1R- 398

REPORTS

DATE:

3-13-12

AMARILLO
921 North Bivins
Amarillo, Texas 79107
Phone 806.467.0607
Fax 806.467.0622

AUSTIN
911 W. Anderson Lane
Suite 202
Austin, Texas 78757
Phone 512.989.3428
Fax 512.989.3487

MIDLAND
2901 State Highway 349
Midland, Texas 79706
Phone 432.522.2133
Fax 432.522.2180

SAN ANTONIO
11 Commercial Place
Schertz, Texas 78154
Phone 210.265.8025
Fax 210.568.2191

OKLAHOMA CITY
7700 North Hudson
Suite 10
Oklahoma City, Oklahoma
73116
Phone 405.486.7032

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318 East Taylor Street
Hobbs, New Mexico 88241
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Artesia, New Mexico 88210
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MOBILE DUAL PHASE EXTRACTION REPORT
LIVINGSTON RIDGE TO HUGH-P.SIMS PIPELINE RELEASE
LEA COUNTY, NEW MEXICO
SRS # 2001-1005
NMOCD# 1R-0398

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 13, 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 9th, 2012 to February 10th, 2012 at the Livingston Ridge to Hugh-P.Sims 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. MW4 & TMW1 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 **102.68 equivalent gallons of PSH (Total)** were removed during the event. The combined volume of PSH was comprised of approximately **16 gallons of PSH (liquid phase)** and approximately **86.68 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 153.82 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 66,201 ppmv for Hydrocarbon Composition. Laboratory analytical results can be found in Attachment 2.

C. Waste Management and Disposition

A cumulative total of 1,602 gallons of fluid were generated during this event. The fluids were temporarily transferred to an on-site storage tank prior to being transported 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:

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

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

Recovery (lbs) = (lbs/hr) x (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)
22:00	0.5	54	17.5	238.16	49.1	160.39	48894	-	66201.00	1.22	80685	119.68	71.76	35.88	35.88
22:30	0.5	53	17.5	238.16	47.7	158.24	50000	-	66201.00	1.25	82510	122.63	72.54	36.27	72.15
23:30	1	52	17.5	238.16	45.3	154.36	45513	-	66201.00	1.13	75105	111.84	64.54	64.54	136.69
0:30	1	52	17.5	238.16	46.1	155.71	40117	66201.00	66201.00	1.00	66201	98.58	57.39	57.39	194.07
1:30	1	50	17.5	238.16	44.9	153.98	39915	-	66201.00	0.99	65868	98.47	56.68	56.68	250.75
2:30	1	50	17.5	238.16	42.7	150.16	34473	-	66201.00	0.86	56887	85.05	47.74	47.74	298.49
3:30	1	52	17.5	238.16	43.5	151.26	30977	-	66201.00	0.77	51118	76.12	43.04	43.04	341.53
4:30	1	52	17.5	238.16	40.3	145.59	27749	-	16565.00	1.31	21709	44.26	24.09	24.09	365.62
5:30	1	52	17.5	238.16	41.5	147.74	28813	-	16565.00	1.36	22541	45.96	25.38	25.38	391.00
6:30	1	52	17.5	238.16	39.7	144.50	25670	-	16565.00	1.21	20082	40.94	22.12	22.12	413.12
7:30	1	52	17.5	238.16	40.6	146.13	21174	16565.00	16565.00	1.00	16565	33.77	18.45	18.45	431.57
8:30	0	58	17.5	238.16	50.9	162.67	22366	-	16565.00	1.06	17498	35.26	21.44	0.00	431.57
9:30	1	62	17.5	238.16	49.7	160.12	23378	-	16565.00	1.10	18289	36.57	21.89	21.89	453.46
10:30	1	62	17.5	238.16	51.3	162.68	24450	-	16565.00	1.15	19128	38.25	23.26	23.26	476.72
Averages:		53.79	17.50	238.16	45.24	153.82	33106.36						Total	476.72	

PSH Mass Recovered in Vapor Phase = 86.68 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)
80685	34.7354333	1	0.0821	54	285.2222222	119.6844901

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=	16
PSH Mass in Pounds=	88

Total Hydrocarbon Recovery

PSH Mass Recovered in Vapor Phase =	476.72	lbs
	86.68	gallons
PSH Mass Recovered in Liquid Phase =	88.00	lbs
	16.00	gallons
TOTAL =	564.72	lbs
	102.68	gallons

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

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	4.5666		45666.00
Ethane (C2H6)	30.07	0.0529		529.00
Propane (C3H8)	44.10	0.0357		357.00
Iso-Butane (C4H10)	58.12	0.1033		1033.00
N-Butane (C4H10)	58.12	0.1627		1627.00
Iso-Pentane (C4H12)	72.15	0.1897		1897.00
N-Pentane (C5H12)	72.15	0.4042		4042.00
Hexane+ (C6H14)	86.18	1.105		11050.00
			Total	66201.00

Molecular Weight Calculations

Total Hydrocarbon %=	6.6201
g of Methane (CH4) =	11.06452531
g of Ethane (C2H6) =	0.240283833
g of Propane (C3H8) =	0.237816649
g of Iso-Butane (C4H10) =	0.906904125
g of N-Butane (C4H10) =	1.428395946
g of Iso-Pentane (C4H12) =	2.067469525
g of N-Pentane (C5H12) =	4.405224997
g of Hexane+ (C6H14) =	14.38481292
Calculated MW (Grams)	34.7354333

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

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.8229		8229.00
Ethane (C2H6)	30.07	0.0061		61.00
Propane (C3H8)	44.10	0.0028		28.00
Iso-Butane (C4H10)	58.12	0.0349		349.00
N-Butane (C4H10)	58.12	0.0664		664.00
Iso-Pentane (C4H12)	72.15	0.1042		1042.00
N-Pentane (C5H12)	72.15	0.107		1070.00
Hexane+ (C6H14)	86.18	0.5122		5122.00
			Total	16565.00

Molecular Weight Calculations

Total Hydrocarbon %=	1.6565
g of Methane (CH4) =	7.968195593
g of Ethane (C2H6) =	0.110731663
g of Propane (C3H8) =	0.074542711
g of Iso-Butane (C4H10) =	1.224502264
g of N-Butane (C4H10) =	2.329712043
g of Iso-Pentane (C4H12) =	4.538502867
g of N-Pentane (C5H12) =	4.660458799
g of Hexane+ (C6H14) =	26.64738666
Calculated MW (Grams)	47.5540326

ATTACHMENT 1
MDPE Field Logs

MDPE FIELD NOTES							
Site Name:	Livingston Ride to Hugh P-Sims					Event #:	2
Location:	NE of Eunice, NM					Arrive at site:	2/9/2012 20:40
Date:	2/9-10/2012						
Job#:	700376.100.02		SRS#:	2001-1005		Start Vac:	2/9/2012 21:30
Phase:	MDPE2		Unit:	1107		Stop Vac:	2/10/2012 10:30
Onsite Personnel:	L. Jaquez & J. Parrish					Leave Site:	2/10/2012 12:00

GAUGING DATA							
WELL#	BEFORE			AFTER			COMMENTS
	PSH	GW	PSH-T	PSH	GW	PSH-T	
MW1	-	36.01	-	Not Gauged			
THMW1	33.16	37.82	4.66	-	36.84	-	Stinger @ 36'
MW4	34.17	34.55	0.38	-	34.91	-	Stinger @ 35'
MW5	-	32.44	-	Not Gauged			
MW8	-	34.72	-	Not Gauged			
MW9	-	35.23	-	Not Gauged			
MW13	-	33.74	-	Not Gauged			
MW12	-	36.41	-	Not Gauged			
WASTE:	H2O:	1586		PSH:	16		TOTAL (GAL): 1602

Sample Name	Analysis	Date:	Time:	Comments:
INFLUENT	ASTM D 1945	2/10/2012	0:30	FID = 40117
INFLUENT	ASTM D 1945	9/16/2011	7:30	FID = 21174
INFLUENT	-	-	-	-
EFFLUENT	-	-	-	-

Notes:
3000 gallon poly
Total measured 62.500" = 1602 gallons total
PSH measured 0.375" = 16 gallons

Start Date: 2/9/2012

MDPE FIELD DATA

		Total 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: MW4 VAC (INH2O)	MW1 VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)
22:00		68	2.3	0.25	54	49.1	17.5	48894	42	1413	36.1	49.2			
22:30		65	2.1	0.25	53	47.7	17.5	>50000	40	1411	35.7	50.7			
23:30		60	2	0.25	52	45.3	17.5	45513	39	1413	37.2	48.9			
0:30	*	60	1.8	0.2	52	46.1	17.5	40117	37	1414	34.9	49.1			
1:30		59	1.7	0.2	50	44.9	17.5	39915	36	1410	35.1	47.7			
2:30		59	1.3	0.2	50	42.7	17.5	34473	34	1413	36.8	49.1			
3:30		58	1.2	0.2	52	43.5	17.5	30977	31	1411	37.3	49.3			
4:30		58	1.2	0.2	52	40.3	17.5	27749	29	1409	37.7	48.6			
5:30		58	1.1	0.2	52	41.5	17.5	28813	27	1413	36.9	50.5			
6:30		58	1.1	0.2	52	39.7	17.5	25670	27	1412	35.2	53.9			
7:30	*	63	1.1	0.2	52	40.6	17.5	21174	42	1415	38.6	53.5			
Propane froze at 07:35. Resumed at 08:30															
8:30		68	1.1	0.2	58	50.9	17.5	22366	40	1411	39.1	54.1			
9:30		75	1.2	0.2	62	49.7	17.5	23378	37	1414	39.8	53.8			
10:30		81	1.2	0.2	62	51.3	17.5	24450	35	1413	39.5	53.7			

Soil Vacuum Influence

Observation Well	MW5
Extraction Well (EW)	THMW1
Distance (ft) to EW	53.7
Time:	In. H2O
22:30	0
3:30	0.08
9:30	0.08

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: February 21, 2012

Work Order: 12021310

Project Location: Eunice, NM
Project Name: Livingston Ridge to Hughs P. Sims
Project Number: 700376.100.02
SRS #: 2001-1005

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
289008	Influent Air #1	air	2012-02-10	00:30	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

Case Narrative

Samples for project Livingston Ridge to Hughs P. Sims were received by TraceAnalysis, Inc. on 2012-02-10 and assigned to work order 12021310. Samples for work order 12021310 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 12021310 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 # 1202131O

Page 1 of 1

12 02 1310 **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/PE / 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
Project #:	700376 . 100 . 02
Project Name:	LIVINGSTON RIDGE To HUGHS P. SIMS
Project Location (including state):	EUNICE NEW MEXICO
Sampler Signature:	

ANALYSIS REQUEST
(Circle or Specify Method No.)

SRS# 2001-1005

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 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	ASTMD 1945			Turn Around Time if different from standard	Hold
289008	INF AIR # 1	1	1LTR			A							X	2-10-12	00:30																	X				
009	INF AIR # 2	1	1LTR			A							X	2-10-12	07:30																	X				

	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	Temp°c:
Relinquished by:	TALONLPE	2-10-12	12:00					
Relinquished by:								
Relinquished by:				Received by: Brenda Ward	Trac Lubbock	2/10/12	5:20 pm	22.5 22.4

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

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

MIDWEST PRECISION TESTING, L.L.C.

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 #: 9234-9235

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: 289008-1
Sample Temp.: N/A
Atmospheric Temp.: N/A
Pressure: N/A
Field Data: N/A
Sample Date: 2/10/12 Time: N/A
Sampled By: N/A
Analysis Date: 2/14/12
Analysis By: Jessica Cabezudo

Lab #: 9234
Quality Control Report: 1878

Analytical Results

Gas Composition					
	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	93.5009	10.2328	89.2928	8929280	92.3064
Carbon Dioxide (CO2):	2.7590	0.4653	4.0870	408700	4.2698
Hydrocarbon Composition	**Mol %**	**GPM**	**Vol. %**		**Wt. %**
Methane (CH4):	3.1021	0.5266	4.5666	45666	1.7497
Ethane (C2H6):	0.0228	0.0061	0.0529	529	0.0241
Propane (C3H8):	0.0149	0.0041	0.0357	357	0.0231
Iso-Butane (C4H10):	0.0364	0.0118	0.1033	1033	0.0743
N-Butane (C4H10):	0.0594	0.0186	0.1627	1627	0.1214
Iso-Pentane (C5H12):	0.0598	0.0218	0.1897	1897	0.1514
N-Pentane (C5H12):	0.1283	0.0463	0.4042	4042	0.3258
Hexanes+ (C6H14):	0.3163	0.1366	1.1050	11050	0.9540
Totals	100.000	11.4699	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	58.8	Z-Comp. Factor-dry:	0.99956
BTU -water vapor sat.(BTU/ft^3):	59.0	Z-Comp. Factor-water vapor sat.:	0.99464
Specific Gravity -dry:	0.9808	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9793		

Office: 806-665-0730
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: 289009-1
Sample Temp.: N/A
Atmospheric Temp.: N/A
Pressure: N/A
Field Data: N/A
Sample Date: 2/10/12 Time: N/A
Sampled By: N/A
Analysis Date: 2/14/12
Analysis By: Jessica Cabezudo

Lab #: 9233
Quality Control Report: 1878

Analytical Results

Gas Composition					
	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	97.9021	10.7134	96.3451	9634510	96.9871
Carbon Dioxide (CO2):	1.3092	0.2208	1.9985	199846	2.0332
Hydrocarbon Composition	**Mol %**	**GPM**	**Vol. %**		**Wt. %**
Methane (CH4):	0.5425	0.0921	0.8229	8229	0.3070
Ethane (C2H6):	0.0025	0.0007	0.0061	61	0.0027
Propane (C3H8):	0.0011	0.0003	0.0028	28	0.0017
Iso-Butane (C4H10):	0.0119	0.0039	0.0349	349	0.0244
N-Butane (C4H10):	0.0235	0.0074	0.0664	664	0.0482
Iso-Pentane (C5H12):	0.0319	0.0116	0.1042	1042	0.0810
N-Pentane (C5H12):	0.0330	0.0119	0.1070	1070	0.0840
Hexanes+ (C6H14):	0.1423	0.0614	0.5122	5122	0.4307
Totals	100.000	11.1234	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	16.6	Z-Comp. Factor-dry:	0.99966
BTU -water vapor sat.(BTU/ft^3):	17.2	Z-Comp. Factor-water vapor sat.:	0.99528
Specific Gravity -dry:	0.9768	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9748		

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

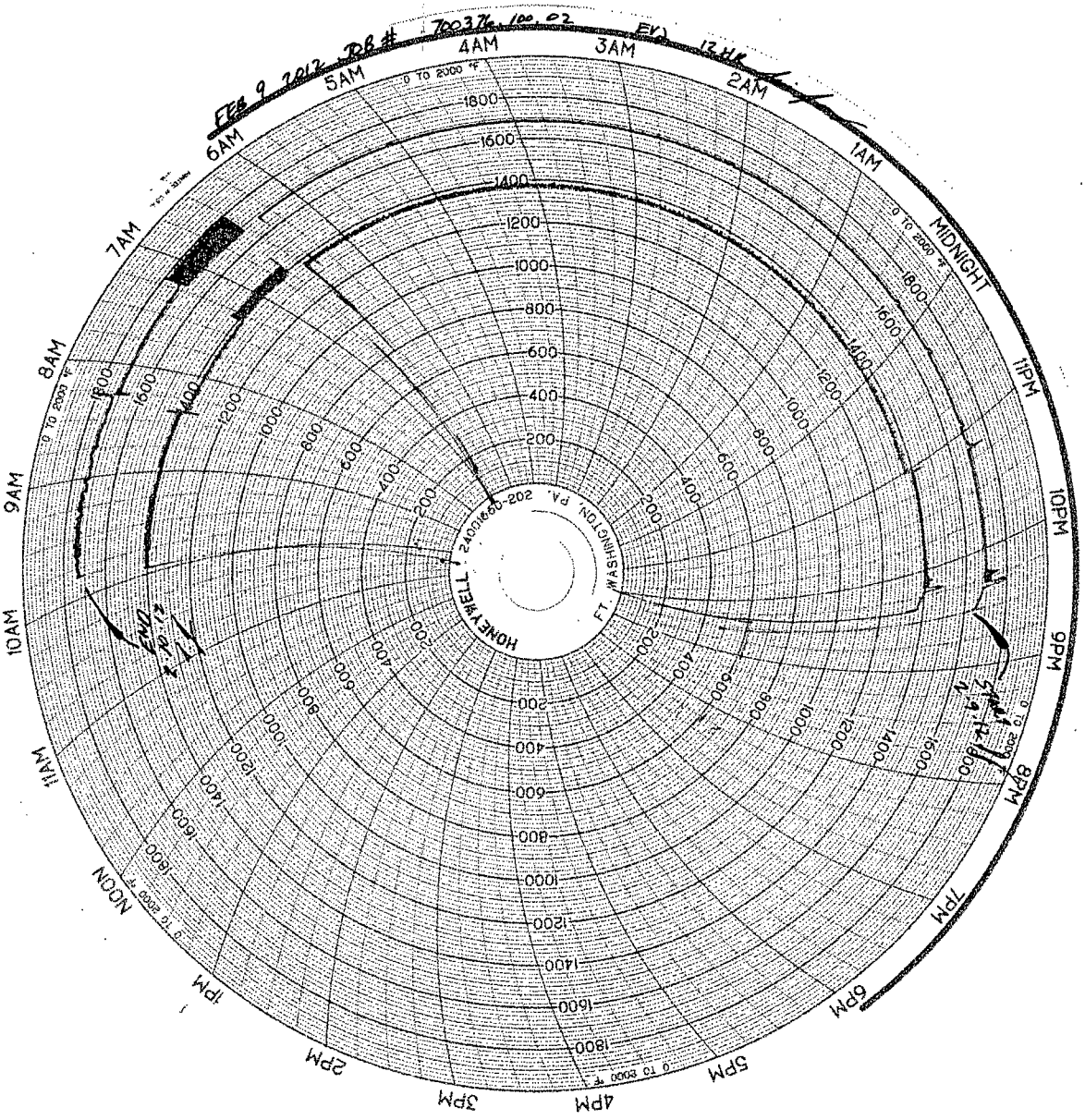
Analytical Results

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 RB # 700376, 100.02 EV1 12 HR
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 FT
HONEYWELL
WASHINGTON PA.
FT

ATTACHMENT 4
Waste Ticket

S. C. C. 05434
ICC MC #259649

TRANSPORTS
FRAC TANKS
VAC TRUCKS
WINCH TRUCKS

PATE TRUCKING CO.

Denver City(806) 592-2772
Hobbs (575) 397-6264
Levelland(806) 897-1785
Seminole(432) 758-2166

BILL TO

CONTRACT NUMBER

FIELD ORDER NUMBER 169654

A. F. E. NUMBER

DATE 2/6/14

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