Santa Barbara County
Air Pollution Control District

Our Vision Clean Air

ONSHORE OIL AND GAS PRODUCTION FLARE REACTIVE ORGANIC COMPOUND EMISSION FACTOR STUDY

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Abbreviations/Acronyms

aFTIR	Active Fourier Transform Infrared Spectroscopy
AP-42	USEPA *Compilation of Emission Factors* Document
ASTM	American Society for Testing and Materials
Btu	British Thermal Unit
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DIAL	Differential Infrared Absorption LIDAR (Light Detection and Ranging)
District	Air Pollution Control District
HAP	Hazardous Air Pollutants
lb	Pound
MM, mm	Million
OCS	Outer Continental Shelf
pFTIR	Passive Fourier Transform Infrared Spectroscopy
ROC	Reactive Organic Compound
scf	Standard Cubic Feet
USEPA	United States Environmental Protection Agency or EPA
VOC	Volatile Organic Compounds

I. EXECUTIVE SUMMARY

A. Introduction

In April 2015, the United States Environmental Protection Agency (USEPA) finalized new AP-42 flare emission factors. These revised emission factors applied to any flare system (regardless if unassisted, air assisted, or steam assisted) that is not an enclosed thermal oxidizer or low NO_x design. Per the new AP-42 guidelines, the CO emission factor decreased to 0.310 lb/MMBtu from the existing 0.370 lb/MMBtu factor. The ROC emission factor increased to 0.570 lb/MMBtu from the previous factor of 0.0861 lb/MMBtu.

B. Background

Members of the Santa Barbara County oil and gas industry as well as environmental consultants expressed concern regarding the dramatic increase in the flare ROC potential-to-emit due to the revised emission factor. It is believed that the revised ROC emission factor was not representative of flares at Santa Barbara County's onshore oil and gas production facilities. Following a review of the AP-42 document, the District determined that the EPA flare study was primarily applicable to oil refineries and chemical manufacturing facilities. Therefore, the new emission factor was not representative of Santa Barbara County's oil and gas production facility flares. The District's Engineering Division concluded that determining a new, countywide production flare ROC emission factor would lead to more accurate potential-to-emit calculations from oil and gas production facilities.

C. Recommendation

The Engineering Division recommends that a ROC emission factor of **0.200 lb/MMBtu** be used to calculate ROC potential-to-emit for all onshore oil and gas production flares meeting the criteria of this study. Analysis of the data showed no outliers in the dataset. All individual facility emission factors fall within two standard deviations of the proposed emission factor. The District considers this emission factor to be representative of production flare ROC emissions at onshore oil and gas production facilities within Santa Barbara County.

II. OVERVIEW

A. Onshore Oil and Gas Production Flare Background

After well drilling operations have ceased, oil and gas production facilities begin to extract an emulsion composed primarily of water, crude petroleum and natural gas. As the emulsion passes through a production facility, the various components are separated. Produced gas recovered from the emulsion is typically sold, reinjected into the wells, or destroyed in a combustion process. In addition, process issues and pressure upsets at the facility may require venting of the produced gas, which must be combusted before its release to the atmosphere, as a safety measure.

In order to operate an oil and gas production flare, a series of headers are installed throughout the facility which feed into the flare system. As the produced gas enters a flare, the reactive content of the gas is combusted and converted to non-reactive waste products: CO, CO_2, and water vapor. Although flare combustion is designed to be highly efficient, a small fraction of the produced gas will inadvertently pass through the flare as un-combusted emissions. Additionally, due to variations in operating parameters, including outside factors such as humidity, temperature, wind speeds, turbulence of the gas, and the instantaneous quality of the gas being burned, flare ROC emissions naturally vary over time.

B. EPA Flare Study- 1983

In 1983, the EPA, in conjunction with Chemical Manufacturers Association, The John Zink Company, and Engineering Science Inc., conducted a full scale experimental study to determine flare operational characteristics which led to a stable flame and good combustion efficiencies. A suspended sample probe located in the flare plume was used to obtain direct emissions data. The report concluded that combustion efficiencies of 98 percent (mass basis) were achievable. Furthermore, the EPA established working parameters for flare operations that have been incorporated into the technology based standards of District Rule 359.

C. District Emission Factor Guidance Document- 2007

A 2012 report prepared by the EPA Office of Air Quality Planning and Standards combined data from several experimental flare efficiency studies. The report was comprised of data sets from ten independent studies conducted between July 1983 and August 2011. Each of the studies focused entirely on refinery flares, chemical plant flares, or industrial flares using either extractive or remote sensing test methods such as pFTIR or aFTIR to collect emissions data. Using extrapolated data, the report concluded that a 96.5 percent combustion efficiency demonstrates good flare performance which translates to a 98 percent destruction efficiency (mass basis).

D. EPA Flare Study- 2015

As a result of a May 2013 lawsuit related to Section 130 of the Clean Air Act, the EPA conducted an extensive study of refinery and manufacturing plants in an attempt to update emission factors for various operational units including flares. Using multiple direct emission test reports and data from a DIAL study conducted in the Houston area, the EPA compiled seven emission test reports from ten flares and developed an updated ROC emission factor of 0.570 lb/MMBtu. After reviewing the updated figure and available background data, the District had several concerns with the applicability of the new flare emission factor.

1. The study used data collected from refinery flares, whereas flares operated in Santa Barbara County are typically production flares. The nature of a refinery operations lends itself to flaring gas products with large fluctuations in heat content. At any given moment, off gasses collected from multiple vessels may be combusted in a refinery flare. The variation in combustion characteristics can be observed in the EPA study's background documentation. Several of the tests showed unstable Btu content indicated by large standard deviation swings in the data. By comparison, the gases sent to production flares in Santa Barbara County have a stable Btu content extended over multiple years of operations.

2. Test results found in study's background data show large differences in the reactive content of the inlet gas with multiple data points exceeding 90 percent reactive content and standard deviations as high as 23 percent. Field gas burned in Santa Barbara County has much lower and stable reactive content, typically on the order of 10 percent, with a relatively consistent composition.

3. Refinery flares have a greater tendency to smoke due to the flared gases' higher molecular weights. Due to these operational considerations, refinery flares typically are assisted by air or steam. All of the flares used in the EPA's study were assisted, thereby diluting the highly variable, and in some cases low, inlet Btu content further. A heat content less than 300 Btu/scf of gas would not be in compliance with the General Provisions of 40 CFR Part 60 and the flare likely would not meet a destruction efficiency of 98 percent (mass basis). Assisted flares also present operational problems when handling highly variable gas streams like those seen in the study. Steam or air volumes require continuous adjustment based on gas composition to prevent soot formation. Refinery flared gas compositions may change quickly enough such that control feedback issues become apparent, and ideal mixing of the gas with steam or air becomes difficult to achieve.

After an extensive review of the data, taking into account concerns from the Santa Barbara County oil and gas operators, the District determined the emission factor derived from the April 2015 EPA study was not applicable to onshore production flare operations in Santa Barbara County.

E. District Flare Studies (1991 and 2015)

In the early 1990's, the District determined that several emergency flaring scenarios at Exxon's Santa Ynez Unit and Chevron's Gaviota processing facilities had the potential to cause large sulfur oxide (SO_x) emissions and violate state and federal ambient air quality standards for SO_x in the area. The District commissioned a study to mitigate predicted violations by reducing or eliminating excess flaring at the facilities. The report, released in July 1991, also developed District wide flare emission factors for criteria pollutants associated with flaring activities. Prior to this report, the District used AP-42 factors for Natural Gas Combustion. These AP-42 factors, designed for estimating emissions from controlled natural gas combustion inside a boiler or process heater, proved unreliable when applied to flaring operations due to the inherent differences between the combustion properties of boilers and flares.

Flare emission factors were derived based on available literature and analyses of test data, including the EPA's 1983 Flare Efficiency Study. The data from these studies was evaluated to obtain the average ROC/THC mass ratios for each type of flare tested. Only flares with

combustion efficiencies greater than 98 percent (mass basis) and steam-to-fuel ratios less than one were analyzed. Assumptions of the reactive content range of produced gas were made to obtain a final ROC emission factor of 0.086 lb/MMBtu.

While the emission factor derived by the study was used for many years as a best available factor, the underlying data used in the study was based on previous EPA studies unrepresentative of flaring operations conducted at oil and gas production fields in Santa Barbara County. The study also cited the EPA's 1983 Flare Efficiency Study when excluding all data below a base combustion efficiency of 98 percent which corresponds to a 99.5 percent hydrocarbon destruction efficiency. According to the more recent EPA's 2012 Flare Design Study, a combustion efficiency of 96.5 percent corresponding to a destruction efficiency of 98 percent (mass basis) more accurately represented good flare performance.

Due to poor representation of existing ROC emission factors for onshore oil and gas production flares, the District proceeded to conduct a new study beginning in July 2015. A common challenge all prior studies have encountered is the applicability of an emission factor to a wide range of flare designs and operating scenarios in industry. By narrowing the focus of the study to flares operating at local onshore oil and gas production facilities, the final emission factor would be more representative of operations occurring in the county.

III. METHODOLOGY

A. Introduction

The District established a methodology to determine the worst case scenario flare emission factor while taking into account cost and resource restrictions. The District determined that conducting direct emissions testing using the pFTIR or DIAL methods found in the EPA studies was not a feasible option due to lack of resources. Instead, the District relied on facility inspection and permit reports for study data.

The District created a set of criteria that a flare must possess in order to be included in the study. After compiling a list of all oil and gas flares in the County, any flares with a lack of reported flare data were removed. Using gas analyses and reported flared volumes, the District calculated a weighted ROC emission factor for each facility. All of the facility data was subsequently averaged to calculate the new county-wide flare ROC emission factor.

B. Assumptions

According to the EPA, properly designed and operated flares, "destroy volatile organic compounds (VOC) or volatile hazardous air pollutants (HAP) with a destruction efficiency of 98 percent or greater". The District made the assumption that all flares in compliance with the technology based standards of District Rule 359.D.2, and the General Provisions of 40 CFR Part 60 Section 18(b) through (d), are considered "properly operated" and achieve a minimum destruction efficiency of 98 percent (mass basis). The technology based requirements for flares include smokeless operation, minimum heating content of inlet gas (200 Btu/scf if non-assisted and 300 Btu/scf if assisted), and use of a reliable ignition source. To calculate the most conservative emission factor, the District deemed it reasonable to apply the 98 percent destruction efficiency to all flaring events.

Secondly, the District assumed that the periodic gas analyses used to determine the flared gas ROC content is representative of gas quality at the facility over the entirety of a reporting period. The District understands that there is an inherent variation for any measurements taken over a period of time and that no two gas samples, even taken sequentially, will be identical. However, gas from a specific production field tends to have a consistent heat content and composition with minimal variation over time. Typically, only operational changes such as the production from a new formation or new wells will cause a significant change in overall gas composition at the flare header.

C. Study Criteria

The study was limited to onshore oil and gas production flares. Therefore, flares operating at oil refineries, gas plants, offshore platforms, wastewater treatment plants, and landfills were excluded. These flares combust gases not found at the type of oil and gas production facilities being evaluated and would not provide representative data.

Emergency flares were excluded from the study since emergency flaring events are not representative of typical operations at a facility. Furthermore, the volume of produced gas combusted during unplanned flaring events is minimal in comparison to planned flaring.

Offshore flares operating on the OCS oil platforms were removed from consideration due to operational differences with flares found at onshore production fields. The offshore platform flares often serve as dual purpose production and emergency flares. As noted above, emergency flares where not included as part of this study. Additionally, the offshore flares have significantly higher maximum heat input ratings compared to their onshore counterparts since the units are designed to handle large gas flows. This difference in gas flow rates makes comparing onshore and offshore flares difficult.

Lastly, only flares which operated in compliance with District Rule 359.D were used in the study. Compliance was determined based on review of District inspection reports. This study criteria was included to ensure the flares met the assumed 98 percent destruction efficiency.

The following table summarizes the eighteen oil and gas production flares which met the aforementioned study criteria:

Table 1. Flares Meeting Study Criteria

Company	***Facility***	***Facility ID***	***Permit Number***	***Device ID***	***Flare Rating (MMBtu/hr)***
AmRich Energy	Bradley II Lease	03226	14409	387954	4.375
AmRich Energy	Chamberlin Lease	11328	13846	113588	87.500
AmRich Energy	Chamberlin Hathaway Lease	11461	14294	387050	3.280
BE Conway Energy	Enos Lease	04114	8496-R8	5846	4.370
BE Conway Energy	Newhall Lease	03841	8042-R8	6227	2.187
BE Conway Energy	Union Sugar Lease	04108	7750-R9	5839	2.187
ERG Resources	Peshine/Tompkins Lease	04129	14617	386944	5.500
ERG Resources	Williams Holding Lease	03009	13500	1671	14.150
Greka Oil and Gas	Armelin Lease	03736	7775-R6	3332	21.870
Greka Oil and Gas	Bradley Lands	04103	7053-R9	5838	12.900
Greka Oil and Gas	Morganti Lease	03303	8096-R9	8428	5.625
HDT Inc.	Los Flores Ranch	11468	14337	387328	20.800
PetroRock	Calderon Lease	11456	14271-01	386923	21.875
PRE Resources [1]	Careaga #1	04017	13719-R1	114417	62.500
Sierra Resources, Inc. [2]	Barham/Boyne Leases	03777	8269-R7	3344	17.500
Sierra Resources, Inc. [2]	Blair Lease (1)	02637	8837-R8	1412	91.880
Sierra Resources, Inc.	Blair Lease (2)	08673	14405	387448	33.400
Towne Exploration	Luton Lease	04106	13903	5838	2.188
Underground Energy	Asphaltea Lease	11312	13980	386661	6.000

[1] Data is from when Venoco Inc. owned and operated the facility
[2] Previously Purisima Hills, LLC

D. Flares Used in Study

Of the eighteen onshore production flares meeting the study criteria, an additional nine were excluded from the study due to a lack of data (see Table 2). These included flares operating at older facilities that either did not have a gas sampling permit requirement or were idle. Additionally, flares at newly permitted facilities which have not yet submitted the results of the required gas sampling were not included.

Table 2: Study Flares

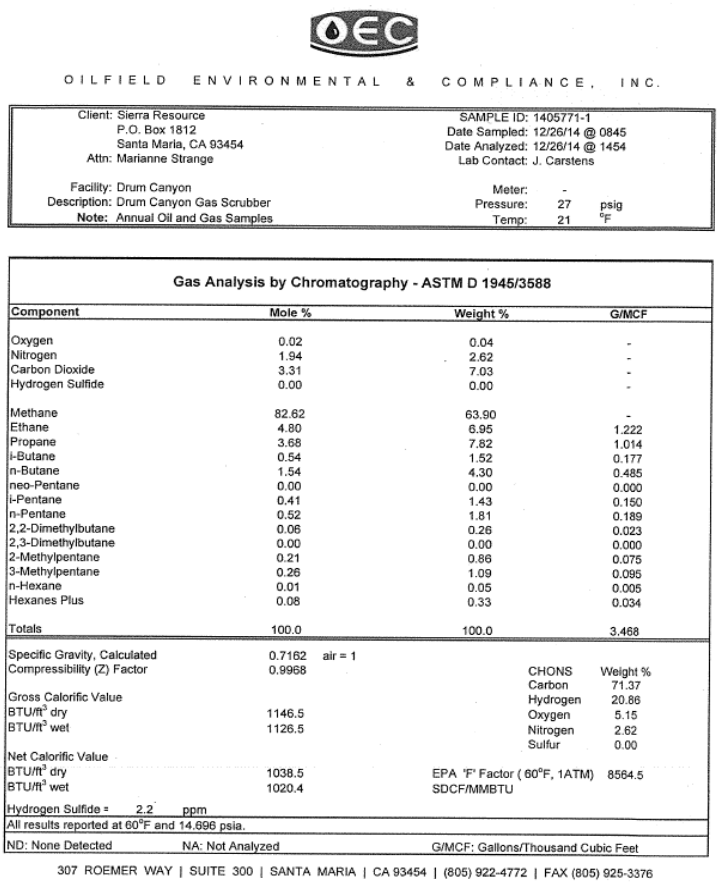
Company	*Facility*	*Facility ID*	*Permit Number*	*Device ID*	*Flare Rating (MMBtu/hr)*
BE Conway Energy	Enos Lease	04114	8496-R8	5846	4.370
BE Conway Energy	Union Sugar Lease	04108	7750-R9	5839	2.187
ERG Resources	Williams Holding Lease	03009	13500	1671	14.150
Greka Oil and Gas	Bradley Lands	04103	7053-R9	5838	12.900
Greka Oil and Gas	Morganti Lease	03303	8096-R9	8428	5.625
PRE Resources	Careaga #1	04017	13719-R1	114417	62.500
Sierra Resources, Inc.	Barham/Boyne Leases	03777	8269-R7	3344	17.500
Sierra Resources, Inc.	Blair Lease (1)	02637	8837-R8	1412	91.880
Sierra Resources, Inc.	Blair Lease (2)	08673	14405	387448	33.400

E. Flare Data

The District incorporates conditions in oil and gas production facility permits requiring the regular sampling of the facility's produced gas and reporting the volume of produced gas flared during the reporting period. These pieces of information allowed the District to calculate the Santa Barbara County flare ROC emission factor.

The produced gas analyses were conducted using ASTM D1945, ASTM D3588, or a District approved alternative methods. These methods determine properties of the produced gas including composition and higher heating value using gas chromatography. Figure 1 on the next page shows an example printout of a gas analysis report.

Figure 1. Sample Gas Analysis Report



OILFIELD ENVIRONMENTAL & COMPLIANCE, INC.

Client: Sierra Resource	SAMPLE ID: 1405771-1
P.O. Box 1812	Date Sampled: 12/26/14 @ 0845
Santa Maria, CA 93454	Date Analyzed: 12/26/14 @ 1454
Attn: Marianne Strange	Lab Contact: J. Carstens
Facility: Drum Canyon	Meter: -
Description: Drum Canyon Gas Scrubber	Pressure: 27 psig
Note: Annual Oil and Gas Samples	Temp: 21 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.02	0.04	-
Nitrogen	1.94	2.62	-
Carbon Dioxide	3.31	7.03	-
Hydrogen Sulfide	0.00	0.00	-
Methane	82.62	63.90	-
Ethane	4.80	6.95	1.222
Propane	3.68	7.82	1.014
i-Butane	0.54	1.52	0.177
n-Butane	1.54	4.30	0.485
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.41	1.43	0.150
n-Pentane	0.52	1.81	0.189
2,2-Dimethylbutane	0.06	0.26	0.023
2,3-Dimethylbutane	0.00	0.00	0.000
2-Methylpentane	0.21	0.86	0.075
3-Methylpentane	0.26	1.09	0.095
n-Hexane	0.01	0.05	0.005
Hexanes Plus	0.08	0.33	0.034
Totals	100.0	100.0	3.468

Specific Gravity, Calculated	0.7162 air = 1		
Compressibility (Z) Factor	0.9968	CHONS	Weight %
Gross Calorific Value		Carbon	71.37
BTU/ft³ dry	1146.5	Hydrogen	20.86
BTU/ft³ wet	1126.5	Oxygen	5.15
		Nitrogen	2.62
Net Calorific Value		Sulfur	0.00
BTU/ft³ dry	1038.5	EPA 'F' Factor (60°F, 1ATM)	8564.5
BTU/ft³ wet	1020.4	SDCF/MMBTU	
Hydrogen Sulfide = 2.2 ppm			

All results reported at 60°F and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

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The gas analysis results provide both the organic and inert compound fractions found in the produced gas. The organic content of a typical natural gas sample consists mainly of methane with progressively smaller fractions of heavier hydrocarbons such as propane, butane, pentane, etc. These organics are often denoted as C1 through C8+ in gas analyses. District Rule 102 does not define methane and ethane as reactive organic compounds. Therefore, these compounds were excluded when determined the flare ROC emission factor.

F. Relevant Equations and Calculations

The first step to calculate each facility's flare ROC emission factor was to determine the ROC content of the produced gas at the facility. For each reporting period that a gas analysis was conducted, Equation 1 was used to calculate the total molecular weight of ROC in the gas sample based on each compounds molecular weight and molecular percentage per the gas sample.

Equation 1

$$Total\ Molecular\ Weight\ Gas\ ROC\ \frac{lb}{lb-mol} = \sum_{i}^{n}((\frac{x_i}{100}) \times M_i)$$

Where

x_i = *mole percentage*

M_i = *molecular weight of reactive organic molecule i (which excludes methane and ethane).*

At standard conditions (60 ºF, 14.696 psia), at which the results of the gas analysis are reported, an ideal gas has a molar volume of 379.48 scf/lb-mole. Treating the field gas as an ideal gas and using the molar volume, the total mass of reactive compounds per scf entering the flare can be calculated using Equation 2.

Equation 2

$$\frac{lb\ ROC}{scf} = Total\ Molecular\ Weight\ Gas\ ROC\ \frac{lb}{lb-mol} \times \frac{1\ lb-mol}{379.48\ scf}$$

Assuming the minimum 98 percent destruction efficiency for all properly designed and operated flares, two percent of the total inlet reactive gas entering a flare goes unreacted and emitted to the atmosphere as ROC emissions. Using this conservative destruction efficiency as a worst case scenario efficiency provides the maximum estimate of ROC content in the flare exhaust plume. The flare ROC emission factor (lb/MMBtu) can be determined using the calculated reactive organic compounds' mass per standard cubic foot of gas (Equation 2), the 98 percent assumed destruction efficiency, and the gas analysis' dry gross calorific higher heating value. Equation 3 below shows this calculation:

Equation 3

$$\frac{lb}{MMBtu} = (\frac{lb}{scf} \div \frac{BTU}{scf}) \times 10^6 \times (1 - 0.98)$$

The calculated flare ROC emission factor is only valid for the reporting period in which a gas analysis was conducted. In order to account for the varying operations over the course of several reporting periods, the District determined that using a weighted-average based on the volume of gas flared would be used to calculate each facility's flare ROC factor. Equation 4 converts individual reporting period ROC emission factors into a facility wide emission factor.

Equation 4

$$Facility\ ROC\ Emission\ Factor = \sum_{i}^{n}(Flared\ Gas\ Volume_i * \frac{lb\ ROC}{scf}_i) \Big/ \sum_{i}^{n} Flared\ Gas\ Volume_i$$

Where
i = the first reporting period

Finally, the calculated facility emission factors are averaged to determine the final Santa Barbara County-wide onshore ROC production flare emission factor using Equation 5.

Equation 5

$$County\ Wide\ ROC\ Emission\ Factor = \frac{\sum Facility\ ROC\ Emission\ Factors}{n}$$

Where
n = the number of Facility ROC Emission Factor data points

IV. RESULTS

A. Facility Emission Factors

Using the calculation methodologies specified in the previous section, the District calculated the following emission factors for each facility used in this study:

Table 3: Facility Emission Factors.

Company	*Facility*	*Facility ID*	*Device ID*	*Flare Rating (MMBtu/hr)*	*Emission Factor (lb/MMBtu)*
BE Conway Energy	Enos Lease	04114	5846	4.370	0.159
BE Conway Energy	Union Sugar Lease	04108	5839	2.187	0.247
ERG Resources	Williams Holding Lease	03009	1671	14.150	0.180
Greka Oil and Gas	Bradley Lands	04103	5838	12.900	0.398
Greka Oil and Gas	Morganti Lease	03303	8428	5.625	0.054
PRE Resources	Careaga #1	04017	114417	62.500	0.309
Sierra Resources, Inc.	Barham/Boyne Leases	03777	3344	17.500	0.098
Sierra Resources, Inc.	Blair Lease (1)	02637	1412	91.880	0.170
Sierra Resources, Inc.	Blair Lease (2)	08673	387448	33.400	0.186

Detailed calculations for each facility and supporting documentation may be found in the Appendices.

B. County-Wide Emission Factor

The District elected to use a non-weighted average of all the facility factors to calculate the Santa Barbara County-wide ROC factor since some facilities had more data available and the District wanted to equally representation of the various oil and gas production facilities. The calculated Santa Barbara County-wide ROC factor was 0.200 lb/MMBtu.

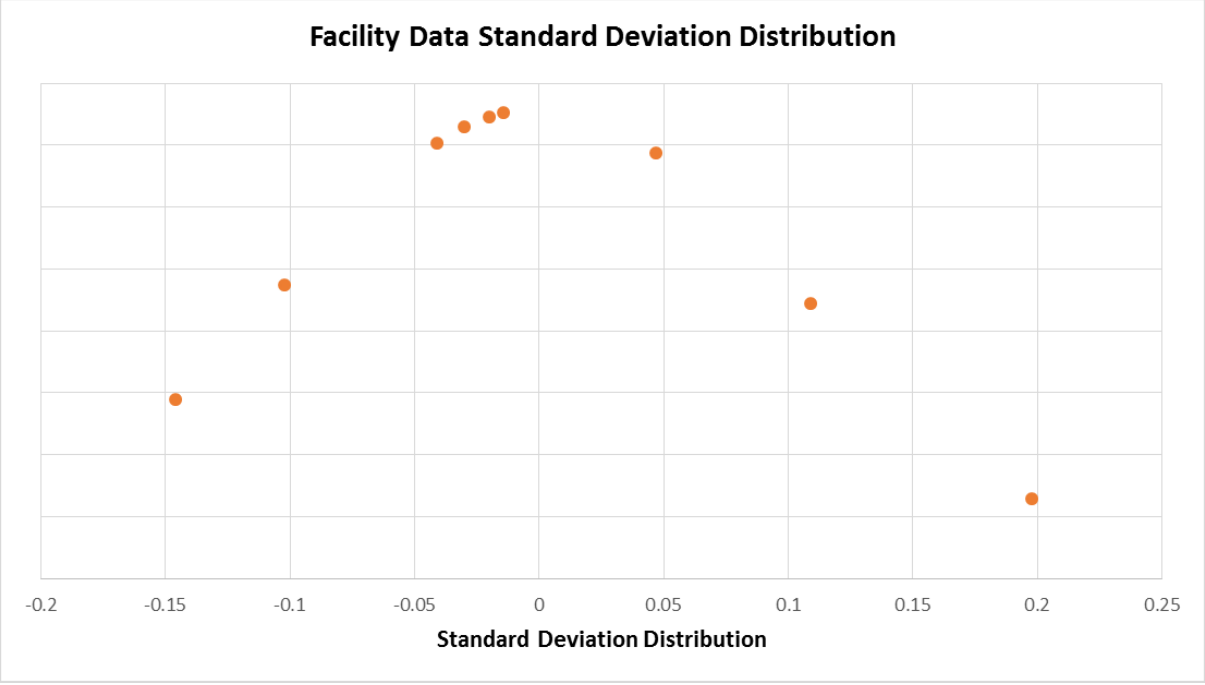
V. DATA ANALYSIS AND VALIDATION

A major goal of the study was to use sufficiently narrow criteria in the candidate flare selection process to remove uncertainty in the data. Since no direct source testing was performed, the District relied on the accuracy and precision of the produced gas chromatography analyses conducted by certified state laboratories for the individual report data points.

Unlike EPA's wide ranging flare studies, the District study solely focused on flare units with similar capacity, function, and combusted field gas extracted from geological formations found in Santa Barbara County. It is reasonable to expect the reactive content of the gas and calculated emission factors to be relatively similar and consistent from year to year at a facility level. The population size of the study includes nearly all of the operating onshore production flares in the county. Therefore, any final emission factor will likely be representative of production flare emissions in the county.

With a mean of 0.200 lb/MMBtu and a standard deviation of 0.105 lb/MMBtu, eight of the nine flares had calculated emission factors that fell within one standard deviation of the mean and all data fell within two standard deviations. Figure 2 below shows the study's data standard deviation distribution. The studies standard deviation of 0.105 lb/MMBtu was normalized and each facilities individual standard deviation was plotted, depicting a normal distribution.

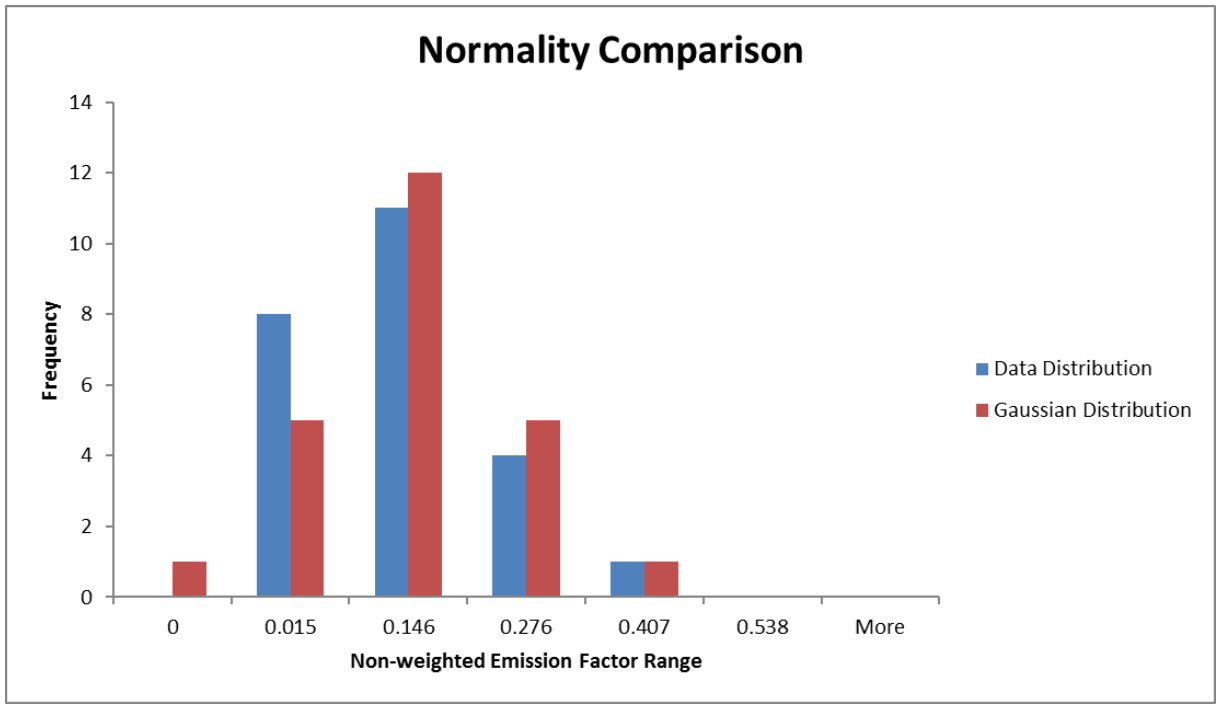
Figure 2: Facility Data Standard Deviation Distribution.



Further analysis was required to determine if outlier data was present using the Dixon Q outlier test. This method, for identification and rejection of outliers, assumes normal distribution of the data and should not be used to reject data more than once in a data set. The first step in conducting this analysis was to determine normality in the emission factor data. The unweighted facility emission factors were collected and plotted as a histogram. A histogram distributes the data into a range, and the number of

values that fall into a specific range is represented by the y axis (frequency). Figure 3 shows the comparison of the data distribution to the distribution expected from data which follows a Gaussian distribution.

Figure 3: Histogram Comparing Data to Gaussian Distribution.



While not exact, the data generally follows a normal distribution and allows the Dixon Q outlier test to be conducted. Running the data through the Dixon Q outlier test at a 95 percent confidence interval yields no outliers in the dataset. The District believes all of the collected data is valid and properly used to conduct this study.

VI. CONCLUSIONS

The Santa Barbara County, onshore production flare ROC emission factor was calculated to be **0.200 lb/MMBtu**. The District believes this emission factor should be used in place of the current AP-42 ROC emission factor.

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Appendix A - BE Conway Energy Enos Lease Data

A.1 General Information

Permit #	8496-R8
Facility Name	Enos Lease
FID	4114
Company	BE Conway Energy
Device ID #	5846
Make	NAO
Model	Unknown
Max Heat Rating (MMBTU/hr)	4.37
Air Assisted?	no
Steam Assisted?	no

A.2 Gas Analysis Summary

Gas Information from Analysis					
	1	2	3	4	5
Location of Sample:	unknown	unknown	unknown	unknown	unknown
Actual Year of Analysis:	2010	2011	2012	2013	2014
ROC Mol%	4.44	4.42	4.25	5.61	5.82
BTU Content (Btu/scf) HHV, dry, 14.73 psi 60F	1005.7	1003.4	989.4	1016.3	1026.7
lb ROC/scf	0.0072	0.0073	0.0067	0.0088	0.0094
Assumed Control %	98	98	98	98	98
Outlet ROC (ppmv)	888	884	850	1122	1164
Calculated ROC Emission Factor (lb/MMBtu)	0.143	0.146	0.136	0.174	0.184
Gas Flared in Year (scf)	9563000	16156000	19376000	18957000	22418000
notes:	none	none	none	none	none

Weighted Average ROC Emission Factor based on flare volume:	0.159

A.3.1 Annual Flare Volume (2010)

BE Conway Energy — Enos Lease Emissions Summary, 2010 — 02/04/2011

Reductions in Emissions (ratioed to permitted)

Production Rates		Permitted Production	Actual Average Production	
Wells	5			
Oil Production (BOPD)		160	4.6	
Gas Production (MSCFD)		800	33.3	
Flare gas (MSCFD)		100	26.2	
Heater gas (MSCFD)		14.1	14.1	100.2%
	(MSCFY)		5,156	
H2S in Fuel Gas		796	96	
Days of Production		365	365	
Loads of Oil			11	
Well-days on		1825	1553	85.1%
Days of Production		365	365	100.0%

ACTUAL PRODUCTION

Month	-------Oil------- B/M	B/D	---Produced Gas---- MSCF/M	MSCF/D	ppm H2S	Well-Days of Prod.	days
Jan	125	4.0	1,394	45.0	80	125	31
Feb	64	2.3	1,313	46.9	80	73	28
March	144	4.7	1,607	51.8	80	152	31
April	128	4.3	1,398	46.6	80	150	30
May	159	5.1	657	21.2	80	155	31
June	201	6.7	690	23.0	80	150	30
July	117	3.8	730	23.5	100	155	31
August	151	4.9	635	20.5	100	155	31
Sept	153	5.1	606	20.2	100	123	30
Oct	139	4.5	1,089	35.1	125	87	31
Nov	153	5.1	958	31.9	125	108	30
Dec	160	5.2	1,065	34.4	125	120	31
Totals	1,694 BOPY		12,142	MSCF/yr	96	1,553	365
	71 MGal						
Average	4.6 BOPD		33.3	MSCF/d		4.25	well-yr

Month	------Flared Gas-------- MSCF/M	MSCF/D	------Sales Gas-------- MSCF/M	MSCF/D	-----Heater Gas-------- (Max of unit 24-7) MSCF/M	MSCF/D	heater days
Jan	1,175	37.9	0	0.0	438	14.1	31
Feb	1,115	39.8	0	0.0	396	14.1	28
March	1,388	44.8	0	0.0	438	14.1	31
April	1,186	39.5	0	0.0	424	14.1	30
May	438	14.1	0	0.0	438	14.1	31
June	478	15.9	0	0.0	424	14.1	30
July	511	16.5	0	0.0	438	14.1	31
August	416	13.4	0	0.0	438	14.1	31
Sept	394	13.1	0	0.0	424	14.1	30
Oct	870	28.1	0	0.0	438	14.1	31
Nov	746	24.9	0	0.0	424	14.1	30
Dec	846	27.3	0	0.0	438	14.1	31
Totals	9,563 MSCF/yr		0	MSCF/yr	5,156	MSCF/yr	365
Average	26.2 MSCF/d		0.0	MSCF/d	14.1	MSCF/d	

A.3.2 Annual Flare Volume (2011)

BE Conway Energy — Enos Lease Emissions Summary, 2011 — 02/05/2012

Reductions in Emissions (ratioed to permitted)

Production Rates		Permitted Production	Actual Average Production	
Wells	5			
	Oil Production (BOPD)	160	5.7	
	Gas Production (MSCFD)	800	51.3	
	Flare gas (MSCFD)	100	44.3	
	Heater gas (MSCFD)	14.1	14.1	100.2%
	(MSCFY)		5,156	
	H2S in Fuel Gas	796	101	
	Days of Production	365	365	
	Loads of Oil		13	
	Well-days on	1825	1659	90.9%
	Days of Production	365	365	100.0%

ACTUAL PRODUCTION

Month	-------Oil------- B/M	B/D	---Produced Gas---- MSCF/M	MSCF/D	ppm H2S	Well-Days of Prod.	days
Jan	129	4.2	1,032	33.3	100	108	31
Feb	170	6.1	911	32.5	100	100	28
March	160	5.2	2,155	69.5	100	143	31
April	300	10.0	1,853	61.8	80	138	30
May	155	5.0	2,079	67.1	80	155	31
June	50	1.7	1,922	64.1	80	150	30
July	281	9.1	1,459	47.1	125	155	31
August	218	7.0	1,399	45.1	125	155	31
Sept	182	6.1	1,415	47.2	125	149	30
Oct	128	4.1	1,508	48.6	100	153	31
Nov	144	4.8	1,423	47.4	100	129	30
Dec	148	4.8	1,579	50.9	100	124	31
Totals	2,066	BOPY	18,735	MSCF/yr	101	1,659	365
	87	MGal					
Average	5.7	BOPD	51.3	MSCF/d		4.55	well-yr

Month	-------Flared Gas-------- MSCF/M	MSCF/D	------Sales Gas--------- MSCF/M	MSCF/D	------Heater Gas--------- (Max of unit 24-7) MSCF/M	MSCF/D	heater days
Jan	813	26.2	0	0.0	438	14.1	31
Feb	713	25.5	0	0.0	396	14.1	28
March	1,936	62.5	0	0.0	438	14.1	31
April	1,641	54.7	0	0.0	424	14.1	30
May	1,860	60.0	0	0.0	438	14.1	31
June	1,710	57.0	0	0.0	424	14.1	30
July	1,240	40.0	0	0.0	438	14.1	31
August	1,180	38.1	0	0.0	438	14.1	31
Sept	1,203	40.1	0	0.0	424	14.1	30
Oct	1,289	41.6	0	0.0	438	14.1	31
Nov	1,211	40.4	0	0.0	424	14.1	30
Dec	1,360	43.9	0	0.0	438	14.1	31
Totals	16,156	MSCF/yr	0	MSCF/yr	5,156	MSCF/yr	365
Average	44.3	MSCF/d	0.0	MSCF/d	14.1	MSCF/d	

A.3.3 Annual Flare Volume (2012)

BE Conway Energy — Enos Lease Emissions Summary, 2012 — 02/02/2013

Reductions in Emissions (ratioed to permitted)

Production Rates		Permitted Production	Actual Average Production	
Wells	5			
	Oil Production (BOPD)	160	5.4	
	Gas Production (MSCFD)	800	60.0	
	Flare gas (MSCFD)	100	52.9	
	Heater gas (MSCFD)	14.1	14.1	100.2%
	(MSCFY)		5,170	
	H2S in Fuel Gas	796	113	
	Days of Production	366	366	
	Loads of Oil		12	
	Well-days on	1830	1709	93.4%
	Days of Production	366	366	100.0%
	API Gravity:	13.5		

ACTUAL PRODUCTION

Month	-------Oil------- B/M	B/D	---Produced Gas---- MSCF/M	MSCF/D	ppm H2S	Well-Days of Prod.	days
Jan	146	4.7	1,660	53.5	100	124	31
Feb	124	4.3	1,823	62.9	100	115	29
March	184	5.9	1,997	64.4	100	124	31
April	136	4.5	2,030	67.7	125	150	30
May	164	5.3	1,937	62.5	125	155	31
June	154	5.1	2,025	67.5	125	150	30
July	207	6.7	1,930	62.3	125	128	31
August	286	9.2	1,866	60.2	125	155	31
Sept	126	4.2	1,930	64.3	125	150	30
Oct	159	5.1	1,993	64.3	100	155	31
Nov	142	4.7	1,368	45.6	100	148	30
Dec	160	5.2	1,403	45.3	100	155	31
Totals	1,987	BOPY	21,962	MSCF/yr	113	1,709	366
	83	MGal					
Average	5.4	BOPD	60.0	MSCF/d		4.67	well-yr

Month	-------Flared Gas-------- MSCF/M	MSCF/D	------Sales Gas--------- MSCF/M	MSCF/D	------Heater Gas--------- (Max of unit 24-7) MSCF/M	MSCF/D	heater days
Jan	1,441	46.5	0	0.0	438	14.1	31
Feb	1,618	55.8	0	0.0	410	14.1	29
March	1,778	57.4	0	0.0	438	14.1	31
April	1,818	60.6	0	0.0	424	14.1	30
May	1,718	55.4	0	0.0	438	14.1	31
June	1,813	60.4	0	0.0	424	14.1	30
July	1,711	55.2	0	0.0	438	14.1	31
August	1,647	53.1	0	0.0	438	14.1	31
Sept	1,718	57.3	0	0.0	424	14.1	30
Oct	1,774	57.2	0	0.0	438	14.1	31
Nov	1,156	38.5	0	0.0	424	14.1	30
Dec	1,184	38.2	0	0.0	438	14.1	31
Totals	19,376	MSCF/yr	0	MSCF/yr	5,170	MSCF/yr	366
Average	52.9	MSCF/d	0.0	MSCF/d	14.1	MSCF/d	

A.3.4 Annual Flare Volume (2013)

BE Conway Energy — Enos Lease Emissions Summary, 2013 — 02/07/2014

Reductions in Emissions (ratioed to permitted)

Production Rates		Permitted Production	Actual Average Production	
Wells	5			
	Oil Production (BOPD)	160	5.8	
	Gas Production (MSCFD)	800	59.0	
	Flare gas (MSCFD)	100	51.9	
	Heater gas (MSCFD)	14.1	14.1	100.2%
	(MSCFY)		5,156	
	H2S in Fuel Gas	796	85	
	Days of Production	365	365	
	Loads of Oil		13	
	Well-days on	1825	1819	99.7%
	Days of Production	365	365	100.0%
	API Gravity:	13.0		

ACTUAL PRODUCTION

Month	-------Oil------- B/M	B/D	---Produced Gas---- MSCF/M	MSCF/D	ppm H2S	Well-Days of Prod.	days
Jan	166	5.3	1,482	47.8	80	155	31
Feb	124	4.4	1,085	38.8	80	140	28
March	152	4.9	1,132	36.5	80	155	31
April	180	6.0	1,230	41.0	100	150	30
May	136	4.4	1,632	52.6	100	155	31
June	301	10.0	2,224	74.1	100	145	30
July	162	5.2	2,071	66.8	80	155	31
August	166	5.3	2,171	70.0	80	155	31
Sept	168	5.6	2,074	69.1	80	150	30
Oct	184	5.9	2,137	68.9	80	155	31
Nov	197	6.6	2,181	72.7	80	150	30
Dec	181	5.8	2,117	68.3	80	154	31
Totals	2,117 BOPY		21,536	MSCF/yr	85	1,819	365
	89 MGal						
Average	5.8 BOPD		59.0	MSCF/d		4.98	well-yr

Month	-------Flared Gas-------- MSCF/M	MSCF/D	------Sales Gas--------- MSCF/M	MSCF/D	------Heater Gas--------- (Max of unit 24-7) MSCF/M	MSCF/D	heater days
Jan	1,263	40.7	0	0.0	438	14.1	31
Feb	887	31.7	0	0.0	396	14.1	28
March	913	29.5	0	0.0	438	14.1	31
April	1,018	33.9	0	0.0	424	14.1	30
May	1,413	45.6	0	0.0	438	14.1	31
June	2,012	67.1	0	0.0	424	14.1	30
July	1,852	59.7	0	0.0	438	14.1	31
August	1,952	63.0	0	0.0	438	14.1	31
Sept	1,862	62.1	0	0.0	424	14.1	30
Oct	1,918	61.9	0	0.0	438	14.1	31
Nov	1,969	65.6	0	0.0	424	14.1	30
Dec	1,898	61.2	0	0.0	438	14.1	31
Totals	18,957 MSCF/yr		0	MSCF/yr	5,156	MSCF/yr	365
Average	51.9 MSCF/d		0.0	MSCF/d	14.1	MSCF/d	

A.3.5 Annual Flare Volume (2014)

BE Conway Energy — Enos Lease Emissions Summary, 2014 — 02/16/2015

Reductions in Emissions (ratioed to permitted)

Production Rates		Permitted Production	Actual Average Production	
Wells	5			
	Oil Production (BOPD)	160	8.1	
	Gas Production (MSCFD)	800	68.7	
	Flare gas (MSCFD)	100	61.4	
	Heater gas (MSCFD)	14.1	14.6	103.4%
	(MSCFY)		5,323	
	H2S in Fuel Gas	796	87	
	Days of Production	365	365	
	Loads of Oil		18	
	Well-days on	1825	1825	100.0%
	Days of Production	365	365	100.0%
	API Gravity:	13.0		

ACTUAL PRODUCTION

Month	-------Oil------- B/M	B/D	---Produced Gas---- MSCF/M	MSCF/D	ppm H2S	Well-Days of Prod.	days
Jan	193	6.2	2,135	68.9	100	155	31
Feb	153	5.5	2,036	72.7	100	140	28
March	195	6.3	1,944	62.7	125	155	31
April	179	6.0	2,085	69.5	80	150	30
May	382	12.3	2,138	69.0	80	155	31
June	290	9.7	2,033	67.8	80	150	30
July	308	9.9	2,222	71.7	80	155	31
August	387	12.5	2,000	64.5	80	155	31
Sept	105	3.5	2,230	74.3	80	150	30
Oct	303	9.8	2,192	70.7	80	155	31
Nov	268	8.9	2,119	70.6	80	150	30
Dec	197	6.3	1,944	62.7	80	155	31
Totals	2,959 BOPY		25,078	MSCF/yr	87	1,825	365
	124 MGal						
Average	8.1 BOPD		68.7	MSCF/d		5.00	well-yr

Month	-------Flared Gas--------- MSCF/M	MSCF/D	------Sales Gas--------- MSCF/M	MSCF/D	------Heater Gas--------- (Max of unit 24-7) MSCF/M	MSCF/D	heater days
Jan	1,916	61.8	0	0.0	438	14.1	31
Feb	1,832	65.4	0	0.0	409	14.6	28
March	1,718	55.4	0	0.0	453	14.6	31
April	1,866	62.2	0	0.0	438	14.6	30
May	1,912	61.7	0	0.0	453	14.6	31
June	1,814	60.5	0	0.0	438	14.6	30
July	1,996	64.4	0	0.0	453	14.6	31
August	1,774	57.2	0	0.0	453	14.6	31
Sept	2,011	67.0	0	0.0	438	14.6	30
Oct	1,964	63.4	0	0.0	456	14.7	31
Nov	1,899	63.3	0	0.0	441	14.7	30
Dec	1,716	55.4	0	0.0	456	14.7	31
Totals	22,418 MSCF/yr		0	MSCF/yr	5,323	MSCF/yr	365
Average	61.4 MSCF/d		0.0	MSCF/d	14.6	MSCF/d	

A.4.1 Gas Analysis (2010)

OILFIELD ENVIRONMENTAL AND COMPLIANCE

2010

Client:	Conway Energy	SAMPLE ID:	1004649-4	
	PO Box 2050	Date Sampled:	11/23/10 @ 0810	
	Orcutt, CA 93457	Date Analyzed:	11/23/10 @ 1337	
Attn:	Mr. Joe Patterson	Lab Contact:	J. Carstens	
Facility:	Enos	Meter:	-	
Description:	Enos Fuel Gas	Pressure:	10.0	psig
Note:	Annual Oil & Gas sample	Temperature:	51	°F

Gas Analysis by Chromatography - ASTM D 3588-91

Component	Mole %	Weight %	G/MCF
Oxygen	0.00	0.00	-
Nitrogen	0.11	0.14	-
Carbon Dioxide	12.66	25.41	-
Hydrogen Sulfide	NA	-	-
Methane	80.51	58.90	-
Ethane	2.28	3.13	0.582
Propane	1.59	3.19	0.438
i-Butane	0.45	1.21	0.149
n-Butane	0.81	2.14	0.255
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.42	1.39	0.154
n-Pentane	0.16	0.53	0.059
2,2-Dimethylbutane	0.02	0.09	0.009
2,3-Dimethylbutane	0.22	0.85	0.078
2-Methylpentane	0.16	0.62	0.057
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.05	0.20	0.021
Hexanes Plus	0.56	2.19	0.234
Totals	100.0	100.0	2.035

Specific Gravity, Calculated	0.7570 air = 1		
Compressibility (Z) Factor	0.9968		
		CHONS	Weight %
Gross Calorific Value		Carbon	63.82
BTU/ft³ dry	1005.7	Hydrogen	17.57
BTU/ft³ wet	988.2	Oxygen	18.47
		Nitrogen	0.14
Net Calorific Value		Sulfur	0.00
BTU/ft³ dry	909.6	EPA 'F' Factor (60°F, 1ATM)	8635.94
BTU/ft³ wet	893.8	SDCF/MMBTU	

Hydrogen Sulfide = NA ppm
ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

	mol %	mol%/100	MW	MW ROC
Methane	80.51	0.8051	16.044	12.89
Ethane	2.28	0.0228	30.07	0.69
Propane	1.59	0.0159	44.097	0.70
Iso-Butane	0.45	0.0045	58.12	0.26
N-Butane	0.81	0.0081	58.12	0.47
neo-pentane	0	0	72.15	0.00
i-Pentane	0.42	0.0042	72.15	0.30
n-Pentane	0.16	0.0016	72.15	0.12
2,2-Dimethylbutane	0.02	0.0002	86.18	0.02
2,3-Dimethylbutane	0.22	0.0022	86.18	0.19
2-Methylpentane	0.16	0.0016	86.18	0.14
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0.05	0.0005	86.18	0.04
Hexane Plus	0.56	0.0056	86.18	0.48
ROC Mol%	4.44			

Total Mol Wt. ROC C3 to C6+	2.7223	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0072	

A.4.2 Gas Analysis (2011)

OILFIELD ENVIRONMENTAL AND COMPLIANCE

2011

Client:	Conway Energy	SAMPLE ID:	1105139-4	
	PO Box 2050	Date Sampled:	10/26/11 @ 0830	
	Orcutt, CA 93457	Date Analyzed:	10/28/11 @ 1346	
Attn:	Mr. Joe Patterson	Lab Contact:	J. Carstens	
Facility:	Enos	Meter:	-	
Description:	Enos Fuel Gas	Pressure:	5.0	psig
Note:	Annual Oil & Gas sample	Temperature:	68	°F

Gas Analysis by Chromatography - ASTM D 3588-91

Component	Mole %	Weight %	G/MCF
Oxygen	0.15	0.22	-
Nitrogen	0.23	0.30	-
Carbon Dioxide	12.91	25.71	-
Hydrogen Sulfide	NA	-	-
Methane	79.98	58.08	-
Ethane	2.31	3.15	0.589
Propane	1.49	2.97	0.411
i-Butane	0.47	1.23	0.153
n-Butane	0.69	1.81	0.217
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.47	1.53	0.172
n-Pentane	0.14	0.47	0.052
2,2-Dimethylbutane	0.03	0.10	0.009
2,3-Dimethylbutane	0.38	1.49	0.138
2-Methylpentane	0.00	0.00	0.000
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.03	0.13	0.014
Hexanes Plus	0.72	2.80	0.302
Totals	100.0	100.0	2.057

Specific Gravity, Calculated	0.7627 air = 1		
Compressibility (Z) Factor	0.9958	CHONS	Weight %
		Carbon	63.41
Gross Calorific Value		Hydrogen	17.38
BTU/ft³ dry	1003.4	Oxygen	18.91
BTU/ft³ wet	986.0	Nitrogen	0.30
		Sulfur	0.00
Net Calorific Value			
BTU/ft³ dry	907.7	EPA 'F' Factor (60°F, 1ATM)	8642.38
BTU/ft³ wet	891.9	SDCF/MMBTU	

Hydrogen Sulfide = NA ppm
ND: None Detected NA: Not Analyzed G/MCF. Gallons/Thousand Cubic Feet

	mol %	mol%/100	MW	MW ROC
Methane	79.98	0.7998	16.044	12.80
Ethane	2.31	0.0231	30.07	0.69
Propane	1.49	0.0149	44.097	0.66
Iso-Butane	0.47	0.0047	58.12	0.27
N-Butane	0.69	0.0069	58.12	0.40
neo-pentane	0	0	72.15	0.00
i-Pentane	0.47	0.0047	72.15	0.34
n-Pentane	0.14	0.0014	72.15	0.10
2,2-Dimethylbutane	0.03	0.0003	86.18	0.03
2,3-Dimethylbutane	0.38	0.0038	86.18	0.33
2-Methylpentane	0	0	86.18	0.00
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0.03	0.0003	86.18	0.03
Hexane Plus	0.72	0.0072	86.18	0.62
ROC Mol%	4.42			

Total Mol Wt. ROC C3 to C6+	2.7710	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0073	

A.4.3 Gas Analysis (2012)

OILFIELD ENVIRONMENTAL AND COMPLIANCE

2012

Client:	Conway Energy	SAMPLE ID:	1205210-1
	P.O. Box 2050	Date Sampled:	10/16/12 @ 1420
	Orcutt, CA 93457	Date Analyzed:	10/18/12 @ 0742
Attn:	Joe Patterson	Lab Contact:	J. Carstens
Facility:	Santa Maria, CA	Meter:	-
Description:	Enos Fuel Gas	Pressure:	5.0 psig
Note:	Annual Oil & Gas Samples 2C	Temp:	90 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.33	0.48	-
Nitrogen	0.78	1.00	-
Carbon Dioxide	12.58	25.28	-
Hydrogen Sulfide	0.00	0.00	-
Methane	79.78	58.42	-
Ethane	2.26	3.11	0.576
Propane	1.58	3.18	0.436
i-Butane	0.47	1.26	0.155
n-Butane	0.78	2.08	0.248
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.50	1.65	0.184
n-Pentane	0.17	0.57	0.062
2,2-Dimethylbutane	0.02	0.08	0.007
2,3-Dimethylbutane	0.20	0.79	0.073
2-Methylpentane	0.24	0.96	0.089
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.02	0.08	0.008
Hexanes Plus	0.27	1.07	0.114
Totals	100.0	100.0	1.951

Specific Gravity, Calculated	0.7564	air = 1		
Compressibility (Z) Factor	0.9969		CHONS	Weight %
			Carbon	62.81
Gross Calorific Value			Hydrogen	17.33
BTU/ft³ dry	989.4		Oxygen	18.86
BTU/ft³ wet	972.2		Nitrogen	1.00
			Sulfur	0.00
Net Calorific Value				
BTU/ft³ dry	894.7	EPA 'F' Factor (60°F, 1ATM		8640.1
BTU/ft³ wet	879.1	SDCF/MMBTU		
Hydrogen Sulfide = NA ppm				

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

	mol %	mol%/100	MW	MW ROC
Methane	79.78	0.7978	16.044	12.77
Ethane	2.26	0.0226	30.07	0.68
Propane	1.58	0.0158	44.097	0.70
Iso-Butane	0.47	0.0047	58.12	0.27
N-Butane	0.78	0.0078	58.12	0.45
neo-pentane	0	0	72.15	0.00
i-Pentane	0.5	0.005	72.15	0.36
n-Pentane	0.17	0.0017	72.15	0.12
2,2-Dimethylbutane	0.02	0.0002	86.18	0.02
2,3-Dimethylbutane	0.2	0.002	86.18	0.17
2-Methylpentane	0.24	0.0024	86.18	0.21
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0.02	0.0002	86.18	0.02
Hexane Plus	0.27	0.0027	86.18	0.23
ROC Mol%	4.25			

Total Mol Wt. ROC C3 to C6+	2.5530	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0067	

A.4.4 Gas Analysis (2013)

OILFIELD ENVIRONMENTAL AND COMPLIANCE

2013

Client: Conway Energy		SAMPLE ID: 1304560-4	
P.O. Box 2050		Date Sampled: 09/27/13 @ 1000	
Orcutt, CA 93457		Date Analyzed: 09/27/13 @ 1455	
Attn: Joe Patterson		Lab Contact: J. Carstens	
Facility: Santa Maria Valley		Meter: -	
Description: Enos Fuel Gas		Pressure: 1.0	psig
Note: Annual Oil & Gas Samples 2013		Temp: 98	°F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.00	0.00	-
Nitrogen	0.09	0.11	-
Carbon Dioxide	13.97	27.05	-
Hydrogen Sulfide	0.01	0.01	-
Methane	78.06	55.09	-
Ethane	2.26	3.00	0.577
Propane	2.02	3.92	0.557
i-Butane	0.60	1.53	0.197
n-Butane	1.21	3.09	0.382
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.58	1.85	0.213
n-Pentane	0.28	0.90	0.103
2,2-Dimethylbutane	0.05	0.20	0.019
2,3-Dimethylbutane	0.37	1.39	0.133
2-Methylpentane	0.02	0.08	0.007
3-Methylpentane	0.12	0.44	0.042
n-Hexane	0.05	0.17	0.019
Hexanes Plus	0.31	1.16	0.129
Totals	100.0	100.0	2.378

Specific Gravity, Calculated	0.7849	air = 1		
Compressibility (Z) Factor	0.9966		CHONS	Weight %
			Carbon	63.22
Gross Calorific Value			Hydrogen	16.99
BTU/ft³ dry	1016.3		Oxygen	19.66
BTU/ft³ wet	998.6		Nitrogen	0.11
			Sulfur	0.01
Net Calorific Value				
BTU/ft³ dry	919.9	EPA 'F' Factor (60°F, 1ATM)		8645.8
BTU/ft³ wet	903.9	SDCF/MMBTU		

Hydrogen Sulfide = 63 ppm

All results reported at 60oF and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

	mol %	mol%/100	MW	MW ROC
Methane	78.06	0.7806	16.044	12.49
Ethane	2.26	0.0226	30.07	0.68
Propane	2.02	0.0202	44.097	0.89
Iso-Butane	0.6	0.006	58.12	0.35
N-Butane	1.21	0.0121	58.12	0.70
neo-pentane	0	0	72.15	0.00
i-Pentane	0.58	0.0058	72.15	0.42
n-Pentane	0.28	0.0028	72.15	0.20
2,2-Dimethylbutane	0.05	0.0005	86.18	0.04
2,3-Dimethylbutane	0.37	0.0037	86.18	0.32
2-Methylpentane	0.02	0.0002	86.18	0.02
3-Methylpentane	0.12	0.0012	86.18	0.10
n-Hexane	0.05	0.0005	86.18	0.04
Hexane Plus	0.31	0.0031	86.18	0.27
ROC Mol%	5.61			

Total Mol Wt. ROC C3 to C6+	3.3561	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0088	

A.4.5 Gas Analysis (2014)

OILFIELD ENVIRONMENTAL AND COMPLIANCE

2014

Client: Conway Energy		SAMPLE ID: 1404505-4	
P.O. Box 2050		Date Sampled: 09/30/14 @ 0920	
Orcutt, CA 93457		Date Analyzed: 09/30/14 @ 1453	
Attn: Joe Patterson		Lab Contact: J. Carstens	
Facility: Santa Maria Valley		Meter:	-
Description: Enos Fuel Gas		Pressure:	0.5 psig
Note: Annual Oil & Gas Samples 2014		Temp:	70 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.38	0.54	-
Nitrogen	1.47	1.81	-
Carbon Dioxide	12.20	23.69	-
Hydrogen Sulfide	0.01	0.01	-
Methane	77.85	55.12	-
Ethane	2.27	3.01	0.578
Propane	1.95	3.80	0.538
i-Butane	0.60	1.53	0.195
n-Butane	1.16	2.98	0.367
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.62	1.96	0.226
n-Pentane	0.27	0.88	0.100
2,2-Dimethylbutane	0.05	0.19	0.018
2,3-Dimethylbutane	0.44	1.69	0.161
2-Methylpentane	0.10	0.38	0.036
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.04	0.14	0.016
Hexanes Plus	0.59	2.25	0.249
Totals	100.0	100.0	2.483

Specific Gravity, Calculated	0.7822	air = 1		
Compressibility (Z) Factor	0.9967		CHONS	Weight %
			Carbon	63.23
Gross Calorific Value			Hydrogen	17.18
BTU/ft³ dry	1026.7		Oxygen	17.77
BTU/ft³ wet	1008.9		Nitrogen	1.81
			Sulfur	0.01
Net Calorific Value				
BTU/ft³ dry	929.6	EPA 'F' Factor (60°F, 1ATM)		8646.1
BTU/ft³ wet	913.4	SDCF/MMBTU		

Hydrogen Sulfide = 63 ppm

All results reported at 60oF and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

	mol %	mol%/100	MW	MW ROC
Methane	77.85	0.7785	16.044	12.46
Ethane	2.27	0.0227	30.07	0.68
Propane	1.95	0.0195	44.097	0.86
Iso-Butane	0.6	0.006	58.12	0.35
N-Butane	1.16	0.0116	58.12	0.67
neo-pentane	0	0	72.15	0.00
i-Pentane	0.62	0.0062	72.15	0.45
n-Pentane	0.27	0.0027	72.15	0.19
2,2-Dimethylbutane	0.05	0.0005	86.18	0.04
2,3-Dimethylbutane	0.44	0.0044	86.18	0.38
2-Methylpentane	0.1	0.001	86.18	0.09
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0.04	0.0004	86.18	0.03
Hexane Plus	0.59	0.0059	86.18	0.51
ROC Mol%	5.82			

Total Mol Wt. ROC C3 to C6+	3.5763	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0094	

Appendix B - BE Conway Energy Union Sugar Lease Data

B.1 General Information

Permit #	7750-R9
Facility Name	Union Sugar Lease
FID	4108
Company	BE Conway Energy
Device ID #	5839
Make	unknown
Model	unknown
Max Heat Rating (MMBTU/hr)	2.187
Air Assisted?	no
Steam Assisted?	no

B.2 Gas Analysis Summary

Gas Information from Analysis		
	1	2
Location of Sample:	unknown	unknown
Actual Year of Analysis:	2010	2013
ROC Mol%	9.42	9.22
BTU Content (Btu/scf) HHV, dry, 14.73 psi 60F	1162.7	1163.3
lb ROC/scf	0.014405973	0.014192059
Assumed Control %	98	98
Outlet ROC (ppmv)	1884	1844
Calculated ROC Emission Factor (lb/MMBtu)	0.247802063	0.243996538
Gas Flared in Year (scf)	4363000	1289000
notes:	none	none

Weighted Average ROC Emission Factor based on flare volume:	0.247

B.3.1 Annual Flare Volume (2010)

BE Conway Energy, Inc. — Union Sugar Lease Emissions Summary, 2010 — 02/04/2011

		Permitted Production		Actual Average Production	
9	wells				
	BOPD	250		46.0	18.4%
	Engine Gas MSCFD	NA		11.6	
	Number of engines at end of year			8	
	Produced gas (MSCFD)	300		38.1	12.7%
	(MSCFY)			13,895	
	Heater gas (MSCFD)	28	@1000BTU	28.6	102.0%
	(MSCFY)			10,429	
	H2S in Fuel Gas	796		72	
	Calender Days of Production	365		365	100.0%
	Loads of Oil			106	
	Well-days of Production	3,285		2,670	81.3%

ACTUAL PRODUCTION

Month	-------Oil------- B/M	B/D	---Produced Gas----- MSCF/M	MSCF/D	-Heater Fuel Gas----- MSCF/M	MSCF/D	Calendar Days	Tank Days
Jan	1,344	43.4	1,216	39.2	886	28.6	31	31
Feb	1,326	47.3	1,045	37.3	800	28.6	28	28
March	1,512	48.8	1,281	41.3	886	28.6	31	31
April	1,530	51.0	1,167	38.9	857	28.6	30	30
May	1,519	49.0	1,189	38.4	886	28.6	31	31
June	1,471	49.0	1,140	38.0	857	28.6	30	30
July	1,488	48.0	1,190	38.4	886	28.6	31	31
August	1,485	47.9	1,186	38.3	886	28.6	31	31
Sept	961	32.0	1,107	36.9	857	28.6	30	30
Oct	1,488	48.0	1,131	36.5	886	28.6	31	31
Nov	1,293	43.1	1,107	36.9	857	28.6	30	30
Dec	1,392	44.9	1,136	36.6	886	28.6	31	31
Totals	16,808	BOPY	13,895	MSCF/yr	10,429	MSCF/yr	365	365
Average	46.0	BOPD	38.1	MSCF/d	28.6	MSCF/d		
	706	MGal	827	GOR				

	H2S	--------Sales Gas-------- MSCF/M	MSCF/D	Well-Days of Prod.	ICE MSCF/Mo	--------Flared Gas----- MSCF/M	MSCF/D	Days Flared
Jan	25	0	0.0	191	360	398	12.8	31
Feb	25	0	0.0	202	325	347	12.4	28
March	25	0	0.0	227	360	463	14.9	31
April	25	0	0.0	229	348	390	13.0	30
May	25	0	0.0	241	360	371	12.0	31
June	25	0	0.0	236	348	363	12.1	30
July	80	0	0.0	238	360	372	12.0	31
August	80	0	0.0	240	360	368	11.9	31
Sept	80	0	0.0	165	348	330	11.0	30
Oct	160	0	0.0	244	360	313	10.1	31
Nov	160	0	0.0	228	348	330	11.0	30
Dec	150	0	0.0	229	360	318	10.3	31
Totals		0	MSCF/yr	2,670	4,237	4,363	MSCF/yr	365
Av. PPM	72	0.0	MSCF/d	7.315	well-yrs	12.0	MSCF/d	days

B.3.2 Annual Flare Volume (2013)

BE Conway Energy, Inc. — Union Sugar Lease Emissions Summary, 2013 — 02/07/2014

		Permitted Production		Actual Average Production	
9	wells				
	BOPD	250		44.9	17.9%
	Engine Gas MSCFD	NA		11.6	
	Number of engines at end of year			8	
	Produced gas (MSCFD)	300		29.6	9.9%
	(MSCFY)			10,821	
	Heater gas (MSCFD)	28	@1000BTU	28.6	102.0%
	(MSCFY)			10,429	
	H2S in Fuel Gas	796		131	
	Calender Days of Production	365		365	100.0%
	Loads of Oil			103	
	Well-days of Production	3,285		2,812	85.6%
	API gravity: 13.8				

ACTUAL PRODUCTION

Month	-------Oil------- B/M	B/D	---Produced Gas----- MSCF/M	MSCF/D	-Heater Fuel Gas----- MSCF/M	MSCF/D	Calendar Days	Tank Days
Jan	457	14.7	1,182	38.1	886	28.6	31	31
Feb	1,428	51.0	698	24.9	800	28.6	28	28
March	1,360	43.9	818	26.4	886	28.6	31	31
April	1,458	48.6	777	25.9	857	28.6	30	30
May	1,434	46.3	818	26.4	886	28.6	31	31
June	1,435	47.8	777	25.9	857	28.6	30	30
July	1,450	46.8	818	26.4	886	28.6	31	31
August	1,377	44.4	818	26.4	886	28.6	31	31
Sept	1,273	42.4	777	25.9	857	28.6	30	30
Oct	1,488	48.0	1,166	37.6	886	28.6	31	31
Nov	1,775	59.2	1,143	38.1	857	28.6	30	30
Dec	1,438	46.4	1,029	33.2	886	28.6	31	31
Totals	16,373	BOPY	10,821	MSCF/yr	10,429	MSCF/yr	365	365
Average	44.9	BOPD	29.6	MSCF/d	28.6	MSCF/d		
	688	MGal	661	GOR				

Month	H2S	--------Sales Gas-------- MSCF/M	MSCF/D	Well-Days of Prod.	ICE MSCF/Mo	--------Flared Gas----- MSCF/M	MSCF/D
Jan	125	0	0.0	236	360	364	0.0
Feb	125	0	0.0	217	325	0	0.0
March	125	0	0.0	239	360	0	0.0
April	175	0	0.0	233	348	0	0.0
May	175	0	0.0	247	360	0	0.0
June	175	0	0.0	238	348	0	0.0
July	100	0	0.0	243	360	0	0.0
August	100	0	0.0	236	360	0	0.0
Sept	100	0	0.0	221	348	0	0.0
Oct	125	0	0.0	235	360	348	0.0
Nov	125	0	0.0	230	348	366	0.0
Dec	125	0	0.0	237	360	211	0.0
Totals		0	MSCF/yr	2,812	4,237	1,289	MSCF/yr
Av. PPM	131	0.0	MSCF/d	7.704	well-yrs	3.5	MSCF/d

B.4.1 Gas Analysis (2010)

OILFIELD ENVIRONMENTAL AND COMPLIANCE

Client:	Conway Energy	SAMPLE ID:	1004649-9	
	PO Box 2050	Date Sampled:	11/23/10 @ 1115	
	Orcutt, CA 93457	Date Analyzed:	11/23/10 @ 1303	
Attn:	Mr. Joe Patterson	Lab Contact:	J. Carstens	
Facility:	Enos	Meter:	-	
Description:	Union Sugar Fuel Gas	Pressure:	10.0	psig
Note:	Annual Oil & Gas sample	Temperature:	56	°F

Gas Analysis by Chromatography - ASTM D 3588-91

Component	Mole %	Weight %	G/MCF
Oxygen	0.12	0.16	-
Nitrogen	0.99	1.19	-
Carbon Dioxide	8.48	16.08	-
Hydrogen Sulfide	NA	-	-
Methane	76.01	52.54	-
Ethane	4.98	6.45	1.269
Propane	4.18	7.94	1.152
i-Butane	0.67	1.69	0.221
n-Butane	1.84	4.62	0.582
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.70	2.17	0.255
n-Pentane	0.64	2.00	0.233
2,2-Dimethylbutane	0.06	0.21	0.021
2,3-Dimethylbutane	0.30	1.11	0.109
2-Methylpentane	0.46	1.72	0.168
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.08	0.30	0.034
Hexanes Plus	0.49	1.81	0.205
Totals	100.0	100.0	4.247

Specific Gravity, Calculated	0.8013 air = 1		
Compressibility (Z) Factor	0.9961	CHONS	Weight %
		Carbon	68.37
Gross Calorific Value		Hydrogen	18.59
BTU/ft³ dry	1162.7	Oxygen	11.85
BTU/ft³ wet	1142.5	Nitrogen	1.19
		Sulfur	0.00
Net Calorific Value			
BTU/ft³ dry	1055.0	EPA 'F' Factor (60°F, 1ATM)	8605.83
BTU/ft³ wet	1036.7	SDCF/MMBTU	

Hydrogen Sulfide = NA ppm
ND: None Detected
NA: Not Analyzed
G/MCF: Gallons/Thousand Cubic Feet

	mol %	mol%/100	MW	MW ROC
Methane	76.01	0.7601	16.044	12.16504
Ethane	4.98	0.0498	30.07	1.497486
Propane	4.18	0.0418	44.097	1.843255
Iso-Butane	0.67	0.0067	58.12	0.389404
N-Butane	1.84	0.0184	58.12	1.069408
neo-pentane	0	0	72.15	0
i-Pentane	0.7	0.007	72.15	0.50505
n-Pentane	0.64	0.0064	72.15	0.46176
2,2-Dimethylbutane	0.06	0.0006	86.18	0.051708
2,3-Dimethylbutane	0.3	0.003	86.18	0.25854
2-Methylpentane	0.46	0.0046	86.18	0.396428
3-Methylpentane	0	0	86.18	0
n-Hexane	0.08	0.0008	86.18	0.068944
Hexane Plus	0.49	0.0049	86.18	0.422282
ROC Mol%	9.42			

Total Mol Wt. ROC C3 to C6+	5.466779	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.014406	

B.4.2 Gas Analysis (2013)

OILFIELD ENVIRONMENTAL AND COMPLIANCE

Client:	Conway Energy	SAMPLE ID:	1304560-9
	P.O. Box 2050	Date Sampled:	09/27/13 @ 1045
	Orcutt, CA 93457	Date Analyzed:	09/27/13 @ 1553
Attn:	Joe Patterson	Lab Contact:	J. Carstens
Facility:	Santa Maria Valley	Meter:	-
Description:	Union Sugar Fuel Gas	Pressure:	18 psig
Note:	Annual Oil & Gas Samples 2013	Temp:	68 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.00	0.00	-
Nitrogen	0.78	0.95	-
Carbon Dioxide	8.30	15.86	-
Hydrogen Sulfide	0.03	0.04	-
Methane	76.96	53.59	-
Ethane	4.70	6.13	1.197
Propane	4.02	7.69	1.108
i-Butane	0.66	1.67	0.217
n-Butane	1.77	4.47	0.559
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.69	2.17	0.253
n-Pentane	0.64	2.02	0.233
2,2-Dimethylbutane	0.05	0.20	0.019
2,3-Dimethylbutane	0.33	1.24	0.120
2-Methylpentane	0.52	1.96	0.190
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.04	0.16	0.018
Hexanes Plus	0.50	1.87	0.210
Totals	100.0	100.0	4.123

Specific Gravity, Calculated	0.7955	air = 1		
Compressibility (Z) Factor	0.9961		CHONS	Weight %
			Carbon	68.72
Gross Calorific Value			Hydrogen	18.76
BTU/ft³ dry	1163.3		Oxygen	11.53
BTU/ft³ wet	1143.0		Nitrogen	0.95
			Sulfur	0.04
Net Calorific Value				
BTU/ft³ dry	1055.4	EPA 'F' Factor (60°F, 1ATM)		8594.3
BTU/ft³ wet	1037.0	SDCF/MMBTU		

Hydrogen Sulfide = 250 ppm

All results reported at 60oF and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

	mol %	mol%/100	MW	MW ROC
Methane	76.96	0.7696	16.044	12.31709
Ethane	4.7	0.047	30.07	1.41329
Propane	4.02	0.0402	44.097	1.772699
Iso-Butane	0.66	0.0066	58.12	0.383592
N-Butane	1.77	0.0177	58.12	1.028724
neo-pentane	0	0	72.15	0
i-Pentane	0.69	0.0069	72.15	0.497835
n-Pentane	0.64	0.0064	72.15	0.46176
2,2-Dimethylbutane	0.05	0.0005	86.18	0.04309
2,3-Dimethylbutane	0.33	0.0033	86.18	0.284394
2-Methylpentane	0.52	0.0052	86.18	0.448136
3-Methylpentane	0	0	86.18	0
n-Hexane	0.04	0.0004	86.18	0.034472
Hexane Plus	0.5	0.005	86.18	0.4309
ROC Mol%	9.22			

Total Mol Wt. ROC C3 to C6+	5.385602	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.014192	

Appendix C - ERG Resources Williams Holding Lease Data

C.1 General Information

Permit #	PTO 13500
Facility Name	Williams Holding Lease
FID	3009
Company	ERG Resources, LLC.
Device ID #	1671

Make	McGill Americas Inc.
Model	N/A
Max Heat Rating (MMBTU/hr)	14.15
Air Assisted?	yes
Steam Assisted?	no

C.2 Gas Analysis Summary

Gas Information from Analysis				
	1	2	3	4
Location of Sample:	Fuel Gas@ compressor	Fuel Gas@ compressor	Fuel Gas@ compressor	Fuel Gas@ compressor
Actual Year of Analysis:	2011	2012	2013	2014
ROC Mol%	7.67	6.26	6.5	4.77
BTU Content (Btu/scf) HHV, dry, 14.73 psi 60F	1153.2	1105.2	1100.8	956.7
lb ROC/scf	0.0108	0.0092	0.0108	0.0078
Assumed Control %	98	98	98	98
Outlet ROC (ppmv)	1534	1252	1300	954
Calculated ROC Emission Factor (lb/MMBtu)	0.188	0.167	0.197	0.163
Gas Flared in Year (scf)	79592000	76169000	31258000	13170000
notes:	None	None	None	None

Weighted Average ROC Emission Factor based on flare volume:	0.180

C.3.1 Annual Flare Volume (2011)

ERG Operating Company
Cat Canyon Field
Williams Holding Lease
PTO 8059 and ATC 13500
2011 Annual Report

PTO Condition 10a		Volume of Dilluent Used Each Month
JANUARY		1,721
FEBRUARY		1,151
MARCH		1,782
APRIL		2,101
MAY		3,193
JUNE		3,948
JULY		1,875
AUGUST		1,002
SEPTEMBER		992
OCTOBER		1,785
NOVEMBER		2,582
DECEMBER		2,428
	TOTAL BBLS PER YEAR	24,558

PTO Condition 10c and ATC 5 c	Highest Recorded Sulfur Content for Each Month/PPM of Gaseous Fuel Burned on Lease	Every Measurement Greater than 650PPMV w/Date & time of measurement
JANUARY	0	N/A
FEBRUARY	0	N/A
MARCH	0	N/A
APRIL	0	N/A
MAY	0	N/A
JUNE	0	N/A
JULY	0	N/A
AUGUST	0	N/A
SEPTEMBER	200	N/A
OCTOBER	300	N/A
NOVEMBER	200	N/A
DECEMBER	200	N/A

PTO Condition 10b and ATC 5b		Total MCF/Gaseous Fuel Burned in Flare
JANUARY		3,625
FEBRUARY		3,945
MARCH		4,922
APRIL		3,389
MAY		5,372
JUNE		6,608
JULY		7,433
AUGUST		7,776
SEPTEMBER		8,563
OCTOBER		12,323
NOVEMBER		6,265
DECEMBER		9,372
	TOTAL GAS PER YEAR	79,592

ATC Condition 5d	ANNUAL HEATING VALUE OF THE GASEOUS FUEL BURNED
	See atached analysis by OEC, Inc.

PTO Condition 10e - Master Paint and Solvent Logs for the entire Cat Canyon stationary source submitted with report for GWP lease PTO 8171 FID: 03007

C.3.2 Annual Flare Volume (2012)

ERG Operating Company
Cat Canyon Field
Williams Holding Lease
PTO 8059, PTO 13500 and ATC/PTO 13899
2012 Annual Report

PTO Condition 10a		Volume of Light Crude Oil Used Each Month
JANUARY		4,008
FEBRUARY		2,987
MARCH		2,822
APRIL		3,499
MAY		3,305
JUNE		3,317
JULY		4,301
AUGUST		5,618
SEPTEMBER		3,000
OCTOBER		3,499
NOVEMBER		4,655
DECEMBER		4,361
	TOTAL BBLS PER YEAR	45,371

PTO Condition 10c and ATC 5 c	Highest Recorded Sulfur Content for Each Month/PPM of Gaseous Fuel Burned on Lease	Every Measurement Greater than 650PPMV w/Date & time of measurement
JANUARY	375	N/A
FEBRUARY	200	N/A
MARCH	400	N/A
APRIL	400	N/A
MAY	300	N/A
JUNE	320	N/A
JULY	350	N/A
AUGUST	350	N/A
SEPTEMBER	350	N/A
OCTOBER	350	N/A
NOVEMBER	350	N/A
DECEMBER	350	N/A

PTO Condition 10b and ATC 5b		Total MCF/Gaseous Fuel Burned in Flare
JANUARY		8,802
FEBRUARY		5,486
MARCH		2,980
APRIL		2,081
MAY		170
JUNE		4,800
JULY		9,334
AUGUST		9,425
SEPTEMBER		8,509
OCTOBER		9,810
NOVEMBER		9,394
DECEMBER		5,378
	TOTAL GAS PER YEAR	76,169

ATC Condition 5d	ANNUAL HEATING VALUE OF THE GASEOUS FUEL BURNED
	See atached analysis by OEC, Inc.

PTO Condition 10e - Master Paint and Solvent Logs for the entire Cat Canyon stationary source submitted with report for GWP lease PTO 8171 FID: 03007

C.3.3 Annual Flare Volume (2013)

ERG Operating Company
Cat Canyon Field
Williams Holding Lease
PTO 8059, PTO 13500 and ATC/PTO 13899
2013 Annual Report

PTO Condition 5a	# Days Each Month Steam Generator 101 Operated	Total MCF/Gaseous Fuel Burned in Steam Generator 101
JANUARY	12	17,596
FEBRUARY	15	14,518
MARCH	15	16,876
APRIL	10	10,313
MAY	21	25,470
JUNE	30	32,993
JULY	31	44,640
AUGUST	30	35,868
SEPTEMBER	30	46,470
OCTOBER	31	49,224
NOVEMBER	30	51,686
DECEMBER	31	51,008
	TOTAL GAS PER YEAR	396,662

PTO Condition 5d.	Highest Recorded Sulfur Content for Each Month/PPM of Gaseous Fuel Burned in SGs
JANUARY	0
FEBRUARY	0
MARCH	0
APRIL	0
MAY	0
JUNE	0
JULY	0
AUGUST	0
SEPTEMBER	0
OCTOBER	0
NOVEMBER	0
DECEMBER	0
40 ppmv H2S Limit - Steam Generators	

PTO Condition 5a	# Days Each Month Steam Generator 102 Operated	Total MCF/Gaseous Fuel Burned in Steam Generator 102
JANUARY	9	5,052
FEBRUARY	19	22,836
MARCH	19	24,233
APRIL	19	25,751
MAY	31	46,299
JUNE	30	39,915
JULY	31	44,403
AUGUST	30	40,749
SEPTEMBER	30	50,159
OCTOBER	31	52,988
NOVEMBER	30	53,733
DECEMBER	31	54,965
	TOTAL GAS PER YEAR	461,083

PTO Condition 5d.	Highest Recorded Sulfur Content for Each Month/PPM of Flare Gas Burned in Flare
JANUARY	350
FEBRUARY	350
MARCH	350
APRIL	350
MAY	350
JUNE	350
JULY	180
AUGUST	210
SEPTEMBER	175
OCTOBER	200
NOVEMBER	0
DECEMBER	0
450 ppmv H2S Limit - Flare	

PTO Condition 5b	# Days Each Month the Flare Operated	Total MCF/Gaseous Fuel Burned in Flare
JANUARY	31	6,861
FEBRUARY	28	6,235
MARCH	30	2,831
APRIL	26	5,711
MAY	18	1,870
JUNE	17	1,824
JULY	16	1,189
AUGUST	17	643
SEPTEMBER	13	624
OCTOBER	12	2,052
NOVEMBER	19	444
DECEMBER	10	974
	TOTAL GAS PER YEAR	31,258

PTO Condition 5d., 5e.	ANNUAL SULFUR CONTENT AND HEATING VALUE OF THE GASEOUS FUEL BURNED
	See atached analysis by OEC, Inc.

PTO Condition 5f. - There was no maintenance done on the Low NOx burners or fuel meters during 2013.

PTO Condition 5k. - Master Paint and Solvent Logs for the entire West Cat Canyon stationary source submitted with report for GWP lease PTO 8171 FID: 03007

PTO Condition 5c	# Days LCO Used	Volume of Light Crude Oil Used Each Month
JANUARY	31	3,856
FEBRUARY	28	3,835
MARCH	31	6,777
APRIL	30	11,896
MAY	31	11,747
JUNE	30	9,892
JULY	31	16,743
AUGUST	31	17,530
SEPTEMBER	30	16,602
OCTOBER	31	24,358
NOVEMBER	30	17,319
DECEMBER	31	15,074
	TOTAL BBLS PER YEAR	155,629

PTO Condition 5c. TVP of LCO - See attached OEC Report.

Appendix C - ERG Resources Williams Holding Lease Data

C.3.4 Annual Flare Volume (2014)

Lease: Williams Holding
Data Year: 2014

PTO 08059-R9 Cond. No.	ATC 13668-02 Cond. No.	ATC 14126 Cond. No.	ATC 14312 Cond. No.	Permit Condition	Dev ID	Dev Description	Units	2014 Data												
								Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
5.a.	---	---	---	Steam gen 101 fuel used	114891	85 mmBtu/hr	mcf	51,361	48,075	53,535	38,476	47,007	50,648	35,134	42,985	44,301	48,341	29,814	23,485	513,162
5.a.	---	---	---	No. of days used	114891	85 mmBtu/hr	days	31	28	31	24	31	30	21	31	30	31	18	14	320
5.a.	---	---	---	Steam gen 102 fuel used	386314	85 mmBtu/hr	mcf	55,122	49,410	51,504	47,015	48,579	52,422	35,541	45,164	45,961	51,219	28,607	32,822	543,366
5.a.	---	---	---	No. of days used	386314	85 mmBtu/hr	days	31	28	31	28	31	30	21	31	30	31	17	22	331
5.b.	---	---	4.a.	Flare fuel used	001671	14.15 mmBtu/hr	mcf	1,046	894	683	2,582	71	320	6,759	293	45	117	109	252	13,170
5.b.	---	---	4.a.	No. of days used	001671	14.15 mmBtu/hr	days	31	28	31	30	31	30	31	31	30	31	30	31	365
5.c.	---	---	---	LCO consumption per month	---	---	bbl	14,942	15,085	14,619	12,447	13,469	11,434	11,249	10,455	9,705	8,444	10,028	9,271	
5.c.	5.b.	---	---	LCO TVP	---	---	psi													2.7
5.c.	5.b.	---	---	LCO temperature	---	---	°F													60
---	5.a.	---	---	LCO deliveries - ATC 13668-02 tanks	---	---	bbl/day	*See Table 5a for ATC 13668-02 tanks LCO deliveries*												
5.d.	---	5.a., 5.c.	---	Monthly and annual fuel gas H2S content - steam gens	---	---	ppm	0	0	0	0	0	0	0	0	0	0	0	0	ND
---	---	---	4.b., 4.c.	Monthly and annual fuel gas H2S content - flare	001671	14.15 mmBtu/hr	ppm	0	0	0	0	0	0	0	0	0	0	0	0	ND
---	---	5.b.	---	Scrubber change-out log	---	---	---	*See Attachment 1 - H2S Scrubber Change-Out Log*												
5.e.	---	---	---	HHV of fuel burned	---	---	Btu/scf													940
5.f.	---	---	---	Low NOx burners maintenance logs	---	---	---	*No burner maintenance was conducted in 2014.*												
5.g.	---	---	---	Calibration records	---	---	---	*See Attachment 2 - Meter Calibration Records*												
5.h.	---	---	---	Source test reports	---	---	---	*See Attachment 3 - Source Test Reports*												
5.i.	---	---	---	Steam generator monitoring records	---	---	---	*See Attachment 4 - Steam Generator Monitoring Records*												
5.j.	---	---	---	Well cellar pumping records	---	---	---	*See Attachment 5 - Well Cellar Pumping Records*												
5.k.	---	---	---	Coating and solvent use	---	---	---	*Coating & Solvent Log for entire WCC stationary source submitted with report for GWP lease PTO 08171-R8, FID: 03007*												
5.l.	5.c.	---	4.d.	Records required by 325.F, 331.G, 343.F, 359.G, & 359.H	---	---	---	*See Attachment 6 - I&M Reports; All records for other rules provided elsewhere on this sheet.*												

C.4.1 Gas Analysis (2011)

OILFIELD ENVIRONMENTAL AND COMPLIANCE

2011

Client: ERG Operating Group
6085 Cat Canyon Road
Santa Maria, CA 93454
Attn: Mr. Phil Hosch

SAMPLE ID: 1105669-1
Date Sampled: 11/29/11 @ 0840
Date Analyzed: 11/30/11 @ 0831
Lab Contact: J. Carstens

Facility: GWP
Description: Fuel Gas none @ wit Compressor
Note: Annual Oil and Gas Sampling

Meter: -
Pressure: 70 psig
Temp: 61 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.00	0.00	-
Nitrogen	2.71	3.66	-
Carbon Dioxide	2.53	5.36	-
Hydrogen Sulfide	0.01	0.01	-
Methane	81.56	63.12	-
Ethane	5.52	8.01	1.407
Propane	4.25	9.04	1.171
i-Butane	0.63	1.76	0.205
n-Butane	1.53	4.30	0.484
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.41	1.42	0.149
n-Pentane	0.37	1.29	0.134
2,2-Dimethylbutane	0.01	0.06	0.005
2,3-Dimethylbutane	0.15	0.64	0.055
2-Methylpentane	0.19	0.78	0.068
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.02	0.10	0.010
Hexanes Plus	0.11	0.45	0.045
Totals	100.0	100.0	3.735

Specific Gravity, Calculated	0.7157	air = 1	
Compressibility (Z) Factor	0.9968		
Gross Calorific Value		CHONS	Weight %
BTU/ft³ dry	1153.2	Carbon	71.46
BTU/ft³ wet	1133.1	Hydrogen	20.96
		Oxygen	3.90
		Nitrogen	3.66
		Sulfur	0.01
Net Calorific Value			
BTU/ft³ dry	1044.7	EPA 'F' Factor (60°F, 1ATM)	8575.0
BTU/ft³ wet	1026.6	SDCF/MMBTU	
Hydrogen Sulfide = 63 ppm			

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

307 ROEMER WAY | SUITE 300 | SANTA MARIA | CA 93454 | (805) 922-4772 | FAX (805) 925-3376 | oecusa.com

	mol %	mol%/100	MW	MW ROC
Methane	81.56	0.8156	16.044	13.05
Ethane	5.52	0.0552	30.07	1.66
Propane	4.25	0.0425	44.097	1.87
Iso-Butane	0.63	0.0063	58.12	0.37
N-Butane	1.53	0.0153	58.12	0.89
neo-pentane	0	0	72.15	0.00
i-Pentane	0.41	0.0041	72.15	0.30
n-Pentane	0.37	0.0037	72.15	0.27
2,2-Dimethylbutane	0.01	0.0001	86.18	0.01
2,3-Dimethylbutane	0.15	0.0015	86.18	0.13
2-Methylpentane	0.19	0.0019	86.18	0.16
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0.02	0.0002	86.18	0.02
Hexane Plus	0.11	0.0011	86.18	0.09
ROC Mol%	7.67			

Total Mol Wt. ROC C3 to C6+	4.1059	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0108	

C.4.2 Gas Analysis (2012)

2012

OILFIELD ENVIRONMENTAL AND COMPLIANCE

Client: ERG Operating Group
6085 Cat Canyon Road
Santa Maria, CA 93454
Attn: Mr. Phil Hosch

SAMPLE ID: 1206196-1
Date Sampled: 12/11/12 @ 0830
Date Analyzed: 12/11/12 @ 1535
Lab Contact: J. Carstens

Facility: Cat Canyon
Description: GWP Fuel Gas done@ WH compressor
Note: GWP Annual Gas Testing

Meter: -
Pressure: 70 psig
Temp: 58 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.08	0.13	-
Nitrogen	3.26	4.43	-
Carbon Dioxide	3.72	7.94	-
Hydrogen Sulfide	0.01	0.02	-
Methane	82.29	64.11	-
Ethane	4.39	6.41	1.119
Propane	2.92	6.25	0.804
i-Butane	0.68	1.92	0.223
n-Butane	1.29	3.63	0.406
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.45	1.58	0.165
n-Pentane	0.37	1.29	0.134
2,2-Dimethylbutane	0.05	0.19	0.016
2,3-Dimethylbutane	0.16	0.66	0.057
2-Methylpentane	0.22	0.91	0.079
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.00	0.00	0.000
Hexanes Plus	0.12	0.50	0.051
Totals	100.0	100.0	3.055

Specific Gravity, Calculated	0.7109	air = 1		
Compressibility (Z) Factor	0.9970		CHONS	Weight %
			Carbon	69.28
Gross Calorific Value			Hydrogen	20.36
BTU/ft³ dry	1105.2		Oxygen	5.90
BTU/ft³ wet	1085.9		Nitrogen	4.43
			Sulfur	0.02
Net Calorific Value				
BTU/ft³ dry	1000.5	EPA 'F' Factor (60°F, 1ATM)		8581.6
BTU/ft³ wet	983.1	SDCF/MMBTU		

Hydrogen Sulfide = 110 ppm

All results reported at 60°F and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

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	mol %	mol%/100	MW	MW ROC
Methane	82.29	0.8229	16.044	13.17
Ethane	4.39	0.0439	30.07	1.32
Propane	2.92	0.0292	44.097	1.29
Iso-Butane	0.68	0.0068	58.12	0.40
N-Butane	1.29	0.0129	58.12	0.75
neo-pentane	0	0	72.15	0.00
i-Pentane	0.45	0.0045	72.15	0.32
n-Pentane	0.37	0.0037	72.15	0.27
2,2-Dimethylbutane	0.05	0.0005	86.18	0.04
2,3-Dimethylbutane	0.16	0.0016	86.18	0.14
2-Methylpentane	0.22	0.0022	86.18	0.19
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0	0	86.18	0.00
Hexane Plus	0.12	0.0012	86.18	0.10
ROC Mol%	6.26			

Total Mol Wt. ROC C3 to C6+	3.4982	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0092	

C.4.3 Gas Analysis (2013)

2013

OILFIELD ENVIRONMENTAL AND COMPLIANCE

Client:	ERG Operating Group	SAMPLE ID:	1305678-1
	6085 Cat Canyon Rd	Date Sampled:	11/26/13 @ 1415
	Santa Maria, CA 93454	Date Analyzed:	11/27/13 @ 1353
Attn:	Phil Hosch	Lab Contact:	J. Carstens
Facility:	WH Lease	Meter:	-
Description:	Cat Canyon Fuel Gas	Pressure:	100 psig
Note:	Williams Holding Annual Oil, Gas and Water Sample	Temperature:	64 °F

Gas Analysis by Chromatography - ASTM D 1946/3588

Component	MW	Mole %*	Kg-C/Kg-fuel*	Weight %*	G/MCF*
Oxygen	32.00	0.00	N/A	0.00	-
Nitrogen	28.01	1.46	N/A	1.87	-
Hydrogen	2.01	0.00	N/A	0.00	-
Carbon Dioxide	44.01	7.69	0.85	15.52	-
Carbon Monoxide	28.01	0.00	0.00	0.00	-
Methane	16.04	81.82	9.03	60.24	-
Ethane	30.07	2.54	0.28	3.50	0.647
Ethene	28.05	0.00	0.00	0.00	0.000
Propane	44.10	1.96	0.22	3.97	0.541
Propene	42.08	0.00	0.00	0.00	0.000
i-Butane	58.12	0.55	0.06	1.46	0.179
n-Butane	58.12	1.26	0.14	3.36	0.398
neo-Pentane		0.00	0.00	0.00	0.000
i-Pentane	72.15	0.58	0.06	1.91	0.211
n-Pentane	72.15	0.54	0.06	1.78	0.195
n-Hexane	86.18	0.09	0.01	0.35	0.037
Hexanes Plus	86.18	1.52	0.17	6.02	0.640
Totals		100.0	10.9	100.0	2.85

Specific Gravity, Calculated		0.7523	air = 1.0000		
Relative Density, Calculated	Kg/m3	0.9065	air = 1.205 Kg/m3		
Compressibility (Z) Factor (60°F, 1ATM)		0.9966			
MW of fuel gas, calculated (60°F, 1ATM)		21.41		CHONS	Mole % Wt%
				Carbon	36.35 67.77
Gross Calorific Value				Hydrogen	60.94 19.07
BTU/ft³ dry		1100.8		Oxygen	2.27 11.29
BTU/ft³ wet		1081.6		Nitrogen	0.43 1.87
				Sulfur	0.00 0.00
Net Calorific Value					
BTU/ft³ dry		997.1	EPA 'F' Factor (60°F, 1ATM)		8585.9
BTU/ft³ wet		979.7	SDCF/MMBTU		
Hydrogen Sulfide =	ND ppm				

* Normalized values — SDCF:Standard dry cubic feet

All results reported at 60°F and 14.696 psia.

ND: None Detected — NA: Not Analyzed — G/MCF: Gallons/Thousand Cubic Feet

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	mol %	mol%/100	MW	MW ROC
Methane	81.82	0.8182	16.044	13.09
Ethane	2.54	0.0254	30.07	0.76
Propane	1.96	0.0196	44.097	0.86
Iso-Butane	0.55	0.0055	58.12	0.32
N-Butane	1.26	0.0126	58.12	0.73
neo-pentane	0	0	72.15	0.00
i-Pentane	0.58	0.0058	72.15	0.42
n-Pentane	0.54	0.0054	72.15	0.39
2,2-Dimethylbutane	0	0	86.18	0.00
2,3-Dimethylbutane	0	0	86.18	0.00
2-Methylpentane	0	0	86.18	0.00
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0.09	0.0009	86.18	0.08
Hexane Plus	1.52	0.0152	86.18	1.31
ROC Mol%	6.5			

Total Mol Wt. ROC C3 to C6+	4.1119	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0108	

C.4.4 Gas Analysis (2014)

2014

OILFIELD ENVIRONMENTAL AND COMPLIANCE

Client:	ERG Operating Group	SAMPLE ID:	1404961-1
	6085 Cat Canyon Road	Date Sampled:	10/28/14 @ 1145
	Santa Maria, CA 93454	Date Analyzed:	10/28/14 @ 1833
Attn:	Phil Hosch	Lab Contact:	J. Carstens
Facility:	WH Lease	Meter:	-
Description:	Cat Canyon Fuel Gas (CLARK Comp.)	Pressure:	89 psig
Note:	Williams Holding Annual Oil, Gas and Water Sample	Temp:	86 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	1.09	1.55	-
Nitrogen	5.49	6.84	-
Carbon Dioxide	11.48	22.45	-
Hydrogen Sulfide	0.00	0.00	-
Methane	75.70	53.98	-
Ethane	1.45	1.93	0.369
Propane	1.39	2.73	0.384
i-Butane	0.42	1.10	0.139
n-Butane	1.14	2.95	0.361
neo-Pentane	0.01	0.02	0.002
i-Pentane	0.44	1.41	0.161
n-Pentane	0.40	1.29	0.146
2,2-Dimethylbutane	0.04	0.16	0.015
2,3-Dimethylbutane	0.22	0.85	0.080
2-Methylpentane	0.26	1.01	0.096
3-Methylpentane	0.01	0.02	0.002
n-Hexane	0.04	0.17	0.018
Hexanes Plus	0.40	1.52	0.167
Totals	100.0	100.0	1.941

Specific Gravity, Calculated	0.7768	air = 1		
Compressibility (Z) Factor	0.9970		CHONS	Weight %
			Carbon	59.06
Gross Calorific Value			Hydrogen	16.22
BTU/ft³ dry	956.7		Oxygen	17.88
BTU/ft³ wet	940.0		Nitrogen	6.84
			Sulfur	0.00
Net Calorific Value				
BTU/ft³ dry	865.6	EPA 'F' Factor (60°F, 1ATM)		8692.4
BTU/ft³ wet	850.5	SDCF/MMBTU		

Hydrogen Sulfide = ND ppm

All results reported at 60°F and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

307 ROEMER WAY | SUITE 300 | SANTA MARIA | CA 93453 | (805)922-4772 | FAX (805)925-3376 | oecusa.com

	mol %	mol%/100	MW	MW ROC
Methane	75.7	0.757	16.044	12.12
Ethane	1.45	0.0145	30.07	0.44
Propane	1.39	0.0139	44.097	0.61
Iso-Butane	0.42	0.0042	58.12	0.24
N-Butane	1.14	0.0114	58.12	0.66
neo-pentane	0.01	0	72.15	0.00
i-Pentane	0.44	0.0044	72.15	0.32
n-Pentane	0.4	0.004	72.15	0.29
2,2-Dimethylbutane	0.04	0.0004	86.18	0.03
2,3-Dimethylbutane	0.22	0.0022	86.18	0.19
2-Methylpentane	0.26	0.0026	86.18	0.22
3-Methylpentane	0.01	0.0001	86.18	0.01
n-Hexane	0.04	0.0004	86.18	0.03
Hexane Plus	0.4	0.004	86.18	0.34
ROC Mol%	4.77			

Total Mol Wt. ROC C3 to C6+	2.9616	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0078	

Appendix D - Greka Oil and Gas Bradley Lands/Bradley Consolidated Lease Data

D.1 General Information

Permit #	PTO 7053-R9
Facility Name	Bradley Lands/Bradley Consolidated Lease
FID	4103
Company	Greka Oil and Gas
Device ID #	5838
Make	Kaldair
Model	Indair
Max Heat Rating (MMBTU/hr)	12.9
Air Assisted?	unknown
Steam Assisted?	unknown

D.2 Gas Analysis Summary

Gas Information from Analysis			
	1	2	3
Location of Sample:	unknown	unknown	unknown
Actual Year of Analysis:	2011	2012	2014
ROC Mol%	15.28	12.832	13.04
BTU Content (Btu/scf) HHV, dry, 14.696 psi 60F	1111.7	1042.11	1049
lb ROC/scf	0.024112536	0.0200	0.0204
Assumed Control %	98	98	98
Outlet ROC (ppmv)	3056	2566.4	2608
Calculated ROC Emission Factor (lb/MMBtu)	0.433795736	0.38304405	0.38939269
Gas Flared in Year (scf)	6030000	13593385	1170651
notes:	data from annual reports	data from annual reports	data from annual reports

Weighted Average ROC Emission Factor based on flare volume:	0.398

Appendix D - Greka Oil and Gas Bradley Lands/Bradley Consolidated Lease Data

D.3.1 Annual Flare Volume (2011)

Clark Avenue SSID: 02200
FID: 04103
PTO: 07053
Lease/Location: Bradley Consolidated /Bradley Lands Unit/ Bradley 1/Standard Payne
Reporting Year 2011

Reporting Requirments		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
6.d.		No H2S incidents resulting in sensor sounding occurred in 2011.												
7.a.	Volume of oil produced (BBL)	3344	3346	3799	3416	3476	4121	4572	4896	4439	3223	3597	4607	46,836
	No. of days of oil produced (Days)	31	28	31	30	31	30	31	31	30	31	30	31	365
7.b.	Volume of wastewater through Wemco (BBL)	Not used in 2011												
	No. of days water was processed													
7.c.	Volume of gas burned in Flare (scf)	293,000	237,000	271,000	260,000	625,000	556,000	991,000	496,000	729,000	981,000	347,000	244,000	6,030,000
	No. of days flare was operated	31	28	31	30	31	30	31	31	30	31	30	31	365
7.d.	Volume of gas burned in combustion units													
	No. of days units operated													
	Heater Treater	242,000	246,000	310,000	216,000	200,000	209,000	0	0	0	227,000	188,000	235,446	2,073,446
	Heater Treater	31	28	31	30	31	30	31	31	30	31	30	31	365
OMNI	Heater Treater	OMNI not used in 2011												
	Heater Treater	0	0	0	0	0	0	0	0	0	0	0	0	0
	Boiler (scf)	198,000	189,000	207,000	442,000	457,000	403,000	381,000	261,000	231,000	271,000	259,000	156,000	3,455,000
	Boiler (days)	31	28	31	30	31	30	31	31	30	31	30	31	365
7.e.	Volume of wastewater through HT/desanders (B	Desander (OMNI) out of service in 2011												
	No. of days water was processed (days)	31	28	31	30	31	30	31	31	30	31	30	31	365
7.f.	Volume of wastewater from desanders to wastev	Volume is Zero. Desanders were out of service in 2011.												
7.g.	sumps (BBL)	Volume is Zero. Sand recovery sumps were out of service in 2011.												
	No. of days water was processed (days)	0	0	0	0	0	0	0	0	0	0	0	0	
	Percentage of total volume of ww processed by	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
7.h	Max hourly heat input to boiler each month (MME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Dates heat input exceeded 4.75 MMBtu/hr	none	none	none	none	none	none	none	none	none	none	none	none	
7.i.	Daily logs with volume and dates of oil shipment	Information available in daily production reports.												
7.j.	Annual HHV of fuel gas (Btu/scf)	1112												
7.k.	Daily H2S content of fuel gas (ppm)	Daily Operator Logs can be provided to District upon request.												
7.l.	Quarterly H2S content of flare gas (ppm)	See records (same as fuel gas)												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
7.m.	Daily fuel gas pressure to CE Natco HTs	8	8	8	8	8	8	8	8	8	8	8	8	
7.n.	Crude Oil API gravity (60 F)	13.6												
	Crude Oil TVP (psi)	0.49												
	Crude Oil Temp (F)	104												
7.o.	Dates of H2S breakthrough and concentration (p	See daily operator logs												
7.p.	Dates of SulfaTreat change out	Multiple dates	Multiple dates	Multiple dates	Multiple dates	Multiple dates	Multiple dates	Multiple dates	Multiple dates	Multiple dates	Multiple dates	Multiple dates	Multiple dates	
	Chemical volumes	4,541	4,541	3,200	4,541	3,400	4,700	5,970	3,600	5,600	2,900	6,100	5,400	

D.3.2 Annual Flare Volume (2012)

Clark Ave Stationary Source:	02200
FID:	04103
PTO:	07053-R8 & 13741
Lease/Location:	Bradley Lands / Bradley Consolidated
Reporting Year:	2012

PTO 07073-R8 Condition 8: Reporting

	Days of Crude/Flare/HT Operations	Produced Crude (bbl)	Trucked Crude (bbl)	WW Processed through Wemco (bbl)	Gas Flared (scf)
Jan	31	4,027	10,313	0	622,639
Feb	29	3,357	8,437	0	553,506
March	31	3,322	8,673	0	1,798,270
April	30	2,914	9,659	0	997,917
May	31	2,960	7,611	0	1,128,094
June	30	3,299	9,015	0	1,237,394
July	31	4,144	9,545	0	925,476
Aug	31	4,357	9,824	0	1,387,943
Sep	30	3,124	8,892	0	1,343,171
Oct	31	3,315	9,422	0	862,848
Nov	30	3,896	8,697	0	1,585,937
Dec	31	4,556	10,620	0	1,150,190
Annual	366	43,271	110,708	0	13,593,385

	Ajax Boiler Fuel Use (scf)	Days of Boiler Operations	HT #1 Fuel Use (scf)	WW Processed through the HT/Desander (bbl)	WW from Desander to WW Tks (bbl)
Jan	3,391,197	31	3,498,287	11,342	7,384
Feb	3,172,410	29	3,272,591	5,612	3,686
March	3,391,197	31	3,498,287	1,468	1,006
April	2,516,049	23	3,385,439	23,373	16,574
May	2,953,623	27	3,498,287	17,717	12,973
June	3,281,803	30	3,385,439	13,437	6,807
July	3,391,197	31	3,498,287	16,214	9,684
Aug	3,391,197	31	3,498,287	0	0
Sep	3,063,016	28	3,385,439	0	0
Oct	3,281,803	30	3,498,287	0	0
Nov	3,281,803	30	3,385,439	0	0
Dec	1,531,508	14	3,498,287	0	0
Annual	36,646,803	335	41,302,358	89,163	58,113

	WW Through Sumps (bbl)	Max Heat Input to Boiler (MMBtu/hr)	Crude Shipped off Lease (bbl)	Dates of Crude Shipments	Dates of H_2S Breakthrough	
					Tower #1	Tower #2
Jan	18,253	4.75	10,313	Multiple Dates	1/4	1/7
Feb	2,787	4.75	8,437	Multiple Dates	2/1 ,2/14, 2/24	2/7
March	28,769	4.75	8,673	Multiple Dates	3/5, 3/16, 3/26	3/10, 3/20
April	1	4.75	9,659	Multiple Dates	4/4, 4/17	
May	53,637	4.75	7,611	Multiple Dates	5/4, 5/13 5/29	5/22
June	12,414	4.75	9,015	Multiple Dates		6/2
July	84,963	4.75	9,545	Multiple Dates	7/31	7/2, 7/8, 7/17
Aug	23,887	4.75	9,824	Multiple Dates		
Sep	7,847	4.75	8,892	Multiple Dates	9/5, 9/14	9/5, 9/14
Oct	37,405	4.75	9,422	Multiple Dates	10/1	
Nov	18,583	4.75	8,697	Multiple Dates	11/13	
Dec	85,306	4.75	10,620	Multiple Dates	12/3, 12/31	12/10, 12/19
Annual	373,851		110,708			

D.3.3 Annual Flare Volume (2014)

Clark Ave Stationary Source: 02200
FID: 04103
PTO: 07053-R8
Lease/Location: Bradley Lands / Bradley Consolidated
Reporting Year: 2014

PTO 07053-R9 Condition 8: Reporting						
	Crude Production Days	Produced Crude (bbl)	Shipped Crude (bbl)	Nos. of days crude was shipped	WW Processed through Wemco (bbl)	Days WW was Processed through Wemco (days)
Jan	31	4,041	11,364	28	0	0
Feb	28	3,581	12,007	26	0	0
March	31	4,029	10,980	25	0	0
April	30	3,952	10,800	22	0	0
May	31	4,035	12,662	24	0	0
June	30	3,372	11,952	29	0	0
July	31	4,626	13,676	24	0	0
Aug	31	3,475	11,600	27	0	0
Sep	30	3,855	11,107	22	0	0
Oct	31	3,867	13,000	27	0	0
Nov	30	4,066	12,710	26	0	0
Dec	31	4,464	13,171	27	0	0
Annual	365	47,363	145,027	307	0	0

	Data for 2014 In Service Fuel Burning Units					
	Flare (scf/mo)	Flare (days of use/mo)	Ajax Boiler Fuel Use (scf)	Days of Boiler Operations/mo	HT #1 Fuel Use (scf)	Days of HT #1 Operations/mo
Jan	78,472	31	116,449	31	0	0
Feb	118,325	28	40,603	28	34,894	28
March	131,806	31	76,387	31	15,450	31
April	55,008	30	0	0	87,169	30
May	65,996	31	77,737	31	0	0
June	102,113	30	25,940	30	51,391	30
July	145,710	31	51,667	31	11,431	31
Aug	57,387	31	103,221	31	0	0
Sep	242,268	30	51,135	30	30,450	30
Oct	101,413	31	52,887	31	20,910	31
Nov	26,731	30	37,956	30	29,821	30
Dec	45,422	31	37,390	31	24,184	31
Annual	1,170,651	365	671,372	335	305,700	272

D.4.1 Gas Analysis (2011)

2011

ZALCO LABORATORIES, INC.
Analytical & Consulting Services
4309 Armour Avenue
Bakersfield, California 93308
(661) 395-0539
FAX (661) 395-3069

Greka Energy, Santa Maria
P. O. Box 5489
Santa Maria CA 93456

Attention: Laura Nuzzo

Laboratory No: 1101083-01
Date Received: 01/07/11
Date Analyzed: 01/07/11
Purchase Order:

Test Code: 1635

Sample Description: **3 ISLAND FUEL GAS HEATER TREATER**
Sampled: 01/06/2011 @ 11:17 AM by E. Elliott

Chromatographic Analysis, ASTM D-1945-03, ASTM D-3588-98, GPA 2145-94, GPA 2261-00

Constituent:	Mole %	Weight %	Gas Liquids, Gallons per 1000 cubic feet	CHONS%
Oxygen	5.374	6.29		Carbon, C 54.84
Nitrogen	21.857	22.38		
Carbon Dioxide	1.886	3.03		Hydrogen, H 14.29
Carbon Monoxide	0.000	0.00		
Hydrogen Sulfide	0.000	0.00		Oxygen, O 8.49
Methane	51.242	30.05		
Ethane	4.360	4.79		
Propane	5.625	9.07	1.55	Nitrogen, N 22.38
IsoButane	1.068	2.27	0.35	
n-Butane	3.329	7.07	1.05	
IsoPentane	1.494	3.94	0.55	Sulfur, S 0.00
n-Pentane	1.479	3.90	0.53	
Hexanes+	2.285	7.20	0.98	
Totals:	100.00	100.00	5.01	100.00

Gas Properties calculated at STP:	degrees F.	60.00	H/C Ratio: 0.26
Measurement Base Pressure at STP	psia	14.696	

Gross Btu/Cu.Ft.,	Dry Gas HHV	1111.7	Relative Gas Density; Ideal gas:	0.9445
Ideal Gross Btu/Lb.	Dry Gas HHV	15361.6	Specific Gravity, (Air = 1) Real gas:	0.9477
Net Btu/Cu.Ft.	Dry Gas LHV	1013.7	Real Gas Density, Lb/Cu.Ft.	0.07237
Ideal Net Btu/Lb	Dry Gas LHV	14008.0	Specific Volume, Cu.Ft./Lb	13.8179
Gross Btu/Cu.Ft.,	water saturated	1088.0	Compressibility, 'z'	0.9961

		Gross or HHV:	Net or LHV:
"F" Factor,	DSCF/MMBtu at 60F.	8665.0	9502.3
"F" Factor,	DSCF/MMBtu at 68F.	8797.0	9647.0
"F" Factor,	DSCF/MMBtu at 70F.	8830.4	9683.7
"FC" Factor,	DSCF CO2/MMBtu60F.	1128.7	1237.7
"FC" Factor,	DSCF CO2/MMBtu68F.	1145.9	1256.6

Robert Cortez, Laboratory Manager

This report is furnished for the exclusive use of our Customer and applies only to the samples tested. Zalco is not responsible for report alteration or detachment.

	mol %	mol%/100	MW	MW ROC
Methane	51.242	0.51242	16.044	8.20
Ethane	4.36	0.0436	30.07	1.31
Propane	5.625	0.05625	44.097	2.48
Iso-Butane	1.068	0.01068	58.12	0.62
N-Butane	3.329	0.03329	58.12	1.93
neo-pentane	0	0	72.15	0.00
i-Pentane	1.494	0.01494	72.15	1.08
n-Pentane	1.479	0.01479	72.15	1.07
2,2-Dimethylbutane	0	0	86.18	0.00
2,3-Dimethylbutane	0	0	86.18	0.00
2-Methylpentane	0	0	86.18	0.00
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0	0	86.18	0.00
Hexane Plus	2.285	0.02285	86.18	1.97
ROC Mol%	15.28			

Total Mol Wt. ROC C3 to C6+	9.1502	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0241	

D.4.2 Gas Analysis (2012)

2012

ZALCO LABORATORIES, INC.
4309 Armour Avenue, Bakersfield, CA 93308 (661) 395-0539 FAX (661) 395-3069 www.zalcolabs.com
2186 Eastman Avenue, Suite 103, Ventura, CA 93003 (805) 477-0114 FAX (805) 477-0125

Greka Energy, Santa Maria
P. O. Box 5489
Santa Maria CA 93456

Laboratory No: 1212042-01
Date Received: 12/04/12
Date Analyzed: 12/06/12

Attention: Danielle Meyers

Sample Description: 3 Island Heater Treater # 1 Fuel Gas
Sampled: 12/4/2012 @ 9:35:00 AM by Eric Elliott

Chromatographic Analysis: ASTM D1945-03 / ASTM D3588-98 / GPA 2145-09 / ASTM D3246-11

Constituent:	Mole %	Weight %	GPM (Gallons per 1000.000 cubic feet)	GPM Fractions	CHONS%
Oxygen	5.407	6.337			Carbon, C 54.10
Nitrogen	14.860	15.245			
Carbon Dioxide	9.132	14.718			Hydrogen, H 13.62
Carbon Monoxide	0.000	0.000			
Hydrogen Sulfide	0.000	0.000			Oxygen, O 17.04
Methane	53.826	31.624			
Ethane	3.943	4.342			
Propane	5.179	8.364	1.424	(C3....C3) =	1.424 Nitrogen, N 15.25
IsoButane	0.915	1.949	0.299		
n-Butane	2.766	5.887	0.871	(C3....C4) =	2.595
IsoPentane	1.025	2.708	0.374		Sulfur, S
n-Pentane	0.916	2.419	0.331	(C3....C5) =	3.299 0.00
Hexanes	2.031	6.408	0.873	(C3....C6+) =	4.173
Totals:	100.00	100.00	4.173		11.491 100.00

Flammable Gases:		70.601
Gas Properties calculated @ STP: degrees F.		60
Measurement Base Pressure @ STP: psia		14.696

B/C Ratio: 0.25

Gas State	Dry Btu / Cu. Ft	Dry Btu / lb	Wet Btu / Cu. Ft
Gross, Ideal Gas	1038.01	14425.64	1019.85
Net, Ideal Gas	945.20	13135.77	928.75
Gross, Real Gas	**1042.11**		1023.97
Net, Real Gas	948.93		932.42

Relative Gas Density; [Air=1] Ideal:	0.9428	"F" Factor, DSCF/MMBtu @ 60F	8646.7	9495.8
Specific Gravity, [Air=1] Real gas:	0.9460	"F" Factor, DSCF/MMBtu @ 68F	8778.4	9640.4
Real Gas Density, Lb/Cu.Ft.:	0.0722	"F" Factor, DSCF/MMBtu @ 70F	8811.7	9677.0
Specific Volume, Cu.Ft./Lb:	13.8426	"FC" Factor, DSCF CO2/MMBtu @ 60F	1185.7	1302.1
Relative Liquid Density @ 60F/60F:	0.4811	"FC" Factor, DSCF CO2/MMBtu @ 68F	1203.8	1322.0
Compressibility, 'z':	0.9961			
Pool kg per kg-mole Molecular wt avg	27.306			

	mol %	mol%/100	MW	MW ROC
Methane	53.826	0.53826	16.044	8.61
Ethane	3.943	0.03943	30.07	1.19
Propane	5.179	0.05179	44.097	2.28
Iso-Butane	0.915	0.00915	58.12	0.53
N-Butane	2.766	0.02766	58.12	1.61
neo-pentane	0	0	72.15	0.00
i-Pentane	1.025	0.01025	72.15	0.74
n-Pentane	0.916	0.00916	72.15	0.66
2,2-Dimethylbutane	0	0	86.18	0.00
2,3-Dimethylbutane	0	0	86.18	0.00
2-Methylpentane	0	0	86.18	0.00
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0	0	86.18	0.00
Hexane Plus	2.031	0.02031	86.18	1.75
ROC Mol%	12.832			

Total Mol Wt. ROC C3 to C6+	7.5739	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0200	

D.4.3 Gas Analysis (2014)

2014

OILFIELD ENVIRONMENTAL & COMPLIANCE, INC.

Client:	Greka Energy	SAMPLE ID:	1405711-1
	2617 E. Clark Road	Date Sampled:	12/19/14 @ 1305
	Santa Maria, CA 93454	Date Analyzed:	12/22/14 @ 1414
Attn:	Joseph Diaz	Lab Contact:	J. Carstens
Facility:	Bradley 3 Island	Meter:	-
Description:	Fuel Gas - Combustion Units	Pressure:	14 psig
Note:	Oil & Gas Testing	Temp:	67 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	4.36	5.15	-
Nitrogen	17.04	17.63	-
Carbon Dioxide	7.54	12.26	-
Hydrogen Sulfide	0.00	0.00	-
Methane	54.23	32.13	-
Ethane	3.78	4.20	0.964
Propane	5.02	8.17	1.384
i-Butane	0.94	2.03	0.309
n-Butane	2.84	6.09	0.896
neo-Pentane	0.00	0.00	0.000
i-Pentane	1.11	2.95	0.405
n-Pentane	1.13	3.02	0.410
2,2-Dimethylbutane	0.11	0.35	0.040
2,3-Dimethylbutane	0.50	1.58	0.180
2-Methylpentane	0.76	2.43	0.277
3-Methylpentane	0.08	0.25	0.028
n-Hexane	0.00	0.00	0.000
Hexanes Plus	0.55	1.75	0.230
Totals	100.0	100.0	5.124

Specific Gravity, Calculated	0.9349	air = 1		
Compressibility (Z) Factor	0.9961		CHONS	Weight %
			Carbon	54.44
Gross Calorific Value			Hydrogen	13.87
BTU/ft³ dry	1049.0		Oxygen	14.06
BTU/ft³ wet	1030.8		Nitrogen	17.63
			Sulfur	0.00
Net Calorific Value				
BTU/ft³ dry	955.3	EPA 'F' Factor (60°F, 1ATM)		8797.2
BTU/ft³ wet	938.7	SDCF/MMBTU		

Hydrogen Sulfide = 28 ppm

All results reported at 60°F and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

307 ROEMER WAY | SUITE 300 | SANTA MARIA | CA 93454 | (805) 922-4772 | FAX (805) 925-3376

	mol %	mol%/100	MW	MW ROC
Methane	54.23	0.5423	16.044	8.68
Ethane	3.78	0.0378	30.07	1.14
Propane	5.02	0.0502	44.097	2.21
Iso-Butane	0.94	0.0094	58.12	0.55
N-Butane	2.84	0.0284	58.12	1.65
neo-pentane	0	0	72.15	0.00
i-Pentane	1.11	0.0111	72.15	0.80
n-Pentane	1.13	0.0113	72.15	0.82
2,2-Dimethylbutane	0.11	0.0011	86.18	0.09
2,3-Dimethylbutane	0.5	0.005	86.18	0.43
2-Methylpentane	0.76	0.0076	86.18	0.65
3-Methylpentane	0.08	0.0008	86.18	0.07
n-Hexane	0	0	86.18	0.00
Hexane Plus	0.55	0.0055	86.18	0.47
ROC Mol%	13.04			

Total Mol Wt. ROC C3 to C6+	7.7504	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0204	

Appendix E - Greka Oil and Gas Morganti Lease Data

E.1 General Information

Permit #	8096-R9
Facility Name	Morganti Lease
FID	3303
Company	Greka Oil and Gas
Device ID #	8428

Make	Unknown
Model	Unknown
Max Heat Rating (MMBTU/hr)	5.625
Air Assisted?	no
Steam Assisted?	no
Pilot Gas type	produced gas
Ignition System Type	continuous

E.2 Gas Analysis Summary

Gas Information from Analysis			
	1	2	3
Location of Sample:	Flare inlet	Flare inlet	Flare Inlet
Actual Year of Analysis:	2011	2012	2014
ROC Mol%	0.357	0.408	3.16
BTU Content (Btu/scf) HHV, dry, 14.73 psi 60F	727.71	631.72	826.1
lb ROC/scf	0.0005	0.0007	0.0047
Assumed Control %	98	98	98
Outlet ROC (ppmv)	71.4	81.6	632
Calculated ROC Emission Factor (lb/MMBtu)	0.015	0.022	0.114
Gas Flared in Year (scf)	18521000	8433197	16390270
notes:	none	none	none

Weighted Average ROC Emission Factor based on flare volume:	0.054

E.3.1 Annual Flare Volume (2011)

Casmalia SSID: 04630
FID: 03303
PTO: 08096
Lease/Location: Casmalia Morganti
Reporting Year: 2011

Reporting Requirements		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
5.a.	Monthly fuel use Boiler (scf)	797,000	656,000	596,000	593,000	661,000	593,000	1,274,000	1,314,000	1,313,000	1,090,000	1,374,000	530,000	10,791,000
	No. of days in use (days)	31	28	31	30	31	30	31	31	30	31	30	31	365
	Average daily fuel use (scf)	25,710	23,429	19,226	19,767	21,323	19,767	41,097	42,387	43,767	35,161	45,800	17,097	29,564
5.b.		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
	Oil through 5000 BBL Wash Tank (BBL)	5,029	4,092	1,511	0	0	0	0	0	0	0	0	0	10,632
	No. of days that oil was produced	31	28	31	30	31	30	31	31	30	31	30	31	365
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
5.c.	Monthly produced gas production	0	0	0	0	0	0	0	0	0	0	0	0	0
	Days of gas production	0	0	0	0	0	0	0	0	0	0	0	0	0
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
5.d.	Monthly diluent (LCR) use	574	1,073	1,150	974	1,132	809	1,107	985	978	1,167	990	959	11,898
	Days of diluent use	31	28	31	30	31	30	31	31	30	31	30	31	365
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
5.e.	Volumes of Oil Shipments (BBL)	5,029	4,092	5,203	4,306	4,163	4,539	4,478	4,286	3,815	4,357	4,456	4,352	53,076
	Dates of Oil Shipments	12/mo	12/mo	12/mo	12/mo	12/mo	12/mo	12/mo	12/mo	12/mo	12/mo	12/mo	12/mo	
	No. of Loads on each date	1	1	1	1	1	1	1	1	1	1	1	1	
	Volumes of Diluent Deliveries (BBL)	574	1,073	1,150	974	1,132	809	1,124	979	982	1,130	977	979	11,883
	No. of Deliveries on each date	7	7	7	7	7	7	7	6	6	7	6	6	
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
5.f.	Volume of Gas Flared (SCF)	1,481,000	1,211,000	1,187,000	1,036,000	1,350,000	837,000	2,088,000	1,689,000	1,890,000	2,965,000	2,465,000	322,000	18,521,000
	No of Days in Operation	31	28	31	30	31	30	31	31	30	31	30	31	365

5.g.	API Gravity of crude (@60F)	12
	TVP of crude (psi)	0
	Crude oil storage temp (F)	135
	Annual HHV (Btu/scf)	1,201
5.h.	API Gravity of diluent (LCR) (@60F)	25
	TVP of diluent (LCR) (psi)	0
5.i.	Weekly H2S	Daily Operator Reports available upon request.
	Annual H2S (ppm)	660

5.j.	Dates of H2S scrubbing solution change	1/month	1/month	1/month	1/month	1/month	1/month	1/month	1/month	1/month	1/month	1/month	1/month	
	Volume of solution changed out (gall)	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	

5.k.	Flare Pilot Observations	Observed daily by Operator
5.l.	Monthly peak fuel line pressure to Miura boiler	Out of Service in 2011
5.m.	Miura boiler Fuel Use demonstration	Out of Service in 2011

5.n.	Type of liquid in each tank	Crude		LCR (light crude)		Crude/Water	
	Temperature of liquid	Crude	135 F	LCR	61 F	Wash	OOS
	Max vapor pressure of tank content		0.07 psi		0.06 psi		OOS
	Date of degassing of each tank	No Degassing events in 2011					

5.o.	Days Emerg Pit contained waste	Rainwater Only
5.p.	No. of times pigging occurred each month	Pigging scrubber is in operation as part of normal gas conveyance system. Liquids are removed by vacuum truck.

5.q.	Gallons of solvent	85
	Gallons of coatings	6

E.3.2 Annual Flare Volume (2012)

	Dates of Oil Shipments	Number of Crude Shipments/ month	Flared Gas (scf)
Jan	Multiple Dates	31	364,220
Feb	Multiple Dates	24	647,224
March	Multiple Dates	29	700,296
April	Multiple Dates	24	522,931
May	Multiple Dates	29	700,983
June	Multiple Dates	28	841,949
July	Multiple Dates	42	799,803
Aug	Multiple Dates	42	710,391
Sep	Multiple Dates	39	571,327
Oct	Multiple Dates	43	887,686
Nov	Multiple Dates	40	725,076
Dec	Multiple Dates	36	961,311
Annual		406	8,433,197

	Weekly H2S of Fuel Gas (ppm)				
	1st	7th	14th	21st	28st
Jan	500	200	500	600	100
Feb	200	200	500	0	75
March	50	100	0	100	500
April	250	25	50	50	100
May	500	50	100	375	100
June	150	200	100	200	600
July	200	550	100	250	100
Aug	200	0	175	50	200
Sep	250	50	300	100	250
Oct	500	175	550	150	50
Nov	225	0	150	50	0
Dec	250	0	500	150	200

E.3.3 Annual Flare Volume (2014)

Casmalia Stationary Source	**04630**
FID:	**03303**
PTO:	**08096 - R8**
Lease/Location:	**Morganti Lease**
Reporting Year:	**2014**

	Dates of Oil Shipments	Number of Crude Shipments/month	Flared Gas (scf)	Flare Operation Days
Jan	See attached records	51	1,062,202	30
Feb		42	799,624	28
Mar		53	998,779	31
Apr		52	1,461,655	30
May		51	1,456,908	27
Jun		51	1,345,994	27
Jul		51	1,260,660	31
Aug		47	2,038,993	31
Sep		47	1,654,327	30
Oct		55	2,233,608	31
Nov		48	836,175	30
Dec		47	1,241,344	31
Total			**16,390,270**	

	Weekly H2S of Fuel Gas (ppm)				
	1st	**7th**	**14th**	**21st**	**28st**
Jan	500	700	200	200	280
Feb	350	100	100	150	300
Mar	300	100	100	100	200
Apr	0	125	200	200	100
May	100	200	300	100	200
Jun	300	300	100	150	275
Jul	200	200	400	150	0
Aug	0	100	250	100	100
Sep	300	450	50	150	300
Oct	400	575	50	100	250
Nov	425	100	300	100	350
Dec	100	150	100	450	325

E.4.1 Gas Analysis (2011)

2011

ZALCO LABORATORIES, INC.
4309 Armour Avenue, Bakersfield, CA 93308 (661) 395-0539 FAX (661) 395-3069 www.zalcolabs.com
1103 East Clark Avenue, Suite F-5, Santa Maria, CA 93455 (805) 938-5341 FAX (805) 938-5892

Greka Energy, Santa Maria
P. O. Box 5489
Santa Maria CA 93456

Laboratory No: 1112411-03
Date Received: 12/29/11
Date Analyzed: 12/30/11

Attention: Laura Nuzzo

Sample Description: CASMALIA MORGANTI FLARE #2202
Sampled: 12/27/2011 @ 10:00 AM by Client

TOTAL SULFUR ANALYSIS, ASTM D3246, GPA-B16/D4810

Constituent:	Result	Units
Hydrogen Sulfide	660	ppm
Total Sulfur	40	grs S/100 SCF

Chromatographic Analysis, ASTM D-1945-03, ASTM D-3588-98, GPA 2145-94, GPA 2261-00

Constituent:	Mole %	Weight %	GPM	GPM Fractions	CHONS%
Oxygen	0.396	0.52			Carbon, C 49.09
Nitrogen	1.941	2.21			
Carbon Dioxide	27.994	50.10			Hydrogen, H 11.66
Carbon Monoxide	0.000	0.00			
Hydrogen Sulfide	0.068	0.09			Oxygen, O 36.95
Methane	67.392	43.97			
Ethane	1.850	2.26			
Propane	0.156	0.28	0.04	(C3....C3) = 0.04	Nitrogen, N 2.21
IsoButane	0.076	0.18	0.02		
n-Butane	0.034	0.08	0.01	(C3....C4) = 0.08	
IsoPentane	0.013	0.04	0.00		Sulfur, S 0.09
n-Pentane	0.008	0.02	0.00	(C3....C5) = 0.09	
Hexanes	0.070	0.25	0.03	(C3....C6+) = 0.12	
Totals:	100.00	100.00	0.12	0.33	100.00

Flammable Gases:		69.601	
Gas Properties calculated @ STP: degrees F.		60	
Measurement Base Pressure @ STP: psia		14.696	**H/C Ratio:** 0.24

Gas State	Dry Btu / Cu. Ft	Dry Btu / lb	Saturated Btu / Cu. Ft
Gross, Ideal Gas	725.59	11197.11	712.96
Net, Ideal Gas	654.06	10093.15	642.68
Gross, Real Gas	**727.71**		715.05
Net, Real Gas	655.97		644.56

Relative Gas Density; [Air=1] Ideal:	0.8491		"F" Factor, DSCF/MMBtu @ 60F	8876.7	9847.6
Specific Gravity, [Air=1] Real gas:	0.8511		"F" Factor, DSCF/MMBtu @ 68F	9011.9	9997.6
Real Gas Density, Lb/Cu.Ft.:	0.0650		"F" Factor, DSCF/MMBtu @ 70F	9046.1	10035.6
Specific Volume, Cu.Ft./Lb:	15.3866		"FC" Factor, DSCF CO2/MMBtu @ 60F	1386.3	1537.9
Relative Liquid Density @ 60F/60F:	0.4568		"FC" Factor, DSCF CO2/MMBtu @ 68F	1407.4	1561.3
Compressibility, 'z':	0.9971				
Fuel kg per kg-mole Molecular wt avg	24.568				

GPM: Gallons per 1000 cubic feet

Robert Cortez, Laboratory Director

	mol %	mol%/100	MW	MW ROC
Methane	67.392	0.67392	16.044	10.79
Ethane	1.85	0.0185	30.07	0.56
Propane	0.156	0.00156	44.097	0.07
Iso-Butane	0.076	0.00076	58.12	0.04
N-Butane	0.034	0.00034	58.12	0.02
neo-pentane	0	0	72.15	0.00
i-Pentane	0.013	0.00013	72.15	0.01
n-Pentane	0.008	0.00008	72.15	0.01
2,2-Dimethylbutane	0	0	86.18	0.00
2,3-Dimethylbutane	0	0	86.18	0.00
2-Methylpentane	0	0	86.18	0.00
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0.07	0.0007	86.18	0.06
Hexane Plus	0	0	86.18	0.00
ROC Mol%	0.357			

Total Mol Wt. ROC C3 to C6+	0.2082	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0005	

E.4.2 Gas Analysis (2012)

2012

ZALCO LABORATORIES, INC.
4309 Armour Avenue, Bakersfield, CA 93308 (661) 395-0539 FAX (661) 395-3069 www.zalcolabs.com
2186 Eastman Avenue, Suite 103, Ventura, CA 93003 (805) 477-0114 Fax (805) 477-0125

Greka Energy, Santa Maria
P. O. Box 5489
Santa Maria CA 93456

Laboratory No: 1211013-01
Date Received: 11/01/12
Date Analyzed: 11/02/12

Attention: Danielle Meyers

Sample Description: Casmalia Flare Meter # 2202
Sampled: 11/1/2012 @ 12:40:00 PM by Eric Elliott

Chromatographic Analysis ASTM D-1945-03/ASTM D-3246-11

Constituent:	Result	Units
Sulfur	9.3	grs S/100 SCF
Total Sulfur	150	ppmv

Chromatographic Analysis ASTM D-1945-03/ASTM D-3588-98/ GPA 2145-09/ASTM D-3246-11

Constituent:	Mole %	Weight %	GPM (Gallons per 1000.000 cubic feet)	GPM Fractions	CHONS%
Oxygen	0.393	0.464			Carbon, C 44.28
Nitrogen	2.375	2.454			
Carbon Dioxide	36.936	59.963			Hydrogen, H 9.17
Carbon Monoxide	0.000	0.000			
Hydrogen Sulfide	0.018	0.022			Oxygen, O 44.07
Methane	58.522	34.632			
Ethane	1.348	1.495			
Propane	0.132	0.214	0.036	(C3....C3) = 0.036	Nitrogen, N 2.45
IsoButane	0.077	0.165	0.025		
n-Butane	0.033	0.070	0.010	(C3....C4) = 0.072	
IsoPentane	0.011	0.030	0.004		Sulfur, S 0.02
n-Pentane	0.006	0.016	0.002	(C3....C5) = 0.078	
Hexanes	0.149	0.473	0.064	(C3....C6+) = 0.142	
Totals:	100.00	100.00	0.142	0.328	100.00

Flammable Gases:		60.277	
Gas Properties calculated @ STP: degrees F.		60	
Measurement Base Pressure @ STP: psia		14.696	H/C Ratio: 0.21

Gas State	Dry Btu / Cu. Ft	Btu / lb	Wet Btu / Cu. Ft
Gross, Ideal Gas	629.70	8814.69	618.74
Net, Ideal Gas	567.66	7946.21	557.78
Gross, Real Gas	**631.72**		620.72
Net, Real Gas	569.48		559.57

Relative Gas Density; [Air=1] Ideal:	0.9360	"F" Factor, DSCF/MMBtu @ 60F	9075	10067.0
Specific Gravity, [Air=1] Real gas:	0.9385	"F" Factor, DSCF/MMBtu @ 68F	9213	10220.3
Real Gas Density, Lb/Cu.Ft.:	0.0717	"F" Factor, DSCF/MMBtu @ 70F	9248	10259.2
Specific Volume, Cu.Ft/Lb:	13.9534	"FC" Factor, DSCF CO2/MMBtu @ 60F	1588.3	1761.9
Relative Liquid Density @ 60F/60F:	0.5050	"FC" Factor, DSCF CO2/MMBtu @ 68F	1612.5	1788.8
Compressibility, 'z':	0.9968			
Fuel kg per kg-mole Molecular wt avg	27.103			

	mol %	mol%/100	MW	MW ROC
Methane	58.522	0.58522	16.044	9.37
Ethane	1.348	0.01348	30.07	0.41
Propane	0.132	0.00132	44.097	0.06
Iso-Butane	0.077	0.00077	58.12	0.04
N-Butane	0.033	0.00033	58.12	0.02
neo-pentane	0	0	72.15	0.00
i-Pentane	0.011	0.00011	72.15	0.01
n-Pentane	0.006	0.00006	72.15	0.00
2,2-Dimethylbutane	0	0	86.18	0.00
2,3-Dimethylbutane	0	0	86.18	0.00
2-Methylpentane	0	0	86.18	0.00
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0.149	0.00149	86.18	0.13
Hexane Plus	0	0	86.18	0.00
ROC Mol%	0.408			

Total Mol Wt. ROC C3 to C6+	0.2628	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0007	

E.4.3 Gas Analysis (2014)

2014

OILFIELD ENVIRONMENTAL & COMPLIANCE, INC.

Client: Greka Energy		SAMPLE ID: 1405681-3	
2617 E. Clark Road		Date Sampled: 12/18/14 @ 0945	
Santa Maria, CA 93454		Date Analyzed: 12/18/14 @ 1813	
Attn: Joseph Diaz		Lab Contact: J. Carstens	
Facility: Casmalia		Meter:	-
Description: Casmalia Flare Gas		Pressure:	< 5.0 psig
Note: Oil & Gas Testing		Temp:	42 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.13	0.16	-
Nitrogen	1.25	1.40	-
Carbon Dioxide	25.73	45.11	-
Hydrogen Sulfide	0.05	0.07	-
Methane	66.82	42.71	-
Ethane	2.86	3.42	0.728
Propane	1.46	2.56	0.402
i-Butane	0.29	0.67	0.095
n-Butane	0.64	1.49	0.203
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.22	0.63	0.081
n-Pentane	0.23	0.67	0.084
2,2-Dimethylbutane	0.02	0.07	0.007
2,3-Dimethylbutane	0.08	0.27	0.029
2-Methylpentane	0.12	0.42	0.045
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.01	0.04	0.005
Hexanes Plus	0.09	0.29	0.036
Totals	100.0	100.0	1.713

Specific Gravity, Calculated	0.8665	air = 1		
Compressibility (Z) Factor	0.9967		CHONS	Weight %
			Carbon	52.91
Gross Calorific Value			Hydrogen	12.67
BTU/ft³ dry	826.1		Oxygen	32.96
BTU/ft³ wet	811.8		Nitrogen	1.40
			Sulfur	0.07
Net Calorific Value				
BTU/ft³ dry	746.8	EPA 'F' Factor (60°F, 1ATM)		8834.2
BTU/ft³ wet	733.8	SDCF/MMBTU		

Hydrogen Sulfide = 490 ppm

All results reported at 60°F and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

307 ROEMER WAY | SUITE 300 | SANTA MARIA | CA 93454 | (805) 922-4772 | FAX (805) 925-3376

	mol %	mol%/100	MW	MW ROC
Methane	66.82	0.6682	16.044	10.69
Ethane	2.86	0.0286	30.07	0.86
Propane	1.46	0.0146	44.097	0.64
Iso-Butane	0.29	0.0029	58.12	0.17
N-Butane	0.64	0.0064	58.12	0.37
neo-pentane	0	0	72.15	0.00
i-Pentane	0.22	0.0022	72.15	0.16
n-Pentane	0.23	0.0023	72.15	0.17
2,2-Dimethylbutane	0.02	0.0002	86.18	0.02
2,3-Dimethylbutane	0.08	0.0008	86.18	0.07
2-Methylpentane	0.12	0.0012	86.18	0.10
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0.01	0.0001	86.18	0.01
Hexane Plus	0.09	0.0009	86.18	0.08
ROC Mol%	3.16			

Total Mol Wt. ROC C3 to C6+	1.7848	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0047	

Appendix F - PRE Resources Careaga #1 Lease Data

F.1 General Information

Permit #	13719-R1
Facility Name	Careaga #1
FID	4017
Company	PRE Resources
Device ID #	114417
Make	Mactronic
Model	M-200
Max Heat Rating (MMBTU/hr)	62.5
Air Assisted?	yes
Steam Assisted?	no

F.2 Gas Analysis Summary

Gas Information from Analysis		
	1	2
Location of Sample:		
Actual Year of Analysis:	2011	2012
ROC Mol%	12.1	15.15
BTU Content (Btu/scf) HHV, dry, 14.73 psi 60F	1243.2	1347.8
lb ROC/scf	0.01779365	0.023441035
Assumed Control %	98	98
Outlet ROC (ppmv)	2420	3030
Calculated ROC Emission Factor (lb/MMBtu)	0.286255635	0.347841443
Gas Flared in Year (scf)	6388200	3796000
notes:	none	none

Weighted Average ROC Emission Factor based on flare volume:	0.309

F.3.1 Annual Flare Volume (2011)

Careaga 6-21 Annual Compliance Report 2011

	Oil Production		Gas Production		Flare	
Month	Volume (BBLS)	Days	Volume (SCF)	Days	Volume (SCF)	Days
January	0.36	5	92,000	5	0	0
February	0	0	0	0	0	0
March	0	0	0	0	0	0
April	0	0	0	0	0	0
May	213.7	21	1,675,500	21	1,675,500	21
June	223.12	24	1,904,600	24	1,904,600	24
July	126.46	19	1,502,500	19	1,502,500	19
August	152	23	732,000	23	732,000	23
September	184.45	30	134,600	30	134,600	30
October	98.13	20	439,000	20	439,000	20
November	0	0	0	0	0	0
December	0	0	0	0	0	0
Total	0	0	0	0	0	0

F.3.2 Annual Flare Volume (2012)

Careaga 6-21 Annual Compliance Report 2012

	Oil Production		Gas Production		Flare	
Month	Volume (BBLS)	Days	Volume (SCF)	Days	Volume (SCF)	Days
January	0	0	0	5	0	0
February	0	0	0	0	0	0
March	163	10	230,000	10	230,000	10
April	268	25	1,571,000	25	1,571,000	25
May	158	27	1,099,000	27	1,035,000	27
June	149	25	468,000	25	210,000	25
July	43	7	132,000	7	61,000	7
August	135	16	354,000	16	248,000	16
September	138	28	473,000	28	261,000	28
October	94	26	393,000	26	180,000	26
November	0	0	0	0	0	0
December	0	0	0	0	0	0
Total	1148	164	4,720,000	169	3,796,000	164

F.4.1 Gas Analysis (2011)

OILFIELD ENVIRONMENTAL AND COMPLIANCE

2011

Client: Venoco, Inc.
3201 Airpark Drive, Ste. 205
Santa Maria, Ca 93455
Attn: John Garnett

SAMPLE ID: 1102380-2
Date Sampled: 05/19/11 @ 1115
Date Analyzed: 05/19/11 @ 1335
Lab Contact: J. Carstens

Facility: Careaga
Description: Careaga 621
Note: Annual Crude Oil and Gas Testing

Meter: -
Pressure: 70 psig
Temperature: 88 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.00	0.00	-
Nitrogen	1.49	1.72	-
Carbon Dioxide	7.30	13.24	-
Hydrogen Sulfide	NA	NA	-
Methane	70.62	46.69	-
Ethane	8.49	10.52	2.162
Propane	5.92	10.76	1.632
i-Butane	0.88	2.10	0.288
n-Butane	2.63	6.31	0.832
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.66	1.95	0.240
n-Pentane	0.76	2.27	0.277
2,2-Dimethylbutane	0.08	0.28	0.028
2,3-Dimethylbutane	0.26	0.92	0.094
2-Methylpentane	0.52	1.86	0.189
3-Methylpentane	0.02	0.08	0.008
n-Hexane	0.07	0.23	0.028
Hexanes Plus	0.30	1.08	0.127
Totals	100.0	100.0	5.904

Specific Gravity, Calculated: 0.8378 air = 1.0000
Compressibility (Z) Factor: 0.9956

Gross Calorific Value
BTU/ft³ dry: 1243.2
BTU/ft³ wet: 1221.6

Net Calorific Value
BTU/ft³ dry: 1129.9
BTU/ft³ wet: 1110.3

CHONS	Weight %
Carbon	69.95
Hydrogen	18.71
Oxygen	9.62
Nitrogen	1.72
Sulfur	0.00

EPA 'F' Factor (60°F, 1ATM) 8609.3
SDCF/MMBTU

Hydrogen Sulfide = NA ppm
ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

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	mol %	mol%/100	MW	MW ROC
Methane	70.62	0.7062	16.044	11.30
Ethane	8.49	0.0849	30.07	2.55
Propane	5.92	0.0592	44.097	2.61
Iso-Butane	0.88	0.0088	58.12	0.51
N-Butane	2.63	0.0263	58.12	1.53
neo-pentane	0	0	72.15	0.00
i-Pentane	0.66	0.0066	72.15	0.48
n-Pentane	0.76	0.0076	72.15	0.55
2,2-Dimethylbutane	0.08	0.0008	86.18	0.07
2,3-Dimethylbutane	0.26	0.0026	86.18	0.22
2-Methylpentane	0.52	0.0052	86.18	0.45
3-Methylpentane	0.02	0.0002	86.18	0.02
n-Hexane	0.07	0.0007	86.18	0.06
Hexane Plus	0.3	0.003	86.18	0.26
ROC Mol%	12.10			

Total Mol Wt. ROC C3 to C6+	6.7523	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0178	

F.4.2 Gas Analysis (2012)

OILFIELD ENVIRONMENTAL AND COMPLIANCE

2012

Client: Venoco		SAMPLE ID: 1201898-1	
3201 Airpark Drive, Ste 205		Date Sampled: 04/16/12 @ 1610	
Santa Maria, CA 93455		Date Analyzed: 04/17/12 @ 1132	
Attn: John Garnett		Lab Contact: J. Carstens	
Facility: Careaga		Meter:	-
Description: Careaga 6-21 Fuel Gas		Pressure:	80 psia
Note: Annual Crude Oil and Gas Testing		Temperature:	73 °F

Gas Analysis by Chromatography - ASTM D 1946/3588

Component	Mole %	Weight %	GPM
Oxygen	0.00	0.00	-
Nitrogen	1.42	1.56	-
Carbon Dioxide	5.84	10.07	-
Hydrogen	0.00	0.00	-
Hydrogen Sulfide	0.00	0.00	-
Methane	58.98	43.36	-
Ethane	8.62	10.15	2.195
Propane	6.17	10.66	1.701
i-Butane	1.04	2.36	0.339
n-Butane	3.42	7.76	1.079
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.96	2.78	0.360
n-Pentane	1.25	3.55	0.454
2,2-Dimethylbutane	0.15	0.51	0.055
2,3-Dimethylbutane	0.55	1.86	0.199
2-Methylpentane	1.29	4.36	0.468
3-Methylpentane	0.07	0.22	0.024
n-Hexane	0.21	0.72	0.089
Hexanes Plus	0.02	0.05	0.006
Totals	100.0	100.0	6.969

Specific Gravity, Calculated	0.8810	air = 1			
Compressibility (Z) Factor	0.9949			CHONS	Weight %
				Carbon	72.14
Gross Calorific Value				Hydrogen	16.97
BTU/ft³ dry	1347.6			Oxygen	7.32
BTU/ft³ wet	1324.3			Nitrogen	1.56
				Sulfur	0.00
Net Calorific Value					
BTU/ft³ dry	1226.9		EPA 'F' Factor (60°F, 1ATM)		8568.4
BTU/ft³ wet	1205.6		SDCF/MMBTU		
Hydrogen Sulfide =	0.32	ppm			
Practical Quantitation Limit(PQL) =	0.05	ppm			

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

	mol %	mol%/100	MW	MW ROC
Methane	68.98	0.6898	16.044	11.04
Ethane	8.62	0.0862	30.07	2.59
Propane	6.17	0.0617	44.097	2.72
Iso-Butane	1.04	0.0104	58.12	0.60
N-Butane	3.42	0.0342	58.12	1.99
neo-pentane	0	0	72.15	0.00
i-Pentane	0.96	0.0098	72.15	0.71
n-Pentane	1.25	0.0125	72.15	0.90
2,2-Dimethylbutane	0.15	0.0015	86.18	0.13
2,3-Dimethylbutane	0.55	0.0055	86.18	0.47
2-Methylpentane	1.29	0.0129	86.18	1.11
3-Methylpentane	0.07	0.0007	86.18	0.06
n-Hexane	0.21	0.0021	86.18	0.18
Hexane Plus	0.02	0.0002	86.18	0.02
ROC Mol%	15.15			

Total Mol Wt. ROC C3 to C6+	8.8954	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0234	

Appendix G – Sierra Resources Barham/Boyne Lease Data

G.1 General Information

Permit #	8269-R7
Facility Name	Braham/Boyne Lease
FID	3777
Company	Purisima Hills LLC
Device ID #	3344

Make	Kaldair
Model	Indar I-6-AS
Max Heat Rating (MMBTU/hr)	17.5
Air Assisted?	no
Steam Assisted?	no

G.2 Gas Analysis Summary

Gas Information from Analysis		
	1	2
Location of Sample:	Separator to Flare	Separator to Flare
Actual Year of Analysis:	2013	2014
ROC Mol%	2.89	2.58
BTU Content (Btu/scf) HHV, dry, 14.696 psi 60F	906.7	859.2
lb ROC/scf	0.0047	0.0040
Assumed Control %	98	98
Outlet ROC (ppmv)	578	516
Calculated ROC Emission Factor (lb/MMBtu)	0.104	0.092
Gas Flared in Year (scf)	30601600	32200000
notes:	none	none

Weighted Average ROC Emission Factor based on flare volume:	0.098

Appendix G – Sierra Resources Barham/Boyne Lease Data

G.3.1 Annual Flare Volume (2013)

2013 Annual Report
H.P. Boyne Lease
PTO 08269-R7 & PTO 12930
SSID: 01153 FID: 03777

	Permitted	Actual Level
Oil Production	2000 BOPD	184 BOPD
Gas production	773 MSCFD	285.647 MSCFD
Flared Gas	0	30601.6 MSCF/year
H2S Level	796 PPM	23 PPM
Total Sulfur (D1072)	796 PPM	UNKNOWN
Storage Temperature of Oil		110° F
RVP		1.1 psia
TVP @ 110° F		1.51 psi
API Gravity		13.2 @ 60° F
Gas BTU Content		907 btu/scf
Solvents and Coatings Used		No Solvents or Coatings were used in 2013

Month	Oil Vol.	Oil Vol.	Gas Vol.	Gas Vol.	Oil Producing Days	Gas Burning Days [1]	Boiler Fuel Use	HT Fuel Use	Flare Gas Burned	Oil Shipments
	bbls/mo	bbls/day	mcf/mo	mcf/day	Days	Days	mcf/mo	mcf/mo	mcf/mo	Shipments
January	5103	165	8832.000	284.903	31	31	1742.2	449.5	2576.3	30
February	4804	172	7984.000	285.143	28	28	1573.6	406.0	2333.7	28
March	6022	194	8832.000	284.903	31	31	1742.2	449.5	2576.3	35
April	5687	190	8545.000	284.833	30	30	1686.0	435.0	2491.1	33
May	5427	175	8832.000	284.903	31	31	1742.2	449.5	2576.3	31
June	5590	186	8814.000	293.800	30	30	1686.0	435.0	2760.1	32
July	5917	191	8832.000	284.903	31	31	1742.2	449.5	2576.3	34
August	5915	191	8832.000	284.903	31	31	1742.2	449.5	2576.3	34
September	5514	184	8545.000	284.833	30	30	1686.0	435.0	2491.1	32
October	5751	186	8832.000	284.903	31	31	1742.2	449.5	2576.3	33
November	5660	189	8545.000	284.833	30	30	1686.0	435.0	2491.1	33
December	5975	193	8832.000	284.903	31	31	1742.2	449.5	2576.3	35
Totals	**67365**		**104257.000**		**365**	**365**	**20513**	**5292.5**	**30601.6**	**390**
Average	**5614**	**184**	**8688.083**	**285.647**			**1709**	**441**	**2550**	**32.500**

Notes: 1 Gas burned day represents the days which the boiler, heater treater (HT) and flare operated.

G.3.2 Annual Flare Volume (2014)

Sierra Resources, Inc.
H. P. Boyne Lease, Barham Ranch Field
2014 Annual Report

Table 2: Combustion Equipment Fuel Use Summary
January - December 2014
PTO 8269 Conditions 5.b, 5.c and 5.d

Month	Days on Production	Gas, MSCF	Flare Fuel Use		Heater Treater Fuel Use		Boiler Fuel Use		ICE Fuel Use
			Days on	Gas, MSCF	Days on	Gas, MSCF	Days on	Gas, MSCF	MScf/month
Jan	31	12,481	31	5,425	31	974	31	2,480	3601.5
Feb	28	11,623	28	5,250	28	880	28	2,240	3253.0
Mar	31	12,481	31	5,425	31	974	31	2,480	3601.5
Apr	30	12,078	30	5,250	30	943	30	2,400	3485.3
May	31	12,650	31	5,425	31	974	31	2,480	3770.4
Jun	30	12,313	30	5,250	30	943	30	2,400	3719.9
Semi-Annual	**181**	**73,625**	**181**	**32,025**	**181**	**5,689**	**181**	**14,480**	**21,432**
Jul	31	12,481	31	5425	31	974	31	2,480	3601.5
Aug	31	12,481	31	5425	31	974	31	2,480	3601.5
Sep	30	12,078	30	5250	30	943	30	2,400	3485.3
Oct	31	12,481	31	5425	31	974	31	2,480	3601.5
Nov	30	12,078	30	5250	30	943	30	2,400	3485.3
Dec	31	12,481	31	5425	31	974	31	2,480	3601.5
Semi-Annual	**184**	**74,079**	**184**	**32,200**	**184**	**5,783**	**184**	**14,720**	**21,377**
Total Annual	**365**	**147,705**	**365**	**64,225**	**365**	**11,471**	**365**	**29,200**	**42,808**

G.4.1 Gas Analysis (2013)

2013

OILFIELD ENVIRONMENTAL AND COMPLIANCE

Client:	Sierra Resource	SAMPLE ID:	1303883-1
	P.O. Box 1812	Date Sampled:	08/16/13 @ 1430
	Santa Maria, CA 93454	Date Analyzed:	08/16/13 @ 1725
Attn:	Charlie Katherman	Lab Contact:	J. Carstens
Facility:	HP Boyne Lease	Meter:	-
Description:	HP Boyne Seperator to Flare M-001	Pressure:	28 psig
Note:	Annual Oil and Gas Samples	Temp:	90 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.00	0.00	-
Nitrogen	0.33	0.41	-
Carbon Dioxide	17.83	34.77	-
Hydrogen Sulfide	0.00	0.00	-
Methane	77.73	55.25	-
Ethane	1.22	1.62	0.310
Propane	0.97	1.90	0.269
i-Butane	0.32	0.83	0.105
n-Butane	0.55	1.42	0.174
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.21	0.67	0.076
n-Pentane	0.13	0.42	0.047
2,2-Dimethylbutane	0.03	0.11	0.010
2,3-Dimethylbutane	0.07	0.27	0.025
2-Methylpentane	0.13	0.51	0.049
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.03	0.10	0.011
Hexanes Plus	0.45	1.71	0.188
Totals	100.0	100.0	1.265

Specific Gravity, Calculated	0.7792	air = 1		
Compressibility (Z) Factor	0.9970		CHONS	Weight %
			Carbon	58.73
Gross Calorific Value			Hydrogen	15.57
BTU/ft³ dry	906.7		Oxygen	25.28
BTU/ft³ wet	890.9		Nitrogen	0.41
			Sulfur	0.00
Net Calorific Value				
BTU/ft³ dry	819.0		EPA 'F' Factor (60°F, 1ATM)	8704.3
BTU/ft³ wet	804.7		SDCF/MMBTU	

Hydrogen Sulfide = 23 ppm

All results reported at 60°F and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

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	mol %	mol%/100	MW	MW ROC
Methane	77.73	0.7773	16.044	12.44
Ethane	1.22	0.0122	30.07	0.37
Propane	0.97	0.0097	44.097	0.43
Iso-Butane	0.32	0.0032	58.12	0.19
N-Butane	0.55	0.0055	58.12	0.32
neo-pentane	0	0	72.15	0.00
i-Pentane	0.21	0.0021	72.15	0.15
n-Pentane	0.13	0.0013	72.15	0.09
2,2-Dimethylbutane	0.03	0.0003	86.18	0.03
2,3-Dimethylbutane	0.07	0.0007	86.18	0.06
2-Methylpentane	0.13	0.0013	86.18	0.11
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0.03	0.0003	86.18	0.03
Hexane Plus	0.45	0.0045	86.18	0.39
ROC Mol%	2.89			

Total Mol Wt. ROC C3 to C6+	1.7906	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0047	

G.4.2 Gas Analysis (2014)

2014

OILFIELD ENVIRONMENTAL AND COMPLIANCE

Client: Sierra Resource	SAMPLE ID: 1404323-1
P.O. Box 1812	Date Sampled: 09/17/14 @ 0915
Santa Maria, CA 93454	Date Analyzed: 09/20/14 @ 1201
Attn: Marianne Strange	Lab Contact: J. Carstens
Facility: HP Boyne Lease	Meter: -
Description: HP Boyne Separator to Flare M-001	Pressure: 25 psig
Note: Annual Oil and Gas Samples	Temp: 90 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	1.27	1.81	-
Nitrogen	5.32	6.67	-
Carbon Dioxide	15.02	29.59	-
Hydrogen Sulfide	0.00	0.01	-
Methane	74.59	53.56	-
Ethane	1.22	1.64	0.311
Propane	0.98	1.94	0.271
i-Butane	0.32	0.84	0.106
n-Butane	0.59	1.54	0.187
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.23	0.73	0.083
n-Pentane	0.15	0.48	0.054
2,2-Dimethylbutane	0.03	0.11	0.010
2,3-Dimethylbutane	0.08	0.30	0.028
2-Methylpentane	0.11	0.43	0.040
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.00	0.00	0.000
Hexanes Plus	0.09	0.34	0.037
Totals	100.0	100.0	1.128

Specific Gravity, Calculated	0.7714 air = 1		
Compressibility (Z) Factor	0.9973		
Gross Calorific Value		CHONS	Weight %
BTU/ft³ dry	859.2	Carbon	55.05
BTU/ft³ wet	844.2	Hydrogen	14.96
		Oxygen	23.32
		Nitrogen	6.67
		Sulfur	0.01
Net Calorific Value			
BTU/ft³ dry	775.8	EPA 'F' Factor (60°F, 1ATM,	8750.8
BTU/ft³ wet	762.3	SDCF/MMBTU	

Hydrogen Sulfide = 40 ppm

All results reported at 60°F and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

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	mol %	mol%/100	MW	MW ROC
Methane	74.59	0.7459	16.044	11.94
Ethane	1.22	0.0122	30.07	0.37
Propane	0.98	0.0098	44.097	0.43
Iso-Butane	0.32	0.0032	58.12	0.19
N-Butane	0.59	0.0059	58.12	0.34
neo-pentane	0	0	72.15	0.00
i-Pentane	0.23	0.0023	72.15	0.17
n-Pentane	0.15	0.0015	72.15	0.11
2,2-Dimethylbutane	0.03	0.0003	86.18	0.03
2,3-Dimethylbutane	0.08	0.0008	86.18	0.07
2-Methylpentane	0.11	0.0011	86.18	0.09
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0	0	86.18	0.00
Hexane Plus	0.09	0.0009	86.18	0.08
ROC Mol%	2.58			

Total Mol Wt. ROC C3 to C6+	1.5024	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ perft3	0.0040	

Appendix H – Sierra Resources Blair Lease (1) Data

H.1 General Information

Permit #	8837-R8
Facility Name	Blair Lease
FID	2637
Company	Purisima Hills LLC
Device ID #	1412

Make	Kaldair
Model	Indair I-6
Max Heat Rating (MMBTU/hr)	91.88
Air Assisted?	no
Steam Assisted?	no

H.2 Gas Analysis Summary

Gas Information from Analysis		
	1	2
Location of Sample:	Separator to Flare	Separator to Flare
Actual Year of Analysis:	2013	2014
ROC Mol%	6.74	5.49
BTU Content (Btu/scf) HHV, dry, 14.73 psi 60F	1061.2	1023.4
lb ROC/scf	0.010	0.008
Assumed Control %	98	98
Outlet ROC (ppmv)	1348	1098
Calculated ROC Emission Factor (lb/MMBtu)	0.194	0.149
Gas Flared in Year (scf)	201878500	223380000
notes:	none	none

Weighted Average ROC Emission Factor based on flare volume:	0.170

Appendix H – Sierra Resources Blair Lease (1) Data

H.3.1 Annual Flare Volume (2013)

2013 Annual Report
Blair Lease
PTO 08837-R7 & PTO 09435-R5
SSID: 02638 FID: 02637

	Permitted	Actual Level
Oil Production	3000 BOPD	131 BOPD
Gas production	2,100 MSCFD	658.3 MSCFD
Flared Gas		240,253 MSCF/year
H2S Level	150 PPM	23 PPM
Total Sulfur (D1072)	150 PPM	UNKNOWN
Storage Temperature of Oil		120° F
RVP		3.2 psia
TVP @ 120° F		4.71 psi
API Gravity		30.0 @ 60° F
Gas BTU Content		1061 btu/scf
Solvents and Coatings Used		No Solvents or Coatings were used in 2013

Month	Oil Vol.	Oil Vol.	Gas Vol.	Gas Vol.	Oil Producing Days	Gas Burning Days [1]	Tank Heater Fuel Use	Flare Gas Burned	VRU Flare Gas Burned	Oil Shippments
	bbls/mo	bbls/day	mcf/mo	mcf/day	Days	Days	mcf/mo	mcf/mo	mcf/mo	Shipments
January	4906	158	22204	716.26	31	31	947.3	18944.8	7.94	28
February	3417	122	18616	664.86	28	28	855.6	15672.2	7.17	20
March	4151	134	20618	665.10	31	31	947.3	17358.8	7.94	24
April	3917	131	19955	665.17	30	30	916.7	16800.9	7.68	23
May	3739	121	20618	665.10	31	31	947.3	17358.8	7.94	21
June	3853	128	20567	685.57	30	30	916.7	17412.9	7.68	22
July	4079	132	19032	613.94	31	31	947.3	15772.8	7.94	23
August	4075	131	19032	613.94	31	31	947.3	15772.8	7.94	23
September	3800	127	18420	614.00	30	30	916.7	15265.9	7.68	22
October	4023	130	20618	665.10	31	31	947.3	17358.8	7.94	23
November	3933	131	19955	665.17	30	30	916.7	16800.9	7.68	23
December	4118	133	20618	665.10	31	31	947.3	17358.8	7.94	24
Totals	**48011**		**240253**		**365**	**365**	**11153.2**	**201878.5**	**93.4**	**276**
Average	**4001**	**131**	**20021.1**	**658.27**			**929**	**16823**	**7.79**	**23.000**

Notes: 1 Gas burned day represents the days which the tank and flares operated.

H.3.2 Annual Flare Volume (2014)

Sierra Resources, Inc.
Blair Lease
2014 Annual Report

Table 2: Combustion Equipment Fuel Use Summary
January - December 2014
PTO 8837 Conditions 5.f and 5.g

	Production Flare		Tank Heater			IC Engines
Month	Days on	Gas, MScf	Days on	Gas, MScf	Propane, MSCF	Gas, MScf
Jan	31	18,972	31	850	0	3,094
Feb	28	17,136	28	768	0	2,795
Mar	31	18,972	31	850	0	3,094
Apr	30	18,360	30	823	0	2,995
May	31	18,972	31	850	0	3,094
Jun	30	18,360	30	823	0	2,995
Semi-Annual	**181**	**110,772**	**181**	**4,965**	**0**	**18,067**
Jul	31	18,972	31	850	0	3,094
Aug	31	18,972	31	850	0	3,101
Sep	30	18,360	30	823	0	2,995
Oct	31	18,972	31	850	0	3,094
Nov	30	18,360	30	823	0	2,995
Dec	31	18,972	31	850	0	3,094
Semi-Annual	**184**	**112,608**	**184**	**5,047**	**0**	**18,373**
Total Annual	**365**	**223,380**	**365**	**10,011**	**0**	**36,440**

H.4.1 Gas Analysis (2013)

OILFIELD ENVIRONMENTAL AND COMPLIANCE, INC

2013

Client:	Sierra Resource	SAMPLE ID:	1303884-1
	P.O. Box 1812	Date Sampled:	08/16/13 @ 1400
	Santa Maria, CA 93454	Date Analyzed:	08/16/13 @ 1759
Attn:	Charlie Katherman	Lab Contact:	J. Carstens
Facility:	Blair Lease	Meter:	-
Description:	Blair Lease Seperator to Flare M-001	Pressure:	42 psig
Note:	Annual Oil and Gas Sample	Temp:	102 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.00	0.00	-
Nitrogen	2.21	2.75	-
Carbon Dioxide	10.35	20.22	-
Hydrogen Sulfide	0.00	0.00	-
Methane	77.18	54.96	-
Ethane	3.52	4.70	0.898
Propane	2.95	5.78	0.814
i-Butane	0.52	1.34	0.170
n-Butane	1.40	3.62	0.443
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.40	1.28	0.146
n-Pentane	0.40	1.28	0.144
2,2-Dimethylbutane	0.05	0.18	0.017
2,3-Dimethylbutane	0.16	0.60	0.057
2-Methylpentane	0.35	1.32	0.125
3-Methylpentane	0.01	0.05	0.005
n-Hexane	0.00	0.00	0.000
Hexanes Plus	0.50	1.91	0.210
Totals	100.0	100.0	3.029

Specific Gravity, Calculated	0.7778	air = 1			
Compressibility (Z) Factor	0.9966			CHONS	Weight %
				Carbon	64.78
Gross Calorific Value				Hydrogen	17.77
BTU/ft³ dry	1061.2			Oxygen	14.70
BTU/ft³ wet	1042.7			Nitrogen	2.75
				Sulfur	0.00
Net Calorific Value					
BTU/ft³ dry	961.3		EPA 'F' Factor (60°F, 1ATM)		8634.9
BTU/ft³ wet	944.6		SDCF/MMBTU		

Hydrogen Sulfide = 5.9 ppm

All results reported at 60°F and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

307 ROEMER WAY I SUITE 300 I SANTA MARIA I CA 93454 I (805) 922-4772 I FAX (805) 925-3376

	mol %	mol%/100	MW	MW ROC
Methane	77.18	0.7718	16.044	12.35
Ethane	3.52	0.0352	30.07	1.06
Propane	2.95	0.0295	44.097	1.30
Iso-Butane	0.52	0.0052	58.12	0.30
N-Butane	1.4	0.014	58.12	0.81
neo-pentane	0	0	72.15	0.00
i-Pentane	0.4	0.004	72.15	0.29
n-Pentane	0.4	0.004	72.15	0.29
2,2-Dimethylbutane	0.05	0.0005	86.18	0.04
2,3-Dimethylbutane	0.16	0.0016	86.18	0.14
2-Methylpentane	0.35	0.0035	86.18	0.30
3-Methylpentane	0.01	0.0001	86.18	0.01
n-Hexane	0	0	86.18	0.00
Hexane Plus	0.5	0.005	86.18	0.43
ROC Mol%	6.74			

Total Mol Wt. ROC C3 to C6+	3.9161	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0103	

H.4.2 Gas Analysis (2014)

2014

OILFIELD ENVIRONMENTAL AND COMPLIANCE

Client: Sierra Resource
P.O. Box 1812
Santa Maria, CA 93454
Attn: Marianne Strange

SAMPLE ID: 1404324-1
Date Sampled: 09/17/14 @ 0945
Date Analyzed: 09/20/14 @ 1321
Lab Contact: J. Carstens

Facility: Blair Lease
Description: Blair Lease Separator to Flare M-001
Note: Annual Oil and Gas Samples

Meter: -
Pressure: 50 psig
Temp: 84 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.00	0.00	-
Nitrogen	2.27	2.94	-
Carbon Dioxide	9.79	19.97	-
Hydrogen Sulfide	0.00	0.00	-
Methane	78.81	58.61	-
Ethane	3.63	5.06	0.925
Propane	3.01	6.15	0.829
i-Butane	0.49	1.33	0.162
n-Butane	1.35	3.63	0.426
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.23	0.77	0.084
n-Pentane	0.23	0.78	0.084
2,2-Dimethylbutane	0.04	0.16	0.015
2,3-Dimethylbutane	0.04	0.17	0.015
2-Methylpentane	0.10	0.42	0.038
3-Methylpentane	0.00	0.00	0.000
n-Hexane	0.00	0.00	0.000
Hexanes Plus	0.00	0.00	0.000
Totals	100.0	100.0	2.578

Specific Gravity, Calculated 0.7448 air = 1
Compressibility (Z) Factor 0.9970

Gross Calorific Value
BTU/ft³ dry 1023.4
BTU/ft³ wet 1005.6

Net Calorific Value
BTU/ft³ dry 925.9
BTU/ft³ wet 909.8

CHONS	Weight %
Carbon	64.42
Hydrogen	18.12
Oxygen	14.52
Nitrogen	2.94
Sulfur	0.00

EPA 'F' Factor (60°F, 1ATM) 8641.3 SDCF/MMBTU

Hydrogen Sulfide = 12 ppm
All results reported at 60°F and 14.696 psia.
ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

307 ROEMER WAY | SUITE 300 | SANTA MARIA | CA 93453 | (805)922-4772 | FAX (805)925-3376 | oecusa.com

	mol %	mol%/100	MW	MW ROC
Methane	78.81	0.7881	16.044	12.61
Ethane	3.63	0.0363	30.07	1.09
Propane	3.01	0.0301	44.097	1.33
Iso-Butane	0.49	0.0049	58.12	0.28
N-Butane	1.35	0.0135	58.12	0.78
neo-pentane	0	0	72.15	0.00
i-Pentane	0.23	0.0023	72.15	0.17
n-Pentane	0.23	0.0023	72.15	0.17
2,2-Dimethylbutane	0.04	0.0004	86.18	0.03
2,3-Dimethylbutane	0.04	0.0004	86.18	0.03
2-Methylpentane	0.1	0.001	86.18	0.09
3-Methylpentane	0	0	86.18	0.00
n-Hexane	0	0	86.18	0.00
Hexane Plus	0	0	86.18	0.00
ROC Mol%	5.49			

Total Mol Wt. ROC C3 to C6+	2.8837	lb/lbmol
At STP 1 lb-mol =	379.48	scf
Total lbs of ROC C3 to C6+ per ft3	0.0076	

Appendix I - Sierra Resources Blair Lease (2) Data

I.1 General Information

Permit #	ATC 14405
Facility Name	Blair Lease, Drum Canyon Production Facility
FID	8673
Company	Sierra Resources, Inc.
Device ID #	387448

Make	Indair
Model	I-9-AS
Max Heat Rating (MMBTU/hr)	33.4
Air Assisted?	no
Steam Assisted?	no

I.2 Gas Analysis Summary

Gas Information from Analysis	
	1
Location of Sample:	Separator to Flare
Actual Year of Analysis:	2014
ROC Mol%	7.31
BTU Content (Btu/scf) HHV, dry, 14.696 psi 60F	1146.5
lb ROC/scf	0.0106
Assumed Control %	98
Outlet ROC (ppmv)	1462
Calculated ROC Emission Factor (lb/MMBtu)	0.186
Gas Flared in Year (scf)	450240
notes:	tested on 12/26/2014 , Drum canyon facility began operation on December 9, 2014

Weighted Average ROC Emission Factor based on flare volume:	0.186

I.3.1 Annual Flare Volume (2014)

Sierra Resources, Inc.
ATC 14405, Drum Canyon, Blair Lease
2014 Annual Report

Table 2: Daily Flare Log
December 2014
ATC 14405 Condition 5.c

Day of Month	Volume of Gas Combusted, MScf
1	0.00
2	0.00
3	0.00
4	0.00
5	0.00
6	0.00
7	0.00
8	0.00
9	0.00
10	0.00
11	0.00
12	0.00
13	0.00
14	0.00
15	0.00
16	28.14
17	28.14
18	28.14
19	28.14
20	28.14
21	28.14
22	28.14
23	28.14
24	28.14
25	28.14
26	28.14
27	28.14
28	28.14
29	28.14
30	28.14
31	28.14
Total	450.24

I.4.1 Gas Analysis (2014)

2014

OILFIELD ENVIRONMENTAL & COMPLIANCE, INC.

Client: Sierra Resource	SAMPLE ID: 1405771-1
P.O. Box 1812	Date Sampled: 12/26/14 @ 0845
Santa Maria, CA 93454	Date Analyzed: 12/26/14 @ 1454
Attn: Marianne Strange	Lab Contact: J. Carstens
Facility: Drum Canyon	Meter: -
Description: Drum Canyon Gas Scrubber	Pressure: 27 psig
Note: Annual Oil and Gas Samples	Temp: 21 °F

Gas Analysis by Chromatography - ASTM D 1945/3588

Component	Mole %	Weight %	G/MCF
Oxygen	0.02	0.04	-
Nitrogen	1.94	2.62	-
Carbon Dioxide	3.31	7.03	-
Hydrogen Sulfide	0.00	0.00	-
Methane	82.62	63.90	-
Ethane	4.80	6.95	1.222
Propane	3.68	7.82	1.014
i-Butane	0.54	1.52	0.177
n-Butane	1.54	4.30	0.485
neo-Pentane	0.00	0.00	0.000
i-Pentane	0.41	1.43	0.150
n-Pentane	0.52	1.81	0.189
2,2-Dimethylbutane	0.06	0.26	0.023
2,3-Dimethylbutane	0.00	0.00	0.000
2-Methylpentane	0.21	0.86	0.075
3-Methylpentane	0.26	1.09	0.095
n-Hexane	0.01	0.05	0.005
Hexanes Plus	0.08	0.33	0.034
Totals	100.0	100.0	3.468

Specific Gravity, Calculated	0.7162	air = 1		
Compressibility (Z) Factor	0.9968		CHONS	Weight %
Gross Calorific Value			Carbon	71.37
BTU/ft³ dry	1146.5		Hydrogen	20.86
BTU/ft³ wet	1126.5		Oxygen	5.15
			Nitrogen	2.62
Net Calorific Value			Sulfur	0.00
BTU/ft³ dry	1038.5	EPA 'F' Factor (60°F, 1ATM)		8564.5
BTU/ft³ wet	1020.4	SDCF/MMBTU		

Hydrogen Sulfide = 2.2 ppm

All results reported at 60°F and 14.696 psia.

ND: None Detected NA: Not Analyzed G/MCF: Gallons/Thousand Cubic Feet

307 ROEMER WAY | SUITE 300 | SANTA MARIA | CA 93454 | (805) 922-4772 | FAX (805) 925-3376

	mol %	mol%/100	MW	MW ROC
Methane	82.62	0.8262	16.044	13.22
Ethane	4.8	0.048	30.07	1.44
Propane	3.68	0.0368	44.097	1.62
Iso-Butane	0.54	0.0054	58.12	0.31
N-Butane	1.54	0.0154	58.12	0.90
neo-pentane	0	0	72.15	0.00
i-Pentane	0.41	0.0041	72.15	0.30
n-Pentane	0.52	0.0052	72.15	0.38
2,2-Dimethylbutane	0.06	0.0006	86.18	0.05
2,3-Dimethylbutane	0	0	86.18	0.00
2-Methylpentane	0.21	0.0021	86.18	0.18
3-Methylpentane	0.26	0.0026	86.18	0.22
n-Hexane	0.01	0.0001	86.18	0.01
Hexane Plus	0.08	0.0008	86.18	0.07
ROC Mol%	7.31			

Total Mol Wt. ROC C3 to C6+	4.0370
At STP 1 lb-mol =	379.48
Total lbs of ROC C3 to C6+ per ft3	0.0106