

AP - 37

# STAGE 2 REPORT

Date

1-17-13



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

HOBBS  
318 East Taylor Street  
Hobbs, New Mexico 88241  
Phone 505.393.4261  
Fax 505.393.4658

ARTESIA  
408 W. Texas Ave.  
Artesia, New Mexico 88210  
Phone 575.746.8768  
Fax 505.746.8905

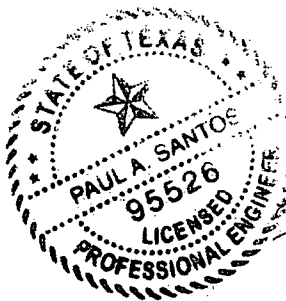
**MOBILE DUAL PHASE EXTRACTION REPORT  
LOVINGTON DEEP 6 PIPELINE RELEASE  
LEA COUNTY, NEW MEXICO  
SRS # 2002-10312  
NMOCD# AP-037**

**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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**JANUARY 17, 2013**

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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 on November 20, 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, MW14, MW-16, & 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 **610.95 equivalent gallons of hydrocarbons (Total)** were removed during the event. The combined volume of hydrocarbons were comprised of approximately **585 gallons of PSH (liquid phase)** and approximately **25.95 gallons as off-gas vapor**. The calculations used to estimate the off-gas vapor mass recovered reflect the mass of total hydrocarbons recovered and does not necessarily equate to an equal mass of the product released. The mass recovery calculations may be affected by variations in the specific gravity of hydrocarbon released, age of release, activity of aerobic and/or anaerobic processes, and site specific geochemical factors.

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 222.05 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 influent concentration was recorded as 17,414 ppmv for Hydrocarbon Composition. Laboratory analytical results can be found in Attachment 2.

## **C. Waste Management and Disposition**

A cumulative total of 1,056 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:**

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

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

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

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

$$\frac{8.34 \text{ lbs}}{\text{gallon water}} \times 0.82 \text{ average specific gravity of light crude} = \frac{6.84 \text{ lbs light crude}}{\text{gallon}} \quad \text{(estimated)}$$

**Table 1**  
**System Operation Data and Mass Recovery Calculations**

Time	Period (hours)	Influent Temp. (°f)	Vacuum (in. hg)	Vacuum (in. h2O)	Differential pressure (in. h2O)	Flow (SCFM)	FID Readings (ppm)	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)
6:30	0.5	42	15	204.14	92.2	243.69	50000	-	17414.00	1.28	22303	27.91	25.42	12.71	12.71
7:00	0.5	50	14.5	197.33	93.3	247.24	39040	17414.00	17414.00	1.00	17414	21.45	19.82	9.91	22.62
8:00	1	56	14.5	197.33	88.9	239.93	36754	-	17414.00	0.94	16394	19.96	17.90	17.90	40.52
9:00	1	62	14.5	197.33	89.7	239.62	33518	-	17414.00	0.86	14951	17.99	16.11	16.11	56.64
10:00	1	72	15	204.14	67.4	202.39	38765	-	17414.00	0.99	17291	20.41	15.45	15.45	72.08
11:00	1	74	15	204.14	53.8	180.48	49142	-	17414.00	1.26	21920	25.78	17.40	17.40	89.48
12:00	1	78	15	204.14	52.1	176.95	47611	-	17414.00	1.22	21237	24.79	16.40	16.40	105.88
13:00	1	78	15	204.14	65.8	198.86	31888	-	15839.00	0.80	12735	14.87	11.05	11.05	116.93
14:00	1	78	15	204.14	89.3	231.68	31294	-	15839.00	0.79	12498	14.59	12.63	12.63	129.56
15:00	1	78	15	204.14	90.8	233.60	30976	-	15839.00	0.78	12371	14.44	12.61	12.61	142.17
16:00	1	74	15	204.14	87.3	229.91	19630	-	15839.00	0.49	7840	9.22	7.92	7.92	150.10
17:00	1	73	15	204.14	88.5	231.70	39659	15839.00	15839.00	1.00	15839	18.66	16.16	16.16	166.26
18:00	1	72	15	204.14	87.5	230.60	27728	-	15839.00	0.70	11074	13.07	11.27	11.27	177.53
Averages:		68.23	14.88	202.56	80.51	222.05	36615.77						Total	177.53	

PSH Mass Recovered in Vapor Phase = 25.95 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.
(ppmv)	(Grams)	(atm)	(atm.liter/K.mole)	(F)	(K)	( C_mg/l)
22303	28.6160	1	0.0821	42	278.555556	27.9069236

Inputs are the green values.

Calculated values are yellow.

Constants are purple values.

Output are the blue values.

Liquid-phase Hydrocarbon Recovery

[ ] \* r2 \* h = volume

### Total Hydrocarbon Recovery

PSH Mass Recovered in Vapor Phase = 177.53 lbs  
25.95 gallons  
 PSH Mass Recovered in Liquid Phase = 4001.40 lbs  
585.00 gallons

**TOTAL = 4178.93 lbs**  
**610.95 gallons**

Gallons removed determined at time of pick up

PSH Volume in Gallons= 585  
 PSH Mass in Pounds= 4001.4

#### % Vol. Hydrocarbon to ppmv - Influent 1

Compound	Molecular Weight (g/mol)	% Vol	=	ppmv
Methane (CH4)	16.04	0.5335		5335.00
Ethane (C2H6)	30.07	0.0002		2.00
Propane (C3H8)	44.10	0.0009		9.00
Iso-Butane (C4H10)	58.12	0.0569		569.00
N-Butane (C4H10)	58.12	0.0584		584.00
Iso-Pentane (C5H12)	72.15	0.0707		707.00
N-Pentane (C5H12)	72.15	0.1479		1479.00
Hexane+ (C6H14)	97.40	0.8729		8729.00
Total				17414.00

\*Hexane+ is treated as 60% hexanes, 30 % heptanes, and 10 % octanes, as such its  
 (0.6\*93.1887)\*(0.3\*100.2019)+(0.1\*114.2285) = 97.3966

#### Molecular Weight Calculations

component	Molecular Weight (g/mol)	mol%
Nitrogen (N2)	28.016	96.5978
Methane (CH4)	16.0425	0.3549
Carbon Dioxide (CO2)	44.011	2.6972
Ethane (C2H6)	30.069	0.0001
Propane (C3H8)	44.0956	0.0004
Iso-Butane (C4H10)	58.1222	0.0162
N-Butane (C4H10)	58.1222	0.0209
Iso-Pentane (C4H12)	72.1488	0.0218
N-Pentane (C5H12)	72.1488	0.0460
Hexane+	97.3966	0.2448
Total		100.0001
Calculated MW	28.6160	

#### % Vol. Hydrocarbon to ppmv - Influent 2

Compound	Molecular Weight (g/mol)	% Vol	=	ppmv
Methane (CH4)	16.04	0.5258		5258.00
Ethane (C2H6)	30.07	0		0.00
Propane (C3H8)	44.10	0.0004		4.00
Iso-Butane (C4H10)	58.12	0.0203		203.00
N-Butane (C4H10)	58.12	0.0329		329.00
Iso-Pentane (C4H12)	72.15	0.0313		313.00
N-Pentane (C5H12)	72.15	0.116		1160.00
Hexane+ (C6H14)	97.40	0.8572		8572.00
Total				15839.00

\*Hexane+ is treated as 60% hexanes, 30 % heptanes, and 10 % octanes, as such its  
 (0.6\*93.1887)\*(0.3\*100.2019)+(0.1\*114.2285) = 97.3966

#### Molecular Weight Calculations

component	Molecular Weight (g/mol)	mol%
Nitrogen (N2)	28.016	96.5680
Methane (CH4)	16.0425	0.3497
Carbon Dioxide (CO2)	44.011	2.7774
Ethane (C2H6)	30.069	0.0000
Propane (C3H8)	44.0956	0.0002
Iso-Butane (C4H10)	58.1222	0.0070
N-Butane (C4H10)	58.1222	0.0118
Iso-Pentane (C4H12)	72.1488	0.0097
N-Pentane (C5H12)	72.1488	0.0361
Hexane+	97.3966	0.2402
Total		100.0001
Calculated MW	28.6110	

Calculated MW=  $\frac{\text{sum (individual component MW x their reported mol\%)}}{100}$

ppmv= % Vol x 10,000

**ATTACHMENT 1**  
MDPE Field Logs





Start Date: 20-Nov-12

## MDPE FIELD DATA

		Well Flow						Well Data				
TIME	SAMPLE TAKEN	Influent temp. (°f)	Diff. Pressure (INH2O) 2" Preso	Vac (In.Hg)	FID Composite (PPM)	Propane Tank (%-size) 500 Gal.	EXHAUST TEMP F	COMMENTS:				
								MW-2	MW-14	MW-16	MW-17	
								VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)
6:30		42	92.2	15	>50000	62	1438	11	13.2	26.5	20.4	
7:00	*	50	93.3	14.5	39040	61	1415	11.6	13.7	28.2	20.8	
8:00		56	88.9	14.5	36754	59	1417	11.9	13.1	28.7	20.6	
9:00		62	89.7	14.5	33518	57	1414	11.8	13.4	29.3	21.1	
10:00		72	67.4	15	38765	55	1407	11.5	16.1	28.4	20.5	
11:00		74	53.8	15	49142	52	1408	11.3	17.2	27.5	20.1	
12:00		78	52.1	15	47611	50	1410	11.1	17.3	28.1	20.6	
13:00		78	65.8	15	31888	48	1415	11.3	18.1	26.8	22.1	
14:00		78	89.3	15	31294	47	1409	11.2	16.9	26.3	22	
15:00		78	90.8	15	30976	46	1412	11	17	26.9	21.8	
16:00		74	87.3	15	19630	45	1408	10.8	18.5	27.6	19.5	
17:00	*	73	88.5	15	39659	44	1402	11	18.2	13.4	21.2	
18:00		72	87.5	15	27728	44	1409	10.7	17.2	28.4	21.3	

## Soil Vacuum Influence

Observation Well	MW-13
Extraction Well (EW)	MW-2
Time:	In.H2O
7:00	1.2
12:00	1
17:00	1.1

**ATTACHMENT 2**  
Laboratory Analytical Results



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 915-585-3443 FAX 915-585-4944  
5002 Basin Street, Suite A1 Midland, Texas 79703 432-689-6301 FAX 432-689-6313  
(BioAquatic) 2501 Mayes Rd., Suite 100, Carrollton, Texas 75006 972-242-7750  
E-Mail: lab@traceanalysis.com WEB: www.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: December 4, 2012

Work Order: 12112710



Project Location: Hobbs, NM  
Project Name: Lovington Deep 6  
Project Number: 700376.051.04 MDPE Event #1  
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
314984	Influent #1	air	2012-11-20	07:00	2012-11-27

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.

This report consists of a total of 6 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

---

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

# Report Contents

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## Case Narrative

Samples for project Lovington Deep 6 were received by TraceAnalysis, Inc. on 2012-11-27 and assigned to work order 12112710. Samples for work order 12112710 were received intact at a temperature of 20.2 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 12112710 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.

Report Date: December 4, 2012  
700376.051.04 MDPE Event #1

Work Order: 12112710  
Lovington Deep 6

Page Number: 4 of 6  
Hobbs, NM

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## 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 than 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.
MI1	Split peak or shoulder peak
MI2	Instrument software did not integrate
MI3	Instrument software misidentified the peak
MI4	Instrument software integrated improperly
MI5	Baseline correction
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

Report Date: December 4, 2012  
700376.051.04 MDPE Event #1

Work Order: 12112710  
Lovington Deep 6

Page Number: 6 of 6  
Hobbs, NM

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The scanned attachments will follow this page.  
Please note, each attachment may consist of more than one page.




email: [lab@traceanalysis.com](mailto: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

**BioAquatic Testing**  
2501 Mayes Rd., Ste 100  
Carrollton, Texas 75006  
Tel (972) 242-7750

Company Name: Talon-LP	Phone #: 8064670607
Address: (Street, City, Zip) 921 N. Bivins Amarillo TX 79107	Fax #:
Contact Person: Simon Walsh	E-mail:
Invoice to: (If different from above) Plains (Jason Henry)	SRS# 2002-10312
Project #: 700376.051.04	Project Name: Livingston Deep 6
Project Location (including state): Hobbs NM	Sampler Signature: 

**ANALYSIS REQUEST**  
**(Circle or Specify Method No.)**

[illegible]

Relinquished by: <u>2</u>	Company: <u>Talon</u>	Date: <u>11-21-12</u>	Time: <u>11:20</u>	Received by: <u>W. Stiller</u>	Company: <u></u>	Date: <u>11/21/12</u>	Time: <u>11:20</u>	INST <u>100</u>	<b>LAB USE ONLY</b> Intact <u>Y</u> / <u>N</u> Headspace <u>Y</u> / <u>NA</u> <input type="checkbox"/> Dry Weight Basis Required <input type="checkbox"/> TRRP Report Required <input type="checkbox"/> Check If Special Reporting Limits Are Needed
Relinquished by: <u></u>	Company: <u></u>	Date: <u></u>	Time: <u></u>	Received by: <u></u>	Company: <u></u>	Date: <u></u>	Time: <u></u>	INST <u></u>	
Relinquished by: <u>W. Stiller</u>	Company: <u></u>	Date: <u>11-21-12</u>	Time: <u>17:30</u>	Received by: <u>Brandon Ward</u>	Company: <u>True</u>	Date: <u>11/27/12</u>	Time: <u>9:45</u>	INST <u>172-3</u>	

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

Carrier # LS ZP 160906

ORIGINAL COPY

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

**MIDWEST  
PRECISION  
TESTING, LLC.**

615 N. Price Rd.  
Pampa, TX 79065

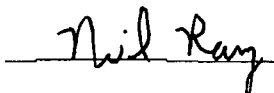
The following analytical results were produced using the strictest quality control and most current methods:

COC #: N/A

Lab #: 16837-16838

Quality Control #: 2338

Approved by:



Neil Ray

Date: 11/30/12

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



615 N. Price Rd.  
Pampa, TX 79065

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

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

Sample Id.: Influent Air #1  
Trace: 314984-1

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

Sample Temp.: N/A  
Atmospheric Temp.: N/A  
Pressure: N/A  
Field Data: N/A  
Sample Date: 11/20/12 Time: N/A  
Sampled By: N/A  
Analysis Date: 11/29/12  
Analysis By: Jessica Cabezudo

Lab #: 16837  
Quality Control Report: 2338

### Analytical Results

<b>Gas Composition</b>					
	<b>Mol %</b>	<b>GPM</b>	<b>Vol %</b>	<b>ppm vol.</b>	<b>Wt. %</b>
Nitrogen (N <sub>2</sub> ):	96.5978	10.5711	94.1891	941891	94.6777
Carbon Dioxide (CO <sub>2</sub> ):	2.6972	0.4548	4.0794	40794	4.1442
<b>Hydrocarbon Composition</b>					
	<b>Mol %</b>	<b>GPM</b>	<b>Vol. %</b>		<b>Wt. %</b>
Methane (CH <sub>4</sub> ):	0.3549	0.0602	0.5335	5335	0.1987
Ethane (C <sub>2</sub> H <sub>6</sub> ):	0.0001	0.0000	0.0002	2	0.0001
Propane (C <sub>3</sub> H <sub>8</sub> ):	0.0004	0.0001	0.0009	9	0.0006
Iso-Butane (C <sub>4</sub> H <sub>10</sub> ):	0.0162	0.0053	0.0469	469	0.0328
N-Butane (C <sub>4</sub> H <sub>10</sub> ):	0.0209	0.0066	0.0584	584	0.0424
Iso-Pentane (C <sub>5</sub> H <sub>12</sub> ):	0.0218	0.0079	0.0707	707	0.0548
N-Pentane (C <sub>5</sub> H <sub>12</sub> ):	0.0460	0.0166	0.1479	1479	0.1159
Hexanes+ (C <sub>6</sub> H <sub>14</sub> ):	0.2448	0.1056	0.8729	8729	0.7328
<b>Totals</b>	<b>100.000</b>	<b>11.2283</b>	<b>100.000</b>		<b>100.000</b>

### Comments - Additional Data

BTU -dry ( BTU/ft <sup>3</sup> ):	20.0	Z-Comp. Factor-dry:	0.99962
BTU -water vapor sat.( BTU/ft <sup>3</sup> ):	20.6	Z-Comp. Factor-water vapor sat.:	0.99500
Specific Gravity -dry:	0.9876	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9858	Molecular Weight	28.6159

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: 314985-1

Sample Temp.: N/A  
Atmospheric Temp.: N/A  
Pressure: N/A  
Field Data: N/A  
Sample Date: 11/20/12 Time: N/A  
Sampled By: N/A  
Analysis Date: 11/29/12  
Analysis By: Jessica Cabezudo

Lab #: 16838  
Quality Control Report: 2338

## Analytical Results

<b>Gas Composition</b>					
	<b>Mol %</b>	<b>GPM</b>	<b>Vol %</b>	<b>ppm vol.</b>	<b>Wt. %</b>
Nitrogen (N2):	96.5680	10.5678	94.2128	942128	94.6632
Carbon Dioxide (CO2):	2.7774	0.4684	4.2031	42031	4.2681
<b>Hydrocarbon Composition</b>					
	<b>Mol %</b>	<b>GPM</b>	<b>Vol. %</b>		<b>Wt. %</b>
Methane (CH4):	0.3497	0.0594	0.5258	5258	0.1958
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):	0.0070	0.0023	0.0203	203	0.0142
N-Butane (C4H10):	0.0118	0.0037	0.0329	329	0.0239
Iso-Pentane (C5H12):	0.0097	0.0035	0.0313	313	0.0243
N-Pentane (C5H12):	0.0361	0.0130	0.1160	1160	0.0909
Hexanes+ (C6H14):	0.2402	0.1037	0.8572	8572	0.7193
<b>Totals</b>	100.000	11.2217	100.000		100.000

## Comments - Additional Data

BTU -dry ( BTU/ft <sup>3</sup> ):	18.3	Z-Comp. Factor-dry:	0.99962
BTU -water vapor sat.( BTU/ft <sup>3</sup> ):	18.9	Z-Comp. Factor-water vapor sat.:	0.99501
Specific Gravity -dry:	0.9874	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9856	Molecular Weight	28.6109

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



615 N. Price Rd.  
Pampa, TX 79065

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

Sample Id.: DCG  
Reference Std. 53619AW  
Sample Temp.: 120° F  
Analysis Date: 11/29/12  
Analysis By: Jessica Cabezudo

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

Quality Control Report#: 2338

### Analytical Results

RESULTS	ACTUAL	ANALYSIS			
<u>Gas Composition</u>			MDL	RL	% Deviation
	Mol %	Mol %	Mol %	ppm mol	(90-100%)
Nitrogen (N2):	4.918	4.9766	0.0010	10	98.8
Carbon Dioxide (CO2):	1.499	1.4929	0.0010	10	99.6
			MDL	RL	% Deviation
<u>Hydrocarbon Composition</u>	Mol %	Mol %	Mol %	ppm mol	(90-100%)
Methane (CH4):	69.891	69.7445	0.0001	1	99.8
Ethane (C2H6):	9.111	9.1362	0.0001	1	99.7
Propane (C3H8):	5.984	6.0127	0.0001	1	99.5
Iso-Butane (C4H10):	3.024	3.0474	0.0001	1	99.2
N-Butane (C4H10):	3.040	2.9582	0.0001	1	97.3
Iso-Pentane (C5H12):	1.012	1.0449	0.0001	1	96.7
N-Pentane (C5H12):	1.018	1.0494	0.0001	1	96.9
Hexane+ (C6H14):	0.503	0.5371	0.0001	1	93.2
<b>Totals</b>	100.000	100.000			

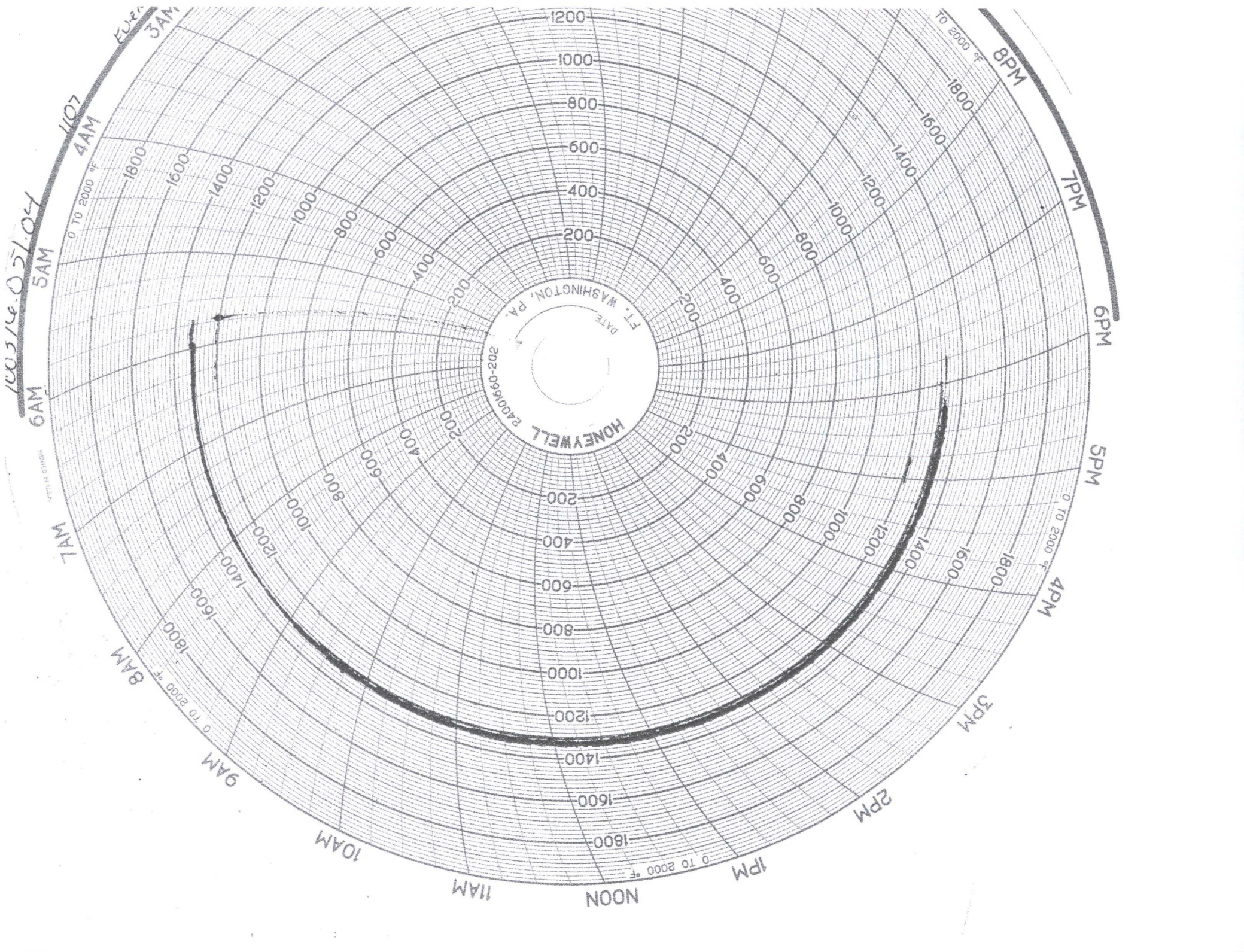
### Comments - Additional Data

ACTUAL		ANALYSIS	
BTU -dry (BTU/ft3):	1324.0	BTU -dry (BTU/ft <sup>3</sup> ):	1326.2
BTU -water vapor sat. (BTU/ft3):	1318.4	BTU -water vapor sat. (BTU/ft <sup>3</sup> ):	1320.6
Specific Gravity -dry:	0.8349	Specific Gravity -dry:	0.8368
Specific Gravity -water vapor sat.:	0.8419	Specific Gravity -water vapor sat.:	0.8438
Z-Comp. Factor -dry:	0.99564	Z-Comp. Factor -dry:	0.99562
Z-Comp. Factor -water vapor sat.:	0.98306	Z-Comp. Factor -water vapor sat.:	0.98302

## **ATTACHMENT 3**

Oxidizer Charts





1003/6.05/04

HONEYWELL  
2400666-0-202  
DATE  
FT. WASHINGTON, PA.



**ATTACHMENT 4**  
Waste Ticket



