Peakview Environmental LLC

Via Electronic Mail

October 17, 2018

Claudia Smith
Tribal NSR Permits Lead
USEPA Region 8
1595 Wynkoop Street
Denver, CO 80202

RE: Federal New Minor Source Review Program in Indian Country
Registration for Existing Sources
EP Energy E&P Company, L.P.
Murray 2-15A1E

Dear Ms. Smith:

On behalf of EP Energy E&P Company, L.P. (EP Energy), Peakview Environmental, LLC (Peakview) is submitting the enclosed Registration for Existing Sources for the Murray 2-15A1E site. The well site began production on September 29, 2016.

On November 28, 2016 Approval Order No. AN150150002-16 was issued for the site by the Utah Department of Environmental Quality, Division of Air Quality (UDAQ). On August 28, 2018 EP Energy was notified that the Murray 2-15A1E site lies within the EPA's boundary for Indian Country and is not under the jurisdiction of UDAQ. Therefore, EP Energy is submitting this Registration for Existing Sources under the USEPA Federal Minor New Source Review Program in Indian Country.

Please contact Chelsea Cantrelle, EP Energy at chelsea.cantrelle@epenergy.com or me at julie.spear@epenergy.com with any questions.

Sincerely,

PEAKVIEW ENVIRONMENTAL, LLC

Julie Spear

Julie Spear, PE
Principal Engineer

Enclosures

cc: Chelsea Cantrelle, EP Energy
Bruce Pargeets, Director, Ute Indian Tribe Energy & Minerals Department
Minnie Grant, Air Coordinator, Ute Indian Tribe Energy & Minerals Department

ED_004016P_00013358-00001

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN COUNTRY
40 CFR 49.151

Registration for Existing Sources
(FORM REG)

Use of this information request form is voluntary and not yet approved by the Office of Management and Budget. The following is a check list of the type of information that Region 8 will use to process information on your registration. While submittal of this form is not required, it does offer details on the information we will use to complete your registration and providing the information requested will help build an existing source emissions inventory. Use of application forms for this program is currently under Office of Management and Budget review and these information request forms will be replaced/updated after that review is completed.

Please submit information to following two entities:

Federal Minor NSR Permit Coordinator
U.S. EPA, Region 8
1595 Wynkoop Street, 8P-AR
Denver, CO 80202-1129
R8airpermitting@epa.gov

For more information, visit:
http://www.epa.gov/caa-permitting/tribal-nsr-permitting-region-8

The Tribal Environmental Contact for the specific reservation:
Minnie Grant
If you need assistance in identifying the appropriate Tribal Environmental Contact and address, please contact:

R8airpermitting@epa.gov

A. GENERAL SOURCE INFORMATION

1. (a) **Company Name** (Who owns this facility?) **EP Energy E&P Company, L.P.** (b) **Operator Name** (Is the company that operates this facility different than the company that owns this facility? What is the name of the company?)	2. **Facility Name** **Murray 2-15A1E** **API# 43-047-55501**
3. Type of Operation **Oil and Gas Production Facility**	4. Portable Source? Yes No **X** 5. Temporary Source? Yes No **X**
6. NAICS Code **211111**	7. SIC Code **1311**
8. Physical Address (Or, home base for portable sources) **Remote location near Altamont, UT**	

9. Reservation*	10. County*	11a. Latitude (decimal format)*	11b. Longitude (decimal format)*
Uintah and Ouray	**Uintah**	**40.39134**	**-109.87350**
12a. Quarter Quarter Section*	12b. Section*	12c. Township*	12d. Range*
SWSW	**15**	**1S**	**1E**

* Provide all locations of operation for portable sources

B. CONTACT INFORMATION

Company Contact (Who is the primary contact for the company that owns this facility?) **Chelsea Cantrelle**	Title **HSER Advisor**
Mailing Address **P.O. Box 4660 Houston, TX 77210-4660**	
Email Address **chelsea.cantrelle@epenergy.com**	
Telephone Number **713-997-6206**	Facsimile Number

Operator Contact (Is the company that operates this facility different than the company that owns this facility? Who is the primary contact for the company that operates this source?)	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number

Permitting Contact (Who is the person primarily responsible for Clean Air Act permitting for the company? We are seeking one main contact for the company. Please do not list consultants.) **Chelsea Cantrelle**	Title **HSER Advisor**
Mailing Address **P.O. Box 4660, Houston, TX 77210-4660**	
Email Address **chelsea.cantrelle@epenergy.com**	
Telephone Number **713-997-6206**	Facsimile Number

Compliance Contact (Is the person responsible for Clean Air Act compliance for this company different than the person responsible for Clean Air Act permitting? Who is the person primarily responsible for Clean Air Act compliance for the company? We are seeking one main contact for the company. Please do not list consultants.) **Chelsea Cantrelle**	Title **HSER Advisor**
Mailing Address **P.O. Box 4660, Houston, TX 77210-4660**	
Email Address **chelsea.cantrelle@epenergy.com**	
Telephone Number **713-997-6206**	Facsimile Number

C. ATTACHMENTS

Include all of the following information as attachments to this form

Narrative description of the operations

Identification and description of all emission units and air pollution generating activities (with the exception of the exempt emissions units and activities listed in §49.153(c)

Identification and description of any existing air pollution control equipment and compliance monitoring devices or activities

Type and amount of each fuel used

Type raw materials used

Production Rates

Operating Schedules

Any existing limitations on source operations affecting emissions or any work practice standards, where applicable, for all regulated NSR pollutants at your source.

Total allowable (potential to emit if there are no legally and practically enforceable restrictions) emissions from the air pollution source for the following air pollutants: particulate matter, PM_{10}, $PM_{2.5}$, sulfur oxides (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

Estimates of the total actual emissions from the air pollution source for the following air pollutants: particulate matter, PM_{10}, $PM_{2.5}$, sulfur oxides (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

Other

The public reporting and recordkeeping burden for this collection of information is estimated to average 6 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

D. TABLE OF ESTIMATED EMISSIONS

The following estimates of the total emissions in tons/year for all pollutants contained in your worksheet stated above should be provided.

Pollutant	Total Actual Emissions (tpy)	Total Allowable or Potential Emissions (TPY)	
PM	0.31	0.31	PM - Particulate Matter PM_{10} - Particulate Matter less than 10 microns in size $PM_{2.5}$ - Particulate Matter less than 2.5 microns in size SO2 - Sulfur Oxides NOx - Nitrogen Oxides CO - Carbon Monoxide VOC - Volatile Organic Compound Pb - Lead and lead compounds Fluorides - Gaseous and particulates H_2SO_4 - Sulfuric Acid Mist H_2S - Hydrogen Sulfide TRS - Total Reduced Sulfur RSC - Reduced Sulfur Compounds
PM_{10}	0.31	0.31	
$PM_{2.5}$	0.31	0.31	
SO_2	0.01	0.01	
NO_x	6.44	6.44	
CO	11.54	11.54	
VOC	15.54	15.54	
Pb	NA	NA	
Fluorides	NA	NA	
H_2SO_4	NA	NA	
H_2S	0.00	0.00	
TRS	0.00	0.00	
RSC	0.00	0.00	

Emissions calculations must include fugitive emissions if the source is one the following listed sources, pursuant to CAA Section 302(j):

(a) Coal cleaning plants (with thermal dryers);
(b) Kraft pulp mills;
(c) Portland cement plants;
(d) Primary zinc smelters;
(e) Iron and steel mills;
(f) Primary aluminum ore reduction plants;
(g) Primary copper smelters;
(h) Municipal incinerators capable of charging more than 250 tons of refuse per day;
(i) Hydrofluoric, sulfuric, or nitric acid plants;
(j) Petroleum refineries;
(k) Lime plants;
(l) Phosphate rock processing plants;
(m) Coke oven batteries;
(n) Sulfur recovery plants;
(o) Carbon black plants (furnace process);
(p) Primary lead smelters;
(q) Fuel conversion plants;
(r) Sintering plants;
(s) Secondary metal production plants;
(t) Chemical process plants
(u) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input;
(v) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels;
(w) Taconite ore processing plants;
(x) Glass fiber processing plants;
(y) Charcoal production plants;
(z) Fossil fuel-fired steam electric plants of more that 250 million British thermal units per hour heat input, and
(aa) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.

Instructions

Please answer all questions. If the item does not apply to the source and its operations write "n/a". If the answer is not known write "unknown".

A. General Source Information

1. Company Name & Operator Name (if the operator of the facility is different than the owner, please provide this information): Provide the complete company and operator names. For corporations, include divisions or subsidiary names, if any.

2. Facility Name: Provide the facility name. Please note that a facility is a site, place, location, etc… that may contain one or more air pollution emitting units.

3. Type of Operation: Indicate the generally accepted name for the operation (i.e., asphalt plant, gas station, dry cleaner, sand & gravel mining, oil and gas wellsite, tank battery, etc.).

4. Portable Source: Will this facility operate in more than one location? Some examples of portable sources include asphalt batch plants and concrete batch plants.

5. Temporary Source: A temporary source, in general, would have emissions that are expected last less than 12 months.

6. NAICS Code: North American Industry Classification System. The NAICS Code for your facility can be found at the following link → North American Industry Classification System (http://www.census.gov/epcd/naics/nsic2ndx.htm#S1).

7. SIC Code: Standard Industrial Classification Code. Although the new North American Industry Classification System (NAICS) has replaced the SIC codes, much of the Clean Air Act permitting processes continue to use these codes. The SIC Code for your facility can be found at the following link → Standard Industrial Classification Code (http://www.osha.gov/pls/imis/sic_manual.html).

8. Physical Address: Provide the actual address of where you are proposing to construct the new facility, not the mailing address. Include the State and the ZIP Code.

9. Reservation: Provide the name of the Indian reservation within which the facility will be constructed.

10. County: Provide the County within which the source will be constructed.

11a & 11b. Latitude & Longitude: These are GPS (global positioning system) coordinates.

12a – 12d. Section-Township-Range: Please provide these coordinates in 1/4 Section/Section/Township/Range. (e.g., SW ¼, NE ¼ S36/T10N/R21E).

B. Contact Information

Please provide the information, requested, in full.

1. Company Contact: Provide the full name of the primary contact for the company that owns the facility.

2. Operator Contact: Provide the name of the primary contact for the company that operates the facility if the company operating the facility is different from the company that owns the facility.

3. Permitting Contact: Provide the name of primary contact, for permitting decisions, at the company that owns the facility or the company that operates the facility.

4. Compliance Contact: Provide the name of primary contact, responsible for compliance of the facility, at the company that owns the facility or the company that operates the facility. If this is the same as the Permitting Contact please note this on the form.

C. Attachments

The information requested in the attachments will enable EPA to understand the type of source being registered and the nature and extent of the air pollutants being emitted.

D. Total Emissions

1. Allowable Emissions (See also, Potential to Emit): Emissions rate of a source calculated using the maximum rated capacity of the source (unless the source is subject to practically and legally enforceable limits which restrict the operating rate, or hours of operation, or both) and the most stringent of the following:

   a) Any applicable standards as set forth in 40 CFR parts 60 and 61;

   b) Any applicable Tribal or Federal Implementation Plan emissions limitation, including those with a future compliance date; or

   c) Any emissions rate specified as a federally enforceable permit condition, including those with a future compliance date.

2. Potential to Emit: The maximum capacity of a source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is enforceable as a practical matter. See Allowable Emissions.

3. Actual Emissions: Estimates of actual emissions must take into account equipment, operating conditions, and air pollution control measures. For a source that operated during the entire calendar year preceding the initial registration submittal, the reported actual emissions typically should be the annual emissions for the preceding calendar year, calculated using the actual

operating hours, production rates, in-place control equipment, and types of materials processed, stored, or combusted during the preceding calendar year. However, if you believe that the actual emissions in the preceding calendar year are not representative of the emissions that your source will actually emit in coming years, you may submit an estimate of projected actual emissions along with the actual emissions from the preceding calendar year and the rationale for the projected actual emissions. For a source that has not operated for an entire year, the actual emissions are the estimated annual emissions for the current calendar year.

4. The emission estimates can be based upon actual test data or, in the absence of such data, upon procedures acceptable to the Reviewing Authority. The following procedures are generally acceptable for estimating emissions from air pollution sources:

   (i) Source-specific emission tests;
   (ii) Mass balance calculations;
   (iii) Published, verifiable emission factors that are applicable to the source. (i.e., manufacturer specifications).
   (iv) Other engineering calculations; or
   (v) Other procedures to estimate emissions specifically approved by the Reviewing Authority.

5. Guidance for estimating emissions can be found at http://www.epa.gov/ttn/chief/efpac/index.html.

MINOR NSR REGISTRATION FOR EXISTING SOURCE FORM REG - ATTACHMENT

Murray 2-15A1E
Remote Location
Uintah County, Utah

Prepared For: EP ENERGY

EP Energy E&P Company, L.P.
P.O. Box 4660
Houston, Texas 77210-4660

Submitted By: Peakview Environmental LLC
2412 Iris Avenue
Boulder, Colorado 80304

October 2018 **Project No. EP0522018**

Table of Contents

1.0 INTRODUCTION 1
1.1 Project Description 1
2.0 PROCESS DESCRIPTION 2
3.0 EMISSION CALCULATIONS 3
3.1 Representative Analysis 3
3.2 Green House Gas Emissions 3
3.3 Storage Tanks 3
3.3.1 Oil Storage Tanks 3
3.3.2 Produced Water Storage Tank 3
3.3.3 Overflow Storage Tank 3
3.4 Crude Oil and Produced Water Loading 4
3.5 Heaters 4
3.6 Equipment Fugitives 4
3.7 Combustor 4
3.8 Internal Combustion Engine 4
4.0 FEDERAL REGULATORY APPLICABILITY ANALYSIS 5
4.1 New Source Performance Standards (40 CFR Part 60) 5
4.2 National Emission Standards for Hazardous Air Pollutants (40 CFR Part 63) 6

List of Appendices

Appendix A Process Flow Diagram and Site Plan
Appendix B Emissions Calculations

1.0 INTRODUCTION

EP Energy E&P Company L.P. (EP Energy) owns and operates the Murray 2-15A1E site (site), an existing oil and gas production site located in Uintah County, Utah. The site began production on September 29, 2016. The site services one well, Murray 2-15A1E, API# 43-047-55501. The site produces up to 150,000 barrels of oil per year (BOPY) or 411 barrels of oil per day (BOPD).

On November 28, 2016 Approval Order No. AN150150002-16 was issued for the site by the Utah Department of Environmental Quality, Division of Air Quality (UDAQ). On August 28, 2018 EP Energy was notified that the Murray 2-15A1E site lies within the EPA's boundary for Indian Country and is not under the jurisdiction of UDAQ. Therefore, EP Energy is submitting this Registration for Existing Sources under the USEPA Federal Minor New Source Review Program in Indian Country.

1.1 Project Description

Equipment/emission sources currently permitted at the site consist of the following:

- Two (2) 500-bbl heated oil storage tanks
- One (1) 600-bbl heated produced water storage tank
- One (1) 600-bbl heated overflow storage tank
- One (1) heater treater and various natural gas-fired heaters ≤7.5-MMBtu/hr combined total
- One 300-horsepower (hp) natural gas-fired generator engine
- Oil and produced water truck loading
- One (1) 2.7-MMBtu/hr combustor
- Equipment fugitives
- Electric pump jack

2.0 PROCESS DESCRIPTION

The Murray 2-15A1E site includes one wellhead with separation and storage capability. With this modification, the produces up to 150,000 BOPY (411 BPOD). The site operates 8,760 hours per year. A general process flow diagram and site plan are included in Appendix A.

Well production is brought to the surface via an electric pump jack and routed to a heater treater to separate the well fluids into three constituent phases: oil, gas and water. The separated oil phase is routed to the heated oil storage tanks prior to truck transport offsite to sales. The separated water phase is routed to the heated produced water storage tank prior to being transported offsite for disposal. Both oil and produced water is transferred to tanker trucks utilizing the submerged loading method. The separated gas phase is routed to the gas sales pipeline. During an emergency upset condition oil or produced water may be rerouted to an overflow tank.

The heater treater and heated storage tanks utilize natural-gas-fired heaters of various ratings. The natural gas fuel for the heaters is residual from the natural gas processing plant and is assumed to be pipeline specification quality. The total rating for all heaters is ≤ 7.5 MMBtu/hr.

Oil storage and produced water tank emissions are routed to a combustor for ≥98% control of volatile organic compounds (VOCs). Oil and produced truck loading emissions are uncontrolled.

Site loads are powered by a natural-gas-fired generator.

3.0 EMISSION CALCULATIONS

Emission calculations for this project are included in Appendix B of this document. Calculation methodologies for each emission source are discussed in the following sections.

3.1 Representative Analysis

Emissions calculations are based on a liquid sample collected from the separator at the Powell 2-13A2 facility on June 17, 2016. Laboratory analysis of the flash gas evolved from hydrocarbon liquid and extended hydrocarbon analysis of the liquids were conducted on this sample. The laboratory report is included in Appendix B.

3.2 Green House Gas Emissions

Controlled and uncontrolled greenhouse gas (GHG) emissions were calculated using CO_2 and CH_4 emissions, AP-42 emission factors and 40 CFR 98 Subpart C emission factors. Total GHG emissions in CO2e (tpy) were calculated using Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1. Controlled storage tank GHG emissions are accounted for in the combustor emissions.

3.3 Storage Tanks

3.3.1 Oil Storage Tanks

Tank flash losses from the oil storage tanks were calculated using the gas-to-oil ratio (GOR) measured by laboratory procedures method and the flash gas composition from the laboratory flash liberation of liquid hydrocarbon analysis.

Working and standing emission losses from the oil storage tanks were calculated using EPA TANKS 4.09d to determine total annual emissions from the tanks. The output from a Promax simulation using the stable oil option was used to speciate the total emissions from the TANKs report. The detailed TANKs report and the Promax output are included in Appendix C.

The flash and working and standing storage tank emissions are routed to the combustor for 98% VOC control.

3.3.2 Produced Water Storage Tank

The well fluids undergo separation in the heater treater where oil/water/gas are separated. Low levels of dissolved hydrocarbons remain in the produced water. Produced water VOC emissions are estimated by taking a 99% reduction from the oil VOC emissions.

3.3.3 Overflow Storage Tank

The overflow tank remains empty except in emergency upset conditions when either the oil or produced water tanks are rerouted to the overflow tank. The overflow tank is emptied when practicable following the upset event. Total site production/throughput is not affected by the use of the of the overflow tank therefore; use of the tanks does not affect the site-wide VOC emissions.

3.4 Crude Oil and Produced Water Loading

Uncontrolled crude oil truck loading emissions were calculated using the AP-42 Section 5.2, equation 1 and submerged loading constants from Table 5.2-1. Produced water emissions are assumed to be negligible due to the low concentrations of dissolved VOCs present in the produced water.

3.5 Heaters

The combined heater emissions were calculated using AP-42 Section 1.4 emission factors. Pipeline quality natural gas is used as fuel for the heaters.

3.6 Equipment Fugitives

Equipment fugitives were calculated using the flash gas composition and 40 CFR 98 Subpart W emission factors. Component counts were estimated based on 40 CFR 98, Subpart W, Table W-1B.

3.7 Combustor

Combustor emissions were calculated using the tank emissions routed to the combustor. The combustor burner is fueled by pipeline-quality natural gas. A minimum 98% destruction efficiency was used to calculate VOC emissions and AP-42 Section 13 emission factors for criteria pollutants. Combustor information is included in Appendix H.

3.8 Internal Combustion Engine

The generator engine emissions were calculated using manufacturer supplied data and AP-42 emission factors and pipeline quality natural gas as fuel.

4.0 FEDERAL REGULATORY APPLICABILITY ANALYSIS

The following section addresses the applicability of Federal Standards for the affected facilities at the site.

The facility is not located within a designated non-attainment area for purposes of determining Federal Non-Attainment New Source Review permitting applicability, the Facility is not an existing major source for purposes of evaluating the applicability of Prevention of Significant Deterioration (PSD) review requirements.

4.1 New Source Performance Standards (40 CFR Part 60)

Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

This subpart is not applicable, there are no compression ignition internal combustion engines at the site.

Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

This subpart is applicable to spark ignited (SI) internal combustion engines manufactured after July 1, 2007. The 300-hp natural-gas-fired, lean-burn engine was manufactured after the applicability date and will be subject to the provisions of this subpart.

Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984

This subpart does not apply to the storage tanks because they are used to store petroleum or condensate prior to custody transfer, and the design capacity of each tank does not exceed 1,589.874 m3 (3,061,721 gallons) according to 40 CFR §60.110b(d)(4).

Subpart KKKK: Standards of Performance for New Stationary Combustion Turbines

There are no stationary combustion turbines located at the site; therefore, this subpart does not apply.

Subpart OOOOa: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution

The well site was completed after the OOOOa applicability date of September 18, 2015. Therefore, the site is subject to this subpart and will comply with the applicable requirements.

4.2 National Emission Standards for Hazardous Air Pollutants (40 CFR Part 63)

Subpart DDDDD: National Emission Standards for Major Sources: Industrial, Commercial and Institutional Boilers and Process Heaters

The site is not a major source therefore the site is not subject to this subpart.

Subpart HH: National Emissions Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities

The facility does not have a TEG dehydration unit; therefore, the facility is not subject to this subpart according to 40 CFR §63.760(b)(2).

Subpart HHH, National Emissions Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities

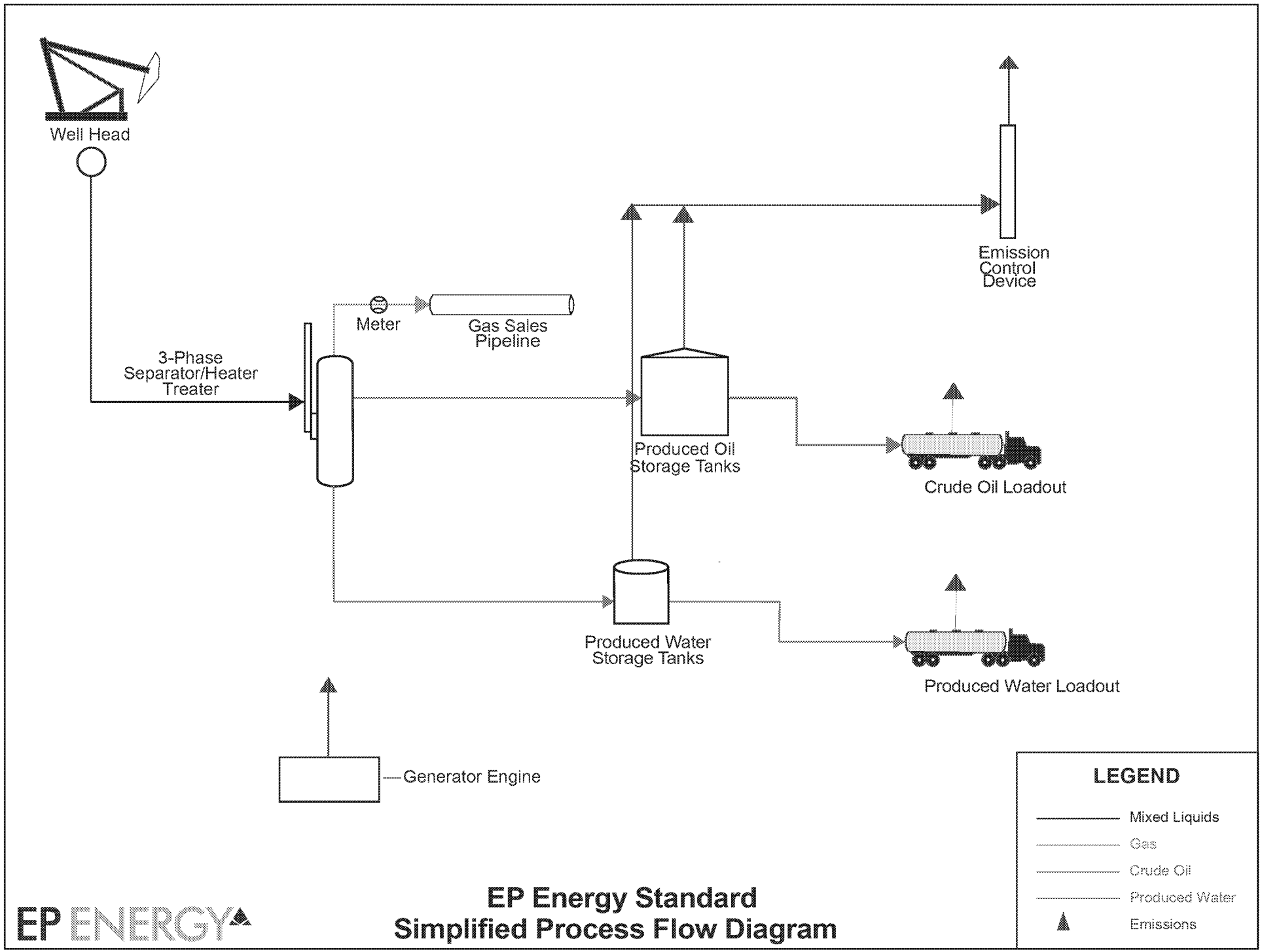
The facility is not a natural gas transmission and storage facility as defined in 40 CFR §63.1270 therefore; this subpart does not apply.

Subpart ZZZZ: National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

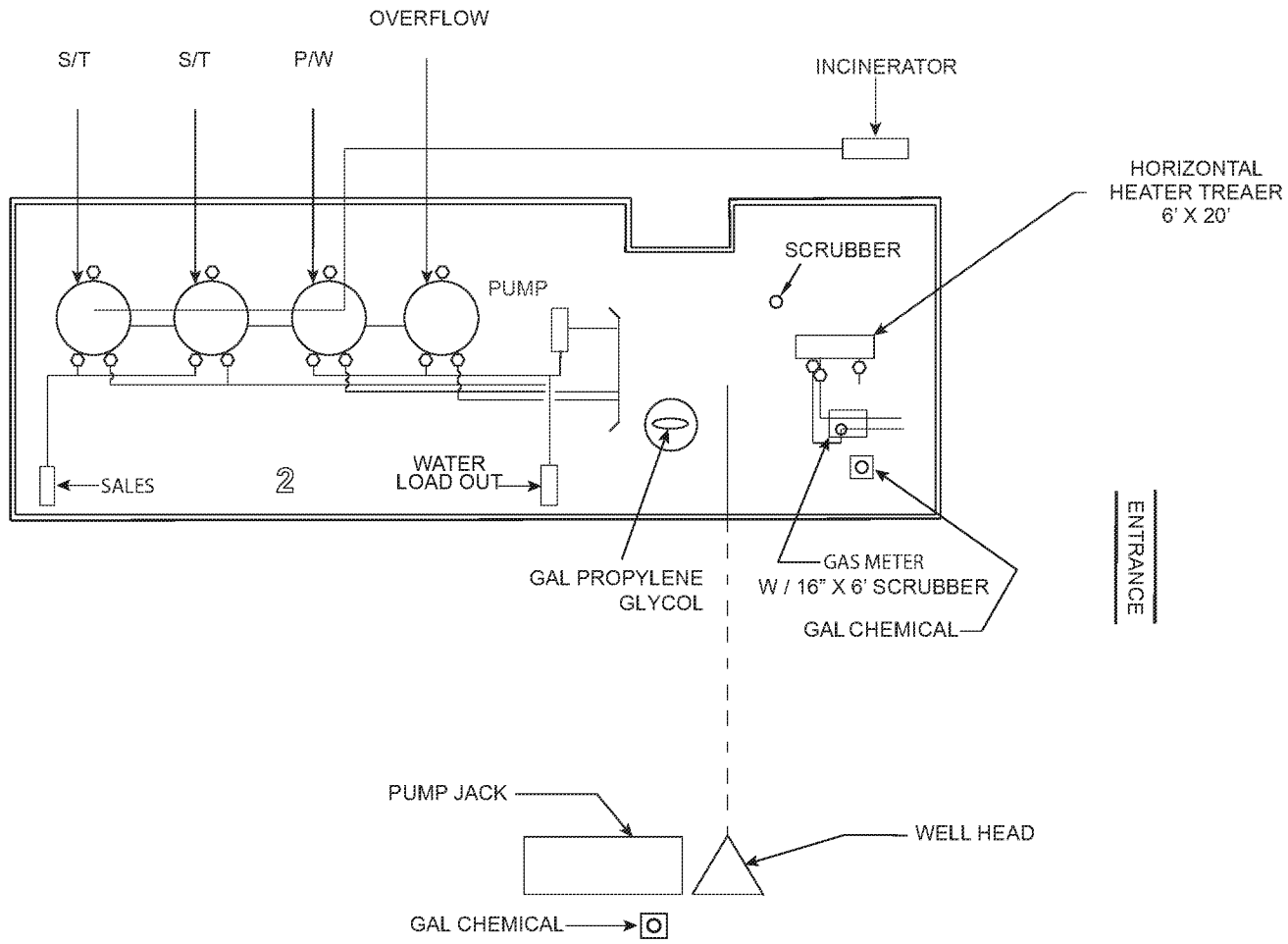
The natural-gas-fired compressor engine is a new stationary reciprocating internal combustion engine (RICE) at an area source of HAP emissions, as defined in 40 CFR §63.6590(c)(1). As specified in 40 CFR §63.6590(c)(1), the engine will meet the requirements of this subpart by meeting the requirements of 40 CFR 60, Subpart JJJJ.

APPENDIX A

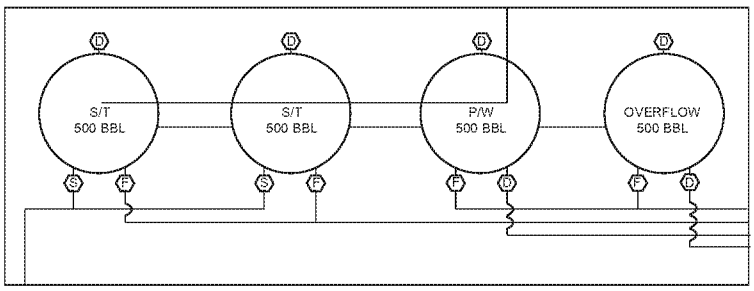
Process Flow Diagram and Site Plan



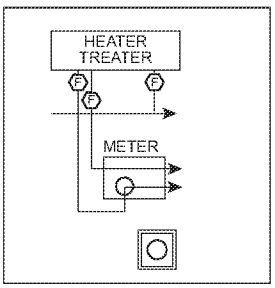
EP Energy Standard
Simplified Process Flow Diagram



SITE PLAN
N.T.S.



Valve Detail A
N.T.S.



Valve Detail B
N.T.S.

LEGEND:

——— ABOVE GROUND LINES

- - - - - BURIED LINES

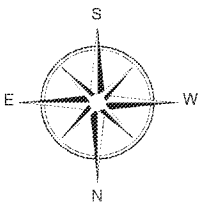
P/W PRODUCED Water

S/T = CRUDE Oil

BBL = BARRELS

GAL = GALLONS

*OVERFLOW, SCRUBBER HEATER TREATER CONTAIN CRUDE OIL AND PRODUCED WATER



Site Map
MURRAY 2-15A1E
SWSW S15, T1S, R1E
LAT 40.391343 LONG -109.873541
UINTAH COUNTY, UT

Peakview Environmental LLC

EP ENERGY E & P COMPANY, LP | July 2017

APPENDIX B

Emission Calculations

Oil Storage Tanks Flash Emissions - GOR Method
Routed to Combustor
EP Energy E&P Company L.P.
Murray 2-15A1E

Site Information

Oil Production [1]	BOPD	411
VRU Operation **(NO VRU)**		0%
Molecular Weight of Flash Gas	lb/lb-mol	50.95
GOR	scf/bbl	30.03
Flash Heat content	MMBtu/hr	2875

Hourly LP Flash Loss (scf/hr) [3]	514.21
Annual LP Flash Loss (MMscf/yr) [4]	4.50
Flash Emissions Heat Content (MMBtu/hr)	1.48
Flash Emissions Heat Content (MMBtu/yr)	12,950

Composition Data [2]					Uncontrolled Emissions	
Pollutant	LP Flash mol%	MW	Molar Wt lb/lb-mol gas	LP Flash Wt%	(lb/hr)[5]	(ton/yr)[6]
Oxygen	0.000	32.00	0.00	0.000	-	-
Carbon Dioxide	0.577	44.01	0.25	0.498	0.35	1.52
Hydrogen Sulfide	0.000	34.80	0.00	0.000	-	-
Nitrogen	2.472	28.01	0.69	1.359	0.95	4.16
Methane	15.558	16.04	2.50	4.898	3.42	14.99
Ethane	10.432	30.07	3.14	6.157	4.30	18.84
Propane	23.739	44.10	10.47	20.547	14.36	62.87
Iso-Butane	4.562	58.12	2.65	5.204	3.64	15.92
Butanes	16.622	58.12	9.66	18.961	13.25	58.02
iso-Pentane	5.218	72.15	3.76	7.389	5.16	22.61
Pentanes	10.688	72.15	7.71	15.135	10.57	46.31
n-Hexane	3.005	86.16	2.59	5.081	3.55	15.55
Other Hexanes	1.699	86.16	1.46	2.873	2.01	8.79
Heptanes +	4.672	100.20	4.68	9.189	6.42	28.12
Benzene	0.664	78.11	0.52	1.018	0.71	3.12
Toluene	0.395	92.13	0.36	0.715	0.50	2.19
Ethylbenzene	0.081	106.17	0.09	0.168	0.12	0.51
Xylenes	0.323	106.17	0.34	0.674	0.47	2.06
2,2,4-Trimethylpentane	0.060	114.23	0.07	0.134	0.09	0.41
Total Volatile Organic Compounds	71.73			87.09	**60.84**	**266.49**
Total HAPs					**5.44**	**23.84**
Totals	100.77		50.95	100.0		

Uncontrolled

GHG	GWP	Emission Factor		Emissions	
		Wt%	Source	tons/yr	CO_2e[8]
CO_2	1	0.5	[7]	2	2
CH_4	25	4.9	[7]	15	375
Total		-	-	-	**376**

[1] Daily production = 102,200 bbls/yr /365 = 280 BOPD

[2] From Precision Analysis Lab Id 16060602-01,6/22/16 Gas Evolved from Flashed Hydrocarbon From 83 psig and 155F to 80F to 14.73 psi and 60F

[3] Hourly Flash Loss (scfh) = GOR (scf/bbl) x Throughput (bbl/day) / 24 (hr/day)

[4] Yearly Flash Loss (MMscf/yr) = Hourly Flash Loss (scfh) x 8760 (hr/yr) / 10^6

[5] Uncontrolled Emissions (lb/hr) = Hourly Flash Loss (scf/hr) x Mol% x MW (lb/lb·mol) / 375 (scf/lb·mol)

[6] Uncontrolled Emissions (ton/yr) = Hourly Flash Loss (scfhr) x Mol% x MW (lb/lb-mol) / 375 (scf/gas/lb-mol) *8760 hrs/yr*1 ton/2000 lb

[7] Stable oil vapor wt%

[8] Total GHG in CO_2e (tpy) calculated using Global Warming Potential from 40 CFR 98 Subpart A, Table A-1

Oil Storage Tanks Working and Standing Emissions
Routed to Combustor
EP Energy E&P Company L.P.
Murray 2-15A1E

Site Information

Oil Production [1]	bbls/year	150,000
Oil Production	gals/year	6,300,000
VRU Operation **(NO VRU)**		-
Molecular Weight of W&S gas[4]	lb/lb-mol	69.0
Reid Vapor Pressure[2]		6.14
W&S Emissions Heat Content[3]	MMBtu/scf	0.0
Total Site Annual W&S Losses[4]	lb/yr	2,567.7
Total Hourly Losses[5]	lb/hr	0.29
Total Annual Losses [6]	ton/yr	1.28

Vapor Density (lb/cu.ft)[4]	0.01
Hourly W&S loss (scf/hr)[7]	21.5
Annual W&S loss (MMscf/yr)[7]	3.8
Heat Content (MMBtu/hr)	0.0
Heat Content (MMBtu/yr)	0.0

Composition Data [3]		Uncontrolled Emissions	
Pollutant	Stable Oil Vapor Wt%	(lb/hr)[8]	(ton/yr) [9]
Oxygen	0.000	-	-
Carbon Dioxide	0.000	-	-
Hydrogen Sulfide	0.000	-	-
Nitrogen	0.104	0.00	0.00
Methane	5.155	0.02	0.07
Ethane	21.520	0.06	0.28
Propane	33.286	0.10	0.43
Iso-Butane	7.911	0.02	0.10
Butanes	19.887	0.06	0.26
iso-Pentane	3.683	0.01	0.05
Pentanes	3.057	0.01	0.04
n-Hexane	1.077	0.00	0.01
Other Hexanes	1.788	0.01	0.02
Heptanes +	1.921	0.01	0.02
Benzene	0.156	0.00	0.00
Toluene	0.124	0.00	0.00
Ethylbenzene	0.077	0.00	0.00
Xylenes [11]	0.119	0.00	0.00
2,2,4-Trimethylpentane	0.134	0.00	0.00
Total Volatile Organic Compounds	73.2207	**0.21**	**0.94**
Total HAPs		**0.00**	**0.02**
Totals	100.000		

Uncontrolled

GHG	GWP	Emission Factor		Emissions	
		Wt%	Source	tons/yr	CO_2e [11]
CO_2	1	0.0	[10]	0	0
CH_4	25	5.2	[10]	0	2
Total		-	-	-	**2**

[1] Annual production = bbls yr /# tanks
[2] From Precision Analysis Lab Id 16060602-1 6/22/16 Gas Evolved from Flashed Hydrocarbon
[3] From Promax stock tank emissions composition
[4] From TANKS v.4.09d Output Report
[5] Total Hourly Losses = Total Annual Losses (lb/yr)/8760 hrs/yr
[6] Total Annual Losses (ton/yr) = Total annual losses (lb/yr)/2000 lb/ton
[7] Tank emission volumetric flow rates are obtained by dividing total emissions by the vapor density
[8] lb/hr emissions = Total working and standing losses (lb/hr)* stable oil vapor wt%/100
[9] ton/yr emissions = Total working and standing losses (ton/yr)* stable oil vapor wt%/100
[10] Stable oil vapor wt%
[11] Total GHG in CO2e (tpy) calculated using Global Warming Potential from 40 CFR 98 Subpart A, Table A-1

Loading Emissions
EP Energy E&P Company L.P.
Murray 2-15A1E

Site Information

Facility Throughput	BOPD	411
	gal/day	17260
	gal/hr	719
True VP of Liquid Loaded (P)[1]	psia	5
MW of Vapor (M)[2]	lb/lb-mol	41.94
Temperature of liquid (T)[3]	°R	619.67
Saturation Factor (S)[4]	constant	0.6
Loading Losses[5] (L)	lb/1000 gal	2.53

Composition Data[2]		Uncontrolled Emissions[6]	
Pollutant	Stable Oil Vapor Wt%	(lb/hr)	(ton/yr)
Oxygen	0.000	-	-
Carbon Dioxide	0.000	-	-
Hydrogen Sulfide	0.000	-	-
Nitrogen	0.104	0.00	0.01
Methane	5.155	0.09	0.41
Ethane	21.520	0.39	1.71
Propane	33.286	0.61	2.65
Iso-Butane	7.911	0.14	0.63
Butanes	19.887	0.36	1.58
iso-Pentane	3.683	0.07	0.29
Pentanes	3.057	0.06	0.24
n-Hexane	1.077	0.02	0.09
Other Hexanes	1.788	0.03	0.14
Heptanes +	1.921	0.03	0.15
Benzene	0.156	0.00	0.01
Toluene	0.124	0.00	0.01
Ethylbenzene	0.077	0.00	0.01
Xylenes [11]	0.119	0.00	0.01
2,2,4-Trimethylpentane	0.134	0.00	0.01
Total VOCs	73.22	1.33	5.84
Total HAPs		0.03	0.13
Totals	100.000		

GHG	GWP	Emission Factor		Emissions	
		Wt%	Source	tons/yr	CO_2e[7]
CO_2	1	0	NA	0	0
CH_4	25	5.2	NA	0	8
Total		-	-	-	**8**

[1]From AP-42, Figure 7.1-13
[2]MW and composition based on Promax output
[3] Temperature of liquids loaded = 160° F
[4]From AP-42, Table 5.2-1, submerged loading
[5] From AP-42, Section 5.2, equation 1; L=12.46*SPM/T
[6] Emissions lb/hr = L (lb/1000 gal)*Loading rate (gal/hr)/1000 gal*wt%/100
Emissions ton/yr = emissions (lb/hr)*8760/2000
[7] CO_2e based on Global Warming Potentials from Table A-1 of 40 CFR Part 98

Produced Water Loading Emissions
EP Energy E&P Company L.P.
Murray 2-15A1E

Site Information

Facility Throughput	BOPD	300
	gal/day	12600
	gal/hr	525
True VP of Liquid Loaded (P)[1]	psia	5
MW of Vapor (M)[2]	lb/lb-mol	41.94
Temperature of liquid (T)[3]	°R	619.67
Saturation Factor (S)[4]	constant	0.6
Loading Losses[5] (L)	lb/1000 gal	2.53
Reduction for PW	99%	99%

Composition Data[2]		Uncontrolled Emissions[6]	
Pollutant	Stable Oil Vapor Wt%	(lb/hr)	(ton/yr)
Oxygen	0.000	-	-
Carbon Dioxide	0.000	-	-
Hydrogen Sulfide	0.000	-	-
Nitrogen	0.104	0.00	0.00
Methane	5.155	0.00	0.00
Ethane	21.520	0.00	0.01
Propane	33.286	0.00	0.02
Iso-Butane	7.911	0.00	0.00
Butanes	19.887	0.00	0.01
iso-Pentane	3.683	0.00	0.00
Pentanes	3.057	0.00	0.00
n-Hexane	1.077	0.00	0.00
Other Hexanes	1.788	0.00	0.00
Heptanes +	1.921	0.00	0.00
Benzene	0.156	0.00	0.00
Toluene	0.124	0.00	0.00
Ethylbenzene	0.077	0.00	0.00
Xylenes [11]	0.119	0.00	0.00
2,2,4-Trimethylpentane	0.134	0.00	0.00
Total VOCs	73.22	0.01	0.04
Total HAPs		0.00	0.00
Totals	100.000		

GHG	GWP	Emission Factor		Emissions	
		Wt%	Source	tons/yr	CO_2e[7]
CO_2	1	0	NA	0	0
CH_4	25	5.2	NA	0	0
Total		-	-	-	**0**

[1] From AP-42, Figure 7.1-13
[2] MW and composition based on Promax output
[3] Temperature of liquids loaded = 160° F
[4] From AP-42, Table 5.2-1, submerged loading
[5] From AP-42, Section 5.2, equation 1; L=12.46*SPM/T
[6] Emissions lb/hr =(L (lb/1000 gal)*Loading rate (gal/hr)/1000 gal*wt%/100)*(1-.099)
Emissions ton/yr =(emissions (lb/hr)*8760/2000)
[7] CO_2e based on Global Warming Potentials from Table A-1 of 40 CFR Part 98

Heater Emissions
EP Energy E&P Company L.P.
Murray 2-15A1E

Site Information

Heater Rating[1]	MMBtu/hr	7.5
Annual Hours of Operation	hr/yr	8,760
Fuel Heating Value[2]	Btu/scf	1,200
Fuel Sulfur Content[3]	grain/scf	5788.0

Pollutant	Emission Factor		Emissions[5]	
	EF (lb/10^6SCF)	AP-42 Source[4]	lb/hr	tons/yr
NOx	100	Table 1.4-1	0.63	2.74
CO	84	Table 1.4-1	0.53	2.30
SO_2	0.17	Table 1.4-2	1.1E-03	4.7E-03
PM_{10}	7.6	Table 1.4-2	0.05	0.21
VOC	5.5	Table 1.4-2	0.03	0.15
Benzene	2.10E-03	Table 1.4-3	1.31E-05	5.75E-05
Hexane	1.8	Table 1.4-3	1.13E-02	4.93E-02
Formaldehyde	7.5E-02	Table 1.4-3	4.69E-04	2.05E-03
Toluene	3.4E-03	Table 1.4-3	2.13E-05	9.31E-05
Total HAPs			1.18E-02	5.15E-02

GHG	GWP	Emission Factor		Emissions	
		EF (lb/10^6 scf)	Source	tons/yr	CO_2e[6]
CO_2	1	1.20E+05	Table 1.4-2	3,285	3,285
CH_4	25	2.3	Table 1.4-2	0.1	2
N_2O	298	2.2	Table 1.4-2	0.1	18
Total		-	-	-	**3,305**

[1] Aggregate of all natural-gas fired heaters at the site

[2] Fuel heat content based on AP-42 pipeline spec

[3] AP-42 assumes a fuel sulfur content of 2000 grans/10^6; emission factor scaled by ration of actual sulfur content to 2,000 grains/10^6 scf. Fuel does not contain sulfur so assume MDL.

[4] Emission factors (EF) are from AP-42 Section 1.4

[5] Emissions; lb/hr = EF*heater rating (mmBTU/hr)/heat content of fuel(Btu/scf); tons/yr= emissions (lb/hr) * 8760 hrs/yr*1 ton/2000 lbs

[6] Total GHG in CO2e (tpy) calculated using Global Warming Potential from 40 CFR 98 Subpart A, Table A-1

IC Engine Emissions
EP Energy E&P Company L.P.
Murray 2-15A1E

Engine Data

Manufacturer	Portable Power
Model	NG200-01P
Serial Number	
Manufacture Date	After 2011
Application	electric gen
Ignition/injection timing	Variable
Horsepower	300
Site Rated Horsepower	300
Fuel Consumption (Btu/hp-hr)	7,404
Hours of operation per year	8760
Engine Type	4 Stroke Lean-

Fuel Data

Fuel Heat Content [2] (Btu/scf)	1,200
Fuel Sulfur Content[3] (grain/scf)	5788.0
Annual Consumption (MMScf/yr)	16.2
Hourly Consumption (MMscf/hr)	0.0019
Hourly Consumption (MMBtu/hr)	2.22

Method of Emission Control

NSCR Catalyst	No
SCR Catalyst	No
JLCC Catalyst	No
Parameter Adjustment	No
Stratified Charge	No
Other(Specify)	AFRC
Lean Burn	Yes

Exhaust Parameters

Stack Height (ft)	15
Stack Diameter (ft)	0.5
Exit Velocity (fps)	105.8
Stack Temperature (°F)	1350
scf/hr	74820

Federal Standards

NSPS Subpart JJJJ	Yes
MACT Subpart ZZZZ	Yes

		EF AP-42			Uncontrolled Emissions[3]		Controls		Controlled Emissions[5]		Form 11 Engine Information			
Contaminant	Test results or manufac-turer's EF before control (g/hp-hr)	Table 3.2-2 4 stroke, lean-burn engine emission factors (lb/mmBtu)	Emission Factor Used	Units	Emissions (lb/hr)	Emissions (tpy)	Efficiency of Control Device (%)	Control Emission factor[4] (g/hp-hr)	Emissions (lb/hr)	Emissions (tpy)	MW[11]	ppmv[8] (20%)	ppmv[9] (15%)	Conc[10] (vol %)
VOC	0.70	0.118	0.70	g/hp-hr	**0.46**	**2.03**			**0.46**	**2.03**	44.10	53.97	353.82	0.04
NOx	1.0	4.08	1.0	g/hp-hr	**0.66**	**2.89**			**0.66**	**2.89**	33.2	102.42	671.40	0.07
CO	2.0	0.317	2.0	g/hp-hr	**1.32**	**5.79**			**1.32**	**5.79**	28.00	242.87	1592.17	0.16
PM10 [1]		0.0099871	0.0100	lb/mmBtu	**0.02**	**0.10**			**0.02**	**0.10**				
PM2.5[1]		0.0099871	0.0100	lb/mmBtu	**0.02**	**0.10**			**0.02**	**0.10**				
SO2		0.000588	0.0006	lb/mmBtu	**0.00**	**0.01**			**0.00**	**0.01**	64.00	0.11	0.69	0.00
Formaldehyde		0.0528	0.0528	lb/mmBtu	**0.12**	**0.51**			**0.12**	**0.51**	30.03	20.10	131.74	0.01
Benzene		0.000404	0.0004	lb/mmBtu	**0.00**	**0.00**			**0.00**	**0.00**	78.11	0.06	0.39	0.00
Acetaldehyde		0.00836	0.0084	lb/mmBtu	**0.02**	**0.08**			**0.02**	**0.08**	44.05	2.17	14.22	0.00
Acrolein		0.00514	0.0051	lb/mmBtu	**0.01**	**0.05**			**0.01**	**0.05**	56.06	1.05	6.87	0.00
Methanol		0.0025	0.0025	lb/mmBtu	**0.01**	**0.02**			**0.01**	**0.02**	32.04	0.89	5.85	0.00
Total HAPS					**0.15**	**0.67**			**0.15**	**0.67**				

[1] PM_{10} EF = PM_{10} (filterable) + PM (Condensable); $PM_{2.5}$ EF = $PM_{2.5}$ (filterable) + PM (Condensable)

[2] AP-42 Pipeline quality gas spec

[3] Emissions (lb/hr)= EF(g/hp-hr)/454 g/lb*hp; or EF(g/mmBTU)*fuel consumption (Btu/hp-hr)*hp/1.0*10^6
Emissions (tpy) = emissions (lb/hr)*8760 hr/yr/2000 lb/ton

[4] Provided by manufacturer or field adjustment

[5] Controlled emissions are calculated using efficiency of control device(%) or controlled emission factor

GHG	GWP	Emission Factor[6]		CO2e Emissions	
		kg/mmBTU	g/hp-hr	tpy	CO_2e[7]
CO_2	1	53.06	393	1,136	1,136
CH_4	25	0.0010	0.010	0.02	1
N_2O	298	0.0001	0	0.00	1
Total		-	-	-	**1,137**

[6] Emission factors from 40 CFR 98, Subpart C, Table C-1 and C-2

[7] Total GHG in CO2e (tpy) calculated using Global Warming Potential from 40 CFR 98 Subpart A, Table A-1

[8] ppmv (20%) = lb/hr*1x10^6 *385 ft3/mw/vol flow rate (ft^3/hr)

[9] ppmV (15%) = ppmv(20%) *(20.9-15/20.9-20)

[10] 1% vol = 10,000 ppmv

[11] Assume mw of VOC = mw propane

Fugitive Emissions
EP Energy E&P Company L.P.
Murray 2-15A1E

Equations[1]

$E_{gas} = \Sigma\, i\, \Sigma j\, Q_{fug,i,j} \times n_i \times t_{annual}$

$E_c = f_c \times E_{gas}$

Site Information

Qfug,i,j=Measured/estimated futgitive emissions rate of gas from component (i) in servuce (j))(kg gas/ component-hr)

Service Type =	Flash Gas[2]		
Conversion factor (scf/lb-mol) =	379.48	f_{nH} = mass fraction of n-hexane =	5.08
MW=molecular weight (lb/lb-mol) =	50.95	f_{Bz} = mass fraction of benzene =	1.02
f_{voc}=VOC mass fraction =	87.09	f_{Tl} = mass fraction of toluene =	0.72
f_{co2}= mass fraction CO2	0.5	f_{Eb} = mass fraction of ethylbenzene =	0.17
f_{CH4}= ass fraction CH4	4.9	f_{Xv} = mass fraction of xylene =	0.67
t_{annual} = annual usage for component	8760	f_{tmp} = mass fraction of 2,2,4-TMP =	0.13

Component Count - Light Oil Service[3]

Equipment	Number	Valves	Flanges	Connectors	OE Lines	Pump Seals	Other
Wells	1	5	10	4	0	0	1
Separator	1	6	12	10	0	0	0
Heater Treater	1	8	12	20	0	0	0
Header	1	5	10	4	0	0	0
Total Components		24	44	38	0	0	1

Light Oil (>20o) Fugitive Emissions

	Valves	Flanges	Connectors	OE Lines	Pump Seals	Other	Total Emissions	
							tons/yr	lbs/yr
Total Emissions (ton/yr)								
EF= scf/component-hr[1]	0.05	0.003	0.007	0.05	0.01	0.30		
lb/component-hr	6.71E-03	4.03E-04	9.40E-04	6.71E-03	1.34E-03	4.03E-02		
Total Emissions (ton/yr)	1.55E+00	1.71E-01	3.44E-01	0.00E+00	0.00E+00	3.88E-01	**2.46**	
GHG Emissions								
CO_2 (ton/yr)	7.76E-03	8.54E-04	1.72E-03	0.00E+00	0.00E+00	1.94E-03	1.23E-02	24.56
CH_4 (ton/yr)	7.61E-02	8.37E-03	1.69E-02	0.00E+00	0.00E+00	1.90E-02	1.20E-01	240.67
GHG CO_2e							**2.79E-01**	**614.00**
VOC Emissions								
VOC (ton/yr)	1.35E+00	1.49E-01	3.00E-01	0.00E+00	0.00E+00	3.38E-01	**2.14**	**4277.50**
HAP Emissions								
n-hexane (ton/yr)	7.89E-02	8.68E-03	1.75E-02	0.00E+00	0.00E+00	1.97E-02	1.25E-01	249.51
benzene (ton/yr)	1.58E-02	1.74E-03	3.51E-03	0.00E+00	0.00E+00	3.96E-03	2.50E-02	50.10
toluene (ton/yr)	1.12E-02	1.23E-03	2.48E-03	0.00E+00	0.00E+00	2.79E-03	1.77E-02	35.36
ethylbenzene (ton/yr)	2.61E-03	2.87E-04	5.78E-04	0.00E+00	0.00E+00	6.52E-04	4.13E-03	8.25
xylene (ton/yr)	1.04E-02	1.14E-03	2.31E-03	0.00E+00	0.00E+00	2.60E-03	1.65E-02	32.91
2,24-TMP (ton/yr)	2.08E-03	2.29E-04	4.61E-04	0.00E+00	0.00E+00	5.20E-04	3.29E-03	6.58
Total HAPs							**0.19**	**382.71**

[1] Equations and emission factors based on 40 CFR Part 98 Subpart W

[2] Composition based on hydrocarbon analysis of site-specific oil and gas samples

[3] Componenet counts based on default values from 40 CFR Part 98 Subpart W; Table W-1C

[4] CO_2e based on Global Warming Potentials from Table A-1 of 40 CFR Part 98

[5] Total GHG in CO_2e (tpy) calculated using Global Warming Potential from 40 CFR 98 Subpart A, Table A-1

Combustor Emissions
EP Energy E&P Company L.P.
Murray 2-15A1E

Site Information

Heat Rating[1]	mmBtu/hr	2.7
Annual Hours of Operation	hr/yr	8,760
Fuel Heating Content[2]	Btu/scf	2,875
Fuel Sulfur Content[2]	grain/scf	0.0
Destruction Efficiency	%	98.0

Pollutant	Emission Factor		Emissions[5]	
	EF (lb/MMBtu)	Source	lb/hr	tons/yr
NO_2	0.068	AP-42 Table 13.5-1	0.18	0.80
CO	0.310	AP-42 Table 13.5-2	0.84	3.67
SO_2	2.89E-04	[3]	7.80E-04	0.00
PM_{10}	0.000	AP-42 Table 13.5-1	0.00	0.00
VOC	98% destruction[6]	NA	1.22	5.35
CH_4	98% destruction[6]	NA	0.07	0.30
n-Hexane	98% destruction[6]	NA	0.07	0.31
Benzene	98% destruction[6]	NA	0.01	0.06
Toluene	98% destruction[6]	NA	0.00	0.04
Xylenes	98% destruction[6]	NA	0.01	0.04
Ethylbenzene	98% destruction[6]	NA	0.00	0.01
2,2,4-Trimethylpentane	98% destruction[6]	NA	0.00	0.01
Total HAP	98% destruction[6]	NA	0.11	0.48

GHG	GWP	Emission Factor		Emissions	
		EF (kg/MMBtu)	Source	tons/yr	CO_2e[6]
CO_2	1	53.020	40 CFR 98-C	1,379	1,379
CH_4	25	[4]	[4]	0.30	8
N_2O	298	0.0001	40 CFR 98-C	0.003	1
Total		-	-	-	**1,388**

[1] Maximum rating of flare ; equipment specifications
[2] From Precision Analysis Lab Id 16060602--01,6/22/16 Gas Evolved from Flashed Hydrocarbon From 83 psig and
[3] MDL for H_2S; assumed to be 100% conversion from H_2S to SO_2
[4] Actual wt% in fuel stream *(1-.98)
[5] Emissions (lb/hr) = EF*7.7 mmBTU/hr; Emissions (tons/yr)= emissions (lb/hr) * 8760 hrs/yr*1 ton/2000 lbs
[6] Total GHG in CO2e (tpy) calculated using Global Warming Potential from 40 CFR 98 Subpart A, Table A-1

Values for Form 4 - Flare Systems

Form 4	Value Used	Reference
Min flowrate Expected (scfm)	4.69	Tank losses (scfm) @ 50% of max production rate
Ave flowrate Expected (scfm)	8.15	Tank losses (scfm) @ 75% of max production rate
Min Expected (MMBtu/hr)	0.97	Tank losses (mmBtu/hr) @ 50% of max production rate
Design Max (MMBtu/hr	7.7	From manufacturer
Heat Content	2875	Heat content of flash losses
Pressure	0.03	From manufacturer

Criteria Pollutants Emissions Summary
EP Energy E&P Company L.P.
Murray 2-15A1E

Uncontrolled Requested PTE (tpy)

Pollutant (TPY)	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Storage Tanks	267.43	-	-	-	-	-
Oil Truck Loading	5.84	-	-	-	-	-
Water Truck Loading	0.04	-	-	-	-	-
Heaters (≤7.5 MMBtu/hr total)	0.15	2.30	2.74	0.00	0.21	0.21
Natural Gas Fired Gen Engine	2.03	5.79	2.89	0.01	0.10	0.10
Fugitives	2.1	-	-	-	-	-
Total	**277.63**	**8.09**	**5.63**	**0.01**	**0.31**	**0.31**

Controlled Requested PTE (tpy)

Pollutant (TPY)	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Storage Tanks	*Routed to Flare*					
Oil Truck Loading	5.84	-	-	-	-	-
Water Truck Loading	0.04	-	-	-	-	-
Heaters (≤7.5 MMBtu/hr total)	0.15	2.30	2.74	0.00	0.21	0.21
Natural Gas Fired Gen Engine	2.03	5.79	2.89	0.01	0.10	0.10
Fugitives	2.14	-	-	-	-	-
Combustor	5.35	3.67	0.80	0.00	0.00	0.00
Total	**15.54**	**11.75**	**6.44**	**0.01**	**0.31**	**0.31**

CO_2e Emissions Summary
EP Energy E&P Company L.P.
Murray 2-15A1E

CO_2e Uncontrolled Requested PTE

GHG (TPY)	CO_2	CH_4	N_2O	Total
Global Warming Potential	*1*	*25*	*298*	-
Storage Tanks	1.52	15.1	0.00	16.6
Oil Truck Loading	0.00	0.41	0.00	0.41
Water Truck Loading	0.00	0.0	0.00	0.00
Heaters (≤7.5 MMBtu/hr total)	3285	0.1	0.06	3285.1
Natural Gas Fired Gen Engine	1136	0.0	0.00	1135.7
Fugitives	0.01	0.12	0.00	0.13
Total Mass (TPY)	4,422	16	0.1	4,438
CO_2e (tpy)	**4,422**	**392**	**19**	**4,833**

CO_2e Controlled Requested PTE

GHG (TPY)	CO_2	CH_4	N_2O	Total
Global Warming Potential	*1*	*25*	*298*	-
Storage Tanks	*Routed to Flare*			
Oil Truck Loading	0.00	0.41	0.00	0.41
Water Truck Loading	0.00	0.00	0.00	0.00
Heaters (≤7.5 MMBtu/hr total)	3,285.0	0.1	0.06	3285.1
Fugitives	0.0	0.1	0.00	0.1
Natural Gas Fired Gen Engine	3,285.0	0.0	0.00	3285.0
Combustor	1,379.4	0.3	0.00	1379.7
Total Mass (TPY)	7,949	0.9	0.1	7,950
CO2e (tpy)	**7,949**	**23**	**19**	**7,992**

HAPs Emissions Summary
EP Energy E&P Company L.P.
Murray 2-15A1E

Uncontrolled Requested PTE (tpy)

Pollutant (TPY)	n-Hexane	Benzene	Toluene	e-benzene	Xylenes	2,2,4-TMP	Formaldehyde	Acetaldehyde	Acrolein	Methanol	Total HAPs
Oil Storage Tanks	15.56	3.12	2.19	0.52	2.06	0.41	-	-	-	-	23.86
Oil Truck Loading	0.09	0.01	0.01	0.01	0.01	0.01	-	-	-	-	0.13
Water Truck Loading	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00
Heaters (≤7.5 MMBtu/hr total)	0.05	0.00	0.00	-	-	-	-	-	-	-	0.05
Natural Gas Fired Gen Engine		0.00	-	-	-	-	0.51	0.08	0.01	0.02	0.63
Fugitives	0.12	0.03	0.02	0.00	0.02	0.00	-	-	-	-	0.19
Total	**15.82**	**3.16**	**2.22**	**0.53**	**2.09**	**0.43**	**0.51**	**0.08**	**0.01**	**0.02**	**24.87**

Controlled Requested PTE (tpy)

Pollutant (TPY)	n-Hexane	Benzene	Toluene	e-benzene	Xylenes	2,2,4-TMP	Formaldehyde	Acetaldehyde	Acrolein	Methanol	Total HAPs
Oil Storage Tanks	*Routed to Flare*										
Oil Truck Loading	0.09	0.01	0.01	0.01	0.01	0.01	-	-	-	-	0.13
Water Truck Loading	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00
Heaters (≤7.5 MMBtu/hr total)	0.05	0.00	0.00	-	-	-	-				0.05
Natural Gas Fired Gen Engine	-	-	-	-	-	-	0.51	0.08	0.01	0.02	0.63
Fugitives	0.12	0.03	0.02	0.00	0.02	0.00	-	-	-	-	0.19
Combustor	0.31	0.06	0.04	0.01	0.04	0.01	-	-	-	-	0.48
Total	**0.57**	**0.10**	**0.07**	**0.02**	**0.07**	**0.02**	**0.51**	**0.08**	**0.01**	**0.02**	**1.48**

HAPs Hourly Maximum Emission Rate

Pollutant (lb/hr)	n-hexane	Benzene	Toluene	e-benzene	Xylenes	2,2,4-TMP	Formaldehyde	Acetaldehyde	Acrolein	Methanol	Total HAPs
Oil Storage Tanks	*Routed to Flare*										
Oil Truck Loading	0.02	0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.03
Water Truck Loading	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00
Heaters (≤7.5 MMBtu/hr total)	0.01	0.00	0.00	-	-	-	-	-	-	-	0.01
Fugitives	0.03	0.01	0.00	0.00	0.00	0.00	-	-	-	-	0.04
Natural Gas Fired Gen Engine	-	0.00	-	-	-	-	0.12	0.02	0.01	0.01	0.15
Combustor	0.07	0.01	0.00	0.00	0.01	0.00	-	-	-	-	0.10
Total	**0.13**	**0.02**	**0.01**	**0.00**	**0.02**	**0.01**	**0.12**	**0.02**	**0.01**	**0.01**	**0.34**

Laboratory Analytical Report and Promax Output

PRECISION ANALYSIS GAS MEASUREMENT EMISSIONS TESTING LABORATORY
866.985.0866
www.Precision-Labs.com

Flash Liberation of Hydrocarbon Liquid Study

Client:	LT Environmental	**Sample Lab ID:**	16060602-01
Site Name:	Powell 2-13 A2	**Analyst:**	AP
Unique Number:	Not Indicated	**Date Analyzed:**	06/22/16
Date Sampled:	06/17/16		
State:	UT	**Site Notes:**	
County:	Duchesne		

Flash Liberation of Hydrocarbon Liquid Conditions

	Pressure (psig)	Temperature (°F)
Separator Hydrocarbon Liquid	83.0	155.0
Stock Tank	80.0	160.0

Base Conditions

	Pressure (psi)	Temperature (°F)
Base Conditions	14.73	60

Flash Liberation of Hydrocarbon Liquid Results

Parameter	Result	Units/Description
Gas Oil Ratio	30.03	SCF flashed vapor/bbl stock tank oil
Gas Specific Gravity	1.770	Air = 1.000
Separator Volume Factor	1.001	Separator Volume/Stock tank Volume

Stock Tank Fluid Properties

Parameter	Result	Units/Description
Shrinkage Recovery Factor	0.999	Fraction of first stage separator liquid
Oil API Gravity at 60 °F	31.94	
Oil API Gravity, observed	33.44	at 83°F
Reid Vapor Pressure, psi	6.14	Absolute Pressure at 100°F by D5191

Quality Control Summary

Duplicate Results	% Difference	Acceptable Range
Gas Oil Ratio	3.3	<5%
Separator Volume Factor	0.003	<5%
Shrinkage Recovery Factor	0.003	<5%
Cylinder Type	Liquid Displacement	
Sample Collection Rate (mL/min)	50	<60

Cylinder Pressure Check

	Pressure (psi)	Temperature (°F)
Sample Conditions	83.0	155.0
Test Sample	30.0	150.0

PRECISION ANALYSIS GAS MEASUREMENT EMISSIONS TESTING LABORATORY
866.985.0866
www.Precision-Labs.com

Gas Evolved from Flashed Hydrocarbon Liquid

Run File:	C:\Galaxie\data\16_06_22\16060602-011.DATA		
Method:	S2_ExtBTEX		
Operator	AP	**Analysis Date**	6/22/2016
Client:	LT Environmental	**Date Sampled:**	6/22/2016
Site Name:	Powell 2-13 A2	**Purpose:**	Flash Gas Analysis
Unique #:	Not Indicated	**Pressure:**	Ambient
Sample Temperature:	70°F	**Type Sample:**	Spot
Sampled by:	AP	**County:**	Duchesne

COMPONENT	MOLE %	GPM
Hydrogen Sulfide	0.000	0.000
Nitrogen (N2)	2.472	
Carbon Dioxide	0.577	
Methane (CH4)	15.557	
Ethane (C2)	10.432	2.783
Propane (C3)	23.740	6.524
iso-Butane (i-C4)	4.562	1.489
Butane (C4)	16.620	5.226
iso-Pentane (i-C5)	5.218	1.903
Pentane (C5)	7.472	2.702
Hexanes	7.054	0.676
Heptanes Plus	6.297	4.768
Totals	100.000	26.070

Specific Gravity	1.770		
Compressibility (Z)	0.9732		
Molecular Weight	50.95		
Saturated Ideal BTUs	2749.1	Saturated Real BTUs	2824.8
Dry Ideal BTUs	2797.8	Dry Real BTUs	2874.9
Base Conditions:	14.73 psi	60 °F	

Gas Evolved from Flashed Hydrocarbon Liquid
Extended Analysis Report

COMPONENT	MOLE %	BTU	GPM	WT %
Hydrogen Sulfide	0.000	0.000	0.000	0.000
Nitrogen (N2)	2.472			1.359
Carbon Dioxide	0.577			0.498
Methane (CH4)	15.557	157.486		4.898
Ethane (C2)	10.432	185.042	2.783	6.157
Propane (C3)	23.740	598.701	6.524	20.547
iso-Butane (i-C4)	4.562	148.691	1.489	5.204
Butane (C4)	16.620	543.458	5.226	18.961
iso-Pentane (i-C5)	5.218	209.255	1.903	7.389
Pentane (C5)	7.472	300.227	2.702	10.581
2,2-Dimethylbutane	0.229	8.057	0.068	0.315
Cyclopentane	1.717	60.427	0.507	2.363
2,3-Dimethylbutane	0.343	12.085	0.101	0.473
2-Methylpentane	0.522	23.011	0.213	0.883
3-Methylpentane	0.308	13.549	0.125	0.520
n-Hexane	3.004	143.192	1.232	5.081
Methylcyclopentane	0.679	37.424	0.312	1.335
Benzene	0.664	23.887	0.185	1.018
Cyclohexane	0.579	24.271	0.197	0.957
2-Methylhexane	0.145	6.068	0.049	0.239
3-Methylhexane	0.207	8.668	0.070	0.342
2,2,4-Trimethylpentane	0.060	3.459	0.031	0.134
Other Heptanes (C7's)	1.131	62.373	0.520	2.224
n-Heptane	0.452	24.949	0.208	0.890
Methylcyclohexane	0.537	26.199	0.215	1.036
Toluene	0.395	16.936	0.132	0.715
Other Octanes (C8's)	0.386	24.184	0.197	0.866
n-Octane	0.208	13.022	0.106	0.466
Ethylbenzene	0.080	4.006	0.031	0.168
m,p-Xylene	0.270	13.429	0.105	0.563
o-Xylene	0.053	2.638	0.021	0.111
Other Nonanes (C9's)	0.350	24.575	0.197	0.882
n-Nonane	0.189	13.233	0.106	0.475
Other Decanes (C10's)	0.589	45.723	0.361	1.645
n-Decane	0.168	13.064	0.103	0.470
Undecanes (C11)	0.084	6.532	0.052	0.235
Totals	100.000	2797.8	26.070	100.000

Specific Gravity	1.770		
Compressibility (Z)	0.973		
Molecular Weight	50.948		
Saturated Ideal BTUs	2749.1	Saturated Real BTUs	2824.8
Dry Ideal BTUs	2797.8	Dry Real BTUs	2874.9
Base Conditions:	14.73 psi	60 °F	

PRECISION ANALYSIS
GAS MEASUREMENT EMISSIONS TESTING LABORATORY
307.856.0866
www.precision-labs.com

EXTENDED HYDROCARBON LIQUID STUDY
CERTIFICATE OF ANALYSIS

Company:	**LT Environmental**	Sample Name:	**Powell 2-13 A2 Pressurized Liquid**
Sample Date:	6/17/2016	Sample Number:	16060602-01
Sample Facility:	Not Indicated	Date Tested:	6/22/2016
Sample Equipment:	Treater Vessle	Test Method:	GPA 2186M
Sample Location:	Duchesne	Date Reported:	6/22/2016
Sample Pressure:	81 PSIG		
Sample Temperature:	155°F		
Sampling Method:	GPA-2174		
Type Sample:	Spot		

Components	Mole %	Weight %	Liq. Vol. %
Carbon Dioxide	0.000	0.000	0.000
Nitrogen	0.047	0.006	0.006
Methane	1.387	0.108	0.275
Ethane	0.901	0.132	0.282
Propane	1.657	0.355	0.534
iso-Butane	0.598	0.169	0.229
n-Butane	1.980	0.592	0.768
iso-Pentane	0.659	0.231	0.282
n-Pentane	0.698	0.245	0.296
2-Methylpentane	0.543	0.227	0.265
3-Methylpentane	0.217	0.091	0.106
Heptanes	1.432	0.698	0.785
Octanes	2.321	1.289	1.407
Nonanes	1.527	0.937	0.912
Decanes+	83.864	93.890	92.868
Benzene	0.144	0.055	0.047
Toluene	0.286	0.128	0.112
Ethylbenzene	0.392	0.203	0.177
m-Xylene	0.388	0.201	0.176
p-Xylene	0.063	0.032	0.028
o-Xylene	0.146	0.076	0.065
n-Hexane	0.595	0.249	0.286
2,2,4-Trimethylpentane	0.155	0.086	0.094
Totals	**100.000**	**100.000**	**100.000**

SAMPLE CHARACTERISTICS

RELATIVE SPECIFIC GRAVITY, calculated	**0.76239**
API GRAVITY AT 60/60 F, calculated	**54.1**
TRUE VAPOR PRESSURE AT 100 F, PSIA, calculated	**83.856**
AVERAGE MOLECULAR WEIGHT	**205.670**
AVERAGE BOILING POINT, F, calculated	**477.926**
RELATIVE SPECIFIC GRAVITY OF DECANES+ (C10+) FRACTION, calculated	**0.76697**
AVERAGE MOLECULAR WEIGHT OF DECANES+ (C10+) FRACTION, calculated	**215.149**
BTU / GALLON OF LIQUID AT 14.73 PSIA, calculated	**59,364.49**
LBS / GALLON OF LIQUID, calculated	**6.356**

NOTATION: ALL CALCULATIONS PERFORMED USING PHYSICAL CONSTANTS FROM GPA 2145-09, THE TABLES OF PHYSICAL CONSTANTS FOR HYDROCARBONS AND OTHER COMPOUNDS OF INTEREST TO THE NATURAL GAS INDUSTRY.

Powell 2-13A2K
ProMax Emissions Output

Process Streams	Residual Oil	Working Breathing
Composition		
Phase: Total	Status	
	From Block:	-
	To Block:	VSSL-190
Mole Fraction	%	%
Nitrogen	0.047*	0.153049*
Methane	1.387*	13.2531*
Ethane	0.901*	29.5124*
Propane	1.657*	31.1336*
i-Butane	0.598*	5.61379*
n-Butane	1.98*	14.1122*
i-Pentane	0.659*	2.10557*
n-Pentane	0.698*	1.74756*
2-Methylpentane	0.543*	0.628189*
3-Methylpentane	0.217*	0.227722*
Heptane	1.432*	0.428482*
Octane	2.321*	0.243435*
Nonane	1.527*	0.0567254*
Benzene	0.144*	0.0824711*
Toluene	0.286*	0.0554282*
Ethylbenzene	0.392*	0.0298483*
m-Xylene	0.388*	0.0344221*
p-Xylene	0.063*	0.00427509*
o-Xylene	0.146*	0.00767785*
n-Hexane	0.595*	0.515504*
2,2,4-Trimethylpentane	0.155*	0.0485079*
decane+	83.864*	0.00601618*
Mass Fraction	%	%
Nitrogen	0.00682324*	0.103954*
Methane	0.115312*	5.15505*
Ethane	0.140401*	21.5163*
Propane	0.378656*	33.2865*
i-Butane	0.180123*	7.91119*
n-Butane	0.596395*	19.8876*
i-Pentane	0.246400*	3.68334*
n-Pentane	0.260982*	3.05706*
2-Methylpentane	0.242499*	1.31255*
3-Methylpentane	0.0969103*	0.475809*
Heptane	0.743612*	1.04100*
Octane	1.37397*	0.674221*
Nonane	1.01494*	0.176399*
Benzene	0.0582916*	0.156193*
Toluene	0.136563*	0.123827*
Ethylbenzene	0.215672*	0.0768323*
m-Xylene	0.213472*	0.0886058*
p-Xylene	0.0346616*	0.0110045*
o-Xylene	0.0803269*	0.0197635*
n-Hexane	0.265722*	1.07711*
2,2,4-Trimethylpentane	0.0917557*	0.134348*
decane+	93.5065*	0.0313837*

CO2	0	
Methane	5.155*	0.05155046
	wt%	wt fraction
VOC	73.225*	0.73224669
B	0.156*	0.00156193
T	0.124*	0.00123827
E	0.077*	0.00076832
X	0.119*	0.00119374
n-hex	1.077*	0.01077106
2,2,4	0.134*	0.00134348

Powell 2-13A2K
ProMax Emissions Output

Mass Flow	lb/h	lb/h
Nitrogen	0.915517*	0.00417860*
Methane	15.4721*	0.207216*
Ethane	18.8385*	0.864887*
Propane	50.8067*	1.33801*
i-Butane	24.1683*	0.318004*
n-Butane	80.0221*	0.799416*
i-Pentane	33.0611*	0.148058*
n-Pentane	35.0177*	0.122884*
2-Methylpentane	32.5376*	0.0527604*
3-Methylpentane	13.0031*	0.0191260*
Heptane	99.7751*	0.0418450*
Octane	184.354*	0.0271015*
Nonane	136.181*	0.00709066*
Benzene	7.82136*	0.00627846*
Toluene	18.3236*	0.00497744*
Ethylbenzene	28.9381*	0.00308841*
m-Xylene	28.6428*	0.00356167*
p-Xylene	4.65077*	0.000442346*
o-Xylene	10.7780*	0.000794431*
n-Hexane	35.6536*	0.0432962*
2,2,4-Trimethylpentane	12.3114*	0.00540035*
decane+	12546.4*	0.00126152*

CO2	0	
Methane	0.207*	0.908*
		UNC
	lb/hr	tpy
VOC	2.943*	12.892*
B	0.006*	0.027*
T	0.005*	0.022*
E	0.003*	0.014*
X	0.005*	0.021*
n-hex	0.043*	0.190*
2,2,4	0.005*	0.024*

Process Streams		Residual Oil	Working Breathing
Properties	Stream		
Phase: Total	From Block	--	--
	To Block	VESL-100	--
Property	Units		
Temperature	°F	155*	124.242*
Pressure	psia	14.6959*	14.3998
Mole Fraction Vapor	%	3.37971	100*
Mole Fraction Light Liquid	%	96.6203	0
Mole Fraction Heavy Liquid	%	0	0
Molecular Weight	lb/lbmol	192.963	41.2436
Mass Density	lb/ft^3	9.99300	0.0958419
Molar Flow	lbmol/h	69.5349	0.0974619
Mass Flow	lb/h	13417.6	4.01968*
Vapor Volumetric Flow	ft^3/h	1342.70	41.9407
Liquid Volumetric Flow	gpm	167.402	5.22897
Std Vapor Volumetric Flow	MMSCFD	0.633297	0.000887645
Std Liquid Volumetric Flow	sgpm	35.3839	0.0168744
Compressibility		0.0430199	0.988887
Specific Gravity			1.42403
API Gravity			
Enthalpy	Btu/h	-1.02556E+07	-4205.73
Mass Enthalpy	Btu/lb	-764.334	-1046.29
Mass Cp	Btu/(lb*°F)	0.547772	0.438862
Ideal Gas CpCv Ratio		1.02345	1.12397
Dynamic Viscosity	cP		0.00928859
Kinematic Viscosity	cSt		6.05025
Thermal Conductivity	Btu/(h*ft*°F)		0.0130719
Surface Tension	lbf/ft		
Net Ideal Gas Heating Value	Btu/ft^3	9641.79	2167.61
Net Liquid Heating Value	Btu/lb	18810.5	19794.6
Gross Ideal Gas Heating Value	Btu/ft^3	10315.7	2357.90
Gross Liquid Heating Value	Btu/lb	20135.9	21545.4

bbl/day	1213.163717

TANKs 4.09d Emissions Report

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Altamont 500 bbl heated oil tank
City:	Salt Lake City
State:	Utah
Company:	EP Energy E&P Company LP
Type of Tank:	Vertical Fixed Roof Tank
Description:	150,000 BOPY

Tank Dimensions

Shell Height (ft):		21.00
Diameter (ft):		13.00
Liquid Height (ft) :		19.00
Avg. Liquid Height (ft):		16.00
Volume (gallons):		18,865.29
Turnovers:		166.97
Net Throughput(gal/yr):		3,150,000.00
Is Tank Heated (y/n):	Y	

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Dome	
Height (ft)		2.00
Radius (ft) (Dome Roof)		13.00

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meterological Data used in Emissions Calculations: Salt Lake City, Utah (Avg Atmospheric Pressure = 12.64 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Altamont 500 bbl heated oil tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 6)	All	0.00	0.00	0.00	0.00	0.7163	0.7163	0.7163	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Altamont 500 bbl heated oil tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

Annual Emission Calcaulations

Standing Losses (lb):	0.0000
Vapor Space Volume (cu ft):	800.5825
Vapor Density (lb/cu ft):	0.0100
Vapor Space Expansion Factor:	0.0000
Vented Vapor Saturation Factor:	0.8137
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	800.5825
Tank Diameter (ft):	13.0000
Vapor Space Outage (ft):	6.0316
Tank Shell Height (ft):	21.0000
Average Liquid Height (ft):	16.0000
Roof Outage (ft):	1.0316
Roof Outage (Dome Roof)	
Roof Outage (ft):	1.0316
Dome Radius (ft):	13.0000
Shell Radius (ft):	6.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0100
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.7163
Daily Avg. Liquid Surface Temp. (deg. R):	459.6700
Daily Average Ambient Temp. (deg. F):	51.9625
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	459.6700
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,452.1184
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0000
Daily Vapor Temperature Range (deg. R):	0.0000
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.7163
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.7163
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.7163
Daily Avg. Liquid Surface Temp. (deg R):	459.6700
Daily Min. Liquid Surface Temp. (deg R):	459.6700
Daily Max. Liquid Surface Temp. (deg R):	459.6700
Daily Ambient Temp. Range (deg. R):	23.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8137
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.7163
Vapor Space Outage (ft):	6.0316
Working Losses (lb):	1,283.8399
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.7163
Annual Net Throughput (gal/yr.):	3,150,000.0000
Annual Turnovers:	166.9734
Turnover Factor:	0.3463
Maximum Liquid Volume (gal):	18,865.2856
Maximum Liquid Height (ft):	19.0000
Tank Diameter (ft):	13.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	1,283.8399

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Altamont 500 bbl heated oil tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 6)	1,283.84	0.00	1,283.84

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	500 gal Methanol Tank
City:	Salt Lake City
State:	Utah
Company:	EP Energy
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):		6.00
Diameter (ft):		4.00
Liquid Height (ft) :		6.00
Avg. Liquid Height (ft):		4.00
Volume (gallons):		564.02
Turnovers:		3.19
Net Throughput(gal/yr):		1,800.00
Is Tank Heated (y/n):	Y	

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Dome	
Height (ft)		22.00
Radius (ft) (Dome Roof)		4.00

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meterological Data used in Emissions Calculations: Salt Lake City, Utah (Avg Atmospheric Pressure = 12.64 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

500 gal Methanol Tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Methyl alcohol	All	59.41	49.72	69.11	54.20	1.4156	1.0351	1.9099	32.0400			32.04	Option 2: A=7.897, B=1474.08, C=229.13

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

500 gal Methanol Tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

Annual Emission Calcaulations

Standing Losses (lb):	55.7471
Vapor Space Volume (cu ft):	5,738.6426
Vapor Density (lb/cu ft):	0.0081
Vapor Space Expansion Factor:	0.1153
Vented Vapor Saturation Factor:	0.0284
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	5,738.6426
Tank Diameter (ft):	4.0000
Vapor Space Outage (ft):	456.6667
Tank Shell Height (ft):	6.0000
Average Liquid Height (ft):	4.0000
Roof Outage (ft):	454.6667
Roof Outage (Dome Roof)	
Roof Outage (ft):	454.6667
Dome Radius (ft):	4.0000
Shell Radius (ft):	2.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0081
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.4156
Daily Avg. Liquid Surface Temp. (deg. R):	519.0816
Daily Average Ambient Temp. (deg. F):	51.9625
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	513.8725
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,452.1184
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1153
Daily Vapor Temperature Range (deg. R):	19.3870
Daily Vapor Pressure Range (psia):	0.8748
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.4156
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	1.0351
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	1.9099
Daily Avg. Liquid Surface Temp. (deg R):	519.0816
Daily Min. Liquid Surface Temp. (deg R):	509.3881
Daily Max. Liquid Surface Temp. (deg R):	528.7751
Daily Ambient Temp. Range (deg. R):	23.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.0284
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	1.4156
Vapor Space Outage (ft):	456.6667
Working Losses (lb):	1.9438
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.4156
Annual Net Throughput (gal/yr.):	1,800.0000
Annual Turnovers:	3.1914
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	564.0197
Maximum Liquid Height (ft):	6.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	57.6909

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

500 gal Methanol Tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Methyl alcohol	1.94	55.75	57.69

ED_004016P_00013358-00048