1R - 464

REPORTS

DATE:

3-14-12

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MOBILE DUAL PHASE EXTRACTION REPORT
VACUUM TO JAL 14 INCH MAINLINE 5 PIPELINE RELEASE
LEA COUNTY, NEW MEXICO
SRS # 2003-00134
NMOCD# 1R-0464

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 14, 2012

TABLE OF CONTENTS

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 on February 23th, 2012 at the Vacuum to Jal 14 Inch Mainline 5 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-1, RW-2, & RW-3 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 **60.01 equivalent gallons of PSH (Total)** were removed during the event. The combined volume of PSH was comprised of approximately **6 gallons of PSH (liquid phase)** and approximately **54.01 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 191.62 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 12,354 ppmv for Hydrocarbon Composition. Laboratory analytical results can be found in Attachment 2.

C. Waste Management and Disposition

A cumulative total of 2,057 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)
7:00	0.5	62	17.5	238.16	45.6	153.38	48842	-	12354.00	1.00	12334	41.34	23.70	11.85	11.85
7:30	0.5	67	17.5	238.16	57.3	171.11	50000	-	12354.00	1.02	12626	41.91	26.81	13.41	25.26
8:30	1	74	17.5	238.16	71.7	190.15	49113	-	12354.00	1.00	12402	40.63	28.88	28.88	54.14
9:30	1	79	17.5	238.16	80.7	200.80	48921	12354.00	12354.00	1.00	12354	40.09	30.10	30.10	84.23
10:30	1	82	17.5	238.16	83.8	204.05	47914	-	12354.00	0.98	12100	39.05	29.79	29.79	114.02
11:30	1	82	17.5	238.16	83.4	203.56	50000	-	12354.00	1.02	12626	40.75	31.01	31.01	145.03
12:30	1	82	17	231.35	78.3	201.16	48813	-	12354.00	1.00	12327	39.78	29.92	29.92	174.95
13:30	1	82	17	231.35	73.2	194.50	46775	-	9286.00	0.94	8687	26.81	19.49	19.49	194.44
14:30	1	84	17	231.35	71.6	192.01	49118	-	9286.00	0.98	9122	28.05	20.13	20.13	214.57
15:30	1	84	16.5	224.55	69.4	192.64	50000	-	9286.00	1.00	9286	28.55	20.56	20.56	235.13
16:30	1	82	16.5	224.55	70.8	194.94	50000	9286.00	9286.00	1.00	9286	28.66	20.88	20.88	256.01
17:30	1	82	16	217.74	69.7	196.98	47711	-	9286.00	0.95	8861	27.34	20.13	20.13	276.15
18:30	1	82	16	217.74	68.9	195.84	49802	-	9286.00	1.00	9249	28.54	20.90	20.90	297.04
Averages:		78.77	17.00	231.35	71.11	191.62	49000.69						Total	297.04	

PSH Mass Recovered in Vapor Phase = 54.01 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)
12334	79.69947385	1	0.0821	62	289.6666667	41.33514695

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=	6
PSH Mass in Pounds=	33

Total Hydrocarbon Recovery

PSH Mass Recovered in Vapor Phase =	297.04	lbs
	54.01	gallons
PSH Mass Recovered in Liquid Phase =	33.00	lbs
	6.00	gallons
TOTAL =	330.04	lbs
	60.01	gallons

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

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.0875		875.00
Ethane (C2H6)	30.07	0		0.00
Propane (C3H8)	44.10	0.0004		4.00
Iso-Butane (C4H10)	58.12	0.0122		122.00
N-Butane (C4H10)	58.12	0.0172		172.00
Iso-Pentane (C4H12)	72.15	0.0285		285.00
N-Pentane (C5H12)	72.15	0.0447		447.00
Hexane+ (C6H14)	86.18	1.0449		10449.00
			Total	12354.00

Molecular Weight Calculations

Total Hydrocarbon %=	1.2354
g of Methane (CH4) =	1.136069289
g of Ethane (C2H6) =	0
g of Propane (C3H8) =	0.014278776
g of Iso-Butane (C4H10) =	0.573954994
g of N-Butane (C4H10) =	0.809182451
g of Iso-Pentane (C4H12) =	1.664460903
g of N-Pentane (C5H12) =	2.610575522
g of Hexane+ (C6H14) =	72.89095192
Calculated MW (Grams)	79.69947385

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

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.0919		919.00
Ethane (C2H6)	30.07	0		0.00
Propane (C3H8)	44.10	0		0.00
Iso-Butane (C4H10)	58.12	0.0262		262.00
N-Butane (C4H10)	58.12	0.0194		194.00
Iso-Pentane (C4H12)	72.15	0.0544		544.00
N-Pentane (C5H12)	72.15	0.0554		554.00
Hexane+ (C6H14)	86.18	0.6813		6813.00
			Total	9286.00

Molecular Weight Calculations

Total Hydrocarbon %=	0.9286
g of Methane (CH4) =	1.587417618
g of Ethane (C2H6) =	0
g of Propane (C3H8) =	0
g of Iso-Butane (C4H10) =	1.639827698
g of N-Butane (C4H10) =	1.214223562
g of Iso-Pentane (C4H12) =	4.226749946
g of N-Pentane (C5H12) =	4.304447555
g of Hexane+ (C6H14) =	63.22898342
Calculated MW (Grams)	76.2016498

ATTACHMENT 1

MDPE Field Logs

MDPE FIELD NOTES					
Site Name:	Vacuum to Jal 14 Inch Mainline #5			Event #:	1
Location:	Eunice, Lea County, NM			Arrive at site:	2/23/2012 5:48
Date:	2/23/2012				
Job#:	700376.130.01	SRS#:	2003-00134	Start Vac:	2/23/2012 6:30
Phase:	MDPE1	Unit:	1107	Stop Vac:	2/23/2012 18:30
Onsite Personnel:	L. Jaquez & J. Parrish			Leave Site:	2/23/2012 18:58

GAUGING DATA

WELL#	BEFORE			AFTER			COMMENTS
	PSH	GW	PSH-T	PSH	GW	PSH-T	
RW-1	50.49	50.55	0.06	-	51.26	-	Stinger @ 51'
RW-2	49.43	49.54	0.11	-	50.89	-	Stinger @ 51'
RW-3	49.96	50.09	0.13	-	51.04	-	Stinger @ 51'
WASTE:	H2O:	2051		PSH:	6		TOTAL (GAL): 2057

Sample Name	Analysis	Date:	Time:	Comments:
INFLUENT	ASTM D 1945	2/23/2012	9:30	FID = 48,921
INFLUENT	ASTM D 1945	2/23/2012	16:30	FID = >50,000
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) 250 Gal.	EXHAUST TEMP F	COMMENTS: RW-1 VAC (INH2O)	RW-2 VAC (INH2O)	RW-3 VAC (INH2O)	VAC (INH2O)	VAC (INH2O)
7:00		82	2.2	0.2	62	45.6	17.5	48842	38	1413	29.33	22.61	38.11		
7:30		86	2.31	0.2	67	57.3	17.5	>50000	35	1411	26.91	10.4	34.7		
8:30		91	2.24	0.2	74	71.7	17.5	49113	85	1409	25.41	9.3	36.2		
9:30	*	97	2.41	0.2	79	80.7	17.5	48921	83	1411	21.11	10.7	34.3		
10:30		100	2.38	0.2	82	83.8	17.5	47914	80	1413	22.97	10.9	32.9		
11:30		102	2.43	0.2	82	83.4	17.5	>50000	78	1412	25.23	11.1	34.4		
12:30		102	2.38	0.2	82	78.3	17	48813	75	1408	23.51	12.3	35.1		
13:30		104	2.29	0.2	82	73.2	17	46775	71	1413	25.8	11.6	39.5		
14:30		104	2.17	0.2	84	71.6	17	49118	68	1411	26.7	10.9	40.2		
15:30		105	2.41	0.2	84	69.4	16.5	>50000	62	1409	26.9	12.1	39.3		
16:30	*	104	2.37	0.2	82	70.8	16.5	>50000	50	1414	27.1	12.2	36.8		
17:30		104	2.3	0.2	82	69.7	16	47711	90	1413	26.1	11.7	33.9		
18:30		104	2.27	0.2	82	68.9	16	49802	88	1410	27.7	12.1	39.4		

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: 12022710

Project Location: Eunice, NM
Project Name: VAC to Jal 14 inch #5
Project Number: 700376.130.01
SRS #: 2003-0134

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
289961	Influent Air #1	air	2012-02-23	09:30	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 inch #5 were received by TraceAnalysis, Inc. on 2012-02-25 and assigned to work order 12022710. Samples for work order 12022710 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 12022710 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 # 12022710

Page 1 of 1

TraceAnalysis, Inc.

email: lab@traceanalysis.com

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

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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: 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 NALSHE
E-mail: SNALSHE@TALONLPG.COM
Invoice to: (If different from above) JASON HENRY PLAINS ALL AMERICAN
Project #: 700376.130.01
Project Name: VAC TO TAL 14 INCH #5
Project Location (including state): EUNICE NEW MEXICO
Sampler Signature:

SRS # 2003-00134

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
28961	INF AIR #1	1	1 LTR			X							X	2-23-12	09:30
962	INF AIR #2	1	1 LTR			X							X	2-23-12	16:30

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
																			X			
																			X			

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:	
	TALON/PE	2·24·12	12:00					INST ____ °C OBS ____ °C COR ____ °C
								INST ____ °C OBS ____ °C COR ____ °C
								INST 4.3 °C OBS ____ °C COR ____ °C

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 # Fed. 8000 0109 4453

ORIGINAL COPY

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 #: 9471-9472

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: 289961-1
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 #: 9471
Quality Control Report: 1894

Analytical Results

Gas Composition					
	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	90.5102	9.9064	85.4491	8544908	85.5439
Carbon Dioxide (CO2):	9.0928	1.5336	13.3155	1331549	13.4719
Hydrocarbon Composition	**Mol %**	**GPM**	**Vol. %**		**Wt. %**
Methane (CH4):	0.0601	0.0102	0.0875	875	0.0325
Ethane (C2H6):	0.0000	0.0000	0.0000	0	0.0000
Propane (C3H8):	0.0002	0.0001	0.0004	4	0.0003
Iso-Butane (C4H10):	0.0043	0.0014	0.0122	122	0.0085
N-Butane (C4H10):	0.0063	0.0020	0.0172	172	0.0124
Iso-Pentane (C5H12):	0.0091	0.0033	0.0285	285	0.0220
N-Pentane (C5H12):	0.0144	0.0052	0.0447	447	0.0349
Hexanes+ (C6H14):	0.3026	0.1306	1.0449	10449	0.8736
Totals	100.000	11.5928	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	17.4	Z-Comp. Factor-dry:	0.99946
BTU -water vapor sat.(BTU/ft^3):	18.0	Z-Comp. Factor-water vapor sat.:	0.99406
Specific Gravity -dry:	1.0247	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	1.0231		

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: 289962-1
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 #: 9472
Quality Control Report: 1894

Analytical Results

Gas Composition	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	92.3962	10.1123	88.2617	8826169	88.3441
Carbon Dioxide (CO2):	7.2954	1.2303	10.8098	1080979	10.9348
Hydrocarbon Composition	**Mol %**	**GPM**	**Vol. %**		**Wt. %**
Methane (CH4):	0.0624	0.0106	0.0919	919	0.0341
Ethane (C2H6):	0.0000	0.0000	0.0000	0	0.0000
Propane (C3H8):	0.0000	0.0000	0.0000	0	0.0000
Iso-Butane (C4H10):	0.0092	0.0030	0.0262	262	0.0182
N-Butane (C4H10):	0.0071	0.0022	0.0194	194	0.0140
Iso-Pentane (C5H12):	0.0171	0.0062	0.0544	544	0.0420
N-Pentane (C5H12):	0.0176	0.0063	0.0554	554	0.0433
Hexanes+ (C6H14):	0.1950	0.0842	0.6813	6813	0.5695
Totals	100.000	11.4552	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	12.5	Z-Comp. Factor-dry:	0.99952
BTU -water vapor sat.(BTU/ft^3):	13.2	Z-Comp. Factor-water vapor sat.:	0.99441
Specific Gravity -dry:	1.0125	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	1.0108		

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

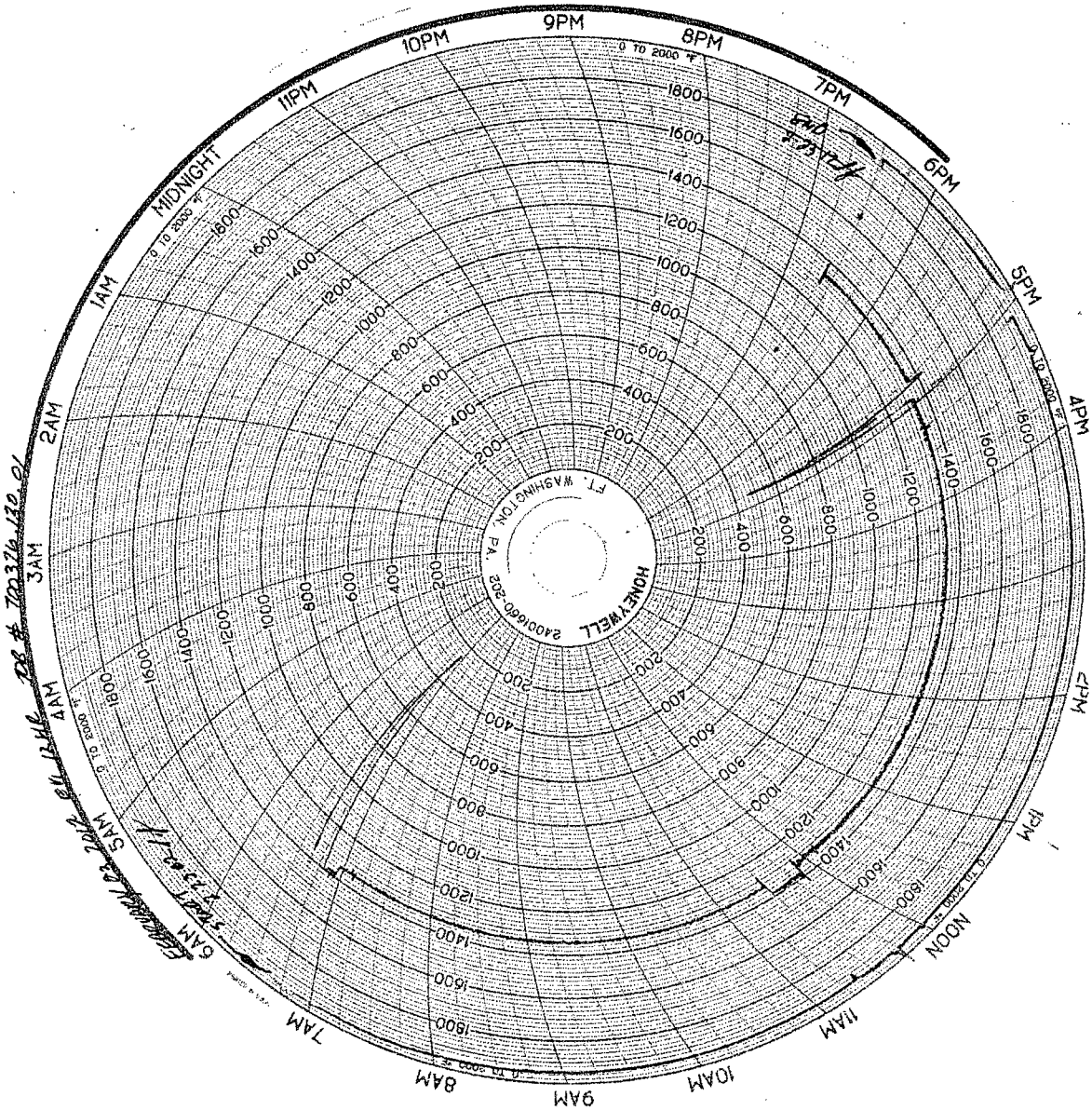
Analytical Results

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


9PM
8PM
7PM
6PM
5PM
4PM
NOON
11AM
10AM
9AM
8AM
7AM
6AM
5AM
4AM
3AM
2AM
1AM
MIDNIGHT
11PM
10PM
0 TO 2000 FT.
200
400
600
800
1000
1200
1400
1600
1800
FT. WASHINGTON PA
HONEYWELL
2400/600-208

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

	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: