1R- 463

REPORTS

DATE:

3-14-12

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MOBILE DUAL PHASE EXTRACTION REPORT
D.S. HUGH GATHERING 4 INCH PIPELINE RELEASE
LEA COUNTY, NEW MEXICO
SRS # 2000-10807
NMOCD# 1R-0463

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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COPY 5 – TALON/LPE

MARCH 14, 2012

TABLE OF CONTENTS

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 on February 22nd to February 23rd, 2012 at the D.S. Hugh Gathering 4 Inch 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. MW-1 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 **4.56 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 **1.56 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 well averaged 41.94 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 1,953 ppmv for Hydrocarbon Composition. Laboratory analytical results can be found in Attachment 2.

C. Waste Management and Disposition

A cumulative total of 1,261 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)
18:00	0.5	73	19	258.57	3.97	42.00	1344	-	1953.00	2.51	4897	10.84	1.70	0.85	0.85
18:30	0.5	71	19	258.57	4.23	43.44	934	-	1953.00	1.74	3403	7.56	1.23	0.61	1.46
19:30	1	68	19	258.57	4.13	43.04	717	-	1953.00	1.34	2613	5.84	0.94	0.94	2.40
20:30	1	68	19	258.57	4.05	42.63	536	1953.00	1953.00	1.00	1953	4.36	0.70	0.70	3.10
21:30	1	65	19	258.57	3.85	41.68	662	-	1953.00	1.24	2412	5.42	0.84	0.84	3.94
22:30	1	62	19	258.57	4.03	42.76	720	-	1953.00	1.34	2623	5.93	0.95	0.95	4.89
23:30	1	59	19	258.57	4.1	43.26	698	-	1953.00	1.30	2543	5.78	0.93	0.93	5.83
0:30	1	61	19	258.57	3.94	42.32	543	-	1195.00	1.31	1571	3.91	0.62	0.62	6.45
1:30	1	61	19	258.57	4.06	42.96	519	-	1195.00	1.26	1502	3.74	0.60	0.60	7.05
2:30	1	62	19	258.57	4.21	43.71	413	1195.00	1195.00	1.00	1195	2.97	0.49	0.49	7.53
3:30	1	60	19	258.57	3.69	41.00	395	-	1195.00	0.96	1143	2.85	0.44	0.44	7.97
4:30	1	60	19	258.57	3.09	37.52	298	-	1195.00	0.72	862	2.15	0.30	0.30	8.27
5:30	1	60	19	258.57	3.32	38.89	312	-	1195.00	0.76	903	2.25	0.33	0.33	8.60
Averages:		63.85	19.00	258.57	3.90	41.94	622.38						Total	8.60	
													PSH Mass Recovered in Vapor Phase =	1.56	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)
4897	53.74915515	1	0.0821	73	295.7777778	10.8392608

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 =	8.60	lbs
	1.56	gallons
PSH Mass Recovered in Liquid Phase =	16.50	lbs
	3.00	gallons
TOTAL =	25.10	lbs
	4.56	gallons

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

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.0583		583.00
Ethane (C2H6)	30.07	0.0128		128.00
Propane (C3H8)	44.10	0.009		90.00
Iso-Butane (C4H10)	58.12	0.0172		172.00
N-Butane (C4H10)	58.12	0.0127		127.00
Iso-Pentane (C4H12)	72.15	0.0109		109.00
N-Pentane (C5H12)	72.15	0.0111		111.00
Hexane+ (C6H14)	86.18	0.0633		633.00
			Total	1953.00

Molecular Weight Calculations

Total Hydrocarbon %=	0.1953
g of Methane (CH4) =	4.788182284
g of Ethane (C2H6) =	1.970793651
g of Propane (C3H8) =	2.032258065
g of Iso-Butane (C4H10) =	5.118607271
g of N-Butane (C4H10) =	3.779436764
g of Iso-Pentane (C4H12) =	4.026804916
g of N-Pentane (C5H12) =	4.100691244
g of Hexane+ (C6H14) =	27.93238095
Calculated MW (Grams)	53.74915515

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

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.0283		283.00
Ethane (C2H6)	30.07	0.0034		34.00
Propane (C3H8)	44.10	0.0023		23.00
Iso-Butane (C4H10)	58.12	0.0162		162.00
N-Butane (C4H10)	58.12	0.0107		107.00
Iso-Pentane (C4H12)	72.15	0.0065		65.00
N-Pentane (C5H12)	72.15	0.0083		83.00
Hexane+ (C6H14)	86.18	0.0438		438.00
			Total	1195.00

Molecular Weight Calculations

Total Hydrocarbon %=	0.1195
g of Methane (CH4) =	3.798594142
g of Ethane (C2H6) =	0.855548117
g of Propane (C3H8) =	0.848786611
g of Iso-Butane (C4H10) =	7.879029289
g of N-Butane (C4H10) =	5.204050209
g of Iso-Pentane (C4H12) =	3.924476987
g of N-Pentane (C5H12) =	5.01125523
g of Hexane+ (C6H14) =	31.58731381
Calculated MW (Grams)	59.10905439

ATTACHMENT 1
MDPE Field Logs

MDPE FIELD NOTES					
Site Name:	D.S. Hugh Gathering 4 Inch Line			Event #:	1
Location:	Lea County, NM			Arrive at site:	2/22/2012 16:49
Date:	2/22-23/2012				
Job#:	700376.129.01	SRS#:	2000-10807	Start Vac:	2/22/2012 17:30
Phase:	MDPE1	Unit:	1107	Stop Vac:	2/23/2012 5:33
Onsite Personnel:	L. Jaquez & J. Parrish			Leave Site:	2/23/2012 5:44

GAUGING DATA

WELL#	BEFORE			AFTER			COMMENTS
	PSH	GW	PSH-T	PSH	GW	PSH-T	
MW-1	46.57	46.79	0.22	-	49.38	-	Stinger @ 49'
MW-2	-	46.66	-	Not Gauged			
MW-3	-	47.01	-	Not Gauged			
MW-4	-	47.69	-	Not Gauged			
MW-5	-	48.11	-	Not Gauged			
MW-6	-	48.73	-	Not Gauged			
MW-7	-	48.31	-	Not Gauged			
WASTE:	H2O:	1258		PSH:	3		TOTAL (GAL): 1261

Sample Name	Analysis	Date:	Time:	Comments:
INFLUENT	ASTM D 1945	2/22/2012	20:30	FID = 536
INFLUENT	ASTM D 1945	2/23/2012	2:30	FID = 413
INFLUENT	-	-	-	-
EFFLUENT	-	-	-	-

Notes:	

Start Date: 2/22/2012

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: MW-1 VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)
18:00		98	1.4	0.25	73	3.97	19	1344	85	1416	11.23				
18:30		96	1.2	0.25	71	4.23	19	934	83	1413	11.89				
19:30		90	1.4	0.2	68	4.13	19	717	79	1409	11.01				
20:30	*	87	1.1	0.2	68	4.05	19	536	77	1411	11.07				
21:30		83	1.2	0.2	65	3.85	19	662	74	1414	11.66				
22:30		80	1	0.2	62	4.03	19	720	71	1413	12.43				
23:30		78	1.3	0.2	59	4.1	19	698	68	1409	11.72				
0:30		80	1.1	0.2	61	3.94	19	543	66	1411	11.33				
1:30		80	1.1	0.2	61	4.06	19	519	59	1414	11.89				
2:30	*	79	1.3	0.2	62	4.21	19	413	51	1412	12.27				
3:30		80	1.2	0.2	60	3.69	19	395	43	1412	12.23				
4:30		80	1.3	0.2	60	3.09	19	298	39	1409	12.71				
5:30		80	1.3	0.25	60	3.32	19	312	35	1407	11.98				

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 8, 2012

Work Order: 12022709

Project Location: Eunice, NM
Project Name: D.S. Hugh Gathering 4 in.
Project Number: 700376.129.01
SRS #: 2000-10807

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
289959	Influent Air #1	air	2012-02-22	20:30	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 D.S. Hugh Gathering 4 in. were received by TraceAnalysis, Inc. on 2012-02-25 and assigned to work order 12022709. Samples for work order 12022709 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 12022709 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 # 12022709

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

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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: TALON LPE / PLAINS ALL AMERICAN
Phone #: 806-467-0607
Address: (Street, City, Zip) 921 N. BIVINS AMARILLO 79107
Fax #: 806-467-0672
Contact Person: SIMON WALSHE
E-mail: SWALSHE@TALONLPE.COM
Invoice to: (If different from above) JASON HENRY PLAINS ALL AMERICAN
Project #: 700376.129.01
Project Name: D.S. HUGH GATHERING 4 INCH
Project Location (including state): EUNICE NEW. MEXICO
Sampler Signature:

ANALYSIS REQUEST
(Circle or Specify Method No.)

SRS# 2000-10807

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, SO4, NO3, NO2, Alkalinity	Na, Ca, Mg, K, TDS, EC	ASTM D45	Turn Around Time if different from standard	Hold
289959	INFL AIR #1	1	1 LTR			X							X	2-22-12	20:30																			X		
960	INFL AIR #2	1	1 LTR			X							X	2-23-12	02:30																			X		

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	
	TALON LPE	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 18.3 °C OBS 22.3 °C COR ____ °C

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

REMARKS:
Fed. Ex 8000 0189 4453

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

Carrier #

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

Office: 806-665-0750
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 #: 9469-9470

Quality Control #: 1894

Approved by:

Neil Ray

Neil Ray

Date: 3/7/12

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: 289959-1
Sample Temp.: N/A
Atmospheric Temp.: N/A
Pressure: N/A
Field Data: N/A
Sample Date: 2/22/12 Time: N/A
Sampled By: N/A
Analysis Date: 3/01/12
Analysis By: Jessica Cabezudo

Lab #: 9469
Quality Control Report: 1894

Analytical Results

Gas Composition					
	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	99.8243	10.9232	99.6581	9965809	99.7276
Carbon Dioxide (CO2):	0.0948	0.0160	0.1468	14679	0.1485
Hydrocarbon Composition	**Mol %**	**GPM**	**Vol. %**		**Wt. %**
Methane (CH4):	0.0379	0.0064	0.0583	583	0.0216
Ethane (C2H6):	0.0053	0.0014	0.0128	128	0.0056
Propane (C3H8):	0.0036	0.0010	0.0090	90	0.0056
Iso-Butane (C4H10):	0.0058	0.0019	0.0172	172	0.0120
N-Butane (C4H10):	0.0044	0.0014	0.0127	127	0.0091
Iso-Pentane (C5H12):	0.0033	0.0012	0.0109	109	0.0084
N-Pentane (C5H12):	0.0034	0.0012	0.0111	111	0.0086
Hexanes+ (C6H14):	0.0173	0.0075	0.0633	633	0.0529
Totals	100.000	10.9611	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	2.0	Z-Comp. Factor-dry:	0.99971
BTU -water vapor sat.(BTU/ft^3):	2.9	Z-Comp. Factor-water vapor sat.:	0.99564
Specific Gravity -dry:	0.9682	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9660		

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: 289960-1
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 #: 9470
Quality Control Report: 1894

Analytical Results

Gas Composition					
	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	99.9223	10.9339	99.8318	9983182	99.8703
Carbon Dioxide (CO2):	0.0313	0.0053	0.0485	4851	0.0490
Hydrocarbon Composition	**Mol %**	**GPM**	**Vol. %**		**Wt. %**
Methane (CH4):	0.0184	0.0031	0.0283	283	0.0105
Ethane (C2H6):	0.0014	0.0004	0.0034	34	0.0015
Propane (C3H8):	0.0009	0.0003	0.0023	23	0.0015
Iso-Butane (C4H10):	0.0054	0.0018	0.0162	162	0.0112
N-Butane (C4H10):	0.0037	0.0012	0.0107	107	0.0078
Iso-Pentane (C5H12):	0.0020	0.0007	0.0065	65	0.0050
N-Pentane (C5H12):	0.0025	0.0009	0.0083	83	0.0065
Hexanes+ (C6H14):	0.0120	0.0052	0.0438	438	0.0366
Totals	100.000	10.9527	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	1.3	Z-Comp. Factor-dry:	0.99971
BTU -water vapor sat.(BTU/ft^3):	2.2	Z-Comp. Factor-water vapor sat.:	0.99565
Specific Gravity -dry:	0.9677	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9656		

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: 3/01/12
Analysis By: Jessica Cabezudo

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

Quality Control Report#: 1894

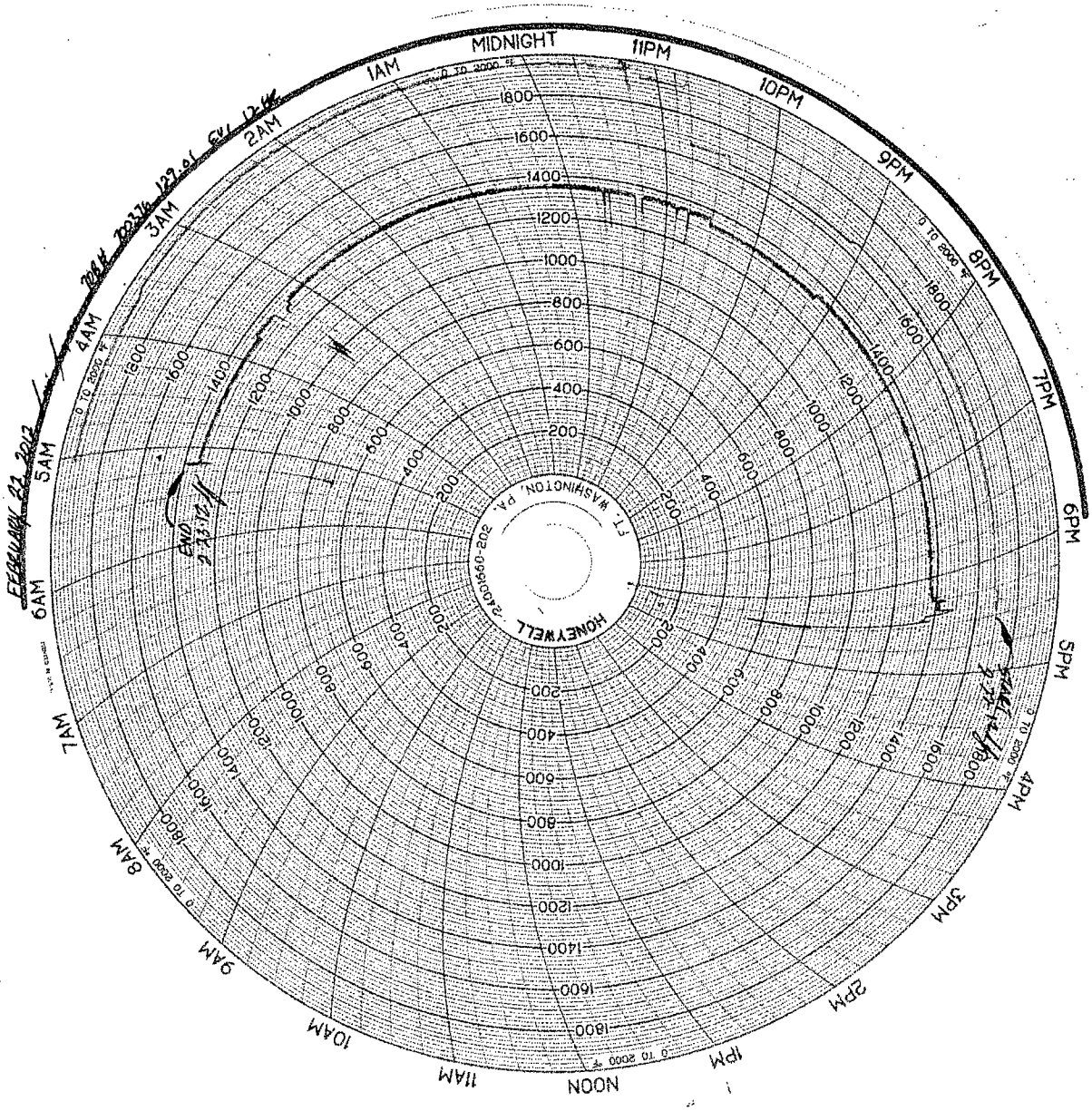
Analytical Results

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 ft
200
400
600
800
1000
1200
1400
1600
1800
HONEYWELL
WASHINGTON, D.C.

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: