

Enervest Operating, LLC

G70-A General Air Permit Application Tygertt Well Pad Natural Gas Production Site

Bolt, West Virginia



Prepared By:

**ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Hurricane, West Virginia**

September 2015

Enervest Operating, LLC
300 Capitol Street, Suite 200
Charleston, WV 25301

September 16, 2015

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

Re: Enervest Operating, LLC, Bolt, West Virginia
Tygerrt Natural Gas Production Facility G70-A Permit Application

Dear Director Durham:

Enclosed are one (1) original hard copy and two (2) CD-ROMs of a G70-A General Air Permit Application for the construction of a natural gas-fired RICE engine at the Tygerrt Natural Gas Production Well Site. A check for \$3,000 is enclosed for the application fee.

If you have any questions concerning this permit application, please contact Mr. Michael Dearing at (304) 414-8171.

Sincerely,

James McKinney
Senior Vice President and General Manager EVOC

cc: Grant Morgan, ERM – grant.morgan@erm.com

Enclosures:

INTRODUCTION

Enervest Operating, LLC (Enervest) submits this G70-A Class II Permit Application to the WVDEP's Department of Air Quality for the Tygertt Well Pad natural gas production site located in Raleigh County, West Virginia. This application addresses the operational activities associated with the production of natural gas at the Tygertt Well pad.

FACILITY DESCRIPTION

The Tygertt Well Pad natural gas production site operates in Raleigh County, WV and consists of two (2) coal-bed methane natural gas wells. Natural gas and produced water is extracted from underground deposits. The natural gas will be transported from the wells to on-site compression for delivery to the gas sales line. The produced water is stored in storage vessels and land applied as necessary.

The applicant seeks to authorize the operation of:

- One (1) 145 bhp Caterpillar natural gas compressor engine;
- Four (4) 210 barrel (bbl) produced water tanks and;
- Two (2) 50 barrel (bbl) produced water tanks.

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

STATEMENT OF AGGREGATION

The Tygertt Well Pad facility will be located in Raleigh County, WV and operated by Enervest. Stationary sources of air pollutants may require aggregation of total emission levels to evaluate the potential applicability of Title I, Parts C and D preconstruction permitting programs and the Title V operating permit program if these sources share the same industrial grouping, are operating under common control, and are classified as contiguous or adjacent facilities. Enervest will operate the Tygertt Well Pad facility with the same industrial grouping as nearby facilities, and some of these facilities are under common control. Enervest is not subject to the aggregation of stationary emission sources because these sites do not meet the definition of contiguous or adjacent facilities.

The Tygertt Well Pad facility will operate under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are no surrounding wells or compressor stations operated by Enervest. Therefore, applicable SIC codes do not apply.

Enervest is the sole operator of the Tygerrt Well Pad facility. Other production sites or compressor stations are operated by Enervest in the area. Therefore, Enervest does qualify as having nearby operations under common control.

Nearby sites do not meet the definition of contiguous or adjacent properties since they are not located within ¼ mile of the Tygerrt Site, do not share common boundaries, and do not have intermingled processes.

Based on the above reasoning, Enervest 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 Tygerrt Well Pad facility 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-A permit application forms.

The West Virginia State Regulations address applicable state (i.e. State Implementation Plan) rules as well as federal regulations, including Prevention of Significant Deterioration or Nonattainment New Source Review Preconstruction Permitting, Title V, New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants. The regulatory requirements in reference to Tygerrt Well Pad 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

No indirect heat exchangers that combust natural gas will be operated or installed at the Tygert Well Pad.

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 Tygerrt Well Pad facility 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

The Tygertt Well Pad does not combust refuse.

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

Natural gas combustion devices will be operated in accordance with the sulfur dioxide concentration limitation. Pipeline quality natural gas will only be used at the Tygertt facility.

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

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

45 CSR 14 / 45 CSR 19 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration / 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 attainment pollutants. The G70-A applicability criteria exclude facilities that meet the definition of a major source, as defined in 45 CSR 19, from being eligible for the general permit.

Operation of equipment at the Tygertt Well Pad facility will not exceed major source emission thresholds established by these permitting programs. Enervest will monitor future construction and modification activities at the site closely and will compare any future increase in emissions with major source thresholds to ensure these activities will not trigger either 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. There are no applicable requirements of NSPS in this G70-A general permit.

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. The facility is not major source with respect to the Title V operating permit program.

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

45 CSR 34 applies to all registrants that are subject to any of the NESHAP requirements described in more detail in the Federal Regulations section. Applicable requirements of NESHAPS, Subpart ZZZZ are included in the G70-A general permit.

FEDERAL REGULATIONS

The following NSPS included in the G70-A permit are not applicable to the Tygertt Well Pad facility:

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 (NO_x), 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-A permit.

The natural gas compressor engine that will be installed at the Tygertt Well Pad is not subject to the requirements of this Rule. The compressor engine is a spark ignition internal combustion engine that was manufactured in 1990 and has not undergone modification or reconstruction. Therefore, these requirements do not apply.

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

This facility was in operation prior NSPS OOOO after taking effect and no construction or reconstruction has taken place that would impact affected facility status. The natural gas-fired RICE engine is located at the well site and is conditionally exempt from compressor affected facility status. Based upon this information, this facility does not qualify as an affected facility under this Rule.

No additional NSPS are currently applicable to this facility.

The following NESHAP included in the G70-A permit are applicable to the Tygertt Well Pad facility:

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

The CAT G3306NA Compressor Engine is subject to the requirements of 40 CFR 63 Subpart ZZZZ. The engine was manufactured in June of 1990 and has not been reconstructed or modified. The engine qualifies as a 4 stroke rich burn Spark Ignition (SI) Internal Combustion Engine (ICE). The engine is not classified as a black start or emergency engine. With a brake horsepower rating of 145, this engine is subject to the requirements of 63.6603(a), as outlined in Table 2d.10. The requirements for non-emergency, non-black start 4SRB stationary RICE with less than 500 hp are as follows:

- Change oil and filter every 1,440 hours of operation or annually, whichever comes first;
- Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and
- Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.



WEST VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 DIVISION OF AIR QUALITY
 601 57th Street, SE
 Charleston, WV 25304
 Phone: (304) 926-0475 • www.dep.wv.gov/daq

APPLICATION FOR GENERAL PERMIT REGISTRATION
 CONSTRUCT, MODIFY, RELOCATE OR ADMINISTRATIVELY UPDATE
 A STATIONARY SOURCE OF AIR POLLUTANTS

- CONSTRUCTION MODIFICATION RELOCATION CLASS I ADMINISTRATIVE UPDATE
 CLASS II ADMINISTRATIVE UPDATE

CHECK WHICH TYPE OF GENERAL PERMIT REGISTRATION YOU ARE APPLYING FOR:

- | | |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <input type="checkbox"/> G10-D – Coal Preparation and Handling | <input type="checkbox"/> G40-C – Nonmetallic Minerals Processing |
| <input type="checkbox"/> G20-B – Hot Mix Asphalt | <input type="checkbox"/> G50-B – Concrete Batch |
| <input type="checkbox"/> G30-D – Natural Gas Compressor Stations | <input type="checkbox"/> G60-C – Class II Emergency Generator |
| <input type="checkbox"/> G33-A – Spark Ignition Internal Combustion Engines | <input type="checkbox"/> G65-C – Class I Emergency Generator |
| <input type="checkbox"/> G35-A – Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit) | <input checked="" type="checkbox"/> G70-A – Class II Oil and Natural Gas Production Facility |

SECTION I. GENERAL INFORMATION

1. Name of applicant (as registered with the WV Secretary of State's Office): Enervest Operating, LLC		2. Federal Employer ID No. (FEIN): 76-0460809	
3. Applicant's mailing address: 300 Capitol Street, Suite 200 Charleston, WV 25301		4. Applicant's physical address: Breckenridge Road, Bolt, WV	
5. If applicant is a subsidiary corporation, please provide the name of parent corporation:			
6. WV BUSINESS REGISTRATION. Is the applicant a resident of the State of West Virginia? <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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 LLC / Registration (one page) including any name change amendments or other Business Certificate as Attachment A.			

SECTION II. FACILITY INFORMATION

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.): Class II Oil and Natural Gas Production Facility	8a. Standard Industrial Classification (SIC) code: 1311	AND	8b. North American Industry System (NAICS) code: 211111
9. DAQ Plant ID No. (for existing facilities only): N/A	10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only): N/A		

A: PRIMARY OPERATING SITE INFORMATION

<p>11A. Facility name of primary operating site:</p> <p>Tygertt Well Pad Natural Gas Production Facility</p>	<p>12A. Address of primary operating site:</p> <p>Mailing: 300 Capitol Street, Suite 200 Charleston, WV 25301</p> <p>Physical: Breckenridge Road, Bolt, WV</p>	
<p>13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>- IF YES, please explain: The applicant leases the site.</p> <p>- IF NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.</p>		
<p>14A. <input type="checkbox"/> For Modifications or Administrative Updates at an existing facility, please provide directions to the present location of the facility from the nearest state road;</p> <p>- For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a MAP as Attachment F.</p> <p>From Fairdale, WV: Head southwest on S Logan Turnpike/Rockhouse Fork toward WV-99 W for 0.1 miles. Turn Right onto WV-99 W for 2.5 miles. Turn right onto Breckenridge Rd / Breckenridge Church Road for 1.0 miles. Turn on 405 Breckenridge Road. Access road is on left.</p>		
<p>15A. Nearest city or town:</p> <p>Bolt</p>	<p>16A. County:</p> <p>Raleigh</p>	<p>17A. UTM Coordinates:</p> <p>Northing (KM): 418.1877</p> <p>Easting (KM): 4,635.0702</p> <p>Zone: 17S</p>
<p>18A. Briefly describe the proposed new operation or change (s) to the facility:</p> <p>The Tygertt Well Pad natural gas production site is a proposing to add a 145bhp Caterpillar G3306NA natural gas compressor engine.</p>		<p>19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):</p> <p>Latitude: 37.78352</p> <p>Longitude: -81.41443</p>

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

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

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

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

25. Please check all attachments included with this permit application. Please refer to the appropriate reference document for an explanation of the attachments listed below.

- ATTACHMENT A : CURRENT BUSINESS CERTIFICATE
- ATTACHMENT B: PROCESS DESCRIPTION
- ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ATTACHMENT D: PROCESS FLOW DIAGRAM
- ATTACHMENT E: PLOT PLAN
- ATTACHMENT F: AREA MAP
- ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM
- ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS
- ATTACHMENT I: EMISSIONS CALCULATIONS
- ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT
- ATTACHMENT K: ELECTRONIC SUBMITTAL (NOT APPLICABLE)
- ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE
- ATTACHMENT M: SITING CRITERIA WAIVER (NOT APPLICABLE)
- ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS) (NOT APPLICABLE)
- ATTACHMENT O: EMISSIONS SUMMARY SHEETS
- OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (Equipment Drawings, Aggregation Discussion, etc.) (NOT APPLICABLE)

Please mail an original and two copies of the complete General Permit Registration Application with the signature(s) to the DAQ Permitting Section, at the address shown on the front page of this application. Please DO NOT fax permit applications. For questions regarding applications or West Virginia Air Pollution Rules and Regulations, please refer to the website shown on the front page of the application or call the phone number also provided on the front page of the application.

SECTION IV. CERTIFICATION OF INFORMATION

This 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 a 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, Emission Inventory, Certified Emission Statement, 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 Registration Application will be returned to the applicant.

FOR A CORPORATION (domestic or foreign)

I certify that I am a President, Vice President, Secretary, Treasurer or in charge of a principal business function of the corporation

FOR A PARTNERSHIP

I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

I certify that I am the President or a member of the Board of Directors

FOR A JOINT VENTURE

I certify that I am the President, General Partner or General Manager

FOR A SOLE PROPRIETORSHIP

I certify that I am the Owner and Proprietor

I hereby certify that (please print or type) _____ 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 Office of Air Quality immediately, and/or,

I hereby certify that all information contained in this 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

Signature _____
(please use blue ink) Responsible Official Date

Name & Title James McKinney, Sr. Vice President and General Manager
(please print or type)

Signature  _____
(please use blue ink) Authorized Representative (if applicable) Date

Applicant's Name Enervest Operation, LLC

Phone & Fax _____
Phone Fax

Email _____

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ATTACHMENT A	BUSINESS CERTIFICATE
ATTACHMENT B	PROCESS DESCRIPTION
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ATTACHMENT H	AIR POLLUTION CONTROL DEVICE SHEETS (NOT APPLICABLE)
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ATTACHMENT N	SAFETY DATA SHEETS (SDS) (NOT APPLICABLE)
ATTACHMENT O	EMISSION SUMMARY SHEETS
	OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (NOT APPLICABLE)

ATTACHMENT A

BUSINESS CERTIFICATE

**WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE**

ISSUED TO:
**ENERVEST OPERATING LLC EASTERN DIVISION
300 CAPITOL ST 200
CHARLESTON, WV 25301-1794**

BUSINESS REGISTRATION ACCOUNT NUMBER: 1051-6031

This certificate is issued on: **05/27/2011**

*This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code*

*The person or organization identified on this certificate is registered
to conduct business in the State of West Virginia at the location above.*

This certificate is not transferrable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

**TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of
this certificate displayed at every job site within West Virginia.**

ATTACHMENT B

PROCESS DESCRIPTION

Attachment B

Process Description

This permit application is being filed for Enervest Operating, LLC (Enervest), and addresses operational activities associated with the Tygerrt natural gas production site. The Tygerrt well site operates as a coalbed methane well. Incoming raw natural gas from the two (2) wells is first routed through the separator where produced water and gas separation occurs. Natural gas from the wells is routed to one (1) 145 bhp Caterpillar G3306NA (S01) natural gas power compressor engine for compression and delivery to the sales line.

Water realized at coalbed methane wells differ from produced fluids in shale gas formations. The presence of coal seams can cause a perched water table, depending upon the depth of the formation, permeability to the formation, and porosity of the coal seam. Based upon these factors, coalbed methane wells can realize large amounts of water. It is important to note that the realized water at a coalbed methane well is not the same as a reservoir fluid or brine water.

Produced water at the Tygerrt well site is routed to one of four (4) 210-bbl produced water storage tanks (S04-S07). Produced water can also be routed to one of two (2) 50-bbl produced water storage tanks (S02-S03). Produced water is land applied to the area around the facility, as allowed under Enervest's registration with WVDEP's Office of Oil and Gas.

Electric powered pump jacks are utilized at this site to overcome the hydrostatic head pressure within the well casing. During normal operations, the reservoir pressure of the coalbed is not high enough to allow gas and water to flow through the water column that continuously exists within the well. In order to realize a sustainable gas supply, these electric pump jacks extract the water column from the well, reducing the hydrostatic head generated by the water column and allowing the methane gas to flow to the surface. The separators operated at the well site are set at or near atmospheric pressure. Produced water is transported to storage tanks under gravity flow from the separators. The lack of a pressure differential between the separators and the fluid tanks makes it infeasible for flashing emissions to be realized at the tanks for this well site. In order to quantify emission from tank operations, Enervest has included EPA Tanks simulations within this permit application that makes an assumption that 1 percent of condensate is realized at the tanks. Enervest asserts that this is a

conservative estimation based upon imperfect fluid separation. This estimate can also be considered conservative because of the type of production well, a coalbed methane well, where reservoir condensate does not exist.

A process flow diagram is included as Attachment D.

ATTACHMENT C

DESCRIPTION OF FUGITIVE EMISSIONS

Attachment C

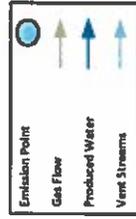
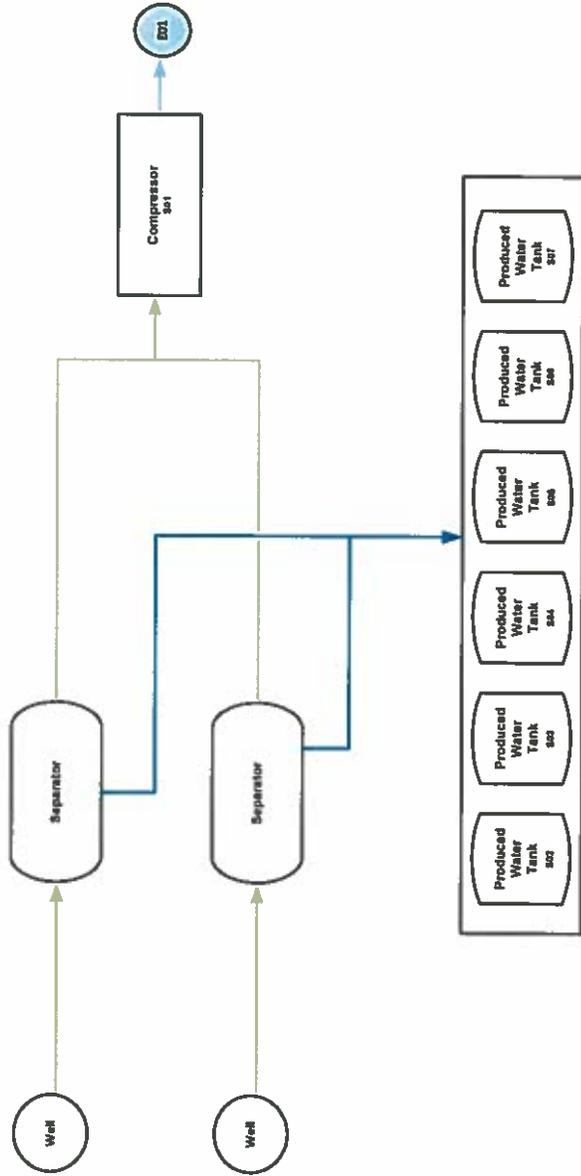
G70-A General Permit Description of Fugitive Emissions

This permit application is being filed for Enervest Operating, LLC (Enervest) and addresses operational activities associated with the Tygertt Well Pad natural gas production site. Fugitive emissions on the site are generated from a number of sources, including an unpaved haul road and equipment leaks. These fugitive emission sources cannot reasonably be controlled by air pollution control devices. Emission levels for fugitive emissions were calculated using AP-42 emission factors and 40 CFR 98 Subpart W factors and equipment counts. A summary of the fugitive emissions on the Tygertt Well Pad natural gas production site can be found in Attachment O – Emissions Summary Sheet.

ATTACHMENT D

PROCESS FLOW DIAGRAM

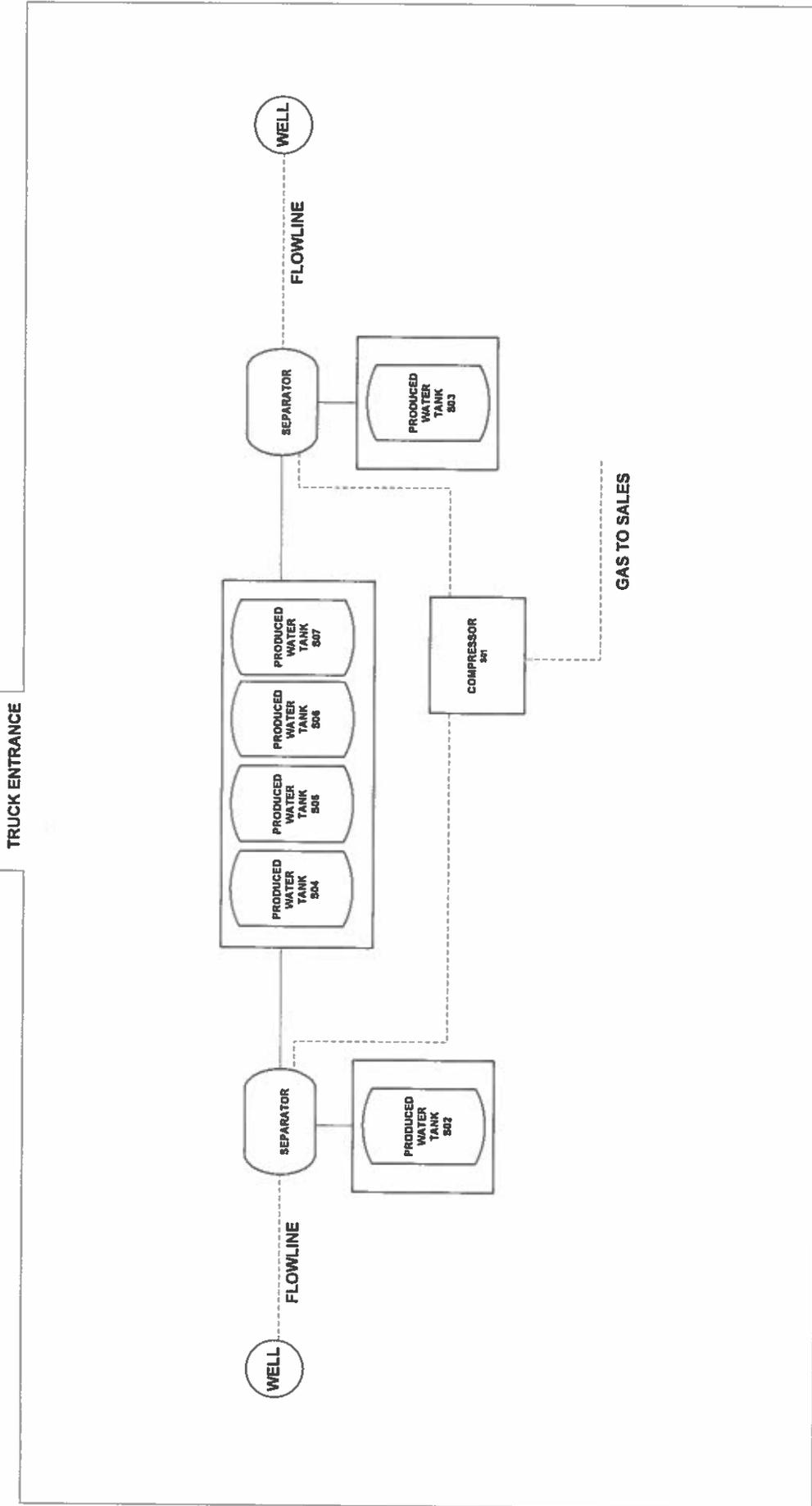
Attachment D
Tygertt Well Pad - Natural Gas Production
Process Flow Diagram



ATTACHMENT E

PLOT PLAN

Attachment E
Plot Plan
Tygerth Well Pad Natural Gas Production Site

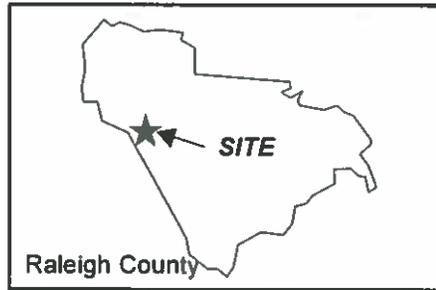


ATTACHMENT F

AREA MAP



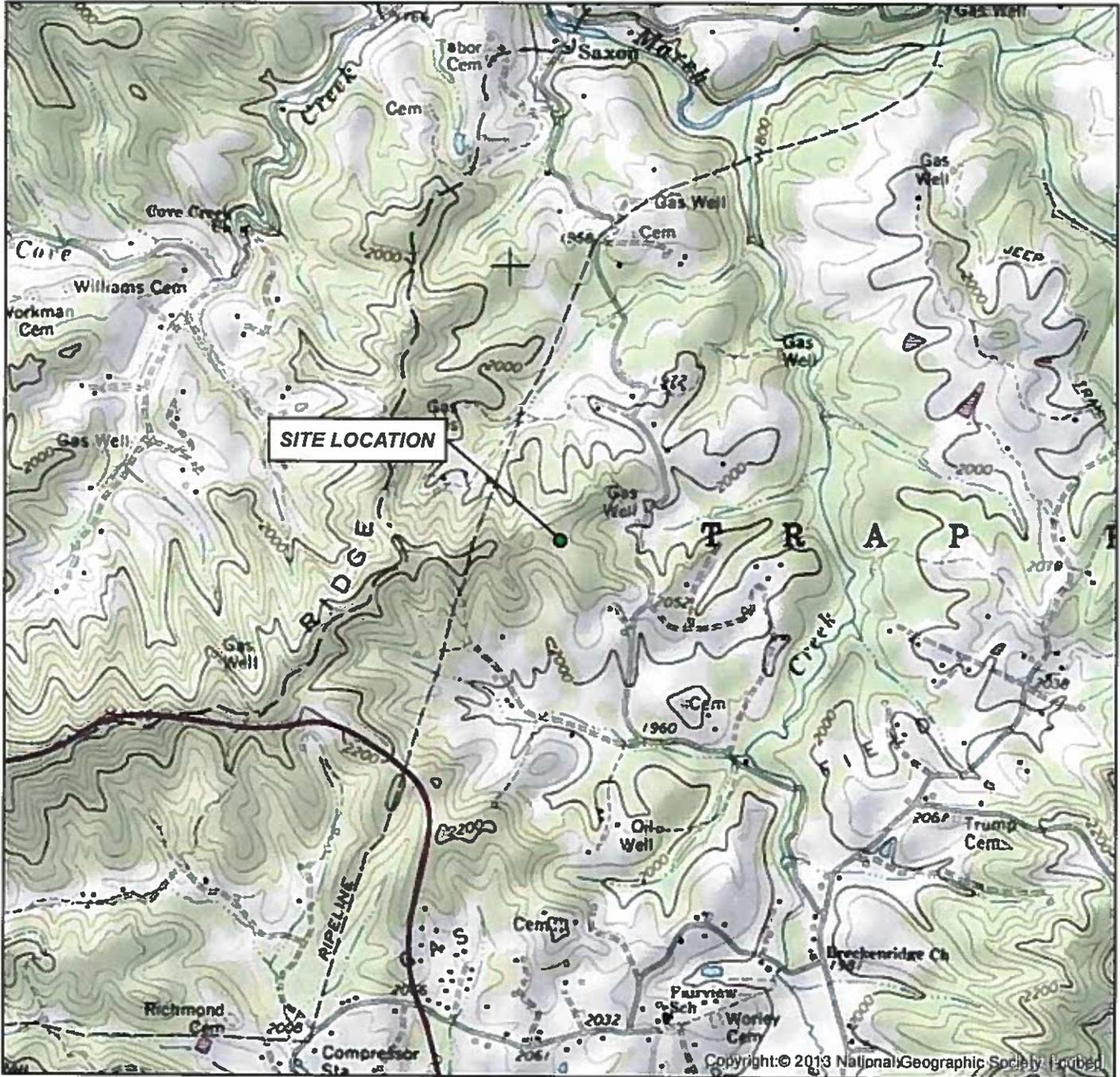
West Virginia



Raleigh County



LAT. 37.783525 LON. -81.414434
 RALEIGH COUNTY
 WEST VIRGINIA



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

SITE LOCATION MAP



Enverest Operating, LLC
 Enverest Tygertt Well Pad
 Enverest Operating, LLC
 Raleigh, West Virginia

GIS Review: GM
 CHK'D: GM
 0314163

Drawn By:
 SRV-9/10/15

Environmental Resources Management

FIGURE X

ATTACHMENT G

**EQUIPMENT DATA SHEETS AND REGISTRATION SECTION
APPLICABILITY FORM**

**General Permit G70-A Registration
Section Applicability Form**

General Permit G70-A was developed to allow qualified applicants to seek registration for a variety of sources. These sources include natural gas well affected facilities, storage tanks, natural gas-fired compressor engines (RICE), natural gas producing units, natural gas-fired in-line heaters, pneumatic controllers, heater treaters, tank truck loading, glycol dehydration units, 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-A 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.

Section 5	Natural Gas Well Affected Facility	<input type="checkbox"/>
Section 6	Storage Vessels*	<input checked="" type="checkbox"/>
Section 7	Gas Producing Units, In-Line Heaters, Heater Treaters, and Glycol Dehydration Reboilers	<input type="checkbox"/>
Section 8	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO)	<input type="checkbox"/>
Section 9	<i>Reserved</i>	<input type="checkbox"/>
Section 10	Natural gas-fired Compressor Engine(s) (RICE) **	<input checked="" type="checkbox"/>
Section 11	Tank Truck Loading Facility ***	<input type="checkbox"/>
Section 12	Standards of Performance for Storage Vessel Affected Facilities (NSPS, Subpart OOOO)	<input type="checkbox"/>
Section 13	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (NSPS, Subpart JJJJ)	<input type="checkbox"/>
Section 14	Control Devices not subject to NSPS, Subpart OOOO	<input type="checkbox"/>
Section 15	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (40CFR63, Subpart ZZZZ)	<input checked="" type="checkbox"/>
Section 16	Glycol Dehydration Units	<input type="checkbox"/>
Section 17	Dehydration Units With Exemption from NESHAP Standard, Subpart HH § 63.764(d) (40CFR63, Subpart HH)	<input type="checkbox"/>
Section 18	Dehydration Units Subject to NESHAP Standard, Subpart HH and Not Located Within an UA/UC (40CFR63, Subpart HH)	<input type="checkbox"/>
Section 19	Dehydration Units Subject to NESHAP Standard, Subpart HH and Located Within an UA/UC (40CFR63, Subpart HH)	<input type="checkbox"/>

* Applicants that are subject to Section 6 may also be subject to Section 12 if the applicant is subject to the NSPS, Subpart OOOO control requirements or the applicable control device requirements of Section 14.

** Applicants that are subject to Section 10 may also be subject to the applicable RICE requirements of Section 13 and/or Section 15.

*** Applicants that are subject to Section 11 may also be subject to control device requirements of Section 14.

NATURAL 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).

Please provide the API number(s) for each NG well at this facility:
47-081-01390
47-081-01391
47-081-01392

Note: This is the same API 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 (American Petroleum Institute) 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.

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
S01	E01	Caterpillar G3306NA	2015	145 bhp	New	NA
S02	E02	Produced Water Tank	Pre- August 2011 ¹	50 bbl	Existing	NA
S03	E03	Produced Water Tank	Pre- August 2011 ¹	50 bbl	Existing	NA
S04	E04	Produced Water Tank	Pre- August 2011 ¹	210 bbl	Existing	NA
S05	E05	Produced Water Tank	Pre- August 2011 ¹	210 bbl	Existing	NA
S06	E06	Produced Water Tank	Pre- August 2011 ¹	210bbl	Existing	NA
S07	E07	Produced Water Tank	Pre- August 2011 ¹	210 bbl	Existing	NA

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.

¹ Enverest Operating, LLC acquired these existing CBM assets in 2012. Records of installation dates are were not available from previous operator, however the construction date is believed to be long before the NSPS OOOO applicablittly date.

NATURAL GAS-FIRED COMPRESSOR ENGINE (RICE) EMISSION UNIT DATA SHEET

Complete this section for any natural gas-fired reciprocating internal combustion engine.

Emission Unit (Source) ID No. ¹		S01					
Emission Point ID No. ²		E01					
Engine Manufacturer and Model		Caterpillar G3306 NA					
Manufacturer's Rated bhp/rpm		145 bhp / 1,800 rpm					
Source Status ³		NS					
Date Installed/Modified/Removed ⁴		2015					
Engine Manufactured/Reconstruction Date ⁵		1990					
Is this engine subject to 40CFR60, Subpart JJJ?		NO					
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60, Subpart JJJ? (Yes or No) ⁶		NO					
Is this engine subject to 40CFR63, Subpart ZZZZ? (yes or no)		YES					
Engine, Fuel and Combustion Data	Engine Type ⁷	RB4S					
	APCD Type ⁸	None					
	Fuel Type ⁹	PQ					
	H ₂ S (gr/100 scf)	0.25					
	Operating bhp/rpm	145 bhp / 1,800 rpm					
	BSFC (Btu/bhp-hr)	7,543					
	Fuel throughput (ft ³ /hr)	1,072					
	Fuel throughput (MMft ³ /yr)	9.4					
	Operation (hrs/yr)	8,760					
Reference ¹⁰	Potential Emissions ¹¹	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Vendor Guarantee	NO _x	7.71	33.76				
Vendor Guarantee	CO	0.45	1.96				
Vendor Guarantee	VOC	0.05	0.22				
AP-42	SO ₂	<0.01	0.003				
AP-42	PM ₁₀	0.01	0.05				
Vendor Guarantee	Formaldehyde	0.07	0.32				
MRR ¹²	Proposed Monitoring:	Enervest will comply with all monitoring requirements set forth in the issued permit.					
	Proposed Recordkeeping:	Enervest will comply with all recordkeeping requirements set forth in the issued permit.					
	Proposed Reporting:	Enervest will comply with all reporting requirements set forth in the issued permit.					

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components ¹	Number of Components Monitored by Frequency ²	Average Time to Repair (days) ³	Estimated Annual Emission Rate (lb/yr) ⁴
Pumps ⁵	light liquid VOC ^{6,7}	--	--	--	--
	heavy liquid VOC ⁸	--	--	--	--
	Non-VOC ⁹	--	--	--	--
Valves ¹⁰	Gas VOC	42	N/A	N/A	87.6
	Light Liquid VOC	--	--	--	--
	Heavy Liquid VOC	--	--	--	--
	Non-VOC	--	--	--	--
	Gas VOC	0	N/A	N/A	<0.001
Safety Relief Valves ¹¹	Gas VOC	0	N/A	N/A	<0.001
	Non VOC	--	--	--	--
Open-ended Lines ¹²	VOC	1	N/A	N/A	8.76
	Non-VOC	--	--	--	--
Sampling Connections ¹³	VOC	--	--	--	--
	Non-VOC	--	--	--	--
Compressors	VOC	--	--	--	--
	Non-VOC	--	--	--	--
Flanges	VOC	--	--	--	--
	Non-VOC	--	--	--	--
Other	VOC	--	--	--	--
	Non-VOC	--	--	--	--

1 - 13 See notes on the following page.

STORAGE VESSEL EMISSION UNIT DATA SHEET

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Produced Water Storage	2. Tank Name Four (4) 210 bbl Produced Water Storage Tanks
3. Emission Unit ID number S04, S05, S06, S07	4. Emission Point ID number E04 – E07
5. Date Installed or Modified <i>(for existing tanks)</i> Pre August 2011	6. Type of change: <input type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other
7A. Description of Tank Modification <i>(if applicable)</i>	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) N/A	

II. TANK INFORMATION (required)

8. Design Capacity <i>(specify barrels or gallons)</i> . Use the internal cross-sectional area multiplied by internal height. 210 bbl	
9A. Tank Internal Diameter (ft.) 12	9B. Tank Internal Height (ft.) 10
10A. Maximum Liquid Height (ft.) 10	10B. Average Liquid Height (ft.) 10
11A. Maximum Vapor Space Height (ft.) 2	11B. Average Vapor Space Height (ft.) 2
12. Nominal Capacity <i>(specify barrels or gallons)</i> . This is also known as "working volume." 8,820	
13A. Maximum annual throughput (gal/yr) 153,300.00	13B. Maximum daily throughput (gal/day) 420
14. Number of tank turnovers per year 18.25	15. Maximum tank fill rate (gal/min) 0.29
16. Tank fill method <input checked="" type="checkbox"/> Submerged <input type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input checked="" type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

<input type="checkbox"/> Refer to enclosed TANKS Summary Sheets
<input checked="" type="checkbox"/> Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

<input type="checkbox"/> Refer to enclosed TANKS Summary Sheets
<input checked="" type="checkbox"/> Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

<input type="checkbox"/> Refer to enclosed TANKS Summary Sheets

26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> 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:
SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: Charleston, WV			
28. Daily Avg. Ambient Temperature (°F): 65		29. Annual Avg. Maximum Temperature (°F): 70	
30. Annual Avg. Minimum Temperature (°F): 55		31. Avg. Wind Speed (mph): 5	
32. Annual Avg. Solar Insulation Factor (BTU/ft ² -day): 1,202		33. Atmospheric Pressure (psia): 14.11	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 65	34A. Minimum (°F): 55	34B. Maximum (°F): 70	
35. Avg. operating pressure range of tank (psig): 5.9	35A. Minimum (psig): 5.4	35B. Maximum (psig): 6.5	
36A. Minimum liquid surface temperature (°F): 47		36B. Corresponding vapor pressure (psia): 5.4	
37A. Avg. liquid surface temperature (°F): 50		37B. Corresponding vapor pressure (psia): 5.9	
38A. Maximum liquid surface temperature (°F): 56		38B. Corresponding vapor pressure (psia): 6.5	
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	Produced Water		
39B. CAS number:			
39C. Liquid density (lb/gal):	5		
39D. Liquid molecular weight (lb/lb-mole):	18.02		
39E. Vapor molecular weight (lb/lb-mole):	18.02		
39F. Maximum true vapor pressure (psia):	NA		
39G. Maxim Reid vapor pressure (psia):	NA		
39H. Months Storage per year. From: To:	January - December		

STORAGE VESSEL EMISSION UNIT DATA SHEET

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Produced Water Storage	2. Tank Name Two (2) 50 bbl Produced Water Storage Tanks
3. Emission Unit ID number S02 & S03	4. Emission Point ID number E02 – E03
5. Date Installed or Modified (<i>for existing tanks</i>) Pre August 2011	6. Type of change: <input type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other
7A. Description of Tank Modification (<i>if applicable</i>)	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) N/A	

II. TANK INFORMATION (required)

8. Design Capacity (<i>specify barrels or gallons</i>). Use the internal cross-sectional area multiplied by internal height. 50 bbl	
9A. Tank Internal Diameter (ft.) 12	9B. Tank Internal Height (ft.) 6
10A. Maximum Liquid Height (ft.) 5	10B. Average Liquid Height (ft.) 3
11A. Maximum Vapor Space Height (ft.) 5	11B. Average Vapor Space Height (ft.) 3
12. Nominal Capacity (<i>specify barrels or gallons</i>). This is also known as "working volume." 4,200	
13A. Maximum annual throughput (gal/yr) 38,325.00	13B. Maximum daily throughput (gal/day) 105
14. Number of tank turnovers per year 9.15	15. Maximum tank fill rate (gal/min) 0.15
16. Tank fill method <input checked="" type="checkbox"/> Submerged <input type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input checked="" type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

III. TANK CONSTRUCTION AND OPERATION INFORMATION (*check which one applies*)

<input type="checkbox"/> Refer to enclosed TANKS Summary Sheets
<input checked="" type="checkbox"/> Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION (*check which one applies*)

<input type="checkbox"/> Refer to enclosed TANKS Summary Sheets
<input checked="" type="checkbox"/> Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION (*check which one applies*)

<input type="checkbox"/> Refer to enclosed TANKS Summary Sheets

26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> 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:
SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: Charleston, WV			
28. Daily Avg. Ambient Temperature (°F): 65		29. Annual Avg. Maximum Temperature (°F): 70	
30. Annual Avg. Minimum Temperature (°F): 55		31. Avg. Wind Speed (mph): 5	
32. Annual Avg. Solar Insulation Factor (BTU/ft ² -day): 1,202		33. Atmospheric Pressure (psia): 14.11	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 65	34A. Minimum (°F): 55	34B. Maximum (°F): 70	
35. Avg. operating pressure range of tank (psig): 5.9	35A. Minimum (psig): 5.4	35B. Maximum (psig): 6.5	
36A. Minimum liquid surface temperature (°F): 47		36B. Corresponding vapor pressure (psia): 5.4	
37A. Avg. liquid surface temperature (°F): 50		37B. Corresponding vapor pressure (psia): 5.9	
38A. Maximum liquid surface temperature (°F): 56		38B. Corresponding vapor pressure (psia): 6.5	
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	Produced Water		
39B. CAS number:			
39C. Liquid density (lb/gal):	5		
39D. Liquid molecular weight (lb/lb-mole):	18.02		
39E. Vapor molecular weight (lb/lb-mole):	18.02		
39F. Maximum true vapor pressure (psia):	NA		
39G. Maxim Reid vapor pressure (psia):	NA		
39H. Months Storage per year. From:	January - December		
To:			

ATTACHMENT H

AIR POLLUTION CONTROL DEVICE SHEET

NOT APPLICABLE

ATTACHMENT I

SUPPORTING EMISSIONS CALCULATIONS

Natural Gas Compressor Engine - Caterpillar G3306NA 145 bhp - (S01)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Engine Rating (bhp)	Fuel Consumption (Btu/bhp-hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOC's	0.16	g/bhp-hr	Vendor Guarantee	145	7,543	1,080	8,760	0.05	0.22
Hexane	1.11E-03	lb/MMBtu	AP-42 Chapter 3.2	145	7,543	1,080	8,760	0.00	0.005
Formaldehyde	0.23	g/bhp-hr	Vendor Guarantee	145	7,543	1,080	8,760	0.07	0.32
Benzene	1.58E-03	lb/MMBtu	AP-42 Chapter 3.2	145	7,543	1,080	8,760	0.00	0.008
Toluene	5.58E-04	lb/MMBtu	AP-42 Chapter 3.2	145	7,543	1,080	8,760	<0.001	0.003
Ethylbenzene	2.48E-05	lb/MMBtu	AP-42 Chapter 3.2	145	7,543	1,080	8,760	<0.001	<0.001
Xylene	1.84E-04	lb/MMBtu	AP-42 Chapter 3.2	145	7,543	1,080	8,760	<0.001	<0.001
CO	1.40	g/bhp-hr	Vendor Guarantee	145	7,543	1,080	8,760	0.45	1.96
NOx	24.11	g/bhp-hr	Vendor Guarantee	145	7,543	1,080	8,760	7.71	33.78
PM	9.91E-03	lb/MMBtu	AP-42 Chapter 3.2	145	7,543	1,080	8,760	0.01	0.05
SO ₂	5.88E-04	lb/MMBtu	AP-42 Chapter 3.2	145	7,543	1,080	8,760	<0.001	0.003
CO ₂	53.08	kg CO ₂ / MMBtu	40 CFR Subpart C	145	7,543	1,080	8,760	148.26	640.83
CH ₄	0.001	kg CH ₄ / MMBtu	40 CFR Subpart C	145	7,543	1,080	8,760	0.003	0.012
N ₂ O	0.0001	kg N ₂ O / MMBtu	40 CFR Subpart C	145	7,543	1,080	8,760	<0.001	0.001
Total HAPs								0.08	0.33
Total CO ₂ e								148.41	641.29

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one NG compressor.
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2, Table 3.2-3 - Uncontrolled Emission Factors for 4-Stroke Rich Burn Engines
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8,760 hr/yr.
- CO₂ equivalency solved for using Global Warming Potentials found in 40 CFR 98 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298
- Vendor Guarantee Emissions are provided by Caterpillar.

Example Equations:

Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/10⁶ scf) × Heating Value of Natural Gas (Btu/scf) × Boiler Rating (MMBtu/hr)

Produced Water Tanks - 50 bbl (S02 & S03)

Pollutant	Max. Hourly Emissions using ESP Tanks (lb/hr)	Max. Yearly Emissions using ESP Tanks (tons/yr)
VOCs	0.12	0.53

Notes:

- Emission rates for Produced Water Tanks S02 and S03 were calculated using EPA Tanks software. EPA Tanks output sheets for the Tygett Well Pad are attached.
- Emissions were calculated using Engineering Estimates to establish input to the EPA Tanks software. Enervest has applied an industry standard assumption that 1% of the produced water realized in the tank will be condensate, based upon imperfect fluid separation. Enervest believes that this is a conservative estimation, since the Tygett Well Pad is a coalbed methane well.
- The emission rates displayed above are pre-control device emissions.
- CO₂ equivalency solved for using Global Warming Potentials found in 40CFR88 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298
- For emission calculation purposes, the total throughput for all produced water tanks is modeled as being received through a single tank. The throughput value represents the total throughput for two (2) 50-barrel tanks. Therefore, emission rates represent a total from all produced water tanks located on the well pad. Actual throughput for each tank will vary based on operations.

Produced Water Tanks - 210 bbl (S04 & S05)

Pollutant	Max. Hourly Emissions using E&P Tanks (lb/hr)	Max. Yearly Emissions using E&P Tanks (tons/yr)
VOCs	0.21	0.94

Notes:

- Emission rates for Produced Water Tanks S04 and S05 were calculated using EPA Tanks software. EPA Tanks output sheets for the Tygert Well Pad are attached.
- Emissions were calculated using Engineering Estimates to establish input to the EPA Tanks software. Enervest has applied an industry standard assumption that 1% of the produced water realized in the tank will be condensate, based upon imperfect fluid separation. Enervest believes that this is a conservative estimation, since the Tygert Well Pad is a coalbed methane well.
- The emission rates displayed above are pre-control device emissions.
- CO₂ equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298
- For emission calculation purposes, the total throughput for all produced water tanks is modeled as being received through a single tank. The throughput value represents the total throughput for two (2) 210-barrel tanks. Therefore, emission rates represent a total from all produced water tanks located on the well pad. Actual throughput for each tank will vary based on operations.

Produced Water Tanks - 210 bbl (S06 & S07)

Pollutant	Max. Hourly Emissions using E&P Tanks (lb/hr)	Max. Yearly Emissions using E&P Tanks (tons/yr)
VOCs	0.18	0.79

Notes:

- Emission rates for Produced Water Tanks S06 and S07 were calculated using EPA Tanks software. EPA Tanks output sheets for the Tygett Well Pad are attached.
- Emissions were calculated using Engineering Estimates to establish input to the EPA Tanks software. Enervest has applied an industry standard assumption that 1% of the produced water realized in the tank will be condensate, based upon imperfect fluid separation. Enervest believes that this is a conservative estimation, since the Tygett Well Pad is a coalbed methane well.
- The emission rates displayed above are pre-control device emissions.
- CO₂ equivalency solved for using Global Warming Potentials found in 40CFR88 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298
- For emission calculation purposes, the total throughput for all produced water tanks is modeled as being received through a single tank. The throughput value represents the total throughput for all two (2) 210-barrel tanks. Therefore, emission rates represent a total from all produced water tanks located on the well pad. Actual throughput for each tank will vary based on operations.

Fugitive Leaks

Default Average Component Counts for Major Onshore Natural Gas Production Equipment¹

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	95	2	1
Dehydrators	24	90	2	2

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

Specific Equipment Co

Facility Equipment Type
Wellheads
Separators
Meters/Piping
Compressors
In-line Heaters
Dehydrators

Gas Composition

Propane	Butanes	Pentanes	Hexane	CO ₂	CH ₄
3.82	1.12	0.26	0.12	0.14	80.73
44.00	58.00	72.00	86.00	44.00	18.00

Fugitive Emissions

Facility Equipment Type	Total Count	Emission Rate (scf/hr/component) ²	Hours of Operation	VOCs (lb/yr)	VOCs (ton/yr)	HAPs (lb/yr)	CO ₂ (lb/yr)	CO ₂ (ton/yr)	CH ₄ (lb/yr)	CH ₄ (ton/yr)	Total CO ₂ e (lb/yr)	Total CO ₂ e (ton/yr)
Valves	42	0.027	8760	0.01	0.03	<0.001	<0.001	<0.001	0.04	0.17	0.95	4.16
Connectors	178	0.003	8760	0.004	0.02	<0.001	<0.001	<0.001	0.02	0.08	0.45	1.98
Open-ended Lines	1	0.06	8760	<0.001	0.00	<0.001	<0.001	<0.001	0.00	0.01	0.05	0.22
Pressure Relief Valves	0	0.04	8760	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Emissions:				6.01	0.05	<0.001	<0.001	0.00	0.06	0.25	1.45	6.34

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

Example Equations:

Fugitive Emissions (lb/yr) = Count x Emission Rate x Hours of Operation + 395.5 scf/tonol x mol VOC's

Fugitive Emissions from Unpaved Haul Roads

Constant		Industrial Roads	
	PM ₁₀	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 Particle size multiplier¹
 s Silt content of road surface material (%)
 p Number of days per year with precipitation

Item Number	Description	Number of Wrecks	W		Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)	PM Emissions (lb/ahr)	PM Emissions (tons/yr)	PM ₁₀ Emissions (lb/ahr)	PM ₁₀ Emissions (tons/yr)	PM _{2.5} Emissions (lb/ahr)	PM _{2.5} Emissions (tons/yr)	
			Mean Vehicle Weight (tons)	W													
1	Employee Vehicles	4	3	10	1.00	1	200	NA	0	0.00	0.00	0.04	0.04	0.04	0.04	0.004	
Totals											1.82	0.18	0.39	0.04	0.04	0.04	0.004

Notes:

- ¹ - Particle Size Multiplier used from AP-42 13.2.2 - Final Version 11/2008
- ² - Silt Content of Road Surface uses Sand and Gravel Processing Plant Road from AP-42 13.2.2 - Final Version 11/2008
- ³ - Number of days per year with precipitation >0.01 in found using AP-42 13.2.2.1 - Final Version 11/2008

Example Calculations:

Emissions (lb/Vehicle Mile Traveled) - E = k * (s/12)² * (W/3)^{0.6}

Site Specific Emissions (lb/VMT) - E_{ss} = E(365-p)/265

Equation 1a from AP-42 13.2.2 - Final Version 11/2008

Equation 2 from AP-42 13.2.2 - Final Version 11/2008

Total Tyrent Well Pad Emission Levels

Emission Sources	VOCs		HAPs		CO		NO _x		PM		SO _x		CO ₂		CH ₄		H ₂ O		CO _{2e}	
	lb/yr	tons/yr	lb/yr	tons/yr	lb/yr	tons/yr	lb/yr	tons/yr	lb/yr	tons/yr	lb/yr	tons/yr	lb/yr	tons/yr	lb/yr	tons/yr	lb/yr	tons/yr	lb/yr	tons/yr
Caterpillar G3306NA 145 bhp (501)	0.05	0.22	0.08	0.33	0.45	1.96	7.71	33.76	0.01	0.05	<0.001	0.003	146.26	640.63	0.003	0.01	<0.001	0.001	146.41	641.29
Produced Water Tanks 50 bbl (502-503)	0.12	0.53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Produced Water Tanks 210 bbl (506-507)	0.71	0.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Produced Water Tanks 210 bbl (504-505)	0.18	0.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fugitive Leaks	0.01	0.05	<0.001	0.002	-	-	-	-	-	-	-	-	<0.001	0.00	-	0.25	-	-	1.45	6.34
Haul Roads	-	-	-	-	-	-	-	-	1.520	0.15	-	-	-	-	-	-	-	-	-	-
Totals	0.58	2.53	0.08	0.34	0.45	1.96	7.71	33.76	1.53	0.20	0.000	0.003	146.26	640.63	0.006	0.27	0.000	0.001	147.86	647.64



Jul 16, 2015

Kelsey Watkins
Exterran
16666 Northchase Drive
Houston, TX 77060

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 735044, Engine Serial Number 07Y03358

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 Jul 16, 2015.

Engine Make:	CATERPILLAR
Engine Model:	G3306NA
Engine Serial Number:	07Y03358
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:	145.00
Engine Manufacture Date:	Jun 12, 1990
Customer:	ENERVEST OPERATING LLC
Business Unit:	Northeast
Exterran Unit Number:	735044
Customer Lease Name:	TYGRETT

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.

G3306 NA

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA



ENGINE SPEED (rpm):	1800	FUEL SYSTEM:	LPG IMPCO
COMPRESSION RATIO:	10.5:1	<u>SITE CONDITIONS:</u>	
JACKET WATER OUTLET (°F):	210	FUEL:	Nat Gas
COOLING SYSTEM:	JW+OC	FUEL PRESSURE RANGE(psig):	1.5-5.0
IGNITION SYSTEM:	MAG	FUEL METHANE NUMBER:	84.8
EXHAUST MANIFOLD:	WC	FUEL LHV (Btu/scf):	905
COMBUSTION:	Standard	ALTITUDE(ft):	500
EXHAUST O2 EMISSION LEVEL %:	2.0	MAXIMUM INLET AIR TEMPERATURE(°F):	77
SET POINT TIMING:	30.0	NAMEPLATE RATING:	145 bhp@1800rpm

RATING	NOTES	LOAD	MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
			100%	100%	75%	50%
ENGINE POWER	(1)	bhp	145	145	109	73
INLET AIR TEMPERATURE		°F	77	77	77	77

ENGINE DATA						
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	7543	7543	8064	9134
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	8367	8367	8945	10132
AIR FLOW	(3)(4)	lb/hr	996	996	804	610
AIR FLOW WET (77°F, 14.7 psia)	(3)(4)	scfm	225	225	181	138
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	26.4	26.4	22.3	17.8
EXHAUST STACK TEMPERATURE	(6)	°F	1040	1040	993	943
EXHAUST GAS FLOW (@ stack temp, 14.5 psia)	(7)(4)	ft ³ /min	697	697	545	399
EXHAUST GAS MASS FLOW	(7)(4)	lb/hr	1051	1051	848	644

EMISSIONS DATA						
NOx (as NO2)	(8)	g/bhp-hr	24.11	24.11	21.09	22.10
CO	(8)	g/bhp-hr	1.40	1.40	1.50	1.50
THC (mol. wt. of 15.84)	(8)	g/bhp-hr	1.60	1.60	1.46	1.91
NMHC (mol. wt. of 15.84)	(8)	g/bhp-hr	0.24	0.24	0.22	0.29
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	0.16	0.16	0.15	0.19
HCHO (Formaldehyde)	(8)	g/bhp-hr	0.23	0.23	0.24	0.28
CO2	(8)	g/bhp-hr	492	492	526	596
EXHAUST OXYGEN	(10)	% DRY	2.0	2.0	2.4	2.6

HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(11)	Btu/min	5652	5652	4964	4213
HEAT REJ. TO ATMOSPHERE	(11)	Btu/min	729	729	585	441
HEAT REJ. TO LUBE OIL (OC)	(11)	Btu/min	924	924	812	689

HEAT EXCHANGER SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC)	(12)	Btu/min	7326

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.
 Max rating is the maximum capability 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.

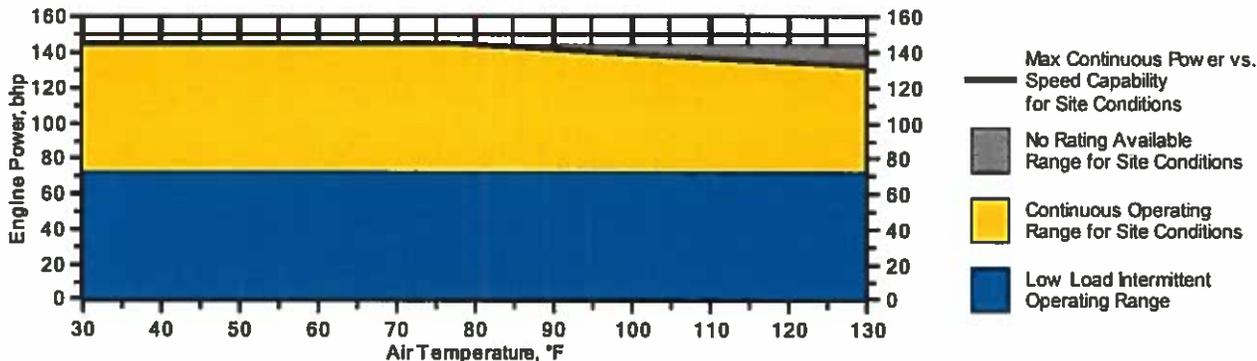
For notes information consult page three.

PREPARED BY:

Data generated by Gas Engine Rating Pro Version 3.04.00
 Ref. Data Set DM5211-06-000, Printed 06Jul2011

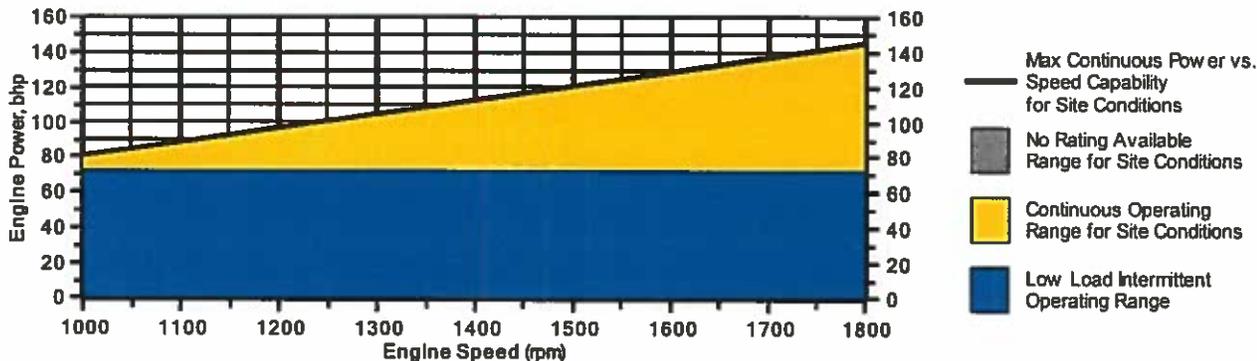
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1800 rpm



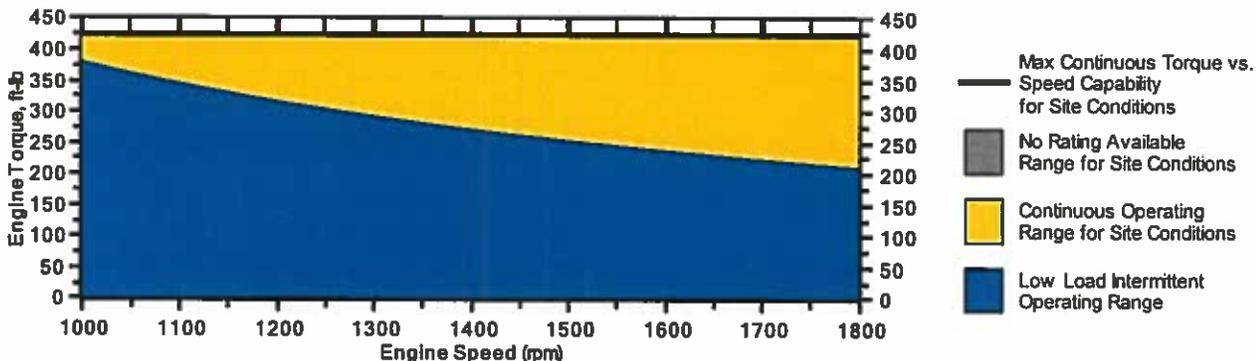
Engine Power vs. Engine Speed

Data represents speed sweep at 500 ft and 77 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 500 ft and 77 °F



Note: At site conditions of 500 ft and 77°F inlet air temp., constant torque can be maintained down to 1000 rpm. The minimum speed for loading at these conditions is 1000 rpm.

NOTES

1. Engine rating is with one engine driven jacket water pump. Tolerance is $\pm 3\%$ of full load.
2. Fuel consumption tolerance is $\pm 4.0\%$ of full load data.
3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of $\pm 5\%$.
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 $\pm 5\%$.
6. Exhaust stack 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 $\pm 6\%$.
8. Emission levels are at engine exhaust flange prior to any after treatment. 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 may require engine adjustment.
9. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
10. Exhaust Oxygen tolerance is ± 0.5 .
11. Heat rejection values are nominal. Tolerances, based on treated water, are $\pm 10\%$ for jacket water circuit, $\pm 50\%$ for radiation, $\pm 20\%$ for lube oil circuit.
12. Heat exchanger sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

PREPARED BY:

Data generated by Gas Engine Rating Pro Version 3.04.00
Ref. Data Set DM5211-06-000, Printed 06Jul2011

Constituent	Abbrev	Mole %	Norm		
Water Vapor	H2O	0.0000	0.0000		
Methane	CH4	92.2700	92.2700	Fuel Makeup:	Nat Gas
Ethane	C2H6	2.5000	2.5000	Unit of Measure:	English
Propane	C3H8	0.5000	0.5000		
Isobutane	iso-C4H10	0.0000	0.0000	Calculated Fuel Properties	
Norbutane	nor-C4H10	0.2000	0.2000	Caterpillar Methane Number:	84.8
Isopentane	iso-C5H12	0.0000	0.0000	Lower Heating Value (Btu/scf):	905
Norpentane	nor-C5H12	0.1000	0.1000	Higher Heating Value (Btu/scf):	1004
Hexane	C6H14	0.0500	0.0500	WOBBE Index (Btu/scf):	1168
Heptane	C7H16	0.0000	0.0000	THC: Free Inert Ratio:	0
Nitrogen	N2	3.4800	3.4800	RPC (%) (To 905 Btu/scf Fuel):	100%
Carbon Dioxide	CO2	0.9000	0.9000	Compressibility Factor:	0.998
Hydrogen Sulfide	H2S	0.0000	0.0000	Stoich A/F Ratio (Vol/Vol):	9.45
Carbon Monoxide	CO	0.0000	0.0000	Stoich A/F Ratio (Mass/Mass):	15.75
Hydrogen	H2	0.0000	0.0000	Specific Gravity (Relative to Air):	0.600
Oxygen	O2	0.0000	0.0000	Specific Heat Constant (K):	1.313
Helium	HE	0.0000	0.0000		
Neopentane	neo-C5H12	0.0000	0.0000		
Octane	C8H18	0.0000	0.0000		
Nonane	C9H20	0.0000	0.0000		
Ethylene	C2H4	0.0000	0.0000		
Propylene	C3H6	0.0000	0.0000		
TOTAL (Volume %)		100.0000	100.0000		

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

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

Identification

User Identification:	210 bbl Produced Water 800 bbl/day
City:	Charleston
State:	West Virginia
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	800 bbl/day produced water

Tank Dimensions

Shell Height (ft):	10.00
Diameter (ft):	12.00
Liquid Height (ft):	10.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	8,820.00
Turnovers:	14.50
Net Throughput(gal/yr):	122,640.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	0.00
Radius (ft) (Dome Roof)	12.00

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

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

210 bbl Produced Water 800 bbl/day - Vertical Fixed Roof Tank
Charleston, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg	Min.	Max.		Avg	Min	Max.					
Gasoline (RVP 13)	As	56.67	51.31	62.04	55.00	8.5261	5.8901	7.2156	82.0000			82.00	Option 4, RVP=13, ASTM Slope=3

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

210 bbl Produced Water 800 bbl/day - Vertical Fixed Roof Tank
Charleston, West Virginia

Annual Emission Calculations	
Standing Losses (lb):	398 5554
Vapor Space Volume (cu ft):	93 0888
Vapor Density (lb/cu ft):	0 0730
Vapor Space Expansion Factor:	0 2053
Vented Vapor Saturation Factor:	0 7784
Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	93 0888
Tank Diameter (ft):	12 0000
Vapor Space Outage (ft):	0 8231
Tank Shell Height (ft):	10 0000
Average Liquid Height (ft):	10 0000
Roof Outage (ft):	0 8231
Roof Outage (Dome Roof)	
Roof Outage (ft):	0 8231
Dome Radius (ft):	12 0000
Shell Radius (ft):	6 0000
Vapor Density	
Vapor Density (lb/cu ft):	0 0730
Vapor Molecular Weight (lb/lb-mole):	62 0000
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	6 5261
Daily Avg. Liquid Surface Temp. (deg. R):	516 3441
Daily Average Ambient Temp. (deg. F):	54 9833
Ideal Gas Constant R:	
(psia-cuft / (lb-mole-deg R)):	10 731
Liquid Bulk Temperature (deg. R):	514 6733
Tank Paint Solar Absorptance (Shell):	0 1700
Tank Paint Solar Absorptance (Roof):	0 1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,250 5726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0 2053
Daily Vapor Temperature Range (deg. R):	21 4567
Daily Vapor Pressure Range (psia):	1 3255
Breather Vent Press. Setting Range (psia):	0 0800
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	6 5261
Vapor Pressure at Daily Minimum Liquid	
Surface Temperature (psia):	5 8901
Vapor Pressure at Daily Maximum Liquid	
Surface Temperature (psia):	7 2158
Daily Avg. Liquid Surface Temp. (deg. R):	516 3441
Daily Min. Liquid Surface Temp. (deg. R):	510 8799
Daily Max. Liquid Surface Temp. (deg. R):	521 7082
Daily Ambient Temp. Range (deg. R):	21 5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0 7784
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	6 5261
Vapor Space Outage (ft):	0 8231
Working Losses (lb):	
Working Losses (lb):	1,181 4838
Vapor Molecular Weight (lb/lb-mole):	62 0000
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	6 5261
Annual Net Throughput (gal/yr):	122,840 0000
Annual Turnovers:	14 5000
Turnover Factor:	1 0000
Maximum Liquid Volume (gal):	8,820 0000
Maximum Liquid Height (ft):	10 0000
Tank Diameter (ft):	12 0000
Working Loss Product Factor:	1 0000
Total Losses (lb)	1,578 0492

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

Emissions Report for: Annual

**210 bbl Produced Water 800 bbl/day - Vertical Fixed Roof Tank
Charleston, West Virginia**

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Gasoline (RVP 13)	1,181.49	396.56	1,578.05

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

Identification

User Identification:	50 bbl Produced Water Tank
City:	Charleston
State:	West Virginia
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	2.5 bbl/day produced water

Tank Dimensions

Shell Height (ft):	6.00
Diameter (ft):	12.00
Liquid Height (ft):	5.00
Avg. Liquid Height (ft):	5.00
Volume (gallons):	4,200.00
Turnovers:	9.15
Net Throughput(gal/yr):	38,325.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	0.00
Radius (ft) (Dome Roof)	12.00

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

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

50 bbl Produced Water Tank - Vertical Fixed Roof Tank
 Charleston, West Virginia

Mixture/Component	Month	Daily Liquid Surf Temperature (deg F)			Liquid Surf Temp (deg F)	Vapor Pressure (psia)			Vapor Mol Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol Weight	Basis for Vapor Pressure Calculations
		Avg	Min.	Max.		Avg	Min.	Max.					
Gasoline (RVP 13)	All	56.87	51.31	62.04	55.00	8.5281	5.8901	7.2156	62.0000			62.00	Option 4 RVP=13, ASTM Slope=3

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

50 bbl Produced Water Tank - Vertical Fixed Roof Tank
Charleston, West Virginia

Annual Emission Calculations	
Standing Losses (lb)	692 0278
Vapor Space Volume (cu ft)	206 1861
Vapor Density (lb/cu ft)	0 0730
Vapor Space Expansion Factor	0 2053
Vented Vapor Saturation Factor	0 6133
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft)	206 1861
Tank Diameter (ft)	12 0000
Vapor Space Outage (ft)	1 8231
Tank Shell Height (ft)	8 0000
Average Liquid Height (ft)	5 0000
Roof Outage (ft)	0 8231
Roof Outage (Dome Roof)	
Roof Outage (ft)	0 8231
Dome Radius (ft)	12 0000
Shell Radius (ft)	6 0000
Vapor Density	
Vapor Density (lb/cu ft)	0 0730
Vapor Molecular Weight (lb/lb-mole)	62 0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	6 5261
Daily Avg Liquid Surface Temp. (deg R)	516 3441
Daily Average Ambient Temp. (deg F)	54 9833
Ideal Gas Constant R (psia cu ft / (lb-mol-deg R))	10 731
Liquid Bulk Temperature (deg R)	514 6733
Tank Paint Solar Absorptance (Shell)	0 1700
Tank Paint Solar Absorptance (Roof)	0 1700
Daily Total Solar Insulation Factor (Btu/sqft day)	1 250 4726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor	0 2053
Daily Vapor Temperature Range (deg R)	21 4567
Daily Vapor Pressure Range (psia)	1 3255
Breather Vent Press. Setting Range (psia)	0 0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	6 5261
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia)	5 6901
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia)	7 2156
Daily Avg Liquid Surface Temp. (deg R)	516 3441
Daily Min. Liquid Surface Temp. (deg R)	510 8799
Daily Max. Liquid Surface Temp. (deg R)	521 7082
Daily Ambient Temp. Range (deg R)	21 5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor	0 6133
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	6 5261
Vapor Space Outage (ft)	1 8231
Working Losses (lb)	
Working Losses (lb)	369 2168
Vapor Molecular Weight (lb/lb-mole)	62 0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	6 5261
Annual Net Throughput (gal/yr)	38 325 0000
Annual Turnovers	8 1500
Turnover Factor	1 0000
Maximum Liquid Volume (gal)	4 200 0000
Maximum Liquid Height (ft)	5 0000
Tank Diameter (ft)	12 0000
Working Loss Product Factor	1 0000
Total Losses (lb)	1 061 2447

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

Emissions Report for: Annual

50 bbl Produced Water Tank - Vertical Fixed Roof Tank
Charleston, West Virginia

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Gasoline (RVP 13)	369.22	692.03	1,061.24

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

Identification

User Identification: 210 bbl Produced Water Tank - 1,000
 City: Charleston
 State: West Virginia
 Company:
 Type of Tank: Vertical Fixed Roof Tank
 Description: 1,000 bbl/day produced water

Tank Dimensions

Shell Height (ft): 10.00
 Diameter (ft): 12.00
 Liquid Height (ft): 10.00
 Avg. Liquid Height (ft): 10.00
 Volume (gallons): 8,820.00
 Turnovers: 18.25
 Net Throughput(gal/yr): 153,300.00
 Is Tank Heated (y/n): N

Paint Characteristics

Shell Color/Shade: White/White
 Shell Condition: Good
 Roof Color/Shade: White/White
 Roof Condition: Good

Roof Characteristics

Type: Dome
 Height (ft): 0.00
 Radius (ft) (Dome Roof): 12.00

Breather Vent Settings

Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

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

210 bbl Produced Water Tank - 1,000 - Vertical Fixed Roof Tank
Charleston, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg	Min.	Max.		Avg	Min.	Max.					
Gasoline (RVP 13)	All	58.87	51.31	62.04	55.00	6.5281	5.8801	7.2158	82.0000			92.00	Option 4 RVP=13, ASTM Slope=3

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

210 bbl Produced Water Tank - 1,000 - Vertical Fixed Roof Tank
Charleston, West Virginia

Annual Emission Calculations	
Standing Losses (lb):	396 5554
Vapor Space Volume (cu ft):	93 0888
Vapor Density (lb/cu ft):	0 0730
Vapor Space Expansion Factor:	0 2053
Vented Vapor Saturation Factor:	0 7784
Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	93 0888
Tank Diameter (ft):	12 0000
Vapor Space Outage (ft):	0 8231
Tank Shell Height (ft):	10 0000
Average Liquid Height (ft):	10 0000
Roof Outage (ft):	0 8231
Roof Outage (Dome Roof)	
Roof Outage (ft):	0 8231
Dome Radius (ft):	12 0000
Shell Radius (ft):	6 0000
Vapor Density	
Vapor Density (lb/cu ft):	0 0730
Vapor Molecular Weight (lb/lb-mole):	62 0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	6 5261
Daily Avg. Liquid Surface Temp. (deg R):	516 3441
Daily Average Ambient Temp. (deg F):	54 8833
Ideal Gas Constant R (psia cu ft / (lb-mol-deg R)):	10 7311
Liquid Bulk Temperature (deg R):	514 6733
Tank Paint Solar Absorptance (Shell):	0 1700
Tank Paint Solar Absorptance (Roof):	0 1700
Daily Total Solar Insolation Factor (Btu/soft days):	1,250 9726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0 2053
Daily Vapor Temperature Range (deg R):	21 4567
Daily Vapor Pressure Range (psia):	1 3255
Breather Vent Press. Setting Range (psia):	0 0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	6 5261
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	5 8901
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	7 2158
Daily Avg. Liquid Surface Temp. (deg R):	516 3441
Daily Min. Liquid Surface Temp. (deg R):	510 9799
Daily Max. Liquid Surface Temp. (deg R):	521 7082
Daily Ambient Temp. Range (deg R):	21 5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0 7784
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	6 5261
Vapor Space Outage (ft):	0 8231
Working Losses (lb):	
Working Losses (lb):	1,476 8672
Vapor Molecular Weight (lb/lb-mole):	62 0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	6 5261
Annual Net Throughput (gal/yr):	153,300 0000
Annual Turnovers:	16 2500
Turnover Factor:	1 0000
Maximum Liquid Volume (gal):	8,620 0000
Maximum Liquid Height (ft):	10 0000
Tank Diameter (ft):	12 0000
Working Loss Product Factor:	1 0000
Total Losses (lb):	1,873 4227

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

Emissions Report for: Annual

210 bbl Produced Water Tank - 1,000 - Vertical Fixed Roof Tank
Charleston, West Virginia

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Gasoline (RVP 13)	1,478.87	396.56	1,873.42

ATTACHMENT J

CLASS I LEGAL ADVERTISEMENT

Attachment J

AIR QUALITY PERMIT NOTICE Notice of Application

Notice is given that Enervest Operating, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a General Permit G70-A Permit Application for a natural gas production operation located on Breckenridge Road, Bolt, in Raleigh County, West Virginia. The latitude and longitude coordinates are: 37.78352, -81.41443.

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

Volatile Organic Compounds (VOCs) = 2.53 tpy
Hazardous Air Pollutants (HAPs) = 0.34 tpy
Carbon Monoxide (CO) = 1.96 tpy
Nitrogen Oxides (NO_x) = 33.76 tpy
Particulate Matter (PM) = 0.20 tpy
Carbon Dioxide Equivalents (CO₂e) = 647.64 tpy

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 1227, during normal business hours.

Dated this the XX day of September, 2015.

By: Enervest Operating, LLC
James McKinney
Sr. Vice President and General Manager
300 Capitol Street, Suite 200
Charleston, WV 25301

ATTACHMENT K

ELECTRONIC SUBMITTAL

NOT APPLICABLE

ATTACHMENT L

GENERAL PERMIT REGISTRATION APPLICATION FEE

Attachment L
G70-A General Permit Application Fee

An application fee of \$3,000.00 is being submitted by Enervest Operating, LLC with this G70-A General Permit Application.

ATTACHMENT M

SITTING CRITERIA WAIVER

NOT APPLICABLE

ATTACHMENT N

SAFETY DATA SHEETS (SDS)

NOT APPLICABLE

ATTACHMENT O

EMISSION SUMMARY SHEETS

Attachment O G70-A EMISSION SUMMARY SHEET

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)		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
		ID No.	Source	ID No.	Device Type		lb/hr	ton/yr	lb/hr	ton/yr		
E01	Upward Vertical Stack	S01	Compressor Engine	N/A	N/A	Total VOCs NOx CO PM Total HAPs Formaldehyde CO ₂ CH ₄ CO _{2e}	0.05 7.71 0.45 0.01 0.08 0.07 146.26 <0.01 146.41	0.22 33.76 1.96 0.05 0.33 0.32 640.63 0.01 641.29	0.05 7.71 0.45 0.01 0.08 0.07 146.26 <0.01 146.41	0.22 33.76 1.96 0.05 0.33 0.32 640.63 0.01 641.29	Gas/Vapor	AP-42 Vendor
E02	Upward Vertical Stack	S02	Produced Water Tank	N/A	N/A	Total VOCs	0.06	0.265	0.06	0.265	Gas/Vapor	AP-42
E03	Upward Vertical Stack	S03	Produced Water Tank	N/A	N/A	Total VOCs	0.06	0.265	0.06	0.265	Gas/Vapor	AP-42
E04	Upward Vertical Stack	S04	Produced Water Tank	N/A	N/A	Total VOCs	0.107	0.47	0.107	0.47	Gas/Vapor	AP-42
E05	Upward Vertical Stack	S05	Produced Water Tank	N/A	N/A	Total VOCs	0.107	0.47	0.107	0.47	Gas/Vapor	AP-42
E06	Upward Vertical Stack	S06	Produced Water Tank	N/A	N/A	Total VOCs	0.09	0.395	0.09	0.395	Gas/Vapor	AP-42
E07	Upward Vertical Stack	S07	Produced Water Tank	N/A	N/A	Total VOCs	0.09	0.396	0.09	0.396	Gas/Vapor	AP-42

The EMISSION 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 EMISSIONS 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 List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO_x, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases

³ 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).

G70-A FUGITIVE EMISSIONS SUMMARY SHEET

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants ¹ Chemical Name/CAS ¹	Maximum Potential Uncontrolled Emissions ²		Maximum Potential Controlled Emissions ³		Est. Method Used ⁴
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	NA	--	--	--	--	--
Unpaved Haul Roads	PM PM-10 PM-2.5	1.52 0.15 0.04	0.15 0.04 <0.01	1.52 0.15 0.04	0.15 0.04 <0.01	AP-42
Equipment Leaks	Total VOC CH ₄ CO ₂ e	0.01 0.058 1.45	0.05 0.25 6.34	0.01 0.058 1.45	0.05 0.25 6.34	40CFR98 Subpart W
Other	NA	NA	NA	NA	NA	NA

¹ List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases.
² Give 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).
³ Give 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).
⁴ Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; M = modeling; O = other (specify).