a	n/a	n/a	n/a	n/a
HCO_3	n/a	n/a		n/a	166 ppm	293 ppm
Iron	1.0 ppm	n/a	n/a	n/a	n/a	n/a
Lead	0.05 ppm	n/a	n/a	n/a	n/a	n/a
Magnesium	n/a	n/a	175 ppm	n/a	97 ppm	219 ppm
Manganese	0.2 ppm	n/a	n/a	n/a	n/a	n/a
Mercury	0.002 ppm	n/a	n/a	n/a	n/a	n/a
Molybdenum	1.0 ppm	n/a	n/a	n/a	n/a	n/a
Nickel	0.2 ppm	n/a	n/a	n/a	n/a	n/a
Potassium	n/a	n/a	25 ppm	n/a	66 ppm	54 ppm
Selenium	0.05 ppm	n/a	n/a	n/a	n/a	n/a
Silver	0.05 ppm	n/a	n/a	n/a	n/a	n/a
Sodium	n/a	n/a	1763 ppm	n/a	3553 ppm	2219 ppm
Sulfate	600 ppm	n/a	832 ppm	142 ppm	553 ppm	536 ppm
T-Alkalinity ($mgCaCO_3/L$)	n/a	n/a	236	n/a	136	240
TDS	1000 ppm	13496 ppm	8170 ppm	10580 ppm	12140 ppm	7240 ppm
Zinc	10.0 ppm	n/a	n/a	n/a	n/a	n/a
pH	> 6 & <9	n/a	7.326	n/a	7.59	7.16
TPH	N/A	48.7 ppm	7.1 ppm	n/a	1.32 ppm	<1.00 ppm
Benzene	0.01 ppm	0.013 ppm	0.003 ppm	n/a	0.008 ppm	<.002 ppm
Toluene	0.75 ppm	0.002ppm	<.002 ppm	n/a	<.002 ppm	<.002 ppm
E. Benzene	0.75 ppm	<.002 ppm	<.002 ppm	n/a	<.002 ppm	<.002 ppm
Total Xylenes	0.62 ppm	0.009ppm	<.006 ppm	n/a	<.006 ppm	<.006 ppm

Monitor Well #8

Contaminant	WQCC Standard	Initial Test 12/11/99	2nd Test 12/11/99
Aluminum	5.0 ppm	n/a	n/a
Arsenic	0.1 ppm	n/a	n/a
Barium	1.0 ppm	n/a	n/a
Boron	0.75 ppm	n/a	n/a
Cadmium	0.01 ppm	n/a	n/a
Calcium	n/a	142 ppm	550 ppm
Carbonate	n/a	0 ppm	0 ppm
Chloride	250.0 ppm	4240 ppm	10800 ppm
Chromium	0.05 ppm	n/a	n/a
Cobalt	0.05 ppm	n/a	n/a
Conductivity (*u*mhos/cm)	n/a	11800	27900
Copper	1.0 ppm	n/a	n/a
HCO_3	n/a	946 ppm	366 ppm
Iron	1.0 ppm	n/a	n/a
Lead	0.05 ppm	n/a	n/a
Magnesium	n/a	116 ppm	265 ppm
Manganese	0.2 ppm	n/a	n/a
Mercury	0.002 ppm	n/a	n/a
Molybdenum	1.0 ppm	n/a	n/a
Nickel	0.2 ppm	n/a	n/a
Potassium	n/a	63.0 ppm	65.9 ppm
Selenium	0.05 ppm	n/a	n/a
Silver	0.05 ppm	n/a	n/a
Sodium	n/a	2746 ppm	6157 ppm
Sulfate	600 ppm	130 ppm	407 ppm
T-Alkalinity ($mgCaCO_3/L$)	n/a	775	300
TDS	1000 ppm	7968 ppm	21772 ppm
Zinc	10.0 ppm	n/a	n/a
pH	> 6 & <9	7.87	7.39
TPH	N/A	15.4 ppm	2.61 ppm
Benzene	0.01 ppm	0.052 ppm	0.072 ppm
Toluene	0.75 ppm	<.002ppm	<.002 ppm
E. Benzene	0.75 ppm	.012 ppm	.007 ppm
Total Xylenes	0.62 ppm	<.006 ppm	<.006 ppm

Appendix C
Analytical Results

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 06/17/99
Reporting Date: 06/21/99
Project Owner: ARCO
Project Name: ARCO PERMIAN
Project Location: IDA WIMBERLY

Sampling Date: 06/17/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NO.	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		06/18/99	06/18/99	06/18/99	06/18/99
H4186-4	MW #4	0.003	<0.002	<0.002	<0.006
Quality Control		0.086	0.097	0.101	0.301
True Value QC		0.100	0.100	0.100	0.300
% Recovery		86.0	97.4	101	100
Relative Percent Difference		0.1	1.1	1.8	2.7

METHOD: EPA SW 846-8021B, 5030, 5021 Gas Chromatography

JUL 06 1999

Chemist

6/21/99
Date

H4186B.XLS

CARDINAL LABORATORIES

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 06/17/99
Reporting Date: 06/21/99
Project Owner: ARCO
Project Name: ARCO PERMIAN
Project Location: IDA WIMBERLY

Analysis Date: 06/18/99
Sampling Date: 06/17/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	$SO_4^=$ (mg/L)
H4186-6	MW #6	1200
H4186-7	MW #7	142
Quality Control		46.4
True Value QC		50.0
% Recovery		93
Relative Percent Difference		2.8

METHOD: EPA 600/4-79-020 375.4

Chemist

6/21/99
Date

H4186C.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 06/17/99
Reporting Date: 06/21/99
Project Owner: ARCO
Project Name: ARCO PERMIAN
Project Location: IDA WIMBERLY

Sampling Date: 06/17/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	TDS (mg/L)	Cl (mg/L)
ANALYSIS DATE:		06/18/99	06/18/99
H4186-1	MW #1	4560	1610
H4186-2	MW #2	7490	3890
H4186-3	MW #3	15180	7570
H4186-4	MW #4	9400	4680
H4186-5	MW #5	5300	2090
H4186-6	MW #6	53980	25500
H4186-7	MW #7	10580	5380
Quality Control		NR	1325
True Value QC		NR	1319
% Recovery		NR	101
Relative Percent Difference		NR	1.5

METHODS: EPA 600/4-79-02	160.1	4500-Cl B*

*Std. Methods

Chemist

6/21/99
Date

H4186A.XLS

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1

Company Name:	SESI	BILL TO	PO #:
Project Manager:	Dee Whatley	Company:	
Address:	703 E Clinton #103	Attn:	
City:	Hobbs State: NM Zip: 88240	Address:	Same
Phone #:	505-397-0516	City:	
Fax #:	505-393-4388	State:	Zip:
Project #:	Project Owner: ARCO	Phone #:	
Project Name:	Arco Permian	Fax #:	
Project Location:	Ida Wimberly		

FOR LAB USE ONLY LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	ANALYSIS REQUEST: TDS	Chlorides	BTEX	SO4
H4189-1	MW #1		1	✓							✓		6-17-99	3:30pm	✓	✓		
-2	MW #2		1	✓							✓		6-17-99		✓	✓		
-3	MW #3		1	✓							✓				✓	✓		
-4	MW #4		3	✓							✓				✓	✓	✓	
-5	MW #5		1	✓							✓				✓	✓		
-6	MW #6		2	✓							✓				✓	✓		✓
-7	MW #7		2	✓							✓				✓	✓		✓

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished: Dee Whatley	Date: 6-17-99 Time: 3:30pm	Received By: Ed Aldred	Phone Result ☐ Yes ☐ No Additional Fax #:
Relinquished By: Ed Aldred	Date: 6/17/99 Time: 3:50	Received By: (Lab Staff) Jenny Hall	Fax Result: ☐ Yes ☐ No
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition Cool ☐ Yes ☐ No Intact ☑ Yes ☐ No	CHECKED BY: (Initials)

REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 09/24/99
Reporting Date: 09/28/99
Project Number: NOT GIVEN
Project Name: IDA WIMBERLY
Project Location: ARCO SOUTH JUSTIS

Sampling Date: 09/24/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC/GP/JP

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		09/27/99	09/24/99	09/24/99	09/24/99	09/24/99
H4360-1	MW #1	2.76	<0.002	<0.002	<0.002	<0.006
H4360-2	MW #2	4.27	0.003	<0.002	<0.002	<0.006
H4360-3	MW #3	1.52	0.005	<0.002	<0.002	<0.006
H4360-4	MW #4	3.27	0.033	<0.002	0.006	<0.006
H4360-5	MW #5	1.26	<0.002	<0.002	<0.002	<0.006
H4360-6	MW #6	1.88	0.003	<0.002	<0.002	<0.006
H4360-7	MW #7	1.32	0.008	<0.002	<0.002	<0.006
Quality Control		41.3	0.092	0.100	0.100	0.304
True Value QC		40.0	0.100	0.100	0.100	0.300
% Recovery		103	92.1	100	99.6	101
Relative Percent Difference		0.6	2.9	6.0	6.7	5.3

METHODS: TRPHC - EPA 600/4-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

9/28/99
Date

H4360A.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 09/24/99
Reporting Date: 09/28/99
Project Number: NOT GIVEN
Project Name: IDA WIMBERLY
Project Location: ARCO SOUTH JUSTIS

Sampling Date: 09/24/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity (mgCaCO3/L)
ANALYSIS DATE:		09/24/99	09/27/99	09/27/99	09/27/99	09/27/99	09/24/99
H4360-1	MW #1	1157	296	126	24	1978	188
H4360-2	MW #2	3611	544	258	62	1715	376
H4360-3	MW #3	2892	448	214	55	1679	376
H4360-4	MW #4	8521	736	272	76	1603	508
H4360-5	MW #5	1355	312	112	20	1657	196
H4360-6	MW #6	22692	2480	1458	98	1482	192
H4360-7	MW #7	3553	600	97	66	1523	136
Quality Control		NR	48	49	4.96	1443	NR
True Value QC		NR	50	50	5.00	1413	NR
% Accuracy		NR	96	98	99	102	NR
Relative Percent Difference		NR	6.3	5.1	0	0.4	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl⁻ (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		09/27/99	09/27/99	09/27/99	09/27/99	09/27/99	09/28/99
H4360-1	MW #1	2231	455	0	229	7.19	4520
H4360-2	MW #2	6590	666	0	459	6.88	14270
H4360-3	MW #3	5374	397	0	459	6.91	10330
H4360-4	MW #4	14600	488	0	620	7.04	20020
H4360-5	MW #5	2535	429	0	239	7.28	5100
H4360-6	MW #6	42583	1428	0	234	6.74	71000
H4360-7	MW #7	6387	553	0	166	7.59	12140
Quality Control		1024	47.47	112	221	6.99	NR
True Value QC		1000	50.00	124	259	7.00	NR
% Accuracy		102	94.9	90.3	85.4	99.9	NR
Relative Percent Difference		9.8	5.2	-	-	1.4	NR
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Chemist

9/28/99
Date

H4360-XLS

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES, INC.
2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240
(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

Page____ of____

Company Name: SESI	BILL TO PO #:
Project Manager: Dee Whatley	Company: SAME
Address: 703 E. CLINTON, #103	Attn:
City: HOBBS State: NM Zip: 88240	Address:
Phone #: (505) 397-0510	City:
Fax #: (505) 393-4388	State: Zip:
Project #: Project Owner:	Phone #:
Project Name: Ida Kimberly	Fax #:
Project Location: Arco South Justis	

ANALYSIS REQUEST

FOR LAB USE ONLY LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	BTEX	TPH 418	Cations + Anions
H4360-1	MW #1	G	4	✓							✓		9-24-99	1:00pm	✓	✓	✓
-2	MW #2	G	4	✓							✓				✓	✓	✓
-3	MW #3	G	4	✓							✓				✓	✓	✓
-4	MW #4	G	4	✓							✓				✓	✓	✓
-5	MW #5	G	4	✓							✓				✓	✓	✓
-6	MW #6	G	4	✓							✓				✓	✓	✓
-7	MW #7	G	4	✓							✓				✓	✓	✓

Sampler Relinquished:	Date: 9-24-99	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time: 1:00pm		Fax Result: ☐ Yes ☐ No
Relinquished By:	Date: 9/24/99	Received By: (Lab Staff)	REMARKS:
	Time: 1:00		
Delivered By: (Circle One)	Sample Condition: Cool ☑ Yes ☐ No; Intact ☑ Yes ☐ No	CHECKED BY: (Initials)	
Sampler - UPS - Bus - Other:			

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

CARDINAL LABORATORIES

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 12/03/99
Reporting Date: 12/07/99
Project Number: NOT GIVEN
Project Name: ARCO
Project Location: IDA WIMBERLY

Sampling Date: 12/03/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity (mgCaCO3/L)
ANALYSIS DATE:		12/07/99	12/06/99	12/06/99	12/06/99	12/06/99	12/06/99
H4491-1	MW #1	738	320	126	66	6187	192
H4491-2	MW #2	4979	760	389	132	27600	348
H4491-3	MW #3	4441	640	316	78	22885	356
H4491-4	MW #4	8529	1160	559	144	44620	390
H4491-5	MW #5	1078	320	219	69	7211	180
H4491-6	MW #6	12550	2760	1045	201	68310	190
H4491-7	MW #7	2219	440	219	54	10580	240
Quality Control		NR	48	49	4.96	1443	NR
True Value QC		NR	50	50	5.00	1413	NR
% Accuracy		NR	96	98	99	102	NR
Relative Percent Difference		NR	6.3	5.1	0	0.4	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl⁻ (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		12/06/99	12/06/99	12/06/99	12/06/99	12/06/99	12/07/99
H4491-1	MW #1	1686	423	0	234	7.22	2910
H4491-2	MW #2	9552	663	0	425	7.00	16260
H4491-3	MW #3	8316	562	0	434	6.84	13260
H4491-4	MW #4	16295	562	0	476	7.01	30010
H4491-5	MW #5	2472	452	0	220	7.25	4530
H4491-6	MW #6	26521	1149	0	232	6.82	47980
H4491-7	MW #7	4328	536	0	293	7.16	7240
Quality Control		978	50.06	112	221	7.03	NR
True Value QC		1000	50.00	124	259	7.00	NR
% Accuracy		98	100	90	85	100	NR
Relative Percent Difference		2.2	5.2	-	-	0.1	
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Gayle A. Potter, Chemist

12/08/99
Date

H4491B.XLS

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 12/03/99
Reporting Date: 12/08/99
Project Number: NOT GIVEN
Project Name: ARCO
Project Location: IDA WIMBERLY

Sampling Date: 12/03/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/kg)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)
ANALYSIS DATE:		12/07/99	12/04/99	12/04/99	12/04/99	12/04/99
H4491-1	MW #1	<1.0	<0.002	<0.002	<0.002	<0.006
H4491-2	MW #2	<1.0	0.010	<0.002	<0.002	<0.006
H4491-3	MW #3	<1.0	<0.002	<0.002	<0.002	<0.006
H4491-4	MW #4	<1.0	0.026	<0.002	0.012	<0.006
H4491-5	MW #5	<1.0	<0.002	<0.002	<0.002	<0.006
H4491-6	MW #6	<1.0	0.007	<0.002	<0.002	<0.006
H4491-7	MW #7	<1.0	<0.002	<0.002	<0.002	<0.006
Quality Control		3.93	0.088	0.100	0.094	0.288
True Value QC		4.00	0.100	0.100	0.100	0.300
% Recovery		98.1	88.0	100	94.2	95.9
Relative Percent Difference		5.6	0.6	2.8	2.0	1.4

METHODS: TRPHC - EPA 600/4-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

12/8/99
Date

H4491A.XLS

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020

101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

Company Name: SESI	BILL TO PO #:
Project Manager:	
Address: 703 E. CLINTON, #103	Company: SAME
City: HOBBS State: NM Zip: 88240	Attn:
Phone #: (505) 397-0510	Address:
Fax #: (505) 393-4388	City:
Project #: Project Owner:	State: Zip:
Project Name: ARCO	Phone #:
Project Location: Lea Winberly	Fax #:

FOR LAB USE ONLY				MATRIX							PRES.			SAMPLING		ANALYSIS REQUEST															
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	OTHER:	DATE	TIME	BTEX	TPH 418.1	Major Cations / Anions														
44491-1	MW #1	C	4	X							X		12.3.99	2:45	X	X															
-2	MW #2	C	4										"	12:00	X	X	X														
-3	MW #3	C	4										"	1:30	X	X	X														
-4	MW #4	C	4										"	11:15	X	X	X														
-5	MW #5	C	4										"	2:35	X	X	X														
-6	MW #6	C	4										"	10:15	X	X	X														
-7	MW #7	C	4										"	12:30	X	X	X														

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Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date: 12.3.99 Time:	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #: Fax Result: ☐ Yes ☐ No REMARKS:
Relinquished By: Sergio Contreras	Date: 12/03/99 Time: 5:45P	Received By: (Lab Staff)	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☒ Yes ☐ No Intact: ☒ Yes ☐ No	CHECKED BY: (Initials)	

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 12/13/99
Reporting Date: 12/17/99
Project Owner: ARCO PERMIAN
Project Name: IDA WIMBERLY
Project Location: EAST OF JAL

Sampling Date: 12/11/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: GP

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (umhos/cm)	T-Alkalinity ($mgCaCO_3/L$)
ANALYSIS DATE:		12/17/99	12/14/99	12/14/99	12/14/99	12/15/99	12/14/99
H4505-1	MW #8-1	2746	142	116	63.0	11800	775
H4505-2	MW #8-2	6157	550	265	65.9	27900	300
Quality Control		NR	80	49	4.96	1392	NR
True Value QC		NR	80	50	5.00	1413	NR
% Accuracy		NR	100	98	99	99	NR
Relative Percent Difference		NR	0	2.0	0	0.2	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl^- (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		12/14/99	12/15/99	12/14/99	12/14/99	12/15/95	12/15/99
H4505-1	MW #8-1	4240	130	0	946	7.87	7968
H4505-2	MW #8-2	10800	407	0	366	7.39	21772
Quality Control		1010	48.63	NR	971	7.02	NR
True Value QC		1000	50.00	NR	1000	7.00	NR
% Accuracy		101	97	NR	97	100	NR
Relative Percent Difference		2.0	2.9	NR	-	0.1	NR
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Gayle A. Potter, Chemist

12/20/99
Date

H4505B.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BETH ALDRICH
703 E. CLINTON, SUITE #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 12/13/99
Reporting Date: 12/15/99
Project Owner: ARCOPERMIAN
Project Name: IDA WIMBERLY
Project Location: EAST OF JAL

Sampling Date: 12/11/99
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NO.	SAMPLE ID	TPH (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		12/13/99	12/14/99	12/14/99	12/14/99	12/14/99
H4505-1	MW #8-1	15.4	0.052	<0.002	0.012	<0.006
H4505-2	MW #8-2	2.61	0.072	<0.002	0.007	<0.006
Quality Control		3.93	0.089	0.101	0.099	0.302
True Value QC		4.00	0.100	0.100	0.100	0.300
% Recovery		98.1	88.7	101	99.1	101
Relative Percent Difference		5.6	1.2	9.6	7.3	5.6

METHODS: TRPHC - EPA 600/4-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

12/15/99
Date

H4505A.XLS

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240

(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

Page____ of ____

Company Name: SESI	BILL TO PO #:
Project Manager:	Company: SAME
Address: 703 E. CLINTON, #103	Attn:
City: HOBBS State: NM Zip: 88240	Address:
Phone #: (505) 397-0510	City:
Fax #: (505) 393-4388	State: Zip:
Project #: Project Owner: ARCO PERMIAN	Phone #:
Project Name: Ida Wimberly	Fax #:
Project Location: East of Jal	

FOR LAB USE ONLY				MATRIX						PRES.			SAMPLING		ANALYSIS REQUEST		
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	OTHER:	DATE	TIME	BTEX	TPH 418	Major Cations & Anions
H4505-1	MW #8-1	C	3	X							X		12-11-99	10:15	X	X	X
-2	MW #8-2	C	3												X	X	X

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date:	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time:		Fax Result: ☐ Yes ☐ No
Relinquished By:	Date: 12/13/99	Received By: (Lab Staff)	REMARKS:
	Time:		
Delivered By: (Circle One)	Sample Condition: Cool ☒ Yes ☐ No, Intact ☒ Yes ☐ No	CHECKED BY: (Initials)	
Sampler - UPS - Bus - Other:			

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

39

ARCO Permian
Monitor Well Report
Ida Wimberly

South Justis Unit F-230
Unit C, Section 25, T25S, R37E
Lea County, New Mexico

January 2, 2001

Prepared for:

ARCO Permian
P.O. Box 1610
Midland, Texas 79702

By:

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

The subject property is located at the Arco Permian South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, New Mexico. Safety & Environmental Solutions, Inc. (SESI) performed sampling and data collection on the eight (8) ground water monitor wells previously installed at the site (See Vicinity Map). The casing size in all wells is 2".

II. Work Performed

On January 2, 2001 a SESI environmental technician arrived at the site. Ground water samples were taken from each well after a hand bailer was used to develop the wells. Three to five casing volumes of water were removed from each well until pH and temperature of the water were stabilized. The water removed was placed in appropriate drums for disposal. The samples were obtained and placed in appropriate containers, preserved and transported under chain of custody to Cardinal Laboratories of Hobbs, New Mexico for analysis of the contaminants identified in the initial sampling. (See Analytical Data)

In addition to the sampling, SESI also measured the depth to the top of the water table and the total depth of each well. The depth to the top of ground water was measured using a Solinst water level indicator. The total depth of each well was measured in order to compute the proper casing volumes. A summary of this data follows:

ID	DATE	TOP OF CASING ELEVATION	DEPTH TO WATER	POTENTIOMETRIC ELEVATION	TOTAL WELL DEPTH	FREE PRODUCT THICKNESS
MW – 1	1/2/01	3,066.98'	64.60'	3,002.38'	66'	0.00
MW – 2	1/2/01	3,065.92'	63.80'	3,002.12'	71'	0.00
MW – 3	1/2/01	3,066.21'	64.13'	3,002.08'	71'	0.00
MW – 4	1/2/01	3,067.93'	65.81'	3,002.12'	82'	0.00
MW – 5	1/2/01	3,066.56'	64.05'	3,002.51'	80'	0.00
MW – 6	1/2/01	3,065.33'	63.43'	3,001.90'	75'	0.00
MW – 7	1/2/01	3,064.64'	62.63'	3,002.01'	75'	0.00
MW – 8	1/2/01	3,062.68'	60.73'	3,001.95'	72.01'	0.11'

III. Analytical Results

The analysis of the groundwater samples performed by Cardinal Laboratories are summarized as follows:

CONTAMINANT	MW #1	MW #2	MW #3	MW #4
Sodium	817ppm	2858ppm	2292ppm	2254ppm
Calcium	335ppm	472ppm	343ppm	300ppm
Magnesium	96ppm	208ppm	312ppm	143ppm
Potassium	20.17ppm	75.02ppm	31.14ppm	75.54ppm
Conductivity	6189ppm	15210ppm	13923ppm	12648ppm
T-Alkalinity	214ppm	401ppm	382ppm	937ppm
Chlorides	1760ppm	5383ppm	4451ppm	3623ppm
Sulfate (SO_4)	327ppm	347ppm	493ppm	284ppm
Carbonate	0ppm	0ppm	0ppm	0ppm
HCO_3	262ppm	489ppm	466pm	1143ppm
TDS	3788ppm	9286ppm	8380ppm	7012ppm
pH	7.43	7.03	7.05	7.3
TPH	<1.0ppm	<1.0ppm	<1.0ppm	<1.0ppm
Benzene	<0.002ppm	<0.002ppm	<0.002ppm	0.0326ppm
Toluene	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	<0.002ppm	<0.002ppm	<0.002ppm	0.0139ppm
T. Xylenes	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	MW #5	MW #6	MW #7
Sodium	529ppm	12114ppm	1521ppm
Calcium	322ppm	2916ppm	442ppm
Magnesium	146ppm	910ppm	200ppm
Potassium	711ppm	142ppm	24.87ppm
Conductivity	6833ppm	66924ppm	10893ppm
T-Alkalinity	205ppm	261ppm	266ppm
Chlorides	2070ppm	25671ppm	3312ppm
Sulfate (SO_4)	331ppm	1088ppm	323ppm
Carbonate	0ppm	0ppm	0ppm
HCO_3	250ppm	318ppm	324ppm
TDS	4234ppm	52084ppm	6706ppm
pH	7.32	6.59	7.13
TPH	<1.0ppm	<1.0ppm	<1.0ppm
Benzene	<0.002ppm	0.0156ppm	<0.002ppm
Toluene	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	<0.002ppm	<0.002ppm	<0.002ppm
T. Xylenes	<0.006ppm	<0.006ppm	<0.006ppm

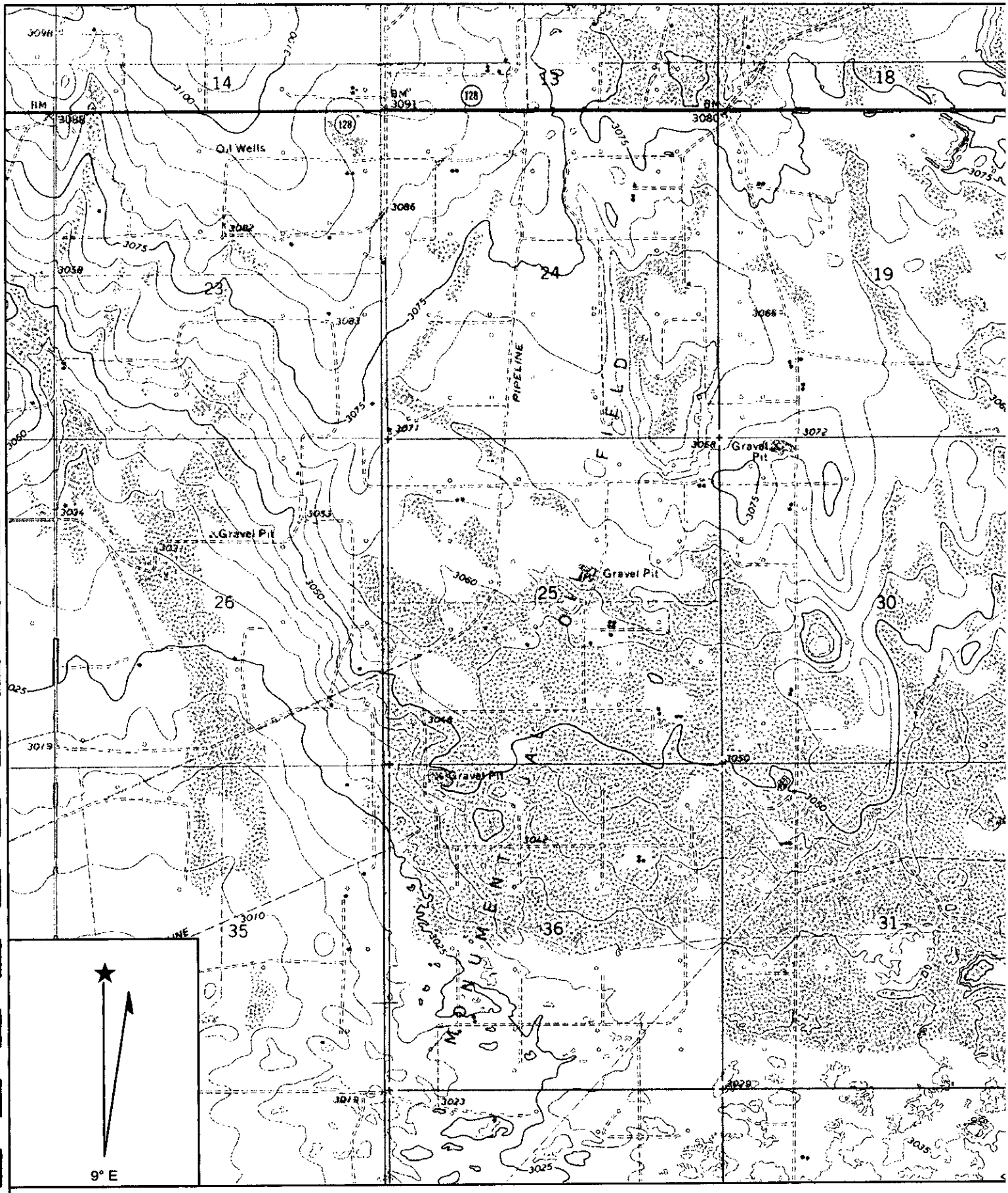
*Red exceeds NM WQCC Ground Water Standards
MW #8 not sampled due to Free Product

IV. Figures and Appendices

Figures:
Vicinity Map
Potentiometric Map

Appendices:
Cumulative Well Water Quality Data
Analytical Results
Water Analysis Validation

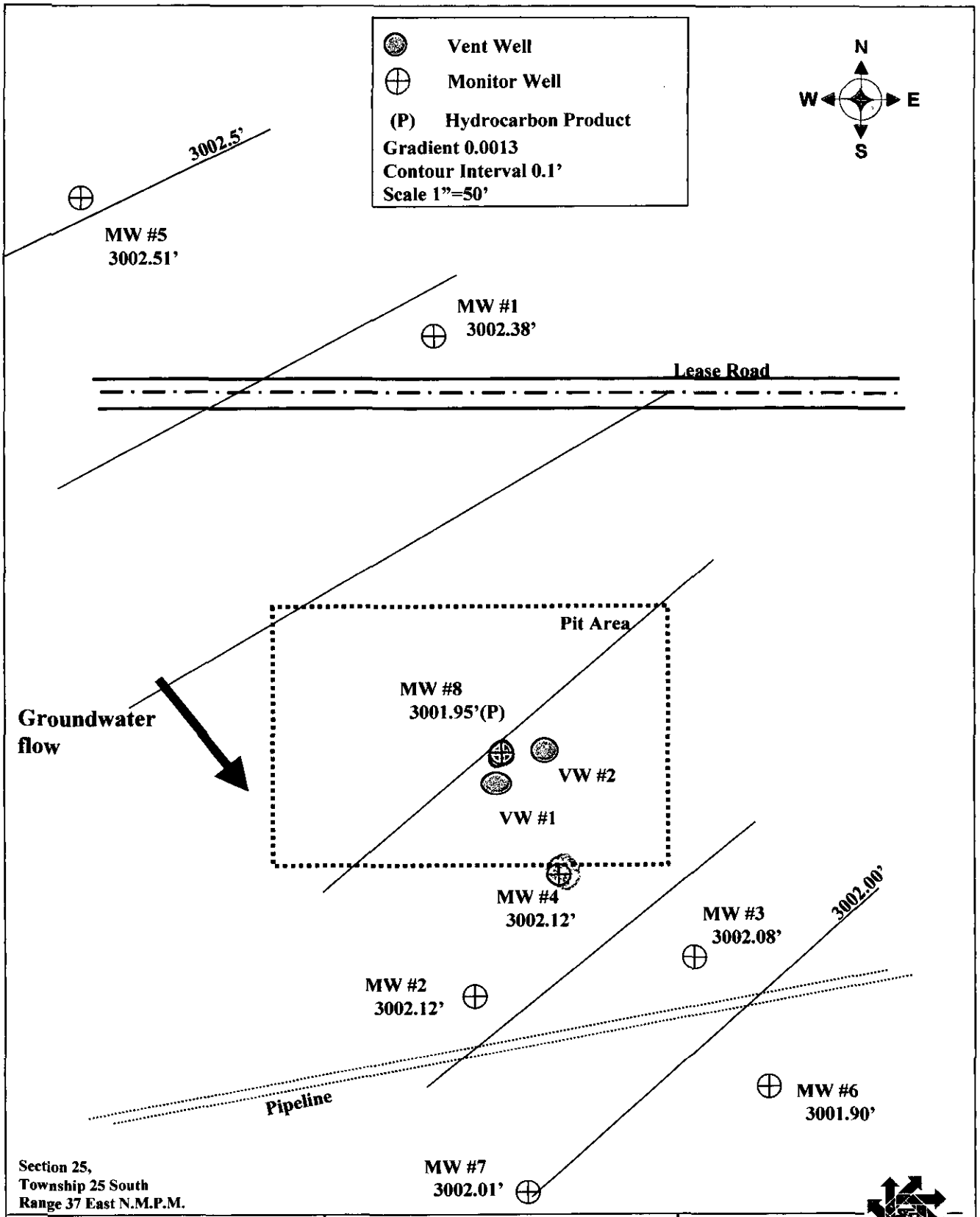
Figure 1
Vicinity Map



Name: JAL SE
Date: 1/19/2001
Scale: 1 inch equals 2000 feet

Location: 032° 06' 05.2" N 103° 07' 06.9" W
Caption: Arco Permian
Ida Wimberly Monitor Wells
Vicinity Map

Figure 2
Potentiometric Map



ARCO Permian January 2, 2001	Water Flow Diagram Ida Wimberly South Justis F-230 Monitor Wells	**Safety & Environmental Solutions, Inc.**

Appendix A
Cumulative Well Water Quality Data

Ida Wimberly Cumulative Well Data

Monitor Well #1

CONTAMINANT	WQCC STANDARD	INITIAL TEST 12/17/97	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	<0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	<1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	<0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	<0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	296ppm	317ppm	N/a	296ppm	320ppm
Carbonate	N/a	0ppm	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	1580ppm	1839ppm	1610ppm	2231ppm	1686ppm
Chromium	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	6116	6273	N/a	1978	6187
Copper	1.0ppm	<0.1ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	122ppm	249ppm	N/a	229ppm	239ppm
Iron	1.0ppm	.388ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	112ppm	112ppm	N/a	126ppm	126ppm
Manganese	0.2ppm	0.345ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	<0.02ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	<0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	22.5ppm	8.8ppm	N/a	24ppm	66ppm
Selenium	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Sodium	N/a	1007ppm	850ppm	N/a	1157ppm	738ppm
Sulfate	600ppm	1050ppm	305ppm	N/a	455ppm	423ppm
T-Alkalinity ($MgCaCO_3/L$)	N/a	100	204	N/a	188	192
TDS	1000ppm	3480ppm	4380ppm	4560ppm	4520ppm	2910ppm
Zinc	10.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	5.58	6.384	N/a	7.19ppm	7.22ppm
TPH	N/a	N/a	42.9ppm	N/a	2.76ppm	<1.00ppm
Benzene	0.01ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	N/a	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00	TEST DATE 1/2/01
Aluminum	5.0ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	301ppm	321ppm	235ppm	817ppm
Carbonate	N/a	0ppm	0ppm	0ppm	0ppm
Chloride	250.0ppm	1570ppm	1973ppm	1651ppm	1760ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	6155	5770	5753	6189
Copper	1.0ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	229ppm	229ppm	250ppm	262ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	N/a	N/a	78ppm	96ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	104.0ppm	49ppm	5.29ppm	20.17ppm
Selenium	0.05ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a
Sodium	N/a	995ppm	904ppm	913ppm	817ppm
Sulfate	600ppm	1180ppm	351ppm	369ppm	327ppm
T-Alkalinity ($MgCaCO_3$/L)	N/a	188	188	205	214
TDS	1000ppm	3930ppm	4640ppm	4290ppm	3788ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	7.15	7.13	7.26	7.43
TPH	N/a	<1.0	<1.0	<1.0	<1.0
Benzene	0.01ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #2

CONTAMINANT	WQCC STANDARD	INITIAL TEST 12/17/97	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	<0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	<1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	<0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	<0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	426ppm	476ppm	N/a	544ppm	760ppm
Carbonate	N/a	0ppm	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	6200ppm	2731ppm	3890ppm	6590ppm	9552ppm
Chromium	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	17028	19010	N/a	1715	27600
Copper	1.0ppm	<0.1ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	404ppm	547ppm	N/a	459ppm	425ppm
Iron	1.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	193ppm	214ppm	N/a	258ppm	389ppm
Manganese	0.2ppm	0.343ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	<0.02ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	<0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	90ppm	42.3ppm	N/a	62ppm	132ppm
Selenium	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Sodium	N/a	3700ppm	1202ppm	N/a	3611ppm	4979ppm
Sulfate	600ppm	1160ppm	426ppm	N/a	666ppm	663ppm
T-Alkalinity ($MgCaCO_3$/L)	N/a	404	448	N/a	376	348
TDS	1000ppm	10490ppm	12240ppm	7490ppm	14270ppm	16260ppm
Zinc	10.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	7.84	6.303	N/a	6.88	7.00
TPH	N/a	N/a	14.0ppm	10.3ppm	4.27ppm	<1.00ppm
Benzene	0.01ppm	<0.002ppm	<0.002ppm	<0.002ppm	.003ppm	.010ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00	TEST DATE 1/2/01
Aluminum	5.0ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	681ppm	373ppm	288ppm	472ppm
Carbonate	N/a	0ppm	0ppm	0ppm	0ppm
Chloride	250.0ppm	9000ppm	3758ppm	4274ppm	5383ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	26494	11250	12374	15210
Copper	1.0ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	395ppm	488ppm	563ppm	489ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	437ppm	175ppm	126ppm	208ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	<0.2ppm	N/a	N/a	N/a
Nickel	0.2ppm	<0.2ppm	N/a	N/a	N/a
Potassium	N/a	90ppm	1920ppm	26.94ppm	75.02ppm
Selenium	0.05ppm	<0.1ppm	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a
Sodium	N/a	3700ppm	1920ppm	2382ppm	2858ppm
Sulfate	600ppm	1080ppm	222ppm	218ppm	347ppm
T-Alkalinity ($MgCaCO_3$/L)	N/a	324	400	461	401
TDS	1000ppm	17610ppm	8440ppm	8080ppm	9286ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	6.88	7.04	6.97	7.03
TPH	N/A	<1.0	<1.0	<1.0	<1.0
Benzene	0.01ppm	.004ppm	<0.002ppm	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #3

CONTAMINANT	WQCC STANDARD	INITIAL TEST 12/17/97	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	<0.3ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	<0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	<1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	<0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	<0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	629ppm	360ppm	N/a	448ppm	640ppm
Carbonate	N/a	0ppm	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	8500ppm	4124ppm	7570ppm	5374ppm	8316ppm
Chromium	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	23846	13960	N/a	1679	22885
Copper	1.0ppm	<0.1ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	316ppm	556ppm	N/a	459ppm	434ppm
Iron	1.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	302ppm	187ppm	N/a	214ppm	316ppm
Manganese	0.2ppm	0.440ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	<0.02ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	<0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	118ppm	31.7ppm	N/a	55ppm	78ppm
Selenium	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Sodium	N/a	4875ppm	2229ppm	N/a	2892ppm	4441ppm
Sulfate	600ppm	1280ppm	279ppm	N/a	397ppm	562ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	316	455	N/a	376	356
TDS	1000ppm	15300ppm	8840ppm	15180ppm	10330ppm	13260ppm
Zinc	10.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	7.77	6.64	N/a	6.91	6.84
TPH	N/a	N/a	24.6ppm	N/a	N/a	<1.00ppm
Benzene	0.01ppm	<0.002 ppm	<0.002ppm	<0.002ppm	.005ppm	<0.002ppm
Toluene	0.75ppm	<0.002 ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75 ppm	<0.002 ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62 ppm	<0.006 ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00	TEST DATE 1/2/01
Aluminum	5.0ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	321ppm	581ppm	676ppm	343ppm
Carbonate	N/a	0ppm	0ppm	0ppm	0ppm
Chloride	250.0ppm	5300ppm	7140ppm	10490ppm	4451ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	15760	20220	29779	13923
Copper	1.0ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	459ppm	449ppm	538ppm	466ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	292ppm	238ppm	224ppm	312ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	88.0ppm	114ppm	49.62ppm	31.14ppm
Selenium	0.05ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a
Sodium	N/a	3071ppm	3808ppm	6027ppm	2292ppm
Sulfate	600ppm	913ppm	414ppm	540ppm	493ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	376	368	441	382
TDS	1000ppm	10310ppm	15316ppm	21050ppm	8380ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	6.99	7.24	6.89	7.05
TPH	N/a	<1.0	<1.0	<1.0	<1.0
Benzene	0.01ppm	.002ppm	.002ppm	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #4

CONTAMINANT	WQCC STANDARD	INITIAL TEST 8/10/98	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	<0.3ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	<0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	<1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	<0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	<0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	480ppm	472ppm	N/a	736ppm	1160ppm
Carbonate	N/a	0ppm	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	9641ppm	6910ppm	4680ppm	14600ppm	16295ppm
Chromium	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	18190	21750	N/a	1603	44620
Copper	1.0ppm	<0.1ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	439ppm	864ppm	N/a	620ppm	476ppm
Iron	1.0ppm	<.2ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	340ppm	248ppm	N/a	272ppm	559ppm
Manganese	0.2ppm	0.440ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	<0.02ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	<0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	68ppm	50.5ppm	N/a	76ppm	144ppm
Selenium	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Sodium	N/a	5252ppm	3921ppm	N/a	8521ppm	8529ppm
Sulfate	600ppm	159ppm	335ppm	N/a	488ppm	562ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	360	708	N/a	508	390
TDS	1000ppm	13580ppm	13960ppm	9460ppm	20020ppm	30010ppm
Zinc	10.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	6.69	6.64	N/a	7.04	7.01
TPH	N/a	<1.0ppm	11.8ppm	N/a	3.27ppm	<1.00ppm
Benzene	0.01ppm	0.033ppm	0.046ppm	0.003ppm	0.033ppm	0.026ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.007ppm	0.012ppm	<0.002ppm	0.006ppm	0.012ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00	TEST DATE 1/2/01
Aluminum	5.0ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	277ppm	733ppm	3714ppm	300ppm
Carbonate	N/a	0.0ppm	0.0ppm	0.0ppm	0ppm
Chloride	250.0ppm	4500ppm	9958ppm	5925ppm	3623ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	13818	27980	17935	12648
Copper	1.0ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	761ppm	600ppm	900ppm	1143ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	165ppm	328ppm	135ppm	143ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	107.0ppm	141ppm	38.7ppm	75.54ppm
Selenium	0.05ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a
Sodium	N/a	2929ppm	5367ppm	3714ppm	2254ppm
Sulfate	600ppm	877ppm	492ppm	332ppm	284ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	624	492	738	937
TDS	1000ppm	8810ppm	21688ppm	11220ppm	7012ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	7.19	7.37	7.26	7.3
TPH	N/a	<1.0	<1.0	<1.0	<1.0
Benzene	0.01ppm	0.029ppm	0.021ppm	0.024ppm	0.0326ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	0.017ppm	0.010ppm	0.011ppm	0.0139ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #5

CONTAMINANT	WQCC STANDARD	INITIAL TEST 8/10/98	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	<0.3ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	<0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	<1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	<0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	<0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	264ppm	320ppm	N/a	312ppm	320ppm
Carbonate	N/a	0ppm	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	1950ppm	2396ppm	2090ppm	2535ppm	2472ppm
Chromium	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	5740	7877	N/a	1657	7211
Copper	1.0ppm	<0.1ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	200ppm	195ppm	N/a	239ppm	220ppm
Iron	1.0ppm	<.2ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	<0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	127ppm	153ppm	N/a	112ppm	219ppm
Manganese	0.2ppm	0.440ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	<0.02ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	<0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	19ppm	10ppm	N/a	20ppm	69ppm
Selenium	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	<0.1ppm	N/a	N/a	N/a	N/a
Sodium	N/a	850ppm	1094ppm	N/a	1355ppm	1078ppm
Sulfate	600ppm	138ppm	274ppm	N/a	429ppm	452ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	164	159	N/a	196	180
TDS	1000ppm	3790ppm	5430ppm	5300ppm	5100ppm	4530ppm
Zinc	10.0ppm	<0.2ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	7.14	7.216	N/a	7.28	7.25
TPH	N/a	<1.0ppm	11.0ppm	N/a	1.26ppm	<1.00ppm
Benzene	0.01ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	N/a	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00	TEST DATE 1/2/01
Aluminum	5.0ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	286ppm	329ppm	350ppm	322ppm
Carbonate	N/a	0.0ppm	0.0ppm	0.0ppm	0ppm
Chloride	250.0ppm	2400ppm	2161ppm	3691ppm	2070ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	6966ppm	6400ppm	10547ppm	6833ppm
Copper	1.0ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	229ppm	229ppm	250ppm	250ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	141ppm	134ppm	134ppm	146ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	78.0ppm	23ppm	6.32ppm	711ppm
Selenium	0.05ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a
Sodium	N/a	1466ppm	1008ppm	1953ppm	529ppm
Sulfate	600ppm	974ppm	348ppm	265ppm	331ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	188	188	205	205
TDS	1000ppm	4380ppm	5176ppm	7680ppm	4234ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	7.28ppm	7.18ppm	7.41ppm	7.32ppm
TPH	N/a	<1.0ppm	<1.0ppm	<1.0ppm	<1.0ppm
Benzene	0.01ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #6

CONTAMINANT	WQCC STANDARD	INITIAL TEST 8/11/98	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	N/a	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a	N/a
Calcium	N/a	N/a	2120ppm	N/a	2480ppm	2760ppm
Carbonate	N/a	N/a	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	29600ppm	24186ppm	25500ppm	42583ppm	26521ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	61900	68740	N/a	1482	68310
Copper	1.0ppm	N/a	N/a	N/a	N/a	N/a
HCO_3	N/a	N/a	220ppm	N/a	234ppm	232ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a	N/a
Magnesium	N/a	N/a	1239ppm	N/a	1458ppm	1045ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a	N/a	N/a
Potassium	N/a	N/a	101ppm	N/a	98ppm	201ppm
Selenium	0.05ppm	N/a	N/a	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a	N/a
Sodium	N/a	N/a	11269ppm	N/a	22692ppm	12550ppm
Sulfate	600ppm	N/a	750ppm	1200ppm	1428ppm	1149ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	N/a	180	N/a	192	240
TDS	1000ppm	58260ppm	58260ppm	53980ppm	71000ppm	47980ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a	N/a
pH	> 6 & <9	N/a	6.82	N/a	6.74	6.82
TPH	N/a	<1.0ppm	6.8ppm	N/a	1.88ppm	<1.00ppm
Benzene	0.01ppm	0.044ppm	0.007ppm	N/a	0.003ppm	0.007ppm
Toluene	0.75ppm	0.004ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	0.009ppm	<0.006ppm	N/a	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00	TEST DATE 1/2/01
Aluminum	5.0ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	2610ppm	2325ppm	1792ppm	2916ppm
Carbonate	N/a	0.0ppm	0.0ppm	0.0ppm	0ppm
Chloride	250.0ppm	26300ppm	23580ppm	25352ppm	25671ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	69660ppm	63460ppm	66214ppm	66924ppm
Copper	1.0ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	244ppm	268ppm	325ppm	318ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	1190ppm	1118ppm	695ppm	910ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	216.0ppm	211ppm	104ppm	142ppm
Selenium	0.05ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a
Sodium	N/a	12560ppm	11940ppm	13658ppm	12114ppm
Sulfate	600ppm	1690ppm	757ppm	1143ppm	1088ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	200	220	267	261
TDS	1000ppm	49130ppm	59776ppm	50260ppm	52084ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	6.81	7.38	6.75	6.59
TPH	N/a	<1.0ppm	<1.0ppm	<1.0ppm	<1.0
Benzene	0.01ppm	0.007ppm	0.007ppm	0.011ppm	0.0156ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Monitor Well #7

CONTAMINANT	WQCC STANDARD	INITIAL TEST 8/12/98	TEST DATE 8/25/98	TEST DATE 6/17/99	TEST DATE 9/24/99	TEST DATE 12/03/99
Aluminum	5.0ppm	N/a	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a	N/a
Calcium	N/a	N/a	460ppm	N/a	600ppm	440ppm
Carbonate	N/a	N/a	0ppm	N/a	0ppm	0ppm
Chloride	250.0ppm	5015ppm	3288ppm	5380ppm	6387ppm	4328ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	N/a	11910	N/a	1523	10580
Copper	1.0ppm	N/a	N/a	N/a	N/a	N/a
HCO_3	N/a	N/a		N/a	166ppm	293ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a	N/a
Magnesium	N/a	N/a	175ppm	N/a	97ppm	219ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a	N/a	N/a
Potassium	N/a	N/a	25ppm	N/a	66ppm	54ppm
Selenium	0.05ppm	N/a	N/a	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a	N/a
Sodium	N/a	N/a	1763ppm	N/a	3553ppm	2219ppm
Sulfate	600ppm	N/a	832ppm	142ppm	553ppm	536ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	N/a	236	N/a	136	240
TDS	1000ppm	13496ppm	8170ppm	10580ppm	12140ppm	7240ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a	N/a
pH	> 6 & <9	N/a	7.326	N/a	7.59	7.16
TPH	N/a	48.7ppm	7.1ppm	N/a	1.32ppm	<1.00ppm
Benzene	0.01ppm	0.013ppm	0.003ppm	N/a	0.008ppm	<0.002ppm
Toluene	0.75ppm	0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	N/a	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	0.009ppm	<0.006ppm	N/a	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

CONTAMINANT	WQCC STANDARD	TEST DATE 2/25/00	TEST DATE 5/31/00	TEST DATE 9/19/00	TEST DATE 1/2/01
Aluminum	5.0ppm	N/a	N/a	N/a	N/a
Arsenic	0.1ppm	N/a	N/a	N/a	N/a
Barium	1.0ppm	N/a	N/a	N/a	N/a
Boron	0.75ppm	N/a	N/a	N/a	N/a
Cadmium	0.01ppm	N/a	N/a	N/a	N/a
Calcium	N/a	2610ppm	425ppm	344ppm	442ppm
Carbonate	N/a	0.0ppm	0.0ppm	0.0ppm	0ppm
Chloride	250.0ppm	4100ppm	3194ppm	3303ppm	3312ppm
Chromium	0.05ppm	N/a	N/a	N/a	N/a
Cobalt	0.05ppm	N/a	N/a	N/a	N/a
Conductivity (umhos/cm)	N/a	11305ppm	9330ppm	10129ppm	10893ppm
Copper	1.0ppm	N/a	N/a	N/a	N/a
HCO_3	N/a	254ppm	298ppm	363ppm	324ppm
Iron	1.0ppm	N/a	N/a	N/a	N/a
Lead	0.05ppm	N/a	N/a	N/a	N/a
Magnesium	N/a	267ppm	185ppm	102ppm	200ppm
Manganese	0.2ppm	N/a	N/a	N/a	N/a
Mercury	0.002ppm	N/a	N/a	N/a	N/a
Molybdenum	1.0ppm	N/a	N/a	N/a	N/a
Nickel	0.2ppm	N/a	N/a	N/a	N/a
Potassium	N/a	88.0ppm	46ppm	13.54ppm	24.87ppm
Selenium	0.05ppm	N/a	N/a	N/a	N/a
Silver	0.05ppm	N/a	N/a	N/a	N/a
Sodium	N/a	2.246ppm	1312ppm	1859ppm	1521ppm
Sulfate	600ppm	1070ppm	369ppm	373ppm	323ppm
T-Alkalinity ($mgCaCO_3/L$)	N/a	208	244	297ppm	266ppm
TDS	1000ppm	8140ppm	7780ppm	7210ppm	6706ppm
Zinc	10.0ppm	N/a	N/a	N/a	N/a
pH	> 6 & <9	7.16	7.15	7.18	7.13
TPH	N/a	<1.0ppm	<1.0ppm	<1.0ppm	<1.0ppm
Benzene	0.01ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Toluene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
E. Benzene	0.75ppm	<0.002ppm	<0.002ppm	<0.002ppm	<0.002ppm
Total Xylenes	0.62ppm	<0.006ppm	<0.006ppm	<0.006ppm	<0.006ppm

*Red exceeds NM WQCC Ground Water Standards

Appendix B
Analytical Results

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, STE 103
HOBBS, NM 88240
FAX TO: (505) 397-4388

Receiving Date: 01/02/01
Reporting Date:
Project Number: NOT GIVEN
Project Name: IDA WIMBERLY-ARCO
Project Location: JAL

Sampling Date: 12/30/00
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (mS/cm)	T-Alkalinity ($mgCaCO_3/L$)
ANALYSIS DATE:		01/04/00	01/02/01	01/02/01	01/02/00	01/03/01	01/02/01
H5481-1	MW #1	817	335	96	20.17	6189	214
H5481-2	MW #2	2858	472	208	75.02	15210	401
H5481-3	MW #3	2292	343	312	31.14	13923	382
H5481-4	MW #4	2254	300	143	75.54	12648	937
H5481-5	MW #5	529	322	146	711	6833	205
H5481-6	MW #6	12114	2916	910	142	66924	261
H5481-7	MW #7	1521	442	200	24.87	10893	266
Quality Control		NR	51	52	4.94	1489	NR
True Value QC		NR	50	50	5.00	1413	NR
% Recovery		NR	102	104	98.8	105	NR
Relative Percent Difference		NR	0	1.9	1.6	0.3	NR

METHODS:		SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

		Cl^- (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		01/02/01	01/03/01	01/02/01	01/02/01	01/03/01	01/04/01
H5481-1	MW #1	1760	327	0	262	7.43	3788
H5481-2	MW #2	5383	347	0	489	7.03	9286
H5481-3	MW #3	4451	493	0	466	7.05	8380
H5481-4	MW #4	3623	284	0	1143	7.3	7012
H5481-5	MW #5	2070	331	0	250	7.32	4234
H5481-6	MW #6	25671	1088	0	318	6.59	52084
H5481-7	MW #7	3312	323	0	324	7.13	6706
Quality Control		1004	53.19	NR	995	7.01	NR
True Value QC		1000	50.00	NR	1000	7.00	NR
% Recovery		100	106	NR	99.5	100	NR
Relative Percent Difference		7.2		NR	0	0.1	

METHODS:	SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Gayle A. Potter, Chemist

01/05/2001
Date

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY AND ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, SUITE 103
HOBBS, NM 88240
FAX TO:

Receiving Date: 01/02/01
Reporting Date: 01/04/01
Project Number: NOT GIVEN
Project Name: NOT GIVEN
Project Location: JAL

Sampling Date: 12/30/00
Sample Type: GROUNDWATER
Sample Condition: COOL, INTACT
Sample Received By: BC
Analyzed By: JA

LAB NUMBER	SAMPLE ID	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
ANALYSIS DATE		01/03/01	01/03/01	01/03/01	01/03/01
H5481-1	MW #1	<2.00	<2.00	<2.00	<6.00
H5481-2	MW #2	<2.00	<2.00	<2.00	<6.00
H5481-3	MW #3	<2.00	<2.00	<2.00	<6.00
H5481-4	MW #4	32.6	<2.00	13.9	<6.00
H5481-5	MW #5	<2.00	<2.00	<2.00	<6.00
H5481-6	MW #6	15.6	<2.00	<2.00	<6.00
H5481-7	MW #7	<2.00	<2.00	<2.00	<6.00

Quality Control	91.6	102	89.8	283
True Value QC	100	100	100	300
% Accuracy	91.6	102	89.8	94.3
Relative Percent Difference	1.9	1.2	2.3	3.2

METHOD: EPA SW 846-8020, 5030, Gas Chromatography

Chemist

1-4-01
Date

H5481LSESIHOBBSBTEXONLY

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: DEE WHATLEY
703 E. CLINTON, STE 103
HOBBS, NM 88240
FAX TO: (505) 397-4388

Receiving Date: 01/02/01
Reporting Date: 01/05/01
Project Number: NOT GIVEN
Project Name: IDA WIMBERLY-ARCO
Project Location: JAL

Analysis Date: 01/04/00
Sampling Date: 12/30/00
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NUMBER	SAMPLE ID	TPH (mg/L)
H5481-1	MW #1	<1.0
H5481-2	MW #2	<1.0
H5481-3	MW #3	<1.0
H5481-4	MW #4	<1.0
H5481-5	MW #5	<1.0
H5481-6	MW #6	<1.0
H5481-7	MW #7	<1.0
Quality Control		5.65
True Value QC		6.00
% Recovery		94.2
Relative Percent Difference		8.2

METHOD: EPA 600/4-79-020 418.1

Chemist

1/5/01
Date

H5481B.XLS

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

J-#1

Page ____ of ____

Company Name: SOBI	**BILL TO**
Project Manager:	P.O. #:
Address:	Company:
City: State: Zip:	Attn:
Phone #: Fax #:	Address:
Project #: Project Owner:	City:
Project Name:	State: Zip:
Project Location: JAL	Phone #:
Sampler Name: Ida Wimberly - ARCO	Fax #:

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER:	PRESERV: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING DATE	TIME	ANALYSIS REQUEST: BTEX	Cations + Anions	TPH
H34811	MW #1		4	X							X		12-30-00		X	X	X
-2	MW #2		4														
-3	MW #3		4														
-4	MW #4		4														
-5	MW #5		4														
-6	MW #6		4														
-7	MW #7		4														

Sampler Relinquished:	Date:	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
	Time:		Fax Result: ☐ Yes ☐ No Add'l Fax #:
Relinquished By:	Date: 10/02/00	Received By: (Lab Staff)	REMARKS:
	Time: 9:10 AM		
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: Yes / No Intact: Yes / No	CHECKED BY: (Initials)	

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476.

Appendix C
Water Analysis Validation

Cations and Anions Calculation Check

	Sample Name	H5481-1	H5481-2	H5481-3	H5481-4	H5481-5	H5481-6	H5481-7
	Well Number	MW1	MW2	MW3	MW4	MW5	MW6	MW7
	Date	01/02/01	01/02/01	01/02/01	01/02/01	01/02/01	01/02/01	01/02/01
Equivalent Weight:	Lab	Cardinal	Cardinal	Cardinal	Cardinal	Cardinal	Cardinal	Cardinal
22.99	Sodium (mg/L)	817	2,858	2,292	2,254	529	12,114	1,521
20.04	Calcium (mg/L)	335	472	343	300	322	2,916	442
12.15	Magnesium (mg/L)	96	208	312	143	146	910	200
39.09	Potassium (mg/L)	20.2	75.0	31.1	75.5	711.0	142.0	24.9
35.45	Chloride (mg/L)	1,760	5,383	4,451	3,623	2,070	25,671	3,312
48.04	Sulfate (mg/L)	327	347	493	284	331	1,088	323
30.00	Carbonate (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61.01	Bicarbonate (mg/L)	262	489	466	1143	250	318	324
50.04	Alkalinity (mg/L CaCO3)	214	401	382	937	205	261	266
62.00	Nitrate (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sum Cations (meq/L)	60.7	166.9	143.3	126.7	69.3	751.0	105.3
	Sum Anions (meq/L)	60.7	167.1	143.5	126.8	69.4	752.0	105.5
	Percent Difference	0.1	0.1	0.1	0.0	0.1	0.1	0.1
	Measured TDS (evap., mg/L)	3,788	9,286	8,380	7,012	4,234	52,084	6,706
	TDS (calc. USGS sum, mg/L)	3,484	9,584	8,151	7,242	4,232	42,998	5,982
	TDS (meas.) / TDS (calc. USGS)	1.1	1.0	1.0	1.0	1.0	1.2	1.1
	TDS (calc. sum, mg/L)	3,617	9,832	8,388	7,823	4,359	43,159	6,147
	Elect. Conductivity (umhos/cm)	6,189	15,210	13,923	12,648	6,833	66,924	10,893
	TDS (C*0.7, mg/L)	4,332	10,647	9,746	8,854	4,783	46,847	7,625
	TDS (calc. USGS) / Conductivity	0.56	0.63	0.59	0.57	0.62	0.64	0.55
	Test Criteria							
1. Anion-Cation Balance:			Anion Sum	Max % diff.				
			0 - 3.0	± 0.2				
			3.0 - 10.0	± 2				
			10.0 - 800	± 5				
2. TDS, Measured to Calculated:			1.0 < (measured TDS/calculated TDS) < 1.2					
3. TDS (calculated USGS) to EC Ratio:			Calculated TDS/conductivity = 0.55 - 0.7					