Lucid Energy Delaware, LLC
Big Lizard Compressor Station

Title V Initial Application

September 2020

Prepared for:

Lucid Energy Delaware, LLC
3100 McKinnon St. #800
Dallas, Texas 75201

Prepared by:

Alliant Environmental, LLC
7804 Pan American Fwy. NE, Suite 5
Albuquerque, NM 87109

Mail Application To:		**For Department use only:**
New Mexico Environment Department Air Quality Bureau Permits Section 525 Camino de los Marquez, Suite 1 Santa Fe, New Mexico, 87505 Phone: (505) 476-4300 Fax: (505) 476-4375 www.env.nm.gov/aqb		AIRS No.:

Universal Air Quality Permit Application

Use this application for NOI, NSR, or Title V sources.

Use this application for: the initial application, modifications, technical revisions, and renewals. For technical revisions, complete Sections, 1-A, 1-B, 2-E, 3, 9 and any other sections that are relevant to the requested action; coordination with the Air Quality Bureau permit staff prior to submittal is encouraged to clarify submittal requirements and to determine if more or less than these sections of the application are needed. Use this application for streamline permits as well. See Section 1-I for submittal instructions for other permits.

This application is submitted as (check all that apply)**:** ☐ Request for a No Permit Required Determination (no fee)
☐ **Updating** an application currently under NMED review. Include this page and all pages that are being updated (no fee required).
Construction Status: ☐ Not Constructed ☒ Existing Permitted (or NOI) Facility ☐ Existing Non-permitted (or NOI) Facility
Minor Source: ☐ a NOI 20.2.73 NMAC ☐ 20.2.72 NMAC application or revision ☐ 20.2.72.300 NMAC Streamline application
Title V Source: ☒ Title V (new) ☐ Title V renewal ☐ TV minor mod. ☐ TV significant mod. TV Acid Rain: ☐ New ☐ Renewal
PSD Major Source: ☐ PSD major source (new) ☐ minor modification to a PSD source ☐ a PSD major modification

Acknowledgements:

☒ I acknowledge that a pre-application meeting is available to me upon request. ☒ Title V Operating, Title IV Acid Rain, and NPR applications have no fees.

☐ $500 NSR application Filing Fee enclosed OR ☐ The full permit fee associated with 10 fee points (required w/ streamline applications).

☐ Check No.: in the amount of

☒ I acknowledge the required submittal format for the hard copy application is printed double sided 'head-to-toe', 2-hole punched (except the Sect. 2 landscape tables is printed 'head-to-head'), numbered tab separators. Incl. a copy of the check on a separate page.

☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance program (SBEAP) and qualifies for 50% of the normal application and permit fees. Enclosed is a check for 50% of the normal application fee which will be verified with the Small Business Certification Form for your company.

☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance Program (SBEAP) but does not qualify for 50% of the normal application and permit fees. To see if you qualify for SBEAP assistance and for the small business certification form go to https://www.env.nm.gov/aqb/sbap/small_business_criteria.html).

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.70.300.B(1) NMAC**
(e.g. application for a new minor source would be 20.2.72.200.A NMAC, one example for a Technical Permit Revision is 20.2.72.219.B.1.b NMAC, a Title V acid rain application would be: 20.2.70.200.C NMAC)

Section 1 – Facility Information

Section 1-A: Company Information

		AI # if known (see 1st 3 to 5 #s of permit IDEA ID No.): **N/A**	Updating Permit/NOI #: **N/A**
1	Facility Name: **Big Lizard Compressor Station**	Plant primary SIC Code (4 digits): **1311**	
		Plant NAIC code (6 digits): **211130**	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): **From the intersection of NM-207 and 3rd St. in Jal, travel west on NM-128 for 23.6 miles. Turn right onto Brininstool Rd. and continue for 4.2 miles. Turn left onto J-2/X-L Rd. and continue for 2.8 miles. Turn right to stay on J-2/X-L Rd. and continue for 1.4 miles. Turn left onto access road and continue for 0.4 miles. Turn left onto access road and continue for 0.2 miles. The facility will be on your right.**		
2	Plant Operator Company Name: **Lucid Energy Delaware, LLC**	Phone/Fax: **214-420-4950**	

a	Plant Operator Address: **3100 McKinnon Street Suite 800, Dallas, TX 75201**	
b	Plant Operator's New Mexico Corporate ID or Tax ID:	
3	Plant Owner(s) name(s): **Lucid Energy Delaware, LLC**	Phone/Fax: **575-810-6021**
a	Plant Owner(s) Mailing Address(s): **3100 McKinnon Street Suite 800, Dallas, TX 75201**	
4	Bill To (Company): **Lucid Energy Delaware, LLC**	Phone/Fax: **575-810-6021**
a	Mailing Address: **3100 McKinnon Street Suite 800, Dallas, TX 75201**	E-mail: **AP@lucid-energy.com**
5	☒ Preparer: **Martin R. Schluep** ☒ Consultant: **Alliant Environmental, LLC**	Phone/Fax: **505-205-4819**
a	Mailing Address: **7804 Pan American Fwy., Suite 5** **Albuquerque, NM 87109**	E-mail: **mschluep@alliantenv.com**
6	Plant Operator Contact: **Jaylen Fuentes**	Phone/Fax: **575-810-6051**
a	Address: **PO BOX 158, Artesia NM, 88211-0158**	E-mail: **jafuentes@lucid-energy.com**
7	Air Permit Contact: **Matthew Eales**	Title: **Vice President of EHSR**
a	E-mail: **MEales@lucid-energy.com**	Phone/Fax: **832-496-7513 / 575-748-4275**
b	Mailing Address: **P.O. Box 158 Artesia, NM 88210**	
c	The designated Air permit Contact will receive all official correspondence (i.e. letters, permits) from the Air Quality Bureau.	

Section 1-B: Current Facility Status

1.a	Has this facility already been constructed? ☒ Yes ☐ No	1.b If yes to question 1.a, is it currently operating in New Mexico? ☒ Yes ☐ No
2	If yes to question 1.a, was the existing facility subject to a Notice of Intent (NOI) (20.2.73 NMAC) before submittal of this application? ☐ Yes ☒ No	If yes to question 1.a, was the existing facility subject to a construction permit (20.2.72 NMAC) before submittal of this application? ☐ Yes ☐ No
3	Is the facility currently shut down? ☐ Yes ☒ No	If yes, give month and year of shut down (MM/YY): N/A
4	Was this facility constructed before 8/31/1972 and continuously operated since 1972? ☐ Yes ☒ No	
5	If Yes to question 3, has this facility been modified (see 20.2.72.7.P NMAC) or the capacity increased since 8/31/1972? ☐Yes ☐No ☒N/A	
6	Does this facility have a Title V operating permit (20.2.70 NMAC)? ☐ Yes ☒ No	If yes, the permit No. is: **N/A**
7	Has this facility been issued a No Permit Required (NPR)? ☐ Yes ☒ No	If yes, the NPR No. is: **N/A**
8	Has this facility been issued a Notice of Intent (NOI)? ☐ Yes ☒ No	If yes, the NOI No. is: **N/A**
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ☒ Yes ☐ No	If yes, the permit No. is: **7960-M2**
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ☐ Yes ☒ No	If yes, the register No. is: **N/A**

Section 1-C: Facility Input Capacity & Production Rate

1	What is the facility's maximum input capacity, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly: **3.33 MMscf of Gas**	Daily: **80 MMscf of Gas**	Annually: **29,200 MMscf of Gas**
b	Proposed	Hourly: **3.33 MMscf of Gas**	Daily: **80 MMscf of Gas**	Annually: **29,200 MMscf of Gas**
2	What is the facility's maximum production rate, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly: **2.51 bbl of Hydrocarbon Liquids**	Daily: **60.2 bbl of Hydrocarbon Liquids**	Annually: **21,988 bbl of Hydrocarbon liquids**

b	Proposed	Hourly: **2.51 bbl of Hydrocarbon Liquids**	Daily: **60.2 bbl of Hydrocarbon Liquids**	Annually: **21,988 bbl of Hydrocarbon liquids**
a	Current	Hourly: **3.33 MMscf/day of Gas**	Daily: **80 MMscf/day of Gas**	Annually: **29,200 MMscf/yr of Gas**
b	Proposed	Hourly: **3.33 MMscf/day of Gas**	Daily: **80 MMscf/day of Gas**	Annually: **29,200 MMscf/yr of Gas**

Section 1-D: Facility Location Information

1	Section: **18**	Range: **33E**	Township: **23S**	County: **Lea**	Elevation (ft): **3,715**
2	UTM Zone: ☐ 12 or ☒ 13			Datum: ☐ NAD 27 ☐ NAD 83 ☒ WGS 84	
a	UTM E (in meters, to nearest 10 meters): **629,930 m**			UTM N (in meters, to nearest 10 meters): **3,575,370 m**	
b	**AND** Latitude (deg., min., sec.): **32°18'27.48"N**			Longitude (deg., min., sec.): **103°37'11.64"W**	
3	Name and zip code of nearest New Mexico town: **Jal, NM**				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): **From the intersection of NM-207 and 3rd St. in Jal, travel west on NM-128 for 23.6 miles. Turn right onto Brininstool Rd. and continue for 4.2 miles. Turn left onto J-2/X-L Rd. and continue for 2.8 miles. Turn right to stay on J-2/X-L Rd. and continue for 1.4 miles. Turn left onto access road and continue for 0.4 miles. Turn left onto access road and continue for 0.2 miles. The facility will be on your right.**				
5	The facility is **28** (distance) miles **Northwest** (direction) of **Jal, NM** (nearest town).				
6	Status of land at facility (check one): ☐ Private ☐ Indian/Pueblo ☒ Federal BLM ☐ Federal Forest Service ☐ Other (specify)				
7	List all municipalities, Indian tribes, and counties within a ten (10) mile radius (20.2.72.203.B.2 NMAC) of the property on which the facility is proposed to be constructed or operated: **Lea and Eddy Counties**				
8	**20.2.72** NMAC applications **only**: Will the property on which the facility is proposed to be constructed or operated be closer than 50 km (31 miles) to other states, Bernalillo County, or a Class I area (see www.env.nm.gov/aqb/modeling/class1areas.html)? ☒ Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers: **34km from Texas**				
9	Name nearest Class I area: **Carlsbad Caverns National Park**				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): **71.90km**				
11	Distance (meters) from the perimeter of the Area of Operations (AO is defined as the plant site inclusive of all disturbed lands, including mining overburden removal areas) to nearest residence, school or occupied structure: **15,400 m**				
12	Method(s) used to delineate the Restricted Area: **Continuous fencing** "**Restricted Area**" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area.				
13	Does the owner/operator intend to operate this source as a portable stationary source as defined in 20.2.72.7.X NMAC? ☐ Yes ☒ No A portable stationary source is not a mobile source, such as an automobile, but a source that can be installed permanently at one location or that can be re-installed at various locations, such as a hot mix asphalt plant that is moved to different job sites.				
14	Will this facility operate in conjunction with other air regulated parties on the same property? ☒ No ☐ Yes If yes, what is the name and permit number (if known) of the other facility? **N/A**				

Section 1-E: Proposed Operating Schedule (The 1-E.1 & 1-E.2 operating schedules may become conditions in the permit.)

1	Facility **maximum** operating ($\frac{\text{hours}}{\text{day}}$): **24**	($\frac{\text{days}}{\text{week}}$): **7**	($\frac{\text{weeks}}{\text{year}}$): **52**	($\frac{\text{hours}}{\text{year}}$): **8,760**		
2	Facility's maximum daily operating schedule (if less than 24 $\frac{\text{hours}}{\text{day}}$)? Start: **N/A**		☐AM ☐PM	End: **N/A**	☐AM ☐PM	
3	Month and year of anticipated start of construction: **Facility is already operating under NSR 7960-M2**					
4	Month and year of anticipated construction completion: **Facility is already operating under NSR 7960-M2**					
5	Month and year of anticipated startup of new or modified facility: **N/A**					

6	Will this facility operate at this site for more than one year? ☒ Yes ☐ No

Section 1-F: Other Facility Information

1	Are there any current Notice of Violations (NOV), compliance orders, or any other compliance or enforcement issues related to this facility? ☐ Yes ☒ No If yes, specify: **N/A**		
a	If yes, NOV date or description of issue: **N/A**		NOV Tracking No: **N/A**
b	Is this application in response to any issue listed in 1-F, 1 or 1a above? ☐ Yes ☒ No If Yes, provide the 1c & 1d info below:		
c	Document Title: **N/A**	Date: **N/A**	Requirement # (or page # and paragraph #): **N/A**
d	Provide the required text to be inserted in this permit: **N/A**		
2	Is air quality dispersion modeling or modeling waiver being submitted with this application? ☐ Yes ☒ No		
3	Does this facility require an "Air Toxics" permit under 20.2.72.400 NMAC & 20.2.72.502, Tables A and/or B? ☐ Yes ☒ No		
4	Will this facility be a source of federal Hazardous Air Pollutants (HAP)? ☒ Yes ☐ No		
a	If Yes, what type of source? ☐ **Major** (☐ ≥10 tpy of any single HAP **OR** ☐ ≥25 tpy of any combination of HAPS) **OR** ☒ **Minor** (☒ <10 tpy of any single HAP **AND** ☒ <25 tpy of any combination of HAPS)		
5	Is any unit exempt under 20.2.72.202.B.3 NMAC? ☐ Yes ☒ No		
a	If yes, include the name of company providing commercial electric power to the facility: **Excel** Commercial power is purchased from a commercial utility company, which specifically does not include power generated on site for the sole purpose of the user.		

Section 1-G: Streamline Application

(This section applies to 20.2.72.300 NMAC Streamline applications only)

1	☐ I have filled out Section 18, "Addendum for Streamline Applications." ☒ N/A (This is not a Streamline application.)

Section 1-H: Current Title V Information - Required for all applications from TV Sources

(Title V-source required information for all applications submitted pursuant to 20.2.72 NMAC (Minor Construction Permits), or 20.2.74/20.2.79 NMAC (Major PSD/NNSR applications), and/or 20.2.70 NMAC (Title V))

1	Responsible Official (R.O.) (20.2.70.300.D.2 NMAC): **Matthew Eales**	Phone: **832-496-7513**
a	R.O. Title: **Vice President - EHSR**	R.O. e-mail: **MEales@lucid-energy.com**
b	R. O. Address: **3100 McKinnon St., Suite 800, Dallas TX 75201**	
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC): **Mike Latchem**	Phone: **214-420-4950**
a	A. R.O. Title: **President and CEO**	A. R.O. e-mail: **MLatchem@lucid-energy.com**
b	A. R. O. Address: **3100 McKinnon St., Suite 800, Dallas TX 75201**	
3	Company's Corporate or Partnership Relationship to any other Air Quality Permittee (List the names of any companies that have operating (20.2.70 NMAC) permits and with whom the applicant for this permit has a corporate or partnership relationship): **N/A**	
4	Name of Parent Company ("Parent Company" means the primary name of the organization that owns the company to be permitted wholly or in part.): **Lucid Energy Group, LLC**	
a	Address of Parent Company: **3100 McKinnon St., Suite 800, Dallas TX 75201**	
5	Names of Subsidiary Companies ("Subsidiary Companies" means organizations, branches, divisions or subsidiaries, which are owned, wholly or in part, by the company to be permitted.): **N/A**	
6	Telephone numbers & names of the owners' agents and site contacts familiar with plant operations: **Kerry Egan, Environmental Compliance Manager, (575-810-6021)**	
7	Affected Programs to include Other States, local air pollution control programs (i.e. Bernalillo) and Indian tribes: Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B)? If yes, state which ones and provide the distances in kilometers: **Texas – 34km**	

Section 1-I – Submittal Requirements

Each 20.2.73 NMAC (**NOI**), a 20.2.70 NMAC (**Title V**), a 20.2.72 NMAC (**NSR** minor source), or 20.2.74 NMAC (**PSD**) application package shall consist of the following:

Hard Copy Submittal Requirements:

1) One hard copy **original signed and notarized application package** **printed double sided** **'head-to-toe'** **2-hole punched** as we bind the document on top, not on the side; except Section 2 (landscape tables), which should be head-to-head. Please use **numbered tab separators** in the hard copy submittal(s) as this facilitates the review process. For NOI submittals only, hard copies of UA1, Tables 2A, 2D & 2F, Section 3 and the signed Certification Page are required. Please include a copy of the check on a separate page.

2) If the application is for a minor NSR, PSD, NNSR, or Title V application, include one working hard **copy** for Department use. This copy should be printed in book form, 3-hole punched, and **must be double sided**. Note that this is in addition to the head-to-to 2-hole punched copy required in 1) above. Minor NSR Technical Permit revisions (20.2.72.219.B NMAC) only need to fill out Sections 1-A, 1-B, 3, and should fill out those portions of other Section(s) relevant to the technical permit revision. TV Minor Modifications need only fill out Sections 1-A, 1-B, 1-H, 3, and those portions of other Section(s) relevant to the minor modification. NMED may require additional portions of the application to be submitted, as needed.

3) The entire NOI or Permit application package, including the full modeling study, should be submitted electronically. Electronic files for applications for NOIs, any type of General Construction Permit (GCP), or technical revisions to NSRs must be submitted with compact disk (CD) or digital versatile disc (DVD). For these permit application submittals, **two** CD copies are required (in sleeves, not crystal cases, please), with additional CD copies as specified below. NOI applications require only a single CD submittal. Electronic files for other New Source Review (construction) permits/permit modifications or Title V permits/permit modifications can be submitted on CD/DVD or sent through AQB's secure file transfer service.

Electronic files sent by (check one):

☒ CD/DVD attached to paper application

☐ Secure electronic transfer. Air Permit Contact Name _____

Email _____

Phone number _____

a. If the file transfer service is chosen by the applicant, after receipt of the application, the Bureau will email the applicant with instructions for submitting the electronic files through a secure file transfer service. Submission of the electronic files through the file transfer service needs to be completed within 3 business days after the invitation is received, so the applicant should ensure that the files are ready when sending the hard copy of the application. The applicant will not need a password to complete the transfer. **Do not use the file transfer service for NOIs, any type of GCP, or technical revisions to NSR permits.**

4) Optionally, the applicant may submit the files with the application on compact disk (CD) or digital versatile disc (DVD) following the instructions above and the instructions in 5 for applications subject to PSD review.

5) If **air dispersion modeling** is required by the application type, include the **NMED Modeling Waiver** and/or electronic air dispersion modeling report, input, and output files. The dispersion modeling ***summary report only*** should be submitted as hard copy(ies) unless otherwise indicated by the Bureau.

6) If the applicant submits the electronic files on CD and the application is subject to PSD review under 20.2.74 NMAC (PSD) or NNSR under 20.2.79 NMC include,
   a. one additional CD copy for US EPA,
   b. one additional CD copy for each federal land manager affected (NPS, USFS, FWS, USDI) and,
   c. one additional CD copy for each affected regulatory agency other than the Air Quality Bureau.

   If the application is submitted electronically through the secure file transfer service, these extra CDs do not need to be submitted.

Electronic Submittal Requirements [in addition to the required hard copy(ies)]:

1) All required electronic documents shall be submitted as 2 separate CDs or submitted through the AQB secure file transfer service. Submit a single PDF document of the entire application as submitted and the individual documents comprising the application.

2) The documents should also be submitted in Microsoft Office compatible file format (Word, Excel, etc.) allowing us to access the text and formulas in the documents (copy & paste). Any documents that cannot be submitted in a Microsoft Office compatible

format shall be saved as a PDF file from within the electronic document that created the file. If you are unable to provide Microsoft office compatible electronic files or internally generated PDF files of files (items that were not created electronically: i.e. brochures, maps, graphics, etc,), submit these items in hard copy format. We must be able to review the formulas and inputs that calculated the emissions.

3) It is preferred that this application form be submitted as 4 electronic files (3 MSWord docs: Universal Application section 1 [UA1], Universal Application section 3-19 [UA3], and Universal Application 4, the modeling report [UA4]) and 1 Excel file of the tables (Universal Application section 2 [UA2]). Please include as many of the 3-19 Sections as practical in a single MS Word electronic document. Create separate electronic file(s) if a single file becomes too large or if portions must be saved in a file format other than MS Word.

4) The electronic file names shall be a maximum of 25 characters long (including spaces, if any). The format of the electronic Universal Application shall be in the format: "A-3423-FacilityName". The "A" distinguishes the file as an application submittal, as opposed to other documents the Department itself puts into the database. Thus, all electronic application submittals should begin with "A-". Modifications to existing facilities should use the core permit number (i.e. '3423') the Department assigned to the facility as the next 4 digits. Use 'XXXX' for new facility applications. The format of any separate electronic submittals (additional submittals such as non-Word attachments, re-submittals, application updates) and Section document shall be in the format: "A-3423-9-description", where "9" stands for the section # (in this case Section 9-Public Notice). Please refrain, as much as possible, from submitting any scanned documents as this file format is extremely large, which uses up too much storage capacity in our database. Please take the time to fill out the header information throughout all submittals as this will identify any loose pages, including the Application Date (date submitted) & Revision number (0 for original, 1, 2, etc.; which will help keep track of subsequent partial update(s) to the original submittal. Do not use special symbols (#, @, etc.) in file names. The footer information should not be modified by the applicant.

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Table 2-A: Regulated Emission Sources

Unit and stack numbering must correspond throughout the application package. If applying for a NOI under 20.2.73 NMAC, equipment exemptions under 2.72.202 NMAC do not apply.

Unit Number[1]	Source Description	Make	Model #	Serial #	Manufacturer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2] / Date of Construction/ Reconstruction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
3347	Compressor Engine 1	Caterpillar	G3516J	N6W00776	1,380HP	1,380HP	8/1/2018 8/1/2018	N/A 1	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
3346	Compressor Engine 2	Caterpillar	G3516J	N6W00723	1,380HP	1,380HP	8/1/2018 8/1/2018	N/A 2	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
3171	Compressor Engine 3	Caterpillar	G3606A4	JFE01052	1,875HP	1,875HP	6/7/2018 6/7/2018	N/A 3	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
3155	Compressor Engine 4	Caterpillar	G3606A4	JFE01056	1,875HP	1,875HP	6/12/2018 6/12/2018	N/A 4	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
3338	Compressor Engine 5	Caterpillar	G3608	XH700858	2,500HP	2,500HP	1/29/2018 1/29/2018	N/A 5	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
3339	Compressor Engine 6	Caterpillar	G3608	XH700861	2,500HP	2,500HP	2/1/2018 2/1/2018	N/A 6	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
Dehy-1	TEG Dehydrator 1	TBD	TBD	TBD	30 MMScf/day	30 MMScf/day	TBD TBD	N/A N/A	31000301	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
RBL-1	Dehydrator Reboiler 1	TBD	TBD	TBD	0.75 MMBtu/hr	0.75 MMBtu/hr	TBD TBD	N/A 11	31000302	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
Dehy-2	TEG Dehydrator 2	TBD	TBD	TBD	30 MMScf/day	30 MMScf/day	TBD TBD	N/A N/A	31000301	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
RBL-2	Dehydrator Reboiler 2	TBD	TBD	TBD	0.75 MMBtu/hr	0.75 MMBtu/hr	TBD TBD	N/A 12	31000302	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
TK-1	Atmospheric Tank 1	TBD	TBD	5661	400 bbl	400 bbl	TBD TBD	N/A N/A	40400311	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	
TK-2	Atmospheric Tank 2	TBD	TBD	5646	400 bbl	400 bbl	TBD TBD	N/A N/A	40400311	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	
LOAD-1	Truck Loading	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	40600132	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
FUG-1	Fugitives	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31000220	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
HAUL	Haul Road Fugitives	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	40600132	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	

Unit Number[1]	Source Description	Make	Model #	Serial #	Manufact-urer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2] / Date of Construction/ Reconstruction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classi-fication Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
3319	Compressor Engine 7	Caterpillar	G3606A4	JFE01514	1,875HP	1,875HP	7/1/2019 7/1/2019	N/A 7	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
3240	Compressor Engine 8	Caterpillar	G3606A4	JFE01175	1,875HP	1,875HP	10/28/2018 10/28/2018	N/A 8	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
ENG-9	Compressor Engine 9	Caterpillar	G3606A4	TBD	1,875HP	1,875HP	TBD TBD	N/A 9	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
ENG-10	Compressor Engine 10	Caterpillar	G3606A4	TBD	1,875HP	1,875HP	TBD TBD	N/A 10	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
Dehy-3	TEG Dehydrator 3	TBD	TBD	TBD	20 MMScf/day	20 MMScf/day	TBD TBD	N/A N/A	31000301	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
RBL-3	Dehydrator Reboiler 3	TBD	TBD	TBD	0.75 MMBtu/hr	0.75 MMBtu/hr	TBD TBD	N/A 13	31000302	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
AU-1	Amine Unit	TBD	TBD	TBD	80 MMScf/day	80 MMScf/day	TBD TBD	N/A N/A	31000305	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
AU-Rb 1	15.0 MMBtu/hr Amine Reboiler	Bryan Steam, LLC	RW 1500	TBD	15.0 MMBtu/hr	15.0 MMBtu/hr	TBD TBD	N/A 14	31000404	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
AU-Rb 2	15.0 MMBtu/hr Amine Reboiler	Bryan Steam, LLC	RW 1500	TBD	15.0 MMBtu/hr	15.0 MMBtu/hr	TBD TBD	N/A 15	31000404	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
FL-1	Control Flare	TBD	TBD	TBD	6.11MMScf/day	6.11 MMScf/day	TBD TBD	N/A 16	31000205	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	
TK-3	Atmospheric Tank 3	TBD	TBD	TBD	400 bbl	400 bbl	TBD TBD	N/A N/A	40400311	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	
TK-4	Atmospheric Tank 4	TBD	TBD	TBD	400 bbl	400 bbl	TBD TBD	N/A N/A	40400311	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	
SSM/M	Startup, Shutdown, and Maintenance	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A		☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	

[1] Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provided.
[2] Specify dates required to determine regulatory applicability.
[3] To properly account for power conversion efficiencies, generator set rated capacity shall be reported as the rated capacity of the engine in horsepower, not the kilowatt capacity of the generator set.
[4] "4SLB" means four stroke lean burn engine, "4SRB" means four stroke rich burn engine, "2SLB" means two stroke lean burn engine, "CI" means compression ignition, and "SI" means spark ignition

Table 2-B: Insignificant Activities[1] (20.2.70 NMAC) OR Exempted Equipment (20.2.72 NMAC)

All 20.2.70 NMAC (Title V) applications must list all Insignificant Activities in this table. All 20.2.72 NMAC applications must list Exempted Equipment in this table. If equipment listed on this table is exempt under 20.2.72.202.B.5, include emissions calculations and emissions totals for 202.B.5 "similar functions" units, operations, and activities in Section 6, Calculations. Equipment and activities exempted under 20.2.72.202 NMAC may not necessarily be Insignificant under 20.2.70 NMAC (and vice versa). Unit & stack numbering must be consistent throughout the application package. Per Exemptions Policy 02-012.00 (see http://www.env.nm.gov/aqb/permit/aqb_pol.html), 20.2.72.202.B NMAC Exemptions do not apply, but 20.2.72.202.A NMAC exemptions do apply to NOI facilities under 20.2.73 NMAC. List 20.2.72.301.D.4 NMAC Auxiliary Equipment for Streamline applications in Table 2-A. The List of Insignificant Activities (for TV) can be found online at http://www.env.nm.gov/aqb/forms/InsignificantListTitleV.pdf . TV sources may elect to enter both TV Insignificant Activities and Part 72 Exemptions on this form.

Unit Number	Source Description	Manufacturer	Model No.	Max Capacity	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5)	Date of Manufacture /Reconstruction[2]	For Each Piece of Equipment, Check Onc
			Serial No.	Capacity Units	Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Installation /Construction[2]	
	Methanol Tank	TBD	TBD	100	20.2.72.202.B.5.NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			TBD	bbl		TBD	
	Glycol Tanks	TBD	TBD	36	20.2.72.202.B.2 NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			TBD	bbl		TBD	
	Lube Oil Tanks	TBD	TBD	36	20.2.72.202.B.2 NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			TBD	bbl		TBD	
	Antifreeze Tanks	TBD	TBD	36	20.2.72.202.B.2 NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			TBD	bbl		TBD	
	Amine Tanks	TBD	TBD	36	20.2.72.202.B.2 NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			TBD	bbl		TBD	
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced

[1] Insignificant activities exempted due to size or production rate are defined in 20.2.70.300.D.6, 20.2.70.7.Q NMAC, and the NMED/AQB List of Insignificant Activities, dated September 15, 2008. Emissions from these insignificant activities do not need to be reported, unless specifically requested.

[2] Specify date(s) required to determine regulatory applicability.

Table 2-C: Emissions Control Equipment

Unit and stack numbering must correspond throughout the application package. Only list control equipment for TAPs if the TAP's maximum uncontrolled emissions rate is over its respective threshold as listed in 20.2.72 NMAC, Subpart V, Tables A and B. In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device regardless if the applicant takes credit for the reduction in emissions.

Control Equipment Unit No.	Control Equipment Description	Date Installed	Controlled Pollutant(s)	Controlling Emissions for Unit Number(s)[1]	Efficiency (% Control by Weight)	Method used to Estimate Efficiency
Catalyst-1	Catalyst	TBD	CO, VOC	3347	>80% CO, 35% VOC	Manufacturer
Catalyst-2	Catalyst	TBD	CO, VOC	3346	>80% CO, 35% VOC	Manufacturer
Catalyst-3	Catalyst	TBD	CO, VOC	3171	>80% CO, 29% VOC	Manufacturer
Catalyst-4	Catalyst	TBD	CO, VOC	3155	>80% CO, 29% VOC	Manufacturer
Catalyst-5	Catalyst	TBD	CO, VOC	3338	>80% CO, 34% VOC	Manufacturer
Catalyst-6	Catalyst	TBD	CO, VOC	3339	>80% CO, 34% VOC	Manufacturer
BTEX-1	Condenser	TBD	HAP, VOC	Dehy-1	95% HAP, VOC	Condenser Curves
BTEX-2	Condenser	TBD	HAP, VOC	Dehy-2	95% HAP, VOC	Condenser Curves
Catalyst-7	Catalyst	TBD	CO, VOC	3319	>80% CO, 29% VOC	Manufacturer
Catalyst-8	Catalyst	TBD	CO, VOC	3240	>80% CO, 29% VOC	Manufacturer
Catalyst-9	Catalyst	TBD	CO, VOC	ENG-9	>80% CO, 29% VOC	Manufacturer
Catalyst-10	Catalyst	TBD	CO, VOC	ENG-10	>80% CO, 29% VOC	Manufacturer
BTEX-3	Condenser	TBD	HAP, VOC	Dehy-3	95% HAP, VOC	Condenser Curves
FL-1	Flare	TBD	HAP, VOC, H2S	AU-1	98% HAP, VOC	Manufacturer/EPA Certificate

[1] List each control device on a separate line. For each control device, list all emission units controlled by the control device.

Table 2-D: Maximum Emissions

☐ **This Table was intentionally left blank because it would be identical to Table 2-E.**

Maximum Emissions are the emissions at maximum capacity and prior to (in the absence of) pollution control, emission-reducing process equipment, or any other emission reduction. Calculate the hourly emissions using the worst case hourly emissions for each pollutant. For each pollutant, calculate the annual emissions as if the facility were operating at maximum plant capacity without pollution controls for 8760 hours per year, unless otherwise approved by the Department. List Hazardous Air Pollutants (HAP) & Toxic Air Pollutants (TAPs) in Table 2-I. Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
3347	1.52	6.66	9.10	39.84	5.14	22.52	0.11	0.50	-	-	0.10	0.45	0.10	0.45	0.00	0.01	-	-
3346	1.52	6.66	9.10	39.84	5.14	22.52	0.11	0.50	-	-	0.10	0.45	0.10	0.45	0.00	0.01	-	-
3171	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	-	-	0.13	0.56	0.13	0.56	0.00	0.02	-	-
3155	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	-	-	0.13	0.56	0.13	0.56	0.00	0.02	-	-
3338	2.76	12.07	17.09	74.83	7.50	32.83	0.19	0.82	-	-	0.17	0.74	0.17	0.74	0.01	0.02	-	-
3339	2.76	12.07	17.09	74.83	7.50	32.83	0.19	0.82	-	-	0.17	0.74	0.17	0.74	0.01	0.02	-	-
Dehy-1	-	-	-	-	73.38	321.41	-	-	-	-	-	-	-	-	0.01	0.09	-	-
Rbl-1	0.07	0.32	0.06	0.27	0.00	0.02	0.01	0.04	-	-	0.01	0.02	0.01	0.02	0.02	0.09	-	-
Dehy-2	-	-	-	-	73.38	321.41	-	-	-	-	-	-	-	-	0.01	0.03	-	-
Rbl-2	0.07	0.32	0.06	0.27	0.00	0.02	0.01	0.04	-	-	0.01	0.02	0.01	0.02	0.02	0.09	-	-
Tk-1	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	1.45E-05	6.33E-05	-	-
Tk-2	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	1.45E-05	6.33E-05	-	-
HAUL	-	-	-	-	-	-	-	-	-	-	0.38	0.04	0.04	0.00	-	-	-	-
Load-1	-	-	-	-	90.72	5.54	-	-	-	-	-	-	-	-	-	-	-	-
Fug-1	-	-	-	-	1.64	7.17	-	-	-	-	-	-	-	-	2.19E-05	9.58E-05	-	-
SSM/M	-	-	-	-	2.36	10.35	-	-	-	-	-	-	-	-	0.00	0.00	-	-
3319	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	-	-	0.13	0.56	0.13	0.56	0.00	0.02	-	-
3240	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	-	-	0.13	0.56	0.13	0.56	0.00	0.02	-	-
ENG-9	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	-	-	0.13	0.56	0.13	0.56	0.00	0.02	-	-
ENG-10	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	-	-	0.13	0.56	0.13	0.56	0.00	0.02	-	-
Dehy-3	-	-	-	-	73.72	322.91	-	-	-	-	-	-	-	-	0.01	0.04	-	-
Rbl-3	0.07	0.32	0.06	0.27	0.00	0.02	0.01	0.04	-	-	0.01	0.02	0.01	0.02	0.02	0.09	-	-
AU-1	-	-	-	-	63.64	278.73	-	-	-	-	-	-	-	-	0.45	1.95	-	-
AU-Rb 1	1.47	6.44	1.24	5.41	0.08	0.35	0.17	0.73	-	-	0.11	0.49	0.11	0.49	0.42	1.83	-	-
AU-Rb 2	1.47	6.44	1.24	5.41	0.08	0.35	0.17	0.73	-	-	0.11	0.49	0.11	0.49	0.42	1.83	-	-
FL-1	1.86	8.16	15.97	69.97	1.39	6.08	0.85	3.72	-	-	0.95	4.17	0.95	4.17	0.02	0.07	-	-
Tk-3	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	1.45E-05	6.33E-05	-	-
Tk-4	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	1.45E-05	6.33E-05	-	-
Totals	25.98	113.79	133.74	585.79	439.51	1533.19	2.66	11.67	-	-	2.89	11.03	2.55	11.00	1.42	6.29	-	-

[1]**Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5 Particulate matter (PM) is not subject to an ambient air quality standard, but PM is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-E: Requested Allowable Emissions

Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or $1.41E^{-4}$).

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
3347	1.52	6.66	0.64	2.80	3.35	14.68	0.11	0.50	-	-	0.10	0.45	0.10	0.45	3.19E-03	0.01		
3346	1.52	6.66	0.64	2.80	3.35	14.68	0.11	0.50	-	-	0.10	0.45	0.10	0.45	3.19E-03	0.01		
3171	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	-	-	0.13	0.56	0.13	0.56	3.98E-03	0.02		
3155	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	-	-	0.13	0.56	0.13	0.56	3.98E-03	0.02		
3338	2.76	6.05	1.19	5.20	4.92	21.57	0.19	0.82	-	-	0.17	0.74	0.17	0.74	5.26E-03	0.02		
3339	2.76	6.05	1.19	5.20	4.92	21.57	0.19	0.82	-	-	0.17	0.74	0.17	0.74	5.26E-03	0.02		
Dehy-1	-	-	-	-	0.69	3.04	-	-	-	-	-	-	-	-	2.88E-04	1.26E-03		
Rbl-1	0.07	0.32	0.06	0.27	4.04E-03	0.02	8.33E-03	0.04	-	-	5.59E-03	0.02	5.59E-03	0.02	0.02	0.09		
Dehy-2	-	-	-	-	0.69	3.04	-	-	-	-	-	-	-	-	2.88E-04	1.26E-03		
Rbl-2	0.07	0.32	0.06	0.27	4.04E-03	0.02	8.33E-03	0.04	-	-	5.59E-03	0.02	5.59E-03	0.02	0.02	0.09		
Tk-1	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-		
Tk-2	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-		
HAUL	-	-	-	-	-	-	-	-	-	-	0.38	0.04	0.04	3.75E-03	-	-		
Load-1	-	-	-	-	90.72	5.54	-	-	-	-	-	-	-	-	-	-		
Fug-1	-	-	-	-	1.64	7.17	-	-	-	-	-	-	-	-	2.19E-05	9.58E-05		
SSM/M	-	-	-	-	2.36	10.35	-	-	-	-	-	-	-	-	0.00	0.00		
3319	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	-	-	0.13	0.56	0.13	0.56	3.98E-03	0.02		
3240	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	-	-	0.13	0.56	0.13	0.56	3.98E-03	0.02		
ENG-9	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	-	-	0.13	0.56	0.13	0.56	3.98E-03	0.02		
ENG-10	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	-	-	0.13	0.56	0.13	0.56	3.98E-03	0.02		
Dehy-3	-	-	-	-	0.73	3.21	-	-	-	-	-	-	-	-	4.39E-04	1.92E-03		
Rbl-3	0.07	0.32	0.06	0.27	4.04E-03	0.02	8.33E-03	0.04	-	-	5.59E-03	0.02	5.59E-03	0.02	0.02	0.09		
AU-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
AU-Rb 1	1.47	6.44	1.24	5.41	0.08	0.35	0.17	0.73	-	-	0.11	0.49	0.11	0.49	0.42	1.83		
AU-Rb 2	1.47	6.44	1.24	5.41	0.08	0.35	0.17	0.73	-	-	0.11	0.49	0.11	0.49	0.42	1.83		
FL-1	1.86	8.16	15.97	69.97	1.39	6.08	0.85	3.72	-	-	0.95	4.17	0.95	4.17	0.02	0.07		
Tk-3	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-		
Tk-4	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-		
Totals	25.98	101.75	26.68	116.85	139.17	217.66	2.66	11.67	-	-	2.89	11.03	2.55	11.00	0.95	4.18		

[1] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-F: Additional Emissions during Startup, Shutdown, and Routine Maintenance (SSM)

☐ This table is intentionally left blank since all emissions at this facility due to routine or predictable startup, shutdown, or scehduled maintenance are no higher than those listed in Table 2-E and a malfunction emission limit is not already permitted or requested. If you are required to report GHG emissions as described in Section 6a, include any GHG emissions during Startup, Shutdown, and/or Scheduled Maintenance (SSM) in Table 2-P. Provide an explanations of SSM emissions in Section 6 and 6a.

All applications for facilities that have emissions during routine our predictable startup, shutdown or scheduled maintenance (SSM)[1], including NOI applications, must include in this table the Maximum Emissions during routine or predictable startup, shutdown and scheduled maintenance (20.2.7 NMAC, 20.2.72.203.A.3 NMAC, 20.2.73.200.D.2 NMAC). In Section 6 and 6a, provide emissions calculations for all SSM emissions reported in this table. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (https://www.env.nm.gov/aqb/permit/aqb_pol.html) for more detailed instructions. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM[2]		PM10[2]		PM2.5[2]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
SSM/M	-	-	-	-	2.36	10.35	-	-	-	-	-	-	-	-	0.00	0.00		
Totals	0.00	0	0	0	2.36	10.35	0	0	0	0	0	0	0	0	0	0		

[1] **For instance**, if the short term steady-state Table 2-E emissions are 5 lb/hr and the SSM rate is 12 lb/hr, enter 7 lb/hr in this table. If the annual steady-state Table 2-E emissions are 21.9 TPY, and the number of scheduled SSM events result in annual emissions of 31.9 TPY, enter 10.0 TPY in the table below.

[2] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-G: Stack Exit and Fugitive Emission Rates for Special Stacks

x I have elected to leave this table blank because this facility does not have any stacks/vents that split emissions from a single source or combine emissions from more than one source listed in table 2-A. Additionally, the emission rates of all stacks match the Requested allowable emission rates stated in Table 2-E.

Use this table to list stack emissions (requested allowable) from split and combined stacks. List Toxic Air Pollutants (TAPs) and Hazardous Air Pollutants (HAPs) in Table 2-I. List all fugitives that are associated with the normal, routine, and non-emergency operation of the facility. Unit and stack numbering must correspond throughout the application package. Refer to Table 2-E for instructions on use of the "-" symbol and on significant figures.

Stack No.	Serving Unit Number(s) from Table 2-A	NOx		CO		VOC		SOx		PM		PM10		PM2.5		□ H_2S or □ Lead	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Totals:																	

Table 2-H: Stack Exit Conditions

Unit and stack numbering must correspond throughout the application package. Include the stack exit conditions for each unit that emits from a stack, including blowdown venting parameters and tank emissions. If the facility has multiple operating scenarios, complete a separate Table 2-H for each scenario and, for each, type scenario name here:

Stack Number	Serving Unit Number(s) from Table 2-A	Orientation (H-Horizontal V=Vertical)	Rain Caps (Yes or No)	Height Above Ground (ft)	Temp. (F)	Flow Rate		Moisture by Volume (%)	Velocity (ft/sec)	Inside Diameter (ft)
						(acfs)	(dscfs)			
1	3347	V	No	22	849	137	N/A	N/A	173.9	1.00
2	3346	V	No	22	849	137	N/A	N/A	173.9	1.00
3	3171	V	No	23	812	197	N/A	N/A	111.8	1.50
4	3155	V	No	23	812	197	N/A	N/A	111.8	1.50
5	3338	V	No	23	825	267	N/A	N/A	151.2	1.50
6	3339	V	No	23	825	267	N/A	N/A	151.20	1.50
7	3319	V	No	23	812	197	N/A	N/A	111.8	1.50
8	3240	V	No	23	812	197	N/A	N/A	111.8	1.50
9	ENG-9	V	No	23	812	197	N/A	N/A	111.8	1.50
10	ENG-10	V	No	23	812	197	N/A	N/A	111.8	1.50
11	RBL-1	V	No	20	600	5.2	N/A	N/A	9.5	0.83
12	RBL-2	V	No	20	600	5.2	N/A	N/A	9.5	0.83
13	RBL-3	V	No	20	600	5.2	N/A	N/A	9.5	0.83
14	AU- Rb 1	V	No	30	600	6200.7	N/A	N/A	39.1	1.83
15	AU- RB 2	V	No	30	600	6200.7	N/A	N/A	39.1	1.83
16	FL-1	V	No	20	1832	31.4	N/A	N/A	40	1

Table 2-I: Stack Exit and Fugitive Emission Rates for HAPs and TAPs

In the table below, report the Potential to Emit for each HAP from each regulated emission unit listed in Table 2-A, only if the entire facility emits the HAP at a rate **greater than or equal to one (1) ton per year** For each such emission unit, HAPs shall be reported to the nearest 0.1 tpy. Each facility-wide Individual HAP total and the facility-wide Total HAPs shall be the sum of all HAP sources calculated to the nearest 0.1 ton per year. Per 20.2.72.403.A.1 NMAC, facilities not exempt [see 20.2.72.402.C NMAC] from TAP permitting shall report each TAP that has an uncontrolled emission rate in excess of its pounds per hour screening level specified in 20.2.72.502 NMAC. TAPs shall be reported using one more significant figure than the number of significant figures shown in the pound per hour threshold corresponding to the substance. Use the HAP nomenclature as it appears in Section 112 (b) of the 1990 CAAA and the TAP nomenclature as it listed in 20.2.72.502 NMAC. Include tank-flashing emissions estimates of HAPs in this table. For each HAP or TAP listed, fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected or the pollutant is emitted in a quantity less than the threshold amounts described above.

Stack No.	Unit No.(s)	Total HAPs		Benzene x HAP or □ TAP		Formaldehyde x HAP or □ TAP		Acetaldehyde x HAP or □ TAP		Acrolein x HAP or □ TAP		Toluene x HAP or □ TAP		Provide Pollutant Name Here □ HAP or □ TAP		Provide Pollutant Name Here □ HAP or □ TAP	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1	3347	0.4	1.7	4.4E-03	1.9E-02	0.2	1.0	0.1	0.4	0.1	0.2	0.00	0.02				
2	3346	0.4	1.7	4.4E-03	1.9E-02	0.2	1.0	0.1	0.4	0.1	0.2	0.00	0.02				
3	3171	0.4	1.6	6.0E-03	2.6E-02	0.2	0.7	0.1	0.5	0.1	0.3	0.01	0.02				
4	3155	0.4	1.6	6.0E-03	2.6E-02	0.2	0.7	0.1	0.5	0.1	0.3	0.01	0.02				
5	3338	0.5	2.3	8.0E-03	3.5E-02	0.3	1.1	0.2	0.7	0.1	0.4	0.01	0.03				
6	3339	0.5	2.3	8.0E-03	3.5E-02	0.3	1.1	0.2	0.7	0.1	0.4	0.01	0.03				
7	3319	0.4	1.6	6.0E-03	2.6E-02	0.2	0.7	0.1	0.5	0.1	0.3	0.01	0.02				
8	3240	0.4	1.6	6.0E-03	2.6E-02	0.2	0.7	0.1	0.5	0.1	0.3	0.01	0.02				
9	ENG-9	0.4	1.6	6.0E-03	2.6E-02	0.2	0.7	0.1	0.5	0.1	0.3	0.01	0.02				
10	ENG-10	0.4	1.6	6.0E-03	2.6E-02	0.2	0.7	0.1	0.5	0.1	0.3	0.01	0.02				
11	RBL-1	1.1E-02	4.7E-02	6.8E-04	3.0E-03	6.8E-04	3.0E-03	4.6E-04	2.0E-03	-	-	0.00	0.00				
12	RBL-2	1.1E-02	4.7E-02	6.8E-04	3.0E-03	6.8E-04	3.0E-03	4.6E-04	2.0E-03	-	-	0.00	0.00				
13	RBL-3	1.1E-02	4.7E-02	6.8E-04	3.0E-03	6.8E-04	3.0E-03	4.6E-04	2.0E-03	-	-	0.00	0.00				
14	AU-Rb 1	0.1	0.5	2.1E-02	4.9E-02	6.8E-04	3.0E-03	1.1E-02	4.8E-02	-	-	0.02	0.07				
15	AU-Rb 2	0.1	0.5	2.1E-02	4.9E-02	6.8E-04	3.0E-03	1.1E-02	4.8E-02	-	-	0.02	0.07				
16	FL-1	0.5	2.4	2.1E-01	0.90	-	-	-	-	-	-	0.24	1.03				
N/A	Dehy-1	0.1	0.4	4.9E-02	0.2	-	-	-	-	-	-	0.03	0.1				
N/A	Dehy-2	0.1	0.4	4.9E-02	0.2	-	-	-	-	-	-	0.03	0.1				
N/A	Dehy-3	0.1	0.4	0.1	0.2	-	-	-	-	-	-	0.03	0.1				
Totals:		5.0	22.2	0.5	1.9	2.0	8.7	1.2	5.2	0.7	3.1	0.4	1.8				

Table 2-J: Fuel

Specify fuel characteristics and usage. Unit and stack numbering must correspond throughout the application package.

Unit No.	Fuel Type (low sulfur Diesel, ultra low sulfur diesel, Natural Gas, Coal, …)	Fuel Source: purchased commercial, pipeline quality natural gas, residue gas, raw/field natural gas, process gas (e.g. SRU tail gas) or other	Specify Units				
			Lower Heating Value	Hourly Usage	Annual Usage	% Sulfur	% Ash
3347	Field Gas	Residue Gas	1,285 Btu/scf	7.97 Mscf/hr	69.79 MMscf/yr	<0.001	N/A
3346	Field Gas	Residue Gas	1,285 Btu/scf	7.97 Mscf/hr	69.79 MMscf/yr	<0.001	N/A
3171	Field Gas	Residue Gas	1,285 Btu/scf	9.94 Mscf/hr	87.11 MMscf/yr	<0.001	N/A
3155	Field Gas	Residue Gas	1,285 Btu/scf	9.94 Mscf/hr	87.11 MMscf/yr	<0.001	N/A
3338	Field Gas	Residue Gas	1,285 Btu/scf	13.15 Mscf/hr	115.21 MMscf/yr	<0.001	N/A
3339	Field Gas	Residue Gas	1,285 Btu/scf	13.15 Mscf/hr	115.21 MMscf/yr	<0.001	N/A
3319	Field Gas	Residue Gas	1,285 Btu/scf	9.94 Mscf/hr	87.11 MMscf/yr	<0.001	N/A
3240	Field Gas	Residue Gas	1,285 Btu/scf	9.94 Mscf/hr	87.11 MMscf/yr	<0.001	N/A
ENG-9	Field Gas	Residue Gas	1,285 Btu/scf	9.94 Mscf/hr	87.11 MMscf/yr	<0.001	N/A
ENG-10	Field Gas	Residue Gas	1,285 Btu/scf	9.94 Mscf/hr	87.11 MMscf/yr	<0.001	N/A
RBL-1	Field Gas	Residue Gas	1,285 Btu/scf	0.58 Mscf/hr	5.11 MMscf/yr	<0.001	N/A
RBL-2	Field Gas	Residue Gas	1,285 Btu/scf	0.58 Mscf/hr	5.11 MMscf/yr	<0.001	N/A
RBL-3	Field Gas	Residue Gas	1,285 Btu/scf	0.58 Mscf/hr	6.82 MMscf/yr	<0.001	N/A
AU-RB 1	Field Gas	Residue Gas	1,285 Btu/scf	11.67 Mscf/hr	102.26 MMscf/yr	<0.001	N/A
AU-Rb 2	Field Gas	Residue Gas	1,285 Btu/scf	11.67 Mscf/hr	102.26 MMscf/yr	<0.001	N/A
FL-1	Field Gas	Other	200 Btu/scf	21.03 Mscf/hr	7.68 MMscf/yr	<0.001	N/A

Table 2-K: Liquid Data for Tanks Listed in Table 2-L

For each tank, list the liquid(s) to be stored in each tank. If it is expected that a tank may store a variety of hydrocarbon liquids, enter "mixed hydrocarbons" in the Composition column for that tank and enter the corresponding data of the most volatile liquid to be stored in the tank. If tank is to be used for storage of different materials, list all the materials in the "All Calculations" attachment, run the newest version of TANKS on each, and use the material with the highest emission rate to determine maximum uncontrolled and requested allowable emissions rate. The permit will specify the most volatile category of liquids that may be stored in each tank. Include appropriate tank-flashing modeling input data. Use additional sheets if necessary. Unit and stack numbering must correspond throughout the application package.

Tank No.	SCC Code	Material Name	Composition	Liquid Density (lb/gal)	Vapor Molecular Weight (lb/lb*mol)	Average Storage Conditions		Max Storage Conditions	
						Temperature (°F)	True Vapor Pressure (psia)	Temperature (°F)	True Vapor Pressure (psia)
TK-1	40400311	Condensate/Oily Wastewater	Mixed Hydrocarbons	8.19	38.28	61.23	7.83	72.59	7.92
TK-2	40400311	Condensate/Oily Wastewater	Mixed Hydrocarbons	8.19	38.28	61.23	7.83	72.59	7.92
TK-3	40400311	Condensate/Oily Wastewater	Mixed Hydrocarbons	8.19	38.28	61.23	7.83	72.59	7.92
TK-4	40400311	Condensate/Oily Wastewater	Mixed Hydrocarbons	8.19	38.28	61.23	7.83	72.59	7.92

Table 2-L: Tank Data

Include appropriate tank-flashing modeling input data. Use an addendum to this table for unlisted data categories. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary. See reference Table 2-L2. Note: 1.00 bbl = 0.159 M3 = 42.0 gal

Tank No.	Date Installed	Materials Stored	Seal Type (refer to Table 2-LR below)	Roof Type (refer to Table 2-LR below)	Capacity		Diameter (M)	Vapor Space (M)	Color (from Table VI-C)		Paint Condition (from Table VI-C)	Annual Throughput (gal/yr)	Turn-overs (per year)
					(bbl)	(M^3)			Roof	Shell			
TK-1		Condensate/Oily Wastewater	N/A	FX	400	64	3.66	3.09	OT-Tan	OT-Tan	Good	923,419	54.97
TK-2		Condensate/Oily Wastewater	N/A	FX	400	64	3.66	3.09	OT-Tan	OT-Tan	Good		
TK-3		Condensate/Oily Wastewater	N/A	FX	400	64	3.66	3.09	OT-Tan	OT-Tan	Good		
TK-4		Condensate/Oily Wastewater	N/A	FX	400	64	3.66	3.09	OT-Tan	OT-Tan	Good		

Table 2-L2: Liquid Storage Tank Data Codes Reference Table

Roof Type	Seal Type, Welded Tank Seal Type		Seal Type, Riveted Tank Seal Type		Roof, Shell Color	Paint Condition
FX: Fixed Roof	**Mechanical Shoe Seal**	**Liquid-mounted resilient seal**	**Vapor-mounted resilient seal**	**Seal Type**	**WH**: White	Good
IF: Internal Floating Roof	**A**: Primary only	**A**: Primary only	**A**: Primary only	**A**: Mechanical shoe, primary only	**AS**: Aluminum (specular)	Poor
EF: External Floating Roof	**B**: Shoe-mounted secondary	**B**: Weather shield	**B**: Weather shield	**B**: Shoe-mounted secondary	**AD**: Aluminum (diffuse)	
P: Pressure	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**LG**: Light Gray	
					MG: Medium Gray	
					BL: Black	
					OT: Other (specify)	

Note: 1.00 bbl = 0.159 M^3 = 42.0 gal

Table 2-M: Materials Processed and Produced (Use additional sheets as necessary.)

Material Processed				Material Produced			
Description	**Chemical Composition**	**Phase (Gas, Liquid, or Solid)**	**Quantity (specify units)**	**Description**	**Chemical Composition**	**Phase**	**Quantity (specify units)**
Natural Gas	Mixed Hydrocarbons	Gas	80 MMSCFD	Natural Gas	Mixed Hydrocarbons	Gas	80 MMscf/day
				Condensate	Condensate	Liquid	60.2 bbl/d

Table 2-N: CEM Equipment

Enter Continuous Emissions Measurement (CEM) Data in this table. If CEM data will be used as part of a federally enforceable permit condition, or used to satisfy the requirements of a state or federal regulation, include a copy of the CEM's manufacturer specification sheet in the Information Used to Determine Emissions attachment. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Stack No.	Pollutant(s)	Manufacturer	Model No.	Serial No.	Sample Frequency	Averaging Time	Range	Sensitivity	Accuracy
There is no CEM equipment onsite.									

Table 2-O: Parametric Emissions Measurement Equipment

Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Unit No.	Parameter/Pollutant Measured	Location of Measurement	Unit of Measure	Acceptable Range	Frequency of Maintenance	Nature of Maintenance	Method of Recording	Averaging Time
There is no PEM equipment onsite.								

Table 2-P: Greenhouse Gas Emissions

Applications submitted under 20.2.70, 20.2.72, & 20.2.74 NMAC are required to complete this Table. Power plants, Title V major sources, and PSD major sources must report and calculate all GHG emissions for each unit. Applicants must report potential emission rates in short tons per year (see Section 6.a for assistance). Include GHG emissions during Startup, Shutdown, and Scheduled Maintenance in this table. For minor source facilities that are not power plants, are not Title V, or are not PSD, there are three options for reporting GHGs 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHG as a second separate unit; OR 3) check the following box □ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

		CO_2 ton/yr	N_2O ton/yr	CH_4 ton/yr	SF_6 ton/yr	PFC/HFC ton/yr[2]								Total GHG Mass Basis ton/yr[4]	Total CO_2e ton/yr[5]
Unit No.	**GWPs [1]**	**1**	**298**	**25**	**22,800**	**footnote 3**									
3347	**mass GHG**	6292.17	0.01	0.12											
	CO_2e	6292.17	3.53	2.96											
3346	**mass GHG**	6292.17	0.01	0.12											
	CO_2e	6292.17	3.53	2.96											
3171	**mass GHG**	7854.19	0.01	0.15											
	CO_2e	7854.19	4.41	3.70											
3155	**mass GHG**	7854.19	0.01	0.15											
	CO_2e	7854.19	4.41	3.70											
3338	**mass GHG**	10387.74	0.02	0.20											
	CO_2e	10387.74	5.83	4.89											
3339	**mass GHG**	10387.74	0.02	0.20											
	CO_2e	10387.74	5.83	4.89											
Dehy-1	**mass GHG**	0.00	0.00	4.25											
	CO_2e	0.00	0.00	106.25											
RBL-1	**mass GHG**	384.27	7.24E-04	0.01											
	CO_2e	384.27	0.22	0.18											
Dehy-2	**mass GHG**	0.00	0.00	4.25											
	CO_2e	0.00	0.00	106.25											
RBL-2	**mass GHG**	384.27	7.24E-04	0.01											
	CO_2e	384.27	0.22	0.18											
3319	**mass GHG**	7854.19	0.01	0.15											
	CO_2e	7854.19	4.41	3.70											
3240	**mass GHG**	7854.19	0.01	0.15											
	CO_2e	7854.19	4.41	3.70											
ENG-9	**mass GHG**	7854.19	0.01	0.15											
	CO_2e	7854.19	4.41	3.70											
ENG-10	**mass GHG**	7854.19	0.01	0.15											
	CO_2e	7854.19	4.41	3.70											
Dehy-3	**mass GHG**	0.00	0.00	4.12											
	CO_2e	0.00	0.00	103.00											

Table 2-P: Greenhouse Gas Emissions

Applications submitted under 20.2.70, 20.2.72, & 20.2.74 NMAC are required to complete this Table. Power plants, Title V major sources, and PSD major sources must report and calculate all GHG emissions for each unit. Applicants must report potential emission rates in short tons per year (see Section 6.a for assistance). Include GHG emissions during Startup, Shutdown, and Scheduled Maintenance in this table. For minor source facilities that are not power plants, are not Title V, or are not PSD, there are three options for reporting GHGs 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHG as a second separate unit; OR 3) check the following box ☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

		CO_2 ton/yr	**N_2O** ton/yr	**CH_4** ton/yr	**SF_6** ton/yr	**PFC/HFC** ton/yr[2]								**Total GHG** Mass Basis ton/yr[4]	**Total CO_2e** ton/yr[5]
RBL-3	**mass GHG**	384.27	7.24E-04	0.01											
	CO_2e	384.27	0.22	0.18											
AU-1	**mass GHG**	0.00	0.00	0.00											
	CO_2e	0.00	0.00	0.00											
AU-Rb 1	**mass GHG**	7685.33	0.01	0.14											
	CO_2e	7685.33	4.32	3.62											
AU-Rb 2	**mass GHG**	7685.33	0.01	0.14											
	CO_2e	7685.33	4.32	3.62											
FL-1	**mass GHG**	61435.88	0.03	128.43											
	CO_2e	61435.88	8.94	3210.75											
Total	**mass GHG**	158,444.27	0.21	142.88										158,587.36	
	CO_2e	158,444.27	63.42	3,571.96											162,079.65

[1] **GWP** (Global Warming Potential): Applicants must use the most current GWPs codified in Table A-1 of 40 CFR part 98. GWPs are subject to change, therefore, applicants need to check 40 CFR 98 to confirm GWP values.

[2] For **HFCs** or **PFCs** describe the specific HFC or PFC compound and use a separate column for each individual compound.

[3] For each new compound, enter the appropriate GWP for each HFC or PFC compound from Table A-1 in 40 CFR 98.

[4] Green house gas emissions on a **mass basis** is the ton per year green house gas emission before adjustment with its GWP.

[5] **CO_2e** means Carbon Dioxide Equivalent and is calculated by multiplying the TPY mass emissions of the green house gas by its GWP.

Section 3

Application Summary

The **Application Summary** shall include a brief description of the facility and its process, the type of permit application, the applicable regulation (i.e. 20.2.72.200.A.X, or 20.2.73 NMAC) under which the application is being submitted, and any air quality permit numbers associated with this site. If this facility is to be collocated with another facility, provide details of the other facility including permit number(s). In case of a revision or modification to a facility, provide the lowest level regulatory citation (i.e. 20.2.72.219.B.1.d NMAC) under which the revision or modification is being requested. Also describe the proposed changes from the original permit, how the proposed modification will affect the facility's operations and emissions, de-bottlenecking impacts, and changes to the facility's major/minor status (both PSD & Title V).

Routine or predictable emissions during Startup, Shutdown, and Maintenance (SSM): Provide an overview of how SSM emissions are accounted for in this application. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions.

Lucid Energy Delaware, LLC is submitting this application pursuant to 20.2.70.300.B(1) for the Big Lizard Compressor Station. The facility is located 28 miles Northwest of Jal, in Lea County, New Mexico. The Big Lizard Compressor Station currently operates under NSR permit number 7960-M2, issued August 30, 2019. The 2019 NSR revision put the site above major source thresholds under 20.2.70 NMAC (Title V regulations) and as such Lucid is submitting this application within 12 months of the start of operation of the site as a major source.

Lucid is requesting the following equipment be included in the Title V permit:

- Ten (10) Compressor Engines
- Two (2) TEG Dehydration units @ 30 MMscfd each
- One (1) TEG Dehydration unit @ 20 MMscfd
- Three (3) Dehydration unit reboilers @ 0.75 MMBtu/hr
- One (1) Amine System @ 80 MMscfd
- Two (2) Amine system reboilers @ 15.0 MMBtu/hr each
- Four (4) Atmospheric Storage tanks @ 400 Bbl each
- Oil loading emissions
- Haul road fugitives
- Facility-wide fugitives
- Startup, shutdown, maintenance emissions (Unit SSM/M)

Note that the NSR permit for the Big Lizard Compressor Station includes an alternate operating scenario for the site which includes generator engines. The generators were included in the NSR permit as line power was not going to be available at the site by the time operation was to begin. The site now receives power from Excel; therefore, the generators are no longer needed and have been removed from the site. As such the generators are not included in this application. In addition, it has come to Lucid's attention that the condensate tanks onsite (Units: TK-1, TK-2, TK-3, TK-4) are 400-barrel tanks and not 300-barrel tanks, as currently permitted. Lucid is including updated tank information and emissions with this application.

Section 4

Process Flow Sheet

A **process flow sheet** and/or block diagram indicating the individual equipment, all emission points and types of control applied to those points. The unit numbering system should be consistent throughout this application.

See the attached Process Flow Diagram.

Non-Condensable Vapors to Fuel System

Control Flare *(FL-1)*

BTEX 1

Dehy Reboilers *(RBL 1 - RBL 3)*

Still Vent Emissions to Flare

To Atmospheric Storage Tanks *(TK 1 - TK 4)*

Amine Reboilers *(AU-RB 1-2)*

To Station Fuel System

Gas Driven Compressors

Inlet Gas

Inlet Scrubber

(ENG 1 - ENG 10)

Amine System *(AU-1)*

Coalescing Filter

TEG Contactors *(Dehy 1 - Dehy 3)*

2nd Stage Liquids

Liquids from Integral Scrubber

3rd Stage Liquids

To Atmospheric Storage Tanks *(TK 1 - TK 4)*

To Atmospheric Storage Tanks *(TK 1 - TK 4)*

Gas Recycled to Inlet

3 Phase Separator

Blow Case

To Atmospheric Storage Tanks *(TK 1 - TK 4)*

LEGEND

- Gas
- Low Pressure Liquids
- High Pressure Liquids
- Waste Water
- Tri-ethylene Glycol (TEG)

Contek Solutions LLC

LUCID ENERGY DELAWARE, LLC
LEA COUNTY, NEW MEXICO
BIG LIZARD COMPRESSOR STATION

07021-21

June 2, 2019

PROCESS FLOW DIAGRAM

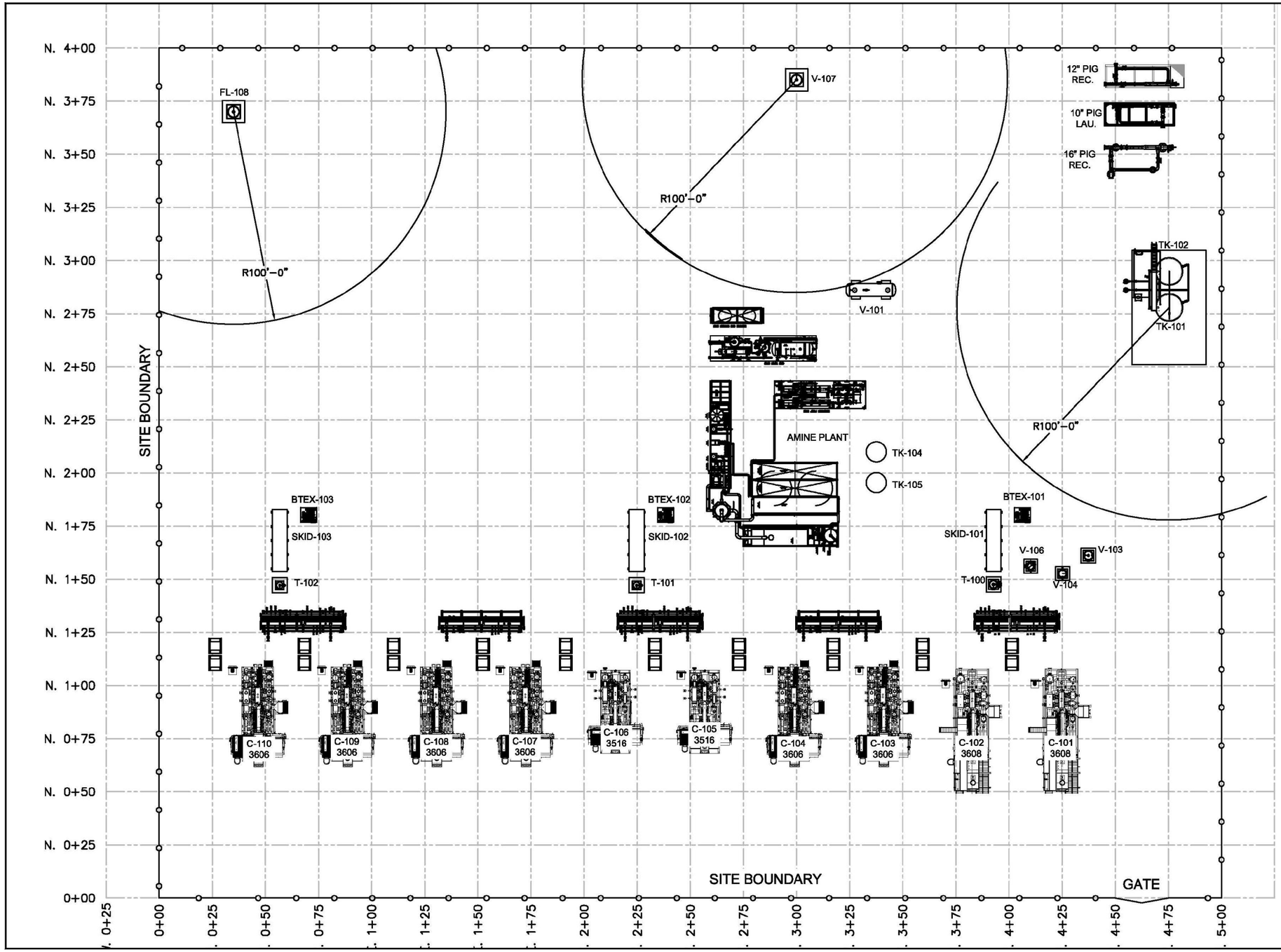
FIGURE 2

Section 5

Plot Plan Drawn To Scale

A **plot plan drawn to scale** showing emissions points, roads, structures, tanks, and fences of property owned, leased, or under direct control of the applicant. This plot plan must clearly designate the restricted area as defined in UA1, Section 1-D.12. The unit numbering system should be consistent throughout this application.

A plot plan is presented on the following page.



EQUIPMENT LIST	
ITEM	DESCRIPTION
C-101	3608 COMPRESSOR
C-102	3608 COMPRESSOR
C-103	3606 COMPRESSOR
C-104	3606 COMPRESSOR
C-105	3516 COMPRESSOR
C-106	3516 COMPRESSOR
C-107	3606 COMPRESSOR (FUTURE)
C-108	3606 COMPRESSOR (FUTURE)
C-109	3606 COMPRESSOR (FUTURE)
C-110	3606 COMPRESSOR (FUTURE)
V-101	I P INIFT SEPARATOR
V-103	3 PHASE SEPARATOR
V-104	BLOWCASE
V-106	FUEL GAS SCRUBBER
V-107	VENT SCRUBBER
T-100	GLYCOL CONTACTOR
SKID-101	GLYCOL REGENERATION UNIT
BTEX-101	BTEX
T 101	GLYCOL CONTACTOR
SKID-102	GLYCOL REGENERATION UNIT
BTEX-102	BTEX
T-102	GLYCOL CONTACTOR
SKID-103	GLYCOL REGENERATION UNIT
BTEX-103	BTEX
TK-101	CONDENSATE TANK
TK-102	WASTE WATER TANK
TK-104	RO WATER TANK
TK-105	AMINE TANK
FL-108	FLARE
AMINE PLANT	AMINE PLANT

0 20 50ft

Contek Solutions LLC

LUCID ENERGY DELAWARE, LLC
LEA COUNTY, NEW MEXICO
BIG LIZARD COMPRESSOR STATION

PLOT PLAN

07021-22

June 2, 2019

FIGURE 2

Section 6

All Calculations

Show all calculations used to determine both the hourly and annual controlled and uncontrolled emission rates. All calculations shall be performed keeping a minimum of three significant figures. Document the source of each emission factor used (if an emission rate is carried forward and not revised, then a statement to that effect is required). If identical units are being permitted and will be subject to the same operating conditions, submit calculations for only one unit and a note specifying what other units to which the calculations apply. All formulas and calculations used to calculate emissions must be submitted. The "Calculations" tab in the UA2 has been provided to allow calculations to be linked to the emissions tables. Add additional "Calc" tabs as needed. If the UA2 or other spread sheets are used, all calculation spread sheet(s) shall be submitted electronically in Microsoft Excel compatible format so that formulas and input values can be checked. Format all spread sheets and calculations such that the reviewer can follow the logic and verify the input values. Define all variables. If calculation spread sheets are not used, provide the original formulas with defined variables. Additionally, provide subsequent formulas showing the input values for each variable in the formula. All calculations, including those calculations are imbedded in the Calc tab of the UA2 portion of the application, the printed Calc tab(s), should be submitted under this section.

Tank Flashing Calculations: The information provided to the AQB shall include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., NOI, permit, or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis. If Hysis is used, all relevant input parameters shall be reported, including separator pressure, gas throughput, and all other relevant parameters necessary for flashing calculation.

SSM Calculations: It is the applicant's responsibility to provide an estimate of SSM emissions or to provide justification for not doing so. In this Section, provide emissions calculations for Startup, Shutdown, and Routine Maintenance (SSM) emissions listed in the Section 2 SSM and/or Section 22 GHG Tables and the rational for why the others are reported as zero (or left blank in the SSM/GHG Tables). Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on calculating SSM emissions. If SSM emissions are greater than those reported in the Section 2, Requested Allowables Table, modeling may be required to ensure compliance with the standards whether the application is NSR or Title V. Refer to the Modeling Section of this application for more guidance on modeling requirements.

Glycol Dehydrator Calculations: The information provided to the AQB shall include the manufacturer's maximum design recirculation rate for the glycol pump. If GRI-Glycalc is used, the full input summary report shall be included as well as a copy of the gas analysis that was used.

Road Calculations: Calculate fugitive particulate emissions and enter haul road fugitives in Tables 2-A, 2-D and 2-E for:

1. If you transport raw material, process material and/or product into or out of or within the facility and have PER emissions greater than 0.5 tpy.
2. If you transport raw material, process material and/or product into or out of the facility more frequently than one round trip per day.

Significant Figures:

A. All emissions standards are deemed to have at least two significant figures, but not more than three significant figures.

B. At least 5 significant figures shall be retained in all intermediate calculations.

C. In calculating emissions to determine compliance with an emission standard, the following rounding off procedures shall be used:

(1) If the first digit to be discarded is less than the number 5, the last digit retained shall not be changed;

(2) If the first digit discarded is greater than the number 5, or if it is the number 5 followed by at least one digit other than the number zero, the last figure retained shall be increased by one unit; **and**

(3) If the first digit discarded is exactly the number 5, followed only by zeros, the last digit retained shall be rounded upward if it is an odd number, but no adjustment shall be made if it is an even number.

(4) The final result of the calculation shall be expressed in the units of the standard.

Control Devices: In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device

regardless if the applicant takes credit for the reduction in emissions. The applicant can indicate in this section of the application if they chose to not take credit for the reduction in emission rates. For notices of intent submitted under 20.2.73 NMAC, only uncontrolled emission rates can be considered to determine applicability unless the state or federal Acts require the control. This information is necessary to determine if federally enforceable conditions are necessary for the control device, and/or if the control device produces its own regulated pollutants or increases emission rates of other pollutants.

Detailed emission calculations are provided on the following pages.

Emissions from the four (4) slop tanks (TK-1 – TK-4) were calculated using Bryan Research and Engineering's Promax software. The simulation report detail and summary are included in Section 7.

Emissions from the three (3) TEG Dehydrators (Dehy-1 – Dehy-3) were calculated using Promax. The simulation report is found in Section 7.

Emissions from the amine system (AU-1) were calculated using Promax. The simulation report is found is Section 7.

The compressor engines are equipped with oxidative catalysts in order to meet the standard emission limits in the New Source Performance Standards (NSPS) for stationary spark ignition internal combustion engines, 40 Code of Federal Regulations (CFR) Part 60, Subpart JJJJ. Emissions data for the engines from the manufacturer have been included in Section 7. Emission rates for VOC, CO, NOx, and formaldehyde were calculated using the manufacturer's controlled emission factors. All other criteria pollutant emissions were calculated using AP-42 emission factors. As noted previously, the manufacturer's specification sheet has been included in Section 7 as well as Table 3.2-3 of AP-42 Section 3.2. The calculation tables show the source of the emission factors used in the calculations by pollutant.

Emissions from the dehydrator reboilers (RBL-1 –RBL-3) and amine reboilers (AU-RB 1 and AU-RB 2) have been calculated using AP-42 emission factors from Section 1.4, Tables 1.4-1 through 1.4-3. These tables are included in Section 7.

Fugitive haul road emissions (HAUL) were calculated based on Equations 1a and 2 of AP-42 Section 13.2.2. Relevant portions of AP-42 Section 13.2.2 are included in Section 7.

Truck loading emissions (LOAD) from loading of the slop tanks were calculated based on AP-42 Section 5.2, Table 5.2-5. Relevant portions of AP-42 Section 5.2 are included in Section 7.

Maintenance, Startup, and Shutdown (MSS) emissions (SSM) were calculated based on a mass balance using gas analysis parameters and other assumption. Specific MSS emissions include blowdowns, slop tank cleaning, slop tank emptying and refilling, and miscellaneous activities.

Facility fugitive emissions (FUG) were calculated using TCEQ's "Emissions Factors for Equipment Leak Fugitive Components" document and assumed component counts for a typical compressor station. Relevant portions of the TCEQ document are included in Section 7.

Greenhouse Gas (GHG) emissions were calculated following the procedures of 40 CFR 98 but are reported in short tons as requested in Section 6.a. Tables C-1 and C-2 of 40 CFR 98, Subpart C are included in Section 7.

Section 6.a
Green House Gas Emissions

(Submitting under 20.2.70, 20.2.72 20.2.74 NMAC)

Title V (20.2.70 NMAC), Minor NSR (20.2.72 NMAC), and PSD (20.2.74 NMAC) applicants must estimate and report greenhouse gas (GHG) emissions to verify the emission rates reported in the public notice, determine applicability to 40 CFR 60 Subparts, and to evaluate Prevention of Significant Deterioration (PSD) applicability. GHG emissions that are subject to air permit regulations consist of the sum of an aggregate group of these six greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Calculating GHG Emissions:

1. Calculate the ton per year (tpy) GHG mass emissions and GHG CO_2e emissions from your facility.
2. GHG mass emissions are the sum of the total annual tons of greenhouse gases without adjusting with the global warming potentials (GWPs). GHG CO_2e emissions are the sum of the mass emissions of each individual GHG multiplied by its GWP found in Table A-1 in 40 CFR 98 Mandatory Greenhouse Gas Reporting.
3. Emissions from routine or predictable start up, shut down, and maintenance must be included.
4. Report GHG mass and GHG CO_2e emissions in Table 2-P of this application. Emissions are reported in **short** tons per year and represent each emission unit's Potential to Emit (PTE).
5. All Title V major sources, PSD major sources, and all power plants, whether major or not, must calculate and report GHG mass and CO2e emissions for each unit in Table 2-P.
6. For minor source facilities that are not power plants, are not Title V, and are not PSD there are three options for reporting GHGs in Table 2-P: 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHGs as a second separate unit; 3) or check the following ☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

Sources for Calculating GHG Emissions:

- Manufacturer's Data
- AP-42 Compilation of Air Pollutant Emission Factors at http://www.epa.gov/ttn/chief/ap42/index.html
- EPA's Internet emission factor database WebFIRE at http://cfpub.epa.gov/webfire/
- 40 CFR 98 Mandatory Green House Gas Reporting except that tons should be reported in short tons rather than in metric tons for the purpose of PSD applicability.
- API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry. August 2009 or most recent version.
- Sources listed on EPA's NSR Resources for Estimating GHG Emissions at http://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases:

Global Warming Potentials (GWP):
Applicants must use the Global Warming Potentials codified in Table A-1 of the most recent version of 40 CFR 98 Mandatory Greenhouse Gas Reporting. The GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to that of one unit mass of CO_2 over a specified time period.

"Greenhouse gas" for the purpose of air permit regulations is defined as the aggregate group of the following six gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. **(20.2.70.7 NMAC, 20.2.74.7 NMAC).** You may also find GHGs defined in 40 CFR 86.1818-12(a).

Metric to Short Ton Conversion:
Short tons for GHGs and other regulated pollutants are the standard unit of measure for PSD and title V permitting programs. 40 CFR 98 Mandatory Greenhouse Reporting requires metric tons.
1 metric ton = 1.10231 short tons (per Table A-2 to Subpart A of Part 98 – Units of Measure Conversions)

Greenhouse gas emissions were estimated for equipment onsite and are included in this Section.

Emissions Summary

Facility Emissions

Uncontrolled Emissions (Normal Operations)

		NOx		CO		VOC		SO_2		TSP		PM-10		PM-2.5		H_2S		Total HAP		Formaldehyde		Benzene		Toluene		Acetaldehyde		Acrolein		CO2	N2O	CH4
Unit No.	Description/Source	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	tpy	tpy	tpy
3347	CAT 3516	1.52	6.66	9.10	39.84	5.14	22.52	0.11	0.50	0.10	0.45	0.10	0.45	0.10	0.45	0.00	0.01	1.33	5.84	1.19	5.20	0.00	0.02	0.00	0.02	0.08	0.37	0.05	0.23	6292.17	0.01	0.12
3346	CAT 3516	1.52	6.66	9.10	39.84	5.14	22.52	0.11	0.50	0.10	0.45	0.10	0.45	0.10	0.45	0.00	0.01	1.33	5.84	1.19	5.20	0.00	0.02	0.00	0.02	0.08	0.37	0.05	0.23	6292.17	0.01	0.12
3171	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.00	0.02	1.03	4.49	0.83	3.62	0.01	0.03	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
3155	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.00	0.02	1.03	4.49	0.83	3.62	0.01	0.03	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
3338	CAT G3608	2.76	12.07	17.09	74.83	7.50	32.83	0.19	0.82	0.17	0.74	0.17	0.74	0.17	0.74	0.01	0.02	1.53	6.71	1.27	5.55	0.01	0.04	0.01	0.03	0.15	0.67	0.09	0.41	10387.74	0.02	0.20
3339	CAT G3608	2.76	12.07	17.09	74.83	7.50	32.83	0.19	0.82	0.17	0.74	0.17	0.74	0.17	0.74	0.01	0.02	1.53	6.71	1.27	5.55	0.01	0.04	0.01	0.03	0.15	0.67	0.09	0.41	10387.74	0.02	0.20
Dehy-1	Glycol Dehydrator	-	-	-	-	73.38	321.41	-	-	-	-	-	-	-	-	0.01	0.09	39.73	174.00	-	-	10.68	46.76	17.39	76.16	-	-	-	-	-	-	4.25
Rbl-1	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.07	0.32	0.06	0.27	0.00	0.02	0.01	0.04	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.09	0.01	0.05	6.85E-04	0.00	6.85E-04	0.00	6.85E-04	0.00	4.57E-04	0.00	-	-	384.27	7.24E-04	0.01
Dehy-2	Glycol Dehydrator	-	-	-	-	73.38	321.41	-	-	-	-	-	-	-	-	0.01	0.03	39.73	174.00	-	-	10.68	46.76	17.39	76.16	-	-	-	-	-	-	4.25
Rbl-2	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.07	0.32	0.06	0.27	0.00	0.02	0.01	0.04	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.09	0.01	0.05	6.85E-04	0.00	6.85E-04	0.00	6.85E-04	0.00	4.57E-04	0.00	-	-	384.27	7.24E-04	0.01
Tk-1	Atmospheric Storage Tank	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tk-2	Atmospheric Storage Tank	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HAUL	Haul Road Emissions	-	-	-	-	-	-	-	-	1.49	0.15	0.38	0.04	0.04	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Load-1	Truck Loading	-	-	-	-	90.72	5.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fug-1	Facility-wide Fugitive Emissions	-	-	-	-	1.64	7.17	-	-	-	-	-	-	-	-	2.19E-05	9.58E-05	0.19	0.83	-	-	-	-	-	-	-	-	-	-	-	-	-
SSM/M	Startup, Shutdown, Maintenance, and Malfunction	-	-	-	-	2.36	10.35	-	-	-	-	-	-	-	-	0.00	0.00	6.43	0.12	-	-	2.52	0.05	-	-	-	-	-	-	-	-	-
3319	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.00	0.02	1.03	4.49	0.83	3.62	0.01	0.03	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
3240	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.00	0.02	1.03	4.49	0.83	3.62	0.01	0.03	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
ENG-9	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.00	0.02	1.03	4.49	0.83	3.62	0.01	0.03	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
ENG-10	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.00	0.02	1.03	4.49	0.83	3.62	0.01	0.03	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
Dehy-3	Glycol Dehydrator	-	-	-	-	73.72	322.91	-	-	-	-	-	-	-	-	0.01	0.04	38.94	170.56			11.03	48.30	16.98	74.39	-	-	-	-	-	-	4.12
Rbl-3	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.07	0.32	0.06	0.27	0.00	0.02	0.01	0.04	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.09	0.01	0.05	6.85E-04	0.00	6.85E-04	0.00	6.85E-04	0.00	4.57E-04	0.00	-	-	384.27	7.24E-04	0.01
AU-1	Amine Unit	-	-	-	-	63.64	278.73	-	-	-	-	-	-	-	-	0.45	1.95	27.25	119.36	-	-	10.27	44.98	11.78	51.59	-	-	-	-	-	-	0.00
AU-Rb 1	15.0 MMBtu/hr Amine Reboiler	1.47	6.44	1.24	5.41	0.08	0.35	0.17	0.73	0.11	0.49	0.11	0.49	0.11	0.49	0.42	1.83	0.12	0.54	-	-	0.02	0.05	0.02	0.07	0.01	0.05	-	-	7685.33	0.01	0.14
AU-Rb 2	15.0 MMBtu/hr Amine Reboiler	1.47	6.44	1.24	5.41	0.08	0.35	0.17	0.73	0.11	0.49	0.11	0.49	0.11	0.49	0.42	1.83	0.12	0.54	-	-	0.02	0.05	0.02	0.07	0.01	0.05	-	-	7685.33	0.01	0.14
FL-1	Control Flare	1.86	8.16	15.97	69.97	1.39	6.08	0.85	3.72	0.95	4.17	0.95	4.17	0.95	4.17	0.02	0.07	0.54	2.38	-	-	0.21	0.90	0.24	1.03	-	-	-	-	61435.88	0.03	128.43
Tk-3	Atmospheric Storage Tank	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tk-4	Atmospheric Storage Tank	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**25.98**	**113.79**	**133.74**	**585.79**	**439.49**	**1533.17**	**2.66**	**11.67**	**4.00**	**11.14**	**2.89**	**11.03**	**2.55**	**11.00**	**1.42**	**6.29**	**164.96**	**694.49**	**9.87**	**43.23**	**45.47**	**188.12**	**63.86**	**279.72**	**1.18**	**5.17**	**0.71**	**3.11**	**158444.27**	**0.21**	**142.88**

Controlled Emissions (Normal Operations)																																	
		NOx		CO		VOC		SO_2		TSP		PM-10		PM-2.5		H_2S		Total HAP		Formaldehyde		Benzene		Toluene		Acetaldehyde		Acrolein		CO2	N2O	CH4
Unit No.	Description/Source	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	tpy	tpy	tpy
3347	CAT 3516	1.52	6.66	0.64	2.80	3.35	14.68	0.11	0.50	0.10	0.45	0.10	0.45	0.10	0.45	0.003	0.01	0.38	1.68	0.24	1.04	0.004	0.019	0.00	0.02	0.08	0.37	0.05	0.23	6292.17	0.01	0.12
3346	CAT 3516	1.52	6.66	0.64	2.80	3.35	14.68	0.11	0.50	0.10	0.45	0.10	0.45	0.10	0.45	0.003	0.01	0.38	1.68	0.24	1.04	0.004	0.019	0.00	0.02	0.08	0.37	0.05	0.23	6292.17	0.01	0.12
3171	CAT 3606	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.004	0.02	0.36	1.59	0.17	0.72	0.006	0.026	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
3155	CAT 3606	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.004	0.02	0.36	1.59	0.17	0.72	0.006	0.026	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
3338	CAT G3608	2.76	6.05	1.19	5.20	4.92	21.57	0.19	0.82	0.17	0.74	0.17	0.74	0.17	0.74	0.01	0.02	0.52	2.27	0.25	1.11	0.008	0.035	0.01	0.03	0.15	0.67	0.09	0.41	10387.74	0.02	0.20
3339	CAT G3608	2.76	6.05	1.19	5.20	4.92	21.57	0.19	0.82	0.17	0.74	0.17	0.74	0.17	0.74	0.01	0.02	0.52	2.27	0.25	1.11	0.008	0.035	0.01	0.03	0.15	0.67	0.09	0.41	10387.74	0.02	0.20
Dehy-1	Glycol Dehydrator	-	-	-	-	0.69	3.04	-	-	-	-	-	-	-	-	2.88E-04	0.001	0.09	0.38	-	-	0.05	0.22	0.03	0.11	-	-	-	-	-	-	4.25
Rbl-1	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.07	0.32	0.06	0.27	0.00	0.02	0.01	0.04	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.091	0.01	0.05	6.85E-04	0.00	6.85E-04	0.00	6.85E-04	0.00	4.57E-04	0.00	-	-	384.27	7.24E-04	0.01
Dehy-2	Glycol Dehydrator	-	-	-	-	0.69	3.04	-	-	-	-	-	-	-	-	2.88E-04	0.001	0.09	0.38	-	-	0.05	0.22	0.03	0.11	-	-	-	-	-	-	4.25
Rbl-2	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.07	0.32	0.06	0.27	0.00	0.02	0.01	0.04	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.091	0.01	0.05	6.85E-04	0.00	6.85E-04	0.00	6.85E-04	0.00	4.57E-04	0.00	-	-	384.27	7.24E-04	0.01
Tk-1	Atmospheric Storage Tank	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tk-2	Atmospheric Storage Tank	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HAUL	Haul Road Emissions	-	-	-	-	-	-	-	-	1.49	0.15	0.38	0.04	0.04	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Load-1	Truck Loading	-	-	-	-	90.72	5.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fug-1	Facility-wide Fugitive Emissions	-	-	-	-	1.64	7.17	-	-	-	-	-	-	-	-	2.19E-05	9.58E-05	0.19	0.83	-	-	-	-	-	-	-	-	-	-	-	-	-
SSM/M	Startup, Shutdown, Maintenance, and Malfunction	-	-	-	-	2.36	10.35	-	-	-	-	-	-	-	-	0.00	0.00	6.43	0.12	-	-	2.52	0.05	-	-	-	-	-	-	-	-	-
3319	CAT 3606	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.004	0.02	0.36	1.59	0.17	0.72	0.01	0.03	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
3240	CAT 3606	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.004	0.02	0.36	1.59	0.17	0.72	0.01	0.03	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
ENG-9	CAT 3606	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.004	0.02	0.36	1.59	0.17	0.72	0.01	0.03	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
ENG-10	CAT 3606	2.07	9.05	0.73	3.21	3.94	17.24	0.14	0.62	0.13	0.56	0.13	0.56	0.13	0.56	0.004	0.02	0.36	1.59	0.17	0.72	0.01	0.03	0.01	0.02	0.11	0.50	0.07	0.31	7854.19	0.01	0.15
Dehy-3	Glycol Dehydrator	-	-	-	-	0.73	3.21	-	-	-	-	-	-	-	-	4.39E-04	0.002	0.09	0.40	-	-	0.05	0.23	0.03	0.11	-	-	-	-	-	-	4.12
Rbl-3	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.07	0.32	0.06	0.27	0.00	0.02	0.01	0.04	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.091	0.01	0.05	6.85E-04	0.00	6.85E-04	0.00	6.85E-04	0.00	4.57E-04	0.00	-	-	384.27	7.24E-04	0.01
AU-1	Amine Unit[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AU-Rb 1	15.0 MMBtu/hr Amine Reboiler	1.47	6.44	1.24	5.41	0.08	0.35	0.17	0.73	0.11	0.49	0.11	0.49	0.11	0.49	0.42	1.83	0.12	0.54	-	-	0.02	0.05	0.02	0.07	0.01	0.05	-	-	7685.33	0.01	0.14
AU-Rb 2	15.0 MMBtu/hr Amine Reboiler	1.47	6.44	1.24	5.41	0.08	0.35	0.17	0.73	0.11	0.49	0.11	0.49	0.11	0.49	0.42	1.83	0.12	0.54	-	-	0.02	0.05	0.02	0.07	0.01	0.05	-	-	7685.33	0.01	0.14
FL-1	Control Flare	1.86	8.16	15.97	69.97	1.39	6.08	0.85	3.72	0.95	4.17	0.95	4.17	0.95	4.17	0.02	0.07	0.54	2.38	-	-	0.21	0.90	0.24	1.03	-	-	-	-	61435.88	0.03	128.43
Tk-3	Atmospheric Storage Tank	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tk-4	Atmospheric Storage Tank	-	-	-	-	0.15	0.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**25.98**	**101.75**	**26.68**	**116.85**	**139.15**	**217.65**	**2.66**	**11.67**	**4.00**	**11.14**	**2.89**	**11.03**	**2.55**	**11.00**	**0.95**	**4.18**	**11.69**	**23.15**	**1.98**	**8.65**	**2.98**	**1.98**	**0.40**	**1.76**	**1.18**	**5.17**	**0.71**	**3.11**	**158444.27**	**0.21**	**142.88**

"-" Indicates emissions of this pollutant are not expected above 1.0 lb/hr or 1.0 TPY.

[1]Controlled Amine Unit Emissions presented under Flare pathway

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Caterpillar G3516

Unit Numbers:	3347 & 3346		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3516J		
Aspiration:	Turbo-charged		

Engine Horsepower and RPM

Engine speed:	1,400.0	rpm	Mfg data
Sea level hp:	1,380.0	hp	Mfg data

Fuel Consumption

BSFC:	7,418.0	Btu/hp-hr	Mfd data for LHV
Fuel heat value:	1,285.0	Btu/scf	Fuel Gas Analysis
Heat input:	10.24	MMBtu/hr	BSFC * site hp
Fuel consumption:	7.966	Mscf/hr	Heat input / fuel heat value
Annual fuel usage:	69.79	MMscf/yr	8760 hrs/yr operation

Exhaust Parameters

Exhaust temp (Tstk):	849	°F	Mfg data
Stack height:	22.00	ft	Engineering Estimate
Stack diameter:	1.00	ft	Engineering Estimate
Exhaust flow:	8190.0	acfm	Mfg data
Exhaust flow:	136.50	acfs	Mfg data
Exhaust velocity:	173.9	ft/sec	Exhaust flow ÷ stack area

Emission Calculations

Uncontrolled Emissions

NO_x	CO	NMNEHC[4]	SO_2 [1]	H_2S [1]			
0.5	3.0	1.30	0.037	0.001	g/hp-hr	Mfg data	Engine data
			5		gr Total Sulfur/Mscf	Pipeline specification	
1.5	**9.1**	**5.1**	**0.11**	0.003	lb/hr	Hourly emission rate	
6.7	**39.8**	**22.5**	**0.50**	**0.01**	tpy	Annual emission rate (8760 hrs/yr)	

PM[2]	HCOH	Total HAPs[3]		
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.03	0.39	0.44	g/hp-hr	Mfg data
0.10	**1.2**	**1.3**	lb/hr	Hourly emission rate
0.45	**5.2**	**5.8**	tpy	Annual emission rate (8760 hrs/yr)

Controlled Emissions

NO_x	CO	NMNEHC[4]	SO_2	H_2S			
0.50	0.21	1.02	0.037	0.001	g/hp-hr	Mfg data	Catalyst data
			5		gr Total Sulfur/Mscf	Pipeline specification	
1.5	**0.6**	**3.4**	**0.11**	0.003	lb/hr	Hourly emission rate	
6.7	**2.8**	**14.7**	**0.50**	**0.01**	tpy	Annual emission rate (8760 hrs/yr)	

PM[2]	HCOH[3]	0.3479 Total HAPs[3]		
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.03	0.078	0.13	g/hp-hr	Mfg data
0.10	**0.237**	**0.38**	lb/hr	Hourly emission rate
0.45	**1.04**	**1.7**	tpy	Annual emission rate (8760 hrs/yr)

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf

0.00714 lb S/Mscf * fuel consumption (Mscf/hr) * 64 lb SO_2/32 lb S = lb SO2/hr

H_2S emissions based on 0.25 g H2S/100 scf, or 0.0004 lb H2S/Mscf in fuel

0.0004 lb H2S/Mscf fuel * fuel consumption (Mscf/hr) = lb H2S/hr

[2] It is assumed that TSP = PM_{10} = $PM_{2.5}$. The emission factor used is filterable plus condensable PM.

[3] Total HAPs is calculated using GRI-HAPCalc 3.01. The manufacturer HCOH emission factor was use on both the uncontrolled and controlled emission calculations and substituted total HAP emission calculations.

[4] VOC emission factor provided by the manufacturer is non-ethane, non-methane, non-formaldehyde.

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Caterpillar G3516 - Greenhouse Gas Emissions

Capacity:

10.2	MMBtu/hr.	Nameplate heat rate	(Manufacturers data)
12.28	MMBtu/hr.	Heat rate, max firing rate (20% safety factor added)	

Greenhouse Gases Emissions from Natural Gas Combustion

Tier 1

Subpart C- General Stationary Fuel Combustion Sources 98.30

40 CFR 98 (b)(1)(v) The Tier 1 Calculation Methodology: (v) May be used for natural gas combustion in a unit of any size, in cases where the annual natural gas consuption is obtained from fuel billing records in units of therm or mmBtu.

$CO_2 = 1 \times 10^{-3} \times Gas \times EF$ (Eq. C-1a)

where:

CO_2 = Annual CO_2 mass emission from natural gas combustion (metric ton).

Gas = Annual natural gas usage, from billing records (mmBtu)

EF = Fuel-specific default CO_2 emission factor for natural gas (kg CO_2/mmBtu)

Table C1 of this subpart = 53.02 (kg Co2/mmBtu)

Annual gas usage =

12.28	MMBtu	8,760	hrs	53.06	kg CO_2	1	Metric Ton
	hr		yr		MMBtu	1000	kg

CO_2 =	5,709.8	metric ton/yr
	6,292.2	ton (US)/yr

CH_4 or $N_2O = 1 \times 10\text{-}3 \times Fuel \times EF$ (Eq. C-8b)

where:

CH_4 or N_2O = Annual Emission from the combustion of natural gas (metric tons)

CH_4 = 1.0 x 10-3 kg CH_4/mmBtu

From Table C-2 To Subpart C of Part 68 - Default CH4 and N2O Emission Factors for Various Types of Fuel: Natural Gas

Annual gas usage =	12.28	MMBtu	8,760	hrs	1.00E-03	kg CH_4	1	Metric Ton
		hr		yr		MMBtu	1000	kg

CH_4 =	0.11	metric ton/yr
	0.12	ton (US)/yr

Converted to CO_{2e}	0.12	25	=	3.0	tons/yr CO_{2e}

N_2O = 1.0 x 10-4 kg N_20/mmBtu

From Table C-2 To Subpart C of Part 68 - Default CH4 and N2O Emission Factors for Various Types of Fuel: Natural Gas

Annual gas usage =	12.28	MMBtu	8,760	hrs	1.00E-04	kg N_2O	1	Metric Ton
			hr		yr		MMBtu	1000	kg

N_2O=	0.011	metric ton/yr
	0.012	ton (US)/yr

Converted to CO_{2e}	0.01	298	=	3.5	tons/yr CO_{2e}

Total Engine CO_{2e} 6,298.7 tons/yr CO_{2e}

Total HAPS	2.96	tpy
Formaldehyde	2.32	tpy
Total - HCOH	0.639	tpy

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Caterpillar G3516

Unit Numbers:	3347 & 3346		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3516J		
Aspiration:	Turbo-charged		
Hours of Operation			8760
Rated Horsepower			1380
Fuel Type			Natural Gas
Engine Type			4SLB
Emission Facotr Set			GRI Literature Set

HAPs	Emission Factor (g/hp hr)	Emissions pph	tpy
Formaldehyde	0.17426	0.530	2.32
Acetaldehyde	0.0276	0.084	0.37
Acrolein	0.01696	0.052	0.23
Benzene	0.00145	0.004	0.02
Toluene	0.00135	0.004	0.02
Xylenes	0.00061	0.002	0.01
	Total:	0.68	2.96

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Caterpillar G3606

Unit Numbers:	3171, 3155, 3319, 3240, ENG-9, ENG-10		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3606A4		
Aspiration:	Turbo-charged		

Engine Horsepower and RPM

Engine speed:	1,000.0	rpm	Mfg data
Sea level hp:	1,875.0	hp	Mfg data

Fuel Consumption

BSFC:	6,815.0	Btu/hp-hr	Mfd data for LHV
Fuel heat value:	1,285.0	Btu/scf	Pipeline specification
Heat input:	12.78	MMBtu/hr	BSFC * site hp
Fuel consumption:	9.944	Mscf/hr	Heat input / fuel heat value
Annual fuel usage:	87.11	MMscf/yr	8760 hrs/yr operation

Exhaust Parameters

Exhaust temp (Tstk):	812	°F	Mfg data
Stack height:	23.0	ft	Engineering Estimate
Stack diameter:	1.50	ft	Engineering Estimate
Exhaust flow:	11846.0	acfm	Mfg data
Exhaust flow:	197.43	acfs	Mfg data
Exhaust velocity:	111.8	ft/sec	Exhaust flow ÷ stack area

Emission Calculations

Uncontrolled Emissions

NO_x	CO	NMNEHC[4]	SO_2[1]	H_2S[1]			
0.5	2.5	1.14	0.034	0.001	g/hp-hr	Mfg data	Engine data
			5		gr Total Sulfur/Mscf	Pipeline specification	
2.1	**10.5**	**5.5**	**0.14**	0.004	lb/hr	Hourly emission rate	
9.1	**45.8**	**24.3**	**0.62**	**0.02**	tpy	Annual emission rate (8760 hrs/yr)	

PM[2]	HCOH	Total HAPs[3]		
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.03	0.20	0.25	g/hp-hr	Mfg data
0.13	**0.8**	**1.0**	lb/hr	Hourly emission rate
0.6	**3.6**	**4.5**	tpy	Annual emission rate (8760 hrs/yr)

Controlled Emissions

NO_x	CO	NMNEHC[4]	SO_2[1]	H_2S[1]			
0.50	0.18	0.91	0.0	0.0	g/hp-hr	Mfg data	Catalyst data
			5		gr Total Sulfur/Mscf	Pipeline specification	
2.1	**0.7**	**3.94**	**0.14**	0.004	lb/hr	Hourly emission rate	
9.1	**3.2**	**17.2**	**0.62**	**0.02**	tpy	Annual emission rate (8760 hrs/yr)	

PM[2]	HCOH[3]	0.2896 Total HAPs[3]		
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.03	0.040	0.09	g/hp-hr	Mfg data
0.13	**0.165**	**0.36**	lb/hr	Hourly emission rate
0.6	**0.72**	**1.6**	tpy	Annual emission rate (8760 hrs/yr)

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf

0.00714 lb S/Mscf * fuel consumption (Mscf/hr) * 64 lb SO_2/32 lb S = lb SO2/hr

H_2S emissions based on 0.25 g H2S/100 scf, or 0.0004 lb H2S/Mscf in fuel

0.0004 lb H2S/Mscf fuel * fuel consumption (Mscf/hr) = lb H2S/hr

[2] It is assumed that TSP = PM_{10} = $PM_{2.5}$. The emission factor used is filterable plus condensable PM.

[3] Total HAPs is calculated using GRI-HAPCalc 3.01. The manufacturer HCOH emission factor was use on both the uncontrolled and controlled emission calculations and substituted total HAP emission calculations.

[4] VOC emission factor provided by the manufacturer is non-ethane, non-methane, non-formaldehyde. Formaldehyde emissions calculated in Hap-Calc were added to hourly and annual VOC total emissions.

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Caterpillar G3606 - Greenhouse Gas Emissions

Capacity:

12.8	MMBtu/hr.	Nameplate heat rate	(Manufacturers data)
15.33	MMBtu/hr.	Heat rate, max firing rate (20% safety factor added)	

Greenhouse Gases Emissions from Natural Gas Combustion

Tier 1

Subpart C- General Stationary Fuel Combustion Sources 98.30

40 CFR 98 (b)(1)(v) The Tier 1 Calculation Methodology: (v) May be used for natural gas combustion in a unit of any size, in cases where the annual natural gas consuption is obtained from fuel billing records in units of therm or mmBtu.

$CO_2 = 1 \times 10^{-3} \times Gas \times EF$ (Eq. C-1a)

where:

CO_2 = Annual CO_2 mass emission from natural gas combustion (metric ton).

Gas = Annual natural gas usage, from billing records (mmBtu)

EF = Fuel-specific default CO_2 emission factor for natural gas (kg CO_2/mmBtu)

Table C1 of this subpart = 53.02 (kg Co2/mmBtu)

Annual gas usage =

15.33	MMBtu	8,760	hrs	53.06	kg CO_2	1	Metric Ton
	hr		yr		MMBtu	1000	kg

CO_2 =	7,127.2	metric ton/yr
	7,854.2	ton (US)/yr

CH_4 or $N_2O = 1 \times 10\text{-}3 \times Fuel \times EF$ (Eq. C-8b)

where:

CH_4 or N_2O = Annual Emission from the combustion of natural gas (metric tons)

CH_4 = 1.0 x 10-3 kg CH_4/mmBtu

From Table C-2 To Subpart C of Part 68 - Default CH4 and N2O Emission Factors for Various Types of Fuel: Natural Gas

Annual gas usage =	15.33	MMBtu	8,760	hrs	1.00E-03	kg CH_4	1	Metric Ton
		hr		yr		MMBtu	1000	kg

CH_4 =	0.13	metric ton/yr
	0.15	ton (US)/yr

Converted to CO_{2e}	0.15	25	=	3.7	tons/yr CO_{2e}

N_2O = 1.0 x 10-4 kg N_2O/mmBtu

From Table C-2 To Subpart C of Part 68 - Default CH4 and N2O Emission Factors for Various Types of Fuel: Natural Gas

Annual gas usage =	15.33	MMBtu	8,760	hrs	1.00E-04	kg N_2O	1	Metric Ton
			hr		yr		MMBtu	1000	kg

N_2O=	0.013	metric ton/yr
	0.015	ton (US)/yr

Converted to CO_{2e}	0.01	298	=	4.4	tons/yr CO_{2e}

Total Engine CO_{2e} 7,862.3 tons/yr CO_{2e}

Gri-Hap Calcs 3.01		
Total HAPS	4.02	tpy
Formaldehyde	3.16	tpy
Total - HCOH	0.869	tpy

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Caterpillar G3606

Unit Numbers:	3171, 3155, 3319, 3240, ENG-9, ENG-10		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3606A4		
Aspiration:	Turbo-charged		
Hours of Operation			8760
Rated Horsepower			1875
Fuel Type			Natural Gas
Engine Type			4SLB
Emission Facotr Set			GRI Literature Set

HAPs	Emission Factor (g/hp hr)	Emissions pph	tpy
Formaldehyde	0.17426	0.720	3.16
Acetaldehyde	0.0276	0.114	0.50
Acrolein	0.01696	0.070	0.31
Benzene	0.00145	0.006	0.03
Toluene	0.00135	0.006	0.02
Xylenes	0.00061	0.003	0.01
	Total:	0.92	4.02

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Caterpillar G3608

Unit Numbers:	3338, 3339		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3608		
Aspiration:	Turbo-charged		

Engine Horsepower and RPM **Greenhouse Gas**

Engine speed:	1,000.0	rpm	Mfg data
Sea level hp:	2,500.0	hp	Mfg data

Fuel Consumption

BSFC:	6,760.0	Btu/hp-hr	Mfd data for LHV
Fuel heat value:	1,285.0	Btu/scf	Pipeline specification
Heat input:	16.90	MMBtu/hr	BSFC * site hp
Fuel consumption:	13.152	Mscf/hr	Heat input / fuel heat value
Annual fuel usage:	115.21	MMscf/yr	8760 hrs/yr operation

Exhaust Parameters

Exhaust temp (Tstk):	825	°F	Mfg data
Stack height:	23.0	ft	Engineering Estimate
Stack diameter:	1.50	ft	Engineering Estimate
Exhaust flow:	16023.0	acfm	Mfg data
Exhaust flow:	267.05	acfs	Mfg data
Exhaust velocity:	151.2	ft/sec	Exhaust flow ÷ stack area

Emission Calculations

Uncontrolled Emissions

NO_x	CO	NMNEHC[4]	SO_2[1]	H_2S[1]			
0.5	3.1	1.13	0.034	0.001	g/hp-hr	Mfg data	Engine data
			5		gr Total Sulfur/Mscf	Pipeline specification	
2.8	**17.1**	**7.5**	**0.19**	0.005	lb/hr	Hourly emission rate	
12.1	**74.8**	**32.8**	**0.82**	**0.02**	tpy	Annual emission rate (8760 hrs/yr)	

PM^2	HCOH	Total HAPs[3]		
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.03	0.23	0.28	g/hp-hr	Mfg data
0.17	**1.3**	**1.5**	lb/hr	Hourly emission rate
0.7	**5.6**	**6.7**	tpy	Annual emission rate (8760 hrs/yr)

Controlled Emissions

NO_x	CO	NMNEHC[4]	SO_2[1]	H_2S[1]			
0.50	0.22	0.85	0.0	0.0	g/hp-hr	Mfg data	Catalyst data
			5		gr Total Sulfur/Mscf	Pipeline specification	
2.8	**1.2**	**4.92**	**0.19**	0.005	lb/hr	Hourly emission rate	
6.1	**5.2**	**21.6**	**0.82**	**0.02**	tpy	Annual emission rate (8760 hrs/yr)	

PM^2	HCOH[3]	0.3430 Total HAPs[3]		
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.03	0.046	0.09	g/hp-hr	Mfg data
0.17	**0.254**	**0.52**	lb/hr	Hourly emission rate
0.7	**1.11**	**2.3**	tpy	Annual emission rate (8760 hrs/yr)

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf

0.00714 lb S/Mscf * fuel consumption (Mscf/hr) * 64 lb SO_2/32 lb S = lb SO2/hr

H_2S emissions based on 0.25 g H2S/100 scf, or 0.0004 lb H2S/Mscf in fuel

0.0004 lb H2S/Mscf fuel * fuel consumption (Mscf/hr) = lb H2S/hr

[2] It is assumed that TSP = PM_{10} = $PM_{2.5}$. The emission factor used is filterable plus condensable PM.

[3] Total HAPs is calculated using GRI-HAPCalc 3.01.

[4] VOC emission factor provided by the

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Caterpillar G3608 - Greenhouse Gas Emissions

Capacity:

16.9	MMBtu/hr.	Nameplate heat rate	(Manufacturers data)
20.28	MMBtu/hr.	Heat rate, max firing rate (20% safety factor added)	

es Emissions from Natural Gas Combustion Tier 1

Subpart C- General Stationary Fuel Combustion Sources 98.30 40 CFR 98

$CO_2 = 1 \times 10^{-3} \times Gas \times EF$ (Eq. C-1a)

where:

CO_2 = Annual CO_2 mass emission from natural gas combustion (metric ton).

Gas = Annual natural gas usage, from billing records (mmBtu)

EF = Fuel-specific default CO_2 emission factor for natural gas (kg CO_2/mmBtu)

Table C1 of this subpart = 53.02 (kg Co2/mmBtu)

Annual gas usage =

20.28	MMBtu	8,760	hrs	53.06	kg CO_2	1	Metric Ton
	hr		yr		MMBtu	1000	kg

CO_2 =	9,426.3	metric ton/yr
	10,387.7	ton (US)/yr

CH_4 or $N_2O = 1 \times 10\text{-}3 \times Fuel \times EF$ (Eq. C-8b)

where:

CH_4 or N_2O = Annual Emission from the combustion of natural gas (metric tons)

CH_4 = 1.0 x 10-3 kg CH_4/mmBtu From Table C-2 To

Annual gas usage =	20.28	MMBtu	8,760	hrs	1.00E-03	kg CH_4	1	Metric Ton
		hr		yr		MMBtu	1000	kg

CH_4 =	0.18	metric ton/yr
	0.20	ton (US)/yr

Converted to CO_{2e} 0.20 25 = 4.9 tons/yr CO_{2e}

N_2O = 1.0 x 10-4 kg N_2O/mmBtu From Table C-2 To Subpart C

Annual gas usage =	20.28	MMBtu	8,760	hrs	1.00E-04	kg N_2O	1	Metric Ton
			hr		yr		MMBtu	1000	kg

N_2O=	0.018	metric ton/yr
	0.020	ton (US)/yr

Converted to CO_{2e} 0.02 298 = 5.8 tons/yr CO_{2e}

Total Engine CO_{2e} 10,398.5 tons/yr CO_{2e}

Gri-Hap Calcs 3.01		
Total HAPS	5.36	tpy
Formaldehyde	4.21	tpy
Total - HCOH	1.16	tpy

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Caterpillar G3608

Unit Numbers:	3338, 3339		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3608		
Aspiration:	Turbo-charged		
Hours of Operation			8760
Rated Horsepower			2500
Fuel Type			Natural Gas
Engine Type			4SLB
Emission Facotr Set			GRI Literature Set

HAPs	Emission Factor (g/hp hr)	Emissions pph	tpy
Formaldehyde	0.17426	0.960	4.21
Acetaldehyde	0.0276	0.152	0.67
Acrolein	0.01696	0.093	0.41
Benzene	0.00145	0.008	0.04
Toluene	0.00135	0.007	0.03
Xylenes	0.00061	0.003	0.01
	Total:	1.22	5.36

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Dehydrator and Reboiler

Unit: Dehy-1 & RBL-1
Description: 30 MMscfd Dehy contactor, reboiler, Jatco BTEX condenser
Reboiler Portion 0.75 MMBtu/hr Glycol Dehydrator Reboiler
Dehy Portion Glycol Dehydrator (Still Vent and Flash Tank)

Control Equipment: Condenser, Reboiler

Reboiler Fuel Usage

Fuel Consumption	0.75	MMBtu/hr	Input heat rate	
Fuel heat value	1285	Btu/scf	Nominal LHV of fuel gas	
Hourly fuel usage	0.58	Mscf/hr	Fuel usage	Fuel Usage (MMBtu/hr) * (10^6 Btu/MMBtu) / Fuel LHV (Btu/scf) * (Mscf/1000 scf)
Fuel Throughput	14.01	Mscf/d	Throughput	
Annual fuel usage	5.11	MMscf/yr	Annual usage	
Operating hours	8760.00	hr/yr		

Uncontrolled Emissions - Glycol Dehydrator with Condenser (on Regenerator) & BTEX Buster

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	TSP		
	100	84	5.5			7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,020 Btu/scf)
Reboiler	126.0	105.8	6.9			9.6	lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
(DEHY-Reboiler-1)	0.07	0.06	0.004	**0.008**	0.02	0.006	lb/hr	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
	0.3	**0.3**	**0.018**	**0.04**	**0.09**	**0.024**	**tpy**	
	-	-	73.4	-	0.006	-	lb/hr	Promax (uncontrolled regenerator emissions)
Dehydrator	-	-	0.0	-	0	-	lb/hr	Promax (flash gas emissions)[3]
(DEHY-Vent-1)	**-**	**-**	**73.4**	**-**	**0.006**	**-**	**lb/hr**	
	-	**-**	**321.4**	**-**	**0.028**	**-**	**tpy**	**Total**

	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HCOH	Acetaldehyde	Total HAPs		
	0.0011	**0.0007**	**0.0007**	**0.0016**	**0.0009**	**0.0007**	**0.0005**	**0.011**	lb/hr	
Reboiler	0.005	0.003	0.003	0.007	0.004	0.003	0.002	0.047	tpy	GRI-HAPCalc Reboiler
(DEHY-Reboiler-1)	0.960	10.676	17.387	1.120	9.583	-	-	39.7	lb/hr	Promax (uncontrolled regenerator emissions)
Dehydrator	0.000	0.000	0.000	0.000	0.000	-	-	0.0	lb/hr	GRI-GLYCalc (flash gas emissions)[3]
(DEHY-Vent-1)	**0.960**	**10.676**	**17.387**	**1.120**	**9.583**	**-**	**-**	**39.7**	**lb/hr**	
	4.205	**46.760**	**76.157**	**4.907**	**41.972**	**-**	**-**	**174.0**	**tpy**	

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf
H_2S emissions based on 0.25 g H2S/100 scf, or 0.0004 lb H2S/Mscf in fuel
[3] Flash Gas is sent back to low pressure inlet.

Controlled Emissions - Glycol Dehydrator with Condenser (on Regenerator) & BTEX Buster

Flow to BTEX Buster	58	scf/hr	Promax - condenser to combustor
	0	scf/hr	Flash Tank off gas (routed to low pressure inlet)
	0.06	Mscf/hr	Total potential fuel routed to BTEX Buster (condenser overheads + flash tank off gas)

Combustor Control Efficiency 95%

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	TSP		
	100	84	5.5			7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,020 Btu/scf)
Reboiler (DEHY-Reboiler)	126.0	105.8	6.9	0.0		9.6	lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
	0.07	**0.06**	**0.004**	**0.008**	**0.02**	**0.006**	**lb/hr**	lb/MMscf * Mscf/hr /(1000 Mscf/1 MMscf)
	0.3	**0.3**	**0.018**	**0.037**	**0.091**	**0.02**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton
	0.000	0.000	0.693	0.000	0.000	0.0000	lb/hr	Promax (controlled regenerator emissions)
Dehydrator	0.000	0.000	0.000	0.000	0.000	0.000	lb/hr	Promax (flash gas emissions)[3]
(DEHY-Vent)	**0.000**	**0.000**	**0.693**	**0.000**	**0.000**	**0.000**	**lb/hr**	**Dehy-Vent**
	0.0	**0.0**	**3.04**	**0.00**	**0.001**	**0.000**	**tpy**	**Total**

	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HCOH	Acetaldehyde	Total HAPs		
	0.0011	**0.0007**	**0.0007**	**0.0016**	**0.0009**	**0.0007**	**0.0005**	**0.011**	lb/hr	
Reboiler (DEHY-Reboiler)	0.005	0.003	0.003	0.007	0.004	0.003	0.002	0.047	tpy	GRI-HAPCalc Reboiler
	0.007	0.049	0.025	0.000	0.004	-	-	0.086	lb/hr	Promax (controlled regenerator emissions)
Dehydrator	0.000	0.000	0.000	0.000	0.000	-	-	0.000	lb/hr	Promax (flash gas emissions)[3]
(DEHY-Vent)	**0.007**	**0.049**	**0.025**	**0.000**	**0.004**	**-**	**-**	**0.086**	**lb/hr**	Emission rate without safety factor
	0.03	**0.22**	**0.11**	**0.00**	**0.02**	**-**	**-**	**0.38**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf
0.00714 lb S/Mscf * fuel consumption (Mscf/hr) * 64 lb SO_2/32 lb S = lb SO2/hr
H_2S emissions based on 0.25 gr H2S/1000 scf * 1000scf/Mscf * 1lb/7000gr , or 0.03571 lb H2S/Mscf in fuel
0.03571 lb H2S/Mscf fuel * fuel consumption (Mscf/hr) = lb H2S/hr
[2] Flow to the BTEX Buster is burned as fuel.
[3] Flash Gas is sent back to low pressure inlet.

GHG Calculations

	CO_2[3]	N_2O[3]	CH_4[3]	CO_2e[3]		
	53.06	1.00E-04	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
Reboiler	1	298	25		GWP	40 CFR 98 Table A-1
(DEHY-Reboiler)	*384.3*	*0.0007*	*0.007*		tpy	Reboiler
	384.3	**0.22**	**0.18**	**384.7**	tpy CO_2e	
			4.252		tpy	Promax (controlled regenerator emissions)
			0.00		tpy	Promax (flash gas emissions)
Dehydrator			*4.25*		tpy	Promax (controlled regenerator emissions+flash tank off gas)
(DEHY-Vent)			**4.25**		tpy	Total
			106.3	**106.3**	tpy CO_2e	

[3] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb
CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Exhaust Parameters

Exhaust temp (Tstk):	600	°F	
Site Elevation:	3715	ft MSL	
Ambient pressure (Pstk):	26.09	in. Hg	Calculated based on elevation
F factor:	10610	wscf/MMB	40 CFR 60 Appx A Method 19
Exhaust flow	132.625	scfm	Calculated from F factor and heat rate
Exhaust flow:	310.035	acfm	scfm * (Pstd/Pstk)*(Tstk/Tstd), Pstd = 29.92 "Hg, Tstd = 520 °R
Stack diameter:	0.83333	ft	Estimated - typical
Stack height:	20	ft	Estimated - typical
Exhaust velocity:	9.5	ft/sec	Exhaust flow ÷ stack area

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Dehydrator and Reboiler

Unit: Dehy-2 & RBL-2
Description: 30 MMscfd Dehy contactor, reboiler, Jatco BTEX condenser
Reboiler Portion 0.75 MMBtu/hr Glycol Dehydrator Reboiler
Dehy Portion Glycol Dehydrator (Still Vent and Flash Tank)

Control Equipment: Condenser, Reboiler

Reboiler Fuel Usage

Fuel Consumption	0.75	MMBtu/hr	Input heat rate	
Fuel heat value	1285	Btu/scf	Nominal LHV of fuel gas	
Hourly fuel usage	0.58	Mscf/hr	Fuel usage	Fuel Usage (MMBtu/hr) * (10^6 Btu/MMBtu) / Fuel LHV (Btu/scf) * (Mscf/1000 scf)
Fuel Throughput	14.01	Mscf/d	Throughput	
Annual fuel usage	5.11	MMscf/yr	Annual usage	
Operating hours	8760.00	hr/yr		

Uncontrolled Emissions - Glycol Dehydrator with Condenser (on Regenerator) & BTEX Buster

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	TSP		
	100	84	5.5			7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,020 Btu/scf)
Reboiler (DEHY-Reboiler-2)	126.0	105.8	6.9			9.6	lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
	0.07	0.06	0.004	**0.008**	0.02	0.006	lb/hr	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
	0.3	**0.3**	**0.018**	**0.04**	**0.09**	**0.024**	**tpy**	
	-	-	73.4	-	0.006	-	lb/hr	Promax (uncontrolled regenerator emissions)
Dehydrator (DEHY-Vent-2)	-	-	0.0	-	0	-	lb/hr	Promax (flash gas emissions)[3]
	-	**-**	**73.4**	**-**	**0.006**	**-**	**lb/hr**	**Total**
	-	**-**	**321.4**	**-**	**0.028**	**-**	**tpy**	

	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HCOH	Acetaldehyde	Total HAPs		
Reboiler	**0.0011**	**0.0007**	**0.0007**	**0.0016**	**0.0009**	**0.0007**	**0.0005**	**0.011**	lb/hr	
(DEHY-Reboiler-2)	0.005	0.003	0.003	0.007	0.004	0.003	0.002	0.047	tpy	GRI-HAPCalc Reboiler
	0.96	10.7	17.4	1.12	9.6	-	-	39.7	lb/hr	Promax (uncontrolled regenerator emissions)
Dehydrator	0.0	0.0	0.0	0.0	0.0	-	-	0.0	lb/hr	Promax (flash gas emissions)[3]
(DEHY-Vent-2)	**0.96**	**10.7**	**17.4**	**1.1**	**9.6**	**-**	**-**	**39.7**	**lb/hr**	
	4.20	**46.76**	**76.16**	**4.91**	**41.97**	**-**	**-**	**174.00**	**tpy**	

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf
H_2S emissions based on 0.25 g H2S/100 scf, or 0.0004 lb H2S/Mscf in fuel
[3] Flash Gas is sent back to low pressure inlet.

Controlled Emissions - Glycol Dehydrator with Condenser (on Regenerator) & BTEX Buster

Flow to BTEX Buster	58	scf/hr	Promax - condenser to combustor
	0	scf/hr	Flash Tank off gas (routed to low pressure inlet)
	0.06	Mscf/hr	Total potential fuel routed to BTEX Buster (condenser overheads + flash tank off gas)

Combustor Control Efficiency 95%

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	TSP		
	100	84	5.5			7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,020 Btu/scf)
Reboiler (DEHY-Reboiler-2)	126.0	105.8	6.9	0.0		9.6	lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
	0.07	**0.06**	**0.004**	**0.008**	**0.02**	**0.006**	**lb/hr**	lb/MMscf * Mscf/hr /(1000 Mscf/1 MMscf)
	0.3	**0.3**	**0.018**	**0.037**	**0.091**	**0.02**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton
	0.000	0.000	0.693	0.000	0.000	0.0000	lb/hr	Promax (controlled regenerator emissions)
Dehydrator (DEHY-Vent-2)	0.000	0.000	0.0	0.000	0.000	0.000	lb/hr	Promax (flash gas emissions)[3]
	0.000	**0.000**	**0.693**	**0.000**	**0.000**	**0.000**	**lb/hr**	**Dehy-Vent**
	0.000	**0.000**	**3.035**	**0.000**	**0.001**	**0.000**	**tpy**	**Total**

	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HCOH	Acetaldehyde	Total HAPs		
Reboiler (DEHY-Reboiler)	**0.0011**	**0.0007**	**0.0007**	**0.0016**	**0.0009**	**0.0007**	**0.0005**	**0.011**	lb/hr	GRI-HAPCalc Reboiler
	0.005	0.003	0.003	0.007	0.004	0.003	0.002	0.047	tpy	
	0.007	0.049	0.025	0.000	0.004	-	-	0.086	lb/hr	Promax (controlled regenerator emissions)
Dehydrator (DEHY-Vent)	0.000	0.000	0.000	0.000	0.000	-	-	0.000	lb/hr	Promax (flash gas emissions)[3]
	0.007	**0.049**	**0.025**	**0.000**	**0.004**	**-**	**-**	**0.086**	**lb/hr**	Emission rate without safety factor
	0.031	**0.215**	**0.111**	**0.002**	**0.018**	**-**	**-**	**0.378**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf
0.00714 lb S/Mscf * fuel consumption (Mscf/hr) * 64 lb SO_2/32 lb S = lb SO2/hr
H_2S emissions based on 0.25 gr H2S/1000 scf * 1000scf/Mscf * 1lb/7000gr , or 0.03571 lb H2S/Mscf in fuel
0.03571 lb H2S/Mscf fuel * fuel consumption (Mscf/hr) = lb H2S/hr
[2] Flow to the BTEX Buster is burned as fuel.
[3] Flash Gas is sent back to low pressure inlet.

GHG Calculations

	CO_2[3]	N_2O[3]	CH_4[3]	CO_2e[3]		
	53.06	1.00E-04	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
Reboiler (DEHY-Reboiler)	1	298	25		GWP	40 CFR 98 Table A-1
	384.3	*0.0007*	*0.007*		tpy	Reboiler
	384.3	**0.22**	**0.18**	**384.7**	tpy CO_2e	
			4.252		tpy	Promax (controlled regenerator emissions)
			0.00		tpy	Promax (flash gas emissions)
Dehydrator (DEHY-Vent)			*4.25*		tpy	Promax (controlled regenerator emissions+flash tank off gas)
			4.25		tpy	Total
			106.3	**106.3**	tpy CO_2e	

[3] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb
CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Exhaust Parameters

Exhaust temp (Tstk):	600	°F	
Site Elevation:	3715	ft MSL	
Ambient pressure (Pstk):	26.09	in. Hg	Calculated based on elevation
F factor:	10610	wscf/MMB	40 CFR 60 Appx A Method 19
Exhaust flow	132.625	scfm	Calculated from F factor and heat rate
Exhaust flow:	310.035	acfm	scfm * (Pstd/Pstk)*(Tstk/Tstd), Pstd = 29.92 "Hg, Tstd = 520 °R
Stack diameter:	0.83333	ft	Estimated - typical
Stack height:	20	ft	Estimated - typical
Exhaust velocity:	9.5	ft/sec	Exhaust flow ÷ stack area

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Dehydrator and Reboiler

Unit: Dehy-3 & RBL-3
Description: 20 MMscfd Dehy contactor, reboiler, Jatco BTEX condenser
Reboiler Portion 0.75 MMBtu/hr Glycol Dehydrator Reboiler
Dehy Portion Glycol Dehydrator (Still Vent and Flash Tank)

Control Equipment: Condenser

Reboiler Fuel Usage

Fuel Consumption	0.75	MMBtu/hr	Input heat rate	
Fuel heat value	1285	Btu/scf	Nominal LHV of fuel gas	
Hourly fuel usage	0.58	Mscf/hr	Fuel usage	Fuel Usage (MMBtu/hr) * (10^6 Btu/MMBtu) / Fuel LHV (Btu/scf) * (Mscf/1000 scf)
Fuel Throughput	14.01	Mscf/d	Throughput	
Annual fuel usage	5.11	MMscf/yr	Annual usage	
Operating hours	8760.00	hr/yr		

Uncontrolled Emissions - Glycol Dehydrator with Condenser (on Regenerator) & BTEX Buster

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	TSP		
	100.00	84.00	5.50			7.60	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,020 Btu/scf)
Reboiler	125.98	105.82	6.93			9.57	lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
(DEHY-Reboiler-3)	0.07	0.06	0.00	**0.01**	0.02	0.01	lb/hr	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
	0.32	**0.27**	**0.02**	**0.04**	**0.09**	**0.02**	**tpy**	
	-	-	73.72	-	0.01	-	lb/hr	Promax (uncontrolled regenerator emissions)
Dehydrator	-	-	0.00	-	-	-	lb/hr	Promax (flash gas emissions)[3]
(DEHY-Vent-3)	**-**	**-**	**73.72**	**-**	**0.01**	**-**	**lb/hr**	**Total**
	-	**-**	**322.91**	**-**	**0.04**	**-**	**tpy**	

	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HCOH	Acetaldehyde	Total HAPs		
Reboiler	**0.0011**	**0.0007**	**0.0007**	**0.0016**	**0.0009**	**0.0007**	**0.0005**	**0.011**	lb/hr	
(DEHY-Reboiler-1)	0.005	0.003	0.003	0.007	0.004	0.003	0.002	0.047	tpy	GRI-HAPCalc Reboiler
	1.02	11.03	16.98	1.06	8.85	-	-	38.94	lb/hr	
Dehydrator										Promax (uncontrolled regenerator emissions)
(DEHY-Vent-3)	0.00	0.00	0.00	1.00	2.00	-	-	0.00	lb/hr	GRI-GLYCalc (flash gas emissions)[3]
	1.02	**11.03**	**16.98**	**2.06**	**10.85**	**-**	**-**	**38.94**	**lb/hr**	
	4.48	**48.30**	**74.39**	**9.01**	**47.52**	**-**	**-**	**170.56**	**tpy**	

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf
H_2S emissions based on 0.25 g H2S/100 scf, or 0.0004 lb H2S/Mscf in fuel
[3] Flash Gas is sent back to low pressure inlet.

Controlled Emissions - Glycol Dehydrator with Condenser (on Regenerator) & BTEX Buster

Flow to BTEX Buster	57.92	scf/hr	Promax - condenser to combustor
	0.00	scf/hr	Flash Tank off gas (routed to low pressure inlet)
	0.06	Mscf/hr	Total potential fuel routed to BTEX Buster (condenser overheads + flash tank off gas)

Combustor Control Efficiency 0.95

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	TSP		
	100.00	84.00	5.50			7.60	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,020 Btu/scf)
Reboiler (DEHY-Reboiler-3)	125.98	105.82	6.93	0.00		9.57	lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
	0.07	**0.06**	**0.00**	**0.01**	**0.02**	**0.01**	**lb/hr**	lb/MMscf * Mscf/hr /(1000 Mscf/1 MMscf)
	0.32	**0.27**	**0.02**	**0.04**	**0.091**	**0.02**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton
	0.00	0.00	0.73	0.00	0.00	0.00	lb/hr	Promax (controlled regenerator emissions)
Dehydrator	0.00	0.00	0.00	0.00	0.00	0.00	lb/hr	Promax (flash gas emissions)[3]
(DEHY-Vent-3)	**0.00**	**0.00**	**0.73**	**0.00**	**0.00**	**0.00**	**lb/hr**	**Dehy-Vent**
	0.00	**0.00**	**3.21**	**0.00**	**0.00**	**0.00**	**tpy**	**Total**

	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HCOH	Acetaldehyde	Total HAPs		
	1.41E-03	7.48E-04	1.02E-03	2.11E-03	1.32E-03	8.44E-04	7.38E-04			Emission Factor (lb/MMBtu)[4]
Reboiler	**0.0011**	**0.0007**	**0.0007**	**0.0016**	**0.0009**	**0.0007**	**0.0005**	**0.011**	lb/hr	
(DEHY-Reboiler-3)	0.005	0.003	0.003	0.007	0.004	0.003	0.002	0.047	tpy	
	0.01	0.05	0.03	0.00	0.00	-	-	0.09	lb/hr	Promax (controlled regenerator emissions)
Dehydrator	0.00	0.00	0.00	0.00	0.00	-	-	0.00	lb/hr	Promax (flash gas emissions)[3]
(DEHY-Vent-3)	**0.01**	**0.05**	**0.03**	**0.0005**	**0.004**	**-**	**-**	**0.09**	**lb/hr**	Emission rate without safety factor
	0.03	**0.23**	**0.11**	**0.0021**	**0.017**	**-**	**-**	**0.40**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf
0.00714 lb S/Mscf * fuel consumption (Mscf/hr) * 64 lb SO_2/32 lb S = lb SO2/hr
H_2S emissions based on 0.25 gr H2S/1000 scf * 1000scf/Mscf * 1lb/7000gr , or 0.03571 lb H2S/Mscf in fuel
0.03571 lb H2S/Mscf fuel * fuel consumption (Mscf/hr) = lb H2S/hr
[2] Flow to the BTEX Buster is burned as fuel.
[3] Flash Gas is sent back to low pressure inlet.
[4] HAP emission factor from GRI-HAPCalc

GHG Calculations

	CO_2[3]	N_2O[3]	CH_4[3]	CO_2e[3]		
	53.06	0.0001	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
Reboiler	1	298	25		GWP	40 CFR 98 Table A-1
(DEHY-Reboiler-3)	*384.3*	*0.0007*	*0.007*		tpy	Reboiler
	384.3	**0.22**	**0.18**	**384.7**	tpy CO_2e	
			4.121		tpy	Promax (controlled regenerator emissions)
Dehydrator			0.00		tpy	Promax (flash gas emissions)
(DEHY-Vent-3)			*4.12*		tpy	Promax (controlled regenerator emissions+flash tank off gas)
			4.12		tpy	Total
			103.0	**103.0**	tpy CO_2e	

[3] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb
CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Exhaust Parameters

Exhaust temp (Tstk):	600	°F	
Site Elevation:	3715	ft MSL	
Ambient pressure (Pstk):	26.09	in. Hg	Calculated based on elevation
F factor:	10610	wscf/MMB	40 CFR 60 Appx A Method 19
Exhaust flow	132.625	scfm	Calculated from F factor and heat rate
Exhaust flow:	310.035	acfm	scfm * (Pstd/Pstk)*(Tstk/Tstd), Pstd = 29.92 "Hg, Tstd = 520 °R
Stack diameter:	0.83333	ft	Estimated - typical
Stack height:	20	ft	Estimated - typical
Exhaust velocity:	9.5	ft/sec	Exhaust flow ÷ stack area

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Amine Unit and Amine Reboilers

Unit: AU-1, AU-Rb 1, and AU-Rb 2

Description:

Reboiler Portion 15.0 MMBtu/hr Amine Reboiler

Dehy Portion 350 gpm Amine Unit

Control Equipment: Reboilers and Flare

Reboiler Fuel Usage

Fuel Consumption	15.00	MMBtu/hr	Input heat rate	
Fuel heat value	1285	Btu/scf	Nominal LHV of fuel gas	
Hourly fuel usage	11.67	Mscf/hr	Fuel usage	Fuel Usage (MMBtu/hr) * (10^6 Btu/MMBtu) / Fuel LHV (Btu/scf) * (Mscf/1000 scf)
Fuel Throughput	280.16	Mscf/d	Throughput	
Annual fuel usage	102.26	MMscf/yr	Annual usage	
Operating hours	8760.00	hr/yr		

Uncontrolled Emissions - Amine Unit and Amine Reboilers

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	TSP		
Reboilers (AU-RB 1 and AU-RB 2)	100	84	5.5			7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,020 Btu/scf)
	126.0	105.8	6.9			9.6	lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
	1.47	1.24	0.081	**0.167**	0.42	0.112	lb/hr	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
	6.4	**5.4**	**0.354**	**0.73**	**1.83**	**0.490**	**tpy**	
Uncontrolled Amine Unit Vent Gas[3]	-	-	63.6	-	4.46E-01	-	lb/hr	Promax (uncontrolled vent gas emissions)
	-	-	0.0	-	-	-	lb/hr	Promax (flash gas emissions)[3]
	-	**-**	**63.6**	**-**	**0.446**	**-**	**lb/hr**	**Total**
	-	**-**	**278.7**	**-**	**1.952**	**-**	**tpy**	

	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HCOH	Acetaldehyde	Total HAPs		
Reboilers (AU-RB 1 and AU-RB 2)	0.0014	0.0007	0.0010	0.0021	0.0013	0.0008	0.0007		lb/MMBtu	GRI-HAPCalc Reboiler Emission Factors
	0.0211	**0.0112**	**0.0152**	**0.0317**	**0.0198**	**0.0127**	**0.0111**	**0.123**	lb/hr	
	0.092	**0.049**	**0.067**	**0.139**	**0.087**	**0.055**	**0.048**	**0.54**	tpy	
Uncontrolled Amine Unit Vent Gas[3]	0.14	10.3	11.8	0.41	4.7	-	-	27.3	lb/hr	Promax (uncontrolled vent gas emissions)
	0.0	0.0	0.0	0.0	0.0	-	-	0.0	lb/hr	Promax (flash gas emissions)[2]
	0.14	**10.3**	**11.8**	**0.4**	**4.7**	**-**	**-**	**27.3**	**lb/hr**	
	0.6	**45.0**	**51.6**	**1.8**	**20.4**	**-**	**-**	**119.4**	**tpy**	

Controlled Emissions - Amine Unit and Amine Reboiler [3]

Flare Destruction Efficiency: 98%

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	TSP		
Reboilers (AU-RB 1 and AU-RB 2)	100	84	5.5			7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,020 Btu/scf)
	126.0	105.8	6.9	0.0		9.6	lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
	1.47	**1.24**	**0.081**	**0.167**	**0.42**	**0.112**	**lb/hr**	lb/MMscf * Mscf/hr /(1000 Mscf/1 MMscf)
	6.4	**5.4**	**0.354**	**0.730**	**1.83**	**0.49**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton
Controlled Amine Unit Vent Gas	0.000	0.000	1.273	0.000	8.91E-03	0.0000	lb/hr	
	0.000	0.000	0.0	0.000	0.000	0.000	lb/hr	**Controlled Amine Emissions Presented Under Flaring Pathway**
	0.000	**0.000**	**1.273**	**0.000**	**0.009**	**0.000**	**lb/hr**	
	0.0	**0.0**	**5.57**	**0.00**	**0.039**	**0.000**	**tpy**	

	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HCOH	Acetaldehyde	Total HAPs		
Reboilers (AU-RB 1 and AU-RB 2)	1.41E-03	7.48E-04	1.02E-03	2.11E-03	1.32E-03	8.44E-04	7.38E-04		Emission Factor (lb/MMBtu)[4]	
	0.0211	**0.0112**	**0.0152**	**0.0317**	**0.0198**	**0.0127**	**0.0111**	**0.12**	lb/hr	GRI-HAPCalc Reboiler
	0.092	**0.049**	**0.067**	**0.139**	**0.087**	**0.055**	**0.048**	**0.54**	tpy	
Controlled Amine Unit Vent Gas	0.003	0.205	0.236	0.008	0.093	-	-	0.545	lb/hr	**Controlled Amine Emissions Presented Under Flaring Pathway**
	0.000	0.000	0.000	0.000	0.000	-	-	0.000	lb/hr	
	0.003	**0.205**	**0.236**	**0.008**	**0.093**	**-**	**-**	**0.545**	**lb/hr**	
	0.01	**0.90**	**1.03**	**0.04**	**0.41**	**-**	**-**	**2.39**	**tpy**	

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf
0.00714 lb S/Mscf * fuel consumption (Mscf/hr) * 64 lb SO_2/32 lb S = lb SO2/hr
H_2S emissions based on 0.25 gr H2S/1000 scf * 1000scf/Mscf * 1lb/7000gr , or 0.03571 lb H2S/Mscf in fuel
0.03571 lb H2S/Mscf fuel * fuel consumption (Mscf/hr) = lb H2S/hr

[2] Flash Gas is sent back to low pressure inlet.

[3] Controlled Amine System emissions presented under FL-1 pathway

[4] HAP emission factor from GRI-HAPCalc

Exhaust Parameters

Exhaust temp (Tstk):	600	°F	
Site Elevation:	3715	ft MSL	
Ambient pressure (Pstk):	26.09	in. Hg	Calculated based on elevation
F factor:	10610	wscf/MMB	40 CFR 60 Appx A Method 19
Exhaust flow	2652.5	scfm	Calculated from F factor and heat rate
Exhaust flow:	6200.69	acfm	scfm * (Pstd/Pstk)*(Tstk/Tstd), Pstd = 29.92 "Hg, Tstd = 520 °R
Stack diameter:	1.83333	ft	Estimated - typical
Stack height:	30	ft	Estimated - typical
Exhaust velocity:	39.1	ft/sec	Exhaust flow ÷ stack area

GHG Calculations

	CO_2[3]	N_2O[3]	CH_4[3]	CO_2e[3]		
Reboiler (AU-RB)	53.06	0.0001	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
	1	298	25		GWP	40 CFR 98 Table A-1
	7685.3	*0.0145*	*0.145*		tpy	Reboiler
	7685.3	**4.32**	**3.62**	**7693.3**	tpy CO_2e	
Controlled Amine Unit Vent Gas			0.000		tpy	Promax (uncontrolled vent gas emissions)
			0.00		tpy	Promax (flash gas emissions)[3]
			0.00		tpy	Promax (uncontrolled regenerator emissions+flash tank off gas)
			0.00		tpy	Total
			0.0	**0.0**	tpy CO_2e	

[3] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb
CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Control Flare Emissions

General Information		
(1) Flare Name:	Control Flare	
(2) Flare EPN:	FL-1	
(3) What kind of device is this? Pick from list.	non-steam assisted flare with LOW Btu stream flared	
	Emission Factors for Waste Gas Stream(s) (lb/MMBtu)	
	NOx 0.0641	
	CO 0.5496	
(4) Is there one or more pilot streams fired with pipeline quality natural gas or propane? Pick Yes or No. Follow instructions below.	No	
	Please move on to next question below.	
	Emission Factors for Pilot Stream (lb/MMscf)	
	NOx 0	
	CO 0	
(5) Is there one or more pilot streams fired with field gas? Pick Yes or No. Follow instructions below.	Yes	
	Enter pilot stream information into the boxes in the column for Stream No. 1 below. If	
	Emission Factors for Pilot Stream (lb/MMBtu)	
	NOx 0.0641	
	CO 0.5496	
(6) Is there an added fuel stream made up of pipeline quality natural gas or propane? Pick Yes or No. Follow instructions below.	No	
	Please move on to next question below.	
	Emission Factors for Added Fuel Stream (lb/MMscf)	
	NOx 0	
	CO 0	
(7) Is there an added fuel stream made up of field gas? Pick Yes or No. Follow instructions below.	Yes	
	Enter added fuel stream information into the boxes in the column for Steam No. 2	
	Emission Factors for Added Fuel Stream (lb/MMBtu)	
	NOx 0.0641	
	CO 0.5496	
(8) VOC percent destruction efficiency (%)	98	
(9) propane percent destruction efficiency (%) *OPTIONAL*		
(10) H_2S percent destruction efficiency (%)	98	
(11) Which is utilized for this device?	continuous pilot	

Emission Factors

Emission Factors from AP-42 Table 1.4-1 and 1.4-2 (lb/MMscf)

NOx	100
CO	84
PM (Total)	7.6

Emission Factors from TCEQ Guidance (lb/MMBtu)

Non-steam assisted, high Btu		Steam assisted, high Btu	
NOx	0.138	NOx	0.0485
CO	0.2755	CO	0.3503
Non-steam assisted, low Btu		Steam assisted, low Btu	
NOx	0.0641	NOx	0.068
CO	0.5496	CO	0.3465

Emission Factors from AP-42 Table 1.4-3 (lb/MMscf)

SO_2	0.6
VOC	5.5
benzene	2.10E-03
propane	1.60

Constants

Btu/MMBtu	1,000,000
scf/MMscf	1,000,000
lb/ton	2,000
H_2S molecular weight	34.08
SO_2 molecular weight	64.06
seconds/hour	3,600
inches/ft	12

Stream Sent to Flare/Vapor Combustor No.	1	2	3	4	5	6	7	8	9	10	11	12	Total
Stream Sent to Flare/Vapor Combustor Name (Enter Names of Each Stream Here)	pilot(s)	Assist Gas	Amine Vent Gas										-
Maximum Expected Hourly Volumtric Flow Rate of Stream (scf/hr)	195	20833.33	104166.67										125,195.00
Amount of Time Stream Fired (hrs/yr)	8,760	8,760	8,760										-
Maximum Expected Annual Volumtric Flow Rate of Stream (scf/yr)	1,708,200	182,500,000	912,500,000										1,096,708,200.00
Heat Value of Stream - from program results or gas analysis (Btu/scf) [1]	1,160	1,160	45										-
propane weight percent of total stream (%) *OPTIONAL*	7.37	7.37	0.19										-
VOC weight percent of total stream (%) *OPTIONAL*	11.47	11.47	0.38										-

Minimum Heat Value Requirement	
Total Stream Heat Value (weighted with hourly volumetric flow rates, Btu/scf)	270
Total Stream Heat Value (weighted with annual volumetric flow rates, Btu/scf)	270

Hourly (lb/hr)

Stream Sent to Flare/Vapor Combustor No.	1	2	3	4	5	6	7	8	9	10	11	12	Total
Stream Sent to Flare/Vapor Combustor Name	pilot(s)	Assist Gas	Amine Vent Gas										-
H2S	-	-	0.45										0.45
Crude or Condensate VOC	-	-											
Natural Gas VOC	-	-											
Total VOC	-	-	63.64										63.64
benzene	-	-	10.27										10.27
Toluene	-	-	11.78										
Xylenes	-	-	4.65										
Ethylbenzene			0.41										

Annual (tpy)

H2S	-	-	1.95		-	-							1.95
Crude or Condensate VOC	-	-	0.00		-	-							
Natural Gas VOC	-	-	0.00		-	-							
Total VOC	-	-	278.73		-	-							278.73
benzene	-	-	44.98		-	-							44.98
Toluene	-	-	51.59										
Xylenes			20.38										
Ethylbenzene			1.81										

Controlled Emissions

Hourly (lb/hr)

Stream Sent to Flare/Vapor Combustor No.	1	2	3	4	5	6	7	8	9	10	11	12	Total
Stream Sent to Flare/Vapor Combustor Name	pilot(s)	Assist Gas	Amine Vent Gas										-
NOx	0.014	1.549	0.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**1.86**
CO	0.124	13.278	2.572	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**15.97**
PM2.5	0.001	0.158	0.792	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.95**
PM10	0.001	0.158	0.792	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.95**
H2S	0.000	0.007	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.02**
SO2	0.000	0.013	0.838	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.85**
Crude or Condensate VOC	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.00**
Natural Gas VOC	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.00**
Total VOC	0.00	0.11	1.273	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**1.39**
benzene	0.000	0.000	0.205	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.21**
Toluene	-	-	0.236	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.24**
Xylenes	-	-	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.09**
Ethylbenzene	-	-	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.01**

Annual (tpy)

Stream Sent to Flare/Vapor Combustor No.	1	2	3	4	5	6	7	8	9	10	11	12	Total
Stream Sent to Flare/Vapor Combustor Name	pilot(s)	Assist Gas	Amine Vent Gas										-
NOx	0.063	6.783	1.314	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**8.16**
CO	0.544	58.158	11.267	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**69.97**
PM2.5	0.006	0.694	3.468	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**4.17**
PM10	0.006	0.694	3.468	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**4.17**
H2S	0.000	0.029	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.07**
SO2	0.001	0.055	3.668	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**3.72**
Crude or Condensate VOC	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.00**
Natural Gas VOC	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.00**
Total VOC	0.005	0.502	5.575	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**6.08**
benzene	0.000	0.000	0.900	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.90**
Toluene	-	-	1.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**1.03**
Xylenes	-	-	0.408	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.41**
Ethylbenzene	-	-	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.04**

Flare/Vapor Combustor Total Emissions

	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Crude or Condensate VOC	0.00	0.00
Natural Gas VOC	0.00	0.00
Total VOC	1.39	6.08
NOx	1.86	8.16
CO	15.97	69.97
PM2.5	0.95	4.17
PM10	0.95	4.17
H2S	0.02	0.07
SO2	0.85	3.72
benzene	0.21	0.90
Toluene	0.24	1.03
Xylenes	0.09	0.41
Ethylbenzene	<0.01	0.04

Lucid Energy Delaware, LLC: Big Lizard Compressor Station
Control Flare Emissions

Emission Units: 2-EP-2a, 3-EP-2a, 4-EP-2a, 5-EP-2a, and 6-EP-2a
§98.233(n) Flare stack GHG emissions.

Pilot & Purge Gas & SSM

Step 1. Calculate contribution of un-combusted CH_4 emissions

$E_{a,CH4}$ (un-combusted) = V_a * (1- η)* X_{CH4} *(Equation W-39B)*

where:

$E_{a,CH4}$ = contribution of annual un-combusted CH_4 emissions from regenerator in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf)

η = Fraction of gas combusted by a burning flare (or regenerator), default value from Subpart W = 0.98
For gas sent to an unlit flare, η is zero.

X_{CH4} = Mole fraction of CH_4 in gas to the flare = 0.1411 Inlet Gas Analysis 1.0 pilot +Purge gas[1]

Step 2. Calculate contribution of un-combusted CO_2 emissions

$E_{a,CO2}$ = V_a * X_{CO2} *(Equation W-20)*

where:

$E_{a,CO2}$ = contribution of annual un-combusted CO_2 emissions from regenerator in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf)

X_{CO2} = Mole fraction of CO_2 in gas to the flare = 0.741 Inlet Gas Analysis 0.0 pilot +Purge gas[1]

Step 3. Calculate contribution of combusted CO_2 emissions

$E_{a,CO2}$ (combusted) = ∑ (η * V_a * Y_j * R_j) *(Equation W-21)*

where:

η = Fraction of gas combusted by a burning flare (or regenerator) = 0.98
For gas sent to an unlit flare, η is zero.

V_a = volume of gas sent to combustion unit during the year (cf)

Y_j = mole fraction of gas hydrocarbon constituents j:

Constituent j, Methane =	0.1411	Gas Analysis
Constituent j, Ethane =	0.0260	
Constituent j, Propane =	0.0139	
Constituent j, Butane =	0.00540	
Constituent j, Pentanes Plus =	0.0015	

R_j = number of carbon atoms in the gas hydrocarbon constituent j:

Constituent j, Methane =	1
Constituent j, Ethane =	2
Constituent j, Propane =	3
Constituent j, Butane =	4
Constituent j, Pentanes Plus =	5

Step 4. Calculate GHG volumetric emissions at standard conditions (scf).

$$E_{s,n} = \frac{E_{a,n} * (459.67 + T_s) * P_a}{(459.67 + T_a) * P_s}$$ *(Equation W-33)*

where:

$E_{s,n}$ = GHG i volumetric emissions at standard temperature and pressure (STP) in cubic feet

$E_{a,n}$ = GHG i volumetric emissions at actual conditions (cf)

T_s = Temperature at standard conditions (F) = 60 F

T_a = Temperature at actual conditions (F) = 76 F (Based on Annual Avg Max Temperature for Hobbs, NM

P_s = Absolute pressure at standard conditions (psia) = 14.7 psia

P_a = Absolute pressure at actual conditions (psia) = 14.7 psia (Assumption)

Constant = 459.67 (temperature conversion from F to R)

Step 5. Calculate annual CH_4 and CO_2 mass emissions (ton).

$Mass_{s,i} = E_{s,i} * \rho_i * 0.0011023$ *(Equation W-36)*

where:

$Mass_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) mass emissions at standard conditions in tons (tpy)

$E_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) volumetric emissions at standard conditions (cf)

ρ_i = Density of GHG i. Use:

CH_4: 0.0192 kg/ft^3 (at 60F and 14.7 psia)

CO_2: 0.0526 kg/ft^3 (at 60F and 14.7 psia)

Step 6. Calculate annual N_2O emissions from portable or stationary fuel combustion sources under actual conditions (cf) using Equation W-40 .

$Mass_{N2O} = 0.0011023 * Fuel * HHV * EF$ *(Equation W-40)*

where:

$Mass_{N2O}$ = annual N_2O emissions from combustion of a particular type of fuel (tons).

Fuel = mass or volume of the fuel combusted

HHV = high heat value of the fuel

Pilot & Purge gas HHV = 0.0012 MMBtu/scf

Inlet Gas HHV = 4.49E-05 MMBtu/scf

EF = 1.00E-04 kg N_2O/MMBtu

10^{-3} = conversion factor from kg to metric tons.

Step 7. Calculate total annual emission from flare by summing Equations W-40, W-19, W-20, and W-21.

Gas Sent to Flare	Gas Sent to Flare (cf/yr)	CH_4 Un-Combusted, $E_{a,CH4}$ (cf)	CO_2 Un-Combusted, $E_{a,CO2}$ (cf)	CO_2 Combusted, $E_{a,CO2}$ (cf)	CH_4 Un-Combusted, $E_{a,CH4}$ (scf)	CO_2 Un-Combusted, $E_{a,CO2}$ (scf)	CO_2 Combusted, $E_{a,CO2}$ (scf)	CH_4 Un-Combusted, $E_{a,CH4}$ (tpy)	CO_2 Un-Combusted, $E_{a,CO2}$ (tpy)	CO_2 Combusted, $E_{a,CO2}$ (tpy)	N_2O Mass Emissions (tpy)	CO2e (tpy)
Pilot & Purge[1]	184,208,200	3684164	0	180,524,036	3,572,121	0	175,033,912	75.60	0.00	10,148.64	0.02355	12045.7
Amine System	912,500,000	2574254	676,446,896	235,850,985	2,495,965	655,874,691	228,678,250	52.83	38,028.26	13,258.99	0.00452	52609.2
Total	**1,096,708,200**	**6,258,418**	**676,446,896**	**416,375,021**	**6,068,086**	**655,874,691**	**403,712,162**	**128**	**38,028**	**23,408**	**0**	**64,655**

	CO_2	CH_4	N_2O
GWP	1	25	298

Note: [1] Pilot+purge fuel is pipeline quality and assumed to be methane.

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Facility Fugitives

Unit: Fug-1
Description: Facility Fugitive Emissions
Control Equipment: N/A

COMPONENT	CURRENT COUNT [1]	EPA[2] FACTOR (lb/hr-src)	REDUCTION ALLOWED FOR LDAR	% VOC IN STREAM[3]	VOC EMISSIONS (lb/hr)	VOC EMISSIONS (tpy)	% H_2S IN STREAM[3]	H_2S EMISSIONS (lb/hr)	H_2S EMISSIONS (tpy)	% CH6 IN STREAM[3]	% CH6 EMISSIONS (lb/hr)	% CH6 EMISSIONS (tpy)	% HAP IN STREAM[3]	% HAP EMISSIONS (lb/hr)	% HAP EMISSIONS (tpy)
Inlet Gas (gas)															
VALVES	310	9.9E-03	0%	29.5%	0.91	3.98	0.0006%	1.9E-05	8.3E-05	1.54%	4.7E-02	2.1E-01	0.28%	8.6E-03	3.8E-02
FLANGES	303	8.6E-04	0%	29.5%	0.077	0.34	0.0006%	1.6E-06	7.1E-06	1.54%	4.0E-03	1.8E-02	0.28%	7.3E-04	3.2E-03
CONNECTORS	75	4.4E-04	0%	29.5%	0.010	0.043	0.0006%	2.0E-07	8.9E-07	1.54%	5.1E-04	2.2E-03	0.28%	9.3E-05	4.1E-04
Open-ended Line	38	4.4E-03	0%	29.5%	0.05	0.21	0.0006%	1.0E-06	4.5E-06	1.54%	2.5E-03	1.1E-02	0.28%	4.6E-04	2.0E-03
COMPRESSOR SEALS	0	1.9E-02	0%	29.5%	-	-	0.0006%	-	-	1.54%	-	-	0.28%	-	-
PUMP SEALS	0	5.3E-03	0%	29.5%	-	-	0.0006%	-	-	1.54%	-	-	0.28%	-	-
Condensate (light oil)															
VALVES	100	5.5E-03	0%	97.760%	0.54	2.4	0.000000%	0.0E+00	0.0E+00	74.52%	4.1E-01	1.8E+00	29.76%	1.6E-01	7.2E-01
FLANGES	88	2.4E-04	0%	97.760%	2.1E-02	0.091	0.000000%	0.0E+00	0.0E+00	74.52%	1.6E-02	6.9E-02	29.76%	6.3E-03	2.8E-02
CONNECTORS	75	4.6E-04	0%	97.760%	3.4E-02	0.15	0.000000%	0.0E+00	0.0E+00	74.52%	2.6E-02	1.1E-01	29.76%	1.0E-02	4.5E-02
PUMP SEALS	0	2.9E-02	0%	97.760%	0.00	0.00	0.000000%	-	-	74.52%	-	-	29.76%	-	-
TOTAL EMISSIONS					1.64	7.17		2.19E-05	9.58E-05		5.06E-01	2.22E+00		1.90E-01	8.33E-01

[1] Fugitive emission source counts were calculated based on the types of field equipment at the facility and a general source count per equipment.

[2] Factors are from Protocol for Equipment Leak Emission Estimates from the EPA (Table 2-4).

[3] VOC and H_2S concentrations are based on ProMax output.

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

SSM/M Emissions

Unit: SSM/M
Description: Startup, Shutdown, Maintenance, and Malfunction Venting
Control Equipment: N/A

Compressor Blowdowns

Compressor	Number of Compressors	Volume per Compressor (scf/event)	Annual events per compresor[1]	Annual Release (scf/yr)	Hourly Volume (scf/hr)	Molecular Weight (lb/lb-mol)	HAP (wt%)	VOC (wt%)	H_2S (wt%)	VOC (lb/hr)	VOC (tpy)	H_2S (lb/hr)	H_2S (tpy)	HAP (lb/hr)	HAP (tpy)	Benzene (lb/hr)	Benzene (tpy)
Cat 3516	2	2136.3	40	170,907	4,273	22.6	0.281	23%	0.00050%	58.47	1.17	0.00	0.00000	0.71	0.01	0.28	0.01
Cat 3606	6	4272.7	37	948,535	25,636	22.6	0.281	23%	0.00050%	350.82	6.49	0.00	0.00000	4.29	0.08	1.68	0.03
Cat 3608	2	4272.7	40	341,814	8,545	22.6	0.281	23%	0.00050%	116.94	2.34	0.00	0.00000	1.43	0.03	0.56	0.01
JPSIB21.9NGP[3]	3	855.0	20	51,300	2,565	22.6	0.281	23%	0.00050%	35.10	0.35	0.00	0.00000	0.43	0.00	0.17	0.00
									Total:	561.33	10.35	0.00	0.00000	6.43	0.12	2.52	0.05
									Requested Limit [2]:	2.36	10.35	0.00	0.00000	6.43	0.12	2.52	0.05

1. Annual events account for malfunction and SSM event for the compresor blowdowns.
2. Requested limit is based on NMED guidanc documents that allow facilities 10 tpy of combined SSM and Malfunction.
3. Assuming conservatively the compressor volume to be 855 scf/event. Based on 1/5 volume of the Cat 3608

Basis of Calculation:
Emissions from venting activities are calculated based on a mass balance as follows:

Maximum Uncontrolled
Hourly Emissions (lb/hr) = [Volume of Gas Vented (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] / [379.5 (scf/lb-mol)]

Maximum
Uncontrolled Annual Emissions (tpy) = [Volume of Gas Vented (scf/yr)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated

*Volumes determined by field measurements of compressors.

Unit	Engine	ES, N (ft3)	lbs VOC per event	Events per year	lbs/year	TPY
ENG-1	Cat G3515	2135.3	29.2	40	1168.8	0.6
ENG-2	Cat G3516	2136.3	29.2	40	1169.4	0.6
ENG-3	Cat G3606	4272.7	58.5	37	2163.4	1.1
ENG-4	Cat G3606	4272.7	58.5	37	2163.4	1.1
ENG-5	Cat G3608	4272.7	58.5	40	2338.8	1.2
ENG-6	Cat G3608	4272.7	58.5	40	2338.8	1.2
ENG-7	Cat G3606	4272.7	58.5	37	2163.4	1.1
ENG-8	Cat G3606	4272.7	58.5	37	2163.4	1.1
ENG-9	Cat G3606	4272.7	58.5	37	2163.4	1.1
ENG-10	Cat G3606	4272.7	58.5	37	2163.4	1.1
GEN-1	JPSIB21.9NGI	855	11.7	20	234.0	0.1
GEN-2	JPSIB21.9NGI	855	11.7	21	245.7	0.1
GEN-3	JPSIB21.9NGI	855	11.7	22	257.4	0.1
				Total:		10.4

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Haul Road

Unit: Haul-1
Description: Haul Road
Control Equipment: N/A

Input Data

Empty vehicle weight[1]	16	tons
Load weight[2]	31.5	tons
Loaded vehicle[3]	47.5	tons
Mean vehicle weight[4]	31.8	tons
Vehicle frequency	0.5	trips/hour
Round-trip distance	0.40	mile/trip
Round-trip distance	48.86	miles/yr
Operating hours	8760	hours/yr
Surface silt content[5]	4.8	%
Annual wet days[6]	70	days/yr
Vehicle miles traveled[7]	0.20	mile/hr
Control percentage	0%	nominal, base course chemical treatment

Emission Factors and Constants

Parameter	PM_{30}	PM_{10}	$PM_{2.5}$
k, lb/VMT[8]	4.9	1.5	0.15
a, lb/VMT[8]	0.70	0.90	0.90
b, lb/VMT[8]	0.45	0.45	0.45
Hourly EF, lb/VMT[9]	7.46	1.90	0.19
Annual EF, lb/VMT[10]	6.03	1.54	0.15

Uncontrolled Emissions

PM_{30}	PM_{10}	$PM_{2.5}$	
1.5	0.38	0.04	lb/hr[11]
1.47E-01	3.75E-02	3.75E-03	ton/yr[12]

Notes

[1] Empty vehicle weight includes driver and occupants and full fuel load.
[2] Cargo, transported materials, etc. (8.3434 lb/gal RVP5 *7560 gal truck/ 2000lb/ton)
[3] Loaded vehicle weight = Empty + Load Size
[4] Mean Vehicle weight = (Loaded Weight + Empty Weight) / 2
[5] AP-42 Table 13.2.2-1, Sand and gravel processing
[6] AP-42 Figure 13.2.2-1
[7] VMT/hr = Vehicle Miles Traveled per hour = Trips per hour * Segment Length
[8] Table 13.2.2-2, Industrial Roads
[9] AP-42 13.2.2, Equation 1a
[10] AP-42 13.2.2, Equation 2
[11] lb/hr = Hourly EF (lb/VMT) * VMT (mile/hr)
[12] ton/yr = Annual EF (lb/VMT) * Truck/day * Mile/truck * 365day/yr * 1ton/2000lb
[13] Uncontrolled emissions * (1 - Control%)

Lucid Energy Delaware, LLC: Big Lizard Compressor Station

Condensate/Slop Oil/Water Loading

Unit: Load-1
Description: Loading Emissions
Control Equipment: N/A

Emissions Estimated by ProMax Simulation

	Annual Throughput (gal/yr)	VOC Emissions		H2S Emissions	
		lb/hr*	tpy*	lb/hr*	tpy*
TK-1	923419	1.45E-01	6.36E-01	-	-
TK-2	0	1.45E-01	6.36E-01	-	-
TK-3	0	1.45E-01	6.36E-01	-	-
TK-4	0	1.45E-01	6.36E-01	-	-

* Emission were provided by ProMax.

Facility Throughput:	60.2	bbl/day
	923419	gal/yr
	7560.00	gal/hr

Emissions Estimated by AP-42 5.2, Table 5.2-5

Emissions Factors (lb/1000 gal loaded)

Material Loaded:	Gasoline	Crude Oil	Jed Naphtha	Jet Kerosene	Oil No2.	Oil No6.
Splash Loading - Dedicated normal service	12	5	4	0.04	0.03	0.0003
Submerged Loading - Dedicated normal service	5	2	1.5	0.016	0.014	0.0001
lb/hr emissions*:	90.72	37.80	30.24	0.30	0.23	0.00
TPY emissions*:	5.54	0.05	0.04	0.00	0.00	0.00

Storage Tanks

Unit: Tk-1, Tk-2, Tk-3, Tk-4
Description: Facility Tanks
Control Equipment:

Facility Tank Summary

Tank Contents	Number of Tanks	Exemption
Methanol	1 (see below for calc)	20.2.72.202.B.5.NMAC
Glycol	2	20.2.72.202.B.2 NMAC
Lube Oil	10	20.2.72.202.B.2 NMAC
Antifreeze	2	20.2.72.202.B.2 NMAC
Amine	2	20.2.72.202.B.2 NMAC
Condensate	4	

Tank Emissions

Uncontrolled Annual Emissions

Unit	Tank Description	Annual Throughput (gal/yr)	W&B Losses (lb/hr)	W&B Losses (tpy)	Flash Losses (lb/hr)	Flash Losses (tpy)	Hourly VOC Emissions (lb/hr)	Annual VOC Emissions (tpy)
-	100 bbl Methanol [1, 2]	2,500	0.019	0.081	-	-	-	0.081
Tk-1	Condensate/Slop Oil [3]	923,419	6.55E-03	0.029	0.139	0.608	0.145	0.636
Tk-2	Condensate/Slop Oil [3]		6.55E-03	0.029	0.139	0.608	0.145	0.636
Tk-3	Condensate/Slop Oil [3]		6.55E-03	0.029	0.139	0.608	0.145	0.636
Tk-4	Condensate/Slop Oil [3]		6.55E-03	0.029	0.139	0.608	0.145	0.636

[1] Standing and working losses for the methanol tank were calculated using TANKS 4.0.9d.

[2] Methanol tank does not have flash losses.

[3] ProMax was used to calculate emissions for the condensate tanks.

Section 7

Information Used To Determine Emissions

Information Used to Determine Emissions shall include the following:

- **x** If manufacturer data are used, include specifications for emissions units and control equipment, including control efficiencies specifications and sufficient engineering data for verification of control equipment operation, including design drawings, test reports, and design parameters that affect normal operation.
- ☐ If test data are used, include a copy of the complete test report. If the test data are for an emissions unit other than the one being permitted, the emission units must be identical. Test data may not be used if any difference in operating conditions of the unit being permitted and the unit represented in the test report significantly effect emission rates.
- **x** If the most current copy of AP-42 is used, reference the section and date located at the bottom of the page. Include a copy of the page containing the emissions factors, and clearly mark the factors used in the calculations.
- ☐ If an older version of AP-42 is used, include a complete copy of the section.
- **x** If an EPA document or other material is referenced, include a complete copy.
- **x** Fuel specifications sheet.
- **x** If computer models are used to estimate emissions, include an input summary (if available) and a detailed report, and a disk containing the input file(s) used to run the model. For tank-flashing emissions, include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., permit or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis.

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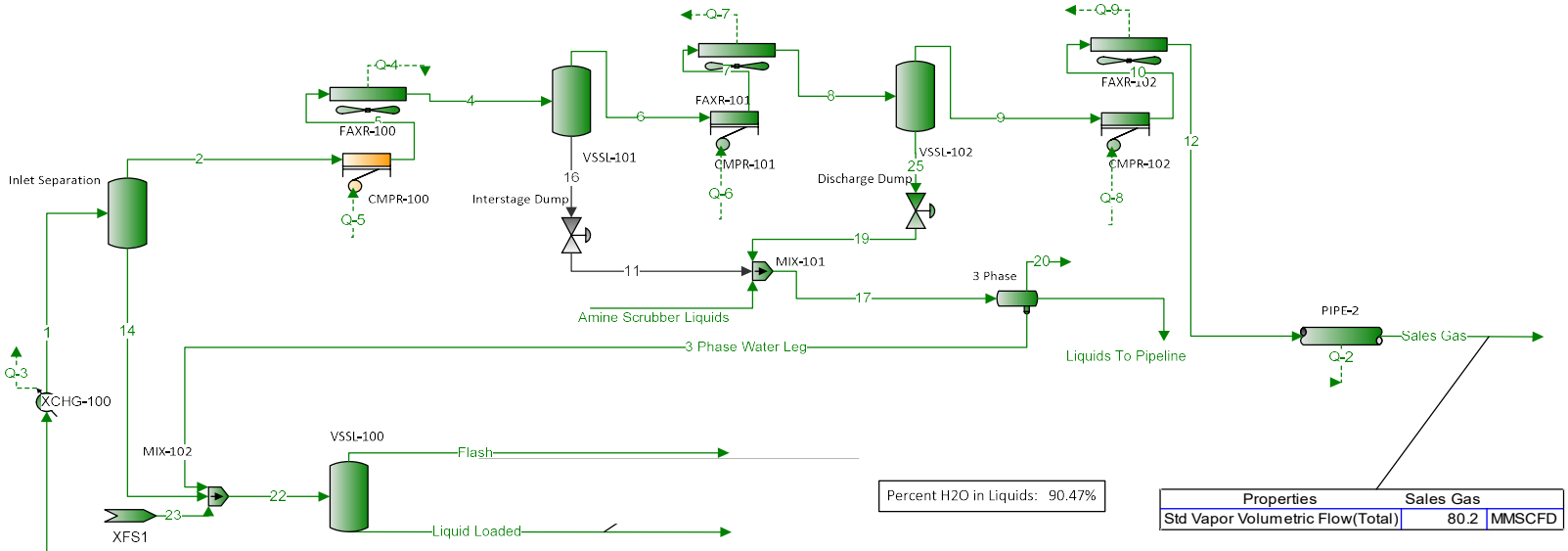
1. Gas analyses for the facility inlet streams;
2. Manufacturer's data sheets for compressor engines;
3. Tables C-1 and C-2 of 40 CFR 98, Subpart C for Greenhouse Gas emissions;
4. Tables 1.4-1 through 1.4-3 from AP-42 Section 1.4 for emission factors used for the Reboilers (RBL-1 – RBL-3; AU-RB1 – AU-RB2);
5. Unpaved Haul Road Emission Calculation Methodology from AP-42 Section 13.2.2 (HAUL);
6. Table 3.2-2 from AP-42 Section 3.2 for all other pollutants for the Compressor Engines;
7. Table 5.2-5 of AP-42 Section 5.2 for Truck Loading (LOAD);
8. TCEQ Emissions Factors for Equipment Leak Fugitive Components for Facility Fugitives (FUG);
9. HAPCalc simulation output for HAPs emitted from reboilers (RBL-1 – RBL-3);
10. Promax simulation output file for the compressor station's tank losses (TK-1 though TK-4);
11. Promax simulation output file for the amine system (AU-1);
12. Promax simulation output file for the dehydrator units (Dehy-1 through Dehy-3).

Big Lizard Compressor Station
80 MMscfd



Percent H2O in Liquids: 90.47%

Properties	Sales Gas	
Std Vapor Volumetric Flow(Total)	80.2	MMSCFD

Annual tank loss calculations for "22".
Total working and breathing losses from the Vertical Cylinder are 0.1147 ton/yr.
Flashing losses are 2.431 ton/yr.

* Only Non-Exempt VOCs are reported.

Tank Farm Emissions (4x400BBL)

Temperature(Total)	80.103	°F
Pressure(Total)	102.7	psia
Mole Fraction Vapor(Total)	100	%
Mole Fraction Light Liquid(Total)	0	%
Mole Fraction Heavy Liquid(Total)	0	%
Std Vapor Volumetric Flow(Total)	80	MMSCFD

Properties	3	
Std Vapor Volumetric Flow (Total)	80	MMSCFD

Names	Units	Liquid Loaded	23	22	14
Temperature	°F	61.333	80	61.326	55
Pressure	psia	14.696*	14.2	14.2	65
Volume Fraction Vapor	%	0	0	18.441	0
Volume Fraction Light Liquid	%	11.488	37.204	9.365	100
Volume Fraction Heavy Liquid	%	88.512	62.796	72.194	0
Mass Fraction Vapor	%	0	0	0.03847	0
Mass Fraction Light Liquid	%	9.4267	31.99	9.4195	100
Mass Fraction Heavy Liquid	%	90.573	68.01	90.542	0
Molecular Weight	lb/lbmol	19.496	24.223	19.5	18.024
Mass Flow	lb/h	628.89	186.14	629.1	278.87
Mass Volume	ft^3/lb	0.016409	0.017417	0.02011	0.016022
Std Vapor Volumetric Flow	MMSCFD	0.29378	0.069987	0.29383	0.14092
Std Liquid Volumetric Flow	sgpm	1.2881	0.403	1.2888	0.55773
Specific Gravity		0.97715	0.9206		1.0007
API Gravity		13.274	21.257		9.9877
Net Ideal Gas Heating Value	Btu/ft^3	88.383	371.63	88.639	0.1316
Net Liquid Heating Value	Btu/lb	745.85	5049.6	750.82	-1056.1
Water(Mass Fraction)	%	90.5	67.975	90.47	99.911
Water(Partial Molar Volumetric Flow)	bbl/d	39.013	8.6966	39.205	19.083
Water(Mass Flow)	lb/h	569.15	126.53	569.15	278.63
Hydrogen Sulfide(Mass Flow)	lb/h	0.00058188	0.00058871	0.00061366	1.1006e-05
Hydrogen Sulfide(Mass Flow)	ton/yr	0.0025487	0.0025786	0.0026878	4.8207e-05

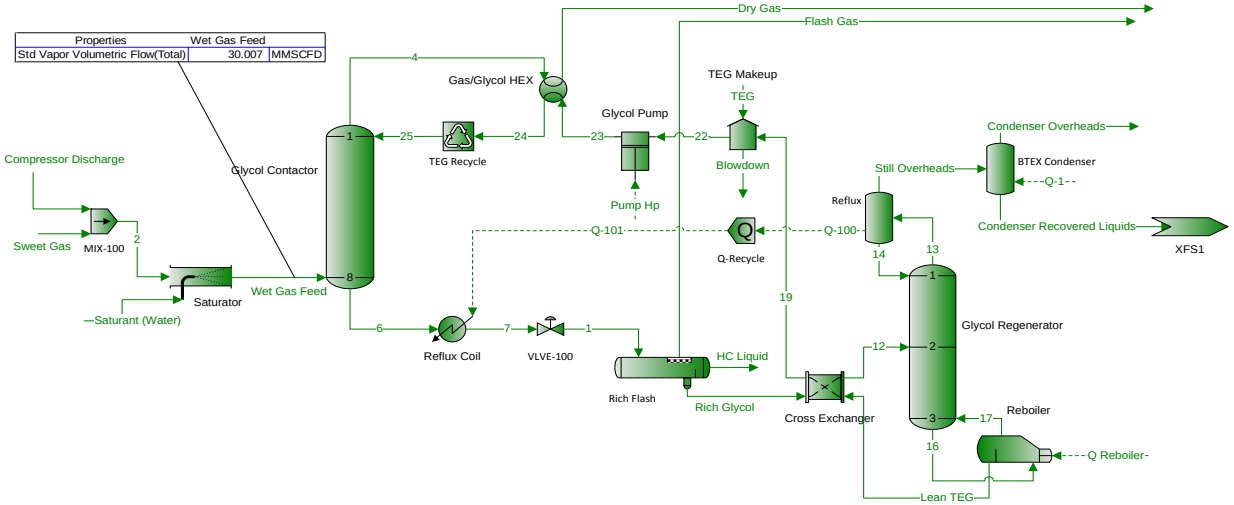
Big Lizard Compressor Station
30 MMSCFD Dehy Unit

"Flash Gas" HAPs = 0.6753 lb/h
"Flash Gas" HAPs = 2.958 ton/yr
"Flash Gas" VOCs = 27.03 lb/h
"Flash Gas" VOCs = 118.4 ton/yr

"Condenser Overheads" HAPs = 1.73 lb/h
"Condenser Overheads" HAPs = 7.578 ton/yr
"Condenser Overheads" VOCs = 13.86 lb/h
"Condenser Overheads" VOCs = 60.71 ton/yr
"Still Overheads" HAPs = 39.73 lb/h
"Still Overheads" HAPs = 174 ton/yr
"Still Overheads" VOCs = 73.43 lb/h
"Still Overheads" VOCs = 321.6 ton/yr

Names	Units	Wet Gas Feed	Dry Gas
Water Content	lbm/MMSCF	106.6	4.765

Properties	Wet Gas Feed	
Std Vapor Volumetric Flow(Total)	30.007	MMSCFD

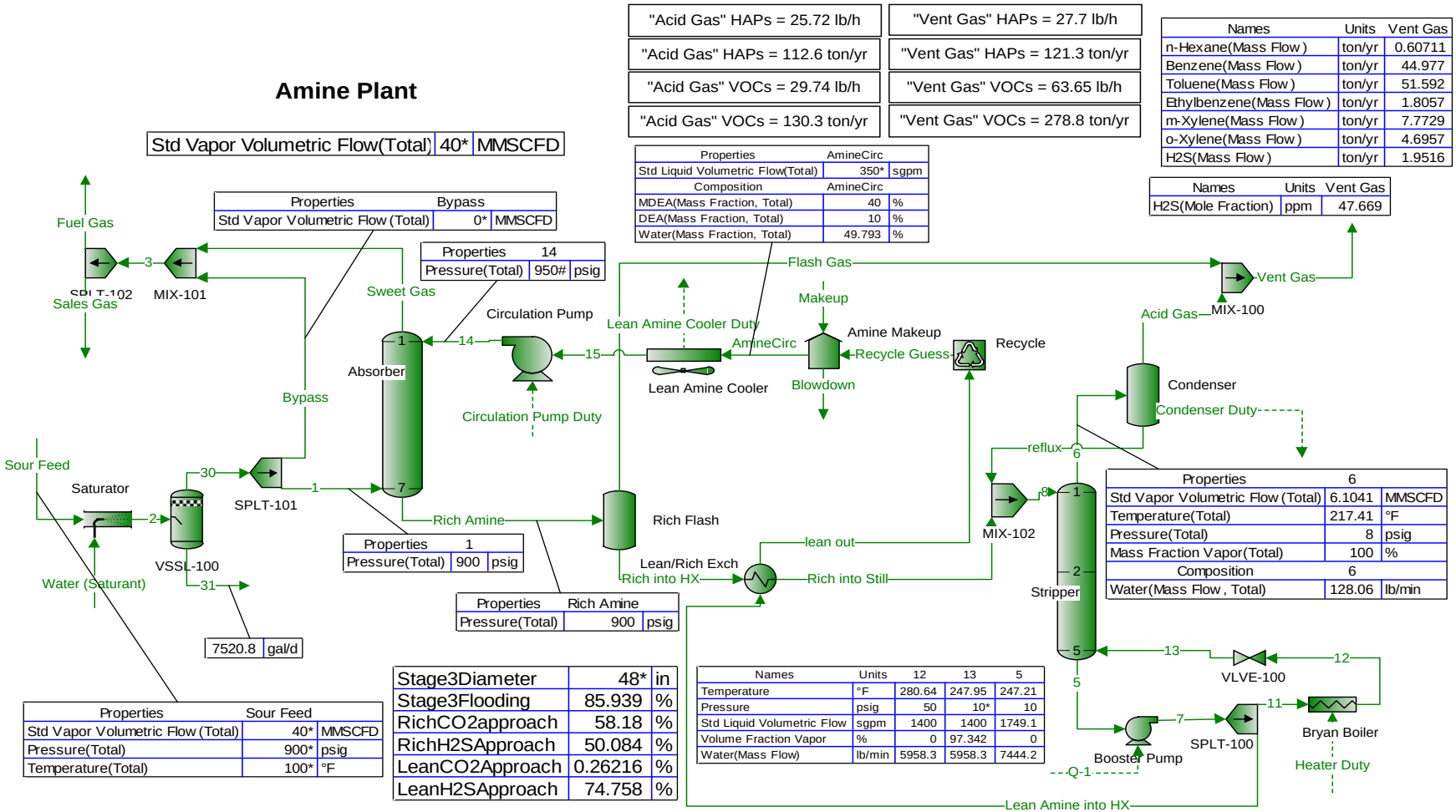


Names	Units	Condenser Recovered Liquids	Condenser Overheads	Still Overheads	Flash Gas	Sweet Gas	Compressor Discharge	Dry Gas
Temperature	°F	80	80*	205.1	123.4	124*	90*	126.6
Pressure	psia	14.2	14.2	14.7	59.7	910*	1015*	799.7
Volume Fraction Vapor	%	0	100	100	100	100	99.31	100
Volume Fraction Light Liquid	%	37.29	0	0	0	0	0.6941	0
Volume Fraction Heavy Liquid	%	62.71	0	0	0	0	0	0
Molecular Weight	lb/lbmol	24.24	43.63	25.23	28.38	21.07	23.72	21.27
Mass Flow	lb/h	185.9	17.87	203.8	57.58	6.386e+04	6250	6.986e+04
Std Vapor Volumetric Flow	MMSCFD	0.06984	0.00373	0.07357	0.01848	27.6*	2.4#	29.91
Std Liquid Volumetric Flow	sgpm	0.4026	0.06899	0.4716	0.2844	364.3	33.33	396.9
Net Ideal Gas Heating Value	Btu/ft^3	372.9	2204	465.8	1506	1124	1245	1135
Net Liquid Heating Value	Btu/lb	5065	1.901e+04	6288	2.002e+04	2.018e+04	1.984e+04	2.018e+04
Gross Ideal Gas Heating Value	Btu/ft^3	441	2391	539.8	1648	1239	1368	1250
Gross Liquid Heating Value	Btu/lb	6130	2.063e+04	7402	2.193e+04	2.225e+04	2.181e+04	2.225e+04

Names	Units	Q Reboiler	Q-100
Energy Rate	MBTU/h	576.9	15.55

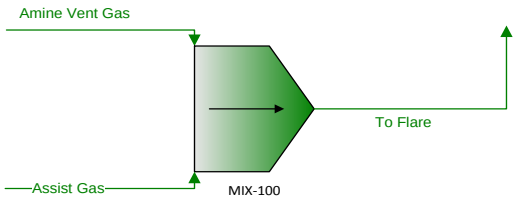
Names	Units	Flash Gas	Condenser Overheads	Still Overheads
Hydrogen Sulfide(Mass Flow)	lb/h	0.002204	0.005756	0.006345
Hydrogen Sulfide(Mass Flow)	ton/yr	0.009654	0.02521	0.02779
Benzene(Mass Flow)	lb/h	0.1769	0.9836	10.68
Benzene(Mass Flow)	ton/yr	0.7748	4.308	46.76
Toluene(Mass Flow)	lb/h	0.1553	0.5062	17.39
Toluene(Mass Flow)	ton/yr	0.68	2.217	76.16
Ethylbenzene(Mass Flow)	lb/h	0.006733	0.009737	1.12
Ethylbenzene(Mass Flow)	ton/yr	0.02949	0.04265	4.907
o-Xylene(Mass Flow)	lb/h	0.01239	0.02381	2.821
o-Xylene(Mass Flow)	ton/yr	0.05426	0.1043	12.36
m-Xylene(Mass Flow)	lb/h	0.02037	0.03021	3.504
m-Xylene(Mass Flow)	ton/yr	0.08921	0.1323	15.35
p-Xylene(Mass Flow)	lb/h	0.0203	0.02898	3.257
p-Xylene(Mass Flow)	ton/yr	0.08891	0.1269	14.27

Amine Plant


"Acid Gas" HAPs = 25.72 lb/h
"Vent Gas" HAPs = 27.7 lb/h
"Acid Gas" HAPs = 112.6 ton/yr
"Vent Gas" HAPs = 121.3 ton/yr
"Acid Gas" VOCs = 29.74 lb/h
"Vent Gas" VOCs = 63.65 lb/h
"Acid Gas" VOCs = 130.3 ton/yr
"Vent Gas" VOCs = 278.8 ton/yr
Std Vapor Volumetric Flow(Total) 40* MMSCFD
Properties Bypass
Std Vapor Volumetric Flow (Total) 0* MMSCFD
Properties 14
Pressure(Total) 950# psig
Properties AmineCirc
Std Liquid Volumetric Flow(Total) 350* sgpm
Composition AmineCirc
MDEA(Mass Fraction, Total) 40 %
DEA(Mass Fraction, Total) 10 %
Water(Mass Fraction, Total) 49.793 %
Names Units Vent Gas
n-Hexane(Mass Flow) ton/yr 0.60711
Benzene(Mass Flow) ton/yr 44.977
Toluene(Mass Flow) ton/yr 51.592
Ethylbenzene(Mass Flow) ton/yr 1.8057
m-Xylene(Mass Flow) ton/yr 7.7729
o-Xylene(Mass Flow) ton/yr 4.6957
H2S(Mass Flow) ton/yr 1.9516
Names Units Vent Gas
H2S(Mole Fraction) ppm 47.669
Fuel Gas
Sales Gas
SPLT-102
MIX-101
Sweet Gas
Circulation Pump
Flash Gas
Vent Gas
MIX-100
Makeup
Lean Amine Cooler Duty
Amine Makeup
Recycle
Acid Gas
Absorber
AmineCirc
Recycle Guess
Lean Amine Cooler
Blowdown
Condenser
Bypass
Circulation Pump Duty
Condenser Duty
reflux
Sour Feed
Saturator
SPLT-101
Rich Amine
Rich Flash
MIX-102
Properties 6
Std Vapor Volumetric Flow (Total) 6.1041 MMSCFD
Temperature(Total) 217.41 °F
Pressure(Total) 8 psig
Mass Fraction Vapor(Total) 100 %
Composition 6
Water(Mass Flow , Total) 128.06 lb/min
Properties 1
Pressure(Total) 900 psig
lean out
Rich into Still
Lean/Rich Exch
Rich into HX
Stripper
VSSL-100
Water (Saturant)
Properties Rich Amine
Pressure(Total) 900 psig
7520.8 gal/d
VLVE-100
Booster Pump
SPLT-100
Bryan Boiler
Heater Duty
Q-1
Lean Amine into HX
Properties Sour Feed
Std Vapor Volumetric Flow (Total) 40* MMSCFD
Pressure(Total) 900* psig
Temperature(Total) 100* °F
Stage3Diameter 48* in
Stage3Flooding 85.939 %
RichCO2approach 58.18 %
RichH2SApproach 50.084 %
LeanCO2Approach 0.26216 %
LeanH2SApproach 74.758 %
Names Units 12 13 5
Temperature °F 280.64 247.95 247.21
Pressure psig 50 10* 10
Std Liquid Volumetric Flow sgpm 1400 1400 1749.1
Volume Fraction Vapor % 0 97.342 0
Water(Mass Flow) lb/min 5958.3 5958.3 7444.2
Names Units Lean Amine into HX Rich Amine
Total Acid Gas Loading/Mole Amine 0.01091 0.32552
Names Units Sour Feed Sales Gas Fuel Gas Vent Gas Bypass Sweet Gas
Std Vapor Volumetric Flow MMSCFD 40* 36.839 0.7154# 2.4979 0* 37.555
Carbon Dioxide(Mole Fraction) % 5.645* 0.081251 0.081251 88.897 5.6508 0.081251
H2S(Mole Fraction) ppm 3* 0.0019019 0.0019019 47.669 2.9908 0.0019019
Names Units Heater Duty
Energy Rate MMBTU/h 24*

Big Lizard Compressor Station
Control Flare (FL-1)

"Amine Vent Gas" HAPs = 27.72 lb/h	"Assist Gas" HAPs = 15.52 lb/h	"To Flare" HAPs = 43.24 lb/h
"Amine Vent Gas" HAPs = 121.4 ton/yr	"Assist Gas" HAPs = 67.97 ton/yr	"To Flare" HAPs = 189.4 ton/yr
"Amine Vent Gas" VOCs = 63.67 lb/h	"Assist Gas" VOCs = 320.6 lb/h	"To Flare" VOCs = 384.3 lb/h
"Amine Vent Gas" VOCs = 278.9 ton/yr	"Assist Gas" VOCs = 1,404 ton/yr	"To Flare" VOCs = 1,683 ton/yr



Names	Units	Amine Vent Gas	Assist Gas	To Flare
Std Vapor Volumetric Flow	MMSCFD	2.5*	0.5*	3
Net Ideal Gas Heating Value	Btu/ft^3	44.93	1160	230.7
Gross Ideal Gas Heating Value	Btu/ft^3	53.02	1277	256.9
Carbon Dioxide(Mass Flow)	lb/h	1.074e+04*	7.248*	1.075e+04
Carbon Dioxide(Mass Flow)	ton/yr	4.704e+04*	31.75*	4.707e+04
Carbon Dioxide(Mole Fraction)	%	88.9*	0.3*	74.13
Hydrogen Sulfide(Mass Flow)	lb/h	0.449*	0*	0.449
Hydrogen Sulfide(Mass Flow)	ton/yr	1.967*	0*	1.967
Hydrogen Sulfide(Mole Fraction)	%	0.0048*	0*	0.004
Benzene(Mass Flow)	lb/h	10.27*	0*	10.27
Benzene(Mass Flow)	ton/yr	44.98*	0*	44.98
Toluene(Mass Flow)	lb/h	11.79*	0*	11.79
Toluene(Mass Flow)	ton/yr	51.62*	0*	51.62
Ethylbenzene(Mass Flow)	lb/h	0.408*	0*	0.408
Ethylbenzene(Mass Flow)	ton/yr	1.787*	0*	1.787
p-Xylene(Mass Flow)	lb/h	1.807*	0*	1.807
p-Xylene(Mass Flow)	ton/yr	7.914*	0*	7.914
m-Xylene(Mass Flow)	lb/h	1.778*	0*	1.778
m-Xylene(Mass Flow)	ton/yr	7.786*	0*	7.786
o-Xylene(Mass Flow)	lb/h	1.078*	0*	1.078
o-Xylene(Mass Flow)	ton/yr	4.723*	0*	4.723
Methane(Mass Flow)	lb/h	118.9*	626.5*	745.4
Ethane(Mass Flow)	lb/h	45.1*	212.6*	257.7
Propane(Mass Flow)	lb/h	23.31*	178.5*	201.8
i-Butane(Mass Flow)	lb/h	2.345*	27.22*	29.56
n-Butane(Mass Flow)	lb/h	7.626*	66.21*	73.84
i-Pentane(Mass Flow)	lb/h	0.7922*	17.15*	17.94
n-Pentane(Mass Flow)	lb/h	1.03*	16.04*	17.07
2,2-Dimethylbutane(Mass Flow)	lb/h	0*	0*	0
Cyclopentane(Mass Flow)	lb/h	0*	0*	0
2-Methylpentane(Mass Flow)	lb/h	0.1419*	0*	0.1419
3-Methylpentane(Mass Flow)	lb/h	0.07096*	0*	0.07096
n-Hexane(Mass Flow)	lb/h	0.1419*	15.52*	15.66
Methylcyclopentane(Mass Flow)	lb/h	0.1848*	0*	0.1848
Cyclohexane(Mass Flow)	lb/h	0.6237*	0*	0.6237
2-Methylhexane(Mass Flow)	lb/h	0*	0*	0
3-Methylhexane(Mass Flow)	lb/h	0.0275*	0*	0.0275
Heptane(Mass Flow)	lb/h	0.0275*	0*	0.0275
Methylcyclohexane(Mass Flow)	lb/h	0.1887*	0*	0.1887
Octane(Mass Flow)	lb/h	0.03136*	0*	0.03136
Nonane(Mass Flow)	lb/h	0*	0*	0
Decane(Mass Flow)	lb/h	0*	0*	0
Undecane(Mass Flow)	lb/h	0*	0*	0
Water(Mass Flow)	lb/h	368.2*	0*	368.2
MDEA(Mass Flow)	lb/h	0*	0*	0
DEA(Mass Flow)	lb/h	0*	0*	0

Analysis Certificate Report
Lucid Energy Group-PURCHASER

8/3/2018 8:14 AM

326 W. Quay
Artesia, NM 88210
Measurement 575-810-6045 or 575-810-6044

Kerry Egan

Analysis ID: 14433 **Alternate ID:** **Use Contract Values:** No

Name Coriander AOC 1-21 State 1H **Company Name:** Lucid Energy Group

Effective Date:	06/01/2018 08:00	**Saturated HV:**		**Sample Date:**	06/28/2018
Valid Thru Date:	12/31/2078 00:00	**As Del. HV:**		**Sample ID:**	
Fixed Edit Date:	01/01/1900 00:00	**Dry HV:**	1106.1	**Sample Type:**	Spot
Last Update:	07/05/2018 09:47	**Measured HV:**		**Sample Pressure Base:**	14.730
Data Acqusition:	File Transfer from Lab	**WOBBE:**	1224.9	**Sample Temperature:**	92.9
Data Source:	Lab Analysis	**Water Content:**		**Sample Pressure:**	123.6
Real Relative Density:	0.8154	**Status:**	Active	**Lab Code:**	F58401

Component	% Mol	GPM
Methane	69.9480	
Ethane	8.7510	2.3397
Propane	4.8550	1.3372
I Butane	0.5990	0.1960
N Butane	1.3890	0.4378
I Pentane	0.3670	0.1342
N Pentane	0.3520	0.1276
Hexanes +	0.4370	0.1906
Nitrogen	2.4360	
CO2	10.8660	
Oxygen	0.0000	
H2O	0.0000	
CO	0.0000	
H2S	0.0000	
Hydrogen	0.0000	
Helium	0.0000	
Argon	0.0000	
Total	100.0000	4.7631

Dry Gravity

Saturated Gravity

Sample Comments:

Configuration Comments:

MITCHELL ANALYTICAL LAB
2638 FAUDREE
ODESSA, TEXAS 79765-8538
432.561.5579

SUMMARY OF CHROMATOGRAPHIC ANALYSIS

Company:	AMI Measurement	Sample Press:	954.70
Producer:	Lucid Energy	Sample Temp:	72.00
Lease:	Bootleg Ridge Compressor	Date Sampled:	9/28/2018
Station:	n.a.	Sampled by:	CV
Date Run:	10/9/2018	Field H2S:	0.0000
Lab Ref#:	18-OCT-96491		

COMPONENT	MOLE %	WEIGHT %
HYDROGEN SULFIDE	0.0000	0.0000
NITROGEN	2.6050	3.2307
OXYGEN	0.0000	0.0000
METHANE	72.2190	51.2907
CARBON DIOXIDE	3.5587	6.9336
ETHANE	11.6843	15.5543
PROPANE	6.1583	12.0223
ISO-BUTANE	0.7258	1.8676
N-BUTANE	1.7805	4.5815
ISO-PENTANE	0.4017	1.2831
N-PENTANE (C-5)	0.4028	1.2866
2,2 DIMETHYL BUTANE	0.0015	0.0057
CYCLOPENTANE	0.0000	0.0000
2-METHYLPENTANE	0.0527	0.2011
3-METHYLPENTANE	0.0258	0.0984
N-HEXANE (C-6)	0.0581	0.2217
METHYLCYCLOPENTANES	0.0377	0.1405
BENZENE	0.0318	0.1100
CYCLOHEXANE	0.0527	0.1964
2-METHYLHEXANE	0.0048	0.0213
3-METHYLHEXANE	0.0127	0.0563
DIMETHYLCYCLOPENTANES	0.0103	0.0448
HEPTANES	0.0091	0.0404
N-HEPTANE (C-7)	0.0189	0.0838
METHYLCYCLOHEXANE	0.0376	0.1601
TOLUENE	0.0259	0.1057
OCTANES	0.0288	0.1456
N-OCTANE (C-8)	0.0054	0.0273
ETHYL BENZENE	0.0018	0.0085
P-M-XYLENE	0.0094	0.0442
O-XYLENE	0.0027	0.0127
NONANES	0.0112	0.0636
N-NONANE (C-9)	0.0031	0.0176
DECANES	0.0092	0.0580
N-DECANE (C-10)	0.0032	0.0202
UNDECANES PLUS	0.0095	0.0657
TOTALS	**100.0000**	**100.0000**

CALCULATED PARAMETERS

TOTAL ANALYSIS SUMMARY

AVE MOLE WT	22.5877
REL DENS, AIR=1	0.7799
VAPOR PRESS PSIA	3717.6

HEXANES PLUS SUMMARY

AVE MOLE WT	94.9171
SP GRAV, 60F/60	0.7423
API GRAVITY	59.1
LBS/GAL	5.939
REL DENS, AIR=1	3.2771
VAPOR PRESS PSIA	3.26

BTEX SUMMARY

WT % BENZENE	0.1100
WT % TOLUENE	0.1057
WT % E BENZENE	0.0085
WT % XYLENES	0.0569

HEATING VALUE

BTU/CUFT, DRY	1231.3
BTU/CUFT, SATURATED	1209.8

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
(432) 561-5579

Gas Analysis

Company:	AMI (371)		
Producer:	Lucid Energy	Sample Pressure:	954.7
Lease:	Bootleg Ridge Compressor	Sample Temp:	72.0
Station #:	n.a.	Date Sampled:	9/28/2018
Date Run:	10/17/2018	Sampled by:	CV
Lab Ref #:	18-OCT-96491	Field Gravity:	
Cylinder:		Field H2S:	0.0000
Analyzed by:	Blake		

Physical Constants per GPA 2145-09
All values calculated @ 60.0 Deg. F.

	Mole %	14.65 psia GPM (Ideal)	14.73 psia GPM (Ideal)	14.73 psia BTU (Ideal Dry)
Nitrogen	2.6050			0.000
CO2	3.5588			0.000
Methane	72.2190			733.400
Ethane	11.6843	3.107	3.127	207.900
Propane	6.1583	1.687	1.698	155.700
Iso-Butane	0.7258	0.236	0.238	23.700
N-Butane	1.7805	0.558	0.562	58.400
Iso-Pentane	0.4017	0.146	0.147	16.200
N-Pentane	0.4028	0.145	0.146	16.200
Hexanes +	0.4638	0.205	0.206	24.600
TOTALS	**100.0000**	**6.084**	**6.122**	**1236.200**

GROSS HEATING VALUE @ 14.73 psia

Dry	Wet	
1241	1221	BTU/Real Cu.Ft.
0.7828	0.7806	Specific Gravity (Real)
	1215	BTU/Ideal Cu.Ft.
0.7801		Specific Gravity (Ideal)
Z Factor :	0.9962	

GASOLINE CONTENT (GPM/Real)

Ethane and Heavier .	6.1075
Propane and Heavier	2.9885
Butane and Heavier .	1.295
Pentane and Heavier	0.4977

G3516J

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	8	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 2 INLET (°F):	130		
AFTERCOOLER - STAGE 1 INLET (°F):	201	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	210	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	7.0-40.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	52.3
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	1165
EXHAUST MANIFOLD:	ASWC	ALTITUDE(ft):	500
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	77
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1380 bhp@1400rpm
SET POINT TIMING:	28		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	1380	1380	1035	690
INLET AIR TEMPERATURE			°F	77	77	77	77
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(3)	Btu/bhp-hr	7418	7418	7946	8534
FUEL CONSUMPTION (HHV)		(3)	Btu/bhp-hr	8164	8164	8744	9391
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(4)(5)	ft3/min	3130	3130	2392	1642
AIR FLOW	(WET)	(4)(5)	lb/hr	13880	13880	10607	7283
FUEL FLOW (60ºF, 14.7 psia)			scfm	147	147	118	84
INLET MANIFOLD PRESSURE		(6)	in Hg(abs)	88.1	88.1	70.1	48.3
EXHAUST TEMPERATURE - ENGINE OUTLET		(7)	°F	849	849	866	924
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(8)(5)	ft3/min	8190	8190	6360	4567
EXHAUST GAS MASS FLOW	(WET)	(8)(5)	lb/hr	14398	14398	11023	7581
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(9)(10)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(9)(10)	g/bhp-hr	3.00	3.00	3.22	3.16
THC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	4.36	4.36	4.68	4.75
NMHC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	2.10	2.10	2.25	2.28
NMNEHC (VOCs) (mol. wt. of 15.84)		(9)(10)(11)	g/bhp-hr	1.28	1.28	1.37	1.39
HCHO (Formaldehyde)		(9)(10)	g/bhp-hr	0.39	0.39	0.37	0.36
CO2		(9)(10)	g/bhp-hr	508	508	544	584
EXHAUST OXYGEN		(9)(12)	% DRY	9.1	9.1	8.8	8.4
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(13)	Btu/min	36391	36391	32610	26900
HEAT REJ. TO ATMOSPHERE		(13)	Btu/min	5313	5313	4428	3543
HEAT REJ. TO LUBE OIL (OC)		(13)	Btu/min	4334	4334	3884	3204
HEAT REJ. TO A/C - STAGE 1 (1AC)		(13)(14)	Btu/min	7643	7643	5670	1127
HEAT REJ. TO A/C - STAGE 2 (2AC)		(13)(14)	Btu/min	5050	5050	4390	2765
COOLING SYSTEM SIZING CRITERIA							
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)		(14)(15)	Btu/min	53255			
TOTAL AFTERCOOLER CIRCUIT (2AC)		(14)(15)	Btu/min	5302			
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.							

CONDITIONS AND DEFINITIONS

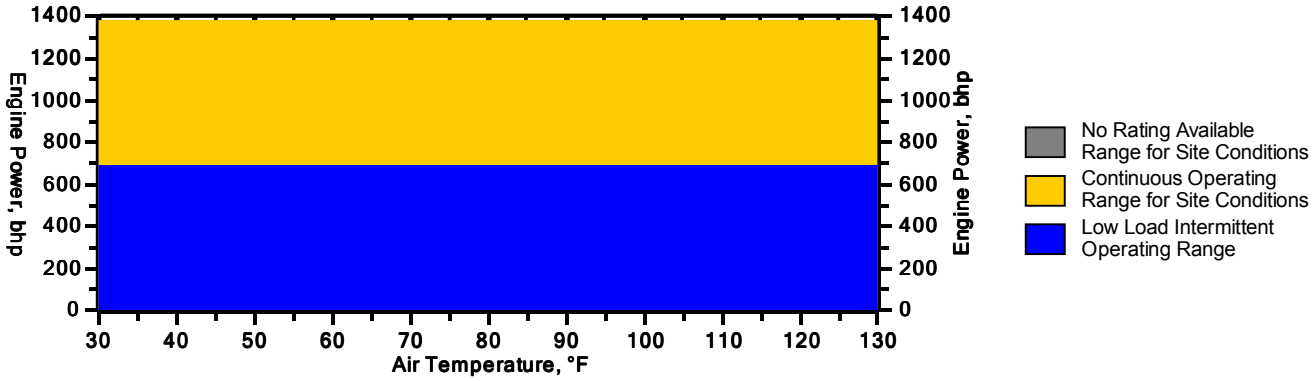
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating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

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 6.08.00
Ref. Data Set EM1495-04-001, Printed 02Aug2018

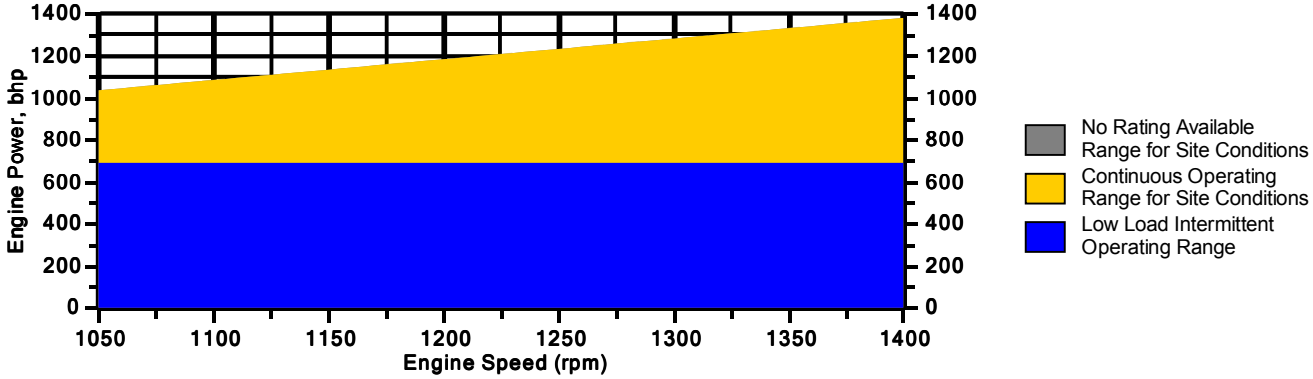
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1400 rpm



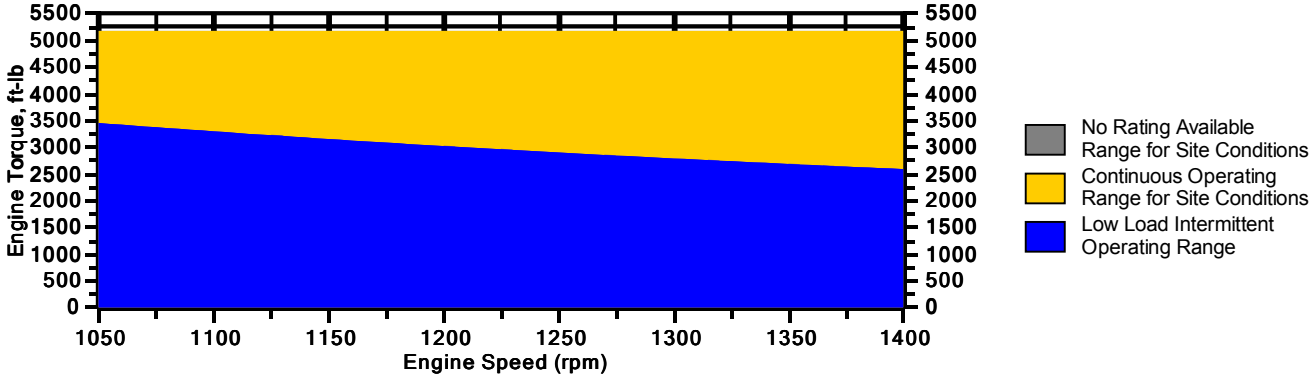
Engine Power vs. Engine Speed

Data represents speed sweep at 500 ft and 77 ºF



Engine Torque vs. Engine Speed

Data represents speed sweep at 500 ft and 77 ºF



Note: At site conditions of 500 ft and 77°F inlet air temp., constant torque can be maintained down to 1050 rpm. The minimum speed for loading at these conditions is 1050 rpm.

NOTES

1. Fuel pressure range specified is to the engine fuel pressure regulator. Additional fuel train components should be considered in pressure and flow calculations.

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

3. Fuel consumption tolerance is ± 3.0% of full load data.

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

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

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

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

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

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

10. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate the maximum values expected under steady state conditions. Fuel methane number cannot vary more than ± 3. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

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

12. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

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

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

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

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	71.1370	71.1370
Ethane	C2H6	12.8790	12.8790
Propane	C3H8	7.3730	7.3730
Isobutane	iso-C4H1O	0.8530	0.8530
Norbutane	nor-C4H1O	2.0750	2.0750
Isopentane	iso-C5H12	0.4330	0.4330
Norpentane	nor-C5H12	0.4050	0.4050
Hexane	C6H14	0.3280	0.3280
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	4.2170	4.2170
Carbon Dioxide	CO2	0.3000	0.3000
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
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

Fuel Makeup:	Gas Analysis
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	52.3
Lower Heating Value (Btu/scf):	1165
Higher Heating Value (Btu/scf):	1281
WOBBE Index (Btu/scf):	1323
THC: Free Inert Ratio:	21.14
Total % Inerts (% N2, CO2, He):	4.52%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.996
Stoich A/F Ratio (Vol/Vol):	12.06
Stoich A/F Ratio (Mass/Mass):	15.56
Specific Gravity (Relative to Air):	0.775
Fuel Specific Heat Ratio (K):	1.278

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.

POWERTHERM

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Caterpillar G3516J Caterpillar G3516J 1380bhp 1400rpm - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	"scfm"	"scfh"	"acfm"	"acfh"
lb/hr(Estimated):	14,399	3,253	195,209	8190	491,400
Brake Horse Power:	1380				
			Maximum Pressure Drop (in)		
Molecular weight:	28.50		0.029	Exhaust Density (lbs/ft3)	

Estimated Exhaust Gas Composition		
N2	74.5	vol%
O2	10	vol%
H2O	10	vol%
CO2	6	vol%

Inlet Temperature

Process Temperature (F): 849

Enter permitted grams per brake horse power hour (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
0.5	0.21	1.024	0.078

Catalyst Type

NG/Diesel (Lean)

Catalyst Module Details

Module Shape		Module/Layer	3	Layers	1
Square				cpsi	300
	X&Y (inch)	15	24	Depth	3.5

Open area for gas flow (ft2):	6.71
Linear Velocity(ft/min):	1,221
Foil thickness (inches):	0.002

Calculated Space Velocity: 99,769

Safety Value 2

Pressure Drop

300	2.03

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	1.52	6.66	64.31	38.68
CO	3.0	9.13	39.98	385.85	232.06
VOC	1.28	3.89	17.06	164.63	99.01
H2CO	0.39	1.19	5.20	50.16	30.17

Target Conversions

NOx	0.0%
CO	93.0%
VOC(NMNE)	20.0%
H2CO	80.0%

Required Output Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	1.52	6.66	64.31	38.68
CO	0.21	0.64	2.80	27.01	16.24
VOC	1.024	3.11	13.65	131.70	79.21
H2CO	0.078	0.24	1.04	10.03	6.03

Conversions Catalyst Design

NOx	0.0%
CO	93.0%
VOC(NMNE)	20.0%
H2CO	80.0%

Output Pollutants with Catalyst Sizing

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	1.52	6.66	64.31	38.68
CO	0.21	0.64	2.80	27.01	16.24
VOC	1.024	3.11	13.65	131.70	79.21
H2CO	0.078	0.24	1.04	10.03	6.03

Customer: Pegasus
Sales Person: KW
Date: 10/31/2018
Project: Lucid Big Lizard G3516J
Contact: Justin Watson

Notes: Lucid Big Lizard Location G3516J
(3) 15 x 24 Standard Elements
>93% CO Reduction
20% VOC Reduction
>80% HCHO Reduction
Insulation of exhaust piping is highly recommended

G3606

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	7.6	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV
AFTERCOOLER - STAGE 2 INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 1 INLET (°F):	174	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	190	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	58.0-70.3
COOLING SYSTEM:	JW+1AC, OC+2AC	FUEL METHANE NUMBER:	52.3
CONTROL SYSTEM:	ADEM4	FUEL LHV (Btu/scf):	1165
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	500
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	77
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1875 bhp@1000rpm
SET POINT TIMING:	16		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	1875	1875	1406	938
INLET AIR TEMPERATURE			°F	77	77	77	77
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(3)	Btu/bhp-hr	6815	6815	7092	7672
FUEL CONSUMPTION (HHV)		(3)	Btu/bhp-hr	7499	7499	7804	8442
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(4)(5)	ft3/min	4705	4705	3564	2451
AIR FLOW	(WET)	(4)(5)	lb/hr	20862	20862	15803	10868
FUEL FLOW (60ºF, 14.7 psia)			scfm	183	183	143	103
INLET MANIFOLD PRESSURE		(6)	in Hg(abs)	101.5	101.5	77.8	55.7
EXHAUST TEMPERATURE - ENGINE OUTLET		(7)	°F	812	812	883	964
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(8)(5)	ft3/min	11846	11846	9486	6934
EXHAUST GAS MASS FLOW	(WET)	(8)(5)	lb/hr	21509	21509	16308	11232
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(9)(10)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(9)(10)	g/bhp-hr	2.53	2.53	2.53	2.53
THC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	3.91	3.91	4.09	4.32
NMHC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	1.88	1.88	1.96	2.08
NMNEHC (VOCs) (mol. wt. of 15.84)		(9)(10)(11)	g/bhp-hr	1.14	1.14	1.19	1.26
HCHO (Formaldehyde)		(9)(10)	g/bhp-hr	0.20	0.20	0.22	0.25
CO2		(9)(10)	g/bhp-hr	466	466	485	524
EXHAUST OXYGEN		(9)(12)	% DRY	11.2	11.2	11.1	10.6
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(13)	Btu/min	22833	22833	18579	15110
HEAT REJ. TO ATMOSPHERE		(13)	Btu/min	5370	5370	5465	5334
HEAT REJ. TO LUBE OIL (OC)		(13)	Btu/min	11714	11714	10805	9352
HEAT REJ. TO A/C - STAGE 1 (1AC)		(13)(14)	Btu/min	13643	13643	6641	1896
HEAT REJ. TO A/C - STAGE 2 (2AC)		(13)(14)	Btu/min	6752	6752	4171	2130

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+1AC)	(14)(15)	Btu/min	39441
TOTAL STAGE 2 AFTERCOOLER CIRCUIT (OC+2AC)	(14)(15)	Btu/min	21147
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

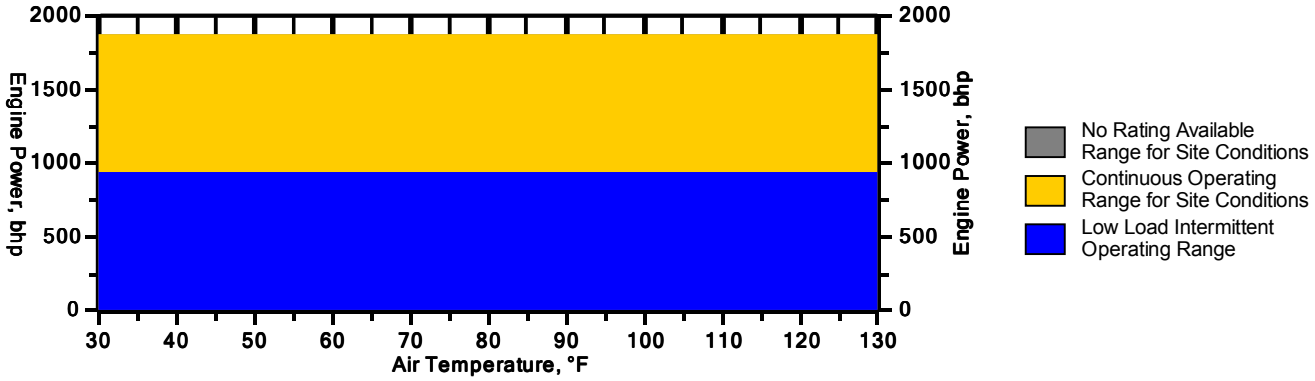
CONDITIONS AND DEFINITIONS

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

For notes information consult page three.

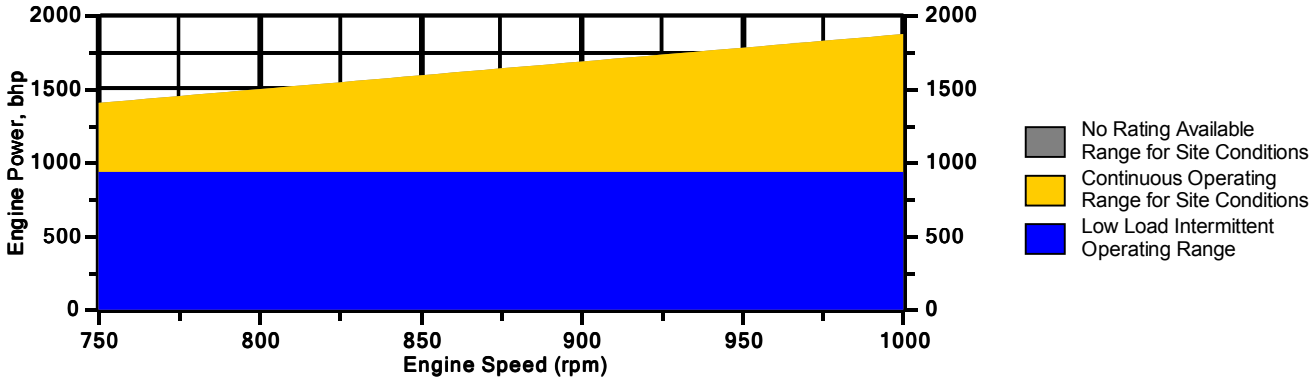
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1000 rpm



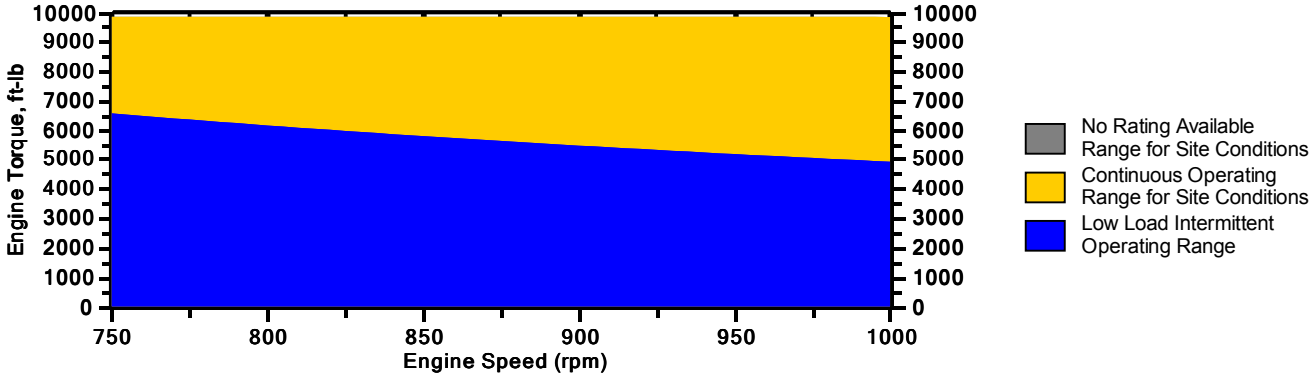
Engine Power vs. Engine Speed

Data represents speed sweep at 500 ft and 77 ºF



Engine Torque vs. Engine Speed

Data represents speed sweep at 500 ft and 77 ºF



Note: At site conditions of 500 ft and 77°F inlet air temp., constant torque can be maintained down to 750 rpm. The minimum speed for loading at these conditions is 750 rpm.

NOTES

1. Fuel pressure range specified is to the engine gas shutoff valve (GSOV). Additional fuel train components should be considered in pressure and flow calculations.

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

3. Fuel consumption tolerance is ± 2.5% of full load data.

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

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

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

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

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

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

10. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate the maximum values expected under steady state conditions. Fuel methane number cannot vary more than ± 3. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

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

12. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

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

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

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

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	71.1370	71.1370
Ethane	C2H6	12.8790	12.8790
Propane	C3H8	7.3730	7.3730
Isobutane	iso-C4H1O	0.8530	0.8530
Norbutane	nor-C4H1O	2.0750	2.0750
Isopentane	iso-C5H12	0.4330	0.4330
Norpentane	nor-C5H12	0.4050	0.4050
Hexane	C6H14	0.3280	0.3280
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	4.2170	4.2170
Carbon Dioxide	CO2	0.3000	0.3000
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
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

Fuel Makeup:	Gas Analysis
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	52.3
Lower Heating Value (Btu/scf):	1165
Higher Heating Value (Btu/scf):	1281
WOBBE Index (Btu/scf):	1323
THC: Free Inert Ratio:	21.14
Total % Inerts (% N2, CO2, He):	4.52%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.996
Stoich A/F Ratio (Vol/Vol):	12.06
Stoich A/F Ratio (Mass/Mass):	15.56
Specific Gravity (Relative to Air):	0.775
Fuel Specific Heat Ratio (K):	1.278

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.

POWERTHERM

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Caterpillar G3606 A4 Caterpillar G3606 A4 - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	"scfm"	"scfh"	"acfm"	"acfh"
lb/hr(Estimated):	21,432	4,843	290,562	11846	710,760
Brake Horse Power:	1875				
			Maximum Pressure Drop (in)		
Molecular weight:	28.50		0.030	Exhaust Density (lbs/ft3)	

Estimated Exhaust Gas Composition		
N2	74.5	vol%
O2	10	vol%
H2O	10	vol%
CO2	6	vol%

Inlet Temperature

Process Temperature (F): 812

Enter permitted grams per brake horse power hour (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
0.5	0.1771	0.912	0.04

Catalyst Type

NG/Diesel (Lean)

Catalyst Module Details

Module Shape		Module/Layer	4	Layers	1
Square				cpsi	300
	X&Y (inch)	15	36	Depth	3.5

Open area for gas flow (ft2):	13.61
Linear Velocity(ft/min):	870
Foil thickness (inches):	0.002

Calculated Space Velocity: 73,191

Safety Value: 2

Pressure Drop

300 | 1.45

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	2.07	9.05	58.70	35.30
CO	2.53	10.46	45.81	297.03	178.64
VOC	1.14	4.71	20.64	133.84	80.50
H2CO	0.20	0.83	3.62	23.48	14.12

Target Conversions

NOx	0.0%
CO	93.0%
VOC(NMNE)	20.0%
H2CO	80.0%

Required Output Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	2.07	9.05	58.70	35.30
CO	0.1771	0.73	3.21	20.79	12.50
VOC	0.912	3.77	16.51	107.07	64.40
H2CO	0.04	0.17	0.72	4.70	2.82

Conversions Catalyst Design

NOx	0.00%
CO	97.88%
VOC(NMNE)	84.86%
H2CO	97.97%

Output Pollutants with Catalyst Sizing

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	2.07	9.05	58.70	35.30
CO	0.05	0.22	0.97	6.30	3.79
VOC	0.17	0.71	3.12	20.26	12.19
H2CO	0.00	0.02	0.07	0.48	0.29

Customer: Pegasus
Sales Person: KW
Date: 10/21/2018
Project: Lucid Big Lizard Location G3606A4
Contact: Justin Watson

Notes: Lucid Big Lizard Location G3606A4
(4) 15 x 36 Standard Elements
Will achieve:
>93% CO Reduction
20% VOC Reduction
>80% HCHO Reduction
Insulation of exhaust piping is highly recommended

G3608

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	7.6	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV
AFTERCOOLER - STAGE 2 INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 1 INLET (°F):	174	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	190	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	58.0-70.3
COOLING SYSTEM:	JW+1AC, OC+2AC	FUEL METHANE NUMBER:	52.3
CONTROL SYSTEM:	ADEM4	FUEL LHV (Btu/scf):	1165
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	500
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	77
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	2500 bhp@1000rpm
SET POINT TIMING:	16		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	2500	2500	1875	1250
INLET AIR TEMPERATURE			°F	77	77	77	77
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(3)	Btu/bhp-hr	6760	6760	7006	7511
FUEL CONSUMPTION (HHV)		(3)	Btu/bhp-hr	7439	7439	7710	8266
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(4)(5)	ft3/min	6298	6298	4767	3257
AIR FLOW	(WET)	(4)(5)	lb/hr	27925	27925	21137	14443
FUEL FLOW (60ºF, 14.7 psia)			scfm	242	242	188	134
INLET MANIFOLD PRESSURE		(6)	in Hg(abs)	100.3	100.3	76.2	53.6
EXHAUST TEMPERATURE - ENGINE OUTLET		(7)	°F	825	825	871	925
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(8)(5)	ft3/min	16023	16023	12580	8966
EXHAUST GAS MASS FLOW	(WET)	(8)(5)	lb/hr	28777	28777	21800	14916
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(9)(10)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(9)(10)	g/bhp-hr	3.08	3.08	3.08	3.08
THC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	3.88	3.88	4.08	4.10
NMHC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	1.87	1.87	1.96	1.97
NMNEHC (VOCs) (mol. wt. of 15.84)		(9)(10)(11)	g/bhp-hr	1.13	1.13	1.19	1.20
HCHO (Formaldehyde)		(9)(10)	g/bhp-hr	0.23	0.23	0.24	0.24
CO2		(9)(10)	g/bhp-hr	465	465	482	516
EXHAUST OXYGEN		(9)(12)	% DRY	11.7	11.7	11.4	10.9
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(13)	Btu/min	26796	26796	23139	19513
HEAT REJ. TO ATMOSPHERE		(13)	Btu/min	9216	9216	9635	9614
HEAT REJ. TO LUBE OIL (OC)		(13)	Btu/min	13082	13082	12201	10982
HEAT REJ. TO A/C - STAGE 1 (1AC)		(13)(14)	Btu/min	19440	19440	9363	2170
HEAT REJ. TO A/C - STAGE 2 (2AC)		(13)(14)	Btu/min	7637	7637	4846	2516

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+1AC)	(14)(15)	Btu/min	49888
TOTAL STAGE 2 AFTERCOOLER CIRCUIT (OC+2AC)	(14)(15)	Btu/min	23717
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

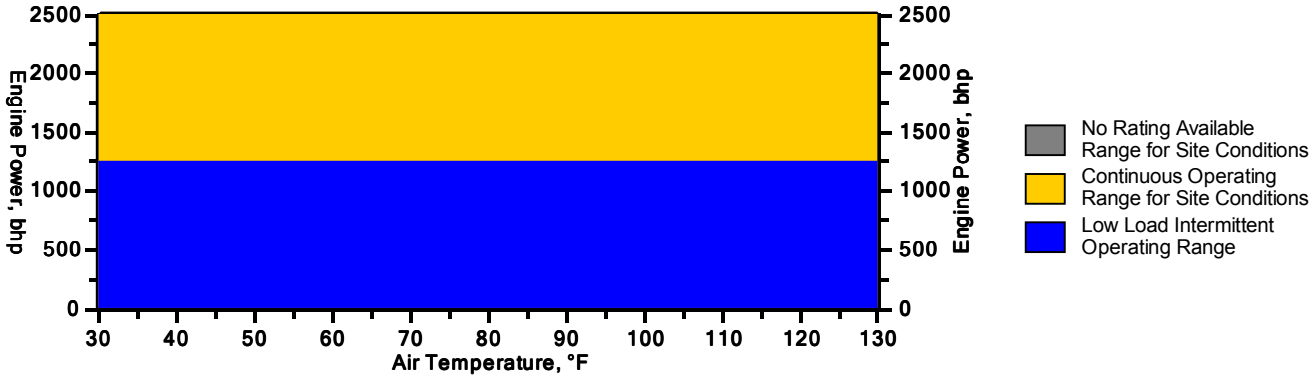
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating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

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 6.08.00
Ref. Data Set EM0655-06-001, Printed 02Aug2018

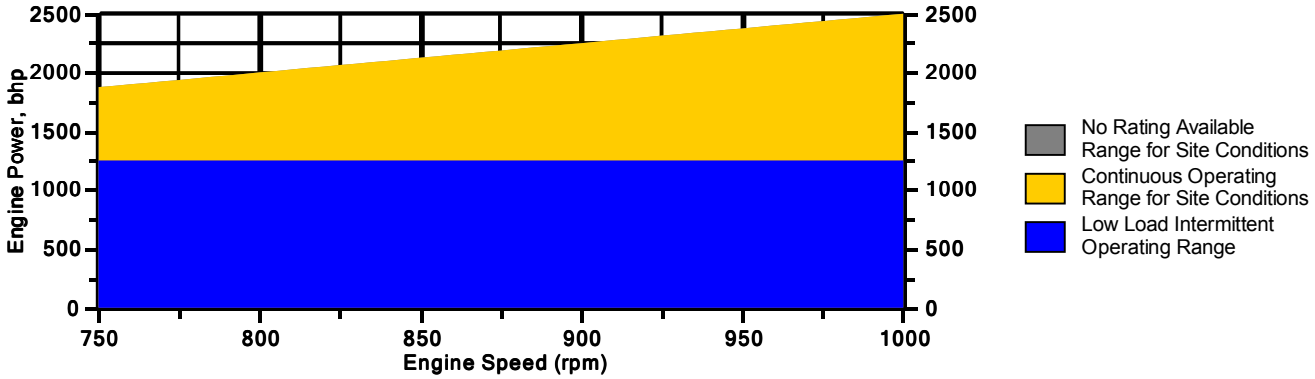
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1000 rpm



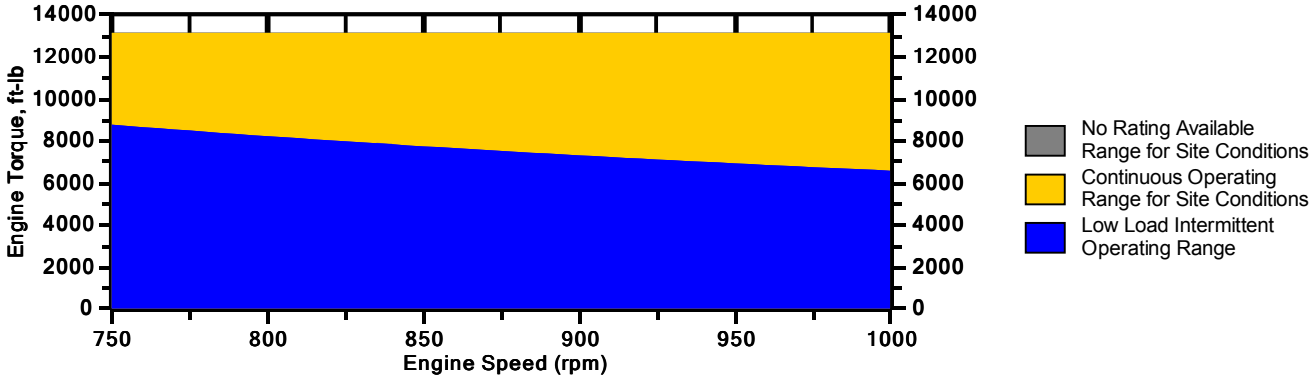
Engine Power vs. Engine Speed

Data represents speed sweep at 500 ft and 77 ºF



Engine Torque vs. Engine Speed

Data represents speed sweep at 500 ft and 77 ºF



Note: At site conditions of 500 ft and 77°F inlet air temp., constant torque can be maintained down to 750 rpm. The minimum speed for loading at these conditions is 750 rpm.

NOTES

1. Fuel pressure range specified is to the engine gas shutoff valve (GSOV). Additional fuel train components should be considered in pressure and flow calculations.

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

3. Fuel consumption tolerance is ± 2.5% of full load data.

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

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

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

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

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

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

10. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate the maximum values expected under steady state conditions. Fuel methane number cannot vary more than ± 3. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

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

12. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

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

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

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

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	71.1370	71.1370
Ethane	C2H6	12.8790	12.8790
Propane	C3H8	7.3730	7.3730
Isobutane	iso-C4H1O	0.8530	0.8530
Norbutane	nor-C4H1O	2.0750	2.0750
Isopentane	iso-C5H12	0.4330	0.4330
Norpentane	nor-C5H12	0.4050	0.4050
Hexane	C6H14	0.3280	0.3280
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	4.2170	4.2170
Carbon Dioxide	CO2	0.3000	0.3000
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
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

Fuel Makeup:	Gas Analysis
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	52.3
Lower Heating Value (Btu/scf):	1165
Higher Heating Value (Btu/scf):	1281
WOBBE Index (Btu/scf):	1323
THC: Free Inert Ratio:	21.14
Total % Inerts (% N2, CO2, He):	4.52%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.996
Stoich A/F Ratio (Vol/Vol):	12.06
Stoich A/F Ratio (Mass/Mass):	15.56
Specific Gravity (Relative to Air):	0.775
Fuel Specific Heat Ratio (K):	1.278

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.

POWERTHERM

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Caterpillar G3608 2500 BHP @ 1000 RPM Caterpillar G3608 A4 - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	"scfm"	"scfh"	"acfm"	"acfh"
lb/hr(Estimated):	27,998	6,326	379,580	15974	958,440
Brake Horse Power:	2500				
			Maximum Pressure Drop (in)		
Molecular weight:	28.50		0.029	Exhaust Density (lbs/ft3)	

Estimated Exhaust Gas Composition		
N2	74.5	vol%
O2	10	vol%
H2O	10	vol%
CO2	6	vol%

Inlet Temperature

Process Temperature (F): 853

Enter permitted grams per brake horse power hour (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
0.5	0.2156	0.8475	0.046

Catalyst Type

NG/Diesel (Lean)

Catalyst Module Details

Module Shape		Module/Layer	6	Layers	1
Square				cpsi	300
	X&Y (inch)	15	36	Depth	3.5

Open area for gas flow (ft2):	20.42
Linear Velocity(ft/min):	782
Foil thickness (inches):	0.002

Calculated Space Velocity: 63,743

Safety Value: 2

Pressure Drop

300	1.30

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	2.76	12.07	59.91	36.03
CO	3.08	16.98	74.35	369.07	221.97
VOC	1.13	6.23	27.28	135.41	81.44
H2CO	0.23	1.27	5.55	27.56	16.58

Target Conversions

NOx	0.0%
CO	93.0%
VOC(NMNE)	25.0%
H2CO	80.0%

Required Output Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	2.76	12.07	59.91	36.03
CO	0.2156	1.19	5.20	25.83	15.54
VOC	0.8475	4.67	20.46	101.56	61.08
H2CO	0.046	0.25	1.11	5.51	3.32

Conversions Catalyst Design

NOx	0.0%
CO	93.0%
VOC(NMNE)	25.0%
H2CO	80.0%

Output Pollutants with Catalyst Sizing

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	2.76	12.07	59.91	36.03
CO	0.2156	1.19	5.20	25.83	15.54
VOC	0.8475	4.67	20.46	101.56	61.08
H2CO	0.046	0.25	1.11	5.51	3.32

Customer: Pegasus
Sales Person: KW
Date: 10/31/2018
Project: Lucid Big Lizard G3608A4
Contact: Justin Watson

Notes: Lucid Big Lizard Location G3608A4
(6) 15 x 36 Standard Elements
>93% CO Reduction
>25% VOC Reduction
>80% HCHO Reduction
Insulation of exhaust piping is highly recommended

ELECTRONIC CODE OF FEDERAL REGULATIONS

e-CFR data is current as of August 23, 2017

Title 40: Protection of Environment
PART 98—MANDATORY GREENHOUSE GAS REPORTING
Subpart C—General Stationary Fuel Combustion Sources

Table C-1 to Subpart C of Part 98—Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel

Link to an amendment published at 81 FR 89252, Dec. 9, 2016.

Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel

Fuel type	Default high heat value	Default CO_2 emission factor
Coal and coke	mmBtu/short ton	kg CO_2/mmBtu
Anthracite	25.09	103.69
Bituminous	24.93	93.28
Subbituminous	17.25	97.17
Lignite	14.21	97.72
Coal Coke	24.80	113.67
Mixed (Commercial sector)	21.39	94.27
Mixed (Industrial coking)	26.28	93.90
Mixed (Industrial sector)	22.35	94.67
Mixed (Electric Power sector)	19.73	95.52
Natural gas	mmBtu/scf	kg CO_2/mmBtu
(Weighted U.S. Average)	1.026×10^{-3}	53.06
Petroleum products	mmBtu/gallon	kg CO_2/mmBtu
Distillate Fuel Oil No. 1	0.139	73.25
Distillate Fuel Oil No. 2	0.138	73.96
Distillate Fuel Oil No. 4	0.146	75.04
Residual Fuel Oil No. 5	0.140	72.93
Residual Fuel Oil No. 6	0.150	75.10
Used Oil	0.138	74.00
Kerosene	0.135	75.20
Liquefied petroleum gases (LPG)[1]	0.092	61.71
Propane[1]	0.091	62.87
Propylene[2]	0.091	67.77
Ethane[1]	0.068	59.60
Ethanol	0.084	68.44
Ethylene[2]	0.058	65.96
Isobutane[1]	0.099	64.94
Isobutylene[1]	0.103	68.86
Butane[1]	0.103	64.77
Butylene[1]	0.105	68.72
Naphtha (<401 deg F)	0.125	68.02
Natural Gasoline	0.110	66.88
Other Oil (>401 deg F)	0.139	76.22
Pentanes Plus	0.110	70.02
Petrochemical Feedstocks	0.125	71.02
Petroleum Coke	0.143	102.41
Special Naphtha	0.125	72.34
Unfinished Oils	0.139	74.54
Heavy Gas Oils	0.148	74.92
Lubricants	0.144	74.27
Motor Gasoline	0.125	70.22
Aviation Gasoline	0.120	69.25
Kerosene-Type Jet Fuel	0.135	72.22
Asphalt and Road Oil	0.158	75.36
Crude Oil	0.138	74.54
Other fuels—solid	mmBtu/short ton	kg CO_2/mmBtu
Municipal Solid Waste	9.95[3]	90.7
Tires	28.00	85.97
Plastics	38.00	75.00

Petroleum Coke	30.00	102.41
Other fuels—gaseous	mmBtu/scf	kg CO_2/mmBtu
Blast Furnace Gas	0.092×10^{-3}	274.32
Coke Oven Gas	0.599×10^{-3}	46.85
Propane Gas	2.516×10^{-3}	61.46
Fuel Gas[4]	1.388×10^{-3}	59.00
Biomass fuels—solid	mmBtu/short ton	kg CO_2/mmBtu
Wood and Wood Residuals (dry basis)[5]	17.48	93.80
Agricultural Byproducts	8.25	118.17
Peat	8.00	111.84
Solid Byproducts	10.39	105.51
Biomass fuels—gaseous	mmBtu/scf	kg CO_2/mmBtu
Landfill Gas	0.485×10^{-3}	52.07
Other Biomass Gases	0.655×10^{-3}	52.07
Biomass Fuels—Liquid	mmBtu/gallon	kg CO_2/mmBtu
Ethanol	0.084	68.44
Biodiesel (100%)	0.128	73.84
Rendered Animal Fat	0.125	71.06
Vegetable Oil	0.120	81.55

[1]The HHV for components of LPG determined at 60 °F and saturation pressure with the exception of ethylene.

[2]Ethylene HHV determined at 41 °F (5 °C) and saturation pressure.

[3]Use of this default HHV is allowed only for: (a) Units that combust MSW, do not generate steam, and are allowed to use Tier 1; (b) units that derive no more than 10 percent of their annual heat input from MSW and/or tires; and (c) small batch incinerators that combust no more than 1,000 tons of MSW per year.

[4]Reporters subject to subpart X of this part that are complying with §98.243(d) or subpart Y of this part may only use the default HHV and the default CO_2 emission factor for fuel gas combustion under the conditions prescribed in §98.243(d)(2)(i) and (d)(2)(ii) and §98.252(a)(1) and (a)(2), respectively. Otherwise, reporters subject to subpart X or subpart Y shall use either Tier 3 (Equation C-5) or Tier 4.

[5]Use the following formula to calculate a wet basis HHV for use in Equation C-1: $HHV_w = ((100 - M)/100)*HHV_d$ where HHV_w = wet basis HHV, M = moisture content (percent) and HHV_d = dry basis HHV from Table C-1.

[78 FR 71950, Nov. 29, 2013]

Title 40: Protection of Environment
PART 98—MANDATORY GREENHOUSE GAS REPORTING
Subpart C—General Stationary Fuel Combustion Sources

TABLE C-2 TO SUBPART C OF PART 98—DEFAULT CH_4 AND N_2O EMISSION FACTORS FOR VARIOUS TYPES OF FUEL

Link to an amendment published at 81 FR 89252, Dec. 9, 2016.

Fuel type	Default CH_4 emission factor (kg CH_4/mmBtu)	Default N_2O emission factor (kg N_2O/mmBtu)
Coal and Coke (All fuel types in Table C-1)	1.1×10^{-02}	1.6×10^{-03}
Natural Gas	1.0×10^{-03}	1.0×10^{-04}
Petroleum (All fuel types in Table C-1)	3.0×10^{-03}	6.0×10^{-04}
Fuel Gas	3.0×10^{-03}	6.0×10^{-04}
Municipal Solid Waste	3.2×10^{-02}	4.2×10^{-03}
Tires	3.2×10^{-02}	4.2×10^{-03}
Blast Furnace Gas	2.2×10^{-05}	1.0×10^{-04}
Coke Oven Gas	4.8×10^{-04}	1.0×10^{-04}
Biomass Fuels—Solid (All fuel types in Table C-1, except wood and wood residuals)	3.2×10^{-02}	4.2×10^{-03}
Wood and wood residuals	7.2×10^{-03}	3.6×10^{-03}
Biomass Fuels—Gaseous (All fuel types in Table C-1)	3.2×10^{-03}	6.3×10^{-04}
Biomass Fuels—Liquid (All fuel types in Table C-1)	1.1×10^{-03}	1.1×10^{-04}

Note: Those employing this table are assumed to fall under the IPCC definitions of the “Energy Industry” or “Manufacturing Industries and Construction”. In all fuels except for coal the values for these two categories are identical. For coal combustion, those who fall within the IPCC “Energy Industry” category may employ a value of 1g of CH_4/mmBtu.

[78 FR 71952, Nov. 29, 2013]

Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_x) AND CARBON MONOXIDE (CO) FROM NATURAL GAS COMBUSTION[a]

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO_x[b]		CO	
	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
Large Wall-Fired Boilers (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS)[c]	280	A	84	B
Uncontrolled (Post-NSPS)[c]	190	A	84	B
Controlled - Low NO_x burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
Small Boilers (<100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO_x burners	50	D	84	B
Controlled - Low NO_x burners/Flue gas recirculation	32	C	84	B
Tangential-Fired Boilers (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
Residential Furnaces (<0.3) [No SCC]				
Uncontrolled	94	B	40	B

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. Emission factors are based on an average natural gas higher heating value of 1,020 Btu/scf. To convert from $lb/10^6$ scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. SCC = Source Classification Code. ND = no data. NA = not applicable.

[b] Expressed as NO_2. For large and small wall fired boilers with SNCR control, apply a 24 percent reduction to the appropriate NO_X emission factor. For tangential-fired boilers with SNCR control, apply a 13 percent reduction to the appropriate NO_X emission factor.

[c] NSPS=New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction modification, or reconstruction after June 19, 1984.

TABLE 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION[a]

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
CO_2[b]	120,000	A
Lead	0.0005	D
N_2O (Uncontrolled)	2.2	E
N_2O (Controlled-low-NO_X burner)	0.64	E
PM (Total)[c]	7.6	D
PM (Condensable)[c]	5.7	D
PM (Filterable)[c]	1.9	B
SO_2[d]	0.6	A
TOC	11	B
Methane	2.3	B
VOC	5.5	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $lb/10^6$ scf to 1b/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. TOC = Total Organic Compounds. VOC = Volatile Organic Compounds.

[b] Based on approximately 100% conversion of fuel carbon to CO_2. $CO_2[lb/10^6 scf] = (3.67)(CON)(C)(D)$, where CON = fractional conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.76), and D = density of fuel, $4.2x10^4$ $lb/10^6$ scf.

[c] All PM (total, condensible, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM_{10}, $PM_{2.5}$ or PM_1 emissions. Total PM is the sum of the filterable PM and condensible PM. Condensible PM is the particulate matter collected using EPA Method 202 (or equivalent). Filterable PM is the particulate matter collected on, or prior to, the filter of an EPA Method 5 (or equivalent) sampling train.

[d] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content is natural gas of 2,000 grains/10^6 scf. The SO_2 emission factor in this table can be converted to other natural gas sulfur contents by multiplying the SO_2 emission factor by the ratio of the site-specific sulfur content (grains/10^6 scf) to 2,000 grains/10^6 scf.

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION[a]

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
91-57-6	2-Methylnaphthalene[b, c]	2.4E-05	D
56-49-5	3-Methylchloranthrene[b, c]	<1.8E-06	E
	7,12-Dimethylbenz(a)anthracene[b,c]	<1.6E-05	E
83-32-9	Acenaphthene[b,c]	<1.8E-06	E
203-96-8	Acenaphthylene[b,c]	<1.8E-06	E
120-12-7	Anthracene[b,c]	<2.4E-06	E
56-55-3	Benz(a)anthracene[b,c]	<1.8E-06	E
71-43-2	Benzene[b]	2.1E-03	B
50-32-8	Benzo(a)pyrene[b,c]	<1.2E-06	E
205-99-2	Benzo(b)fluoranthene[b,c]	<1.8E-06	E
191-24-2	Benzo(g,h,i)perylene[b,c]	<1.2E-06	E
207-08-9	Benzo(k)fluoranthene[b,c]	<1.8E-06	E
106-97-8	Butane	2.1E+00	E
218-01-9	Chrysene[b,c]	<1.8E-06	E
53-70-3	Dibenzo(a,h)anthracene[b,c]	<1.2E-06	E
25321-22-6	Dichlorobenzene[b]	1.2E-03	E
74-84-0	Ethane	3.1E+00	E
206-44-0	Fluoranthene[b,c]	3.0E-06	E
86-73-7	Fluorene[b,c]	2.8E-06	E
50-00-0	Formaldehyde[b]	7.5E-02	B
110-54-3	Hexane[b]	1.8E+00	E
193-39-5	Indeno(1,2,3-cd)pyrene[b,c]	<1.8E-06	E
91-20-3	Naphthalene[b]	6.1E-04	E
109-66-0	Pentane	2.6E+00	E
85-01-8	Phenanathrene[b,c]	1.7E-05	D
74-98-6	Propane	1.6E+00	E

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION (Continued)

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
129-00-0	Pyrene[b, c]	5.0E-06	E
108-88-3	Toluene[b]	3.4E-03	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $1b/10^6$ scf to lb/MMBtu, divide by 1,020. Emission Factors preceeded with a less-than symbol are based on method detection limits.

[b] Hazardous Air Pollutant (HAP) as defined by Section 112(b) of the Clean Air Act.

[c] HAP because it is Polycyclic Organic Matter (POM). POM is a HAP as defined by Section 112(b) of the Clean Air Act.

[d] The sum of individual organic compounds may exceed the VOC and TOC emission factors due to differences in test methods and the availability of test data for each pollutant.

The following empirical expressions may be used to estimate the quantity in pounds (lb) of size-specific particulate emissions from an unpaved road, per vehicle mile traveled (VMT):

For vehicles traveling on unpaved surfaces at industrial sites, emissions are estimated from the following equation:

$$E = k\,(s/12)^a (W/3)^b \qquad (1a)$$

and, for vehicles traveling on publicly accessible roads, dominated by light duty vehicles, emissions may be estimated from the following:

$$E = \frac{k\,(s/12)^a (S/30)^d}{(M/0.5)^c} - C \qquad (1b)$$

where k, a, b, c and d are empirical constants (Reference 6) given below and

E = size-specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)
M = surface material moisture content (%)
S = mean vehicle speed (mph)
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

The source characteristics s, W and M are referred to as correction parameters for adjusting the emission estimates to local conditions. The metric conversion from lb/VMT to grams (g) per vehicle kilometer traveled (VKT) is as follows:

1 lb/VMT = 281.9 g/VKT

The constants for Equations 1a and 1b based on the stated aerodynamic particle sizes are shown in Tables 13.2.2-2 and 13.2.2-4. The PM-2.5 particle size multipliers (k-factors) are taken from Reference 27.

Table 13.2.2-2. CONSTANTS FOR EQUATIONS 1a AND 1b

Constant	Industrial Roads (Equation 1a)			Public Roads (Equation 1b)		
	PM-2.5	PM-10	PM-30*	PM-2.5	PM-10	PM-30*
k (lb/VMT)	0.15	1.5	4.9	0.18	1.8	6.0
a	0.9	0.9	0.7	1	1	1
b	0.45	0.45	0.45	-	-	-
c	-	-	-	0.2	0.2	0.3
d	-	-	-	0.5	0.5	0.3
Quality Rating	B	B	B	B	B	B

*Assumed equivalent to total suspended particulate matter (TSP)
"-" = not used in the emission factor equation

Table 13.2.2-2 also contains the quality ratings for the various size-specific versions of Equation 1a and 1b. The equation retains the assigned quality rating, if applied within the ranges of source conditions, shown in Table 13.2.2-3, that were tested in developing the equation:

Table 13.2.2-3. RANGE OF SOURCE CONDITIONS USED IN DEVELOPING EQUATION 1a AND 1b

Emission Factor	Surface Silt Content, %	Mean Vehicle Weight		Mean Vehicle Speed		Mean No. of Wheels	Surface Moisture Content, %
		Mg	ton	km/hr	mph		
Industrial Roads (Equation 1a)	1.8-25.2	1.8-260	2-290	8-69	5-43	4-17[a]	0.03-13
Public Roads (Equation 1b)	1.8-35	1.4-2.7	1.5-3	16-88	10-55	4-4.8	0.03-13

[a] See discussion in text.

As noted earlier, the models presented as Equations 1a and 1b were developed from tests of traffic on unpaved surfaces. Unpaved roads have a hard, generally nonporous surface that usually dries quickly after a rainfall or watering, because of traffic-enhanced natural evaporation. (Factors influencing how fast a road dries are discussed in Section 13.2.2.3, below.) The quality ratings given above pertain to the mid-range of the measured source conditions for the equation. A higher mean vehicle weight and a higher than normal traffic rate may be justified when performing a worst-case analysis of emissions from unpaved roads.

The emission factors for the exhaust, brake wear and tire wear of a 1980's vehicle fleet (*C*) was obtained from EPA's MOBILE6.2 model [23]. The emission factor also varies with aerodynamic size range

average uncontrolled conditions (but including natural mitigation) under the simplifying assumption that annual average emissions are inversely proportional to the number of days with measurable (more than 0.254 mm [0.01 inch]) precipitation:

$$E_{ext} = E\ [(365 - P)/365] \quad (2)$$

where:

E_{ext} = annual size-specific emission factor extrapolated for natural mitigation, lb/VMT

E = emission factor from Equation 1a or 1b

P = number of days in a year with at least 0.254 mm (0.01 in) of precipitation (see below)

Figure 13.2.2-1 gives the geographical distribution for the mean annual number of "wet" days for the United States.

Equation 2 provides an estimate that accounts for precipitation on an annual average basis for the purpose of inventorying emissions. It should be noted that Equation 2 does not account for differences in the temporal distributions of the rain events, the quantity of rain during any event, or the potential for the rain to evaporate from the road surface. In the event that a finer temporal and spatial resolution is desired for inventories of public unpaved roads, estimates can be based on a more complex set of assumptions. These assumptions include:

1. The moisture content of the road surface material is increased in proportion to the quantity of water added;
2. The moisture content of the road surface material is reduced in proportion to the Class A pan evaporation rate;
3. The moisture content of the road surface material is reduced in proportion to the traffic volume; and
4. The moisture content of the road surface material varies between the extremes observed in the area. The CHIEF Web site (http://www.epa.gov/ttn/chief/ap42/ch13/related/c13s02-2.html) has a file which contains a spreadsheet program for calculating emission factors which are temporally and spatially resolved. Information required for use of the spreadsheet program includes monthly Class A pan evaporation values, hourly meteorological data for precipitation, humidity and snow cover, vehicle traffic information, and road surface material information.

It is emphasized that the simple assumption underlying Equation 2 and the more complex set of assumptions underlying the use of the procedure which produces a finer temporal and spatial resolution have not been verified in any rigorous manner. For this reason, the quality ratings for either approach should be downgraded one letter from the rating that would be applied to Equation 1.

13.2.2.3 Controls[18-22]

A wide variety of options exist to control emissions from unpaved roads. Options fall into the following three groupings:

1. Vehicle restrictions that limit the speed, weight or number of vehicles on the road;

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES[a]
(SCC 2-02-002-54)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO_x[c] 90 - 105% Load	4.08 E+00	B
NO_x[c] <90% Load	8.47 E-01	B
CO[c] 90 - 105% Load	3.17 E-01	C
CO[c] <90% Load	5.57 E-01	B
CO_2[d]	1.10 E+02	A
SO_2[e]	5.88 E-04	A
TOC[f]	1.47 E+00	A
Methane[g]	1.25 E+00	C
VOC[h]	1.18 E-01	C
PM10 (filterable)[i]	7.71 E-05	D
PM2.5 (filterable)[i]	7.71 E-05	D
PM Condensable[j]	9.91 E-03	D
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane[k]	<4.00 E-05	E
1,1,2-Trichloroethane[k]	<3.18 E-05	E
1,1-Dichloroethane	<2.36 E-05	E
1,2,3-Trimethylbenzene	2.30 E-05	D
1,2,4-Trimethylbenzene	1.43 E-05	C
1,2-Dichloroethane	<2.36 E-05	E
1,2-Dichloropropane	<2.69 E-05	E
1,3,5-Trimethylbenzene	3.38 E-05	D
1,3-Butadiene[k]	2.67E-04	D
1,3-Dichloropropene[k]	<2.64 E-05	E
2-Methylnaphthalene[k]	3.32 E-05	C
2,2,4-Trimethylpentane[k]	2.50 E-04	C
Acenaphthene[k]	1.25 E-06	C

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES (Continued)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Acenaphthylene[k]	5.53 E-06	C
Acetaldehyde[k,l]	8.36 E-03	A
Acrolein[k,l]	5.14 E-03	A
Benzene[k]	4.40 E-04	A
Benzo(b)fluoranthene[k]	1.66 E-07	D
Benzo(e)pyrene[k]	4.15 E-07	D
Benzo(g,h,i)perylene[k]	4.14 E-07	D
Biphenyl[k]	2.12 E-04	D
Butane	5.41 E-04	D
Butyr/Isobutyraldehyde	1.01 E-04	C
Carbon Tetrachloride[k]	<3.67 E-05	E
Chlorobenzene[k]	<3.04 E-05	E
Chloroethane	1.87 E-06	D
Chloroform[k]	<2.85 E-05	E
Chrysene[k]	6.93 E-07	C
Cyclopentane	2.27 E-04	C
Ethane	1.05 E-01	C
Ethylbenzene[k]	3.97 E-05	B
Ethylene Dibromide[k]	<4.43 E-05	E
Fluoranthene[k]	1.11 E-06	C
Fluorene[k]	5.67 E-06	C
Formaldehyde[k,l]	5.28 E-02	A
Methanol[k]	2.50 E-03	B
Methylcyclohexane	1.23 E-03	C
Methylene Chloride[k]	2.00 E-05	C
n-Hexane[k]	1.11 E-03	C
n-Nonane	1.10 E-04	C

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES
(Continued)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
n-Octane	3.51 E-04	C
n-Pentane	2.60 E-03	C
Naphthalene[k]	7.44 E-05	C
PAH[k]	2.69 E-05	D
Phenanthrene[k]	1.04 E-05	D
Phenol[k]	2.40 E-05	D
Propane	4.19 E-02	C
Pyrene[k]	1.36 E-06	C
Styrene[k]	<2.36 E-05	E
Tetrachloroethane[k]	2.48 E-06	D
Toluene[k]	4.08 E-04	B
Vinyl Chloride[k]	1.49 E-05	C
Xylene[k]	1.84 E-04	B

[a] Reference 7. Factors represent uncontrolled levels. For NO_x, CO, and PM10, "uncontrolled" means no combustion or add-on controls; however, the factor may include turbocharged units. For all other pollutants, "uncontrolled" means no oxidation control; the data set may include units with control techniques used for NOx control, such as PCC and SCR for lean burn engines, and PSC for rich burn engines. Factors are based on large population of engines. Factors are for engines at all loads, except as indicated. SCC = Source Classification Code. TOC = Total Organic Compounds. PM-10 = Particulate Matter ≤ 10 microns (μm) aerodynamic diameter. A "<" sign in front of a factor means that the corresponding emission factor is based on one-half of the method detection limit.

[b] Emission factors were calculated in units of (lb/MMBtu) based on procedures in EPA Method 19. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by the heat content of the fuel. If the heat content is not available, use 1020 Btu/scf. To convert from (lb/MMBtu) to (lb/hp-hr) use the following equation:

$$\text{lb/hp-hr} = (\text{lb/MMBtu})\ (\text{heat input, MMBtu/hr})\ (1/\text{operating HP, 1/hp})$$

[c] Emission tests with unreported load conditions were not included in the data set.

[d] Based on 99.5% conversion of the fuel carbon to CO_2. CO_2 [lb/MMBtu] = (3.67)(%CON)(C)(D)(1/h), where %CON = percent conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.75), D = density of fuel, 4.1 E+04 lb/10^6 scf, and

where:

L_T = transit loss from ships and barges, lb/week-10^3 gal transported
P = true vapor pressure of the transported liquid, psia
W = density of the condensed vapors, lb/gal

Emissions from gasoline truck cargo tanks during transit have been studied by a combination of theoretical and experimental techniques, and typical emission values are presented in Table 5.2-5.[11-12] Emissions depend on the extent of venting from the cargo tank during transit, which in turn depends on the vapor tightness of the tank, the pressure relief valve settings, the pressure in the tank at the start of the trip, the vapor pressure of the fuel being transported, and the degree of fuel vapor saturation of the space in the tank. The emissions are not directly proportional to the time spent in transit. If the vapor leakage rate of the tank increases, emissions increase up to a point, and then the rate changes as other determining factors take over. Truck tanks in dedicated vapor balance service usually contain saturated vapors, and this leads to lower emissions during transit because no additional fuel evaporates to raise the pressure in the tank to cause venting. Table 5.2-5 lists "typical" values for transit emissions and "extreme" values that could occur in the unlikely event that all determining factors combined to cause maximum emissions.

Table 5.2-5 (Metric And English Units). TOTAL UNCONTROLLED ORGANIC EMISSION FACTORS FOR PETROLEUM LIQUID RAIL TANK CARS AND TANK TRUCKS

Emission Source	Gasoline[a]	Crude Oil[b]	Jet Naphtha (JP-4)	Jet Kerosene	Distillate Oil No. 2	Residual Oil No. 6
Loading operations[c]						
Submerged loading - Dedicated normal service[d]						
mg/L transferred	590	240	180	1.9	1.7	0.01
lb/10^3 gal transferred	5	2	1.5	0.016	0.014	0.0001
Submerged loading - Vapor balance service[d]						
mg/L transferred	980	400	300	—[e]	—[e]	—[e]
lb/10^3 gal transferred	8	3	2.5	—[e]	—[e]	—[e]
Splash loading - Dedicated normal service						
mg/L transferred	1,430	580	430	5	4	0.03
lb/10^3 gal transferred	12	5	4	0.04	0.03	0.0003
Splash loading - Vapor balance service						
mg/L transferred	980	400	300	—[e]	—[e]	—[e]
lb/10^3 gal transferred	8	3	2.5	—[e]	—[e]	—[e]

Table 5.2-5 (cont.).

Emission Source	Gasoline[a]	Crude Oil[b]	Jet Naphtha (JP-4)	Jet Kerosene	Distillate Oil No. 2	Residual Oil No. 6
Transit losses						
Loaded with product						
mg/L transported						
Typical	0 - 1.0	ND	ND	ND	ND	ND
Extreme	0 - 9.0	ND	ND	ND	ND	ND
lb/10^3 gal transported						
Typical	0 - 0.01	ND	ND	ND	ND	ND
Extreme	0 - 0.08	ND	ND	ND	ND	ND
Return with vapor						
mg/L transported						
Typical	0 - 13.0	ND	ND	ND	ND	ND
Extreme	0 - 44.0	ND	ND	ND	ND	ND
lb/10^3 gal transported						
Typical	0 - 0.11	ND	ND	ND	ND	ND
Extreme	0 - 0.37	ND	ND	ND	ND	ND

[a] Reference 2. Gasoline factors represent emissions of VOC as well as total organics, because methane and ethane constitute a negligible weight fraction of the evaporative emissions from gasoline. VOC factors for crude oil can be assumed to be 15% lower than the total organic factors, to account for the methane and ethane content of crude oil evaporative emissions. All other products should be assumed to have VOC factors equal to total organics. The example gasoline has an RVP of 69 kPa (10 psia). ND = no data.
[b] The example crude oil has an RVP of 34 kPa (5 psia).
[c] Loading emission factors are calculated using Equation 1 for a dispensed product temperature of 16°C (60°F).
[d] Reference 2.
[e] Not normally used.

In the absence of specific inputs for Equations 1 through 5, the typical evaporative emission factors presented in Tables 5.2-5 and 5.2-6 should be used. It should be noted that, although the crude oil used to calculate the emission values presented in these tables has an RVP of 5, the RVP of crude oils can range from less than 1 up to 10. Similarly, the RVP of gasolines ranges from 7 to 13. In areas where loading and transportation sources are major factors affecting air quality, it is advisable to obtain the necessary parameters and to calculate emission estimates using Equations 1 through 5.

5.2.2.2 Service Stations -

Another major source of evaporative emissions is the filling of underground gasoline storage tanks at service stations. Gasoline is usually delivered to service stations in 30,000-liter (8,000-gal) tank trucks or smaller account trucks. Emissions are generated when gasoline vapors in the underground storage tank are displaced to the atmosphere by the gasoline being loaded into the tank. As with other loading losses, the quantity of loss in service station tank filling depends on several variables, including the method and rate of filling, the tank configuration, and the gasoline temperature, vapor pressure and composition. An average emission rate for submerged filling is 880 mg/L (7.3 lb/1000 gal) of transferred gasoline, and the rate for splash filling is 1380 mg/L (11.5 lb/1000 gal) transferred gasoline (see Table 5.2-7).[5]

EMISSIONS FACTORS FOR EQUIPMENT LEAK FUGITIVE COMPONENTS

Technical Disclaimer

This document is intended to help you accurately determine equipment leak fugitive emissions. It does not supersede or replace any state or federal law, rule, or regulation.

This guidance reflects the current understanding of how piping components work and how they generate emissions, how they are monitored or tested, and what data are available for emissions determination, may change over time as we continue our scientific studies and as new information becomes available. We welcome any data, information, or feedback that may improve our understanding of equipment leak fugitive emissions and thereby further improve determinations within the emissions inventory.

The calculation methods represented are intended as an emissions calculation aid; alternate calculation methods may be equally acceptable if they are based upon, and adequately demonstrate, sound engineering assumptions or data. If you have a question regarding the acceptability of a given emissions determination method, contact the Emissions Assessment Section at 512-239-1773.

Introduction

This document provides emission factor guidance for determining equipment leak fugitive emissions from piping components and associated equipment at industrial facilities. It does not address emissions from cooling towers, oil/water separators, material stockpiles, loading operations, or other sources not related to piping components. Use this guidance in conjunction with *2007 Emissions Inventory Guidelines*, Appendix A, Technical Supplement 3: Equipment Leak Fugitives.

Guidance Available in This Document

This document provides appropriate emission factors to be used when determining emissions from piping component fugitives. Specifically, the emission factors included are:

- Correlation equations – synthetic organic chemical manufacturing industry (SOCMI);
- Correlation equations – petroleum industry;
- Average emission factors – SOCMI;
- Average emission factors – oil and gas production;
- Average emission factors – refinery; and
- Average emission factors – petroleum marketing terminal.

Table 4. Average Emission Factors - Petroleum Industry.

Equipment/Service	Petroleum Marketing Terminal [1]	Oil and Gas Production Operations [2]				Refinery [3]
		Gas	Heavy Oil <20° API	Light Oil >20° API	Water/ Light Oil	
Valves		0.00992	0.0000185	0.0055	0.000216	
Gas/Vapor	0.0000287	0.00992				0.059
Light Liquid	0.0000948					0.024
Heavy Liquid	0.0000948					0.000510
Pumps		0.00529	0.0011300	0.02866	0.00005290	
Light Liquid	0.00119					0.251
Heavy Liquid	0.00119					0.046
Flanges/Connectors		0.000860	0.00000086	0.000243	0.00000617	0.000550
Gas/Vapor	0.000092604	0.000860				
Light Liquid	0.00001762					
Heavy Liquid	0.00001720					
Compressors		0.0194	0.0000683	0.0165	0.0309	1.399
Relief Valve Gas/Vapor		0.0194	0.0000683	0.0165	0.0309	0.35
Open-ended Lines [4]		0.00441	0.0003090	0.00309	0.0006	0.0051
Sampling Connections [5]						0.033
Connectors		0.000440	0.0000165	0.0004630	0.000243	
Other [6]		0.0194	0.0000683	0.0165	0.0309	
Gas/Vapor	0.000265					
Light/heavy Liquid	0.000287					
Process Drains		0.0194	0.0000683	0.0165	0.0309	0.07

All factors are in units of (lb/hr)/component.

Notes:
1. Factors taken from EPA document EPA-453/R-95-017; November, 1995; pp. 2-14.
2. Factors taken from EPA document EPA-453/R-95-017; November, 1995; pp. 2-15.
3. Factors taken from EPA document EPA-453/R-95-017; November, 1995; pp. 2-13.
4. The 28 Series quarterly LDAR programs require open-ended lines to be equipped with a cap, blind flange, plug, or a second valve. If so equipped, open-ended lines may be given a 100% control credit.
5. Factor for Sampling Connections is in terms of pounds per hour per sample taken.
6. For Petroleum Marketing Terminals, ”Other” includes any component except fittings, pumps, and valves. For Oil & Gas Production Operations, “Other” includes diaphragms, dump arms, hatches, instruments, meters, polished rods, and vents.

GRI-HAPCalc ® 3.01
External Combustion Devices Report

Facility ID:	**0.75 MMBTU/HR HEATER**	**Notes:**
Operation Type:	**COMPRESSOR STATION**	
Facility Name:	**0.75 MMBTU/HR HEATER**	
User Name:		
Units of Measure:	**U.S. STANDARD**	

Note: Emissions less than 5.00E-09 tons (or tonnes) per year are considered insignificant and are treated as zero. These emissions are indicated on the report with a "0". Emissions between 5.00E-09 and 5.00E-05 tons (or tonnes) per year are represented on the report with "0.0000".

External Combustion Devices

Unit Name: 0.75 MMBTU

Hours of Operation:	8,760	Yearly
Heat Input:	0.75	MMBtu/hr
Fuel Type:	NATURAL GAS	
Device Type:	HEATER	
Emission Factor Set:	FIELD > EPA > LITERATURE	
Additional EF Set:	-NONE-	

Calculated Emissions (ton/yr)

Chemical Name	Emissions	Emission Factor	Emission Factor Set
HAPs			
3-Methylcholanthrene	0.0000	0.0000000018 lb/MMBtu	EPA
7,12-Dimethylbenz(a)anthracene	0.0000	0.0000000157 lb/MMBtu	EPA
Formaldehyde	0.0028	0.0008440090 lb/MMBtu	GRI Field
Methanol	0.0032	0.0009636360 lb/MMBtu	GRI Field
Acetaldehyde	0.0024	0.0007375920 lb/MMBtu	GRI Field
1,3-Butadiene	0.0011	0.0003423350 lb/MMBtu	GRI Field
Benzene	0.0025	0.0007480470 lb/MMBtu	GRI Field
Toluene	0.0033	0.0010163310 lb/MMBtu	GRI Field
Ethylbenzene	0.0069	0.0021128220 lb/MMBtu	GRI Field
Xylenes(m,p,o)	0.0043	0.0013205140 lb/MMBtu	GRI Field
2,2,4-Trimethylpentane	0.0093	0.0028417580 lb/MMBtu	GRI Field
n-Hexane	0.0046	0.0014070660 lb/MMBtu	GRI Field
Phenol	0.0000	0.0000001070 lb/MMBtu	GRI Field
Styrene	0.0068	0.0020788960 lb/MMBtu	GRI Field
Naphthalene	0.0000	0.0000005100 lb/MMBtu	GRI Field
2-Methylnaphthalene	0.0000	0.0000001470 lb/MMBtu	GRI Field
Acenaphthylene	0.0000	0.0000000670 lb/MMBtu	GRI Field
Biphenyl	0.0000	0.0000004730 lb/MMBtu	GRI Field
Acenaphthene	0.0000	0.0000000900 lb/MMBtu	GRI Field
Fluorene	0.0000	0.0000000800 lb/MMBtu	GRI Field
Anthracene	0.0000	0.0000000870 lb/MMBtu	GRI Field
Phenanthrene	0.0000	0.0000000600 lb/MMBtu	GRI Field
Fluoranthene	0.0000	0.0000000900 lb/MMBtu	GRI Field
Pyrene	0.0000	0.0000000830 lb/MMBtu	GRI Field
Benz(a)anthracene	0.0000	0.0000000870 lb/MMBtu	GRI Field

Chrysene	0.0000	0.0000001170	lb/MMBtu	GRI Field
Benzo(a)pyrene	0.0000	0.0000000700	lb/MMBtu	GRI Field
Benzo(b)fluoranthene	0.0000	0.0000001500	lb/MMBtu	GRI Field
Benzo(k)fluoranthene	0.0000	0.0000007600	lb/MMBtu	GRI Field
Benzo(g,h,i)perylene	0.0000	0.0000002600	lb/MMBtu	GRI Field
Indeno(1,2,3-c,d)pyrene	0.0000	0.0000001200	lb/MMBtu	GRI Field
Dibenz(a,h)anthracene	0.0000	0.0000001030	lb/MMBtu	GRI Field
Lead	0.0000	0.0000004902	lb/MMBtu	EPA
Total	0.0472			

Criteria Pollutants

VOC	0.0177	0.0053921569	lb/MMBtu	EPA
PM	0.0245	0.0074509804	lb/MMBtu	EPA
PM, Condensible	0.0184	0.0055882353	lb/MMBtu	EPA
PM, Filterable	0.0061	0.0018627451	lb/MMBtu	EPA
CO	0.1063	0.0323636360	lb/MMBtu	GRI Field
NMHC	0.0280	0.0085294118	lb/MMBtu	EPA
NOx	0.3187	0.0970167730	lb/MMBtu	GRI Field
SO2	0.0019	0.0005880000	lb/MMBtu	EPA

Other Pollutants

Dichlorobenzene	0.0000	0.0000011765	lb/MMBtu	EPA
Methane	0.0346	0.0105212610	lb/MMBtu	GRI Field
Acetylene	0.0460	0.0140000000	lb/MMBtu	GRI Field
Ethylene	0.0031	0.0009476310	lb/MMBtu	GRI Field
Ethane	0.0086	0.0026312210	lb/MMBtu	GRI Field
Propylene	0.0077	0.0023454550	lb/MMBtu	GRI Field
Propane	0.0035	0.0010686280	lb/MMBtu	GRI Field
Isobutane	0.0048	0.0014640770	lb/MMBtu	GRI Field
Butane	0.0045	0.0013766990	lb/MMBtu	GRI Field
Cyclopentane	0.0037	0.0011304940	lb/MMBtu	GRI Field
Pentane	0.0114	0.0034671850	lb/MMBtu	GRI Field
n-Pentane	0.0047	0.0014221310	lb/MMBtu	GRI Field
Cyclohexane	0.0030	0.0009183830	lb/MMBtu	GRI Field
Methylcyclohexane	0.0072	0.0022011420	lb/MMBtu	GRI Field
n-Octane	0.0094	0.0028538830	lb/MMBtu	GRI Field
1,2,3-Trimethylbenzene	0.0112	0.0034224540	lb/MMBtu	GRI Field
1,2,4-Trimethylbenzene	0.0112	0.0034224540	lb/MMBtu	GRI Field
1,3,5-Trimethylbenzene	0.0112	0.0034224540	lb/MMBtu	GRI Field
n-Nonane	0.0120	0.0036604170	lb/MMBtu	GRI Field
CO2	386.4706	117.6470588235	lb/MMBtu	EPA

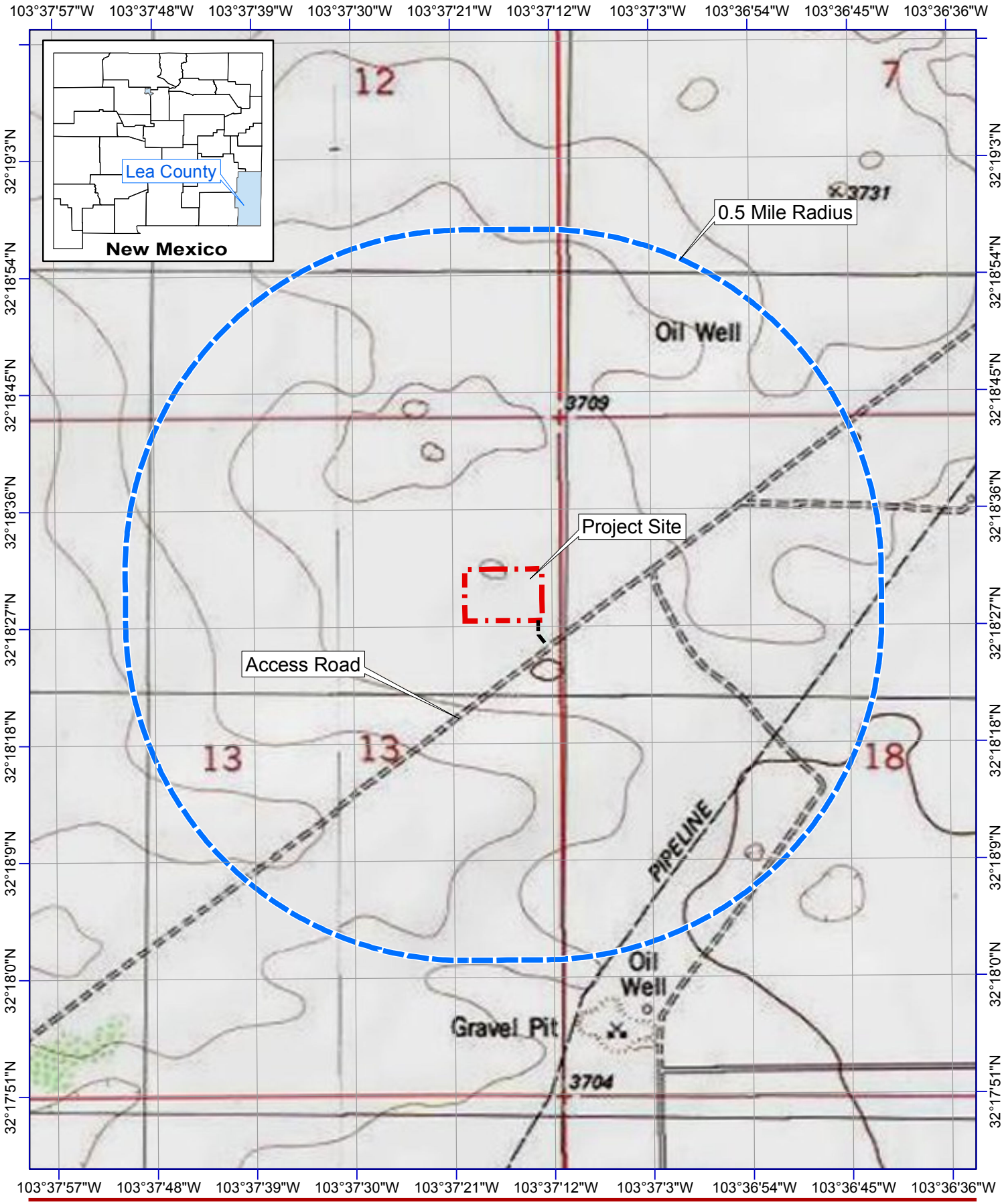
Section 8

Map(s)

A map such as a 7.5 minute topographic quadrangle showing the exact location of the source. The map shall also include the following:

The UTM or Longitudinal coordinate system on both axes	An indicator showing which direction is north
A minimum radius around the plant of 0.8km (0.5 miles)	Access and haul roads
Topographic features of the area	Facility property boundaries
The name of the map	The area which will be restricted to public access
A graphical scale	

A map is presented on the following page.



0 500 1,000
Feet

Coordinate System:
NAD 1983 2011 StatePlane New Mexico East FIPS 3001 Ft US

N

Contek Solutions LLC

LUCID ENERGY DELAWARE, LLC
LEA COUNTY, NEW MEXICO
BIG LIZARD COMPRESSOR STATION

07021-23
Oct 2, 2019

SITE LOCATION MAP

FIGURE 3

Section 9

Proof of Public Notice

(for NSR applications submitting under 20.2.72 or 20.2.74 NMAC)

(This proof is required by: 20.2.72.203.A.14 NMAC "Documentary Proof of applicant's public notice")

Public notice is not required for this application as it is for a Title V permit submitted under 20.2.70 NMAC. Public notice was last completed for this site with the NSR permit application submitted in July 2019.

Section 10

Written Description of the Routine Operations of the Facility

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A written description of the routine operations of the facility. Include a description of how each piece of equipment will be operated, how controls will be used, and the fate of both the products and waste generated. For modifications and/or revisions, explain how the changes will affect the existing process. In a separate paragraph describe the major process bottlenecks that limit production. The purpose of this description is to provide sufficient information about plant operations for the permit writer to determine appropriate emission sources.

Description of Operations:

Low pressure field gas is gathered from various wells in the area. The gas is compressed by natural gas engine driven compressors. Natural gas combustion in internal combustion compressor engines is considered to generate emissions of nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC) - which include several HAPs. Maximum emissions from the compressor engine are calculated based on emission factors provided by the manufacturers. All emission values listed in the application forms for the engines corresponds to 100% load at maximum engine speed.

Minor amounts of hydrocarbon liquids and water are collected in the inlet separator and are stored in atmospheric storage tanks. Hydrocarbon liquids condensed during the compression process, is dumped back into the station's discharge line to be delivered to gas plants where stabilization can occur.

Once the gas is compressed, it is treated by an amine system for carbon dioxide removal. The amine system incorporates two sources of air emissions: (1) gas-fired reboiler burners, and (2) gas vent that is controlled by a control flare. This registration includes one amine system and two associated reboilers.

After amine treatment, it is treated using a glycol dehydration system to remove entrained water. The glycol dehydration unit incorporates two distinct sources of air emissions: (1) gas-fired reboiler burners, and (2) a glycol recovery still. Emissions generated in the reboiler burners exhaust to atmosphere through a distinct stack dedicated to the flow of combustion byproducts. This registration includes three dehydration systems and three reboilers. The maximum flowrate through each dehy system is 30 MMscfd for Dehy-1 and 2, and 20 MMscfd for Dehy-3. However, the gas flowrate through the dehy unit is limited by the engine capacity, and field conditions.

Emissions from the glycol recovery still consist of water vapor and various volatile organic compounds (VOC), including several hazardous air pollutants (HAPs). The vent stream from the glycol recovery still is controlled by a condenser. Noncondensable vapors passing through the condenser are routed to the reboiler fuel system for further control of emissions. Maximum emissions from the glycol recovery still are calculated in accordance with department policy using *Promax*, a software package developed by Bryan Research and Engineering. A maximum gas processing rate of 30 MMscfd and a maximum glycol recirculation rate of 12 gal/min are used to calculate maximum potential emissions from the unit. The composition of the wet gas introduced to the glycol dehydration unit was based off a representative sample taken at a facility operating in a similar manner, using appropriate analytical techniques. This information was entered to the program to calculate emissions from the glycol recovery still.

The glycol dehydration unit is also equipped with a flash tank. The vent stream from the flash tank will not be allowed to vent to the atmosphere. The flash tank off gases will either be recovered as product or recovered as fuel. These emissions are calculated in the *Promax* program but are not summed in the facility emissions.

The units will be equipped with a condenser/incinerator device (i.e. reboiler) to control VOC and HAP emissions. The emissions from the recovery still will be condensed and the liquid phase will be pumped to the oily wastewater tank on-site. The gaseous phase will be incinerated in the reboiler burner or routed to the station inlet. The overall destruction efficiency of this control device will be at a minimum 95%, possibly greater.

The dehydrated gas is discharged from the station via pipeline to gas processing plants.

Section 11
Source Determination

Source submitting under 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC

Sources applying for a construction permit, PSD permit, or operating permit shall evaluate surrounding and/or associated sources (including those sources directly connected to this source for business reasons) and complete this section. Responses to the following questions shall be consistent with the Air Quality Bureau's permitting guidance, Single Source Determination Guidance, which may be found on the Applications Page in the Permitting Section of the Air Quality Bureau website.

Typically, buildings, structures, installations, or facilities that have the same SIC code, that are under common ownership or control, and that are contiguous or adjacent constitute a single stationary source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes. Submission of your analysis of these factors in support of the responses below is optional, unless requested by NMED.

A. Identify the emission sources evaluated in this section (list and describe)**:**

Big Lizard Compressor Station (see Form UA2 for a list of equipment)

B. Apply the 3 criteria for determining a single source:

SIC Code: Surrounding or associated sources belong to the same 2-digit industrial grouping (2-digit SIC code) as this facility, OR surrounding or associated sources that belong to different 2-digit SIC codes are support facilities for this source.

X Yes **☐ No**

Common Ownership or Control: Surrounding or associated sources are under common ownership or control as this source.

X Yes **☐ No**

Contiguous or Adjacent: Surrounding or associated sources are contiguous or adjacent with this source.

X Yes **☐ No**

C. Make a determination:

X The source, as described in this application, constitutes the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes. If in "A" above you evaluated only the source that is the subject of this application, all "**YES**" boxes should be checked. If in "A" above you evaluated other sources as well, you must check **AT LEAST ONE** of the boxes "**NO**" to conclude that the source, as described in the application, is the entire source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes.

☐ The source, as described in this application, **does not** constitute the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes (A permit may be issued for a portion of a source). The entire source consists of the following facilities or emissions sources (list and describe):

Section 12

Section 12.A
PSD Applicability Determination for All Sources

(Submitting under 20.2.72, 20.2.74 NMAC)

This section is not required for this application as it is for a Title V permit submitted under 20.2.70 NMAC.

Section 13

Determination of State & Federal Air Quality Regulations

This section lists each state and federal air quality regulation that may apply to your facility and/or equipment that are stationary sources of regulated air pollutants.

Not all state and federal air quality regulations are included in this list. Go to the Code of Federal Regulations (CFR) or to the Air Quality Bureau's regulation page to see the full set of air quality regulations.

Required Information for Specific Equipment:
For regulations that apply to specific source types, in the 'Justification' column **provide any information needed to determine if the regulation does or does not apply**. **For example**, to determine if emissions standards at 40 CFR 60, Subpart IIII apply to your three identical stationary engines, we need to know the construction date as defined in that regulation; the manufacturer date; the date of reconstruction or modification, if any; if they are or are not fire pump engines; if they are or are not emergency engines as defined in that regulation; their site ratings; and the cylinder displacement.

Required Information for Regulations that Apply to the Entire Facility:
See instructions in the 'Justification' column for the information that is needed to determine if an 'Entire Facility' type of regulation applies (e.g. 20.2.70 or 20.2.73 NMAC).

Regulatory Citations for Regulations That Do Not, but Could Apply:
If there is a state or federal air quality regulation that does not apply, but you have a piece of equipment in a source category for which a regulation has been promulgated, you must **provide the low level regulatory citation showing why your piece of equipment is not subject to or exempt from the regulation. For example** if you have a stationary internal combustion engine that is not subject to 40 CFR 63, Subpart ZZZZ because it is an existing 2 stroke lean burn stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, your citation would be 40 CFR 63.6590(b)(3)(i). **We don't want a discussion of every non-applicable regulation, but if it is possible a regulation could apply, explain why it does not. For example,** if your facility is a power plant, you do not need to include a citation to show that 40 CFR 60, Subpart OOO does not apply to your non-existent rock crusher.

Regulatory Citations for Emission Standards:
For each unit that is subject to an emission standard in a source specific regulation, such as 40 CFR 60, Subpart OOO or 40 CFR 63, Subpart HH, include the low level regulatory citation of that emission standard. Emission standards can be numerical emission limits, work practice standards, or other requirements such as maintenance. **Here are examples:** a glycol dehydrator is subject to the general standards at 63.764C(1)(i) through (iii); an engine is subject to 63.6601, Tables 2a and 2b; a crusher is subject to 60.672(b), Table 3 and all transfer points are subject to 60.672(e)(1)

Federally Enforceable Conditions:
All federal regulations are federally enforceable. All Air Quality Bureau State regulations are federally enforceable except for the following: affirmative defense portions at 20.2.7.6.B, 20.2.7.110(B)(15), 20.2.7.11 through 20.2.7.113, 20.2.7.115, and 20.2.7.116; 20.2.37; 20.2.42; 20.2.43; 20.2.62; 20.2.63; 20.2.86; 20.2.89; and 20.2.90 NMAC. Federally enforceable means that EPA can enforce the regulation as well as the Air Quality Bureau and federally enforceable regulations can count toward determining a facility's potential to emit (PTE) for the Title V, PSD, and nonattainment permit regulations.

INCLUDE ANY OTHER INFORMATION NEEDED TO COMPLETE AN APPLICABILITY DETERMINATION OR THAT IS RELEVENT TO YOUR FACILITY'S NOTICE OF INTENT OR PERMIT.

EPA Applicability Determination Index for 40 CFR 60, 61, 63, etc: http://cfpub.epa.gov/adi/

Table for STATE REGULATIONS:

STATE REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.1 NMAC	General Provisions	Yes	Facility	General Provisions apply to Notice of Intent, Construction, and Title V permit applications.
20.2.3 NMAC	Ambient Air Quality Standards NMAAQS	Yes	Facility	Lucid will meet all applicable requirements under 20.2.3 NMAC.
20.2.7 NMAC	Excess Emissions	Yes	Facility	This regulation establishes requirements for the facility if operations at the facility result in any excess emissions. The owner or operator will operate the source at the facility having an excess emission, to the extent practicable, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions. The facility will also notify the NMED of any excess emission per 20.2.7.110 NMAC.
20.2.33 NMAC	Gas Burning Equipment - Nitrogen Dioxide	No	N/A	This facility does not include new gas burning equipment (external combustion emission sources, such as gas fired boilers and heaters) having a heat input of greater than 1,000,000 million British Thermal Units per year per unit.
20.2.34 NMAC	Oil Burning Equipment: NO_2	No	N/A	This facility has no oil burning equipment having a heat input of greater than 1,000,000 million British Thermal Units per year per unit.
20.2.35 NMAC	Natural Gas Processing Plant – Sulfur	No	N/A	The purpose of this regulation is to establish sulfur emissions standards for natural gas processing plants [20.2.35.6 NMAC]. This facility is not a natural gas processing plant as defined in the regulation [20.2.35.7 NMAC]. As this facility is not defined as a natural gas processing plant under this regulation, the facility is not subject to this regulation.
20.2.37 and 20.2.36 NMAC	Petroleum Processing Facilities and Petroleum Refineries	N/A	N/A	**These regulations were repealed by the Environmental Improvement Board. If you had equipment subject to 20.2.37 NMAC before the repeal, your combustion emission sources are now subject to 20.2.61 NMAC.**
20.2.38 NMAC	Hydrocarbon Storage Facility	No	N/A	As this facility is not considered a petroleum production facility or tank battery, this rule does not apply.
20.2.39 NMAC	Sulfur Recovery Plant - Sulfur	No	N/A	This facility is not a sulfur recovery plant. This regulation does not apply.
20.2.61.109 NMAC	Smoke & Visible Emissions	Yes	3347, 3346, 3171, 3155, 3338, 3339, 3319, 3240, ENG-9, ENG-10, RBL-1, RBL-2, RBL-3, AU-RB1, AU-RB2	This regulation that limits opacity to 20% applies to Stationary Combustion Equipment, such as engines, boilers, heaters, and flares unless your equipment is subject to another state regulation that limits particulate matter such as 20.2.19 NMAC (see 20.2.61.109 NMAC).
20.2.70 NMAC	Operating Permits	Yes	Facility	This regulation establishes requirements for obtaining an operating permit. The facility is a Title V major source.
20.2.71 NMAC	Operating Permit Fees	Yes	Facility	If subject to 20.2.70 NMAC and your permit includes numerical ton per year emission limits, you are subject to 20.2.71 NMAC. Lucid will comply with the requirements of 20.2.71 NMAC once a Title V permit has been issued.
20.2.72 NMAC	Construction Permits	Yes	Facility	The Big Lizard Compressor Station operates under NSR permit number 7960-M2. Lucid will continue to comply with the NSR permit and 20.2.72 NMAC.

STATE REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.73 NMAC	NOI & Emissions Inventory Requirements	Yes	Facility	This is not a NOI facility. All facilities that are a Title V Major Source as defined at 20.2.70.7.R NMAC, are subject to Emissions Inventory Reporting; therefore, this rule applies.
20.2.74 NMAC	Permits – Prevention of Significant Deterioration (PSD)	No	N/A	This regulation establishes requirements for obtaining a prevention of significant deterioration permit. The facility does not have the potential to emit greater than 250 tons per year of any criteria pollutant and, therefore, is not subject to this regulation.
20.2.75 NMAC	Construction Permit Fees	No	N/A	This regulation does not apply because the application is for a Title V permit submitted under 20.2.70 NMAC.
20.2.77 NMAC	New Source Performance	Yes	3347, 3346, 3171, 3155, 3338, 3339, 3319, 3240, ENG-9, ENG-10, FUG-1	The engines are subject to NSPS JJJJ. NSPS OOOOa applies to the compressors and fugitive components.
20.2.78 NMAC	Emission Standards for HAPS	No	N/A	Facility emits Hazardous Air Pollutants which are not subject to the requirements of 40 CFR 61.
20.2.79 NMAC	Permits – Nonattainment Areas	No	N/A	This regulation establishes the requirements for obtaining a non-attainment area permit. The facility is not located in a non-attainment area and therefore is not subject to this regulation.
20.2.80 NMAC	Stack Heights	No	N/A	Usually not applicable for TV.
20.2.82 NMAC	MACT Standards for source categories of HAPS	Yes	Facility	Facility Emits Hazardous Air Pollutants which are subject to 40 CFR 63.760.

Table for FEDERAL REGULATIONS:

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
40 CFR 50	NAAQS	Yes	Facility	This applies if you are subject to 20.2.70, 20.2.72, 20.2.74, and/or 20.2.79 NMAC. As this application is being submitted under 20.2.70 NMAC, this regulation applies.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR 60, Subpart A	General Provisions	Yes	3347, 3346, 3171, 3155, 3338, 3339, 3319, 3240, ENG-9, ENG-10, FUG-1	The engines are subject to NSPS JJJJ, the compressors are subject to NSPS OOOOa, and fugitive components are subject to NSPS OOOOa.
NSPS 40 CFR60.40a, Subpart Da	Subpart Da, Performance Standards for **Electric Utility Steam Generating Units**	No	N/A	This Facility does not operate any electric utility steam generating units.
NSPS 40 CFR60.40b Subpart Db	**Electric Utility Steam Generating Units**	No	N/A	This Facility does not operate any electric utility steam generating units.
40 CFR 60.40c, Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	No	N/A	This Facility does not operate any steam generating units.
NSPS 40 CFR 60, Subpart Ka	Standards of Performance for **Storage Vessels for Petroleum Liquids** for which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and **Prior** to July 23, 1984	No	N/A	This facility does not operate storage vessels constructed between May 18, 1978 and July 23, 1984.
NSPS 40 CFR 60, Subpart Kb	Standards of Performance for **Volatile Organic Liquid Storage Vessels** (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced **After** July 23, 1984	No	N/A	This facility does not have storage vessels with design capacities >75m^3
NSPS 40 CFR 60.330 Subpart GG	**Stationary Gas Turbines**	No	N/A	This Facility does not operate stationary gas turbines with a heat input equal to or greater than 10 million Btu per hour.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR 60, Subpart KKK	Leaks of VOC from **Onshore Gas Plants**	No	N/A	This facility will have commenced construction after August 23, 2011. Thus the facility is not subject to this subpart.
NSPS 40 CFR Part 60 Subpart LLL	Standards of Performance for **Onshore Natural Gas Processing**: SO_2 Emissions	No	N/A	This facility will have commenced construction after August 23, 2011. Thus the facility is not subject to this subpart.
NSPS 40 CFR Part 60 Subpart OOOO	Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution for which construction, modification or reconstruction commenced after August 23, 2011 and before September 18, 2015	No	N/A	None of the equipment onsite was constructed between the dates of August 23, 2011 and September 18, 2015; therefore, OOOO does not apply.
NSPS 40 CFR Part 60 Subpart OOOOa	Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015	Yes	3347, 3346, 3171, 3155, 3338, 3339, 3319, 3240, ENG-9, ENG-10, FUG-1	The compressors associated with the engines are subject to OOOOa. TK-1, TK-2, TK-3, and TK-4 emit less than 6tpy of VOC, therefore they are not subject to this subpart. Facility fugitives (FUG) are subject to this subpart.
NSPS 40 CFR 60 Subpart IIII	Standards of performance for Stationary Compression Ignition Internal Combustion Engines	No	N/A	This facility does not operate stationary compression ignition internal combustion engines.
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	Yes	3347, 3346, 3171, 3155, 3338, 3339, 3319, 3240, ENG-9, ENG-10	The compressors associated with the engines are subject to JJJJ as they are considered new 4SLB engines rated between 1380-hp and 2500-hp.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR 60 Subpart TTTT	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units	No	N/A	This facility does not operate steam generating units, IGCCs, or stationary combustions turbines.
NSPS 40 CFR 60 Subpart UUUU	Emissions Guidelines for Greenhouse Gas Emissions and Compliance Times for Electric Utility Generating Units	No	N/A	This facility does not operate steam generating units, IGCCs, or stationary combustions turbines.
NSPS 40 CFR 60, Subparts WWW, XXX, Cc, and Cf	Standards of performance for Municipal Solid Waste (MSW) Landfills	No	N/A	This facility is not a municipal solid waste landfill.
NESHAP 40 CFR 61 Subpart A	General Provisions	No	N/A	Applies if any other Subpart in 40 CFR 61 applies.
NESHAP 40 CFR 61 Subpart E	National Emission Standards for **Mercury**	No	N/A	The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge
NESHAP 40 CFR 61 Subpart V	National Emission Standards for **Equipment Leaks** (Fugitive Emission Sources)	No	N/A	The provisions of this subpart apply to each of the following sources that are intended to operate in volatile hazardous air pollutant (VHAP) service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by this subpart. VHAP service means a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight of VHAP. VHAP means a substance regulated under this subpart for which a standard for equipment leaks of the substance has been promulgated. Benzene is a VHAP (See 40 CFR 61 Subpart J). Link to 40 CFR 61 Subpart V Note: If 40 CFR 60 also applies source only needs to comply with this part. This facility does not service gas or liquids that are 10 percent by weight VHAP, therefore is not subject to this subpart.
MACT 40 CFR 63, Subpart A	General Provisions	Yes	Facility	Applies if any other Subpart in 40 CFR 63 applies.
MACT 40 CFR 63.760 Subpart HH	**Oil and Natural Gas Production Facilities**	Yes	Dehy-1, Dehy-2, Dehy-3	This facility is subject to the requirements of 40 CFR 63 Subpart HH.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
MACT 40 CFR 63 Subpart HHH	National Emission Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities	No	N/A	This facility is not a natural gas transmission or storage facility. Thus, this subpart does not apply.
MACT 40 CFR 63 Subpart DDDDD	National Emission Standards for Hazardous Air Pollutants for Major Industrial, Commercial, and Institutional Boilers & Process Heaters	No	N/A	Facility is not a major source for HAPs, therefore, this regulation is not applicable.
MACT 40 CFR 63 Subpart UUUUU	National Emission Standards for Hazardous Air Pollutants Coal & Oil Fire Electric Utility Steam Generating Unit	No	N/A	This facility does not operate coal- or oil-fired electric utility steam generating units.
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (**RICE MACT**)	Yes	3347, 3346, 3171, 3155, 3338, 3339, 3319, 3240, ENG-9, ENG-10	The engines are subject to this subpart, however the requirements of this subpart are being met by meeting the requirements of NSPS JJJJ, as stated under §63.6590(c)(1).
40 CFR 64	**Compliance Assurance Monitoring**	No	N/A	The compressor engines have pre-control CO, VOC, and HAP emissions greater than major source thresholds, however, they are subject to NSPS JJJJ and are therefore exempt from CAM requirements pursuant to 40 CFR 64.2(b)(1)(i). CAM is not applicable to all other equipment onsite as none are major in and of itself and that use controls to comply with a regulatory requirement.
40 CFR 68	**Chemical Accident Prevention**	No	N/A	This facility is exempt from being subject to this chapter as it handles naturally occurring hydrocarbon mixtures as stated in §68.115(b)(2)(iii).
Title IV – Acid Rain 40 CFR 72	**Acid Rain**	No	N/A	Not applicable as this facility does not generates commercial electric power or electric power for sale.
Title IV – Acid Rain 40 CFR 73	**Sulfur Dioxide** Allowance Emissions	No	N/A	Not applicable as this facility does not generates commercial electric power or electric power for sale.
Title IV-Acid Rain 40 CFR 75	**Continuous Emissions Monitoring**	No	N/A	Not applicable as this facility does not generates commercial electric power or electric power for sale.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
Title IV – Acid Rain 40 CFR 76	**Acid Rain** Nitrogen Oxides **Emission Reduction Program**	No	N/A	Not applicable as this facility does not generates commercial electric power or electric power for sale.
Title VI – 40 CFR 82	Protection of **Stratospheric Ozone**	No	N/A	Not applicable as the facility does not do any of the following: **(40 CFR 82.1 and 82.100)** produce, transform, destroy, import or export a controlled substance or import or export a controlled product; **(40 CFR 82.30)** if you perform service on a motor vehicle for consideration when this service involves the refrigerant in the motor vehicle air conditioner; **(40 CFR 82.80)** if you are a department, agency, and instrumentality of the United States subject to Federal procurement requirements; **(82.150)** if you service, maintain, or repair appliances, dispose of appliances, refrigerant reclaimers, **if you are an owner or operator of an appliance**, if you are a manufacturer of appliances or of recycling and recovery equipment, if you are an approved recycling and recovery equipment testing organization, and/or if you sell or offer for sell or purchase class I or class I refrigerants. **Note:** Owners and operators of appliances subject to 40 CFR 82.150 Recycling and Emissions Reduction have recordkeeping and reporting requirements even if the owner/operator is not performing the actual work. **Note:** Disposal definition in 82.152: Disposal means the process leading to and including: (1) The discharge, deposit, dumping or placing of any discarded appliance into or on any land or water; (2) The disassembly of any appliance for discharge, deposit, dumping or placing of its discarded component parts into or on any land or water; or (3) The disassembly of any appliance for reuse of its component parts. “Major maintenance, service, or repair means” any maintenance, service, or repair that involves the removal of any or all of the following appliance components: compressor, condenser, evaporator, or auxiliary heat exchange coil; or any maintenance, service, or repair that involves uncovering an opening of more than four (4) square inches of “flow area” for more than 15 minutes.

Section 14

Operational Plan to Mitigate Emissions

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

☒ **Title V Sources** (20.2.70 NMAC)**:** By checking this box and certifying this application the permittee certifies that it has developed an **Operational Plan to Mitigate Emissions During Startups, Shutdowns, and Emergencies** defining the measures to be taken to mitigate source emissions during startups, shutdowns, and emergencies as required by **20.2.70.300.D.5(f) and (g) NMAC**. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.

☐ **NSR** (20.2.72 NMAC)**, PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has developed an **Operational Plan to Mitigate Source Emissions During Malfunction, Startup, or Shutdown** defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown as required by **20.2.72.203.A.5 NMAC**. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.

☒ **Title V** (20.2.70 NMAC)**, NSR** (20.2.72 NMAC)**, PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has established and implemented a Plan to Minimize Emissions During Routine or Predictable Startup, Shutdown, and Scheduled Maintenance through work practice standards and good air pollution control practices as required by **20.2.7.14.A and B NMAC**. This plan shall be kept on site or at the nearest field office to be made available to the Department upon request. This plan should not be submitted with this application.

- To the maximum extent practicable, the air pollution control equipment, process equipment, or processes, will be maintained and operated in a manner consistent with good practice for minimizing emissions;
- Repairs will be made in an expeditious fashion when the operator becomes aware that applicable emission limitations are being exceeded;
- Off-shift labor and overtime will be utilized, to the extent practicable, to ensure that such repairs were made as expeditiously as practicable;
- Scheduled maintenance will be planned ahead to coincide with maintenance on other production equipment, or other source shutdowns, to the extent practicable;
- The amount and duration of the excess emissions (including any during bypass) periods will be minimized to the maximum extent practicable;
- All possible steps will be taken to minimize the impact of the excess emissions on ambient air quality; and,
- The facility will monitor all operations to ensure that excess emissions are not part of a recurring pattern indicative of inadequate design, operation, or maintenance.

Section 15

Alternative Operating Scenarios

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

Alternative Operating Scenarios: Provide all information required by the department to define alternative operating scenarios. This includes process, material and product changes; facility emissions information; air pollution control equipment requirements; any applicable requirements; monitoring, recordkeeping, and reporting requirements; and compliance certification requirements. Please ensure applicable Tables in this application are clearly marked to show alternative operating scenario.

Construction Scenarios: When a permit is modified authorizing new construction to an existing facility, NMED includes a condition to clearly address which permit condition(s) (from the previous permit and the new permit) govern during the interval between the date of issuance of the modification permit and the completion of construction of the modification(s). There are many possible variables that need to be addressed such as: Is simultaneous operation of the old and new units permitted and, if so for example, for how long and under what restraints? In general, these types of requirements will be addressed in Section A100 of the permit, but additional requirements may be added elsewhere. Look in A100 of our NSR and/or TV permit template for sample language dealing with these requirements. Find these permit templates at: https://www.env.nm.gov/aqb/permit/aqb_pol.html. Compliance with standards must be maintained during construction, which should not usually be a problem unless simultaneous operation of old and new equipment is requested.

In this section, under the bolded title "Construction Scenarios", specify any information necessary to write these conditions, such as: conservative-realistic estimated time for completion of construction of the various units, whether simultaneous operation of old and new units is being requested (and, if so, modeled), whether the old units will be removed or decommissioned, any PSD ramifications, any temporary limits requested during phased construction, whether any increase in emissions is being requested as SSM emissions or will instead be handled as a separate Construction Scenario (with corresponding emission limits and conditions, etc.

There will not be any alternative operating scenarios for this facility.

Section 16

Air Dispersion Modeling

1) Minor Source Construction (20.2.72 NMAC) and Prevention of Significant Deterioration (PSD) (20.2.74 NMAC) ambient impact analysis (modeling): Provide an ambient impact analysis as required at 20.2.72.203.A(4) and/or 20.2.74.303 NMAC and as outlined in the Air Quality Bureau's Dispersion Modeling Guidelines found on the Planning Section's modeling website. If air dispersion modeling has been waived for one or more pollutants, attach the AQB Modeling Section modeling waiver approval documentation.
2) SSM Modeling: Applicants must conduct dispersion modeling for the total short term emissions during routine or predictable startup, shutdown, or maintenance (SSM) using realistic worst case scenarios following guidance from the Air Quality Bureau's dispersion modeling section. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions modeling requirements.
3) Title V (20.2.70 NMAC) ambient impact analysis: Title V applications must specify the construction permit and/or Title V Permit number(s) for which air quality dispersion modeling was last approved. Facilities that have only a Title V permit, such as landfills and air curtain incinerators, are subject to the same modeling required for preconstruction permits required by 20.2.72 and 20.2.74 NMAC.

What is the purpose of this application?	Enter an X for each purpose that applies
New PSD major source or PSD major modification (20.2.74 NMAC). See #1 above.	
New Minor Source or significant permit revision under 20.2.72 NMAC (20.2.72.219.D NMAC). See #1 above. **Note:** Neither modeling nor a modeling waiver is required for VOC emissions.	
Reporting existing pollutants that were not previously reported.	
Reporting existing pollutants where the ambient impact is being addressed for the first time.	
Title V application (new, renewal, significant, or minor modification. 20.2.70 NMAC). See #3 above.	X
Relocation (20.2.72.202.B.4 or 72.202.D.3.c NMAC)	
Minor Source Technical Permit Revision 20.2.72.219.B.1.d.vi NMAC for like-kind unit replacements.	
Other: i.e. SSM modeling. See #2 above.	
This application does not require modeling since this is a No Permit Required (NPR) application.	
This application does not require modeling since this is a Notice of Intent (NOI) application (20.2.73 NMAC).	
This application does not require modeling according to 20.2.70.7.E(11), 20.2.72.203.A(4), 20.2.74.303, 20.2.79.109.D NMAC and in accordance with the Air Quality Bureau's Modeling Guidelines.	

Check each box that applies:

☐ See attached, approved modeling **waiver for all** pollutants from the facility.
☐ See attached, approved modeling **waiver for some** pollutants from the facility.
☐ Attached in Universal Application Form 4 (UA4) is a **modeling report for all** pollutants from the facility.
☐ Attached in UA4 is a **modeling report for some** pollutants from the facility.
☒ No modeling is required.

Air dispersion modeling is not required with this application as it is for a Title V permit being submitted under 20.2.70 NMAC. Air dispersion modeling was last performed for this facility with the NSR permit application submitted in July 2019.

Section 17

Compliance Test History

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

To show compliance with existing NSR permits conditions, you must submit a compliance test history. The table below provides an example.

Compliance Test History Table

Unit Number	Testing Requirement	Date of Test
3347	Tested in accordance with EPA test methods for NOx, CO, and VOC under 40 CFR Part 60, Subpart JJJJ and as required under NSR permit 7960-M2.	5/23/2019, 8/19/2019, 11/14/2019, 5/27/2020
3346	Tested in accordance with EPA test methods for NOx, CO, and VOC under 40 CFR Part 60, Subpart JJJJ and as required under NSR permit 7960-M2.	5/23/2019, 8/19/2019, 11/14/2019, 5/27/2020
3171	Tested in accordance with EPA test methods for NOx, CO, and VOC under 40 CFR Part 60, Subpart JJJJ and as required under NSR permit 7960-M2.	5/22/2019, 8/19/2019, 11/14/2019, 5/26/2020
3155	Tested in accordance with EPA test methods for NOx, CO, and VOC under 40 CFR Part 60, Subpart JJJJ and as required under NSR permit 7960-M2.	5/22/2019, 8/19/2019, 11/14/2019, 5/26/2020
3338	Tested in accordance with EPA test methods for NOx, CO, and VOC under 40 CFR Part 60, Subpart JJJJ and as required under NSR permit 7960-M2.	2/18/2019, 8/19/2019, 11/14/2019, 5/28/2020
3339	Tested in accordance with EPA test methods for NOx, CO, and VOC under 40 CFR Part 60, Subpart JJJJ and as required under NSR permit 7960-M2.	2/18/2019, 8/19/2019, 11/14/2019, 5/28/2020
3319	Tested in accordance with EPA test methods for NOx, CO, and VOC under 40 CFR Part 60, Subpart JJJJ and as required under NSR permit 7960-M2.	5/28/2020
3240	Tested in accordance with EPA test methods for NOx, CO, and VOC under 40 CFR Part 60, Subpart JJJJ and as required under NSR permit 7960-M2.	5/28/2020
ENG-9	Engine has not yet been installed onsite.	N/A
ENG-10	Engine has not yet been installed onsite.	N/A

Section 18

Addendum for Streamline Applications

This Section is not applicable as this is not a streamline application.

Section 19

Requirements for Title V Program

Who Must Use this Attachment:

* Any major source as defined in 20.2.70 NMAC.
* Any source, including an area source, subject to a standard or other requirement promulgated under Section 111 - Standards of Performance for New Stationary Sources, or Section 112 Hazardous Air Pollutants, of the 1990 federal Clean Air Act ("federal Act"). Non-major sources subject to Sections 111 or 112 of the federal Act are exempt from the obligation to obtain an 20.2.70 NMAC operating permit until such time that the EPA Administrator completes rulemakings that require such sources to obtain operating permits. In addition, sources that would be required to obtain an operating permit solely because they are subject to regulations or requirements under Section 112(r) of the federal Act are exempt from the requirement to obtain an Operating Permit.
* Any Acid Rain source as defined under title IV of the federal Act. The Acid Rain program has additional forms. See http://www.env.nm.gov/aqb/index.html. Sources that are subject to both the Title V and Acid Rain regulations are encouraged to submit both applications simultaneously.
* Any source in a source category designated by the EPA Administrator ("Administrator"), in whole or in part, by regulation, after notice and comment.

19.1 - 40 CFR 64, Compliance Assurance Monitoring (CAM) (20.2.70.300.D.10.e NMAC)

Any source subject to 40CFR, Part 64 (Compliance Assurance Monitoring) must submit all the information required by section 64.7 with the operating permit application. The applicant must prepare a separate section of the application package for this purpose; if the information is already listed elsewhere in the application package, make reference to that location. Facilities not subject to Part 64 are invited to submit periodic monitoring protocols with the application to help the AQB to comply with 20.2.70 NMAC. Sources subject to 40 CFR Part 64, must submit a statement indicating your source's compliance status with any enhanced monitoring and compliance certification requirements of the federal Act.

The compressor engines have pre-control CO, VOC, and HAP emissions greater than major source threshold, however, they are subject to NSPS JJJJ and are therefore exempt to CAM requirements pursuant to 40 CFR 64.2(b)(1)(i).

19.2 - Compliance Status (20.2.70.300.D.10.a & 10.b NMAC)

Describe the facility's compliance status with each applicable requirement at the time this permit application is submitted. This statement should include descriptions of or references to all methods used for determining compliance. This statement should include descriptions of monitoring, recordkeeping and reporting requirements and test methods used to determine compliance with all applicable requirements. Refer to Section 2, Tables 2-N and 2-O of the Application Form as necessary. (20.2.70.300.D.11 NMAC) For facilities with existing Title V permits, refer to most recent Compliance Certification for existing requirements. Address new requirements such as CAM, here, including steps being taken to achieve compliance.

Based on the information and belief formed after reasonable inquiry, Lucid believes that the Big Lizard Compression Station is in compliance with each requirement applicable to the facility.

19.3 - Continued Compliance (20.2.70.300.D.10.c NMAC)

Provide a statement that your facility will continue to be in compliance with requirements for which it is in compliance at the time of permit application. This statement must also include a commitment to comply with other

applicable requirements as they come into effect during the permit term. This compliance must occur in a timely manner or be consistent with such schedule expressly required by the applicable requirement.

As described in Section 19.2 and based on information and belief formed after reasonable inquiry, Lucid states that Big Lizard Compressor Station will continue to be operated in compliance with applicable requirements for which it is in compliance as of the submittal date of this application.

In addition, Lucid will meet additional applicable requirements that become effective during the permit term in a timely manner or on such a time schedule as expressly required by the applicable requirement. In the event that Lucid should discover new information affecting the compliance status of Big Lizard Compressor Station, Lucid will make appropriate notifications and/or take corrective actions as appropriate.

19.4 - Schedule for Submission of Compliance (20.2.70.300.D.10.d NMAC)

You must provide a proposed schedule for submission to the department of compliance certifications during the permit term. This certification must be submitted annually unless the applicable requirement or the department specifies a more frequent period. A sample form for these certifications will be attached to the permit.

Lucid is proposing a compliance certification schedule report submittal every 12 months.

19.5 - Stratospheric Ozone and Climate Protection

In addition to completing the four (4) questions below, you must submit a statement indicating your source's compliance status with requirements of Title VI, Section 608 (National Recycling and Emissions Reduction Program) and Section 609 (Servicing of Motor Vehicle Air Conditioners).

---

1. Does your facility have any air conditioners or refrigeration equipment that uses CFCs, HCFCs or other ozone-depleting substances? ☐ **Yes** **x No**

2. Does any air conditioner(s) or any piece(s) of refrigeration equipment contain a refrigeration charge greater than 50 lbs? ☐ **Yes** **x No**

   (If the answer is yes, describe the type of equipment and how many units are at the facility.)

3. Do your facility personnel maintain, service, repair, or dispose of any motor vehicle air conditioners (MVACs) or appliances ("appliance" and "MVAC" as defined at 82. 152)? ☐ **Yes** **x No**

4. Cite and describe which Title VI requirements are applicable to your facility (i.e. 40 CFR Part 82, Subpart A through G.)

19.6 - Compliance Plan and Schedule

Applications for sources, which are not in compliance with all applicable requirements at the time the permit application is submitted to the department, must include a proposed compliance plan as part of the permit application package. This plan shall include the information requested below:

A. Description of Compliance Status: (20.2.70.300.D.11.a NMAC)
A narrative description of your facility's compliance status with respect to all applicable requirements (as defined in 20.2.70 NMAC) at the time this permit application is submitted to the department.

B. Compliance plan: (20.2.70.300.D.11.B NMAC)
A narrative description of the means by which your facility will achieve compliance with applicable requirements with which it is not in compliance at the time you submit your permit application package.

C. Compliance schedule: (20.2.70.300D.11.c NMAC)
A schedule of remedial measures that you plan to take, including an enforceable sequence of actions with milestones, which will lead to compliance with all applicable requirements for your source. This schedule of compliance must be at least as stringent as that contained in any consent decree or administrative order to which your source is subject. The obligations of any consent decree or administrative order are not in any way diminished by the schedule of compliance.

D. Schedule of Certified Progress Reports: (20.2.70.300.D.11.d NMAC)
A proposed schedule for submission to the department of certified progress reports must also be included in the compliance schedule. The proposed schedule must call for these reports to be submitted at least every six (6) months.

E. Acid Rain Sources: (20.2.70.300.D.11.e NMAC)
If your source is an acid rain source as defined by EPA, the following applies to you. For the portion of your acid rain source subject to the acid rain provisions of title IV of the federal Act, the compliance plan must also include any additional requirements under the acid rain provisions of title IV of the federal Act. Some requirements of title IV regarding the schedule and methods the source will use to achieve compliance with the acid rain emissions limitations may supersede the requirements of title V and 20.2.70 NMAC. You will need to consult with the Air Quality Bureau permitting staff concerning how to properly meet this requirement.

NOTE: The Acid Rain program has additional forms. See http://www.env.nm.gov/aqb/index.html. Sources that are subject to both the Title V and Acid Rain regulations are **encouraged** to submit both applications **simultaneously**.

Based on information and belief formed after reasonable inquiry as described in Section 19.2, and with this filing, Lucid states that Big Lizard Compressor Station is in compliance with applicable requirements. No compliance plan, compliance schedule, or compliance reports are required.

In addition, based on information and belief formed after reasonable inquiry Lucid states that Big Lizard is not an acid rain source as defined at 40 CFR 72.6

19.7 - 112(r) Risk Management Plan (RMP)

Any major sources subject to section 112(r) of the Clean Air Act must list all substances that cause the source to be subject to section 112(r) in the application. The permittee must state when the RMP was submitted to and approved by EPA.

This facility is exempt from being subject to 40 CFR Part 68 as it handles naturally occurring hydrocarbon mixtures as stated in §68.115(b)(2)(iii).

19.8 - Distance to Other States, Bernalillo, Indian Tribes and Pueblos

Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B NMAC)?

(If the answer is yes, state which apply and provide the distances.)

Yes, 34.4km from Texas border; No Indian tribes, pueblos, or local pollution control programs are within 80km.

19.9 - Responsible Official

Provide the Responsible Official as defined in 20.2.70.7.AD NMAC:

Matt Eales - Vice President EHSR

Section 20

Other Relevant Information

Other relevant information. Use this attachment to clarify any part in the application that you think needs explaining. Reference the section, table, column, and/or field. Include any additional text, tables, calculations or clarifying information.

Additionally, the applicant may propose specific permit language for AQB consideration. In the case of a revision to an existing permit, the applicant should provide the old language and the new language in track changes format to highlight the proposed changes. If proposing language for a new facility or language for a new unit, submit the proposed operating condition(s), along with the associated monitoring, recordkeeping, and reporting conditions. In either case, please limit the proposed language to the affected portion of the permit.

No other relevant information is being included in the application.

Section 21

Addendum for Landfill Applications

This Section is not applicable as this is not a landfill application.

Section 22: Certification

Company Name: Lucid Energy Delaware, LLC

I, Matt Eales, hereby certify that the information and data submitted in this application are true and as accurate as possible, to the best of my knowledge and professional expertise and experience.

Signed this 11 day of September 2020, upon my oath or affirmation, before a notary of the State of New Mexico.

Matt Eales
*Signature

9-11-2020
Date

Mat Eales
Printed Name

Vice President EHSR
Title

Scribed and sworn before me on this 11th day of September, 2020

My authorization as a notary of the State of New Mexico expires on the 12th day of June, 2022.

Notary's Signature

9-11-2020
Date

Wilma M. Harmon
Notary's Printed Name

*For Title V applications, the signature must be of the Responsible Official as defined in 20.2.70.7.AE NMAC.