

# **Chevron Appalachia, LLC**

### G70-D General Permit Application Crow Natural Gas Production Site

Moundsville, West Virginia

**Prepared By:** 



ENVIRONMENTAL RESOURCES MANAGEMENT, Inc. Hurricane, West Virginia

September 2017

Chevron Appalachia, LLC 700 Cherrington Parkway Coraopolis, PA 15108

September 29, 2017

Mr. William F. Durham, Director WV Department of Environmental Protection Division of Air Quality 601 57th Street, SE Charleston, West Virginia 25304

#### HAND DELIVERED

Re: G70-D General Permit Registration Application Chevron Appalachia, LLC Crow Natural Gas Production Facility

Dear Director Durham:

Enclosed are one (1) original hard copy and two (2) complete PDFs included on CD-ROM of a G70-D General Permit Registration Application for the authority to modify the Crow natural gas production site located in Marshall County, West Virginia.

A legal advertisement will be published in the next few days and proof of publication will be forwarded as soon as it is received. Please see the attached check for payment of the application fee.

If you have any questions concerning this permit application, please contact Ms. Erica Blumenschein, Environmental Specialist - Air, of my staff at (412) 865-3148 or by email at eblumenschein@chevron.com.

Sincerely,

Gary Orr Appalachia Area Manager for Chevron Appalachia, LLC

Enclosures:

### **1.0 INTRODUCTION NARRATIVE**

Chevron Appalachia, LLC submits this G70-D General Permit application to the West Virginia Department of Environmental Protection's Division of Air Quality (WVDAQ) for modification of the Crow natural gas production site located in Marshall County, West Virginia. This application addresses the operational activities associated with the production of natural gas, condensate, and produced water at the Crow pad.

Chevron would like to submit a G70-D General Permit application to reflect the following at the Crow site:

- One (1) Natural Gas Well;
- One (1) Gas Production Unit/Heater rated at 1.00 MMBtu/hr input (BAP-0110);
- One (1) 400 bbl Test Tank (ABJ-0014);
- One (1) 400 bbl Produced Water Storage Tank (ABJ-0011);
- One (1) enclosed ground flare with a capacity of 4.4 MMBtu/hr heat input (ZZZ-0060);
- One (1) Liquids Loading Rack (LR-1); and
- One (1) 47 hp Arrow A-42 compression engine (CBA-0050).

Chevron Appalachia, LLC is submitting this G70-D General Permit application for modification of the Crow site currently permitted under R13-3143B. This permit application addresses the replacement of the previously permitted 95 hp Caterpillar G3304NA compression engine with the 47 hp Arrow A-42 compression engine listed above. WVDAQ determined in a Permit Determination dated August 25, 2017 that the proposed replacement triggers a substantive requirement of a Federal air regulation and, therefore, requires an update from R13-3143B to this G70-D for the compressor engine replacement.

### Statement of aggregation

The Crow natural gas production site is located in Marshall County, WV and operated by Chevron. Stationary sources of air pollutants may require aggregation of total emission levels if these sources share the same industrial grouping, are operating under common control, and are classified as contiguous or adjacent properties. Chevron operates Crow with the same industrial grouping as nearby facilities, and some of these facilities are under common control. The Crow site is not subject to the aggregation of stationary emission sources because these sites do meet the definition of contiguous or adjacent facilities.

The Crow site operates under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are surrounding sites operated by Crow that share the same two-digit major SIC code of 13 for Crude Petroleum and Natural Gas Extraction. Therefore, the Crow Site does share the same SIC codes as the surrounding wells and compressor stations.

Chevron is the sole operator of the Crow site. Chevron is also the sole operator of other production sites and compressor stations in the area. Therefore, Chevron does qualify as having nearby operations under common control.

Based on the EPA's Source Determination Guidance for Certain Emission Units in the Oil and Natural Gas Sector, effective on August 2, 2016, the term "adjacent" is defined as follows:

Equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located near each other – specifically, if they are located on the same site or on sites that share equipment and are within <sup>1</sup>/<sub>4</sub> mile of each other.

The Crow site does not exist within a 1/4 mile of another site and does not share equipment with another site. Based on this reasoning, Chevron is not subject to the aggregation of stationary emission sources since the stationary sources are not considered contiguous or adjacent facilities.

### 2.0 REGULATORY DISCUSSION

This section outlines the State air quality regulations that could be reasonably expected to apply to the Crow site and makes an applicability determination for each regulation based on activities conducted at the site and the emissions of regulated air pollutants. This review is presented to supplement and/or add clarification to the information provided in the WVDEP G70-D permit application forms. The West Virginia State Regulations address federal regulations, including Prevention of Significant Deterioration permitting, Title V permitting, New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants.

The regulatory requirements in reference to the Crow Site are described in detail in the below section.

### West Virginia State Air Regulations

### 45 CSR 02 – To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

The line heater associated with the gas production unit is an indirect heat exchanger that combusts natural gas but is exempt from this regulation since the heat input capacity is less than 10 MMBtu/hr.

45 CSR 04 – To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

Operations conducted at the Crow site are subject to this requirement. Based on the nature of the process at the site, the presence of objectionable odors is unlikely.

#### 45 CSR 06 – Control of Air Pollution from the Combustion of Refuse

The enclosed combustion devices located at the Crow site will be subject to this regulation. Per 45 CSR 6-4.3, opacity of emissions from the enclosed combustion device shall not exceed 20 percent, except as provided by 4.4. Particulate matter emissions from this unit will not exceed the levels calculated in accordance with 6-4.1.

§45-6-4.1 Determination for Maximum Allowable Particulate Emissions

#### 4.4 MMBtu/hr Combustor

Emissions (lb/hr) = F x Incinerator Capacity (tons/hr)

 $\rho_{WG} = 0.09505 \ lb/scf - Density of Waste Gas Firing Incinerator Incinerator Rating = 4.4 mmBtu/hr Waste Gas Heating Value = 1,895.25 Btu/scf$ 

Incinerator Capacity Calculation:

 $\frac{4.4\ mmBtu}{hr}\ X\ \frac{10^6Btu}{mmBtu}\ X\ \frac{scf}{1,895.25\ Btu}X\ \frac{0.09505\ lb\ Test\ Tank\ Vent\ Gas}{scf}\ X\ \frac{ton}{2000\ lbs}=0.110\ tons/hr$ 

If the Incinerator Capacity is less than 15,000 lbs/hr, then F = 5.43

Emissions (lb/hr) = 5.43 \* (0.110 tons/hour)

Emissions (lb/hr) = 0.60 lbs/hr

The enclosed combustion devices utilize a ProMax simulation to determine emissions from the combustion of refuse natural gas. Based upon the type of fuel combusted and the emission factors utilized, the PM emissions from the enclosed combustion devices will be below the maximum allowable particulate emissions mandated by 45 CSR 06.

45 CSR 10 – To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

The line heater is an indirect heat exchanger that combusts natural gas but is exempt from this regulation since the heat input capacities are less than 10 MMBtu/hr.

45 CSR 13 – Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants

This G70-D permit application is being submitted for the operational activities associated with Chevron's production of natural gas.

45 CSR 14 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration (PSD). The G70-D applicability criteria excludes facilities that meet the definition of a major source as defined in 45 CSR 19 for being eligible for the general permit.

Operation of equipment at the Crow site will not exceed emission thresholds established by this permitting program. Chevron will monitor future construction and modification activities at the site closely and will compare any future increase in emissions with the PSD thresholds to ensure these activities will not trigger this program.

### 45 CSR 16 - Standards of Performance for New Stationary Sources (NSPS)

45 CSR 16 applies to all registrants that are subject to any of the NSPS requirements described in more detail in the Federal Regulations section.

### 45 CSR 19 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contributed to Non-attainment

Federal construction permitting programs regulate new and modified sources of non-attainment pollutants under Non-Attainment New Source Review (NNSR). The G70-D applicability criterion excludes facilities that meet the definition of a major source as defined in 45 CSR 19 for being eligible for the general permit.

Operation of equipment at the Crow site will not exceed emission thresholds established by either of these permitting programs. Chevron Appalachia, LLC will monitor future construction and modification activities at the site closely and will compare any future increase in emissions with the NSR thresholds to ensure these activities will not trigger this program.

### 45 CSR 25 – Control of Air Pollution from Hazardous Waste Treatment, Storage, and Disposal Facilities

No hazardous waste will be burned at this well site; therefore, it is not subject to this hazardous waste rule.

#### 45 CSR 30 – Requirements for Operating Permits

45 CSR 30 applies to the requirements of the federal Title V operating permit program (40 CFR 70). The major source thresholds for the Title V operating permit program regulations are 10 tons per year (tpy) of a single hazardous air pollutant (HAP), 25 tpy of any combination of HAPs, or 100 tpy of all other regulated pollutants.

The potential emissions of all regulated pollutants at the proposed facility are below the corresponding major source threshold(s). Therefore, the Crow site will not be a major source under the Title V program.

#### 45 CSR 34 – National Emission Standards for Hazardous Air Pollutants (NESHAP)

45 CSR 34 applies to all registrants that are subject to any of the NESHAP requirements. The NESHAP Rules are discussed further in the Federal Regulation section of this document.

### **Federal Regulations**

#### **New Source Performance Standards**

### 40 CFR 60, Subpart OOOO (Standards of Performance for Crude oil and Natural Gas Production, Transmission and Distribution)

Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO<sub>2</sub>) emissions from affected facilities that commence construction, modification or reconstruction between August 23, 2011 and September 18, 2015. The applicable provisions and requirements of Subpart OOOO are included under the G70-D permit. The Crow site does not qualify as a gas well affected facility as the well was completed prior to August 23, 2011.

There are several equipment types that have been installed at Crow that do not meet the affected facility definitions as specified by EPA. These include:

- Storage vessels: Emissions from each storage vessel (ABJ-0014 and ABJ-0011) were determined to be below 6 tons per year (tpy) of VOC. Therefore, the produced water tank and test tank are not affected storage vessels.
- Pneumatic devices: All pneumatic devices installed at the Crow facility are either low-continuous bleed or intermittent bleed and do not qualify as affected sources.

Subpart OOOOa (Standards Of Performance For Crude Oil And Natural Gas Facilities For Which Construction, Modification, Or Reconstruction Commenced After September 18, 2015)

The Crow facility commenced construction before September 18, 2015 and, therefore, will not qualify as an affected facility under OOOOa, and no major modifications, as defined under Subpart OOOO, have taken place at the facility since that time.

40 CFR 60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)

The Crow site has a compressor engine that was constructed after June 12, 2006 and is subject to this rule. One (1) engine is a non-emergency, spark-ignition, lean-burn reciprocating internal combustion engine with a horsepower rating of 47 bhp. These units are subject to the following emission standards:

- NOx 1.0 g/bhp-hr
- CO 2.0 g/bhp-hr
- VOCs 0.7 g/bhp-hr

Since the compressor engine does not possess an EPA Certificate of Conformity, Chevron will comply with the rule by demonstrating the emission standards are met in an initial performance test. No continuous emissions testing requirements apply to this unit, and no additional NSPS are expected to be applicable to this facility.

### National Emissions Standards for Hazardous Air Pollutants

40 CFR 63, Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)

The 47 hp Arrow A-42 compression engine complies with Subpart ZZZZ by complying with the JJJJ regulations.

The following NESHAP included in the G70-D permit are not applicable to the Crow:

• 40 CFR 63 Subpart HH (National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities).

Subpart HH is not applicable since the Crow Site does not have an dehydration units.

No additional NESHAP are expected to be applicable to this facility.

General Permit G70-D will establish an emission cap on the following regulated and hazardous air pollutants (consistent with the PTE of the facility):

Pagulated Pollutant	Potential Annual Emissions	Maximum Annual Emission	
Regulated Follutalit	(tpy)	Limit (tpy)	
СО	2.68	80	
NOx	3.02	50	
PM	0.08	20	
PM-10	0.08	20	
SO <sub>2</sub>	0.01	20	
VOC	2.50	80	
Total HAPs	0.14	20	

The fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source for the purposes of 45CSR30-2.26.b or for eligibility of this General Permit.

dep	west virginia department of	environmental protection	Division of Air Quality 601 57 <sup>th</sup> Street SE Charleston, WV 25 4 Phone (304) 926-0475 Fax (304) 926-0479 www.dep.wv.gov		
<b>G70-D GENERAL PERMIT REGISTRATION APPLICATION</b> PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF					
□CONSTRUCTIO ⊠MODIFICATIO □RELOCATION	CONSTRUCTION     CLASS I ADMINISTRATIVE UPDATE       MODIFICATION     CLASS II ADMINISTRATIVE UPDATE       RELOCATION     CLASS II ADMINISTRATIVE UPDATE				
	SECTION 1. GENE	ERAL INFORMATION			
Name of Applicant (as registe	red with the WV Secretary of State's Offic	e): Chevron Appalachia, LL	C		
Federal Employer ID No. (FE	IN): <b>25-0527925</b>				
Applicant's Mailing Address:	700 Cherrington Parkway				
City: Coraopolis	State: Pennsylv	vania	ZIP Code: <b>15108</b>		
Facility Name: Crow Nat	ural Gas Production Site				
Operating Site Physical Addre If none available, list road, ci	ess: <b>Middle Grave Creek Road</b> ty or town and zip of facility.				
City: Moundsville, W	Zip Code: 26041	L	County: Marshall		
Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: <b>39.88644</b> Longitude: <b>-80.6540</b>					
SIC Code: 1311 DAQ Facility ID No. (For existing facilities) 051-00187					
CERTIFICATION OF INFORMATION					
This G70-D General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of the Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. Any administratively incomplete or improperly signed or unsigned G70-D Registration Application will be returned to the applicant. Furthermore, if the G70-D forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.					
I hereby certify that is an Authorized Representative and in that capacity shall represent the interest of the business (e.g., Corporation, Partnership, Limited Liability Company, Association Joint Venture or Sole Proprietorship) and may obligate and legally bind the business. If the business changes its Authorized Representative, a Responsible Official shall notify the Director of the Division of Air Quality immediately. I hereby certify that all information contained in this G70-D General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most					
Responsible Official Signatur	e: — Annalachia Aroa Managor	N 412 965 2500			
Email: orrga@chevron	- Appaiacina Area Manager .com	Phone: 412-003-2303	Fax:		
If applicable: Authorized Representative Sig Name and Title: Email:	gnature: Phone: Date:	Fax:			
If applicable: Environmental Contact Name and Title: Erica Blu Email: eblumenschein	menschein, Environmental S @chevron.com	pecialist - Air Phone: 412-8 Date:	<b>365-3148</b> Fax:		



west virginia department of environmental protection

Division of Air Quality 601 57<sup>th</sup> Street SE Charleston, WV 254 Phone (304) 926-0475 Fax (304) 926-0479 www.dep.wv.gov

#### **G70-D GENERAL PERMIT REGISTRATION APPLICATION**

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS PRODUCTION FACILITIES LOCATED AT THE WELL SITE

□CONSTRUCTION ⊠MODIFICATION □RELOCATION

□CLASS I ADMINISTRATIVE UPDATE □CLASS II ADMINISTRATIVE UPDATE

#### **OPERATING SITE INFORMATION**

Briefly describe the proposed new operation and/or any change(s) to the facility: **Replacement of 95 hp Caterpillar** G3304NA compression engine with a 47 hp Arrow A-42 compression engine.

Directions to the facility: Directions from Moundsville, WV. Travel East on 4<sup>th</sup> Street for approximately 1.4 miles. Continue onto Middle Grave Creek Road for approximately 7 miles. The entrance road for the Crow natural gas production site is on the left.

#### ATTACHMENTS AND SUPPORTING DOCUMENTS

#### I have enclosed the following required documents:

Check payable to WVDEP - Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22).

 $\boxtimes$  Check attached to front of application.

□ I wish to pay by electronic transfer. Contact for payment (incl. name and email address):

□ I wish to pay by credit card. Contact for payment (incl. name and email address):

 $\boxtimes$  \$500 (Construction, Modification, and Relocation)  $\square$  \$300 (Class II Administrative Update)  $\boxtimes$  \$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ, OOOO and/or OOOOa <sup>1</sup>  $\square$  \$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH <sup>2</sup>

<sup>1</sup> Only one NSPS fee will apply.

<sup>2</sup> Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ.

NSPS and NESHAP fees apply to new construction or if the source is being modified.

Responsible Official or Authorized Representative Signature (if applicable)

Single Source Determination Form (must be completed) – Attachment A

□ Siting Criteria Waiver (if applicable) – Attachment B	🖾 Current Business Certificate – Attachment C
🛛 Process Flow Diagram – Attachment D	⊠ Process Description – Attachment E
🛛 Plot Plan – Attachment F	🖾 Area Map – Attachment G
G70-D Section Applicability Form – Attachment H	Emission Units/ERD Table – Attachment I

Summary Sheet - Attachment J

🖾 Gas Well Affected Facility Data Sheet (if applicable) – Attachment K

⊠ Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment L

⊠ Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment M

⊠ Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N

Tanker Truck/Rail Car Loading Data Sheet (if applicable) – Attachment O

 $\Box$  Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc<sup>TM</sup> input and output reports and information on reboiler if applicable) – Attachment P



west virginia department of environmental protection

Division of Air Quality 601 57<sup>th</sup> Street SE Charleston, WV 254 Phone (304) 926-0475 Fax (304) 926-0479 www.dep.wv.gov

#### **G70-D GENERAL PERMIT REGISTRATION APPLICATION**

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS PRODUCTION FACILITIES LOCATED AT THE WELL SITE

□CONSTRUCTION ⊠MODIFICATION □RELOCATION	□CLASS I ADMINISTRATIVE UPDATE □CLASS II ADMINISTRATIVE UPDATE
🖾 Pneumatic Controllers Data Sheet – Attachment Q	
🖾 Pneumatic Pump Data Sheet – Attachment R	
⊠ Air Pollution Control Device/Emission Reduction applicable) – Attachment S	Device(s) Sheet(s) (include manufacturer performance data sheet(s) if
$\boxtimes$ Emission Calculations (please be specific and inclusion)	ude all calculation methodologies used) – Attachment T
⊠ Facility-wide Emission Summary Sheet(s) – Attack	nment U
🛛 Class I Legal Advertisement – Attachment V	

🖾 One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments

All attachments must be identified by name, divided into sections, and submitted in order.

## **Attachment A**

AIIACHMENIA · SINGLE SUUKUE DEIEKMINAIIUN FUKW	ATTACHMENT A ·	- SINGLE SOU	RCE DETERMIN	NATION FORM
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Classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and	
45CSR19 is based on the definition of Building, structure, facility, or installation as given in	n
§45-14-2.13 and §45-19-2.12. The definition states:	

"Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the
same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the
control of the same person (or persons under common control). Pollutant-emitting activities are a part of the
same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit
code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing
Office stock number GPO 1987 0-185-718:QL 3).

The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and will become effective on August 2, 2016. EPA defined the term "adjacent" and stated that equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located on the same site or on sites that share equipment and are within <sup>1</sup>/<sub>4</sub> mile of each other.

Is there equ	ipment and activities in the same industrial grouping (defined		
by SIC code	e)?		
Yes 🖂	No 🗆		
Is there equipment and activities under the control of the same			
person/peop	ple?		
Yes 🛛	No 🗆		
Is there equ	ipment and activities located on the same site or on sites that		
share equip	ment and are within <sup>1</sup> / <sub>4</sub> mile of each other?		

	-	_		
Yes			No	$\times$

### Attachment B (Not Applicable)

## **Attachment C**



### I, Natalie E. Tennant, Secretary of State of the State of West Virginia, hereby certify that

the attached true and exact copy of the Articles of Amendment to the Articles of Organization of

### ATLAS AMERICA, LLC

are filed in my office, signed and verified, as required by the provisions of West Virginia Code §31B-2-204 and conform to law. Therefore, I issue this

### CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the limited liability company to

### CHEVRON APPALACHIA, LLC



Given under my hand and the Great Seal of the State of West Virginia on this day of April 28, 2011

Vlaterie E. Yuman

Secretary of State



Natalie E. Tennant Secretary of State 1900 Kanawha Blvd E. Bldg 1, Suite 157-K Charleston, WV 25305



Penney Barker, Manager Corporations Division Tel: (304)558-8000 Fax: (304)558-8381 <u>WWW.WYSOS.com</u> Hrs: 8:30 a.m. – 5:00 p.m. ET

FILE ONE ORIGINAL (Two if you want a filed stamped copy returned to you) FEE: \$25.00

#### WV APPLICATION FOR AMENDED CERTIFICATE OF AUTHORITY OF A LIMITED LIABILITY COMPANY

In accordance with the provisions of the West Virginia Code, the undersigned limited liability company hereby applies for an Amended Certificate of Authority and submits the following statement:

•	Name under which the or authorized to transact bus	ganization was iness in WV:	Atlas America, LLC	
2	Date Certificate of Authority was issued in West Virginia:		03/08/2007	
3.	Change of Name Informa in the home state)	tion or Text of A	Amendment: (Attach one certifie	d copy of the name change as filed
	Change of name from:	Atlas America,		
	To: Chevron Appalac		achia, LLC	
	Name the organization el (Due to home state name not	ects to use in W being available)	V:	FILED
	Other amendment (use additional pages if		f necessary)	APR 28 2011
				IN THE OFFICE OF SECRETARY OF STATE
	· · · · · · · · · · · · · · · · · · ·			

4. Contact name and number to reach in case of a problem with filing: (optional, however, listing one may help to avoid a return or rejection of filing if there is a problem with the document)

800-927-9801 x2207	
Phone Number	
	800-927-9801 x2207 Phone Number

Business e-mail address, if any: jsuarez@cscinfo.com

5. Signafure of person executing document:

Assistant Secretary

Title/Capacity (Example: member, manager, etc.)

## **Attachment D**

### Attachment D Crow Natural Gas Production Site Process Flow Diagram



## **Attachment E**

### Attachment E Process Description

This G70-D General Permit application is being filed for Chevron Appalachia, LLC (Chevron) and addresses the replacement of the flash compressor engine associated with the Crow natural gas production site. The new flash gas compressor engine (CBA-0050) has a lower capacity with a rating of 47 horsepower (hp) than the previously permitted engine which was rated at 95 hp. Chevron is seeking to reflect this change in this G70-D as a replacement to the current R13.

Incoming raw natural gas from the wells enters the site through a pipeline. The raw gas is first routed through a line heater (BAP-0110) to assist with the phase separation process in the downstream three-phase separator (MBD-0120); especially during cooler ambient temperatures. In the separator, a produced water and condensate mix is removed from the raw gas and transferred to the condensate flash vessel (MBD-0040). Volatiles within the fluid flash off within the condensate flash vessel and are directed to the suction scrubber (MBF-0050). Any additional fluids within the gas are removed in the suction scrubber and directed to the blowdown tank (ABJ-0014). From the suction scrubber, gas flows to the gas compressor (CBA-0050), where the pressure is increased to enter the gas sales line. The remaining condensate fluids flow from the condensate flash vessel to a condensate sales line. The produced water from the condensate flash tank flows to the produced water storage tank (ABJ-0011). From the phase separator, natural gas flows to the downstream sales pipeline. A smaller gas stream is routed from the phase separator to the fuel gas scrubber (MBF-0030). Produced water is removed in the scrubber and transferred to the produced water storage tank (ABJ-0011). From the scrubber, gas either flows to the vapor destruction unit, (ZZZ-0060) where it burned, or to the ethanol based de-salter (MBF-0111). Gas flows from the ethanol based de-salter to the fuel gas pot (MBF-0110) and then to the line heater, where it is burned as a fuel source. Produced water is removed in the desalter and gas pot and transferred to the produced water storage tank (ABJ-0011). Emissions from the produced water, condensate, and blowdown tanks are directed to a knockout drum, (ABF-0065) and then to the vapor destruction unit (ZZZ-0060), where they are incinerated. Water that accumulates in the knockout drum (ABF-0065) is pumped back into the blowdown tank (ABJ-0014). From the storage tanks, the produced water and blowdown fluid is pumped into a tank truck on an as needed basis and is disposed of off-site. Condensate is sent off-site through piping.

Various control systems are used at the site to monitor and regulate temperature, flow, and pressure. Numerous other activities, including blowdowns are required to conduct maintenance activities, pneumatic device venting, and fugitive component leaks occur at the production site.

A process flow diagram is included as Attachment D.

## **Attachment F**

Attachment F Plot Plan Chevron Crow Natural Gas Production Site





## **Attachment G**



## **Attachment H**

### ATTACHMENT H – G70-D SECTION APPLICABILITY FORM General Permit G70-D Registration Section Applicability Form

General Permit G70-D was developed to allow qualified applicants to seek registration for a variety of sources. These sources include gas well affected facilities, storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, pneumatic pumps, reciprocating internal combustion engines (RICEs), tank truck/rail car loading, fugitive emissions, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

General Permit G70-D allows the registrant to choose which sections of the permit they are seeking registration under. Therefore, please mark which additional sections that you are applying for registration under. If the applicant is seeking registration under multiple sections, please select all that apply. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

GENERAL PERMIT G70-D APPLICABLE SECTIONS		
$\boxtimes$ Section 5.0	Gas and Oil Well Affected Facility (NSPS, Subpart OOOO/OOOOa)	
Section 6.0	Storage Vessels Containing Condensate and/or Produced Water <sup>1</sup>	
□Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)	
Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH	
Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc	
□Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO/OOOOa)	
□Section 11.0	Pneumatic Pump Affected Facility (NSPS, Subpart OOOOa)	
□Section 12.0	Fugitive Emissions GHG and VOC Standards (NSPS, Subpart OOOOa)	
Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines	
Section 14.0	Tanker Truck/Rail Car Loading <sup>2</sup>	
□Section 15.0	Glycol Dehydration Units <sup>3</sup>	

- 1 Applicants that are subject to Section 6 may also be subject to Section 7 if the applicant is subject to the NSPS, Subparts OOOO or OOOOa control requirements or the applicable control device requirements of Section 8.
- 2 Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 8.
- 3 Applicants that are subject to Section 15 may also be subject to the requirements of Section 9 (reboilers). Applicants that are subject to Section 15 may also be subject to control device and emission reduction device requirements of Section 8.

## **Attachment I**

#### ATTACHMENT I - EMISSION UNITS / EMISSION REDUCTION DEVICES (ERD) TABLE

Include ALL emission units and air pollution control devices/ERDs that will be part of this permit application review. Do not include fugitive emission sources in this table. Deminimis storage tanks shall be listed in the Attachment L table. This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

Emission Unit ID <sup>1</sup>	Emission Point ID <sup>2</sup>	Emission Unit Description	Year Installed	Manufac. Date <sup>3</sup>	Design Capacity	Type <sup>4</sup> and Date of Change	Control Device(s) <sup>5</sup>	$ERD(s)^{6}$
BAP-0110	BAP-0110	Line Heater	2013	2013	1.0 MMBtu/hr	Existing	NA	NA
CBA-0050	CBA-0050	Arrow A-42 Compression Engine	2017	2009	47 bhp	New	<b>Oxidation</b> Catalyst	NA
ABJ-0014	ZZZ-0060	Test Tank	2013	2013	400 bbl	Existing	NA	ZZZ-0060
ABJ-0011	ZZZ-0060	Produced Water Tank	2013	2013	400 bbl	Existing	NA	ZZZ-0060
ZZZ-0060	ZZZ-0060	Enclosed Ground Flare	2013	2013	4.4 MMBtu	Existing	NA	NA
LR-1	LR-1	Liquids Loading Rack	2013	2013	5,040 gal/day	Existing	NA	NA
<ul> <li><sup>1</sup> For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S, or other appropriate designation.</li> <li><sup>2</sup> For Emission Points use the following numbering system:1E, 2E, 3E, or other appropriate designation.</li> <li><sup>3</sup> When required by rule</li> <li><sup>4</sup> New, modification, removal, existing</li> </ul>								

<sup>5</sup> For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.
 <sup>6</sup> For ERDs use the following numbering system: 1D, 2D, 3D,... or other appropriate designation.

## **Attachment J**

	ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET								
	Sources of fugitive emissions may include loading operations, equipment leaks, blowdown emissions, etc. Use extra pages for each associated source or equipment if necessary.								
	Source/Equip	Source/Equipment: Crow site equipment							
	Leak Detection Method          □ Audible, visual, and olfactory         Used           □ Infrared (FLIR) cameras         □				□ Other (please d	escribe)	⊠ None required		
Component Ty	Closed			Source of Leak Factors (EPA, other (specify))		Stream type	Estimated Emissions (tpy)		ions (tpy)
	Syste	System Count				etc.)	VOC	НАР	GHG (methane, CO <sub>2</sub> e)
Pumps	□ Yes □ No					□ Gas □ Liquid □ Both			
Valves	□ Yes ⊠ No		59	I	EPA	⊠ Gas □ Liquid □ Both	0.15	<0.01	0.19, 4.84
Safety Relief Valves	. □ Yes ⊠ No		1	I	EPA	⊠ Gas □ Liquid □ Both	<0.01	<0.01	<0.01, 0.12
Open Ended Lines	□ Yes ⊠ No		3	I	EPA	⊠ Gas □ Liquid □ Both	0.01	<0.01	0.02, 0.46
Sampling Connections	□ Yes □ No					□ Gas □ Liquid □ Both			
Connections sampling)	(Not ☐ Yes ⊠ No		256	I	EPA	⊠ Gas □ Liquid □ Both	0.07	<0.01	0.09, 2.34
Compressors	□ Yes □ No					□ Gas □ Liquid □ Both			
Flanges	□ Yes □ No					□ Gas □ Liquid □ Both			
Other <sup>1</sup>	⊠ Yes □ No		N/A	Pr	oMax	⊠ Gas □ Liquid □ Both	0.04	<0.01	
<sup>1</sup> Uncontrolled Working and Breathing losses from Produced Water and Test Tanks for a maximum of 200 hrs/year									
Please provide an explanation of the sources of fugitive emissions (e.g. pigging operations, equipment blowdowns, pneumatic controllers, etc.): NA									
Please indicate if there are any closed vent bypasses (include component): NA									
Specify all equipment used in the closed vent system (e.g. VRU, ERD, thief hatches, tanker truck/rail car loading, etc.) NA									

## **Attachment K**

#### ATTACHMENT K - GAS WELL AFFECTED FACILITY DATA SHEET

Complete this data sheet if you are the owner or operator of a gas well affected facility for which construction, modification or reconstruction commenced after August 23, 2011. This form must be completed for natural gas well affected facilities regardless of when flowback operations occur (or have occurred).

API Number	Date of Flowback	Date of Well Completion	Green Completion and/or Combustion Device	Subject to OOOO or OOOOa?
47051013950000	6/17/11	6/14/11	No	No

#### Note: If future wells are planned and no API number is available please list as PLANNED. If there are existing wells that commenced construction prior to August 23, 2011, please acknowledge as existing.

This is the same API (American Petroleum Institute) well number(s) provided in the well completion notification and as provided to the WVDEP, Office of Oil and Gas for the well permit. The API number may be provided on the application without the state code (047).

Every oil and gas well permitted in West Virginia since 1929 has been issued an API number. This API is used by agencies to identify and track oil and gas wells.

The API number has the following format: 047-001-00001

Where,

047 =	State code. The state code for WV is 047.
001 =	County Code. County codes are odd numbers, beginning with 001
	(Barbour) and continuing to 109 (Wyoming).
00001=	Well number. Each well will have a unique well number.
# **Attachment L**

## ATTACHMENT L – STORAGE VESSEL DATA SHEET

Complete this data sheet if you are the owner or operator of a storage vessel that contains condensate and/or produced water. This form must be completed for *each* new or modified bulk liquid storage vessel(s) that contains condensate and/or produced water. (If you have more than one (1) identical tank (i.e. 4-400 bbl condensate tanks), then you can list all on one (1) data sheet). **Include gas sample analysis, flashing emissions, working and breathing losses, USEPA Tanks, simulation software (ProMax, E&P Tanks, HYSYS, etc.), and any other supporting documents where applicable.** 

## The following information is **REQUIRED**:

- □ Composition of the representative sample used for the simulation
- □ For each stream that contributes to flashing emissions:
  - $\Box$  Temperature and pressure (inlet and outlet from separator(s))
  - □ Simulation-predicted composition
  - □ Molecular weight
  - $\Box$  Flow rate
- □ Resulting flash emission factor or flashing emissions from simulation
- □ Working/breathing loss emissions from tanks and/or loading emissions if

simulation is used to quantify those emissions

Additional information may be requested if necessary.

### **GENERAL INFORMATION (REQUIRED)**

1. Bulk Storage Area Name Tank Area	2. Tank Name Produced Water Tank				
3 Emission Unit ID number ABI-0011	4 Emission Point ID number 777-0060				
5. Date Installed , Modified or Relocated (for existing	6. Type of change:				
tanks) 2013	$\Box$ New construction $\Box$ New stored material $\Box$ Other				
Was the tank manufactured after August 23, 2011 and on	□ Relocation				
or before September 18, 2015?					
$\boxtimes$ Yes $\square$ No					
Was the tank manufactured after September 18, 2015?					
$\Box$ Yes $\boxtimes$ No					
7A. Description of Tank Modification ( <i>if applicable</i> ) NA					
7B. Will more than one material be stored in this tank? If so	o, a separate form must be completed for each material.				
$\Box$ Yes $\boxtimes$ No					
7C. Was USEPA Tanks simulation software utilized?					
$\Box$ Yes $\boxtimes$ No					
If Yes, please provide the appropriate documentation and i	tems 8-42 below are not required.				

### TANK INFORMATION

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.						
400 bbl						
9A. Tank Internal Diameter (ft.) 15	9B. Tank Internal Height (ft.) 20					
10A. Maximum Liquid Height (ft.) 18	10B. Average Liquid Height (ft.) 10					
11A. Maximum Vapor Space Height (ft.) 18	11B. Average Vapor Space Height (ft.) 10					
12. Nominal Capacity (specify barrels or gallons). This	is also known as "working volume". 400 bbl					
13A. Maximum annual throughput (gal/yr) 2,217,638	13B. Maximum daily throughput (gal/day) 6,075					
14. Number of tank turnovers per year <b>132</b>	15. Maximum tank fill rate (gal/min) <b>3.0</b>					
16. Tank fill method $\boxtimes$ Submerged $\square$ Splash	□ Bottom Loading					
17. Is the tank system a variable vapor space system?	Yes 🛛 No					
If yes, (A) What is the volume expansion capacity of the	system (gal)?					
(B) What are the number of transfers into the syste	em per year?					
18. Type of tank (check all that apply):						
$\boxtimes$ Fixed Roof $\boxtimes$ vertical $\square$ horizontal $\square$ f	That roof $\Box$ cone roof $\Box$ dome roof $\Box$ other (describe)					
External Floating Roof     pontoon roof	$\Box$ External Floating Roof $\Box$ pontoon roof $\Box$ double deck roof					
□ Domed External (or Covered) Floating Roof						
□ Internal Floating Roof □ vertical column sup	oport  Self-supporting					
□ Variable Vapor Space □ lifter roof □ diap	hragm					
$\Box$ Pressurized $\Box$ spherical $\Box$ cylin	ndrical					
$\Box$ Other (describe)						

## PRESSURE/VACUUM CONTROL DATA

19. Check as many as appl	y:								
☑ Does Not Apply	Not Apply   Rupture Disc (psig)								
$\Box$ Inert Gas Blanket of $\Box$ Carbon Adsorption <sup>1</sup>									
□ Vent to Vapor Combustion Device <sup>1</sup> (vapor combustors, flares, thermal oxidizers, enclosed combustors)									
□ Conservation Vent (psi	$\Box$ Conservation Vent (psig) $\Box$ Condenser <sup>1</sup>								
Vacuum Setting	Vacuum Setting Pressure Setting								
Emergency Relief Valv	e (psig)								
Vacuum Setting		Pressure	Setting						
□ Thief Hatch Weighted	□ Yes □	] No							
<sup>1</sup> Complete appropriate Air	Pollutio	n Control	Device Sh	leet					
20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).									
r	te (suom	it Test Da		mations ne		where in t	ne applica	uoii).	
Material Name	Flashi	ng Loss	Breathi	ng Loss	Workin	ig Loss	Total		Estimation Method <sup>1</sup>
Material Name	Flashi	ng Loss	Breathi	ng Loss	Workin	ag Loss	Total Emissio	ons Loss	Estimation Method <sup>1</sup>
Material Name	Flashin lb/hr	ng Loss tpy	Breathi lb/hr	ng Loss	Workin lb/hr	g Loss tpy	Total Emissic lb/hr	ons Loss tpy	Estimation Method <sup>1</sup>
Material Name	Flashii lb/hr	ng Loss tpy	Breathi lb/hr Se	ng Loss tpy ee Attac	Workin Ib/hr hment U	tpy	Total Emissio lb/hr	ns Loss tpy	Estimation Method <sup>1</sup>
Material Name	Flashin lb/hr	ng Loss tpy	Breathi lb/hr Se	tpy	Workin lb/hr hment U	tpy	Total Emissio lb/hr	ns Loss tpy	Estimation Method <sup>1</sup>
Material Name	Flashin lb/hr	ng Loss tpy	Breathi lb/hr Se	ng Loss tpy ee Attac	Workin lb/hr hment U	tpy	Total Emissic Ib/hr	ns Loss tpy	Estimation Method <sup>1</sup>
Material Name	Flashii lb/hr	ng Loss tpy	Breathi lb/hr Se	tpy ee Attac	Workin Ib/hr hment U	tpy	Total Emissic Ib/hr	tpy	Estimation Method <sup>1</sup>
Material Name	Flashin lb/hr	ng Loss tpy	Breathi Ib/hr Se	tpy ee Attac	Workin Ib/hr hment U	g Loss	Total Emissic Ib/hr	ns Loss tpy	Estimation Method <sup>1</sup>
Material Name	Flashin lb/hr	tpy	Breathi lb/hr Sc	tpy ee Attac	Workin Ib/hr hment U	tpy	Total Emissic Ib/hr	tpy	Estimation Method <sup>1</sup>

<sup>1</sup> EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify) *Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.* 

TANK CONSTRUCTION AND OP	ERAT	TION INFORMATION	N			
21. Tank Shell Construction:						
□ Riveted □ Gunite lined □	🗆 Ep	oxy-coated rivets	⊠ Othe	r (describe) W	Velded	
21A. Shell Color: Green		21B. Roof Color: Gi	een		21C. Yes	ar Last Painted: 2013
22. Shell Condition (if metal and unlin	ned):					
🛛 No Rust 🗆 Light Rust 🗆	De	nse Rust 🛛 Not ap	plicabl	e		
22A. Is the tank heated? $\Box$ Yes $\boxtimes$	No	22B. If yes, operating	tempera	ature:	22C. If y	es, how is heat provided to tank?
23. Operating Pressure Range (psig): Must be listed for tanks using V	0.031 /RUs	to 1 with closed vent sy	stem			
24. Is the tank a <b>Vertical Fixed Roof</b>	KUS	24A. If yes, for dome	e roof pr	ovide radius	24B. If v	res, for cone roof, provide slop
Tank?		(ft):	, 1001 pi		(ft/ft):	es, for cone foor, provide stop
$\boxtimes$ Yes $\Box$ No		6			NA	
25. Complete item 25 for Floating Ro	oof Ta	nks 🗌 Does not ap	oply 🖂	]		
25A. Year Internal Floaters Installed:						
25B. Primary Seal Type (check one):		Aetallic (mechanical)	shoe se	eal 🗆 Liqu	id mounte	d resilient seal
		apor mounted resilie	ent seal	$\Box$ Othe	er (describ	e):
25C. Is the Floating Roof equipped w	ith a s	econdary seal? 🗆 Yes	s 🗆	] No		
25D. If yes, how is the secondary seal	l mour	ited? (check one)	Shoe	□ Rim □	Other (	describe):
25E. Is the floating roof equipped with	h a we	ather shield? 🛛 Yes	s [	🗆 No		
25F. Describe deck fittings:						
					. 1	
26. Complete the following section fo	or Inte	rnal Floating Roof Tai	nks	Does not	t apply	
26A. Deck Type: 🗌 Bolted		Welded	26B. 1	For bolted deck	s, provide c	leck construction:
26C. Deck seam. Continuous sheet co	onstru	ction:	l			
$\Box$ 5 ft. wide $\Box$ 6 ft. wide $\Box$	7 ft. v	vide 🛛 5 x 7.5 ft. v	vide 🗆	∃ 5 x 12 ft. wi	de 🗆 ot	her (describe)
26D. Deck seam length (ft.): 26H	E. Are	a of deck (ft <sup>2</sup> ):	26F. I	For column sup	ported	26G. For column supported
			tanks,	# of columns:	*	tanks, diameter of column:
27. Closed Vent System with VRU?	□ Ye	es 🗆 No				
28. Closed Vent System with Enclose	d Con	nbustor? 🛛 Yes 🗆 N	lo			
SITE INFORMATION						
29. Provide the city and state on which	h the c	lata in this section are b	ased: Cl	harleston, W	V	
30. Daily Avg. Ambient Temperature	(°F): '	70	31. A	nnual Avg. Ma	ximum Ten	nperature (°F): 65.5
32. Annual Avg. Minimum Temperate	ure (°I	F): <b>44.0</b>	33. A	vg. Wind Speed	d (mph): 18	mph
34. Annual Avg. Solar Insulation Fact	tor (B	ΓU/ft <sup>2</sup> -day): <b>1,123</b>	35. A	tmospheric Pres	ssure (psia)	: 14.70
LIQUID INFORMATION		1			T	
36. Avg. daily temperature range of b	ulk	36A. Minimum (°F):			36B. Ma	ximum (°F):
liquid (°F):						
37. Avg. operating pressure range of t	tank	37A. Minimum (psig	;):		37B. Ma	ximum (psig):
(psig):						
38A. Minimum liquid surface tempera	ature (	°F):	38B.	Corresponding	vapor press	ure (psia):
39A. Avg. liquid surface temperature	(°F):		39B.	Corresponding	vapor press	ure (psia):
40A. Maximum liquid surface temper	ature (	(°F):	40B.	Corresponding	vapor press	ure (psia):
41. Provide the following for each liqu	uid or	gas to be stored in the t	ank. Ad	ld additional pa	ges if neces	sary.
41A. Material name and composition:	:	Produced Wat	er			
41B. CAS number:		NA				
41C. Liquid density (lb/gal):		8.32				

41D. Liquid molecular weight (lb/lb-mole):	18.02	
41E. Vapor molecular weight (lb/lb- mole):	18.02	
41F. Maximum true vapor pressure (psia):	NA	
41G. Maximum Reid vapor pressure	N A	
(psia):	INA	
41H. Months Storage per year.	Lanuary to December	
From: To:	January to December	
42. Final maximum gauge pressure and		
temperature prior to transfer into tank used		
as inputs into flashing emission		
calculations.		

## ATTACHMENT L – STORAGE VESSEL DATA SHEET

Complete this data sheet if you are the owner or operator of a storage vessel that contains condensate and/or produced water. This form must be completed for *each* new or modified bulk liquid storage vessel(s) that contains condensate and/or produced water. (If you have more than one (1) identical tank (i.e. 4-400 bbl condensate tanks), then you can list all on one (1) data sheet). **Include gas sample analysis, flashing emissions, working and breathing losses, USEPA Tanks, simulation software (ProMax, E&P Tanks, HYSYS, etc.), and any other supporting documents where applicable.** 

## The following information is **REQUIRED**:

- □ Composition of the representative sample used for the simulation
- □ For each stream that contributes to flashing emissions:
  - $\Box$  Temperature and pressure (inlet and outlet from separator(s))
  - □ Simulation-predicted composition
  - □ Molecular weight
  - $\Box$  Flow rate
- □ Resulting flash emission factor or flashing emissions from simulation
- □ Working/breathing loss emissions from tanks and/or loading emissions if

simulation is used to quantify those emissions

Additional information may be requested if necessary.

### **GENERAL INFORMATION (REQUIRED)**

1. Bulk Storage Area Name Tank Area	2. Tank Name Test Tank				
3. Emission Unit ID number ABJ-0014	4. Emission Point ID number <b>ZZZ-0060</b>				
5. Date Installed , Modified or Relocated (for existing	6. Type of change:				
tanks) 2013	$\Box$ New construction $\Box$ New stored material $\Box$ Other				
Was the tank manufactured after August 23, 2011 and on	⊠ Relocation				
or before September 18, 2015?					
$\boxtimes$ Yes $\Box$ No					
Was the tank manufactured after September 18, 2015?					
$\Box$ Yes $\boxtimes$ No					
7A. Description of Tank Modification ( <i>if applicable</i> )					
7B. Will more than one material be stored in this tank? If see	o, a separate form must be completed for each material.				
⊠ Yes □ No This emission unit data shee	t addresses the produced water loading to tank ABJ-0014				
7C. Was USEPA Tanks simulation software utilized?					
$\Box$ Yes $\boxtimes$ No					
If Yes, please provide the appropriate documentation and i	tems 8-42 below are not required.				

### TANK INFORMATION

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.						
400 bbl						
9A. Tank Internal Diameter (ft.) 15	9B. Tank Internal Height (ft.) 20					
10A. Maximum Liquid Height (ft.) 18	10B. Average Liquid Height (ft.) 10					
11A. Maximum Vapor Space Height (ft.) 18	11B. Average Vapor Space Height (ft.) 10					
12. Nominal Capacity (specify barrels or gallons). This is	also known as "working volume". 400 bbl					
13A. Maximum annual throughput (gal/yr) 117,780	13B. Maximum daily throughput (gal/day) 323					
14. Number of tank turnovers per year 7	15. Maximum tank fill rate (gal/min) <b>3.0</b>					
16. Tank fill method $\boxtimes$ Submerged $\square$ Splash	□ Bottom Loading					
17. Is the tank system a variable vapor space system? $\Box$	Yes 🛛 No					
If yes, (A) What is the volume expansion capacity of the sy	stem (gal)?					
(B) What are the number of transfers into the system	per year?					
18. Type of tank (check all that apply):						
$\boxtimes$ Fixed Roof $\boxtimes$ vertical $\square$ horizontal $\square$ flat	roof $\Box$ cone roof $\Box$ dome roof $\Box$ other (describe)					
$\Box$ External Floating Roof $\Box$ pontoon roof $\Box$ do	uble deck roof					
□ Domed External (or Covered) Floating Roof	□ Domed External (or Covered) Floating Roof					
□ Internal Floating Roof □ vertical column support	ort 🗆 self-supporting					
□ Variable Vapor Space □ lifter roof □ diaphragm						
$\Box$ Pressurized $\Box$ spherical $\Box$ cylind	rical					
□ Other (describe)						

## PRESSURE/VACUUM CONTROL DATA

19. Check as many as appl	y:								
☑ Does Not Apply	Not Apply   Rupture Disc (psig)								
$\Box$ Inert Gas Blanket of $\Box$ Carbon Adsorption <sup>1</sup>									
□ Vent to Vapor Combustion Device <sup>1</sup> (vapor combustors, flares, thermal oxidizers, enclosed combustors)									
□ Conservation Vent (psi	$\Box$ Conservation Vent (psig) $\Box$ Condenser <sup>1</sup>								
Vacuum Setting	Vacuum Setting Pressure Setting								
Emergency Relief Valv	e (psig)								
Vacuum Setting		Pressure	Setting						
□ Thief Hatch Weighted	□ Yes □	] No							
<sup>1</sup> Complete appropriate Air	Pollutio	n Control	Device Sh	leet					
20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).									
r	te (suom	it Test Da		mations ne		where in t	ne applica	uoii).	
Material Name	Flashi	ng Loss	Breathi	ng Loss	Workin	ig Loss	Total		Estimation Method <sup>1</sup>
Material Name	Flashi	ng Loss	Breathi	ng Loss	Workin	ig Loss	Total Emissio	ons Loss	Estimation Method <sup>1</sup>
Material Name	Flashin lb/hr	ng Loss tpy	Breathi lb/hr	ng Loss	Workin lb/hr	g Loss tpy	Total Emissic lb/hr	ons Loss tpy	Estimation Method <sup>1</sup>
Material Name	Flashii lb/hr	ng Loss tpy	Breathi lb/hr Se	ng Loss tpy ee Attac	Workin Ib/hr hment U	tpy	Total Emissio lb/hr	ns Loss tpy	Estimation Method <sup>1</sup>
Material Name	Flashin lb/hr	ng Loss tpy	Breathi lb/hr Se	tpy	Workin lb/hr hment U	tpy	Total Emissio lb/hr	ns Loss tpy	Estimation Method <sup>1</sup>
Material Name	Flashin lb/hr	ng Loss tpy	Breathi lb/hr Se	ng Loss tpy ee Attac	Workin lb/hr hment U	tpy	Total Emissic Ib/hr	ns Loss tpy	Estimation Method <sup>1</sup>
Material Name	Flashii lb/hr	ng Loss tpy	Breathi lb/hr Se	tpy ee Attac	Workin Ib/hr hment U	tpy	Total Emissic Ib/hr	tpy	Estimation Method <sup>1</sup>
Material Name	Flashin lb/hr	ng Loss tpy	Breathi Ib/hr Se	tpy ee Attac	Workin Ib/hr hment U	g Loss	Total Emissic Ib/hr	ns Loss tpy	Estimation Method <sup>1</sup>
Material Name	Flashin lb/hr	tpy	Breathi lb/hr Sc	tpy ee Attac	Workin Ib/hr hment U	tpy	Total Emissic Ib/hr	tpy	Estimation Method <sup>1</sup>

<sup>1</sup> EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify) *Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.* 

TANK CONSTRUCTION AND O	<b>PERA</b>	TION INFORMATIO	N			
21. Tank Shell Construction:						
$\Box$ Riveted $\Box$ Gunite lined	🗆 Ep	oxy-coated rivets	⊠ Othe	r (describe) W	elded	
21A. Shell Color: Green		21B. Roof Color: G	reen		21C. Yea	ar Last Painted: 2013
22. Shell Condition (if metal and ur	nlined):					
🛛 No Rust 🛛 Light Rust	□ De	nse Rust 🛛 🗆 Not ap	oplicabl	e		
22A. Is the tank heated? $\Box$ Yes [	⊠ No	22B. If yes, operating	g tempera	ature:	22C. If y	es, how is heat provided to tank?
23. Operating Pressure Range (psig Must be listed for tanks using	): 0.031 VRUs	to 1 with closed vent sy	stem.		1	
24. Is the tank a Vertical Fixed Ro	of	24A. If yes, for dome	e roof pr	ovide radius	24B. If y	es, for cone roof, provide slop
Tank?		(ft):			(ft/ft):	
$\boxtimes$ Yes $\Box$ No		6			NA	
25. Complete item 25 for Floating	Roof Ta	nks 🗌 Does not aj	pply 🛛			
25A. Year Internal Floaters Installe	d:					
25B. Primary Seal Type (check one	): 🗆 N	Metallic (mechanical)	shoe so	eal 🗌 Liqu	id mounte	d resilient seal
		apor mounted resilie	ent seal	□ Othe	er (describ	e):
25C. Is the Floating Roof equipped	with a s	econdary seal?	s 🗆	No		
25D. If yes, how is the secondary se	eal mour	ited? (check one)	Shoe	□ Rim □	Other (	describe):
25E Is the floating roof equipped y	with a we	eather shield? Ves	3 [	No		
25E Describe deck fittings:	vitil a we		, .			
251. Desense deek namgs.						
26. Complete the following section	for Inte	rnal Floating Roof Ta	nks	⊠ Does not	apply	
26A. Deck Type: 🗌 Bolted		Welded	26B.	For bolted deck	s, provide d	leck construction:
26C Deck seam Continuous sheet	constru	ction:				
$\square$ 5 ft wide $\square$ 6 ft wide $\square$	$\frac{1}{7}$ ft v	vide 🗌 5x75ft v	vide [	∃5 x 12 ft wi	de 🗌 of	her (describe)
26D Deck seam length (ft ): 2	26E Are	$ra of deck (ft^2)$	26F 1	For column sum	norted	26G For column supported
20D. Deek seum lengui (it.).	.01. 110	<i>a</i> of deek (it ).	tanks,	# of columns:	ported	tanks, diameter of column:
27. Closed Vent System with VRU	? 🗆 Ye	es 🗆 No				
28. Closed Vent System with Enclo	sed Con	nbustor? 🗆 Yes 🗆 N	lo			
SITE INFORMATION						
29. Provide the city and state on wh	ich the c	lata in this section are b	ased: Cl	harleston, W	V	
30. Daily Avg. Ambient Temperatu	re (°F): '	70	31. A	nnual Avg. Max	kimum Terr	perature (°F): 65.5
32. Annual Avg. Minimum Temper	ature (°F	F): <b>44.0 F</b>	33. A	vg. Wind Speed	l (mph): 18	mph
34. Annual Avg. Solar Insulation F	actor (B	ГU/ft <sup>2</sup> -day): <b>1,123</b>	35. A	tmospheric Pres	ssure (psia):	: 14.70
LIQUID INFORMATION						
36. Avg. daily temperature range of	bulk	36A. Minimum (°F):			36B. Ma	ximum (°F):
IIquid (Г).	ftank	374 Minimum (psig	r).		37B Ma	vimum (neig):
(psig):	or tank	57A. Willingin (psig	<i>;</i> ).		57 <b>D</b> . Ma	xiniuni (psig).
38A. Minimum liquid surface temp	erature (	°F):	38B	Corresponding	vapor press	ure (psia):
39A. Avg. liquid surface temperatu	re (°F):	- /-	39B.	Corresponding	vapor press	ure (psia):
40A. Maximum liquid surface temp	erature (	(°F):	40B.	Corresponding	vapor press	ure (psia):
41. Provide the following for each l	iquid or	gas to be stored in the t	ank. Ad	d additional page	ges if neces	sary.
41A. Material name and composition	on:	Produced Wat	er			
41B. CAS number:		NA				
41C. Liquid density (lb/gal):		8.32				

41D. Liquid molecular weight (lb/lb- mole):	18.02	
41E. Vapor molecular weight (lb/lb- mole):	18.02	
41F. Maximum true vapor pressure (psia):	NA	
41G. Maximum Reid vapor pressure (psia):	NA	
41H. Months Storage per year.From:To:	January to December	
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.		

## STORAGE TANK DATA TABLE

## List all deminimis storage tanks (i.e. lube oil, glycol, diesel etc.)

Source ID # <sup>1</sup>	Status <sup>2</sup>	Content <sup>3</sup>	Volume <sup>4</sup>
N/A			

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the well site. Tanks should be designated T01, T02, T03, etc. 2.

Enter storage tank Status using the following:

- EXIST Existing Equipment
- NEW Installation of New Equipment
- REM Equipment Removed
- 3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, diesel, mercaptan etc.

4. Enter the maximum design storage tank volume in gallons.

# **Attachment M**

### ATTACHMENT M – SMALL HEATERS AND REBOILERS NOT SUBJECT TO 40CFR60 SUBPART DC DATA SHEET

Complete this data sheet for each small heater and reboiler not subject to 40CFR60 Subpart Dc at the facility. *The Maximum Design Heat Input (MDHI) must be less than 10 MMBTU/hr.* 

Emission Unit ID# <sup>1</sup>	Emission Point ID# <sup>2</sup>	Emission Unit Description (manufacturer, model #)	Year Installed/ Modified	Type <sup>3</sup> and Date of Change	Maximum Design Heat Input (MMBTU/hr) <sup>4</sup>	Fuel Heating Value (BTU/scf) <sup>5</sup>
BAP-0110	BAP-0110	Line Heater	2013	NA	1.0 MMBtu/hr	1,319

- <sup>1</sup> Enter the appropriate Emission Unit (or Source) identification number for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For sources, use 1S, 2S, 3S...or other appropriate designation. Enter glycol dehydration unit Reboiler Vent data on the Glycol Dehydration Unit Data Sheet.
- <sup>2</sup> Enter the appropriate Emission Point identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For emission points, use 1E, 2E, 3E...or other appropriate designation.
- <sup>3</sup> New, modification, removal.
- <sup>4</sup> Enter design heat input capacity in MMBtu/hr.
- <sup>5</sup> Enter the fuel heating value in BTU/standard cubic foot.

# **Attachment N**

## ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET

Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form*.

Emission Unit I		C	BA-0050				
Engine Manufac	D#		rrow 4.4?				
Manufacturers I	Pated hhp/rpm	47/1800					
Source Status <sup>2</sup>			NS				
Date Installed/			2017				
Modified/Remo	ved/Relocated <sup>3</sup>		2017				
Engine Manufac /Reconstruction	ctured Date <sup>4</sup>	:	8/5/2009				
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable) <sup>5</sup>		<ul> <li>☑ 40CFR60 Subpart JJJJ</li> <li>□ JJJJ Certified?</li> <li>□ 40CFR60 Subpart IIII</li> <li>□ IIII Certified?</li> <li>□ 40CFR63 Subpart ZZZZ</li> <li>□ NESHAP ZZZZ/ NSPS JJJJ</li> <li>Window</li> <li>□ NESHAP ZZZZ Remote</li> <li>Sources</li> </ul>		□ 40CFR60 Subpart JJJJ □ JJJJ Certified? □ 40CFR60 Subpart IIII □ IIII Certified? □ 40CFR63 Subpart ZZZZ □ NESHAP ZZZZ/ NSPS JJJJ Window □ NESHAP ZZZZ Remote Sources		□40CFR60 Subpart         JJJJ         □JJJJ Certified?         □40CFR60 Subpart         IIII         □IIII Certified?         □40CFR63 Subpart         ZZZZ         □ NESHAP ZZZZ/         NSPS JJJJ Window         □ NESHAP ZZZZ         Remote Sources	
Engine Type <sup>6</sup>		4SRB					
APCD Type <sup>7</sup>		A/F					
Fuel Type <sup>8</sup>		PQ					
H <sub>2</sub> S (gr/100 scf)	)	<0.01					
Operating bhp/r	pm	47/1800					
BSFC (BTU/bhj	p-hr)	9,889					
Hourly Fuel Th	roughput	ft <sup>3</sup> /hr gal/hr			ft <sup>3</sup> /hr gal/hr	ft³/hr gal/hr	
Annual Fuel Th (Must use 8,760 emergency gene	roughput hrs/yr unless rator)	MMft <sup>3</sup> /yr gal/yr		MMft <sup>3</sup> /yr gal/yr		MMft <sup>3</sup> /yr gal/yr	
Fuel Usage or H Operation Meter	lours of red	Yes 🗆 No 🗆		Yes 🗆 No 🗆		Yes 🗆 No 🗆	
Calculation Methodology <sup>9</sup>	Pollutant <sup>10</sup>	Hourly PTE (lb/hr) <sup>11</sup>	Annual PTE (tons/year) <sup>11</sup>	Hourly PTE (lb/hr) 11	Annual PTE (tons/year) <sup>11</sup>	Hourly PTE (lb/hr) <sup>11</sup>	Annual PTE (tons/year)
MD	NO <sub>x</sub>	0.21	0.91				
MD	СО	0.21	0.91				
MD	VOC	0.01	0.06				
AP-42	SO <sub>2</sub>	<0.01	<0.01				
AP-42	PM10	<0.01	0.02				
AP-42	Formaldehyde	<0.01	0.04				
AP-42	Total HAPs	0.01	0.05				
AP-42	GHG (CO <sub>2</sub> e)	54.53	238.42				

- 1 Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion engine/generator the well site. Multiple engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be engine located at designated GE-1, GE-2, GE-3 etc. Microturbine generator engines should be designated MT-1, MT-2, MT-3 etc. If more than three (3) engines exist, please use additional sheets.
- Enter the Source Status using the following codes: 2

NS	Construction of New Source (installation)	ES	Existing Source
MS	Modification of Existing Source	RS	Relocated Source
REM	Removal of Source		

- 3 Enter the date (or anticipated date) of the engine's installation (construction of source), modification, relocation or removal.
- 4 Enter the date that the engine was manufactured, modified or reconstructed.
- 5 Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart IIII/JJJJ? If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance as appropriate.

#### Provide a manufacturer's data sheet for all engines being registered.

6	Enter th	he Engine Type designation(s) using the following	codes:						
	2SLB 4SLB	Two Stroke Lean Burn Four Stroke Lean Burn	48	RB	Four Str	oke Rich Buri	1		
7	Enter tl	he Air Pollution Control Device (APCD) type desig	gnation	(s) us	ing the fol	llowing codes:	:		
	A/F HEIS PSC NSCR SCR	Air/Fuel Ratio High Energy Ignition System Prestratified Charge Rich Burn & Non-Selective Catalytic Reduction Lean Burn & Selective Catalytic Reduction			IR SIPC LEC OxCat	Ignition Reta Screw-in Pre Low Emissio Oxidation Ca	rd combustion Cha n Combustion talyst	umber	s
8	Enter tl	he Fuel Type using the following codes:							
	PQ	Pipeline Quality Natural Gas	RG	Ra	w Natural	Gas /Product	ion Gas	D	Diesel
9	Enter	the Potential Emissions Data Reference desi	gnatio	n usi	ng the fo	ollowing cod	es. Attach all	refe	rence data u
	MD GR	Manufacturer's Data GRI-HAPCalc <sup>TM</sup>		AP OT	AP- Oth	-42 ler	(please list)		
10	Enter calcu	r each engine's Potential to Emit (PTE) for the liste lated at manufacturer's rated brake horsepower and	ed regul d may r	ated perflect	ollutants reduction	in pounds per	hour and tons p of listed Air Poll	er yea	ar. PTE shall Control Dev

be ices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the Emissions Summary Sheet.

sed.

11 PTE for engines shall be calculated from manufacturer's data unless unavailable.

### Engine Air Pollution Control Device (Emission Unit ID# CBA-0050, use extra pages as necessary)

Air Pollution Control Device Manufacturer's Data Sheet included? Yes ⊠ No □

□ NSCR  $\Box$  SCR ⊠ Oxidation Catalyst Provide details of process control used for proper mixing/control of reducing agent with gas stream: Manufacturer: USA Compression Model #: VXC-1408-04-HSG Design Operating Temperature: °F Design gas volume: scfm Service life of catalyst: Provide manufacturer data?  $\Box$  Yes 🗆 No Volume of gas handled: acfm at °F Operating temperature range for NSCR/Ox Cat: °F to From ٥F Reducing agent used, if any: Ammonia slip (ppm): inches of H<sub>2</sub>O Pressure drop against catalyst bed (delta P): Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:

Is temperature and pressure drop of catalyst required to be monitored per 40CFR63 Subpart ZZZZ?  $\Box$  Yes  $\boxtimes$  No

How often is catalyst recommended or required to be replaced (hours of operation)?

How often is performance test required?

🛛 Initial

🗌 Annual

Every 8,760 hours of operation

Field Testing Required

 $\square$  No performance test required. If so, why (please list any maintenance required and the applicable sections in NSPS/GACT.

USA COMPRESSION

### **Emissions Report**

6/19/2017

		USA Co	mpressior	n Unit 5281, VR2	260/VRC2		
Engine Serial Number	4B08110	)5362			Engine Manufactured Date	8/5/2009	
Max HP	47				Max RPM	1800	
Number of Engine Cylinders	4				Total Displacement (in3)	253	
Combustion Type & Setting	4 Stroke	Rich Burn			Fuel Delivery Method	Carburetor	
Compression Ratio	10:01				Combustion Air Treatment	Naturally Aspirated	
Engine Modified/Reconstructed?	EMD afte	er 7/1/08 (uncertified	)				
Compressor Frame Serial #	09060				Unit Packaged Date	9/29/2009	
Compressor Frame Max RPM	1800				# of Compressor Throws	2	
AIR ENVIRONMENTAL REGULATION	IS						
County and State selected for Quote: Indiana	a, PA						
NSPS JJJJ	NOx	2.8 g/hp-hr	CO	4.8 g/hp-hr	VOC		
Ozone Non-Attainment/General	NOx	2 g/hp-hr	со	2 g/hp-hr	VOC	CH20	
reiniit							
RAW ENGINE EMISSIONS							
(based on assumption of burning 900-970 L	HV BTU/	SCF or 80-85 Fuel N	/lethane # F	uel Gas with little t	o no H2S)		
Fuel Consumption: 9889 HHV BTU/bhp-hr							
				g/bhp-hr	lb/MMBTU	lb/hr	TPY
Nitrogren Oxides (NOx)				12.8		1.326	5.808
Carbon Monoxide (CO) Volatile Organic Compounds (NMNEHC exc	ludina C	H2O)		5.1 0.04		0.528 0.004	2.313 0.018
Formaldehyde (CH2O)		,		0.09	0.0404	0.009	0.039
Particulate Matter (PM) Filterable+Conden Sulfur Dioxide (SO2)	sable				0.0194 0.0006	0.009 0.0003	0.0395 0.0012
				g/bhp-hr	lb/MMBTU	lb/hr	Metric
Carbon Dioxide (CO2)				0	110	51.126	203.113
Methane (CH4)					0.23	0.107	0.425
CONTROLLED EMISSIONS							
Catalytic Converter Make/Mod	ne v	XC-1408-04-HSG					
Catalyst Elements Concerntly in Users	pe 3	-vvay					
# of Catalyst Elements Currently in House	ng i	100					
All/Fuel Ratio Cont	roi i	es Iono					
Other Engine Emissions Control Equipme	iii N	ione	0/ Deduct				
			% Reduct with JJ.	JJ & Non-Attainme	ent / Ib/hr		TPY
			Gen	eral Permit Limits	0.0070		0.000
Carbon Monoxide (CO)				84 61	0.2072		0.908
Volatile Organic Compounds (NMNEHC exc	cluding C	H2O)		0	0.004		0.018
Formaldehyde (CH2O) Particulate Matter (PM) Filterable+Conden	sable			0	0.009 0.009		0.039 0.0395
Sulfur Dioxide (SO2)				0	0.0003		0.0012
			% Deduct	ion Dominad to Co	analy a		
			with JJ.	JJ & Non-Attainme	ent / Ib/hr	Me	tric Tonne/yr
Carbon Dioxide (CO2)			Gen	eral Permit Limits			
Methane (CH4)				0	0.107		0.425

1. g/bhp-hr are based on Engine Manufacturer Specifications assuming a "Pipeline Quality" fuel gas composition, 1200 ft elevation, and 100- 110 F Max Air Inlet. Note that g/bhphr values are based on 100% engine load operation and some g/hp-hr values are Nominal and are not representative of Not- To-Exceed values. It is recommended to apply safety factor (i.e. increase the value by a nominal percentage) to the g/hp- hr values for Air Permitting to allow for operational flexibility and variations in fuel gas composition.

 Ib/MMBTU emission Factors are based on EPA's AP-42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combution Sources (Section 3.2 Natural Gas-Fired Reciprocating Engines).

## **Attachment O**

## ATTACHMENT O – TANKER TRUCK/RAIL CAR LOADING DATA SHEET

Complete this data sheet for each new or modified bulk liquid transfer area or loading rack at the facility. This is to be used for bulk liquid transfer operations to tanker trucks/rail cars. Use extra pages if necessary.

## Truck/Rail Car Loadout Collection Efficiencies

The following applicable capture efficiencies of a truck/rail car loadout are allowed:

- For tanker trucks/rail cars passing the MACT level annual leak test 99.2%
- For tanker trucks/rail cars passing the NSPS level annual leak test 98.7%
- For tanker trucks/rail cars not passing one of the annual leak tests listed above 70%

Compliance with this requirement shall be demonstrated by keeping records of the applicable MACT or NSPS Annual Leak Test certification for *every* truck and railcar loaded/unloaded. This requirement can be satisfied if the trucking/rail car company provided certification that its entire fleet was compliant. This certification must be submitted in writing to the Director of the DAQ. These additional requirements must be noted in the Registration Application.

Emission Unit ID#: LR-	-1	Emissi	Emission Point ID#: LR-1			Year Installed/Modified: 2013		
Emission Unit Description: Tank Loading Operations								
			Loading A	Area Data				
Number of Pumps: 1		Numbe	Number of Liquids Loaded: 1			Max number of trucks/rail cars loading at one (1) time: <b>1</b>		
Are tanker trucks/rail cars pressure tested for leaks at this or any other location? $\Box$ Yes $\boxtimes$ No $\Box$ Not Required If Yes, Please describe:								
Provide description of c	losed vent syste	m and an	y bypasses.					
<ul> <li>Are any of the following truck/rail car loadout systems utilized?</li> <li>Closed System to tanker truck/rail car passing a MACT level annual leak test?</li> <li>Closed System to tanker truck/rail car passing a NSPS level annual leak test?</li> <li>Closed System to tanker truck/rail car not passing an annual leak test and has vapor return?</li> </ul>								
Pro	jected Maximu	n Operat	ting Schedul	e (for rack o	r transf	er point as a wh	(ole)	
Time	Jan – Ma	ar	Apr - Jun		Jul – Sept		Oct - Dec	
Hours/day	24		24		24		24	
Days/week	7		7		7		7	
	Bul	k Liquid	Data (use e	xtra pages a	s necess	ary)		
Liquid Name	Produce	ed Water						
Max. Daily Throughput (1000 gal/day)	6.4							
Max. Annual Throughpu (1000 gal/yr)								
Loading Method <sup>1</sup>	Submer	ged						
Max. Fill Rate (gal/min) 6.0								
Average Fill Time (min/loading)200 min								
Max. Bulk Liquid Temperature (°F)	70 F							
True Vapor Pressure <sup>2</sup>	NA							
Cargo Vessel Condition <sup>3</sup> U								

Control Equipment or Method <sup>4</sup>		NA	
Max. Collection Efficiency (%)		NA	
Max. Control Efficiency (%)		NA	
Max.VOC	Loading (lb/hr)	<0.01	
Rate	Annual (ton/yr)	<0.01	
Max.HAP Emission Rate	Loading (lb/hr)	<0.01	
	Annual (ton/yr)	<0.01	
Estimation Method <sup>5</sup>		ProMax	

#### 1 BF Bottom Fill SP Splash Fill SUB Submerged Fill

2 At maximum bulk liquid temperature

3 С U В Ballasted Vessel Cleaned Uncleaned (dedicated service) O Other (describe) List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)

4

Carbon Adsorption Enclosed Combustion Device vв Dedicated Vapor Balance (closed system) CA

F ECD Flare

Thermal Oxidization or Incineration EPA Emission Factor in AP-42 то

5 EPA

MB Material Balance ТМ Test Measurement based upon test data submittal 0 Other (describe)

## Attachment P (Not Applicable)

# Attachment Q

<b>ATTACHMENT Q – PNEUMATIC CONTROLLERS</b>
DATA SHEET

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?



Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after September 18, 2015?

Yes	🖂 No
-----	------

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

Yes No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after September 18, 2015?

Yes	🔀 No
-----	------

Please list approximate number.

# Attachment R

## ATTACHMENT R – PNEUMATIC PUMP DATA SHEET

Are there any natural gas-driven diaphragm pumps located at a well site that commenced construction, modification or reconstruction after September 18, 2015?

🗌 Yes 🛛 🖾 No

Please list.

Source ID #	Date	Pump Make/Model	Pump Size

# **Attachment S**

## ATTACHMENT S – AIR POLLUTION CONTROL DEVICE / EMISSION REDUCTION DEVICE SHEETS

Complete the applicable air pollution control device sheets for each flare, vapor combustor, thermal oxidizer, condenser, adsorption system, vapor recovery unit, BTEX Eliminator, Reboiler with and without Glow Plug, etc. at the facility. Use extra pages if necessary.

Emissions calculations must be performed using the most conservative control device efficiency.

The following five (5) rows are only to be completed if registering an alternative air pollution control device.						
Emission Unit ID: ZZZ-0060	Make/Model: Flare Industries/ FEF-36					
Primary Control Device ID: ZZZ-0060	Make/Model:					
Control Efficiency (%): 98 %	APCD/ERD Data Sheet Completed: 🛛 Yes 🗌 No					
Secondary Control Device ID:	Make/Model:					
Control Efficiency (%):	APCD/ERD Data Sheet Completed:  Yes No					

VAPOR COMBUSTION								
Concred Information								
		•	General II	Installatio	n Date: 2	013		
Control De	evice ID#: <b>ZZZ-006</b>	0		🗌 New	□ N	Iodified	Relocated	
Maximum 2,100 scfh		Maximum DesignHeat Input (from mfg. spec sheet)Design H <b>4.4 MMBTU/hr1,319 BT</b>			eat Content YU/scf			
	Control Device Information							
Enclos	Type of Vapor Combustion Control?       Enclosed Combustion Device     Elevated Flare       Thermal Oxidizer						Ground Flare	
Manufactu Model: <b>FE</b>	rer: Flare Industri F-36 or equivalent	28		Hours of o	peration	per year? 8	3760	
List the en	nission units whose	emissions	are controlled by this	vapor conti	ol device	(Emission	Point ID# ZZZ-0060)	
Emission Unit ID#	ission it ID# Emission Source Description			Emission Unit ID#	Emissio	on Source I	Description	
ABJ- 0011	Produced Water Tank							
ABJ- 0014	Test Tank	z Tank						
If this	s vapor combustor c	ontrols en	nissions from more the	an six (6) en	ission ur	its, please	attach additional pages.	
Assist Typ	e (Flares only)		Flare Height	Tip Diameter			Was the design per §60.18?	
Steam Pressu	re 🛛 Air		30 feet	3 feet			☐ Yes ☐ No Provide determination.	
		·	Waste Gas 1	Information	1			
Maximum	waste Gas Flow R (scfm)	ate <b>4.47</b>	Heat Value of W 2065.09	/aste Gas Stream Exit Ve BTU/ft <sup>3</sup>			locity of the Emissions Stream 0.01 (ft/s)	
	Provide an	attachme	nt with the characteri	stics of the	waste gas	stream to	be burned.	
			Pilot Gas I	nformation				
Number	of Pilot Lights 1	Fuel I Fl	Flow Rate to Pilot lame per Pilot <b>62 scfh</b>	Heat Input per Pilot 81,778 BTU/hr		Pilot <b>hr</b>	Will automatic re-ignition be used? ⊠ Yes □ No	
If automat	ic re-ignition is use	l, please d	lescribe the method. <b>H</b>	Ioneywell				
Is pilot fla presence o	Is pilot flame equipped with a monitor to detect the presence of the flame?If YesThermocoupleInfrared $\square$ Ultraviolet $\square$ Camera $\square$ Other:							
Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty. (If unavailable, please indicate). N/A								
Additional Please atta performan	Additional information attached? Please attach copies of manufacturer's data sheets, drawings, flame demonstration per §60.18 or §63.11(b) and performance testing							

# **Attachment T**

## Line Heater BAP-0110

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions. (Ib/hr)	Max. Annual Emissions. (tpy)
VOCs	5.5	lb/10 <sup>6</sup> scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.01	0.02
Hexane	1.8	lb/10 <sup>6</sup> scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.01	<0.01
Formaldehyde	0.075	lb/10 <sup>6</sup> scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.01	<0.01
Benzene	0.0021	lb/10 <sup>6</sup> scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.01	<0.01
Toluene	0.0034	lb/10 <sup>6</sup> scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.01	<0.01
Pb	0.0005	lb/10 <sup>6</sup> scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.01	<0.01
со	84	lb/10 <sup>6</sup> scf	AP-42 Chapter 1.4	1.00	1,319	8,760	0.06	0.279
NOx	100	lb/10 <sup>6</sup> scf	AP-42 Chapter 1.4	1.00	1,319	8,760	0.08	0.332
PM <sub>10</sub>	7.6	lb/10 <sup>6</sup> scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.01	0.025
SO <sub>2</sub>	0.6	lb/10 <sup>6</sup> scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.01	<0.01
CO <sub>2</sub>	53.06	kg CO <sub>2</sub> / MMBtu	40 CFR Subpart C	1.00	1,319	8,760	116.98	512.360
CH <sub>4</sub>	0.001	kg CO <sub>2</sub> / MMBtu	40 CFR Subpart C	1.00	1,319	8,760	<0.01	<0.01
N <sub>2</sub> O	0.0001	kg CO <sub>2</sub> / MMBtu	40 CFR Subpart C	1.00	1,319	8,760	<0.01	<0.01
Total HAPs							<0.01	<0.01
Total CO <sub>2</sub> e							117.10	512.89

#### Notes:

-Emission rates displayed above represent the max. hourly and max. annual emissions for one line heater.

-Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.

-AP-42, Chapter 1.4 references are from the July 1998 revision.

Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

-CO<sub>2</sub> equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO<sub>2</sub>=1, GWP CH<sub>4</sub>=25, GWP N<sub>2</sub>O=298

### Example Equations:

Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/10<sup>6</sup> scf) ÷ Heating Value of Natural Gas (Btu/scf) x Boiler Rating (MMBtu/hr)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heat Value of Natural Gas (Btu/scf)	Rated bhp	BSFC (Btu/hp-hr)	Annual Operating Hours	% Reduction by Catalytic Converter	Max. Hourly Emissions. (Ib/hr)	Max. Annual Emissions. (tpy)
VOCs	0.13	g/bhp-hr	Manufacturer Guarantee	1,319	47	9,889	8,760		0.01	0.06
Formaldehyde	0.09	g/bhp-hr	Manufacturer Guarantee	1,319	47	9,889	8,760		<0.01	0.04
Benzene	1.58E-03	lb/MMBtu	AP-42 Chapter 3.2	1,319	47	9,889	8,760		<0.01	<0.01
Toluene	5.58E-04	lb/MMBtu	AP-42 Chapter 3.2	1,319	47	9,889	8,760		<0.01	<0.01
Ethylbenzene	2.48E-05	lb/MMBtu	AP-42 Chapter 3.2	1,319	47	9,889	8,760		<0.01	<0.01
Xylenes	1.95E-04	lb/MMBtu	AP-42 Chapter 3.2	1,319	47	9,889	8,760		<0.01	<0.01
со	5.10	g/bhp-hr	Manufacturer Guarantee	1,319	47	9,889	8,760	61%	0.21	0.91
NOx	12.80	g/bhp-hr	Manufacturer Guarantee	1,319	47	9,889	8,760	84%	0.21	0.91
PMFil-10/2.5	9.50E-03	lb/MMBtu	AP-42 Chapter 3.2	1,319	47	9,889	8,760		<0.01	0.02
PMCondensable	9.91E-03	lb/MMBtu	AP-42 Chapter 3.2	1,319	47	9,889	8,760		<0.01	0.02
SO <sub>2</sub>	5.88E-04	lb/MMBtu	AP-42 Chapter 3.2	1,319	47	9,889	8,760		<0.01	<0.01
CO <sub>2</sub>	53.06	kg CO <sub>2</sub> / MMBtu	40 CFR Subpart C	1,319	47	9,889	8,760		11.19	49.01
CH <sub>4</sub>	0.001	kg CO <sub>2</sub> / MMBtu	40 CFR Subpart C	1,319	47	9,889	8,760		<0.01	<0.01
N <sub>2</sub> O	1.00E-04	kg CO <sub>2</sub> / MMBtu	40 CFR Subpart C	1,319	47	9,889	8,760		<0.01	<0.01
Total HAPs									0.01	0.05
Total CO <sub>2</sub> e									11.20	49.06

### Flash Gas Compressor Engine - CBA-0050

#### Notes:

- Engine emissions are controlled through the operation of a catalytic converter.

- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.

- AP-42, Chapter 3.2 references are from the August 2000 revision.

- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

- CO2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO2=1, GWP CH4=25, GWP N2O=298

#### Example Equations:

Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/MMBtu) x BSFC (Btu/hp-hr) ÷ 1,000,000 x Engine Rating (bhp)

## Produced Water Tank ABJ-0011

Pollutant	Max. Uncontrolled Hourly Emissions using ProMax (Ib/hr)	Max. Uncontrolled Annual Emissions using ProMax (tons/yr)		
VOCs	11.16	48.90		
Total HAPs	0.49	2.15		
n-Hexane	0.49	2.15		
Benzene	<0.01	<0.01		
Toluene	<0.01	<0.01		
Ethylbenzene	<0.01	<0.01		
Xylenes	<0.01	<0.01		
CO <sub>2</sub>	<0.01	0.02		
CH <sub>4</sub>	1.05	4.58		
Total CO <sub>2</sub> e	26.17	114.63		

### Notes:

- Emission rates for Produced Water Tank ABJ-0011 were calculated using ProMax software. ProMax output sheets for the Crow Pad are attached.

- Emissions were calculated using Engineering Estimates to establish input to the ProMax software. Chevron has applied an industry standard assumption that 1% of the produced water realized in the tank will be condensate, based upon imperfect fluid separation.

- The emission rates displayed above are pre-control device emissions. Emissions are routed to Enclosed Ground Flare ZZZ-0060.

- CO<sub>2</sub> equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO<sub>2</sub>=1, GWP CH<sub>4</sub>=25, GWP N<sub>2</sub>O=298

## Test Tank (ABJ-0014)

Pollutant	Max. Uncontrolled Hourly Emissions using ProMax (lb/hr)	Max. Uncontrolled Annual Emissions using ProMax (tons/yr)		
VOCs	14.86	65.10		
Total HAPs	0.59	2.60		
n-Hexane	0.59	2.60		
Benzene	<0.01	<0.01		
Toluene	<0.01	<0.01		
Ethylbenzene	<0.01	<0.01		
Xylenes	<0.01	<0.01		
CO <sub>2</sub>	<0.01	0.026		
CH <sub>4</sub>	1.01	4.44		
Total CO <sub>2</sub> e	25.33	110.97		

#### Notes:

- Emission rates for blowdown test tank ABJ-0014 were calculated using ProMax software. ProMax output sheets for the Crow Pad are attached.

- Emissions were calculated using Engineering Estimates to establish input to the ProMax software. Chevron has applied an industry standard assumption that 1% of the produced water realized in the tank will be condensate, based upon imperfect fluid separation.

- The emission rates displayed above are pre-control device emissions. Emissions are routed to Enclosed Ground Flare ZZZ-0060.

- CO<sub>2</sub> equivalency solved for using Global Warming Potentials found in 40CFR98 Subpart W Table A-1 (Updated January 2014). GWP CO<sub>2</sub>=1, GWP CH<sub>4</sub>=25, GWP N<sub>2</sub>O=298

#### Equations

VOCs (lb/hr) = Total emission rate output from ProMax (lb/hr)

VOCs (tons/yr) = Max. Hourly Emissions (lb/hr) x 8760 (hrs/yr) ÷ 2000 (lbs/ton)

## **Uncontrolled Working and Breathing Emissions**

Tank	Pollutant	Max. Hourly Emissions (Ib/hr)	Max. Yearly Emissions (tons/yr)			
PW Tank	VOCs	0.02	<0.01			
Test Tank	VOCs	0.36	0.04			
Totals	VOCs	0.37	0.04			

**Total Emissions from Tank Unloading Operations** 

### Notes:

- Working and Breathing emissions will be uncontrolled from the Produced Water Tank and Test Tank for a maximum of 200 hours per year.

- Emission rates for Working and Breathing tank losses were calculated using ProMax software. All Working and Breathing losses were assumed to be VOCs to provide a conservative estimate of emissions. ProMax summary sheets are attached.

## Tank Unloading Operations (LR-1)

Tank	Pollutant	Max. Hourly Emissions (Ib/hr)	Max. Yearly Emissions (tons/yr)			
PW Tank	VOCs	0.01	0.05			
Test Tank	VOCs	0.01	0.05			
Totals	VOCs	0.02	0.10			

### **Total Emissions from Tank Unloading Operations**

#### Notes:

- Tank Unloading Operations will be uncontrolled at the Crow natural gas production site

- Emission rates for liquid unloading operations were calculated using ProMax software. All loading losses were assumed to be

VOCs to provide a conservative estimate of emissions. ProMax summary sheets are attached.

#### Emissions from Tanks Gas Composition of Vent Gas Amount of Gas Sent Vapor Destruction Max. Hourly Max. Yearly Amount of Gas Sent to VDU Input to Vapor Destruction Pollutant to VDU Unit Combustion Emissions Emissions Gas Stream Mole Fraction Unit (lbs/hr) (tons/year) Efficiency (lb/hr) (tons/yr) VOCs 11.16 48.90 98% 0.22 0.98 Methane 0.20 HAPs 0.49 2.15 98% <0.01 0.04 0.21 Ethane Hexane 0.49 2.15 98% <0.01 0.04 Propane 0.24 Benzene < 0.01 <0.01 98% <0.01 < 0.01 Butane 0.17 Produced Water Tank ABJ-0011 Toluene < 0.01 <0.01 98% < 0.01 < 0.01 Pentanes 0.09 Ethylbenzene < 0.01 <0.01 98% <0.01 <0.01 Carbon Dioxide 0.000 Xylene < 0.01 < 0.01 98% < 0.01 < 0.01 CO<sub>2</sub> <0.01 0.02 98% 33.91 148.51 Vent Gas Properties CH₄ 4.58 0.02 1.05 98% 0.09 Mass Flow Rate VOCs 14.86 65.10 98% 0.30 1.30 Vent Gas Properties Density (lb/ft<sup>3</sup>) (lb/hr) HAPs 0.59 2.60 98% 0.01 0.05 0.01 0.59 2.60 98% 0.05 Hexane Produced Water Tank 13.78 0.11 Benzene <0.01 98% < 0.01 Test Tank 20.16 0.11 < 0.01 <0.01 Test Tank ABJ-0014 Toluene < 0.01 <0.01 98% <0.01 <0.01 <0.01 98% <0.01 Ethylbenzene <0.01 <0.01 Xylene < 0.01 <0.01 98% <0.01 <0.01 $CO_2$ < 0.01 0.03 98% 49.73 217.81 CH₄ 1.01 4.44 98% 0.02 0.09 VOCs 26.03 114.00 0.52 2.28 ---HAPs 1.08 4.75 ---0.02 0.10 1.08 4.75 0.02 0.09 Hexane ---Benzene < 0.01 <0.01 ---<0.01 <0.01 Toluene < 0.01 <0.01 ---<0.01 <0.01 Totals Ethylbenzene <0.01 <0.01 <0.01 <0.01 ---Xylene <0.01 < 0.01 < 0.01 <0.01 ---CO<sub>2</sub> 0.01 0.04 83.63 366.32 --- $CH_4$ 9.02 2.06 ---0.04 0.18 CO2e 51.51 225.60 ---84.66 370.83

### Vapor Destruction Unit (ZZZ-0060) - 4.4 MMBtu/hr

Emissions from Pilot Operations											
Pollutant	Emission Factor (Ib/10 <sup>6</sup> scf)	Emission Factors (kg XX/MMBtu)	Heat Value of Natural Gas (Btu/scf)	Enclosed Ground Flare Pilot Rating (Btu/hr)	Enclosed Ground Flare Burner Rating (Btu/hr)	Pilot Max. Hourly Emissions (Ib/yr)	Pilot Max. Hourly Emissions (tons/yr)	Burner Max.Hourly Emissions (Ib/hr)	Burner Max.Hourly Emissions (tons/hr)	Max. Hourly Emissions (Ib/hr)	Max. Yearly Emissions (tons/yr)
VOCs	5.50		1,088	30,000	4,400,000	<0.01	<0.01			<0.01	<0.01
Hexane	1.80		1,088	30,000	4,400,000	<0.01	<0.01			<0.01	<0.01
Formaldehyde	0.075		1,088	30,000	4,400,000	<0.01	<0.01			<0.01	<0.01
CO	84		1,088	30,000	4,400,000	<0.01	0.01	0.34	1.49	0.34	1.50
NO <sub>x</sub>	100		1,088	30,000	4,400,000	<0.01	0.01	0.40	1.77	0.41	1.78
PM <sub>Condensable</sub>	5.70		1,088	30,000	4,400,000	<0.01	<0.01	0.02	0.10	0.02	0.10
PM <sub>Filterable</sub>	1.90		1,088	30,000	4,400,000	<0.01	<0.01	<0.01	0.03	<0.01	0.03
PM <sub>Total</sub>	7.60		1,088	30,000	4,400,000	<0.01	<0.01	0.03	0.13	0.03	0.14
SO <sub>2</sub>	0.60		1,088	30,000	4,400,000	<0.01	<0.01	<0.01	0.01	<0.01	0.01
CO <sub>2</sub>	120,000	53.06	1,088	30,000	4,400,000	3.51	15.37	514.70	2,254.38	518.21	2,269.75
CH <sub>4</sub>	2.3	0.001	1,088	30,000	4,400,000	<0.01	<0.01	<0.01	0.04	<0.01	0.04
N <sub>2</sub> O	2.2	<0.001	1,088	30,000	4,400,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total HAPs										<0.01	<0.01
CO <sub>2</sub> e										518.74	2,272.10
#### **Total Enclosed Combustion Device Emissions**

Pollutant	Max. Hourly Emissions (Ib/hr)	Max. Yearly Emissions (tons/yr)
VOCs	0.52	2.28
HAPs	0.02	0.10
CO	0.34	1.50
NO <sub>x</sub>	0.41	1.78
PM <sub>Condensable</sub>	0.02	0.10
PM <sub>Filterable</sub>	<0.01	0.03
PM <sub>Total</sub>	0.03	0.14
SO <sub>2</sub>	<0.01	0.01
CO <sub>2</sub>	601.84	2,636.07
CH <sub>4</sub>	0.05	0.22
N <sub>2</sub> O	<0.01	<0.01
CO <sub>2</sub> e	603.41	2,642.93

#### Notes:

- Emissions from Enclosed Combustion Device Operations from AP-42, Chapter 1.4 references are from the July 1998 revision.

- Greenhouse Gas Emissions from the Enclosed Combustion Device Pilot and Burner calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.

- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

- CO2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO2=1, GWP CH4=25, GWP N2O=298

### Example Calculations:

- Emissions from Tanks VOCs (lb/hr) = Amount of Gas sent to Enclosed Combustion Device (lb/hr) x 0.02 = Max. Hourly Emissions (lb/hr)

- Emissions from Enclosed Combustion Device Operations (lb/hr) = Emission factor (lb/106 Btu) x Heat Value of Natural Gas (Btu/scf) ÷ 1,000,000 x Enclosed Combustion Device Pilot Gas Usage (mcfd) x 1,000 ÷ 24 - Emissions from Enclosed Combustion Device Vapor Destruction CO2 Methodologies shown below sample equation

- Emissions from Enclosed Combustion Device Operations CO2 (tons/yr) = ((Enclosed Combustion Device Pilot Gas Usage (mcfd) x 1,000 x 365 x Fraction of Gas Combusted by Enclosed Combustion Device x Mole Fraction of Methane x Number of Carbon Atoms in Methane) + ... + (Enclosed Combustion Device Pilot Gas Usage (mcfd) x 1,000 x 365 x Fraction of Gas Combusted by Enclosed Combustion Device x Mole Fraction of Pentanes-plus x Number of Carbon Atoms in Pentanes-plus)) x .0526 (kg/ft3) CO2 x .001 x 1.102 tons/tonnes

$E_{a,CH4}(un - combusted) = V_a * (1 - \eta) * X_{CH4}$	(Eq. W-19)
$E_{a,CO2}$ (un-combusted) = $V_a * X_{CO2}$	(Eq. W-20)
$E_{a,CO2} (combusted) = \sum_{i=1}^{5} (\eta * V_a * Y_j * R_j)$	(Eq. W-21)

#### Where:

Ea, CH<sub>4</sub>(un-combusted) = Contribution of annual un-combusted CH4 emissions from Enclosed Combustion Device stack in cubic feet, under actual conditions.

Ea, CO<sub>2</sub>(un-combusted) = Contribution of annual un-combusted CO2 emissions from Enclosed Combustion Device stack in cubic feet, under actual conditions.

Ea,CO<sub>2</sub>(combusted) = Contribution of annual combusted CO2 emissions from Enclosed Combustion Device stack in cubic feet, under actual conditions.

Va = Volume of gas sent to Enclosed Combustion Device in cubic feet, during the year.

η = Fraction of gas combusted by a burning Enclosed Combustion Device (default is 0.98). For gas sent to an unlit Enclosed Combustion Device, η is zero.

 $\mathsf{XCH4}=\mathsf{Mole}\xspace$  fraction of CH4 in gas to the Enclosed Combustion Device.

 $\mathsf{XCO2} = \mathsf{Mole}$  fraction of CO2 in gas to the Enclosed Combustion Device.

Y<sub>i</sub> = Mole fraction of gas hydrocarbon constituents j (such as methane, ethane, propane, butane, and pentanes-plus).

R<sub>i</sub> = Number of carbon atoms in the gas hydrocarbon constituent j: 1 for methane, 2 for ethane, 3 for propane, 4 for butane, and 5 for pentanes plus).

# Fugitive Emissions from Unpaved Haul Roads

Constant	Industrial Roads										
Constant	PM	PM-10	PM-2.5								
k (lb/VMT)	4.9	1.5	0.15								
а	0.7	0.9	0.9								
b	0.45	0.45	0.45								
where											
k		Patricle size m	ultiplier <sup>1</sup>								
S		4.8 Silt content of road surface ma									

	Patricle size multiplier <sup>1</sup>
4.8	Silt content of road surface material (%)
150	Number of days per year with precipitation

Item Number	Description	Number of Wheels	W Mean Vehicle Weight (tons)	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)	PM Emissions (Ibs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (Ibs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (Ibs/hr)	PM-2.5 Emissions (tons/yr)
1	Liquids Hauling	14	30	10	0.32	1	289,080	NA	NA	1.37	198.12	0.35	50.49	0.03	5.05
2	Employee Vehicles	4	3	10	0.32	1	200	NA	NA	0.49	0.05	0.12	0.01	0.01	0.001
									Totals:	1.86	198.17	0.47	50.51	0.05	5.05

р

Notes: <sup>1</sup> - Particle Size Multiplier used from AP-42 13.2.2 - Final Version 11/2006

<sup>2</sup> - Silt Content of Road Surface uses Sand and Gravel Processing Plant Road from AP-42 13.2.2 - Final Version 11/2006

<sup>3</sup> - Number of days per year with precipitation >0.01 in3 found using AP-42 13.2.2 Figure 13.2.2-1 - Final Version 11/2006

### Example Calculations:

Emissions (Ib/Vehicle Mile Traveled) - E = k x (s/12)<sup>a</sup> x (W/3)<sup>b</sup>

Equation 1a from AP-42 13.2.2 - Final Version 11/2006

Size Specific Emissions (Ib/VMT) - E<sub>ext</sub> = E[(365-p)/365]

Equation 2 from AP-42 13.2.2 - Final Version 11/2006

# Fugitive Leaks

Default Average Component Counts for Major Onshore Natural Gas Production Equipment <sup>1</sup>												
Facility Equipment Type	Valves	Connectors	Open-ended Lines	Pressure Relief Valves								
Wellheads	8	38	0.5	0								
Separators	1	6	0	0								
Meters/Piping	12	45	0	0								
Compressors	12	57	0	0								
In-line Heaters	14	65	2	1								
Dehydrators	24	90	2	2								

Well Specific Eq	Well Specific Equipment Counts										
Facility Equipment											
Туре	Count on Site										
Wellheads	1										
Separators	1										
Meters/Piping	2										
Compressors	1										
In-line Heaters	1										
Dehydrators	0										

1- Table W-1B to 40CFR98 Subpart W

Well Gas Composition														
Emissions from Flaring Operations	Propane	Butane	Pentanes	Heptane	Octane	Nonanes	Decanes	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylene	CO2	CH <sub>4</sub>
Mole %	7.187	3.30	1.50	0.35	0.53	0.33	0.289	0.39	0.01	0.026	0.023	0.070	0.15	66.90
MW	44	58	72	100	114	128.000	142	86.00	78.00	92.00	106.00	106.00	44.00	16.00

	Fugitive Emissions													
Facility Equipment Type	Total Count	Emission Rate (scf/hr/component) <sup>2</sup>	Hours of Operation	VOCs (Ibs/hr)	VOCs (tons/yr)	HAPs (Ibs/hr)	HAPs (tons/yr)	CO <sub>2</sub> (lbs/hr)	CO <sub>2</sub> (tons/yr)	CH <sub>4</sub> (Ibs/hr)	CH <sub>4</sub> (tons/yr)	Total CO <sub>2</sub> e (Ibs/hr)	Total CO <sub>2</sub> e (tons/yr)	
Valves	59	0.027	8760	0.03	0.15	<0.01	<0.01	<0.01	<0.01	0.04	0.19	1.11	4.84	
Connectors	256	0.003	8760	0.02	0.07	<0.01	<0.01	<0.01	<0.01	0.02	0.09	0.53	2.34	
Open-ended Lines	3	0.06	8760	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.11	0.46	
Pressure Relief Valves	1	0.04	8760	<0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.12	
			Total Emissions:	0.06	0.24	<0.01	0.01	<0.01	<0.01	0.07	0.31	1.77	7.77	

2- Table W-1A to 40CFR98 Subpart W

Notes: -The "Wellstream" gas composition in the attached ProMax simulations is utilized to calculate emission from fugitive leaks for the most conservative estimate.

Example Equations: Fugitive Emissions (lb/hr) = Count x Emission Rate x Hours of Operation ÷ 385.5 scf/lbmol x mol VOC's

Crow Natural Gas Production Site Total Emissions

	VC	Cs	H/	APs	C	:0	N	O <sub>x</sub>	PM -	10/2.5	S	02	c	O <sub>2</sub>	C	∶H₄	N	2 <b>0</b>	С	O <sub>2</sub> e
Emission Sources	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Line Heater (E0110)	<0.01	0.02	<0.01	<0.01	0.06	0.28	0.08	0.33	<0.01	0.03	<0.01	<0.01	116.98	512.36	<0.01	< 0.01	<0.01	< 0.01	117.10	512.89
Flash Gas Compressor (E0050)	0.01	0.06	0.01	0.05	0.21	0.91	0.21	0.91	<0.01	0.02	<0.01	<0.01	11.19	49.01	< 0.01	< 0.01	<0.01	< 0.01	11.20	49.06
Vapor Destruction Unit (ZZZ-0060)	0.52	2.28	0.02	0.10	0.34	1.50	0.41	1.78	<0.01	0.03	<0.01	0.01	601.84	2,636.07	0.05	0.22	<0.01	< 0.01	603.41	2,642.93
Tank Truck Loading Activities (VS-1)	0.02	0.10			-		1				-		-				1			
Uncontrolled Tank Working & Breathing Losses	0.37	0.04			-		1				-		-				1			
Haul Roads					-		1		0.52	55.56							-			
Fugitives Leaks	0.06	0.24	<0.01	0.01	-		-						<0.01	<0.01	0.07	0.31	-		1.77	7.77
Totals	0.99	2.74	0.03	0.15	0.61	2.68	0.69	3.02	0.52	55.63	<0.01	0.01	730.01	3,197.44	0.12	0.53	<0.01	<0.01	733.48	3,212.64

	Total HAPs		n-Hexane		Benzene		Toluene		Ethylbenzene		Xylene		Formaldehyde	
Emission Sources	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Line Heater (E0110)	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Flash Gas Compressor (E0050)	0.01	0.05			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04
Vapor Destruction Unit (ZZZ-0060)	0.02	0.10	0.02	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tank Truck Loading Activities (VS-1)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uncontrolled Working and Breathing	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Haul Roads			-								-		-	
Fugitives Leaks	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01		
Totals	0.03	0.15	0.02	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04

# Crow Site Total Controlled Emission Levels - HAP Speciation

			Crow 1H Plant Schema	tic		
Client Name:	Chevron Appalachia,	LLC			Job: Crow Prod	luced Water
Location:						
Flowsheet:	Crow 1H					
		Properties Average Condensate Temparature(Total) 90' F. Pressure(Total) 1000' psig Average Condensate 	Filad 1 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS-100 VSS	Mass Flow =11.15 lb/h         Properties         API Gravity(Total)         Temperature(Total)         Temperature(Total)         Y4.682         Pressure(Total)         Std Liquid Volumetric Flow(Total)         Std Liquid Volumetric Flow(Total)         Std         Tarik loss catalations for '7'.         Total working and Preating losses from the Vertical Quirder are Loading losses are Cultaribut for table flow).	F psia bbillyr	

AMBU PW Calcs\_7.17.14(1).pmx

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			Process Str All St Tabulated b	eams Report reams <sup>y Total Phase</sup>			
Client Name:	Chevron Appalach	hia, LLC			Job: Crow	Produced Water	
Flowsheet:	Crow 1H						
			Conn	ections			
			Average Condensate	Flash Gas	Flash 1	Liquid 1	PW
From Block			 MIX-100	VSSL-101	VSSL-100	VSSL-100	VSSL-101
TOBIOOR			WINC 100			VOOL IVI	
			Stream Co	omposition			
Mala Frantian			Average Condensate	Flash Gas	Flash 1	Liquid 1	PW
Nitrogen			<u> </u>	<u>%</u>	%	%	%
Carbon Dioxide			0.0228112	0.0282082		9.42714E-05	1.33658E-05
Methane			13.6989	19.651		0.056613	0.000460267
Ethane			14.5567	20.5911		0.0601582	0.000560751
Propane			17.2894	23.6104		0.0714514	0.000713233
i-Butane			3.01413	3.82781		0.0124564	3.99588E-05
n-Butane			3 54938	3 4518		0.0444866	0.00029666 5.43031E-05
n-Pentane			6.13992	5.35181		0.0253743	8.29062E-05
Neohexane			0.05399	0.0358709		0.000223123	1.90903E-07
2-Methylpentane			2.24019	1.16314		0.009258	8.52871E-06
3-Methylpentane			1.14508	0.553315		0.00473223	1.10463E-05
n-Hexane			4.1568	1.71642		0.0171787	1.00093E-05
Heptane			23.3681	4.05881		0.0965728	2.7005E-05
Water			0	3.01134		99.3007	55.5511
			Average Condensate	Flash Gas	Flash 1	Liquid 1	PW
Molar Flow			lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Nitrogen			0	0	0	0	0
egen			0			0	0
Carbon Dioxide			0.00010979	9.36583E-05	0	0.00010979	1.55007E-05
Carbon Dioxide Methane			0.00010979 0.0659325 0.0700613	9.36583E-05 0.0652461	0	0.00010979 0.0659325	1.55007E-05 0.000533785
Carbon Dioxide Methane Ethane Propape			0.00010979 0.0659325 0.0700613 0.0832136	9.36583E-05 0.0652461 0.0683675 0.0783925	0 0 0	0.00010979 0.0659325 0.0700613 0.0832136	0 1.55007E-05 0.000533785 0.00065032 0.000827158
Carbon Dioxide Methane Ethane Propane i-Butane			0.00010979 0.0659325 0.0700613 0.0832136 0.014507	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093	0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993	0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608	0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693	0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane Neohexane 2 Methylooptopo			0 0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.00177693 0.000296101	0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 0.90101E.06
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane Neohexane 2-Methylpentane			0 0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00183714	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00183714 0.00569892	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066	0 1.55007E-05 0.000533785 0.00085032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0020066 0.11247	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00183714 0.00569892 0.0134762	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066 0.11247	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066 0.11247 0	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066 0.11247 115.98	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 115.97
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066 0.11247 0 0	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905 Flash Gas	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.020066 0.11247 115.98	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 115.97 <b>PW</b>
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066 0.11247 0 0 Average Condensate	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00183714 0.00569892 0.0134762 0.0099905 Flash Gas	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066 0.11247 115.98	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 1.15.97 PW %
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane n-Pentane 2-Methylpentane 3-Methylpentane Meptane Water Mass Fraction Nitrogen			0 0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.00551124 0.0200066 0.11247 0 0 <b>Average</b> Condensate % 0	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905 Flash Gas % 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.000551124 0.0200066 0.11247 115.98 Liquid 1 %	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 3.13186E-05 115.97 PW % 0
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane n-Pentane 2-Methylpentane 3-Methylpentane 3-Methylpentane Heptane Water Mass Fraction Nitrogen Carbon Dioxide			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.0200066 0.11247 0 0 <b>Average</b> Condensate % 0 0.0169668	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00386191 0.00569892 0.0134762 0.00999905 Flash Gas % 0 0.028559	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.000551124 0.000551124 0.011247 115.98 Liquid 1 % 0 0.000228142	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 3.13186E-05 115.97 <b>PW</b> % 0 3.26503E-05
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane n-Pentane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water Mass Fraction Nitrogen Carbon Dioxide Methane			0 0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.0200066 0.11247 0 0 0 Average Condensate % 0 0 0.0169668 3.71417	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00386191 0.00569892 0.0134762 0.0099905 Flash Gas % 0 0.028559 7.25231	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.00551124 0.000551124 0.000511247 115.98 Liquid 1 % 0 0.000228142 0.0499419	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 3.13186E-05 115.97 <b>PW</b> % 0 3.26503E-05 0.000409852
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane n-Pentane 2-Methylpentane 3-Methylpentane 3-Methylpentane Mass Fraction Nitrogen Carbon Dioxide Methane Ethane			0 0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.0200066 0.11247 0 0 0 0.0169668 3.71417 7.39756 0 0	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905 Flash Gas % 0 0.028559 7.25231 14.2436 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.000551124 0.00066 0.11247 115.98 Liquid 1 % 0 0.000228142 0.0499419 0.0994701	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 1.15.97 <b>PW</b> % 0 3.26503E-05 0.000409852 0.000935915 0.000935915
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butano			0 0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066 0.11247 0 0 0 0 0 0 0 0.0169668 3.71417 7.39756 12.8849 2.0608	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905 Flash Gas % 0 0.028559 7.25231 14.2436 23.9508 5 11914	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.020066 0.11247 115.98 Liquid 1 % 0 0.000228142 0.0499419 0.0994701 0.173254 0.023942	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 1.15.97 <b>PW</b> % 0 3.26503E-05 0.000409852 0.000438915 0.00174572 0.000438914
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane			0 0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.00059853 0.010782 0.00551124 0.0200066 0.11247 0 0 0 0 0 0 0.0169668 3.71417 7.39756 12.8849 2.9608 10.5742	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905 Flash Gas % 0 0.028559 7.25231 14.2436 23.9508 5.11814 17.3137	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.000551124 0.000551124 0.0200066 0.11247 115.98 Liquid 1 % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 1.15.97 <b>PW</b> 0 3.26503E-05 0.000409852 0.000935915 0.00174572 0.000128914 0.000957079
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane i-Butane			0 0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066 0.11247 0 0 0 0.0169668 3.71417 7.39756 12.8849 2.9608 10.5742 4.32799	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00386191 0.00569892 0.0134762 0.00999905 Flash Gas % 0 0.028559 7.25231 14.2436 23.9508 5.11814 17.3137 5.72922	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.000551124 0.000551124 0.0200066 0.11247 115.98 Liquid 1 % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.0581956	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 3.13186E-05 3.13186E-05 3.13186E-05 115.97 <b>PW</b> % 0 3.26503E-05 0.000409852 0.000935915 0.00174572 0.000128914 0.000957079 0.000217471
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Butane n-Butane n-Butane n-Pentane			0 0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.0200066 0.11247 0 0 0 0.0169668 3.71417 7.39756 12.8849 2.9608 10.5742 4.32799 7.48681	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905 Flash Gas % 0 0.028559 7.25231 14.2436 23.9508 5.11814 17.3137 5.72922 8.88281	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.000551124 0.000551124 0.0200066 0.11247 115.98 Liquid 1 % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.0581956 0.10067	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 3.13186E-05 3.13186E-05 3.13186E-05 115.97 <b>PW</b> 0 3.26503E-05 0.000409852 0.000935915 0.00174572 0.000128914 0.000957079 0.000217471 0.000332019
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Butane n-Butane n-Butane n-Pentane Neohexane			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.0200066 0.11247 0 0 <b>Average</b> Condensate % 0 0 0.0169668 3.71417 7.39756 12.8849 2.9608 10.5742 4.32799 7.48681 0.0786324	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905 Flash Gas % 0 0.028559 7.25231 14.2436 23.9508 5.11814 17.3137 5.72922 8.88281 0.0711125	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.0200066 0.11247 115.98 Liquid 1 % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.0381956 0.10067 0.00105732	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 1.15.97 <b>PW</b> % 0 3.26503E-05 0.000409852 0.000409852 0.000128915 0.00174572 0.000128914 0.000957079 0.000217471 0.000332019 9.13153E-07
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Butane n-Butane n-Butane n-Pentane Neohexane 2-Methylpentane			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.0200066 0.11247 0 0 <b>Average</b> Condensate % 0 0 0.0169668 3.71417 7.39756 12.8849 2.9608 10.5742 4.32799 7.48681 0.0786324 3.26268	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905 Flash Gas % 0 0.028559 7.25231 14.2436 23.9508 5.11814 17.3137 5.72922 8.88281 0.0711125 2.30588	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.0200066 0.11247 115.98 Liquid 1 % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.039812 0.142184 0.0581956 0.10067 0.00105732 0.0438711	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 1.15.97 <b>PW</b> % 0 3.26503E-05 0.000409852 0.000409852 0.000128915 0.00174572 0.000128914 0.000957079 0.000217471 0.000332019 9.13153E-07 4.07956E-05
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Butane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane 3-Methylpentane			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.000551124 0.000551124 0.000551124 0.000551124 0.010782 0.0109668 3.71417 7.39756 12.8849 2.9608 10.5742 4.32799 7.48681 0.0786324 3.26268 1.66772	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905 Flash Gas % 0 0.028559 7.25231 14.2436 23.9508 5.11814 17.3137 5.72922 8.88281 0.0711125 2.30588 1.09692 2.40272	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.020066 0.11247 115.98 Liquid 1 % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.039812 0.142184 0.0581956 0.10067 0.00105732 0.0438711 0.0224247 0.0224247	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 1.15.97 <b>PW</b> % 0 0 3.26503E-05 0.000409852 0.000409852 0.000174572 0.000128914 0.000957079 0.000217471 0.00032019 9.13153E-07 4.07956E-05 5.28385-05
Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane n-Hexane Heptane Water Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Butane n-Butane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane 3-Methylpentane n-Hexane			0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.000551124 0.0200066 0.11247 0 0 0 0 0 0 0.0169668 3.71417 7.39756 12.8849 2.9608 10.5742 4.32799 7.48681 0.0786324 3.26268 1.66772 6.05408	9.36583E-05 0.0652461 0.0683675 0.0783925 0.0127093 0.042993 0.0114608 0.0177693 0.0001191 0.00386191 0.00183714 0.00569892 0.0134762 0.00999905 Flash Gas % 0 0.028559 7.25231 14.2436 23.9508 5.11814 17.3137 5.72922 8.88281 0.0711125 2.30588 1.09692 3.40272 0.25514	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00010979 0.0659325 0.0700613 0.0832136 0.014507 0.0518099 0.0170831 0.0295514 0.000259853 0.010782 0.00551124 0.000551124 0.0200066 0.11247 115.98 Liquid 1 % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.039812 0.142184 0.0581956 0.10067 0.00105732 0.0438711 0.0224247 0.0814052 0.652123	0 1.55007E-05 0.000533785 0.00065032 0.000827158 4.63414E-05 0.000344046 6.2977E-05 9.61488E-05 2.21396E-07 9.89101E-06 1.28108E-05 1.1608E-05 3.13186E-05 1.15.97 <b>PW</b> % 0 0 3.26503E-05 0.000409852 0.00049852 0.000174572 0.000128914 0.000957079 0.000217471 0.00032019 9.13153E-07 4.07956E-05 5.28383E-05 4.78775E-05

\* User Specified Values ? Extrapolated or Approximate Values

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Page	2	of	4
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			Process Str All St Tabulated b	reams Report reams y Total Phase				
Client Name:	Chevron Appala	achia, LLC				Job: Crow	Produced Water	
Location:		,						
Flowsheet:	Crow 1H							
Mass Fraction			Average Condensate	Flash Gas	Fla	sh 1	Liquid 1	PW
Water			/0	1 2/91		/0	08 6554	70 0040
Walei			0	1.2401			90.0004	33.3343
			Average Condensate	Flash Gas	Fla	sh 1	Liquid 1	PW
Mass Flow			lb/h	lb/h	lt	o/h	lb/h	lb/h
Nitrogen			0	0		0	0	0
Carbon Dioxide			0.00483181	0.00412185		0	0.00483181	0.000682178
Methane			1.05772	1.04671		0	1.05772	0.00856323
Ethane			2.10668	2.05575		0	2.10668	0.0195545
Propane i Butana			3.00933	3.43070		0	3.00933	0.030474
n Butano			0.043170	0.73009		0	0.043170	0.00209340
i Pontano			1 22252	2.49000		0	1 22252	0.0199907
n-Dentane			2 13200	1 28204		0	2 13200	0.00434372
Neohexane			0.0223929	0.0102635		0	0.0223929	1 90789E-05
2-Methylpentane			0.929145	0.332802		0	0.929145	0.000852361
3-Methylpentane			0.474934	0.158316		0	0.474934	0.00110397
n-Hexane			1.72408	0.491107		0	1.72408	0.00100033
Heptane			11.2698	1.35035		0	11.2698	0.00313818
Water			0	0.180136		0	2089.42	2089.24
			Stream F	Properties				
Property		Units	Average Condensate	Flash Gas	Fla	sh 1	Liquid 1	PW
Temperature		°F	90 *	74.6823		75 *	75	74.6823
Pressure		psia	1014.1 *	14.1		314.1 *	314.1	14.1
Mole Fraction Vapor	•	%	0	100			0	0
Mole Fraction Light	Liquid	%	100	0			0.366535	100
Mole Fraction Heavy	/ Liquid	%	0	0			99.6335	0
Molecular Weight			59.1691	43.469			18.1854	18.0158
Mass Density		ID/IT/3	36.1706	0.108542		0	01.0830	62.2296
Mass Flow		lb/h	0.461299	0.332025		0	2117.0	2080.35
Vapor Volumotric El	014/	ftA2/b	0 797224	122 060		0	2/17.9	2009.33
Liquid Volumetric Flo	0₩	00m	0.0081500	16 578			4 28071	4 18595
Std Vapor Volumetri	c Flow	MMSCED	0.00438349	0.00302396		0	1 06069	1 05624
Std Liquid Volumetri	c Flow	sgpm	0.0995804 *	0.0573062		0	4.27648	4.17699
Compressibility			0.281225	0.984708		-	0.0161388	0.000711842
Specific Gravity			0.579945	1.50087			0.989011	0.997765
API Gravity			104.704				11.2359	10.0152
Enthalpy		Btu/h	-30903	-16041.6		0	-1.42868E+07	-1.42568E+07
Mass Enthalpy		Btu/lb	-1085.15	-1111.47			-6745.73	-6823.59
Mass Cp	-	Btu/(lb*°F)	0.571155	0.412858			0.977111	0.982817
Ideal Gas CpCv Rat	io		1.08909	1.12539			1.32218	1.32561

Dynamic Viscosity

Kinematic Viscosity

Surface Tension

Remarks

Thermal Conductivity

Net Ideal Gas Heating Value

Gross Liquid Heating Value

Gross Ideal Gas Heating Value

Net Liquid Heating Value

сΡ

cSt

lbf/ft

Btu/ft^3

Btu/ft^3

Btu/lb

Btu/lb

Btu/(h\*ft\*°F)

0.169009

0.291698

0.061802

0.000405466 ?

3059.97

19472.5

3315.16

21109.2

0.00844841

4.85909

2249.07

19476.3

2446.17

21196.9

0.0112589

0.938939

0.941932

0.34921 0.00500668

0.0476759

-1058.71

50.3607

1.08571

0.919778

0.925684

0.0049111

0.34255

12.6459

-783.676

63.8026

283.841

			Process Stro All St Tabulated by	eams Report reams <sup>y Total Phase</sup>			
Client Name:	Chevron Appala	ichia, LLC	Job: Crow	Produced Water			
Location: Flowsheet	Crow 1H						
			Conne	ections			
			Stable Oil	Water	2	3	
From Block			VSSL-101		MIX-100	MIX-101	
To Block			MIX-101	MIX-100	VSSL-100		
			01				
			Stream CC	Water	2	2	
Mole Fraction			Stable OII	water %	2 %	3 %	
Nitrogen			0	0	0	0	
Carbon Dioxide			0.000402787	0	9.42714E-05	1.38912E-05	
Methane			0.0973936	0	0.056613	0.000591059	
Ethane			0.665932	0	0.0601582	0.00145854	
Propane			2.54887	0	0.0714514	0.00415147	
n-Butane			5.40726	0	0.0444866	0.0075923	
i-Pentane			3.54785	0	0.0146684	0.00484136	
n-Pentane			7.45775	0	0.0253743	0.0101456	
Neohexane			0.0896851	0	0.000223123	0.000121203	
2-Methylpentane			4.41	0	0.009258	0.00595895	
3-Methylpentane			2.33658	0	0.00473223	0.00316379	
Hentane			9.12300	0	0.0171787	0.0123205	
Water			0.0403673	100	99.5867	99.8628	
			Stable Oil	Water	2	3.,,	
Molar Flow			Ibmol/h	Ibmol/h	Ibmol/n	Ibmol/n	
Carbon Dioxide			6 31144E-07	0	0 00010979	1 61318E-05	
Methane			0.00015261	0	0.0659325	0.000686396	
Ethane			0.00104348	0	0.0700613	0.0016938	
Propane			0.00399394	0	0.0832136	0.00482109	
i-Butane			0.00175138	0	0.014507	0.00179773	
n-Butane			0.00847288	0	0.0518099	0.00881692	
n-Pentane			0.00000929	0	0.0170831	0.00562226	
Neohexane			0.000140531	0	0.000259853	0.000140753	
2-Methylpentane			0.00691023	0	0.010782	0.00692012	
3-Methylpentane			0.00366129	0	0.00551124	0.0036741	
n-Hexane			0.0142961	0	0.0000066	0.0143077	
Heptane			0.0112001	0	0.0200066	0.0140077	
			0.0989629	0	0.0200066	0.0989942	
water			0.0989629 6.32532E-05	0 0 115.98	0.0200088 0.11247 115.98	0.0989942 115.97	
vvater			0.0989629 6.32532E-05	0 115.98 Water	0.11247 115.98	0.0989942 115.97	
Mass Fraction			0.0989629 6.32532E-05 Stable Oil %	0 115.98 Water %	0.0200066 0.11247 115.98 2 %	0.0989942 115.97 3 %	
Mass Fraction Nitrogen			0.0989629 6.32532E-05 Stable Oil % 0	0 115.98 Water % 0	0.0200066 0.11247 115.98 <b>2</b> % 0	0.0989942 115.97 3 %	
Mass Fraction Nitrogen Carbon Dioxide			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703	0 115.98 Water % 0 0	0.0200066 0.11247 115.98 <b>2</b> % 0 0.000228142	0.0989942 115.97 3 % 0 3.37517E-05	
Mass Fraction Nitrogen Carbon Dioxide Methane			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377	0 115.98 Water % 0 0 0	0.0200066 0.11247 115.98 <b>2</b> % 0 0.000228142 0.0499419 0.0047201	0.0989942 115.97 3 % 0 3.37517E-05 0.000523492	
Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Pronane			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377 0.222197 1.24719	0 115.98 Water % 0 0 0 0	0.0200066 0.11247 115.98 <b>2</b> % 0 0.000228142 0.0499419 0.0994701 0.173254	0.0989942 115.97 3 % 0 3.37517E-05 0.000523492 0.00242128 0.0101066	
Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377 0.222197 1.24719 0.720875	0 0 115.98 Water % 0 0 0 0 0 0 0 0	0.0200066 0.11247 115.98 <b>2</b> % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812	0.0989942 115.97 3 % 0 3.37517E-05 0.000523492 0.00242128 0.0101066 0,00496741	
Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377 0.222197 1.24719 0.720875 3.48746	0 0 115.98 Water % 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0200066 0.11247 115.98 <b>2</b> % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184	0.0989942 115.97 3 % 0 3.37517E-05 0.000523492 0.00242128 0.0101066 0.00496741 0.0243626	
Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377 0.222197 1.24719 0.720875 3.48746 2.84043	0 0 115.98 Water % 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0200066 0.11247 115.98 <b>2</b> % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.0581956	0.0989942 115.97 3 % 0 3.37517E-05 0.000523492 0.00242128 0.0101066 0.00496741 0.0243626 0.0192843	
Mass Fraction         Nitrogen         Carbon Dioxide         Methane         Ethane         Propane         i-Butane         n-Butane         n-Pentane			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377 0.222197 1.24719 0.720875 3.48746 2.84043 5.97072	0 0 115.98 Water % 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0200066 0.11247 115.98 <b>2</b> % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.0581956 0.10067	0.0989942 115.97 3 % 0 3.37517E-05 0.000523492 0.00242128 0.0101066 0.00496741 0.0243626 0.0192843 0.0404123	
Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane n-Pentane Neohexane			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377 0.222197 1.24719 0.720875 3.48746 2.84043 5.97072 0.0857616	0 0 115.98 Water % 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0200066 0.11247 115.98 2 % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.0581956 0.10067 0.00105732 0.00105732	0.0989942 115.97 3 % 0 3.37517E-05 0.000523492 0.00242128 0.0101066 0.00496741 0.0243626 0.0192843 0.0404123 0.00057664	
Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane n-Pentane Neohexane 2-Methylpentane 3. Methylpentane			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377 0.222197 1.24719 0.720875 3.48746 2.84043 5.97072 0.0857616 4.21708 2.2426	0 0 115.98 Water % 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0200066 0.11247 115.98 <b>2</b> % 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.0581956 0.10067 0.00105732 0.0438711 0.0224247	0.0143077 0.0989942 115.97 0 3.37517E-05 0.000523492 0.00242128 0.0101066 0.00496741 0.0243626 0.0192843 0.0404123 0.00057664 0.0283505 0.0450522	
Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377 0.222197 1.24719 0.720875 3.48746 2.84043 5.97072 0.0857616 4.21708 2.23436 8.72444	0 0 115.98 Water % 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0200066 0.11247 115.98 2 % 0 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.0581956 0.10067 0.00105732 0.0438711 0.0224247 0.0814052	0.0143077 0.0989942 115.97 0 3.37517E-05 0.000523492 0.00242128 0.0101066 0.00496741 0.0243626 0.0192843 0.0404123 0.00057664 0.0283505 0.0150522 0.0586162	
Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane Heptane Heptane			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377 0.222197 1.24719 0.720875 3.48746 2.84043 5.97072 0.0857616 4.21708 2.23436 8.72444 70.2239	0 0 115.98 Water % 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0200066 0.11247 115.98 2 % 0 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.0581956 0.10067 0.00105732 0.0438711 0.0224247 0.0814052 0.53212	0.0143077 0.0989942 115.97 0 3.37517E-05 0.000523492 0.00242128 0.0101066 0.00496741 0.0243626 0.0192843 0.00404123 0.00057664 0.0283505 0.0150522 0.0586162 0.471574	
Mass Fraction Nitrogen Carbon Dioxide Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane Neohexane 2-Methylpentane 3-Methylpentane Heptane Water			0.0989629 6.32532E-05 Stable Oil % 0 0.000196703 0.0173377 0.222197 1.24719 0.720875 3.48746 2.84043 5.97072 0.0857616 4.21708 2.23436 8.72444 70.2239 0.00806975	0 0 115.98 Water % 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0200066 0.11247 115.98 2 % 0 0 0.000228142 0.0499419 0.0994701 0.173254 0.039812 0.142184 0.0581956 0.10067 0.00105732 0.0438711 0.0224247 0.0814052 0.53212 98.6554	0.0143077 0.0989942 115.97 0 3.37517E-05 0.000523492 0.00242128 0.0101066 0.00496741 0.0243626 0.0192843 0.00404123 0.00057664 0.0283505 0.0150522 0.0586162 0.471574 99.3237	

			Process Str All St Tabulated b				
Client Name:	Chevron Appala	chia. LLC			Job: Crow	Produced Water	
Location:							
Flowsheet:	Crow 1H						
	ł				+		
Mass Flow			Stable Oil lb/h	Water Ib/h	2 Ib/h	3 Ib/h	
Nitrogen			0	0	0	0	
Carbon Dioxide			2.77763E-05	0	0.00483181	0.000709955	
Methane			0.00244825	0	1.05772	0.0110115	
Ethane			0.0313764	0	2.10668	0.0509309	
Propane			0.176115	0	3.66935	0.212589	
i-Butane			0.101794	0	0.843178	0.104488	
n-Butane			0.492462	0	3.01131	0.512459	
i-Pentane			0.401096	0	1.23252	0.405639	
n-Pentane			0.843122	0	2.13209	0.850059	
Neohexane			0.0121103	0	0.0223929	0.0121294	
2-Methylpentane			0.595491	0	0.929145	0.596344	
3-Methylpentane			0.315513	0	0.474934	0.316617	
n-Hexane			1.23197	0	1.72408	1.23297	
Heptane			9.91627	0	11.2698	9.91941	
Water			0.00113952	2089.42	2089.42	2089.24	
			Stream	Properties			
Property		Unite	Stable Oil	Water	2	2	· · ·
Топренту		Units °F		Walei	2	3	
Proceuro		F	14.0623	90	90.0263	14.0623	
Mole Frection Vapor		рыа 0/	14.1	1014.1	1014.1	14.1	
Note Fraction Vapor	iquid	70	100	100	0.266004	0 12 402	
Mole Fraction Light L		% 0/	100	100	0.300004	0.13493	
Molecular Weight		70 lb/lbmol	00 1177	19.0152	199.034	10 1121	
Moss Density			90.1177	62 1229	10.1004 61 5645	62.0205	
Molar Flow		lbmol/b	0 156604	115.09	116 462	116 12	
Moon Flow		lb/lb/li	14 1200	2090 42	2117.0	2102.47	
Vapor Volumetria Ela		10/11 ft/2/b	0.240969	2009.42	2117.9	2103.47	
Vapor Volumetric Fic	)w	10-3/11 anm	0.340000	33.0332	34.4013	4 22944	
Std Vapor Volumetric Fit			0.0424970	4.19323	4.20099	4.22044	
Std Liquid Volumetri		Saba	0.00142711	1.05051	1.00009	4 21019	
Comprossibility		зуртт	0.0421910	0.0409529	0.0507780	0.000719009	
Specific Gravity			0.00534005	0.0490550	0.0307789	0.000710090	
API Gravity			70 186/	0.550000	11 1262	10 /838	
Enthalov		Rtu/h	-13904	-1 42207E±07	-1 42516E±07	-1 42707E±07	
Mass Enthalov		Btu/lb	-984 64	-6806.02	-6729.1	-6784 39	
Mass Cn		Btu/(lb*°E)	0 514546	0.980196	0 975134	0,079673	
Ideal Gas CnCv Rati	0		1 05937	1 32489	1 32137	1 32365	
Dynamic Viscosity	•	сP	0 32547	0 793234	0 77745	0.932774	
Kinematic Viscosity		cSt	0 49047	0 797118	0 784429	0.037305	
Thermal Conductivity	V	Btu/(h*ft*°F)	0.0697371	0.355983	0.348989	0.346401	
Surface Tension	1	lbf/ft	0.0012702 2	0 00489079	0.00479218 2	0.00496913 2	
Net Ideal Gas Heatin	ng Value	Btu/ft^3	4598.03	0.00- <del>1</del> 00073	12 6459	6 25175	
Net Liquid Heating V	alue	Btu/lb	19203 1	-1059 76	-783 676	-922 688	
Gross Ideal Gas Hea	ating Value	Btu/ft^3	4964 34	50 31	63 8026	56 9912	
Gross Liquid Heating	n Value	Btu/lb	20745.6	00.01	283 841	140.347	
				<b>v</b>	200.011	. 10.0 11	1

Remarks

			Energy Strear	n Report		
Client Name:	ient Name: Chevron Appalachia, LLC					uced Water
Location:						
Flowsheet:	Crow 1H					
			Energy Str	eams		
Energy Stream		Energy Rate	Power		From Block	To Block
Q-1		-35219.1 Btu/h	-13.8416	hp		VSSL-100
	L. L.					
Remarks						

Simulation Initiated on 7/17	/2014 9:47:32 AM	AMBU PW Calcs_7.17.14(1).pmx			Page 1 of 1			
		N Mixe	Blocks /IX-100 r/Splitter Report					
Client Name:	Chevron Appalact	Job: Crow Prod	luced Water					
Location:		Modified: 11:35 AM, 8/13/2013						
Flowsheet:	Crow 1H			Status: Solved 9	9:45 AM, 7/17/2014			
		Co	nnections					
Stream	Connectio	n Type Other Block	Stream	Connection	Type Other Block			
Average Condensa	ate Inlet	t	Water	Inlet				
2	Outle	et VSSL-100						
		Block	<b>A Parameters</b>					
Pressure Drop		0 psi	Fraction to PSt	ream 2	100 %			
Remarks								

7/2014 9:47:32 AM	AMBU PW Calc		Page 1 of 1					
	Blo MIX Mixer/Spli	- <b>101</b> (tter Report						
Chevron Appalachia, LLC			Job: Crow Produced Wa	ter				
	Modified: 11:35 AM, 8/13/2013							
Crow 1H		Status: Solved 9:45 AM, 7/17/2014						
Connections								
Connection Type	Other Block	Stream	Connection Type	Other Block				
Inlet	VSSL-101	PW	Inlet	VSSL-101				
Outlet								
	Block Pa	rameters						
	0 psi	Fraction to PStream 3		100 %				
	7/2014 9:47:32 AM Chevron Appalachia, LLC Crow 1H Connection Type Inlet Outlet	/2014 9:47:32 AM     AMBU PW Calcs       Blo     MIX:       Mixer/Split     Chevron Appalachia, LLC       Crow 1H     Connection Type       Connection Type     Other Block       Inlet     VSSL-101       Outlet     Block Pa       0 psi     0	V2014 9:47:32 AM     AMBU PW Calcs_7.17.14(1).pmx       Blocks MIX-101 Mixer/Splitter Report       Chevron Appalachia, LLC       Crow 1H       Connections       Connection Type     Other Block       Stream       Inlet     VSSL-101       Outlet	Blocks MIX-101 Mixer/Splitter Report         Chevron Appalachia, LLC       Job: Crow Produced Wa         Modified: 11:35 AM, 8/12         Crow 1H       Status: Solved 9:45 AM,         Connections         Connections         Connection Type         Inlet       VSSL-101       PW       Inlet         O psi       Fraction to PStream 3				

Simulation Initiated on 7/17	7/2014 9:47:32 AM	AMBU PW Calc	s_7.17.14(1).pmx			Page 1 of 1
Client Name:	Chevron Appalachia, LLC			Job: Crow P	roduced Water	
Location:				Modified: 11	:35 AM, 8/13/2013	3
Flowsheet:	Crow 1H			Status: Solv	ed 9:45 AM, 7/17/2	2014
		Conne	ections			
Stream	Connection Type	Other Block	Stream	Connectio	on Type	Other Block
2	Inlet	MIX-100	Flash 1	Vapor (	Outlet	
Liquid 1	Light Liquid Outlet	VSSL-101	Q-1	Ener	rgy	
		Block Pa	arameters			
Pressure Drop		700 psi	Main Liquid Phase		Light Liquid	
Mole Fraction Vap	or	0 %	Heat Duty		-35219.1	Btu/h
Mole Fraction Ligh	nt Liquid 0.36	6535 %	Heat Release Curve	Туре	Plug Flow	
Mole Fraction Hea	avy Liquid 99.	.6335 %	Heat Release Curve 5			
			Increments			
Remarks						

Simulation Initiated on 7/17	//2014 9:47:32 AM	AMBU PW Calc	s_7.17.14(1).pmx			Page 1 of 1			
Client Name:	Chevron Appalachia, LLC	Job: Crow F	Produced Water						
Location:				Modified: 1	1:35 AM, 8/13/2	013			
Flowsheet:	Crow 1H			Status: Solv	ved 9:45 AM, 7/	17/2014			
Connections									
Stream	Connection Type	Other Block	Stream	Connect	ion Type	Other Block			
Liquid 1	Inlet	VSSL-100	Flash Gas	Vapor	Outlet				
Stable Oil	Light Liquid Outlet	MIX-101	PW	Heavy Liq	uid Outlet	MIX-101			
		Block Pa	arameters						
Pressure Drop		300 psi	Main Liquid Phase		Light Lic	uid			
Mole Fraction Vap	or 0.2	85093 %	Heat Duty			0 Btu/h			
Mole Fraction Ligh	nt Liquid 0.1	34546 %	Heat Release Curve T	Гуре	Plug F	ow			
Mole Fraction Hea	vy Liquid 99	.5804 %	Heat Release Curve Increments			5			
Remarks									

		FI	lowsheet Envirc	Environment onment1					
Client Name:	Chevron Appala	achia, LLC			Job: Crow F	Produced Water			
Location:									
Flowsheet:	Crow 1H								
		ſ	Environm	ent Settings					
Number of Poynting Intervals		0		Freeze Out Temperatu Threshold Difference	ire	10 ో	Έ		
Gibbs Excess Model		77 °F		Phase Tolerance		1 9	%		
Evaluation Temper	rature								
Components									
Component Name		Henry`s Law Component	Phase Initiator	Component Name		Henry`s Lav Componen	v Phase t Initiator		
Nitrogen		False	False	n-Pentane		False	False		
Carbon Dioxide		False	False	Neohexane		False	False		
Methane		False	False	2-Methylpentane		False	False		
Ethane		False	False	3-Methylpentane		False	False		
Propane		False	False	n-Hexane		False	False		
i-Butane		False	False	Heptane		False	False		
n-Butane		False	False	Water		False	True		
i-Pentane		False	False						
		Phys	ical Prope	erty Method Sets					
Liquid Molar Volume		COSTALD	)	Overall Package		Peng-Rob	oinson		
Stability Calculation		Peng-Robins	on	Vapor Package		Peng-Rob	oinson		
Light Liquid Package	)	Peng-Robins	on	Heavy Liquid Package		Peng-Rob	oinson		
Remarks									

		Er	vironmo	ents Report			
Client Name	Chevron Appala	chia LLC			Job: Crow Pr	oduced Water	
Location:	Опстоп Арраіа				505. 010W 1 1		
		P	roject-Wio	le Constants			
Atmospheric Pressur	re	14.1 p	osia	IG Ref Pressure	14.6959 psia		
IG Ref Temperature		60 °	F	IG Ref Volume		379.485 f	t^3/lbmol
Liq Ref Temperature		60 °	F				
		Envi	ronment	[Environment1]			
		E	Environm	ent Settings			
Number of Poyntin	0		Freeze Out Temperatu	re	10 °F		
0				Threshold Difference			
Gibbs Excess Model // °F				Phase I olerance		1 %	
Evaluation Temper	rature						
			Comp	onents			
Component Name		Henry's Law	Phase	Component Name		Henry's Law	Phase
Nitrogon		Component	Initiator	- Dentono		Component	Initiator
Nitrogen		Faise	Faise	n-Pentane		False	Faise
Mothane		False	False			False	False
Fthane		False	Falso			Falso	False
Pronane		False	False	n-Heyane		False	False
i-Rutane		False	False	Hentane		False	False
n-Butane		False	False	Water		False	True
i-Pentane		False	False	Trate.			
		Phys	ical Prope	erty Method Sets			
Liquid Molar Volume		COSTALD		Overall Package		Peng-Robins	on
Stability Calculation		Peng-Robins	on	Vapor Package		Peng-Robins	on
Light Liquid Package	;	Peng-Robins	on	Heavy Liquid Package		Peng-Robins	on
Remarks							

		Ca	lculator	Report			
Client Name:	Chevron Appala	chia, LLC			Job: Crow I	Produced Water	
Location:							
			Crow				
			Source	Code			
Residual Error (for C	CV1) = Crow_Oil /	528 - 1					
		Calcu	ulated Var	iable [CV1]			
SourceMoniker	ProMax:ProMa Flow	x!Project!Flowsheets!Crow	1H!PStream	s!Average Condensate!	Phases!Tota	al!Properties!Std Liquid Volun	netric
Value Unit	3.41418 bbl/d						
	551/0						
		Measur	ed Variab	le [Crow_Oil]			
SourceMoniker Value	ProMax:ProMa	x!Project!Flowsheets!Crow	1H!PStream	s!Stable Oil!Phases!Tot	al!Properties	Std Liquid Volumetric Flow	
Unit	bbl/yr						
			Colver Dra	nortico		Status: Solved	
Error		-3 76437E-08	Solver Pro	Iterations			
Calculated Value		0.0995804 sgpm		Max Iterations		20	
Lower Bound		sgpm		Weighting		1	
Upper Bound Step Size		sgpm		Priority Solver Active			
Is Minimizer		False		Group		Active	
Algorithm		Default		Skip Dependency Che	ck	False	
			Crow	DW/			
				Code			
Residual Error (for C	CV1) = Crow_PW	/ 52272 - 1	Jource	Code			
SourceMoniker Value Unit	ProMax:ProMa 52271 bbl/yr	Calcu x!Project!Flowsheets!Crow	Ilated Var 1H!PStream	<pre>iable [CV1] s!Water!Phases!Total!P</pre>	roperties!Sto	d Liquid Volumetric Flow	
		Maggur	ad Variab				
SourceMoniker Value	ProMax:ProMa 52272	x!Project!Flowsheets!Crow	1H!PStream	s!PW!Phases!Total!Pro	perties!Std L	iquid Volumetric Flow	
Unit	bbl/yr						
				nortico		Status: Solved	
Error		-1.30032F-11	olver Pro	Iterations		4	
Calculated Value		4.1769 sgpm		Max Iterations		20	
Lower Bound		sgpm		Weighting		1	
Upper Bound		sgpm		Priority Solver Active		0 Activo	
Is Minimizer		sgpm False		Group		Active	
Algorithm		Default		Skip Dependency Che	ck	False	
Pomarka							
Remarks							

	User Val	ue Sets Report	
Client Name: Chevron Ap	palachia, LLC		Job: Crow Produced Water
	Crow V	OC Flash (lb/hr)	
	User Val	ue [CnPlusSum]	
* Parameter	11.1461 lb/h	Upper Bound	lb/h
Lower Bound	lb/h	* Enforce Bounds	False
Remarks This User Value Set was program	nmatically generated. GUID={7D939	BE9-1E96-479B-BB94-59E77F	0AB4FF}
	Crow_Ta	nk Losses (lb/hr)	
	User Val	ue [ShellLength]	
* Parameter	20 ft	Upper Bound	Foloo
Lower Bound	0 11	Enforce Bounds	Faise
	llsor Va	lue [ShellDiam]	
* Parameter	15 ft	Upper Bound	
* Lower Bound	0 ft	* Enforce Bounds	False
	User Val	lue [BreatherVP]	
* Parameter	0.03 psig	Upper Bound	
Lower Bound		* Enforce Bounds	False
-			
	User Valu	e [BreatherVacP]	
* Parameter	-0.03 psig	Upper Bound	<b>-</b> .
Lower Bound		* Enforce Bounds	Faise
Baramatar		Upper Bound	<i>t</i>
Lower Bound	it	* Enforce Bounds	False
Lowof Board	ĸ		
	User V	alue [OnPress]	
* Parameter	0 psig	Upper Bound	
Lower Bound		* Enforce Bounds	False
	User Value	e [AvgPercentLiq]	
* Parameter	50 %	Upper Bound	
Lower Bound	%	* Enforce Bounds	False
* Demonstration	User Value	e [MaxPercentLiq]	
Parameter	90 %		Falso
	/0	Enioroe Bounds	1 000
	llser Va	lue [AnnNetTP]	
* Parameter	144.975 bbl/day	Upper Bound	
* Lower Bound	0 bbl/day	* Enforce Bounds	False
	User	Value [OREff]	
* Parameter	0 %	Upper Bound	
Lower Bound	%	* Enforce Bounds	False
	User Valu	ue [AtmPressure]	
* Parameter	97274.7 Pa	Upper Bound	Pa
	Pa		

		User Valı	le Sets Report		
Client Name:	Chevron Appala	achia, LLC		Job: Crow	Produced Water
Location:					
		User Value	[WorkingLosses]		
* Parameter		0.0612417 ton/vr	Upper Bound		
Lower Bound			* Enforce Bounds		False
		User Value	[Standing] ossas]		
* Deremeter					
Parameter		0.0189508 101/91	* Enforce Rounda		Falsa
Lower Bound			Efficice Bounds		Faise
		<u> </u>			
		User Value	[RimSealLosses]		
* Parameter		0 ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds		False
-					
		User Value	[WithdrawalLoss]		
* Parameter		0 ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds		False
		User Value	[LoadingLosses]		
* Parameter		0.0489932 lb/h	Upper Bound		
Lower Bound			* Enforce Bounds		False
		User Value [[	DeckFittingLosses]		
* Parameter					ton/vr
Lower Bound		ton/yr	* Enforce Bounds		False
Lonor Dound			2		
		Lisor Value [			
* Deverseter					to a los
Parameter			Upper Bound		ton/yr
Lower Bound		ton/yi	Efficice Bounds		Faise
* <b>D</b>			[FlashingLosses]		
* Parameter		0 ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds		Faise
		User Value	[GasMoleWeight]		
* Parameter		0.0196571 kg/mol	Upper Bound		kg/mol
Lower Bound		kg/mol	* Enforce Bounds		False
		User Value	[MaxLiqSurfaceT]		
* Parameter		66.3119 °F	Upper Bound		°F
Lower Bound		°F	* Enforce Bounds		False
		User Valu	e [TotalLosses]		
* Parameter		0.0183088 lb/h	Upper Bound		lb/h
Lower Bound		lb/h	* Enforce Bounds		False
Remarks					
This User Value Set	was programmat	tically generated. GUID={21A053	D7-FA37-49F2-83D2-F060C	8962F32}	

		Cr Pla	ow Blowdown nt Schematic		
Client Name:	Chevron Appalachia,	LLC		Job: Crow Tes	Tank
Location:					
Flowsheet:	Crow Blowdown				
		Properties     Average     Contensate       Temperature(Total)     90° fF       Pressure(Total)     1000° psig       -Veter     -Q-1 - Veter	Temperature(Total)     75' 1FF       Pressure(Total)     75' 1FF       Stream Flash Gas C3+ Mass Flow =14.51 lb/h       Intermediation Gas       Properties       Flath Gas       Properties       Properties       API Gas/(Total)       Properties       Properties       API Gas/(Total)       Properties       Properties       API Gas/(Total)       Properties       Properties       Mither Colspan="2">Properties       Properties       Properties       Properties <t< td=""><th>Stable Oil 79.6306 [ 72.899] "F 14.1 psia 792  bbl/yr</th><th></th></t<>	Stable Oil 79.6306 [ 72.899] "F 14.1 psia 792  bbl/yr	
			Tank loss calculations for "3". Total working and breathing losses from the Vertical Oylinder are 0.3559 lb/h. Loading losses are 0.01078 lb/h of loaded liquid.		

		Process St All S Tabulated	reams Report treams by Total Phase			
Client Name:	Chevron Appala	achia, LLC		Job: Crow	Test Tank	
Location:	Crow Blowdowr					
Flowsheet.	CIOW BIOWOOWI	1				
		Com				
		Conr	lections	<b>F</b> 1 1 4		DW/
		Average Condensate	Flash Gas	Flash 1	Liquid 1	PW
From Block			VSSL-101	VSSL-100	VSSL-100	VSSL-101
TO BIOCK		MIX-100			VSSL-101	MIX-101
			• . •			
		Stream C	omposition			
		Average	Flash Gas	Flash 1	Liquid 1	PW
Mole Fraction		Condensate %	%	%	%	%
Nitrogen			0	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	<i>,</i> 0	0
Carbon Dioxide		0.0228112	0.0331333	0.0206277	0.000254451	1.60292E-05
Methane		13.6989	15.3891	63.8963	0.110583	0.00036491
Ethane		14.5567	21.2143	22.2064	0.154962	0.000587339
Propane		17.2894	25.8973	9.92034	0.197541	0.000804915
i-Butane		3.01413	4.2001	0.764441	0.0352292	4.49122E-05
n-Butane		10.7646	14.1449	1.9826	0.12643	0.000330705
n-Pentane		6 13002	5.03705	0.299512	0.0419775	3.87931E-05
Neohexane		0.05399	0.0359432	0.00209724	0.00064054	1.96725E-07
2-Methylpentane		2.24019	1.13769	0.0601657	0.0265998	8.50328E-06
3-Methylpentane		1.14508	0.538616	0.0279014	0.0135989	1.10157E-05
n-Hexane		4.1568	1.64908	0.0828159	0.049381	9.8162E-06
Heptane		23.3681	3.74061	0.186245	0.277832	2.63043E-05
Water		0	2.83482	0.148022	98.8923	99.9976
			<u> </u>	<u> </u>		
		Average Condensate	Flash Gas	Flash 1	Liquid 1	PW
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Nitrogen		0	0	0	0	0
Carbon Dioxide		0.000155928	0.000135972	9.71622E-06	0.000146212	9.10698E-06
Fthane		0.0930399	0.0031534	0.030097	0.003543	0.000207323
Propane		0.000000	0.0070303	0.00467276	0.0000400	0.000457311
i-Butane		0.0206034	0.0172363	0.000360073	0.0202433	2.55168E-05
n-Butane		0.0735825	0.0580476	0.000933859	0.0726486	0.000187889
i-Pentane		0.0242621	0.0149257	0.000141079	0.024121	3.34043E-05
n-Pentane		0.04197	0.0227649	0.000189572	0.0417804	4.98748E-05
Neohexane		0.000369053	0.000147503	9.8786E-07	0.000368066	1.11769E-07
2-Methylpentane		0.0153131	0.00466882	2.83397E-05	0.0152847	4.83112E-06
3-Methylpentane		0.00782728	0.00221036	1.31424E-05	0.00781414	6.25856E-06
Hentane		0.0204142	0.00070740	8 77265E-05	0.0203732	1 49447E-05
Water		0	0.0116335	6.97224E-05	56.8252	56.8135
		Average	Flash Gas	Flash 1	Liquid 1	PW
Mass Fraction		%	%	%	%	%
Nitrogen		0	0	0	0	0
Carbon Dioxide		0.0169668	0.0326023	0.0381807	0.000605308	3.91566E-05
Methane		3.71417	5.51976	43.1116	0.0958926	0.00032494
Ethane		7.39756	14.2622	28.0831	0.251867	0.00098029
Propane		12.8849	25.5322	18.3979	0.470845	0.00197011
n-Butane		2.9608	0.40000 18 2817	1.0000/	0.11008	0.000144895
i-Pentane		<u>10.3742</u> <u>4</u> 32700	5 86699	0.908847	0.397200	0.000235459
n-Pentane		7.48681	8.94843	1.22125	0.283562	0.000351556
Neohexane		0.0786324	0.0692526	0.00760114	0.0029837	9.40996E-07
2-Methylpentane		3.26268	2.19201	0.218061	0.123905	4.06739E-05
3-Methylpentane		1.66772	1.03777	0.101125	0.0633448	5.26916E-05
n-Hexane		6.05408	3.17732	0.300154	0.230022	4.6954E-05
neoiane		39.5/36	8.38022	0.784887	1.50482	0.000146301

\* User Specified Values ? Extrapolated or Approximate Values

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			Process Str All St Tabulated b	reams Report reams y Total Phase			
Client Name:	Chevron App	alachia. LLC			Job: Crow	Test Tank	
Location:		,					
Flowsheet:	Crow Blowdo	own					
	*						
Mass Fraction			Average Condensate %	Flash Gas %	Flash 1	Liquid 1 %	PW %
Water			0	1,14184	0.112154	96.3006	99,9946
					01112101	00.0000	00.001.0
			Average Condensate	Flash Gas	Flash 1	Liquid 1	PW
Mass Flow			lb/h	lb/n	Ib/n	lb/n	lb/h
Nitrogen			0.006962222	0.00509.406	0	0.00642472	0 000 400 702
Carbon Dioxide			0.00000232	0.00596406	0.000427606	1.01020	0.000400793
Ethane			2 00108	2 61778	0.40203	2 677/7	0.00332597
Propane			5 21136	4 68635	0.206048	5 00531	0.0100339
i-Butane			1,19751	1.00181	0.0209282	1,17659	0.00148309
n-Butane			4.27678	3.37385	0.054278	4.2225	0.0109205
i-Pentane			1.75048	1.07687	0.0101787	1.7403	0.00241008
n-Pentane			3.02808	1.64246	0.0136774	3.01441	0.0035984
Neohexane			0.0318033	0.0127111	8.51292E-05	0.0317182	9.63171E-06
2-Methylpentane			1.31961	0.402337	0.00244219	1.31717	0.000416324
3-Methylpentane			0.674519	0.190479	0.00113255	0.673386	0.000539334
n-Hexane			2.4486	0.583188	0.00336158	2.44524	0.000480605
Heptane			16.0057	1.53816	0.00879036	15.997	0.00149749
Water			0	0.209581	0.00125607	1023.72	1023.51
			Stream I	Properties			
Property		Units	Average Condensate	Flash Gas	Flash 1	Liquid 1	PW
Temperature		°F	90 *	72.8985	75 *	75	72.8985
Pressure		psia	1014.1 *	14.1	314.1 *	314.1	14.1
Mole Fraction Va	por	%	0	100	100	0	0
Mole Fraction Lig	Iht Liquid	%	100	0	0	1.06026	100
Mole Fraction He	avy Liguid	%	0	0	0	98.9397	0

70	100	0	0	1.00020	100
%	0	0	0	98.9397	0
lb/lbmol	59.1691	44.7263	23.7768	18.5001	18.0158
lb/ft^3	36.1706	0.112177	1.45858	60.7371	62.247
lbmol/h	0.683559	0.410378	0.0471028	57.4617	56.8148
lb/h	40.4455	18.3547	1.11995	1063.05	1023.57
ft^3/h	1.11819	163.623	0.767838	17.5025	16.4436
gpm	0.139411	20.3998	0.0957305	2.18212	2.05011
MMSCFD	0.0062256	0.00373757	0.000428995	0.52334	0.517448
sgpm	0.141428 *	0.0721538	0.00618198	2.18174	2.0463
	0.281225	0.983649	0.892361	0.0166739	0.000714028
	0.579945	1.54428	0.820948	0.973835	0.998044
	104.704			13.4137	10.0153
Btu/h	-43889.6	-20040.9	-1686.08	-7.02707E+06	-6.98616E+06
Btu/lb	-1085.15	-1091.87	-1505.49	-6610.3	-6825.32
Btu/(lb*°F)	0.571155	0.409711	0.512813	0.967066	0.982937
	1.08909	1.12252	1.2218	1.31606	1.32569
cP	0.169009	0.00832409	0.010704	0.891247	0.959996
cSt	0.291698	4.63248	0.458137	0.901828	0.962787
Btu/(h*ft*°F)	0.061802	0.0108751	0.0171904	0.331704	0.34839
lbf/ft	0.000405466 ?			0.0047514 ?	0.00502028 ?
Btu/ft^3	3059.97	2313.68	1295.99	35.3388	0.0508359
Btu/lb	19472.5	19470.6	20595	-301.388	-1058.64
Btu/ft^3	3315.16	2515.37	1424.14	88.0222	50.3641
Btu/lb	21109.2	21181.9	22640.4	779.283	1.15687
	%         lb/lbmol         lb/ft^3         lbmol/h         lb/h         ft^3/h         gpm         MMSCFD         sgpm         Btu/h         Btu/lb         Btu/(lb*°F)         cP         cSt         Btu/(h*ft*°F)         lbf/ft         Btu/tb         Btu/th*3         Btu/tb         Btu/tb         Btu/th*3         Btu/lb         Btu/lb	%         0           %         0           lb/lbmol         59.1691           lb/ltr3         36.1706           lbmol/h         0.683559           lb/h         40.4455           ft^3/h         1.11819           gpm         0.139411           MMSCFD         0.0062256           sgpm         0.141428 *           0.281225         0.579945           104.704         4           Btu/h         -43889.6           Btu/lb         -1085.15           Btu/lb         -1085.15           Btu/(lb*°F)         0.571155           2         0.291698           Btu/(h*ft*°F)         0.061802           lbf/ft         0.000405466 ?           Btu/ft^3         3059.97           Btu/lb         19472.5           Btu/ft^3         3315.16           Btu/lb         21109.2	100         0           %         0         0           %         0         0           lb/lbmol         59.1691         44.7263           lb/ft^3         36.1706         0.112177           lbmol/h         0.683559         0.410378           lb/h         40.4455         18.3547           ft^3/h         1.11819         163.623           gpm         0.139411         20.3998           MMSCFD         0.0062256         0.00373757           sgpm         0.141428 *         0.0721538           0.281225         0.983649           0.579945         1.54428           104.704         1           Btu/h         -43889.6         -20040.9           Btu/lb         -1085.15         -1091.87           Btu/lb         -1085.15         -1091.87           Btu/lb         -108909         1.12252           cP         0.169009         0.00832409           cSt         0.291698         4.63248           Btu/(h*ft*°F)         0.061802         0.0108751           lb/ft         0.000405466 </td 9           Btu/lb         19472.5         19470.6           Btu/	%         0         0         0           %         0         0         0         0           lb/lbmol         59.1691         44.7263         23.7768           lb/ft^3         36.1706         0.112177         1.45858           lbmol/h         0.683559         0.410378         0.0471028           lb/h         40.4455         18.3547         1.11995           ft^3/h         1.11819         163.623         0.767838           gpm         0.139411         20.3998         0.0957305           MMSCFD         0.0062256         0.00373757         0.000428995           sgpm         0.141428 *         0.0721538         0.00618198           0.281225         0.983649         0.892361           0.579945         1.54428         0.820948           104.704         -         -           Btu/h         -43889.6         -20040.9         -1686.08           Btu/lb         -1085.15         -1091.87         -1505.49           Btu/lb         -1085.15         -1091.87         -1505.49           Btu/(lb**F)         0.571155         0.409711         0.512813           cP         0.169009         0.00832409         0.010704 </td <td>70         100         0         0         0         98.9397           lb/lbmol         59.1691         44.7263         23.7768         18.5001           lb/lt^3         36.1706         0.112177         1.45858         60.7371           lbmol/h         0.683559         0.410378         0.0471028         57.4617           lb/h         40.4455         18.3547         1.11995         1063.05           ft*3/h         1.11819         163.623         0.767838         17.5025           gpm         0.139411         20.3998         0.0957305         2.18212           MMSCFD         0.0062256         0.00373757         0.000428995         0.52334           sgpm         0.141428         0.0721538         0.00618198         2.18174           0.281225         0.983649         0.892361         0.0166739           0.579945         1.54428         0.820948         0.973835           104.704         13.4137         1.34137           Btu/h         -43889.6         -20040.9         -1686.08         -7.02707E+06           Btu/lb         -1085.15         -1091.87         -1505.49         -6610.3           Btu/lb         0.571155         0.409711         0.51</td>	70         100         0         0         0         98.9397           lb/lbmol         59.1691         44.7263         23.7768         18.5001           lb/lt^3         36.1706         0.112177         1.45858         60.7371           lbmol/h         0.683559         0.410378         0.0471028         57.4617           lb/h         40.4455         18.3547         1.11995         1063.05           ft*3/h         1.11819         163.623         0.767838         17.5025           gpm         0.139411         20.3998         0.0957305         2.18212           MMSCFD         0.0062256         0.00373757         0.000428995         0.52334           sgpm         0.141428         0.0721538         0.00618198         2.18174           0.281225         0.983649         0.892361         0.0166739           0.579945         1.54428         0.820948         0.973835           104.704         13.4137         1.34137           Btu/h         -43889.6         -20040.9         -1686.08         -7.02707E+06           Btu/lb         -1085.15         -1091.87         -1505.49         -6610.3           Btu/lb         0.571155         0.409711         0.51

## Warnings

ProMax:ProMax!Project!Flowsheets!Crow Blowdown!PStreams!Flash Gas

Error: The flash conditions for stream Flash Gas are already defined by Temperature and Mole Fraction Vapor. Before specifying another property, one specification must be cleared.

		Process Streams Report All Streams Tabulated by Total Phase		
Client Name:	Chevron Appala	chia, LLC	Job: Crow	Test Tank
Location:				
Flowsheet:	Crow Blowdown			
	•		•	
Remarks				

All Streams Tabulated by Total Phase	
Client Name: Chevron Appalachia, LLC Job: Crow Test Tan	ank
Location:	
Flowsheet: Crow Blowdown	
Connections	
Stable Oil Water 2 3	3
From Block VSSL-101 MIX-100 MIX-	X-101
To Block MIX-101 MIX-100 VSSL-100 -	
Stream Composition	
Stable Oil Water 2 3	3
Mole Fraction % % 9	%
Nitrogen 0 0 0 0 0	0
Carbon Dioxide 0.000479032 0 0.000271138 1.794	9488E-05
Weinane         0.0779414         0         0.102027         0.000           Ethane         0.698121         0         0.173024         0.00	00082813
Propage 2.86472 0 0.205504 0.0	0.0126788
i-Butane 1.26048 0 0.0358265 0.00	00527071
n-Butane 6.09343 0 0.12795 0.0	0.0255929
i-Pentane 3.87338 0 0.0421884 0.0	0.0161177
n-Pentane 8.01807 0 0.0729801 0.0	0.0333306
Neohexane 0.0931996 0 0.000641733 0.000	00386604
2-Methylpentane 4.48602 0 0.0266273 0.0	0.0186076
3-interrypentane 2.30645 0 0.0136106 0.00	00982234
1-1 lexalle 9.1327 0 0.0494004 0.0	0.252024
Hentane 60.9976 0 0.277757 0	
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         0	99 5832
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9	99.5832
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Stable Oil         Water         2         3	99.5832 3
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow         Stable Oil Ibmol/h         Water         2         3	99.5832 3 mol/h
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2 Ibmol/h         3 Ibmol/h           Nitrogen         0         0         0         0	0.232924 99.5832 3 mol/h 0
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2 Ibmol/h         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024         1.024 <td< td=""><td>3 mol/h 0 2401E-05</td></td<>	3 mol/h 0 2401E-05
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924 99.5832 3 mol/h 0 2401E-05 00389554
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow         Stable Oil Ibmol/h         Water         2         3           Nitrogen         0         0         0         0         1bmol/h         Ibmol/h         Ibmol/h </td <td>0.232924 99.5832 3 mol/h 0 2401E-05 00389554 00198501 0027324</td>	0.232924 99.5832 3 mol/h 0 2401E-05 00389554 00198501 0027324
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924 99.5832 3 mol/h 0 2401E-05 00389554 00198501 0.0072334 00300701
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924 99.5832 3 mol/h 0 2401E-05 00389554 00198501 0.0072334 00300701 0.0146011
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924           99.5832           3           mol/h           0           2401E-05           00389554           00198501           0.0072334           00300701           0.0146011           00919535
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924           99.5832           3           0           2401E-05           00389554           00198501           0.0072334           00300701           0.0146011           00919535           0.0190155
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924           99.5832           3           0           2401E-05           00389554           00198501           0.0072334           00300701           0.0146011           00919535           0.0190155           00220563
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924           99.5832           3           mol/h           0           2401E-05           00389554           00198501           0.0072334           00300701           0.0146011           00919535           0.0190155           00220563           0.0106159
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924       99.5832       3       mol/h       0       2401E-05       00389554       00198501       0.0072334       00300701       0.0146011       00919535       0.0190155       00220563       0.0106159       00560378
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         0.0190155         00220563         0.0106159         00560378         0.0216077         0.444296
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Nitrogen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924           99.5832           3           mol/h           0           2401E-05           00389554           00198501           0.0072334           00300701           0.0146011           00219535           0.0190155           000220563           0.0166159           00560378           0.0216077           0.144296           56.8136
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow         Ibmol/h         Ib	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         0.0190155         00220563         0.0216077         0.144296         56.8136
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow           Molar Flow         Ibmol/h	0.232924       99.5832       3       mol/h       0       2401E-05       00389554       00198501       0.0072334       00300701       0.0146011       00919535       0.0190155       00220563       0.016159       00560378       0.0216077       0.144296       56.8136
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water         2         3           Molar Flow         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.000155928         1.024           Methane         0.000182231         0         0.0995038         0.000           Ethane         0.00165131         0         0.0995038         0.00           Propane         0.0029815         0         0.0206034         0.00           i-Butane         0.0144132         0         0.0735825         0.00           n-Pentane         0.0189657         0         0.0242621         0.000           n-Pentane         0.0106111         0         0.0153131         0.0           2-Methylpentane         0.0216022         0         0.0284142         0.00           n-Hexane         0.0216022         0         0.0284142         0.0           heptane         0.144282         0         0.159735         0.           Water         9.058338-05         56.	0.232924       99.5832       3       mol/h       0       2401E-05       00389554       00198501       0.0072334       00300701       0.0146011       00919535       0.0190155       00220563       0.016159       00560378       0.0216077       0.144296       56.8136
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water         2         5           Molar Flow         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.000155928         1.024           Methane         0.000182231         0         0.0986339         0.000           Ethane         0.00165131         0         0.0995038         0.00           Propane         0.00277609         0         0.118183         0.00           i-Butane         0.0029815         0         0.024621         0.00           n-Pentane         0.0198657         0         0.0242621         0.00           n-Pentane         0.0198657         0         0.0242621         0.00           Neohexane         0.00165111         0         0.0073525         0.00           2-Methylpentane         0.0216022         0         0.00782728         0.00           n-Hexane         0.0216022         0         0.0284142         0.0           n-Hexane         0.0216022	0.232924       99.5832       3       mol/h       0       2401E-05       00389554       00198501       0.0072334       00300701       0.0146011       00919535       0.0190155       00220563       0.0216077       0.144296       56.8136
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow         Stable Oil Ibmol/h         Water         2         3           Molar Flow         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.000155928         1.024           Methane         0.000182231         0         0.0995038         0.000           Ethane         0.00165131         0         0.0995038         0.000           Propane         0.00677609         0         0.118183         0.00           i-Butane         0.0018955         0         0.0246621         0.00           n-Pentane         0.00189657         0         0.044197         0.00           n-Pentane         0.0106111         0         0.0123131         0.00           2-Methylpentane         0.0165132         0         0.00242621         0.00           Neohexane         0.000220451         0         0.00242621         0.00           2-Methylpentane         0.0216022         0         0.0284142         0.00           N-Hexane         0.0216022<	0.232924       99.5832       3       mol/h       0       2401E-05       00389554       00198501       0.0072334       00300701       0.0146011       00919535       0.0190155       00220563       0.0216077       0.144296       56.8136       3       %       0       3138E-05
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water         2         3           Molar Flow         0         0         0         0         0           Nitrogen         0         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.00936399         0.000         0         0         0         0         0         0         0         0         0         0         0         0         0.0036399         0.000         0         0         0         0         0.0036399         0.000         0         0         0         0         0         0         0.000         0         0         0         0         0         0         0.000         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         0.0190155         00220563         0.0216077         0.144296         56.8136         3         %         0         3138E-05         00598204
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water         2         3           Molar Flow         0         0         0         0         0           Nitrogen         0         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.00936399         0.000         0         0         0         0         0         0         0         0         0         0         0         0         0.0936399         0.000         0         0         0         0.0936399         0.000         0         0         0         0         0.0155131         0         0.0296038         0.000         0         0         0.118183         0.00         0         0         0.00         0         0         0.00         0         0         0.00         0         0         0         0.00         0         0         0.00         0         0         0         0         0         0         0         0         0         0         0         0	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         0.0190155         00220563         0.0216077         0.144296         56.8136
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow         Stable Oil Ibmol/h         Water         2         3           Molar Flow         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.000155928         1.024           Methane         0.000182231         0         0.0936399         0.000           Ethane         0.000185131         0         0.0995038         0.00           Propane         0.0029815         0         0.0206034         0.00           Heptane         0.00144132         0         0.0736825         0.00           I-Pentane         0.001820451         0         0.002869053         0.000           n-Pentane         0.001820451         0         0.004197         0.00           Neohexane         0.00029451         0         0.00786728         0.000           2-Methylpentane         0.0106111         0         0.00782728         0.00           n-Hexane         0.0216022         0         0.0284142         0.0           Mass Fraction         %<	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         000200563         0.0106159         00560378         0.0216077         0.144296         56.8136         0         3138E-05         00598204         00571337         0.0305316
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         9           Molar Flow         Stable Oil Ibmol/h         Water         2         3           Nitrogen         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.000155928         1.024           Methane         0.000182231         0         0.0995038         0.000           Propane         0.00677609         0         0.118183         0.00           I-Butane         0.0018915         0         0.024621         0.00           I-Pentane         0.00189657         0         0.0242621         0.00           I-Pentane         0.00189657         0         0.0242621         0.00           I-Pentane         0.0144132         0         0.00735825         0.00           I-Pentane         0.0169657         0         0.0242621         0.000           I-Pentane         0.0166111         0         0.01753131         0.00           Stable Oil         Water         9.05833E-05         56.8253         56.8253         5           Mass Fraction	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         0.0190155         00220563         0.0106159         00560378         0.0216077         0         3138E-05         00598204         0059316         0.0167297         0.0305316         0.0167297
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         0           Molar Flow         Ibmol/h         Ib	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         00190155         00220563         0.0106159         00560378         0.0216077         0         3138E-05         00598204         00598204         00571337         0.0305316         0.0167297         0.081234
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water         2         3           Nitrogen         0         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.00015528         1.024         0.0986399         0.000           Ethane         0.00165131         0         0.0995038         0.000         0         0         0         0         0         0         0         0         0         0         0         0         0.00165131         0         0.0296034         0.000         0         0         0.014183         0.0         0         0         0         0.014183         0.0         0         0         0.0024621         0.00         0         0         0.0242621         0.00         0         0         0.00224621         0.00         0         0         0.00224621         0.00         0         0         0.00242621         0.00         0         0         0         0         0         0         0.0242621         0.00         0         <	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00920563         0.0106159         00560378         0.0216077         0         3138E-05         00598204         00598204         00591337         0.0305316         0.0167297         0.081234         0.0635051         0
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         5           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         5           Molar Flow         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <t< td=""><td>0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         0.0106159         00220563         0.0106159         00560378         0.0216077         0         3138E-05         00598204         00598204         00571337         0.0305316         0.0167297         0.081234         0.0635051         0.131325         00181939</td></t<>	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         0.0106159         00220563         0.0106159         00560378         0.0216077         0         3138E-05         00598204         00598204         00571337         0.0305316         0.0167297         0.081234         0.0635051         0.131325         00181939
Heptane         60.9976         0         0.277757         0.           Water         0.0382957         100         98.8114         0           Molar Flow         Stable Oil Ibmol/h         Water         2         3           Molar Flow         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.00936399         0.000           Bthane         0.000185231         0         0.0995038         0.00           Propane         0.00677609         0         0.118183         0.0           I-Butane         0.0029815         0         0.0226034         0.00           I-Butane         0.0018135         0         0.0226034         0.00           I-Pentane         0.00191155         0         0.0226631         0.00         0.00389053         0.000           Neohexane         0.000220451         0         0.00389053         0.000         0         0         0.0028053         0.000           2-Methylpentane         0.00220451         0         0.00782728         0.00         0.002762728         0.00         0         0         0         0         0         0.0280153         0.00         0	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         00190155         00220563         0.0106159         00560378         0.0216077         0.144296         56.8136
Heptane         60.9976         0         0.277757         0.0           Water         0.0382957         100         98.8114         0           Molar Flow         Stable Oil Ibmol/h         Water         2         13           Molar Flow         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.000155228         1.024           Methane         0.000165131         0         0.0995038         0.000           Ethane         0.0026815         0         0.0206034         0.00           Propane         0.002815         0         0.0228625         0.00           I-Pentane         0.0018112         0         0.0248621         0.00           Neohexane         0.00220451         0         0.0248621         0.00           Neohexane         0.000220451         0         0.00788228         0.00           Mass Fraction         0.0278272         0         0.07782728         0.00           Nitrogen         0         0.0216022         0         0.0284142         0.0           Vater         9.05833E-05         56.8253         56.8253         56.8253         5           Ma	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         00190155         00220563         0.0106159         00560378         0.0216077         0.144296         56.8136
Heptane         60.9976         0         0.277757         0.0           Water         0.0382957         100         98.8114         0           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         5           Molar Flow         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         <	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         00190155         00220563         0.0106159         00560378         0.0216077         0.144296         56.8136
Heptane         60.9976         0         0.277757         0.0           Water         0.0382957         100         98.8114         0           Molar Flow         Stable Oil Ibmol/h         Water Ibmol/h         2         3           Molar Flow         0         0         0         0         0         0         0         0         0         0         0         0           Carbon Dioxide         1.13309E-06         0         0.000155928         1.024         1         0         0.995038         0.000           Ethane         0.00165131         0         0.0995038         0.000         0         0         0         0         0         0.000348         0.00           Propane         0.00165131         0         0.026034         0.00         0         0.014132         0         0.024621         0.00           I-Butane         0.0018195         0         0.024621         0.00         0         0.014313         0.00         0.024523         0.00         0.00389053         0.000           I-Pentane         0.00559752         0         0.0073825         0.00         0.0073825         0.00         0.024621         0.00         0.00         0.024602	0.232924         99.5832         3         mol/h         0         2401E-05         00389554         00198501         0.0072334         00300701         0.0146011         00919535         00190155         00220563         0.0106159         000560378         0.0216077         0.144296         56.8136

Client Name:         Dob: Crow Test Tank           Job: Crow Fest Tank         Job: Crow Test Tank           Flowsheet:         Crow Blowdown           Mass Flow         Stable Oit Ib/n         Water Ib/n         Ib/n         Ib/n           Nitrogen         0         0         0         0         0         0         0           Carbon Dioxide         4 9866565         0         0.00686232         0.0005666           Methane         0.00292343         0         1.50221         0.00656673           Propane         0.298766         0         5.21136         0.318961           Propane         0.66123         0         1.75048         0.66334           n-Pentane         0.6123         0         1.75048         0.663434           n-Pentane         0.612386         0         0.574519         0.442208           Methypentane         0.42386         0         0.674519         0.442208           Methypentane         1.46473         0         10.0057         14.4688           Water         0.010618         Water         2.3         3           Preperty         Units         Stabe Oit         Water         2.3         3           Din				Process Str All St Tabulated b							
Location: Flowsheet:         Crow Blowdown           Mass Flow         Stable Oil Ib/h         Water Ib/h         2 Ib/h         3 Ib/h           Mass Flow         4.96655:05         0         0.00686232         0.00045066           Methane         0.0292343         0         1.50221         0.0062441           Ehane         0.0496533         0         2.99198         0.0559673           Propane         0.239766         0         5.21136         0.318961           Fiburane         0.037726         0         4.27678         0.84647           Fiburane         0.33935         0         3.02808         1.37195           Neohexane         0.0419674         0         0.0318033         0.0190071           Adentrypertane         0.042388         0         0.0318033         0.0190071           Adentrypertane         0.442388         0         0.244691         0.46208           Adentrypertane         1.86157         0         2.4468         14.4573           Methane         0.445288         0         0.02375         72.8985           Preperty         Units         Stable Oil         Water         2         3           Tempgrature         *F <t< td=""><td>Client Name:</td><td>Chevron Appala</td><td>chia, LLC</td><td></td><td>Job: Crow</td><td>Test Tank</td><td></td></t<>	Client Name:	Chevron Appala	chia, LLC		Job: Crow	Test Tank					
Flow sheet:         Crow Blowdown           Mass Flow         Stable Oil Ib/h         Water Ib/h         Ib/h         Ib/h         Ib/h           Nitrogen         0         0         0         0         0         0           Carbon Dioxide         4.98665-05         0         0.000686232         0.00659873           Ehane         0.0069633         0         1.50221         0.00659873           Propane         0.238796         0         5.21138         0.318961           Flowane         0.1772281         0         1.19751         0.174774           n-Butane         0.661023         0         1.27548         0.668434           n-Pentane         0.018974         0         0.0318033         0.0190071           2-Methylopentane         0.0142328         0         1.37195           Abdthylopentane         0.44273         0         1.30233         0.0190071           2-Methylopentane         0.44573         0         2.4486         1.86205           Heptane         1.4657         0         2.4486         1.86205           Heptane         1.46238         0         0         0         0           Doctol 1188         1023.72	Location:		· ·								
Mass Flow         Stable Oil         Water         2         3           Nitrogen         0         0         0         0         0         0           Carbon Dioxide         4.98665E-05         0         0.0068232         0.00042066           Behane         0.00282343         0         2.92188         0.00568473           Propane         0.238795         0         5.21138         0.0348641           Februane         0.0173291         0         1.19751         0.174774           Februane         0.0661023         0         1.75048         0.683434           Februane         0.0189774         0         0.032086         1.37195           Neobexane         0.018974         0         0.0318661         0.948647           -Vettriypentane         0.018974         0         0.0318661         0.914822           -Mettrypentane         0.018974         0         0.0318651         0.914822           -Mettrypentane         0.482368         0         0.674519         0.482200           -Hexane         1.86157         0         2.4486         1.86205           Heptane         1.4.4573         0         16.0057         14.4588 <t< th=""><th>Flowsheet:</th><th>Crow Blowdown</th><th>)</th><th></th><th></th><th></th><th></th><th></th></t<>	Flowsheet:	Crow Blowdown	)								
Stabio Oil         Water         2         3           Nitrogen         0         0         0         0         0         0           Carbon Doxide         498685405         0         0.00686232         0.00045066           Methane         0.00282343         0         0.5028273         0.00698471           Propane         0.0298706         0         2.29198         0.03959873           Propane         0.037278         0         1.19751         0.149774           HBanne         0.037278         0         1.27718         0.848477           HPentane         0.681033         0         0.0319861         0.948533           HPentane         0.048974         0         0.0131033         0.0190071           Hertane         0.348671         0         0.31961         0.914629           Hertane         0.34857         0         0.3018033         0.0190071           Hertane         0.34857         0         0.01383974         0         0.824868           Hertane         1.44573         0         0.607519         0.428286           Hertane         1.44573         0         0         0         0         0         0         0<											
Nitrogen         0         0         0         0         0         0         0         0           Cathon Dioxide         4.98665-05         0         0.000688032         0.00042941           Ethane         0.0496533         0         2.99198         0.00698731           Propane         0.298796         0         5.21136         0.319961           Potane         0.43776         0         4.27678         0.448647           Pentane         0.661023         0         1.75048         0.668344           n-Pentane         0.661023         0         1.75048         0.648047           Ventare         0.0189374         0         0.0318033         0.0190071           Admitylpentane         0.0189374         0         0.032808         1.37195           Neghexane         0.0163977         0         0.432308         0.118033         0.0190071           Admitylpentane         0.0163188         1023.72         1023.51         0         163205           Temperature         7F         72.8985         90         90.0375         72.8985           Pressure         psia         14.4         1014.1         1014.1         14.1           Mole Fraction	Mass Flow			Stable Oil Ib/h	Water Ib/h	2 lb/h	3 lb/h				
Carbin Dioxide         4.98665-05         0         0.00849232         0.0049695           Behane         0.0049653         0         1.50221         0.0049693           Popane         0.098796         0         5.21136         0.318961           Henne         0.039726         0         5.21136         0.178774           Heltane         0.179291         0         1.19751         0.174774           Heltane         0.681728         0         4.26778         0.048643           n-Pentane         0.661023         0         1.75048         0.648643           n-Pentane         0.018974         0         0.0318033         0.0190071           2Methypentane         0.618974         0         0.0318033         0.190071           Altertypentane         0.814372         0         1.31851         0           Altertypentane         0.814372         0         1.436208         0           n-Hexane         1.86157         0         2.4486         1.86205           Heptane         1.4673         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 </td <td>Nitrogen</td> <td></td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td></td>	Nitrogen			0	0	0	0				
Methane         0.00292343         0         0.1120221         0.00292441           Ehane         0.0496533         0         2.99198         0.0596873           Propane         0.0298796         0         5.21136         0.019961           Hause         0.173291         0         1.19751         0.17474           n-Butane         0.6837726         0         4.27678         0.848647           ri-Pentane         0.661023         0         1.75048         0.68434           n-Pentane         0.661023         0         1.75048         0.68434           Neohexane         0.0189974         0         0.031033         0.0190071           Zhethylpentane         0.482368         0         0.674519         0.482906           n-Hexane         1.46573         0         16.0057         14.4588           Water         0.00155         12.23.51         1023.72         1023.72         1023.51           Enseture         'F         72.8985         90<'	Carbon Dioxide			4.98665E-05	0	0.00686232	0.00045066				
Enhane         0.0496533         0         2.99198         0.0596873           Propane         0.298786         0         5.21136         0.318961           Fedurane         0.837726         0         4.27678         0.848647           FPertane         0.061023         0         1.75048         0.0148774           Nechexane         0.0169974         0         0.0318033         0.019071           Anchexane         0.0169974         0         0.0318033         0.019071           Anthyppentane         0.914412         0         1.37195           Anthyppentane         0.422368         0         0.674519         0.442208           n-Hexane         1.66157         0         2.4486         1.66205           Heptane         1.46157         0         12.0372         1023.72           Water         0.00163188         1023.72         1023.75         72.8985           Property         Units         Stable Oll         Water         2         3           Mole Fraction Light Liguid         %         0         0         0         0         0         0         0         0         0         0         0         0         0         0	Methane			0.00292343	0	1.50221	0.00624941				
Propane         0.289796         0         5.21136         0.318961           Butane         0.173291         0         1.19751         0.174774           n-Butane         0.837726         0         4.27678         0.848647           i-Pentane         0.661023         0         1.75648         0.68434           n-Pentane         0.0169974         0         0.0318033         0.0190071           2-Methylpentane         0.914412         0         1.31961         0.914429           3-Methylpentane         0.482368         0         0.674519         0.482908           n-Hexane         1.486157         0         2.4466         1.860205           Heptane         1.4.4573         0         16.0057         14.4588           Water         0.0015318         1023.72         1023.72         1023.51           Stream Properties           Property         Units         Stable Oil         Water         2         3           Property         Units         Stable Oil         Water         2         3           Property         Units         Stable Oil         Water         2         3           Property <td>Ethane</td> <td></td> <td></td> <td>0.0496533</td> <td>0</td> <td>2.99198</td> <td>0.0596873</td> <td></td>	Ethane			0.0496533	0	2.99198	0.0596873				
Bulane         0.173291         0         1.19751         0.174774           n-Butane         0.837726         0         4.27678         0.84647           I-Pentane         0.061023         0         1.75048         0.668434           n-Pentane         0.0189974         0         0.031303         0.0190071           2-Methylpentane         0.914412         0         1.31961         0.914829           3-Methylpentane         0.482368         0         0.674519         0.482206           n-Hexane         1.86157         0         2.4486         1.86205           Heptane         1.46473         0         16.0057         14.4588           Water         0.00163188         1023.72         1023.51           Temperature         *         7         2.8985           Pressure         psia         14.1         1014.1         14.1         14.1           Mole Fraction Vapor         %         0         0         0         0         0           Mole Fraction Vapor         %         0         0         0         0         0         0         0         0         0         0         0         0         0         0	Propane			0.298796	0	5.21136	0.318961				
n-Butane 0.837726 0 4.27678 0.446647 iPentane 0.661023 0 1.75048 0.663434 n-Pentane 136835 0 3.02808 1.37195 Neohexane 0.018974 0 0.0318033 0.0180071 2.48thylpentane 0.914412 0 1.31961 0.914829 2.48thylpentane 0.482368 0 0.674519 0.482903 n-Hexane 1.86157 0 2.24486 1.86205 Heptane 1.4657 0 2.24486 1.86205 Heptane 1.4657 0 1.24486 1.86205 Heptane 0.00163188 1023.72 1023.72 1023.51 <b>Stream Properties</b> <b>Property Units Stable Oli Water 2 3</b> <b>Temperature °F</b> 7.2.8985 90 9 90.0375 72.8985 Pressure psia 1.4.1 1014.1 1.014.1 1.4.1 Mole Fraction Vapor % 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	i-Butane			0.173291	0	1.19751	0.174774				
i-Pentane 0.661023 0 1.75048 0.663434 0.97494 0 0.663434 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97495 0.97314 0.99596 0.99495 0.97495 0.97495 0.97314 0.99596 0.99495 0.97495 0.97344 0.99696 0.99608 0.970324 0.98797 0.94195 0.994050 0.994578 0.974954 0.974954 0.97344 0.97324 0.98797 0.97495 0.97454 0.94659 0.907314 0.96493 0.97344 0.97456 0.948638 0.055565 0.90073314 0.99696 0.99616 0.97454 0.99608 0.9056375 0.904953 0.97454 0.97454 0.97454 0.97456 0.97454 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.97456 0.9745	n-Butane			0.837726	0	4.27678	0.848647				
n-Pentane 1.36835 0 3.02808 1.37195 Nechexane 0.018974 0 0.0318033 0.0190071 2.Methylpentane 0.914412 0 1.31961 0.914829 3.Methylpentane 0.482368 0 0.674519 0.482908 n-Hexane 1.86157 0 2.4486 1.86205 Heptane 14.4573 0 16.0057 14.4588 Water 0.00163188 1023.72 1023.72 1023.51 Temperature °FF 72.8985 90 90.0375 72.8985 Pressure psia 14.1 1014.1 * 1014.1 14.1 Mole Fraction Vapor % 0 0 0 0 0 0 0 Mole Fraction Light Liquid % 10 00 0 0 0 0 0 Mole Fraction Light Liquid % 0 0 0 98.8719 99.5854 Molecular Weight 1b/hmol 89.3228 18.0153 18.5044 18.3115 Mass Density 1b/h*3 41.3927 62.1238 60.5181 16.61512 Mole Fraction Light Liquid % 0 0 0 98.8719 99.5854 Molecular Weight 1b/hmol 89.3228 18.0153 18.5044 18.3115 Mass Density 1b/h*3 10.2162,72 1064.17 1044.69 Vapor Volumetric Flow 1b/h 0.121.218 1023.72 1064.17 1044.69 Vapor Volumetric Flow 1b/h 0.1124 10.023.72 1064.17 1044.69 Vapor Volumetric Flow 3pm 0.0636381 2.0654 2.19233 2.11375 Std Vapor Volumetric Flow 3pm 0.0636276 0.248538 0.052625 0.00073314 Specific Gravity 0.00035276 0.248538 0.52508 0.00073314 Specific Gravity 0.00035276 0.248538 0.525265 0.00073314 Specific Gravity 0.0633674 0.996068 0.970324 0.987977 API Gravity 0.00053276 0.248538 0.52525 0.00073314 Specific Gravity 0.00032372 0.518762 2.10399 Std Liquid Volumetric Flow 3pm 0.0632876 0.248538 0.52525 0.00073314 Specific Gravity 0.00032371 0.048538 0.52576 0.00073314 Specific Gravity 0.0633276 0.248538 0.52525 0.00073314 Specific Gravity 0.0633276 0.248538 0.0523769 0.519602 Std Liquid Volumetric Flow 3pm 0.0632876 0.248538 0.0523769 0.519602 Std Liquid Volumetric Flow 11.4104 987513 6.606.02 66858.9 6-6707.25 Mass Chuby Btu/h 2908513 6.606.02 6685.99 6-6707.25 Mass Chuby Btu/h 2908643 0.797324 0.975123 0.948643 Compressibility 0.0490791 0.32404 0.79334 0.751623 0.948643 Chemaloy Btu/h 39234 0.75163 0.948643 0.94863 Chub 0.94863 0.948643 Chemaloy Btu/h*3 4921.99 50.31 89.1166 70.0562 Gross Liquid Heating Value Btu/h*3 4921.99 50.31 89.1166 70.0562 Gross Liquid Heating Value Btu/h*3 4921.99 50.31 89.1166 70.5	i-Pentane			0.661023	0	1.75048	0.663434				
Neohexane         0.0198974         0         0.0318033         0.0190071           2Methylpentane         0.914412         0         1.31961         0.914829           3Methylpentane         0.482368         0         0.674519         0.482908           n-Hexane         1.86157         0         2.4486         1.86205           Heptane         14.4573         0         16.0557         14.4588           Water         0.00163188         1023.72         1023.72         1023.51           Stream Properties           Property         Units         Stable Oil         Water         2         3           Temporature         °F         72.8985         90<°	n-Pentane			1.36835	0	3.02808	1.37195				
2-Methylpentane         0.914412         0         1.31961         0.91429           3-Methylpentane         0.462368         0         0.674519         0.482098           n-Hexane         1.86157         0         2.4486         1.86205           Heptane         14.4573         0         16.0057         14.4588           Water         0.00163188         1023.72         1023.51           Stream Properties           Property         Units         Stable Oil         Water         2         3           Temperature         °F         72.8985         90         90.0375         72.8985           Pressure         psia         14.1         1014.1         1014.1         14.1           Mole Fraction Vapor         %         0         0         0         0           Mole Fraction Light Liquid         %         100         100         1.12811         0.414603           Mole Fraction Heavy Liguid         %         0         0         0         0           Mass Density         Ib/hrv3         41.3927         62.1238         60.5181         61.6192           Mass Flow         Ib/h         2.11281         1023.72         1064.	Neohexane			0.0189974	0	0.0318033	0.0190071				
3-Methylpentane 0.482368 0 0.674519 0.482908 h Hexane 1.86157 0 2.4486 1.86205 Heptane 1.44573 0 16.0057 14.4588 Water 0.00163188 1023.72 1023.72 1023.51 <b>Stream Properties 7</b> <b>Property Units Stabe Oil Water 2 3</b> Temperature °F 72.8985 90 90 90.0375 72.8985 Pressure psia 14.1 1014.1 1014.1 14.1 Mole Fraction Vapor % 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2-Methylpentane			0.914412	0	1.31961	0.914829				
n-Hexane         1.86157         0         2.4486         1.86205           Heptane         14.4573         0         16.0057         14.4588           Water         0.00163188         1023.72         1023.72         1023.51           Property         Units         Stable Oil         Water         2         3           Temperature         *F         72.8985         90         90.0375         72.8985           Pressure         psia         1.4.1         1014.1         1.4.1         1014.1         1.4.1           Mole Fraction Vapor         %         0         0         0         0.4.14603           Mole Fraction Heavy Liquid         %         0.0         0         98.8719         995.854           Mole cular Weight         Ib/bmol         89.3228         18.0153         18.5044         18.3115           Mass Density         Ib/ft*3         41.327         26.1238         60.6181         61.6192           Molar Flow         Ib/mol         0.236536         56.8253         57.5088         57.0513           Mass Density         Ib/ft*3         41.1281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         gpm         0.0636381	3-Methylpentane			0.482368	0	0.674519	0.482908				
Heptane         14.4573         0         16.0057         14.4588           Water         0.00163188         1023.72         1023.72         1023.51           Property         Units         Stable Oil         Water         2         3           Image: Stream Properties         Stream Properties         Stream Properties         Stream Properties           Property         Units         Stable Oil         Water         2         3           Mole Fraction Vapor         %         0         0         0         0         0           Mole Fraction Light Liquid         %         100         100         1.12811         0.414603           Mole Fraction Heavy Liquid         %         0         0         0         0         0           Mole Fraction Heavy Liquid         %         100         10.2382         18.0163         18.5044         18.3115           Mass Density         Ib/ft <sup>M3</sup> 41.3927         62.1238         60.5181         61.6192           Molar Flow         Ibm0/h         0.236536         58.253         57.508         57.5013           Mass Erlow         Ib/ft <sup>3</sup> 0.51043         16.4788         17.5843         16.954           Liquid Volumetri	n-Hexane			1.86157	0	2.4486	1.86205				
Water         0.00163188         1023.72         1023.72         1023.71           Stream Properties           Property         Units         Stable Oil         Water         2         3           Temperature         °F         72.8985         90         90.0375         72.8985           Pressure         psia         14.1         1014.1         1014.1         14.1           Mole Fraction Vapor         %         0         0         0         0           Mole Fraction Vapor         %         100         100         1.12811         0.414603           Mole Fraction Heavy Liquid         %         0         0         98.8719         99.5854           Mole Fraction Heavy Liquid         %         0         0         98.8719         99.5854           Molescular Weight         Ib/Ibmol         89.3228         18.0153         18.5044         18.3115           Mass Density         Ib/Ih/43         41.3927         26.253         57.5088         57.0513           Mass Flow         Ib/Ih         21.1281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         MMSCFD         0.00328375         2.04855         2.19233         2.11375 <td>Heptane</td> <td></td> <td></td> <td>14.4573</td> <td>0</td> <td>16.0057</td> <td>14.4588</td> <td></td>	Heptane			14.4573	0	16.0057	14.4588				
Stream Properties           Property         Units         Stable Oil         Water         2         3           Temperature         °F         72.8985         90         90.0375         72.8985           Pressure         psia         14.1         1014.1         1014.1         14.1           Mole Fraction Vapor         %         0         0         0         0           Mole Fraction Light Liquid         %         100         100         1.12811         0.414603           Molecular Weight         Ib/b/mol         89.3228         18.0153         18.5044         18.3115           Mass Density         Ib/ftv3         41.3927         62.1238         60.6181         61.6192           Molar Flow         Ib/h         0.1.2811         1023.72         1064.17         1044.69           Vapor Volumetric Flow         Ib/h         21.1281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         gpm         0.0636381         2.0545         2.1923         2.11375           Std Vapor Volumetric Flow         MMSCFD         0.00215429         0.517543         0.523769         0.519602           Std Liquid Volumetric Flow         MMSCFD         0.0632875<	Water			0.00163188	1023.72	1023.72	1023.51				
Stream Properties           Property         Units         Stable Oil         Water         2         3           Temperature         °F         72.8985         90 *         90.0375         72.8985           Pressure         psia         14.1         1014.1         1014.1         14.1           Mole Fraction Vapor         %         0         0         0         0         0           Mole Fraction Light Liquid         %         0         0         0         98.8719         99.5854           Moleclar Weight         Ib/ft*3         41.3927         62.1238         60.5181         61.6192           Molar Flow         Ibmol/h         0.236536         56.8253         57.5088         57.0513           Mass Density         Ib/ft*3         41.3927         62.1238         60.5181         61.6192           Molar Flow         Ibmol/h         0.2365381         2.0545         2.19233         2.11375           Mass Plow         Ib/h         21.1281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         gpm         0.0636381         2.0545         2.19233         2.11375           Std Liquid Volumetric Flow         gpm         0.0636376											
Property         Units         Stable Oil         Water         2         3           Temperature         °F         72.9985         90 *         90.0375         72.8985           Pressure         psia         14.1         1014.1         1014.1         14.1           Mole Fraction Vapor         %         0         0         0         0         0           Mole Fraction Light Liquid         %         100         100         1.12811         0.414603           Mole Fraction Heavy Liquid         %         0         0         98.8719         99.5854           Molecular Weight         Ib/Ibmol         89.3228         18.0153         18.5044         18.3115           Mass Density         Ibmol/n         0.236536         56.8253         57.5088         57.0513           Mass Flow         Ibmol/n         0.236536         56.8253         57.5088         57.0513           Mass Flow         Ibmol/n         0.21281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         If^3/n         0.51043         16.5754         2.1823         2.10959           Compressibility         0.0052875         2.0465         2.18792         2.10959				Stream I	Properties						
Troperty         Differ         Otable On         Pressure         Pressure         Psia         14.1         1014.1         *         1014.1         14.1           Mole Fraction Vapor         %         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	Property		Unite	Stable Oil	Water	2	3	· · ·			
Tensure         psia         14.1         1014.1         1014.1         14.1           Mole Fraction Vapor         %         0         0         0         0         0           Mole Fraction Light Liquid         %         100         100         1.12811         0.414603           Mole Fraction Heavy Liquid         %         0         0         98.8719         99.5854           Molecular Weight         Ib/Ibmol         89.3228         18.0153         18.5044         18.3115           Mass Density         Ib/It*/3         41.3927         62.1238         60.5181         61.6192           Molar Flow         Ibmol/n         0.236536         56.8253         57.5088         57.0513           Mass Flow         Ib/h         21.1281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         gpm         0.0636381         2.0545         2.19233         2.11375           Std Vapor Volumetric Flow         spm         0.0632376         0.2465 *         2.18792         2.10959           Compressibility         0.00532376         0.048638         0.0522652         0.00073314           Specific Gravity         0.663674         0.996068         0.970324         0.987977	Tomporaturo		°⊑	72 9095		00.0275	72 9095				
Noise Fraction Vapor         %         0         0         0         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1	Prossuro		nsia	12.0303	1014.1 *	1014 1	14.1				
Mole Fraction Light Liquid         %         100         100         100         100         1.12811         0.414603           Mole Fraction Light Liquid         %         0         0         98.8719         99.5854           Mole craction Heavy Liquid         %         0         0         98.8719         99.5854           Mole craction Heavy Liquid         %         0         0         98.8719         99.5854           Mole Traction Light Liquid         1b/ftv3         41.3927         62.1238         60.5181         61.6192           Molar Flow         Ibmol/h         0.236536         56.8253         57.5088         57.0513           Mass Density         Ib/h         21.1281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         gpm         0.0636381         2.0545         2.19233         2.11375           Std Liquid Volumetric Flow         gpm         0.0632875         2.0465         2.18792         2.10959           Compressibility         0.00532376         0.0498538         0.052625         0.00073314           Specific Gravity         79.6306         9.89095         13.4938         11.4342           Enthalpy         Btu/h         -20864.3         -6.96749E+	Mole Fraction Vanor		%	14.1	0	0	14.1				
Mole Fraction Havion Equit Liquid         78         100         17.12.01         0.17.12.01           Mole Fraction Heavy Liquid         %         0         0         98.82719         99.5854           Mole Craction Heavy Liquid         %         0         0         98.82719         99.5854           Mole Craction Heavy Liquid         %         0         0         98.82719         99.5854           Mole Fraction Heavy Liquid         %         0.1382         18.0153         18.5044         18.3115           Mass Flow         Ib/h         0.216536         56.8253         57.5088         57.5081         57.5081           Vapor Volumetric Flow         Ib/h         21.1281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         gpm         0.0636381         2.0545         2.19233         2.11375           Std Vapor Volumetric Flow         sgpm         0.0632875         2.0465 *         2.18792         2.10959           Compressibility         0.000215429         0.517543         0.525625         0.00073314           Specific Gravity         0.663674         0.996068         0.970324         0.98777           API Gravity         79.6306         9.89095         13.4938         11	Mole Fraction Light L	iquid	%	100	100	1 12811	0.414603				
Index Fideword Weight         D/b         Bo         Bo<	Mole Fraction Heavy		%	0	0	98 8719	99 5854				
Motional rotation         District         District         District         District         District           Mass Density         Ib/ftV3         41.3227         62.1238         60.5181         61.6192           Molar Flow         Ib/n         21.1281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         ft/3/h         0.51043         16.4788         17.5843         16.954           Liquid Volumetric Flow         gpm         0.0636381         2.0545         2.19233         2.11375           Std Vapor Volumetric Flow         MMSCFD         0.00215429         0.517543         0.523769         0.519602           Std Vapor Volumetric Flow         sgpm         0.0632875         2.0465*         2.18792         2.10959           Compressibility         0.0632876         0.0498538         0.0525625         0.0007314           Specific Gravity         0.663674         0.996068         0.970324         0.987977           API Gravity         T9.6306         9.89095         13.4938         11.4342           Enthalpy         Btu/h         -20864.3         -6.96749E+06         -7.01137E+06         -7.00703E+06           Mass Enthalpy         Btu/lb         -987.513         -6806.02	Molecular Weight		lb/lbmol	89 3228	18 0153	18 5044	18 3115				
India Flow         Ibmol/h         0.236536         56.8253         57.508         57.0513           Mass Flow         Ib/h         21.1281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         ft^3/h         0.51043         16.4788         17.5843         16.954           Liquid Volumetric Flow         gpm         0.0636381         2.0545         2.19233         2.11375           Std Vapor Volumetric Flow         MMSCFD         0.00215429         0.517543         0.523769         0.519602           Std Liquid Volumetric Flow         sgpm         0.0632875         2.0465         2.18792         2.10959           Compressibility         0.0632876         0.0498538         0.0525625         0.00073314           Specific Gravity         0.663674         0.996068         0.970324         0.987977           API Gravity         79.6306         9.89095         13.4938         11.4342           Enthalpy         Btu/h         -20864.3         -6.96749E+06         -7.01137E+06         -7.00703E+06           Mass Enthalpy         Btu/(b*°F)         0.514046         0.980196         0.945166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497 <t< td=""><td>Mass Density</td><td></td><td>lb/ft^3</td><td>41 3927</td><td>62 1238</td><td>60 5181</td><td>61 6192</td><td></td></t<>	Mass Density		lb/ft^3	41 3927	62 1238	60 5181	61 6192				
Mass Flow         Ib/h         21.1281         1023.72         1064.17         1044.69           Vapor Volumetric Flow         gpm         0.0636381         2.0545         2.19233         2.11375           Std Vapor Volumetric Flow         gpm         0.0632831         2.0545         2.19233         2.11375           Std Vapor Volumetric Flow         MMSCFD         0.00215429         0.517543         0.523769         0.519602           Std Liquid Volumetric Flow         sgpm         0.0632875         2.0465         2.18792         2.10959           Compressibility         0.00532376         0.0498538         0.0525625         0.00073314           Specific Gravity         0.663674         0.996068         0.970324         0.987977           API Gravity         79.6306         9.89095         13.4938         11.4342           Enthalpy         Btu/h         -20864.3         -6.96749E-h66         -7.0137E+h66           Mass Cp         Btu/lb         -987.513         -6806.02         -6588.59         -6707.25           Mass Cp         Btu/(b**F)         0.514046         0.980196         0.965166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31893 <tr< td=""><td>Molar Flow</td><td></td><td>lbmol/h</td><td>0.236536</td><td>56.8253</td><td>57,5088</td><td>57.0513</td><td></td></tr<>	Molar Flow		lbmol/h	0.236536	56.8253	57,5088	57.0513				
Name         Data         Data <thdata< th="">         Data         Data         <thd< td=""><td>Mass Flow</td><td></td><td>lb/h</td><td>21 1281</td><td>1023 72</td><td>1064 17</td><td>1044 69</td><td></td></thd<></thdata<>	Mass Flow		lb/h	21 1281	1023 72	1064 17	1044 69				
Liquid Volumetric Flow         gpm         0.0636381         2.0545         2.19233         2.11375           Std Vapor Volumetric Flow         MMSCFD         0.00215429         0.517543         0.523769         0.519602           Std Liquid Volumetric Flow         sgpm         0.0632875         2.0465 *         2.18792         2.10959           Compressibility         0.0632876         0.0498538         0.0525625         0.00073314           Specific Gravity         0.663674         0.996068         0.970324         0.987977           API Gravity         79.6306         9.89095         13.4938         11.4342           Enthalpy         Btu/h         -20864.3         -6.96749E+06         -7.01137E+06         -7.00703E+06           Mass Cp         Btu/lb         -987.513         -6806.02         -6588.59         -6707.25           Mass Cp         Btu/(lb*°F)         0.5124046         0.980196         0.965166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31983           Dynamic Viscosity         cP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         cSt         0.488357         0.797118         0.763537	Vapor Volumetric Flo	W	ft^3/h	0.51043	16.4788	17,5843	16,954				
Std Vapor Volumetric Flow         MMSCFD         0.00215429         0.517543         0.523769         0.519602           Std Liquid Volumetric Flow         sgpm         0.0632875         2.0465 *         2.18792         2.10959           Compressibility         0.00532376         0.0498538         0.0525625         0.00073314           Specific Gravity         0.663674         0.996068         0.970324         0.987977           API Gravity         79.6306         9.89095         13.4938         11.4342           Enthalpy         Btu/h         -20864.3         -6.96749E+06         -7.01137E+06         -7.00703E+06           Mass Enthalpy         Btu/lb         -987.513         -6806.02         -6588.59         -6707.25           Mass Cp         Btu/(lb*°F)         0.514046         0.980196         0.965166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31983           Dynamic Viscosity         cP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         cSt         0.488357         0.797118         0.763537         0.948503           Surface Tension         lb/ft         0.00126907 ?         0.00480739         0.00461	Liquid Volumetric Flo	)W	apm	0.0636381	2.0545	2,19233	2,11375				
Std Liquid Volumetric Flow         sgpm         0.0632875         2.0465 *         2.18792         2.10959           Compressibility         0.00532376         0.0498538         0.0525625         0.00073314           Specific Gravity         0.663674         0.996068         0.970324         0.987977           API Gravity         79.6306         9.89095         13.4938         11.4342           Enthalpy         Btu/h         -20864.3         -6.96749E+06         -7.01137E+06         -7.00703E+06           Mass Enthalpy         Btu/lb         -987.513         -6806.02         -6588.59         -6707.25           Mass Cp         Btu/(lb*°F)         0.514046         0.980196         0.965166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31983           Dynamic Viscosity         cP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         cSt         0.488357         0.797118         0.763537         0.948503           Thermal Conductivity         Btu/(h*ft*°F)         0.0042907 ?         0.0048079         0.0046113 ?         0.00490734 ?           Net Ideal Gas Heating Value         Btu/lth         19207.6         -1059.76	Std Vapor Volumetric	c Flow	MMSCFD	0.00215429	0.517543	0.523769	0.519602				
Compressibility         0.00532376         0.0498538         0.0525625         0.00073314           Specific Gravity         0.663674         0.996068         0.970324         0.987977           API Gravity         79.6306         9.89095         13.4938         11.4342           Enthalpy         Btu/h         -20864.3         -6.96749E+06         -7.01137E+06         -7.00703E+06           Mass Enthalpy         Btu/lb         -987.513         -6806.02         -6588.59         -6707.25           Mass Cp         Btu/(lb*°F)         0.514046         0.980196         0.965166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31983           Dynamic Viscosity         CP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         cSt         0.488357         0.797118         0.763537         0.948503           Surface Tension         lbf/ft         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/[b         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/[b         20751.8         0	Std Liquid Volumetric	c Flow	sapm	0.0632875	2.0465 *	2.18792	2.10959				
Specific Gravity         0.663674         0.996068         0.970324         0.987977           API Gravity         79.6306         9.89095         13.4938         11.4342           Enthalpy         Btu/h         -20864.3         -6.96749E+06         -7.01137E+06         -7.00703E+06           Mass Enthalpy         Btu/lb         -987.513         -6806.02         -6588.59         -6707.25           Mass Cp         Btu/(lb*°F)         0.514046         0.980196         0.965166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31983           Dynamic Viscosity         cP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         cSt         0.488357         0.797118         0.763537         0.948503           Thermal Conductivity         Btu/(h*ft*°F)         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lt^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         <	Compressibility		01	0.00532376	0.0498538	0.0525625	0.00073314				
API Gravity         79.6306         9.89095         13.4938         11.4342           Enthalpy         Btu/h         -20864.3         -6.96749E+06         -7.01137E+06         -7.00703E+06           Mass Enthalpy         Btu/lb         -987.513         -6806.02         -6588.59         -6707.25           Mass Cp         Btu/(lb*°F)         0.514046         0.980196         0.965166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31983           Dynamic Viscosity         CP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         CSt         0.488357         0.797118         0.763537         0.948503           Thermal Conductivity         Btu/(h*ft*°F)         0.0697251         0.355983         0.336984         0.34           Surface Tension         Ibf/ft         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lt^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         B	Specific Gravity			0.663674	0.996068	0.970324	0.987977				
Enthalpy         Btu/h         -20864.3         -6.96749E+06         -7.01137E+06         -7.00703E+06           Mass Enthalpy         Btu/lb         -987.513         -6806.02         -6588.59         -6707.25           Mass Cp         Btu/(lb*°F)         0.514046         0.980196         0.965166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31983           Dynamic Viscosity         CP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         CSt         0.488357         0.797118         0.763537         0.948503           Thermal Conductivity         Btu/(h*ft*°F)         0.0697251         0.355983         0.336984         0.34           Surface Tension         lbf/ft         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lt^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	API Gravity			79.6306	9.89095	13.4938	11.4342				
Mass Enthalpy         Btu/lb         -987.513         -6806.02         -6588.59         -6707.25           Mass Cp         Btu/(lb*°F)         0.514046         0.980196         0.965166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31983           Dynamic Viscosity         cP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         cSt         0.488357         0.797118         0.763537         0.948503           Thermal Conductivity         Btu/(h*ft*°F)         0.0697251         0.355983         0.336984         0.34           Surface Tension         lbf/ft         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lt^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Enthalpy		Btu/h	-20864.3	-6.96749E+06	-7.01137E+06	-7.00703E+06				
Mass Cp         Btu/(lb*°F)         0.514046         0.980196         0.965166         0.973454           Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31983           Dynamic Viscosity         cP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         cSt         0.488357         0.797118         0.763537         0.948503           Thermal Conductivity         Btu/(h*ft*°F)         0.0697251         0.355983         0.336984         0.34           Surface Tension         lbf/ft         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lt^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Mass Enthalpy		Btu/lb	-987.513	-6806.02	-6588.59	-6707.25				
Ideal Gas CpCv Ratio         1.06009         1.32489         1.31497         1.31983           Dynamic Viscosity         cP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         cSt         0.488357         0.797118         0.763537         0.948503           Thermal Conductivity         Btu/(h*ft*°F)         0.0697251         0.355983         0.336984         0.34           Surface Tension         lbf/ft         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lt^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Mass Cp		Btu/(lb*°F)	0.514046	0.980196	0.965166	0.973454				
Dynamic Viscosity         CP         0.323804         0.793234         0.751623         0.940843           Kinematic Viscosity         CSt         0.488357         0.797118         0.763537         0.948503           Thermal Conductivity         Btu/(h*ft*°F)         0.0697251         0.355983         0.336984         0.34           Surface Tension         lbf/ft         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lt^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Ideal Gas CpCv Rati	0		1.06009	1.32489	1.31497	1.31983				
Kinematic Viscosity         cSt         0.488357         0.797118         0.763537         0.948503           Thermal Conductivity         Btu/(h*ft*°F)         0.0697251         0.355983         0.336984         0.34           Surface Tension         lbf/t         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lt^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Dynamic Viscosity		cP	0.323804	0.793234	0.751623	0.940843				
Thermal Conductivity         Btu/(h*ft*°F)         0.0697251         0.355983         0.336984         0.34           Surface Tension         lbf/t         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/ft^3         4558.53         0         36.3713         18.9504           Net Liquid Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lt^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Kinematic Viscosity		cSt	0.488357	0.797118	0.763537	0.948503				
Surface Tension         Ibf/ft         0.00126907         0.00489079         0.0046113         0.00490734         ?           Net Ideal Gas Heating Value         Btu/ft^3         4558.53         0         36.3713         18.9504           Net Liquid Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lb         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Thermal Conductivity	/	Btu/(h*ft*°F)	0.0697251	0.355983	0.336984	0.34				
Net Ideal Gas Heating Value         Btu/ft^3         4558.53         0         36.3713         18.9504           Net Liquid Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lb         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Surface Tension		lbf/ft	0.00126907 ?	0.00489079	0.0046113 ?	0.00490734 ?				
Net Liquid Heating Value         Btu/lb         19207.6         -1059.76         -279.397         -648.771           Gross Ideal Gas Heating Value         Btu/lt^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Net Ideal Gas Heatin	ig Value	Btu/ft^3	4558.53	0	36.3713	18.9504				
Gross Ideal Gas Heating Value         Btu/ft^3         4921.99         50.31         89.1166         70.562           Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Net Liquid Heating V	alue	Btu/lb	19207.6	-1059.76	-279.397	-648.771				
Gross Liquid Heating Value         Btu/lb         20751.8         0         802.29         420.821	Gross Ideal Gas Hea	ting Value	Btu/ft^3	4921.99	50.31	89.1166	70.562				
	Gross Liquid Heating	Value	Btu/lb	20751.8	0	802.29	420.821				

Remarks

		-				: =g= : =: :
Energy Stream Report						
Client Name:	Chevron Appa	achia, LLC			Job: Crow Test Tar	nk
Location:						
Flowsheet:	Crow Blowdow	'n				
			Energy Strea	ns		
Energy Stream		Energy Rate	Power	F	rom Block	To Block
Q-1		-17380.5 Btu/h	-6.83078 h	р		VSSL-100
Remarks						

Simulation Initiated on 7/17	7/2014 10:49:18 AM	AMBU Blowdown Calculations_7.17.14.pmx					Page 1 of 1
Blocks MIX-100 Mixer/Splitter Report							
Client Name:	Chevron Appala	ichia, LLC			Job: Crow 7	est Tank	
Location:					Modified: 10	):17 AM, 8/14/2	013
Flowsheet:	Crow Blowdown	1			Status: Solv	/ed 10:48 AM, 7	//17/2014
			Conn	ections			
Stream	Connect	ion Type	Other Block	Stream	Connecti	on Type	Other Block
Average Condensa	ate In	let		Water	Inl	et	
2	Ou	tlet	VSSL-100				
			Block Pa	arameters			
Pressure Drop	Pressure Drop 0 psi Fraction to PStream 2 100 %					100 %	
Remarks							

Simulation Initiated on 7/17	/2014 10:49:18 AM	AMBU Blowdown Calculations_7.17.14.pmx				Page 1 of 1	
Blocks MIX-101 Mixer/Splitter Report							
Client Name:	Chevron Appalachia, LLC			Job: Crow T	est Tank		
Location:				Modified: 10	):17 AM, 8/14/2	.013	
Flowsheet:	Crow Blowdown			Status: Solv	lved 10:48 AM, 7/17/2014		
		Conne	ections				
Stream	Connection Type	Other Block	Stream	Connecti	on Type	Other Block	
Stable Oil	Inlet	VSSL-101	PW	Inle	et	VSSL-101	
3	Outlet						
		Block Pa	rameters				
		0 pei	Fraction to PStream	13		100 %	
Pressure Drop		0 pai					
Pressure Drop							

Simulation Initiated on 7/17	7/2014 10:49:18 AM	lculations_7.17.14.pmx			Page 1 of 1			
Client Name:	Chevron Appalachia, LLC			Job: Crow	Test Tank			
Location:				Modified: 1	0:17 AM, 8/14/2013	3		
Flowsheet:	Crow Blowdown			Status: Solv	ved 10:48 AM, 7/17	//2014		
Connections								
Stream	Connection Type	Other Block	Stream	Connect	ion Type	Other Block		
2	Inlet	MIX-100	Flash 1	Vapor	Outlet			
Liquid 1	Light Liquid Outlet	VSSL-101	Q-1	Ene	ergy			
		Block Pr	arameters					
Pressure Drop		700 psi	Main Liquid Phase		Light Liquid			
Mole Fraction Vap	or 0.081	9054 %	Heat Duty		-17380.5	Btu/h		
Mole Fraction Ligh	nt Liquid 1.0	0594 %	Heat Release Curve	Туре	Plug Flow			
Mole Fraction Hea	avy Liquid 98.	8587 %	Heat Release Curve 5					
			Increments					
Remarks								

Simulation Initiated on 7/17	//2014 10:49:18 AM	AMBU Blowdown Cal	Iculations_7.17.14.pmx			Page 1 of 1			
Client Name:	Chevron Appalachia, LLC			Job: Crow T	Fest Tank				
Location:				Modified: 10	0:17 AM, 8/14/2	013			
Flowsheet:	Crow Blowdown			Status: Solv	ved 10:48 AM, 7	7/17/2014			
	Connections								
Stream	Connection Type	Other Block	Stream	Connecti	ion Type	Other Block			
Liquid 1	Inlet	VSSL-100	Flash Gas	Vapor	Outlet				
Stable Oil	Light Liquid Outlet	MIX-101	PW	Heavy Liq	uid Outlet	MIX-101			
		Block Pa	arameters						
Pressure Drop		300 psi	Main Liquid Phase		Light Lic	Juid			
Mole Fraction Vap	or 0.71	4176 %	Heat Duty			0 Btu/h			
Mole Fraction Ligh	nt Liquid 0.41	1642 %	Heat Release Curve T	Гуре	Plug F	low			
Mole Fraction Hea	vy Liquid 98.	8742 %	Heat Release Curve Increments			5			
Remarks									

		F	lowsheet Enviro	Environment nment1				
Client Name:	Chevron Appala	chia, LLC			Job: Crow 7	Test Tank		
Location:								
Flowsheet:	Crow Blowdown							
			Environme	ent Settings				
Number of Poyntin	g Intervals	0		Freeze Out Temperatu Threshold Difference	re	10 °I		
Gibbs Excess Moc Evaluation Temper	lel rature	77 °F		Phase Tolerance		1 %	)	
			Comp	onents				
Component Name		Henry`s Law Component	Phase Initiator	Component Name		Henry`s Law Component	Phase Initiator	
Nitrogen		False	False	n-Pentane		False	False	
Carbon Dioxide		False	False	Neohexane		False	False	
Methane		False	False	2-Methylpentane		False	False	
Ethane		False	False	3-Methylpentane		False	False	
Propane		False	False	n-Hexane		False	False	
i-Butane		False	False	Heptane		False	False	
n-Butane		False	False	Water		False	True	
i-Pentane		False	False					
Physical Property Method Sets								
Liquid Molar Volume		COSTALD	1	Overall Package		Peng-Robi	nson	
Stability Calculation		Peng-Robins	on	Vapor Package		Peng-Robi	nson	
Light Liquid Package	)	Peng-Robins	on	Heavy Liquid Package		Peng-Robi	nson	
Remarks								

		Er	vironm	ents Report			
Client Name:	Chevron Appala	chia, LLC			Job: Crow 1	est Tank	
Location:							
		P	roject-Wie	de Constants			
Atmospheric Pressur	re	14.1 p	osia	IG Ref Pressure		14.6959 p	osia
IG Ref Temperature		60 °	'F	IG Ref Volume		379.485 f	t^3/lbmol
Liq Ref Temperature		60 °	Ϋ́F				
		Envi	ironment	[Environment1]			
			Environm	ent Settings			
Number of Poyntin	ig Intervals	0		Freeze Out Temperatur	e	10 °F	
Gibbs Excess Model		77 °F		Phase Tolerance		1 %	
Evaluation Temper	rature						
			Comp	onents			
Component Name		Henry`s Law Component	Phase Initiator	Component Name		Henry`s Law Component	Phase Initiator
Nitrogen		False	False	n-Pentane		False	False
Carbon Dioxide		False	False	Neohexane		False	False
Methane		False	False	2-Methylpentane		False	False
Ethane		False	<u>False</u>	3-Methylpentane		False	False
Propane		False	False	n-Hexane		False	False
n Butane		False	False	Motor		False	True
i-Pentane		False	False	Walei		1 0135	THUE
		Phys	ical Prope	erty Method Sets			
Liquid Molar Volume		COSTALD		Overall Package		Peng-Robins	on
Stability Calculation		Peng-Robins	on	Vapor Package		Peng-Robins	on
Light Liquid Package	9	Peng-Robins	on	Heavy Liquid Package		Peng-Robins	on

		Cal	lculator	Report			
Client Name:	Chevron Appala	chia, LLC			Job: Crow 7	Fest Tank	
Location:							
			Crow	Oil			
			Source (	Code			
Residual Error (for C		792 - 1	Course	0000			
		Calcu	Ilated Var	iable [CV1]			
SourceMoniker	ProMax:ProMa Volumetric Flo	<pre>ix!Project!Flowsheets!Crow E</pre>	Blowdown!P	Streams!Average Cond	densate!Phas	es!Total!Properties!Std Liquid	d
Value	4.84896						
Unit	bbl/d						
SourceManikar	DroMov:DroM	Measure	ed Variab	le [Crow_OII]	a col Totoll Dr	anartical Etd. Liquid Valumatri	o Flow
Value	791.998		DIOWUOWII!P				
Unit	bbl/yr						
						Otatua Oaluad	
Error		2 52197E 06	olver Pro	perties		Status: Solved	
Calculated Value		0.141428 sqpm		Max Iterations		20	
Lower Bound		sgpm		Weighting		1	
Upper Bound		sgpm		Priority Solver Active			
Is Minimizer		False		Group		Active	
Algorithm		Default		Skip Dependency Che	eck	False	
			-				
			Crow_	PW			
Desides I Frank (ten C		/ 05000 . 4	Source	Code			
Residual Error (for C	$C(1) = Crow_PW$	/ 25608 - 1					
		Calcu	lated Var	iable [CV1]			
SourceMoniker	ProMax:ProMa	ax!Project!Flowsheets!Crow E	Blowdown!P	Streams!Water!Phases	s!Total!Proper	ties!Std Liquid Volumetric Flo	SW
Value	25610.4					•	
Unit	bbl/yr						
		Moasure	ad Variab	le [Crow PW]			
SourceMoniker	ProMax:ProMa	ax!Project!Flowsheets!Crow E	Blowdown!P	Streams!PW!Phases!T	otal!Propertie	s!Std Liquid Volumetric Flow	
Value	25608						
Unit	bbl/yr		_		_		_
		C	olver Pro	nerties		Status: Solved	
Error		-1.89597E-09		Iterations		4	
Calculated Value		2.0465 sgpm		Max Iterations		20	
Lower Bound		sgpm		Weighting Priority		1	
Step Size		sgpm		Solver Active		Active	
Is Minimizer		False		Group		<b>_</b>	
Algorithm		Default		Skip Dependency Che	eck	False	
Remarks							

			User Value	Sets Report		
Client Name:	Chevron Appala	chia, LLC			Job: Crow T	est Tank
Location:						
			Cn+ Flow	Frac. Crow		
			User Value	[CnPlusSum]		
* Parameter		14.5082	lb/h	Upper Bound		
Lower Bound				* Enforce Bounds		False
Remarks						
This User Value S	et was programmat	ically generated. G	UID={11539540-	81C6-4D44-A840-E5460A	460A2B}	
			Tank Los	ses Crow		
			User Value	[Shell] ength]		
* Parameter		20	ft	Upper Bound		
* Lower Bound		0	ft	* Enforce Bounds		False
* Deverseter		45		[ShellDiam]		
* Lower Bound		0	ft	* Enforce Bounds		False
		-				
			User Value	[BreatherVP]		
* Parameter		0.03	psig	Upper Bound		
Lower Bound				* Enforce Bounds		False
* Parameter		-0.03		Upper Bound		
Lower Bound		0.00	poig	* Enforce Bounds		False
_			User Value [	DomeRadius]		
Parameter			ft ft	Upper Bound		ft
Lower Bound			n.	Enlorce Bounds		T dise
			User Valu	e [OpPress]		
* Parameter		0	psig	Upper Bound		
Lower Bound				* Enforce Bounds		False
				<u> </u>		
* Doromotor		50	User Value [A			
Lower Bound		50	%	* Enforce Bounds		False
			User Value [M	[axPercentLiq]		
* Parameter		90	%	Upper Bound		<b>F</b> .
Lower Bound			%	Enforce Bounds		False
			User Value	[AnnNetTP]		
* Parameter		72.4715	bbl/day	Upper Bound		
* Lower Bound		0	bbl/day	* Enforce Bounds		False
* Doromotor		70		ue [OREff]		
Lower Bound		70	<del>%</del>	* Enforce Bounds		False
			User Value [	AtmPressure]		
* Parameter		97274.7	Ра	Upper Bound		
Lower Bound				* Enforce Bounds		False

		User Value	e Sets Report				
Client Name:	Chevron Appala	achia, LLC		Job: Crow	Test Tank		
Location:							
		User Value [N	MaxLiqSurfaceT]				
* Parameter		63.6116 °F	Upper Bound				
Lower Bound			<ul> <li>* Enforce Bounds</li> </ul>		False		
		User Value	[TotalLosses]				
* Parameter		0.355899 lb/h	Upper Bound				
Lower Bound		lb/h	<ul> <li>* Enforce Bounds</li> </ul>		False		
		User Value [1	WorkingLosses]				
* Parameter		0.146308 ton/yr	Upper Bound				
Lower Bound		ton/yr	* Enforce Bounds		False		
		User Value [S	StandingLosses1				
* Parameter		1.41253 ton/yr	Upper Bound				
Lower Bound		ton/vr	* Enforce Bounds		False		
		Ilser Value []	RimSeall osses1				
* Parameter							
Lower Bound		0 101// y1	* Enforce Bounds		False		
Lower Bound			Enioroo Boundo		1 4100		
		Licor Value IV	Nithdrawall oss1				
* Paramotor							
Lower Bound		0 101791	* Enforce Bounds		False		
Lower Bound			Enforce Bounds		1 0.50		
* Deverseter							
Parameter		0.0107814 lb/n	* Enforce Round		Foloo		
Lower Bouria		10/11	Enlorce Bounds		Faise		
* <b>D</b>		User Value [De	eckFittingLosses				
* Parameter		0 ton/yr	Upper Bound		<b>F</b> -l		
Lower Bound			* Enforce Bounds		False		
		User Value [D	eckSeamLosses]				
* Parameter		0 ton/yr	Upper Bound				
Lower Bound			* Enforce Bounds		False		
		User Value [F	FlashingLosses]				
* Parameter		0 ton/yr	Upper Bound				
Lower Bound			<ul> <li>* Enforce Bounds</li> </ul>		False		
		User Value [(	GasMoleWeight]				
* Parameter		0.0567017 kg/mol	Upper Bound				
Lower Bound			* Enforce Bounds		False		
Remarks This User Value Set	Remarks This User Value Set was programmatically generated. GUID={7D48A338-91BB-40BD-BAA3-4314E2DB012C}						
	Names	Units	Average Condensate				
--------------------------------------------------------	--------------------------------	-------	--------------------				
	Temperature	°F	90				
	Pressure	psig	1000				
	Nitrogen(Mole Fraction)	%	0				
	Carbon Dioxide(Mole Fraction)	%	0.022811				
	Methane(Mole Fraction)	%	13.699				
	Ethane(Mole Fraction)	%	14.557				
Namos Units Bryan Hazlott Taylor Bryan	Propane(Mole Fraction)	%	17.289				
Tomporaturo °E 00 00 00	i-Butane(Mole Fraction)	%	3.0141				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	n-Butane(Mole Fraction)	%	10.765				
Q-1	i-Pentane(Mole Fraction)	%	3.5494				
MIX-100	n-Pentane(Mole Fraction)	%	6.1399				
VSSI-100	Neohexane(Mole Fraction)	%	0.05399				
	2-Methylpentane(Mole Fraction)	%	2.2402				
	3-Methylpentane(Mole Fraction)	%	1.1451				
	n-Hexane(Mole Fraction)	%	4.1568				
Average Condensate	Heptane(Mole Fraction)	%	23.368				
	Water(Mole Fraction)	%	0				

#### J-W Measurement Company Shreveport,LA Tyler,TX Victoria,TX Midland,TX Fairfield,TX Oklahoma City,OK Mounds,OK Tulsa,OK www.JWOPERATING.COM 888-226-9110

J-W MC Number:	CUSBA004
Customer Name:	CHEVRON PA
Station Name:	HAZELETT 1-H
Station Number:	3470510002
Producer:	
Field:	FT. BEELER
Co. or Pr.:	MARSHALL
State:	PA

#### Remarks:

Component	Mole Percent	Liq Vol %	<u>Liq Wgt %</u>
Nitrogen	0.0000	0.0000	0.0000
Carbon Dioxide	0.0000	0.0000	0.0000
Methane	6.3205	3.1214	1.6009
Ethane	15.0320	11.7107	7.1362
Propane	22.1908	17.8092	15.4489
I-Butane	3.0574	2.9144	2.8056
n-Butane	11.4455	10.5113	10.5028
I-Pentane	2.6010	2.7709	2.9628
n-Pentane	5.5906	5.9033	6.3682
Neohexane	0.0072	0.0088	0.0098
2-Methylpentane	1.7929	2.1661	2.4394
3-Methylpentane	0.8647	1.0274	1.1765
n-Hexane	3.8535	4.6161	5.2428
Heptanes+	27.2439	37.4404	44.3063
Hydrogen Sulfide			
TOTAL	100.0000	100.0000	100.0000

	TOTAL SAMPLE	PENTANES + FRACTION
Specific Gravity (H2O=1)	0.5847	0.6776
API Gravity	110.5132	77.5002
Molecular Weight	63.3390	94.5840
Absolute Density (lbs/gal)	4.8746	5.6624
Heating Value Liq. Idl Gas (btu/gal)	103589	118201
Vapor/Liquid (cu.ft./gal)	29.2051	22.7704
Vapor Pressure (psig)	473.7088	

DISTRIBUT	ION:			
	1	CP-CAN		
METHOD:	GPA 2165-9	5		
Note: Calibrat	ion, Standards	, and testing procedures		

are achieved pursuant to GPA Regulations.

J-W ANALYST

Run Date: 05/22/13

Sampled by: JM Procure Date: 05/09/13 Pressure (lbs.): 800 Temperature (° F): 96 Bottle Number: 69886

#### J-W Measurement Company Shreveport,LA Tyler,TX Victoria,TX Midland,TX Fairfield,TX Oklahoma City,OK Mounds,OK Tulsa,OK www.JWOPERATING.COM 888-226-9110

J-W MC Number:	CUSBA007
Customer Name:	CHEVRON PA
Station Name:	BRYAN 1-H
Station Number:	2470510006
Producer:	
Field:	FT. BEELER
Co. or Pr.:	MARSHALL
State:	WV

#### Remarks:

Component	Mole Percent	Liq Vol %	<u>Liq Wgt %</u>
Nitrogen	0.0000	0.0000	0.0000
Carbon Dioxide	0.0000	0.0000	0.0000
Methane	4.7851	2.2346	1.0956
Ethane	9.1783	6.7616	3.9388
Propane	14.4113	10.9369	9.0696
I-Butane	3.1468	2.8365	2.6104
n-Butane	13.2599	11.5154	10.9994
I-Pentane	4.9562	4.9929	5.1035
n-Pentane	8.8867	8.8735	9.1508
Neohexane	0.1578	0.1814	0.1941
2-Methylpentane	3.5237	4.0256	4.3339
3-Methylpentane	1.7739	1.9931	2.1818
n-Hexane	6.1822	7.0029	7.6035
Heptanes+	29.7380	38.6456	43.7187
Hydrogen Sulfide			
TOTAL	100.0000	100.0000	100.0000

	TOTAL SAMPLE	PENTANES + FRACTION
Specific Gravity (H2O=1)	0.6116	0.6728
API Gravity	99.8570	79.0080
Molecular Weight	70.0668	91.9350
Absolute Density (lbs/gal)	5.0991	5.6219
Heating Value Liq. Idl Gas (btu/gal)	107860	117451
Vapor/Liquid (cu.ft./gal)	27.6169	23.2589
Vapor Pressure (psig)	337.7668	

DISTRIBU	TION:				
	1	CP-CAN			
METHOD:	GPA 2165-9	95			
Note: Calibra	ation, Standards	, and testing procedures			

Note: Calibration, Standards, and testing procedure are achieved pursuant to GPA Regulations.

J-W ANALYST

Run Date: 07/23/13

Sampled by: JM Procure Date: 07/16/13 Pressure (lbs.): 450 Temperature (° F): 65 Bottle Number: 69885

### J-W Measurement Company Shreveport,LA Tyler,TX Victoria,TX Midland,TX Fairfield,TX Oklahoma City,OK Mounds,OK Tulsa,OK WWW.JWOPERATING.COM 888-226-9110

04/03/13

J-W MC Number:	CUSBA001				•	Run Date:
Customer Name:	CHEVRON PA					04/03
Station Name:	TAYLOR #1-H					
Station Number:	2470510007	1.1		Sampled by:	JM	_
Producer:				Procure Date:	03/26/13	
Field:	OHIO VALLEY MID			Pressure (lbs.):	1000	
Co. or Pr.:	MARSHALL		Te	emperature (°F):	67	•
State:				Bottle Number:	75564	
			· .	,		

#### Remarks:

<u>Component</u>	Mole Percent	Liq Vol %	Liq Wgt %
Nitrogen	0.0000	0.0000	0.0000-
Carbon Dioxide	0.0608	0.0354	0.0551
Methane	27.2294	15.7592	9.0020
Ethane	18.5038	16.8939	11.4659
Propane	15.4243	14.5070	14.0162
I-Butane	2.8697	3.2058	3.4372
n-Butane	8.1619	8.7845	9.7760
I-Pentane	3.2222	4.0229	4.7908
n-Pentane	4.3865	5.4282	6.5219
Neohexane	0.0100	0.0143	0.0178
2-Methylpentane	1.5840	2.2427	2.8130
3-Methylpentane	0.8760	1.2198	1.5557
n-Hexane	2.7768	3.8982	4.9312
Heptanes+	14.8945	23.9882	31.6171
Hydrogen Sulfide			
	400.0000	400 0000	400.000

	TOTAL SAMPLE	PENTANES + FRACTION
Specific Gravity (H2O=1)	0.5250 -	0.6720
API Gravity	138.0403	79.2477
Molecular Weight	48.5257	91.5741
Absolute Density (Ibs/gal)	4.3768	5.6155
Heating Value Liq. Idl Gas (btu/gal)	94204	117331
Vapor/Liquid (cu.ft./gal)	34.2274	23.3241
Vapor Pressure (psig)	1532.0372	

DISTRIBUTION:		 •	-
1 CP-CAN			
METHOD: GPA 2165-95			
Note: Calibration, Standards, and testing procedures		 •	
are achieved pursuant to GPA Regulations.	· .	 J-W ANALYST	

We appreciate your business

# **Attachment U**

ATTACHMENT U – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET																	
List all sources of emissions in this table. Use extra pages if necessary.																	
Emission Point ID#	NO <sub>x</sub>		С	СО		VOC		SO <sub>2</sub>		PM <sub>10</sub>		PM <sub>2.5</sub>		CH <sub>4</sub>		GHG (CO <sub>2</sub> e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
Line Heater (E0110)	0.08	0.33	0.06	0.28	< 0.01	0.02	<0.01	<0.01	<0.01	0.03	< 0.01	0.03	< 0.01	< 0.01	117.10	512.89	
Flash Gas Compressor (E0050)	0.21	0.91	0.21	0.91	0.01	0.06	<0.01	< 0.01	<0.01	0.02	<0.01	0.02	< 0.01	<0.01	11.20	49.06	
Vapor Destruction Unit (ZZZ-0060)	0.41	1.78	0.34	1.50	0.52	2.28	<0.01	0.01	<0.01	0.03	<0.01	0.03	0.05	0.22	603.41	2,642.93	
Tank Truck Loading Activities (VS-1)	<0.01	<0.01	<0.01	< 0.01	0.02	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Uncontrolled Tank Working & Breathing Emissions	<0.01	<0.01	<0.01	<0.01	0.37	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	
TOTAL	0.69	3.02	0.61	2.68	0.93	2.50	< 0.01	0.01	<0.01	0.08	< 0.01	0.08	0.05	0.22	731.71	3,204.88	

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

ATTACHMENT U – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET														
List all sources of emissions in this table. Use extra pages if necessary.														
Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Line Heater (E0110)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Flash Gas Compressor (E0050)	< 0.01	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.045
Vapor Destruction Unit (ZZZ-0060)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.10	0.02	0.095
Tank Truck Loading Activities (VS-1)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01	< 0.01	< 0.01
Uncontrolled Tank Working & Breathing Emissions	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	< 0.01	<0.01	< 0.01	<0.01
TOTAL	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.10	0.03	0.14

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

# Attachment V

## **AIR QUALITY PERMIT NOTICE**

## **Notice of Application**

Notice is given that Chevron Appalachia, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-D General Permit Modification for a natural gas production operation located on Middle Grave Creek Road, Moundsville, Marshall County, West Virginia. The latitude and longitude coordinates are: 39.88644 and -80.65404.

The applicant estimates the maximum potential to discharge the following regulated air pollutants on a facility-wide basis will be:

Particulate Matter (PM) = 55.56 tpy Sulfur Dioxide (SO<sub>2</sub>) = 0.01 tpy Volatile Organic Compounds (VOC) = 2.74 tpy Carbon Monoxide (CO) = 2.68 tpy Nitrogen Oxides (NO<sub>x</sub>) = 3.02 tpy Total Hazardous Air Pollutants = 0.15 tpy Formaldehyde (HCHO) = 0.04 tpy Hexane (C<sub>8</sub>H<sub>14</sub>) = 0.10 tpy Benzene (C<sub>6</sub>H<sub>6</sub>) = <0.01 tpy Toluene (C<sub>7</sub>H<sub>8</sub>) = <0.01 tpy Ethylbenzene (C<sub>8</sub>H<sub>10</sub>) = <0.01 tpy Xylene (C<sub>8</sub>H<sub>10</sub>) = <0.01 tpy Carbon Dioxide Equivalents (CO<sub>2</sub>e) = 3,212.64 tpy

Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57<sup>th</sup> Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926 – 0499, extension 1250, during normal business hours.

Dated this the 29<sup>th</sup> day of September 2017.

By: Chevron Appalachia, LLC Gary Orr - Appalachia Area Manager 700 Cherrington Parkway Coraopolis, PA 15108