AP - 37

STAGE 2 REPORT

Date 3-12-12

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MOBILE DUAL PHASE EXTRACTION REPORT
LOVINGTON DEEP 6 PIPELINE RELEASE
LEA COUNTY, NEW MEXICO
SRS # 2002-10312
NMOCD# AP-037

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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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 8th to February 9th, 2012 at the Lovington Deep 6 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. MW2, MW13 & MW17 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 **337.28 equivalent gallons of PSH (Total)** were removed during the event. The combined volume of PSH was comprised of approximately **29 gallons of PSH (liquid phase)** and approximately **308.28 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 229.88 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 69,741 ppmv for Hydrocarbon Composition. Laboratory analytical results can be found in Attachment 2.

C. Waste Management and Disposition

A cumulative total of 1,004 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:

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

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

$$\text{Recovery (lbs)} = \text{(lbs/hr)} \times \text{(hrs)}$$

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

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

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)
13:45	0.5	55	15	204.14	67.1	205.25	23866	-	69741.00	0.95	66270	208.31	159.83	79.91	79.91
14:15	0.5	53	15	204.14	73.7	215.52	24095	-	69741.00	0.96	66906	211.13	170.10	85.05	164.96
15:15	1	53	15	204.14	84.1	230.23	24362	-	69741.00	0.97	67647	213.46	183.72	183.72	348.68
16:15	1	53	15	204.14	82.5	228.03	25116	69741.00	69741.00	1.00	69741	220.07	187.59	187.59	536.27
17:15	1	50	15	204.14	82.7	228.97	28804	-	69741.00	1.15	79982	253.87	217.31	217.31	753.58
18:15	1	50	15	204.14	83.2	229.67	26112	-	69741.00	1.04	72507	230.15	197.59	197.59	951.17
19:15	1	50	15	204.14	83.1	229.53	27719	-	69741.00	1.10	76969	244.31	209.63	209.63	1160.80
20:15	1	51	15	204.14	82.9	229.03	29114	-	27388.00	1.34	36827	122.07	104.51	104.51	1265.31
21:15	1	50	15	204.14	87.6	235.66	27425	-	27388.00	1.27	34690	115.22	101.50	101.50	1366.81
22:15	1	48	15	204.14	89.2	238.27	21175	-	27388.00	0.98	26785	89.31	79.55	79.55	1446.36
23:15	1	48	15	204.14	89.7	238.94	21652	27388.00	27388.00	1.00	27388	91.32	81.57	81.57	1527.93
0:15	1	49	15	204.14	90.6	239.90	18213	-	27388.00	0.84	23038	76.67	68.75	68.75	1596.69
1:15	1	48	15	204.14	90.1	239.47	26183		27388.00	1.21	33119	110.43	98.86	98.86	1695.55
Averages:		50.62	15.00	204.14	83.58	229.88	24910.46						Total	1695.55	

PSH Mass Recovered in Vapor Phase = 308.28 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)
66270	73.74893047	1	0.0821	55	285.7777778	208.3058404

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

Total Hydrocarbon Recovery

PSH Mass Recovered in Vapor Phase =	1695.55	lbs
	308.28	gallons
PSH Mass Recovered in Liquid Phase =	159.50	lbs
	29.00	gallons
TOTAL =	1855.05	lbs
	337.28	gallons

Gallons removed determined at time of pick up

PSH Volume in Gallons=	29
PSH Mass in Pounds=	159.5

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

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.8389		8389.00
Ethane (C2H6)	30.07	0.0189		189.00
Propane (C3H8)	44.10	0.13		1300.00
Iso-Butane (C4H10)	58.12	0.1628		1628.00
N-Butane (C4H10)	58.12	0.2355		2355.00
Iso-Pentane (C4H12)	72.15	0.1996		1996.00
N-Pentane (C5H12)	72.15	0.5237		5237.00
Hexane+ (C6H14)	86.18	4.8647		48647.00
			Total	69741.00

Molecular Weight Calculations

Total Hydrocarbon %=	6.9741
g of Methane (CH4) =	1.929418276
g of Ethane (C2H6) =	0.081490515
g of Propane (C3H8) =	0.822041554
g of Iso-Butane (C4H10) =	1.356725025
g of N-Butane (C4H10) =	1.962584419
g of Iso-Pentane (C4H12) =	2.064946015
g of N-Pentane (C5H12) =	5.417896933
g of Hexane+ (C6H14) =	60.11382773
Calculated MW (Grams)	73.74893047

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

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.2173		2173.00
Ethane (C2H6)	30.07	0.0029		29.00
Propane (C3H8)	44.10	0.0228		228.00
Iso-Butane (C4H10)	58.12	0.1186		1186.00
N-Butane (C4H10)	58.12	0.0135		135.00
Iso-Pentane (C4H12)	72.15	0.1168		1168.00
N-Pentane (C5H12)	72.15	0.2118		2118.00
Hexane+ (C6H14)	86.18	2.0351		20351.00
			Total	27388.00

Molecular Weight Calculations

Total Hydrocarbon %=	2.7388
g of Methane (CH4) =	1.272634731
g of Ethane (C2H6) =	0.031839857
g of Propane (C3H8) =	0.367124288
g of Iso-Butane (C4H10) =	2.516807361
g of N-Butane (C4H10) =	0.286483131
g of Iso-Pentane (C4H12) =	3.076938805
g of N-Pentane (C5H12) =	5.57958595
g of Hexane+ (C6H14) =	64.03713962
Calculated MW (Grams)	77.16855375

ATTACHMENT 1
MDPE Field Logs

MDPE FIELD NOTES					
Site Name:	Lovington Deep 6			Event #:	1
Location:	Lea County, NM			Arrive at site:	2/8/2012 9:30
Date:	2/8-9/2012				
Job#:	700376.051.02	SRS#:	2002-10312	Start Vac:	2/8/2012 13:15
Phase:	MDPE1	Unit:	1107	Stop Vac:	2/9/2012 1:15
Onsite Personnel:	L. Jaquez & J. Parrish			Leave Site:	2/9/2012 2:30

GAUGING DATA

WELL#	BEFORE			AFTER			COMMENTS
	PSH	GW	PSH-T	PSH	GW	PSH-T	
MW13	64.94	65.11	0.17	-	65.76	-	Stinger @ 65'
MW2	63.48	68.02	4.54	-	66.84	-	Stinger @ 68'
MW17	64.64	64.82	0.18	-	65.30	-	Stinger @ 65'
MW1	-	64.70	-	Not Gauged			
MW7	-	64.54	-	Not Gauged			
MW3	-	63.98	-	Not Gauged			
MW5	-	64.72	-	Not Gauged			
MW8	-	65.01	-	Not Gauged			
WASTE:	H2O:	975		PSH:	29		TOTAL (GAL): 1004

Sample Name	Analysis	Date:	Time:	Comments:
INFLUENT	ASTM D 1945	2/8/2012	16:15	FID = 25,116
INFLUENT	ASTM D 1945	2/8/2012	23:15	FID = 21,652
INFLUENT	-	-	-	-
EFFLUENT	-	-	-	-

Notes:	

Start Date: 2/8/2012

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: MW2 VAC (INH2O)	MW13 VAC (INH2O)	MW17 VAC (INH2O)	VAC (INH2O)	VAC (INH2O)
13:45		68	3.3	0.2	55	67.1	15	23866	82	1411	8.11	8.93	18.1		
14:15		72	1	0.2	53	73.7	15	24095	80	1409	9.31	10.43	15.2		
15:15		72	1	0.2	53	84.1	15	24362	78	1414	11.71	11.15	13.7		
16:15	*	70	1.1	0.2	53	82.5	15	25116	77	1411	13.77	15.61	12.2		
17:15		70	0.9	0.05	50	82.7	15	28804	75	1413	11.83	14.87	10.9		
18:15		68	0.6	0.05	50	83.2	15	26112	73	1414	14.62	13.57	10.8		
19:15		68	0.5	0.05	50	83.1	15	27719	72	1426	13.3	10.41	10.1		
20:15		68	0.5	0.05	51	82.9	15	29114	71	1429	15.11	14.93	7.81		
21:15		66	0.4	0.05	50	87.6	15	27425	70	1422	13.05	14.44	7.48		
22:15		65	0.3	0.05	48	89.2	15	21175	69	1418	15.89	13.61	5.48		
23:15	*	64	0.3	0.05	48	89.7	15	21652	69	1418	14.29	14.34	8.27		
0:15		65	0.4	0.05	49	90.6	15	18213	68	1415	15.81	12.93	4.14		
1:15		63	0.4	0.05	48	90.1	15	26183	66	1417	14.56	14.21	8.17		

Soil Vacuum Influence

Observation Well	MW3
Extraction Well (EW)	MW2
Distance (ft) to EW	53.5
Time:	In.H2O
14:15	0
19:15	0.06
0:15	0

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
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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

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

Report Date: February 21, 2012

Work Order: 12021308

Project Location: Lea Co., NM
Project Name: Lovington Deep 6
Project Number: 700376.051.02
SRS #: 2002-10312

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
289004	Influent Air #1	air	2012-02-08	16:15	2012-02-10

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

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Sample 289004 (Influent Air #1) 4

Appendix **5**
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Case Narrative

Samples for project Lovington Deep 6 were received by TraceAnalysis, Inc. on 2012-02-10 and assigned to work order 12021308. Samples for work order 12021308 were received intact at a temperature of 22.4 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 12021308 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

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 # 12021308 Page 1 of 1

12021308 **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
8808 Camp Bowie Blvd. West, Suite 180, Ft. Worth, Texas 76116, Tel (817) 201-5260, Fax (817) 560-4336

Company Name: TALON LPE / 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@TALONLPG.COM
Invoice to: (If different from above) JASON HENRY
Project #: 700376.051.02
Project Name: LOVINGTON DEEP 6
Project Location (including state): LEA COUNTY NEW MEXICO
Sampler Signature:

SRS# 2002-10312

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
289004	INF AIR # 1	1	1 LTR			A							X	2-8-12	16:15
005	INF AIR # 2	1	1 LTR			A							X	2-8-12	23:15

MTBE 8021B / 602 / 8260B / 624	BTEX 8021B / 602 / 8260B / 624	TPH 418.1 / TX1005 / TX1005 Ext(C35)	TPH 8015 GRO / DRO / TVHC	PAH 8270C / 625	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B / 624	GC/MS Semi. Vol. 8270C / 625	PCB's 8082 / 608	Pesticides 8081A / 608	BOD, TSS, pH	Moisture Content	X ASTMD 1945			Turn Around Time if different from standard	Hold
																	X				
																	X				

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	Temp°c:
	TALON LPE	2-10-12	12:00					
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	Temp°c:
Relinquished by:	Company:	Date:	Time:	Received by: Brenda Ward	Company: Trac Lubbock	Date: 2/10/12	Time: 5:20	Temp°c: 22.4

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

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 # Carrier

ORIGINAL COPY

Office: 806-665-0790
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 #: 9230-9231

Quality Control #: 1878

Approved by:

Neil Ray

Neil Ray

Date: 2/17/12

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: 289004-1
Sample Temp.: N/A
Atmospheric Temp.: N/A
Pressure: N/A
Field Data: N/A
Sample Date: 2/08/12 Time: N/A
Sampled By: N/A
Analysis Date: 2/14/12
Analysis By: Jessica Cabezudo

Lab #: 9230
Quality Control Report: 1878

Analytical Results

Gas Composition					
	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	95.9282	10.4995	90.6115	9061155	92.1217
Carbon Dioxide (CO2):	1.6478	0.2779	2.4143	241431	2.4806
Hydrocarbon Composition	**Mol %**	**GPM**	**Vol. %**		**Wt. %**
Methane (CH4):	0.5762	0.0978	0.8389	8389	0.3161
Ethane (C2H6):	0.0082	0.0022	0.0189	189	0.0085
Propane (C3H8):	0.0549	0.0151	0.1300	1300	0.0828
Iso-Butane (C4H10):	0.0579	0.0189	0.1628	1628	0.1151
N-Butane (C4H10):	0.0869	0.0273	0.2355	2355	0.1727
Iso-Pentane (C5H12):	0.0636	0.0231	0.1996	1996	0.1566
N-Pentane (C5H12):	0.1681	0.0606	0.5237	5237	0.4152
Hexanes+ (C6H14):	1.4081	0.6079	4.8647	48647	4.1306
Totals	100.000	11.6302	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	93.3	Z-Comp. Factor-dry:	0.99946
BTU -water vapor sat.(BTU/ft^3):	93.1	Z-Comp. Factor-water vapor sat.:	0.99405
Specific Gravity -dry:	1.0112	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	1.0098		

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: 289005-1
Sample Temp.: N/A
Atmospheric Temp.: N/A
Pressure: N/A
Field Data: N/A
Sample Date: 2/08/12 Time: N/A
Sampled By: N/A
Analysis Date: 2/14/12
Analysis By: Jessica Cabezudo

Lab #: 9231
Quality Control Report: 1878

Analytical Results

Gas Composition					
	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	97.5948	10.6804	94.9523	9495230	95.4976
Carbon Dioxide (CO2):	1.5298	0.2580	2.3087	230875	2.3467
Hydrocarbon Composition	Mol %	GPM	Vol. %		Wt. %
Methane (CH4):	0.1449	0.0246	0.2173	2173	0.0810
Ethane (C2H6):	0.0012	0.0003	0.0029	29	0.0013
Propane (C3H8):	0.0094	0.0026	0.0228	228	0.0144
Iso-Butane (C4H10):	0.0410	0.0133	0.1186	1186	0.0830
N-Butane (C4H10):	0.0048	0.0015	0.0135	135	0.0098
Iso-Pentane (C5H12):	0.0361	0.0131	0.1168	1168	0.0907
N-Pentane (C5H12):	0.0660	0.0238	0.2118	2118	0.1661
Hexanes+ (C6H14):	0.5719	0.2469	2.0351	20351	1.7095
Totals	100.000	11.2645	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	36.5	Z-Comp. Factor-dry:	0.99960
BTU -water vapor sat.(BTU/ft^3):	37.0	Z-Comp. Factor-water vapor sat.:	0.99490
Specific Gravity -dry:	0.9901	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9883		

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

MIDWEST PRECISION TESTING, LLC.

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: 2/14/12
Analysis By: Jessica Cabezudo

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

Quality Control Report#: 1878

Analytical Results

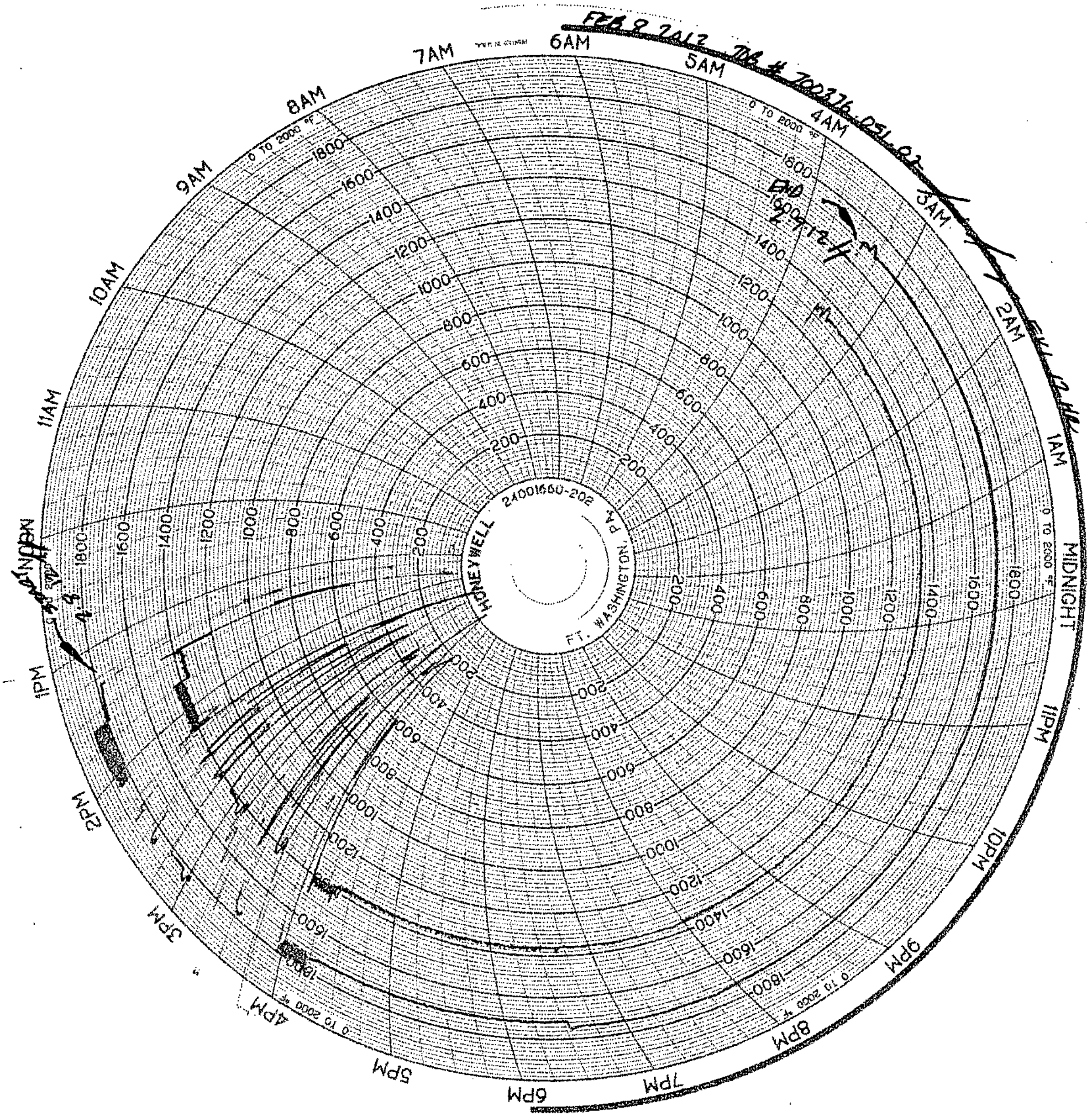
RESULTS	ACTUAL	ANALYSIS			
Gas Composition			MDL	RL	% Deviation
	Mol %	Mol %	Mol %	ppm mol	(90-100%)
Nitrogen (N2):	4.926	4.7361	0.0010	10	96.1
Carbon Dioxide (CO2):	1.489	1.4670	0.0010	10	98.5
			MDL	RL	% Deviation
Hydrocarbon Composition	Mol %	Mol %	Mol %	ppm mol	(90-100%)
Methane (CH4):	69.955	69.7973	0.0001	1	99.8
Ethane (C2H6):	9.138	8.9481	0.0001	1	97.9
Propane (C3H8):	5.947	6.2076	0.0001	1	95.6
Iso-Butane (C4H10):	3.018	3.0949	0.0001	1	97.5
N-Butane (C4H10):	3.021	3.0884	0.0001	1	97.8
Iso-Pentane (C5H12):	1.001	1.0850	0.0001	1	91.6
N-Pentane (C5H12):	1.007	1.0471	0.0001	1	96.0
Hexane+ (C6H14):	0.498	0.5285	0.0001	1	93.9
Totals	100.000	100.000			

Comments - Additional Data

ACTUAL		ANALYSIS	
BTU -dry (BTU/ft3):	1322.3	BTU -dry (BTU/ft^3):	1335.2
BTU -water vapor sat. (BTU/ft3):	1316.6	BTU -water vapor sat. (BTU/ft^3):	1329.6
Specific Gravity -dry:	0.8337	Specific Gravity -dry:	0.8397
Specific Gravity -water vapor sat.:	0.8406	Specific Gravity -water vapor sat.:	0.8467
Z-Comp. Factor -dry:	0.99565	Z-Comp. Factor -dry:	0.99556
Z-Comp. Factor -water vapor sat.:	0.98309	Z-Comp. Factor -water vapor sat.:	0.98292

ATTACHMENT 3

Oxidizer Charts


FEB 9 2012 JOB # 700376.051.02
HONEYWELL
24001660-202
FT. WASHINGTON, PA.
0 TO 2000 °F
MIDNIGHT
1AM
2AM
3AM
4AM
5AM
6AM
7AM
8AM
9AM
10AM
11AM
NOON
1PM
2PM
3PM
4PM
5PM
6PM
7PM
8PM
9PM
10PM
11PM
END

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 170300
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.
203					

DESCRIPTION	OHR. OBBL.		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: