Chevron Appalachia, LLC

Class II Administrative Update
Crow Natural Gas Production Site
Permit R13-3143

Moundsville, West Virginia

Prepared By:

ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Hurricane, West Virginia

October 2015

Gary Orr
Appalachia Area Operations Manager

Appalachian/Michigan Business Unit
Chevron North America Exploration & Production Company (a division of Chevron U.S.A. Inc.)
700 Cherrington Parkway
Moon Township, PA 15108
Tel 1 412-865-2509
orrga@chevron.com

October 22, 2015

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

HAND DELIVERED

Re: Chevron Appalachia, LLC, Moundsville, West Virginia
Crow Natural Gas Production Facility Class II Administrative Update

Dear Director Durham:

Chevron Appalachia, L.L.C. is submitting this Class II administrative Update for the Crow Natural Gas Production Well Site currently operating under permit R13-3143A. The Class II administrative update addresses the replacement of the flash compressor engine (CBA-0050) at the facility with a replicate engine of the same model and capacity. The previous permitted compressor engine is a Caterpillar G3304NA four stroke rich burn engine manufactured on June 12, 2007. The replacement compressor engine is a Caterpillar G3304NA four stroke rich burn engine manufactured on January 24, 2007.

New Source Performance Standards (NSPS) for spark ignition reciprocating internal combustion engines (RICE) are codified in 40 CFR 60 Subpart JJJJ. Under permit R13-3143, the determination of applicability for the existing Caterpillar G3304NA four stroke rich burn engine concluded that the engine was manufactured prior to the June 1, 2008 applicability date and is not subject to Subpart JJJJ. Similarly, the proposed engine manufactured on January 24, 2007 is not subject to NSPS Subpart JJJJ.

National Emission Standards for Hazardous Air Pollutants (NESHAP) for RICE engines are codified in 40 CFR 63 Subpart ZZZZ. NESHAP ZZZZ classifies engines as "new" and "existing" engines. Under this Rule, engines that were manufactured or modified/reconstructed prior to June 12, 2006 qualify as existing engines. Engines constructed or modified/reconstructed after this date qualify as new stationary engines. New stationary engines comply with the requirements of the NESHAP Rule by complying with the requirements of the applicable NSPS Rule (40 CFR §63.6590(c)). Both the existing and the proposed engine classify as new engines per the Rule.

In an October 19, 2010 memo from Melanie King of the USEPA Office of Air Quality Planning and Standards Energy Strategies Group, Ms. King states that there are some engines that fall into a window where they would not have any requirements under either 40CFR60 Subpart JJJJ or 40CFR63 Subpart ZZZZ. For the purposes of this permit update, both the existing and the proposed engines qualify as this type of engine.

Enclosed are one hard copy and two electronic copies of a Class II Administrative Update for the Crow Natural Gas Production Well Site currently operating under permit R13-3143A. A check for $300 is enclosed for the update fee.

We would like to request for Mr. Jerry Williams to be the Permit Engineer on this submittal. Mr. Williams completed the initial air permit submittal for this site.

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

Sincerely,

Gary Orr
Appalachia Area Manager

Introduction

Chevron Appalachia, LLC is submitting a Class II Administrative Update to the WVDEP's Department of Air Quality for the Crow Natural Gas Production Site located in Marshall County, West Virginia. This update is being filed to indicate the replacement of the flash gas compressor engine (CBA-0050) currently permitted on site. The engine will be replaced by a replicate engine with the same hp, catalyst converter, and engine outputs. Therefore, updates to the existing Crow Permit, R13-3143A, will not have an effect on emissions.

Facility Description

The Crow Natural Gas Production Facility operates in Marshall County, West Virginia. Natural gas and liquids are extracted from underground deposits and pass through separation equipment designed to extract the natural gas from the produced water. The natural gas is transported from the well to a gas sales line and condensate is transported to a condensate sales line. Produced water is stored temporarily on-site in storage vessels and is removed from the site by tank trucks on an as needed basis.

The following equipment is currently permitted under R13-3143A:

- One (1) natural gas compressor and engine (CBA-0050);
- One (1) line heater rated at 1.0 mmBtu/hr heat input (BAP-0110);
- One (1) 400 barrel (bbl) Test Tank (ABJ-0014)-previously Blowdown Tank;
- One (1) 400 bbl Produced Water Storage tank (ABJ-0011);
- One (1) enclosed ground flare with a capacity of 4.4 mmBtu/hr heat input (ZZZ-060);
- One (1) Liquids Loading Rack (LR-1); and
- Fugitive Components

The following equipment will be affected with this update:

- Removal of One (1) natural gas compressor and engine (CBA-0050);
- Installation of One (1) natural gas compressor and engine (CBA-0050);

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

APPLICATION FOR NSR PERMIT AND TITLE V PERMIT REVISION (OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

☐ **CONSTRUCTION** ☐ **MODIFICATION** ☐ **RELOCATION**
☐ **CLASS I ADMINISTRATIVE UPDATE** ☐ **TEMPORARY**
☒ **CLASS II ADMINISTRATIVE UPDATE** ☒ **AFTER-THE-FACT**

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION**

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant *(as registered with the WV Secretary of State's Office):*
Chevron Appalachia, LLC

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

3. Name of facility *(if different from above):*
Crow Natural Gas Production Site

4. The applicant is the:
☐ **OWNER** ☐ **OPERATOR** ☒ **BOTH**

5A. Applicant's mailing address:
700 Cherrington Parkway
Coraopolis, PA 15108

5B. Facility's present physical address:
Middle Grave Creek Road
Moundsville, WV 26041

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☐ **YES** ☒ **NO**

- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation: **Chevron U.S.A. Inc.**

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**

- If **YES,** please explain: **The applicant leases the proposed site.**
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.):
Natural Gas Production Facility

10. North American Industry Classification System **(NAICS)** code for the facility:
211111

11A. DAQ Plant ID No. (for existing facilities only):
051-00187

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R13-3143A

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

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

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
N/A	**Moundsville**	**Marshall**
12.E. UTM Northing (KM): **4,415.21**	12F. UTM Easting (KM): **529.58**	12G. UTM Zone: **17**

13. Briefly describe the proposed change(s) at the facility:

Chevron Appalachia, LLC is submitting an update to this permit to replace the existing flash gas compressor engine at the facility with an engine of the same make and model, hp and post catalyst emission controls.

14A. Provide the date of anticipated installation or change:	14B. Date of anticipated Start-Up if a permit is granted:
– If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: **August 24, 2015**	**NA**

14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day **24** Days Per Week **7** Weeks Per Year **52**

16. Is demolition or physical renovation at an existing facility involved? ☐ **YES** ☒ **NO**

17**. Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18**. Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known).* A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known).* Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance***) **.**

– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**

– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

– For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☐ Bulk Liquid Transfer Operations	☐ Haul Road Emissions	☐ Quarry
☐ Chemical Processes	☐ Hot Mix Asphalt Plant	☐ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	☐ Storage Tanks
☐ Grey Iron and Steel Foundry	☐ Indirect Heat Exchanger	
☒ General Emission Unit, specify **CBA-0050**		

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

☐ Absorption Systems	☐ Baghouse	☐ Flare
☐ Adsorption Systems	☐ Condenser	☐ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System

☐ Other Collectors, specify **N/A**

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33**. Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's ***"Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

☐ Authority of Corporation or Other Business Entity	☐ Authority of Partnership
☐ Authority of Governmental Agency	☐ Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R.**

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative,** hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE _____ *(Please use blue ink)* DATE: 10-22-15 *(Please use blue ink)*

35B. Printed name of signee: **Gary Orr**		35C. Title: **Appalachia Area Manager for Chevron Appalachia, LLC**
35D. E-mail: **orrga@chevron.com**	36E. Phone: **412-389-3686**	36F. FAX:
36A. Printed name of contact person (if different from above): **Amy McGreevy**		36B. Title: **Air Specialist**
36C. E-mail: **Amy.McGreevy@chevron.com**	36D. Phone: **412-865-2495**	36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

☒ **Attachment A: Business Certificate**
☒ **Attachment B: Map(s)**
☒ **Attachment C: Installation and Start Up Schedule**
☒ **Attachment D: Regulatory Discussion**
☒ **Attachment E: Plot Plan**
☒ **Attachment F: Detailed Process Flow Diagram(s)**
☒ **Attachment G: Process Description**
☒ **Attachment H: Material Safety Data Sheets (MSDS)**
☒ **Attachment I: Emission Units Table**
☒ **Attachment J: Emission Points Data Summary Sheet**
☒ **Attachment K: Fugitive Emissions Data Summary Sheet**
☒ **Attachment L: Emissions Unit Data Sheet(s)**
☒ **Attachment M: Air Pollution Control Device Sheet(s)**
☒ **Attachment N: Supporting Emissions Calculations**
☒ **Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans**
☒ **Attachment P: Public Notice**
☒ **Attachment Q: Business Confidential Claims**
☒ **Attachment R: Authority Forms**
☒ **Attachment S: Title V Permit Revision Information**
☒ **Application Fee**

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

☐ ***Forward 1 copy of the application to the Title V Permitting Group and:***
☐ ***For Title V Administrative Amendments:***
  ☐ ***NSR permit writer should notify Title V permit writer of draft permit,***
☐ ***For Title V Minor Modifications:***
  ☐ ***Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,***
  ☐ ***NSR permit writer should notify Title V permit writer of draft permit.***
☐ ***For Title V Significant Modifications processed in parallel with NSR Permit revision:***
  ☐ ***NSR permit writer should notify a Title V permit writer of draft permit,***
  ☐ ***Public notice should reference both 45CSR13 and Title V permits,***
  ☐ ***EPA has 45 day review period of a draft permit.***

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

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Attachment A

State of West Virginia

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:

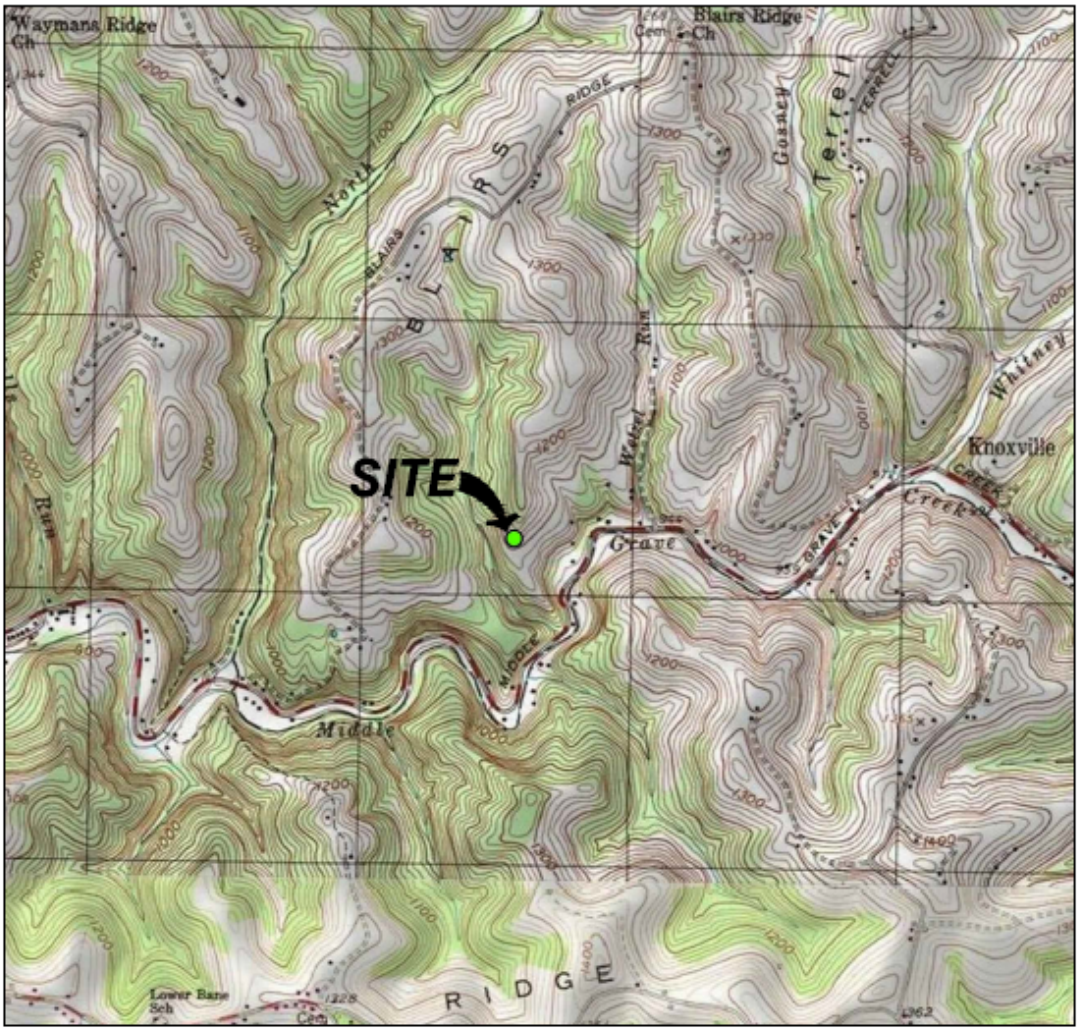
   _____ — Signature
   Assistant Secretary — Title/Capacity
   (Example: member, manager, etc.)

Attachment B

LAT. 39.8864 LON. -80.6540
CITY OF MOUNDSVILLE
MARSHALL COUNTY
WEST VIRGINIA

N

0 2000
SCALE (IN FEET)



SITE LOCATION MAP

ADAPTED FROM USGS

REVISIONS ARE TO BE MADE ON THE CADD FILE ONLY

ERM.	**CHEVRON APPALACHIA, LLC** CROW NATURAL GAS PRODUCTION SITE MOUNDSVILLE, WEST VIRGINIA	CADD Review CHK'D GM 0208717
Drawn By MLB/7-29-14	Environmental Resources Management	ATTACHMENT B

Attachment C

Attachment C
Schedule of Installation

The natural gas production site included in this construction permit is existing. Since this is an administrative permit update, a schedule of installation is not being provided.

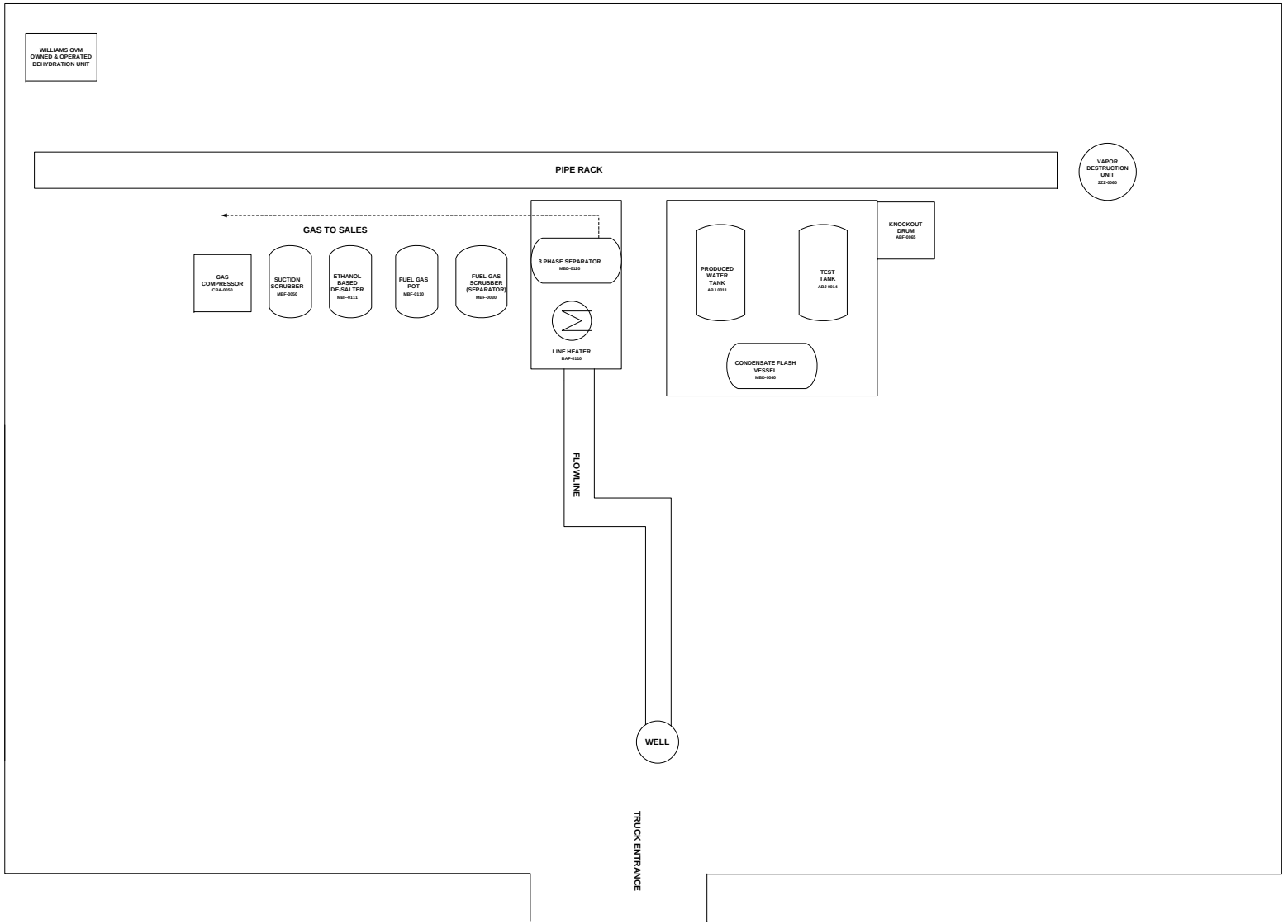
Attachment D

Attachment D
Regulatory Discussion

Please refer to application Cover Letter for regulatory implications of engine replacement.

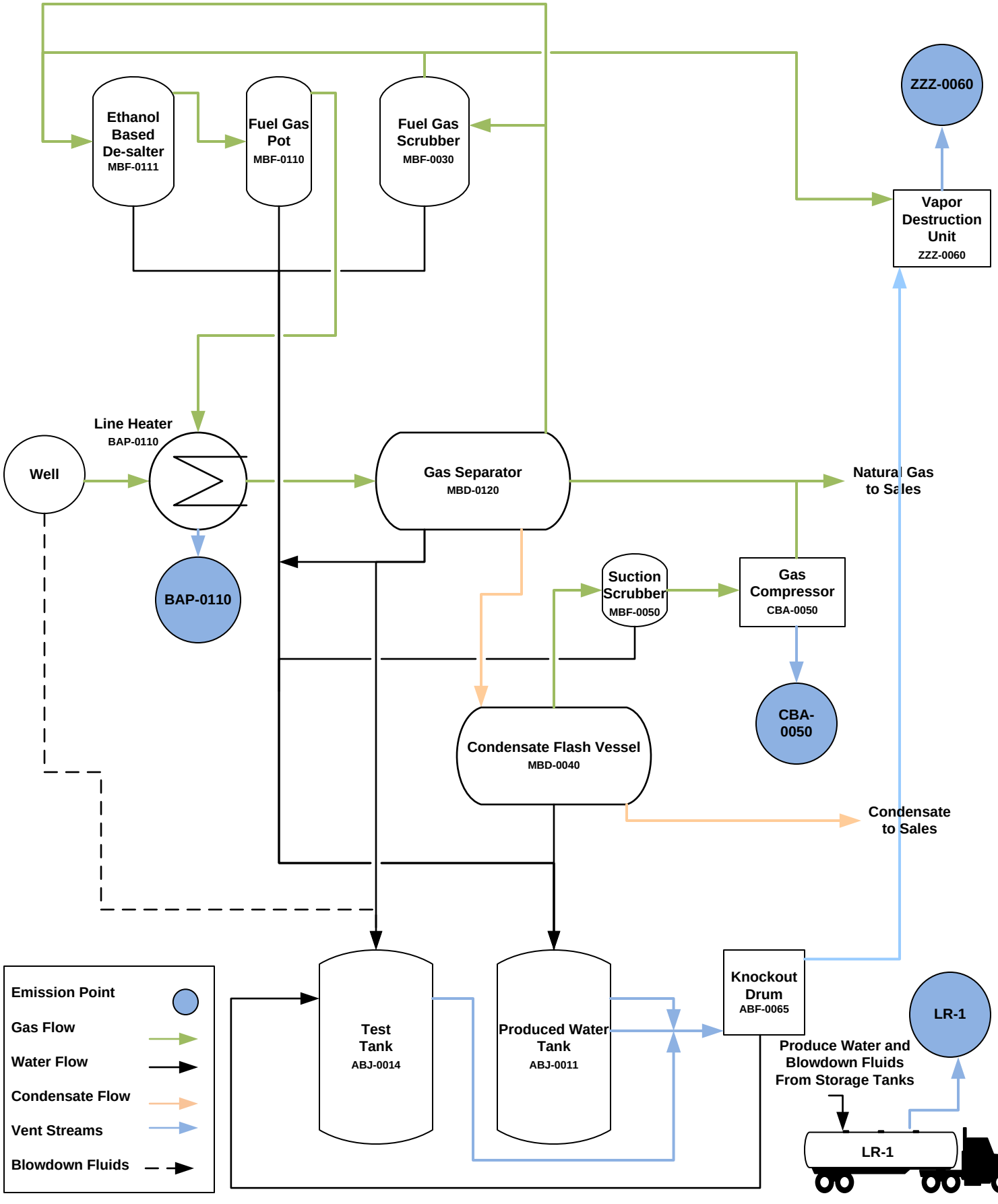
Attachment E

Attachment E
Plot Plan
Chevron Crow Natural Gas Production Site



Attachment F

Attachment F
Crow Natural Gas Production
Site Process Flow Diagram



Attachment G

Attachment G
Process Description

This permit application is being filed for Chevron Appalachia, LLC (Chevron) and addresses the flash compressor engine replacement associated with the Crow natural gas production site. The new engine for the flash gas compressor has the same capacity as the previously permitted engine and will have no effect on emission yields or federal applicability set in place by the approved permit.

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

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

A process flow diagram is included as Attachment F.

Attachment H

Attachment H
Material Safety Data Sheets

There are no newly proposed chemicals that will be used at the Crow Natural Gas Production Site. Therefore, no additional material safety data sheets are being included with this update.

Attachment I

Attachment I

Emission Units Table
(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
CBA-0050	**CBA-0050**	**Gas Compressor**	**2013**	**95 bhp**	**Removal**	**NSCR**
CBA-0050	**CBA-0050**	**Gas Compressor**	**2015**	**95 bhp**	**New**	**NSCR**

***Units denoted with an asterisk (*) have been included in this update.**

[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] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment J

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] (mg/m^3)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
CBA-0050 (old)	**Upward Vertical Stack**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**Total VOCs** **Total HAPs** **Formaldehyde** **NO_x** **CO** **PM_{10}** **CO_2** **CH_4** **CO_2e**	**0.06** **0.04** **0.04** **0.11** **0.42** **<0.01** **103.06** **1.08** **125.91**	**0.27** **0.19** **0.18** **0.47** **1.84** **0.03** **451.41** **4.75** **551.49**	**0.06** **0.04** **0.04** **0.11** **0.42** **<0.01** **103.06** **1.08** **125.91**	**0.27** **0.19** **0.18** **0.47** **1.84** **0.03** **451.41** **4.75** **551.49**	**Gas**	**AP-42, Subpart W**	**NA**
CBA-0050 (new)	**Upward Vertical Stack**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**Total VOCs** **Total HAPs** **Formaldehyde** **NO_x** **CO** **PM_{10}** **CO_2** **CH_4** **CO_2e**	**0.06** **0.04** **0.04** **0.11** **0.42** **<0.01** **103.06** **1.08** **125.91**	**0.27** **0.19** **0.18** **0.47** **1.84** **0.03** **451.41** **4.75** **551.49**	**0.06** **0.04** **0.04** **0.11** **0.42** **<0.01** **103.06** **1.08** **125.91**	**0.27** **0.19** **0.18** **0.47** **1.84** **0.03** **451.41** **4.75** **551.49**	**Gas**	**AP-42, Subpart W**	**NA**

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

[4] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (^{0}F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
CBA-0050 (old)	**NA**	**Ambient**	**NA**	**NA**	**1,331**	**7**	**4,415.21**	**529.58**
CBA-0050 (new)	**NA**	**Ambient**	**NA**	**NA**	**1,331**	**7**	**4,415.21**	**529.58**

Attachment K

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The engine replacement will not change fugitive emissions at the Crow Natural Gas Production Site. Therefore, an updated fugitive emissions data summary sheet is not being included with this update.

Attachment L

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **CBA-0050**

1. Name or type and model of proposed affected source: **Caterpillar G3304**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour: **7,875 Btu/bhp-hr**
4. Name(s) and maximum amount of proposed material(s) produced per hour: **N/A**
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: **N/A**

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Natural Gas

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

% Sulfur – 0.01
% Ash – N/A

(c) Theoretical combustion air requirement (ACF/unit of fuel): N/A

N/A @ **N/A** **°F and** **N/A** **psia.**

(d) Percent excess air: **N/A**

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

N/A

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

N/A

(g) Proposed maximum design heat input: **7.94** $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:				
@ Ambient	**70** °F and		Ambient **14.7**	psia
a. NO_X	**0.11**	lb/hr	**N/A**	grains/ACF
b. SO_2	**<0.001**	lb/hr	**N/A**	grains/ACF
c. CO	**0.42**	lb/hr	**N/A**	grains/ACF
d. PM_{10}	**0.007**	lb/hr	**N/A**	grains/ACF
e. Hydrocarbons	**N/A**	lb/hr	**N/A**	grains/ACF
f. VOCs	**0.06**	lb/hr	**N/A**	grains/ACF
g. Pb	**N/A**	lb/hr	**N/A**	grains/ACF
h. Specify other(s)				
Formaldehyde	**0.04**	lb/hr	**N/A**	grains/ACF
Benzene	**0.001**	lb/hr	**N/A**	grains/ACF
Ethyl Benzene	**<0.001**	lb/hr	**N/A**	grains/ACF
n-Hexane	**<0.001**	lb/hr	**N/A**	grains/ACF
Toluene	**0.001**	lb/hr	**N/A**	grains/ACF
Xylene	**0.000**	lb/hr	**N/A**	grains/ACF
Total HAPs	**0.04**	lb/hr	**N/A**	grains/ACF
CO_2	**103.06**	lb/hr	**N/A**	grains/ACF
CH_4	**1.08**	lb/hr	**N/A**	grains/ACF
N_2O	**<0.001**	lb/hr	**N/A**	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
See Attachment O	See Attachment O
REPORTING	TESTING
See Attachment O	See Attachment O

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

N/A

Attachment M

Attachment M
Air Pollution Control Device Sheet

Not Applicable. The proposed replacement engine will be identical to the existing NSCR-equipped engine.

Attachment N

Gas Compressor - CBA 0050 (old)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Engine Rating (bhp)	Fuel Consumption (Btu/bhp-hr)	Heat Value of Natural Gas[3] (Btu/scf)	Annual Operating Hours	Catalytic Convert Reduction (%)	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
NOx	13.11	g/bhp-hr	Vendor Guarantee	95	7,875	905	8,760	96.10	0.11	0.47
CO	13.11	g/bhp-hr	Vendor Guarantee	95	7,875	905	8,760	84.70	0.42	1.84
VOC's	0.29	g/bhp-hr	Vendor Guarantee	95	7,875	905	8,760	0.0	0.06	0.27
PM_{10}	9.99E-03	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.007	0.03
SO_2	5.88E-04	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.000	0.002
Benzene	1.94E-03	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.001	0.006
Ethylbenze	1.08E-04	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.000	0.000
Formaldehyde	5.52E-02	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.04	0.18
Xylene	2.68E-04	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.000	0.001
Hexane	4.45E-04	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.000	0.001
Toluene	9.63E-04	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.001	0.003
CO_2	4.92E+02	g/bhp-hr	Vendor Guarantee	95	7,875	905	8,760	0.0	103.06	451.41
CH_4	1.45E+00	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	1.08	4.75
N_2O	1.00E-04	kg N_2O	40CFR98 Subpart W	95	7,875	905	8,760	0.0	0.000	0.001
Total CO_2e									125.91	551.49

Notes:

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

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

[3]- Heat Value of Natural Gas used based upon manufacturer emissioins guarantee usage conditions

-Nitrous Oxide emissions solved for using equation (z)(2)(vi) from 40CFR98 Subpart W. Calculation methodology is included below.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Subpart W Table A-1. GWP CO_2=1, GWP CH_4=21, GWP N_2O=310

Example Equations:

Vendor Guaranteed Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(g/bhp-hr) x** Engine Rating **(bhp)** x 0.002205 **(lb/gram)**

AP-42 Max. Hourly Emission Rate **(lb/hr)** = Emission Factor **(lb/mmBtu)** x Engine Rating **(bhp)** x Fuel Consumption **(Btu/bhp-hr)** x **(mmBtu/1,000,000 Btu)**

Subpart W Max. Hourly Emission Rate **(lb/hr)** = Fuel Consumption Rate **(Btu/bhp-hr)** x Engine Rating **(bhp)** / HHV of NG **(Btu/scf)** x 0.001 x 0.001235 **(mmBtu/scf)** x Emission Factor **(kg N_2O)** x 1.102 **(tons/tonnes)** x 2,000 **(lbs/ton)**

Equation Methodology used to solve for Nitrous Oxide Emissions:

(z)(2)(vi) Calculate N_2O mass emissions using Equation W-40 of this section.

$$Mass_{N2O} = \left(1 \times 10^{-3}\right) \times Fuel \times HHV \times EF \times GWP \qquad \text{(Eq. W-40)}$$

Where:

$Mass_{N2O}$ = Annual N_2O emissions from the combustion of a particular type of fuel (metric tons CO_2e).

Fuel = Mass or volume of the fuel combusted (mass or volume per year, choose appropriately to be consistent with the units of HHV).

HHV = For the higher heating value for field gas or process vent gas, use 1.235 x 10^{-3} mmBtu/scf for HHV.

EF = Use 1.0 × 10^{-4} kg N_2O/mmBtu.

1 × 10^{-3} = Conversion factor from kilograms to metric tons.

Gas Compressor - CBA 0050 (new)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Engine Rating (bhp)	Fuel Consumption (Btu/bhp-hr)	Heat Value of Natural Gas[3] (Btu/scf)	Annual Operating Hours	Catalytic Convert Reduction (%)	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
NOx	13.11	g/bhp-hr	Vendor Guarantee	95	7,875	905	8,760	96.10	0.11	0.47
CO	13.11	g/bhp-hr	Vendor Guarantee	95	7,875	905	8,760	84.70	0.42	1.84
VOC's	0.29	g/bhp-hr	Vendor Guarantee	95	7,875	905	8,760	0.0	0.06	0.27
PM_{10}	9.99E-03	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.007	0.03
SO_2	5.88E-04	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.000	0.002
Benzene	1.94E-03	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.001	0.006
Ethylbenze	1.08E-04	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.000	0.000
Formaldehyde	5.52E-02	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.04	0.18
Xylene	2.68E-04	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.000	0.001
Hexane	4.45E-04	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.000	0.001
Toluene	9.63E-04	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	0.001	0.003
CO_2	4.92E+02	g/bhp-hr	Vendor Guarantee	95	7,875	905	8,760	0.0	103.06	451.41
CH_4	1.45E+00	lb/mmBtu	AP-42 Chapter 3.2	95	7,875	905	8,760	0.0	1.08	4.75
N_2O	1.00E-04	kg N_2O	40CFR98 Subpart W	95	7,875	905	8,760	0.0	0.000	0.001
Total CO_2e									125.91	551.49

Notes:

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

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

[3]- Heat Value of Natural Gas used based upon manufacturer emissioins guarantee usage conditions

-Nitrous Oxide emissions solved for using equation (z)(2)(vi) from 40CFR98 Subpart W. Calculation methodology is included below.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Subpart W Table A-1. GWP CO_2=1, GWP CH_4=21, GWP N_2O=310

Example Equations:

Vendor Guaranteed Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(g/bhp-hr) x** Engine Rating **(bhp)** x 0.002205 **(lb/gram)**

AP-42 Max. Hourly Emission Rate **(lb/hr)** = Emission Factor **(lb/mmBtu)** x Engine Rating **(bhp)** x Fuel Consumption **(Btu/bhp-hr)** x **(mmBtu/1,000,000 Btu)**

Subpart W Max. Hourly Emission Rate **(lb/hr)** = Fuel Consumption Rate **(Btu/bhp-hr)** x Engine Rating **(bhp)** / HHV of NG **(Btu/scf)** x 0.001 x 0.001235 **(mmBtu/scf)** x Emission Factor **(kg N_2O)** x 1.102 **(tons/tonnes)** x 2,000 **(lbs/ton)**

Equation Methodology used to solve for Nitrous Oxide Emissions:

(z)(2)(vi) Calculate N_2O mass emissions using Equation W-40 of this section.

$$Mass_{N2O} = \left(1 \times 10^{-3}\right) \times Fuel \times HHV \times EF \times GWP \qquad \text{(Eq. W-40)}$$

Where:

$Mass_{N2O}$ = Annual N_2O emissions from the combustion of a particular type of fuel (metric tons CO_2e).

Fuel = Mass or volume of the fuel combusted (mass or volume per year, choose appropriately to be consistent with the units of HHV).

HHV = For the higher heating value for field gas or process vent gas, use 1.235 x 10^{-3} mmBtu/scf for HHV.

EF = Use 1.0 × 10^{-4} kg N_2O/mmBtu.

1 × 10^{-3} = Conversion factor from kilograms to metric tons.

MURPHY Compliance

EICS Emissions Performance Specification Summary - G3304 NA HCR **Current as of: 2/25/2012**

Engine Data

Number of Engines: 1
Engine Manufacturer: Caterpillar
Model Number: G3304 NA HCR
Power Output: 95 bhp
Load: 100%
Speed: 1800 RPM
Lubrication Oil: 0.6 wt% sulfated ash or less
Type of Fuel: Natural Gas (905 BTU LHV)
Exhaust Flow Rate: 447 acfm (cfm)
Exhaust Temperature: 1089°F

NSCR Catalytic Converter Details

Part Number: E2379011
Material: Stainless Steel
Diameter: 9.5"
Inlet Pipe Size & Connection: 5" FF Flange, 125# ANSI standard bolt pattern
Outlet Pipe Size & Connection: 5" FF Flange, 125# ANSI standard bolt pattern
Overall Length: 24"
Weight: 40 lbs
System Pressure Loss: 6.0 inches of WC (Fresh)
Exhaust Temperature Limits: 750°F – 1250°F (catalyst inlet); 1350°F (catalyst outlet)

Emission Requirements

Exhaust Gases	Engine Outputs (g/bhp-hr)	Reduction (%)	Warranted * Converter Outputs (g/bhp-hr)
NOx	13.11	96.1%	0.50
CO	13.11	84.7%	2.00
NMNEHC	—		0.70
Oxygen	0.2 - 0.4%		

* FW Murphy confirms the emissions reduction using the EICS system which includes the catalyst as an essential element to yield the engine-out emissions and warrants the performance of the converter, as stated above.

1. **System Design**

a. The Engine Integrated Control System (EICS) incorporates complete engine control to maintain optimum emissions output, including electronic ignition, speed governing and air-fuel ratio control.
b. Pre and Post catalyst oxygen sensor monitors

2. **Operation**

a. Data based on continuous operating duty, 8760 hours per year.
b. Continuous operating exhaust gas temperature must be between 750°F and 1,250°F
c. System backpressure must remain within +/-5% normal conditions.

Aug 20, 2015

Dennis Matto
Exterran
4477 Gleason Road
Lakewood, NY 14750

Exterran
QHSE and Operations Services
16666 Northchase Drive
Houston, Texas 77060 U.S.A.

Main 281.836.7000
Fax 281.836.8161
www.exterran.com

Re: Engine Pedigree for Exterran Compressor Unit 70581, Engine Serial Number N4F02439

In order to better assist your company with any of its state and federal permitting needs, Exterran submits the following information in regards to the engine of the above-referenced compressor unit, which Exterran is currently utilizing to provide your company contract compression services. This letter should provide information necessary to answer questions pertaining to, but not limited to, the New Source Performance Standards (NSPS) for Stationary Spark Ignition Internal Combustion Engines, Subpart JJJJ. This information is current as of Aug 20, 2015.

Engine Make:	CATERPILLAR
Engine Model:	G3304NA
Engine Serial Number:	N4F02439
Engine Type:	4 Stroke RB
Engine Category:	Existing
Engine Subcategory:	Non Certified
Engine NSPS Status*:	Exempt
Exemption Justification*:	Overhauls since 6/12/06 have not triggered recon./modif.
Engine Speed:	1800.00
OEM Rated HP:	95.00
Engine Manufacture Date:	Jan 24, 2007
Customer:	CHEVRON USA INC (EDI)
Business Unit:	Mid-Con
Exterran Unit Number:	70581
Customer Lease Name:	N/A

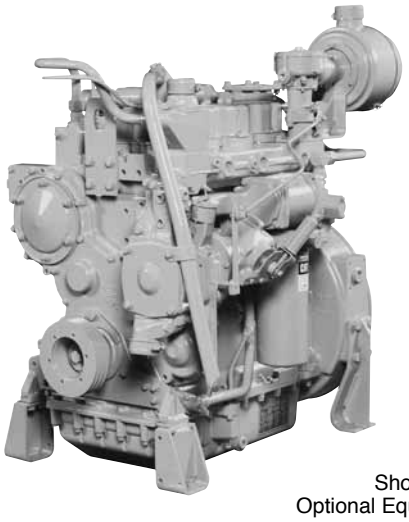
Please contact Kyle Poycker with any questions at or kyle.poycker@exterran.com.

* The "Engine NSPS Status" and "Exemption Justification" entries herein are based on Exterran's present knowledge of the engine in question and its reading of U.S. EPA's regulations and guidance pursuant to 40 C.F.R. Part 60, Subpart JJJJ. Any change in law or in the federal, state, or local interpretation of existing law could result in this engine being subject to additional or different legal requirements. These conclusions are Exterran's and are not offered as legal opinions or advice to your company. Additionally, any reconstruction or modification respecting this engine (as those terms are defined in the applicable regulations) could result in the applicability of Subpart JJJJ or other legal requirements to this engine and create legal compliance responsibilities for your company.

G3304 Gas Petroleum Engine

71 bkW (95 bhp)
1800 rpm

2.0% O_2 Rating



Shown with Optional Equipment

CAT® ENGINE SPECIFICATIONS

In-line 4, 4-Stroke-Cycle

Bore	121 mm (4.8 in.)
Stroke	152 mm (6.0 in.)
Displacement	7.0 L (425 cu. in.)
Aspiration	Naturally Aspirated
Governor and Protection	Hydra-mechanical
Combustion	Rich Burn
Engine Weight, net dry (approx)	757.5 kg (1670 lb)
Power Density	10.7 kg/kW (17.6 lb/bhp)
Power per Displacement	13.6 bhp/L
Jacket Water Capacity	16.0 L (4.2 gal)
Lube Oil System (refill)	31.2 L (8.3 gal)
Oil Change Interval	750 hours
Rotation (from flywheel end)	Counterclockwise
Flywheel and Flywheel Housing	SAE No. 1
Flywheel Teeth	156

FEATURES

Engine Design
- Proven reliability and durability
- Ability to burn a wide spectrum of gaseous fuels
- Robust diesel strength design prolongs life and lowers owning and operating costs
- Broad operating speed range

Full Range of Attachments
Large variety of factory-installed engine attachments reduces packaging time

Testing
Every engine is full-load tested to ensure proper engine performance.

Gas Engine Rating Pro
GERP is a PC-based program designed to provide site performance capabilities for Cat® natural gas engines for the gas compression industry. GERP provides engine data for your site's altitude, ambient temperature, fuel, engine coolant heat rejection, performance data, installation drawings, spec sheets, and pump curves.

Product Support Offered Through Global Cat Dealer Network
More than 2,200 dealer outlets

Cat factory-trained dealer technicians service every aspect of your petroleum engine

Cat parts and labor warranty

Preventive maintenance agreements available for repair-before-failure options

S•O•S℠ program matches your oil and coolant samples against Caterpillar set standards to determine:
- Internal engine component condition
- Presence of unwanted fluids
- Presence of combustion by-products
- Site-specific oil change interval

Over 80 Years of Engine Manufacturing Experience
Over 60 years of natural gas engine production

Ownership of these manufacturing processes enables Caterpillar to produce high quality, dependable products.
- Cast engine blocks, heads, cylinder liners, and flywheel housings
- Machine critical components
- Assemble complete engine

Web Site
For all your petroleum power requirements, visit www.catoilandgas.cat.com.

STANDARD EQUIPMENT

Air Inlet System
Air cleaner
Air cleaner rain cap
Service indicator

Control System
Hydra-mechanical governor

Cooling System
Thermostats and housing
Jacket water pump — gear-driven

Exhaust System
Watercooled exhaust manifolds
Dry exhaust elbow

Flywheel & Flywheel Housing
SAE No. 1 flywheel
SAE No. 1 flywheel housing
SAE standard rotation

Fuel System
Gas pressure regulator
Natural gas carburetor

Ignition System
Altronic V ignition system

Instrumentation
Service meter

Lube System
Crankcase breather — top mounted
Oil cooler
Oil pan — full sump
Oil filler and dipstick

Mounting System
Engine supports

Protection System
Shutoffs

General
Paint — Cat yellow
Crankshaft drive pulley
Lifting eyes

OPTIONAL EQUIPMENT

Charging System
Battery chargers
Charging alternators
Ammeter gauge
Ammeter gauge and wiring

Control System
Vernier and positive locking control

Cooling System
Expansion tank
Heat exchanger/expansion tank
Radiator
Blower fan
Suction fan
Belt tightener
Fan drive

Exhaust System
Flexible fittings
Elbows
Flange
Pipe
Rain cap
Mufflers

Ignition System
Altronic III
CSA shielded ignition
Wiring harness

Instrumentation
Gauges and instrument panels

Lube System
Lubricating oil

Mounting System
Vibration isolators

Power Take-Offs
Auxiliary drive pulleys
Auxiliary pump
Enclosed clutch
Flywheel stub shaft
Front stub shaft

Protection System
Mechanical shutoffs
Gas valves

Starting System
Air starting motor
Air pressure regulator
Air silencer
Electric starting motor
Battery sets
Battery cables
Battery rack

General
Tool set

TECHNICAL DATA

G3304 Gas Petroleum Engine — 1800 rpm

		TM9744-06
Engine Power		
@ 100% Load	bkW (bhp)	71 (95)
@ 75% Load	bkW (bhp)	53 (71)
Engine Speed	rpm	1800
Max Altitude @ Rated Torque and 38°C (100°F)	m (ft)	0
Speed Turndown @ Max Altitude, Rated Torque, and 38°C (100°F)	%	48.3
AC Temperature	°C (°F)	—
Emissions*		
NOx	g/bkW-hr (g/bhp-hr)	28.3 (21.08)
CO	g/bkW-hr (g/bhp-hr)	2.15 (1.6)
CO_2	g/bkW-hr (g/bhp-hr)	667 (498)
VOC**	g/bkW-hr (g/bhp-hr)	0.32 (0.24)
Fuel Consumption***		
@ 100% Load	MJ/bkW-hr (Btu/bhp-hr)	10.71 (7567)
@ 75% Load	MJ/bkW-hr (Btu/bhp-hr)	11.10 (7842)
Heat Balance		
Heat Rejection to Jacket Water		
@ 100% Load	bkW (Btu/min)	66.8 (3800)
@ 75% Load	bkW (Btu/min)	54.1 (3076)
Heat Rejection to Aftercooler		
@ 100% Load	bkW (Btu/min)	—
@ 75% Load	bkW (Btu/min)	—
Heat Rejection to Exhaust (LHV to 77°F)		
@ 100% Load	bkW (Btu/min)	55.6 (3163)
@ 75% Load	bkW (Btu/min)	42.6 (2425)
Exhaust System		
Exhaust Gas Flow Rate		
@ 100% Load	m^3/min (cfm)	13 (459)
@ 75% Load	m^3/min (cfm)	10.17 (359)
Exhaust Stack Temperature		
@ 100% Load	°C (°F)	548 (1018)
@ 75% Load	°C (°F)	529 (984)
Intake System		
Air Inlet Flow Rate		
@ 100% Load	m^3/min (scfm)	4.25 (150)
@ 75% Load	m^3/min (scfm)	3.40 (120)
Gas Pressure	kPag (psig)	10.34-34.47 (1.5-5)

*at 100% load and speed, all values are listed as not to exceed

**Volatile organic compounds as defined in U.S. EPA 40 CFR 60, subpart JJJJ

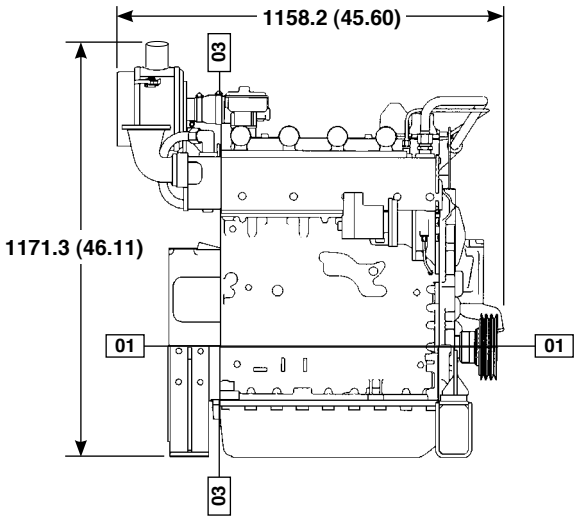
***ISO 3046/1

CATERPILLAR®

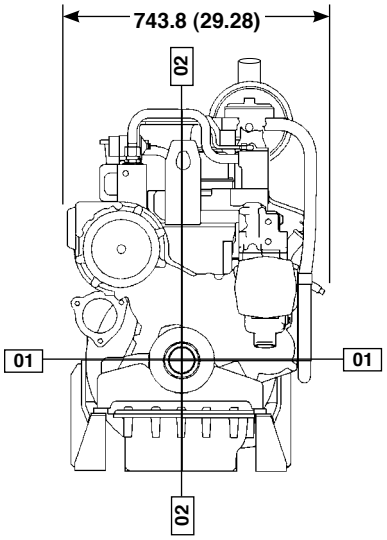
G3304 GAS PETROLEUM ENGINE

71 bkW (95 bhp)

DIMENSIONS



RIGHT SIDE VIEW



FRONT VIEW

PACKAGE DIMENSIONS		
Length	mm (in.)	1158.2 (45.60)
Width	mm (in.)	743.8 (29.28)
Height	mm (in.)	1171.3 (46.11)
Shipping Weight	kg (lb)	757.5 (1670)

Note: General configuration not to be used for installation. See general dimension drawing 5N-6644 for detail.

Dimensions are in mm (inches).

RATING DEFINITIONS AND CONDITIONS

Engine performance is obtained in accordance with SAE J1995, ISO3046/1, BS5514/1, and DIN6271/1 standards.

Transient response data is acquired from an engine/ generator combination at normal operating temperature and in accordance with ISO3046/1 standard ambient conditions. Also in accordance with SAE J1995, BS5514/1, and DIN6271/1 standard reference conditions.

Conditions: Power for gas engines is based on fuel having an LHV of 33.74 kJ/L (905 Btu/cu ft) at 101 kPa (29.91 in. Hg) and 15° C (59° F). Fuel rate is based on a cubic meter at 100 kPa (29.61 in. Hg) and 15.6° C (60.1° F). Air flow is based on a cubic foot at 100 kPa (29.61 in. Hg) and 25° C (77° F). Exhaust flow is based on a cubic foot at 100 kPa (29.61 in. Hg) and stack temperature.

Performance Number: TM9744-06
LEHW0019-00 (11-09)
Supersedes LEHW0614-04

Attachment O

Attachment O

Monitoring, Recording, Reporting, and Testing Plans

Monitoring, recordkeeping, reporting and testing requirements are not affected by the submission of this Class II Administrative Update. Chevron will continue to comply with the requirements of R13-3143, as they are reflected in the updated version of the issued permit.

Attachment P

Attachment P

AIR QUALITY PERMIT NOTICE
Notice of Application

Since emissions will not be altered for the engine replacement, a public notice is not included in the submittal of this Class II Administrative Update.

Attachment Q

Attachment Q
Business Confidential Claims

There is no confidential information associated with this permit application.

Attachment R

Attachment R
Authority Forms

Since this application is signed by the “Responsible Official”, this section is not applicable.

Attachment S

Attachment S
Title V Permit Revision Information

An Attachment S is not being provided with this permit application since the site does not currently possess a Title V Permit.