AP - 7

DA #4

ANNUAL MONITORING REPORT

YEAR(S): 2011

2011 ANNUAL GROUNDWATER MONITORING REPORT

DARR ANGELL NO. 4
NW ¼, NE ¼, SECTION 11, TOWNSHIP 15 SOUTH, RANGE 37 EAST
SW ¼, SE ¼, SECTION 2, TOWNSHIP 15 SOUTH, RANGE 37 EAST
PLAINS SRS NUMBER: 2001-10876
NMOCD REFERENCE NUMBER: AP-007
LEA COUNTY, NEW MEXICO

PLAINS
ALL AMERICAN

March 29, 2012

Mr. Edward Hansen
New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: Plains All American – 2011 Annual Monitoring Reports
4 Sites in Lea County, New Mexico

Dear Mr. Hansen:

Plains All American is an operator of crude oil pipelines and terminal facilities in the state of New Mexico. Plains All American actively monitors certain historical release sites exhibiting groundwater impacts, consistent with assessments and work plans developed in consultation with the New Mexico Oil Conservation Division (NMOCD). In accordance with the rules and regulations of the NMOCD, Plains All American hereby submits our Annual Monitoring reports for the following sites:

Darr Angell #1	AP-007	Section 11, Township 15 South, Range 37 East, Lea County
Darr Angell #2	AP-007	Section 11, Township 15 South, Range 37 East, Lea County Section 14, Township 15 South, Range 37 East, Lea County
Darr Angell #4	AP-007	Section 11, Township 15 South, Range 37 East, Lea County Section 02, Township 15 South, Range 37 East, Lea County
Denton Station	1R-0234	Section 14, Township 15 South, Range 37 East, Lea County

Conestoga-Rovers & Associates (CRA) prepared these documents and has vouched for their accuracy and completeness, and on behalf of Plains All American, I have personally reviewed the documents and interviewed CRA personnel in order to verify the accuracy and completeness of these documents. It is based upon these inquiries and reviews that Plains All American submits the enclosed Annual Monitoring Reports for the above facilities.

If you have any questions or require further information, please contact me at (575) 441-1099.

Sincerely,

Jason Henry
Remediation Coordinator
Plains All American

CC: Geoff Leking, NMOCD, Hobbs, NM

Enclosures

CONESTOGA-ROVERS
& ASSOCIATES

2011 ANNUAL GROUNDWATER MONITORING REPORT

RECEIVED
MAY 14 2012
Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, NM 87505

DARR ANGELL NO. 4
NW ¼, NE ¼, SECTION 11, TOWNSHIP 15 SOUTH, RANGE 37 EAST
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PLAINS SRS NUMBER: 2001-10876
NMOCD REFERENCE NUMBER: AP-007
LEA COUNTY, NEW MEXICO

Prepared For:

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MARCH 2012
REF. NO. 074684(2)

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1.0 INTRODUCTION

This 2011 Annual Groundwater Monitoring Report presents data collected at the Darr Angell No. 4 location (hereafter referred to as the "Site") by Conestoga-Rovers & Associates (CRA) on behalf of Plains Pipeline, L.P. (Plains) in compliance with the New Mexico Oil Conservation Division (NMOCD) correspondence dated May 1998. This report presents groundwater assessment and remediation activities associated with quarterly gauging and sampling events (March, June, September and November/December) and bi-weekly light non-aqueous phase liquid (LNAPL) abatement activities were performed during the 2011 calendar year.

1.1 SITE LOCATION AND HISTORY

The legal description of the site is NW ¼, NE ¼, Section 11, Township 15 South, Range 37 East and SW ¼, SE ¼, Section 2, Township 15 South, Range 37 East (FIGURE 1). The Darr Angell No. 4 Pipeline Release Site was formerly the responsibility of Enron Oil Trading and Transportation (EOTT); however, the Site is currently the responsibility of Plains. There were two separate releases at the Site. The first release occurred on November 9, 1999 and the second on February 2, 2001. The second release was discovered by EOTT employees and notification was made to the NMOCD immediately. A Release Notification and Corrective Action Form (C-141) was submitted to the NMOCD dated May 21, 2005. According to the release report, an estimated 150 barrels of crude oil was released and 95 barrels were recovered during initial response actions. The release was reported to have occurred from an 8-inch EOTT pipeline and was attributed to internal pipeline corrosion. Beginning on May 29, 2004, project management responsibilities were assumed by NOVA. NOVA conducted the first quarter 2011 groundwater sampling event. CRA assumed Site remediation and project management responsibilities on May 2, 2011.

Currently, there are sixteen groundwater monitor wells (MW-1A through MW-16) and thirteen product recovery wells (RW-1 through RW-13) on-site. Select monitor and recovery wells are equipped with a total fluid pump for LNAPL recovery. All pumps are compressor driven and are periodically relocated depending on LNAPL thickness and product recovery rates in an effort to maximize product abatement at the Site. Monitor and recovery wells which exhibit LNAPL, but were not part of the automated recovery system, were recovered manually. Recovered product is periodically transported to Wasson Station facility for reinjection to the Plains Pipeline system and recovered groundwater is transported to a licensed disposal facility.

2.0 REGULATORY FRAMEWORK

The New Mexico Oil Conservation Division (NMOCD) guidelines require groundwater to be analyzed for potential contaminants as defined by the New Mexico Water Quality Control Commission (NMWQCC) Standards 20.6.2.3103 Sections A. NMQCC 20.6.2.3103 Section A provides the Human Health Standards for Groundwater. The constituents of concern (COCs) in affected groundwater at the Site are LNAPL, benzene, toluene, ethylbenzene, and xylenes (BTEX). In this report, groundwater analytical results for the COCs are compared to the NMWQCC standards as show in the following table:

Analyte	NMWQCC Standard for Groundwater
20.6.2.3103 Section A – Human Health Standard	
Benzene	0.01 mg/L
Toluene	0.75 mg/L
Ethylbenzene	0.75 mg/L
Total Xylenes	0.62 mg/L

The table below is the site sampling schedule approved by the NMOCD in a correspondence dated April 28, 2004 and was amended in a NMOCD correspondence dated June 21, 2005.

NMOCD Approved Sampling Schedule					
MW-1A	Annually	MW-11	Annually	RW-4	Quarterly
MW-2	Annually	MW-12	Annually	RW-5	Quarterly
MW-3	Quarterly	MW-13	Annually	RW-6	Quarterly
MW-4	Annually	MW-14	Quarterly	RW-7	Quarterly
MW-5	Annually	MW-15	Quarterly	RW-8	Quarterly
MW-6	Quarterly	MW-16	Quarterly	RW-9	Quarterly
MW-7	Annually			RW10	Quarterly
MW-8	Quarterly	RW-1	Quarterly	RW-11	Quarterly
MW-9	Semi-Annually	RW-2	Quarterly	RW-12	Quarterly
MW-10	Quarterly	RW-3	Quarterly	RW-13	Quarterly

3.0 GROUNDWATER MONITORING ACTIVITIES

NOVA conducted the first quarterly groundwater sampling event on March 2, 2011. The remaining quarterly groundwater monitoring event activities were conducted by CRA on June 15, September 6 and 13, November 29 and December 1, 2011. The Site is monitored with a network of 16 monitor wells and 13 recovery wells. Wells were sampled in accordance with the sampling scheduled referred to in Section 2.0. Wells containing measureable amount of LNAPL (>0.01 feet) were not sampled. A Site Details Map is presented as FIGURE 2.

3.1 GROUNDWATER MONITORING METHODOLOGY

Prior to purging wells, static fluid levels were measured with an electric interface probe to the nearest hundredth of a foot to obtain groundwater elevation data and assess for the presence of LNAPL. After recording fluid levels, wells not containing LNAPL were purged of three casing volumes of water and then groundwater samples were collected using clean, disposable PVC bailers. Laboratory-supplied sample containers were then filled directly from the bailers. Groundwater samples were then placed on ice in insulated coolers and chilled to a temperature of approximately 4°C (40°F). The coolers were prepared for delivery and proper chain-of-custody documentation accompanied the samples to TraceAnalysis, Inc in Midland, Texas for analysis of BTEX by EPA Method 8021B. In addition, during the December 2011 sampling event two wells (MW-6 and RW-6) were also analyzed for Polycyclic Aromatic Hydrocarbons (PAH) by 8270B. The groundwater fluids recovered during the Site activities were containerized onsite in properly labeled and sealed drums or poly tanks and disposed of at an approved salt water disposal (SWD) facility.

3.2 GROUNDWATER MONITORING RESULTS

All depth to groundwater measurements were recorded from the top of casing (TOC) of each well. However, the gauging data presented below represents corrected calculated groundwater elevations using a specific gravity of 0.81 for wells with measurable amounts of LNAPL and the elevation data obtained from professional surveying activities. The NOVA groundwater elevation data table for the March 2011 gauging event in presented in APPENDIX A. Groundwater gauging data collected by CRA during the June, September and November groundwater gauging events is presented in TABLE I. Groundwater gradient maps for March, June, September and November 2011 are provided as FIGURES 3, 4, 5 and 6, respectively.

Corrected groundwater elevations ranged from 3,729.92 to 3,731.30 feet in March, from 3,725.84 to 3,730.99 feet in June, from 3,725.68 to 3,730.67 feet in September and from 3,725.50 to 3,730.00 feet in November. LNAPL was encountered in 10 wells during the March gauging event, 12 wells during the June event, 10 wells during the September event and 6 wells during the November event. LNAPL thickness ranged from 0.04 to 5.78 feet in March, from 0.08 to 5.35 feet in June, from 0.08 to 3.59 feet in September and from 0.28 to 5.19 feet in November 2011. The groundwater flow direction is towards the southeast and appears to be consistent with historical data. The average groundwater

gradient observed at the Site during the 2011 groundwater monitoring events was approximately 0.001 feet/foot.

During the March 2011 groundwater sampling event nine wells were sampled, of which one well (RW-13) detected benzene concentrations above the NMWQCC Standard (0.01 mg/L). During the June 2011 sampling event nine wells were sampled, of which one well (RW-5) detected benzene concentrations above the NMWQCC Standard. During the September 2011 sampling event eight wells were sampled, of which one well (RW-5) detected benzene concentrations above the NMWQCC Standard. During the December 2011 sampling event seventeen wells were sampled, of which four wells (MW-12, RW-6, RW-8 and RW-13) detected benzene concentration above the NMWQCC Standard. During the December 2011 sampling event five wells (MW-3, MW-8, MW-13, RW-3 and RW-4) were not sampled due to insufficient water levels in the well. Also in December, two wells (MW-6 and RW-6) were submitted for PAH analysis, and the results were below NMWQCC Standards for all constituents analyzed. Groundwater BTEX analytical results are summarized in TABLE II. Groundwater PAH results are summarized in TABLE III. Groundwater BTEX concentration maps for the March, June, September and December 2011 groundwater sampling events are presented as FIGURES 7, 8, 9 and 10, respectively. Copies of the certified laboratory reports and chain-of-custody documentation are attached in APPENDIX B.

4.0 CORRECTIVE ACTION

On June 10, 2011 CRA mobilized to the Site with subcontractor AcuVac Remediation Inc. (AcuVac) to perform an eight hour Mobile Duel Phase (MDP) Pilot test. The pilot test consisted of a vacuum pump connected to an extraction well (RW-2) creating a vacuum effect on that well and the surrounding subsurface formations. Select wells were used as observations wells (MW-4, RW-1 and RW-7) and were sealed off with well casing plugs. Each plug has an attachment designed to collect vapor parameter readings which, aids in the calculation of the radius of influence at the Site. The induced vacuum causes light hydrocarbons in the vadose zones and on the groundwater to volatilize and flow through a moisture knockout tank, inducing contaminant yields.

The eight hour MDP pilot test produced a total of 1,236 gallons of liquid; 1.43% or 17.64 gallons were liquid LNAPL. Approximately 15.31 gallons of contaminant were removed as part of the influent vapors and burned off through the systems combustion engine. Total LNAPL recovered during the event was 32.85 gallons, 223 lbs or 2.66% of the total extracted volume. The radius of influence for the Site was calculated to range from 81.50 to 92.15 feet. The AcuVac MDP pilot test report is included in APPENDIX C.

On September 12, 2011 CRA mobilized to the Site with Straub Corporation (Straub) to swab and brush the screens of three wells; MW-8, MW-9 and RW-11. The screen cleaning was an attempt to increase product recovery in those wells by removing scale from the screened interval. CRA mobilized to the Site twice a week to gauge and manually recover product from wells not included in the automated LNAPL recovery system, but had product present in the fluids column. Wells which were equipped with total fluids pumps each quarter are identified on Figures 7, 8, 9 and 10. Inspections and maintenance of the operating systems on Site were also conducted weekly. This included inspections and maintenance of the compressor (i.e. oil changes, drain water), total fluids pumps (i.e. cleaning) and any other "house-keeping" needed at the Site to maintain the most efficient product recovery system as possible. Periodically and as needed, CRA personnel adjusted the total fluids pump intervals in the wells as an effort to increase LNAPL recovery.

From June to December 2011, CRA recovered approximately 784 gallons (18.6 barrels) of product from the Site. Approximately 14,061 gallons (334.8 barrels) of product have been recovered from the start of the product abatement program.

5.0 SUMMARY OF FINDINGS

Based on groundwater assessment monitoring and remedial activities performed by CRA at the Site in 2011, the following summary of findings is presented:

- There were two separate releases at the Site. The first release occurred on November 9, 1999 and the second on February 2, 2001. The second release was discovered by EOTT employees and notification was made to the NMOCD immediately. According to the release report, an estimated 150 barrels of crude oil was released and 95 barrels were recovered during initial response actions;
- CRA assumed remediation responsibility of the Site on May 2, 2011;
- The Site is monitored with a network of sixteen groundwater monitor wells (MW-1A through MW-16) and thirteen product recovery wells (RW-1 through RW-13).
- Select monitor and recovery wells are equipped with a total fluid pump for LNAPL recovery. All pumps are compressor driven and are periodically relocated depending on LNAPL thickness and product recovery rates in an effort to maximize product recovery at the Site;
- Wells which contain measureable product, but are not equipped with a total fluids pump, the product is manually recovery bi-weekly;
- NOVA conducted the first quarterly groundwater sampling event on March 2, 2011. The remaining quarterly groundwater monitoring event activities were conducted by CRA on June 15, September 6 and 13, November 29 and December 1, 2011;
- The groundwater flow direction at the Site is to the southeast and appears to be consistent with historical data. The average groundwater gradient observed at the Site during the 2011 groundwater monitoring events was approximately 0.001 feet/foot;
- LNAPL was encountered in 10 wells during the March gauging event, 12 wells during the June event, 10 wells during the September event and 6 wells during the November event. LNAPL thicknesses ranged from 0.04 to 5.78 feet in March, from 0.08 to 5.35 feet in June, from 0.08 to 3.59 feet in September and from 0.28 to 5.19 feet in November 2011;
- During the March 2011 groundwater sampling event nine wells were sampled, of which one well (RW-13) detected benzene concentrations above the NMWQCC Standard;
- During the June 2011 sampling event nine wells were sampled, of which one well (RW-5) detected benzene concentrations above the NMWQCC Standard;
- During the September 2011 sampling event eight wells were sampled, of which one well (RW-5) detected benzene concentrations above the NMWQCC Standard;
- During the December 2011 sampling event seventeen wells were sampled, of which four wells (MW-12, RW-6, RW-8 and RW-13) detected benzene concentration above the NMWQCC Standard;
- On June 10, 2011 CRA mobilized to the Site with subcontractor AcuVac to perform an eight hour Mobile Duel Phase (MDP) Pilot test. LNAPL recovered during the event was 32.85 gallons, 223 lbs or 2.66% of the total extracted volume

(1,236 gallons). The radius of influence for the Site was calculated to range from 81.50 to 92.15 feet;

- On September 12, 2011 CRA mobilized to the Site with Straub to swab and brush the screens of three wells; MW-8, MW-9 and RW-11;
- CRA performed weekly inspections and maintenance of the product recovery system on Site;
- Wells with standing product in the fluids column were gauged and manually recovered twice a week; and
- From June to December 2011, CRA recovered approximately 784 gallons (18.6 barrels) of product from the Site. Approximately 14,061 gallons (334.8 barrels) of product have been recovered from the start of the product abatement program.

6.0 RECOMMENDATIONS

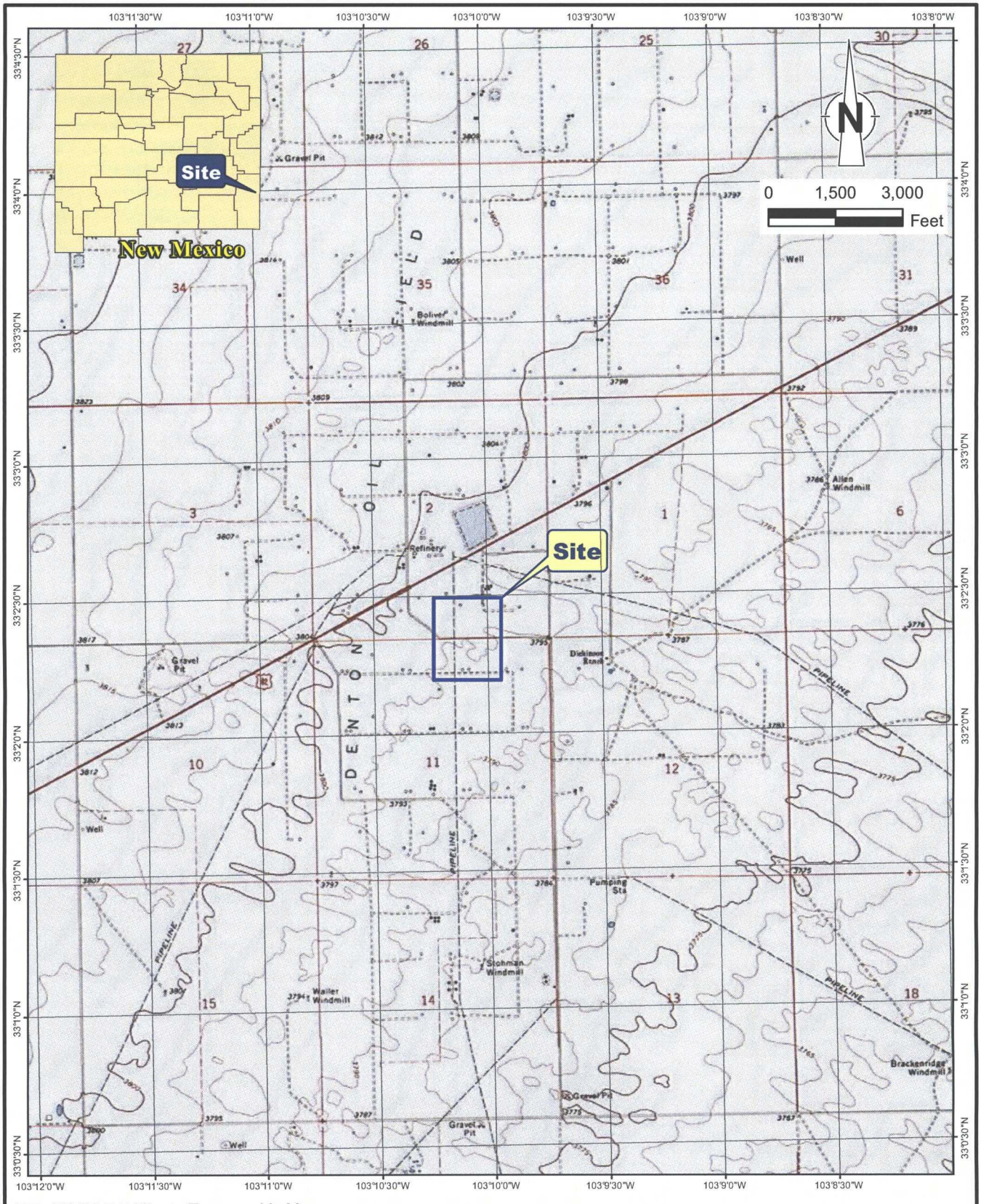
Based upon the data and conclusions presented in this report, the following is recommended:

- Continue quarterly groundwater monitoring events in 2012 with annual reporting to the NMOCD;
- Continue bi-weekly LNAPL abatement in 2012. This includes continuation of moving total fluids pumps and adjusting product recovery schedules to maximize product recovery; and
- Continue Mobile Dual Phase Extraction (MDPE) events to increase product recovery at the Site.

All of Which is Respectfully Submitted,
CONESTOGA-ROVERS & ASSOCIATES

Todd Wells
Project Manager

Thomas C. Larson
Midland Branch Manager

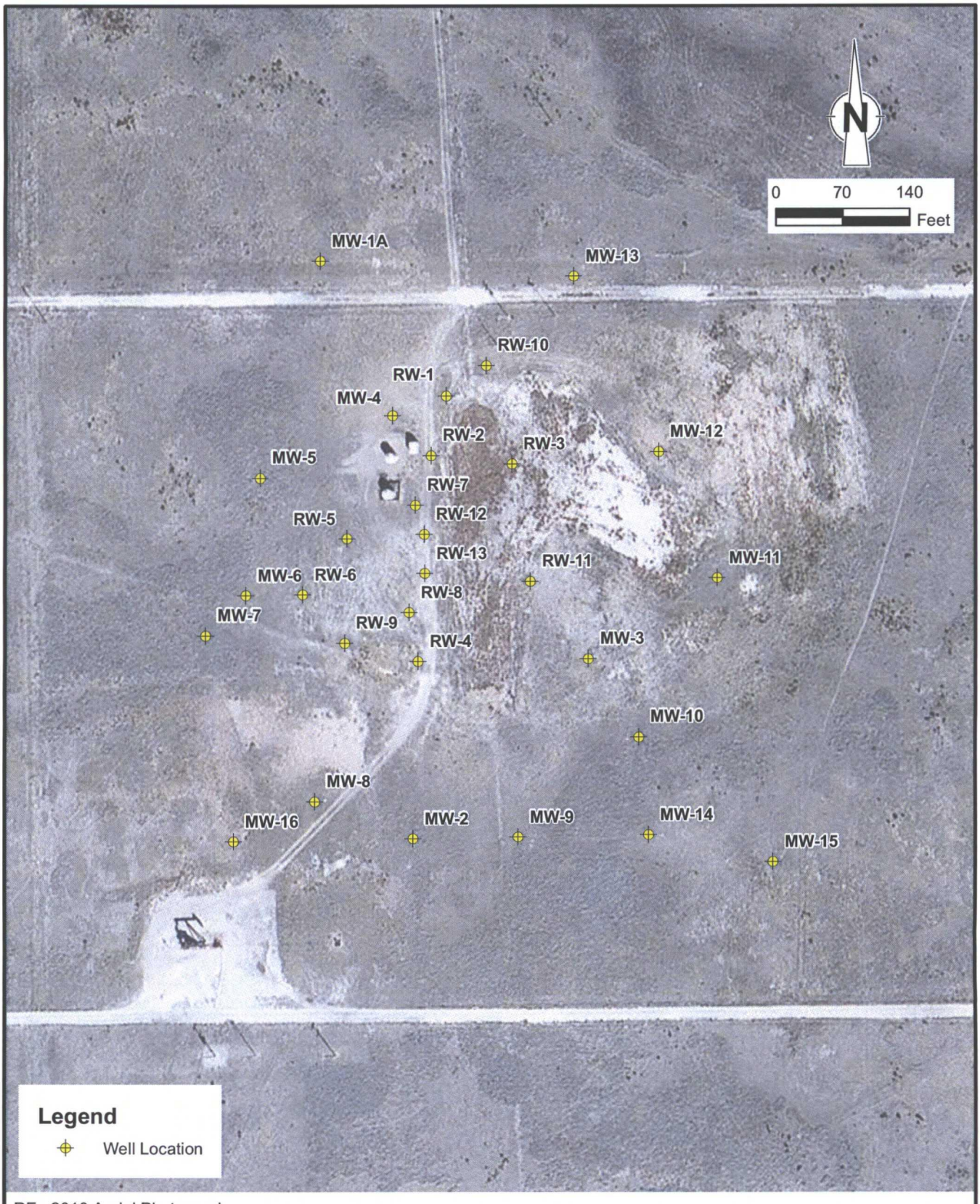


RE: USGS 7.5 Minute Topographic Maps.

figure 1
SITE LOCATION MAP
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO
Plains Pipeline L.P.

CRA

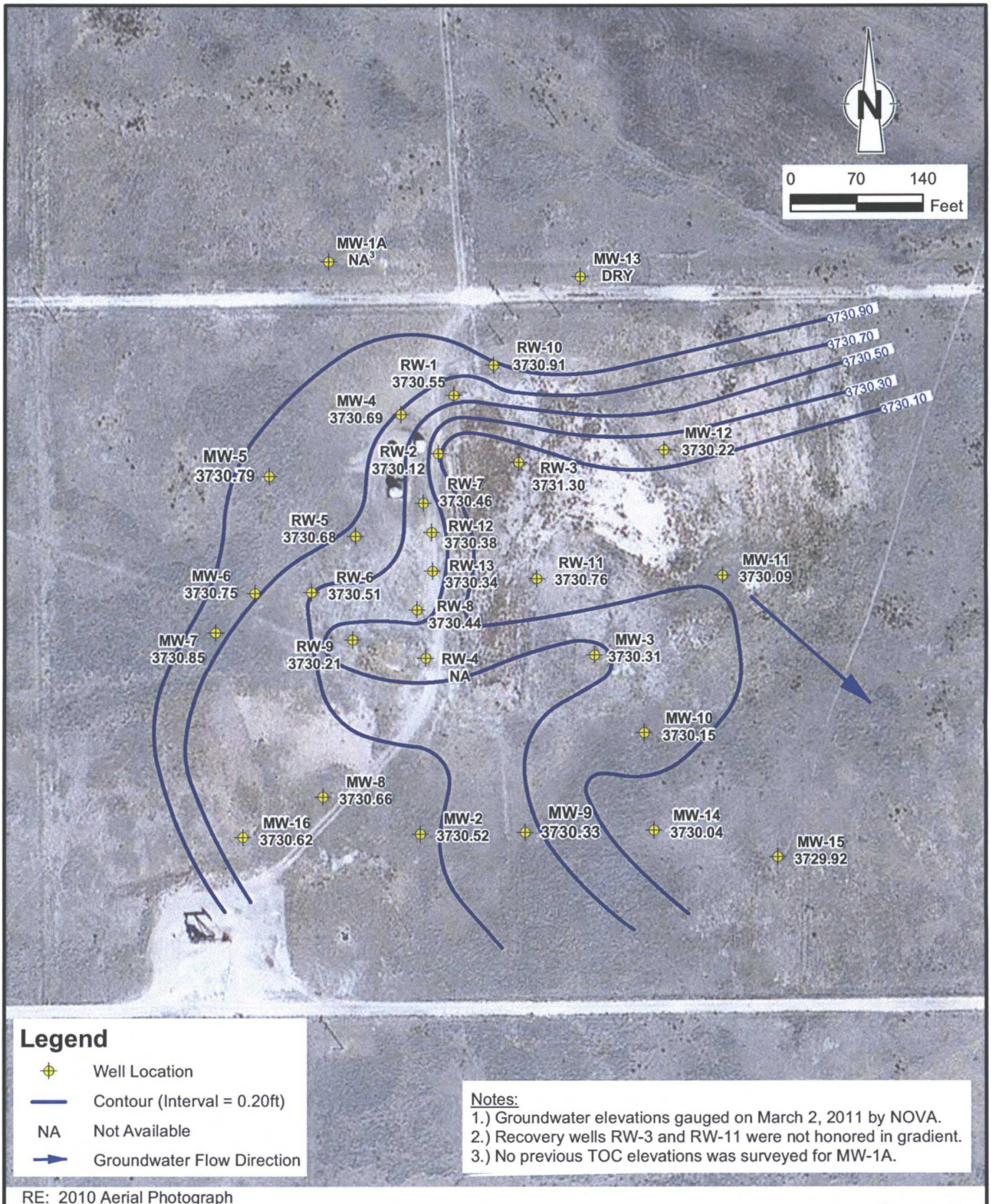
074684-11(002)PR-BR001 Apr 9/2012



RE: 2010 Aerial Photograph

figure 2
SITE DETAILS MAP
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO
Plains Pipeline L.P.

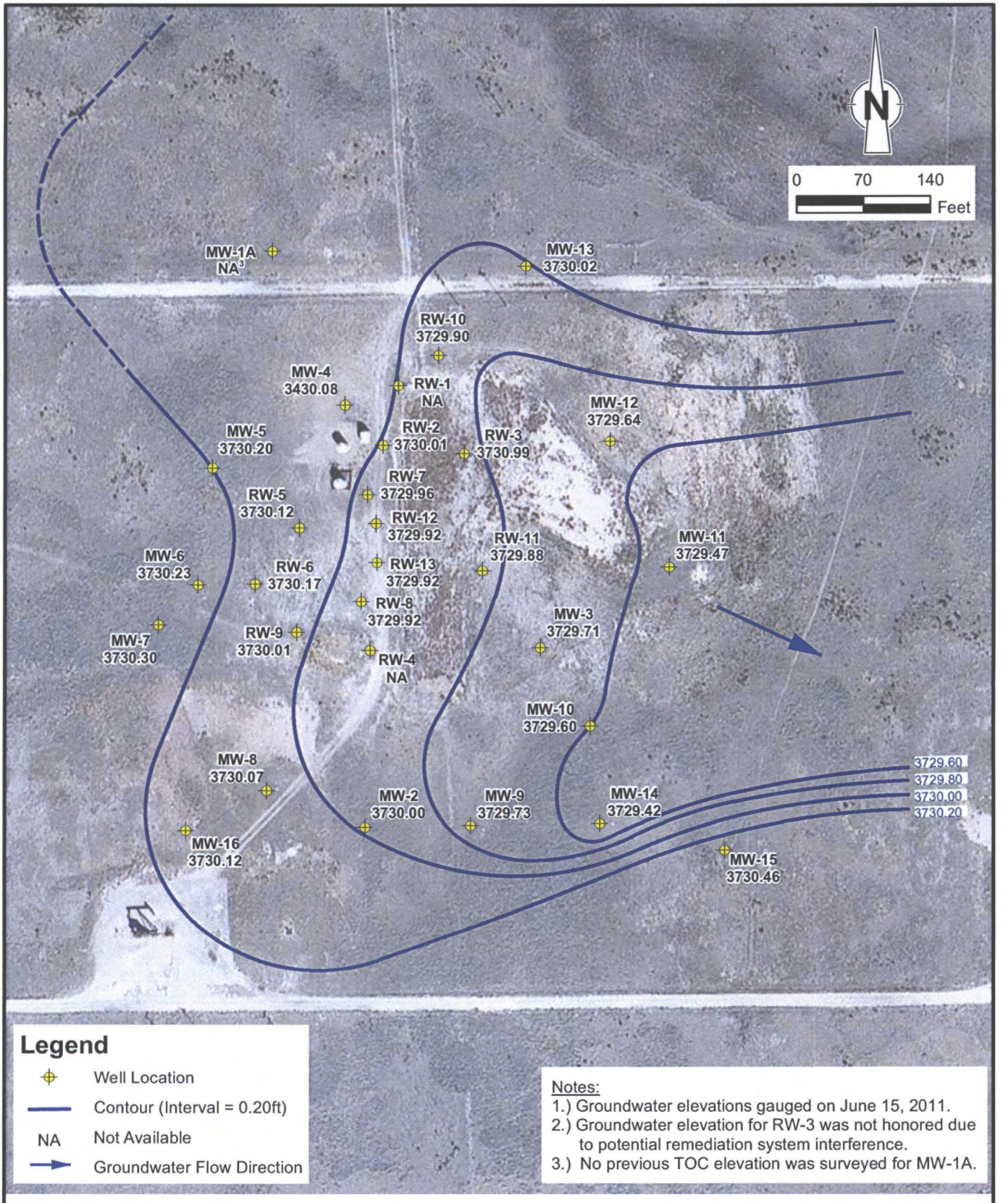
074684-11(002)PR-BR002 Apr 9/2012



RE: 2010 Aerial Photograph

figure 3
GROUNDWATER GRADIENT MAP - MARCH 2011
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO
Plains Pipeline L.P.

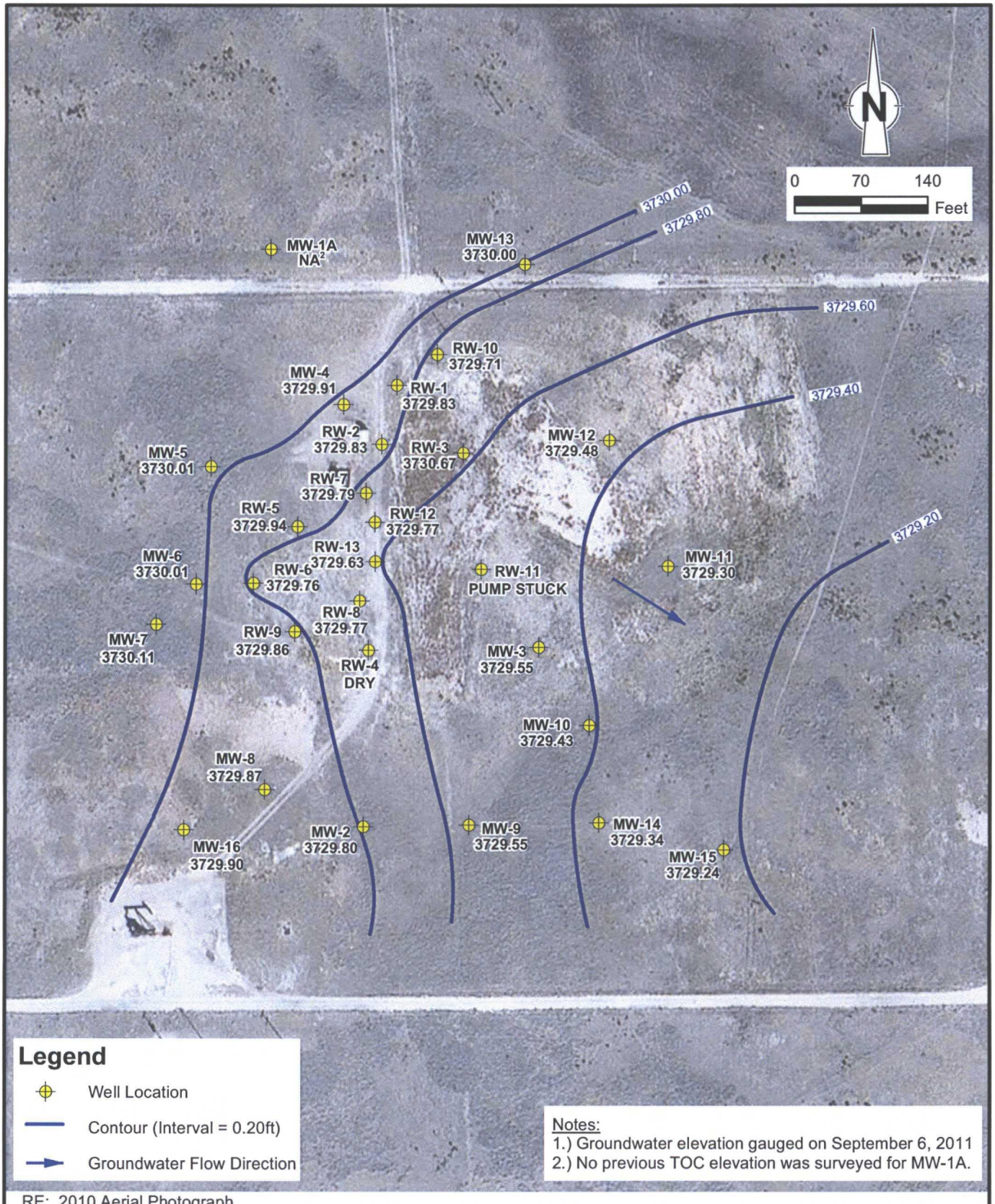
074684-11(002)PR-BR010 Apr 13/2012



RE: 2010 Aerial Photograph

figure 4
GROUNDWATER GRADIENT MAP - JUNE 2011
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO
Plains Pipeline L.P.

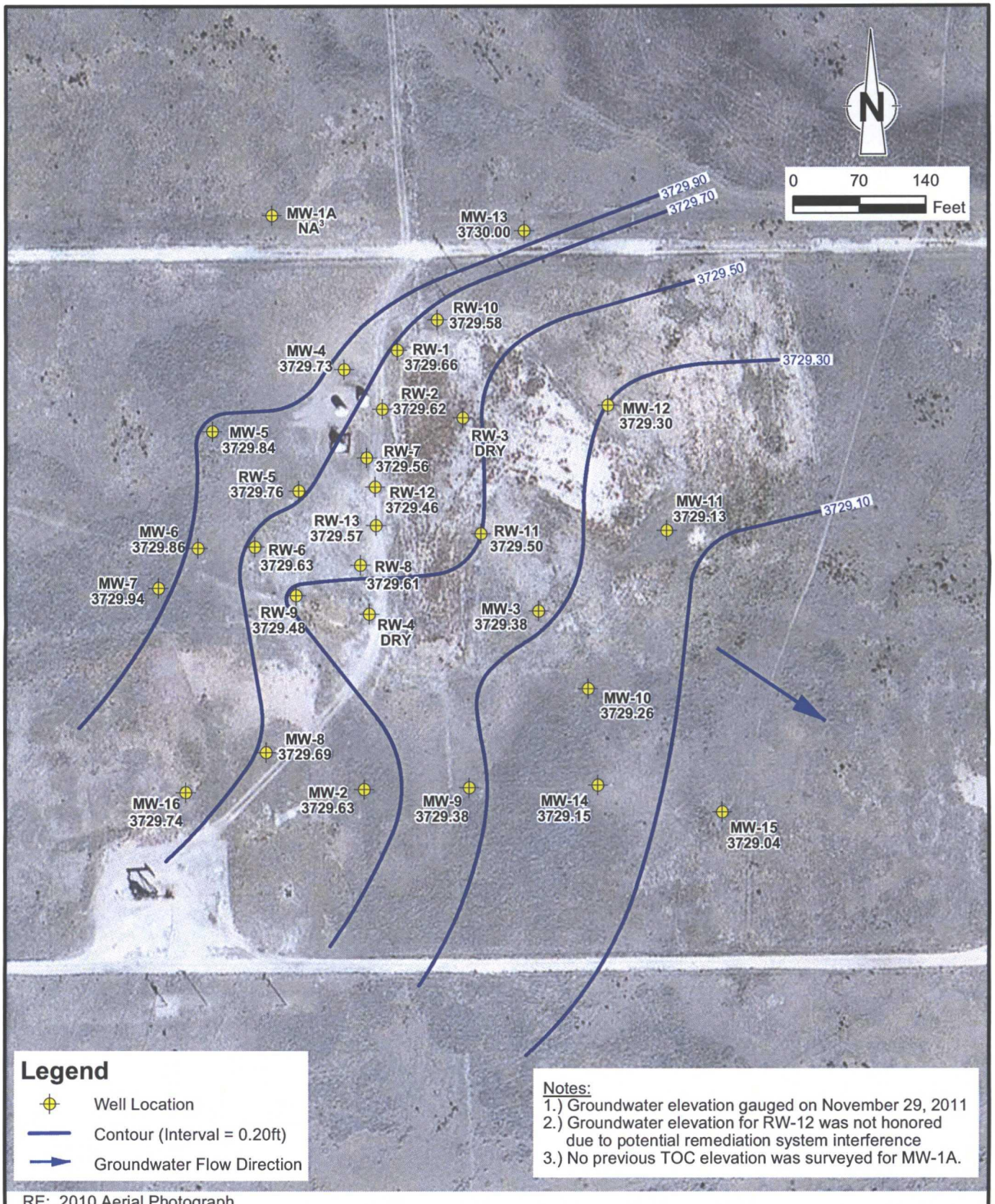
074684-11(002)PR-BR004 Apr 13/2012



RE: 2010 Aerial Photograph

figure 5
GROUNDWATER GRADIENT MAP - SEPTEMBER 2011
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO
Plains Pipeline L.P.

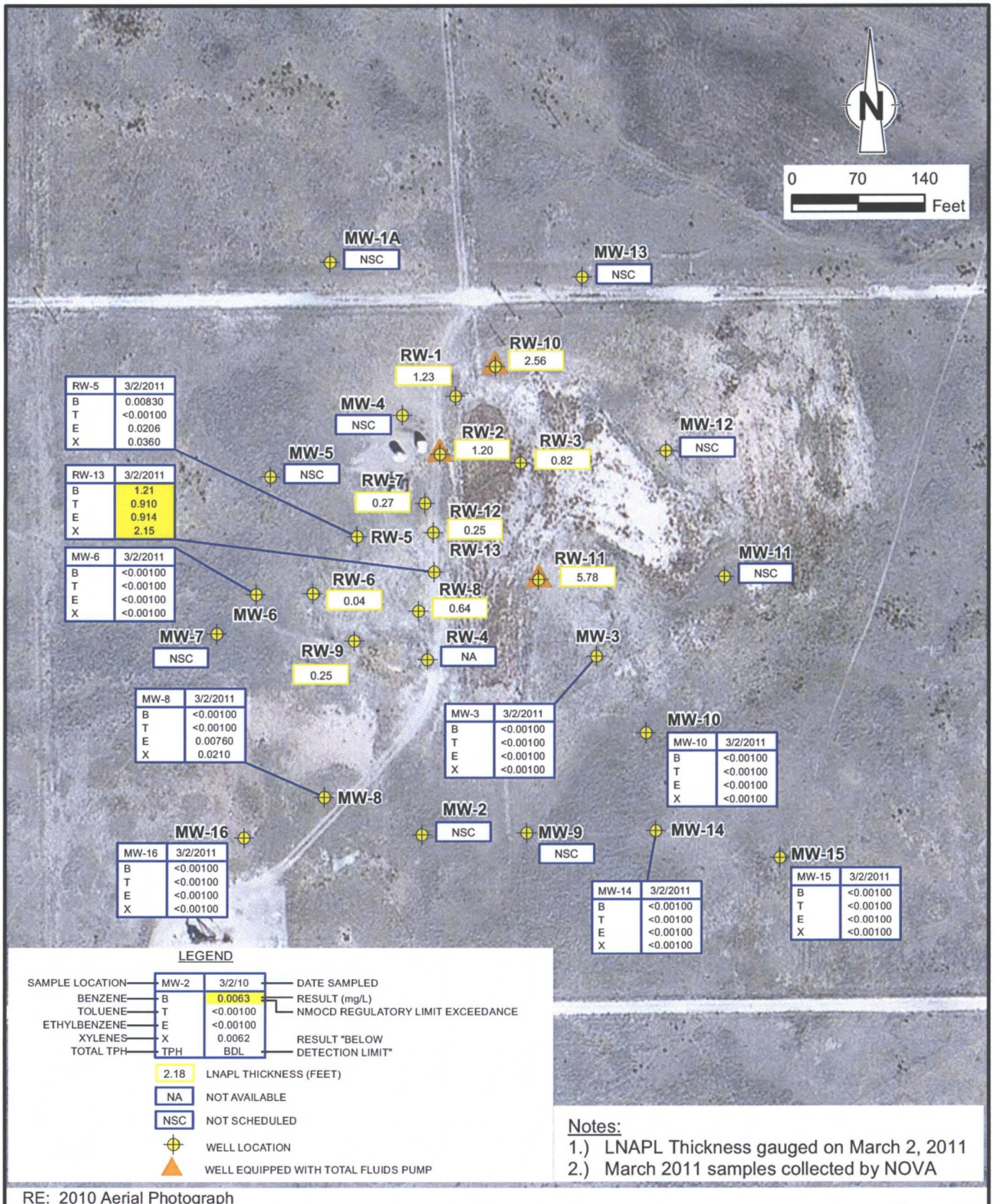
074684-11(002)PR-BR006 Apr 13/2011



RE: 2010 Aerial Photograph

figure 6
GROUNDWATER GRADIENT MAP - NOVEMBER 2011
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO
Plains Pipeline L.P.

074684-11(002)PR-BR008 Apr 13/2012

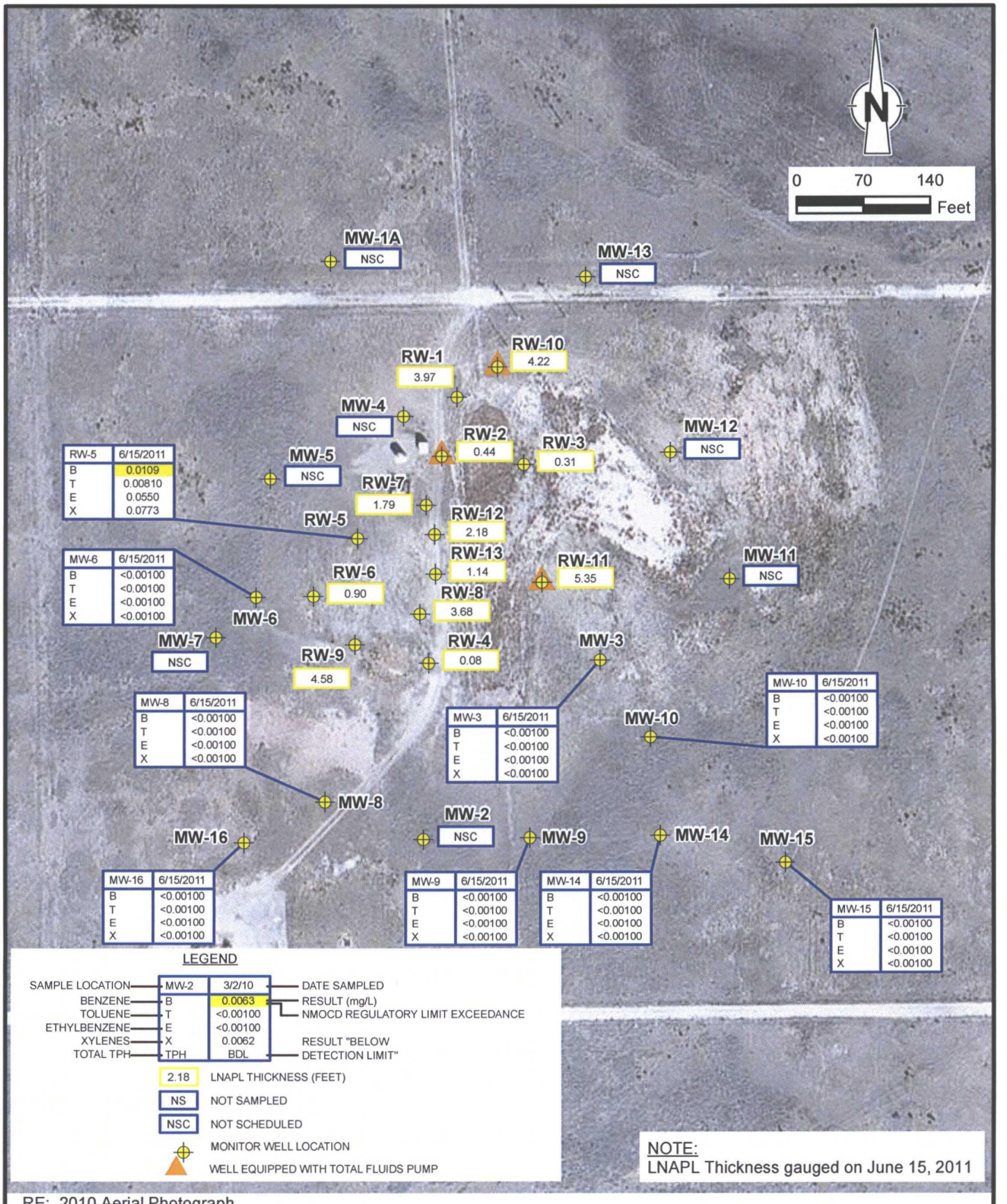


RE: 2010 Aerial Photograph

figure 7

GROUNDWATER BTEX CONCENTRATION MAP - MARCH 2011
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO
Plains Pipeline L.P.

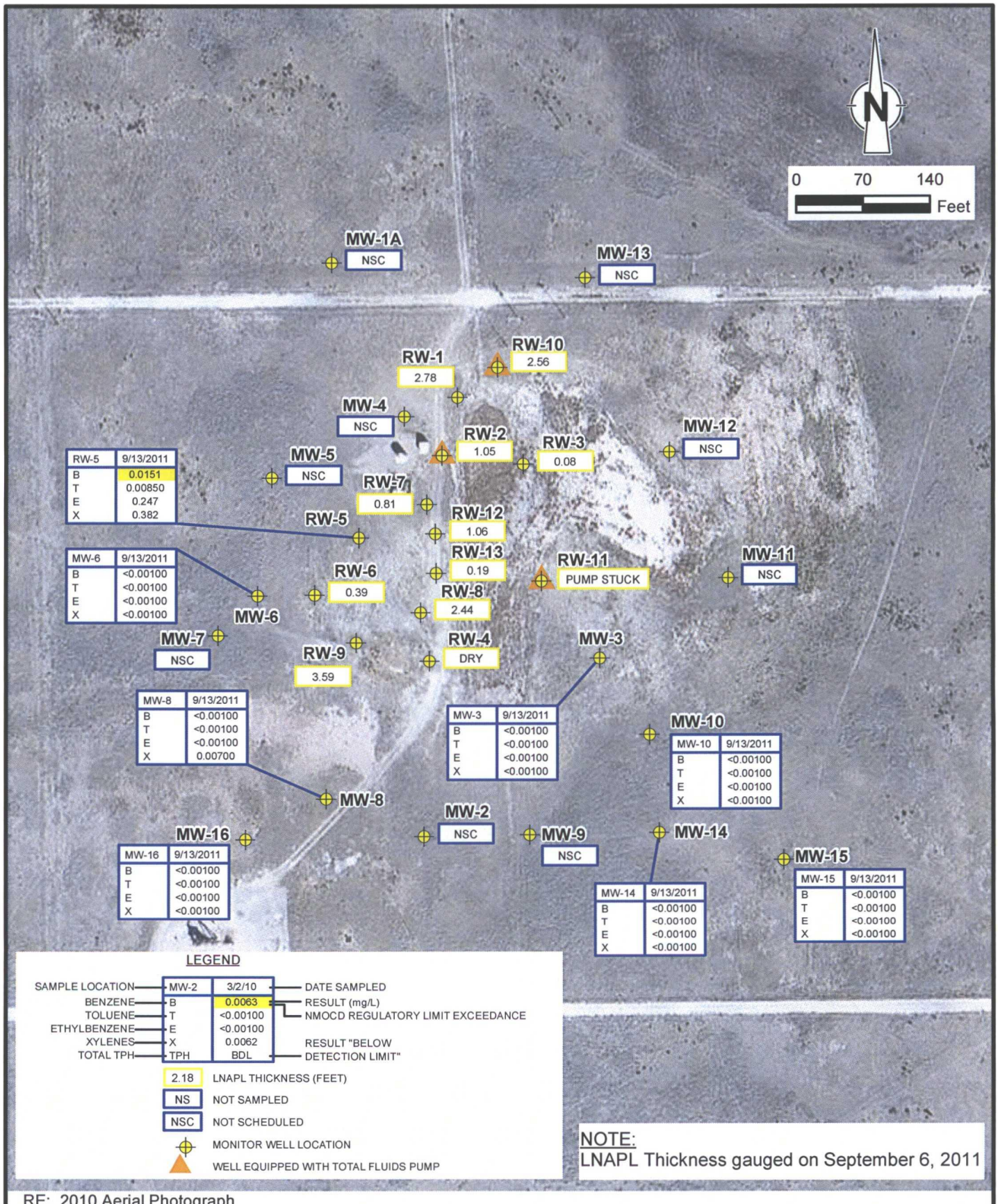
074684-11(002)PR-BR011 Apr 12/2012



RE: 2010 Aerial Photograph

figure 8

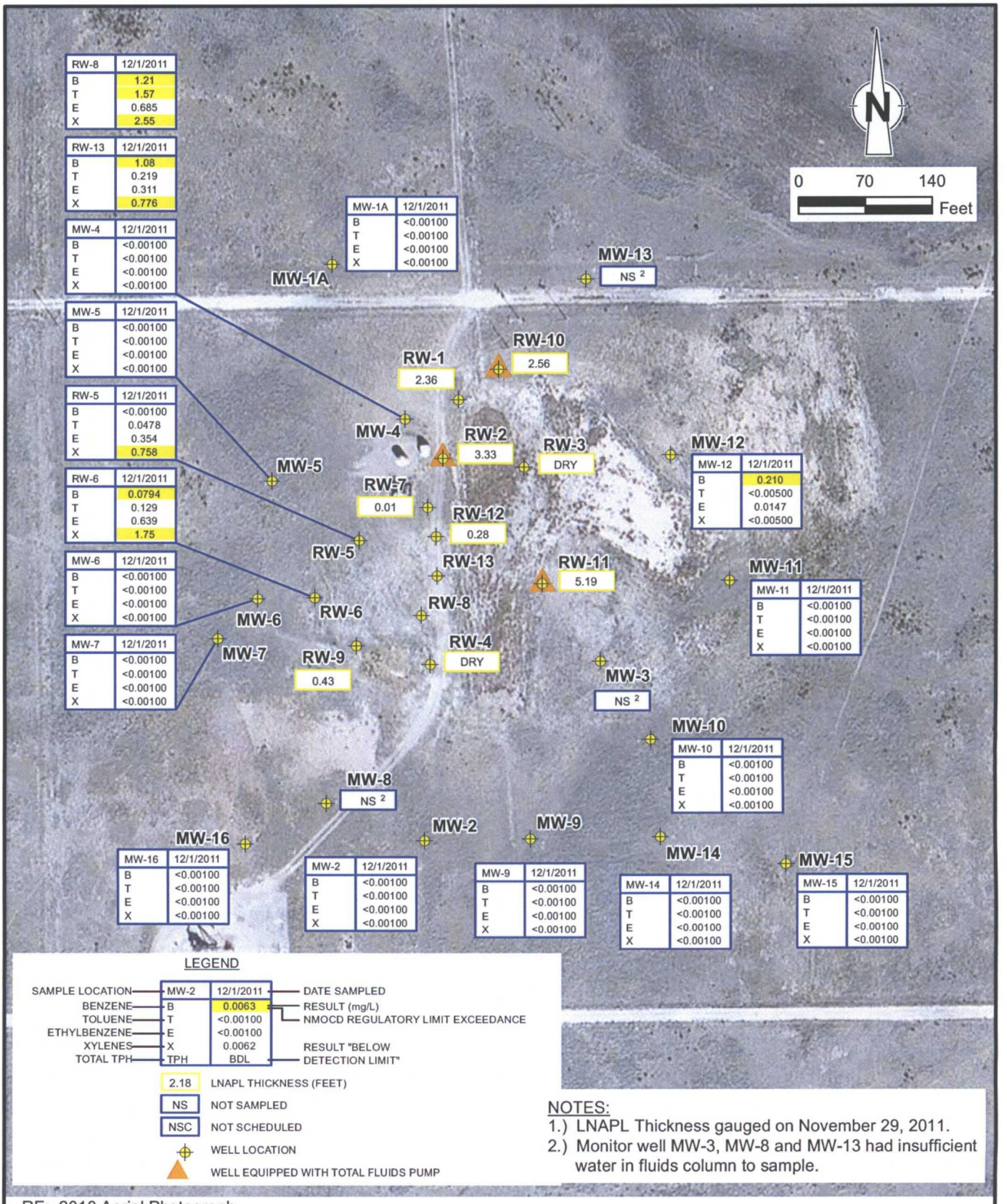
GROUNDWATER BTEX CONCENTRATION MAP - JUNE 2011
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO
Plains Pipeline L.P.



RE: 2010 Aerial Photograph

figure 9

GROUNDWATER BTEX CONCENTRATION MAP - SEPTEMBER 2011
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO
Plains Pipeline L.P.



RE: 2010 Aerial Photograph

figure 10

GROUNDWATER BTEX CONCENTRATION MAP - DECEMBER 2011
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO
Plains Pipeline L.P.

074684-11(002)PR-BR009 Apr 12/2012

TABLE I
GROUNDWATER GAUGING SUMMARY
PLAINS PIPELINE, L.P.
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO

Well ID *TOC Elevation*	Collection Date	Depth to Groundwater (ft TOC)	Depth to LNAPL (ft TOC)	LNAPL Thickness (ft)	Corrected Groundwater Elevation (ft)	Well Depth (ft TOC)	Well Screen Interval (ft bgs) *Well Size (in)*
MW-1A	6/15/11	70.49	---	---	---	74.12	40-65
	9/6/11	70.65	---	---	---	74.14	2
	11/29/11	70.83	---	---	---	74.15	
MW-2	6/15/11	66.33	---	---	3730.00	68.80	41-66
3796.33	9/6/11	66.53	---	---	3729.80	68.85	2
	11/29/11	66.70	---	---	3729.63	68.90	
MW-3	6/15/11	68.39	---	---	3729.71	68.92	40-65
3798.10	9/6/11	68.55	---	---	3729.55	69.01	2
	11/29/11	68.72	---	---	3729.38	69.05	
MW-4	6/15/11	67.65	---	---	3730.08	69.95	47-67
3797.73	9/6/11	67.82	---	---	3729.91	70.00	2
	11/29/11	68.00	---	---	3729.73	70.00	
MW-5	6/15/11	67.03	---	---	3730.20	70.00	47-67
3797.23	9/6/11	67.22	---	---	3730.01	70.07	2
	11/29/11	67.39	---	---	3729.84	70.10	
MW-6	6/15/11	66.28	---	---	3730.23	69.20	47-67
3796.51	9/6/11	66.50	---	---	3730.01	69.23	2
	11/29/11	66.65	---	---	3729.86	70.32	
MW-7	6/15/11	65.86	---	---	3730.30	68.73	47-67
3796.16	9/6/11	66.05	---	---	3730.11	67.75	2
	11/29/11	66.22	---	---	3729.94	68.80	
MW-8	6/15/11	65.82	---	---	3730.07	66.31	47-67
3795.89	9/6/11	66.02	---	---	3729.87	66.35	2
	11/29/11	66.20	---	---	3729.69	66.51	
MW-9	6/15/11	65.93	---	---	3729.73	69.18	47-67
3795.66	9/6/11	66.11	---	---	3729.55	69.22	2
	11/29/11	66.28	---	---	3729.38	69.24	
MW-10	6/15/11	66.63	---	---	3729.60	69.20	47-67
3796.23	9/6/11	66.80	---	---	3729.43	69.28	2
	11/29/11	66.97	---	---	3729.26	70.40	
MW-11	6/15/11	67.11	---	---	3729.47	70.03	47-67
3796.58	9/6/11	67.28	---	---	3729.30	70.03	2
	11/29/11	67.45	---	---	3729.13	70.05	
MW-12	6/15/11	68.39	---	---	3729.64	69.74	47-67
3798.03	9/6/11	68.55	---	---	3729.48	69.74	2
	11/29/11	68.73	---	---	3729.30	69.75	

TABLE I
GROUNDWATER GAUGING SUMMARY
PLAINS PIPELINE, L.P.
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO

Well ID *TOC Elevation*	Collection Date	Depth to Groundwater (ft TOC)	Depth to LNAPL (ft TOC)	LNAPL Thickness (ft)	Corrected Groundwater Elevation (ft)	Well Depth (ft TOC)	Well Screen Interval (ft bgs) *Well Size (in)*
MW-13	6/15/11	69.63	---	---	3730.02	69.72	47-67
3799.65	9/6/11	69.65	---	---	3730.00	69.74	*2*
	11/29/11	69.65	---	---	3730.00	69.75	
MW-14	6/15/11	66.68	---	---	3729.42	72.72	---
3796.10	9/6/11	66.76	---	---	3729.34	72.70	*2*
	11/29/11	66.95	---	---	3729.15	72.82	
MW-15	6/15/11	65.50	---	---	3730.46	72.75	---
3795.96	9/6/11	66.72	---	---	3729.24	72.92	*2*
	11/29/11	66.92	---	---	3729.04	73.15	
MW-16	6/15/11	65.81	---	---	3730.12	72.50	---
3795.93	9/6/11	66.03	---	---	3729.90	72.65	*2*
	11/29/11	66.19	---	---	3729.74	73.18	
RW-1	6/15/11	---	66.84	3.97	NA*	70.81	45-70
3797.66	9/6/11	70.08	67.30	2.78	3729.83	70.85	*4*
	11/29/11	69.91	67.55	2.36	3729.66	70.80	
RW-2	6/15/11	67.95	67.51	0.44	3730.01	71.95	44-69
3797.60	9/6/11	68.62	67.57	1.05	3729.83	72.05	*4*
	11/29/11	70.68	67.35	3.33	3729.62	71.98	
RW-3	6/15/11	68.07	67.76	0.31	3730.99	68.25	44-69
3798.81	9/6/11	68.20	68.12	0.08	3730.67	68.29	*4*
	11/29/11		DRY				
RW-4	6/15/11	---	67.31	0.08	NA*	67.39	44-69
3798.34	9/6/11		DRY			67.43	*4*
	11/29/11		DRY				
RW-5	6/15/11	67.48	---	---	3730.12	70.35	47-67
3797.60	9/6/11	67.66	---	---	3729.94	70.39	*4*
	11/29/11	67.84	---	---	3729.76	70.38	
RW-6	6/15/11	67.84	66.94	0.90	3730.17	68.35	47-67
3797.28	9/6/11	67.84	67.45	0.39	3729.76	68.35	*4*
	11/29/11	67.65	---	---	3729.63	68.40	
RW-7	6/15/11	68.92	67.13	1.79	3729.96	73.28	---
3797.43	9/6/11	68.30	67.49	0.81	3729.79	73.30	*4*
	11/29/11	67.87	67.86	0.01	3729.57	73.32	

TABLE I
GROUNDWATER GAUGING SUMMARY
PLAINS PIPELINE, L.P.
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO

Well ID *TOC Elevation*	Collection Date	Depth to Groundwater (ft TOC)	Depth to LNAPL (ft TOC)	LNAPL Thickness (ft)	Corrected Groundwater Elevation (ft)	Well Depth (ft TOC)	Well Screen Interval (ft bgs) *Well Size (in)*
RW-8	6/15/11	71.39	67.71	3.68	3729.92	72.80	---
3798.33	9/6/11	70.54	68.10	2.44	3729.77	72.94	*4*
	11/29/11	68.72	---	---	3729.61	73.00	
RW-9	6/15/11	71.69	67.11	4.58	3730.01	74.10	---
3797.99	9/6/11	71.04	67.45	3.59	3729.86	74.14	*4*
	11/29/11	68.86	68.43	0.43	3729.48	74.35	
RW-10	6/15/11	72.62	68.40	4.22	3729.90	73.49	---
3799.10	9/6/11	71.46	68.90	2.56	3729.71	72.60	*4*
	11/29/11	71.59	69.03	2.56	3729.58	73.50	
RW-11	6/15/11	71.10	65.75	5.35	3729.88	71.10	---
3796.65	9/6/11		Pump Stuck			68.90	*4*
	11/29/11	71.35	66.16	5.19	3729.50	73.70	
RW-12	6/15/11	69.98	67.80	2.18	3729.92	72.83	---
3798.13	9/6/11	69.22	68.16	1.06	3729.77	72.84	*4*
	11/29/11	68.90	68.62	0.28	3729.46	72.85	
RW-13	6/15/11	69.52	68.38	1.14	3729.92	73.85	---
3798.52	9/6/11	69.04	68.85	0.19	3729.63	73.92	*4*
	11/29/11	68.95	---	---	3729.57	73.90	

Notes:
1. TOC - Top of Casing.
2. LNAPL - Light non-aqueous phase liquid.
3. bgs - below ground surface.
4. Corrected groundwater elevations were calculated using an LNAPL specific gravity of 0.81.
5. NA - Total fluids column was product.

TABLE II
GROUNDWATER BTEX ANALYTICAL SUMMARY
PLAINS PIPELINE, L.P.
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO

Sample ID	Sample Date	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	Total BTEX
New Mexico Oil Conservation Division Regulatory Limits						
		0.01	0.75	0.75	0.62	0.05
MW-1A	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-2	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-3	3/2/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	6/15/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	9/13/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-4	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-5	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-6	3/2/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	6/15/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	9/13/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-7	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-8	3/2/11	<0.00100	<0.00100	**0.00760**	**0.0210**	<0.00100
	6/15/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	9/13/11	<0.00100	<0.00100	<0.00100	**0.00700**	**0.00700**
MW-9	6/15/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-10	3/2/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	6/15/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	9/13/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-11	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-12	12/1/11	**0.210**	<0.00500	**0.0147**	<0.00500	**0.225**
MW-14	3/2/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	6/15/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	9/13/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
MW-15	3/2/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	6/15/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	9/13/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100

TABLE II
GROUNDWATER BTEX ANALYTICAL SUMMARY
PLAINS PIPELINE, L.P.
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO

Sample ID	Sample Date	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	Total BTEX
New Mexico Oil Conservation Division Regulatory Limits						
		0.01	0.75	0.75	0.62	0.05
MW-16	3/2/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	6/15/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	9/13/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	12/1/11	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
RW-5	3/2/11	**0.00830**	<0.00100	**0.0206**	**0.0360**	**0.0649**
	6/15/11	**0.0109**	<0.00100	<0.00100	<0.00100	**0.0109**
	9/13/11	**0.0151**	**0.00850**	**0.247**	**0.382**	**0.6526**
	12/1/11	<0.00100	**0.0478**	**0.354**	**0.758**	**1.1598**
RW-6	12/1/11	**0.0794**	**0.129**	**0.639**	**1.75**	**2.5974**
RW-8	12/1/11	**1.21**	**1.57**	**0.685**	**2.55**	**6.0150**
RW-13	3/2/11	**1.21**	**0.910**	**0.914**	**2.15**	**5.1840**
	12/1/11	**1.08**	**0.219**	**0.311**	**0.776**	**2.3860**

Notes:

1. Shaded cells indicate New Mexico Oil Conserrvation Division Regulatory Limit exceedances.
2. **Bold** indicates detection.
3. BTEX analyses by EPA Method 8021B.
4. Results shown in mg/L.
5. March 2011 analytical results collected by NOVA.

TABLE III
GROUNDWATER PAH ANALYTICAL SUMMARY
PLAINS PIPELINE, L.P.
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO

Sample ID	Sample Date	Acenaphthlene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Napthalene	1-Methylnapthalene	2-Methylnapthalene	Dibenzofuran
NMWQCC Drinking Water Standards Section 1-101.UU and 3-103.A					0.001	0.007	0.002		0.002	0.002	0.003			0.004				0.03		
MW-1A	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	**0.000974**	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-2	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-3	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	12/1/09	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-4	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	0.000209	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-5	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-6	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	**0.000391**	<0.000183	<0.000183	<0.000183	<0.000183	**0.000285**
	12/1/09	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
	12/1/11	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184
MW-7	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-8	12/3/08	<0.000192	<0.000192	<0.000192	<0.000192	<0.000192	<0.000192	<0.000192	<0.000192	<0.000192	<0.000192	<0.000192	**0.00604**	<0.000192	**0.00597**	<0.000192	**0.00205**	**0.0108**	**0.00967**	**0.00451**
	12/1/09	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	**0.0617**	<0.000917	**0.00241**	<0.000917	<0.000917	<0.000917	<0.000917	**0.00402**
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		

TABLE III
GROUNDWATER PAH ANALYTICAL SUMMARY
PLAINS PIPELINE, L.P.
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO

Sample ID	Sample Date	Acenaphthlene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Napthalene	1-Methylnapthalene	2-Methylnapthalene	Dibenzofuran
NMWQCC Drinking Water Standards Section 1-101.UU and 3-103.A					0.001	0.007	0.002		0.002	0.002	0.003			0.004			0.03			
MW-9	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-10	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-11	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-12	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-13	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	12/1/09	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201	<0.000201
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-14	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-15	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	12/2/09	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
MW-16	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	12/1/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-1	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	**0.00669**	<0.000184	**0.0084**	<0.000184	**0.0278**	**0.0518**	**0.0478**	**0.00414**
	12/2/09	Not sampled due to insufficient water volume																		
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		

TABLE III
GROUNDWATER PAH ANALYTICAL SUMMARY
PLAINS PIPELINE, L.P.
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO

Sample ID	Sample Date	Acenaphthlene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Napthalene	1-Methylnapthalene	2-Methylnapthalene	Dibenzofuran
NMWQCC Drinking Water Standards Section 1-101.UU and 3-103.A					0.001	0.007	0.002		0.002	0.002	0.003			0.004				0.03		
RW-2	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	0.019	<0.000184	0.0227	<0.000184	0.0656	0.166	0.153	0.0115
	12/2/09	<0.00461	<0.00461	<0.00461	<0.00461	<0.00461	<0.00461	<0.00461	<0.00461	<0.00461	<0.00461	<0.00461	0.248	<0.00461	0.336	<0.00461	0.808	2.17	3.02	0.145
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-3	12/3/08	Not sampled due to insufficient water volume																		
	12/2/09	Not sampled due to insufficient water volume																		
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-4	12/3/08	Not sampled due to insufficient water volume																		
	12/2/09	Not sampled due to insufficient water volume																		
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-5	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	0.00148	<0.000183	0.000841	<0.000183	0.0254	0.0160	0.0144	0.00133
	12/2/09	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	<0.000187	0.00763	0.00624	0.00263	0.000674
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-6	12/3/08	Not sampled due to insufficient water volume																		
	12/2/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	0.00340	<0.000183	0.00476	<0.000183	0.0382	0.0445	0.0553	0.00257
	11/23/10	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	0.00513	<0.000183	<0.000183	<0.000183	0.0486	0.0529	0.0633	0.00378
	12/1/11	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184
RW-7	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	0.0179	<0.000184	0.0232	<0.000184	0.0942	0.172	0.158	0.0118
	12/2/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	0.0400	<0.000183	0.0570	<0.000183	0.172	0.408	0.506	0.0240
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-8	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	0.0128	<0.000183	0.0164	<0.000183	0.0496	0.115	0.106	0.00891
	12/2/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	0.0106	<0.000183	0.0145	<0.000183	0.0534	0.102	0.128	0.00772
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-9	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	0.00907	<0.000184	0.0112	<0.000184	0.0574	0.0859	0.0791	0.00642
	12/2/09	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	<0.000917	0.0488	<0.000917	0.0679	<0.000917	0.215	0.473	0.625	0.0320
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-10	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	0.0265	<0.000183	0.0346	<0.000183	0.121	0.279	0.257	0.0193
	12/2/09	Not sampled due to insufficient water volume																		

TABLE III
GROUNDWATER PAH ANALYTICAL SUMMARY
PLAINS PIPELINE, L.P.
DARR ANGELL NO. 4
LEA COUNTY, NEW MEXICO

Sample ID	Sample Date	Acenaphthlene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Napthalene	1-Methylnapthalene	2-Methylnapthalene	Dibenzofuran
NMWQCC Drinking Water Standards Section 1-101.UU and 3-103.A					0.001	0.007	0.002		0.002	0.002	0.003			0.004				0.03		
RW-10	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-11	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	**0.0076**	<0.000184	**0.0093**	<0.000184	**0.053**	**0.066**	**0.0609**	**0.00494**
	12/2/09	Not sampled due to insufficient water volume																		
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-12	12/3/08	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	**0.0193**	<0.000183	**0.0242**	<0.000183	**0.11**	**0.198**	**0.182**	**0.0143**
	12/2/09	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	**0.0127**	<0.000184	**0.0182**	<0.000184	**0.049**	**0.112**	**0.141**	**0.0081**
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		
RW-13	12/3/08	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	<0.000184	**0.00409**	<0.000184	<0.000184	**0.0187**	<0.000184	**0.0234**	<0.000184	**0.0608**	**0.139**	**0.128**	**0.0131**
	12/2/09	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	<0.000183	**0.0013**	<0.000183	**0.00156**	<0.000183	**0.00094**	**0.00489**	**0.00337**	**0.000891**
	11/23/10	Not sampled as part of Quarterly Monitoring Event																		

Notes:

1. Shaded cells indicate New Mexico Oil Conservation Division Regulatory Limit exceedance.
2. **Bold** indicates detection.
3. BTEX analyses by EPA Method 8021B.
4. Results shown in mg/L.
5. 2008 through 2010 analytical results collected by NOVA.

TABLE 1

GROUNDWATER ELEVATION DATA

PLAINS MARKETING, L.P.
DARR ANGELL 4
LEA COUNTY, NEW MEXICO
NMOCD REFERENCE NUMBER AP-007

WELL NUMBER	DATE MEASURED	TOP OF CASING ELEVATION	DEPTH TO PRODUCT	DEPTH TO WATER	PSH THICKNESS	CORRECTED GROUND WATER ELEVATION
MW - 1	07/24/08		PLUGGED & ABANDONED			
MW-1A	*03/02/11*			69.88	0.00	0.00
MW - 2	*03/02/11*	3,796.33	-	65.81	0.00	3,730.52
MW - 3	*03/02/11*	3,798.10	-	67.82	0.00	3,730.31
MW - 4	*03/02/11*	3,797.73	-	67.04	0.00	3,730.69
MW - 5	*03/02/11*	3,797.23	-	66.44	0.00	3,730.79
MW - 6	*03/02/11*	3,796.51	-	65.76	0.00	3,730.75
MW - 7	*03/02/11*	3,796.16	-	65.31	0.00	3,730.85
MW - 8	*03/02/11*	3,795.89	-	65.23	0.00	3,730.66
MW - 9	*03/02/11*	3,795.66	-	65.33	0.00	3,730.33
MW - 10	*03/02/11*	3,796.23	-	66.08	0.00	3,730.15
MW - 11	*03/02/11*	3,796.58	-	66.49	0.00	3,730.09
MW - 12	*03/02/11*	3,798.03	-	67.81	0.00	3,730.22
MW - 13	*11/23/10*	3,799.65	**WELL IS DRY**			
MW - 14	*03/02/11*	3,796.10	-	66.06	0.00	3,730.04
MW - 15	*03/02/11*	3,795.96	-	66.04	0.00	3,729.92
MW - 16	*03/02/11*	3,795.93	-	65.31	0.00	3,730.62
RW - 1	01/05/11	3,797.66	67.62	ND	0.00	#VALUE!
RW - 1	01/12/11	3,797.66	68.79	ND	0.00	#VALUE!
RW - 1	01/19/11	3,797.66	66.97	68.01	1.04	3,730.53
RW - 1	02/23/11	3,797.66	66.66	70.76	4.10	3,730.39
RW - 1	*03/02/11*	3,797.66	66.93	68.16	1.23	3,730.55
RW - 1	03/03/11	3,797.66	66.81	70.55	3.74	3,730.29
RW - 1	03/10/11	3,797.66	67.23	68.61	1.38	3,730.22
RW - 1	03/15/11	3,797.66	67.30	68.18	0.88	3,730.23
RW - 1	03/17/11	3,797.66	67.35	68.25	0.90	3,730.18
RW - 1	03/22/11	3,797.66	67.28	68.18	0.90	3,730.25
RW - 1	03/24/11	3,797.66	67.20	68.55	1.35	3,730.26
RW - 1	03/29/11	3,797.66	67.18	69.18	2.00	3,730.18
RW - 1	04/01/11	3,797.66	68.24	68.60	0.36	3,729.37
RW - 1	04/08/11	3,797.66	68.20	68.59	0.39	3,729.40

TABLE 1

GROUNDWATER ELEVATION DATA

PLAINS MARKETING, L.P.
DARR ANGELL 4
LEA COUNTY, NEW MEXICO
NMOCD REFERENCE NUMBER AP-007

WELL NUMBER	DATE MEASURED	TOP OF CASING ELEVATION	DEPTH TO PRODUCT	DEPTH TO WATER	PSH THICKNESS	CORRECTED GROUND WATER ELEVATION
RW - 1	04/12/11	3,797.66	68.23	68.63	0.40	3,729.37
RW - 1	04/14/11	3,797.66	68.17	68.53	0.36	3,729.44
RW - 2	*03/02/11*	3,797.60	67.30	68.50	1.20	3,730.12
RW - 2	03/03/11	3,797.60	sheen	68.68	0.00	3,728.92
RW - 3	01/05/11	3,798.81	67.52	67.68	0.16	3,731.27
RW - 3	01/12/11	3,798.81	67.36	ND	0.00	#VALUE!
RW - 3	01/19/11	3,798.81	67.36	68.23	0.87	3,731.32
RW - 3	02/23/11	3,798.81	67.62	67.70	0.08	3,731.18
RW - 3	*03/02/11*	3,798.81	67.39	68.21	0.82	3,731.30
RW - 3	03/03/11	3,798.81	67.61	67.80	0.19	3,731.17
RW - 3	03/10/11	3,798.81	67.62	67.92	0.30	3,731.15
RW - 3	03/15/11	3,798.81	67.64	68.04	0.40	3,731.11
RW - 3	03/17/11	3,798.81	67.65	68.05	0.40	3,731.10
RW - 3	03/22/11	3,798.81	67.63	68.02	0.39	3,731.12
RW - 3	03/24/11	3,798.81	67.64	67.93	0.29	3,731.13
RW - 3	03/29/11	3,798.81	67.68	68.00	0.32	3,731.08
RW - 3	04/01/11	3,798.81	67.60	67.91	0.31	3,731.16
RW - 3	04/08/11	3,798.81	67.67	67.90	0.23	3,731.11
RW - 3	04/12/11	3,798.81	67.63	67.90	0.27	3,731.14
RW - 3	04/14/11	3,798.81	67.63	67.98	0.35	3,731.13
RW - 4	01/05/11	3,798.34	66.93	ND	ND	#VALUE!
RW - 4	01/12/11	3,798.34	66.92	ND	ND	#VALUE!
RW - 4	01/19/11	3,798.34	66.91	ND	ND	#VALUE!
RW - 4	02/23/11	3,798.34	67.14	67.38	0.24	3,731.16
RW - 4	*03/02/11*	3,798.34	66.84	ND	0.00	#VALUE!
RW - 4	03/03/11	3,798.34	67.13	67.39	0.26	3,731.17
RW - 4	03/10/11	3,798.34	67.17	67.38	0.21	3,731.14
RW - 4	03/15/11	3,798.34	67.17	67.38	0.21	3,731.14
RW - 4	03/17/11	3,798.34	67.18	67.39	0.21	3,731.13
RW - 4	03/22/11	3,798.34	67.19	67.38	0.19	3,731.12
RW - 4	03/24/11	3,798.34	67.20	67.38	0.18	3,731.11
RW - 4	03/29/11	3,798.34	67.23	67.40	0.17	3,731.08
RW - 4	04/01/11	3,798.34	67.17	67.38	0.21	3,731.14
RW - 4	04/08/11	3,798.34	67.18	67.38	0.20	3,731.13
RW - 4	04/12/11	3,798.34	67.20	67.38	0.18	3,731.11
RW - 4	04/14/11	3,798.34	67.15	67.39	0.24	3,731.15
RW - 5	*03/02/11*	3,797.60	sheen	66.92	0.00	3,730.68
RW - 5	03/03/11	3,797.60	sheen	67.33	0.00	3,730.27
RW - 5	03/10/11	3,797.60	sheen	67.35	0.00	3,730.25
RW - 5	03/15/11	3,797.60	sheen	67.37	0.00	3,730.23
RW - 5	03/17/11	3,797.60	sheen	67.37	0.00	3,730.23
RW - 5	03/22/11	3,797.60	sheen	67.37	0.00	3,730.23
RW - 5	03/24/11	3,797.60	sheen	67.36	0.00	3,730.24
RW - 5	03/29/11	3,797.60	sheen	67.40	0.00	3,730.20

TABLE 1

GROUNDWATER ELEVATION DATA

PLAINS MARKETING, L.P.
DARR ANGELL 4
LEA COUNTY, NEW MEXICO
NMOCD REFERENCE NUMBER AP-007

WELL NUMBER	DATE MEASURED	TOP OF CASING ELEVATION	DEPTH TO PRODUCT	DEPTH TO WATER	PSH THICKNESS	CORRECTED GROUND WATER ELEVATION
RW - 5	04/01/11	3,797.60		67.34	0.00	3,730.26
RW - 5	04/08/11	3,797.60		67.35	0.00	3,730.25
RW - 5	04/12/11	3,797.60		67.30	0.00	3,730.30
RW - 5	04/14/11	3,797.60		67.27	0.00	3,730.33
RW - 6	01/05/11	3,797.28	sheen	66.84	0.00	3,730.44
RW - 6	01/12/11	3,797.28	sheen	66.71	0.00	3,730.57
RW - 6	01/19/11	3,797.28	sheen	66.72	0.00	3,730.56
RW - 6	02/23/11	3,797.28	67.12	67.29	0.17	3,730.13
RW - 6	*03/02/11*	3,797.28	66.76	66.80	0.04	3,730.51
RW - 6	03/03/11	3,797.28	66.93	67.18	0.25	3,730.31
RW - 6	03/10/11	3,797.28	66.95	67.20	0.25	3,730.29
RW - 6	03/15/11	3,797.28	66.96	67.21	0.25	3,730.28
RW - 6	03/17/11	3,797.28	66.96	67.22	0.26	3,730.28
RW - 6	03/22/11	3,797.28	66.96	67.20	0.24	3,730.28
RW - 6	03/24/11	3,797.28	66.99	67.19	0.20	3,730.26
RW - 6	03/29/11	3,797.28	66.97	67.40	0.43	3,730.25
RW - 6	04/01/11	3,797.28	66.98	67.20	0.22	3,730.27
RW - 6	04/08/11	3,797.28	66.96	67.18	0.22	3,730.29
RW - 6	04/12/11	3,797.28	67.00	67.20	0.20	3,730.25
RW - 6	04/14/11	3,797.28	67.05	67.21	0.16	3,730.21
RW - 7	01/05/11	3,797.43	67.05	67.96	0.91	3,730.20
RW - 7	01/12/11	3,797.43	66.90	67.32	0.42	3,730.45
RW - 7	01/19/11	3,797.43	66.94	67.28	0.34	3,730.42
RW - 7	02/23/11	3,797.43	66.98	68.63	1.65	3,730.12
RW - 7	*03/02/11*	3,797.43	66.92	67.19	0.27	3,730.46
RW - 7	03/03/11	3,797.43	67.21	67.70	0.49	3,730.12
RW - 7	03/10/11	3,797.43	67.24	67.67	0.43	3,730.10
RW - 7	03/15/11	3,797.43	67.28	67.63	0.35	3,730.08
RW - 7	03/17/11	3,797.43	67.26	67.63	0.37	3,730.10
RW - 7	03/22/11	3,797.43	67.23	67.65	0.42	3,730.12
RW - 7	03/24/11	3,797.43	67.27	67.63	0.36	3,730.09
RW - 7	03/29/11	3,797.43	67.30	67.61	0.31	3,730.07
RW - 7	04/01/11	3,797.43	67.25	67.65	0.40	3,730.10
RW - 7	04/08/11	3,797.43	67.30	67.64	0.34	3,730.06
RW - 7	04/12/11	3,797.43	67.24	67.60	0.36	3,730.12
RW - 7	04/14/11	3,797.43	67.20	67.58	0.38	3,730.15
RW - 8	01/05/11	3,798.33	67.84	68.76	0.92	3,730.35
RW - 8	01/12/11	3,798.33	67.68	68.37	0.69	3,730.55
RW - 8	01/19/11	3,798.33	67.82	68.49	0.67	3,730.41
RW - 8	02/23/11	3,798.33	67.59	70.96	3.37	3,730.23
RW - 8	*03/02/11*	3,798.33	67.79	68.43	0.64	3,730.44
RW - 8	03/03/11	3,798.33	68.04	68.95	0.91	3,730.15
RW - 8	03/10/11	3,798.33	68.07	68.83	0.76	3,730.15
RW - 8	03/15/11	3,798.33	68.09	68.94	0.85	3,730.11
RW - 8	03/17/11	3,798.33	68.13	68.68	0.55	3,730.12

TABLE 1

GROUNDWATER ELEVATION DATA

PLAINS MARKETING, L.P.
DARR ANGELL 4
LEA COUNTY, NEW MEXICO
NMOCD REFERENCE NUMBER AP-007

WELL NUMBER	DATE MEASURED	TOP OF CASING ELEVATION	DEPTH TO PRODUCT	DEPTH TO WATER	PSH THICKNESS	CORRECTED GROUND WATER ELEVATION
RW - 8	03/22/11	3,798.33	68.10	68.85	0.75	3,730.12
RW - 8	03/24/11	3,798.33	68.10	68.80	0.70	3,730.13
RW - 8	03/29/11	3,798.33	68.10	68.93	0.83	3,730.11
RW - 8	04/01/11	3,798.33	68.03	68.83	0.80	3,730.18
RW - 8	04/08/11	3,798.33	68.00	68.80	0.80	3,730.21
RW - 8	04/12/11	3,798.33	68.00	68.80	0.80	3,730.21
RW - 8	04/14/11	3,798.33	68.05	68.81	0.76	3,730.17
RW - 9	01/05/11	3,797.99	67.09	67.87	0.78	3,730.78
RW - 9	01/12/11	3,797.99	67.49	68.11	0.62	3,730.41
RW - 9	01/19/11	3,797.99	67.38	68.13	0.75	3,730.50
RW - 9	02/23/11	3,797.99	66.88	71.89	5.01	3,730.36
RW - 9	*03/02/11*	3,797.99	67.74	67.99	0.25	3,730.21
RW - 9	03/03/11	3,797.99	67.52	68.85	1.33	3,730.27
RW - 9	03/10/11	3,797.99	67.60	68.53	0.93	3,730.25
RW - 9	03/15/11	3,797.99	67.63	68.43	0.80	3,730.24
RW - 9	03/17/11	3,797.99	67.67	68.33	0.66	3,730.22
RW - 9	03/22/11	3,797.99	67.59	68.50	0.91	3,730.26
RW - 9	03/24/11	3,797.99	67.54	68.51	0.97	3,730.30
RW - 9	03/29/11	3,797.99	67.53	69.18	1.65	3,730.21
RW - 9	04/01/11	3,797.99	67.61	68.53	0.92	3,730.24
RW - 9	04/08/11	3,797.99	67.60	68.90	1.30	3,730.20
RW - 9	04/12/11	3,797.99	67.59	68.55	0.96	3,730.26
RW - 9	04/14/11	3,797.99	67.61	68.57	0.96	3,730.24
RW - 10	*03/02/11*	3,799.10	67.81	70.37	2.56	3,730.91
RW - 10	03/03/11	3,799.10	69.04	69.12	0.08	3,730.05
RW - 11	*03/02/11*	3,796.65	65.02	70.80	5.78	3,730.76
RW - 11	03/03/11	3,796.65	66.51	67.27	0.76	3,730.03
RW - 12	01/05/11	3,798.13	67.72	68.98	1.26	3,730.22
RW - 12	01/12/11	3,798.13	67.71	68.10	0.39	3,730.36
RW - 12	01/19/11	3,798.13	67.71	68.11	0.40	3,730.36
RW - 12	02/23/11	3,798.13	67.74	69.20	1.46	3,730.17
RW - 12	*03/02/11*	3,798.13	67.71	67.96	0.25	3,730.38
RW - 12	03/03/11	3,798.13	67.95	68.43	0.48	3,730.11
RW - 12	03/10/11	3,798.13	67.95	68.35	0.40	3,730.12
RW - 12	03/15/11	3,798.13	67.99	68.34	0.35	3,730.09
RW - 12	03/18/11	3,798.13	67.98	68.39	0.41	3,730.09
RW - 12	03/22/11	3,798.13	67.96	68.36	0.40	3,730.11
RW - 12	03/24/11	3,798.13	68.00	68.38	0.38	3,730.07
RW - 12	03/29/11	3,798.13	68.00	68.31	0.31	3,730.08
RW - 12	04/01/11	3,798.13	67.95	68.33	0.38	3,730.12
RW - 12	04/08/11	3,798.13	67.95	68.30	0.35	3,730.13
RW - 12	04/12/11	3,798.13	67.94	68.34	0.40	3,730.13
RW - 12	04/14/11	3,798.13	67.90	68.26	0.36	3,730.18

TABLE 1

GROUNDWATER ELEVATION DATA

PLAINS MARKETING, L.P.
DARR ANGELL 4
LEA COUNTY, NEW MEXICO
NMOCD REFERENCE NUMBER AP-007

WELL NUMBER	DATE MEASURED	TOP OF CASING ELEVATION	DEPTH TO PRODUCT	DEPTH TO WATER	PSH THICKNESS	CORRECTED GROUND WATER ELEVATION
RW - 13	01/05/11	3,798.52	sheen	68.32	0.00	3,730.20
RW - 13	01/12/11	3,798.52	sheen	68.27	0.00	3,730.25
RW - 13	01/19/11	3,798.52	sheen	67.18	0.00	3,731.34
RW - 13	02/23/11	3,798.52	68.45	68.79	0.34	3,730.02
RW - 13	*03/02/11*	3,798.52	sheen	68.18	0.00	3,730.34
RW - 13	03/03/11	3,798.52	sheen	68.53	0.00	3,729.99
RW - 13	03/10/11	3,798.52	**LOCKED**			
RW - 13	03/22/11	3,798.52	**LOCKED**			
RW - 13	03/24/11	3,798.52	**LOCKED**			
RW - 13	03/29/11	3,798.52	**LOCKED**			
RW - 13	04/01/11	3,798.52	**LOCKED**			
RW - 13	04/08/11	3,798.52	**LOCKED**			

Elevations based on the North American Vertical Datum of 1929.

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
200 East Sunset Road, Suite E El Paso, Texas 79922 888•588•3443 915•585•3443 FAX 915•585•4944
5002 Basin Street, Suite A1 Midland, Texas 79703 432•689•6301 FAX 432•689•6313
6015 Harris Parkway, Suite 110 Ft. Worth, Texas 76132 817•201•5260
E-Mail: lab@traceanalysis.com

Certifications

WBENC: 237019 **HUB:** 1752439743100-86536 **DBE:** VN 20657
NCTRCA WFWB38444Y0909

NELAP Certifications

Lubbock: T104704219-08-TX LELAP-02003 Kansas E-10317 **El Paso:** T104704221-08-TX LELAP-02002 **Midland:** T104704392-08-TX

Analytical and Quality Control Report

Jason Henry
Plains All American Houston

P.O. Box 4648
Houston, Tx, 77210-4648

Report Date: March 14, 2011

Work Order: 11030302

Project Location: NE of Lovington, NM
Project Number: Darr Angel #4
SRS#: 2001-10876

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
259361	MW-3	water	2011-03-02	12:00	2011-03-03
259362	MW-16	water	2011-03-02	12:30	2011-03-03
259363	MW-10	water	2011-03-02	13:00	2011-03-03
259364	MW-14	water	2011-03-02	13:30	2011-03-03
259365	MW-6	water	2011-03-02	14:00	2011-03-03
259366	MW-8	water	2011-03-02	14:30	2011-03-03
259367	MW-15	water	2011-03-02	15:00	2011-03-03
259368	RW-5	water	2011-03-02	16:00	2011-03-03
259369	RW-13	water	2011-03-02	17:00	2011-03-03

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 14 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Dr. Blair Leftwich, Director
Dr. Michael Abel, Project Manager

Standard Flags

B - The sample contains less than ten times the concentration found in the method blank.

Case Narrative

Samples for project were received by TraceAnalysis, Inc. on 2011-03-03 and assigned to work order 11030302. Samples for work order 11030302 were received intact without headspace and at a temperature of 1.9 C.

Samples were analyzed for the following tests using their respective methods.

Test	Method	Prep Batch	Prep Date	QC Batch	Analysis Date
BTEX	S 8021B	67105	2011-03-07 at 08:25	79086	2011-03-07 at 08:25
BTEX	S 8021B	67107	2011-03-09 at 08:39	79089	2011-03-09 at 09:06
BTEX	S 8021B	67220	2011-03-11 at 14:52	79235	2011-03-12 at 03:58

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11030302 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Analytical Report

Sample: 259361 - MW-3

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	79086	Date Analyzed:	2011-03-07	Analyzed By:	ME
Prep Batch:	67105	Sample Preparation:	2011-03-07	Prepared By:	ME

Parameter	Flag	Result	RL	Units	Dilution	RL
Benzene		<0.00100		mg/L	1	0.00100
Toluene		<0.00100		mg/L	1	0.00100
Ethylbenzene		<0.00100		mg/L	1	0.00100
Xylene		<0.00100		mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0965	mg/L	1	0.100	96	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0868	mg/L	1	0.100	87	51.1 - 128

Sample: 259362 - MW-16

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	79086	Date Analyzed:	2011-03-07	Analyzed By:	ME
Prep Batch:	67105	Sample Preparation:	2011-03-07	Prepared By:	ME

Parameter	Flag	Result	RL	Units	Dilution	RL
Benzene		<0.00100		mg/L	1	0.00100
Toluene		<0.00100		mg/L	1	0.00100
Ethylbenzene		<0.00100		mg/L	1	0.00100
Xylene		<0.00100		mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.101	mg/L	1	0.100	101	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0863	mg/L	1	0.100	86	51.1 - 128

Sample: 259363 - MW-10

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	79089	Date Analyzed:	2011-03-09	Analyzed By:	ME
Prep Batch:	67107	Sample Preparation:	2011-03-09	Prepared By:	ME

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.107	mg/L	1	0.100	107	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0968	mg/L	1	0.100	97	51.1 - 128

Sample: 259364 - MW-14

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	79089	Date Analyzed:	2011-03-09	Analyzed By:	ME
Prep Batch:	67107	Sample Preparation:	2011-03-09	Prepared By:	ME

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.106	mg/L	1	0.100	106	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0950	mg/L	1	0.100	95	51.1 - 128

Sample: 259365 - MW-6

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	79089	Date Analyzed:	2011-03-09	Analyzed By:	ME
Prep Batch:	67107	Sample Preparation:	2011-03-09	Prepared By:	ME

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0945	mg/L	1	0.100	94	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0694	mg/L	1	0.100	69	51.1 - 128

Sample: 259366 - MW-8

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	79089	Date Analyzed:	2011-03-09	Analyzed By:	ME
Prep Batch:	67107	Sample Preparation:	2011-03-09	Prepared By:	ME

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		**0.00760**	mg/L	1	0.00100
Xylene		**0.0210**	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0902	mg/L	1	0.100	90	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.115	mg/L	1	0.100	115	51.1 - 128

Sample: 259367 - MW-15

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	79089	Date Analyzed:	2011-03-09	Analyzed By:	ME
Prep Batch:	67107	Sample Preparation:	2011-03-09	Prepared By:	ME

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.105	mg/L	1	0.100	105	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0875	mg/L	1	0.100	88	51.1 - 128

Sample: 259368 - RW-5

Laboratory: Midland
Analysis: BTEX | Analytical Method: S 8021B | Prep Method: S 5030B
QC Batch: 79089 | Date Analyzed: 2011-03-09 | Analyzed By: ME
Prep Batch: 67107 | Sample Preparation: 2011-03-09 | Prepared By: ME

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		**0.00830**	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		**0.0206**	mg/L	1	0.00100
Xylene		**0.0360**	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0956	mg/L	1	0.100	96	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0888	mg/L	1	0.100	89	51.1 - 128

Sample: 259369 - RW-13

Laboratory: Midland
Analysis: BTEX | Analytical Method: S 8021B | Prep Method: S 5030B
QC Batch: 79235 | Date Analyzed: 2011-03-12 | Analyzed By: ME
Prep Batch: 67220 | Sample Preparation: 2011-03-11 | Prepared By: ME

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		**1.21**	mg/L	50	0.00100
Toluene		**0.910**	mg/L	50	0.00100
Ethylbenzene		**0.914**	mg/L	50	0.00100
Xylene		**2.15**	mg/L	50	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		4.74	mg/L	50	5.00	95	67.8 - 126
4-Bromofluorobenzene (4-BFB)		4.93	mg/L	50	5.00	99	51.1 - 128

Method Blank (1) QC Batch: 79086

QC Batch: 79086 | Date Analyzed: 2011-03-07 | Analyzed By: ME
Prep Batch: 67105 | QC Preparation: 2011-03-07 | Prepared By: ME

Parameter	Flag	MDL Result	Units	RL
Benzene		<0.000400	mg/L	0.001
Toluene		<0.000300	mg/L	0.001
Ethylbenzene		<0.000300	mg/L	0.001
Xylene		<0.000333	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0825	mg/L	1	0.100	82	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.0826	mg/L	1	0.100	83	47.3 - 116

Method Blank (1) QC Batch: 79089

QC Batch: 79089 Date Analyzed: 2011-03-09 Analyzed By: ME
Prep Batch: 67107 QC Preparation: 2011-03-09 Prepared By: ME

Parameter	Flag	MDL Result	Units	RL
Benzene		<0.000400	mg/L	0.001
Toluene		<0.000300	mg/L	0.001
Ethylbenzene		<0.000300	mg/L	0.001
Xylene		<0.000333	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0948	mg/L	1	0.100	95	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.0918	mg/L	1	0.100	92	47.3 - 116

Method Blank (1) QC Batch: 79235

QC Batch: 79235 Date Analyzed: 2011-03-12 Analyzed By: ME
Prep Batch: 67220 QC Preparation: 2011-03-11 Prepared By: ME

Parameter	Flag	MDL Result	Units	RL
Benzene		<0.000400	mg/L	0.001
Toluene		<0.000300	mg/L	0.001
Ethylbenzene		<0.000300	mg/L	0.001
Xylene		<0.000333	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0791	mg/L	1	0.100	79	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.0886	mg/L	1	0.100	89	47.3 - 116

Laboratory Control Spike (LCS-1)

QC Batch: 79086 | Date Analyzed: 2011-03-07 | Analyzed By: ME
Prep Batch: 67105 | QC Preparation: 2011-03-07 | Prepared By: ME

Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	0.0964	mg/L	1	0.100	<0.000400	96	82.9 - 108
Toluene	0.0962	mg/L	1	0.100	<0.000300	96	82.7 - 107
Ethylbenzene	0.0936	mg/L	1	0.100	<0.000300	94	78.8 - 106
Xylene	0.282	mg/L	1	0.300	<0.000333	94	79.3 - 106

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene	0.0984	mg/L	1	0.100	<0.000400	98	82.9 - 108	2	20
Toluene	0.0972	mg/L	1	0.100	<0.000300	97	82.7 - 107	1	20
Ethylbenzene	0.0952	mg/L	1	0.100	<0.000300	95	78.8 - 106	2	20
Xylene	0.287	mg/L	1	0.300	<0.000333	96	79.3 - 106	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0948	0.0812	mg/L	1	0.100	95	81	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.0979	0.0857	mg/L	1	0.100	98	86	68.2 - 124

Laboratory Control Spike (LCS-1)

QC Batch: 79089 | Date Analyzed: 2011-03-09 | Analyzed By: ME
Prep Batch: 67107 | QC Preparation: 2011-03-09 | Prepared By: ME

Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	0.0888	mg/L	1	0.100	<0.000400	89	82.9 - 108
Toluene	0.0876	mg/L	1	0.100	<0.000300	88	82.7 - 107
Ethylbenzene	0.0874	mg/L	1	0.100	<0.000300	87	78.8 - 106
Xylene	0.262	mg/L	1	0.300	<0.000333	87	79.3 - 106

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene	0.0939	mg/L	1	0.100	<0.000400	94	82.9 - 108	6	20
Toluene	0.0926	mg/L	1	0.100	<0.000300	93	82.7 - 107	6	20
Ethylbenzene	0.0909	mg/L	1	0.100	<0.000300	91	78.8 - 106	4	20
Xylene	0.275	mg/L	1	0.300	<0.000333	92	79.3 - 106	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0956	0.0978	mg/L	1	0.100	96	98	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.0948	0.0993	mg/L	1	0.100	95	99	68.2 - 124

Laboratory Control Spike (LCS-1)

QC Batch: 79235 Date Analyzed: 2011-03-12 Analyzed By: ME
Prep Batch: 67220 QC Preparation: 2011-03-11 Prepared By: ME

Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	0.102	mg/L	1	0.100	<0.000400	102	82.9 - 108
Toluene	0.103	mg/L	1	0.100	<0.000300	103	82.7 - 107
Ethylbenzene	0.101	mg/L	1	0.100	<0.000300	101	78.8 - 106
Xylene	0.306	mg/L	1	0.300	<0.000333	102	79.3 - 106

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene	0.102	mg/L	1	0.100	<0.000400	102	82.9 - 108	0	20
Toluene	0.102	mg/L	1	0.100	<0.000300	102	82.7 - 107	1	20
Ethylbenzene	0.102	mg/L	1	0.100	<0.000300	102	78.8 - 106	1	20
Xylene	0.306	mg/L	1	0.300	<0.000333	102	79.3 - 106	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0907	0.100	mg/L	1	0.100	91	100	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.105	0.113	mg/L	1	0.100	105	113	68.2 - 124

Matrix Spike (MS-1) Spiked Sample: 259361

QC Batch: 79086 Date Analyzed: 2011-03-07 Analyzed By: ME
Prep Batch: 67105 QC Preparation: 2011-03-07 Prepared By: ME

Param	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	0.0819	mg/L	1	0.100	<0.000400	82	77.9 - 114
Toluene	0.0827	mg/L	1	0.100	<0.000300	83	78.3 - 111
Ethylbenzene	0.0832	mg/L	1	0.100	<0.000300	83	75.3 - 110
Xylene	0.250	mg/L	1	0.300	<0.000333	83	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene	0.0841	mg/L	1	0.100	<0.000400	84	77.9 - 114	3	20
Toluene	0.0847	mg/L	1	0.100	<0.000300	85	78.3 - 111	2	20
Ethylbenzene	0.0849	mg/L	1	0.100	<0.000300	85	75.3 - 110	2	20
Xylene	0.253	mg/L	1	0.300	<0.000333	84	75.7 - 109	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0909	0.0934	mg/L	1	0.1	91	93	68.3 - 107
4-Bromofluorobenzene (4-BFB)	0.0862	0.0904	mg/L	1	0.1	86	90	60.1 - 135

Matrix Spike (MS-1) Spiked Sample: 259745

QC Batch: 79089 Date Analyzed: 2011-03-09 Analyzed By: ME
Prep Batch: 67107 QC Preparation: 2011-03-09 Prepared By: ME

Param	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	0.926	mg/L	10	1.00	0.0924	83	77.9 - 114
Toluene	0.883	mg/L	10	1.00	<0.00300	88	78.3 - 111
Ethylbenzene	1.04	mg/L	10	1.00	0.02564	101	75.3 - 110
Xylene	2.96	mg/L	10	3.00	0.6685	76	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene	0.948	mg/L	10	1.00	0.0924	86	77.9 - 114	2	20
Toluene	0.906	mg/L	10	1.00	<0.00300	91	78.3 - 111	3	20
Ethylbenzene	1.06	mg/L	10	1.00	0.02564	80	75.3 - 110	2	20
Xylene	3.05	mg/L	10	3.00	0.6685	79	75.7 - 109	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.980	0.992	mg/L	10	1	98	99	68.3 - 107
4-Bromofluorobenzene (4-BFB)	0.815	0.819	mg/L	10	1	82	82	60.1 - 135

Matrix Spike (MS-1) Spiked Sample: 259747

QC Batch: 79235 Date Analyzed: 2011-03-12 Analyzed By: ME
Prep Batch: 67220 QC Preparation: 2011-03-11 Prepared By: ME

Param	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	1.80	mg/L	10	1.00	0.8487	95	77.9 - 114
Toluene	0.948	mg/L	10	1.00	<0.00300	95	78.3 - 111
Ethylbenzene	0.916	mg/L	10	1.00	<0.00300	92	75.3 - 110
Xylene	2.73	mg/L	10	3.00	0.1985	84	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene	1.82	mg/L	10	1.00	0.8487	97	77.9 - 114	1	20
Toluene	0.972	mg/L	10	1.00	<0.00300	97	78.3 - 111	2	20
Ethylbenzene	0.949	mg/L	10	1.00	<0.00300	95	75.3 - 110	4	20
Xylene	2.83	mg/L	10	3.00	0.1985	88	75.7 - 109	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.927	0.886	mg/L	10	1	93	89	68.3 - 107
4-Bromofluorobenzene (4-BFB)	0.937	0.898	mg/L	10	1	94	90	60.1 - 135

Standard (CCV-2)

QC Batch: 79086 Date Analyzed: 2011-03-07 Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0935	94	80 - 120	2011-03-07
Toluene		mg/L	0.100	0.0921	92	80 - 120	2011-03-07
Ethylbenzene		mg/L	0.100	0.0911	91	80 - 120	2011-03-07
Xylene		mg/L	0.300	0.269	90	80 - 120	2011-03-07

Standard (CCV-3)

QC Batch: 79086 Date Analyzed: 2011-03-07 Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0978	98	80 - 120	2011-03-07
Toluene		mg/L	0.100	0.0965	96	80 - 120	2011-03-07
Ethylbenzene		mg/L	0.100	0.0938	94	80 - 120	2011-03-07
Xylene		mg/L	0.300	0.281	94	80 - 120	2011-03-07

Standard (CCV-1)

QC Batch: 79089 Date Analyzed: 2011-03-09 Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0926	93	80 - 120	2011-03-09
Toluene		mg/L	0.100	0.0908	91	80 - 120	2011-03-09
Ethylbenzene		mg/L	0.100	0.0889	89	80 - 120	2011-03-09
Xylene		mg/L	0.300	0.264	88	80 - 120	2011-03-09

Standard (CCV-2)

QC Batch: 79089 Date Analyzed: 2011-03-09 Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0921	92	80 - 120	2011-03-09
Toluene		mg/L	0.100	0.0898	90	80 - 120	2011-03-09
Ethylbenzene		mg/L	0.100	0.0880	88	80 - 120	2011-03-09
Xylene		mg/L	0.300	0.255	85	80 - 120	2011-03-09

Standard (CCV-3)

QC Batch: 79089 Date Analyzed: 2011-03-09 Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0917	92	80 - 120	2011-03-09
Toluene		mg/L	0.100	0.0906	91	80 - 120	2011-03-09
Ethylbenzene		mg/L	0.100	0.0870	87	80 - 120	2011-03-09
Xylene		mg/L	0.300	0.256	85	80 - 120	2011-03-09

Standard (CCV-2)

QC Batch: 79235 Date Analyzed: 2011-03-12 Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.100	100	80 - 120	2011-03-12
Toluene		mg/L	0.100	0.0982	98	80 - 120	2011-03-12
Ethylbenzene		mg/L	0.100	0.0932	93	80 - 120	2011-03-12

continued ...

standard continued ...

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Xylene		mg/L	0.300	0.279	93	80 - 120	2011-03-12

Standard (CCV-3)

QC Batch: 79235 Date Analyzed: 2011-03-12 Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0959	96	80 - 120	2011-03-12
Toluene		mg/L	0.100	0.0945	94	80 - 120	2011-03-12
Ethylbenzene		mg/L	0.100	0.0927	93	80 - 120	2011-03-12
Xylene		mg/L	0.300	0.276	92	80 - 120	2011-03-12

Summary Report

Todd Wells
CRA-Midland
2135 South Loop 250 West
Midland, TX 79703

Report Date: June 23, 2011

Work Order: 11061712

Project Location: Lea Co., NM
Project Name: Darr Angell #4 Site
Project Number: 074684
SRS #: 2001-10876

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
269691	Dup-1 061511	water	2011-06-15	00:00	2011-06-17
269692	MW-3 061511	water	2011-06-15	13:30	2011-06-17
269693	MW-6 061511	water	2011-06-15	15:30	2011-06-17
269694	MW-8 061511	water	2011-06-15	15:00	2011-06-17
269695	MW-9 061511	water	2011-06-15	14:30	2011-06-17
269696	MW-14 061511	water	2011-06-15	14:10	2011-06-17
269697	MW-15 061511	water	2011-06-15	13:35	2011-06-17
269698	MW-16 061511	water	2011-06-15	14:45	2011-06-17
269699	RW-5 061511	water	2011-06-15	15:15	2011-06-17
269700	MW-10 061511	water	2011-06-15	13:45	2011-06-17

	BTEX			
Sample - Field Code	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)
269691 - Dup-1 061511	<0.00100	<0.00100	<0.00100	<0.00100
269692 - MW-3 061511	<0.00100	<0.00100	<0.00100	<0.00100
269693 - MW-6 061511	<0.00100	<0.00100	<0.00100	<0.00100
269694 - MW-8 061511	<0.00100	<0.00100	<0.00100	<0.00100
269695 - MW-9 061511	<0.00100	<0.00100	<0.00100	<0.00100
269696 - MW-14 061511	<0.00100	<0.00100	<0.00100	<0.00100
269697 - MW-15 061511	<0.00100	<0.00100	<0.00100	<0.00100
269698 - MW-16 061511	<0.00100	<0.00100	<0.00100	<0.00100
269699 - RW-5 061511	**0.0109**	**0.00810**	**0.0550**	**0.0773**
269700 - MW-10 061511	<0.00100	<0.00100	<0.00100	<0.00100

TRACEANALYSIS, INC.

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5002 Basin Street, Suite A1 Midland, Texas 79703 432•689•6301 FAX 432•689•6313
6015 Harris Parkway, Suite 110 Ft. Worth, Texas 76132 817•201•5260
E-Mail: lab@traceanalysis.com

Certifications

WBE HUB NCTRCA DBE NELAP DoD LELAP Kansas Oklahoma ISO 17025

Analytical and Quality Control Report

Todd Wells
CRA-Midland
2135 South Loop 250 West
Midland, TX, 79703

Report Date: June 23, 2011

Work Order: 11061712

Project Location: Lea Co., NM
Project Name: Darr Angell #4 Site
Project Number: 074684
SRS #: 2001-10876

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
269691	Dup-1 061511	water	2011-06-15	00:00	2011-06-17
269692	MW-3 061511	water	2011-06-15	13:30	2011-06-17
269693	MW-6 061511	water	2011-06-15	15:30	2011-06-17
269694	MW-8 061511	water	2011-06-15	15:00	2011-06-17
269695	MW-9 061511	water	2011-06-15	14:30	2011-06-17
269696	MW-14 061511	water	2011-06-15	14:10	2011-06-17
269697	MW-15 061511	water	2011-06-15	13:35	2011-06-17
269698	MW-16 061511	water	2011-06-15	14:45	2011-06-17
269699	RW-5 061511	water	2011-06-15	15:15	2011-06-17
269700	MW-10 061511	water	2011-06-15	13:45	2011-06-17

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

Blair Leftwich

Dr. Blair Leftwich, Director
Dr. Michael Abel, Project Manager

Report Contents

Case Narrative

Samples for project Darr Angell #4 Site were received by TraceAnalysis, Inc. on 2011-06-17 and assigned to work order 11061712. Samples for work order 11061712 were received intact without headspace and at a temperature of 3.7 C.

Samples were analyzed for the following tests using their respective methods.

Test	Method	Prep Batch	Prep Date	QC Batch	Analysis Date
BTEX	S 8021B	69993	2011-06-22 at 08:33	82424	2011-06-22 at 08:33

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11061712 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Analytical Report

Sample: 269691 - Dup-1 061511

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	Sample Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.00100	mg/L	1	0.00100
Toluene		1	<0.00100	mg/L	1	0.00100
Ethylbenzene		1	<0.00100	mg/L	1	0.00100
Xylene		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0847	mg/L	1	0.100	85	67.8 - 129
4-Bromofluorobenzene (4-BFB)			0.0782	mg/L	1	0.100	78	51.1 - 128

Sample: 269692 - MW-3 061511

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	Sample Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.00100	mg/L	1	0.00100
Toluene		1	<0.00100	mg/L	1	0.00100
Ethylbenzene		1	<0.00100	mg/L	1	0.00100
Xylene		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0810	mg/L	1	0.100	81	67.8 - 129
4-Bromofluorobenzene (4-BFB)			0.0720	mg/L	1	0.100	72	51.1 - 128

Sample: 269693 - MW-6 061511

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	Sample Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.00100	mg/L	1	0.00100
Toluene		1	<0.00100	mg/L	1	0.00100
Ethylbenzene		1	<0.00100	mg/L	1	0.00100
Xylene		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0891	mg/L	1	0.100	89	67.8 - 129
4-Bromofluorobenzene (4-BFB)			0.0797	mg/L	1	0.100	80	51.1 - 128

Sample: 269694 - MW-8 061511

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	Sample Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.00100	mg/L	1	0.00100
Toluene		1	<0.00100	mg/L	1	0.00100
Ethylbenzene		1	<0.00100	mg/L	1	0.00100
Xylene		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0878	mg/L	1	0.100	88	67.8 - 129
4-Bromofluorobenzene (4-BFB)			0.0947	mg/L	1	0.100	95	51.1 - 128

Sample: 269695 - MW-9 061511

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	Sample Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.00100	mg/L	1	0.00100
Toluene		1	<0.00100	mg/L	1	0.00100
Ethylbenzene		1	<0.00100	mg/L	1	0.00100
Xylene		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0862	mg/L	1	0.100	86	67.8 - 129
4-Bromofluorobenzene (4-BFB)			0.0822	mg/L	1	0.100	82	51.1 - 128

Sample: 269696 - MW-14 061511

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	Sample Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.00100	mg/L	1	0.00100
Toluene		1	<0.00100	mg/L	1	0.00100
Ethylbenzene		1	<0.00100	mg/L	1	0.00100
Xylene		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0882	mg/L	1	0.100	88	67.8 - 129
4-Bromofluorobenzene (4-BFB)			0.0822	mg/L	1	0.100	82	51.1 - 128

Sample: 269697 - MW-15 061511

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	Sample Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.00100	mg/L	1	0.00100
Toluene		1	<0.00100	mg/L	1	0.00100
Ethylbenzene		1	<0.00100	mg/L	1	0.00100
Xylene		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0876	mg/L	1	0.100	88	67.8 - 129
4-Bromofluorobenzene (4-BFB)			0.0802	mg/L	1	0.100	80	51.1 - 128

Sample: 269698 - MW-16 061511

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	Sample Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.00100	mg/L	1	0.00100
Toluene		1	<0.00100	mg/L	1	0.00100
Ethylbenzene		1	<0.00100	mg/L	1	0.00100
Xylene		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0892	mg/L	1	0.100	89	67.8 - 129
4-Bromofluorobenzene (4-BFB)			0.0819	mg/L	1	0.100	82	51.1 - 128

Sample: 269699 - RW-5 061511

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	Sample Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	**0.0109**	mg/L	1	0.00100
Toluene		1	**0.00810**	mg/L	1	0.00100
Ethylbenzene		1	**0.0550**	mg/L	1	0.00100
Xylene		1	**0.0773**	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0932	mg/L	1	0.100	93	67.8 - 129
4-Bromofluorobenzene (4-BFB)			0.0935	mg/L	1	0.100	94	51.1 - 128

Sample: 269700 - MW-10 061511

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	Sample Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.00100	mg/L	1	0.00100
Toluene		1	<0.00100	mg/L	1	0.00100
Ethylbenzene		1	<0.00100	mg/L	1	0.00100
Xylene		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0854	mg/L	1	0.100	85	67.8 - 129
4-Bromofluorobenzene (4-BFB)			0.0808	mg/L	1	0.100	81	51.1 - 128

Method Blanks

Method Blank (1) QC Batch: 82424

QC Batch:	82424	Date Analyzed:	2011-06-22	Analyzed By:	ME
Prep Batch:	69993	QC Preparation:	2011-06-22	Prepared By:	ME

Parameter	Flag	Cert	MDL Result	Units	RL
Benzene		1	<0.000400	mg/L	0.001
Toluene		1	<0.000300	mg/L	0.001
Ethylbenzene		1	<0.000300	mg/L	0.001
Xylene		1	<0.000333	mg/L	0.001

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0898	mg/L	1	0.100	90	70.2 - 118
4-Bromofluorobenzene (4-BFB)			0.0782	mg/L	1	0.100	78	47.3 - 116

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: 82424 | Date Analyzed: 2011-06-22 | Analyzed By: ME
Prep Batch: 69993 | QC Preparation: 2011-06-22 | Prepared By: ME

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	0.0999	mg/L	1	0.100	<0.000400	100	76.8 - 110
Toluene		1	0.107	mg/L	1	0.100	<0.000300	107	81 - 118
Ethylbenzene		1	0.0906	mg/L	1	0.100	<0.000300	91	78.8 - 118
Xylene		1	0.270	mg/L	1	0.300	<0.000333	90	80.3 - 119

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	0.106	mg/L	1	0.100	<0.000400	106	76.8 - 110	6	20
Toluene		1	0.115	mg/L	1	0.100	<0.000300	115	81 - 118	7	20
Ethylbenzene		1	0.0981	mg/L	1	0.100	<0.000300	98	78.8 - 118	8	20
Xylene		1	0.292	mg/L	1	0.300	<0.000333	97	80.3 - 119	8	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0918	0.0901	mg/L	1	0.100	92	90	66.6 - 114
4-Bromofluorobenzene (4-BFB)	0.0877	0.0873	mg/L	1	0.100	88	87	68.2 - 124

Matrix Spike (MS-1) Spiked Sample: 269706

QC Batch: 82424 | Date Analyzed: 2011-06-22 | Analyzed By: ME
Prep Batch: 69993 | QC Preparation: 2011-06-22 | Prepared By: ME

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	6.05	mg/L	50	5.00	1.3048	95	77.9 - 114
Toluene		1	5.43	mg/L	50	5.00	<0.0150	109	78.3 - 111
Ethylbenzene		1	4.55	mg/L	50	5.00	<0.0150	91	75.3 - 110
Xylene		1	13.7	mg/L	50	15.0	<0.0166	91	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	6.00	mg/L	50	5.00	1.3048	94	77.9 - 114	1	20
Toluene		1	5.42	mg/L	50	5.00	<0.0150	108	78.3 - 111	0	20
Ethylbenzene		1	4.68	mg/L	50	5.00	<0.0150	94	75.3 - 110	3	20
Xylene		1	13.9	mg/L	50	15.0	<0.0166	93	75.7 - 109	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	4.52	4.35	mg/L	50	5	90	87	68.3 - 107
4-Bromofluorobenzene (4-BFB)	4.46	4.22	mg/L	50	5	89	84	60.1 - 135

Calibration Standards

Standard (CCV-1)

QC Batch: 82424 | Date Analyzed: 2011-06-22 | Analyzed By: ME

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.102	102	80 - 120	2011-06-22
Toluene		1	mg/L	0.100	0.108	108	80 - 120	2011-06-22
Ethylbenzene		1	mg/L	0.100	0.0910	91	80 - 120	2011-06-22
Xylene		1	mg/L	0.300	0.270	90	80 - 120	2011-06-22

Standard (CCV-2)

QC Batch: 82424 | Date Analyzed: 2011-06-22 | Analyzed By: ME

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.108	108	80 - 120	2011-06-22
Toluene		1	mg/L	0.100	0.114	114	80 - 120	2011-06-22
Ethylbenzene		1	mg/L	0.100	0.0958	96	80 - 120	2011-06-22
Xylene		1	mg/L	0.300	0.287	96	80 - 120	2011-06-22

Standard (CCV-3)

QC Batch: 82424 | Date Analyzed: 2011-06-22 | Analyzed By: ME

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.105	105	80 - 120	2011-06-22
Toluene		1	mg/L	0.100	0.112	112	80 - 120	2011-06-22
Ethylbenzene		1	mg/L	0.100	0.0950	95	80 - 120	2011-06-22
Xylene		1	mg/L	0.300	0.283	94	80 - 120	2011-06-22

Appendix

Laboratory Certifications

C	Certifying Authority	Certification Number	Laboratory Location
-	NCTRCA	WFWB384444Y0909	TraceAnalysis
-	DBE	VN 20657	TraceAnalysis
-	HUB	1752439743100-86536	TraceAnalysis
-	WBE	237019	TraceAnalysis
1	NELAP	T104704392-10-TX	Midland

Standard Flags

F	Description
B	Analyte detected in the corresponding method blank above the method detection limit
H	Analyzed out of hold time
J	Estimated concentration
Jb	The analyte is positively identified and the value is approximated between the SDL and MQL. Sample contains less then ten times the concentration found in the method blank. The result should be considered non-detect to the SDL.
Je	Estimated concentration exceeding calibration range.
Qc	Calibration check outside of laboratory limits.
Qr	RPD outside of laboratory limits
Qs	Spike recovery outside of laboratory limits.
Qsr	Surrogate recovery outside of laboratory limits.
U	The analyte is not detected above the SDL

Attachments

The scanned attachments will follow this page.
Please note, each attachment may consist of more than one page.

LAB Order ID # 11061712

Page 1 of 1

TraceAnalysis, Inc.

email: lab@traceanalysis.com

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Lubbock, Texas 79424
Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296

5002 Basin Street, Suite A1
Midland, Texas 79703
Tel (432) 689-6301
Fax (432) 689-6313

200 East Sunset Rd., Suite E
El Paso, Texas 79922
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

BioAquatic Testing
2501 Mayes Rd., Ste 100
Carrollton, Texas 75006
Tel (972) 242-7750

Company Name: CRA
Phone #: 432-686-0086
Address: (Street, City, Zip) 2135 S. Loop 250 West Midland, TX
Fax #: 686-0186
Contact Person: Todd Wells
E-mail: Twells@Craworld.com
Invoice to: (If different from above) Jason Henry - Plains SRS # 2001-10876
Project #: 074684
Project Name: Darr Angell #4
Project Location (including state): Lea County, NM
Sampler Signature: [signature]

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume / Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME	MTBE 8021 / 602 / 8260 / 624	BTEX (8021B) / 602 / 8260 / 624	TPH 418.1 / TX1005 / TX1005 Ext(C35)	TPH 8015 GRO / DRO / TVHC	PAH 8270 / 625	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260 / 624	GC/MS Semi. Vol. 8270 / 625	PCB's 8082 / 608	Pesticides 8081 / 608	BOD, TSS, pH	Moisture Content	Cl, Fl, S04, NO3, NO2, Alkalinity	Na, Ca, Mg, K, TDS, EC	Turn Around Time if different from standard	Hold
269691	DUP-1 061511	3		✓				✓						6-15-11			✓																			
692	MW-3 061511	3		✓				✓						6-15-11	1330		✓																			
693	MW-6 061511	3		✓				✓						6-15-11	1530		✓																			
694	MW-8 061511	3		✓				✓						6-15-11	1500		✓																			
695	MW-9 061511	3		✓				✓						6-15-11	1430		✓																			
696	MW-14 061511	3		✓				✓						6-15-11	1410		✓																			
697	MW-15 061511	3		✓				✓						6-15-11	1335		✓																			
698	MW-16 061511	3		✓				✓						6-15-11	1445		✓																			
699	RW-5 061511	3		✓				✓						6-15-11	1515		✓																			
700	MW-10 061511	3		✓				✓						6-15-11	1345		✓																			

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	
[signature]	CRA	6-17-11	0910	[signature]	TA	6-17-11	9:10	INST ___ OBS 3.7 °C COR 3.7 °C
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	INST ___ OBS ___ °C COR ___ °C
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	INST ___ OBS ___ °C COR ___ °C

LAB USE ONLY
Intact (Y) / N
Headspace Y / (N) / NA
Log-in-Review

REMARKS:
*All tests Midland

☐ Dry Weight Basis Required
☐ TRRP Report Required
☐ Check If Special Reporting Limits Are Needed

Carrier # Courier

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C.

ORIGINAL COPY

Summary Report

Todd Wells
CRA-Midland
2135 South Loop 250 West
Midland, TX 79703

Report Date: September 20, 2011

Work Order: 11091507

Project Location: Lea Co., NM
Project Name: Darr Angel #4 Site
Project Number: 074684
SRS #: 2001-10876

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
277175	MW-3 091311	water	2011-09-13	09:30	2011-09-14
277176	MW-10 091311	water	2011-09-13	09:40	2011-09-14
277177	MW-15 091311	water	2011-09-13	09:50	2011-09-14
277178	Dup-3 091311	water	2011-09-13	00:00	2011-09-14
277179	MW-14 091311	water	2011-09-13	10:00	2011-09-14
277180	MW-16 091311	water	2011-09-13	10:05	2011-09-14
277181	MW-8 091311	water	2011-09-13	10:10	2011-09-14
277182	RW-5 091311	water	2011-09-13	10:30	2011-09-14
277183	MW-6 091311	water	2011-09-13	10:20	2011-09-14

	BTEX			
Sample - Field Code	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)
277175 - MW-3 091311	<0.00100	<0.00100	<0.00100	<0.00100
277176 - MW-10 091311	<0.00100	<0.00100	<0.00100	<0.00100
277177 - MW-15 091311	<0.00100	<0.00100	<0.00100	<0.00100
277178 - Dup-3 091311	<0.00100	<0.00100	<0.00100	<0.00100
277179 - MW-14 091311	<0.00100	<0.00100	<0.00100	<0.00100
277180 - MW-16 091311	<0.00100	<0.00100	<0.00100	<0.00100
277181 - MW-8 091311	<0.00100	<0.00100	<0.00100	**0.00700**
277182 - RW-5 091311	**0.0151**	**0.00850**	**0.247**	**0.382**
277183 - MW-6 091311	<0.00100	<0.00100	<0.00100	<0.00100

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
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5002 Basin Street, Suite A1 Midland, Texas 79703 432•689•6301 FAX 432•689•6313
6015 Harris Parkway, Suite 110 Ft. Worth, Texas 76132 817•201•5260
E-Mail: lab@traceanalysis.com

Certifications

WBE HUB NCTRCA DBE NELAP DoD LELAP Kansas Oklahoma ISO 17025

Analytical and Quality Control Report

Todd Wells
CRA-Midland
2135 South Loop 250 West
Midland, TX, 79703

Report Date: September 20, 2011

Work Order: 11091507

Project Location: Lea Co., NM
Project Name: Darr Angel #4 Site
Project Number: 074684
SRS #: 2001-10876

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
277175	MW-3 091311	water	2011-09-13	09:30	2011-09-14
277176	MW-10 091311	water	2011-09-13	09:40	2011-09-14
277177	MW-15 091311	water	2011-09-13	09:50	2011-09-14
277178	Dup-3 091311	water	2011-09-13	00:00	2011-09-14
277179	MW-14 091311	water	2011-09-13	10:00	2011-09-14
277180	MW-16 091311	water	2011-09-13	10:05	2011-09-14
277181	MW-8 091311	water	2011-09-13	10:10	2011-09-14
277182	RW-5 091311	water	2011-09-13	10:30	2011-09-14
277183	MW-6 091311	water	2011-09-13	10:20	2011-09-14

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

Blair Leftwich

Dr. Blair Leftwich, Director
Dr. Michael Abel, Project Manager

Report Contents

Case Narrative

Samples for project Darr Angel #4 Site were received by TraceAnalysis, Inc. on 2011-09-14 and assigned to work order 11091507. Samples for work order 11091507 were received intact without headspace and at a temperature of 4.0 C.

Samples were analyzed for the following tests using their respective methods.

Test	Method	Prep Batch	Prep Date	QC Batch	Analysis Date
BTEX	S 8021B	72009	2011-09-18 at 17:00	84788	2011-09-19 at 01:44

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11091507 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Analytical Report

Sample: 277175 - MW-3 091311

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	84788	Date Analyzed:	2011-09-19	Analyzed By:	AG
Prep Batch:	72009	Sample Preparation:	2011-09-18	Prepared By:	AG

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
Benzene	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.105	mg/L	1	0.100	105	79.1 - 127.2
4-Bromofluorobenzene (4-BFB)			0.0771	mg/L	1	0.100	77	67.5 - 140.8

Sample: 277176 - MW-10 091311

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	84788	Date Analyzed:	2011-09-19	Analyzed By:	AG
Prep Batch:	72009	Sample Preparation:	2011-09-18	Prepared By:	AG

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
Benzene	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0984	mg/L	1	0.100	98	79.1 - 127.2
4-Bromofluorobenzene (4-BFB)			0.0725	mg/L	1	0.100	72	67.5 - 140.8

Sample: 277177 - MW-15 091311

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	84788	Date Analyzed:	2011-09-19	Analyzed By:	AG
Prep Batch:	72009	Sample Preparation:	2011-09-18	Prepared By:	AG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.105	mg/L	1	0.100	105	79.1 - 127.2
4-Bromofluorobenzene (4-BFB)			0.0784	mg/L	1	0.100	78	67.5 - 140.8

Sample: 277178 - Dup-3 091311

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	84788	Date Analyzed:	2011-09-19	Analyzed By:	AG
Prep Batch:	72009	Sample Preparation:	2011-09-18	Prepared By:	AG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.104	mg/L	1	0.100	104	79.1 - 127.2
4-Bromofluorobenzene (4-BFB)			0.0750	mg/L	1	0.100	75	67.5 - 140.8

Sample: 277179 - MW-14 091311

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	84788	Date Analyzed:	2011-09-19	Analyzed By:	AG
Prep Batch:	72009	Sample Preparation:	2011-09-18	Prepared By:	AG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.101	mg/L	1	0.100	101	79.1 - 127.2
4-Bromofluorobenzene (4-BFB)			0.0744	mg/L	1	0.100	74	67.5 - 140.8

Sample: 277180 - MW-16 091311

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	84788	Date Analyzed:	2011-09-19	Analyzed By:	AG
Prep Batch:	72009	Sample Preparation:	2011-09-18	Prepared By:	AG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.104	mg/L	1	0.100	104	79.1 - 127.2
4-Bromofluorobenzene (4-BFB)			0.0749	mg/L	1	0.100	75	67.5 - 140.8

Sample: 277181 - MW-8 091311

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	84788	Date Analyzed:	2011-09-19	Analyzed By:	AG
Prep Batch:	72009	Sample Preparation:	2011-09-18	Prepared By:	AG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	1	<0.00100	mg/L	1	0.00100
Xylene		1	**0.00700**	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0894	mg/L	1	0.100	89	79.1 - 127.2
4-Bromofluorobenzene (4-BFB)			0.108	mg/L	1	0.100	108	67.5 - 140.8

Sample: 277182 - RW-5 091311

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	84788	Date Analyzed:	2011-09-19	Analyzed By:	AG
Prep Batch:	72009	Sample Preparation:	2011-09-18	Prepared By:	AG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	**0.0151**	mg/L	1	0.00100
Toluene		1	**0.00850**	mg/L	1	0.00100
Ethylbenzene		1	**0.247**	mg/L	1	0.00100
Xylene		1	**0.382**	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.110	mg/L	1	0.100	110	79.1 - 127.2
4-Bromofluorobenzene (4-BFB)			0.125	mg/L	1	0.100	125	67.5 - 140.8

Sample: 277183 - MW-6 091311

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	84788	Date Analyzed:	2011-09-19	Analyzed By:	AG
Prep Batch:	72009	Sample Preparation:	2011-09-18	Prepared By:	AG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.101	mg/L	1	0.100	101	79.1 - 127.2
4-Bromofluorobenzene (4-BFB)			0.0727	mg/L	1	0.100	73	67.5 - 140.8

Method Blanks

Method Blank (1) QC Batch: 84788

QC Batch:	84788	Date Analyzed:	2011-09-19	Analyzed By:	AG
Prep Batch:	72009	QC Preparation:	2011-09-18	Prepared By:	AG

Parameter	Flag	Cert	MDL Result	Units	RL
Benzene		1	<0.000400	mg/L	0.001
Toluene		1	<0.000300	mg/L	0.001
Ethylbenzene		1	<0.000300	mg/L	0.001
Xylene		1	<0.000333	mg/L	0.001

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.102	mg/L	1	0.100	102	61.1 - 118.4
4-Bromofluorobenzene (4-BFB)			0.0813	mg/L	1	0.100	81	45.9 - 126.4

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: 84788 | Date Analyzed: 2011-09-19 | Analyzed By: AG
Prep Batch: 72009 | QC Preparation: 2011-09-18 | Prepared By: AG

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	0.108	mg/L	1	0.100	<0.000400	108	76.8 - 120.3
Toluene		1	0.104	mg/L	1	0.100	<0.000300	104	90.9 - 122.2
Ethylbenzene		1	0.0999	mg/L	1	0.100	<0.000300	100	72.7 - 120.2
Xylene		1	0.291	mg/L	1	0.300	<0.000333	97	72.1 - 121.5

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	0.107	mg/L	1	0.100	<0.000400	107	76.8 - 120.3	7	20
Toluene		1	0.0997	mg/L	1	0.100	<0.000300	100	90.9 - 122.2	7	20
Ethylbenzene		1	0.0967	mg/L	1	0.100	<0.000300	97	72.7 - 120.2	5	20
Xylene		1	0.286	mg/L	1	0.300	<0.000333	95	72.1 - 121.5	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0967	0.0989	mg/L	1	0.100	97	99	61.9 - 119.2
4-Bromofluorobenzene (4-BFB)	0.0894	0.0936	mg/L	1	0.100	89	94	56.4 - 127.9

Matrix Spike (MS-1) Spiked Sample: 277190

QC Batch: 84788 | Date Analyzed: 2011-09-19 | Analyzed By: AG
Prep Batch: 72009 | QC Preparation: 2011-09-18 | Prepared By: AG

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	1.71	mg/L	10	1.00	0.5298	118	66.9 - 128.2
Toluene		1	1.08	mg/L	10	1.00	<0.00300	108	81.6 - 122.9
Ethylbenzene		1	1.06	mg/L	10	1.00	<0.00300	106	62.7 - 117.9
Xylene		1	3.04	mg/L	10	3.00	<0.00333	101	62.9 - 118.2

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	1.75	mg/L	10	1.00	0.5298	122	66.9 - 128.2	2	20
Toluene		1	1.09	mg/L	10	1.00	<0.00300	109	81.6 - 122.9	1	20
Ethylbenzene		1	1.08	mg/L	10	1.00	<0.00300	108	62.7 - 117.9	2	20
Xylene		1	3.13	mg/L	10	3.00	<0.00333	104	62.9 - 118.2	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	1.00	1.02	mg/L	10	1	100	102	58.6 - 119.7
4-Bromofluorobenzene (4-BFB)	0.944	0.968	mg/L	10	1	94	97	52.2 - 135.8

Calibration Standards

Standard (CCV-1)

QC Batch: 84788 | Date Analyzed: 2011-09-19 | Analyzed By: AG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.117	117	80 - 120	2011-09-19
Toluene		1	mg/L	0.100	0.109	109	80 - 120	2011-09-19
Ethylbenzene		1	mg/L	0.100	0.106	106	80 - 120	2011-09-19
Xylene		1	mg/L	0.300	0.311	104	80 - 120	2011-09-19

Standard (CCV-2)

QC Batch: 84788 | Date Analyzed: 2011-09-19 | Analyzed By: AG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.112	112	80 - 120	2011-09-19
Toluene		1	mg/L	0.100	0.101	101	80 - 120	2011-09-19
Ethylbenzene		1	mg/L	0.100	0.0963	96	80 - 120	2011-09-19
Xylene		1	mg/L	0.300	0.281	94	80 - 120	2011-09-19

Appendix

Laboratory Certifications

C	Certifying Authority	Certification Number	Laboratory Location
-	NCTRCA	WFWB384444Y0909	TraceAnalysis
-	DBE	VN 20657	TraceAnalysis
-	HUB	1752439743100-86536	TraceAnalysis
-	WBE	237019	TraceAnalysis
1	NELAP	T104704392-10-TX	Midland

Standard Flags

F	Description
B	Analyte detected in the corresponding method blank above the method detection limit
H	Analyzed out of hold time
J	Estimated concentration
Jb	The analyte is positively identified and the value is approximated between the SDL and MQL. Sample contains less then ten times the concentration found in the method blank. The result should be considered non-detect to the SDL.
Je	Estimated concentration exceeding calibration range.
Qc	Calibration check outside of laboratory limits.
Qr	RPD outside of laboratory limits
Qs	Spike recovery outside of laboratory limits.
Qsr	Surrogate recovery outside of laboratory limits.
U	The analyte is not detected above the SDL

Attachments

The scanned attachments will follow this page.
Please note, each attachment may consist of more than one page.

LAB Order ID # 11091507

Page 1 of 1

TraceAnalysis, Inc.

email: lab@traceanalysis.com

6701 Aberdeen Avenue, Suite 9
Lubbock, Texas 79424
Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296

5002 Basin Street, Suite A1
Midland, Texas 79703
Tel (432) 689-6301
Fax (432) 689-6313

200 East Sunset Rd., Suite E
El Paso, Texas 79922
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

BioAquatic Testing
2501 Mayes Rd., Ste 100
Carrollton, Texas 75006
Tel (972) 242-7750

Company Name: CRA
Phone #: 432-686-0086
Address: (Street, City, Zip) 2135 S. Loop 250 W Midland TX
Fax #: 686-0186
Contact Person: Todd Wells
E-mail:
Invoice to: (If different from above) Jason Henry w/Plains All American SRS# Parr Ansell #4
Project #: 074684
Project Name: Parr Ansell #4
Project Location (including state): Parr Ansell Ranch NM
Sampler Signature: TG

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume / Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME	MTBE 8021 / 602 / 8260 / 624	BTEX 8021B / 602 / 8260 / 624	TPH 418.1 / TX1005 / TX1005 Ext(C35)	TPH 8015 GRO / DRO / TVHC	PAH 8270 / 625	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260 / 624	GC/MS Semi. Vol. 8270 / 625	PCB's 8082 / 608	Pesticides 8081 / 608	BOD, TSS, pH	Moisture Content	Cl, Fl, SO4, NO3, NO2, Alkalinity	Na, Ca, Mg, K, TDS, EC			Turn Around Time if different from standard	Hold
175	MW-3 091311	3		X				X						9-13-11	930		X																					
176	MW-10 091311	3		X				X						9-13-11	940		X																					
177	MW-15 091311	3		X				X						9-13-11	950		X																					
178	DUP-3 091311	3		X				X						9-13-11			X																					
179	MW-14 091311	3		X				X						9-13-11	1000		X																					
180	MW-16 091311	3		X				X						9-13-11	1005		X																					
181	MW-8 091311	3		X				X						9-13-11	1010		X																					
182	RW-5 091311	3		X				X						9-13-11	1030		X																					
183	MW-6 091311	3		X				X						9-13-11	1020		X																					

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	INST / OBS / COR
	CRA	9-14-11	940	Ken Horton	CRA	9/14/11	9:40	
Ken Horton	CRA	9/14/11	1406		CRA	9-14-11	1406	
	CRA	9-14-11	1428		MA	9-14-11	14:30	OBS 4.0 °C, COR 4.0 °C

LAB USE ONLY
Intact Y / N
Headspace Y / N / NA
Log-in-Review

REMARKS:
All tests Midland

- [ ] Dry Weight Basis Required
- [ ] TRRP Report Required
- [ ] Check If Special Reporting Limits Are Needed

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C.

Carrier #

ORIGINAL COPY

Summary Report

Todd Wells
CRA-Midland
2135 South Loop 250 West
Midland, TX 79703

Report Date: December 14, 2011

Work Order: 11120505

Project Location: Lea Co., NM
Project Name: Darr Angel #4 Site
Project Number: 074684
SRS #: 2001-10876

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
283657	MW 1A 120111	water	2011-12-01	09:50	2011-12-02
283658	MW 2 120111	water	2011-12-01	10:00	2011-12-02
283659	MW 4 120111	water	2011-12-01	10:15	2011-12-02
283660	MW 5 120111	water	2011-12-01	10:25	2011-12-02
283661	MW 6 120111	water	2011-12-01	10:35	2011-12-02
283662	MW 7 120111	water	2011-12-01	10:50	2011-12-02
283663	MW 9 120111	water	2011-12-01	11:20	2011-12-02
283664	MW 10 120111	water	2011-12-01	11:30	2011-12-02
283665	MW 11 120111	water	2011-12-01	11:40	2011-12-02
283666	MW 12 120111	water	2011-12-01	11:50	2011-12-02
283667	MW 14 120111	water	2011-12-01	12:10	2011-12-02
283668	MW 15 120111	water	2011-12-01	12:20	2011-12-02
283669	MW 16 120111	water	2011-12-01	12:30	2011-12-02
283670	RW 6 120111	water	2011-12-01	13:00	2011-12-02
283671	RW 5 120111	water	2011-12-01	12:40	2011-12-02
283672	RW 8 120111	water	2011-12-01	13:10	2011-12-02
283673	RW 13 120111	water	2011-12-01	12:50	2011-12-02
283674	Dup. 1 120111	water	2011-12-01	10:15	2011-12-02
283675	Dup. 2 120111	water	2011-12-01	13:10	2011-12-02

	BTEX				MTBE
Sample - Field Code	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)
283657 - MW 1A 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283658 - MW 2 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283659 - MW 4 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283660 - MW 5 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283661 - MW 6 120111	<0.00100	<0.00100	<0.00100	<0.00100	

continued ...

... continued

Sample - Field Code	BTEX Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE MTBE (mg/L)
283662 - MW 7 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283663 - MW 9 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283664 - MW 10 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283665 - MW 11 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283666 - MW 12 120111	**0.210**	<0.00500	**0.0147**	<0.00500	
283667 - MW 14 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283668 - MW 15 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283669 - MW 16 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283670 - RW 6 120111	**0.0794**	**0.129** Qs	**0.639** Je	**1.75** Je	
283671 - RW 5 120111	<0.00100	**0.0478** Qs	**0.354**	**0.758**	
283672 - RW 8 120111	**1.21**	**1.57**	**0.685**	**2.55**	
283673 - RW 13 120111	**1.08**	**0.219**	**0.311**	**0.776**	
283674 - Dup. 1 120111	<0.00100	<0.00100	<0.00100	<0.00100	
283675 - Dup. 2 120111	**1.06**	**1.48**	**0.661**	**2.45**	

Sample: 283661 - MW 6 120111

Param	Flag	Result	Units	RL
Naphthalene		<0.000184	mg/L	0.0002
2-Methylnaphthalene		<0.000184	mg/L	0.0002
1-Methylnaphthalene		<0.000184	mg/L	0.0002
Acenaphthylene		<0.000184	mg/L	0.0002
Acenaphthene		<0.000184	mg/L	0.0002
Dibenzofuran		<0.000184	mg/L	0.0002
Fluorene		<0.000184	mg/L	0.0002
Anthracene	Qs	<0.000184	mg/L	0.0002
Phenanthrene	Qs	<0.000184	mg/L	0.0002
Fluoranthene		<0.000184	mg/L	0.0002
Pyrene		<0.000184	mg/L	0.0002
Benzo(a)anthracene	Qs	<0.000184	mg/L	0.0002
Chrysene		<0.000184	mg/L	0.0002
Benzo(b)fluoranthene		<0.000184	mg/L	0.0002
Benzo(k)fluoranthene		<0.000184	mg/L	0.0002
Benzo(a)pyrene		<0.000184	mg/L	0.0002
Indeno(1,2,3-cd)pyrene		<0.000184	mg/L	0.0002
Dibenzo(a,h)anthracene		<0.000184	mg/L	0.0002
Benzo(g,h,i)perylene		<0.000184	mg/L	0.0002

TRACEANALYSIS, INC.

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E-Mail: lab@traceanalysis.com

Certifications

WBE HUB NCTRCA DBE NELAP DoD LELAP Kansas Oklahoma ISO 17025

Analytical and Quality Control Report

Todd Wells
CRA-Midland
2135 South Loop 250 West
Midland, TX, 79703

Report Date: December 14, 2011

Work Order: 11120505

Project Location: Lea Co., NM
Project Name: Darr Angel #4 Site
Project Number: 074684
SRS #: 2001-10876

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
283657	MW 1A 120111	water	2011-12-01	09:50	2011-12-02
283658	MW 2 120111	water	2011-12-01	10:00	2011-12-02
283659	MW 4 120111	water	2011-12-01	10:15	2011-12-02
283660	MW 5 120111	water	2011-12-01	10:25	2011-12-02
283661	MW 6 120111	water	2011-12-01	10:35	2011-12-02
283662	MW 7 120111	water	2011-12-01	10:50	2011-12-02
283663	MW 9 120111	water	2011-12-01	11:20	2011-12-02
283664	MW 10 120111	water	2011-12-01	11:30	2011-12-02
283665	MW 11 120111	water	2011-12-01	11:40	2011-12-02
283666	MW 12 120111	water	2011-12-01	11:50	2011-12-02
283667	MW 14 120111	water	2011-12-01	12:10	2011-12-02
283668	MW 15 120111	water	2011-12-01	12:20	2011-12-02
283669	MW 16 120111	water	2011-12-01	12:30	2011-12-02
283670	RW 6 120111	water	2011-12-01	13:00	2011-12-02
283671	RW 5 120111	water	2011-12-01	12:40	2011-12-02
283672	RW 8 120111	water	2011-12-01	13:10	2011-12-02
283673	RW 13 120111	water	2011-12-01	12:50	2011-12-02

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
283674	Dup. 1 120111	water	2011-12-01	10:15	2011-12-02
283675	Dup. 2 120111	water	2011-12-01	13:10	2011-12-02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 29 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Dr. Blair Leftwich, Director
Dr. Michael Abel, Project Manager

Report Contents

Case Narrative

Samples for project Darr Angel #4 Site were received by TraceAnalysis, Inc. on 2011-12-02 and assigned to work order 11120505. Samples for work order 11120505 were received intact without headspace and at a temperature of 1.0 C.

Samples were analyzed for the following tests using their respective methods.

Test	Method	Prep Batch	Prep Date	QC Batch	Analysis Date
BTEX	S 8021B	73834	2011-12-06 at 13:11	86957	2011-12-06 at 13:11
BTEX	S 8021B	73835	2011-12-06 at 13:11	86958	2011-12-06 at 13:11
BTEX	S 8021B	73894	2011-12-08 at 08:47	87026	2011-12-08 at 08:47
PAH	S 8270D	73942	2011-12-07 at 15:00	87077	2011-12-12 at 11:05

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11120505 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Analytical Report

Sample: 283657 - MW 1A 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86957	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73834	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag		Cert	Result	RL Units	Dilution	RL
Benzene	U		U	1	<0.00100	mg/L	1	0.00100
Toluene	U		U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U		U	1	<0.00100	mg/L	1	0.00100
Xylene	U		U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.107	mg/L	1	0.100	107	70 - 130
4-Bromofluorobenzene (4-BFB)			0.110	mg/L	1	0.100	110	70 - 130

Sample: 283658 - MW 2 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86957	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73834	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag		Cert	Result	RL Units	Dilution	RL
Benzene	U		U	1	<0.00100	mg/L	1	0.00100
Toluene	U		U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U		U	1	<0.00100	mg/L	1	0.00100
Xylene	U		U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.107	mg/L	1	0.100	107	70 - 130
4-Bromofluorobenzene (4-BFB)			0.110	mg/L	1	0.100	110	70 - 130

Sample: 283659 - MW 4 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86957	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73834	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0969	mg/L	1	0.100	97	70 - 130
4-Bromofluorobenzene (4-BFB)			0.101	mg/L	1	0.100	101	70 - 130

Sample: 283660 - MW 5 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0886	mg/L	1	0.100	89	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0922	mg/L	1	0.100	92	70 - 130

Sample: 283661 - MW 6 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag		Cert	RL Result	Units	Dilution	RL
Benzene	U	U		1	<0.00100	mg/L	1	0.00100
Toluene	U	U		1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	U		1	<0.00100	mg/L	1	0.00100
Xylene	U	U		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0965	mg/L	1	0.100	96	70 - 130
4-Bromofluorobenzene (4-BFB)			0.101	mg/L	1	0.100	101	70 - 130

Sample: 283661 - MW 6 120111

Laboratory:	Lubbock				
Analysis:	PAH	Analytical Method:	S 8270D	Prep Method:	S 3510C
QC Batch:	87077	Date Analyzed:	2011-12-12	Analyzed By:	MN
Prep Batch:	73942	Sample Preparation:	2011-12-07	Prepared By:	MN

Parameter		Flag		Cert	RL Result	Units	Dilution	RL
Naphthalene	U	U		1	<0.000184	mg/L	0.922	0.000200
2-Methylnaphthalene	U	U		1	<0.000184	mg/L	0.922	0.000200
1-Methylnaphthalene	U	U			<0.000184	mg/L	0.922	0.000200
Acenaphthylene	U	U		1	<0.000184	mg/L	0.922	0.000200
Acenaphthene	U	U		1	<0.000184	mg/L	0.922	0.000200
Dibenzofuran	U	U		1	<0.000184	mg/L	0.922	0.000200
Fluorene	U	U		1	<0.000184	mg/L	0.922	0.000200
Anthracene	Qs,U	Qs,U		1	<0.000184	mg/L	0.922	0.000200
Phenanthrene	Qs,U	Qs,U			<0.000184	mg/L	0.922	0.000200
Fluoranthene	U	U			<0.000184	mg/L	0.922	0.000200
Pyrene	U	U		1	<0.000184	mg/L	0.922	0.000200
Benzo(a)anthracene	Qs,U	Qs,U			<0.000184	mg/L	0.922	0.000200
Chrysene	U	U		1	<0.000184	mg/L	0.922	0.000200
Benzo(b)fluoranthene	U	U			<0.000184	mg/L	0.922	0.000200
Benzo(k)fluoranthene	U	U		1	<0.000184	mg/L	0.922	0.000200
Benzo(a)pyrene	U	U		1	<0.000184	mg/L	0.922	0.000200
Indeno(1,2,3-cd)pyrene	U	U		1	<0.000184	mg/L	0.922	0.000200
Dibenzo(a,h)anthracene	U	U		1	<0.000184	mg/L	0.922	0.000200

continued ...

sample 283661 continued ...

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Benzo(g,h,i)perylene	U	U	<0.000184		mg/L	0.922	0.000200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5			0.0477	mg/L	0.922	0.0800	60	10 - 117
2-Fluorobiphenyl			0.0456	mg/L	0.922	0.0800	57	10 - 99
Terphenyl-d14			0.0552	mg/L	0.922	0.0800	69	22.6 - 115

Sample: 283662 - MW 7 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag	Cert	Result	RL	Units	Dilution	RL
Benzene	U	U	1	<0.00100		mg/L	1	0.00100
Toluene	U	U	1	<0.00100		mg/L	1	0.00100
Ethylbenzene	U	U	1	<0.00100		mg/L	1	0.00100
Xylene	U	U	1	<0.00100		mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.105	mg/L	1	0.100	105	70 - 130
4-Bromofluorobenzene (4-BFB)			0.111	mg/L	1	0.100	111	70 - 130

Sample: 283663 - MW 9 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag	Cert	Result	RL	Units	Dilution	RL
Benzene	U	U	1	<0.00100		mg/L	1	0.00100

continued ...

sample 283663 continued ...

Parameter		Flag	Cert	RL Result	Units	Dilution	RL
Toluene	U	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.109	mg/L	1	0.100	109	70 - 130
4-Bromofluorobenzene (4-BFB)			0.123	mg/L	1	0.100	123	70 - 130

Sample: 283664 - MW 10 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.109	mg/L	1	0.100	109	70 - 130
4-Bromofluorobenzene (4-BFB)			0.113	mg/L	1	0.100	113	70 - 130

Sample: 283665 - MW 11 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

continued ...

sample 283665 continued ...

Parameter		Flag		Cert	RL Result	Units	Dilution	RL
Parameter		Flag		Cert	RL Result	Units	Dilution	RL
Benzene	U	U		1	<0.00100	mg/L	1	0.00100
Toluene	U	U		1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	U		1	<0.00100	mg/L	1	0.00100
Xylene	U	U		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.100	mg/L	1	0.100	100	70 - 130
4-Bromofluorobenzene (4-BFB)			0.105	mg/L	1	0.100	105	70 - 130

Sample: 283666 - MW 12 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag		Cert	RL Result	Units	Dilution	RL
Benzene				1	**0.210**	mg/L	5	0.00100
Toluene	U	U		1	<0.00500	mg/L	5	0.00100
Ethylbenzene				1	**0.0147**	mg/L	5	0.00100
Xylene	U	U		1	<0.00500	mg/L	5	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.469	mg/L	5	0.500	94	70 - 130
4-Bromofluorobenzene (4-BFB)			0.501	mg/L	5	0.500	100	70 - 130

Sample: 283667 - MW 14 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.104	mg/L	1	0.100	104	70 - 130
4-Bromofluorobenzene (4-BFB)			0.108	mg/L	1	0.100	108	70 - 130

Sample: 283668 - MW 15 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0932	mg/L	1	0.100	93	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0981	mg/L	1	0.100	98	70 - 130

Sample: 283669 - MW 16 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	U	1	<0.00100	mg/L	1	0.00100

continued ...

sample 283669 continued ...

Parameter		Flag		Cert	RL Result	Units	Dilution	RL
Toluene	U	U		1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	U		1	<0.00100	mg/L	1	0.00100
Xylene	U	U		1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0836	mg/L	1	0.100	84	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0865	mg/L	1	0.100	86	70 - 130

Sample: 283670 - RW 6 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	87026	Date Analyzed:	2011-12-08	Analyzed By:	ZLM
Prep Batch:	73894	Sample Preparation:	2011-12-08	Prepared By:	ZLM

Parameter		Flag		Cert	RL Result	Units	Dilution	RL
Benzene				1	**0.0794**	mg/L	1	0.00100
Toluene	Qs	Qs		1	**0.129**	mg/L	1	0.00100
Ethylbenzene	Je	Je		1	**0.639**	mg/L	1	0.00100
Xylene	Je	Je		1	**1.75**	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0739	mg/L	1	0.100	74	70 - 130
4-Bromofluorobenzene (4-BFB)	Qsr	Qsr	0.192	mg/L	1	0.100	192	70 - 130

Sample: 283671 - RW 5 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	87026	Date Analyzed:	2011-12-08	Analyzed By:	ZLM
Prep Batch:	73894	Sample Preparation:	2011-12-08	Prepared By:	ZLM

continued ...

sample 283671 continued ...

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U U	1	<0.00100	mg/L	1	0.00100
Toluene	Qs Qs	1	**0.0478**	mg/L	1	0.00100
Ethylbenzene		1	**0.354**	mg/L	1	0.00100
Xylene		1	**0.758**	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0860	mg/L	1	0.100	86	70 - 130
4-Bromofluorobenzene (4-BFB)	Qsr Qsr		0.149	mg/L	1	0.100	149	70 - 130

Sample: 283672 - RW 8 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	**1.21**	mg/L	100	0.00100
Toluene		1	**1.57**	mg/L	100	0.00100
Ethylbenzene		1	**0.685**	mg/L	100	0.00100
Xylene		1	**2.55**	mg/L	100	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			10.3	mg/L	100	10.0	103	70 - 130
4-Bromofluorobenzene (4-BFB)			10.2	mg/L	100	10.0	102	70 - 130

Sample: 283673 - RW 13 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	**1.08**	mg/L	50	0.00100
Toluene		1	**0.219**	mg/L	50	0.00100
Ethylbenzene		1	**0.311**	mg/L	50	0.00100
Xylene		1	**0.776**	mg/L	50	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			4.62	mg/L	50	5.00	92	70 - 130
4-Bromofluorobenzene (4-BFB)			4.55	mg/L	50	5.00	91	70 - 130

Sample: 283674 - Dup. 1 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter		Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	U	1	<0.00100	mg/L	1	0.00100
Toluene	U	U	1	<0.00100	mg/L	1	0.00100
Ethylbenzene	U	U	1	<0.00100	mg/L	1	0.00100
Xylene	U	U	1	<0.00100	mg/L	1	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.104	mg/L	1	0.100	104	70 - 130
4-Bromofluorobenzene (4-BFB)			0.109	mg/L	1	0.100	109	70 - 130

Sample: 283675 - Dup. 2 120111

Laboratory:	Lubbock				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	86958	Date Analyzed:	2011-12-06	Analyzed By:	ZLM
Prep Batch:	73835	Sample Preparation:	2011-12-06	Prepared By:	ZLM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	**1.06**	mg/L	50	0.00100

continued ...

sample 283675 continued ...

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Toluene		1	**1.48**	mg/L	50	0.00100
Ethylbenzene		1	**0.661**	mg/L	50	0.00100
Xylene		1	**2.45**	mg/L	50	0.00100

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			4.83	mg/L	50	5.00	97	70 - 130
4-Bromofluorobenzene (4-BFB)			5.17	mg/L	50	5.00	103	70 - 130

Method Blanks

Method Blank (1) QC Batch: 86957

QC Batch: 86957 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM
Prep Batch: 73834 | QC Preparation: 2011-12-06 | Prepared By: ZLM

Parameter	Flag	Cert	MDL Result	Units	RL
Benzene		1	<0.000765	mg/L	0.001
Toluene		1	<0.000719	mg/L	0.001
Ethylbenzene		1	<0.000860	mg/L	0.001
Xylene		1	<0.000942	mg/L	0.001

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.110	mg/L	1	0.100	110	70 - 130
4-Bromofluorobenzene (4-BFB)			0.115	mg/L	1	0.100	115	70 - 130

Method Blank (1) QC Batch: 86958

QC Batch: 86958 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM
Prep Batch: 73835 | QC Preparation: 2011-12-06 | Prepared By: ZLM

Parameter	Flag	Cert	MDL Result	Units	RL
Benzene		1	<0.000765	mg/L	0.001
Toluene		1	<0.000719	mg/L	0.001
Ethylbenzene		1	<0.000860	mg/L	0.001
Xylene		1	<0.000942	mg/L	0.001

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0995	mg/L	1	0.100	100	70 - 130
4-Bromofluorobenzene (4-BFB)			0.103	mg/L	1	0.100	103	70 - 130

Method Blank (1) QC Batch: 87026

QC Batch: 87026 | Date Analyzed: 2011-12-08 | Analyzed By: ZLM
Prep Batch: 73894 | QC Preparation: 2011-12-08 | Prepared By: ZLM

Parameter	Flag	Cert	MDL Result	Units	RL
Benzene		1	<0.000765	mg/L	0.001
Toluene		1	<0.000719	mg/L	0.001
Ethylbenzene		1	<0.000860	mg/L	0.001
Xylene		1	<0.000942	mg/L	0.001

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.102	mg/L	1	0.100	102	70 - 130
4-Bromofluorobenzene (4-BFB)			0.108	mg/L	1	0.100	108	70 - 130

Method Blank (1) QC Batch: 87077

QC Batch: 87077 | Date Analyzed: 2011-12-12 | Analyzed By: MN
Prep Batch: 73942 | QC Preparation: 2011-12-07 | Prepared By: MN

Parameter	Flag	Cert	MDL Result	Units	RL
Naphthalene		1	<0.0000904	mg/L	0.0002
2-Methylnaphthalene		1	<0.000184	mg/L	0.0002
1-Methylnaphthalene			<0.000120	mg/L	0.0002
Acenaphthylene		1	<0.000101	mg/L	0.0002
Acenaphthene		1	<0.000122	mg/L	0.0002
Dibenzofuran		1	<0.000119	mg/L	0.0002
Fluorene		1	<0.000198	mg/L	0.0002
Anthracene		1	<0.000190	mg/L	0.0002
Phenanthrene			<0.000190	mg/L	0.0002
Fluoranthene			<0.000122	mg/L	0.0002
Pyrene		1	<0.000142	mg/L	0.0002
Benzo(a)anthracene			<0.000138	mg/L	0.0002
Chrysene		1	<0.000155	mg/L	0.0002
Benzo(b)fluoranthene			<0.000179	mg/L	0.0002
Benzo(k)fluoranthene		1	<0.000185	mg/L	0.0002
Benzo(a)pyrene		1	<0.000169	mg/L	0.0002
Indeno(1,2,3-cd)pyrene		1	0.000511	mg/L	0.0002
Dibenzo(a,h)anthracene		1	0.000474	mg/L	0.0002
Benzo(g,h,i)perylene			0.000653	mg/L	0.0002

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5			0.0549	mg/L	1	0.0800	69	10 - 117
2-Fluorobiphenyl			0.0432	mg/L	1	0.0800	54	10 - 99

continued ...

method blank continued ...

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Terphenyl-d14			0.0530	mg/L	1	0.0800	66	22.6 - 115

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: 86957 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM
Prep Batch: 73834 | QC Preparation: 2011-12-06 | Prepared By: ZLM

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	0.102	mg/L	1	0.100	<0.000765	102	70 - 130
Toluene		1	0.0987	mg/L	1	0.100	<0.000719	99	70 - 130
Ethylbenzene		1	0.0988	mg/L	1	0.100	<0.000860	99	70 - 130
Xylene		1	0.296	mg/L	1	0.300	<0.000942	99	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	0.0994	mg/L	1	0.100	<0.000765	99	70 - 130	3	20
Toluene		1	0.0961	mg/L	1	0.100	<0.000719	96	70 - 130	3	20
Ethylbenzene		1	0.0962	mg/L	1	0.100	<0.000860	96	70 - 130	3	20
Xylene		1	0.287	mg/L	1	0.300	<0.000942	96	70 - 130	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0917	0.0947	mg/L	1	0.100	92	95	70 - 130
4-Bromofluorobenzene (4-BFB)	0.0904	0.0938	mg/L	1	0.100	90	94	70 - 130

Laboratory Control Spike (LCS-1)

QC Batch: 86958 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM
Prep Batch: 73835 | QC Preparation: 2011-12-06 | Prepared By: ZLM

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	0.0987	mg/L	1	0.100	<0.000765	99	70 - 130
Toluene		1	0.0960	mg/L	1	0.100	<0.000719	96	70 - 130
Ethylbenzene		1	0.0957	mg/L	1	0.100	<0.000860	96	70 - 130
Xylene		1	0.286	mg/L	1	0.300	<0.000942	95	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	0.0997	mg/L	1	0.100	<0.000765	100	70 - 130	1	20
Toluene		1	0.0973	mg/L	1	0.100	<0.000719	97	70 - 130	1	20
Ethylbenzene		1	0.0971	mg/L	1	0.100	<0.000860	97	70 - 130	1	20
Xylene		1	0.291	mg/L	1	0.300	<0.000942	97	70 - 130	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0946	0.0934	mg/L	1	0.100	95	93	70 - 130
4-Bromofluorobenzene (4-BFB)	0.0945	0.0943	mg/L	1	0.100	94	94	70 - 130

Laboratory Control Spike (LCS-1)

QC Batch: 87026 | Date Analyzed: 2011-12-08 | Analyzed By: ZLM
Prep Batch: 73894 | QC Preparation: 2011-12-08 | Prepared By: ZLM

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	0.0961	mg/L	1	0.100	<0.000765	96	70 - 130
Toluene		1	0.0941	mg/L	1	0.100	<0.000719	94	70 - 130
Ethylbenzene		1	0.0933	mg/L	1	0.100	<0.000860	93	70 - 130
Xylene		1	0.281	mg/L	1	0.300	<0.000942	94	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	0.0969	mg/L	1	0.100	<0.000765	97	70 - 130	1	20
Toluene		1	0.0952	mg/L	1	0.100	<0.000719	95	70 - 130	1	20
Ethylbenzene		1	0.0951	mg/L	1	0.100	<0.000860	95	70 - 130	2	20
Xylene		1	0.285	mg/L	1	0.300	<0.000942	95	70 - 130	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0923	0.0917	mg/L	1	0.100	92	92	70 - 130
4-Bromofluorobenzene (4-BFB)	0.0929	0.0931	mg/L	1	0.100	93	93	70 - 130

Laboratory Control Spike (LCS-1)

QC Batch: 87077 | Date Analyzed: 2011-12-12 | Analyzed By: MN
Prep Batch: 73942 | QC Preparation: 2011-12-07 | Prepared By: MN

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Naphthalene		1	0.0411	mg/L	1	0.0800	<0.0000904	51	10 - 89.9
2-Methylnaphthalene		1	0.0462	mg/L	1	0.0800	<0.000184	58	13.8 - 98.4
1-Methylnaphthalene			0.0529	mg/L	1	0.0800	<0.000120	66	13.1 - 103
Acenaphthylene		1	0.0576	mg/L	1	0.0800	<0.000101	72	20 - 104
Acenaphthene		1	0.0561	mg/L	1	0.0800	<0.000122	70	21.6 - 94.6
Dibenzofuran		1	0.0425	mg/L	1	0.0800	<0.000119	53	22.9 - 74.9
Fluorene		1	0.0646	mg/L	1	0.0800	<0.000198	81	30.8 - 109
Anthracene		1	0.0759	mg/L	1	0.0800	<0.000190	95	37.6 - 96.4
Phenanthrene			0.0793	mg/L	1	0.0800	<0.000190	99	42.4 - 99.8
Fluoranthene			0.0806	mg/L	1	0.0800	<0.000122	101	48 - 118
Pyrene		1	0.0752	mg/L	1	0.0800	<0.000142	94	45.3 - 109
Benzo(a)anthracene			0.0866	mg/L	1	0.0800	<0.000138	108	48 - 113
Chrysene		1	0.0692	mg/L	1	0.0800	<0.000155	86	35.2 - 175
Benzo(b)fluoranthene			0.0658	mg/L	1	0.0800	<0.000179	82	16.6 - 106
Benzo(k)fluoranthene		1	0.0673	mg/L	1	0.0800	<0.000185	84	36.8 - 99.4
Benzo(a)pyrene		1	0.0698	mg/L	1	0.0800	<0.000169	87	32.3 - 99.7
Indeno(1,2,3-cd)pyrene		1	0.0681	mg/L	1	0.0800	0.000511	84	34.1 - 106
Dibenzo(a,h)anthracene		1	0.0584	mg/L	1	0.0800	0.000474	72	47.1 - 103
Benzo(g,h,i)perylene			0.0719	mg/L	1	0.0800	0.000653	89	21.9 - 112

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Naphthalene		1	0.0468	mg/L	1	0.0800	<0.0000904	58	10 - 89.9	13	20
2-Methylnaphthalene		1	0.0526	mg/L	1	0.0800	<0.000184	66	13.8 - 98.4	13	20
1-Methylnaphthalene			0.0600	mg/L	1	0.0800	<0.000120	75	13.1 - 103	13	20
Acenaphthylene		1	0.0670	mg/L	1	0.0800	<0.000101	84	20 - 104	15	20
Acenaphthene		1	0.0651	mg/L	1	0.0800	<0.000122	81	21.6 - 94.6	15	20
Dibenzofuran		1	0.0483	mg/L	1	0.0800	<0.000119	60	22.9 - 74.9	13	20
Fluorene		1	0.0708	mg/L	1	0.0800	<0.000198	88	30.8 - 109	9	20
Anthracene	Qs Qs	1	0.0863	mg/L	1	0.0800	<0.000190	108	37.6 - 96.4	13	20
Phenanthrene	Qs Qs		0.0904	mg/L	1	0.0800	<0.000190	113	42.4 - 99.8	13	20
Fluoranthene			0.0944	mg/L	1	0.0800	<0.000122	118	48 - 118	16	20
Pyrene		1	0.0836	mg/L	1	0.0800	<0.000142	104	45.3 - 109	11	20
Benzo(a)anthracene	Qs Qs		0.0985	mg/L	1	0.0800	<0.000138	123	48 - 113	13	20
Chrysene		1	0.0792	mg/L	1	0.0800	<0.000155	99	35.2 - 175	14	20
Benzo(b)fluoranthene			0.0760	mg/L	1	0.0800	<0.000179	95	16.6 - 106	14	20
Benzo(k)fluoranthene		1	0.0765	mg/L	1	0.0800	<0.000185	96	36.8 - 99.4	13	20
Benzo(a)pyrene		1	0.0786	mg/L	1	0.0800	<0.000169	98	32.3 - 99.7	12	20

continued ...

control spikes continued ...

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Indeno(1,2,3-cd)pyrene		1	0.0755	mg/L	1	0.0800	0.000511	94	34.1 - 106	10	20
Dibenzo(a,h)anthracene		1	0.0649	mg/L	1	0.0800	0.000474	80	47.1 - 103	10	20
Benzo(g,h,i)perylene			0.0796	mg/L	1	0.0800	0.000653	99	21.9 - 112	10	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Nitrobenzene-d5	0.0517	0.0579	mg/L	1	0.0800	65	72	10 - 117
2-Fluorobiphenyl	0.0488	0.0584	mg/L	1	0.0800	61	73	10 - 99
Terphenyl-d14	0.0804	0.0896	mg/L	1	0.0800	100	112	22.6 - 115

Matrix Spike (MS-1) Spiked Sample: 283601

QC Batch: 86957 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM
Prep Batch: 73834 | QC Preparation: 2011-12-06 | Prepared By: ZLM

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	0.131	mg/L	1	0.100	0.0314	100	70 - 130
Toluene		1	0.0962	mg/L	1	0.100	<0.000719	96	70 - 130
Ethylbenzene		1	0.0973	mg/L	1	0.100	<0.000860	97	70 - 130
Xylene		1	0.291	mg/L	1	0.300	<0.000942	97	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	0.132	mg/L	1	0.100	0.0314	101	70 - 130	1	20
Toluene		1	0.0980	mg/L	1	0.100	<0.000719	98	70 - 130	2	20
Ethylbenzene		1	0.0983	mg/L	1	0.100	<0.000860	98	70 - 130	1	20
Xylene		1	0.295	mg/L	1	0.300	<0.000942	98	70 - 130	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0996	0.0951	mg/L	1	0.1	100	95	70 - 130
4-Bromofluorobenzene (4-BFB)	0.100	0.0963	mg/L	1	0.1	100	96	70 - 130

Matrix Spike (MS-1) Spiked Sample: 283664

QC Batch: 86958 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM
Prep Batch: 73835 | QC Preparation: 2011-12-06 | Prepared By: ZLM

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	0.0987	mg/L	1	0.100	<0.000765	99	70 - 130
Toluene		1	0.0949	mg/L	1	0.100	<0.000719	95	70 - 130
Ethylbenzene		1	0.0951	mg/L	1	0.100	<0.000860	95	70 - 130
Xylene		1	0.282	mg/L	1	0.300	<0.000942	94	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	0.103	mg/L	1	0.100	<0.000765	103	70 - 130	4	20
Toluene		1	0.0996	mg/L	1	0.100	<0.000719	100	70 - 130	5	20
Ethylbenzene		1	0.0992	mg/L	1	0.100	<0.000860	99	70 - 130	4	20
Xylene		1	0.296	mg/L	1	0.300	<0.000942	99	70 - 130	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.105	0.102	mg/L	1	0.1	105	102	70 - 130
4-Bromofluorobenzene (4-BFB)	0.105	0.102	mg/L	1	0.1	105	102	70 - 130

Matrix Spike (MS-1) Spiked Sample: 283898

QC Batch: 87026 | Date Analyzed: 2011-12-08 | Analyzed By: ZLM
Prep Batch: 73894 | QC Preparation: 2011-12-08 | Prepared By: ZLM

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	0.0845	mg/L	1	0.100	0.0019	83	70 - 130
Toluene		1	0.0808	mg/L	1	0.100	<0.000719	81	70 - 130
Ethylbenzene		1	0.0826	mg/L	1	0.100	<0.000860	83	70 - 130
Xylene		1	0.246	mg/L	1	0.300	<0.000942	82	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	0.0730	mg/L	1	0.100	0.0019	71	70 - 130	15	20
Toluene	Qs Qs	1	0.0695	mg/L	1	0.100	<0.000719	70	70 - 130	15	20

continued ...

matrix spikes continued ...

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Ethylbenzene		1	0.0716	mg/L	1	0.100	<0.000860	72	70 - 130	14	20
Xylene		1	0.214	mg/L	1	0.300	<0.000942	71	70 - 130	14	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.101	0.0892	mg/L	1	0.1	101	89	70 - 130
4-Bromofluorobenzene (4-BFB)	0.102	0.0925	mg/L	1	0.1	102	92	70 - 130

Calibration Standards

Standard (CCV-2)

QC Batch: 86957 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.102	102	80 - 120	2011-12-06
Toluene		1	mg/L	0.100	0.0985	98	80 - 120	2011-12-06
Ethylbenzene		1	mg/L	0.100	0.0980	98	80 - 120	2011-12-06
Xylene		1	mg/L	0.300	0.293	98	80 - 120	2011-12-06

Standard (CCV-3)

QC Batch: 86957 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.100	100	80 - 120	2011-12-06
Toluene		1	mg/L	0.100	0.0969	97	80 - 120	2011-12-06
Ethylbenzene		1	mg/L	0.100	0.0959	96	80 - 120	2011-12-06
Xylene		1	mg/L	0.300	0.287	96	80 - 120	2011-12-06

Standard (CCV-1)

QC Batch: 86958 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.0994	99	80 - 120	2011-12-06
Toluene		1	mg/L	0.100	0.0969	97	80 - 120	2011-12-06
Ethylbenzene		1	mg/L	0.100	0.0972	97	80 - 120	2011-12-06
Xylene		1	mg/L	0.300	0.289	96	80 - 120	2011-12-06

Standard (CCV-2)

QC Batch: 86958 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.0951	95	80 - 120	2011-12-06
Toluene		1	mg/L	0.100	0.0921	92	80 - 120	2011-12-06
Ethylbenzene		1	mg/L	0.100	0.0919	92	80 - 120	2011-12-06
Xylene		1	mg/L	0.300	0.272	90	80 - 120	2011-12-06

Standard (CCV-3)

QC Batch: 86958 | Date Analyzed: 2011-12-06 | Analyzed By: ZLM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.101	101	80 - 120	2011-12-06
Toluene		1	mg/L	0.100	0.0970	97	80 - 120	2011-12-06
Ethylbenzene		1	mg/L	0.100	0.0962	96	80 - 120	2011-12-06
Xylene		1	mg/L	0.300	0.287	96	80 - 120	2011-12-06

Standard (CCV-1)

QC Batch: 87026 | Date Analyzed: 2011-12-08 | Analyzed By: ZLM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.0994	99	80 - 120	2011-12-08
Toluene		1	mg/L	0.100	0.0959	96	80 - 120	2011-12-08
Ethylbenzene		1	mg/L	0.100	0.0964	96	80 - 120	2011-12-08
Xylene		1	mg/L	0.300	0.286	95	80 - 120	2011-12-08

Standard (CCV-2)

QC Batch: 87026 | Date Analyzed: 2011-12-08 | Analyzed By: ZLM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/L	0.100	0.0892	89	80 - 120	2011-12-08
Toluene		1	mg/L	0.100	0.0869	87	80 - 120	2011-12-08
Ethylbenzene		1	mg/L	0.100	0.0873	87	80 - 120	2011-12-08
Xylene		1	mg/L	0.300	0.261	87	80 - 120	2011-12-08

Standard (CCV-1)

QC Batch: 87077 Date Analyzed: 2011-12-12 Analyzed By: MN

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Naphthalene		1	mg/L	60.0	50.4	84	80 - 120	2011-12-12
2-Methylnaphthalene		1	mg/L	60.0	51.3	86	80 - 120	2011-12-12
1-Methylnaphthalene			mg/L	60.0	58.7	98	80 - 120	2011-12-12
Acenaphthylene		1	mg/L	60.0	51.0	85	80 - 120	2011-12-12
Acenaphthene		1	mg/L	60.0	50.4	84	80 - 120	2011-12-12
Dibenzofuran		1	mg/L	60.0	50.3	84	80 - 120	2011-12-12
Fluorene		1	mg/L	60.0	49.5	82	80 - 120	2011-12-12
Anthracene		1	mg/L	60.0	59.7	100	80 - 120	2011-12-12
Phenanthrene			mg/L	60.0	59.6	99	80 - 120	2011-12-12
Fluoranthene			mg/L	60.0	60.7	101	80 - 120	2011-12-12
Pyrene		1	mg/L	60.0	55.1	92	80 - 120	2011-12-12
Benzo(a)anthracene			mg/L	60.0	60.6	101	80 - 120	2011-12-12
Chrysene		1	mg/L	60.0	52.8	88	80 - 120	2011-12-12
Benzo(b)fluoranthene			mg/L	60.0	59.2	99	80 - 120	2011-12-12
Benzo(k)fluoranthene		1	mg/L	60.0	49.2	82	80 - 120	2011-12-12
Benzo(a)pyrene		1	mg/L	60.0	52.9	88	80 - 120	2011-12-12
Indeno(1,2,3-cd)pyrene		1	mg/L	60.0	52.8	88	80 - 120	2011-12-12
Dibenzo(a,h)anthracene		1	mg/L	60.0	54.2	90	80 - 120	2011-12-12
Benzo(g,h,i)perylene			mg/L	60.0	51.1	85	80 - 120	2011-12-12

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5			58.1	mg/L	1	60.0	97	-
2-Fluorobiphenyl			53.6	mg/L	1	60.0	89	-
Terphenyl-d14			58.6	mg/L	1	60.0	98	-

Appendix

Report Definitions

Name	Definition
MDL	Method Detection Limit
MQL	Minimum Quantitation Limit
SDL	Sample Detection Limit

Laboratory Certifications

C	Certifying Authority	Certification Number	Laboratory Location
-	NCTRCA	WFWB384444Y0909	TraceAnalysis
-	DBE	VN 20657	TraceAnalysis
-	HUB	1752439743100-86536	TraceAnalysis
-	WBE	237019	TraceAnalysis
1	NELAP	T104704219-11-5	Lubbock

Standard Flags

F	Description
B	Analyte detected in the corresponding method blank above the method detection limit
H	Analyzed out of hold time
J	Estimated concentration
Jb	The analyte is positively identified and the value is approximated between the SDL and MQL. Sample contains less then ten times the concentration found in the method blank. The result should be considered non-detect to the SDL.
Je	Estimated concentration exceeding calibration range.
Qc	Calibration check outside of laboratory limits.
Qr	RPD outside of laboratory limits
Qs	Spike recovery outside of laboratory limits.
Qsr	Surrogate recovery outside of laboratory limits.
U	The analyte is not detected above the SDL

Attachments

The scanned attachments will follow this page.
Please note, each attachment may consist of more than one page.

LAB Order ID # 11120505

Page 1 of 2

TraceAnalysis, Inc.

email: lab@traceanalysis.com

6701 Aberdeen Avenue, Suite 9
Lubbock, Texas 79424
Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296

5002 Basin Street, Suite A1
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Tel (432) 689-6301
Fax (432) 689-6313

200 East Sunset Rd., Suite E
El Paso, Texas 79922
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

BioAquatic Testing
2501 Mayes Rd., Ste 100
Carrollton, Texas 75006
Tel (972) 242-7750

Company Name: CRA

Phone #: 432-686-0086

Address: (Street, City, Zip) 2135 S Loop 250 West, Midland, 79703

Fax #: 432-686-0186

Contact Person: Todd Wells

E-mail: Twells@cra.world.com

Invoice to: (If different from above) Jason Henry

Project #: 074684

Project Name: Dora Angell #4

Project Location (including state): Lovington, NM

Sampler Signature:

ANALYSIS REQUEST (Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume / Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME	MTBE 8021 / 602 / 8260 / 624	BTEX 8021 / 602 / 8260 / 624	TPH 418.1 / TX1005 / TX1005 Ext(C35)	TPH 8015 GRO / DRO / TVHC	PAH 8270 / 625	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260 / 624	GC/MS Semi. Vol. 8270 / 625	PCB's 8082 / 608	Pesticides 8081 / 608	BOD, TSS, pH	Moisture Content	Cl, Fl, S04, NO3, NO2, Alkalinity	Na, Ca, Mg, K, TDS, EC				Turn Around Time if different from standard	Hold
283667	MW 1A 12011	3	120 ml	X				X						12-1	0950		X																					
658	MW 2 12011	3	120 ml	X				X						12-1	1000		X																					
659	MW 4 12011	3	120 ml	X				X						12-1	1015		X																					
660	MW 5 12011	3	120 ml	X				X						12-1	1025		X																					
661	MW 6 12011	4	1 L V	X				X						12-1	1035		X			X																	
662	MW 7 12011	3	120 ml	X				X						12-1	1050		X																					
663	MW 9 12011	3	120 ml	X				X						12-1	1120		X																					
664	MW 10 12011	3	120 ml	X				X						12-1	1130		X																					
665	MW 11 12011	3	120 ml	X				X						12-1	1143		X																					
666	MW 12 12011	3	120 ml	X				X						12-1	1150		X																					
667	MW 14 12011	3	120 ml	X				X						12-1	1210		X																					

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	
	CRA	12-2-11	1539					INST ____ °C OBS ____ °C COR ____ °C
								INST ____ °C OBS ____ °C COR ____ °C
				Brenda Ward	Trace Lubbock	12/2/11	15:38	INST +1K °C OBS 0.9 °C COR 1.0 °C

LAB USE ONLY

Intact Y / N

Headspace Y / N / NA

Log-In-Review MK

REMARKS:

- ☐ Dry Weight Basis Required
- ☐ TRRP Report Required
- ☐ Check If Special Reporting Limits Are Needed

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C.

Carrier # Courier

ORIGINAL COPY

LAB Order ID # 11120505

TraceAnalysis, Inc.

email: lab@traceanalysis.com

6701 Aberdeen Avenue, Suite 9
Lubbock, Texas 79424
Tel (806) 794-1296
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Tel (972) 242-7750

Company Name: CRA
Phone #: 432-686-0086
Address: (Street, City, Zip) 2135 S Loop 250 west, Midland 79703
Fax #: 432-686-0186
Contact Person: Todd Wells
E-mail: Twells@cravworld.com
Invoice to: (If different from above) Jason Henry
Project #: 074684
Project Name: Doss #4
Project Location (including state): Lovington, NM
Sampler Signature:

ANALYSIS REQUEST (Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume / Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME	MTBE 8021 / 602 / 8260 / 624	BTEX (8021) / 602 / 8260 / 624	TPH 418.1 / TX1005 / TX1005 Ext(C35)	TPH 8015 GRO / DRO / TVHC	PAH 8270 / 625	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260 / 624	GC/MS Semi. Vol. 8270 / 625	PCB's 8082 / 608	Pesticides 8081 / 608	BOD, TSS, pH	Moisture Content	Cl, Fl, S04, NO3, NO2, Alkalinity	Na, Ca, Mg, K, TDS, EC					Turn Around Time if different from standard	Hold
283668	MW15 120111	3	120 ml	X				X						12-1	1220		X																							
669	MW16 120111	3	120 ml	X				X						12-1	1230		X																							
670	RW6 120111	3	120 ml	X				X						12-1	1300		X																							
671	RW5 120111	3	120 ml	X				X						12-1	1240		X																							
672	RW8 120111	3	120 ml	X				X						12-1	1310		X																							
673	RW13 120111	3	120 ml	X				X						12-1	1250		X																							
674	Dup 1 120111	3	120 ml	X				X						12-1	1015		X																							
675	Dup 2 120111	3	120 ml	X				X						12-1	1310		X																							

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	
	CRA	12-2-11	1537					INST ____ °C OBS ____ °C COR ____ °C
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	
								INST ____ °C OBS ____ °C COR ____ °C
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	
				Brandy Wood	Trace Lubbock	12/2/11	15:38	INST IR °C OBS 0.9 °C COR 1.0 °C

LAB USE ONLY
Intact Y / N
Headspace Y / N / NA
Log-In-Review MA

REMARKS:

- ☐ Dry Weight Basis Required
- ☐ TRRP Report Required
- ☐ Check If Special Reporting Limits Are Needed

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C.

Carrier # Couple

ORIGINAL COPY

AcuVac Remediation Inc.

1656-H Townhurst, Houston, Texas 77043
713.468.6688 · fax:713.468.6689 · www.acuvac.com

June 14, 2011

Mr. Brian Noonan
Mr. Todd Wells
Project Managers
Conestoga-Rovers & Associates
2135 S. Loop 250 W.
Midland, TX 79703

Dear Brian and Todd:

Re: Darr Angell #4, Lea County, NM
Project: #074684

Following is the report on the Mobile Dual Phase (MDP) Pilot Testing performed on June 10, 2011 at the above location, MDP is also referred to as Enhanced Vacuum Recovery (EVR) two pump with groundwater depression. The tests were conducted using AcuVac's I-6 System, with Roots RAI-33 blower, various instrumentation, including the HORIBA Analyzer, Solinst Interface Probe, Lumidor O_2 Meter, In Situ Data Logger, magnehelic gauges, Dwyer digital manometer, flow gauges, a sensitive instrument to determine barometric pressure, V-1 vacuum box to capture non-diluted vapor samples, Redi-Flo 2 Total Fluids Pump, and other special equipment. The report consists of one extended test with groundwater/NAPL extraction. Due to the depth of the well and screen interval, SVE short circuiting was not a factor. The contaminant was crude oil. An Engineer and a Geologist, with over 14,000 hours of on-site testing, conducted the Pilot Test. The total MDP test time, including static data time, was 10.0 hours.

Introduction

The vacuum extraction portion of the AcuVac System consists of a vacuum pump driven by an internal combustion (IC) engine. The vacuum pump is connected to the extraction well and the vacuum created on the extraction well causes light hydrocarbons in the soil and on the GW to volatilize and flow through a moisture knockout tank to the vacuum pump and the internal combustion engine where they are burned as part of the normal combustion process. Propane is used as an auxiliary fuel to help power the engine if the well vapors do not provide the required BTU.

Emissions from the engine are passed through three catalytic converters to ensure maximum destruction of removed hydrocarbon vapors. The engine's fuel to air ratio can be adjusted to maintain efficient combustion. Because the engine is the power source for all equipment, all systems stop when the engine stops. This eliminates any uncontrolled release of hydrocarbons. Since the AcuVac System is held

entirely under vacuum, any leaks in the seals or connections are leaked into the System and not emitted into the atmosphere. The engine is automatically shut down by vacuum loss, low oil pressure or overheating. This eliminates any uncontrolled release of hydrocarbon vapors.

The Groundwater (GW) and NAPL Extraction are provided by an in-well, Redi-Flo 2 Total Fluids Pump that has the discharge line connected to a manifold. The discharge line from the manifold is then connected to the on-site tank. A portable 120v generator supplies the power for the GW pump. The change in the EW liquid level is measured and recorded with an in-well In Situ Data Logger. The liquid flow rate can be adjusted to maintain a target drawdown level. Interface meters are used to measure all DTGW/DTNAPL. PSH is referred to as NAPL in this report. GW/NAPL samples are taken frequently during the test period, in a 2,000 ml beaker, to determine the average NAPL percentage of total volume.

MDP Test Objectives:

- Evaluate the potential for removing NAPL from the GW and soils in the subsurface formations.
- Expose the capillary fringe area and below to the extraction well (EW) induced vacuum.
- With induced vacuums, increase the GW and contaminant specific yields. Stress the GW System and monitor its response.
- Provide induced hydraulic gradient to gain hydraulic control of the area.
- Determine GW depression and pump rates to accomplish the above objectives.

Project Scope:

- Install GW/NAPL pump into the EW (RW-2). Set pump and data logger at the selected depth from TOC.
- Connect discharge hoses to liquid volume manifold and then connect to the on-site product tank.
- Connect the AcuVac System to the selected EW manifold and seal the selected outer observation wells with plugs designed to accept magnehelic gauges or digital manometers. Record the static well data, DTNAPL, DTGW, well size, TD, screen intervals and then apply EW induced vacuum. Record the vacuum and well flow, all System data (including fuel flow of propane), temperature and barometric pressure.
- The test procedures are to provide variable rates of induced vacuum and GW/NAPL pumping over the test period.
- Start the total fluids pump and set at proper flow to maintain selected GW/NAPL drawdown.
- Record pump flow rate and total liquid volume.
- Install and observe the digital manometer on the outer observation wells to determine if the selected EW induced vacuum is in vacuum communication with the outer observation wells.
- Record the data at a selected interval of time.
- Collect GW/NAPL samples frequently during the test period to determine the NAPL percentage of total collected volume.

- Collect non-diluted influent vapor (well gas) samples to provide on-site HORIBA Analyzer analytical data consisting of TPH ppmv, CO_2%, CO% and O_2%.
- Record the distances from the selected EW to the outer wells.
- Operate the AcuVac System in such a manner that all well vapors are passed through the engine and catalytic converters, to destruct the contaminants and exhausted, to meet air emission standards. Comply with all security and safety regulations.
- Complete the tests by providing a report consisting of operating and analytical data, projection of vacuum radius of influence, the induced hydraulic gradient and the collected volumes of GW/NAPL.

Standard Conditions Relating to Pilot Testing:

- To offset the induced vacuum/pressure as a result of GW depression or upwelling in the outer monitoring wells, the wells are vented periodically to atmosphere and then re-plugged prior to recording data at each 0.5 hour interval. The potential for increased vacuum or pressure as a result of in/decreasing GW levels will help to minimize the effect on the outer observation wells. GW depression surrounding an outer observation well will result in an induced vacuum not associated with the induced vacuum created in the EW. Likewise, GW mounding will create the opposite effect on well pressures.
- Generally, a decreasing barometric pressure results in increased well pressures (decreased vacuums) on those wells plugged and sealed at the TOC, while an increasing barometric pressure results in increased well vacuums. **There are many variables that can affect Pilot Test data, but barometric pressure fluctuations have the most immediate and profound effect.** This assumes that SVE short circuiting is not a factor.

Attached Schedules & Figures:

Attachment A: Acronyms and Definitions, Page 10
Schedule A: Summary of Data - 1 Extended Test #MDP-1
Schedule B: Graphic Summary of Data - Test #MDP-1
Figure #1: Plot of Observed Vacuum vs Distance at the Facility (ROI)
Figure #2: Plot of Recorded GW Gradient vs Distance at the Facility (ROI)

Well Data Information: TABLE #1 - TEST #MDP-1

WELL NO.		RW-2	RW-1	RW-7	MW-4	GWD [2]	GWR [3]	EW/VAC [4]
TD	ft	N/A	N/A	N/A	N/A	-	-	-
Screen	ft	N/A	N/A	N/A	N/A	-	-	-
Well size	in	4.0	4.0	4.0	2.0	-	-	-
DTGW - 0700 Hrs - Static	ft	70.06	71.00	68.98	67.44	-	-	-
DTGW - Hydro Equivalent	ft	67.61	67.50	67.48	67.44	-	-	-
DTNAPL - 0700 Hrs - Static	ft	67.18	66.88	67.21	-	-	-	-
NAPL - 0700 Hrs - Static	ft	2.88	4.12	1.77	-	-	-	-
Data Logger - 0730 Hrs - Static	ft	3.255	67.50	67.48	67.44	0	0	0
Data Logger - 0800 Hrs - Start MDP	ft	1.986	-	-	-	-1.269	2.0	30
Data Logger - 0830 Hrs	ft	0.785	-	-	-	-2.470	2.0	30
Data Logger - 0900 Hrs	ft	0.788	-	-	-	-2.467	2.0	30
Data Logger - 0930 Hrs	ft	0.812	-	-	-	-2.443	2.0	30
Data Logger - 1000 Hrs	ft	0.781	-	-	-	-2.474	2.0	30
Data Logger - 1030 Hrs	ft	1.003	-	-	-	-2.252	2.2	45
Data Logger - 1100 Hrs	ft	0.935	67.78	67.74	67.47	-2.320	2.2	45
Data Logger - 1130 Hrs	ft	0.904	-(0.28)	-(0.26)	-(0.03)	-2.351	2.2	45
Data Logger - 1200 Hrs	ft	0.912	-	-	-	-2.343	2.2	45
Data Logger - 1230 Hrs	ft	0.869	-	-	-	-2.386	2.2	45
Data Logger - 1300 Hrs	ft	0.874	-	-	-	-2.381	2.2	45
Data Logger - 1330 Hrs	ft	0.858	-	-	-	-2.397	2.2	45
Data Logger - 1400 Hrs	ft	1.054	67.86	67.80	67.54	-2.201	2.4	60
Data Logger - 1430 Hrs	ft	0.972	-(0.36)	-(0.32)	-(0.10)	-2.283	2.4	60
Data Logger - 1500 Hrs	ft	0.909	-	-	-	-2.346	2.4	60
Data Logger - 1530 Hrs	ft	0.914	-	-	-	-2.341	2.4	60
Data Logger - 1600 Hrs	ft	0.919	-	-	-	-2.336	2.4	60
Data Logger - 1630 Hrs	ft	0.917	-	-	-	-2.338	2.4	60
Data Logger - 1700 Hrs - Stop MDP	ft	0.901	67.92	67.86	67.62	-2.345	2.4	60
Data Logger - 1730 Hrs - Static	ft	3.216	-(0.42)	-(0.38)	-(0.18)	-0.039	-	-
DTGW - 1700 Hrs	ft	67.71	70.88	69.47	67.62	-	-	-
DTGW - Hydro Equivalent	ft	64.72	67.92	67.86	67.62	-	-	-
DTNAPL - 1700 Hrs	ft	64.70	67.40	67.58	-	-	-	-
NAPL - 1700 Hrs	ft	0.13	3.48	1.89	-	-	-	-
Average GW Depression Based on Hydro Equivalent	ft	2.36 [1]	-0.42	-0.38	-0.18	-	-	-
Distance from RW-2	ft	0	37.5	41.4	67.1	-	-	-

1. Average GW Depression during the test period
2. GW Depression, RW-2/ft
3. GW Pump Rate, RW-2/GPM
4. EW Induced Vacuum/"H_2O
5. N/A: Not Available
6. ( ) Indicates the decreased liquid level based on Hydro Equivalent

Pre-Test Functions - #MDP-1

Prior to starting the MDP test with GW Extraction, all systems were checked for normal and safe operation. The depth to groundwater (DTGW), depth to non-aqueous petroleum liquids (DTNAPL), barometric pressure and ambient air temperature were recorded. **The extraction well recorded 2.88 ft of NAPL.** The GW pump inlet was set at 69.75 ft below top of casing (BTOC) which was 0.5 ft from the TD. The pump was then connected to the liquid manifold. The discharge hose was connected to the on-site liquid product collection tank. Each magnehelic gauge was checked and calibrated to zero. The outer monitoring wells were plugged with expandable well plugs designed to accept a digital manometer. Static well data and the atmospheric effect on the outer wells were recorded prior to engaging the AcuVac System. The propane tank fuel level was recorded so that an accurate fuel consumption could be estimated for the total test period. The HORIBA Analyzer was set for the local altitude of 3,910 ft and calibrated with SPAN gas. All safety checks were performed on the System.

Discussion of Data - Test #MDP-1

Test #MDP-1 with vacuum and GW/NAPL extraction was a 10.0 hour MDP test, including static well data, conducted from well RW-2 as the EW. Immediately prior to starting the test, the selected outer monitoring wells were recording slight vacuums ranging from 0.01 to 0.07"H_2O. The general weather conditions were clear and mild. At the start of the MDP test, the EW induced vacuum was set at 30.0"H_2O, with an initial well vapor flow of 16.85 scfm. The initial GW/NAPL pump rate was set at 2.0 gpm. The pump rate was necessary to maintain a GW depression in the 2.4 ft range. The barometric pressure was increasing from 30.08 to 30.09"Hg and the GW temperature was 66.76°F. The influent vapor temperature was 71°F and the ambient air temperature was 73.9°F. The outer observation wells, RW-1 & 7 and MW-4, immediately recorded an increasing vacuum trend.

HORIBA analytical data indicated the influent vapors taken from the EW had HC concentrations of 32,180 and 35,480 ppmv, with CO_2 at 9.82 and 9.46%, CO at 0.41 and 0.56% and O_2 levels at 4.8 and 4.7%. (The maximum HC level that can be recorded by the HORIBA is 100,000 ppmv and the maximum CO level is 25%.) The propane flow to the IC engine was recorded at 140 cfh, with a well flow of 16.85 scfm. The HC levels were within the range normally found in soil gas samples taken from an area highly contaminated with a light crude oil or condensate.

During the first 2.0 hours of the test, the induced vacuum remained constant at 30.0"H_2O, with the well flow also constant at 16.85 scfm. All the outer wells continued on an increasing trend during the 2.0 hour test period. There was excellent vacuum communication between the induced vacuum from EW and the outer observation wells. The GW pump rate was steady at 2.0 gpm during the test period. The ambient air temperature increased to 90.1°F and the influent vapor temperature increased to 72°F. The barometric pressure was mostly steady at 30.09"Hg. The total collected volume was 240 gallons, **with 4.5% or 10.8 gals of NAPL observed on the collected groundwater.** The GW depression in the EW averaged 2.46 ft below static level. The GW depression (drawdown) was limited due to the placement of the pump near the bottom of the well. The induced hydraulic gradient from well RW-2 was on a decreasing trend.

After 2.0 hours of steady induced vacuum on the EW, **the vacuum was increased to 45.0"H_2O, with a well flow of 23.69 scfm.** The test period was 3.0 hours with the EW vacuum and well flow remaining steady. All the outer monitoring wells, RW-1 & 7 and MW-4, immediately recorded an increased vacuum trend in response to the EW increased induced vacuum and continued on an increasing trend for 2.0 hours, then became mostly steady. The barometric pressure developed a slight decreasing trend from

30.09 to 30.08"Hg. The ambient air temperature increased to 100.1°F and the influent vapor temperature was steady at 72°F. The pump rate increased to 2.2 gpm. During this test period, an additional 396 gals were collected, increasing the total volume to 636 gals. The GW depression in the EW averaged 2.38 ft below static GW level. **A NAPL volume of 1.0% or 3.96 gals was observed on the collected GW.**

HORIBA analytical data indicated the samples of the influent vapors taken from the EW had hydrocarbon levels of 37,210, 37,410 and 37,370 ppmv, with CO_2 at 9.62, 9.48 and 9.14%, CO at 0.85, 0.78 and 0.69% and O_2 at 5.0, 4.9 and 5.1%. The propane flow to the IC engine was recorded at 130 cfh, with a well flow of 23.69 scfm. The HC levels continued to be within the range normally found in soil gas samples taken from an area highly saturated with light crude oil or condensate.

The purpose of the EW induced vacuum variable rate test is to define the pressure/flow characteristics of sub-surface soils around the EW and to estimate potential conditions for an operational Dual Phase System. Starting a test with lower variable rates of vacuum and flow allows the EW and outer wells sufficient time to adjust and stabilize and minimizes the risk of developing preferential paths. This will also assist the development of newly installed vapor extraction wells.

After 3.0 hours of steady induced vacuum on the EW, **the vacuum was increased to 60.0"H_2O, with a well flow of 29.14 scfm.** The test period was 4.0 hours with the EW vacuum and well flow remaining steady. The outer wells initially remained mostly steady in response to the increased induced vacuum. This was mainly due to the rapidly decreasing barometric pressure. After the first hour of the test period, the outer wells began to record increased vacuum levels in response to the increased induced vacuum. The barometric pressure decreased from 30.08 to 29.95"Hg and had a direct effect on all the wells.

The ambient air temperature increased to 102.7°F and the influent vapor temperature increased to 73°F. The pump rate increased to 2.4 gpm. During this test period, an additional liquid volume of 576 gals was collected, bringing the total volume to 1,212 gals. The GW depression in the EW averaged 2.33 ft below static GW level. **A NAPL volume of 0.5% or 2.88 gals was observed on the collected GW.**

Additional HORIBA analytical data indicated the influent vapors recorded HC levels of 39,470, 38,090 and 37,510 ppmv, with CO_2 at 9.76, 9.58 and 9.22%, CO at 0.96, 0.82 and 0.68% and O_2 at 4.7, 4.9 and 5.1%.

After 4.0 hours of steady induced vacuum, the outer wells were unplugged. GW pumping and the EW induced vacuum continued for the next 0.2 hours during which DTGW and DTNAPL were recorded. The wells were re-plugged for static data. The GW pump rate remained constant at 2.4 gpm. During this period, the EW GW depression remained approximately 2.30 ft below static level. An additional liquid volume of GW/NAPL of 24 gals was recovered during this short period bringing the total liquid volume of GW/NAPL recovered during the test to 1,236 gallons. **An additional 0.5% or 0.12 gals of NAPL was observed on the collected groundwater.**

The final HORIBA analytical data indicated the influent vapors recorded an HC level of 37,390 ppmv, with CO_2 at 9.18%, CO at 0.58% and O_2 at 5.1%.

The static well data, recorded 0.5 hours after the EW vacuum had ceased, indicated well vacuums ranging from 0.21 to 0.39"H_2O. When high vacuums are recorded on the outer wells, a slight remaining residual vacuum is not uncommon. At the conclusion of the test, **the extraction well recorded 0.13 ft of NAPL.**

The test provided excellent data to use in the calculation and projection of an effective vacuum radius of influence and sufficient data to project an induced hydraulic gradient.

Product Recovery:

A total of 1,236 gals of liquid were recovered during the test period, of which 1.43% or 17.64 gals were liquid crude oil. Approximately 15.21 gals of crude oil contaminant that were removed as part of the influent vapors, were burned as IC engine fuel. The total liquid and vapor NAPL recovered was 32.85 gals, 223 lbs or 2.66% of the total volume.

The HORIBA analytical instrument is calibrated with Hexane and CO_2. One effluent and one influent samples were collected for laboratory analysis.

The formula used to calculate the Emission Rate is:

$$ER = HC\ (ppmv) \times MW\ (Hexane) \times Flow\ Rate\ (scfm) \times 1.58E^{-7} \frac{(min)(lb\ mole)}{(hr)(ppmv)(ft^3)} = lbs/hr$$

Groundwater Recovery:

GW recovery was monitored in well RW-2 (EW) for 30 minutes after the vacuum and pumping had ceased. The GW recovery was recorded with the data logger. In 30 minutes, the recovery for RW-2 was equal to 98.8%.

Emission Data

During this extended test, HORIBA data indicated that the influent vapors had an average hydrocarbon level (TPH) of 36,901 ppmv. Laboratory analysis of influent vapor samples from previous pilot tests indicated that influent vapor samples from light crude oil had a benzene level of approximately 2.0% of the TPH. Using a well flow of 24.18 scfm from this extended test, **the calculated emissions from one extraction well without vapor treatment were as follows:**

HC	=	325	lbs/day	=	13.54 lbs/hr
Benzene	=	6.5	lbs/day	=	0.27 lbs/hr

Although the HORIBA Analyzer has been reasonably accurate compared to laboratory analysis of influent vapors, projections should be based on analytical results from a Certified Testing Laboratory qualified to conduct tests on air emission samples.

Radius of Influence & Induced Hydraulic Gradient:

Figure #1 indicated that the effective vacuum radius of influence from Test #MDP-1 with groundwater extraction (GWE) would be from 81.50 to 92.15 ft, with extraction well flow of 25 to 26 scfm and extraction well vacuum in the 53 to 55"H_2O range. An approximation of the radius of influence may be obtained by determining the point at which the measured vacuum is **0.60 to 0.80"H_2O.** It is assumed that beyond the lower point, the pressure gradient (driving force) is negligible to effectively

transport vaporized contaminants to the extraction well. Under continuous operation, vacuum and radius of influence will most likely continue to increase horizontally and vertically.

Figure #2 indicated that the effective induced hydraulic gradient from Test #MDP-1 with vacuum and groundwater extraction would be greater than approximately 75 ft, with a pump rate of 2.4 gpm. An approximation of the radius of influence may be obtained by determining the point at which the measured GW level effect on the outer wells is greater than 0.1 ft. Under continuous operation, the gradient effect of the GW pump rate and depression may cover a larger area.

The effective vacuum radius of influence is based on calculations and equations using a software program of which data was provided from an extensive data base collected by AcuVac over a period of years. Each projection is based on the test data and site parameters, and takes into consideration such variables as barometric pressure oscillations and gauge error. Although we cannot provide total assurance of accuracy, past experience and results have proven these projections to be well within the acceptable range of accuracy.

To calculate EVR well placement, the equation we use is as follows:

$L = 2\ ROI\ \cos 30°$; (L = distance between wells; ROI = radius of influence)

All other data, including the groundwater depth, well placement, extraction well screened intervals, air injection pressure and flow and EVR recovery rate, must be considered in the final design for a corrective action plan (CAP).

Conclusion:

Pilot Tests are conducted to provide information on short-term tests that can be projected into long-term remedial plans. These feasibility tests indicated that Dual Phase Extraction (DPE) with groundwater depression should be an effective method of remediation for this facility. **The test results provided positive indication that wells RW-1 & 7 and MW-4 were in vacuum communication with the selected extraction well.** The vacuum radius of influence defines the region within which the vapor in the vadose zone flows to the extraction well under the influence of a vacuum. The radius of influence depends on the soil properties of the vented zone, properties of surrounding soil layers, the depth at which the well is screened, well installation and the presence of any impermeable boundaries such as the water table, clay layers, surface seal, building basements and the presence of such areas as tank pits with backfill and underground utilities. **The induced hydraulic gradient (IHG) defines the region within which a selected GW depression is recorded in the outer monitoring wells.** The IHG depends on the hydraulic properties of the underlying sub-surface, aquifer characteristics and the effect of the induced vacuum on specific yields.

Additional Information (this should be read as part of the report):

- Field Operating Data and Notes - MDP-1
- Site Map
- Site Photographs

Summary and Observations:

- **Test #MDP-1:** A low induced vacuum was required to provide a normal vapor well flow. The ratio of the average EW induced vacuum to the EW well flow was 1.96:1.

- The GW pump rate was increased to provide a sufficient GW depression when the EW induced vacuum was increased.
- As the induced vacuum in the EW (RW-2) was increased, liquid NAPL was observed on the GW.
- The HC levels recorded during the test period were within the range normally associated with soil gas samples taken from an area that is highly saturated with a light crude oil or condensate. The CO_2 levels in the influent well vapors were in the normal range. The CO levels were in the low range. The O_2 levels varied from 4.7 to 5.1% which is also in the low range.
- During each increase of the induced vacuum, the outer observation wells recorded increased vacuum levels and decreased GW levels.
- **The test provided excellent data for the calculation and projection of a vacuum radius of influence, sufficient data for the projection of an induced hydraulic gradient and excellent data to support the collection and removal of NAPL with Dual Phase Extraction. The total liquid and vapor NAPL recovered was 2.66% or 32.85 gals from a total liquid volume of 1,236 gals.**

Recommendations:

Since the higher percent of liquid NAPL recovery was during the first four hours of the tests, short Mobile Dual Phase Events (four hours per well) may be the most effective method of removing the liquid and vapor NAPL. A two or three day 8 hour Event period has proven to be a very effective and cost effective method of remediation. The initial Events are usually conducted on a 30 to 60 day schedule reducing to a 90 day schedule.

We appreciate the opportunity to have provided this service to CRA. Once you have reviewed the report, please contact me if you have any questions.

Sincerely,

James E. Sadler
Engineer/Environmental

110024.REP

Attachment A

Acronyms and Definitions

A	Annulus - the space between the pipes and lines in the extraction well and the outer casing
AI (AS)	Air Injection (Sparging) the mass transfer of O_2 from air to groundwater
BGL	Below Ground Level
BGS	Below Ground Surface
BP	Barometric Pressure (Atmospheric Pressure)
BTOC	Below Top of Casing
CFH	Cubic Feet Per Hour
CFM	Cubic Feet Per Minute
DNAPL	Dense Non-Aqueous Petroleum Liquid
DPVE	Dual Phase Vacuum Extraction
DTGW	Depth to Groundwater
DTPSH	Depth to Phase Separated Hydrocarbons/LNAPL
DT	Drop Tube
EVR	Enhanced Vacuum Recovery, also referred to as SVE/GWD
EW	Extraction Well
GW	Groundwater
GWD	Groundwater Depression
GWE	Groundwater Extraction
GWUP	Groundwater upwelling
HC	Hydrocarbons (Petroleum)
"H_2O	Inches of Water
"Hg	Inches of Mercury
IHG	Induced Hydraulic Gradient
IV	Induced Vacuum, normally from a vacuum pump connected to the extraction well or vapor recovery well
MDP	Mobile Dual Phase
NAPL	Light Non-Aqueous Petroleum Liquid
P	Pressure, the existence of above atmospheric pressure
ROI	Radius of Influence
RPM	Revolutions Per Minute
SCFM	Standard Cubic Feet Per Minute
SVE	Soil Vacuum Extraction
TD	Total Depth
QT	Quick Test, a short duration SVE Test
V	Vacuum, the existence of below atmospheric pressure
VEGE	Vacuum Enhanced Groundwater Extraction
VER	Vacuum Enhanced Recovery
VEW	Vapor Extraction Well

6/10/11	Static Data Time 0730	First Data Time 0800	Second Data Time 0830	Third Data Time 0900	Fourth Data Time 0930	Fifth Data Time 1000	Sixth Data Time 1030
Horiba HC ppmv	ND	ND	32,180	ND	35,480	ND	37,210
Horiba CO_2%	ND	ND	9.82	ND	9.46	ND	9.62
Horiba CO%	ND	ND	0.41	ND	0.56	ND	0.85
Horiba O_2%	ND	ND	4.8	ND	4.7	ND	5.0
Influent Vapor Temp °F	-	71	71	72	72	72	72
Barometric Pressure "Hg	30.08	30.09	30.09	30.10	30.10	30.09	30.09
Extraction Well Flow SCFM Well RW-2	OFF	16.85	16.85	16.85	16.85	16.85	23.69
Extraction Well Vacuum "H_2O Well RW-2	OFF	30.0	30.0	30.0	30.0	30.0	45.0
Well RW-1 Vacuum "H_2O Dist. 37.5 ft	.07	.20	1.21	1.82	2.00	1.97	2.36
Well RW-7 Vacuum "H_2O Dist. 41.4 ft	.01	.12	.92	1.36	1.51	1.71	2.08
Well MW-4 Vacuum "H_2O Dist. 67.1 ft	.03	.07	.46	.88	.92	.93	1.04
Pump Rate gals/min	-	2.0	2.0	2.0	2.0	2.0	2.2
Total Volume gals	-	-	60	120	180	240	306

-() Indicates Well Pressure
ND - No Data Recorded

6/10/11	Seventh Data Time 1100	Eighth Data Time 1130	Ninth Data Time 1200	Tenth Data Time 1230	Eleventh Data Time 1300	Twelfth Data Time 1330	Thirteenth Data Time 1400	Fourteenth Data Time 1430
Horiba HC ppmv	ND	37,410	ND	37,370	ND	39,470	ND	38,090
Horiba CO_2%	ND	9.48	ND	9.14	ND	9.76	ND	9.58
Horiba CO%	ND	0.78	ND	0.69	ND	0.96	ND	0.82
Horiba O_2%	ND	4.9	ND	5.1	ND	4.7	ND	4.9
Influent Vapor Temp °F	72	72	72	72	72	73	73	73
Barometric Pressure "Hg	30.09	30.09	30.09	30.08	30.08	30.05	30.04	30.02
Extraction Well Flow SCFM Well RW-2	23.69	23.69	23.69	23.69	23.69	29.14	29.14	29.14
Extraction Well Vacuum "H_2O Well RW-2	45.0	45.0	45.0	45.0	45.0	60.0	60.0	60.0
Well RW-1 Vacuum "H_2O Dist. 37.5 ft	2.85	2.95	3.11	3.09	3.07	3.07	3.10	3.21
Well RW-7 Vacuum "H_2O Dist. 41.4 ft	2.49	2.53	2.63	2.64	2.60	2.60	2.63	2.70
Well MW-4 Vacuum "H_2O Dist. 67.1 ft	1.28	1.40	1.30	1.40	1.40	1.36	1.38	1.43
Pump Rate gals/min	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4
Total Volume gals	372	438	504	570	636	708	780	852

-() Indicates Well Pressure
ND - No Data Recorded

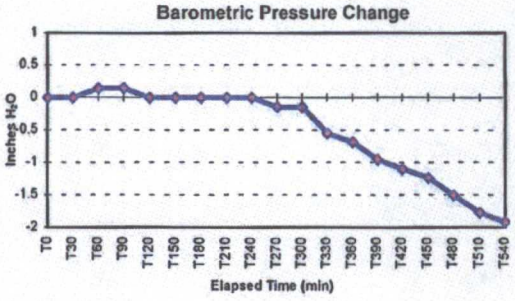
6/10/11	Fifteenth Data Time 1500	Sixteenth Data Time 1530	Seventeenth Data Time 1600	Eighteenth Data Time 1630	Nineteenth Data Time 1700	Static Data Time 1730	Average Data 9.0 Hrs	Maximum Data
Horiba HC ppmv	ND	37,510	ND	37,390	ND	ND	36,901	39,470
Horiba CO_2%	ND	9.22	ND	9.18	ND	ND	9.47	9.82
Horiba CO%	ND	0.68	ND	0.58	ND	ND	0.70	0.96
Horiba O_2%	ND	5.1	ND	5.1	ND	ND	4.9	5.1
Influent Vapor Temp °F	73	73	73	73	73	-	72	73
Barometric Pressure "Hg	30.01	30.00	29.98	29.96	29.95	29.93	30.05	30.10
Extraction Well Flow SCFM Well RW-2	29.14	29.14	29.14	29.14	29.14	OFF	24.18	29.14
Extraction Well Vacuum "H_2O Well RW-2	60.0	60.0	60.0	60.0	60.0	OFF	47.4	60.0
Well RW-1 Vacuum "H_2O Dist. 37.5 ft	3.47	3.55	3.60	3.64	3.68	.39	2.73	3.68
Well RW-7 Vacuum "H_2O Dist. 41.4 ft	3.11	3.04	3.13	3.13	3.16	.32	2.32	3.16
Well MW-4 Vacuum "H_2O Dist. 67.1 ft	1.56	1.60	1.62	1.62	1.63	.21	1.23	1.63
Pump Rate gals/min	2.4	2.4	2.4	2.4	2.4	OFF	2.2	2.4
Total Volume gals	924	996	1,068	1,140	1,212	1,236	-	1,236

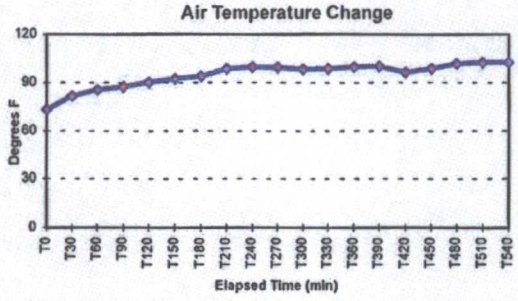
-() Indicates Well Pressure
ND - No Data Recorded

SCHEDULE B
Summary of ACUVAC TEST #MDP-1

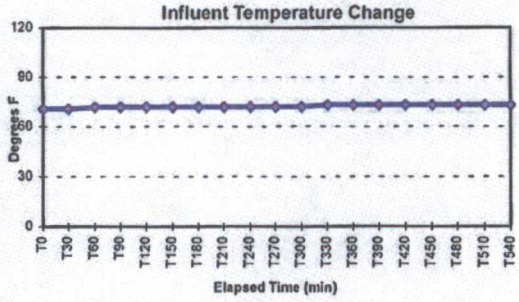
DARR ANGELL #4
LEA COUNTY, NM
June 10, 2011

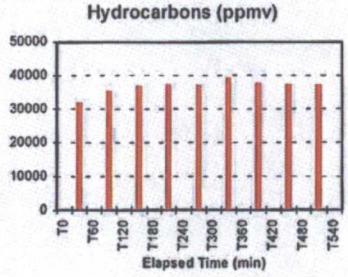
Atmospheric Conditions

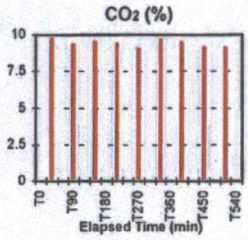


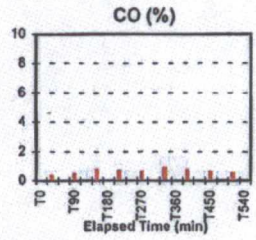


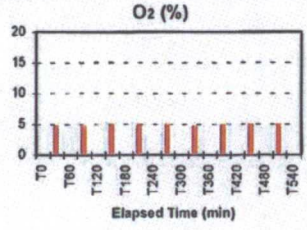
Influent Vapor Data

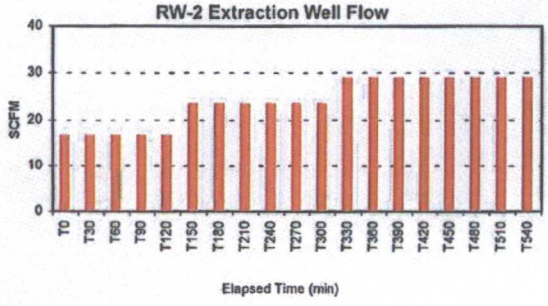


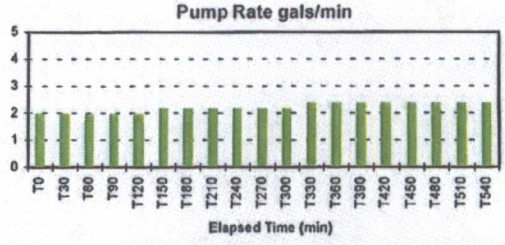


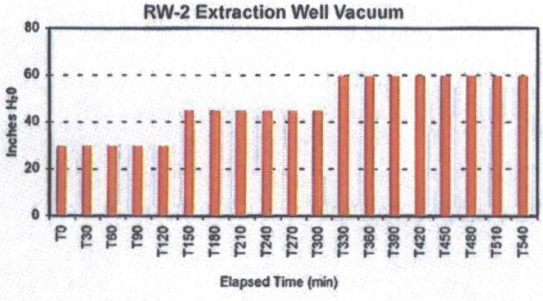


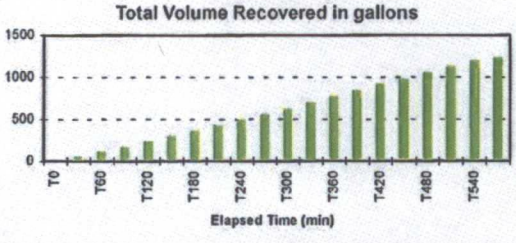










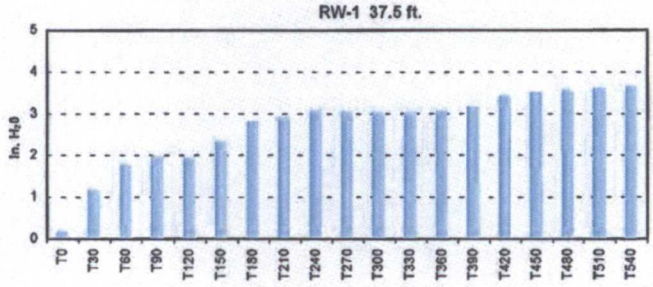


SCHEDULE B
Summary of ACUVAC TEST #MDP-1

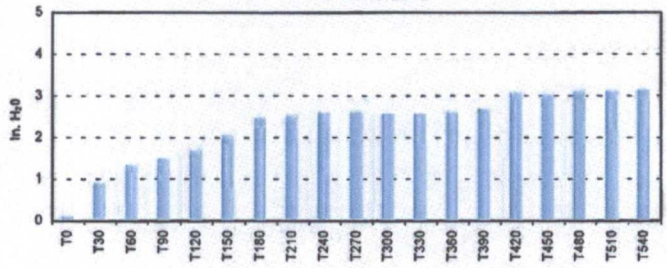
DARR ANGELL #4
LEA COUNTY, NM
June 10, 2011

Recorded Well Vacuums and/or Pressures

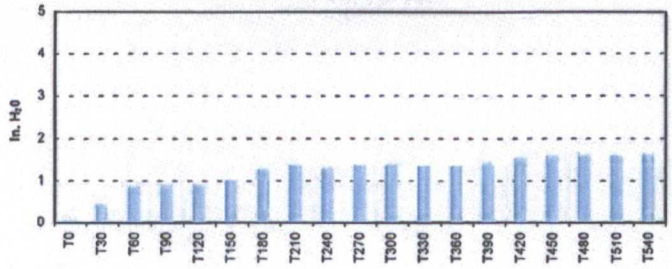
RW-1 37.5 ft.



RW-7 41.4 ft.



MW-4 67.1 ft.



DARR ANGELL #4
LEA COUNTY, NM

AcuVac Remediation Inc.
June 10, 2011

Figure #1
Radius of Influence
Data from Tests #MDP-1

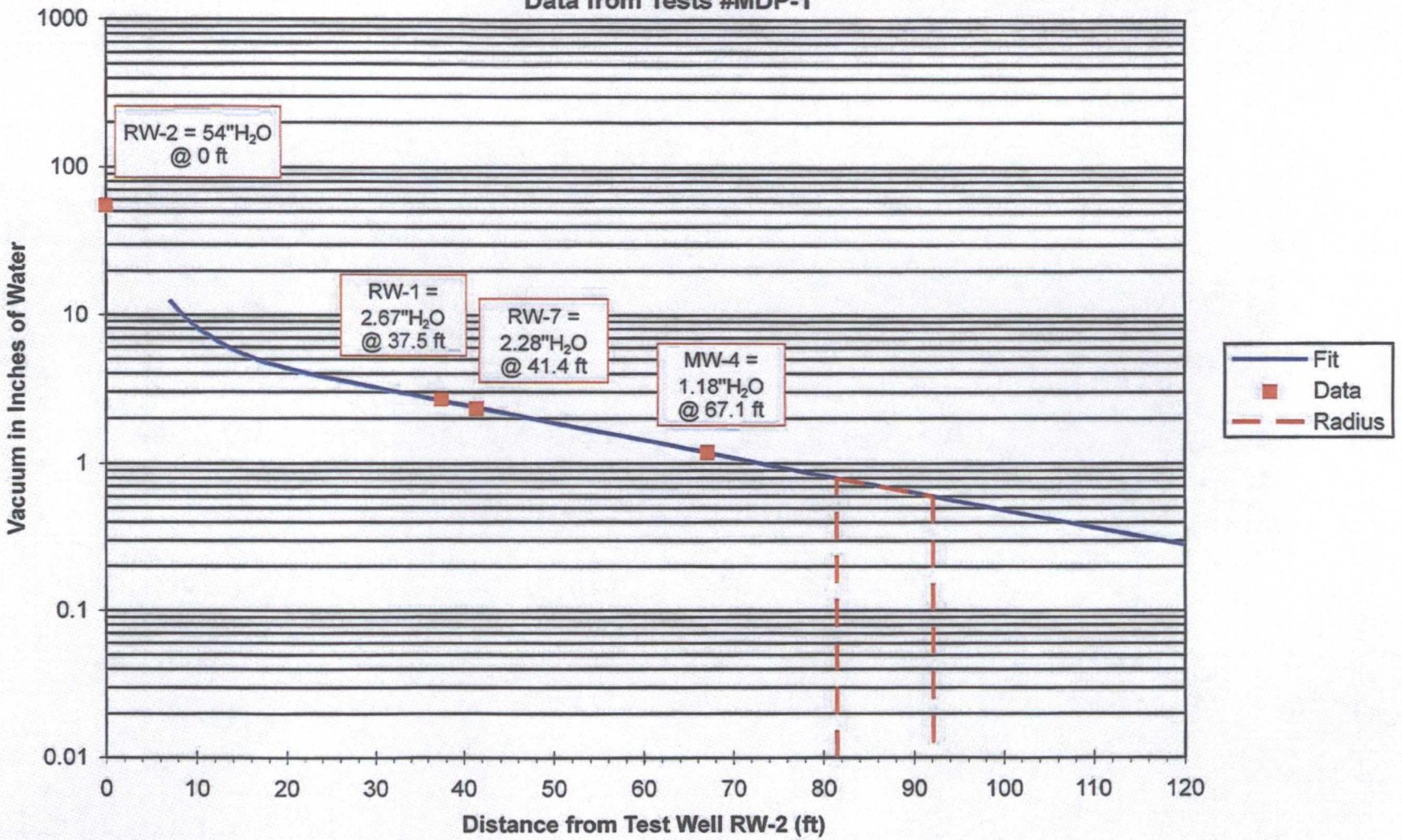
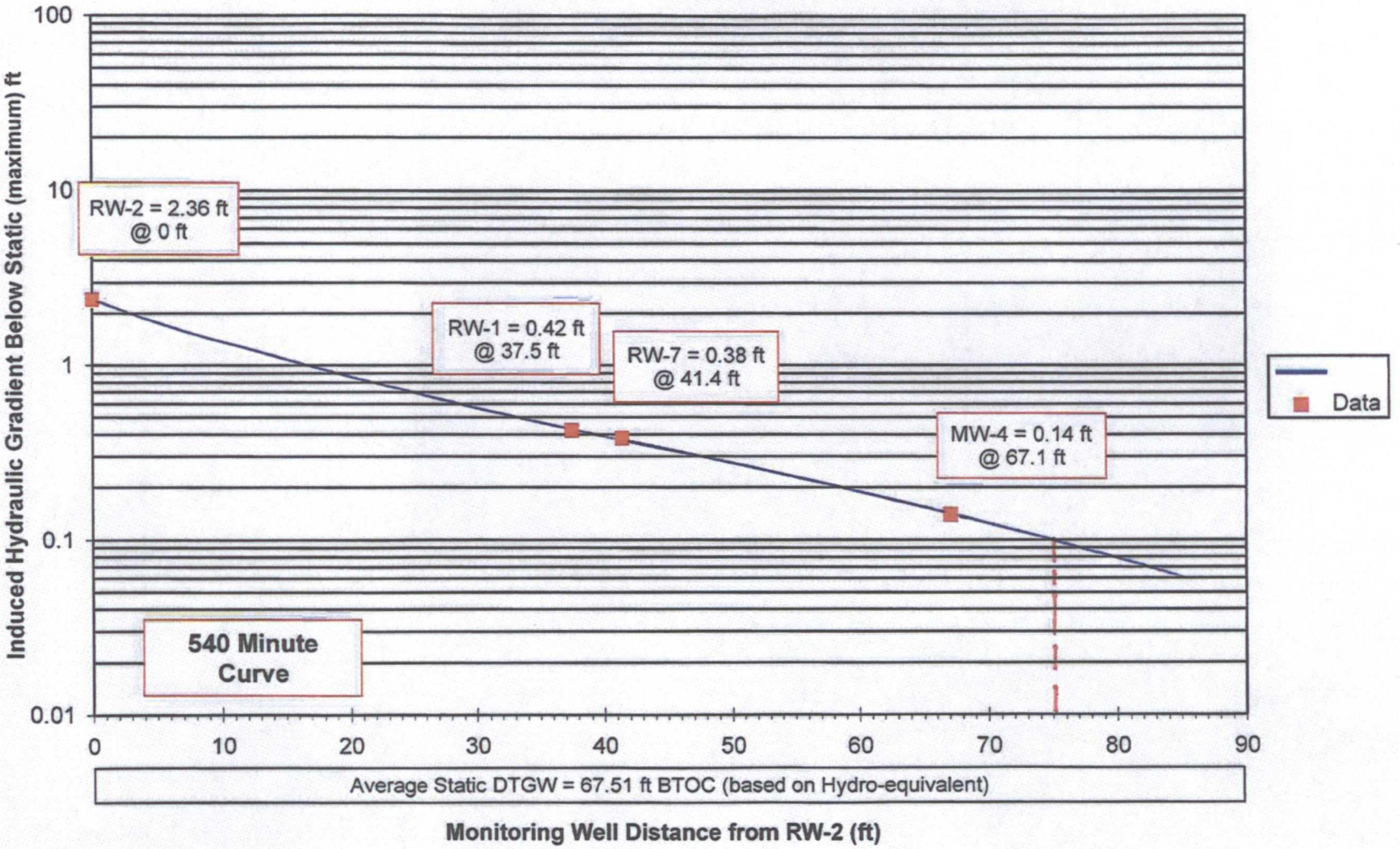


Figure #2
Drawdown at 540 Minutes vs Monitoring Well Distance



OPERATING DATA - PILOT TEST # MDP-- PAGE # (DUAL PHASE PILOT TEST

Location: DAGGER ANGEL #4 - LEA COUNTY, NM Project Engineer: SADLER / LUNDGREN

	Date:	6-10-11	-	-	-	-	-
	Parameters	Time	Time	Time	Time	Time	Time
		0730	0800	0830	0900	0930	1000
	Well # RW-2	Hr Meter	Hr Meter	Hr Meter	Hr Meter	Hr Meter	Hr Meter
		1209.0	1209.5	1210.0	1210.5	1211.0	1211.5
ENGINE/BLOWER	R.P.M.	1000	1800	1800	1800	1800	1800
	Oil Pressure psi	50	50	50	50	50	50
	Water Temp °F	160	160	160	165	165	165
	Volts	13	13	13	13	13	13
	Intake Vacuum "Hg	18	18	18	18	18	18
	Gas Flow Fuel/Propane cfh	100	140	140	140	140	140
ATMOSPHERE/VAPOR/AIR	GW Pump ON/OFF	OFF	ON	ON	ON	ON	ON
	Extraction Well Flow scfm	OFF	16.85	16.85	16.85	16.85	16.85
	Extraction Well Vac. "H_2O	OFF	30	30	30	30	30
	Pump Rate gals/min	OFF	2.0	2.0	2.0	2.0	2.0
	Total Volume gals	-	-	60	120	180	240
	Influent Vapor Temp. °F	-	71	71	72	72	72
	Air Temp °F	73.4	73.9	81.8	85.6	87.4	90.1
	Barometric Pressure "Hg (FLO = 3910)	30.08	30.09	30.09	30.10	30.10	30.09
MONITOR WELL VACUUM	37.5 RW-1 "H_2O	.07	.20	1.21	1.82	2.00	1.97
	41.4 RW-7 "H_2O	.01	.12	.92	1.36	1.51	1.71
	67.1 MW-4 "H_2O	.03	.07	.46	.88	.92	.93
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O		START				
	"H_2O						
	"H_2O						
	"H_2O						
	NAPL 0/0 Vol/Gals	-	-	10/60	3/1.8	3/1.8	2/1.2
	Data Logger ft	3.355	1.986	0.785	0.788	0.812	0.781
	Depth of GW Depression ft	-	-1.369	-2.410	-2.467	-2.443	-2.474
	Extraction Well DTNAPL	67.18	-	-			
	Extraction Well DTGW	70.06	-	-	-		

() Indicates Well Pressure

NAPL = 2.88'
HE = 67.60'

TEST	Instrument	HORIBA	HORIBA				
	WELCH	RW-2	RW-2				
	Time	0815	0915				
VAPOR/INFLUENT	HC ppmv	32,180	35,480				
	CO_2 %	9.82	9.46				
	CO %	0.41	0.56				
	O_2 %	4.8	4.7				
EMISSIONS	HC ppmv						
	CO_2 %						
	CO %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE: 6/10/11 DARA ANGELL #4 TEST NO: MDP-1 Page No: 1

0610	Arrived at site; Positioned MDP system near well RW-2 as the
	extraction well (EW) - Tailgate Safety Meeting - Mobilized SVE &
	Pumping systems - Opened selected outer wells - Gauged wells - Installed DL and
	GW/NAPL pump in EW - Connected hoses - Safety checks, all OK (Pump 0.5ft off Bottom)
0750	Recorded static well data - DLE 3,255' - Outer wells, slight vacuums
0800	START TEST MDP-1 - Initial EW induced vacuum set @ 30" H2O,
	Vapor well flow = 16.8 SCFM - GW/NAPL rate 2.0 GPM - Heavy NAPL FLOW
	Outer well vacuums recording slight increases
0815	HORIBA DATA: HC=TPH = 32,180 ppmv, CO_2 = 9.82% - CO = 0.41% - O_2 = 4.8%
0830	Recorded data: BP - All the outer wells recorded increased vacuum levels
	GW/NAPL = 2.0 GPM GWD ≈ -2.470' - NAPL @ 10% of Volume
0900	Recorded data: BP ↑ Outer wells continue an increasing vacuum trend
	GW/NAPL = 2.0 GPM GWD ≈ -2.467' NAPL @ 3% of Volume
0915	HORIBA DATA: HC = 35,480 ppmv ↑, CO_2 = 9.46% ↓, CO = 0.56% ↑, O_2 = 4.7% ↓
0930	Recorded data: BP - Outer wells continue to record increased vacuum
	levels - PP = 2.0 GPM - GWD ≈ -2.443' NAPL @ 3%
1000	Recorded data: BP ↓ Outer wells variable, slight increases/decreases
	GWD = 2.474 - INCREASED EW vacuum = 46" H2O, VWP = 2309 - GW/NAPL = 2.2 GPM

OPERATING DATA - PILOT TEST # MPE-1 PAGE # 2 DUAL PHASE PILOT TEST

Location: DARR ANGELL #4 - LEA COUNTY, NM Project Engineer: SANDELL/LUNDGREN

	Date:	6-10-11	—	—	—	—	—
	Parameters	Time 1030	Time 1100	Time 1130	Time 1200	Time 1230	Time 1300
	Well # RW-2	Hr Meter 1217.0	Hr Meter 1217.5	Hr Meter 1218.0	Hr Meter 1218.5	Hr Meter 1219.0	Hr Meter 1219.5
ENGINE/BLOWER	R.P.M.	1900	1900	1900	1900	1900	1900
	Oil Pressure psi	50	50	50	50	50	50
	Water Temp °F	170	170	170	175	175	175
	Volts	13	13	13	13	13	13
	Intake Vacuum "Hg	17	17	17	17	17	17
	Gas Flow Fuel/Propane cfh	130	130	130	130	130	130
ATMOSPHERE/VAPOR/AIR	GW Pump ON/OFF	ON	ON	ON	ON	ON	ON
	Extraction Well Flow scfm	23.69	23.69	23.69	23.69	23.69	23.69
	Extraction Well Vac. "H_2O	45	45	45	45	45	45
	Pump Rate gals/min	2.2	2.2	2.2	2.2	2.2	2.2
	Total Volume gals	306	372	438	504	570	636
	Influent Vapor Temp. °F	72	72	72	72	72	72
	Air Temp °F	92.6	94.1	98.7	100.1	99.6	98.5
	Barometric Pressure "Hg	30.09	30.09	30.09	30.09	30.08	30.08
MONITOR WELL VACUUM	RW-1 "H_2O	2.36	2.85	2.95	3.11	3.09	3.07
	RW-7 "H_2O	2.08	2.49	2.53	2.63	2.64	2.60
	MW-4 "H_2O	1.09	1.28	1.40	1.30	1.40	1.40
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	NAPL 0/0 Vol Gals	1/.66	1/.66	1/.66	1/.66	1/.66	1/.66
	Data Logger 3.255 ft	1.003	0.435	0.904	0.912	0.869	0.874
	Depth of GW Depression ft	-2.252	-2.320	-2.351	-2.343	-2.386	-2.381
	Extraction Well DTNAPL						
	Extraction Well DTGW						

() Indicates Well Pressure

TEST	Instrument	HORIBA	HORIBA	HORIBA			
	WELL #	RW-2	RW-2	RW-2			
	Time	1015	1115	1215			
VAPOR/INFLUENT	HC ppmv	37,210	37,410	37,370			
	CO_2 %	9.62	9.48	9.14			
	CO %	0.85	0.78	0.69			
	O_2 %	5.0	4.9	5.1			
EMISSIONS	HC ppmv						
	CO_2 %						
	CO %						
	Air/Fuel Ratio %						

H_2S = 0 ppm

OPERATING DATA AND NOTES

DATE: 6/10/11 DART ARGUS #4 TEST NO MDA-1 Page No: 2

1015	HORIBA DATA: HC = 37,210 ppmv ↑, CO_2 = 9.62% ↑, CO = 0.85% ↑, O_2 = 5.0% ↑
1030	Recorded data: BP - All outer wells recorded increased vacuum levels in response
	to the EW vacuum increase. GWD -2,352' - GW/NAPL note = 7.3 gpm - NAPL: 1%
1100	Recorded data: BP - Outer wells continue to record increased vacuum
	levels - GWD -2,350' - NAPL @ 1%
1115	HORIBA DATA: HC = 37,410 ppmv ↑ CO_2 = 9.48% ↓, CO = .78% ↓, O_2 = 4.9% ↓
1130	Recorded data: BP - Outer wells still on increasing trend
	GWD -2,351' - NAPL @ 1%
1200	Recorded data: BP - Outer wells variable - Slight increase: some decrease
	GWD -2,343'
1215	HORIBA DATA: HC = 37,370 ppmv ↓ CO_2 = 9.14% ↓, CO = 0.69 ↓, O_2 = 5.1% ↑
1230	Recorded data: BP ↓ Outer wells mostly steady - GWD: -2,386'
1300	Recorded data: BP - Outer wells on slight decreasing vacuum
	trend - GWD -2,381 - NAPL @ 1%
1305	INCREASED EW vacuum = 60" H_2O, VMF: 29.14 scfm
	GWD = 1,076 GW/NAPL note @ 2.4 gpm

Form/19950

OPERATING DATA - PILOT TEST # MDP-1 PAGE # 3 DUAL PHASE PILOT TEST

Location: DARR ANGELL #4 - LEA COUNTY, NM Project Engineer: SADLER / LUNDGREN

		Date:	6-10-11	"	"	"	"	
		Parameters	Time	Time	Time	Time	Time	Time
			1330	1400	1430	1500	1530	1600
		Well # RW-2	Hr Meter	Hr Meter	Hr Meter	Hr Meter	Hr Meter	Hr Meter
			1215.0	1215.5	1216.0	1216.5	1217.0	1217.5
ENGINE/BLOWER	R.P.M.		2000	2000	2000	2000	2000	2000
	Oil Pressure	psi	50	50	50	50	50	50
	Water Temp	°F	180	180	180	180	180	180
	Volts		13	13	13	13	13	13
	Intake Vacuum	"Hg	14	14	14	14	14	14
	Gas Flow Fuel/Propane	cfh	100	100	100	100	100	100
ATMOSPHERE/VAPOR/AIR	GW Pump	ON/OFF	ON	ON	ON	ON	ON	ON
	Extraction Well Flow	scfm	29.14	29.14	29.14	29.14	29.14	29.14
	Extraction Well Vac.	"H_2O	60	60	60	60	60	60
	Pump Rate	gals/min	2.4	2.4	2.4	2.4	2.4	2.4
	Total Volume	gals	708	780	852	924	996	1068
	Influent Vapor Temp.	°F	73	73	73	73	73	73
	Air Temp	°F	98.7	99.9	100.4	clouds 96.9	clouds 98.8	101.8
	Barometric Pressure	"Hg	30.05	30.04	30.02	30.01	30.00	29.98
MONITOR WELL VACUUM	RW-1	"H_2O	3.07	3.10	3.21	3.47	3.55	3.60
	RW-7	"H_2O	2.60	2.63	2.70	3.11	3.04	3.13
	MW-4	"H_2O	1.36	1.38	1.43	1.56	1.60	1.62
		"H_2O						
		"H_2O						
		"H_2O						
		"H_2O						
		"H_2O						
		"H_2O						
		"H_2O						
	NAPL 0 / 0	Vol Gals	0.5 / .36	0.5 / .36	0.5 / .36	0.5 / .36	0.5 / .36	0.5 / .36
	Data Logger	ft	0.858	1.054	0.972	0.909	0.914	0.919
	Depth of GW Depression	ft	-2.397	-2.201	-2.283	-2.346	-2.341	-2.336
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						

() Indicates Well Pressure

TEST	Instrument	HORIBA	HORIBA	HORIBA			
	WELL #	RW-2	RW-2	RW-2			
	Time	1315	1415	1515			
VAPOR/INFLUENT	HC ppmv	39,470	38,090	37,510			
	CO_2 %	9.76	9.58	9.22			
	CO %	0.96	0.82	0.68			
	O_2 %	4.7	4.9	5.1			
EMISSIONS	HC ppmv						
	CO_2 %						
	CO %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE: 6/10/11 DARA ANGELC #4 TEST NO: MDA-1 Page No: 3

1315	HORIBA DATA: HC = 39,470 ppmv ↑, CO_2 = 38,090 % ↑, CO = 0.96% ↑, O_2 = 4.7% ↓
1330	Recorded data BP ↓↓↓ Outer wells mostly steady in response to EW
	vacuum increase mainly due to rapid decreasing BP. - GW/NAPL = 2.4gpm GWD = 2.31'
1400	Recorded data: BP ↓ - Outer wells developing a slight increasing
	vacuum trend. - Pump @ 2.4 gpm - GWD = -2.201'
1415	HORIBA DATA: HC = 38,090 ppmv ↓, CO_2 = 9.58% ↓, CO = 0.82% ↓, O_2 = 4.9% ↑
1430	Recorded data: BP ↓↓ Outer wells recovering a slight increasing
	trend - BP still on rapid decrease. - GWD = -2.238' - Pump @ 2.4gpm
1500	Recorded data: BP ↓ Outer wells overcoming decrease BP and
	continue to record increased vacuums. GWD = -2.316' - Pump @ 2.4gpm
1515	HORIBA DATA: HC = 37,510 ppmv ↓, CO_2 = 9.22% ↓, CO = 0.68% ↓, O_2 = 5.1% ↑
1530	Recorded data: BP ↓ - Outer wells continue on increasing trend
	GWD = -2.341' - Rate @ 2.4gpm - NAPL steady @ 0.5% of volume
1600	Recorded data: BP ↓↓ - Outer wells continue with a slight
	increasing trend. GWD = -2.336' - Pump @ 2.4 - NAPL @ 0.5%

OPERATING DATA - PILOT TEST # MDP-1 PAGE # 4 DUAL PHASE PILOT TEST

Location: DARR ANGELL #4 - LEA COUNTY, NM Project Engineer: SADLER / LUNDGREN

		Date:	6-10-11	—	—			
		Parameters	Time 1630	Time 1700	Time 1730	Time	Time	Time
		Well # RW-2	Hr Meter 1218.0	Hr Meter 1218.5	Hr Meter 1219.0	Hr Meter	Hr Meter	Hr Meter
ENGINE/BLOWER	R.P.M.		2000	2000	1000			
	Oil Pressure	psi	50	50	50			
	Water Temp	°F	125	125	125			
	Volts		13	13	13			
	Intake Vacuum	"Hg	14	14	18			
	Gas Flow Fuel/Propane	cfh	100	100	90			
ATMOSPHERE/VAPOR/AIR	GW Pump	ON/OFF	ON	ON	OFF			
	Extraction Well Flow	scfm	29.14	29.14	OFF			
	Extraction Well Vac.	"H_2O	60	60	OFF			
	Pump Rate	gals/min	2.4	2.4	OFF			
	Total Volume	gals	1140	1212	1236			
	Influent Vapor Temp.	°F	73	73	—			
	Air Temp	°F	102.7	102.5	101.8			
	Barometric Pressure	"Hg	29.96	29.95	29.93			
MONITOR WELL VACUUM	RW-1	"H_2O	3.64	3.68	.39			
	RW-7	"H_2O	3.13	3.16	.32			
	MW-4	"H_2O	1.62	1.63	.21			
		"H_2O			STATIC DATA			
		"H_2O						
		"H_2O		STOP MDP				
		"H_2O						
		"H_2O						
		"H_2O						
		"H_2O						
	NAPL 0 / 0	Vol / Gals	0.5/1.36	0.5/1.36	—			
	Data Logger 3.253	ft	0.917	0.901	3.216			
	Depth of GW Depression	ft	-2.338	-2.345	-0.039			
	Extraction Well	DTNAPL			67.38			
	Extraction Well	DTGW			67.51			

() Indicates Well Pressure

NAPL = 0.13'
HE = 67.40'

TEST	Instrument	HORIBA						
	WELL #	RW-2						
	Time	1615						
VAPOR/INFLUENT	HC ppmv	37,390						
	CO_2 %	9.18						
	CO %	0.58						
	O_2 %	5.1						
EMISSIONS	HC ppmv							
	CO_2 %							
	CO %							
	Air/Fuel Ratio %							

OPERATING DATA AND NOTES

DATE: 6/10/11 DARR ANGALL TEST NO: MAP-1 Page No: 4

1615	HORIBA DATA: HC = 37,300 ppmv ↓, CO_2 = 9.18% ↓, CO: 0.58% ↓, O_2 = 5.1% —
1630	Recorded data: BP ↓↓ Outer wells mostly steady - GWD: -2.338'
	Pump @ 2.4 gpm - NAPL @ 0.5%
1700	Recorded data: BP ↓ - Outer wells recorded a slight increased
	vacuum level - GWD = -2.345' - Pump @ 2.4 gpm - NAPL @ 0.5%
	Gauged outer wells - Replugged wells for static data
	Discontinued SVE and GW/NAPL pumping to allow time
	for outer wells to adjust to atmospheric changes
1730	Recorded final DL data, Outer wells recording a slight
	residual vacuum which is not uncommon as the formation
	adjusts from vacuum to atmospheric
	Demobilized all equipment - Secured wells - Loaded truck
1815	TEST MPP-1 completed - Departed site.

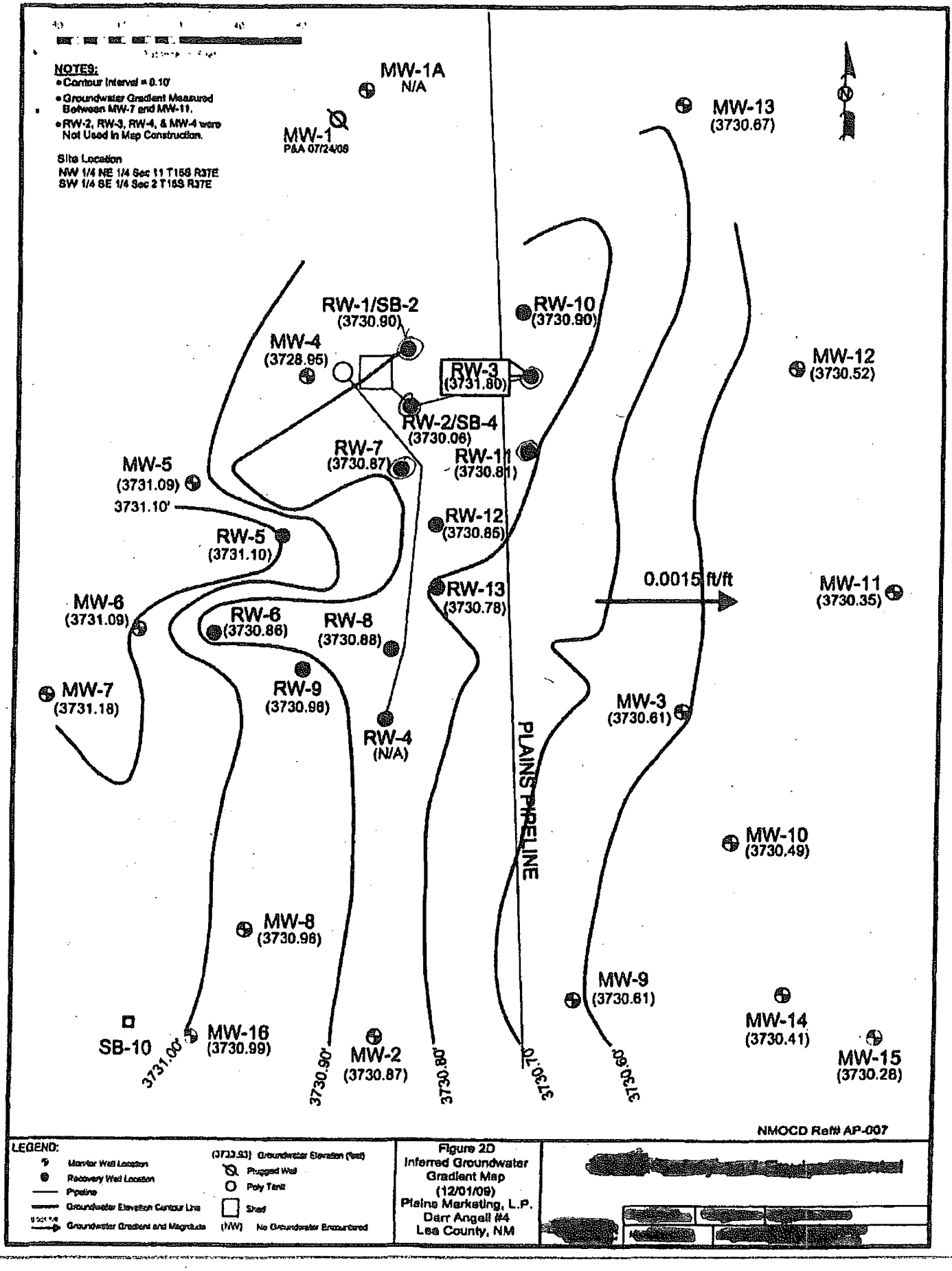
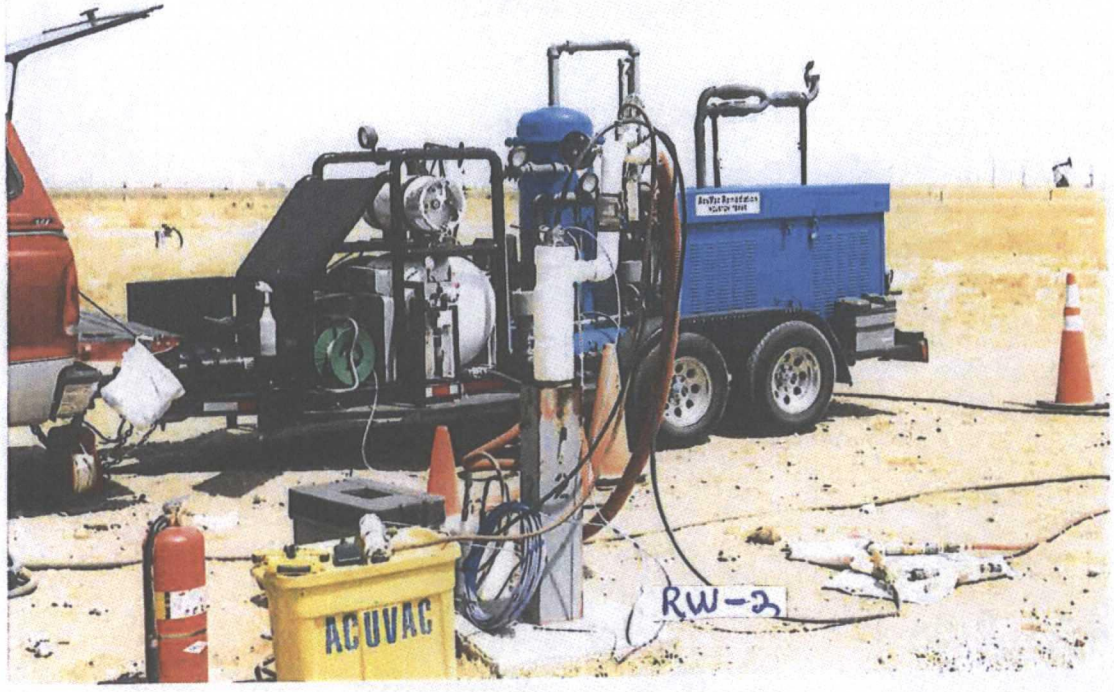
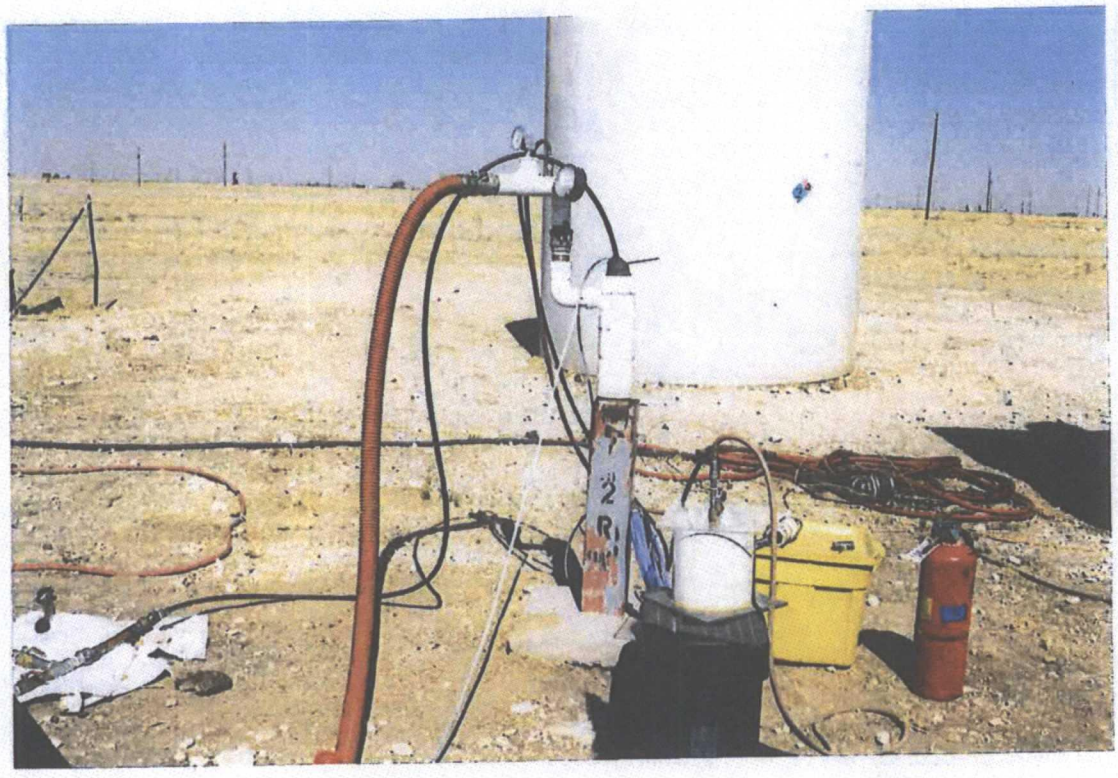


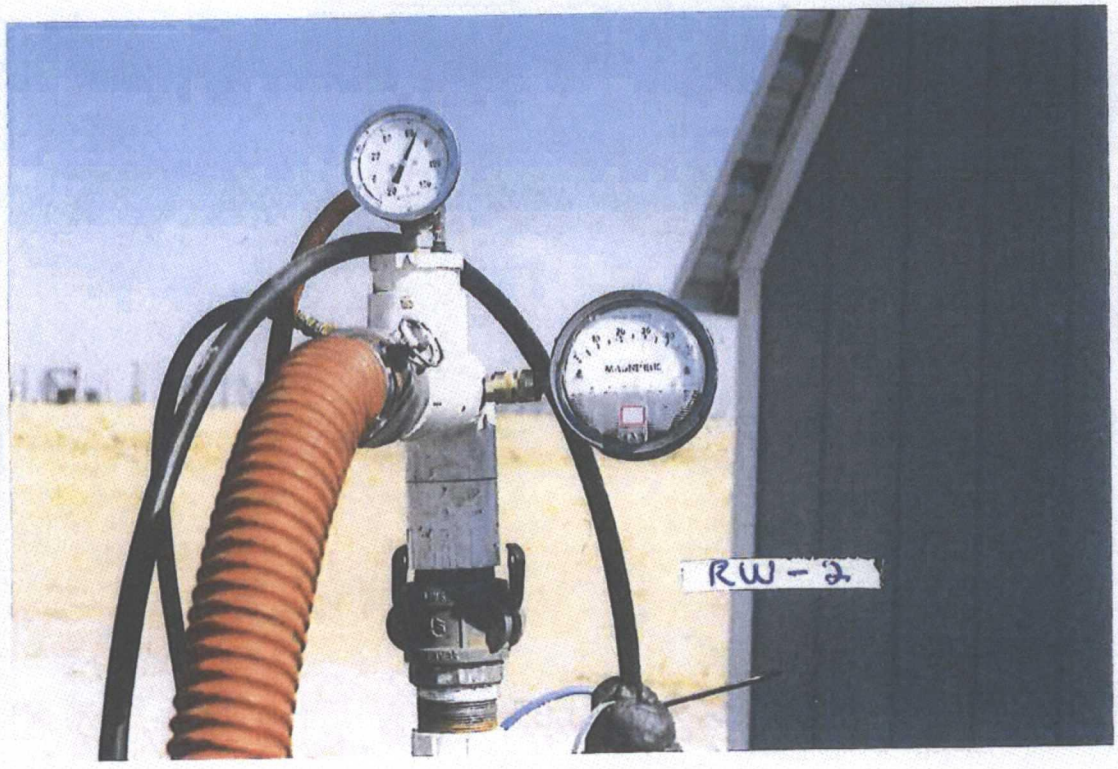
Figure 2D
Inferred Groundwater Gradient Map
(12/01/09)
Plains Marketing, L.P.
Darr Angell #4
Lea County, NM

DARR ANGELL #4
LEA COUNTY, NM



DARR ANGELL #4
LEA COUNTY, NM





DARR ANGELL #4
LEA COUNTY, NM