1R- 455

REPORTS

DATE:

3-12-12

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MOBILE DUAL PHASE EXTRACTION REPORT
VACUUM TO JAL 14 INCH MAINLINE 3 PIPELINE RELEASE
LEA COUNTY, NEW MEXICO
SRS # 2003-00117
NMOCD# 1R-0455

PREPARED FOR:

PLAINS MARKETING, L.P.
333 CLAY STREET
SUITE 1600
HOUSTON, TEXAS 77002

PREPARED BY:

TALON/LPE
921 N. BIVINS
AMARILLO, TEXAS 79107

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MARCH 12, 2012

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Section Page

Attachments:

I. MDPE SUMMARY REPORT AND WASTE DISPOSITION

A. MDPE Results

The following report summarizes data collected during the 12-hour High Vacuum Multi-Phase Extraction (MDPE) event conducted from February 23th to February 24th, 2012 at the Vacuum to Jal 14 Inch Mainline 3 Pipeline release site, located in Lea County, New Mexico. The objective of the MDPE treatment was to remove both vapor and liquid phase separated hydrocarbons (PSH) from onsite groundwater wells. Talon/LPE utilized an MDPE unit which consisted of an SVE extraction pump capable of generating vacuum up to 25" hg. Off gas vapors extracted from the extraction wells were destroyed using a propane-fired 1000-SCFM thermal oxidizer capable of processing 172.96 lbs/hr of gasoline.

A total of 12 hours (0.5 days) of PSH recovery was performed. RW-3, RW-4, & RW-5 for 12 hours.

Prior to and immediately following the event, the groundwater wells were gauged for groundwater elevation and PSH. Depth to groundwater ranges were measured in feet below the top of casing. Refer to Attachment 1 for a summary of data collected during the MDPE event.

The volume of PSH removed during the MDPE event is shown to reflect the portions of PSH in the liquid phase and as off-gas vapor. Air removal rates were calculated from velocity measurements recorded at the influent manifold prior to entry into the MDPE unit. PSH recovery and air flow data has been detailed and is contained in Table 1. Two influent air samples were collected over the course of the event. These samples were submitted for laboratory testing in order to compare the predicted vapor concentrations (based on field-screening or calculated based on fuel consumption) to the actual vapor concentrations. Both influent samples were tested for Total-Gas Analysis (Hydrocarbon Composition) by ASTM method D 1945. Laboratory analytical results can be found in Attachment 2.

Based on a combination of field vapor screening and collected laboratory samples, a combined estimated total of **60.78 equivalent gallons of PSH (Total)** were removed during the event. The combined volume of PSH was comprised of approximately **3 gallons of PSH (liquid phase)** and approximately **57.78 gallons as off-gas vapor**.

The cumulative air flow measurements for the MDPE event were calculated using a combination of field data measurements and Preso® B+ manufacturer provided formulas. **Air flow rates extracted from the recovery wells averaged 315.86 SCFM** during the event.

A portion of the extracted air flow rates measured is attributable to compressed air, which was "injected" into the extraction wells. This "injected" air is introduced into the extraction wells for the purpose of enhancing liquid recovery rates.

B. Air Quality

Two influent air samples were collected during the event. These samples were submitted for laboratory testing in order to compare the predicted vapor concentrations (based on field-screening or calculated based on fuel consumption) to the actual vapor concentrations. The maximum concentration in air influent was recorded as 14,857 ppmv for Hydrocarbon Composition. Laboratory analytical results can be found in Attachment 2.

C. Waste Management and Disposition

A cumulative total of 1,106 gallons of fluid were generated during this event. The fluids were temporarily transferred to an on-site storage tank prior to being transferred to an authorized disposal facility. A copy of the waste ticket can be found in Attachment 4.

II. SYSTEM OPERATION DATA AND MASS RECOVERY CALCULATIONS

Formulae:

$$\text{Concentration (C\_mg/l)} = \frac{\text{C\_ppmv x Mol. wt. in mg(estimated) x 1000 x 0.000001}}{\text{0.0821 x Temp (K)}}$$

$$\text{Recovery Rate (lbs/hr)} = \frac{\text{(C\_mg/l) x 2.2 x (Flowrate) x 60 x 28.32}}{\text{1,000,000}}$$

Recovery (lbs) = (lbs/hr) x (hrs)

$$\text{Correction Factor (CF)} = \frac{\text{FID Reading(ppmv)}}{\text{FID Reading at Time of Laboratory Analysis}}$$

$$\frac{\text{8.34 lbs}}{\text{gallon water}} \times \text{0.66 average specific gravity of light crude (estimated)} = \frac{\text{5.5 lbs light crude}}{\text{gallon}}$$

Table 1
System Operation Data and Mass Recovery Calculations

Time	Period (hours)	Influent Temp. (°f)	Vacuum (In. hg)	Vacuum (In. h20)	Differential pressure (In. h20)	Flow (SCFM)	FID Readings (ppmv)	Lab Result (ppmv)	Assigned Lab Result (ppmv)	Correction Factor (CF)	Adjusted Lab Result (ppmv)	Adjusted Lab Result (mg/L)	Recovery (lbs/hr)	Recovery in Period (lbs)	Total Recovery (lbs)
20:00	0.5	58	9.5	129.29	123.6	324.83	1436	-	12778.00	5.64	72127	80.36	97.58	48.79	48.79
20:30	0.5	53	10	136.09	121.8	320.04	700.3	-	12778.00	2.75	35175	39.57	47.34	23.67	72.46
21:30	1	50	10	136.09	120.1	318.73	413.8	-	12778.00	1.63	20784	23.52	28.02	28.02	100.48
22:30	1	49	10	136.09	121.5	320.89	254.4	12778.00	12778.00	1.00	12778	14.49	17.38	17.38	117.86
23:30	1	49	10	136.09	120.8	319.97	330.4	-	12778.00	1.30	16595	18.82	22.51	22.51	140.37
0:30	1	49	10	136.09	121.7	321.16	360.7	-	12778.00	1.42	18117	20.54	24.66	24.66	165.03
1:30	1	48	10	136.09	122.2	322.13	374.4	-	12778.00	1.47	18805	21.36	25.73	25.73	190.76
2:30	1	48	10	136.09	123.5	323.84	339.2	-	14857.00	0.83	12288	18.27	22.11	22.11	212.87
3:30	1	48	10	136.09	121.2	320.81	362.1	-	14857.00	0.88	13118	19.50	23.38	23.38	236.26
4:30	1	74	11	149.70	122.1	306.10	304.8	-	14857.00	0.74	11042	15.61	17.87	17.87	254.12
5:30	1	80	11	149.70	124.7	307.62	317.8	-	14857.00	0.77	11513	16.10	18.51	18.51	272.63
6:30	1	82	11.5	156.50	122.9	300.78	410.1	14857.00	14857.00	1.00	14857	20.70	23.27	23.27	295.90
7:30	1	82	11.5	156.50	121.7	299.31	387.7	-	14857.00	0.95	14045	19.57	21.89	21.89	317.80
Averages:		59.23	10.35	140.80	122.14	315.86	460.90						Total	317.80	

PSH Mass Recovered in Vapor Phase = 57.78 gallons

FID maximum Concentration = 50,000 PPM

Ex: Conversion from ppmv to mg/L (Influent 1)

Measured Conc.	Molecular Wt.	Pressure	Gas Constant	Temp.	Temp.	Conc.
(C_ppmv)	(Grams)	(atm)	(atm.liter/K.mole)	(F)	(K)	(C_mg/l)
72127	26.29269839	1	0.0821	58	287.4444444	80.35969872

Inputs are the green values.
Calculated values are yellow.
Constants are purple values.
Outpus are the blue values.

Liquid-phase Hydrocarbon Recovery

(assumes gasoline product)

$\prod * r^2 * h$ = volume

Gallons removed determined at time of pick up

PSH Volume in Gallons=	3
PSH Mass in Pounds=	16.5

Total Hydrocarbon Recovery

PSH Mass Recovered in Vapor Phase =	317.80	lbs
	57.78	gallons
PSH Mass Recovered in Liquid Phase =	16.50	lbs
	3.00	gallons
TOTAL =	334.30	lbs
	60.78	gallons

% Total Hydrocarbon to mg/m³ to ppmv - Influent 1

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.9401		9401.00
Ethane (C2H6)	30.07	0.1185		1185.00
Propane (C3H8)	44.10	0.0473		473.00
Iso-Butane (C4H10)	58.12	0.0231		231.00
N-Butane (C4H10)	58.12	0.026		260.00
Iso-Pentane (C4H12)	72.15	0.0234		234.00
N-Pentane (C5H12)	72.15	0.0171		171.00
Hexane+ (C6H14)	86.18	0.0823		823.00
			Total	12778.00

Molecular Weight Calculations

Total Hydrocarbon %=	1.2778
g of Methane (CH4) =	11.80091094
g of Ethane (C2H6) =	2.788617154
g of Propane (C3H8) =	1.632438566
g of Iso-Butane (C4H10) =	1.050690249
g of N-Butane (C4H10) =	1.182595085
g of Iso-Pentane (C4H12) =	1.321263108
g of N-Pentane (C5H12) =	0.965538425
g of Hexane+ (C6H14) =	5.550644856
Calculated MW (Grams)	26.29269839

% Total Hydrocarbon to mg/m³ to ppmv - Influent 2

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.8343		8343.00
Ethane (C2H6)	30.07	0.1549		1549.00
Propane (C3H8)	44.10	0.102		1020.00
Iso-Butane (C4H10)	58.12	0.0822		822.00
N-Butane (C4H10)	58.12	0.0731		731.00
Iso-Pentane (C4H12)	72.15	0.0382		382.00
N-Pentane (C5H12)	72.15	0.0382		382.00
Hexane+ (C6H14)	86.18	0.1628		1628.00
			Total	14857.00

Molecular Weight Calculations

Total Hydrocarbon %=	1.4857
g of Methane (CH4) =	9.007317763
g of Ethane (C2H6) =	3.13511678
g of Propane (C3H8) =	3.027663728
g of Iso-Butane (C4H10) =	3.215631689
g of N-Butane (C4H10) =	2.859643266
g of Iso-Pentane (C4H12) =	1.855105338
g of N-Pentane (C5H12) =	1.855105338
g of Hexane+ (C6H14) =	9.443430033
Calculated MW (Grams)	34.39901393

ATTACHMENT 1

MDPE Field Logs

MDPE FIELD NOTES					
Site Name:	Vacuum to Jal 14" Mainline #3			Event #:	1
Location:	Eunice, Lea County, NM			Arrive at site:	2/23/2012 19:18
Date:	2/23-24/2012				
Job#:	700376.128.01	SRS#:	2003-00117	Start Vac:	2/23/2012 20:00
Phase:	MDPE1	Unit:	1107	Stop Vac:	2/24/2012 15:00
Onsite Personnel:	L. Jaquez & J. Parrish			Leave Site:	2/24/2012 16:00

GAUGING DATA

WELL#	BEFORE			AFTER			COMMENTS
	PSH	GW	PSH-T	PSH	GW	PSH-T	
RW-3	47.74	47.79	0.05	-	48.73	-	Stinger @ 48'
RW-4	46.47	46.56	0.09	-	47.54	-	Stinger @ 47'
RW-5	47.32	47.35	0.03	-	48.91	-	Stinger @ 48'
MW-3	Well heads were locked						
RW-2	Well heads were locked						
MW-8	Well heads were locked						
RW-1	Well heads were locked						
WASTE:	H2O:	1103		PSH:	3		TOTAL (GAL): 1106

Sample Name	Analysis	Date:	Time:	Comments:
INFLUENT	ASTM D 1945	2/23/2012	22:30	FID = 254.4
INFLUENT	ASTM D 1945	2/24/2012	6:30	FID = 317.8
INFLUENT	-	-	-	-
EFFLUENT	-	-	-	-

Notes:	

Start Date: 2/23/2012

MDPE FIELD DATA

		Dilution Flow			Well Flow						Well Data				
TIME	SAMPLE TAKEN *	Inflent temp. (°f)	Diff. Pressure (INH20) 6" Pitot	Pressure (In. h2O)	Inflent temp. (°f)	Diff. Pressure (INH20) 2" Preso	Vac (In.Hg)	FID Composite (PPM)	Propane Tank (%-size) 500 Gal.	EXHAUST TEMP F	COMMENTS: RW-3 VAC (INH2O)	RW-4 VAC (INH2O)	RW-5 VAC (INH2O)	VAC (INH2O)	VAC (INH2O)
20:00		72	2.6	0.25	58	123.6	9.5	1436	85	1411	6.7	14.7	11.3		
20:30		70	2.5	0.25	53	121.8	10	700.3	80	1414	7.1	14.3	9.7		
21:30		65	2.6	0.25	50	120.1	10	413.8	77	1410	7.2	15.5	5.1		
22:30	*	62	2.6	0.25	49	121.5	10	254.4	73	1408	6.3	16.4	6.3		
23:30		62	2.5	0.25	49	120.8	10	330.4	67	1411	6.6	14.1	5.7		
0:30		60	2.4	0.25	49	121.7	10	360.7	62	1413	6.9	13.7	6.8		
1:30		60	2.5	0.25	48	122.2	10	374.4	53	1409	7	15.9	6.4		
2:30		60	2.6	0.25	48	123.5	10	339.2	47	1408	7.1	14.3	6		
3:30		60	2.4	0.25	48	121.2	10	362.1	20	1410	6.7	14.5	5.1		
4:30		75	2.5	0.25	74	122.1	11	304.8	85	1408	6.3	15.7	6.6		
5:30		80	2.5	0.25	80	124.7	11	317.8	82	1409	6.1	15.4	5.9		
6:30	*	86	2.3	0.25	82	122.9	11.5	410.1	78	1411	6.4	15.1	5.6		
7:30		90	2.6	0.25	82	121.7	11.5	387.7	74	1409	6.2	14.6	6.6		

ATTACHMENT 2

Laboratory Analytical Results

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

WBE HUB NCTRCA DBE NELAP DoD LELAP Kansas Oklahoma ISO 17025

Analytical and Quality Control Report

Simon Walshe
Talon LPE-Amarillo
921 North Bivins
Amarillo, TX, 79107

Report Date: March 7, 2012

Work Order: 12022708

Project Location: Eunice, NM
Project Name: VAC to Jal 14 in. #3
Project Number: 700376.128.01
SRS #: 2003-00117

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
289957	Influent Air #1	air	2012-02-23	22:30	2012-02-25

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.

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

Report Contents

Case Narrative

Samples for project VAC to Jal 14 in. #3 were received by TraceAnalysis, Inc. on 2012-02-25 and assigned to work order 12022708. Samples for work order 12022708 were received intact at a temperature of 22.3 C.

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

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 12022708 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

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 # 12022708

Page 1 of 1

TraceAnalysis, Inc.

email: lab@traceanalysis.com

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Fax (806) 794-1298
1 (800) 378-1296

5002 Basin Street, Suite A1
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Tel (432) 689-6301
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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: TALONLPE / PLAINS ALL AMERICAN
Phone #: 806·467·0607
Address: (Street, City, Zip) 921 N. BIVINS AMARILLO 79107
Fax #: 806·467·0622
Contact Person: SIMON WALSHE
E-mail: SWALSHE@TALONLPE.COM
Invoice to: (If different from above) JASON HENRY / PLAINS ALL AMERICAN
Project #: 700376.128.01
Project Name: VAC TO JAL 14 INCH #3
Project Location (including state): EUNICE NEW MEXICO
Sampler Signature:

SRS# 2003-00117

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	ASTMD 1945	Turn Around Time if different from standard	Hold
289957	INFL AIR #1	1	1LTR			X							X	2·23·12	22:30																			X		
958	INFL AIR #2	1	1LTR			X							X	2·24·12	06:30																			X		

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	
	TALONLPE	2·24·12	12:00					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:	
					TA	2/25/12	9:25	INST 1.5 °C OBS 22.3 °C COR ____ °C

LAB USE ONLY

Intact Y / N
Headspace Y / N / NA
Log-In-Review MH

REMARKS:

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

Fed. 8000 6109 4453

Carrier #

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

Office: 806-665-0730
Fax: 806-665-0745

MIDWEST PRECISION TESTING, LLC.

615 N. Price Rd.
Pampa, TX 79065

The following analytical results were produced using the strictest quality control and most current methods:

COC #: N/A

Lab #: 9467-9468

Quality Control #: 1894

Approved by:

Neil Ray

Neil Ray

Date: 3/5/12

Office: 806-665-0750
Fax: 806-665-0745

MIDWEST PRECISION TESTING, LLC.

615 N. Price Rd.
Pampa, TX 79065

Sample Matrix: Gas
Sample Type: Spot
Preservative: N/A
Sample Container: Tedlar Bag

Method(s): ASTM D 1945
Gas Analysis by Gas Chromatography

Client: Trace Analysis, Inc.
Project Location: N/A

Sample Id.: Influent Air #1
Trace: 289957-1
Sample Temp.: N/A
Atmospheric Temp.: N/A
Pressure: N/A
Field Data: N/A
Sample Date: 2/23/12 Time: N/A
Sampled By: N/A
Analysis Date: 3/01/12
Analysis By: Jessica Cabezudo

Lab #: 9467
Quality Control Report: 1894

Analytical Results

Gas Composition					
	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	99.1391	10.8483	98.5261	9852606	99.2312
Carbon Dioxide (CO2):	0.1272	0.0214	0.1961	19610	0.1996
Hydrocarbon Composition	Mol %	GPM	Vol. %		Wt. %
Methane (CH4):	0.6137	0.1042	0.9401	9401	0.3510
Ethane (C2H6):	0.0491	0.0131	0.1185	1185	0.0525
Propane (C3H8):	0.0190	0.0052	0.0473	473	0.0298
Iso-Butane (C4H10):	0.0078	0.0025	0.0231	231	0.0162
N-Butane (C4H10):	0.0091	0.0029	0.0260	260	0.0189
Iso-Pentane (C5H12):	0.0071	0.0026	0.0234	234	0.0182
N-Pentane (C5H12):	0.0052	0.0019	0.0171	171	0.0134
Hexanes+ (C6H14):	0.0226	0.0098	0.0823	823	0.0692
Totals	100.000	11.0118	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	9.7	Z-Comp. Factor-dry:	0.99970
BTU -water vapor sat.(BTU/ft^3):	10.5	Z-Comp. Factor-water vapor sat.:	0.99557
Specific Gravity -dry:	0.9664	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9643		

Office: 806-665-0750
Fax: 806-665-0745

MIDWEST PRECISION TESTING, LLC.

615 N. Price Rd.
Pampa, TX 79065

Sample Matrix: Gas
Sample Type: Spot
Preservative: N/A
Sample Container: Tedlar Bag

Method(s): ASTM D 1945
Gas Analysis by Gas Chromatography

Client: Trace Analysis, Inc.
Project Location: N/A

Sample Id.: Influent Air #2
Trace: 289958-1
Sample Temp.: N/A
Atmospheric Temp.: N/A
Pressure: N/A
Field Data: N/A
Sample Date: 2/24/12 Time: N/A
Sampled By: N/A
Analysis Date: 3/01/12
Analysis By: Jessica Cabezudo

Lab #: 9468
Quality Control Report: 1894

Analytical Results

Gas Composition					
	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	98.8220	10.8137	97.8929	9789287	98.6154
Carbon Dioxide (CO2):	0.4043	0.0682	0.6213	62126	0.6325
Hydrocarbon Composition	Mol %	GPM	Vol. %		Wt. %
Methane (CH4):	0.5464	0.0927	0.8343	8343	0.3115
Ethane (C2H6):	0.0643	0.0171	0.1549	1549	0.0687
Propane (C3H8):	0.0411	0.0113	0.1020	1020	0.0644
Iso-Butane (C4H10):	0.0279	0.0091	0.0822	822	0.0576
N-Butane (C4H10):	0.0257	0.0081	0.0731	731	0.0532
Iso-Pentane (C5H12):	0.0116	0.0042	0.0382	382	0.0297
N-Pentane (C5H12):	0.0117	0.0042	0.0382	382	0.0300
Hexanes+ (C6H14):	0.0449	0.0194	0.1628	1628	0.1370
Totals	100.000	11.0480	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	12.6	Z-Comp. Factor-dry:	0.99969
BTU -water vapor sat.(BTU/ft^3):	13.4	Z-Comp. Factor-water vapor sat.:	0.99548
Specific Gravity -dry:	0.9694	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9674		

Office: 806-665-0790
Fax: 806-665-0745

MIDWEST PRECISION TESTING, L.L.C.

615 N. Price Rd.
Pampa, TX 79065

Sample Type: Standard
Preservative: N/A
Sample Container: Industrial Cylinder

Sample Id.: DCG
Reference Std. 47366AW
Sample Temp.: 120° F
Analysis Date: 3/01/12
Analysis By: Jessica Cabezudo

Method(s): ASTM D 1945
Gas Analysis by Gas Chromatography

Quality Control Report#: 1894

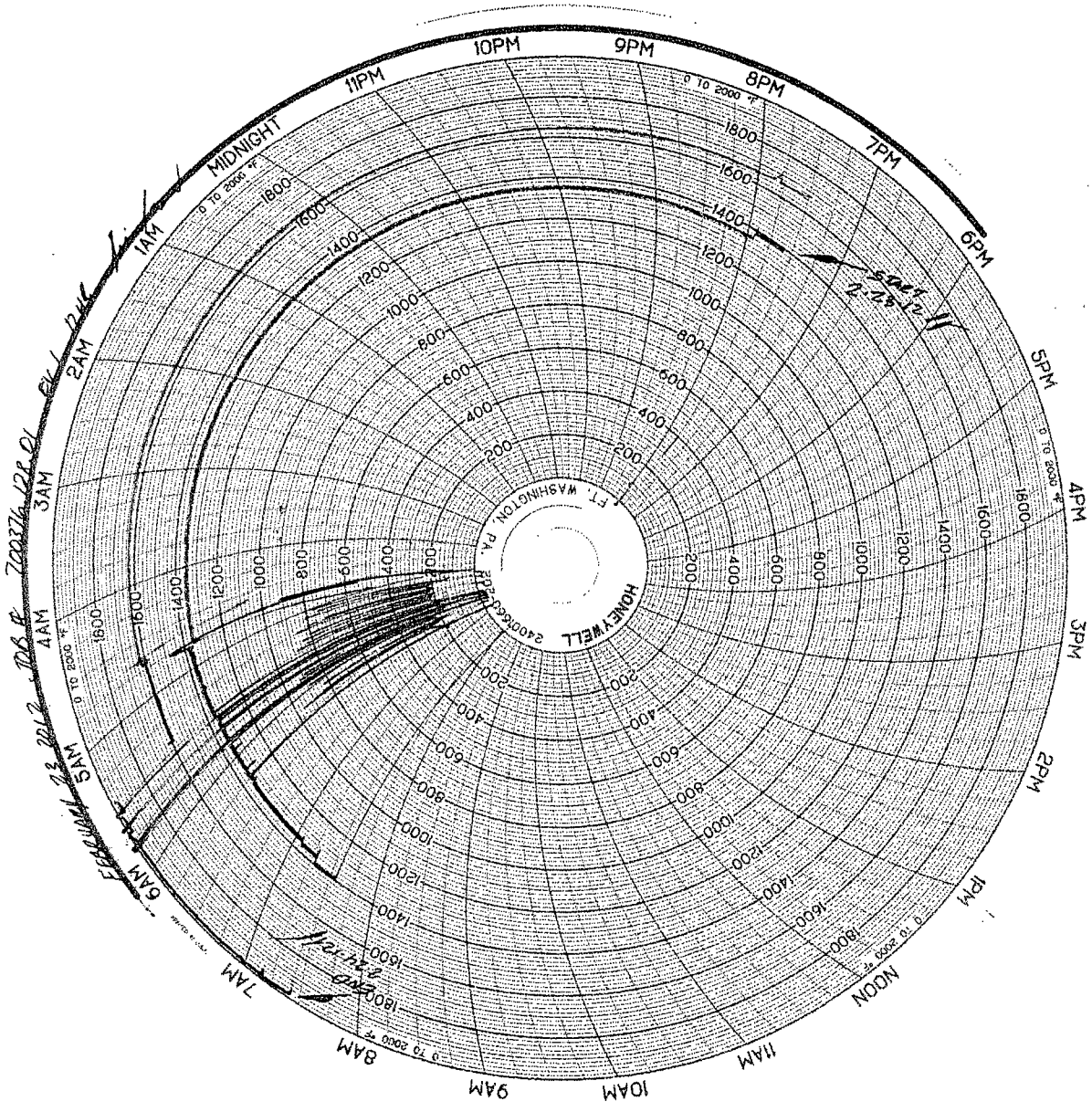
Analytical Results

RESULTS	ACTUAL	ANALYSIS			
Gas Composition			**MDL**	**RL**	**% Deviation**
	Mol %	**Mol %**	**Mol %**	**ppm mol**	**(90-100%)**
Nitrogen (N2):	4.926	4.9850	0.0010	10	98.8
Carbon Dioxide (CO2):	1.489	1.4788	0.0010	10	99.3
			MDL	**RL**	**% Deviation**
Hydrocarbon Composition	**Mol %**	**Mol %**	**Mol %**	**ppm mol**	**(90-100%)**
Methane (CH4):	69.955	69.6940	0.0001	1	99.6
Ethane (C2H6):	9.138	9.0388	0.0001	1	98.9
Propane (C3H8):	5.947	5.8797	0.0001	1	98.9
Iso-Butane (C4H10):	3.018	3.2640	0.0001	1	91.9
N-Butane (C4H10):	3.021	3.0740	0.0001	1	98.2
Iso-Pentane (C5H12):	1.001	1.0341	0.0001	1	96.7
N-Pentane (C5H12):	1.007	1.0308	0.0001	1	97.6
Hexane+ (C6H14):	0.498	0.5208	0.0001	1	95.4
Totals	100.000	100.000			

Comments - Additional Data

ACTUAL		ANALYSIS	
BTU -dry (BTU/ft3):	1322.3	BTU -dry (BTU/ft^3):	1329.4
BTU -water vapor sat. (BTU/ft3):	1316.6	BTU -water vapor sat. (BTU/ft^3):	1323.8
Specific Gravity -dry:	0.8337	Specific Gravity -dry:	0.8388
Specific Gravity -water vapor sat.:	0.8406	Specific Gravity -water vapor sat.:	0.8458
Z-Comp. Factor -dry:	0.99565	Z-Comp. Factor -dry:	0.99560
Z-Comp. Factor -water vapor sat.:	0.98309	Z-Comp. Factor -water vapor sat.:	0.98298

ATTACHMENT 3
Oxidizer Charts


MIDNIGHT
1AM
2AM
3AM
4AM
5AM
6AM
7AM
8AM
9AM
10AM
11AM
NOON
1PM
2PM
3PM
4PM
5PM
6PM
7PM
8PM
9PM
10PM
11PM
0 TO 2000 °F
200
400
600
800
1000
1200
1400
1600
1800
FT. WASHINGTON, PA.
HONEYWELL

ATTACHMENT 4
Waste Ticket

S. C. C. 35434
ICC MC #259649

TRANSPORTS
FRAC TANKS
VAC TRUCKS
WINCH TRUCKS

PATE TRUCKING CO.

Denver City(806) 592-2772
Hobbs (575) 397-6264
Levelland(806) 897-1705
Seminole(432) 758-2166

BILL TO

CONTRACT NUMBER		FIELD ORDER NUMBER
A. F. E. NUMBER		DATE -
REQ. OR PURCHASE ORDER NUMBER		ORDERED BY

DELIVERED FROM

TO

LOCATION

WELL OR RIG NO.

TRUCK OR UNIT NO.	CAPACITY	AMOUNT HAULED	START TIME AM PM	END TIME AM PM	HOURS CHGD.

DESCRIPTION	○HR. ○BBL.	RATE	AMOUNT
	Hrs.		
	Bbls		
	Bbls		
	KCL		
	Disp		
	Disp		
	Helper		
	Tank Min		
	Day Rental		
	Chart Recorder		

TOP GAUGE BOTTOM GAUGE SET DATE RELEASE DATE

FOR OFFICE USE ONLY

TAX

NET TOTAL

Thank You

OPERATOR OR DRIVER

AUTHORIZED BY: