1R - 119

REPORTS

DATE:

3-13-12

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

AUSTIN
3003 Tom Gary Cove
Building C-100
Round Rock, Texas 78664
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
17170 Jordan Road
Suite 102
Selma, Texas 78154
Phone 210.579.0235
Fax 210.568.2191

TULSA
9906 East 43rd Street
Suite G
Tulsa, Oklahoma 74146
Phone 918.742.0871
Fax 918.742.0876

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

TYLER
719 West Front Street
Suite 255
Tyler, Texas 75702
Phone 903.531.9971
Fax 903.531.9979

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MOBILE DUAL PHASE EXTRACTION REPORT
TNM MONUMENT 10 PIPELINE RELEASE
MONUMENT, LEA COUNTY, NEW MEXICO
SRS # TNM MONUMENT 10
NMOCD# 1R-0119

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

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 9, 2012 at the TNM Monument 10 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 & MW3 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 **20.97 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 **14.97 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 289.65 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 3,361 ppmv for Hydrocarbon Composition. Laboratory analytical results can be found in Attachment 2.

C. Waste Management and Disposition

A cumulative total of 700 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)

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

$$\frac{\text{8.34 lbs}}{\text{gallon water}} \times \text{0.845 average specific gravity of light crude (estimated)} = \frac{\text{7.047 lbs light crude}}{\text{gallon}}$$

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)
5:45	0.5	48	13	176.92	112.1	284.40	477.2	-	3361.00	0.82	2744	5.72	6.08	3.04	3.04
6:15	0.5	50	12	163.31	110.7	290.27	533.7	-	3361.00	0.91	3068	6.37	6.91	3.46	6.50
7:15	1	52	12	163.31	112.3	291.78	569.3	-	3361.00	0.97	3273	6.77	7.38	7.38	13.88
8:15	1	55	12	163.31	112.5	291.19	584.6	3361.00	3361.00	1.00	3361	6.91	7.52	7.52	21.40
9:15	1	57	12	163.31	110.7	288.29	616.7	-	3361.00	1.05	3546	7.26	7.83	7.83	29.23
10:15	1	63	12	163.31	109.2	284.69	1113	-	3361.00	1.90	6399	12.95	13.79	13.79	43.01
11:15	1	64	12	163.31	115.3	292.25	1545	-	3361.00	2.64	8883	17.95	19.61	19.61	62.62
12:15	1	66	12	163.31	114.7	290.93	1566	-	3114.00	0.87	2718	6.29	6.84	6.84	69.46
13:15	1	68	12	163.31	113.3	288.61	1622	-	3114.00	0.90	2815	6.49	7.00	7.00	76.47
14:15	1	65	12	163.31	112.9	288.92	1593	-	3114.00	0.89	2765	6.41	6.92	6.92	83.39
15:15	1	65	12	163.31	114.8	291.34	1794	3114.00	3114.00	1.00	3114	7.22	7.86	7.86	91.25
16:15	1	63	12	163.31	114.4	291.39	1661	-	3114.00	0.93	2883	6.71	7.31	7.31	98.56
17:15	1	60	12	163.31	113.7	291.33	1566		3114.00	0.87	2718	6.36	6.93	6.93	105.49
Averages:		59.69	12.08	164.35	112.82	289.65	1172.42						Total	105.49	

PSH Mass Recovered in Vapor Phase = 14.97 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)
2744	48.23922642	1	0.0821	48	281.8888889	5.718595211

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=	42.28

Total Hydrocarbon Recovery

PSH Mass Recovered in Vapor Phase =	105.49	lbs
	14.97	gallons
PSH Mass Recovered in Liquid Phase =	42.28	lbs
	6.00	gallons
TOTAL =	147.77	lbs
	20.97	gallons

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

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.1222		1222.00
Ethane (C2H6)	30.07	0.0036		36.00
Propane (C3H8)	44.10	0.0118		118.00
Iso-Butane (C4H10)	58.12	0.0325		325.00
N-Butane (C4H10)	58.12	0.0433		433.00
Iso-Pentane (C4H12)	72.15	0.0681		681.00
N-Pentane (C5H12)	72.15	0.0285		285.00
Hexane+ (C6H14)	86.18	0.0261		261.00
			Total	3361.00

Molecular Weight Calculations

Total Hydrocarbon %=	0.3361
g of Methane (CH4) =	5.831859566
g of Ethane (C2H6) =	0.322082713
g of Propane (C3H8) =	1.5482892
g of Iso-Butane (C4H10) =	5.620053555
g of N-Butane (C4H10) =	7.487640583
g of Iso-Pentane (C4H12) =	14.61890806
g of N-Pentane (C5H12) =	6.118045225
g of Hexane+ (C6H14) =	6.692347516
Calculated MW (Grams)	**48.23922642**

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

Compound	Molecular Weight (g/mol)	% total	=	ppmv
Methane (CH4)	16.04	0.0909		909.00
Ethane (C2H6)	30.07	0.0068		68.00
Propane (C3H8)	44.10	0.0104		104.00
Iso-Butane (C4H10)	58.12	0.0135		135.00
N-Butane (C4H10)	58.12	0.0363		363.00
Iso-Pentane (C4H12)	72.15	0.0199		199.00
N-Pentane (C5H12)	72.15	0.0497		497.00
Hexane+ (C6H14)	86.18	0.0839		839.00
			Total	3114.00

Molecular Weight Calculations

Total Hydrocarbon %=	0.3114
g of Methane (CH4) =	4.682196532
g of Ethane (C2H6) =	0.656634554
g of Propane (C3H8) =	1.47283237
g of Iso-Butane (C4H10) =	2.519653179
g of N-Butane (C4H10) =	6.775067437
g of Iso-Pentane (C4H12) =	4.610741811
g of N-Pentane (C5H12) =	11.51526975
g of Hexane+ (C6H14) =	23.21933847
Calculated MW (Grams)	**55.4517341**

ATTACHMENT 1
MDPE Field Logs

MDPE FIELD NOTES					
Site Name:	TNM Monument #10			Event #:	3
Location:	S. of Monument, NM			Arrive at site:	2/9/2012 4:10
Date:	2/9/2012				
Job#:	700376.082.03	SRS#:	TNM Monument #10	Start Vac:	2/9/2012 5:15
Phase:	MDPE3	Unit:	1107	Stop Vac:	2/9/2012 17:15
Onsite Personnel:	J. Parrish & L. Jaquez			Leave Site:	2/9/2012 18:00

GAUGING DATA

WELL#	BEFORE			AFTER			COMMENTS
	PSH	GW	PSH-T	PSH	GW	PSH-T	
MW3	22.19	23.83	1.64	-	24.18	-	Stinger set @ 24'
MW2	22.49	23.17	0.68	-	24.37	-	Stinger set @ 24'
MW1	-	21.83	-	Not Gauged			
MW6	-	24.17	-	Not Gauged			
MW7	-	24.06	-	Not Gauged			
MW4	-	20.93	-	Not Gauged			
MW5	-	22.41	-	Not Gauged			
WASTE:	H2O:	694		PSH:	6		TOTAL (GAL): 700

Sample Name	Analysis	Date:	Time:	Comments:
INFLUENT	ASTM D 1945	2/9/2012	8:15	FID = 584.6
INFLUENT	ASTM D 1945	2/9/2012	15:15	FID = 1794
INFLUENT	-	-	-	-
EFFLUENT	-	-	-	-

Notes:	

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: MW2 VAC (INH2O)	MW3 VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)
5:45		60	2.1	0.2	48	112.1	13	477.2	62	1416	52.1	16.73			
6:15		60	0.5	0.05	50	110.7	12	533.7	60	1414	51.7	15.85			
7:15		62	0.3	0.05	52	112.3	12	569.3	58	1408	53.3	16.71			
8:15	*	70	0.3	0.05	55	112.5	12	584.6	56	1410	52.8	17.31			
9:15		73	0.4	0.05	57	110.7	12	616.7	55	1413	55.1	16.17			
10:15		84	1.4	0.05	63	109.2	12	1113	55	1409	53.7	15.21			
11:15		80	2	0.2	64	115.3	12	1545	54	1411	49.1	17.25			
12:15		82	1.1	0.2	66	114.7	12	1566	53	1409	51.3	16.33			
13:15		82	1	0.2	68	113.3	12	1622	52	1412	52.7	14.27			
14:15		82	1	0.2	65	112.9	12	1593	50	1410	50.9	16.07			
15:15	*	84	1.1	0.2	65	114.8	12	1794	48	1413	48.7	14.75			
16:15		82	1	0.2	63	114.4	12	1661	48	1415	49.6	11.48			
17:15		80	1	0.2	60	113.7	12	1566	46	1412	48.5	11			

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: 12021309

Project Location: Lea Co., NM
Project Name: TNM Monument #10
Project Number: 700376.082.03
SRS #: TNM Monument #10

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
289006	Influent Air #1	air	2012-02-09	08:15	2012-02-10

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 5 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

Case Narrative

Samples for project TNM Monument #10 were received by TraceAnalysis, Inc. on 2012-02-10 and assigned to work order 12021309. Samples for work order 12021309 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 12021309 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 # 12021309

Page 1 of 1

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

6002 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: TALONLPE / 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 ALL AMERICAN

Project #: 700376.082.03
Project Name: TNM MONUMENT #10

Project Location (including state): LEA COUNTY NEW MEXICO
Sampler Signature:

ANALYSIS REQUEST
(Circle or Specify Method No.)

SRS # TNM MONUMENT #10

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, S04, NO3, NO2, Alkalinity	Na, Ca, Mg, K, TDS, EC	ASTMD 1945		Turn Around Time if different from standard	Hold
289006	INF AIR #1	1	1LTR			A								2-9-12	08:15																			X			
007	INF AIR #2	1	1LTR			A								2-9-12	15:15																			X			

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
	TALONLPE	2-10-12	12:00				
				Brenda Ward	Trace Lubbock	2/10/12	5:20 pm

INST ____ °C
OBS ____ °C
COR ____ °C

INST IR °C
OBS 22.5 °C
COR 22.4 °C

LAB USE ONLY

Intact Y / N
Headspace Y / N / NA
Log-in-Review MA

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 # Caruso

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 #: 9232-9233

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: 289006-1
Sample Temp.: N/A
Atmospheric Temp.: N/A
Pressure: N/A
Field Data: N/A
Sample Date: 2/09/12 Time: N/A
Sampled By: N/A
Analysis Date: 2/14/12
Analysis By: Jessica Cabezudo

Lab #: 9232
Quality Control Report: 1878

Analytical Results

Gas Composition					
	Mol %	GPM	Vol %	ppm vol.	Wt. %
Nitrogen (N2):	97.9023	10.7133	96.6799	9667989	96.7764
Carbon Dioxide (CO2):	1.9480	0.3285	2.9839	298388	3.0186
Hydrocarbon Composition	**Mol %**	**GPM**	**Vol. %**		**Wt. %**
Methane (CH4):	0.0803	0.0136	0.1222	1222	0.0454
Ethane (C2H6):	0.0015	0.0004	0.0036	36	0.0016
Propane (C3H8):	0.0048	0.0013	0.0118	118	0.0074
Iso-Butane (C4H10):	0.0111	0.0036	0.0325	325	0.0226
N-Butane (C4H10):	0.0153	0.0048	0.0433	433	0.0313
Iso-Pentane (C5H12):	0.0208	0.0076	0.0681	681	0.0526
N-Pentane (C5H12):	0.0087	0.0032	0.0285	285	0.0222
Hexanes+ (C6H14):	0.0072	0.0031	0.0261	261	0.0219
Totals	100.000	11.0793	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	3.4	Z-Comp. Factor-dry:	0.99967
BTU -water vapor sat.(BTU/ft^3):	4.2	Z-Comp. Factor-water vapor sat.:	0.99535
Specific Gravity -dry:	0.9785	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9765		

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: 289007-1
Sample Temp.: N/A
Atmospheric Temp.: N/A
Pressure: N/A
Field Data: N/A
Sample Date: 2/09/12 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):	97.0860	10.6242	95.4423	9544226	95.5027
Carbon Dioxide (CO2):	2.7847	0.4696	4.2464	424635	4.2942
Hydrocarbon Composition	**Mol %**	**GPM**	**Vol. %**		**Wt. %**
Methane (CH4):	0.0600	0.0102	0.0909	909	0.0337
Ethane (C2H6):	0.0028	0.0008	0.0068	68	0.0030
Propane (C3H8):	0.0042	0.0012	0.0104	104	0.0065
Iso-Butane (C4H10):	0.0046	0.0015	0.0135	135	0.0094
N-Butane (C4H10):	0.0129	0.0040	0.0363	363	0.0262
Iso-Pentane (C5H12):	0.0061	0.0022	0.0199	199	0.0154
N-Pentane (C5H12):	0.0153	0.0055	0.0497	497	0.0388
Hexanes+ (C6H14):	0.0233	0.0101	0.0839	839	0.0701
Totals	100.000	11.1292	100.000		100.000

Comments - Additional Data

BTU -dry (BTU/ft^3):	3.4	Z-Comp. Factor-dry:	0.99965
BTU -water vapor sat.(BTU/ft^3):	4.2	Z-Comp. Factor-water vapor sat.:	0.99522
Specific Gravity -dry:	0.9834	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	0.9814		

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

MIDWEST PRECISION TESTING, LLC.

615 N. Price Rd.
Pampa, TX 79065

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

Sample Id.: DCG
Reference Std. 47366AW
Sample Temp.: 120° F
Analysis Date: 2/14/12
Analysis By: Jessica Cabezudo

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

Quality Control Report#: 1878

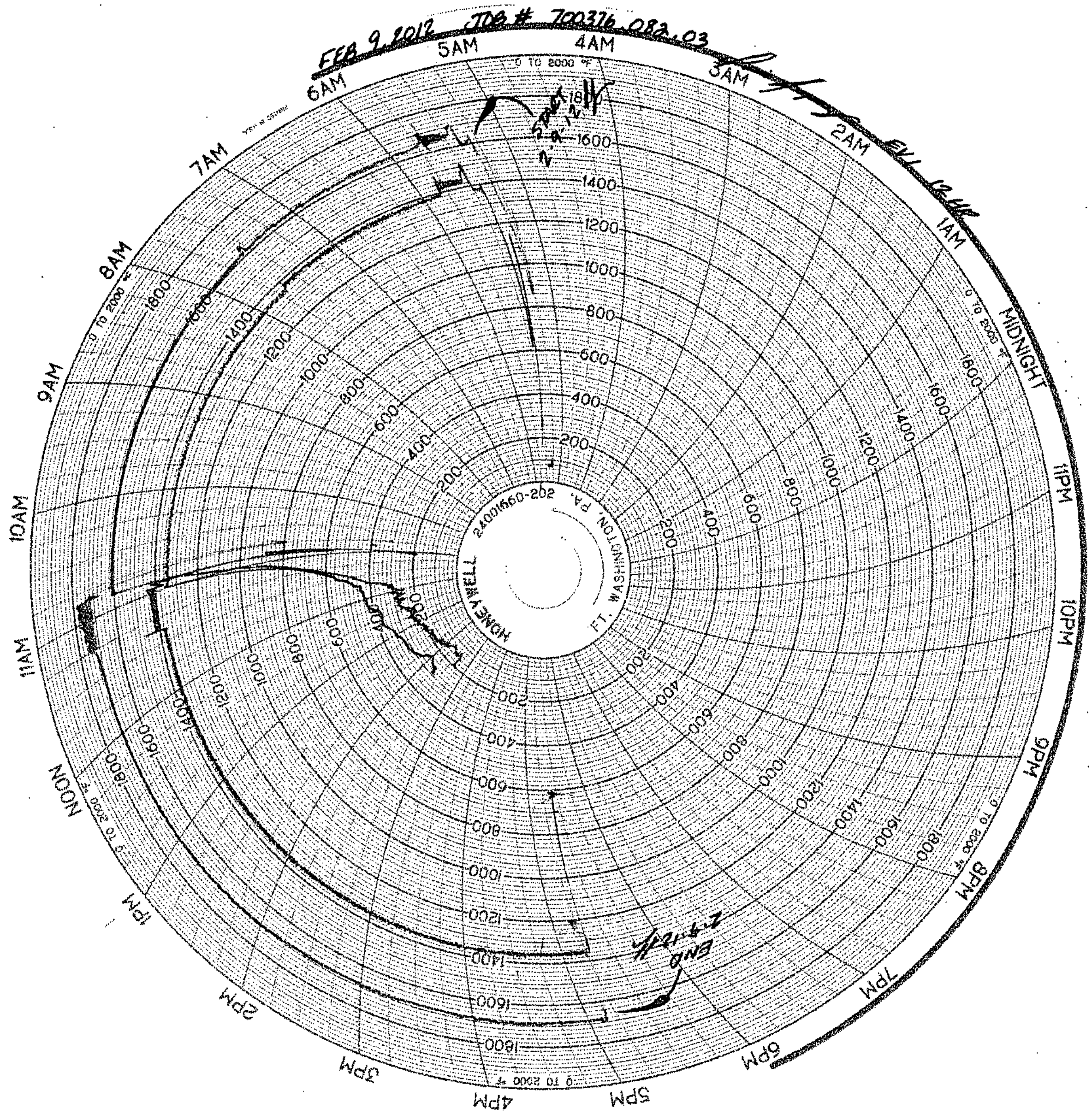
Analytical Results

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

Comments - Additional Data

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

ATTACHMENT 3
Oxidizer Charts


FEB 9 2012 JOB # 700376.082.03
START
END
2-9-12
HONEYWELL
24001660-202
FT. WASHINGTON, PA.
0 TO 2000 °F
MIDNIGHT
1AM
2AM
3AM
4AM
5AM
6AM
7AM
8AM
9AM
10AM
11AM
NOON
1PM
2PM
3PM
4PM
5PM
6PM
7PM
8PM
9PM
10PM
11PM

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: