Chevron Appalachia, LLC

Air Permit Application
Curry Natural Gas Production Site

Moundsville, West Virginia

Prepared By:

ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Hurricane, West Virginia

August 2016

Chevron

Gary Orr
Appalachia Area Manager

Chevron Appalachia, LLC
700 Cherrington Parkway
Coraopolis, PA 15108
Tel 412-865-2509
orrga@chevron.com

August 1, 2016

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: Chevron Appalachia, LLC, Moundsville, West Virginia
Curry Pad A Natural Gas Production Facility G70-C Permit Application

Dear Director Durham:

Enclosed are one (1) original hard copy and two (2) CD-ROMs of a G70-C General Air Permit Application for the construction of the Curry Pad A Natural Gas Production Well Site. A check for $4,000 is enclosed for the application fee.

Chevron Appalachia, LLC currently operates the Curry natural gas production site under R13-3137B and wishes to receive the authority to construct additional stationary sources through the issuance of a G70-C general permit.

If you have any questions concerning this permit application, please contact Ms. Amy McGreevy, Air Specialist, of my staff at (412) 865-2495.

Sincerely,

Gary Orr
Appalachia Area Manager

INTRODUCTION

Chevron Appalachia, LLC (Chevron) is submitting this G70-C General Permit Application to the WVDEP's Division of Air Quality for the Curry Pad A natural gas production site located in Marshall County, West Virginia. This application addresses the operational activities associated with the production of natural gas and condensate at the Curry site, already permitted under R13-3137B. This application seeks to update the authority to construct three (3) additional wells and associated equipment at the Curry natural gas production site through the issuance of a G70-C.

FACILITY DESCRIPTION

The Curry natural gas production site is located in Marshall County, WV and will consist of four (4) natural gas wells. The single well authorized by the R13-3137B permit well was shut in on December 24, 2014 to allow for three (3) additional wells to be drilled on the well pad. The WVDEP was notified of this suspension of activity on February 26, 2015. At this time, all associated equipment was removed from the site.

Natural gas and liquids (including water and condensate) will be extracted from underground deposits. The natural gas and condensate will be transported from the wells to sales pipelines for compression or pumping and additional processing, as necessary. The produced water and fluids realized from blowdown activities will be stored in storage vessels.

The applicant seeks to authorize the operation of the following under the G70-C General Permit Application:

- Four (4) natural gas wells;
- Two (2) line heaters rated at 1.0 mmBtu/hr heat input (BAP-0110, BAP-0810);
- Three (3) line heaters rated at 1.25 mmBtu/hr heat input (BAP-0210, BAP-0910, BAP-0012);
- Two (2) 400 bbl Produced Water Tanks (ABJ-0011A and ABJ-0011B);
- One (1) 400 bbl Blowdown /Test Storage Tank (ABJ-0014);
- One (1) glycol reboiler rated at 0.5 mmBtu/hr heat input (BBC-0100A);
- One (1) glycol dehydration unit rated at 30.0 mmscf/day (BBC-0100B);
- One (1) flash gas compressor engine rated at 276 hp (CBA-0050);
- One (1) electric drive Vapor Recovery Unit (VS-1);
- Two (2) truck liquid loading connections (ZZZ-0011AB and ZZZ-0014).

All equipment operated on the physical site contained within R13-3137B, with the exception of BAP-0110, will be modified with this submittal.

A process flow diagram is included in this application in Attachment D.

STATEMENT OF AGGREGATION

The Curry natural gas production site is located in Marshall County, WV and is operated by Chevron Appalachia, LLC. 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 Appalachia, LLC will operate the Curry site with the same industrial grouping as nearby facilities, and some of these facilities are under common control. Chevron Appalachia, LLC, however, is not subject to the aggregation of stationary emission sources because these sites do not meet the definition of contiguous or adjacent facilities.

The Curry natural gas production site will operate under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are surrounding wells operated by Chevron Appalachia, LLC that share the same two-digit major SIC code of 13 for Crude Petroleum and Natural Gas Extraction. Therefore, the Curry site does share the same SIC codes as the surrounding wells.

Chevron Appalachia, LLC is the sole operator of the Curry natural gas production site. Chevron Appalachia, LLC is also the sole operator of other production sites in the area. Therefore, Chevron Appalachia, LLC does qualify as having nearby operations under common control.

Chevron's Curry natural gas production site is within 0.70 miles of the Siburt natural gas production site and 0.60 miles of the Hart B natural gas production site. These facilities do not meet the definition of contiguous or adjacent properties since they are not in contact and do not share a common boundary. Operations conducted at the Curry site do not rely on or interact with other sites. Furthermore, operations separated by this distance do not meet the common sense notion of a "plant."

On June 3, 2016 the EPA Administrator published the *Source Determination for Certain Emission Units in the Oil and Natural Gas Sector*. This notice clarifies how properties in the oil and natural gas sector are determined to be adjacent in order to assist permitting authorities and permit applicants in making consistent source determinations. The following regulatory text defines "adjacent" for the oil and gas sector in terms of proximity.

> *Pollutant emitting activities shall be considered adjacent if they are located on the same surface site, or on surface sites that are located within ¼ mile of one another.*

The Siburt and Hart B sites are located on surface sites located greater than ¼ mile. Although the applicant notes that the EPA's Source Determination Rule does not mandate adoption by the State, it is the only guidance available on a finite distance impacting the adjacency determination, and has been noted due to lack of WVDAQ guidance. Based upon the proximity of nearby facilities, Chevron does not believe aggregation based upon adjacency is required.

Based on the above reasoning, Chevron Appalachia, LLC is not subject to the aggregation of stationary emission sources since the stationary sources are not considered contiguous or adjacent facilities.

REGULATORY DISCUSSION

This section outlines the State and Federal air quality regulations that could be reasonably expected to apply to the Curry natural gas production 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-C 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 Curry 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 heaters and glycol reboiler are indirect heat exchangers that combust natural gas with heat input ratings less than 10 MMBtu/hr. Such units are subject to 10% opacity as a six-minute block average limitation, but are exempt from most other requirements in the rule aside from discretionary testing requirements.

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

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

There will be no combustion of refuse at the Curry site. The VDU permitted under the existing R13-3137B will be replaced by an electric VRU control device. The external fuel combustion heaters do not meet the definition of incinerators under this Rule.

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

The line heaters and glycol reboiler are indirect heat exchangers that combust natural gas with heat input ratings less than 10 MMBTU/hr. Such units are subject to the 2,000 ppm_v sulfur dioxide concentration limitation but are exempt from most other requirements in the rule aside from discretionary testing requirements. Compliance with the allowable sulfur dioxide concentration limitations is based on a block (3) hour averaging time.

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

This G70-C permit application is being submitted for the operational activities associated with Chevron Appalachia, LLC'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-C 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 Curry site will not exceed emission thresholds established by this permitting program. Chevron Appalachia, LLC 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. Applicable requirements of NSPS Subpart JJJJ and OOOO are included in the G70-C general permit.

Although not incorporated in the G70-C, this facility is expected to operate as a gas well affected facility and a storage tank affected facility under Subpart OOOOa. No additional NSPS are applicable for this facility. Additional discussion is provided in the Federal Regulation Discussion of this permit application.

45 CSR R19 – 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-C 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 Curry 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 burnt 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 with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of all other regulated pollutants.

The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility after the proposed project. Therefore, the wellpad is not a major source for Title V purposes.

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. Excluded from G70-C general permit eligibility are any sources that are subject to NESHAP Subpart HHH.

The Curry site will operate a reciprocating internal combustion engine subject to 40 CFR 63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines), as discussed in the Federal Regulation Applicability of this application.

The Curry site will also operate a triethylene glycol (TEG) dehydration unit subject to 40 CFR 63 Subpart HH (National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities), as discussed in the Federal Regulation Applicability of this application.

FEDERAL REGULATIONS

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

Subpart JJJJ established standards and compliance schedules for the control of volatile organic compounds (VOC), Nitrogen Oxides (NOx), and Carbon Monoxide (CO) emissions from affected facilities that commence construction, modification, or reconstruction after June 12, 2006. The applicable provisions and requirements of Subpart JJJJ are included under the G70-C permit.

The natural gas-fired flash gas compressor that will be installed at the Curry natural gas production facility is subject to the requirements of this Rule. The CAT G3406TA Compressor Engine is a 276 bhp 4 stroke rich burn (4SRB), non-emergency spark ignition (SI) engine manufactured in October of 2014. The engine is not classified as a certified stationary SI internal combustion engine and is rated as greater than or equal to 100 hp and less than or equal to 500 hp. Therefore, the engine is required to follow the compliance requirements of Section §60.4243(b)(2)(i):

- Keep maintenance plan and records of conducted maintenance;
- Maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions;
- Conduct an initial performance test within one (1) year of engine startup to demonstrate compliance for NOx, CO, and VOC emissions.

40 CFR 60, Subpart OOOOa (Standards of Performance for Crude oil and Natural Gas Facilities for Which Construction, Modification, or Reconstruction Commenced After September 18, 2015)

Subpart OOOOa establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC), sulfur dioxide (SO_2), and greenhouse gas (GHG) emissions from affected facilities in the crude oil and natural gas source category that commence construction, modification or reconstruction after September 18, 2015. Based upon the Federal applicability of OOOOa, the Curry site will be subject to this rule.

The Curry natural gas production site is expected to be subject to NSPS OOOOa, for the affected facility types listed below:

- Each gas well affected facility, which is a single natural gas well.

- Storage vessel affected facility. Based on PTE calculations included within this permit, each storage vessel will be manifolded and routed to a vapor recovery device such that emissions from each of these tanks are expected to exceed 6 tons per year (tpy) of VOC. Therefore, the Curry site will be considered storage vessel affected facilities

The Curry natural gas production site will not qualify as a pneumatic controller affected facility, since pneumatic controller installed at this facility will be intermittent bleed rate devices.

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

The CAT G3406TA Compressor Engine is a 276 bhp 4 stroke rich burn (4SRB) spark ignition (SI) engine manufactured in October of 2014. The engine meets the requirements of 40 CFR 60 Subpart JJJJ. Per 40CFR63.6590(c)(1), no further requirements apply for a new stationary RICE located at an area source subject to regulation under 40 CFR 60 Subpart JJJJ.

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

The Curry site will contain a natural gas dehydration unit that is upstream from a point of custody transfer and is subject to requirements under Subpart HH. Since the emissions from the storage vessels and natural gas dehydration unit are below major source thresholds, the Curry site should be considered an area source for MACT applicability under this NESHAP. Based on PTE calculations provided within this application, the dehydration unit is expected to emit less than 0.9 megagrams of benzene (or 1 ton of benzene) per year, which classifies the unit as a small dehydration unit. Small dehydration units are exempt from the control requirements expressed in §63.764(e).

west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25 4
Phone (304) 926-0475
Fax (304) 926-0479
www.dep.wv.gov

G70-C 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

SECTION 1. GENERAL INFORMATION

Name of Applicant (as registered with the WV Secretary of State's Office):
Chevron Appalachia, LLC

Federal Employer ID No. (FEIN): **25-0527925**

Applicant's Mailing Address: **700 Cherrington Parkway**

City: **Coraopolis** State: **PA** ZIP Code: **15108**

Facility Name: **Curry Natural Gas Production Site**

Operating Site Physical Address: **9 Waymans Ridge Road**
Moundsville, WV 26041
If none available, list road, city or town and zip of facility.

City: **Moundsville** Zip Code: **26041** County: **Marshall**

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: **39.91013**
Longitude: **-80.66596**

SIC Code: **1381**

NAICS Code: **211111**

DAQ Facility ID No. (For existing facilities)
051-00181

CERTIFICATION OF INFORMATION

This G70-C 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-C Registration Application will be returned to the applicant. Furthermore, if the G70-C 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-C 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 comprehensive information possible.

Responsible Official Signature:

Name and Title: **Gary Orr – Appalachia Area Manager for Chevron Appalachia, LLC** Phone: **412-865-2509**

Fax: **N/A** Email: **orrga@chevron.com** Date:

west virginia department of environmental protection

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G70-C 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

If applicable:
Authorized Representative Signature:______________________________
Name and Title: Phone: Fax:
Email: Date:

If applicable:
Environmental Contact
Name and Title: **Amy McGreevy – Air Specialist** Phone: **412-865-2495** Fax: **N/A**
Email: **amy.mcgreevy@chevron.com** Date:

OPERATING SITE INFORMATION

Briefly describe the proposed new operation and/or any change(s) to the facility: **Chevron Appalachia, LLC submits this permit modification to address three new wells, associated line heaters, phase separators, tanks, and a dehydration unit to the Curry natural gas production site.**

Directions to the facility: **From Moundsville, WV travel south on US 250 (Waynesburg Pike) approximately 6.0 miles. Take a left onto Waymans Ridge Road. The entrance to the site road is on the left, 1.75 miles ahead.**

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).

☒ 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):

☒$500 (Construction, Modification, and Relocation) ☐300 (Class II Administrative Update)
☒$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO [1]
☒$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH [2]

[1] Only one NSPS fee will apply.
[2] 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 in its entirety)** – 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-C Section Applicability Form – Attachment H	☒ Emission Units/ERD Table – Attachment I

☒ Fugitive Emissions 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 Loading Data Sheet (if applicable) – Attachment O

☒ Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc^{TM} input and output reports and information on reboiler if applicable) – Attachment P

☒ Pneumatic Controllers Data Sheet – Attachment Q

☒ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment R

☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment S

☒ Facility-wide Emission Summary Sheet(s) – Attachment T

☒ Class I Legal Advertisement – Attachment U

☒ 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.

Table of Contents

Attachment A

SINGLE SOURCE DETERMINATION FORM

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

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 §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).

Is there a facility owned by or associated with the natural gas industry located within one (1) mile of the proposed facility? Yes ☒ No ☐

If Yes, please complete the questionnaire on the following page (Attachment A).

Please provide a source aggregation analysis for the proposed facility below:

Source aggregation analysis is addressed in the Introduction.

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

Answer each question with a detailed explanation to determine contiguous or adjacent properties which are under a common control and any support facilities. This section must be completed in its entirety.

Provide a map of contiguous or adjacent facilities (production facilities, compressor stations, dehydration facilities, etc.) which are under common control and those facilities that are not under common control but are support facilities. Please indicate the SIC code, permit number (if applicable), and the distance between facilities in question on the map.

Are the facilities owned by the same parent company or a subsidiary of the parent company? Provide the owners identity and the percentage of ownership of each facility.	Yes ☒ No ☐
Does an entity such as a corporation have decision making authority over the operation of a second entity through a contractual agreement or voting interest? Please explain.	Yes ☐ No ☒
Is there a contract for service relationship between the two (2) companies or, a support/dependency relationship that exists between the two (2) companies? Please explain.	Yes ☐ No ☒
Do the facilities share common workforces, plant managers, security forces, corporate executive officers or board executives?	Yes ☒ No ☐
Will managers or other workers frequently shuttle back and forth to be involved actively at both facilities?	Yes ☒ No ☐
Do the facilities share common payroll activities, employee benefits, health plans, retirement funds, insurance coverage, or other administrative functions? Please explain.	Yes ☒ No ☐
Does one (1) facility operation support the operation of the other facility?	Yes ☐ No ☒
Is one (1) facility dependent on the other? If one (1) facility shuts down, what are the limitations on the other to pursue outside business? Please explain.	Yes ☐ No ☒
Are there any financial arrangements between the two (2) entities?	Yes ☐ No ☒
Are there any legal or lease agreements between the two (2) facilities?	Yes ☐ No ☒
Do the facilities share products, byproducts, equipment, or other manufacturing or air pollution control device equipment? Please explain.	Yes ☐ No ☒
Do all the pollutant-emitting activities at the facilities belong to the same SIC Code? Please provide the SIC Codes. **1311**	Yes ☒ No ☐
Was the location of the new facility chosen primarily because of its proximity to the existing facility to integrate the operation of the two (2) facilities? Please explain.	Yes ☐ No ☒
Will materials be routinely transferred between the two (2) facilities? Please explain the amount of transfer and how often the transfers take place and what percentages go to the various entities.	Yes ☐ No ☒
Does the facility influence production levels or compliance with environmental regulations at other facilities? Who accepts the responsibility for compliance with air quality requirements? Please explain.	Yes ☐ No ☒

Attachment B

SITING CRITERIA WAIVER – (NOT APPLICABLE)

Attachment C

BUSINESS CERTIFICATE

State of West Virginia

AB

Certificate

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

Natalie E Tennant

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
www.wvsos.com
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:

1. Name under which the organization was authorized to transact business in WV: Atlas America, LLC

2. Date Certificate of Authority was issued in West Virginia: 03/08/2007

3. Change of Name Information or Text of Amendment: (Attach one certified copy of the name change as filed in the home state)

   Change of name from: Atlas America, LLC

   To: Chevron Appalachia, LLC

   Name the organization elects to use in WV:
   (Due to home state name not being available)

   Other amendment (use additional pages if necessary)

FILED
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)

   Jerome L. Suarez — Contact Name
   800-927-9801 x2207 — Phone Number

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

5. Signature of person executing document:

   Signature
   Assistant Secretary — Title/Capacity
   (Example: member, manager, etc.)

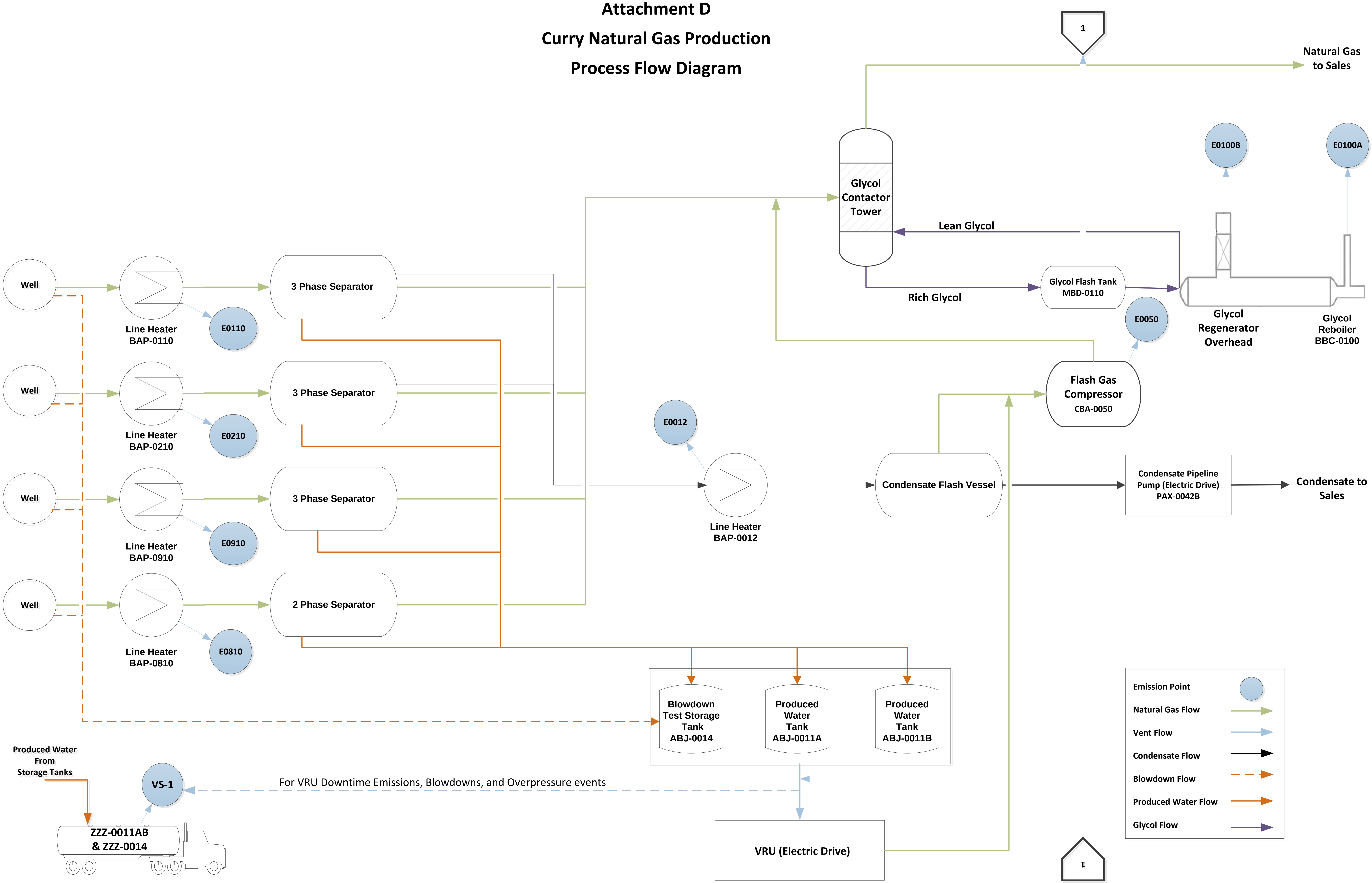
Attachment D

PROCESS FLOW DIAGRAM

Attachment D

Curry Natural Gas Production

Process Flow Diagram



Attachment E

PROCESS DESCRIPTION

Attachment E
Process Description

This permit application is being filed by Chevron Appalachia, LLC (Chevron) and addresses operational activities associated with the Curry natural gas production site. Incoming raw natural gas from each of the four wells enter the site and is first routed through a line heater (BAP-0110, BAP-0210, BAP-0410, BAP-0810, and BAP-0910) to assist with the phase separation process in the downstream separators. In the first stage separators, condensate and water is removed from the raw gas.

The raw gas is routed through a Triethylene Glycol (TEG) Dehydration Unit (BBC-0100) for removal of entrained fluids prior to exiting the site via a natural gas sales line. The flash tank (MBD-0110) included within the Curry site route flash vapors to the electric drive Vapor Recovery Unit control device. The rich glycol stream will then flow to the glycol reboiler, where the water and hydrocarbons will be removed from the glycol stream and routed to the glycol regenerator overhead (E100B).

Condensate is removed from the raw gas in the first stage separators and is transferred to the Condensate Flash Vessel via a comingled condensate line. The condensate is routed through a line heater (BAP-0012) prior to the Condensate Flash Vessel to aid in fluid separation. At these pressure and temperature conditions, light hydrocarbon constituents volatilize within the condensate flash vessel and are directed to the Flash Gas Compressor (CBA-0050). Flash Gas Compressor (CBA-0050) will be powered by a 276 hp 4-Stroke Rich Burn Caterpillar-G3406TA engine. The Flash Gas Compressor will increase the pressure of the recovered gas and the gas will be pumped into the raw gas line to the Glycol Contactor Tower. The remaining condensate fluid flows from the condensate flash vessel to a condensate sales line. An Electric Condensate Pipeline Pump (PAX-0042B) is used to lift the condensate through the condensate sales line.

From the first stage separators, produced water flows into two (2) Produced Water Tanks (ABJ-0011A and ABJ-0011B) and a Blowdown/Test Storage Tank (ABJ-0014). Emissions from the produced water tanks and the blowdown/test tank are directed to the electric drive vapor recovery unit (VRU). As a second stage of compression, tank vapors from the VRU are routed to the Flash Gas Compressor (CBA-0050) and into the raw gas line before the Glycol Contactor Tower. From the storage tanks, the produced water and blowdown fluids are pumped into tank trucks on an as needed basis and are managed off-site. Vapors from the unloading of the tanks are directed to a vent stack

(VS-1) and released to atmosphere. Chevron conducts three blowdowns at the Curry site per year and the blowdown fluid flows into the Blowdown/Test Storage Tank (ABJ-0014). Emissions realized during VRU downtime, blowdown events, and overpressure events from the tanks located at the Curry Site are also directed to the vent stack (VS-1).

A process flow diagram is included as Attachment D.

Attachment F

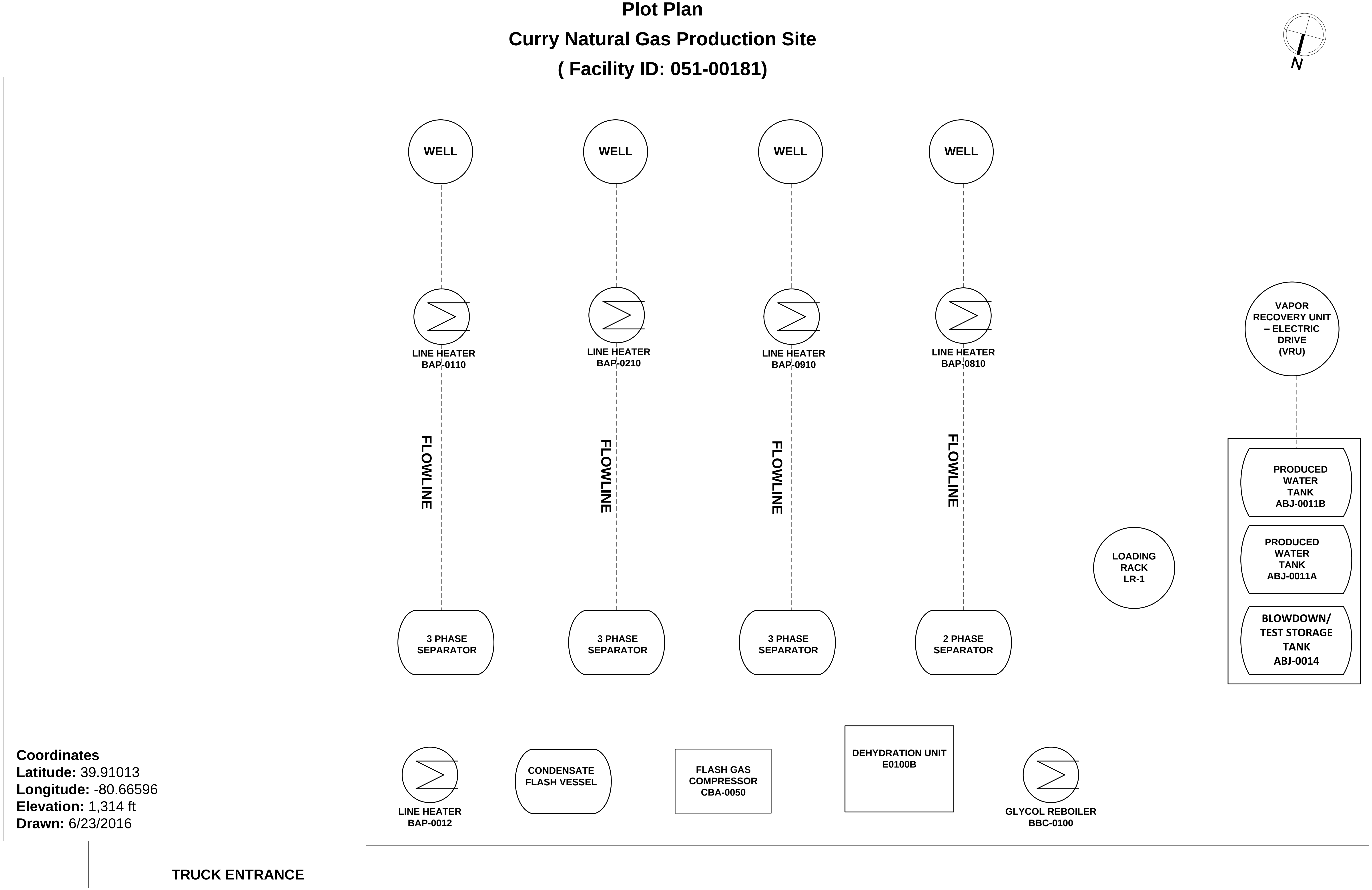
PLOT PLAN

Attachment F

Plot Plan

Curry Natural Gas Production Site

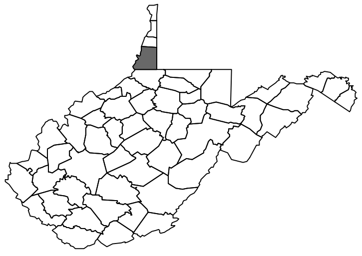
(Facility ID: 051-00181)

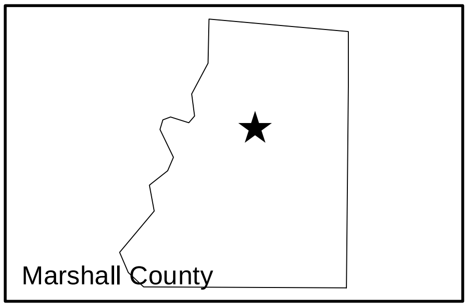


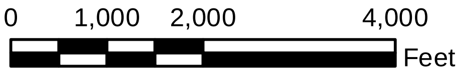
Coordinates
Latitude: 39.91013
Longitude: -80.66596
Elevation: 1,314 ft
Drawn: 6/23/2016

Attachment G

AREA MAP

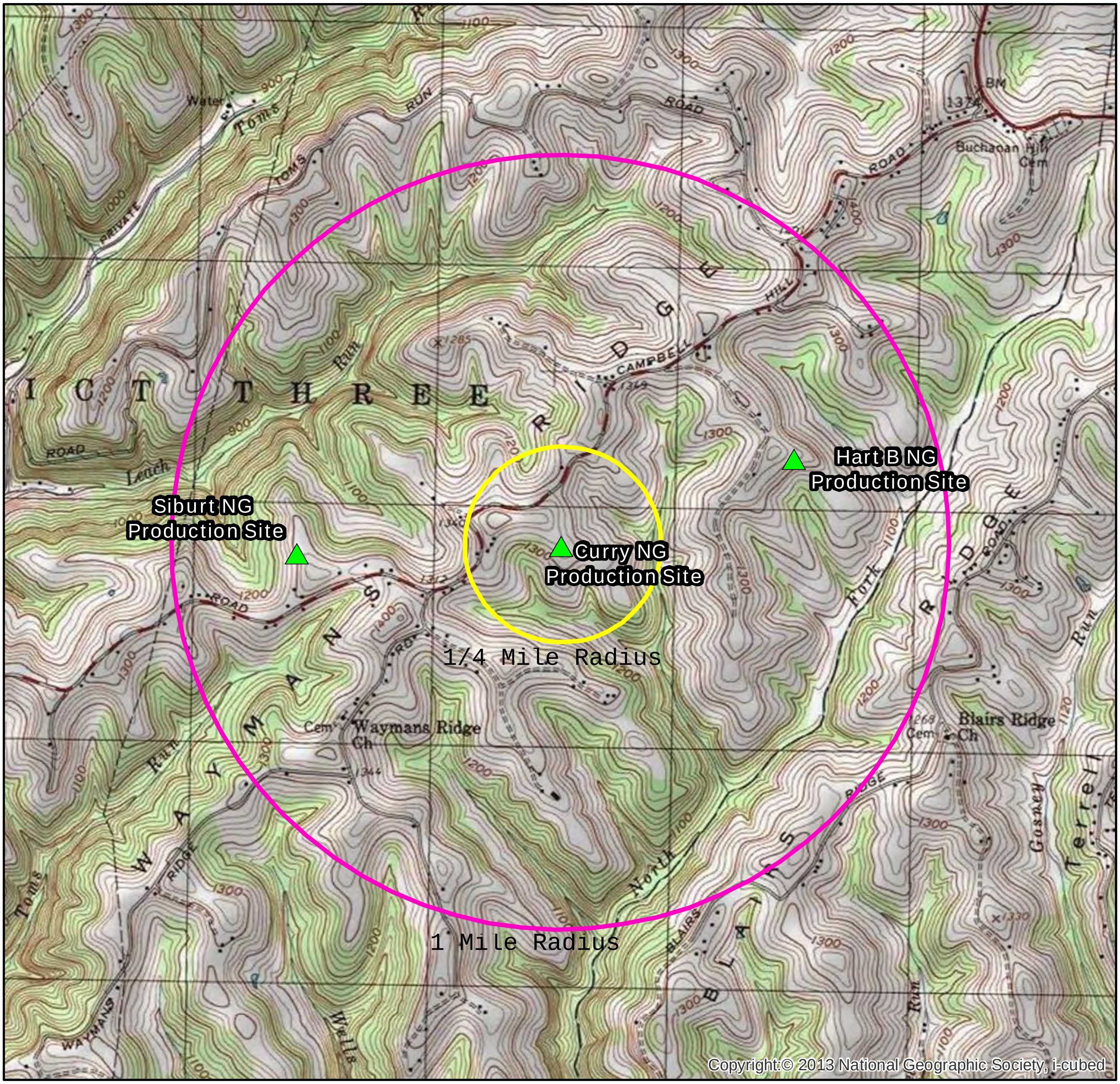






LAT. 39.910133 LON. -80.665963
MARSHALL COUNTY
WEST VIRGINIA

N



USGS 1:24K 7.5' Quadrangle:
Moundsville, WV

SITE LOCATION MAP

Chevron Appalachia, LLC

Curry Natural Gas Production Site
Moundsville, West Virginia

GIS Review: GM	
CHK'D: GM	
0334598	

Drawn By:
SRV-7/12/16

Environmental Resources Management

ATTACHMENT G

J:\GIS\Projects\SiteLocationMaps\Chevron_MXD\AttachmentG-Site_Location_Map.mxd - 7/12/2016|SRV

Attachment H

APPLICABILITY FORM

ATTACHMENT H – G70-C SECTION APPLICABILITY FORM

General Permit G70-C Registration
Section Applicability Form

General Permit G70-C 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, centrifugal compressors, reciprocating compressors, reciprocating internal combustion engines (RICEs), tank truck 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-C 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-C APPLICABLE SECTIONS	
☒Section 5.0	Gas Well Affected Facility (NSPS, Subpart OOOO)
☒Section 6.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☒Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO)
☒Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO 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)
☐Section 11.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO)[2]
☐Section 12.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO)[2]
☒Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines, Microturbines
☒Section 14.0	Tanker Truck Loading[3]
☒Section 15.0	Glycol Dehydration Units[4]

1 *Applicants that are subject to Section 6 may also be subject to Section 7 if the applicant is subject to the NSPS, Subpart OOOO control requirements or the applicable control device requirements of Section 8.*

2 *Applicants that are subject to Section 11 and 12 may also be subject to the applicable RICE requirements of Section 13.*

3 *Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 8.*

4 *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

EMISSION UNITS / EMISSION REDUCTION DEVICES (ERD) TABLE

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[1]	**Emission Point ID[2]**	**Emission Unit Description**	**Year Installed**	**Manufac. Date[3]**	**Design Capacity**	**Type[4] and Date of Change**	**Control Device(s)[5]**	**ERD(s)[6]**
BAP-0110	E0110	Line Heater	2016	NA	1.00 MMBtu/hr	New	N/A	N/A
BAP-0210	E0210	Line Heater	2016	NA	1.25 MMBtu/hr	New	N/A	N/A
BAP-0810	E0810	Line Heater	2016	NA	1.00 MMBtu/hr	New	N/A	N/A
BAP-0910	E0910	Line Heater	2016	NA	1.25 MMBtu/hr	New	N/A	N/A
BAP-0012	E0012	Line Heater	2016	NA	1.25 MMBtu/hr	New	N/A	N/A
CBA-0050	E0050	Flash Gas Compressor	2016	2014	276 hp	New	N/A	N/A
BBC-0100	E0100A	Glycol Reboiler	2016	NA	0.5MMBtu/hr	New	N/A	N/A
BBC-0100	E0100B	Glycol Regenerator Overhead	2016	NA	30 mmscf/day	New	N/A	N/A
MBD-0110	VS-1	Dehydration Unit Glycol Flash Tank	2016	NA	200 psig 35 deg F	New	VRU	N/A
ABJ-0011A	VS-1	Produced Water Tank	2016	2014	400 bbls	Existing	VRU	N/A
ABJ-0011B	VS-1	Produced Water Tank	2016	2015	400 bbls	Existing	VRU	N/A
ABJ-0014	VS-1	Blowdown Test Storage Tank	2016	2016	400 bbls	New	VRU	N/A
ZZZ-0011AB	VS-1	Truck Process Connection	2016	2016	5,040 gal/day	New	N/A	N/A
ZZZ-0014	VS-1	Truck Process Connection	2016	2016	5,040 gal/day	New	N/A	N/A

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] When required by rule
[4] New, modification, removal, existing
[5] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.
[6] For ERDs use the following numbering system: 1D, 2D, 3D,... or other appropriate designation.

Attachment J

FUGITIVE EMISSIONS SUMMARY SHEET

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/Equipment:

Leak Detection Method Used ☐ Audible, visual, and olfactory (AVO) inspections ☒ Infrared (FLIR) cameras ☐ Other (please describe) ☐ None required

Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)		
					VOC	HAP	GHG (CO$_2$e)
Pumps	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Valves	☐ Yes ☐ No	**241**	**EPA – 40CFR98 Subpart W**	☐ Gas ☐ Liquid ☒ Both	**0.62**	**0.03**	**19.79**
Safety Relief Valves	☐ Yes ☐ No	**8**	**EPA – 40CFR98 Subpart W**	☐ Gas ☐ Liquid ☒ Both	**0.03**	**0.002**	**0.97**
Open Ended Lines	☐ Yes ☐ No	**16**	**EPA – 40CFR98 Subpart W**	☐ Gas ☐ Liquid ☒ Both	**0.09**	**0.005**	**2.97**
Sampling Connections	☐ Yes ☐ No			☐ Gas ☐ Liquid ☒ Both			
Connections (Not sampling)	☐ Yes ☐ No	**1058**	**EPA – 40CFR98 Subpart W**	☐ Gas ☐ Liquid ☒ Both	**0.30**	**0.02**	**9.65**
Compressors	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Flanges	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Other[1]	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			

[1] Other equipment types may include compressor seals, relief valves, diaphragms, drains, meters, etc.

Please provide an explanation of the sources of fugitive emissions (e.g. pigging operations, equipment blowdowns, pneumatic controllers, etc.):
Fugitive emissions sources at the site included above cover equipment counts and emissions associated with equipment leaks. Emissions associated with equipment blowdowns are included with the Blowdown/Test Tank PTE calculations and are attributed to emission point VS-1 (Vent Stack -1).

Please indicate if there are any closed vent bypasses (include component):
A closed vent bypass is proposed on the closed vent system from the storage tanks to the VRU. The bypass would direct emissions to VS-1 and would include emissions from tank unloading events and VRU downtime.

Specify all equipment used in the closed vent system (e.g. VRU, ERD, thief hatches, tanker truck loading, etc.)
Equipment utilized in the closed vent system from the storage tanks includes VRUs and weighted thief hatches.

Attachment K

GAS WELL AFFECTED FACILITY DATA SHEET

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
Well 1H = 47-051-01297	3/13/2010	3/13/2010	N/A
Well 2H = 47-051-01779	TBD	TBD	Green Completion
Well 8H = 47-051-01784	TBD	TBD	Green Completion
Well 9H = 47-051-01785	TBD	TBD	Green Completion

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

STORAGE VESSEL DATA SHEET

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:
  - ☒ Temperature and pressure (inlet and outlet from separator(s))
  - ☒ Simulation-predicted composition
  - ☒ Molecular weight
  - ☒ 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 Farm**	2. Tank Name: **Produced Water Tanks**
3. Emission Unit ID number: **ABJ-0011A, ABJ-0011B**	4. Emission Point ID number: **VS-1**
5. Date Installed , Modified or Relocated *(for existing tanks)* **2016** Was the tank manufactured after August 23, 2011? ☒ Yes ☐ No	6. Type of change: ☐ New construction ☐ New stored material ☐ Other ☒ Relocation
7A. Description of Tank Modification *(if applicable)* **N/A**	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 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 bbls

9A. Tank Internal Diameter (ft.): **12 ft**

9B. Tank Internal Height (ft.): **20 ft**

10A. Maximum Liquid Height (ft.): **18 ft**

10B. Average Liquid Height (ft.): **10 ft**

11A. Maximum Vapor Space Height (ft.): **18 ft**

11B. Average Vapor Space Height (ft.): **10 ft**

12. Nominal Capacity *(specify barrels or gallons)*. This is also known as “working volume”. **400 bbls**

13A. Maximum annual throughput (gal/yr): **29,632,890**

13B. Maximum daily throughput (gal/day): **81,186**

14. Number of tank turnovers per year: **1,764**

15. Maximum tank fill rate (gal/min): **56.38**

16. Tank fill method ☒ Submerged ☐ 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 system per year?

18. Type of tank (check all that apply):
☒ Fixed Roof ☒ vertical ☐ horizontal ☐ flat roof ☐ cone roof ☐ dome roof
☐ other (describe)

☐ External Floating Roof ☐ pontoon roof ☐ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting
☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm
☐ Pressurized ☐ spherical ☐ cylindrical
☐ Other (describe)

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:
☐ Does Not Apply ☐ Rupture Disc (psig)
☐ Inert Gas Blanket of Nitrogen ☐ Carbon Adsorption[1]
☐ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)
☐ Conservation Vent (psig) ☐ Condenser[1]
Vacuum Setting Pressure Setting
☒ Emergency Relief Valve (psig)
0.4 oz Vacuum Setting **16 oz** Pressure Setting
☐ Thief Hatch Weighted ☒ Yes ☐ No

[1] Complete appropriate Air Pollution Control Device Sheet

20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name	**Flashing Loss**		**Breathing Loss**		**Working Loss**		**Total Emissions Loss**		**Estimation Method[1]**
	lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	
See Attachment S									

[1] 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 OPERATION INFORMATION

21. Tank Shell Construction:

☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☒ Other (describe) **Welded**

21A. Shell Color: **Dark Green**

21B. Roof Color: **Dark Green**

21C. Year Last Painted: **2016**

22. Shell Condition (if metal and unlined):

☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ Yes ☒ No

22B. If yes, operating temperature:

22C. If yes, how is heat provided to tank?

23. Operating Pressure Range (psig): **0.031-1**

Must be listed for tanks using VRUs with closed vent system.

24. Is the tank a **Vertical Fixed Roof Tank**?

☒ Yes ☐ No

24A. If yes, for dome roof provide radius (ft):

6 ft

24B. If yes, for cone roof, provide slop (ft/ft):

N/A

25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒

25A. Year Internal Floaters Installed:

25B. Primary Seal Type *(check one)*: ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal ☐ Vapor mounted resilient seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐ No

25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No

25F. Describe deck fittings:

26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply

26A. Deck Type: ☐ Bolted ☐ Welded

26B. For bolted decks, provide deck construction:

26C. Deck seam. Continuous sheet construction:

☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)

26D. Deck seam length (ft.):

26E. Area of deck (ft^2):

26F. For column supported tanks, # of columns:

26G. For column supported tanks, diameter of column:

27. Closed Vent System with VRU? ☒ Yes ☐ No

28. Closed Vent System with Enclosed Combustor? ☐ Yes ☒ No

SITE INFORMATION

29. Provide the city and state on which the data in this section are based: **Charleston, WV**

30. Daily Avg. Ambient Temperature (°F): **70**

31. Annual Avg. Maximum Temperature (°F): **65.5**

32. Annual Avg. Minimum Temperature (°F): **44.0**

33. Avg. Wind Speed (mph): **18**

34. Annual Avg. Solar Insulation Factor (BTU/ft^2-day): **1123**

35. Atmospheric Pressure (psia): **14.70**

LIQUID INFORMATION

36. Avg. daily temperature range of bulk liquid (°F): **N/A**	36A. Minimum (°F): **30**	36B. Maximum (°F): **68**
37. Avg. operating pressure range of tank (psig): **0.52 psig**	37A. Minimum (psig): **N/A**	37B. Maximum (psig): **N/A**

38A. Minimum liquid surface temperature (°F): **N/A**	38B. Corresponding vapor pressure (psia): **N/A**
39A. Avg. liquid surface temperature (°F): **N/A**	39B. Corresponding vapor pressure (psia): **N/A**
40A. Maximum liquid surface temperature (°F): **N/A**	40B. Corresponding vapor pressure (psia): **N/A**

41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.

41A. Material name and composition:	**Produced Water**		
41B. CAS number:	**N/A**		
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):	**N/A**		
41G. Maximum Reid vapor pressure (psia):	**N/A**		
41H. Months Storage per year. From: To:	**January - December**		
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.	**1200 psig** **120 F**		

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:
    - ☒ Temperature and pressure (inlet and outlet from separator(s))
    - ☒ Simulation-predicted composition
    - ☒ Molecular weight
    - ☒ 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 Farm**	2. Tank Name: **Blowdown Test Storage Tank (Produced Water Mode of Operation)**
3. Emission Unit ID number: **ABJ-0014**	4. Emission Point ID number: **VS-1**
5. Date Installed , Modified or Relocated *(for existing tanks)* **2016** Was the tank manufactured after August 23, 2011? ☒ Yes ☐ No	6. Type of change: ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* **N/A**	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☒ Yes ☐ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 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.
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13B. Maximum daily throughput (gal/day): **81,186**

14. Number of tank turnovers per year: **1764**

15. Maximum tank fill rate (gal/min): **56.38**

16. Tank fill method ☒ Submerged ☐ 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 system per year?

18. Type of tank (check all that apply):
☒ Fixed Roof ☒ vertical ☐ horizontal ☐ flat roof ☐ cone roof ☐ dome roof
☐ other (describe)

☐ External Floating Roof ☐ pontoon roof ☐ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting
☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm
☐ Pressurized ☐ spherical ☐ cylindrical
☐ Other (describe)

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:
☐ Does Not Apply ☐ Rupture Disc (psig)
☐ Inert Gas Blanket of Nitrogen ☐ Carbon Adsorption[1]
☐ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)
☐ Conservation Vent (psig) ☐ Condenser[1]
Vacuum Setting Pressure Setting
☒ Emergency Relief Valve (psig)
0.4 oz Vacuum Setting 16 oz Pressure Setting
☒ Thief Hatch Weighted ☒ Yes ☐ No

[1] Complete appropriate Air Pollution Control Device Sheet

20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name	**Flashing Loss**		**Breathing Loss**		**Working Loss**		**Total Emissions Loss**		**Estimation Method**[1]
	lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	
See Attachment S									

[1] 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 OPERATION INFORMATION

21. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☒ Other (describe) **Welded**

21A. Shell Color: **Dark Green**
21B. Roof Color: **Dark Green**
21C. Year Last Painted: **2016**

22. Shell Condition (if metal and unlined):
☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ Yes ☒ No
22B. If yes, operating temperature:
22C. If yes, how is heat provided to tank?

23. Operating Pressure Range (psig): **0.031-1**
Must be listed for tanks using VRUs with closed vent system.

24. Is the tank a **Vertical Fixed Roof Tank**?
☒ Yes ☐ No
24A. If yes, for dome roof provide radius (ft):
6 ft
24B. If yes, for cone roof, provide slop (ft/ft):
N/A

25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒

25A. Year Internal Floaters Installed:

25B. Primary Seal Type *(check one)*: ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal
☐ Vapor mounted resilient seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐ No

25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No

25F. Describe deck fittings:

26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply

26A. Deck Type: ☐ Bolted ☐ Welded
26B. For bolted decks, provide deck construction:

26C. Deck seam. Continuous sheet construction:
☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)

26D. Deck seam length (ft.):
26E. Area of deck (ft^2):
26F. For column supported tanks, # of columns:
26G. For column supported tanks, diameter of column:

27. Closed Vent System with VRU? ☒ Yes ☐ No

28. Closed Vent System with Enclosed Combustor? ☐ Yes ☒ No

SITE INFORMATION

29. Provide the city and state on which the data in this section are based: **Charleston, WV**

30. Daily Avg. Ambient Temperature (°F): **70**
31. Annual Avg. Maximum Temperature (°F): **65.5**

32. Annual Avg. Minimum Temperature (°F): **44.0**
33. Avg. Wind Speed (mph): **18**

34. Annual Avg. Solar Insulation Factor (BTU/ft^2-day): **1123**	35. Atmospheric Pressure (psia): **14.70**

LIQUID INFORMATION

36. Avg. daily temperature range of bulk liquid (°F): **N/A**	36A. Minimum (°F): **30**	36B. Maximum (°F): **68**
37. Avg. operating pressure range of tank (psig): **0.52 psig**	37A. Minimum (psig): **N/A**	37B. Maximum (psig): **N/A**

38A. Minimum liquid surface temperature (°F): **N/A**	38B. Corresponding vapor pressure (psia): **N/A**
39A. Avg. liquid surface temperature (°F): **N/A**	39B. Corresponding vapor pressure (psia): **N/A**
40A. Maximum liquid surface temperature (°F): **N/A**	40B. Corresponding vapor pressure (psia): **N/A**

41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.

41A. Material name and composition:	**Produced Water**		
41B. CAS number:	**N/A**		
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):	**N/A**		
41G. Maximum Reid vapor pressure (psia):	**N/A**		
41H. Months Storage per year. From: To:	**January - December**		
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.	**1200 psig** **120 F**		

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:
  ☒ Temperature and pressure (inlet and outlet from separator(s))
  ☒ Simulation-predicted composition
  ☒ Molecular weight
  ☒ 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 Farm**	2. Tank Name: **Blowdown Test Storage Tank (Blowdown Fluids Mode of Operation)**
3. Emission Unit ID number: **ABJ-0014**	4. Emission Point ID number: **VS-1**
5. Date Installed , Modified or Relocated *(for existing tanks)* **2016** Was the tank manufactured after August 23, 2011? ☐ Yes ☒ No	6. Type of change: ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* **N/A**	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☒ Yes ☐ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 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 bbls

9A. Tank Internal Diameter (ft.): **12 ft**

9B. Tank Internal Height (ft.): **20 ft**

10A. Maximum Liquid Height (ft.): **18 ft**

10B. Average Liquid Height (ft.): **10 ft**

11A. Maximum Vapor Space Height (ft.): **18 ft**

11B. Average Vapor Space Height (ft.): **10 ft**

12. Nominal Capacity *(specify barrels or gallons)*. This is also known as "working volume". **400 bbls**

13A. Maximum annual throughput (gal/yr):**2,520**

13B. Maximum daily throughput (gal/day): **840**

14. Number of tank turnovers per year: 1

15. Maximum tank fill rate (gal/min): **56**

16. Tank fill method ☒ Submerged ☐ 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 system per year?

18. Type of tank (check all that apply):

☒ Fixed Roof ☒ vertical ☐ horizontal ☐ flat roof ☐ cone roof ☐ dome roof
☐ other (describe)

☐ External Floating Roof ☐ pontoon roof ☐ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting
☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm
☐ Pressurized ☐ spherical ☐ cylindrical
☐ Other (describe)

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply ☐ Rupture Disc (psig)
☐ Inert Gas Blanket of Nitrogen ☐ Carbon Adsorption[1]
☐ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)
☐ Conservation Vent (psig) ☐ Condenser[1]
Vacuum Setting Pressure Setting
☒ Emergency Relief Valve (psig)
0.4 oz Vacuum Setting 16 oz Pressure Setting
☒ Thief Hatch Weighted ☒ Yes ☐ No

[1] Complete appropriate Air Pollution Control Device Sheet

20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name	**Flashing Loss**		**Breathing Loss**		**Working Loss**		**Total Emissions Loss**		**Estimation Method[1]**
	lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	
See Attachment S									

[1] 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 OPERATION INFORMATION

21. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☒ Other (describe) **Welded**

21A. Shell Color: **Dark Green**
21B. Roof Color: **Dark Green**
21C. Year Last Painted: **2016**

22. Shell Condition (if metal and unlined):
☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ Yes ☒ No
22B. If yes, operating temperature:
22C. If yes, how is heat provided to tank?

23. Operating Pressure Range (psig): **0.031-1**
Must be listed for tanks using VRUs with closed vent system.

24. Is the tank a **Vertical Fixed Roof Tank**?
☒ Yes ☐ No
24A. If yes, for dome roof provide radius (ft): **6 ft**
24B. If yes, for cone roof, provide slop (ft/ft): **N/A**

25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒

25A. Year Internal Floaters Installed:

25B. Primary Seal Type *(check one)*: ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal
☐ Vapor mounted resilient seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐ No

25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No

25F. Describe deck fittings:

26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply

26A. Deck Type: ☐ Bolted ☐ Welded
26B. For bolted decks, provide deck construction:

26C. Deck seam. Continuous sheet construction:
☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)

26D. Deck seam length (ft.):
26E. Area of deck (ft^2):
26F. For column supported tanks, # of columns:
26G. For column supported tanks, diameter of column:

27. Closed Vent System with VRU? ☐ Yes ☒ No – Due to the high pressure of the blowdown event, Chevron does not seek to reduce the PTE of blowdown events through the use of the VRU that will control the Produced Water method of loading for this tank.

28. Closed Vent System with Enclosed Combustor? ☐ Yes ☒ No

SITE INFORMATION

29. Provide the city and state on which the data in this section are based: **Charleston, WV**

30. Daily Avg. Ambient Temperature (°F): **70**
31. Annual Avg. Maximum Temperature (°F): **65.5**

32. Annual Avg. Minimum Temperature (°F): **44.0**	33. Avg. Wind Speed (mph): **18**
34. Annual Avg. Solar Insulation Factor (BTU/ft^2-day): **1123**	35. Atmospheric Pressure (psia): **14.70**

LIQUID INFORMATION

36. Avg. daily temperature range of bulk liquid (°F): **N/A**	36A. Minimum (°F): **30**	36B. Maximum (°F): **68**
37. Avg. operating pressure range of tank (psig): **0.52 psig**	37A. Minimum (psig): **N/A**	37B. Maximum (psig): **N/A**

38A. Minimum liquid surface temperature (°F): **N/A**	38B. Corresponding vapor pressure (psia): **N/A**
39A. Avg. liquid surface temperature (°F): **N/A**	39B. Corresponding vapor pressure (psia): **N/A**
40A. Maximum liquid surface temperature (°F): **N/A**	40B. Corresponding vapor pressure (psia): **N/A**

41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.

41A. Material name and composition:	**Blowdown Fluids**		
41B. CAS number:	**N/A**		
41C. Liquid density (lb/gal):	**8.32**		
41D. Liquid molecular weight (lb/lb-mole):	**18.27**		
41E. Vapor molecular weight (lb/lb-mole):	**18.02**		
41F. Maximum true vapor pressure (psia):	**N/A**		
41G. Maximum Reid vapor pressure (psia):	**N/A**		
41H. Months Storage per year. From: To:	**January - December**		
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.	**3914 psig** **135 F**		

STORAGE TANK DATA TABLE

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

Source ID #[1]	Status[2]	Content[3]	Volume[4]

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the compressor station. 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

HEATER AND REBOILERS NOT SUBJECT TO 40CFR60 SUBPART Dc

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#[1]	**Emission Point ID#[2]**	**Emission Unit Description (manufacturer, model #)**	**Year Installed/ Modified**	**Type[3] and Date of Change**	**Maximum Design Heat Input (MMBTU/hr)[4]**	**Fuel Heating Value (BTU/scf)[5]**
BAP-0110	E0110	Line Heater	2016	New	1.00	1342
BAP-0210	E0210	Line Heater	2016	New	1.25	1342
BAP-0810	E0810	Line Heater	2016	New	1.00	1342
BAP-0910	E0910	Line Heater	2016	New	1.25	1342
BAP-0012	E0012	Line Heater	2016	New	1.25	1342
BBC-0100	E0100A	Glycol Reboiler	2016	New	0.5	1342

[1] 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.

[2] 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.

[3] New, modification, removal

[4] Enter design heat input capacity in MMBtu/hr.

[5] Enter the fuel heating value in BTU/standard cubic foot.

Attachment N

INTERNAL COMBUSTION ENGINE DATA SHEET

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 ID#[1]	**CBA-0050**		
Engine Manufacturer/Model	**Caterpillar G3406TA**		
Manufacturers Rated bhp/rpm	**276 hp**		
Source Status[2]	**NS**		
Date Installed/ Modified/Removed/Relocated[3]	**October 2016**		
Engine Manufactured /Reconstruction Date[4]	**10/1/2014**		
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable)[5]	☒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	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
Engine Type[6]	**4SRB**		
APCD Type[7]	**NSCR**		
Fuel Type[8]	**PQ**		
H_2S (gr/100 scf)	**--**		
Operating bhp/rpm	**276 hp**		
BSFC (BTU/bhp-hr)	**8122**		
Hourly Fuel Throughput	**1700** ft^3/hr -- gal/hr	ft^3/hr gal/hr	ft^3/hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	**14.89** $MMft^3$/yr -- gal/yr	$MMft^3$/yr gal/yr	$MMft^3$/yr gal/yr
Fuel Usage or Hours of Operation Metered	Yes ☒ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

Calculation Methodology[9]	**Pollutant[10]**	**Hourly PTE (lb/hr)[11]**	**Annual PTE (tons/year)[11]**	**Hourly PTE (lb/hr)[11]**	**Annual PTE (tons/year)[11]**	**Hourly PTE (lb/hr)[11]**	**Annual PTE (tons/year)[11]**
MD	NO_x	**0.15**	**0.67**				
MD	CO	**0.18**	**0.80**				
MD	VOC	**0.10**	**0.43**				
AP-42	SO_2	**0.001**	**0.006**				
AP-42	PM_{10}	**0.02**	**0.10**				
MD	Formaldehyde	**0.09**	**0.42**				
AP-42 & MD	Total HAPs	**0.10**	**0.44**				
OT	GHG (CO_2e)	**54.02**	**236.62**				

1 Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be 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.

2 Enter the Source Status using the following codes:

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 the Engine Type designation(s) using the following codes:

2SLB	Two Stroke Lean Burn	4SRB	Four Stroke Rich Burn
4SLB	Four Stroke Lean Burn		

7 Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:

A/F	Air/Fuel Ratio	IR	Ignition Retard
HEIS	High Energy Ignition System	SIPC	Screw-in Precombustion Chambers
PSC	Prestratified Charge	LEC	Low Emission Combustion
NSCR	Rich Burn & Non-Selective Catalytic Reduction	OxCat	Oxidation Catalyst
SCR	Lean Burn & Selective Catalytic Reduction		

8 Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas /Production Gas	D	Diesel

9 Enter the Potential Emissions Data Reference designation using the following codes. Attach all reference data used.

MD	Manufacturer's Data	AP	AP-42
GR	GRI-HAPCalc^{TM}	OT	Other **40 CFR Subpart C** (please list)

10 Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. 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*.

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 ☐ SCR ☐Oxidation Catalyst

Provide details of process control used for proper mixing/control of reducing agent with gas stream: **Emit, Advance AFR Control**

Manufacturer: **Miratech**	Model #: **RCS-2216-08**
Design Operating Temperature:	Design gas volume: scfm
Service life of catalyst:	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: acfm at °F	Operating temperature range for NSCR/Ox Cat: From °F to °F
Reducing agent used, if any:	Ammonia slip (ppm):

Pressure drop against catalyst bed (delta P): inches of H_2O

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?
☐ Yes ☒ 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
☐ No performance test required. If so, why (please list any maintenance required and the applicable sections in NSPS/GACT,

USA COMPRESSION

Unit 6569 Caterpillar G3406TA Engine Emissions

Date of Manufacture	October 1, 2014	Engine Serial Number	4FD04852	Date Modified/Reconstructed	N/A
Driver Rated HP	276	Rated Speed in RPM	1800	Combustion Type	Spark Ignited 4 Stroke
Number of Cylinders	6	Compression Ratio	9.4:1	Combustion Setting	Rich Burn
Displacement, in^3	824	Fuel Delivery Method	Carburetor	Combustion Air Treatment	Turbocharged & Aftercooled

Raw Engine Emissions with Customer Supplied Fuel Gas.

Fuel Consumption	*7371*	*LHV BTU/bhp-hr*	*or*	*8122 HHV BTU/bhp-hr*
Altitude	*1200*	*ft*		
Maximum Air Inlet Temp	*90*	*F*		

	g/bhp-hr [1]	lb/MMBTU [2]	lb/hr	TPY
Nitrogen Oxides (NOx)	17.53		10.666	46.719
Carbon Monoxide (CO)	17.53		10.666	46.719
Volatile Organic Compounds (VOC or NMNEHC; excludes CH2O)	0.27		0.164	0.720
Formaldehyde (CH2O)	0.26		0.158	0.693
Particulate Matter (PM) Filterable+Condensable		1.94E-02	0.044	0.191
Sulfur Dioxide (SO2)		5.88E-04	0.001	0.006

	g/bhp-hr [1]	lb/MMBTU [2]	lb/hr	Metric Tonne/yr
Carbon Dioxide (CO2)	536		326	1296
Methane (CH4)	0.79		0.481	1.910

[1] g/bhp-hr are based on Caterpillar Specifications. Note that g/bhp-hr values are based on 100% Load Operation.
It is recommended to add a safety margin to emissions to allow for operational flexibility and fuel gas composition variability.

[2] Emission Factor obtained from EPA's AP-42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combution Sources (Section 3.2 Natural Gas-Fired Reciprocating Engines, Table 3.2-3).

Catalytic Converter Emissions

Catalytic Converter Make and Model:	*Miratech, RCS-2216-08*
Element Type:	*16" NSCR,3-Way*
Number of Elements in Housing:	*2*
Air/Fuel Ratio Control	*Emit, Advance AFR Control*

	% Reduction	**g/bhp-hr**	**lb/hr**	**TPY**
Nitrogen Oxides (NOx)	98.6	*0.25*	**0.15**	**0.65**
Carbon Monoxide (CO)	98.3	*0.30*	**0.18**	**0.79**
Volatile Organic Compounds (VOC or NMNEHC, excl. HCHO)	40	*0.16*	**0.10**	**0.43**
Formaldehyde (CH2O)	40		**0.09**	**0.42**
Particulate Matter (PM)	0		**4.35E-02**	**1.91E-01**
Sulfur Dioxide (SO2)	0		**1.32E-03**	**5.77E-03**

	% Reduction	**lb/hr**	**Metric Tonne/yr**
Carbon Dioxide (CO2)	0	**326**	**1296**
Methane (CH4)	0	**0.48**	**1.91**

DCL America Inc.
12620 FM 1960 W, Ste A4 Box # 560, Houston, TX 77065
Tel.: 877-897-9759 Fax: 281-605-5858 E-mail: info@dclamerica.com

To	Chris Magee	**Phone**	
	USA Compression	**Fax**	
Date	June 29,2016	**Email**	

RE: Emissions Statement – Unit 6569 Chevron Curry Pad A

ENGINE DATA

Engine model	**Cat 3406TA**
Power	276 bhp
Fuel	PQNG
Exhaust Flow	1854 lb/hr
Exhaust Temperature	1080 ˚F

CATALYST SYSTEM DATA

Catalyst Housing	RCS-2216-08
Catalyst Model	IQ16 (A7X5-01-4OV9-31)
Catalyst Type	NSCR 3-Way
Element Diameter	Round 14.75” x 3.16 ” w/ bonnet
Number of Elements	2
Cell Density	300 cpsi

EMISSION REQUIREMENTS

Exhaust Gas Component	Engine Output g/bhp-hr	Converter Output g/bhp-hr
NOx	17.53	.25
CO	17.53	.30
VOC	.27	.16
CH2O	.26	>76% reduction

Regards,

Sam Kirk
Regional Sales Manager
DCL America
281-253-3091

G3406

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Chevron Curry Pad A 6/28/16

CATERPILLAR®

ENGINE SPEED (rpm):	1800
COMPRESSION RATIO:	9.4
AFTERCOOLER TYPE:	SCAC
AFTERCOOLER WATER INLET (°F):	130
JACKET WATER OUTLET (°F):	210
ASPIRATION:	TA
COOLING SYSTEM:	JW+OC, AC
CONTROL SYSTEM:	CDIS
EXHAUST MANIFOLD:	WC
COMBUSTION:	CATALYST SETTING
EXHAUST OXYGEN (% O2):	0.3
SET POINT TIMING:	24

RATING STRATEGY:	STANDARD
RATING LEVEL:	CONTINUOUS
FUEL SYSTEM:	LPG IMPCO WITH CUSTOMER SUPPLIED AIR FUEL RATIO CONTROL
SITE CONDITIONS:	
FUEL:	Chevron Berger Pad A Fuel 6-29-16
FUEL PRESSURE RANGE(psig):	1.5-5.0
FUEL METHANE NUMBER:	58.6
FUEL LHV (Btu/scf):	1148
ALTITUDE(ft):	1200
MAXIMUM INLET AIR TEMPERATURE(°F):	90
STANDARD RATED POWER:	276 bhp@1800rpm

			MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING	**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER (WITHOUT FAN)	(1)	bhp	276	276	207	138
INLET AIR TEMPERATURE		°F	90	90	90	90
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	7371	7371	8030	9385
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	8122	8122	8849	10342
AIR FLOW (@inlet air temp, 14.7 psia) (WET)	(3)(4)	ft3/min	387	387	311	239
AIR FLOW (WET)	(3)(4)	lb/hr	1677	1677	1348	1035
FUEL FLOW (60ºF, 14.7 psia)		scfm	30	30	24	19
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	43.2	43.2	35.0	26.6
EXHAUST TEMPERATURE - ENGINE OUTLET	(6)	°F	1068	1068	1003	935
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia) (WET)	(7)(4)	ft3/min	1194	1194	920	675
EXHAUST GAS MASS FLOW (WET)	(7)(4)	lb/hr	1775	1775	1428	1098
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)	(8)(9)	g/bhp-hr	17.53	17.53	17.48	15.75
CO	(8)(9)	g/bhp-hr	17.53	17.53	17.48	15.75
THC (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	1.42	1.42	1.66	2.35
NMHC (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	0.63	0.63	0.73	1.03
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)(10)	g/bhp-hr	0.27	0.27	0.31	0.45
HCHO (Formaldehyde)	(8)(9)	g/bhp-hr	0.26	0.26	0.26	0.26
CO2	(8)(9)	g/bhp-hr	536	536	561	596
EXHAUST OXYGEN	(8)(11)	% DRY	0.3	0.3	0.3	0.3
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(12)	Btu/min	10398	10398	9702	8820
HEAT REJ. TO ATMOSPHERE	(12)	Btu/min	1357	1357	1109	864
HEAT REJ. TO LUBE OIL (OC)	(12)	Btu/min	1701	1701	1587	1443
HEAT REJ. TO AFTERCOOLER (AC)	(12)(13)	Btu/min	560	560	342	133
COOLING SYSTEM SIZING CRITERIA						
TOTAL JACKET WATER CIRCUIT (JW+OC)	(13)	Btu/min	13479			
TOTAL AFTERCOOLER CIRCUIT (AC)	(13)(14)	Btu/min	588			
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.						

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

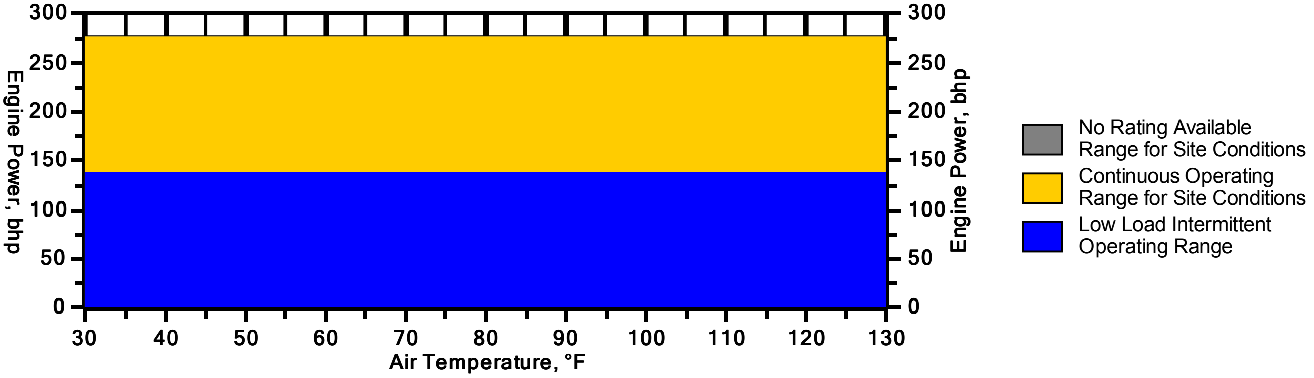
For notes information consult page three.

*****WARNINGS ISSUED FOR THIS RATING CONSULT PAGE 3*****

PREPARED BY: Chris Magee, USAC
Data generated by Gas Engine Rating Pro Version 6.01.02
Ref. Data Set DM5084-06-001, Printed 29Jun2016

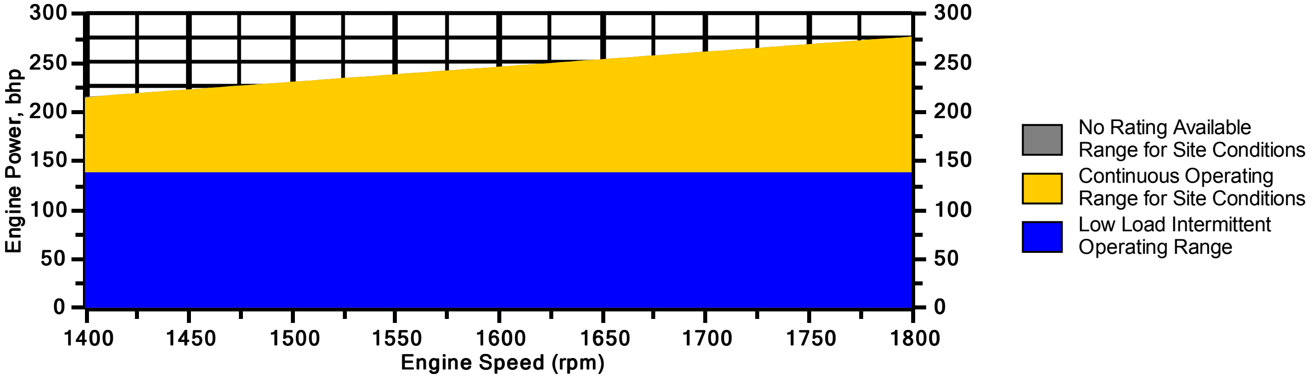
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1200 ft and 1800 rpm



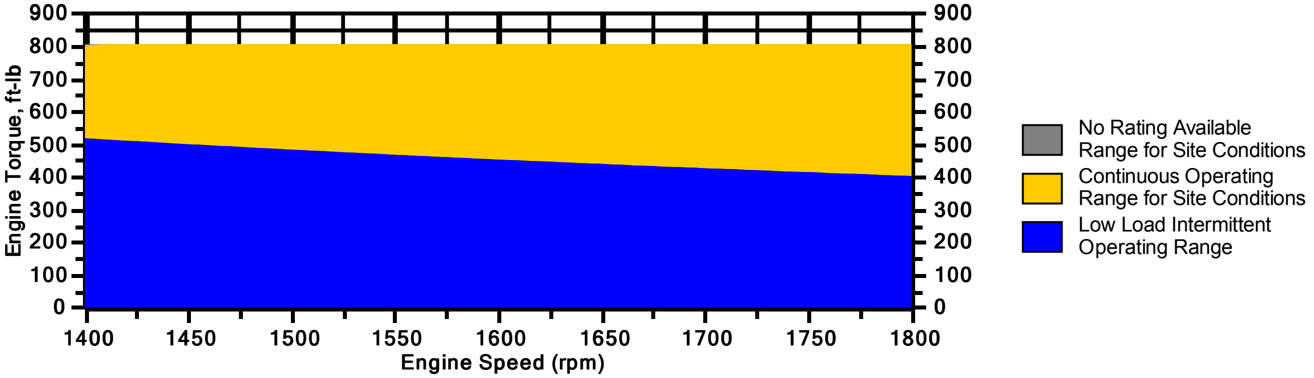
Engine Power vs. Engine Speed

Data represents speed sweep at 1200 ft and 90 ºF



Engine Torque vs. Engine Speed

Data represents speed sweep at 1200 ft and 90 ºF



Note: At site conditions of 1200 ft and 90°F inlet air temp., constant torque can be maintained down to 1410 rpm. The minimum speed for loading at these conditions is 1400 rpm.

NOTES

1. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.

2. Fuel consumption tolerance is ± 5.0% of full load data.

3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.

5. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

6. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

8. Emissions data is at engine exhaust flange prior to any after treatment.

9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. Part Load data requires customer supplied air fuel ratio control.

10. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ

11. Exhaust Oxygen tolerance is ± 0.2.

12. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit, and ± 5% for aftercooler circuit.

13. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.

14. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

WARNING(S):

1. The lower heating value of the fuel is higher than or equal to 1050 Btu/scf and lower than 1250 Btu/scf. May require on-site adjustment or tuning of the fuel system and up to two 130-5697 valve washers to lean out part load operating points.

RECOMMENDED ACTION

For additional information please contact your Caterpillar engine dealer.

Attachment O

TANKER TRUCK LOADING DATA SHEET

ATTACHMENT O – TANKER TRUCK 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. Use extra pages if necessary.

Truck Loadout Collection Efficiencies

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

- For tanker trucks passing the MACT level annual leak test – 99.2%
- For tanker trucks passing the NSPS level annual leak test – 98.7%
- For tanker trucks 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 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#: **ZZZ-0011AB, ZZZ-0014**	Emission Point ID#: **VS-1**	Year Installed/Modified: **2016**

Emission Unit Description: **Truck Process Connection – Produced Water Tanks**

Loading Area Data

Number of Pumps: **2**	Number of Liquids Loaded: **2**	Max number of trucks loading at one (1) time: **1**

Are tanker trucks pressure tested for leaks at this or any other location? ☐ Yes ☒ No ☐ Not Required

If Yes, Please describe:

Provide description of closed vent system and any bypasses.

N/A

Are any of the following truck loadout systems utilized?

☐ Closed System to tanker truck passing a MACT level annual leak test?

☐ Closed System to tanker truck passing a NSPS level annual leak test?

☐ Closed System to tanker truck not passing an annual leak test and has vapor return?

Projected Maximum Operating Schedule (for rack or transfer point as a whole)

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	**As Needed**	**As Needed**	**As Needed**	**As Needed**
Days/week	**As Needed**	**As Needed**	**As Needed**	**As Needed**

Bulk Liquid Data (use extra pages as necessary)

Liquid Name	**Produced Water**	**Blowdown Fluids**	
Max. Daily Throughput (1000 gal/day)	**81.2**	**0.84**	
Max. Annual Throughput (1000 gal/yr)	**29,632.9**	**2.52**	
Loading Method[1]	**SUB**	**SUB**	
Max. Fill Rate (gal/min)	**84**	**84**	
Average Fill Time (min/loading)	**200 min**	**200 min**	
Max. Bulk Liquid Temperature (°F)	**70°F**	**70°F**	

True Vapor Pressure[2]		**14.7 psia**	**14.7 psia**	
Cargo Vessel Condition[3]		**U**	**U**	
Control Equipment or Method[4]		**N/A**	**N/A**	
Max. Collection Efficiency (%)		**N/A**	**N/A**	
Max. Control Efficiency (%)		**N/A**	**N/A**	
Max.VOC Emission Rate	Loading (lb/hr)	**0.90**	**1.31**	
	Annual (ton/yr)	**3.98**	**<0.01**	
Max.HAP Emission Rate	Loading (lb/hr)	**<0.01**	**<0.01**	
	Annual (ton/yr)	**0.01**	**<0.01**	
Estimation Method[5]		**ProMax**	**ProMax**	

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill
2 At maximum bulk liquid temperature
3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)
4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration
5 EPA EPA Emission Factor in AP-42 MB Material Balance

TM Test Measurement based upon test data submittal O Other (describe)

Attachment P

GLYCOL DEHYDRATION UNIT DATA SHEET

ATTACHMENT P – GLYCOL DEHYDRATION UNIT
DATA SHEET

Complete this data sheet for each Glycol Dehydration Unit, Reboiler, Flash Tank and/or Regenerator at the facility. Include gas sample analysis and GRI- GLYCalc™ input and aggregate report. Use extra pages if necessary.

Manufacturer:	Model:
Max. Dry Gas Flow Rate: **30 mmscf/day**	Reboiler Design Heat Input: **0.5 MMBTU/hr**
Design Type: ☒ TEG ☐ DEG ☐ EG	Source Status[1]: **NS**
Date Installed/Modified/Removed[2]: **2016**	Regenerator Still Vent APCD/ERD[3]:
Control Device/ERD ID#[3]: **VRU (Flash Tank Only)**	Fuel HV (BTU/scf): **1,319**
H_2S Content (gr/100 scf): **--**	Operation (hours/year): **8,760**

Pump Rate (gpm): **1.44**

Water Content (wt %) in: Wet Gas: **30.0 lbs/mmscf** Dry Gas: **7.0 lbs/mmscf**

Is the glycol dehydration unit exempt from 40CFR63 Section 764(d)? ☒ Yes ☐ No: If Yes, answer the following:

The actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters per day, as determined by the procedures specified in §63.772(b)(1) of this subpart. ☐ Yes ☒ No

The actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram per year (1 ton per year), as determined by the procedures specified in §63.772(b)(2) of this subpart. ☒ Yes ☐ No

Is the glycol dehydration unit located within an Urbanized Area (UA) or Urban Cluster (UC)? ☐ Yes ☒ No

Is a lean glycol pump optimization plan being utilized? ☐ Yes ☒ No

Recycling the glycol dehydration unit back to the flame zone of the reboiler.
☐ Yes ☒ No

Recycling the glycol dehydration unit back to the flame zone of the reboiler and mixed with fuel.
☐ Yes ☒ No

What happens when temperature controller shuts off fuel to the reboiler?
☐ Still vent emissions to the atmosphere.
☐ Still vent emissions stopped with valve.
☐ Still vent emissions to glow plug.

Please indicate if the following equipment is present.
☒ Flash Tank
☐ Burner management system that continuously burns condenser or flash tank vapors

Control Device Technical Data

Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)
Entire Gas Stream from Flash Tank	95% (VRU)

Emissions Data

Emission Unit ID / Emission Point ID[4]	**Description**	**Calculation Methodology[5]**	**PTE[6]**	**Controlled Maximum Hourly Emissions (lb/hr)**	**Controlled Maximum Annual Emissions (tpy)**
E0100A	Reboiler Exhaust	AP-42	NO_x	**0.04**	**0.17**
		AP-42	CO	**0.03**	**0.14**

		AP-42	VOC	**0.002**	**0.01**
		AP-42	SO_2	**<0.001**	**<0.001**
		AP-42	PM_{10}	**0.003**	**0.01**
		AP-42	GHG (CO_2e)	**58.55**	**256.44**
E0100B	Glycol Regenerator Still Vent	GRI-GlyCalc^{TM}	VOC	**1.58**	**6.91**
		GRI-GlyCalc^{TM}	Benzene	**0.04**	**0.19**
		GRI-GlyCalc^{TM}	Toluene	**0.20**	**0.86**
		GRI-GlyCalc^{TM}	Ethylbenzene	**0.17**	**0.73**
		GRI-GlyCalc^{TM}	Xylenes	**0.67**	**2.95**
		GRI-GlyCalc^{TM}	n-Hexane	**0.03**	**0.11**
MBD-0110 / VS-1 (Post Control Emissions Displayed)	Glycol Flash Tank	GRI-GlyCalc^{TM}	VOC	**0.78**	**3.43**
		GRI-GlyCalc^{TM}	Benzene	**0.003**	**0.01**
		GRI-GlyCalc^{TM}	Toluene	**0.01**	**0.03**
		GRI-GlyCalc^{TM}	Ethylbenzene	**0.01**	**0.04**
		GRI-GlyCalc^{TM}	Xylenes	**0.02**	**0.09**
		GRI-GlyCalc^{TM}	n-Hexane	**0.002**	**0.01**

1 Enter the Source Status using the following codes:
NS Construction of New Source ES Existing Source
MS Modification of Existing Source

2 Enter the date (or anticipated date) of the glycol dehydration unit’s installation (construction of source), modification or removal.

3 Enter the Air Pollution Control Device (APCD)/Emission Reduction Device (ERD) type designation using the following codes and the device ID number:
NA None CD Condenser FL Flare
CC Condenser/Combustion Combination TO Thermal Oxidizer
O Other (please list)

4 Enter the appropriate Emission Unit ID Numbers and Emission Point ID Numbers for the glycol dehydration unit reboiler vent and glycol regenerator still vent. The glycol dehydration unit reboiler vent and glycol regenerator still vent should be designated RBV-1 and RSV-1, respectively. If the compressor station incorporates multiple glycol dehydration units, a Glycol Dehydration Emission Unit Data Sheet shall be completed for each, using Source Identification RBV-2 and RSV-2, RBV-3 and RSV-3, etc.

5 Enter the Potential Emissions Data Reference designation using the following codes:
MD Manufacturer’s Data AP AP-42
GR GRI-GLYCalc^{TM} OT Other **ProMax** (please list)

6 Enter the Reboiler Vent and Glycol Regenerator Still Vent Potential to Emit (PTE) for the listed regulated pollutants in lbs per hour and tons per year. The Glycol Regenerator Still Vent potential emissions may be determined using the most recent version of the thermodynamic software model GRI-GLYCalc^{TM} (Radian International LLC & Gas Research Institute). **Attach all referenced Potential Emissions Data (or calculations) and the GRI-GLYCalc^{TM} Aggregate Calculations Report (shall include emissions reports, equipment reports, and stream reports) to this Glycol Dehydration Emission Unit Data Sheet(s). Backup pumps do not have to be considered as operating for purposes of PTE.** This PTE data shall be incorporated in the Emissions Summary Sheet.

```
GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Chevron Appalachia, LLC
File Name: M:\Projects\C\Chevron\WV Air Permit Applications\Curry Wellpad\G70-C
Update\GlyCalc\Curry.ddf
     Date: July 21, 2016

 DESCRIPTION:

    Description: Curry Wellpad

    Annual Hours of Operation:    8760.0 hours/yr



 EMISSIONS REPORTS:
 -------------------------------------------------------------------



 UNCONTROLLED REGENERATOR EMISSIONS
 -------------------------------------------------------------------
            Component               lbs/hr     lbs/day     tons/yr
 ------------------------------ ----------- ----------- -----------
                        Methane      0.0935       2.243      0.4093
                         Ethane      0.1303       3.127      0.5707
                        Propane      0.1574       3.779      0.6896
                      Isobutane      0.0301       0.723      0.1320
                       n-Butane      0.1002       2.405      0.4389

                     Isopentane      0.0247       0.593      0.1082
                      n-Pentane      0.0419       1.006      0.1835
                   Cyclopentane      0.0006       0.014      0.0025
                       n-Hexane      0.0257       0.616      0.1124
                    Cyclohexane      0.0235       0.563      0.1028

                  Other Hexanes      0.0087       0.209      0.0382
                       Heptanes      0.0369       0.885      0.1615
              Methylcyclohexane      0.0491       1.178      0.2150
                        Benzene      0.0429       1.031      0.1881
                        Toluene      0.1969       4.725      0.8622

                   Ethylbenzene      0.1663       3.992      0.7286
                        Xylenes      0.6727      16.145      2.9464
 ------------------------------ ----------- ----------- -----------
                Total Emissions      1.8014      43.232      7.8899

    Total Hydrocarbon Emissions      1.8014      43.232      7.8899
            Total VOC Emissions      1.5776      37.863      6.9099
            Total HAP Emissions      1.1045      26.508      4.8377
           Total BTEX Emissions      1.0788      25.892      4.7254



 FLASH TANK OFF GAS
 -------------------------------------------------------------------
            Component               lbs/hr     lbs/day     tons/yr
 ------------------------------ ----------- ----------- -----------
                        Methane     23.2128     557.108    101.6722
                         Ethane     11.6321     279.171     50.9487
                        Propane      6.8366     164.078     29.9443
                      Isobutane      1.0134      24.321      4.4387
                       n-Butane      2.7621      66.289     12.0978

                     Isopentane      0.6882      16.517      3.0144
                      n-Pentane      0.9853      23.648      4.3158
                   Cyclopentane      0.0036       0.086      0.0157
                       n-Hexane      0.3920       9.408      1.7170
                    Cyclohexane      0.1037       2.489      0.4542
```

```
                 Other Hexanes      0.1719       4.125      0.7528
                      Heptanes      0.3277       7.864      1.4353
             Methylcyclohexane      0.1899       4.557      0.8316
                       Benzene      0.0329       0.790      0.1442
                       Toluene      0.1157       2.777      0.5067

                  Ethylbenzene      0.0654       1.571      0.2867
                       Xylenes      0.1909       4.581      0.8361
                   C8+ Heavies      1.7812      42.748      7.8016
------------------------------ ----------- ----------- -----------
               Total Emissions     50.5054    1212.130    221.2137

   Total Hydrocarbon Emissions     50.5054    1212.130    221.2137
           Total VOC Emissions     15.6604     375.851     68.5928
           Total HAP Emissions      0.7970      19.127      3.4907
          Total BTEX Emissions      0.4050       9.719      1.7737



EQUIPMENT REPORTS:
------------------------------------------------------------------



ABSORBER
------------------------------------------------------------------

            Calculated Absorber Stages:       1.40
           Specified Dry Gas Dew Point:       7.00 lbs. H2O/MMSCF
                           Temperature:      120.0 deg. F
                              Pressure:     1200.0 psig
                     Dry Gas Flow Rate:    30.0000 MMSCF/day
            Glycol Losses with Dry Gas:     3.5603 lb/hr
                 Wet Gas Water Content: Subsaturated
       Specified Wet Gas Water Content:      30.00 lbs. H2O/MMSCF
  Calculated Lean Glycol Recirc. Ratio:       3.00 gal/lb H2O

                                    Remaining   Absorbed
               Component            in Dry Gas  in Glycol
    ------------------------------ ----------- -----------
                             Water      23.32%      76.68%
                    Carbon Dioxide      99.93%       0.07%
                          Nitrogen      99.99%       0.01%
                           Methane      99.99%       0.01%
                            Ethane      99.98%       0.02%

                           Propane      99.98%       0.02%
                         Isobutane      99.98%       0.02%
                          n-Butane      99.97%       0.03%
                        Isopentane      99.98%       0.02%
                         n-Pentane      99.97%       0.03%

                      Cyclopentane      99.88%       0.12%
                          n-Hexane      99.96%       0.04%
                       Cyclohexane      99.83%       0.17%
                     Other Hexanes      99.97%       0.03%
                          Heptanes      99.94%       0.06%

                 Methylcyclohexane      99.84%       0.16%
                           Benzene      98.53%       1.47%
                           Toluene      98.28%       1.72%
                      Ethylbenzene      98.17%       1.83%
                           Xylenes      97.46%       2.54%

                       C8+ Heavies      99.90%       0.10%


FLASH TANK
```

```
-------------------------------------------------------------------

                          Flash Control: Vented to atmosphere
                      Flash Temperature:     200.0 deg. F
                         Flash Pressure:      35.0 psig

                                      Left in    Removed in
               Component                Glycol   Flash Gas
    ------------------------------- ----------- -----------
                              Water      97.21%       2.79%
                     Carbon Dioxide       2.95%      97.05%
                           Nitrogen       0.39%      99.61%
                            Methane       0.40%      99.60%
                             Ethane       1.11%      98.89%

                            Propane       2.25%      97.75%
                          Isobutane       2.89%      97.11%
                           n-Butane       3.50%      96.50%
                         Isopentane       3.61%      96.39%
                          n-Pentane       4.25%      95.75%

                       Cyclopentane      13.97%      86.03%
                           n-Hexane       6.33%      93.67%
                        Cyclohexane      20.45%      79.55%
                      Other Hexanes       5.17%      94.83%
                           Heptanes      10.34%      89.66%

                  Methylcyclohexane      22.92%      77.08%
                            Benzene      58.70%      41.30%
                            Toluene      65.83%      34.17%
                       Ethylbenzene      74.63%      25.37%
                            Xylenes      80.71%      19.29%

                        C8+ Heavies       3.67%      96.33%


REGENERATOR
-------------------------------------------------------------------

  No Stripping Gas used in regenerator.

                                     Remaining   Distilled
               Component             in Glycol   Overhead
    ------------------------------- ----------- -----------
                              Water      30.54%      69.46%
                     Carbon Dioxide       0.00%     100.00%
                           Nitrogen       0.00%     100.00%
                            Methane       0.00%     100.00%
                             Ethane       0.00%     100.00%

                            Propane       0.00%     100.00%
                          Isobutane       0.00%     100.00%
                           n-Butane       0.00%     100.00%
                         Isopentane       4.18%      95.82%
                          n-Pentane       4.10%      95.90%

                       Cyclopentane       2.49%      97.51%
                           n-Hexane       3.22%      96.78%
                        Cyclohexane      11.96%      88.04%
                      Other Hexanes       6.95%      93.05%
                           Heptanes       2.44%      97.56%

                  Methylcyclohexane      13.05%      86.95%
                            Benzene       8.23%      91.77%
                            Toluene      11.67%      88.33%
                       Ethylbenzene      13.60%      86.40%
                            Xylenes      15.78%      84.22%

                        C8+ Heavies     223.13%    -123.13%
```

```
STREAM REPORTS:
-------------------------------------------------------------------



WET GAS STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Pressure:      1214.70 psia
    Flow Rate:   1.25e+006 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 6.32e-002 3.75e+001
                     Carbon Dioxide 9.54e-002 1.38e+002
                           Nitrogen 4.73e-001 4.37e+002
                            Methane 7.20e+001 3.81e+004
                             Ethane 1.69e+001 1.68e+004

                            Propane 6.47e+000 9.40e+003
                          Isobutane 7.06e-001 1.35e+003
                           n-Butane 1.80e+000 3.46e+003
                         Isopentane 3.82e-001 9.09e+002
                          n-Pentane 5.14e-001 1.22e+003

                       Cyclopentane 9.98e-004 2.31e+000
                           n-Hexane 1.59e-001 4.51e+002
                        Cyclohexane 2.02e-002 5.60e+001
                      Other Hexanes 7.45e-002 2.12e+002
                           Heptanes 1.00e-001 3.30e+002

                  Methylcyclohexane 3.50e-002 1.13e+002
                            Benzene 1.93e-003 4.97e+000
                            Toluene 5.81e-003 1.76e+001
                       Ethylbenzene 3.51e-003 1.23e+001
                            Xylenes 9.51e-003 3.33e+001

                        C8+ Heavies 1.92e-001 1.08e+003
    ------------------------------- --------- ---------
                   Total Components    100.00 7.41e+004



DRY GAS STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Pressure:      1214.70 psia
    Flow Rate:   1.25e+006 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 1.47e-002 8.75e+000
                     Carbon Dioxide 9.54e-002 1.38e+002
                           Nitrogen 4.73e-001 4.37e+002
                            Methane 7.20e+001 3.81e+004
                             Ethane 1.69e+001 1.68e+004

                            Propane 6.47e+000 9.40e+003
                          Isobutane 7.06e-001 1.35e+003
                           n-Butane 1.80e+000 3.46e+003
                         Isopentane 3.82e-001 9.09e+002
                          n-Pentane 5.14e-001 1.22e+003

                       Cyclopentane 9.97e-004 2.30e+000
```

```
                           n-Hexane 1.59e-001 4.51e+002
                        Cyclohexane 2.02e-002 5.59e+001
                      Other Hexanes 7.45e-002 2.12e+002
                           Heptanes 1.00e-001 3.30e+002

                  Methylcyclohexane 3.50e-002 1.13e+002
                            Benzene 1.90e-003 4.89e+000
                            Toluene 5.71e-003 1.73e+001
                       Ethylbenzene 3.45e-003 1.21e+001
                            Xylenes 9.28e-003 3.24e+001

                        C8+ Heavies 1.92e-001 1.08e+003
    ------------------------------- --------- ---------
                   Total Components    100.00 7.40e+004



LEAN GLYCOL STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Flow Rate:   1.44e+000 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                                TEG 9.85e+001 7.98e+002
                              Water 1.50e+000 1.22e+001
                     Carbon Dioxide 1.15e-012 9.32e-012
                           Nitrogen 4.23e-013 3.43e-012
                            Methane 1.00e-017 8.14e-017

                             Ethane 1.50e-007 1.21e-006
                            Propane 9.23e-009 7.48e-008
                          Isobutane 1.12e-009 9.05e-009
                           n-Butane 2.96e-009 2.40e-008
                         Isopentane 1.33e-004 1.08e-003

                          n-Pentane 2.21e-004 1.79e-003
                       Cyclopentane 1.79e-006 1.45e-005
                           n-Hexane 1.05e-004 8.55e-004
                        Cyclohexane 3.93e-004 3.19e-003
                      Other Hexanes 8.04e-005 6.51e-004

                           Heptanes 1.14e-004 9.22e-004
                  Methylcyclohexane 9.09e-004 7.37e-003
                            Benzene 4.75e-004 3.85e-003
                            Toluene 3.21e-003 2.60e-002
                       Ethylbenzene 3.23e-003 2.62e-002

                            Xylenes 1.55e-002 1.26e-001
                        C8+ Heavies 1.87e-002 1.52e-001
    ------------------------------- --------- ---------
                   Total Components    100.00 8.10e+002



RICH GLYCOL AND PUMP GAS STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Pressure:      1214.70 psia
    Flow Rate:   1.61e+000 gpm
    NOTE: Stream has more than one phase.

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                                TEG 8.95e+001 7.99e+002
                              Water 4.59e+000 4.10e+001
                     Carbon Dioxide 1.89e-002 1.69e-001
                           Nitrogen 3.07e-002 2.74e-001
```

```
                            Methane 2.61e+000 2.33e+001

                             Ethane 1.32e+000 1.18e+001
                            Propane 7.83e-001 6.99e+000
                          Isobutane 1.17e-001 1.04e+000
                           n-Butane 3.21e-001 2.86e+000
                         Isopentane 8.00e-002 7.14e-001

                          n-Pentane 1.15e-001 1.03e+000
                       Cyclopentane 4.66e-004 4.16e-003
                           n-Hexane 4.69e-002 4.19e-001
                        Cyclohexane 1.46e-002 1.30e-001
                      Other Hexanes 2.03e-002 1.81e-001

                           Heptanes 4.09e-002 3.65e-001
                  Methylcyclohexane 2.76e-002 2.46e-001
                            Benzene 8.93e-003 7.97e-002
                            Toluene 3.79e-002 3.39e-001
                       Ethylbenzene 2.89e-002 2.58e-001

                            Xylenes 1.11e-001 9.90e-001
                        C8+ Heavies 2.07e-001 1.85e+000
    ------------------------------- --------- ---------
                   Total Components    100.00 8.93e+002



FLASH TANK OFF GAS STREAM
-------------------------------------------------------------
    Temperature:    200.00 deg. F
    Pressure:        49.70 psia
    Flow Rate:   8.28e+002 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 2.91e+000 1.14e+000
                     Carbon Dioxide 1.71e-001 1.64e-001
                           Nitrogen 4.46e-001 2.73e-001
                            Methane 6.63e+001 2.32e+001
                             Ethane 1.77e+001 1.16e+001

                            Propane 7.11e+000 6.84e+000
                          Isobutane 7.99e-001 1.01e+000
                           n-Butane 2.18e+000 2.76e+000
                         Isopentane 4.37e-001 6.88e-001
                          n-Pentane 6.26e-001 9.85e-001

                       Cyclopentane 2.34e-003 3.58e-003
                           n-Hexane 2.08e-001 3.92e-001
                        Cyclohexane 5.65e-002 1.04e-001
                      Other Hexanes 9.14e-002 1.72e-001
                           Heptanes 1.50e-001 3.28e-001

                  Methylcyclohexane 8.86e-002 1.90e-001
                            Benzene 1.93e-002 3.29e-002
                            Toluene 5.76e-002 1.16e-001
                       Ethylbenzene 2.83e-002 6.54e-002
                            Xylenes 8.24e-002 1.91e-001

                        C8+ Heavies 4.79e-001 1.78e+000
    ------------------------------- --------- ---------
                   Total Components    100.00 5.21e+001



FLASH TANK GLYCOL STREAM
-------------------------------------------------------------
    Temperature:    200.00 deg. F
    Flow Rate:   1.50e+000 gpm
```

```
                  Component           Conc.   Loading
                                      (wt%)   (lb/hr)
    ------------------------------ --------- ---------
                               TEG 9.50e+001 7.99e+002
                             Water 4.74e+000 3.98e+001
                    Carbon Dioxide 5.94e-004 4.99e-003
                          Nitrogen 1.26e-004 1.06e-003
                           Methane 1.11e-002 9.35e-002

                            Ethane 1.55e-002 1.30e-001
                           Propane 1.87e-002 1.57e-001
                         Isobutane 3.58e-003 3.01e-002
                          n-Butane 1.19e-002 1.00e-001
                        Isopentane 3.07e-003 2.58e-002

                         n-Pentane 5.20e-003 4.37e-002
                      Cyclopentane 6.92e-005 5.82e-004
                          n-Hexane 3.15e-003 2.65e-002
                       Cyclohexane 3.17e-003 2.67e-002
                     Other Hexanes 1.12e-003 9.37e-003

                          Heptanes 4.50e-003 3.78e-002
                 Methylcyclohexane 6.72e-003 5.65e-002
                           Benzene 5.57e-003 4.68e-002
                           Toluene 2.65e-002 2.23e-001
                      Ethylbenzene 2.29e-002 1.93e-001

                           Xylenes 9.50e-002 7.99e-001
                       C8+ Heavies 8.08e-003 6.79e-002
    ------------------------------ --------- ---------
                  Total Components    100.00 8.41e+002


REGENERATOR OVERHEADS STREAM
------------------------------------------------------------
    Temperature:    212.00 deg. F
    Pressure:        14.70 psia
    Flow Rate:   5.93e+002 scfh

                  Component           Conc.   Loading
                                      (vol%)  (lb/hr)
    ------------------------------ --------- ---------
                             Water 9.82e+001 2.77e+001
                    Carbon Dioxide 7.25e-003 4.99e-003
                          Nitrogen 2.41e-003 1.06e-003
                           Methane 3.72e-001 9.35e-002
                            Ethane 2.77e-001 1.30e-001

                           Propane 2.28e-001 1.57e-001
                         Isobutane 3.32e-002 3.01e-002
                          n-Butane 1.10e-001 1.00e-001
                        Isopentane 2.19e-002 2.47e-002
                         n-Pentane 3.71e-002 4.19e-002

                      Cyclopentane 5.17e-004 5.67e-004
                          n-Hexane 1.90e-002 2.57e-002
                       Cyclohexane 1.78e-002 2.35e-002
                     Other Hexanes 6.47e-003 8.72e-003
                          Heptanes 2.35e-002 3.69e-002

                 Methylcyclohexane 3.20e-002 4.91e-002
                           Benzene 3.51e-002 4.29e-002
                           Toluene 1.37e-001 1.97e-001
                      Ethylbenzene 1.00e-001 1.66e-001
                           Xylenes 4.05e-001 6.73e-001
    ------------------------------ --------- ---------
                  Total Components    100.03 2.95e+001
```

```
GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Chevron Appalachia, LLC
File Name: M:\Projects\C\Chevron\WV Air Permit Applications\Curry Wellpad\G70-C
Update\GlyCalc\Curry.ddf
     Date: July 21, 2016

 DESCRIPTION:
 -------------------------------------------------------------------

    Description: Curry Wellpad

    Annual Hours of Operation:    8760.0 hours/yr

 WET GAS:
 -------------------------------------------------------------------

     Temperature:    120.00 deg. F
     Pressure:      1200.00 psig
                  Wet Gas Water Content: Subsaturated
        Specified Wet Gas Water Content:     30.00 lbs. H2O/MMSCF

                Component               Conc.
                                       (vol %)
     ------------------------------- -----------
                      Carbon Dioxide      0.0951
                            Nitrogen      0.4718
                             Methane     71.7791
                              Ethane     16.8548
                             Propane      6.4465

                           Isobutane      0.7037
                            n-Butane      1.7990
                          Isopentane      0.3810
                           n-Pentane      0.5124
                        Cyclopentane      0.0010

                            n-Hexane      0.1584
                         Cyclohexane      0.0201
                       Other Hexanes      0.0743
                            Heptanes      0.0997
                   Methylcyclohexane      0.0349

                             Benzene      0.0019
                             Toluene      0.0058
                        Ethylbenzene      0.0035
                             Xylenes      0.0095
                         C8+ Heavies      0.1913


 DRY GAS:
 -------------------------------------------------------------------

                         Flow Rate:      30.0 MMSCF/day
                     Water Content:       7.0 lbs. H2O/MMSCF


 LEAN GLYCOL:
 -------------------------------------------------------------------

                       Glycol Type: TEG
                     Water Content:       1.5 wt% H2O
                         Flow Rate:       1.4 gpm


 PUMP:
 -------------------------------------------------------------------
```

```
                Glycol Pump Type: Gas Injection
   Gas Injection Pump Volume Ratio:     0.080 acfm gas/gpm glycol



FLASH TANK:
-------------------------------------------------------------------

                          Flash Control: Vented to atmosphere
                      Temperature:     200.0 deg. F
                         Pressure:      35.0 psig
```

Attachment Q

PNEUMATIC CONTROLLERS DATA SHEET

ATTACHMENT Q – PNEUMATIC CONTROLLERS 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?

☐ Yes ☒ No

Please list approximate number. N/A

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?

☐ Yes ☒ No

Please list approximate number. N/A

Attachment R

AIR POLLUTION CONTROL DEVICE / EMISSION REDUCTION DEVICE (ERD) SHEET

ATTACHMENT R – 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:	Make/Model:
Primary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No
Secondary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No

VAPOR RECOVERY UNIT

General Information

Emission Unit ID#: **VRU**

Installation Date: **2016**
☒ New ☐ Modified ☐ Relocated

Device Information

Manufacturer: **Hy-Bon**
Model: **HB-HG12307HIE-100-18DV**

List the emission units whose emissions are controlled by this vapor recovery unit (Emission Point ID# **VS-1**)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
ABJ-0011A	**Produced Water Tank**		
ABJ-0011B	**Produced Water Tank**		
ABJ-0014	**Blowdown Test Storage Tank**		
MBD-0110	**Glycol Dehydration Unit Flash Tank**		

If this vapor recovery unit controls emissions from more than six (6) emission units, please attach additional pages.

Additional information attached? ☒ Yes ☐ No
Please attach copies of manufacturer's data sheets, drawings, and performance testing.

The registrant may claim a capture and control efficiency of 95 % (which accounts for 5% downtime) for the vapor recovery unit.

The registrant may claim a capture and control efficiency of 98% if the VRU has a backup flare that meet the requirements of Section 8.1.2 of this general permit.

The registrant may claim a capture and control efficiency of 98% if the VRU has a backup VRU.

AMBU Vapor Recovery Unit (VRU) DATA SHEET

Sheet 1 OF 3

AMBU
Chevron North America
Exploration and Production Company

Project: Curry Pad A
Location: 1692 Waymans Ridge Road, Moundsville, WV 26041
WBS: UWSAP-D5099-MCH
Project Owner: Tim Vandall
Phone / Email: (724) 272-0370/ tim.vandall@chevron.com

REV.	DATE	DOCUMENT STATUS	ORIG.	CHK	Approval
A	7/7/2016	Request for Quote	JBM		JBM

1 **Note:** m **Information to be completed by Purchaser** Δ **By Manufacturer** o **Option**

GENERAL INFORMATION

2 Applicable to: x Proposal o Purchase o As Built
3 m Client: **Chevron AMBU**
4 m Equipment ID: **VRU Tag (CBA-0055)** m FMT: **Tri-State**
5 m Service: **Vapor from All Tanks** m No. of Units Required: **1**
6 m Type: **Oil Flooded Screw** Δ Model No.: **(fill)**
7 m Mfr.: **(fill)**

DESIGN CONDITIONS

8 m Flow Rate (mscfd): m Initial **155 (120 psi)** m Max **380(120 psi)** m Future **55 (300 psig)**
9 m Gas Analysis Attached: x Yes o No m CO$_2$ Cont (mole frac) **0.003400**
10 m H$_2$S Content (ppm): m **None** Δ K Value: **(fill)**
11 m Specific Gravity m **1.558 rel to air**
12 m NACE MR-0175 Trim: x No Sour Trim Required o Sour Trim Required
13 m Pressure (psig): m Suction **0** m Discharge **120** initial **300** future
14 m Temperature (°F): m Suction **20-90** Δ Discharge **120**

COMPRESSORS AND DRIVERS

15 m Compressor Type Required: o Lobe o Rotary Vane o Screw x Oil Flooded
16 m Drive Arrangement Required: o Gear x Direct Coupled o V-Belt w/Jackshaft
17 Δ Compressor Manufacturer: **LeROI** Δ Model No. **HG12307HIE** Δ Data Sheet
18 m Driver Type Required: o Engine x Elec Motor o Turbine o Others
19 Δ Driver Manufacturer: **Marathon (or equal)** Δ Model No. Δ Data Sheet:
20 Δ Driver Data: Δ Horsepower: **100** Δ Speed (rpm): **1800**
21 Δ Driver Electrical Data: m Voltage: **460** m Phase: **3-ph** m Frequency (Hz): **60**
22 m Electric Motor Definition: x TEFC o Explosion Proof
23 Δ Motor Starter: o Skid Mounted x Remotely Mounted Δ Manufacturer: **By Chevron**
24 Δ Circuit Breaker: o Skid Mounted x Remotely Mounted Δ Manufacturer: **By Chevron**
25 Area Classification (if skid mounted): Class 1 Div 2

PRESSURE VESSELS

26 m Vessels: x Suction Scrubber o Discharge Scrubber x Oil/Gas Separator
27 m Corrosion Allowance: x Yes o No m Corrosion Allowance (in): **1/16"**
28 m Level Gauge with Cocks and Check Valves (in Addition to Std. Scrubber Equipment): x Yes o No
29 m Pressure Indicator w/Isolating Valve: x Yes o No
30 m Internal coating required: o Yes x No *See Sheet 2 for coating details

SUCTION SCRUBBERS

31 Δ Manufacturer: **HYBON** Δ Vessel Data Sheet:
32 Δ Outside Diameter (in): **16** Δ Length, Seam to Seam (ft): **5** m MAWP (psig) **125**
33 m Operating Pressure (psig): **0** m Design Temp. (°F): **200** m Operating Temperature (°F): **20-90**
34 m Mist Eliminator: o Yes x No Δ Type: o Mesh o Vane

35	Δ m	**Nozzle Schedule:**	**Size (in)**	**Rating**	**Face**	**Comments:**
36	Δ x	Inlet	**6**	**150 #**	**RF**	
37	x	High Level - Pump Start	**2**	**3000#**	**NPT**	Mounted on Vessel
38	x	Level Bridle (LSH and LG)	**2**	**150#**	**RF**	2" bridle with 3/4" taps for sight glass and 2" NPT for LSH
39	x	Pressure Indicator	**3/4**	**3000#**	**NPT**	
40	x	Drain	**1**	**3000#**	**NPT**	
41	Δ x	Outlet	**4**	**150#**	**RF**	
42	x	Low Level - Pump Stop	**2**	**3000#**	**NPT**	Mounted on Vessel
43	Δ x	Relief Valve	**2**	**150#**	**RF**	Mounted on Vessel upstream any Mist Extractor if any
44	Δ x	Recycle Line	**2**	**150#**	**RF**	
45	Δ x	Manway/Handhole	**-**			
46	x	Other:	**3/4**	**3000#**	**NPT**	Temperature Indicator

47 **Comments:** Line 28: 316 SS recommended
48

AMBU Vapor Recovery Unit (VRU) DATA SHEET

Sheet 2 OF 3

AMBU
Chevron North America
Exploration and Production Company

Project: Curry Pad A
Location: 1692 Waymans Ridge Road, Moundsville, WV 26041
WBS: UWSAP-D5099-MCH
Project Owner: Tim Vandall
Phone / Email: (724) 272-0370/ tim.vandall@chevron.com

DISCHARGE SCRUBBERS (Oil / Gas Separator)

1 Δ Manufacturer: **HYBON** Δ Vessel Data Sheet No.:
2 Δ Outside Diameter (in): **16** Δ Length, Seam to Seam (ft): **5**
3 m Operating Pressure (psig): **120 - 300** Δ Design Temp. (°F): **300**
4 Δ Operating Temperature (°F): **120** m MAWP (psig): **400**
5 m Mist Eliminator: x Yes o No Δ Mist Eliminator Type: o Mesh o Vane

6	Δ **Nozzle Schedule:**	**Size (in)**	**Rating**	**Face**		**Comments:**
7	o Inlet	**2**	**300#**	**RF**		
8	o Spare	**2**	**300#**	**RF**		Mounted on Vessel
9	o Level Bridle (LSH and LG)	**2**	**300#**	**RF**		
10	o Pressure Indicator	**3/4**	**3000#**	**NPT**		
11	o Drain	**1**	**3000#**	**NPT**		
12	o Outlet	**2**	**300#**	**RF**		
13	o Oil Fill	**2**	**300#**	**RF**		Angled up to allow for ease of filling oil
14	o Relief Valve	**2**	**300#**	**RF**		
15	o Oil Recycle	**1**	**3000#**	**NPT**		Oil Recycle back to compressor
16	o Manway/Handhole	**-**				
17	o Pressure Diff Ind.	**1/2"**	**3000#**	**NPT**		Two fittings, one upstream Filter, one downstrear

LIQUIDS PUMP / BLOWCASE

18 m Liquids Pump Required: x Yes o No — Blow Case Required: o Yes x No
19 m Type: x Gear o Centrifugal o Other: **(fill)** — Δ Manufacturer: **Tuthill 2LE**
20 m Material: o 316 SS x CS x Ductile Iron — Δ MAWP (psig): **720 (Op @ 50)**

COMPRESSOR CASE COOLING SYSTEM

21 m Sight Flow Indicators: x Yes o No m Temperature Indicators: x Yes o No
22 m Gas Aftercooling: x Yes o No Cool to Temperature (°F): **120**
23 Δ Auto Control of Cooler Air Circulation: o Yes o No
24 Δ Cooler Control Method: x Louvres o Variable Pitch Fan
25 m Cooler Bug Screens: o Yes x No
26 m Gas Pre-cooling: o Yes x No Cool to Temperature (°F): **N/A**
27 m Cooler Structure Hot-Dipped Galvanized: o Yes x No

INTERNAL AND EXTERNAL COATINGS

28 m External Coating required x Yes o No
29 m Internal Coating Required o Yes x No o Corvell EC-1660 m Other:
30 m External Primer: **See Coating Standard** m Top Coat: **See Std.** Color: Gumbo Buster Green

31 **Comments:** Cooler bug screens are not normally required because guard is expanded metal screen cover only. Bug screens may be required in areas with Cotton Wood trees.
Line 22: For SID requirements. Guarding may be used as an alternate. Consider gas contract requirements.

AMBU Vapor Recovery Unit (VRU) DATA SHEET

Sheet 3 OF 3

AMBU
Chevron North America
Exploration and Production Company

Project: Curry Pad A
Location: 1692 Waymans Ridge Road, Moundsville, WV 26041
WBS: UWSAP-D5099-MCH
Project Owner: Tim Vandall
Phone / Email: (724) 272-0370/ tim.vandall@chevron.com

PIPING AND VALVES

1	m Process Gas Piping:	o Screwed	o Socket Welded	x Butt Welded
2	m Utility Piping:	x Screwed	o Socket Welded	o Butt Welded
3	m Tube Fittings:	o Steel	o 304 Stainless Steel	x 316 Stainless Steel
4	m Sour Service:	o Yes x No	m Fire-Safe Valves required:	o Yes x No
5	m Valves Mounted in Piping:	x Suction Block Valve	x Discharge Block Valve	x Check Valve
6	m Suct. **150#** Disch **300#**	x Blowdown Valve	x Purge Valve	x By-pass valve
7	m Temporary Startup Screens required:	x Yes	o No	
8	m Relief Valve Vent Pipes Vent Gas Discharge:	x Upward to Atmosphere	o Skid Edge	
9	m Height of Discharge:	**10 ft**		

ELECTRICAL SYSTEM

10	Δ Electrical Power	Volts (AC)	Phase	Hertz	Volts (DC)	**Comments:**
11	m Main Prime Mover	**460**	**3-ph**	**60**	**-**	VFD will be installed offskid
12	m Transfer Pump Motors	**460**	**3-ph**	**60**	**-**	
13	Δ Heaters	**-**	**-**		**-**	
14	m Instrumentation	**-**	**-**		**24**	

INSTRUMENT AIR / INSTRUMENT GAS

15	m Instrument air available at site:	x Yes	o No
16	m Instrument gas available at site:	o Yes	o No

INSTRUMENTS AND CONTROLS

17	m Control Rack provided Company	o Yes	x No	
18	m Control panel provided Company	o Yes	x No	
19	m Panels with Enclosed Backs:	x Yes	o No	m Panel **Must meet Class 1 Division 2 req.**
20	m Panel Type:	o Free-Standing	x Skid-Mounted	o Off-Skid Mounted

CAPACITY CONTROL

21	m Capacity Control:	o No x Yes	x Suction Pressure	x Discharge Pressure	
22	m Pressure Range:	From **0** To **24**	o in H_2O	o in psig	x oz/sq. in.
23	m Capacity Control Operation:	o Manual	x Automatic with Manual Override		
24	Δ Start-up Bypass (for screw compressors):	o No	o Yes	o N/A	

END DEVICES

25	Δ m Instrument Device	Yes	No	Manufacturer	Model	Range From:	Range To:
26	Recycle Valve	x	o	**Kimray**		**100-175 psi U/S**	**3-8 oz D/S**
27	Level Scrubber Switch(s)	x	o	**Murphy**	**LS200**		
28	Discharge Temp. Transmitter	x	o	**Rosemount**	**248**	**100°F**	**400°F**
29	Discharge Pressure Transmitter	x	o	**Rosemount**	**2088**	**0 PSIG**	**300 psig**
30	Pressure Gauge	x	o	**Wika**	**2-1/2" Silicone Fill**	**0 PSIG**	**300 psig**
31	Gauge Cock	x	o	**Penberthy**			
32	Lube Oil (Flow) Press Transmitter	x	o	**Pro-Flo Jr**	**0-PF1-JR-D**		
33	Vibration Transmitter	x	o	**Metrix**			
34	Sight Glasses	x	o	**Penberthy**			
35	Thermowells	x	o	**Rosemount**	**w/ transmitter**		
36	Oxygen Sensor	x	o	**Rosemount (or equiv.)**			
37	Manometer	o	o				
38	Other	o	o				

39 **Comments:** Suction pressure Transmitter, Motor Starters By Chevron. Cabling shall be type CLX. All electrical components shall be rated for Class 1 Div 2 areas and -20 F ambient temperature (or lower). Control Panel drawings shall be provided, reviewed and approved by Chevron Engineer. Allen Bradley Compact Logix PLC shall be specified for control system.

40 Tubing shall be (Swagelok or SSP)

41

Attachment S

EMISSION CALCULATIONS

Line Heaters

BAP-0110, BAP-0810

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. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	5.5	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,319	8,760	0.004	0.02
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,319	8,760	0.001	0.006
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.001	<0.001
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.001	<0.001
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.001	<0.001
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.001	<0.001
CO	84	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,319	8,760	0.06	0.28
NOx	100	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,319	8,760	0.08	0.33
PM_{10}	7.6	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,319	8,760	0.006	0.03
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	1.00	1,319	8,760	<0.001	0.002
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	1.00	1,319	8,760	116.98	512.36
CH_4	0.001	kg CO_2 / MMBtu	40 CFR Subpart C	1.00	1,319	8,760	0.002	0.01
N_2O	0.0001	kg CO_2 / MMBtu	40 CFR Subpart C	1.00	1,319	8,760	<0.001	<0.001
Total HAPs							0.001	0.006
Total CO_2e							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_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Example Equations:

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

Line Heaters

BAP-0210, BAP-0910, BAP-0012

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. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	5.5	lb/10^6 scf	AP-42 Chapter 1.4	1.25	1,319	8,760	0.005	0.02
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	1.25	1,319	8,760	0.002	0.007
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	1.25	1,319	8,760	<0.001	<0.001
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	1.25	1,319	8,760	<0.001	<0.001
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	1.25	1,319	8,760	<0.001	<0.001
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	1.25	1,319	8,760	<0.001	<0.001
CO	84	lb/10^6 scf	AP-42 Chapter 1.4	1.25	1,319	8,760	0.08	0.35
NOx	100	lb/10^6 scf	AP-42 Chapter 1.4	1.25	1,319	8,760	0.09	0.42
PM_{10}	7.6	lb/10^6 scf	AP-42 Chapter 1.4	1.25	1,319	8,760	0.007	0.03
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	1.25	1,319	8,760	<0.001	0.002
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	1.25	1,319	8,760	146.22	640.45
CH_4	0.001	kg CO_2 / MMBtu	40 CFR Subpart C	1.25	1,319	8,760	0.003	0.01
N_2O	0.0001	kg CO_2 / MMBtu	40 CFR Subpart C	1.25	1,319	8,760	<0.001	0.001
Total HAPs							0.002	0.008
Total CO_2e							146.37	641.11

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_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Example Equations:

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

Flash Gas Compressor Engine - CBA-0050

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	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	0.16	g/bhp-hr	Manufacturer Guarantee	1,319	276	8,122	8,760	0.19	0.84
Formaldehyde	0.16	g/bhp-hr	Manufacturer Guarantee	1,319	276	8,122	8,760	0.09	0.42
Benzene	1.58E-03	lb/MMBtu	AP-42 Chapter 3.2	1,319	276	8,122	8,760	0.004	0.02
Toluene	5.58E-04	lb/MMBtu	AP-42 Chapter 3.2	1,319	276	8,122	8,760	0.001	0.005
Ethylbenzene	2.48E-05	lb/MMBtu	AP-42 Chapter 3.2	1,319	276	8,122	8,760	<0.001	<0.001
Xylenes	1.95E-04	lb/MMBtu	AP-42 Chapter 3.2	1,319	276	8,122	8,760	<0.001	0.002
CO	0.30	g/bhp-hr	Manufacturer Guarantee	1,319	276	8,122	8,760	0.18	0.80
NOx	0.25	g/bhp-hr	Manufacturer Guarantee	1,319	276	8,122	8,760	0.15	0.67
PMFil-10/2.5	9.50E-03	lb/MMBtu	AP-42 Chapter 3.2	1,319	276	8,122	8,760	0.02	0.09
PMCondensable	9.91E-03	lb/MMBtu	AP-42 Chapter 3.2	1,319	276	8,122	8,760	0.02	0.10
SO_2	5.88E-04	lb/MMBtu	AP-42 Chapter 3.2	1,319	276	8,122	8,760	0.001	0.006
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	1,319	276	8,122	8,760	53.97	236.38
CH_4	0.001	kg CO_2 / MMBtu	40 CFR Subpart C	1,319	276	8,122	8,760	0.001	0.004
N_2O	1.00E-04	kg CO_2 / MMBtu	40 CFR Subpart C	1,319	276	8,122	8,760	<0.001	<0.001
Total HAPs								0.10	0.44
Total CO_2e								54.02	236.62

Notes:

-Engine emissions are controlled through the operation of NSCR.

-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.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=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)

Glycol Reboiler
BBC-0100

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. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	5.5	lb/10^6 scf	AP-42 Chapter 1.4	0.5	1,319	8,760	0.002	0.01
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	0.5	1,319	8,760	<0.001	0.003
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	0.5	1,319	8,760	<0.001	<0.001
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	0.5	1,319	8,760	<0.001	<0.001
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	0.5	1,319	8,760	<0.001	<0.001
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	0.5	1,319	8,760	<0.001	<0.001
CO	84	lb/10^6 scf	AP-42 Chapter 1.4	0.5	1,319	8,760	0.03	0.14
NOx	100	lb/10^6 scf	AP-42 Chapter 1.4	0.5	1,319	8,760	0.04	0.17
PM_{10}	7.6	lb/10^6 scf	AP-42 Chapter 1.4	0.5	1,319	8,760	0.003	0.01
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	0.5	1,319	8,760	<0.001	<0.001
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	0.5	1,319	8,760	58.49	256.18
CH_4	0.001	kg CO_2 / MMBtu	40 CFR Subpart C	0.5	1,319	8,760	0.001	0.00
N_2O	0.0001	kg CO_2 / MMBtu	40 CFR Subpart C	0.5	1,319	8,760	<0.001	<0.001
Total HAPs							<0.001	0.003
Total CO_2e							58.55	256.44

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_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Example Equations:

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

Dehydrator Emissions

Regenerator Overhead Vent - E0100B

Pollutant	Max. Hourly Controlled Emissions (lb/hr)	Max. Annual Controlled Emissions (tons/yr)
VOCs	1.58	6.91
HAPs	1.10	4.84
Benzene	0.04	0.19
Ethylbenzene	0.17	0.73
Toluene	0.20	0.86
Xylenes	0.67	2.95
n-Hexane	0.03	0.11
Methane	0.09	0.41
CO_2e	2.34	10.23

Flash Tank - MBD 0110

Pollutant	Max. Hourly Controlled Emissions (lb/hr)	Max. Annual Controlled Emissions (tons/yr)
VOCs	15.66	68.59
HAPs	0.80	3.49
Benzene	0.03	0.14
Ethylbenzene	0.07	0.29
Toluene		0.51
Xylenes	0.19	0.84
n-Hexane	0.39	1.72
Methane	23.21	101.67
CO_2e	580.32	2,541.81

- The flash tank included within the Curry wellpad will be routed to the Vapor Recovery Unit (VRU). The emission rates displayed above for the Flash Tank are pre-control emission rates. Post-control emissions are calculated on the VRU emission calculations included with this submittal.

- The regenerator overhead vent will at the Curry wellpad will be uncontrolled.

- Emission rates for the dehydrator were calculated using GRI-GLYCALC version 4.0. The GRI-GLYCALC output sheets for the Curry site are attached.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1. GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Produced Water Tanks ABJ-0011(A-B) and Blowdown Test Storage Tank ABJ-0014

Pollutant	Max. Uncontrolled Hourly Emissions using ProMax (lb/hr)	Max. Uncontrolled Annual Emissions using ProMax (tons/yr)
VOCs	118.65	519.69
Total HAPs	5.71	25.02
Hexane	5.28	23.12
Benzene	0.06	0.26
Toluene	0.16	0.68
Ethylbenzene	0.06	0.28
Xylenes	0.15	0.68
CO_2	1.33	5.83
CH_4	50.83	222.61
Total CO_2e	1,271.96	5,571.18

Notes:

-Emission rates for Produced Water Tanks ABJ-0011A, ABJ-0011B, and Test Tank ABJ-0014 were calculated using ProMax software. ProMax output sheets for the Curry Pad are attached.

-The Blowdown Test Tank (ABJ-0014) is a tank with 2 modes of operation. The tank will act as as a produced water tank during normal operations and will receive produced water from the separators. The produced water tanks and test tank are manifolded together. The test tank will also receive fluids from maintenance blowdown actitivies, as represented in the Test Tank calculations.

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.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

-CO_2 and CH_4 emissions solved for using emissions rates (lb/hr) of "Flash Gas" from the ProMax output sheets.

-For emission calculation purposes, the total throughput for tanks ABJ-0011(A-B), ABJ-0014 is modeled as being received through a single tank. The throughput value represents the total throughput for all three (3) 400-barrel tanks. Therefore, emission rates represent a total from all produced fluids tanks located on the well pad. Actual throughput for each tank will vary based on operations.

Blowdown Events (ABJ-0014)

Pollutant	Max. Uncontrolled Hourly Emissions using ProMax (lb/hr)	Max. Uncontrolled Annual Emissions using ProMax (tons/yr)
VOCs	97.46	0.15
Total HAPs	4.47	0.01
Hexane	3.79	0.01
Benzene	0.05	0.000
Toluene	0.19	0.000
Ethylbenzene	0.12	0.000
Xylenes	0.32	0.000
CO_2	0.81	0.001
CH_4	134.00	0.20
Total CO_2e	3,350.75	5.03

Notes:

-Emissions from short term maintenance blowdowns are not included in the Site PTE for Max. Hourly Emissions (lb/hr), as displayed in the calculation summary table of this application, since they are irregular and are associated with site maintenance activities.

-Emission rates for blowdown test tank ABJ-0014 were calculated using ProMax software. ProMax blowdown summary sheets are attached.

-Pound/hour emissions based on one 15 minute blowdown event. The wells are blown down 3 times per year.

-Blowdown events are routed to a vent stack (VS-1) and are uncontrolled emission releases.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Subpart W Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

-CO_2 and CH_4 emissions solved for using emissions rates (lb/hr) of flash gas from ProMax summary sheets.

Equations

VOCs **(lb/hr)** = Total emission rate output from ProMax **(lb/hr) x .25 (hrs)**

VOCs **(tons/yr)** = Max. Hourly Emissions **(lb/hr)** x 3 blowdowns per year ÷ 2000 (**lbs/ton**)

Tank Unloading Operations ZZZ-001AB, ZZZ-0014

Total Emissions from Tank Unloading Operations

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	2.22	3.98
HAPs	0.003	0.01
CO_2	0.014	0.06
CH_4	0.11	0.50
Total CO_2e	2.90	12.52

Notes:

Tank Unloading Operations will be uncontrolled at the Curry natural gas production facility

-Emission rates for liquid unloading operations were calculated using ProMax software. ProMax summary sheets are attached.

Vapor Recovery Unit

Emissions from Tanks

Waste Gas to VRU	Pollutant	Amount of Gas Sent to VRU (lbs/hr)	Amount of Gas Sent to VRU (tons/year)	VRU Control Efficiency	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
Produced Water Tanks ABJ-0011(A-B), Test Tank ABJ-0014	VOCs	118.65	519.69	95%	5.93	25.98
	Total HAPs	5.71	25.02	95%	0.29	1.25
	Hexane	5.28	23.12	95%	0.26	1.16
	Benzene	0.06	0.26	95%	0.003	0.01
	Toluene	0.16	0.68	95%	0.01	0.03
	Ethylbenzene	0.06	0.28	95%	0.003	0.01
	Xylenes	0.15	0.68	95%	0.008	0.03
	CO_2	1.33	5.83	95%	0.07	0.29
	CH_4	50.83	222.61	95%	2.54	11.13
	CO_2e	1,271.96	5,571.18	95%	63.60	278.56
Glycol Dehydration Unit Flash Tank (MBD-0110)	VOCs	15.66	68.59	95%	0.78	3.43
	Total HAPs	0.80	3.49	95%	0.04	0.17
	Hexane	0.03	0.14	95%	0.002	0.01
	Benzene	0.07	0.29	95%	0.003	0.01
	Toluene	<0.001	0.51	95%	<0.001	0.03
	Ethylbenzene	0.19	0.84	95%	0.01	0.04
	Xylenes	0.39	1.72	95%	0.02	0.09
	CO_2	23.21	101.67	95%	1.16	5.08
	CH_4	580.32	2541.81	95%	29.02	127.09
	CO_2e	14,531.21	63,646.80	95%	726.56	3,182.34
Totals	VOCs	134.31	588.28	95%	6.72	29.41
	Total HAPs	6.51	28.51	95%	0.33	1.43
	Hexane	5.31	23.27	95%	0.27	1.16
	Benzene	0.12	0.55	95%	0.006	0.03
	Toluene	0.16	1.19	95%	0.01	0.06
	Ethylbenzene	0.25	1.12	95%	0.013	0.06
	Xylenes	0.55	2.39	95%	0.03	0.12
	CO_2	24.54	107.50	95%	1.23	5.37
	CH_4	631.15	2764.42	95%	31.56	138.22
	CO_2e	15,803.17	69,217.98	95%	790.16	3,460.90

Notes:

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

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Example Calculations:

Waste Gas Flow Rate **(lb/hr)** x 1- Control Efficiency **(%)** = Emission Rate **(lb/hr)**

Fugitive Emissions from Unpaved Haul Roads

Constant	Industrial Roads		
	PM	PM-10	PM-2.5
k (lb/VMT)	4.9	1.5	0.15
a	0.7	0.9	0.9
b	0.45	0.45	0.45

where

k Patricle size multiplier[1]

s 4.8 Silt content of road surface material (%)

p 150 Number of days per year with precipitation

Item Number	Description	Number of Wheels	W	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)	PM-2.5 Emissions (tons/yr)
			Mean Vehicle Weight (tons)												
1	Liquids Hauling	14	30	10	0.19	1	7,055	NA	NA	0.81	2.86	0.21	0.73	0.02	0.07
2	Employee Vehicles	4	3	10	0.19	1	200	NA	NA	0.29	0.03	0.07	0.01	0.01	<0.001
									Totals:	**1.10**	**2.89**	**0.28**	**0.74**	**0.03**	**0.07**

Notes:

[1] - Particle Size Multiplier used from AP-42 13.2.2 - Final Version 11/2006

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

[3] - 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 (lb/Vehicle Mile Traveled) - $E = k \times (s/12)^{a} \times (W/3)^{b}$ Equation 1a from AP-42 13.2.2 - Final Version 11/2006

Size Specific Emissions (lb/VMT) - $E_{ext} = E[(365-p)/365]$ 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[1]

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

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

Well Specific Equipment Counts

Facility Equipment Type	Count on Site
Wellheads	4
Separators	5
Meters/Piping	5
Compressors	2
In-line Heaters	6
Dehydrators	1

Well Gas Composition

Emissions from Flaring Operations	Propane	Butane	Pentanes	Heptane	Octane	Nonanes	Decanes	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylene	CO_2	CH_4
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)[2]	Hours of Operation	VOCs (lbs/hr)	VOCs (tons/yr)	HAPs (lbs/hr)	HAPs (tons/yr)	CO_2 (lbs/hr)	CO_2 (tons/yr)	CH_4 (lbs/hr)	CH_4 (tons/yr)	Total CO_2e (lbs/hr)	Total CO_2e (tons/yr)
Valves	241	0.027	8760	0.14	0.62	0.008	0.03	0.001	0.005	0.18	0.79	4.52	19.79
Connectors	1058	0.003	8760	0.07	0.30	0.004	0.02	<0.001	0.002	0.09	0.39	2.20	9.65
Open-ended Lines	16	0.06	8760	0.02	0.09	0.001	0.005	<0.001	<0.001	0.03	0.12	0.68	2.97
Pressure Relief Valves	8	0.04	8760	0.007	0.03	<0.001	0.002	<0.001	<0.001	0.01	0.04	0.22	0.97
			Total Emissions:	**0.24**	**1.05**	**0.01**	**0.06**	**0.002**	**0.01**	**0.30**	**1.33**	**7.62**	**33.38**

[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

Curry Natural Gas Production Site Total Emissions

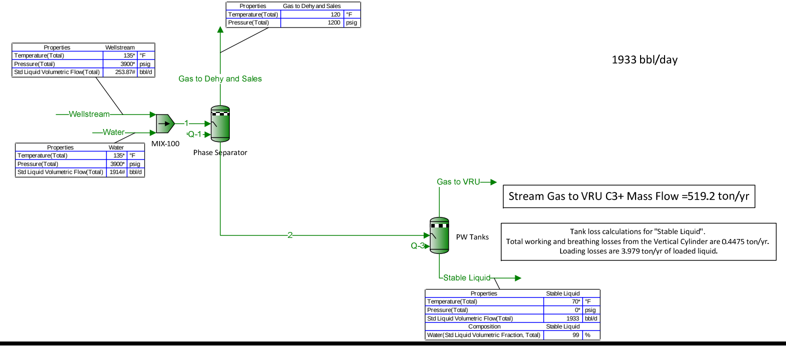
	VOCs		HAPs		CO		NO$_x$		PM - 10/2.5		SO_2		CO_2		CH_4		N_2O		CO_2e	
Emission Sources	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
Line Heater (E0110)	0.004	0.02	0.001	0.006	0.06	0.28	0.08	0.33	0.006	0.03	<0.001	0.002	116.98	512.36	0.002	0.01	<0.001	<0.001	117.10	512.89
Line Heater (E0210)	0.005	0.02	0.002	0.008	0.08	0.35	0.09	0.42	0.007	0.03	<0.001	0.002	146.22	640.45	0.003	0.01	<0.001	0.001	146.37	641.11
Line Heater (E0810)	0.004	0.02	0.001	0.006	0.06	0.28	0.08	0.33	0.006	0.03	<0.001	0.002	116.98	512.36	0.002	0.01	<0.001	<0.001	117.10	512.89
Line Heater (E0910)	0.005	0.02	0.002	0.008	0.08	0.35	0.09	0.42	0.007	0.03	<0.001	0.002	146.22	640.45	0.003	0.01	<0.001	0.001	146.37	641.11
Line Heater (E0012)	0.005	0.02	0.002	0.008	0.08	0.35	0.09	0.42	0.007	0.03	<0.001	0.002	146.22	640.45	0.003	0.01	<0.001	0.001	146.37	641.11
Glycol Reboiler (E0100A)	0.002	0.009	<0.001	0.003	0.03	0.14	0.04	0.17	0.003	0.01	<0.001	<0.001	58.49	256.18	0.001	0.005	<0.001	<0.001	58.55	256.44
Flash Gas Compressor (E0050)	0.19	0.84	0.10	0.44	0.18	0.80	0.15	0.67	0.02	0.09	0.001	0.006	53.97	236.38	0.001	0.004	<0.001	<0.001	54.02	236.62
Vapor Recovery Unit (VS-1)	6.72	29.41	0.33	1.43	--	--	--	--	--	--	--	--	1.23	5.37	31.56	138.22	--	--	790.16	3,460.90
Glycol Dehydrator (E0100B)	1.58	6.91	1.10	4.84	--	--	--	--	--	--	--	--	--	--	0.09	0.41	--	--	2.34	10.23
Blowdown Events (VS-1)	--	0.15	--	0.01	--	--	--	--	--	--	--	--	--	0.00	--	0.20	--	--	--	5.03
Tank Truck Loading Activities (VS-1)	2.22	3.98	0.003	0.01	--	--	--	--	--	--	--	--	0.01	0.06	0.11	0.50	--	--	2.90	12.52
Haul Roads	--	--	--	--	--	--	--	--	0.31	0.81	--	--	--	--	--	--	--	--	--	--
Fugitives Leaks	0.24	1.05	0.01	0.06	--	--	--	--	--	--	--	--	0.002	0.01	0.30	1.33	--	--	7.62	33.38
Totals	**10.97**	**42.46**	**1.55**	**6.82**	**0.58**	**2.54**	**0.63**	**2.74**	**0.37**	**1.06**	**0.001**	**0.02**	**786.32**	**3,444.07**	**32.08**	**140.73**	**<0.001**	**0.004**	**1,588.91**	**6,964.23**

Total Curry Natural Gas Production Site Total Controlled Emission Levels - HAP Speciation

	Total HAPs		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)	0.001	0.006	0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Line Heater (E0210)	0.002	0.008	0.002	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Line Heater (E0810)	0.001	0.006	0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Line Heater (E0910)	0.002	0.008	0.002	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Line Heater (E0012)	0.002	0.008	0.002	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Glycol Reboiler (E0100A)	<0.001	0.003	0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Flash Gas Compressor (E0050)	0.10	0.44	--	--	0.004	0.02	0.001	0.005	<0.001	<0.001	<0.001	0.002	0.09	0.42
Vapor Recovery Unit (VS-1)	0.33	1.43	0.27	1.16	0.006	0.03	0.008	0.06	0.013	0.06	0.03	0.12	--	--
Dehydrator (E0100B)	1.10	4.84	0.03	0.11	0.04	0.19	0.20	0.86	0.17	0.73	0.67	2.95	--	--
Blowdown Events (VS-1)	--	0.007	--	0.006	--	0.000	--	0.000	--	0.00	--	0.00	--	--
Tank Truck Loading Activities (VS-1)	0.003	0.01	0.003	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--
Haul Roads	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fugitives Leaks	0.01	0.06	0.02	0.07	<0.001	0.001	<0.001	0.01	<0.001	0.01	<0.001	0.02	--	--
Totals	**1.55**	**6.82**	**0.32**	**1.40**	**0.05**	**0.23**	**0.21**	**0.94**	**0.18**	**0.79**	**0.70**	**3.09**	**0.09**	**0.42**

Flowsheet1
Plant Schematic

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	



1933 bbl/day

Properties	Gas to Dehy and Sales	
Temperature(Total)	120	°F
Pressure(Total)	1200	psig

Properties	Wellstream	
Temperature(Total)	135*	°F
Pressure(Total)	3900*	psig
Std Liquid Volumetric Flow(Total)	253.87#	bbl/d

Properties	Water	
Temperature(Total)	135*	°F
Pressure(Total)	3900*	psig
Std Liquid Volumetric Flow(Total)	1914#	bbl/d

Stream Gas to VRU C3+ Mass Flow =519.2 ton/yr

Tank loss calculations for "Stable Liquid".
Total working and breathing losses from the Vertical Cylinder are 0.4475 ton/yr.
Loading losses are 3.979 ton/yr of loaded liquid.

Properties	Stable Liquid	
Temperature(Total)	70*	°F
Pressure(Total)	0*	psig
Std Liquid Volumetric Flow(Total)	1933	bbl/d
Composition	Stable Liquid	
Water(Std Liquid Volumetric Fraction, Total)	99	%

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Connections

	Gas to Dehy and Sales	Gas to VRU	Stable Liquid	Water	Wellstream
From Block	Phase Separator	PW Tanks	PW Tanks	--	--
To Block	--	--	--	MIX-100	MIX-100

Stream Composition

Mole Fraction	Gas to Dehy and Sales %	Gas to VRU %	Stable Liquid %	Water %	Wellstream %
Hydrogen Sulfide	0	0	0	0 *	0 *
Nitrogen	0.469379	0.173589	2.42399E-06	0 *	0.42 *
Carbon Dioxide	0.102584	0.446058	0.000240343	0 *	0.149 *
Methane	71.9471	46.744	0.00143094	0 *	66.896 *
Ethane	16.9144	19.9692	0.00131072	0 *	16.864 *
Propane	6.44009	13.3906	0.00230407	0 *	7.187 *
Isobutane	0.693716	2.17824	0.000810803	0 *	0.881 *
n-Butane	1.76094	6.64344	0.00361351	0 *	2.418 *
2,2-Dimethylpropane	0.00967544	0.0400886	2.94451E-05	0 *	0.014 *
Isopentane	0.360834	1.84411	0.00257453	0 *	0.607 *
n-Pentane	0.480329	2.7081	0.00507779	0 *	0.886 *
2,2-Dimethylbutane	0.00684984	0.0439427	0.000132774	0 *	0.015 *
Cyclopentane	0.000918484	0.00611414	1.64335E-05	0 *	0.002 *
2,3-Dimethylbutane	0.0139005	0.0923482	0.000381444	0 *	0.034 *
2-Methylpentane	0.0818151	0.53781	0.00247815	0 *	0.206 *
3-Methylpentane	0.0495816	0.330282	0.00170055	0 *	0.131 *
n-Hexane	0.138615	0.903792	0.00582133	0 *	0.394 *
Methylcyclopentane	0.0119035	0.0830606	0.000552665	0 *	0.036 *
Benzene	0.00169489	0.0111729	0.000112451	0 *	0.006 *
Cyclohexane	0.0173576	0.115836	0.000988242	0 *	0.057 *
2-Methylhexane	0.0301783	0.16232	0.00248631	0 *	0.116 *
3-Methylhexane	0.0311862	0.169022	0.00270962	0 *	0.124 *
2,2,4-Trimethylpentane	0	0	0	0 *	0 *
n-Heptane	0.0806878	0.404779	0.00821953	0 *	0.351 *
Methylcyclohexane	0.0283207	0.158218	0.00316101	0 *	0.133 *
Toluene	0.00466127	0.0248199	0.000670898	0 *	0.026 *
n-Octane	0.0721549	0.233828	0.0154802	0 *	0.528 *
Ethylbenzene	0.00257588	0.00886359	0.000697127	0 *	0.023 *
m-Xylene	0.00247574	0.00787932	0.000739787	0 *	0.024 *
o-Xylene	0.00438434	0.0136232	0.00143521	0 *	0.046 *
n-Nonane	0.0252616	0.0512095	0.0107205	0 *	0.331 *
n-Decane	0.0134935	0.014753	0.00974808	0 *	0.289 *
C11	0.0195519	0.0121803	0.0278559	0 *	0.806 *
Water	0.183414	2.47669	99.8865	100 *	0 *

Molar Flow	Gas to Dehy and Sales lbmol/h	Gas to VRU lbmol/h	Stable Liquid lbmol/h	Water lbmol/h	Wellstream lbmol/h
Hydrogen Sulfide	0	0	0	0 *	0 *
Nitrogen	0.218593	0.0117654	3.76104E-05	0 *	0.230396 *
Carbon Dioxide	0.0477741	0.0302324	0.00372914	0 *	0.0817357 *
Methane	33.5062	3.16816	0.0222023	0 *	36.6966 *
Ethane	7.87715	1.35345	0.020337	0 *	9.25094 *
Propane	2.99919	0.907572	0.0357497	0 *	3.94251 *
Isobutane	0.323068	0.147634	0.0125804	0 *	0.483283 *
n-Butane	0.820084	0.450272	0.0560669	0 *	1.32642 *
2,2-Dimethylpropane	0.00450592	0.00271708	0.000456868	0 *	0.00767986 *
Isopentane	0.168043	0.124988	0.0399463	0 *	0.332977 *
n-Pentane	0.223692	0.183547	0.0787866	0 *	0.486026 *
2,2-Dimethylbutane	0.00319001	0.0029783	0.00206011	0 *	0.00822843 *
Cyclopentane	0.000427744	0.000414398	0.000254981	0 *	0.00109712 *

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Molar Flow	Gas to Dehy and Sales lbmol/h	Gas to VRU lbmol/h	Stable Liquid lbmol/h	Water lbmol/h	Wellstream lbmol/h
2,3-Dimethylbutane	0.00647357	0.00625907	0.00591845	0 *	0.0186511 *
2-Methylpentane	0.0381018	0.0364511	0.0384508	0 *	0.113004 *
3-Methylpentane	0.0230905	0.0223855	0.0263856	0 *	0.0718616 *
n-Hexane	0.0645537	0.0612562	0.0903233	0 *	0.216133 *
Methylcyclopentane	0.00554352	0.00562959	0.00857512	0 *	0.0197482 *
Benzene	0.000789323	0.000757266	0.00174478	0 *	0.00329137 *
Cyclohexane	0.00808354	0.00785099	0.0153335	0 *	0.031268 *
2-Methylhexane	0.0140542	0.0110015	0.0385774	0 *	0.0636332 *
3-Methylhexane	0.0145236	0.0114558	0.0420422	0 *	0.0680216 *
2,2,4-Trimethylpentane	0	0	0	0 *	0 *
n-Heptane	0.0375768	0.0274346	0.127534	0 *	0.192545 *
Methylcyclohexane	0.0131892	0.0107235	0.049046	0 *	0.0729587 *
Toluene	0.00217078	0.00168222	0.0104096	0 *	0.0142626 *
n-Octane	0.033603	0.0158481	0.240189	0 *	0.289641 *
Ethylbenzene	0.0011996	0.000600747	0.0108166	0 *	0.0126169 *
m-Xylene	0.00115297	0.000534036	0.0114785	0 *	0.0131655 *
o-Xylene	0.00204181	0.00092334	0.0222687	0 *	0.0252338 *
n-Nonane	0.0117645	0.00347082	0.166339	0 *	0.181574 *
n-Decane	0.00628399	0.000999912	0.15125	0 *	0.158534 *
C11	0.00910546	0.000825545	0.43221	0 *	0.442141 *
Water	0.0854171	0.167862	1549.83	1550.08 *	0 *

Mass Fraction	Gas to Dehy and Sales %	Gas to VRU %	Stable Liquid %	Water %	Wellstream %
Hydrogen Sulfide	0	0	0	0 *	0 *
Nitrogen	0.588467	0.153472	3.7466E-06	0 *	0.44465 *
Carbon Dioxide	0.20205	0.61955	0.000583604	0 *	0.24782 *
Methane	51.6555	23.6666	0.00126658	0 *	40.5578 *
Ethane	22.7619	18.9505	0.00217456	0 *	19.1639 *
Propane	12.7093	18.6352	0.00560572	0 *	11.977 *
Isobutane	1.8045	3.99565	0.00260015	0 *	1.93518 *
n-Butane	4.58058	12.1864	0.0115881	0 *	5.31131 *
2,2-Dimethylpropane	0.0312416	0.0912827	0.000117215	0 *	0.0381734 *
Isopentane	1.16512	4.19908	0.0102487	0 *	1.65509 *
n-Pentane	1.55096	6.16642	0.0202137	0 *	2.41583 *
2,2-Dimethylbutane	0.0264178	0.119511	0.000631302	0 *	0.0488515 *
Cyclopentane	0.00288288	0.0135331	6.35907E-05	0 *	0.00530097 *
2,3-Dimethylbutane	0.0536102	0.25116	0.00181365	0 *	0.11073 *
2-Methylpentane	0.315536	1.46269	0.0117829	0 *	0.670894 *
3-Methylpentane	0.191222	0.898269	0.00808563	0 *	0.426636 *
n-Hexane	0.534595	2.45805	0.0276787	0 *	1.28317 *
Methylcyclopentane	0.0448341	0.220616	0.00256629	0 *	0.114501 *
Benzene	0.00592505	0.0275437	0.000484642	0 *	0.0177122 *
Cyclohexane	0.065377	0.30767	0.00458889	0 *	0.181293 *
2-Methylhexane	0.135333	0.513319	0.0137459	0 *	0.439276 *
3-Methylhexane	0.139853	0.534514	0.0149805	0 *	0.469571 *
2,2,4-Trimethylpentane	0	0	0	0 *	0 *
n-Heptane	0.36184	1.28007	0.0454427	0 *	1.32919 *
Methylcyclohexane	0.124448	0.490281	0.0171245	0 *	0.49352 *
Toluene	0.0192211	0.0721739	0.00341066	0 *	0.0905352 *
n-Octane	0.36887	0.842966	0.0975645	0 *	2.27935 *
Ethylbenzene	0.0122388	0.0296982	0.00408352	0 *	0.0922811 *
m-Xylene	0.011763	0.0264003	0.0043334	0 *	0.0962933 *
o-Xylene	0.0208314	0.0456457	0.00840696	0 *	0.184562 *
n-Nonane	0.145	0.207283	0.0758632	0 *	1.60438 *
n-Decane	0.0859221	0.0662473	0.076526	0 *	1.554 *
C11	0.136774	0.0600869	0.240237	0 *	4.76124 *
Water	0.147879	1.40816	99.2862	100 *	0 *

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report

All Streams

Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Mass Flow	Gas to Dehy and Sales lb/h	Gas to VRU lb/h	Stable Liquid lb/h	Water lb/h	Wellstream lb/h
Hydrogen Sulfide	0	0	0	0 *	0 *
Nitrogen	6.12353	0.329588	0.00105359	0 *	6.45417 *
Carbon Dioxide	2.10252	1.33051	0.164118	0 *	3.59715 *
Methane	537.522	50.8251	0.35618	0 *	588.703 *
Ethane	236.858	40.6971	0.611515	0 *	278.167 *
Propane	132.251	40.02	1.57641	0 *	173.848 *
Isobutane	18.7774	8.58084	0.731198	0 *	28.0895 *
n-Butane	47.6651	26.1708	3.25873	0 *	77.0946 *
2,2-Dimethylpropane	0.325096	0.196034	0.0329625	0 *	0.554093 *
Isopentane	12.1241	9.01772	2.88207	0 *	24.0239 *
n-Pentane	16.1391	13.2427	5.68436	0 *	35.0662 *
2,2-Dimethylbutane	0.274901	0.256656	0.177531	0 *	0.709088 *
Cyclopentane	0.0299989	0.0290629	0.0178826	0 *	0.0769444 *
2,3-Dimethylbutane	0.557862	0.539378	0.510025	0 *	1.60727 *
2-Methylpentane	3.28344	3.14119	3.31351	0 *	9.73814 *
3-Methylpentane	1.98983	1.92908	2.27379	0 *	6.1927 *
n-Hexane	5.56294	5.27878	7.78364	0 *	18.6254 *
Methylcyclopentane	0.46654	0.473783	0.721677	0 *	1.662 *
Benzene	0.0616554	0.0591515	0.136288	0 *	0.257095 *
Cyclohexane	0.680306	0.660735	1.29046	0 *	2.6315 *
2-Methylhexane	1.40826	1.10238	3.86553	0 *	6.37617 *
3-Methylhexane	1.4553	1.14789	4.21271	0 *	6.8159 *
2,2,4-Trimethylpentane	0	0	0	0 *	0 *
n-Heptane	3.76527	2.749	12.7791	0 *	19.2934 *
Methylcyclohexane	1.29499	1.0529	4.81564	0 *	7.16353 *
Toluene	0.200013	0.154997	0.959124	0 *	1.31413 *
n-Octane	3.83842	1.81031	27.4365	0 *	33.0852 *
Ethylbenzene	0.127356	0.0637783	1.14834	0 *	1.33948 *
m-Xylene	0.122405	0.0566959	1.21861	0 *	1.39771 *
o-Xylene	0.216769	0.0980263	2.36415	0 *	2.67895 *
n-Nonane	1.50885	0.445151	21.3338	0 *	23.2878 *
n-Decane	0.894097	0.142269	21.5202	0 *	22.5565 *
C11	1.42326	0.129039	67.558	0 *	69.1102 *
Water	1.53881	3.02409	27920.6	27925.2 *	0 *

Stream Properties

Property	Units	Gas to Dehy and Sales	Gas to VRU	Stable Liquid	Water	Wellstream
Temperature	°F	120	70	70 *	135 *	135 *
Pressure	psia	1214.7	14.6959	14.6959 *	3914.7 *	3914.7 *
Mole Fraction Vapor	%	100	100	0	0	100
Mole Fraction Light Liquid	%	0	0	0.110563	100	0
Mole Fraction Heavy Liquid	%	0	0	99.8894	0	0
Molecular Weight	lb/lbmol	22.3443	31.6855	18.1242	18.0153	26.4604
Mass Density	lb/ft^3	5.70779	0.0826406	62.1001	61.677	20.3504
Molar Flow	lbmol/h	46.5707	6.77769	1551.59	1550.08	54.8562
Mass Flow	lb/h	1040.59	214.755	28121.4	27925.2	1451.52
Vapor Volumetric Flow	ft^3/h	182.31	2598.66	452.84	452.765	71.3262
Liquid Volumetric Flow	gpm	22.7296	323.988	56.4579	56.4486	8.89262
Std Vapor Volumetric Flow	MMSCFD	0.424148	0.0617287	14.1313	14.1176	0.49961
Std Liquid Volumetric Flow	sgpm	5.86158	0.98835	56.3792	55.8245 *	7.40459 *
Compressibility		0.764402	0.991278	0.000754562	0.179174	0.797593
Specific Gravity		0.771489	1.09401	0.995688	0.988905	0.913606
API Gravity				10.4079	9.54602	
Enthalpy	Btu/h	-1.65301E+06	-284489	-1.90839E+08	-1.88608E+08	-2.15569E+06
Mass Enthalpy	Btu/lb	-1588.53	-1324.72	-6786.25	-6754.04	-1485.13
Mass Cp	Btu/(lb*°F)	0.702264	0.430365	0.979674	0.974348	0.751506
Ideal Gas CpCv Ratio		1.222	1.17154	1.3237	1.32279	1.18487
Dynamic Viscosity	cP	0.0144685	0.00938412	0.991624	0.521301	0.0409878

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Gas to Dehy and Sales	Gas to VRU	Stable Liquid	Water	Wellstream
Kinematic Viscosity	cSt	0.158247	7.08891	0.996371	0.527648	0.125736
Thermal Conductivity	Btu/(h*ft*°F)	0.0241892	0.0137661	0.344347	0.372658	0.0493115
Surface Tension	lbf/ft			0.00500727 ?	0.00455539	
Net Ideal Gas Heating Value	Btu/ft^3	1214.29	1653.42	6.53668	0	1420.06
Net Liquid Heating Value	Btu/lb	20546.6	19666.3	-916.564	-1059.76	20270.5
Gross Ideal Gas Heating Value	Btu/ft^3	1336.41	1807.23	57.2935	50.31	1556.76
Gross Liquid Heating Value	Btu/lb	22620.5	21508.1	146.172	0	22230.7

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Connections

	1	2			
From Block	MIX-100	Phase Separator			
To Block	Phase Separator	PW Tanks			

Stream Composition

Mole Fraction	1 %	2 %			
Hydrogen Sulfide	0	0			
Nitrogen	0.0143554	0.000757391			
Carbon Dioxide	0.00509275	0.0021793			
Methane	2.28648	0.204725			
Ethane	0.576404	0.0881556			
Propane	0.245648	0.0605326			
Isobutane	0.0301122	0.0102809			
n-Butane	0.0826462	0.0324915			
2,2-Dimethylpropane	0.000478514	0.000203671			
Isopentane	0.020747	0.0105838			
n-Pentane	0.0302831	0.0168338			
2,2-Dimethylbutane	0.000512693	0.000323313			
Cyclopentane	6.83591E-05	4.29538E-05			
2,3-Dimethylbutane	0.0011621	0.000781427			
2-Methylpentane	0.00704099	0.00480642			
3-Methylpentane	0.00447752	0.00312962			
n-Hexane	0.0134667	0.0097268			
Methylcyclopentane	0.00123046	0.00091151			
Benzene	0.000205077	0.000160555			
Cyclohexane	0.00194823	0.00148774			
2-Methylhexane	0.00396483	0.00318146			
3-Methylhexane	0.00423826	0.00343295			
2,2,4-Trimethylpentane	0	0			
n-Heptane	0.011997	0.00994426			
Methylcyclohexane	0.00454588	0.00383539			
Toluene	0.000888668	0.000775927			
n-Octane	0.0180468	0.0164298			
Ethylbenzene	0.00078613	0.000732645			
m-Xylene	0.000820309	0.000770838			
o-Xylene	0.00157226	0.00148822			
n-Nonane	0.0113134	0.0108966			
n-Decane	0.00987789	0.00976984			
C11	0.0275487	0.0277877			
Water	96.582	99.4628			

Molar Flow	1 lbmol/h	2 lbmol/h			
Hydrogen Sulfide	0	0			
Nitrogen	0.230396	0.011803			
Carbon Dioxide	0.0817357	0.0339615			
Methane	36.6966	3.19037			
Ethane	9.25094	1.37379			
Propane	3.94251	0.943322			
Isobutane	0.483283	0.160215			
n-Butane	1.32642	0.506339			
2,2-Dimethylpropane	0.00767986	0.00317395			
Isopentane	0.332977	0.164934			
n-Pentane	0.486026	0.262333			
2,2-Dimethylbutane	0.00822843	0.00503841			
Cyclopentane	0.00109712	0.000669379			
2,3-Dimethylbutane	0.0186511	0.0121775			
2-Methylpentane	0.113004	0.0749019			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Molar Flow	1 lbmol/h	2 lbmol/h			
3-Methylpentane	0.0718616	0.0487711			
n-Hexane	0.216133	0.15158			
Methylcyclopentane	0.0197482	0.0142047			
Benzene	0.00329137	0.00250205			
Cyclohexane	0.031268	0.0231845			
2-Methylhexane	0.0636332	0.0495789			
3-Methylhexane	0.0680216	0.053498			
2,2,4-Trimethylpentane	0	0			
n-Heptane	0.192545	0.154968			
Methylcyclohexane	0.0729587	0.0597695			
Toluene	0.0142626	0.0120918			
n-Octane	0.289641	0.256038			
Ethylbenzene	0.0126169	0.0114173			
m-Xylene	0.0131655	0.0120125			
o-Xylene	0.0252338	0.023192			
n-Nonane	0.181574	0.169809			
n-Decane	0.158534	0.15225			
C11	0.442141	0.433035			
Water	1550.08	1550			

Mass Fraction	1 %	2 %			
Hydrogen Sulfide	0	0			
Nitrogen	0.0219704	0.00116685			
Carbon Dioxide	0.0122449	0.00527465			
Methane	2.00398	0.180622			
Ethane	0.946896	0.145781			
Propane	0.591787	0.146796			
Isobutane	0.0956181	0.0328628			
n-Butane	0.262434	0.103859			
2,2-Dimethylpropane	0.00188616	0.000808142			
Isopentane	0.0817786	0.0419951			
n-Pentane	0.119367	0.0667947			
2,2-Dimethylbutane	0.00241377	0.00153227			
Cyclopentane	0.000261923	0.000165674			
2,3-Dimethylbutane	0.00547122	0.00370341			
2-Methylpentane	0.0331491	0.022779			
3-Methylpentane	0.0210803	0.0148322			
n-Hexane	0.0634018	0.0460981			
Methylcyclopentane	0.00565754	0.00421885			
Benzene	0.000875165	0.000689718			
Cyclohexane	0.00895777	0.00688588			
2-Methylhexane	0.0217048	0.0175321			
3-Methylhexane	0.0232017	0.0189179			
2,2,4-Trimethylpentane	0	0			
n-Heptane	0.0656758	0.0547997			
Methylcyclohexane	0.024385	0.0207104			
Toluene	0.00447338	0.0039318			
n-Octane	0.112624	0.103214			
Ethylbenzene	0.00455965	0.00427764			
m-Xylene	0.00475789	0.00450064			
o-Xylene	0.00911929	0.00868919			
n-Nonane	0.0792729	0.0768592			
n-Decane	0.0767837	0.0764481			
C11	0.235255	0.238872			
Water	95.059	98.5444			

Mass Flow	1 lb/h	2 lb/h			
Hydrogen Sulfide	0	0			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report

All Streams

Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Mass Flow	**1** **lb/h**	**2** **lb/h**			
Nitrogen	6.45417	0.330641			
Carbon Dioxide	3.59715	1.49463			
Methane	588.703	51.1813			
Ethane	278.167	41.3086			
Propane	173.848	41.5964			
Isobutane	28.0895	9.31204			
n-Butane	77.0946	29.4295			
2,2-Dimethylpropane	0.554093	0.228996			
Isopentane	24.0239	11.8998			
n-Pentane	35.0662	18.927			
2,2-Dimethylbutane	0.709088	0.434187			
Cyclopentane	0.0769444	0.0469455			
2,3-Dimethylbutane	1.60727	1.0494			
2-Methylpentane	9.73814	6.4547			
3-Methylpentane	6.1927	4.20287			
n-Hexane	18.6254	13.0624			
Methylcyclopentane	1.662	1.19546			
Benzene	0.257095	0.19544			
Cyclohexane	2.6315	1.95119			
2-Methylhexane	6.37617	4.96791			
3-Methylhexane	6.8159	5.3606			
2,2,4-Trimethylpentane	0	0			
n-Heptane	19.2934	15.5281			
Methylcyclohexane	7.16353	5.86854			
Toluene	1.31413	1.11412			
n-Octane	33.0852	29.2468			
Ethylbenzene	1.33948	1.21212			
m-Xylene	1.39771	1.27531			
o-Xylene	2.67895	2.46218			
n-Nonane	23.2878	21.7789			
n-Decane	22.5565	21.6624			
C11	69.1102	67.687			
Water	27925.2	27923.7			

Stream Properties

Property	**Units**	**1**	**2**			
Temperature	°F	135.061	120 *			
Pressure	psia	3914.7	1214.7 *			
Mole Fraction Vapor	%	3.19665	0			
Mole Fraction Light Liquid	%	96.8034	0.420558			
Mole Fraction Heavy Liquid	%	0	99.5794			
Molecular Weight	lb/lbmol	18.3039	18.1832			
Mass Density	lb/ft^3	56.3209	61.0156			
Molar Flow	lbmol/h	1604.94	1558.37			
Mass Flow	lb/h	29376.7	28336.1			
Vapor Volumetric Flow	ft^3/h	521.596	464.408			
Liquid Volumetric Flow	gpm	65.0301	57.9003			
Std Vapor Volumetric Flow	MMSCFD	14.6172	14.1931			
Std Liquid Volumetric Flow	sgpm	63.2291	57.3675			
Compressibility		0.199337	0.0581905			
Specific Gravity			0.978299			
API Gravity			11.416			
Enthalpy	Btu/h	-1.90764E+08	-1.89682E+08			
Mass Enthalpy	Btu/lb	-6493.7	-6694.01			
Mass Cp	Btu/(lb*°F)	0.965651	0.975763			
Ideal Gas CpCv Ratio		1.31476	1.31977			
Dynamic Viscosity	cP		0.565087			
Kinematic Viscosity	cSt		0.574945			
Thermal Conductivity	Btu/(h*ft*°F)		0.358616			
Surface Tension	lbf/ft		0.00455808 ?			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report

All Streams

Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	1	2			
Net Ideal Gas Heating Value	Btu/ft^3	48.537	13.6993			
Net Liquid Heating Value	Btu/lb	-5.82362	-760.57			
Gross Ideal Gas Heating Value	Btu/ft^3	101.8	64.9043			
Gross Liquid Heating Value	Btu/lb	1098.43	308.07			

Remarks

Energy Stream Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Energy Streams

Energy Stream	Energy Rate		Power		From Block	To Block
Q-1	-571470	Btu/h	-224.596	hp	--	Phase Separator
Q-3	-1.44093E+06	Btu/h	-566.307	hp	--	PW Tanks

Remarks

* User Specified Values
? Extrapolated or Approximate Values

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	Modified: 8:51 AM, 6/16/2016
Flowsheet:	Flowsheet1	Status: Solved 12:41 PM, 7/19/2016

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Wellstream	Inlet		Water	Inlet	
1	Outlet	Phase Separator			

Block Parameters

Pressure Drop	0 psi	Fraction to PStream 1	100 %

Remarks

Blocks
Phase Separator
Separator Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	Modified: 8:52 AM, 6/16/2016
Flowsheet:	Flowsheet1	Status: Solved 12:41 PM, 7/19/2016

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
1	Inlet	MIX-100	Gas to Dehy and Sales	Vapor Outlet	
2	Light Liquid Outlet	PW Tanks	Q-1	Energy	

Block Parameters

Pressure Drop	2700	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	2.90171	%	Heat Duty	-571470	Btu/h
Mole Fraction Light Liquid	0.408355	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	96.6899	%	Heat Release Curve Increments	5	

Remarks

Blocks
PW Tanks
Separator Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	Modified: 12:12 PM, 7/14/2016
Flowsheet:	Flowsheet1	Status: Solved 12:41 PM, 7/19/2016

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
2	Inlet	Phase Separator	Gas to VRU	Vapor Outlet	
Stable Liquid	Light Liquid Outlet		Q-3	Energy	

Block Parameters

Pressure Drop	1200	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0.434922	%	Heat Duty	-1.44093E+06	Btu/h
Mole Fraction Light Liquid	0.110082	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	99.455	%	Heat Release Curve Increments	5	

Remarks

Flowsheet Environment
Environment1

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Environment Settings

Number of Poynting Intervals	0	Freeze Out Temperature Threshold Difference	10 °F
Gibbs Excess Model Evaluation Temperature	77 °F	Phase Tolerance	1 %

Components

Component Name	Henry`s Law Component	Phase Initiator	Component Name	Henry`s Law Component	Phase Initiator
Hydrogen Sulfide	False	False	Methylcyclopentane	False	False
Nitrogen	False	False	Benzene	False	False
Carbon Dioxide	False	False	Cyclohexane	False	False
Methane	False	False	2-Methylhexane	False	False
Ethane	False	False	3-Methylhexane	False	False
Propane	False	False	2,2,4-Trimethylpentane	False	False
Isobutane	False	False	n-Heptane	False	False
n-Butane	False	False	Methylcyclohexane	False	False
2,2-Dimethylpropane	False	False	Toluene	False	False
Isopentane	False	False	n-Octane	False	False
n-Pentane	False	False	Ethylbenzene	False	False
2,2-Dimethylbutane	False	False	m-Xylene	False	False
Cyclopentane	False	False	o-Xylene	False	False
2,3-Dimethylbutane	False	False	n-Nonane	False	False
2-Methylpentane	False	False	n-Decane	False	False
3-Methylpentane	False	False	C11	False	False
n-Hexane	False	False	Water	False	True

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

Calculator Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	

Simple Solver 1

Source Code

Residual Error (for CV1) = TotalFlow-1933

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Wellstream!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	7.40459
Unit	sgpm

Measured Variable [TotalFlow]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Stable Liquid!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	1933
Unit	bbl/d

Solver Properties

Status: Solved

Error	0.000522066		Iterations	3
Calculated Value	7.40459	sgpm	Max Iterations	20
Lower Bound		sgpm	Weighting	1
Upper Bound		sgpm	Priority	0
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		Group	
Algorithm	Default		Skip Dependency Check	False

Remarks

Simple Solver 2

Source Code

Residual Error (for CV1) = WaterPercent-99

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Water!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	55.8245
Unit	sgpm

Measured Variable [WaterPercent]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Stable Liquid!Phases!Total!Composition!Std. Liquid Volumetric Fraction!Water
Value	99
Unit	%

Solver Properties

Status: Solved

Error	1.55563E-05		Iterations	3
Calculated Value	55.8245	sgpm	Max Iterations	20
Lower Bound		sgpm	Weighting	1
Upper Bound		sgpm	Priority	0
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		Group	
Algorithm	Default		Skip Dependency Check	False

Remarks

* User Specified Values
? Extrapolated or Approximate Values

ProMax 3.2.12198.0

User Value Sets Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	

Cn+ Flow/Frac.

User Value [CnPlusSum]

* Parameter	519.241	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={28788FB9-D5D0-4F3B-A3EE-562C3FE5F72A}

Tank Losses

User Value [ShellLength]

* Parameter	20	ft	Upper Bound		ft
* Lower Bound	0	ft	* Enforce Bounds	False	

User Value [ShellDiam]

* Parameter	12	ft	Upper Bound		ft
* Lower Bound	0	ft	* Enforce Bounds	False	

User Value [BreatherVP]

* Parameter	0.03	psig	Upper Bound		psig
Lower Bound		psig	* Enforce Bounds	False	

User Value [BreatherVacP]

* Parameter	-0.03	psig	Upper Bound		psig
Lower Bound		psig	* Enforce Bounds	False	

User Value [DomeRadius]

Parameter		ft	Upper Bound		ft
Lower Bound	ft	ft	* Enforce Bounds	False	

User Value [OpPress]

* Parameter	0	psig	Upper Bound		psig
Lower Bound		psig	* Enforce Bounds	False	

User Value [AvgPercentLiq]

* Parameter	50	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds	False	

User Value [MaxPercentLiq]

* Parameter	90	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds	False	

User Value [AnnNetTP]

* Parameter	1935.67	bbl/day	Upper Bound		bbl/day
* Lower Bound	0	bbl/day	* Enforce Bounds	False	

User Value [OREff]

* Parameter	0	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds	False	

User Value [AtmPressure]

* Parameter	97274.7	Pa	Upper Bound		Pa
Lower Bound		Pa	* Enforce Bounds	False	

* User Specified Values
? Extrapolated or Approximate Values

User Value Sets Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Updated
Location:	Curry G70-C	

User Value [MaxLiqSurfaceT]

*	Parameter	70.3624	°F		Upper Bound		°F
	Lower Bound		°F	*	Enforce Bounds	False	

User Value [TotalLosses]

*	Parameter	0.447504	ton/yr		Upper Bound		ton/yr
	Lower Bound		ton/yr	*	Enforce Bounds	False	

User Value [WorkingLosses]

*	Parameter	0.133965	ton/yr		Upper Bound		ton/yr
	Lower Bound		ton/yr	*	Enforce Bounds	False	

User Value [StandingLosses]

*	Parameter	0.0152032	ton/yr		Upper Bound		ton/yr
	Lower Bound		ton/yr	*	Enforce Bounds	False	

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	3.97902	ton/yr		Upper Bound		ton/yr
	Lower Bound		ton/yr	*	Enforce Bounds	False	

User Value [DeckFittingLosses]

*	Parameter	0	ton/yr		Upper Bound		ton/yr
	Lower Bound		ton/yr	*	Enforce Bounds	False	

User Value [DeckSeamLosses]

*	Parameter	0	ton/yr		Upper Bound		ton/yr
	Lower Bound		ton/yr	*	Enforce Bounds	False	

User Value [FlashingLosses]

*	Parameter	0	ton/yr		Upper Bound		ton/yr
	Lower Bound		ton/yr	*	Enforce Bounds	False	

User Value [GasMoleWeight]

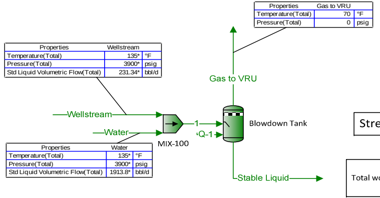
*	Parameter	0.0190331	kg/mol		Upper Bound		kg/mol
	Lower Bound		kg/mol	*	Enforce Bounds	False	

Remarks

This User Value Set was programmatically generated. GUID={7CEAC84C-A692-4205-B9D4-E8C8D833100F}

Flowsheet1
Plant Schematic

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	



Properties	Gas to VRU	
Temperature(Total)	70	°F
Pressure(Total)	0	psig

Properties	Wellstream	
Temperature(Total)	135*	°F
Pressure(Total)	3900*	psig
Std Liquid Volumetric Flow(Total)	231.34*	bbl/d

Properties	Water	
Temperature(Total)	135*	°F
Pressure(Total)	3900*	psig
Std Liquid Volumetric Flow(Total)	1913.8*	bbl/d

1933 bbl/day
3 15-min blowdowns/year

Stream Gas to VRU C3+ Mass Flow =389.8 lb/h

Tank loss calculations for "Stable Liquid".
Total working and breathing losses from the Vertical Cylinder are 0.07798 lb/h.
Loading losses are 0.8687 lb/h of loaded liquid.

* User Specified Values
? Extrapolated or Approximate Values

ProMax 3.2.12198.0

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Connections

	Gas to VRU	Stable Liquid	Water	Wellstream	1
From Block	Blowdown Tank	Blowdown Tank	--	--	MIX-100
To Block	--	--	MIX-100	MIX-100	Blowdown Tank

Stream Composition

Mole Fraction	Gas to VRU %	Stable Liquid %	Water %	Wellstream %	1 %
Hydrogen Sulfide	0	0	0 *	0 *	0
Nitrogen	0.418378	5.54655E-06	0 *	0.42 *	0.0131223
Carbon Dioxide	0.146087	7.76264E-05	0 *	0.149 *	0.00465528
Methane	66.6066	0.00188725	0 *	66.896 *	2.09007
Ethane	16.7794	0.000853015	0 *	16.864 *	0.526891
Propane	7.13631	0.000837002	0 *	7.187 *	0.224547
Isobutane	0.871802	0.000199207	0 *	0.881 *	0.0275255
n-Butane	2.38496	0.00079905	0 *	2.418 *	0.0755468
2,2-Dimethylpropane	0.0137605	6.18693E-06	0 *	0.014 *	0.000437409
Isopentane	0.589412	0.000501402	0 *	0.607 *	0.0189648
n-Pentane	0.852923	0.000971519	0 *	0.886 *	0.0276818
2,2-Dimethylbutane	0.0141558	2.56474E-05	0 *	0.015 *	0.000468653
Cyclopentane	0.00189628	3.13337E-06	0 *	0.002 *	6.2487E-05
2,3-Dimethylbutane	0.0314741	7.7954E-05	0 *	0.034 *	0.00106228
2-Methylpentane	0.189151	0.000522326	0 *	0.206 *	0.00643616
3-Methylpentane	0.119177	0.00036802	0 *	0.131 *	0.0040929
n-Hexane	0.350862	0.00135217	0 *	0.394 *	0.0123099
Methylcyclopentane	0.0319083	0.000128411	0 *	0.036 *	0.00112477
Benzene	0.0048544	3.64084E-05	0 *	0.006 *	0.000187461
Cyclohexane	0.0489901	0.000252879	0 *	0.057 *	0.00178088
2-Methylhexane	0.0900161	0.000828041	0 *	0.116 *	0.00362425
3-Methylhexane	0.0952628	0.000916261	0 *	0.124 *	0.0038742
2,2,4-Trimethylpentane	0	0	0 *	0 *	0
n-Heptane	0.254112	0.0030967	0 *	0.351 *	0.0109665
Methylcyclohexane	0.0967573	0.00115818	0 *	0.133 *	0.00415539
Toluene	0.0168254	0.000294044	0 *	0.026 *	0.000812331
n-Octane	0.235434	0.00941032	0 *	0.528 *	0.0164966
Ethylbenzene	0.00919141	0.000444365	∗ *	0.023 *	0.000718601
m-Xylene	0.00860953	0.000495453	0 *	0.024 *	0.000749844
o-Xylene	0.0152798	0.000989166	0 *	0.046 *	0.0014372
n-Nonane	0.0670951	0.00850469	0 *	0.331 *	0.0103416
n-Decane	0.0213608	0.00863025	0 *	0.289 *	0.00902938
C11	0.0180639	0.0254127	0 *	0.806 *	0.0251823
Water	2.4799	99.9309	100 *	0 *	96.8756

Molar Flow	Gas to VRU lbmol/h	Stable Liquid lbmol/h	Water lbmol/h	Wellstream lbmol/h	1 lbmol/h
Hydrogen Sulfide	0	0	0 *	0 *	0
Nitrogen	0.209864	8.59599E-05	0 *	0.20995 *	0.20995
Carbon Dioxide	0.0732793	0.00120305	0 *	0.0744823 *	0.0744823
Methane	33.4108	0.0292484	0 *	33.4401 *	33.4401
Ethane	8.41678	0.0132199	0 *	8.43 *	8.43
Propane	3.57968	0.0129718	0 *	3.59265 *	3.59265
Isobutane	0.437308	0.00308729	0 *	0.440395 *	0.440395
n-Butane	1.19633	0.0123836	0 *	1.20871 *	1.20871
2,2-Dimethylpropane	0.00690245	9.58845E-05	0 *	0.00699834 *	0.00699834
Isopentane	0.295657	0.00777068	0 *	0.303428 *	0.303428
n-Pentane	0.427838	0.0150565	0 *	0.442895 *	0.442895
2,2-Dimethylbutane	0.00710074	0.000397481	0 *	0.00749822 *	0.00749822
Cyclopentane	0.000951202	4.85607E-05	0 *	0.000999763 *	0.000999763
2,3-Dimethylbutane	0.0157878	0.00120812	0 *	0.016996 *	0.016996
2-Methylpentane	0.0948806	0.00809495	0 *	0.102976 *	0.102976

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Molar Flow	**Gas to VRU** **lbmol/h**	**Stable Liquid** **lbmol/h**	**Water** **lbmol/h**	**Wellstream** **lbmol/h**	**1** **lbmol/h**
3-Methylpentane	0.0597809	0.00570354	0 *	0.0654845 *	0.0654845
n-Hexane	0.175997	0.0209558	0 *	0.196953 *	0.196953
Methylcyclopentane	0.0160056	0.00199009	0 *	0.0179957 *	0.0179957
Benzene	0.00243503	0.000564254	0 *	0.00299929 *	0.00299929
Cyclohexane	0.0245741	0.00391909	0 *	0.0284932 *	0.0284932
2-Methylhexane	0.0451533	0.0128329	0 *	0.0579862 *	0.0579862
3-Methylhexane	0.0477852	0.0142001	0 *	0.0619853 *	0.0619853
2,2,4-Trimethylpentane	0	0	0 *	0 *	0
n-Heptane	0.127466	0.0479924	0 *	0.175458 *	0.175458
Methylcyclohexane	0.0485348	0.0179494	0 *	0.0664842 *	0.0664842
Toluene	0.00843985	0.00455707	0 *	0.0129969 *	0.0129969
n-Octane	0.118097	0.14584	0 *	0.263937 *	0.263937
Ethylbenzene	0.00461054	0.00688673	0 *	0.0114973 *	0.0114973
m-Xylene	0.00431866	0.00767849	0 *	0.0119972 *	0.0119972
o-Xylene	0.00766454	0.01533	0 *	0.0229945 *	0.0229945
n-Nonane	0.0336558	0.131805	0 *	0.165461 *	0.165461
n-Decane	0.0107149	0.133751	0 *	0.144466 *	0.144466
C11	0.00906112	0.393843	0 *	0.402904 *	0.402904
Water	1.24395	1548.72	1549.96 *	0 *	1549.96

Mass Fraction	**Gas to VRU** **%**	**Stable Liquid** **%**	**Water** **%**	**Wellstream** **%**	**1** **%**
Hydrogen Sulfide	0	0	0 *	0 *	0
Nitrogen	0.485723	8.58925E-06	0 *	0.44465 *	0.0201103
Carbon Dioxide	0.266448	0.000188852	0 *	0.24782 *	0.0112082
Methane	44.2836	0.00167366	0 *	40.5578 *	1.83432
Ethane	20.9098	0.00141789	0 *	19.1639 *	0.866731
Propane	13.0414	0.00204027	0 *	11.977 *	0.541686
Isobutane	2.09998	0.000640049	0 *	1.93518 *	0.087523
n-Butane	5.74483	0.00256733	0 *	5.31131 *	0.240216
2,2-Dimethylpropane	0.041145	2.46758E-05	0 *	0.0381734 *	0.00172648
Isopentane	1.76239	0.00199978	0 *	1.65509 *	0.0748552
n-Pentane	2.55031	0.00387478	0 *	2.41583 *	0.109261
2,2-Dimethylbutane	0.0505558	0.000122178	0 *	0.0488515 *	0.00220942
Cyclopentane	0.00551162	1.21479E-05	0 *	0.00530097 *	0.000239749
2,3-Dimethylbutane	0.112406	0.000371354	0 *	0.11073 *	0.00500802
2-Methylpentane	0.675531	0.00248823	0 *	0.670894 *	0.0303427
3-Methylpentane	0.425628	0.00175316	0 *	0.426636 *	0.0192956
n-Hexane	1.25307	0.00644142	0 *	1.28317 *	0.0580341
Methylcyclopentane	0.111291	0.000597407	0 *	0.114501 *	0.00517857
Benzene	0.0157147	0.000157212	0 *	0.0177122 *	0.000801073
Cyclohexane	0.17087	0.00117647	0 *	0.181293 *	0.0081994
2-Methylhexane	0.37381	0.00458664	0 *	0.439276 *	0.0198673
3-Methylhexane	0.395598	0.0050753	0 *	0.469571 *	0.0212374
2,2,4-Trimethylpentane	0	0	0 *	0 *	0
n-Heptane	1.05525	0.0171531	0 *	1.32919 *	0.0601156
Methylcyclohexane	0.39372	0.00628628	0 *	0.49352 *	0.0223206
Toluene	0.0642481	0.00149768	0 *	0.0905352 *	0.00409466
n-Octane	1.11455	0.0594218	0 *	2.27935 *	0.103089
Ethylbenzene	0.0404406	0.00260788	0 *	0.0922811 *	0.00417363
m-Xylene	0.0378804	0.00290771	0 *	0.0962933 *	0.00435509
o-Xylene	0.0672283	0.0058052	0 *	0.184562 *	0.00834725
n-Nonane	0.356631	0.0602976	0 *	1.60438 *	0.0725616
n-Decane	0.125957	0.0678795	0 *	1.554 *	0.0702831
C11	0.117017	0.219583	0 *	4.76124 *	0.215338
Water	1.85152	99.5193	100 *	0 *	95.4773

Mass Flow	**Gas to VRU** **lb/h**	**Stable Liquid** **lb/h**	**Water** **lb/h**	**Wellstream** **lb/h**	**1** **lb/h**
Hydrogen Sulfide	0	0	0 *	0 *	0

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Mass Flow	Gas to VRU lb/h	Stable Liquid lb/h	Water lb/h	Wellstream lb/h	1 lb/h
Nitrogen	5.87901	0.00240803	0 *	5.88142 *	5.88142
Carbon Dioxide	3.22498	0.0529455	0 *	3.27793 *	3.27793
Methane	535.992	0.469217	0 *	536.461 *	536.461
Ethane	253.084	0.397511	0 *	253.482 *	253.482
Propane	157.848	0.571999	0 *	158.42 *	158.42
Isobutane	25.4173	0.17944	0 *	25.5968 *	25.5968
n-Butane	69.5333	0.719762	0 *	70.2531 *	70.2531
2,2-Dimethylpropane	0.498004	0.00691795	0 *	0.504922 *	0.504922
Isopentane	21.3313	0.560645	0 *	21.892 *	21.892
n-Pentane	30.868	1.08631	0 *	31.9543 *	31.9543
2,2-Dimethylbutane	0.611909	0.034253	0 *	0.646162 *	0.646162
Cyclopentane	0.0667105	0.00340571	0 *	0.0701163 *	0.0701163
2,3-Dimethylbutane	1.36052	0.104111	0 *	1.46463 *	1.46463
2-Methylpentane	8.17637	0.697586	0 *	8.87396 *	8.87396
3-Methylpentane	5.15164	0.491505	0 *	5.64315 *	5.64315
n-Hexane	15.1666	1.80588	0 *	16.9725 *	16.9725
Methylcyclopentane	1.34703	0.167485	0 *	1.51451 *	1.51451
Benzene	0.190205	0.044075	0 *	0.23428 *	0.23428
Cyclohexane	2.06815	0.329828	0 *	2.39798 *	2.39798
2-Methylhexane	4.52445	1.28588	0 *	5.81033 *	5.81033
3-Methylhexane	4.78816	1.42288	0 *	6.21105 *	6.21105
2,2,4-Trimethylpentane	0	0	0 *	0 *	0
n-Heptane	12.7723	4.80893	0 *	17.5813 *	17.5813
Methylcyclohexane	4.76544	1.76238	0 *	6.52782 *	6.52782
Toluene	0.777634	0.419881	0 *	1.19752 *	1.19752
n-Octane	13.4901	16.6591	0 *	30.1492 *	30.1492
Ethylbenzene	0.489478	0.73113	0 *	1.22061 *	1.22061
m-Xylene	0.458491	0.815187	0 *	1.27368 *	1.27368
o-Xylene	0.813706	1.62751	0 *	2.44122 *	2.44122
n-Nonane	4.31653	16.9046	0 *	21.2212 *	21.2212
n-Decane	1.52453	19.0303	0 *	20.5548 *	20.5548
C11	1.41633	61.5609	0 *	62.9773 *	62.9773
Water	22.4102	27900.6	27923 *	0 *	27923

Stream Properties

Property	Units	Gas to VRU	Stable Liquid	Water	Wellstream	1
Temperature	°F	70	70 *	135 *	135 *	135.064
Pressure	psia	14.6959	14.6959 *	3914.7 *	3914.7 *	3914.7
Mole Fraction Vapor	%	100	0	0	100	2.90226
Mole Fraction Light Liquid	%	0	0.0663301	100	0	97.0977
Mole Fraction Heavy Liquid	%	0	99.9337	0	0	0
Molecular Weight	lb/lbmol	24.1294	18.0898	18.0153	26.4604	18.2791
Mass Density	lb/ft^3	0.0627055	62.164	61.677	20.3504	56.7622
Molar Flow	lbmol/h	50.1614	1549.79	1549.96	49.9881	1599.95
Mass Flow	lb/h	1210.36	28035.4	27923	1322.71	29245.7
Vapor Volumetric Flow	ft^3/h	19302.3	450.99	452.73	64.9966	515.233
Liquid Volumetric Flow	gpm	2406.53	56.2274	56.4442	8.10347	64.2368
Std Vapor Volumetric Flow	MMSCFD	0.456852	14.1149	14.1165	0.455273	14.5718
Std Liquid Volumetric Flow	sgpm	6.41977	56.1479	55.8202 *	6.74749 *	62.5677
Compressibility		0.994875	0.000752354	0.179174	0.797593	0.197518
Specific Gravity		0.833121	0.996713	0.988905	0.913606	
API Gravity			10.2638	9.54602		
Enthalpy	Btu/h	-1.88492E+06	-1.9064E+08	-1.88593E+08	-1.96439E+06	-1.90558E+08
Mass Enthalpy	Btu/lb	-1557.32	-6799.98	-6754.04	-1485.13	-6515.75
Mass Cp	Btu/(lb*°F)	0.458651	0.980799	0.974348	0.751506	0.96659
Ideal Gas CpCv Ratio		1.21981	1.32436	1.32279	1.18487	1.31543
Dynamic Viscosity	cP	0.0101434	0.994072	0.521301	0.0409878	
Kinematic Viscosity	cSt	10.0985	0.998362	0.527648	0.125736	
Thermal Conductivity	Btu/(h*ft*°F)	0.0159102	0.345279	0.372658	0.0493115	
Surface Tension	lbf/ft		0.00501966 ?	0.00455539		

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Gas to VRU	Stable Liquid	Water	Wellstream	1
Net Ideal Gas Heating Value	Btu/ft^3	1279.54	4.38931	0	1420.06	44.3677
Net Liquid Heating Value	Btu/lb	20017.9	-963.379	-1059.76	20270.5	-95.0504
Gross Ideal Gas Heating Value	Btu/ft^3	1406.61	55.0013	50.31	1556.76	97.3768
Gross Liquid Heating Value	Btu/lb	22016.1	98.3479	0	22230.7	1005.43

Remarks

Energy Stream Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Q-1	-1.96714E+06 Btu/h	-773.117 hp	--	Blowdown Tank

Remarks

Blocks
Blowdown Tank
Separator Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	Modified: 8:52 AM, 6/16/2016
Flowsheet:	Flowsheet1	Status: Solved 9:20 AM, 6/16/2016

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
1	Inlet	MIX-100	Gas to VRU	Vapor Outlet	
Stable Liquid	Light Liquid Outlet		Q-1	Energy	

Block Parameters

Pressure Drop	3900	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	3.13518	%	Heat Duty	-1.96714E+06	Btu/h
Mole Fraction Light Liquid	0.0642506	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	96.8006	%	Heat Release Curve Increments	5	

Remarks

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	Modified: 8:51 AM, 6/16/2016
Flowsheet:	Flowsheet1	Status: Solved 8:59 AM, 6/16/2016

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Wellstream	Inlet		Water	Inlet	
1	Outlet	Blowdown Tank			

Block Parameters

Pressure Drop	0 psi	Fraction to PStream 1	100 %

Remarks

Flowsheet Environment
Environment1

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	
Flowsheet:	Flowsheet1	

Environment Settings

Number of Poynting Intervals	0	Freeze Out Temperature Threshold Difference	10 °F
Gibbs Excess Model Evaluation Temperature	77 °F	Phase Tolerance	1 %

Components

Component Name	Henry`s Law Component	Phase Initiator	Component Name	Henry`s Law Component	Phase Initiator
Hydrogen Sulfide	False	False	Methylcyclopentane	False	False
Nitrogen	False	False	Benzene	False	False
Carbon Dioxide	False	False	Cyclohexane	False	False
Methane	False	False	2-Methylhexane	False	False
Ethane	False	False	3-Methylhexane	False	False
Propane	False	False	2,2,4-Trimethylpentane	False	False
Isobutane	False	False	n-Heptane	False	False
n-Butane	False	False	Methylcyclohexane	False	False
2,2-Dimethylpropane	False	False	Toluene	False	False
Isopentane	False	False	n-Octane	False	False
n-Pentane	False	False	Ethylbenzene	False	False
2,2-Dimethylbutane	False	False	m-Xylene	False	False
Cyclopentane	False	False	o-Xylene	False	False
2,3-Dimethylbutane	False	False	n-Nonane	False	False
2-Methylpentane	False	False	n-Decane	False	False
3-Methylpentane	False	False	C11	False	False
n-Hexane	False	False	Water	False	True

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

User Value Sets Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	

Cn+ Flow/Frac.

User Value [CnPlusSum]

*	Parameter	389.772	lb/h		Upper Bound		
	Lower Bound		lb/h	*	Enforce Bounds	False	

Remarks

This User Value Set was programmatically generated. GUID={28788FB9-D5D0-4F3B-A3EE-562C3FE5F72A}

Tank Losses

User Value [ShellLength]

*	Parameter	20	ft		Upper Bound		
*	Lower Bound	0	ft	*	Enforce Bounds	False	

User Value [ShellDiam]

*	Parameter	12	ft		Upper Bound		
*	Lower Bound	0	ft	*	Enforce Bounds	False	

User Value [BreatherVP]

*	Parameter	0.03	psig		Upper Bound		
	Lower Bound			*	Enforce Bounds	False	

User Value [BreatherVacP]

*	Parameter	-0.03	psig		Upper Bound		
	Lower Bound			*	Enforce Bounds	False	

User Value [DomeRadius]

	Parameter		ft		Upper Bound		ft
	Lower Bound		ft	*	Enforce Bounds	False	

User Value [OpPress]

*	Parameter	0	psig		Upper Bound		
	Lower Bound			*	Enforce Bounds	False	

User Value [AvgPercentLiq]

*	Parameter	50	%		Upper Bound		
	Lower Bound		%	*	Enforce Bounds	False	

User Value [MaxPercentLiq]

*	Parameter	90	%		Upper Bound		
	Lower Bound		%	*	Enforce Bounds	False	

User Value [AnnNetTP]

*	Parameter	1935.67	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 Value [AtmPressure]

*	Parameter	97274.7	Pa		Upper Bound		
	Lower Bound			*	Enforce Bounds	False	

* User Specified Values
? Extrapolated or Approximate Values

User Value Sets Report

Client Name:	Chevron Appalachia, LLC	Job: 1933 bpd, Blowdowns
Location:	Curry G70-C	

User Value [MaxLiqSurfaceT]

* Parameter	70.3624	°F	Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	0.0779819	lb/h	Upper Bound	
Lower Bound		lb/h	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0.074679	lb/h	Upper Bound	
Lower Bound		lb/h	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	0.00330289	lb/h	Upper Bound	
Lower Bound		lb/h	* Enforce Bounds	False

User Value [RimSealLosses]

* Parameter	0	ton/yr	Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [WithdrawalLoss]

* Parameter	0	ton/yr	Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [LoadingLosses]

* Parameter	0.868747	lb/h	Upper Bound	
Lower Bound		lb/h	* Enforce Bounds	False

User Value [DeckFittingLosses]

* Parameter	0	ton/yr	Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [DeckSeamLosses]

* Parameter	0	ton/yr	Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [FlashingLosses]

* Parameter	0	ton/yr	Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [GasMoleWeight]

* Parameter	0.018351	kg/mol	Upper Bound	
Lower Bound			* Enforce Bounds	False

Remarks

This User Value Set was programmatically generated. GUID={7CEAC84C-A692-4205-B9D4-E8C8D833100F}

* User Specified Values
? Extrapolated or Approximate Values

Attachment T

FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

ATTACHMENT T – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		GHG (CO_2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Line Heater (E0100)	**0.08**	**0.33**	**0.06**	**0.28**	**<0.01**	**0.02**	**<0.01**	**<0.01**	**<0.01**	**0.03**	**<0.01**	**0.03**	**117.10**	**512.89**
Line Heater (E0210)	**0.09**	**0.42**	**0.08**	**0.35**	**<0.01**	**0.02**	**<0.01**	**<0.01**	**<0.01**	**0.03**	**<0.01**	**0.03**	**146.37**	**641.11**
Line Heater (E0810)	**0.08**	**0.33**	**0.06**	**0.28**	**<0.01**	**0.02**	**<0.01**	**<0.01**	**<0.01**	**0.03**	**<0.01**	**0.03**	**117.10**	**512.89**
Line Heater (E0910)	**0.09**	**0.42**	**0.08**	**0.35**	**<0.01**	**0.02**	**<0.01**	**<0.01**	**<0.01**	**0.03**	**<0.01**	**0.03**	**146.37**	**641.11**
Line Heater (E0012)	**0.09**	**0.42**	**0.08**	**0.35**	**<0.01**	**0.02**	**<0.01**	**<0.01**	**<0.01**	**0.03**	**<0.01**	**0.03**	**146.37**	**641.11**
Reboiler Exhaust (E0100A)	**0.04**	**0.17**	**0.03**	**0.14**	**<0.01**	**0.01**	**<0.01**	**<0.01**	**<0.01**	**0.01**	**<0.01**	**0.01**	**58.55**	**256.44**
Flash Gas Compressor (E0050)	**0.15**	**0.67**	**0.18**	**0.80**	**0.19**	**0.84**	**<0.01**	**<0.01**	**0.02**	**0.09**	**0.02**	**0.09**	**54.02**	**236.62**
Vapor Recovery Unit (VS-1)	**--**	**--**	**--**	**--**	**6.72**	**29.41**	**--**	**--**	**--**	**--**	**--**	**--**	**790.16**	**3,460.90**
Glycol Dehydrator (E0100B)	**--**	**--**	**--**	**--**	**1.58**	**6.91**	**--**	**--**	**--**	**--**	**--**	**--**	**2.34**	**10.23**
Blowdown Events (VS-1)	**--**	**--**	**--**	**--**	**--**	**0.15**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**5.03**
Truck Loading Activities (VS-1)	**--**	**--**	**--**	**--**	**2.22**	**3.98**	**--**	**--**	**--**	**--**	**--**	**--**	**2.90**	**12.52**
TOTAL	**0.63**	**2.74**	**0.58**	**2.54**	**10.73**	**41.41**	**<0.01**	**0.02**	**0.06**	**0.25**	**0.06**	**0.25**	**1,581.29**	**6,930.85**

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 T – 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 (E0100)	**<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**
Line Heater (E0210)	**<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**
Line Heater (E0810)	**<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**
Line Heater (E0910)	**<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**
Line Heater (E0012)	**<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**
Glycol Reboiler (E0100A)	**<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)	**0.09**	**0.42**	**<0.01**	**0.02**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**--**	**--**	**0.10**	**0.44**
Vapor Recovery Unit (VS-1)	**--**	**--**	**<0.01**	**0.03**	**0.01**	**0.06**	**0.01**	**0.06**	**0.03**	**0.12**	**0.27**	**1.16**	**0.33**	**1.43**
Dehydrator (E0100B)	**--**	**--**	**0.03**	**0.11**	**0.20**	**0.86**	**0.17**	**0.73**	**0.67**	**2.95**	**0.03**	**0.11**	**1.10**	**4.84**
Blowdown Events (VS-1)	**--**	**--**	**--**	**<0.01**	**--**	**<0.01**	**--**	**<0.01**	**--**	**<0.01**	**--**	**<0.01**	**--**	**<0.01**
Truck Loading Activities (VS-1)	**--**	**--**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.02**	**<0.01**	**0.02**
TOTAL	**0.09**	**0.42**	**0.05**	**0.23**	**0.21**	**0.93**	**0.18**	**0.78**	**0.70**	**3.07**	**0.30**	**1.33**	**1.54**	**6.76**

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

CLASS I LEGAL ADVERTISEMENT

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-C General Permit Registration, for a natural gas production facility located at 9 Waymans Ridge Road, in Moundsville, in Marshall County, West Virginia. The latitude and longitude coordinates are: 39.91013, -80.66596.

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

Carbon Monoxide (CO) = 2.54 tpy
Nitrogen Oxides (NO_x) = 2.74 tpy
Particulate Matter – 2.5 = 1.06 tpy
Particulate Matter – 10 = 1.06 tpy
Sulfur Dioxide (SO_2) = 0.02 tpy
Volatile Organic Compounds (VOC) = 42.46 tpy
Formaldehyde = 0.42 tpy
Benzene = 0.23 tpy
Toluene = 0.94 tpy
Ethylbenzene = 0.79 tpy
Xylenes = 3.09 tpy
Hexane = 1.40 tpy
Total Hazardous Air Pollutants (HAPs) =6.82 tpy

Startup of operation is planned to begin on or about the 1st day of December, 2016. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th 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 21st day of July, 2016.

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