NMED AIR QUALITY BUREAU
NSR SIGNIFICANT REVISION

TARGA NORTHERN DELAWARE LLC
Big Lizard Compressor Station

Prepared By:

TRINITY CONSULTANTS
1800 W Loop South
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Houston, TX 77027
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June 2024

Project 243201.0014

Trinity Consultants
1800 W Loop S, Ste 1000, Houston, TX 77027 / P 713.552.1371 / F 713.552.1374 / **trinityconsultants.com**

July 2, 2024

Permit Programs Manager
NMED Air Quality Bureau
525 Camino de los Marquez Suite 1
Santa Fe, NM 87505-1816

RE: Application for NSR Significant Modification
Targa Northern Delaware LLC; Big Lizard Compressor Station

To Whom It May Concern:

On behalf of Targa Northern Delaware LLC, Trinity Consultants is submitting an application for the Big Lizard Compressor Station, currently authorized to operate under NSR Permit No. 7960-M2 and Title V Operating Permit No. P-289. With this application, Targa seeks to revise the current NSR permit, 7960-M2 by the following actions:

The following units will be added to the facility:

- Startup, shutdown, and maintenance emissions (Unit SSM);
- Malfunction emissions (Unit M); and
- One (1) 13.8 hp heater trailer (Unit Trailer-1).

The following units will be removed from the facility:

- Three (3) Generator Engines (Units GEN-1, GEN-2, GEN-3)

The following units will be modified per the following:

- Update carbon monoxide (CO), oxides of nitrogen (NOx), volatile organic compound (VOC), and formaldehyde emission factors for site compressor engines (Units C-1 through C-10);
- Increase liquid throughput for tanks and loading through the site (Units TK-1-3 and Load-1);
- Route emissions from tanks and loading to the site flare (Unit FL-1);
- Increase fugitive components due to updated site estimates (Unit FUG-1); and
- Update units at the facility based on a recent inlet gas analysis.

The format and content of this application are consistent with the Bureau's current policy regarding NSR significant modification applications. Enclosed are two hard copies of the application, including the original certification. Electronic files will be provided upon request from our assigned permit engineer. Please feel free to contact me by email at andrea.sayles@trinityconsultants.com if you have any questions regarding this application.

Sincerely,

TRINITY CONSULTANTS

Andrea Sayles

Andrea Sayles
Managing Consultant

Cc: Charles Bates (Targa Northern Delaware, LLC)
Rob Liles (Trinity Consultants)

Trinity Project File: 243201.0014

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		

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.

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: ☐ 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.: 3500508571, Agency ID 29590, in the amount of **$500**

☒ 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.

☒ I acknowledge there is an annual fee for permits in addition to the permit review fee: www.env.nm.gov/air-quality/permit-fees-2/.

☐ This facility qualifies for the small business fee reduction per 20.2.75.11.C. NMAC. The full $500.00 filing fee is included with this application and I understand the fee reduction will be calculated in the balance due invoice. The Small Business Certification Form has been previously submitted or is included with this application. (Small Business Environmental Assistance Program Information: www.env.nm.gov/air-quality/small-biz-eap-2/.)

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.72.219.D 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: **29590**	Updating Permit/NOI #: **7960-M2**
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): **See directions in section 1-D.**		
2	Plant Operator Company Name: **Targa Northern Delaware, LLC**	Phone/Fax: **(575) 631-7093 / (575) 396-7702**	

a	Plant Operator Address: **201 S 4th Street, Artesia, NM, 88210**	
b	Plant Operator's New Mexico Corporate ID or Tax ID: **1948249**	
3	Plant Owner(s) name(s): **Targa Northern Delaware, LLC**	Phone/Fax: **(575) 631-7093 / (575) 396-7702**
a	Plant Owner(s) Mailing Address(s): **201 S 4th Street, Artesia, NM, 88210**	
4	Bill To (Company): **Targa Northern Delaware, LLC**	Phone/Fax: **(575) 631-7093 / (575) 396-7702**
a	Mailing Address: **201 S 4th Street, Artesia, NM, 88210**	E-mail:
5	☐ Preparer: ☒ Consultant: Andrea Sayles, Trinity Consultants	Phone/Fax: **217-971-5797**
a	Mailing Address: **1800 W Loop S #1000, Houston, TX 77027**	E-mail: Andrea.Sayles@trinityconsultants.com
6	Plant Operator Contact: **Jaylen Fuentes**	Phone/Fax: **575-810-6136**
a	Address: **201 S 4th Street, Artesia, NM, 88210**	E-mail: jaylen.fuentes@targaresources.com
7	Air Permit Contact: **Robert Andries**	Title: **Sr. Environmental Specialist**
a	E-mail: randries@targaresources.com	Phone/Fax: **(713) 584-1360 / (713) 584-1522**
b	Mailing Address: **811 Louisiana Street, Ste 2100, Houston, TX 77002**	
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):
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: **P289**
7	Has this facility been issued a No Permit Required (NPR)? ☐ Yes ☒ No	If yes, the NPR No. is:
8	Has this facility been issued a Notice of Intent (NOI)? ☐ Yes ☒ No	If yes, the NOI No. is:
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ☒ Yes ☐ No	If yes, the permit No. is: **NSR 7960-M2**
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ☐ Yes ☒ No	If yes, the register No. is:

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**	Daily: **80 MMscf**	Annually: **29,200 MMscf**
b	Proposed	Hourly: **3.96 MMscf**	Daily: **95 MMscf**	Annually: **34,675 MMscf**
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: **170.81 bbl of Hydrocarbon Liquids**	Daily: **70.9 bbl of Hydrocarbon Liquids**	Annually: **25,883 bbl of hydrocarbon liquids**

Section 1-D: Facility Location Information

1	Latitude (decimal degrees): **32.307633**	Longitude (decimal degrees): **-103.6199**	County: **Lea**	Elevation (ft): **3,715**
2	UTM Zone: ☐ 12 or ☒ 13	Datum: ☐ 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**		
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): 1) 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) From the intersection of US Hwy 62/180 and US Hwy 285 in Carlsbad, NM go south on US Hwy 285 (Pecos Hwy) for 7.8 miles to CR 31. Turn left and go 7.58 miles to US Hwy 128. Turn right (east) on US Hwy 128 and go 19.0 miles. Turn left (northeast) onto the Enterprise pipeline ROW road. Continue straight on this road for 7.7 miles. Turn left (north) onto the lease road. The station will be immediately on your left (west side of road).			
5	The facility is **28** (distance) miles **Northwest** (direction) of **Jal, NM** (nearest town).			
6	Land Status of facility (check one): ☐ Private ☐ Indian/Pueblo ☐ Government ☒ BLM ☐ Forest Service ☐ Military			
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/air-quality/modeling-publications/)? ☒ Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers: **34 km 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): **71.90 km**			
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?			

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 ($\frac{hours}{day}$): **24**	($\frac{days}{week}$): **7**	($\frac{weeks}{year}$): **52**	($\frac{hours}{year}$): **8760**	
2	Facility's maximum daily operating schedule (if less than 24 $\frac{hours}{day}$)? Start:	☐AM ☐PM	End:		☐AM ☐PM
3	Month and year of anticipated start of construction: **Upon permit issuance**				
4	Month and year of anticipated construction completion: **Upon permit issuance**				
5	Month and year of anticipated startup of new or modified facility: **Upon permit issuance**				

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: Site is part of an approved environmental audit under AQB Civil Penalty Policy, Appendix D. Approval letter is dated October 26, 2022.		
a	If yes, NOV date or description of issue: **January 2024 Audit Report under NMED Voluntary Environmental Disclosure Policy**		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: **January 2024 Audit Report under NMED Voluntary Environmental Disclosure Policy**	Date: **1/31/2024**	Requirement # (or page # and paragraph #): **Submit significant permit revision to include SSM activities**
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 **X** No		
a	If yes, include the name of company providing commercial electric power to the facility: ___________________________ 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.) **Jimmy Oxford** (20.2.70.300.D.2 NMAC):	Phone: **(940) 220-2493**
a	R.O. Title: **Vice President Operations**	R.O. e-mail: joxford@targaresources.com
b	R. O. Address: **201 S 4th Street, Artesia, NM, 88210**	
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC): **N/A**	Phone: **N/A**
a	A. R.O. Title: **N/A**	A. R.O. e-mail: **N/A**
b	A. R. O. Address: **N/A**	
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): **Targa Resources, Inc.**	
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.): **Targa Resources, Inc.**	
a	Address of Parent Company: **811 Louisiana Suite 2100, Houston, TX 77002-1400**	

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.): **None**
6	Telephone numbers & names of the owners' agents and site contacts familiar with plant operations: **Jaylen Fuentes – (575) 810-6051**
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 – 34 km**

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' <u>2-hole</u> <u>punched</u>** 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 <u>copy</u> 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 **Andrea Sayles**, Email andrea.sayles@trinityconstultants.com Phone number **217-971-5797**.

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 ***<u>summary</u> <u>report</u> <u>only</u>*** 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.

Table of Contents

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 #	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.
C-10	Compressor Engine	Caterpillar	G3516	N6W00776	1,380HP	1,380HP	8/7/2018 TBD	Catalyst-1 1	20200254	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	4SLB	
C-9	Compressor Engine	Caterpillar	G3516	N6W00724	1,380HP	1,380HP	8/1/2018 4/8/2022	Catalyst-2 2	20200254	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	4SLB	
C-3	Compressor Engine	Caterpillar	G3606	JFE01052	1,875HP	1,875HP	6/1/2018 TBD	Catalyst-3 3	20200254	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	4SLB	
C-4	Compressor Engine	Caterpillar	G3606	JFE01056	1,875HP	1,875HP	6/1/2018 TBD	Catalyst-4 4	20200254	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	4SLB	
C-7	Compressor Engine	Caterpillar	G3608	XH700858	2,500HP	2,500HP	1/29/2018 TBD	Catalyst-5 5	20200254	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	4SLB	
C-8	Compressor Engine	Caterpillar	G3608	XH700861	2,500HP	2,500HP	2/1/2018 TBD	Catalyst-6 6	20200254	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	4SLB	
Dehy-1	TEG Dehydrator 1	TBD	TBD	TBD	35 MMScf/day	32 MMScf/day	TBD TBD	BTEX-1 N/A	31000301	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ 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) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	N/A	
Dehy-2	TEG Dehydrator 2	TBD	TBD	TBD	35 MMScf/day	35 MMScf/day	TBD TBD	BTEX-2 N/A	31000301	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ 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) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	N/A	
TK-1	Atmospheric Storage Tank	TBD	TBD	TBD	300 bbl	300 bbl	TBD TBD	N/A N/A	40400311	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	N/A	
TK-2	Atmospheric Storage Tank	TBD	TBD	TBD	300 bbl	300 bbl	TBD TBD	N/A N/A	40400311	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ 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) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	N/A	
FUG-1	Facility-wide Fugitive Emissions	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31000220	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	N/A	
C-1	Compressor Engine	Caterpillar	G3606	JFE01514	1,875HP	1,875HP	7/1/2019 TBD	Catalyst-7 7	20200254	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	4SLB	
C-5	Compressor Engine	Caterpillar	G3606	JFE01307	1,875HP	1,875HP	3/2/2019 7/10/2023	Catalyst-8 8	20200254	☐ Existing (unchanged) ☐ New/Additional ☑ To Be Modified ☐ To be Removed ☐ Replacement Unit ☐ To be Replaced	4SLB	

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.
C-2	Compressor Engine	Caterpillar	G3606	JFE01018	1,875HP	1,875HP	5/9/2018 6/23/2021	Catalyst-9 9	20200254	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	4SLB	
C-6	Compressor Engine	Caterpillar	G3606	JFE01615	1,875HP	1,875HP	9/1/2019 8/7/2021	Catalyst-10 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	25 MMScf/day	25 MMScf/day	TBD TBD	BTEX-3 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	90 MMScf/day	90 MMScf/day	TBD TBD	FL-1 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	2.32 MMSCF/day	2.32 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	300 bbl	300 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	300 bbl	300 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	
GEN-1	Generator Engine 1	PSI	B21.9NGP	TBD	612HP	612HP	TBD TBD	N/A 17	20100102	☐ Existing (unchanged) ☑ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
GEN-2	Generator Engine 2	PSI	B21.9NGP	TBD	612HP	612HP	TBD TBD	N/A 18	20100102	☐ Existing (unchanged) ☑ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
GEN-3	Generator Engine 3	PSI	B21.9NGP	TBD	612HP	612HP	TBD TBD	N/A 19	20100102	☐ Existing (unchanged) ☑ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	
Trailer-1	Heater Trailer	TBD	TBD	TBD	13.8 hp	13.8 hp	TBD TBD	N/A 20	20100202	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	CI	
SSM	Startup, Shutdown, Maintenance	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31088811	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	
M	Malfunction	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31088811	☐ 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 https://www.env.nm.gov/wp-content/uploads/sites/2/2017/10/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. / Serial No.	Max Capacity / Capacity Units	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5) / Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Manufacture /Reconstruction[2] / Date of Installation /Construction[2]	For Each Piece of Equipment, Check Onc
Various-1	Methanol Tank	TBD	TBD	100	20.2.72.202.B.5.NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed
			TBD	bbl		TBD	☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Various-2	Glycol Tanks	TBD	TBD	36	20.2.72.202.B.2.NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed
			TBD	bbl		TBD	☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Various-3	Lube Oil Tanks	TBD	TBD	36	20.2.72.202.B.2.NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed
			TBD	bbl		TBD	☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Various-4	Antifreeze Tanks	TBD	TBD	36	20.2.72.202.B.2.NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed
			TBD	bbl		TBD	☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Various-5	Amine Tanks	TBD	TBD	36	20.2.72.202.B.2.NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed
			TBD	bbl		TBD	☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
HAUL	Haul Road Emissions	TBD	TBD	N/A	20.2.72.202.B.5.NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed
			TBD	N/A		TBD	☐ 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	18-347	83% CO, 46% VOC, 80% HCOH	Manufacturer
Catalyst-2	Catalyst	TBD	CO, VOC	18-346	83% CO, 46% VOC, 80% HCOH	Manufacturer
Catalyst-3	Catalyst	TBD	CO, VOC	18-171	80% CO, 39% VOC, 80% HCOH	Manufacturer
Catalyst-4	Catalyst	TBD	CO, VOC	18-155	80% CO, 39% VOC, 80% HCOH	Manufacturer
Catalyst-5	Catalyst	TBD	CO, VOC	18-338	84% CO, 38% VOC, 80% HCOH	Manufacturer
Catalyst-6	Catalyst	TBD	CO, VOC	18-339	84% CO, 38% VOC, 80% HCOH	Manufacturer
BTEX-1	Condenser	TBD	HAP, VOC	Dehy-1	98% HAP, VOC	Condenser Curves
BTEX-2	Condenser	TBD	HAP, VOC	Dehy-2	98% HAP, VOC	Condenser Curves
Catalyst-7	Catalyst	TBD	CO, VOC	ENG-7	80% CO, 39% VOC, 80% HCOH	Manufacturer
Catalyst-8	Catalyst	TBD	CO, VOC	ENG-8	80% CO, 39% VOC, 80% HCOH	Manufacturer
Catalyst-9	Catalyst	TBD	CO, VOC	ENG-9	80% CO, 39% VOC, 80% HCOH	Manufacturer
Catalyst-10	Catalyst	TBD	CO, VOC	ENG-10	80% CO, 39% VOC, 80% HCOH	Manufacturer
BTEX-3	Condenser	TBD	HAP, VOC	Dehy-3	98% 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 (under normal operating conditions)

☐ **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
C-10	1.52	6.66	9.10	39.84	5.14	22.52	0.12	0.51	0.10	0.45	0.10	0.45	0.10	0.45	3.26E-03	0.014	-	-
C-9	1.52	6.66	9.10	39.84	5.14	22.52	0.12	0.51	0.10	0.45	0.10	0.45	0.10	0.45	3.26E-03	0.014	-	-
C-3	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
C-4	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
C-7	2.76	12.07	17.09	74.83	7.50	32.83	0.19	0.84	0.17	0.74	0.17	0.74	0.17	0.74	5.38E-03	0.024	-	-
C-8	2.76	12.07	17.09	74.83	7.50	32.83	0.19	0.84	0.17	0.74	0.17	0.74	0.17	0.74	5.38E-03	0.024	-	-
Dehy-1	-	-	-	-	81.30	356.10	-	-	-	-	-	-	-	-	3.29E-03	0.014	-	-
RBL-1	0.074	0.32	0.062	0.27	7.41E-01	0.02	3.41E-03	0.015	5.59E-03	0.024	5.59E-03	0.024	5.59E-03	0.024	-	-	-	-
Dehy-2	-	-	-	-	81.30	356.10	-	-	-	-	-	-	-	-	0.003	0.014	-	-
RBL-2	0.074	0.32	0.062	0.27	7.41E-01	0.02	3.41E-03	0.015	5.59E-03	0.024	5.59E-03	0.024	5.59E-03	0.024	-	-	-	-
TK-1	-	-	-	-	53.60	3.20	-	-	-	-	-	-	-	-	4.65E-03	3.74E-04	-	-
TK-2	-	-	-	-	53.60	3.20	-	-	-	-	-	-	-	-	4.65E-03	3.74E-04	-	-
Trailer-1	0.30	1.33	0.18	0.81	0.01	0.05	0.59	2.60	0.023	0.10	0.023	0.10	0.023	0.10	-	-	-	-
LOAD-1	-	-	-	-	64.37	2.76	-	-	-	-	-	-	-	-	7.72E-03	3.31E-04	-	-
FUG-1	-	-	-	-	6.06	26.55	-	-	-	-	-	-	-	-	4.82E-04	2.11E-03	-	-
SSM[2]	-	-	-	-	4173.45	24.91	-	-	47.79	0.14	6.79	0.020	0.68	2.03E-03	0.446	2.62E-03	-	-
M[2]	-	-	-	-	4173.45	10.00	-	-	-	-	-	-	-	-	-	-	-	-
C-1	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
C-5	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
C-2	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
C-6	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
Dehy-3	-	-	-	-	81.30	356.10	-	-	-	-	-	-	-	-	0.003	0.014	-	-
RBL-3	0.074	0.32	0.062	0.27	7.41E-01	0.018	0.003	0.015	0.006	0.024	0.006	0.024	0.006	0.024	-	-	-	-
AU-1	-	-	-	-	58.92	258.05	-	-	-	-	-	-	-	-	8.50	37.23	-	-
AU-Rb 1	1.47	6.44	1.24	5.41	0.08	0.35	0.07	0.30	0.11	0.49	0.11	0.49	0.11	0.49	-	-	-	-
AU-Rb 2	1.47	6.44	1.24	5.41	0.08	0.35	0.07	0.30	0.11	0.49	0.11	0.49	0.11	0.49	-	-	-	-
FL-1	0.03	0.15	0.07	0.30	-	-	1.11E-03	4.88E-03	-	-	-	-	-	-	-	-	-	-
TK-3	-	-	-	-	53.60	3.20	-	-	-	-	-	-	-	-	4.65E-03	3.74E-04	-	-
Totals	24.46	107.11	118.02	516.93	4768.41	1657.23	2.23	9.77	49.37	7.07	8.37	6.95	2.26	6.93	9.02	37.46	0.00	0.00

[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).

[2] Only SSM or malfunction emissions can occur any any time, therefore only SSM are noted in the hourly totals.

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
C-10	1.52	6.66	1.52	6.66	2.45	10.73	0.12	0.51	0.10	0.45	0.10	0.45	0.10	0.45	3.26E-03	0.014	-	-
C-9	1.52	6.66	1.52	6.66	2.45	10.73	0.12	0.51	0.10	0.45	0.10	0.45	0.10	0.45	3.26E-03	0.014	-	-
C-3	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
C-4	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
C-7	2.76	12.07	2.76	12.07	4.26	18.67	0.19	0.84	0.17	0.74	0.17	0.74	0.17	0.74	5.38E-03	0.024	-	-
C-8	2.76	12.07	2.76	12.07	4.26	18.67	0.19	0.84	0.17	0.74	0.17	0.74	0.17	0.74	5.38E-03	0.024	-	-
Dehy-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RBL-1	0.157	0.69	0.132	0.58	7.45E-01	3.26	7.27E-03	0.032	1.20E-02	0.052	1.20E-02	0.052	1.20E-02	0.052	-	-	-	-
Dehy-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RBL-2	0.157	0.69	0.132	0.58	7.45E-01	3.26	7.27E-03	0.032	1.20E-02	0.052	1.20E-02	0.052	1.20E-02	0.052	-	-	-	-
TK-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TK-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trailer-1	0.30	6.09E-03	0.18	3.70E-03	0.011	2.19E-04	0.59	1.19E-02	0.023	4.68E-04	0.023	4.68E-04	0.023	4.68E-04	-	-	-	-
LOAD-1	-	-	-	-	19.31	0.83	-	-	-	-	-	-	-	-	2.32E-03	9.92E-05	-	-
FUG-1	-	-	-	-	6.06	26.55	-	-	-	-	-	-	-	-	4.82E-04	2.11E-03	-	-
SSM[2]	-	-	-	-	4173.45	24.91	-	-	47.79	0.14	6.79	0.020	0.68	2.03E-03	0.45	2.62E-03	-	-
M[2]	-	-	-	-	4173.45	10.00	-	-	-	-	-	-	-	-	-	-	-	-
C-1	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
C-5	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
C-2	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
C-6	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	-	-
Dehy-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RBL-3	0.157	0.69	0.132	0.58	7.45E-01	3.263	7.27E-03	0.032	1.20E-02	0.052	1.20E-02	0.052	1.20E-02	0.052	-	-	-	-
AU-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AU-Rb 1	1.47	6.44	1.24	5.41	0.081	0.35	0.07	0.30	0.11	0.49	0.11	0.49	0.11	0.49	-	-	-	-
AU-Rb 2	1.47	6.44	1.24	5.41	0.081	0.35	0.07	0.30	0.11	0.49	0.11	0.49	0.11	0.49	-	-	-	-
FL-1	1.31	5.57	10.99	46.80	4.41	1.51	15.64	68.37	-	-	-	-	-	-	0.170	0.741	-	-
TK-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	25.98	112.31	35.00	151.14	4238.10	216.50	17.89	75.59	49.39	7.05	8.39	6.93	2.28	6.91	0.66	0.93	0.00	0.00

[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).

[2] Only SSM or malfunction emissions can occur any any time, therefore only SSM are noted in the hourly totals.

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	-	-	-	-	4173.45	24.91	-	-	47.79	0.14	6.79	0.020	0.68	2.03E-03	0.45	0.0026	-	-
Totals	0.00	0.00	0.00	0.00	4173.45	24.91	0.00	0.00	47.79	0.14	6.79	0.020	0.68	2.03E-03	0.45	0.0026	0.00	0.00

[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

☑ 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	C-10	V	No	22	849	137	N/A	N/A	173.9	1.00
2	C-9	V	No	22	849	137	N/A	N/A	173.9	1.00
3	C-3	V	No	22	812	197	N/A	N/A	111.8	1.50
4	C-4	V	No	22	812	197	N/A	N/A	111.8	1.50
5	C-7	V	No	22	825	267	N/A	N/A	151.2	1.50
6	C-8	V	No	22	825	267	N/A	N/A	151.2	1.50
7	C-1	V	No	22	812	197	N/A	N/A	111.8	1.50
8	C-5	V	No	22	812	197	N/A	N/A	111.8	1.50
9	C-2	V	No	22	812	197	N/A	N/A	111.8	1.50
10	C-6	V	No	22	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-Rb1	V	No	30	600	103	N/A	N/A	39.1	1.83
15	AU-Rb2	V	No	30	600	103	N/A	N/A	39.1	1.83
16	FL-1	V	No	20	1832	31	N/A	N/A	40.0	1.00
17	Trailer-1	V	No	15	782	117.69	N/A	N/A	305.80	0.70

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		Formaldehyde ☑ HAP or ☐ TAP		Benzene ☑ HAP or ☐ TAP		Toluene ☑ HAP or ☐ TAP		Acetaldehyde ☑ HAP or ☐ TAP		Acrolein ☑ HAP or ☐ TAP		Provide Pollutant Name Here ☐ 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	lb/hr	ton/yr
1	C-10	0.38	1.68	0.24	1.04	4.41E-03	1.93E-02	4.11E-03	1.80E-02	0.084	0.37	0.052	0.23						
2	C-9	0.38	1.68	0.24	1.04	4.41E-03	1.93E-02	4.11E-03	1.80E-02	0.084	0.37	0.052	0.23						
3	C-3	0.36	1.59	0.17	0.72	5.99E-03	2.63E-02	5.58E-03	2.44E-02	0.11	0.50	0.070	0.31						
4	C-4	0.36	1.59	0.17	0.72	5.99E-03	2.63E-02	5.58E-03	2.44E-02	0.11	0.50	0.070	0.31						
5	C-7	0.52	2.27	0.25	1.11	7.99E-03	3.50E-02	7.44E-03	3.26E-02	0.15	0.67	0.093	0.41						
6	C-8	0.52	2.27	0.25	1.11	7.99E-03	3.50E-02	7.44E-03	3.26E-02	0.15	0.67	0.093	0.41						
7	C-1	0.36	1.59	0.17	0.72	5.99E-03	2.63E-02	5.58E-03	2.44E-02	0.11	0.50	0.070	0.31						
8	C-5	0.36	1.59	0.17	0.72	5.99E-03	2.63E-02	5.58E-03	2.44E-02	0.11	0.50	0.070	0.31						
9	C-2	0.36	1.59	0.17	0.72	5.99E-03	2.63E-02	5.58E-03	2.44E-02	0.11	0.50	0.070	0.31						
10	C-6	0.36	1.59	0.17	0.72	5.99E-03	2.63E-02	5.58E-03	2.44E-02	0.11	0.50	0.070	0.31						
11	RBL-1	5.39E-02	2.36E-01	-	-	-	-	-	-	-	-	-	-						
12	RBL-2	5.39E-02	2.36E-01	-	-	-	-	-	-	-	-	-	-						
13	RBL-3	5.39E-02	2.36E-01	-	-	-	-	-	-	-	-	-	-						
14	AU-Rb 1	0.03	0.12	1.10E-03	4.83E-03	3.09E-05	1.35E-04	5.00E-05	2.19E-04	-	-	-	-						
15	AU-Rb 2	0.03	0.12	1.10E-03	4.83E-03	3.09E-05	1.35E-04	5.00E-05	2.19E-04	-	-	-	-						
16	FL-1	0.31	0.46	-	-	-	-	-	-	-	-	-	-						
17	Trailer-1	0.043	8.68E-04	-	-	-	-	-	-	-	-	-	-						
N/A	FUG-1	0.37	1.63	-	-	-	-	-	-	-	-	-	-						
N/A	SSM	162.83	1.50	-	-	-	-	-	-	-	-	-	-						
N/A	M	-	-	-	-	-	-	-	-	-	-	-	-						
N/A	LOAD-1	0.79	0.03	-	-	-	-	-	-	-	-	-	-						
Totals:		168.55	22.03	1.98	8.65	0.06	0.27	0.06	0.25	1.16	5.07	0.71	3.11						

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 Btu/scf	Hourly Usage Mscf/hr	Annual Usage MMscf/yr	% Sulfur	% Ash
C-10	Field Gas	Residue Gas	1256.11	8.15	71.39	<0.001	N/A
C-9	Field Gas	Residue Gas	1256.11	8.15	71.39	<0.001	N/A
C-3	Field Gas	Residue Gas	1256.11	10.17	89.11	<0.001	N/A
C-4	Field Gas	Residue Gas	1256.11	10.17	89.11	<0.001	N/A
C-7	Field Gas	Residue Gas	1256.11	13.45	117.86	<0.001	N/A
C-8	Field Gas	Residue Gas	1256.11	13.45	117.86	<0.001	N/A
C-1	Field Gas	Residue Gas	1256.11	10.17	89.11	<0.001	N/A
C-5	Field Gas	Residue Gas	1256.11	10.17	89.11	<0.001	N/A
C-2	Field Gas	Residue Gas	1256.11	10.17	89.11	<0.001	N/A
C-6	Field Gas	Residue Gas	1256.11	10.17	89.11	<0.001	N/A
RBL-1	Field Gas	Residue Gas	1256.11	0.60	5.23	<0.001	N/A
RBL-2	Field Gas	Residue Gas	1256.11	0.60	5.23	<0.001	N/A
RBL-3	Field Gas	Residue Gas	1256.11	0.60	5.23	<0.001	N/A
AU-RB1	Field Gas	Residue Gas	1256.11	11.94	104.61	<0.001	N/A
AU-RB2	Field Gas	Residue Gas	1256.11	11.94	104.61	<0.001	N/A
FL-1	Field Gas	Other	1256.11	21.03	7.68	<0.001	N/A
Trailer-1	Diesel	Purchased Commercial	137,000 Btu/gal	4.28E-04	0.0171	15 ppm	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	Mixed Hydrocarbons	8.19	44.35	66.63	11.65	95.00	12.88
TK-2	40400311	Condensate	Mixed Hydrocarbons	8.19	44.35	66.63	11.65	95.00	12.88
TK-3	40400311	Condensate	Mixed Hydrocarbons	8.19	44.35	66.63	11.65	95.00	12.88

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 = 10.159 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	N/A	FX	300	48	3.66	3.09	OT-Tan	OT-Tan	Good	1,087,087	86.28
TK-2		Condensate	N/A	FX	300	48	3.66	3.09	OT-Tan	OT-Tan	Good	1,087,087	86.28
TK-3		Condensate	N/A	FX	300	48	3.66	3.09	OT-Tan	OT-Tan	Good	1,087,087	86.28

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
	Mechanical Shoe Seal	Liquid-mounted resilient seal	Vapor-mounted resilient seal	Seal Type		
FX: Fixed Roof					**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	95 MMSCFD	Natural Gas	Mixed Hydrocarbons	Gas	95 MMscf/day
				Condensate	Condensate	Liquid	70.9 bbl/day

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										
C-10	mass GHG	6292.17	0.012	0.12											6,292.30	
	CO_2e	6292.17	3.53	2.96												6,298.66
C-9	mass GHG	6292.17	1.19E-02	0.12											6,292.30	
	CO_2e	6292.17	3.53	2.96												6,298.66
C-3	mass GHG	7854.19	0.015	0.15											7,854.35	
	CO_2e	7854.19	4.41	3.70												7,862.30
C-4	mass GHG	7854.19	0.01	0.15											7,854.35	
	CO_2e	7854.19	4.41	3.70												7,862.30
C-7	mass GHG	10387.74	0.020	0.20											10,387.95	
	CO_2e	10387.74	5.83	4.89												10,398.46
C-8	mass GHG	10387.74	0.02	0.20											10,387.95	
	CO_2e	10387.74	5.83	4.89												10,398.46
Dehy-1	mass GHG	-	-	-											0.00	
	CO_2e	-	-	-												0.00
RBL-1	mass GHG	384.27	7.24E-04	0.01											384.27	
	CO_2e	384.27	0.22	0.18												384.66
Dehy-2	mass GHG	-	-	-											0.00	
	CO_2e	-	-	-												0.00
RBL-2	mass GHG	384.27	7.24E-04	0.01											384.27	
	CO_2e	384.27	0.22	0.18												384.66
TK-1	mass GHG	-	-	-											0.00	
	CO_2e	-	-	-												0.00
TK-2	mass GHG	-	-	-											0.00	
	CO_2e	-	-	-												0.00

		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**										
C-1	**mass GHG**	7854.19	0.015	0.15											7,854.35	
	CO_2e	7854.19	4.41	3.70												7,862.30
C-5	**mass GHG**	7854.19	1.48E-02	0.15											7,854.35	
	CO2e	7854.19	4.41	3.70												7,862.30
C-2	**mass GHG**	7854.19	0.015	0.15											7,854.35	
	CO_2e	7854.19	4.41	3.70												7,862.30
C-6	**mass GHG**	7854.19	1.48E-02	0.15											7,854.35	
	CO2e	7854.19	4.41	3.70												7,862.30
Dehy-3	**mass GHG**	-	-	-											0.00	
	CO_2e	-	-	-												0.00
RBL-3	**mass GHG**	384.27	7.24E-04	0.01											384.27	
	CO2e	384.27	0.22	0.18												384.66
AU-1	**mass GHG**	-	-	-											0.00	
	CO_2e	-	-	-												0.00
AU-Rb 1	**mass GHG**	7685.33	1.45E-02	0.14											7,685.49	
	CO2e	7685.33	4.32	3.62												7,693.27
AU-Rb 2	**mass GHG**	7685.33	0.014	0.14											7,685.49	
	CO_2e	7685.33	4.32	3.62												7,693.27
FL-1	**mass GHG**	15592.95	0.10	27.24											15,620.29	
	CO2e	15592.95	29.74	681.00												16,303.68
TK-3	**mass GHG**	-	-	-											0.00	
	CO_2e	-	-	-												0.00
SSM	**mass GHG**	4.98	-	16.43											21.41	
	CO_2e	4.98	0.00E+00	410.83												415.81
Trailer-1	**mass GHG**	3.26	2.65E-05	1.32E-04											3.26	
	CO_2e	3.26	7.88E-03	3.31E-03												3.27
FUG-1	**mass GHG**	5.51	-	31.48											36.98	
	CO_2e	5.51	0.00E+00	786.89												792.40
Total	**mass GHG**	112615.08	0.28	76.98											112692.34	
	CO_2e	112615.08	84.23	1924.43												114623.74

[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).

The **Process Summary** shall include a brief description of the facility and its processes.

Startup, Shutdown, and Maintenance (SSM) routine or predictable emissions: 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.

Targa Northern Delaware, LLC (Targa) owns and operates the Big Lizard Compressor Station (Big Lizard) in Lea County, NM. The facility is currently authorized to operate under NSR Permit No. 7960-M2 and Title V Operating Permit No. P289. Targa is submitting this application for a significant revision pursuant to 20.2.72.219.D NMAC.

The following units will be added to the facility:

- Startup, shutdown, and maintenance emissions (Unit SSM);
- Malfunction emissions (Unit M); and
- One (1) 13.8 hp heater trailer (Unit Trailer-1).

The following units will be removed from the facility:

- Three (3) Generator Engines (Units GEN-1, GEN-2, GEN-3)

The following units will be modified per the following:

- Update carbon monoxide (CO), oxides of nitrogen (NOx), volatile organic compound (VOC), and formaldehyde emission factors for site compressor engines (Units C-1 through C-10);
- Increase liquid throughput for tanks and loading through the site (Units TK-1-3 and Load-1);
- Route emissions from tanks and loading to the site flare (Unit FL-1);
- Increase fugitive components due to updated site estimates (Unit FUG-1); and
- Update units at the facility based on a recent inlet gas analysis (Units Dehy1-3, Rbl-1-3, AU-1, AU-Rb 1-2).

In addition to the requested emission rate modifications, Targa would like to request an update to the current permit equipment specific requirement in A204.A Operation Inspection of (Units RBL-1, RBL-2, RBL-3, AU-RB1, AU-RB-2). The current requirement specifies conducting a monthly operational inspection to determine proper heater operation. Targa requests the requirement be updated to conduct an annual operation inspection to align with recent permits issued for equipment of similar service and size.

Targa would also like to update the unit ID of the compressor engines. The following table contains the information of the compressor engines along with the old and new unit IDs:

Unit ID on Permit	Make	Model #	Capacity	New Unit ID
18-347	Caterpillar	3516	1380 hp	**C-10**
18-346	Caterpillar	3516	1380 hp	**C-9**
18-171	Caterpillar	3606 A4	1875 hp	**C-3**
18-155	Caterpillar	3606 A4	1875 hp	**C-4**
18-338	Caterpillar	3608 A4	2500 hp	**C-7**
18-339	Caterpillar	3608 A4	2500 hp	**C-8**
ENG-7	Caterpillar	3606 A4	1875 hp	**C-1**
ENG-8	Caterpillar	3606 A4	1875 hp	**C-5**
ENG-9	Caterpillar	3606 A4	1875 hp	**C-2**
ENG-10	Caterpillar	3606 A4	1875 hp	**C-6**

After the proposed changes, the facility will remain a minor source with respect to PSD, and a major source with respect to Title V permitting if/when all equipment is installed and operating.

Section 4

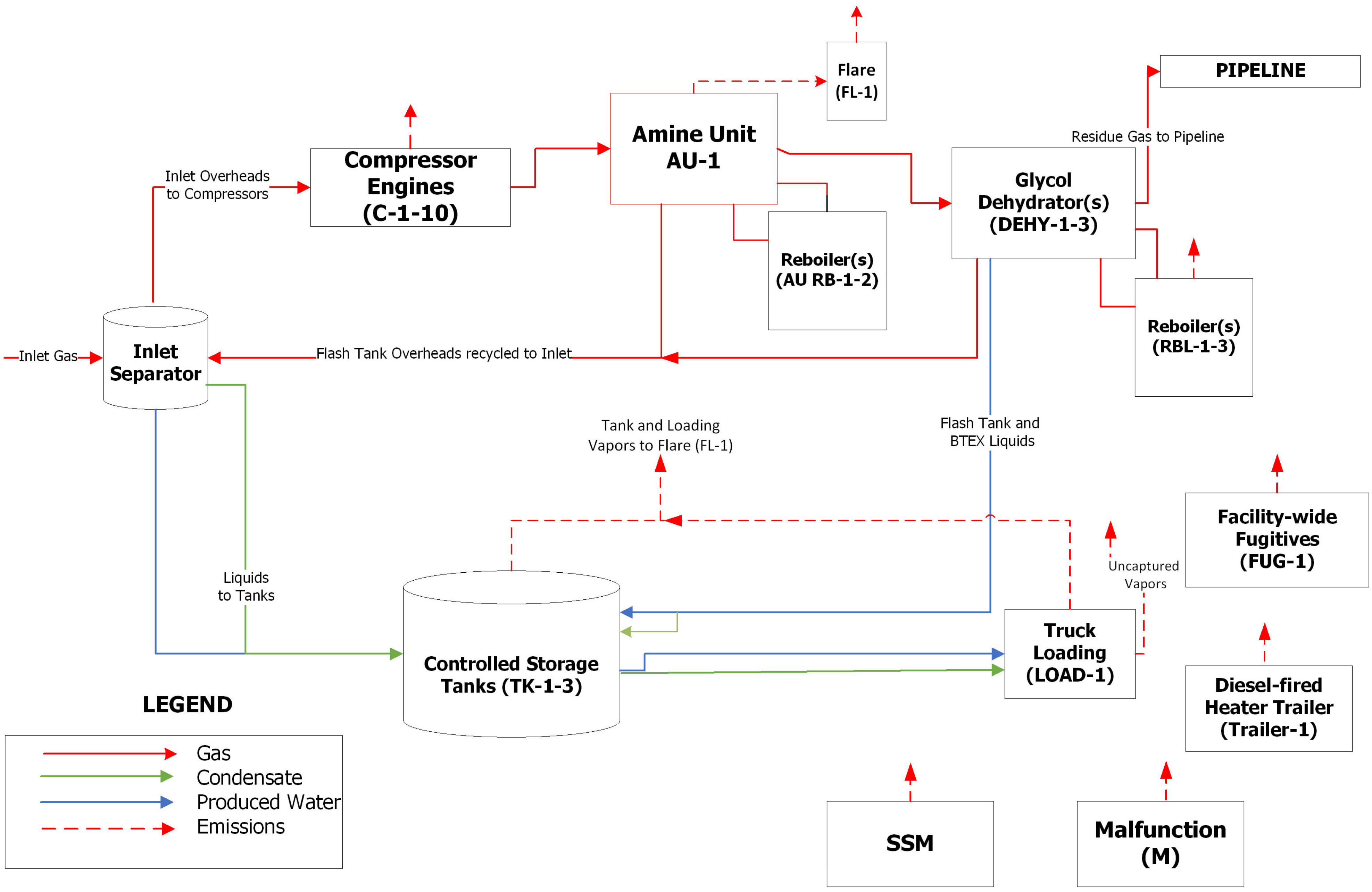
Process Flow Sheet

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.

Process Flow Sheet:
See attached Process Flow Diagram.

Big Lizard Compressor Station

Targa Northern Delaware, LLC

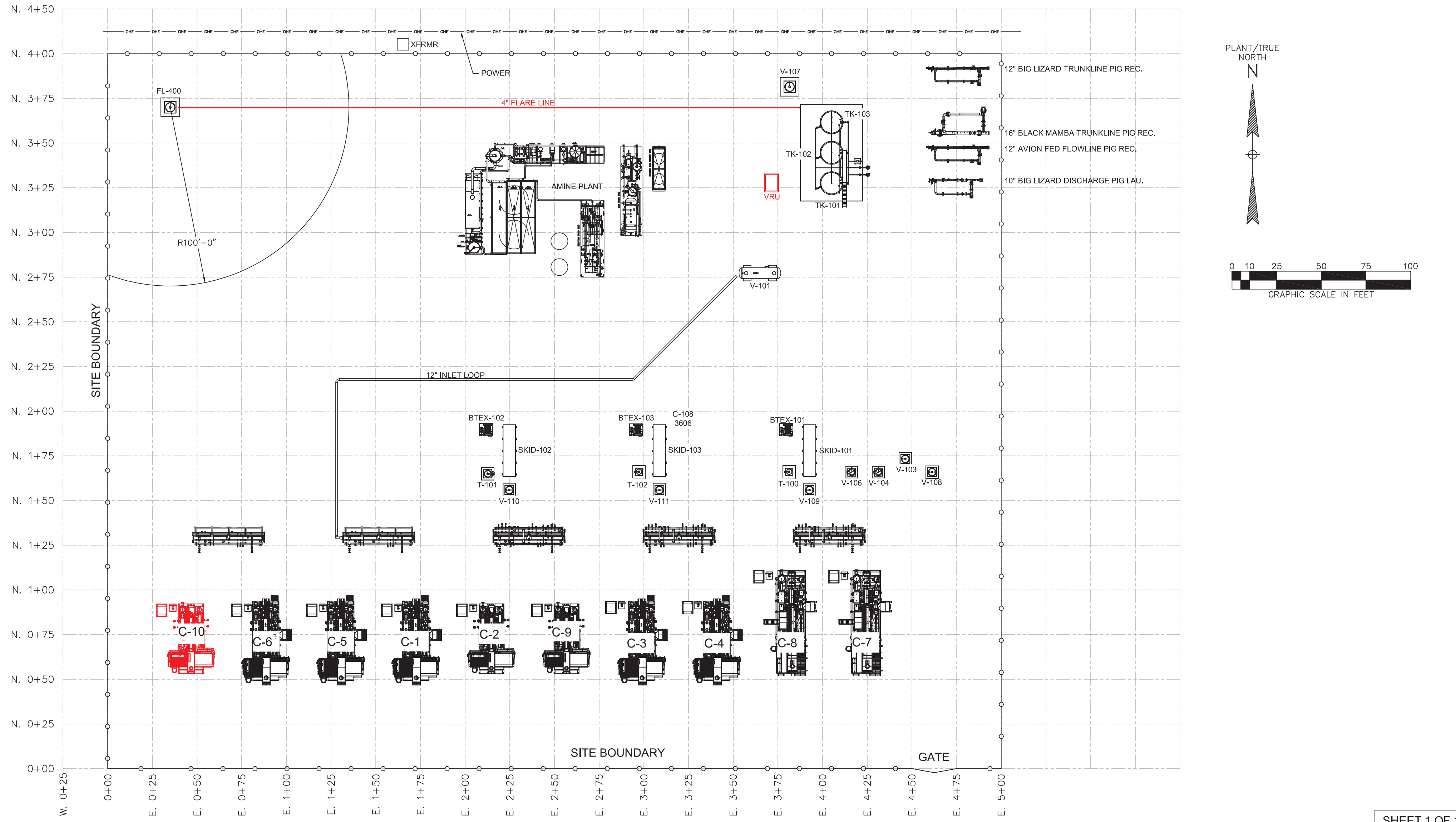


Section 5

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



SHEET 1 OF 1

NOTES:

REV	DESCRIPTION	DATE	BY	APPROVED

DRAWING REVISION

REV	DESCRIPTION	DATE	BY	APPROVED
B	COMPRESSOR & EQUIPMENT ADDITIONS	01/10/22	SSH	CSS
A	PRELIMINARY	08/2018	SSH	JJ

DRAWING REVISION

DRAWING NUMBER	DESCRIPTION

REFERENCE DRAWINGS

LUCID energy group

DRAWN BY SSH	DATE 08/2018
CHECKED BY JJ	DATE 08/2018
ENGINEERED BY	DATE
APPROVED BY	DATE
APPROVED BY	DATE

BIG LIZARD COMPRESSOR STATION
PLOT PLAN
LEA COUNTY, NEW MEXICO

CLIENT NUMBER	SCALE	DRAWING NUMBER	REV
	GRAPHIC	1804–450	B

S:\BD-ENGR\CAD STANDARD DWGS\PROJECTS\1804 BIG LIZARD\PLOT PLAN\1804-450.DWG

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.

Compressor Engines (Units C-1 through C-10)
NO_X, CO, VOC, and formaldehyde emissions are calculated using manufacturer specifications. SO_2 emissions are based on a conservative fuel sulfur content estimated of 5 gr S/100 scf and 100% conversion of elemental sulfur to SO_2. Particulate (PM, $PM_{2.5}$, and PM_{10}) and HAP emissions were calculated using AP-42 Table 3.2-2. Greenhouse gas emissions are estimated using emission factors from 40 CFR 98 Subpart C Tables C-1 and C-2.

Glycol Dehydrators (Units Dehy-1-3)
The regenerator and flash tank emissions for Dehy-1-3 are calculated using a BR&E ProMax simulation. The dehydrator configurations include a flash tank that uses recycle and recompression as a control option with an associated 100% efficiency. The regenerator uses a BTEX condenser and condenser overhead VOC, HAP and H_2S emissions are routed to the dehydrator reboilers with a with a 98% reduction efficiency. Controlled emissions are represented under the reboilers associated with the glycol dehydrators (Units RBL-1-3).

Glycol Dehydrator Reboilers (Units RBL-1-3)
NO_x, CO, VOC, PM, and HAPs emissions are calculated using AP-42 Table 1.4-1 through 1.4-3 emission factors. Greenhouse gas emissions are estimated using emission factors from 40 CFR 98 Subpart C Tables C-1 and C-2.

Amine Unit (Unit AU-1)
Acid gas emissions from the amine unit (Unit AU-1) are calculated using a BR&E ProMax simulation. The flash tank uses recycle and recompression as a control option with an associated 100% efficiency. Regenerator overheads VOC, H_2S, and HAP emissions from this unit are routed to the flare with a 100% capture efficiency and a 98% destruction efficiency. Controlled emissions are represented under the flare (Unit FL-1).

Amine Unit Reboilers (Units AU RBL-1-2)
NO_x, CO, VOC, PM, and HAPs emissions are calculated using AP-42 Table 1.4-1 through 1.4-3 and 20.2.50 NMAC emission factors. Greenhouse gas emissions are estimated using emission factors from 40 CFR 98 Subpart C Tables C-1 and C-2.

Facility Flare (Unit FL-1)
The flare will control the acid gas stream from the amine unit as well as the waste gas from the tanks and loading operations. Additional supplemental fuel is routed to the flare to ensure a 200 scf/btu combustion heat input. A 98% destruction efficiency of VOC and H_2S was assumed. 100% conversion of H_2S to SO_2 was assumed to estimate SO_2 from combustion. Emissions of NO_x and CO were calculated using emission factors from the *Texas Natural Resource Conservation Commission's Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers* (RG-109). Greenhouse gas emissions from the flare were calculated using 40 CFR 98 Subpart C Table C-1 and Table C-2 with the methodology outlined in 40 CFR 98.233(n).

Condensate Tanks (Units T-1-3)
Flashing, working, and breathing emissions from the tanks are calculated using a BR&E ProMax simulation representing liquids removed from various processes at the facility. Emissions are routed to the facility flare (Unit FL-1) with a 100% capture efficiency and a 98% DRE. Controlled emissions are represented at FL-1.

Condensate Loading (Unit LOAD-1)
Loading emissions are calculated using AP-42 Section 5.2 methodology. The maximum hourly throughput is based on the assumption that two trucks with a 180 bbl capacity can be loaded in an hour. Emissions are routed to the facilty flare (Unit FL-1) with a 70% capture efficiency and a 98% DRE. Controlled emissions are represented at FL-1.

Haul Road Emissions (Unit HAUL) (Exempt pursuant to 20.2.72.202.B(5) NMAC.

PM_{10} and $PM_{2.5}$ emissions are calculated using Equation 2 of AP-42 Section 13.2.2. Haul road emissions at this facility are exempt pursuant to 20.2.2.72.202.B.(5) NMAC. Emissions calculations are included in the application reference.

Fugitive Emissions (Unit FUG-1)

Fugitive emission calculations were completed using emission factors from Table 2-4 of EPA Protocol for Equipment Leak Emissions Estimates, 1995. Subcomponent counts for each subcomponent are based on estimated average component counts for each piece of equipment.

Startup, Shutdown, and Maintenance (Unit SSM)

Emissions are based on various activities including, but not limited to, compressor blowdowns, dehydrator blowdowns, filter coalescer blowdowns, scrubber blowdowns, pump blowdowns, reboiler maintenance, pigging, pipeline downs, tank maintenance, surface coating, and abrasive blasting. All blowdowns are conservatively based on the inlet gas. Blowdown volumes were provided by Targa. Worst case hourly VOC, HAP, and H_2S emissions are based on pipeline blowdowns, the sum of all other simultaneous activities will be less than these totals.

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)

Targa Northern Delaware, LLC - Big Lizard
Compressor Station

Emissions Summary

Facility Emissions

Uncontrolled Emissions (Normal Operations)																			
		NOx		CO		VOC		SO_2		TSP		PM-10		PM-2.5		H_2S		Total HAP	
Unit No.	Description/Source	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy
C-10	CAT 3516	1.52	6.66	9.10	39.84	5.14	22.52	0.12	0.51	0.10	0.45	0.10	0.45	0.10	0.45	3.26E-03	0.014	1.33	5.84
C-9	CAT 3516	1.52	6.66	9.10	39.84	5.14	22.52	0.12	0.51	0.10	0.45	0.10	0.45	0.10	0.45	3.26E-03	0.014	1.33	5.84
C-3	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	1.03	4.49
C-4	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	1.03	4.49
C-7	CAT G3608	2.76	12.07	17.09	74.83	7.50	32.83	0.19	0.84	0.17	0.74	0.17	0.74	0.17	0.74	5.38E-03	0.024	1.53	6.71
C-8	CAT G3608	2.76	12.07	17.09	74.83	7.50	32.83	0.19	0.84	0.17	0.74	0.17	0.74	0.17	0.74	5.38E-03	0.024	1.53	6.71
Dehy-1	Glycol Dehydrator	-	-	-	-	81.30	356.10	-	-	-	-	-	-	-	-	3.29E-03	0.014	4.17	18.25
Rbl-1	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.074	0.32	0.062	0.27	0.741	0.018	3.41E-03	0.015	5.59E-03	0.02	5.59E-03	0.024	5.59E-03	0.024	-	-	-	-
Dehy-2	Glycol Dehydrator	-	-	-	-	81.30	356.10	-	-	-	-	-	-	-	-	3.29E-03	0.014	4.17	18.25
Rbl-2	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.074	0.32	0.062	0.27	0.741	0.018	3.41E-03	0.015	5.59E-03	0.02	5.59E-03	0.024	5.59E-03	0.024	-	-	-	-
Tk-1	Atmospheric Storage Tank	-	-	-	-	53.60	3.20	-	-	-	-	-	-	-	-	4.65E-03	3.74E-04	2.85	0.13
Tk-2	Atmospheric Storage Tank	-	-	-	-	53.60	3.20	-	-	-	-	-	-	-	-	4.65E-03	3.74E-04	2.85	0.13
LOAD-1	Truck Loading	-	-	-	-	64.37	2.76	-	-	-	-	-	-	-	-	7.72E-03	3.31E-04	2.63	0.11
FUG-1	Facility-wide Fugitive Emissions	-	-	-	-	6.06	26.55	-	-	-	-	-	-	-	-	4.82E-04	2.11E-03	0.37	1.63
SSM	Startup, Shutdown, and Maintenance	-	-	-	-	4173.45	24.91	-	-	47.79	0.14	6.79	0.020	0.68	2.03E-03	0.45	2.62E-03	162.83	1.50
M	Malfunction[1]	-	-	-	-	4173.45	10.00	-	-	-	-	-	-	-	-	-	-	-	-
C-1	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	1.03	4.49
C-5	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	1.03	4.49
C-2	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	1.03	4.49
C-6	CAT 3606	2.07	9.05	10.46	45.81	5.54	24.26	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	1.03	4.49
Dehy-3	Glycol Dehydrator	-	-	-	-	81.30	356.10	-	-	-	-	-	-	-	-	3.29E-03	0.014	4.17	18.25
Rbl-3	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.074	0.32	0.062	0.27	0.741	0.018	3.41E-03	0.015	5.59E-03	0.02	5.59E-03	0.024	5.59E-03	0.024	-	-	-	-
AU-1	Amine Unit	-	-	-	-	58.92	258.05	-	-	-	-	-	-	-	-	8.50	37.23	6.08	26.61
AU-Rb 1	15.0 MMBtu/hr Amine Reboiler	1.47	6.44	1.24	5.41	0.081	0.35	0.07	0.30	0.11	0.49	0.11	0.49	0.11	0.49	-	-	0.03	0.12
AU-Rb 2	15.0 MMBtu/hr Amine Reboiler	1.47	6.44	1.24	5.41	0.081	0.35	0.07	0.30	0.11	0.49	0.11	0.49	0.11	0.49	-	-	0.03	0.12
FL-1	Control Flare	0.03	0.15	0.07	0.30	-	-	1.11E-03	4.88E-03	-	-	-	-	-	-	-	-	-	-
Tk-3	Atmospheric Storage Tank	-	-	-	-	53.60	3.20	-	-	-	-	-	-	-	-	4.65E-03	3.74E-04	2.85	0.13
Trailer-1	Heater Trailer	0.30	1.33	0.18	0.81	0.011	0.048	0.59	2.60	0.023	0.10	0.023	0.10	0.023	0.10	-	-	0.04	0.19
Total		**24.46**	**107.11**	**118.02**	**516.93**	**4768.41**	**1657.23**	**2.23**	**9.77**	**49.37**	**7.07**	**8.37**	**6.95**	**2.26**	**6.93**	**9.02**	**37.46**	**204.94**	**137.48**

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Emissions Summary

Facility Emissions

Controlled Emissions (Normal Operations)																			
		NOx		CO		VOC		SO_2		TSP		PM-10		PM-2.5		H_2S		Total HAP	
Unit No.	Description/Source	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy
C-10	CAT 3516	1.52	6.66	1.52	6.66	2.45	10.73	0.12	0.51	0.10	0.45	0.10	0.45	0.10	0.45	3.26E-03	0.014	0.38	1.68
C-9	CAT 3516	1.52	6.66	1.52	6.66	2.45	10.73	0.12	0.51	0.10	0.45	0.10	0.45	0.10	0.45	3.26E-03	0.014	0.38	1.68
C-3	CAT 3606	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	0.36	1.59
C-4	CAT 3606	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	0.36	1.59
C-7	CAT G3608	2.76	12.07	2.76	12.07	4.26	18.67	0.19	0.84	0.17	0.74	0.17	0.74	0.17	0.74	5.38E-03	0.024	0.52	2.27
C-8	CAT G3608	2.76	12.07	2.76	12.07	4.26	18.67	0.19	0.84	0.17	0.74	0.17	0.74	0.17	0.74	5.38E-03	0.024	0.52	2.27
Dehy-1	Glycol Dehydrator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rbl-1	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.16	0.69	0.132	0.58	0.75	3.263	7.27E-03	3.19E-02	1.20E-02	5.24E-02	1.20E-02	0.052	1.20E-02	0.052	-	-	0.054	0.24
Dehy-2	Glycol Dehydrator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rbl-2	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.16	0.69	0.132	0.58	0.75	3.263	7.27E-03	3.19E-02	1.20E-02	5.24E-02	1.20E-02	0.052	1.20E-02	0.052	-	-	0.054	0.24
Tk-1	Atmospheric Storage Tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tk-2	Atmospheric Storage Tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LOAD-1	Truck Loading	-	-	-	-	19.31	0.83	-	-	-	-	-	-	-	-	2.32E-03	9.92E-05	0.79	0.03
FUG-1	Facility-wide Fugitive Emissions	-	-	-	-	6.06	26.55	-	-	-	-	-	-	-	-	4.82E-04	2.11E-03	0.37	1.63
SSM	Startup, Shutdown, and Maintenance	-	-	-	-	4173.45	24.91	-	-	47.79	0.14	6.79	0.020	0.68	2.03E-03	0.45	2.62E-03	162.83	1.50
M	Malfunction[1]	-	-	-	-	4173.45	10.00	-	-	-	-	-	-	-	-	-	-	-	-
C-1	CAT 3606	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	0.36	1.59
C-5	CAT 3606	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	0.36	1.59
C-2	CAT 3606	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	0.36	1.59
C-6	CAT 3606	2.07	9.05	2.07	9.05	3.17	13.90	0.15	0.64	0.13	0.56	0.13	0.56	0.13	0.56	4.07E-03	0.018	0.36	1.59
Dehy-3	Glycol Dehydrator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rbl-3	0.75 MMBtu/hr reboiler w/ BTEX condenser	0.16	0.69	0.132	0.58	0.75	3.263	7.27E-03	3.19E-02	1.20E-02	5.24E-02	1.20E-02	0.052	1.20E-02	0.052	-	-	0.054	0.24
AU-1	Amine Unit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AU-Rb 1	15.0 MMBtu/hr Amine Reboiler	1.47	6.44	1.24	5.41	0.081	0.35	0.07	0.30	0.11	0.49	0.11	0.49	0.11	0.49	-	-	0.03	0.12
AU-Rb 2	15.0 MMBtu/hr Amine Reboiler	1.47	6.44	1.24	5.41	0.081	0.35	0.07	0.30	0.11	0.49	0.11	0.49	0.11	0.49	-	-	0.03	0.12
FL-1	Control Flare	1.31	5.57	10.99	46.80	4.41	1.51	15.64	68.37	-	-	-	-	-	-	0.17	0.74	0.31	0.46
Tk-3	Atmospheric Storage Tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trailer-1	Heater Trailer	0.30	6.09E-03	0.18	3.70E-03	0.011	2.19E-04	0.59	0.012	0.023	4.68E-04	0.023	4.68E-04	0.023	4.68E-04	-	-	0.043	8.68E-04
Total		**25.98**	**112.31**	**35.00**	**151.14**	**4238.10**	**216.50**	**17.89**	**75.59**	**49.39**	**7.05**	**8.39**	**6.93**	**2.28**	**6.91**	**0.66**	**0.93**	**168.55**	**22.03**

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

[1] Only SSM or malfunction emissions can occur any any time, therefore only SSM are noted in the hourly totals.

Targa Northern Delaware, LLC - Big Lizard
Compressor Station

Emissions Summary

Facility Emissions

		Formaldehyde		Benzene		Toluene		Acetaldehyde		Acrolein		CO2	N2O	CH4
Unit No.	Description/Source	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	tpy	tpy	tpy
C-10	CAT 3516	1.19	5.20	4.41E-03	0.019	4.11E-03	0.018	0.084	0.37	0.052	0.23	6292.17	0.012	0.12
C-9	CAT 3516	1.19	5.20	4.41E-03	0.019	4.11E-03	0.018	0.084	0.37	0.052	0.23	6292.17	0.012	0.12
C-3	CAT 3606	0.83	3.62	5.99E-03	0.026	0.0056	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
C-4	CAT 3606	0.83	3.62	5.99E-03	0.026	0.0056	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
C-7	CAT G3608	1.27	5.55	7.99E-03	0.035	0.0074	0.033	0.15	0.67	0.093	0.41	10387.74	0.020	0.20
C-8	CAT G3608	1.27	5.55	7.99E-03	0.035	0.0074	0.033	0.15	0.67	0.093	0.41	10387.74	0.020	0.20
Dehy-1	Glycol Dehydrator	-	-	-	-	0.36	1.57	-	-	-	-	-	-	-
Rbl-1	0.75 MMBtu/hr reboiler w/ BTEX condenser	-	-	-	-	-	-	-	-	-	-	-	-	-
Dehy-2	Glycol Dehydrator	-	-	-	-	0.36	1.57	-	-	-	-	-	-	-
Rbl-2	0.75 MMBtu/hr reboiler w/ BTEX condenser	-	-	-	-	-	-	-	-	-	-	-	-	-
Tk-1	Atmospheric Storage Tank	-	-	-	-	0.26	0.012	-	-	-	-	-	-	-
Tk-2	Atmospheric Storage Tank	-	-	-	-	0.26	0.012	-	-	-	-	-	-	-
LOAD-1	Truck Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
FUG-1	Facility-wide Fugitive Emissions	-	-	-	-	-	-	-	-	-	-	-	-	-
SSM	Startup, Shutdown, and Maintenance	-	-	-	-	-	-	-	-	-	-	4.98	-	16.43
M	Malfunction[1]	-	-	-	-	-	-	-	-	-	-	-	-	-
C-1	CAT 3606	0.83	3.62	5.99E-03	0.026	5.58E-03	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
C-5	CAT 3606	0.83	3.62	5.99E-03	0.026	5.58E-03	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
C-2	CAT 3606	0.83	3.62	5.99E-03	0.026	5.58E-03	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
C-6	CAT 3606	0.83	3.62	5.99E-03	0.026	5.58E-03	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
Dehy-3	Glycol Dehydrator			-	-	0.36	1.57	-	-	-	-	-	-	-
Rbl-3	0.75 MMBtu/hr reboiler w/ BTEX condenser	-	-	-	-	-	-	-	-	-	-	-	-	-
AU-1	Amine Unit	-	-	-	-	1.33	5.83	-	-	-	-	-	-	-
AU-Rb 1	15.0 MMBtu/hr Amine Reboiler	1.10E-03	4.83E-03	3.09E-05	1.35E-04	5.00E-05	2.19E-04	-	-	-	-	7685.33	0.014	0.14
AU-Rb 2	15.0 MMBtu/hr Amine Reboiler	1.10E-03	4.83E-03	3.09E-05	1.35E-04	5.00E-05	2.19E-04	-	-	-	-	7685.33	0.014	0.14
FL-1	Control Flare	-	-	-	-	-	-	-	-	-	-	15592.95	0.10	27.24
Tk-3	Atmospheric Storage Tank	-	-	-	-	0.26	0.012	-	-	-	-	-	-	-
Trailer-1	Heater Trailer	0.034	6.84E-04	1.15E-03	2.29E-05	6.61E-03	1.32E-04	8.31E-04	1.66E-05	2.02E-04	4.03E-06	3.26	2.65E-05	1.32E-04
Total		**9.90**	**43.23**	**0.06**	**0.27**	**3.25**	**10.81**	**1.16**	**5.07**	**0.71**	**3.11**	**111456.78**	**0.28**	**45.48**

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Emissions Summary

Facility Emissions

Unit No.	Description/Source	Formaldehyde pph	Formaldehyde tpy	Benzene pph	Benzene tpy	Toluene pph	Toluene tpy	Acetaldehyde pph	Acetaldehyde tpy	Acrolein pph	Acrolein tpy	CO2 tpy	N2O tpy	CH4 tpy
C-10	CAT 3516	0.24	1.04	4.41E-03	0.019	4.11E-03	0.018	0.084	0.37	0.052	0.23	6292.17	0.012	0.12
C-9	CAT 3516	0.24	1.04	4.41E-03	0.019	4.11E-03	0.018	0.084	0.37	0.052	0.23	6292.17	0.012	0.12
C-3	CAT 3606	0.17	0.72	5.99E-03	0.026	0.0056	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
C-4	CAT 3606	0.17	0.72	5.99E-03	0.026	0.0056	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
C-7	CAT G3608	0.25	1.11	7.99E-03	0.035	0.0074	0.033	0.15	0.67	0.093	0.41	10387.74	0.020	0.20
C-8	CAT G3608	0.25	1.11	7.99E-03	0.035	0.0074	0.033	0.15	0.67	0.093	0.41	10387.74	0.020	0.20
Dehy-1	Glycol Dehydrator	-	-	-	-	-	-	-	-	-	-	-	-	-
Rbl-1	0.75 MMBtu/hr reboiler w/ BTEX condenser	-	-	-	-	-	-	-	-	-	-	384.27	7.24E-04	7.24E-03
Dehy-2	Glycol Dehydrator	-	-	-	-	-	-	-	-	-	-	-	-	-
Rbl-2	0.75 MMBtu/hr reboiler w/ BTEX condenser	-	-	-	-	-	-	-	-	-	-	384.27	7.24E-04	7.24E-03
Tk-1	Atmospheric Storage Tank	-	-	-	-	-	-	-	-	-	-	-	-	-
Tk-2	Atmospheric Storage Tank	-	-	-	-	-	-	-	-	-	-	-	-	-
LOAD-1	Truck Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
FUG-1	Facility-wide Fugitive Emissions	-	-	-	-	-	-	-	-	-	-	5.51	-	31.48
SSM	Startup, Shutdown, and Maintenance	-	-	-	-	-	-	-	-	-	-	4.98	-	16.43
M	Malfunction[1]	-	-	-	-	-	-	-	-	-	-	-	-	-
C-1	CAT 3606	0.17	0.72	5.99E-03	0.026	5.58E-03	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
C-5	CAT 3606	0.17	0.72	5.99E-03	0.026	5.58E-03	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
C-2	CAT 3606	0.17	0.72	5.99E-03	0.026	5.58E-03	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
C-6	CAT 3606	0.17	0.72	5.99E-03	0.026	5.58E-03	0.024	0.11	0.50	0.070	0.31	7854.19	0.015	0.15
Dehy-3	Glycol Dehydrator	-	-	-	-	-	-	-	-	-	-	-	-	-
Rbl-3	0.75 MMBtu/hr reboiler w/ BTEX condenser	-	-	-	-	-	-	-	-	-	-	384.27	7.24E-04	7.24E-03
AU-1	Amine Unit	-	-	-	-	-	-	-	-	-	-	-	-	-
AU-Rb 1	15.0 MMBtu/hr Amine Reboiler	0.00	0.00	3.09E-05	1.35E-04	5.00E-05	2.19E-04	-	-	-	-	7685.33	0.014	0.14
AU-Rb 2	15.0 MMBtu/hr Amine Reboiler	0.00	0.00	3.09E-05	1.35E-04	5.00E-05	2.19E-04	-	-	-	-	7685.33	0.014	0.14
FL-1	Control Flare	-	-	-	-	-	-	-	-	-	-	15592.95	0.100	27.24
Tk-3	Atmospheric Storage Tank	-	-	-	-	-	-	-	-	-	-	-	-	-
Trailer-1	Heater Trailer	3.42E-02	6.84E-04	1.15E-03	2.29E-05	6.61E-03	1.32E-04	8.31E-04	1.66E-05	2.02E-04	4.03E-06	3.26	2.65E-05	1.32E-04
Total		**2.01**	**8.66**	**0.06**	**0.27**	**0.06**	**0.25**	**1.16**	**5.07**	**0.71**	**3.11**	**112615.08**	**0.28**	**76.98**

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

[1] Only SSM or malfunction emissions can occur any any time, therefore only SSM are noted in the hourly totals.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Caterpillar G3516

Unit Numbers:	C-10, C-9		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3516		
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:	1,256.1	Btu/scf	Fuel Gas Analysis
Heat input:	10.24	MMBtu/hr	BSFC * site hp
Fuel consumption:	8.150	Mscf/hr	Heat input / fuel heat value
Annual fuel usage:	71.39	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	0.038	0.001	g/hp-hr	Mfg data	Engine data
			5		gr Total Sulfur/Mscf	Pipeline specification	
1.52	**9.10**	**5.14**	**0.12**	0.0033	lb/hr	Hourly emission rate	
6.66	**39.84**	**22.52**	**0.51**	**0.014**	tpy	Annual emission rate (8760 hrs/yr)	

PM[2]	HCOH	Total HAPs[3]		
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.034	0.39	0.44	g/hp-hr	Mfg data
0.10	**1.19**	**1.33**	lb/hr	Hourly emission rate
0.45	**5.20**	**5.84**	tpy	Annual emission rate (8760 hrs/yr)

Controlled Emissions

NO_x	CO	NMNEHC[4]	SO_2	H_2S			
0.00%	83.28%	46.15%			% Reduction		
0.50	0.50	0.70	0.038	0.001	g/hp-hr	Mfg data	Catalyst data
			5		gr Total Sulfur/Mscf	Pipeline specification	
1.52	**1.52**	**2.45**	**0.12**	0.0033	lb/hr	Hourly emission rate	
6.66	**6.66**	**10.73**	**0.51**	**0.0143**	tpy	Annual emission rate (8760 hrs/yr)	

PM[2]	HCOH[3]	Total HAPs[3]		
	80.00%		% Reduction	
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.034	0.078	0.13	g/hp-hr	Mfg data
0.10	**0.24**	**0.38**	lb/hr	Hourly emission rate
0.45	**1.04**	**1.68**	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.

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

Subpart C- General Stationary Fuel Combustion Sources 98.30

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

Tier 1

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.

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 x 10-3 x Fuel x 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

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Caterpillar G3516

Unit Numbers:	C-10, C-9		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3516		
Aspiration:	Turbo-charged		
Hours of Operation			8760
Rated Horsepower			1380
Fuel Type			Natural Gas
Engine Type			4SLB
Emission Factor Set			GRI Literature Set

HAPs	Emission Factor		Emissions	
	(g/hp hr)		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

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Caterpillar G3606

Unit Numbers:	C-3, C-4, C-1, C-5, C-2, C-6		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3606		
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:	1,256.1	Btu/scf	Pipeline specification
Heat input:	12.78	MMBtu/hr	BSFC * site hp
Fuel consumption:	10.173	Mscf/hr	Heat input / fuel heat value
Annual fuel usage:	89.11	MMscf/yr	8760 hrs/yr operation

Exhaust Parameters

Exhaust temp (Tstk):	812	°F	Mfg data
Stack height:	22.0	ft	Engineering Estimate
Stack diameter:	1.00	ft	Engineering Estimate
Exhaust flow:	11846.0	acfm	Mfg data
Exhaust flow:	197.43	acfs	Mfg data
Exhaust velocity:	251.5	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	0.035	0.001	g/hp-hr	Mfg data	Engine data
			5		gr Total Sulfur/Mscf	Pipeline specification	
2.07	**10.46**	**5.54**	**0.15**	0.0041	lb/hr	Hourly emission rate	
9.05	**45.81**	**24.26**	**0.64**	**0.018**	tpy	Annual emission rate (8760 hrs/yr)	

PM[2]	HCOH	Total HAPs[3]		
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.031	0.20	0.25	g/hp-hr	Mfg data
0.13	**0.83**	**1.03**	lb/hr	Hourly emission rate
0.56	**3.62**	**4.49**	tpy	Annual emission rate (8760 hrs/yr)

Controlled Emissions

NO_x	CO	NMNEHC[4]	SO_2[1]	H_2S[1]			
0%	80%	39%			% Reduction		
0.50	0.50	0.70	0.035	0.001	g/hp-hr	Mfg data	Catalyst data
			5		gr Total Sulfur/Mscf	Pipeline specification	
2.07	**2.07**	**3.17**	**0.15**	0.0041	lb/hr	Hourly emission rate	
9.05	**9.05**	**13.90**	**0.64**	**0.018**	tpy	Annual emission rate (8760 hrs/yr)	

PM[2]	HCOH[3]	Total HAPs[3]		
	80%		% Reduction	
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.031	0.040	0.088	g/hp-hr	Mfg data
0.13	**0.17**	**0.36**	lb/hr	Hourly emission rate
0.56	**0.72**	**1.59**	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.

Targa Northern 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)	

<u>Greenhouse Gases Emissions from Natural Gas Combustion</u>

Subpart C- General Stationary Fuel Combustion Sources 98.30

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

Tier 1

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.

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 x 10-3 x Fuel x 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: <u>Natural Gas</u>

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: <u>Natural</u> 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

Caterpillar G3606

Unit Numbers:	C-3, C-4, C-1, C-5, C-2, C-6		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3606		
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	Emissions	
	(g/hp hr)	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

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Caterpillar G3608

Unit Numbers:	C-7, C-8		
Source description:	4	Stroke	Lean Burn Natural Gas Engine
Manufacturer:	Caterpillar		
Model:	G3608		
Aspiration:	Turbo-charged		

Engine Horsepower and RPM

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:	1,256.1	Btu/scf	Pipeline specification
Heat input:	16.90	MMBtu/hr	BSFC * site hp
Fuel consumption:	13.454	Mscf/hr	Heat input / fuel heat value
Annual fuel usage:	117.86	MMscf/yr	8760 hrs/yr operation

Exhaust Parameters

Exhaust temp (Tstk):	825	°F	Mfg data
Stack height:	22.0	ft	Engineering Estimate
Stack diameter:	1.00	ft	Engineering Estimate
Exhaust flow:	16023.0	acfm	Mfg data
Exhaust flow:	267.05	acfs	Mfg data
Exhaust velocity:	340.2	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	0.035	0.001	g/hp-hr	Mfg data	Engine data
			5		gr Total Sulfur/Mscf	Pipeline specification	
2.76	17.09	7.50	0.19	0.005	lb/hr	Hourly emission rate	
12.07	74.83	32.83	0.84	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
0.031	0.23	0.28	g/hp-hr	Mfg data
0.17	1.27	1.53	lb/hr	Hourly emission rate
0.74	5.55	6.71	tpy	Annual emission rate (8760 hrs/yr)

Controlled Emissions

NO_x	CO	NMNEHC[4]	SO_2[1]	H_2S[1]			
0.50	0.50	0.70	0.035	0.001	g/hp-hr	Mfg data	Catalyst data
			5		gr Total Sulfur/Mscf	Pipeline specification	
2.76	2.76	4.26	0.19	0.0054	lb/hr	Hourly emission rate	
12.07	12.07	18.67	0.84	0.024	tpy	Annual emission rate (8760 hrs/yr)	

PM[2]	HCOH[3]	Total HAPs[3]		
0.010			lb/MMBtu	AP-42 Table 3.2-2
0.031	0.046	0.094	g/hp-hr	Mfg data
0.17	0.25	0.52	lb/hr	Hourly emission rate
0.74	1.11	2.27	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.

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)	

Greenhouse Gases 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_20/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

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Caterpillar G3608

Unit Numbers:	C-7, C-8		
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

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Dehydrator

Emission Unit:	Dehy-1
Source Description:	Dehy contactor with BTEX condenser
Operating Hours:	8760 hrs/yr
Throughput:	35.00 MMSCFD

Uncontrolled [1]	VOC		H_2S		Total HAP		Hexane		Benzene		Toluene		Ethylbenzene		Xylene	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Uncontrolled Flash Tank Overheads	44.25	193.82	1.198E-03	5.248E-03	1.47	6.46	1.37	6.01	-	-	0.03	0.13	0.019	0.083	0.05	0.23
Uncontrolled Condenser Overheads	37.05	162.27	2.093E-03	9.169E-03	2.69	11.80	2.06	9.00	-	-	0.33	1.44	0.136	0.59	0.37	1.60
Uncontrolled Emissions Per Unit	**81.30**	**356.10**	**3.292E-03**	**0.014**	**4.17**	**18.25**	**3.43**	**15.02**	**-**	**-**	**0.36**	**1.57**	**0.154**	**0.68**	**0.42**	**1.83**

Controlled [2]	VOC		H_2S		Total HAP		Hexane		Benzene		Toluene		Ethylbenzene		Xylene	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Controlled Flash Tank Overheads	Flash Tank Overheads are routed back to facility inlet.															
Controlled Condenser Overheads	Regenerator Overheads are routed to the reboilers.															
Controlled Emissions Per Unit	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

[1] Emissions estimated using BR&E ProMax.

[2] BTEX non-condensable overheads are sent to the reboilers (RBL-1, RBL-2 and RBL-3). Emissions are represented at those units.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Reboiler

Emission Unit:	RBL-1
Source Description:	Reboiler
Destruction Efficiency:	98%

Reboiler Information	
Unit(s):	RBL-1
Unit Count:	1
Annual Operating Hours:	8,760
Combustion Efficiency (%):	98%

Input Information

Activity	Parameters	Value	Unit	Notes:
Fuel	Hourly Volume Flow Rate	597.08	scf/hr	Facility design
	Natural Gas Heat Value	1256.11	Btu/scf	Inlet Gas Analysis
	Annual Volume Flow Rate	5.23	MMscf/yr	scf/hr * 8760 hr/yr / 10^6
	Hourly Heat Rate	0.75	MMBtu/hr	scf/hr * Btu/scf / 10^6
	Annual Heat Rate	6,570.00	MMBtu/yr	MMBtu/hr * 8760 hr/yr
Process Emission Stream	Noncondensable Flow Rate	310.08	scf/hr	Dehy-1 maximum flow rate
	Hourly Weighted Heat Value	2758.38	BTU/scf	Dehy-1 maximum heating value promax
	Annual Flow Rate	2.72	MMscf/yr	Dehy-1 annual flow rate
	Hourly Heat Rate	0.86	MMBtu/hr	scf/hr * Btu/scf / 10^6
	Annual Heat Rate	7492.52	MMBtu/yr	MMscf/yr * Btu/scf
	Hourly VOC	37.05	lb/hr VOC	Dehy-1 non-condensable overheads
	Annual VOC	162.27	tpy VOC	Dehy-1 non-condensable overheads
	Hourly HAP	2.69	lb/hr HAP	Dehy-1 non-condensable overheads
	Annual HAP	11.80	tpy HAP	Dehy-1 non-condensable overheads
	Hourly H_2S	2.09E-03	lb/hr H_2S	Dehy-1 non-condensable overheads
	Annual H_2S	9.17E-03	tpy H_2S	Dehy-1 non-condensable overheads

Emission Calculation

Description	NO_X[1]	CO[1]	VOC	SO_2[1]	PM[1]	H_2S[1]	HAPs	Units	Notes
Emission Factors	100	84	5.5		7.6			lb/MMscf	AP-42 Table 1.4-1 & 2
	123	103	6.77		9.36			lb/MMscf	Adjusted EF, per footnote a in Tables 1.4-1 and 1.4-2 for fuel gas
	270	227	14.87		20.55			lb/MMscf	Adjusted EF, per footnote a in Tables 1.4-1 and 1.4-2 for process gas
Fuel Sulfur Content				2.0				gr S/100scf	Fuel sulfur content (gr/100scf)
				0.0029				lb S/ Mscf	Gr S/100 scf * (1 lb/7000 gr) * (1000scf/Mscf)
Fuel Emissions	0.074	0.062	0.0040	0.0034	0.0056	-	-	lb/hr	RBL-1 Fuel Emissions
	0.32	0.271	0.018	0.015	0.024	-	-	tpy	RBL-1 Fuel Emissions
Process Emissions	0.084	0.070	0.74	3.862E-03	6.37E-03	4.19E-05	0.054	lb/hr	Dehy-1 non-condensable overheads
	0.37	0.309	3.25	0.02	2.79E-02	1.83E-04	0.24	tpy	Dehy-1 non-condensable overheads
Total Emissions	0.16	0.13	0.75	0.007	0.0120	4.19E-05	0.054	lb/hr	
	0.69	0.58	3.26	0.03	0.052	1.83E-04	0.24	tpy	

Notes:

(1) NO_X, CO, VOC, and PM emission factors: AP-42 Table 1.4-1 & 2. SO_2: Mass balance assuming 95% combustion of H_2S and 100% conversion of combusted H_2S to SO_2:

Fuel Gas SO_2 Emissions (lb/hr) = [(Fuel Gas Flow (Mscf/hr) * Fuel Gas Sulfur Content (lb S/Mscf)*(64 lb/lbmol SO_2 / 32 lb/lbmol S)) + (Fuel Gas Flow (Mscf/yr) * Fuel Gas H_2S Content (lb H_2S/Mscf)*(64 lb/lbmol SO_2 /34 lb/lbmol H_2S)*(DRE))]

Fuel Gas H_2S Emissions (lb/hr) = [Pilot Gas Flow Rate (Mscf/yr) * Fuel Gas H_2S Content (lb H_2S/Mscf) * (1 - DRE)]

Process SO_2 Emissions (lb/hr) = [H_2S Mass Flow Rate (lb/hr) * DRE * (64 lb/lbmol SO_2 / 34 lb/lbmol H_2S)]

Process SO_2 Emissions (tpy) = [H_2S Mass Flow Rate (tpy) * DRE * (64 lb/lbmol SO_2 / 34 lb/lbmol H_2S)]

(2) VOC, HAP and H_2S emissions estimated based on event stream routed to reboiler and 95% efficiency.

Exhaust Parameters		
Input heat rate	0.75 MMBtu/hr	Pilot Heating Value (MMBtu/hr) + Process Heating Value (MMBtu/hr)
Exhaust Temperature	600 F	Engineering Estimate
Exhaust Flow (actual)	0.3 acfs	(Process Flow Rate (scf/hr) + Pilot Flow Rate (scf/hr)) / 3600
Stack Area	0.65 ft^2	Calculated
Stack Diameter	10 in	Calculated
Stack Diameter	0.83 ft	Design Data
Exhaust Velocity	0.5 ft/sec	Per modeling guidance
Stack Height	20 ft	Design Data

Site Data		
Site Elevation	3715 ft MSL	
Standard Pressure (Ps)	29.92 in Hg	
Pressure at Elevation (Pa)	26.11 in Hg	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
Standard Temperature (Ts)	528 R	

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Dehydrator

Emission Unit:	Dehy-2
Source Description:	Dehy contactor with BTEX condenser
Operating Hours:	8760 hrs/yr
Throughput:	35.00 MMSCFD

Uncontrolled [1]	VOC		H_2S		Total HAP		Hexane		Benzene		Toluene		Ethylbenzene		Xylene	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Uncontrolled Flash Tank Overheads	44.25	193.82	1.198E-03	5.248E-03	1.47	6.46	1.37	6.01	-	-	0.03	0.13	0.019	0.083	0.05	0.23
Uncontrolled Condenser Overheads	37.05	162.27	2.093E-03	9.169E-03	2.69	11.80	2.06	9.00	-	-	0.33	1.44	0.136	0.59	0.37	1.60
Uncontrolled Emissions Per Unit	**81.30**	**356.10**	**3.292E-03**	**0.014**	**4.17**	**18.25**	**3.43**	**15.02**	**-**	**-**	**0.36**	**1.57**	**0.154**	**0.68**	**0.42**	**1.83**

Controlled [2]	VOC		H_2S		Total HAP		Hexane		Benzene		Toluene		Ethylbenzene		Xylene	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Controlled Flash Tank Overheads	Flash Tank Overheads are routed back to facility inlet.															
Controlled Condenser Overheads	Regenerator Overheads are routed to the reboilers.															
Controlled Emissions Per Unit	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

[1] Emissions estimated using BR&E ProMax.

[2] BTEX non-condensable overheads are sent to the reboilers (RBL-1, RBL-2 and RBL-3). Emissions are represented at those units.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Reboiler

Emission Unit: RBL-2
Source Description: Reboiler
Destruction Efficiency: 98%

Reboiler Information	
Unit(s):	RBL-2
Unit Count:	1
Annual Operating Hours:	8,760
Combustion Efficiency (%):	98%

Input Information				
Activity	Parameters	Value	Unit	Notes:
Fuel	Hourly Volume Flow Rate	597.08	scf/hr	Facility design
	Natural Gas Heat Value	1256.11	Btu/scf	Inlet Gas Analysis
	Annual Volume Flow Rate	5.23	MMscf/yr	scf/hr * 8760 hr/yr / 10^6
	Hourly Heat Rate	0.75	MMBtu/hr	scf/hr * Btu/scf / 10^6
	Annual Heat Rate	6,570.00	MMBtu/yr	MMBtu/hr * 8760 hr/yr
Process Emission Stream	Noncondensable Flow Rate	310.08	scf/hr	Dehy-2 maximum flow rate
	Hourly Weighted Heat Value	2758.38	BTU/scf	Dehy-2 maximum heating value promax
	Annual Flow Rate	2.72	MMscf/yr	Dehy-2 annual flow rate
	Hourly Heat Rate	0.86	MMBtu/hr	scf/hr * Btu/scf / 10^6
	Annual Heat Rate	7492.52	MMBtu/yr	MMscf/yr * Btu/scf
	Hourly VOC	37.05	lb/hr VOC	Dehy-2 non-condensable overheads
	Annual VOC	162.27	tpy VOC	Dehy-2 non-condensable overheads
	Hourly HAP	2.69	lb/hr HAP	Dehy-2 non-condensable overheads
	Annual HAP	11.80	tpy HAP	Dehy-2 non-condensable overheads
	Hourly H_2S	2.09E-03	lb/hr H_2S	Dehy-2 non-condensable overheads
	Annual H_2S	9.17E-03	tpy H_2S	Dehy-2 non-condensable overheads

Emission Calculation

Description	NO_x[1]	CO[1]	VOC	SO_2[1]	PM[1]	H_2S[1]	HAPs	Units	Notes
Emission Factors	100	84	5.5		7.6			lb/MMscf	AP-42 Table 1.4-1 & 2
	123	103	6.77		9.36			lb/MMscf	Adjusted EF, per footnote a in Tables 1.4-1 and 1.4-2 for fuel gas
	270	227	14.87		20.55			lb/MMscf	Adjusted EF, per footnote a in Tables 1.4-1 and 1.4-2 for process gas
Fuel Sulfur Content				2.0				gr S/100scf	Fuel sulfur content (gr/100scf)
				0.0029				lb S/ Mscf	Gr S/100 scf * (1 lb/7000 gr) * (1000scf/Mscf)
Fuel Emissions	0.074	0.062	0.0040	0.0034	0.0056	-	-	lb/hr	RBL-2 Fuel Emissions
	0.32	0.271	0.018	0.015	0.024	-	-	tpy	RBL-2 Fuel Emissions
Process Emissions	0.084	0.070	0.74	3.862E-03	6.37E-03	4.19E-05	0.054	lb/hr	Dehy-2 non-condensable overheads
	0.37	0.309	3.25	0.02	2.79E-02	1.83E-04	0.24	tpy	Dehy-2 non-condensable overheads
Total Emissions	0.16	0.13	0.75	0.007	0.0120	4.19E-05	0.054	lb/hr	
	0.69	0.58	3.26	0.03	0.052	1.83E-04	0.24	tpy	

Notes:

(1) NO_X, CO, VOC, and PM emission factors: AP-42 Table 1.4-1 & 2. SO_2: Mass balance assuming 95% combustion of H_2S and 100% conversion of combusted H_2S to SO_2:
Fuel Gas SO_2 Emissions (lb/hr) = [(Fuel Gas Flow (Mscf/hr) * Fuel Gas Sulfur Content (lb S/Mscf)*(64 lb/lbmol SO_2 / 32 lb/lbmol S)) + (Fuel Gas Flow (Mscf/yr) * Fuel Gas H_2S Content (lb H_2S/Mscf)*(64 lb/lbmol SO_2 /34 lb/lbmol H_2S)*(DRE))]
Fuel Gas H_2S Emissions (lb/hr) = [Pilot Gas Flow Rate (Mscf/yr) * Fuel Gas H_2S Content (lb H_2S/Mscf) * (1 - DRE)]
Process SO_2 Emissions (lb/hr) = [H_2S Mass Flow Rate (lb/hr) * DRE * (64 lb/lbmol SO_2 / 34 lb/lbmol H_2S)]
Process SO_2 Emissions (tpy) = [H_2S Mass Flow Rate (tpy) * DRE * (64 lb/lbmol SO_2 / 34 lb/lbmol H_2S)]

(2) VOC, HAP and H_2S emissions estimated based on event stream routed to reboiler and 95% efficiency.

Exhaust Parameters		
Input heat rate	0.75 MMBtu/hr	Pilot Heating Value (MMBtu/hr) + Process Heating Value (MMBtu/hr)
Exhaust Temperature	600 F	Engineering Estimate
Exhaust Flow (actual)	0.3 acfs	(Process Flow Rate (scf/hr) + Pilot Flow Rate (scf/hr)) / 3600
Stack Area	0.65 ft^2	Calculated
Stack Diameter	10 in	Calculated
Stack Diameter	0.83 ft	Design Data
Exhaust Velocity	0.5 ft/sec	Per modeling guidance
Stack Height	20 ft	Design Data

Site Data		
Site Elevation	3715 ft MSL	
Standard Pressure (Ps)	29.92 in Hg	
Pressure at Elevation (Pa)	26.11 in Hg	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
Standard Temperature (Ts)	528 R	

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Dehydrator

Emission Unit:	Dehy-3
Source Description:	Dehy contactor with BTEX condenser
Operating Hours:	8760 hrs/yr
Throughput:	35.00 MMSCFD

Uncontrolled [1]	VOC		H_2S		Total HAP		Hexane		Benzene		Toluene		Ethylbenzene		Xylene	
	lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**
Uncontrolled Flash Tank Overheads	44.25	193.82	1.198E-03	5.248E-03	1.47	6.46	1.37	6.01	-	-	0.03	0.13	0.019	0.083	0.05	0.23
Uncontrolled Condenser Overheads	37.05	162.27	2.093E-03	9.169E-03	2.69	11.80	2.06	9.00	-	-	0.33	1.44	0.136	0.59	0.37	1.60
Uncontrolled Emissions Per Unit	**81.30**	**356.10**	**3.292E-03**	**0.014**	**4.17**	**18.25**	**3.43**	**15.02**	**-**	**-**	**0.36**	**1.57**	**0.154**	**0.68**	**0.42**	**1.83**

Controlled [2]	VOC		H_2S		Total HAP		Hexane		Benzene		Toluene		Ethylbenzene		Xylene	
	lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**
Controlled Flash Tank Overheads	Flash Tank Overheads are routed back to facility inlet.															
Controlled Condenser Overheads	Regenerator Overheads are routed to the reboilers.															
Controlled Emissions Per Unit	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

[1] Emissions estimated using BR&E ProMax.

[2] BTEX non-condensable overheads are sent to the reboilers (RBL-1, RBL-2 and RBL-3). Emissions are represented at those units.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Reboiler

Emission Unit:	RBL-3
Source Description:	Reboiler
Destruction Efficiency:	98%

Reboiler Information	
Unit(s):	RBL-3
Unit Count:	1
Annual Operating Hours:	8,760
Combustion Efficiency (%):	98%

Input Information

Activity	Parameters	Value	Unit	Notes:
Fuel	Hourly Volume Flow Rate	597.08	scf/hr	Facility design
	Natural Gas Heat Value	1256.11	Btu/scf	Inlet Gas Analysis
	Annual Volume Flow Rate	5.23	MMscf/yr	scf/hr * 8760 hr/yr / 10^6
	Hourly Heat Rate	0.75	MMBtu/hr	scf/hr * Btu/scf / 10^6
	Annual Heat Rate	6,570.00	MMBtu/yr	MMBtu/hr * 8760 hr/yr
Process Emission Stream	Noncondensable Flow Rate	310.08	scf/hr	Dehy-3 maximum flow rate
	Hourly Weighted Heat Value	2758.38	BTU/scf	Dehy-3 maximum heating value promax
	Annual Flow Rate	2.72	MMscf/yr	Dehy-3 annual flow rate
	Hourly Heat Rate	0.86	MMBtu/hr	scf/hr * Btu/scf / 10^6
	Annual Heat Rate	7492.52	MMBtu/yr	MMscf/yr * Btu/scf
	Hourly VOC	37.05	lb/hr VOC	Dehy-3 non-condensable overheads
	Annual VOC	162.27	tpy VOC	Dehy-3 non-condensable overheads
	Hourly HAP	2.69	lb/hr HAP	Dehy-3 non-condensable overheads
	Annual HAP	11.80	tpy HAP	Dehy-3 non-condensable overheads
	Hourly H_2S	2.09E-03	lb/hr H_2S	Dehy-3 non-condensable overheads
	Annual H_2S	9.17E-03	tpy H_2S	Dehy-3 non-condensable overheads

Emission Calculation

Description	NO_X[1]	CO[1]	VOC	SO_2[1]	PM[1]	H_2S[1]	HAPs	Units	Notes
Emission Factors	100	84	5.5		7.6			lb/MMscf	AP-42 Table 1.4-1 & 2
	123	103	6.77		9.36			lb/MMscf	Adjusted EF, per footnote a in Tables 1.4-1 and 1.4-2 for fuel gas
	270	227	14.87		20.55			lb/MMscf	Adjusted EF, per footnote a in Tables 1.4-1 and 1.4-2 for process gas
Fuel Sulfur Content				2.0				gr S/100scf	Fuel sulfur content (gr/100scf)
				0.0029				lb S/ Mscf	Gr S/100 scf * (1 lb/7000 gr) * (1000scf/Mscf)
Fuel Emissions	0.074	0.062	0.0040	0.0034	0.0056	-	-	lb/hr	RBL-3 Fuel Emissions
	0.32	0.271	0.018	0.015	0.024	-	-	tpy	RBL-3 Fuel Emissions
Process Emissions	0.084	0.070	0.74	3.862E-03	6.37E-03	4.19E-05	0.054	lb/hr	Dehy-3 non-condensable overheads
	0.37	0.309	3.25	0.02	2.79E-02	1.83E-04	0.24	tpy	Dehy-3 non-condensable overheads
Total Emissions	0.16	0.13	0.75	0.007	0.0120	4.19E-05	0.054	lb/hr	
	0.69	0.58	3.26	0.03	0.052	1.83E-04	0.24	tpy	

Notes:

(1) NO_X, CO, VOC, and PM emission factors: AP-42 Table 1.4-1 & 2. SO_2: Mass balance assuming 95% combustion of H_2S and 100% conversion of combusted H_2S to SO_2:

Fuel Gas SO_2 Emissions (lb/hr) = [(Fuel Gas Flow (Mscf/hr) * Fuel Gas Sulfur Content (lb S/Mscf)*(64 lb/lbmol SO_2 / 32 lb/lbmol S)) + (Fuel Gas Flow (Mscf/yr) * Fuel Gas H_2S Content (lb H_2S/Mscf)*(64 lb/lbmol SO_2 /34 lb/lbmol H_2S)*(DRE))]

Fuel Gas H_2S Emissions (lb/hr) = [Pilot Gas Flow Rate (Mscf/yr) * Fuel Gas H_2S Content (lb H_2S/Mscf) * (1 - DRE)]

Process SO_2 Emissions (lb/hr) = [H_2S Mass Flow Rate (lb/hr) * DRE * (64 lb/lbmol SO_2 / 34 lb/lbmol H_2S)]

Process SO_2 Emissions (tpy) = [H_2S Mass Flow Rate (tpy) * DRE * (64 lb/lbmol SO_2 / 34 lb/lbmol H_2S)]

(2) VOC, HAP and H_2S emissions estimated based on event stream routed to reboiler and 95% efficiency.

Exhaust Parameters		
Input heat rate	0.75 MMBtu/hr	Pilot Heating Value (MMBtu/hr) + Process Heating Value (MMBtu/hr)
Exhaust Temperature	600 F	Engineering Estimate
Exhaust Flow (actual)	0.3 acfs	(Process Flow Rate (scf/hr) + Pilot Flow Rate (scf/hr)) / 3600
Stack Area	0.65 ft^2	Calculated
Stack Diameter	10 in	Calculated
Stack Diameter	0.83 ft	Design Data
Exhaust Velocity	0.5 ft/sec	Per modeling guidance
Stack Height	20 ft	Design Data

Site Data		
Site Elevation	3715 ft MSL	
Standard Pressure (Ps)	29.92 in Hg	
Pressure at Elevation (Pa)	26.11 in Hg	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
Standard Temperature (Ts)	528 R	

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Amine Sweetening Unit

Emission Unit:	AU-1
Source Description:	90 MMSCFD
Flare Destruction Efficiency:	98.0%
Operating Hours:	8760 hrs/yr

	Uncontrolled Emissions[1]																	
	VOC		H_2S		Total HAP		Benzene		Toluene		Ethylbenzene		Xylene		Methane		Hexane	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Uncontrolled Acid Gas Overheads	11.223	49.159	8.461	37.058	5.179	22.685	--	--	1.330	5.825	0.760	3.327	3.049	13.353	7.994	35.015	0.041	0.180
Uncontrolled Flash Tank Overheads	47.693	208.896	0.040	0.175	0.896	3.926	--	--	0.106	0.466	0.067	0.292	0.193	0.847	126.756	555.192	0.472	2.066
Uncontrolled Emissions Per Unit	58.917	258.055	8.501	37.233	6.076	26.611	--	--	1.436	6.292	0.826	3.620	3.242	14.200	134.751	590.208	0.513	2.245

	Controlled Emissions[2]																	
	VOC		H_2S		Total HAP		Benzene		Toluene		Ethylbenzene		Xylene		Methane		Hexane	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Controlled Acid Gas Overheads	Vent stream emissions are controlled by the flare (Flare-1).																	
Controlled Flash Tank Overheads	Flash Tank overheads are recycled back to inlet.																	
Controlled Emissions Per Unit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Note:

[1]Emissions estimated using BR&E ProMax.

[2]Emissions include the uncontrolled condenser emissions (acid gas) and the flash tank emissions (flash gas). The flash gas stream is routed back to inlet with 100% collection efficiency. The acid gas stream is routed to the flare (Unit ID FL-1). Controlled emissions will be represented at that unit.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Amine Unit Reboiler

Unit:	AU-RB 1
Heat Input:	15 MMBTU/hr
Fuel Heat Value:	1256.11 BTU/scf
Fuel Sulfur Content:	2 gr/100 scf
Operating Hours:	8,760 hours/yr
Fuel Usage:	11941.61 scf/hr

Criteria Pollutant Emission Rates per Unit							
	NO_x	**CO**	**VOC**	**SO_2[1]**	**PM[2]**	**Units**	**Notes**
Emission Factors	100	84	5.5	-	7.6	lb/MMscf	AP-42 Table 1.4-1 & 2
	123.15	103.44	6.77	-	9.36	lb/MMscf	Adjusted EF, per footnote a in Tables 1.4-1 and 1.4-2
	-	-	-	2	-	gr / 100 scf	
Emissions	1.47	1.24	0.08	0.068	0.11	lb/hr[3]	
	6.44	5.41	0.35	0.30	0.49	tons/year[4]	

HAP Emission Rates per Unit							
	n-Hexane	**Benzene**	**Toluene**	**HCHO**	**Total HAPs[5]**	**Units**	**Notes**
Emission Factors	1.80	2.1E-03	3.4E-03	7.5E-02	-	lb/MMscf	AP-42 Table 1.4-3
	2.22	2.59E-03	4.19E-03	9.24E-02	-	lb/MMscf	Adjusted EF, per footnote a in Table 1.4-3
Emissions	0.03	3.09E-05	5.00E-05	1.10E-03	0.03	lb/hr[3]	
	0.12	1.35E-04	2.19E-04	4.83E-03	0.12	tons/year[4]	

Notes:

[1] SO_2 emissions based on fuel sulfur (gr/100 scf)

[2] Assumes $PM_{10} = PM_{2.5}$

[3] lb/hr emissions calculated using the following methods:
Criteria and HAPs lb/hr = EF (lb/MMscf) * Rating (MMBtu/hr) / Heat value (Btu/scf)

[4] For all pollutant calculations, tons/year = lb/hr * Operating hours * 1ton/2000lb

[5] Total HAP emissions are the sum of all individual HAPs calculated.

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Targa Northern Delaware, LLC - Big Lizard Compressor Station

Amine Unit Reboiler

Unit:	AU-RB 2
Heat Input:	15 MMBTU/hr
Fuel Heat Value:	1256.11 BTU/scf
Fuel Sulfur Content:	2 gr/100 scf
Operating Hours:	8,760 hours/yr
Fuel Usage:	11941.61 scf/hr

Criteria Pollutant Emission Rates per Unit							
	NO_x	CO	VOC	SO_2[1]	PM[2]	Units	Notes
Emission Factors	100	84	5.5	-	7.6	lb/MMscf	AP-42 Table 1.4-1 & 2
	123.15	103.44	6.77	-	9.36	lb/MMscf	Adjusted EF, per footnote a in Tables 1.4-1 and 1.4-2
	-	-	-	2	-	gr / 100 scf	
Emissions	1.47	1.24	0.08	0.068	0.11	lb/hr[3]	
	6.44	5.41	0.35	0.30	0.49	tons/year[4]	

HAP Emission Rates per Unit							
	n-Hexane	Benzene	Toluene	HCHO	Total HAPs[5]	Units	Notes
Emission Factors	1.80	2.1E-03	3.4E-03	7.5E-02	-	lb/MMscf	AP-42 Table 1.4-3
	2.22	2.59E-03	4.19E-03	9.24E-02	-	lb/MMscf	Adjusted EF, per footnote a in Table 1.4-3
Emissions	0.03	3.09E-05	5.00E-05	1.10E-03	0.03	lb/hr[3]	
	0.12	1.35E-04	2.19E-04	4.83E-03	0.12	tons/year[4]	

Notes:

[1] SO_2 emissions based on fuel sulfur (gr/100 scf)

[2] Assumes PM_{10} = $PM_{2.5}$

[3] lb/hr emissions calculated using the following methods:

Criteria and HAPs lb/hr = EF (lb/MMscf) * Rating (MMBtu/hr) / Heat value (Btu/scf)

[4] For all pollutant calculations, tons/year = lb/hr * Operating hours * 1ton/2000lb

[5] Total HAP emissions are the sum of all individual HAPs calculated.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Heater Trailer Emission

Unit:	Trailer-1		
Description:	Diesel-fired Heater Trailer		
Rating:	10.29	kW	
Horsepower:	13.8	hp	Manufacturer Specs
Operating hours:	40	hrs/year	
Fuel consumption:	3.2	gal/hr	
Fuel consumption:	0.43	scf/hr	
Heating rate:	1.00	MMBtu/hr	Manufacturer Specs

Uncontrolled	NO_x	CO	VOC	SO_2	PM	HAP	Unit	Notes
Engine Emission Factors [1,2]	5.32	4.9	0.28		0.3		g/bhp-hr	NSPS IIII Tier IV Final Emission Factors
				0.29			lb/MMBtu	AP-42 Table 3.3-1
						3.79E-03	lb/MMBtu	AP-42 Table 3.3-2
Heater Emission Factors [3,4,5]	20.00	5.0	0.34	42.6	2.0		lb/1000 gal	AP-42 Table 1.3-1
	0.14	0.036	2.43E-03	0.30	0.014		lb/MMBtu[6]	AP-42 Table 1.3-2(d)
							lb/MMBtu	AP-42 Table 1.3-9
Engine Emissions	0.16	0.15	8.52E-03	0.29	9.13E-03	3.79E-03	lb/hr	
	0.71	0.65	0.04	1.27	0.04	0.017	tpy	Emissions based on 8760 hr/yr
Heater Emissions	0.14	0.036	2.43E-03	0.30	0.014	0.040	lb/hr	
	0.63	0.16	0.01	1.33	0.063	0.17	tpy	Emissions based on 8760 hr/yr
Total Emissions	**0.30**	**0.18**	**0.011**	**0.59**	**0.02**	**0.04**	**lb/hr**	
	1.33	**0.81**	**0.048**	**2.60**	**0.10**	**0.19**	**tpy**	Emissions based on 8760 hr/yr

Controlled	NO_x	CO	VOC	SO_2	PM	HAP	Unit	Notes
Engine Emission Factors [1,2]	5.32	4.9	0.28		0.3		g/bhp-hr	NSPS IIII Tier IV Final Emission Factors
				0.29			lb/MMBtu	AP-42 Table 3.3-1
						3.79E-03	lb/MMBtu	AP-42 Table 3.3-2
Heater Emission Factors [3,4,5]	20.00	5.0	0.34	42.6	2.0		lb/1000 gal	AP-42 Table 1.3-1
	0.14	0.036	2.43E-03	0.30	0.014		lb/MMBtu[6]	AP-42 Table 1.3-2(d)
							lb/MMBtu	AP-42 Table 1.3-9
Engine Emissions	0.16	0.15	8.52E-03	0.29	9.13E-03	3.79E-03	lb/hr	
	3.24E-03	2.98E-03	1.70E-04	5.80E-03	1.83E-04	7.58E-05	tpy	Emissions based on 40 hr/yr
Heater Emissions	0.14	0.036	2.43E-03	0.30	0.014	0.040	lb/hr	
	2.86E-03	7.14E-04	4.86E-05	6.09E-03	2.86E-04	7.92E-04	tpy	Emissions based on 40 hr/yr
Total Emissions	**0.30**	**0.18**	**0.011**	**0.59**	**0.023**	**0.043**	**lb/hr**	
	6.09E-03	**3.70E-03**	**2.19E-04**	**0.012**	**4.68E-04**	**8.68E-04**	**tpy**	Emissions based on 40 hr/yr

Engine HAPS	Formaldehyde	Acetaldehyde	Acrolein	Benzene	Toluene	Unit	Notes
	1.18E-03	7.67E-04	9.25E-05	9.33E-04	4.09E-04	lb/MMBtu	AP-42 Table 3.3-2
	1.18E-03	**7.67E-04**	**9.25E-05**	**9.33E-04**	**4.09E-04**	**lb/hr**	
	2.36E-05	**1.53E-05**	**1.85E-06**	**1.87E-05**	**8.18E-06**	**tpy**	

Heater HAPs	Formaldehyde	Ethylbenzene	Xylene	Benzene	Toluene	Unit	Notes
	3.30E-02	6.36E-05	1.09E-04	2.14E-04	6.20E-03	lb/MMBtu	AP-42 Table 1.3-9
	3.30E-02	**6.36E-05**	**1.09E-04**	**2.14E-04**	**6.20E-03**	**lb/hr**	
	6.60E-04	**1.27E-06**	**2.18E-06**	**4.28E-06**	**1.24E-04**	**tpy**	

Notes

[1] NSPS IIII Tier IV has a combined NO_x and VOC emission factor of 5.6 g/hp-hr. Per CARB Emission Factors for CI Diesel Engines, when the non-methane hydrocarbon (NMHC) and nitrogen oxide (NO_x) emission factor is combined, assume a breakdown of 5% and 95%, respectivley.

[2] SO_2 and total HAPs were calculated using AP-42 emissions factors for Diesel Industrial Engines (Table 3.3-1 & 3.3-2).

[3] NO_x, CO, PM Emission factors are from US EPA, AP-42, Section 1.3, Table 1.3, Firing cofiguration *Distillate oil fired.*

[4] VOC Emission factor is from US EPA, AP-42, Section 1.3, Table 1.3-3 Nonmethane Total Organic Compounds, Firing cofiguration Distillate oil fired.

[5] SO_2 Emission Factor is 142S from AP-42 Table 1.3-1 EF where S indicates that the weight % of sulfur in the oil should be multiplied by the value given. AP 42 Ch 1.3.1 states Distillate oils contain less that 0.3 percent sulfur by weight.

[6] Per AP-42 Section 1.3, page 1.3-13, in order to convert the emission factors from lb/1000 gal to lb/MMBtu of Fuel Oil No. 2, divide the emission factor by a heating value of 140 MMBtu/1000 gal.

GHG Emissions from Natural Gas Combustion at Reboilers

Emission Source	Source Description	Heat Rate	CO_2 EF	CO_2 Emissions		CH_4 EF	CH_4 Emissions		N_2O EF	N_2O Emissions	
		mmbtu/hr	kg/mmbtu	metric TPY	short tpy	kg/mmbtu	metric TPY	short tpy	kg/mmbtu	metric TPY	short tpy
RBL-1	Reboiler	0.75	53.06	348.60	384.27	0.001	0.007	0.007	0.0001	0.001	0.001
RBL-2	Reboiler	0.75	53.06	348.60	384.27	0.001	0.007	0.007	0.0001	0.001	0.001
RBL-3	Reboiler	0.75	53.06	348.60	384.27	0.001	0.007	0.007	0.0001	0.001	0.001
AU-RB 1	Amine Unit Reboiler	15	53.06	6972.08	7685.33	0.001	0.131	0.145	0.0001	0.013	0.014
AU-RB 2	Amine Unit Reboiler	15	53.06	6972.08	7685.33	0.001	0.131	0.145	0.0001	0.013	0.014

Emission Factors (EF) from Tables C-1 and C-2 to 40 CFR 98 Subpart C

GHG Emissions from Diesel Combustion at Heater Trailer

Emission Source	Source Description	Heat Rate	CO_2 EF	CO_2 Emissions		CH_4 EF	CH_4 Emissions		N_2O EF	N_2O Emissions	
		mmbtu/hr	kg/mmbtu	metric TPY	short tpy	kg/mmbtu	metric TPY	short tpy	kg/mmbtu	metric TPY	short tpy
Trailer-1	Heater Trailer	1.00	73.96	2.96	3.26	0.003	1.20E-04	1.32E-04	0.0006	2.40E-05	2.65E-05

Emission Factors (EF) from Tables C-1 and C-2 to 40 CFR 98 Subpart C for distillate fuel oil No. 2 and petroleum products, respectively.

TARGA

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Process Flare

Emission Unit:	FL-1
Source Description:	Process Flare
Destruction Efficiency:	98%

Flare Information	
Unit(s):	FL-1
Unit Count:	1
Annual Operating Hours:	8,760
Combustion Efficiency (%):	98%

Input Information				
Activity	**Parameters**	**Value**	**Unit**	**Notes:**
Pilot	Hourly Volume Flow Rate	195.00	scf/hr	Engineering estimate
	Natural Gas Heat Value	1256.11	Btu/scf	Inlet Gas Analysis
	Annual Volume Flow Rate	1.71	MMscf/yr	scf/hr * 8760 hr/yr / 10^6
	Hourly Heat Rate	0.245	MMBtu/hr	scf/hr * Btu/scf / 10^6
	Annual Heat Rate	2,145.69	MMBtu/yr	MMBtu/hr * 8760 hr/yr
Assist Gas	Hourly Volume Flow Rate	9937.26	scf/hr	Estimated for combined gas stream heat content of 200 Btu/scf
	Natural Gas Heat Value	1256.11	Btu/scf	Inlet Gas Analysis
	Annual Volume Flow Rate	87.05	MMscf/yr	scf/hr * 8760 hr/yr / 10^6
	Hourly Heat Rate	12.48	MMBtu/hr	scf/hr * Btu/scf / 10^6
	Annual Heat Rate	109,345.03	MMBtu/yr	MMBtu/hr * 8760 hr/yr
Process Emission Stream	Hourly Amine Flow Rate	86625	scf/hr	Acid Gas Flow to Flare from Promax
	Hourly Tank + Loading Flow Rate	2850	scf/hr	Tank Losses (lbs/hr) + (Loading Losses (lbs/1000 gal) * Hourly Throughput (gal/hr)) / Mass Density (lb/scf)
	Hourly Amine Heat Value	10.14	Btu/scf	Net heating value of Acid Gas
	Hourly Tank + Loading Heat Value	2288.16	Btu/scf	Net heating value of Tank and Loading Vapors
	Hourly Weighted Heat Value	200.0	BTU/scf	Net heating value to flare
	Annual Amine Flow Rate	758.84	MMscf/yr	Acid Gas Flow to Flare from Promax
	Annual Tank + Loading Flow Rate	0.24	MMscf/yr	[(Tank Losses (tpy) *2000 (lb/ton)) + (Loading Losses (lbs/1000 gal) * Annual Throughput (gal/yr)) / Mass Density (lb/scf)]/1000000 (scf/MMscf)
	Total Process Hourly Heat Rate	19.88	MMBtu/hr	scf/hr * Btu/scf / 10^6
	Total Process Annual Heat Rate	169226.20	MMBtu/yr	MMscf/yr * Btu/scf
	Amine Hourly VOC	11.22	lb/hr VOC	Amine Promax
	Tanks + Loading Hourly VOC	205.87	lb/hr VOC	Tank and Loading Losses
	Amine Annual VOC	49.16	tpy VOC	Amine Promax
	Tanks + Loading Annual VOC	11.52	tpy VOC	Tank and Loading Losses
	Amine Hourly HAP	5.18	lb/hr HAP	Amine Promax
	Tanks + Loading Hourly HAP	10.39	lb/hr HAP	Tank and Loading Losses
	Amine Annual HAP	22.69	tpy HAP	Amine Promax
	Tanks + Loading Annual HAP	0.48	tpy HAP	Tank and Loading Losses
	Amine Hourly H_2S	8.46	lb/hr H_2S	Amine Promax
	Tanks + Loading Hourly H_2S	0.02	lb/hr H_2S	Tank and Loading Losses
	Amine Annual H_2S	37.06	tpy H_2S	Amine Promax
	Tanks + Loading Annual H_2S	1.35E-03	tpy H_2S	Tank and Loading Losses

Pilot Emission Calculation

Description	NO_X[1]	CO[1]	VOC[2]	SO_2[1]	H_2S[1]	HAPs	Units	Notes
Emission Factors	0.138	0.2755					lb/MMBTU	TNRCC RG-109 (high Btu; other)
	0.064	0.5496					lb/MMBTU	TNRCC RG-109 (low Btu; other)
			5.5				lb/MMscf	AP-42 Chapter 1.4, Table 1.4-2 Natrual Gas Combustion
			6.77				lb/MMscf	Adjusted EF, per footnote a in Tables 1.4-1 and 1.4-2
Fuel Sulfur Content				2.0			gr S/100scf	Fuel sulfur content (gr/100scf)
				0.0029			lb S/ Mscf	Gr S/100 scf * (1 lb/7000 gr) * (1000scf/Mscf)
Pilot Emissions	0.034	0.067	-	0.0011	-	-	lb/hr	
	0.15	0.30	-	0.0049	-	-	tpy	
Assist Gas[3]	-	-	0.07	-	-	-	lb/hr	Assist Gas VOC Contribution
	-	-	0.29	-	-	-	tpy	Assist Gas VOC Contribution
Total Process Emissions	1.27	10.93	4.34	15.64	0.17	0.31	lb/hr	Assist Gas, Amine Unit, Tanks, Loading Emissions
	5.42	46.50	1.21	68.36	0.74	0.46	tpy	Assist Gas, Amine Unit, Tanks, Loading Emissions
Total Emissions	1.31	10.99	4.41	15.64	0.17	0.31	lb/hr	
	5.57	46.80	1.51	68.37	0.74	0.46	tpy	

Notes:

(1) Flare NO_X and CO emission factors: TNRCC RG-109 (high Btu; other). SO_2: Mass balance assuming 98% combustion of H_2S and 100% conversion of combusted H_2S to SO_2:

(2) VOC, HAP and H_2S emissions estimated based on event stream routed to flare and 98% efficiency.

(3) Assist Gas is included in total process emissions except for VOC emissions, calculated using factors from AP-42, Chapter 1.4, Table 1.4-2.

Exhaust Parameters		
Input heat rate	20.127 MMBtu/hr	Pilot Heating Value (MMBtu/hr) + Proces Heating Value (MMBtu/hr)
Exhaust Temperature	1832 F	Engineering Estimate
Exhaust Flow (actual)	24.1 acfs	(Process Flow Rate (scf/hr) + Pilot Flow Rate (scf/hr)) / 3600
Stack Area	0.79 ft^2	Calculated
Stack Diameter	12 in	From previous application
Stack Diameter	1.00 ft	
Exhaust Velocity	30.7 ft/sec	Per modeling guidance
Stack Height	20 ft	From previous application

Site Data		
Site Elevation	3715 ft MSL	
Standard Pressure (Ps)	29.92 in Hg	
Pressure at Elevation (Pa)	26.11 in Hg	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
Standard Temperature (Ts)	528 R	

TARGA

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Process Flare Greenhouse Gas Emissions

Emission Unit: FL-1

Source Description: Combustion Pilot Gas, Assist Gas, Amine Gas

Notes: The flare will combust amine unit vent gas, pilot gas, and assist gas. A weighted averaged of the fuel gas and vent gas analyses are used to determine the greenhouse gas emissions from this unit.

§98.233(n) Flare stack GHG emissions.

Step 1. Calculate contribution of un-combusted CH_4 emissions from the flare combustion gas vent (actual conditions).

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

where:

$E_{a,CH4}$ = contribution of annual un-combusted CH_4 emissions from flare 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 = 0.074 (Gas analysis)

Step 2. Calculate contribution of un-combusted CO_2 emissions from the flare combustion gas vent (actual conditions).

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

where:

$E_{a,CO2}$ = contribution of annual un-combusted CO_2 emissions from flare 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 = 0.849

Step 3. Calculate contribution of combusted CO_2 emissions from the flare combustion gas vent (actual conditions).

$E_{a,CO2}$ (combusted) = Σ (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 =	0.074
Constituent j, Ethane =	0.0167
Constituent j, Propane =	0.0128
Constituent j, Butane =	0.00873
Constituent j, Pentanes =	0.00466
Constituent j, Hexane Plus =	0.00591

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 =	5
Constituent j, Hexane Plus =	6

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Process Flare Greenhouse Gas Emissions

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 (Annual Avg Max Temperature for Midland, TX from Western Regional Climate Center)

P_s = Absolute pressure at standard conditions (psia) = 12.73 psia

P_a = Absolute pressure at actual conditions (psia) = 13.28 psia Pressure in Midland, TX from TANKS 4.0.9d

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

Field gas HHV = 1.038E-03 MMBtu/scf (Default provided in Subpart W Final Amendment;)

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 (regenerator) by summing Equations W-40, W-19, W-20, and W-21.

Gas Sent to Flare (scf/yr)	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)
872,563,903	1287083	64,354,162	204,577,914	27.24	3,731.317	11,861.63	1.0E-01

Step 8. Calculate CO_2 equivalent[1]

$CO_2e = CO_2 + \{CH_4 \times GWP\} + \{N_2O \times GWP\}$

CO_2e = 15,592.95 + 681.00 + 29.74

CO_2e = 16,303.68 tons/year

[1] Global Warming Potentials (GWP) are from Table A-1 of the EPA GHG MRR under 40 CFR Part 98.

CH_4 GWP = 25

N_2O GWP = 298

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Fugitive Emissions

Emission unit number(s): FUG-1
Source description: Facility-wide Fugitive Emissions
Total Operating Hours 8,760

Component		Emission factor[1] (lb/hr/source)	VOC Content[2] (wt%)	HAP Content[2] (wt%)	H_2S Content[2] (wt%)	CO_2 Content[2] (wt%)	CH_4 Content[2] (wt%)	Subcomponent Count[3]	VOC Emissions[4,5]		HAP Emissions[4,5]		H_2S Emissions[4,5]		CO_2 Emissions[4,5]		CH_4 Emissions[4,5]	
									lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Valves	Inlet Gas	9.92E-03	32.279%	1.259%	0.0034%	6.55%	46.02%	900	2.88	12.62	0.112	0.49	3.08E-04	1.35E-03	0.58	2.56	4.11	18.00
	Fuel Gas	9.92E-03	26.900%	0.999%	0.0002%	3.394%	52.49%	200	0.53	2.34	0.020	0.087	4.61E-06	2.02E-05	0.07	0.29	1.04	4.56
	Light Liquid	5.51E-03	28.116%	3.864%	0.0011%	7.359%	3.14%	600	0.93	4.07	0.13	0.56	3.48E-05	1.52E-04	0.24	1.07	0.10	0.46
Connectors	Inlet Gas	4.41E-04	32.279%	1.259%	0.0034%	6.55%	46.02%	2600	0.37	1.62	0.014	0.063	3.95E-05	1.73E-04	0.08	0.33	0.53	2.31
	Fuel Gas	4.41E-04	26.900%	0.999%	0.0002%	3.39%	52.49%	800	0.095	0.42	0.0035	0.015	8.20E-07	3.59E-06	0.01	0.05	0.19	0.81
	Light Liquid	4.63E-04	28.116%	3.864%	0.0011%	7.36%	3.14%	2400	0.31	1.37	0.04	0.19	1.17E-05	5.12E-05	0.08	0.36	0.03	0.15
Flanges	Inlet Gas	8.60E-04	32.279%	1.259%	0.0034%	6.55%	46.02%	1000	0.28	1.22	0.0108	0.047	2.97E-05	1.30E-04	0.06	0.25	0.40	1.73
	Fuel Gas	8.60E-04	26.900%	0.999%	0.0002%	3.39%	52.49%	100	0.023	0.101	0.00086	0.0038	2.00E-07	8.75E-07	0.00	0.01	0.05	0.20
	Light Liquid	2.43E-04	28.116%	3.864%	0.0011%	7.36%	3.14%	300	0.020	0.09	0.0028	0.012	7.65E-07	3.35E-06	0.01	0.02	0.00	0.01
Pump Seals	Inlet Gas	5.29E-03	32.279%	1.259%	0.0034%	6.55%	46.02%	0	-	-	-	-	-	-	0.00	0.00	0.00	0.00
	Fuel Gas	5.29E-03	26.900%	0.999%	0.0002%	3.39%	52.49%	0	-	-	-	-	-	-	0.00	0.00	0.00	0.00
	Light Liquid	2.87E-02	28.116%	3.864%	0.0011%	7.36%	3.14%	10	0.08	0.35	0.011	0.05	3.01E-06	1.32E-05	0.02	0.09	0.01	0.04
Other	Inlet Gas	1.94E-02	32.279%	1.259%	0.0034%	6.55%	46.02%	70	0.44	1.92	0.017	0.075	4.68E-05	2.05E-04	0.09	0.39	0.62	2.74
	Fuel Gas	1.94E-02	26.900%	0.999%	0.0002%	3.39%	52.49%	10	0.052	0.23	0.0019	0.0085	4.51E-07	1.97E-06	0.01	0.03	0.10	0.45
	Light Liquid	1.65E-02	28.116%	3.864%	0.0011%	7.36%	3.14%	10	0.05	0.20	0.006	0.028	1.74E-06	7.62E-06	0.01	0.05	0.01	0.02
								Total:	**6.06**	**26.55**	**0.372**	**1.63**	**4.82E-04**	**2.11E-03**	**1.26**	**5.51**	**7.19**	**31.48**

[1] Emission factors from Table 2-4 of EPA Protocol for Equipment Leak Emission Estimates, 1995.
[2] Weight percent of gas and liquid components from site specific liquids and gas analyses.
[3] Component counts are based on facility design.
[4] Hourly Emissions [lb/hr] = Emissions Factor [lb/hr/component] * Weight Content of Chemical Component [%] * Subcomponent Count.
[5] Annual Emissions [ton/yr] = Hourly Emissions [lb/hr] * Operating Hours [hr/yr] * 1/2000 [ton/lb].

TARGA

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Atmospheric **Storage Tanks**

Emission unit number(s):	TK-1, TK-2, and TK-3
Source description:	300 bbl Atmospheric Tanks

Annual Operating Hours:	8,760
Number of Tanks:	3
Capacity of Tanks:	300 bbl
Hourly Throughout:	170.81 bbl/hr
Daily Throughput:	70.91 bbl/d
Annual Throughput:	25,883.02 bbl/yr

Condensate Storage Tank Emissions[1,2]

Component	Uncontrolled Emissions (hourly basis)			Uncontrolled Emissions (annual basis)		
	Flash (lb/hr)	Working and Breathing (lb/hr)	Total per Tank (lb/hr)	Flash (lb/hr)	Working and Breathing (lb/hr)	Total Emissions Per Tank (tpy)
H2S	8.69E-03	5.27E-03	4.65E-03	9.19E-05	1.64E-04	3.74E-04
Nitrogen	0.17	8.01E-03	0.06	2.90E-03	2.17E-04	4.55E-03
CO2	8.48	5.14	4.54	0.108	0.15	0.370
Methane	13.39	2.31	5.23	0.21	0.06	0.40
Ethane	16.54	10.03	8.86	0.20	0.365	0.82
Propane	26.12	15.83	13.98	0.26	0.45	1.03
i-Butane	6.51	3.95	3.49	0.06	0.10	0.22
n-Butane	20.00	12.12	10.70	0.17	0.28	0.66
i-Pentane	8.26	5.01	4.42	0.06	0.11	0.25
n-Pentane	9.83	5.96	5.26	0.07	0.12	0.29
Neohexane	0.13	0.08	0.07	9.694E-04	1.57E-03	3.704E-03
Cyclopentane	3.03	1.84	1.62	0.02	0.036	0.09
2-Methylpentane	3.19	1.94	1.71	0.02	0.037	0.09
3-Methylpentane	1.95	1.18	1.05	0.01	0.022	0.05
n-Hexane	4.04	2.45	2.17	0.03	0.044	0.11
2,2-Dimethylpentane	-	-	-	-	-	-
Methylcyclopentane	-	-	-	-	-	-
2,2,3-Trimethylbutane	1.67	1.01	0.89	0.01	0.02	0.04
Benzene	-	-	-	-	-	-
Cyclohexane	3.59	2.18	1.92	0.02	0.039	0.09
2-Methylhexane	0.03	0.02	0.02	2.081E-04	3.22E-04	7.736E-04
3-Methylhexane	2.50	1.51	1.34	0.017	0.03	0.06
1,1-Dimethylcyclopentane	1.39	0.84	0.74	9.41E-03	0.01	0.04
n-Heptane	0.29	0.17	0.15	1.87E-03	2.84E-03	6.88E-03
Methylcyclohexane	2.12	1.29	1.14	0.01	0.021	0.05
2,5-Dimethylhexane	-	-	-	-	-	-
Toluene	0.49	0.29	0.26	3.165E-03	4.81E-03	0.012
2-Methylheptane	-	-	-	-	-	-
n-Octane	1.96	1.19	1.05	0.012	0.02	0.043
Ethylcyclohexane	0.54	0.32	0.29	3.315E-03	4.91E-03	0.012
Ethylbenzene	0.20	0.12	0.11	1.218E-03	1.79E-03	4.390E-03
p-Xylene	-	-	-	-	-	-
o-Xylene	0.59	0.36	0.32	3.557E-03	5.19E-03	0.013
n-Nonane	0.09	0.05	0.05	5.076E-04	7.22E-04	1.795E-03
Isopropylbenzene	-	-	-	-	-	-
Cyclooctane	1.22	0.74	0.65	7.275E-03	0.01	0.026
Propylbenzene	0.13	0.079	0.07	7.49E-04	1.07E-03	2.66E-03
1,3,5-Trimethylbenzene	9.20E-04	5.57E-04	4.92E-04	5.223E-06	7.41E-06	1.844E-05
Isobutylbenzene	0.03	0.02	0.02	1.607E-04	2.28E-04	5.670E-04
Butylbenzene	6.44E-04	3.905E-04	3.45E-04	3.46E-06	4.78E-06	1.20E-05
n-Decane	0.20	0.12	0.11	1.058E-03	1.46E-03	3.672E-03
Water	3.91	2.370	2.09	0.02	0.03	0.08
TEG	9.01E-10	5.46E-10	4.83E-10	1.81E-12	1.50E-12	4.83E-12
MDEA	0.02	0.01	0.01	1.38E-04	2.14E-04	5.14E-04
VOC	**100.13**	**60.68**	**53.60**	**0.82**	**1.37**	**3.20**
Total HAPS	**7.17**	**3.23**	**2.85**	**0.04**	**0.056**	**0.13**
Total H_2S	**8.69E-03**	**5.27E-03**	**4.65E-03**	**9.19E-05**	**1.643E-04**	**3.74E-04**

[1] Uncontrolled emissions are calculated using BR&E ProMax. Hourly loading emissions are based on the short-term worse case scenario. Annual emissions are based on the daily throughput of the facility.

[2] Emissions are sent to the flare (FL-1) with a 100% capture efficiency and a 98% DRE.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Truck Loading

Equation[1]:

$$L_L = \frac{12.46 * SPM}{T}$$

Variables[1]:

L_L - Loading Loss (lbs/1000 gal loaded)
S - Saturation Factor (From Table 5.2-1 of AP-42, Section 5.2)
P - True Vapor Pressure of Loaded Liquid (psia)
M - Molecular Weight of Vapor (lb/lb mol)
T- Temperature of Bulk Liquid (°R = [°F + 460])

Unit	Material Loaded [2]	Loading Method	S	P_{max} [6] (psia)	M [6] (lb/lbmol)	T_{max} [4] (°R)	L_L (lbs/1000 gal)	Hourly Throughput [5] (gal/hr)	Capture Efficiency [8] (%)	VOC Wt %	HAP Wt %	H_2S Wt % [3]	VOC Vapor Loading Losses (lb/hr)	HAP Vapor Loading Losses (lb/hr)	H_2S Vapor Loading Losses (lb/hr)	LOAD-1 Uncaptured VOC Vapor Loading Losses (lb/hr)	LOAD-1 Uncaptured HAP Vapor Loading Losses (lb/hr)	LOAD-1 Uncaptured H_2S Vapor Loading Losses (lb/hr)	DRE [8] (%)
LOAD-1	Condensate	Submerged	0.6	12.88	35.36	554.60	6.14	15,120	70%	69.34%	2.84%	0.0083%	45.06	1.84	5.40E-03	19.31	0.79	2.32E-03	98%
												TOTAL	45.06	1.84	5.40E-03	19.31	0.79	2.32E-03	

Unit	Material Loaded [2]	Loading Method	S	P_{avg} [7] (psia)	M [7] (lb/lbmol)	T_{avg} [4] (°R)	L_L (lbs/1000 gal)	Annual Throughput [7] (gal/yr)	Capture Efficiency [8] (%)	VOC Wt %	HAP Wt %	H_2S Wt % [3]	VOC Vapor Loading Losses (tpy)	HAP Vapor Loading Losses (tpy)	H_2S Vapor Loading Losses (tpy)	LOAD-1 Uncaptured VOC Vapor Loading Losses (tpy)	LOAD-1 Uncaptured HAP Vapor Loading Losses (tpy)	LOAD-1 Uncaptured H_2S Vapor Loading Losses (tpy)	DRE [8] (%)
LOAD-1	Condensate	Submerged	0.6	11.65	44.35	526.23	7.34	1,083,780	70%	69.34%	2.84%	0.0083%	1.93	0.08	2.32E-04	0.83	0.03	9.92E-05	98%
												TOTAL	1.93	0.08	2.32E-04	0.83	0.03	9.92E-05	

[1] Loading loss equation and variables are from AP-42, Section 5.2, Transportation and Marketing of Petroleum Liquids.
[2] Material loaded is 100% condensate oil.
[3] H_2S content is conservatively assumed.
[4] Worst case scenario temperature is 95° F and the average temperature is 66.53° F.
[5] The maximum hourly throughput is based on the assumption that two trucks with a 180 bbl capacity can be loaded in an hour.
[6] TVP and MW pulled from Max Hourly promax
[7] TVP, MW, and annual throughput pulled from Annual Average promax
[8] Controlled loading emissions are based on normal operations which account for a capture efficiency of 70% for vapor balanced loading, and a DRE of 98% at the flare. Captured vapors are balanced to the tanks which are controlled by the flare and are thus included in the flare emission totals.

Extended Gas Analysis

Supreme Sample 10-27-2023
Dated 10/27/2023

Temperature	76.0 F
Pressure	100.9 psig

Component	Mole %	Weight %
H2S	0.00250	0.003
Nitrogen	1.81361	2.055
CO2	3.67926	6.550
Methane	70.91176	46.020
Ethane	10.76252	13.092
Propane	5.93725	10.591
i-Butane	0.88678	2.085
n-Butane	2.13589	5.022
i-Pentane	0.62655	1.829
n-Pentane	0.69061	2.016
Neohexane	0.00801	0.028
Cyclopentane	0.06306	0.179
2-Methylpentane	0.20418	0.712
3-Methylpentane	0.11510	0.401
n-Hexane	0.27624	0.963
2,2-Dimethylpentane	0.00000	0.000
Methylcyclopentane	0.00000	0.000
2,2,3-Trimethylbutane	0.10910	0.442
Benzene	0.00000	0.000
Cyclohexane	0.12411	0.423
2-Methylhexane	0.00300	0.012
3-Methylhexane	0.23421	0.949
1,1-Dimethylcyclopentane	0.05605	0.223
n-Heptane	0.03403	0.138
Methylcyclohexane	0.15814	0.628
2,5-Dimethylhexane	0.00000	0.000
Toluene	0.00801	0.030
2-Methylheptane	0.00000	0.000
n-Octane	0.54849	2.535
Ethylcyclohexane	0.11410	0.518
Ethylbenzene	0.01301	0.056
p-Xylene	0.00000	0.000
o-Xylene	0.04904	0.211
n-Nonane	0.05405	0.280
Isopropylbenzene	0.00000	0.000
Cyclooctane	0.12611	0.572
Propylbenzene	0.03003	0.146
1,3,5-Trimethylbenzene	0.00100	0.005
Isobutylbenzene	0.01301	0.071
Butylbenzene	0.00100	0.005
n-Decane	0.21019	1.210
Water	0.00000	0.000
TEG	0.00000	0.000
MDEA	0.00000	0.000
Total:	100.000	100.000
VOCs:	12.830	32.279
HAPs:	0.346	1.259
H_2S:	0.003	0.003

Molecular Weight	24.720
Dry Heating Value	1256.11 Btu/scf

Promax Residue Composition

Big Lizard CS - Dehy Dry Gas

Temperature	152.0 F
Pressure	989.9 psi

Component	Mole %	Weight %
H2S	0.0002	0.0002
Nitrogen	1.8943	2.3456
CO2	1.7447	3.3939
Methane	74.0210	52.4884
Ethane	11.1875	14.8693
Propane	6.0994	11.8884
i-Butane	0.8888	2.2834
n-Butane	2.1004	5.3961
i-Pentane	0.5680	1.8113
n-Pentane	0.5995	1.9120
Neohexane	0.0063	0.0240
Cyclopentane	0.0505	0.1565
2-Methylpentane	0.1444	0.5502
3-Methylpentane	0.0782	0.2977
n-Hexane	0.1709	0.6511
2,2-Dimethylpentane	0.0000	0.0000
Methylcyclopentane	0.0000	0.0000
2,2,3-Trimethylbutane	0.0579	0.2564
Benzene	0.0000	0.0000
Cyclohexane	0.0688	0.2558
2-Methylhexane	0.0013	0.0057
3-Methylhexane	0.0940	0.4164
1,1-Dimethylcyclopentane	0.0255	0.1106
n-Heptane	0.0115	0.0507
Methylcyclohexane	0.0528	0.2293
2,5-Dimethylhexane	0.0000	0.0000
Toluene	0.0020	0.0080
2-Methylheptane	0.0000	0.0000
n-Octane	0.0782	0.3949
Ethylcyclohexane	0.0158	0.0783
Ethylbenzene	0.0012	0.0058
p-Xylene	0.0000	0.0000
o-Xylene	0.0035	0.0165
n-Nonane	0.0031	0.0175
Isopropylbenzene	0.0000	0.0000
Cyclooctane	0.0057	0.0281
Propylbenzene	0.0014	0.0073
1,3,5-Trimethylbenzene	0.0000	0.0000
Isobutylbenzene	0.0004	0.0022
Butylbenzene	0.0000	0.0000
n-Decane	0.0051	0.0322
Water	0.0175	0.0139
TEG	0.0003	0.0022
MDEA	0.0000	0.0002
Total:	100.0000	100.0000
VOCs:	11.152	26.900
HAPs:	0.251	0.999
H2S:	0.000	0.000

Molecular Weight	22.624

Condensate Composition

Supreme Sample 10-27-2023
Dated 10/27/2023

Temperature	76.00 F
Pressure	100.9 psi

Component	Mole %	Weight %
H2S	0.0025	0.0011
Nitrogen	0.0180	0.0062
CO2	0.2180	0.1184
Methane	1.5040	0.2979
Ethane	2.4859	0.9228
Propane	7.0488	3.8372
i-Butane	2.9089	2.0873
n-Butane	10.2587	7.3611
i-Pentane	6.5298	5.8162
n-Pentane	8.8848	7.9137
Neohexane	0.1420	0.1511
Cyclopentane	1.0890	0.9429
2-Methylpentane	4.1109	4.3734
3-Methylpentane	2.3999	2.5532
n-Hexane	6.2358	6.6341
2,2-Dimethylpentane	0.7310	0.9042
Methylcyclopentane	2.9499	3.0649
2,2,3-Trimethylbutane	0.0080	0.0099
Benzene	2.7369	2.6393
Cyclohexane	6.4718	6.7241
2-Methylhexane	1.3930	1.7231
3-Methylhexane	1.9520	2.4146
1,1-Dimethylcyclopentane	0.5470	0.6630
n-Heptane	4.9199	6.0860
Methylcyclohexane	6.7508	8.1830
2,5-Dimethylhexane	0.2130	0.3004
Toluene	4.2439	4.8274
2-Methylheptane	1.3960	1.9686
n-Octane	4.7349	6.6771
Ethylcyclohexane	0.0090	0.0125
Ethylbenzene	0.3880	0.5085
p-Xylene	1.7630	2.3106
o-Xylene	0.3650	0.4784
n-Nonane	2.3229	3.6780
Isopropylbenzene	0.0800	0.1187
Cyclooctane	0.1710	0.2369
Propylbenzene	0.0280	0.0415
1,3,5-Trimethylbenzene	0.2550	0.3784
Isobutylbenzene	0.0130	0.0215
Butylbenzene	0.0840	0.1392
n-Decane	1.6360	2.8736
Water	0.0000	0.0000
TEG	0.0000	0.0000
MDEA	0.0000	0.0000
Total:	100.0000	100.0000
VOCs:	95.772	98.654
HAPs:	15.733	17.398
H2S:	0.002	0.001

Molecular Weight	81.002

TARGA

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Haul Road

Unit: HAUL
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	57.52	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]
1.73E-01	4.42E-02	4.42E-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%)

TARGA

Targa Northern Delaware, LLC - Big Lizard Compressor Station
Emission Calculation Inputs

Compressor Blowdowns

Compressor Name	Quantity of Compressors (#)	Quantity of Compressors Simultaneously (#)	Total Volume (scf/event)[1]	Hours / Blowdown (hr/event)	Number of Total Events
Cat 3516	2	2	2136.3	1	80
Cat 3606	6	6	4272.7	1	222
Cat 3608	2	2	6184.9	1	80

[1] Blowdown volumes provided by Targa.

Filter Coalescer Blowdowns

Input Data	Value	Units
Volume of gas per blowdown	6900	scf/event
Number of Filter Coalescers	1	Units
Number of Blowdowns per unit per year	2	events/yr
Duration of Event	1	hr/event

Scrubbers

Input Data	Value	Units
Volume of Gas Per Blowdown	33800	scf/event
Number of Scrubbers	5	Units
Number of Blowdowns per unit per year	1	events/yr
Duration of Event	1	hr/event
Simultaneous unit blowdowns	1	

Pipeline Blowdown - Only if pipeline is opened and a segment is vented

Input Data	Value	Units
Pipeline Diameter	12	inches
Pipeline Length	10000	ft
Duration of Event	2	hr/event
Maintenance events per year	1	events/yr
Actual Pressure	800	psia
Maximum Temperature	100	°F
Annual Temperature	80	°F
Pipeline volume vented	396987	scf/event

Pump Blowdowns

Input Data	Value	Units
Volume of gas per blowdown	16	scf/event
Number of pumps	3	Units
Number of blowdowns per unit per year	1	events/yr
Hours per event	1	hr/event
Simultaneous unit blowdowns	2	Units

Pigging

Input Data	Value	Units
Unit #1 Volume Vented	640	scf/event
Unit #2 Volume Vented	120	scf/event
Unit #3 Volume Vented	100	scf/event
Unit #4 Volume Vented	100	scf/event
Maximum hourly number of pigging events	1	events/hr
Unit #1 Annual Number of Events	24	events/yr
Unit #2 Annual Number of Events	15	events/yr
Unit #3 Annual Number of Events	15	events/yr
Unit #4 Annual Number of Events	15	events/yr
Actual Pressure	70	psig
Maximum Temperatue	100	°F
Annual Temperature	80	°F

Surface Coating

Input Data	Value	Units
Maximum amount of paint used in an hour	25	gal/hr
Maximum amount of paint used in a year	100	gal/yr
Source Painted	Tank	-

Abrasive Blasting

Input Data	Value	Units
Blasting Material	Sand	-
Usage per Event	3100	lb/event
Events per year	1	-
Duration of event	6	hr/event

Dehydrator/ Amine Blowdowns

Dehydrator/Amine	Volume of Gas per Blowdown (scf/event)	# Blowdowns / year (# /year)	Hours / Blowdown (hr/event)	Number of Units (#)
42" Contactor	15,448	1	1	1
42" Contactor	15,448	1	1	1
30" Contactor	9,025	1	1	1

Reboiler Maintenance

Input Data	Value	Units
Volume of Gas Released during Reboiler Maintenance	65	scf/event
Number of Reboilers	5	-
Duration of Event	1	hr/event
Maintenance Events per year	1	event/ year
Actual Pressure	15.2	psia
Maximum Temperature	100	°F
Annual Temperature	80	°F
Simultaneous Events	1	events

Tank Maintenance

Input Data	Value	Units
Number of tanks	3	Units
Molecular Weight of Vapors	44.35	lb/lb-mol
Duration of tank purging/degassing	24	hr/event
Volume of gas released during degassing event	1696.50	scf/event
Tank Height	15	ft
Tank Diameter	12	ft
Number of tank purging/degassing events per tank per year	1	event/yr

Targa Northern Delaware, LLC - Big Lizard Compressor Station

SSM Summary

Description	VOC		PM		PM_{10}		$PM_{2.5}$		H_2S		Total HAPs		CO_2		CH_4		CO_2e	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Compressor Blowdowns	888.93	16.97	-	-	-	-	-	-	0.10	<0.01	34.68	0.66	180.39	3.44	290.24	5.64	7,436.38	144.46
Coalescer Blowdowns	145.08	0.15	-	-	-	-	-	-	0.02	<0.01	5.66	0.01	29.44	0.03	206.84	0.21	5,200.35	5.20
Scrubber Blowdown	710.67	1.78	-	-	-	-	-	-	0.08	<0.01	27.73	0.07	144.22	0.36	1,013.20	2.53	25,474.15	63.69
Pipeline Blowdowns	4,173.45	4.17	-	-	-	-	-	-	0.45	<0.01	162.83	0.16	846.92	0.85	5,950.09	5.95	149,599.25	149.60
Pump Blowdowns	0.34	<0.01	-	-	-	-	-	-	<0.01	<0.01	0.01	<0.01	0.07	<0.01	0.48	<0.01	12.06	0.01
Pigging	13.46	0.21	-	-	-	-	-	-	<0.01	<0.01	0.53	0.53	2.73	0.04	19.18	0.30	482.35	7.60
Surface Coating	73.00	0.15	0.77	<0.01	0.07	<0.01	0.005	<0.0001	-	-	13.39	0.03	-	-	-	-	-	-
Abrasive Blasting	-	-	47.02	0.14	6.72	0.02	0.67	<0.01	-	-	-	-	-	-	-	-	-	-
Dehydrator Blowdowns	839.34	1.26	-	-	-	-	-	-	0.09	<0.01	32.75	0.05	170.33	0.26	1,196.65	1.79	30,086.63	45.13
Reboiler Maintenance	1.37	<0.01	-	-	-	-	-	-	<0.01	<0.01	0.05	<0.01	0.28	<0.01	1.95	<0.01	48.99	0.12
Tank Degassing	52.42	0.22	-	-	-	-	-	-	<0.01	<0.01	0.01	<0.01	-	-	-	-	-	-
TOTAL	**4,173.45**	**24.91**	**47.79**	**0.14**	**6.79**	**0.02**	**0.68**	**<0.01**	**0.45**	**<0.01**	**162.83**	**1.50**	**846.92**	**4.98**	**5,950.09**	**16.43**	**149,599.25**	**415.81**

*Maximum Hourly estimates are based on max of compressor blowdowns or all other activitiy simultaneous hourly emissions.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

ENG-1 & ENG-2 Blowdowns

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

Maximum Uncontrolled Hourly Emissions (lb/hr) = [Volume of blowdown (scf/event/unit)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# compressors blowndown simultaneously (units)] / [event duration (hr/event)] / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions (tpy) = [Volume of blowdown (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# compressors blowndown at site (units)] x [frequency of events

Compressor BlowDown Emissions

Estimated Gas Vented per BlowDown Event [1] =	2,136	scf/event
Compressors at Site =	2	units
Compressors Blowndown Simultaneously =	2	units
Assumed BlowDown Duration =	1	hrs/event
Compressor BlowDowns in One Year =	80	events/yr
Molecular Weight of Stream =	25	lb/lb-mol
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
H2S	0.0034	9.60E-03	1.92E-04
Nitrogen	2.0553	5.72	0.11
CO2	6.5504	18.23	0.36
Methane	46.0203	128.08	2.56
Ethane	13.0916	36.44	0.73
Propane	10.5911	29.48	0.59
i-Butane	2.0851	5.80	0.12
n-Butane	5.0220	13.98	0.28
i-Pentane	1.8287	5.09	0.10
n-Pentane	2.0157	5.61	0.11
Neohexane	0.0279	0.08	1.55E-03
Cyclopentane	0.1789	0.50	9.96E-03
2-Methylpentane	0.7118	1.98	0.04
3-Methylpentane	0.4013	1.12	0.02
n-Hexane	0.9630	2.68	0.05
2,2-Dimethylpentane	0.0000	--	--
Methylcyclopentane	0.0000	--	--
2,2,3-Trimethylbutane	0.4422	1.23	0.02
Benzene	0.0000	--	--
Cyclohexane	0.4225	1.18	0.02
2-Methylhexane	0.0122	0.03	6.77E-04
3-Methylhexane	0.9494	2.64	0.05
1,1-Dimethylcyclopentane	0.2226	0.62	0.01
n-Heptane	0.1379	0.38	7.68E-03
Methylcyclohexane	0.6281	1.75	0.03
2,5-Dimethylhexane	0.0000	--	--
Toluene	0.0298	0.08	1.66E-03
2-Methylheptane	0.0000	--	--
n-Octane	2.5345	7.05	0.14
Ethylcyclohexane	0.5180	1.44	0.03
Ethylbenzene	0.0559	0.16	3.11E-03
p-Xylene	0.0000	--	--
o-Xylene	0.2106	0.59	0.01
n-Nonane	0.2804	0.78	0.02
Isopropylbenzene	0.0000	--	--
Cyclooctane	0.5725	1.59	0.03
Propylbenzene	0.1460	0.41	8.13E-03
1,3,5-Trimethylbenzene	0.0049	0.01	2.71E-04
Isobutylbenzene	0.0706	0.20	3.93E-03
Butylbenzene	0.0054	0.02	3.02E-04
n-Decane	1.2098	3.37	0.07
Water	0.0000	--	--
TEG	0.0000	--	--
MDEA	0.0000	--	--
Total VOC	**32.279**	**89.836**	**1.797**
H_2S	**0.003**	**9.60E-03**	**1.92E-04**
Total HAP	**1.259**	**3.505**	**0.070**

[1] This is a representative estimate of the amount of gas vented per blow down event.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

ENG-3-4 & ENG-7-10 Blowdowns

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

Maximum Uncontrolled Hourly Emissions (lb/hr) = [Volume of blowdown (scf/event/unit)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# compressors blowndown simultaneously (units)] / [event duration (hr/event)] / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions (tpy) = [Volume of blowdown (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# compressors blowndown at site (units)] x [frequency of

Compressor BlowDown Emissions

Estimated Gas Vented per BlowDown Event [1] =	4,273	scf/event
Compressors at Site =	6	units
Compressors Blowndown Simultaneously =	6	units
Assumed BlowDown Duration =	1	hrs/event
Compressor BlowDowns in One Year =	222	events/yr
Molecular Weight of Stream =	25	lb/lb-mol
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
H2S	0.0034	0.06	1.07E-03
Nitrogen	2.0553	34.32	0.63
CO2	6.5504	109.38	2.02
Methane	46.0203	768.47	14.22
Ethane	13.0916	218.61	4.04
Propane	10.5911	176.86	3.27
i-Butane	2.0851	34.82	0.64
n-Butane	5.0220	83.86	1.55
i-Pentane	1.8287	30.54	0.56
n-Pentane	2.0157	33.66	0.62
Neohexane	0.0279	0.47	8.62E-03
Cyclopentane	0.1789	2.99	0.06
2-Methylpentane	0.7118	11.89	0.22
3-Methylpentane	0.4013	6.70	0.12
n-Hexane	0.9630	16.08	0.30
2,2-Dimethylpentane	0.0000	--	--
Methylcyclopentane	0.0000	--	--
2,2,3-Trimethylbutane	0.4422	7.38	0.14
Benzene	0.0000	--	--
Cyclohexane	0.4225	7.06	0.13
2-Methylhexane	0.0122	0.20	3.76E-03
3-Methylhexane	0.9494	15.85	0.29
1,1-Dimethylcyclopentane	0.2226	3.72	0.07
n-Heptane	0.1379	2.30	0.04
Methylcyclohexane	0.6281	10.49	0.19
2,5-Dimethylhexane	0.0000	--	--
Toluene	0.0298	0.50	9.22E-03
2-Methylheptane	0.0000	--	--
n-Octane	2.5345	42.32	0.78
Ethylcyclohexane	0.5180	8.65	0.16
Ethylbenzene	0.0559	0.93	0.02
p-Xylene	0.0000	--	--
o-Xylene	0.2106	3.52	0.07
n-Nonane	0.2804	4.68	0.09
Isopropylbenzene	0.0000	--	--
Cyclooctane	0.5725	9.56	0.18
Propylbenzene	0.1460	2.44	0.05
1,3,5-Trimethylbenzene	0.0049	0.08	1.50E-03
Isobutylbenzene	0.0706	1.18	0.02
Butylbenzene	0.0054	0.09	1.68E-03
n-Decane	1.2098	20.20	0.37
Water	0.0000	--	--
TEG	0.0000	--	--
MDEA	0.0000	--	--
Total VOC	**32.279**	**539.014**	**9.972**
H_2S	**0.003**	**5.76E-02**	**1.07E-03**
Total HAP	**1.259**	**21.030**	**0.389**

[1] This is a representative estimate of the amount of gas vented per blow down event.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

ENG-5 & ENG-6 Blowdowns

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

Maximum Uncontrolled Hourly Emissions (lb/hr) = [Volume of blowdown (scf/event/unit)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# compressors blowndown simultaneously (units)] / [event duration (hr/event)] / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions (tpy) = [Volume of blowdown (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# compressors blowndown at site (units)] x [frequency of events (events/yr/unit)] / [379.5 (scf/lb-mol)] / [2,000 (lb/ton)]

Compressor BlowDown Emissions

Estimated Gas Vented per BlowDown Event [1] =	6,185	scf/event
Compressors at Site =	2	units
Compressors Blowndown Simultaneously =	2	units
Assumed BlowDown Duration =	1	hrs/event
Compressor BlowDowns in One Year =	80	events/yr
Molecular Weight of Stream =	25	lb/lb-mol
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
H2S	0.0034	0.03	5.56E-04
Nitrogen	2.0553	16.56	0.33
CO2	6.5504	52.78	1.06
Methane	46.0203	370.80	7.42
Ethane	13.0916	105.48	2.11
Propane	10.5911	85.34	1.71
i-Butane	2.0851	16.80	0.34
n-Butane	5.0220	40.46	0.81
i-Pentane	1.8287	14.73	0.29
n-Pentane	2.0157	16.24	0.32
Neohexane	0.0279	0.22	4.50E-03
Cyclopentane	0.1789	1.44	0.03
2-Methylpentane	0.7118	5.74	0.11
3-Methylpentane	0.4013	3.23	0.06
n-Hexane	0.9630	7.76	0.16
2,2-Dimethylpentane	0.0000	--	--
Methylcyclopentane	0.0000	--	--
2,2,3-Trimethylbutane	0.4422	3.56	0.07
Benzene	0.0000	--	--
Cyclohexane	0.4225	3.40	0.07
2-Methylhexane	0.0122	0.10	1.96E-03
3-Methylhexane	0.9494	7.65	0.15
1,1-Dimethylcyclopentane	0.2226	1.79	0.04
n-Heptane	0.1379	1.11	0.02
Methylcyclohexane	0.6281	5.06	0.10
2,5-Dimethylhexane	0.0000	--	--
Toluene	0.0298	0.24	4.81E-03
2-Methylheptane	0.0000	--	--
n-Octane	2.5345	20.42	0.41
Ethylcyclohexane	0.5180	4.17	0.08
Ethylbenzene	0.0559	0.45	9.01E-03
p-Xylene	0.0000	--	--
o-Xylene	0.2106	1.70	0.03
n-Nonane	0.2804	2.26	0.05
Isopropylbenzene	0.0000	--	--
Cyclooctane	0.5725	4.61	0.09
Propylbenzene	0.1460	1.18	0.02
1,3,5-Trimethylbenzene	0.0049	0.04	7.84E-04
Isobutylbenzene	0.0706	0.57	0.01
Butylbenzene	0.0054	0.04	8.76E-04
n-Decane	1.2098	9.75	0.19
Water	0.0000	--	--
TEG	0.0000	--	--
MDEA	0.0000	--	--
Total VOC	**32.279**	**260.083**	**5.202**
H_2S	**0.003**	**2.78E-02**	**5.56E-04**
Total HAP	**1.259**	**10.147**	**0.203**

[1] This is a representative estimate of the amount of gas vented per blow down event.

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Targa Northern Delaware, LLC - Big Lizard Compressor Station

Compressor Blowdowns

Hours per event: 1

Compressor	Number of Compressors	Volume per Compressor Event (scf/event)	Annual Events	Annual Release (scf/yr)	Hourly Volume (scf/hr)	Molecular Weight (lb/lb-mol)
ENG-1 & ENG-2	2	2136.3	80	341,814	4,273	25
ENG-3-4 & ENG-7-10	6	4272.7	222	5,691,210	25,636	25
ENG-5 & ENG-6	2	6184.9	80	989,584	12,370	25

Uncontrolled Emissions	VOC		H_2S		Total HAP		CO_2		CH_4	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
ENG-1 & ENG-2	89.84	1.80	9.60E-03	1.92E-04	3.50	0.070	18.23	0.36	128.08	2.562
ENG-3-4 & ENG-7-10	539.01	9.97	0.06	1.07E-03	21.03	0.389	109.38	2.02	109.38	2.024
ENG-5 & ENG-6	260.08	5.20	0.03	5.56E-04	10.15	0.203	52.78	1.06	52.78	1.056
TOTAL	888.93	16.97	0.10	1.81E-03	34.68	0.66	180.39	3.44	290.24	5.64

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Filter Coalescer Blowdowns

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

Maximum Uncontrolled Hourly Emissions (lb/hr) = [Volume of blowdown (scf/event/unit)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# units blowndown simultaneously (units)] / [event duration (hr/event)] / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions (tpy) = [Volume of blowdown (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# units blowndown at site (units)] x [frequency of events (events/yr/unit)] / [379.5 (scf/lb-mol)] / [2,000 (lb/ton)]

Filter Coalescer BlowDown Emissions

Estimated Gas Vented per BlowDown Event [1] =	6,900	scf/event
Units at Site =	1	units
Units Blowndown Simultaneously =	1	units
BlowDown Duration =	1	hrs/event
Unit BlowDowns in One Year =	2	events/yr
Molecular Weight of Stream =	25	lb/lb-mol
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
H2S	0.0034	0.02	1.55E-05
Nitrogen	2.0553	9.24	9.24E-03
CO2	6.5504	29.44	0.03
Methane	46.0203	206.84	0.21
Ethane	13.0916	58.84	0.06
Propane	10.5911	47.60	0.05
i-Butane	2.0851	9.37	9.37E-03
n-Butane	5.0220	22.57	0.02
i-Pentane	1.8287	8.22	8.22E-03
n-Pentane	2.0157	9.06	9.06E-03
Neohexane	0.0279	0.13	1.25E-04
Cyclopentane	0.1789	0.80	8.04E-04
2-Methylpentane	0.7118	3.20	3.20E-03
3-Methylpentane	0.4013	1.80	1.80E-03
n-Hexane	0.9630	4.33	4.33E-03
2,2-Dimethylpentane	0.0000	--	--
Methylcyclopentane	0.0000	--	--
2,2,3-Trimethylbutane	0.4422	1.99	1.99E-03
Benzene	0.0000	--	--
Cyclohexane	0.4225	1.90	1.90E-03
2-Methylhexane	0.0122	0.05	5.47E-05
3-Methylhexane	0.9494	4.27	4.27E-03
1,1-Dimethylcyclopentane	0.2226	1.00	1.00E-03
n-Heptane	0.1379	0.62	6.20E-04
Methylcyclohexane	0.6281	2.82	2.82E-03
2,5-Dimethylhexane	0.0000	--	--
Toluene	0.0298	0.13	1.34E-04
2-Methylheptane	0.0000	--	--
n-Octane	2.5345	11.39	0.01
Ethylcyclohexane	0.5180	2.33	2.33E-03
Ethylbenzene	0.0559	0.25	2.51E-04
p-Xylene	0.0000	--	--
o-Xylene	0.2106	0.95	9.47E-04
n-Nonane	0.2804	1.26	1.26E-03
Isopropylbenzene	0.0000	--	--
Cyclooctane	0.5725	2.57	2.57E-03
Propylbenzene	0.1460	0.66	6.56E-04
1,3,5-Trimethylbenzene	0.0049	0.02	2.19E-05
Isobutylbenzene	0.0706	0.32	3.18E-04
Butylbenzene	0.0054	0.02	2.44E-05
n-Decane	1.2098	5.44	5.44E-03
Water	0.0000	--	--
TEG	0.0000	--	--
MDEA	0.0000	--	--
Total VOC	**32.279**	**145.077**	**0.145**
H_2S	**0.003**	**0.016**	**1.55E-05**
Total HAP	**1.259**	**5.660**	**0.006**

[1] This is a representative estimate of the amount of gas vented per blow down event.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Scrubber Blowdown

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

Maximum Uncontrolled Hourly Emissions (lb/hr) = [Volume of blowdown (scf/event/unit)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# units blowndown simultaneously (units)] / [event duration (hr/event)] / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions (tpy) = [Volume of blowdown (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# units blowndown at site (units)]

Scrubber BlowDown Emissions

Estimated Gas Vented per BlowDown Event [1] =	33,800	scf/event
Units at Site =	5	units
Units Blowndown Simultaneously =	1	units
BlowDown Duration =	1	hrs/event
Unit BlowDowns in One Year =	1	events/yr
Molecular Weight of Stream =	25	lb/lb-mol
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
H2S	0.0034	0.08	1.90E-04
Nitrogen	2.0553	45.25	0.11
CO2	6.5504	144.22	0.36
Methane	46.0203	1013.20	2.53
Ethane	13.0916	288.23	0.72
Propane	10.5911	233.18	0.58
i-Butane	2.0851	45.91	0.11
n-Butane	5.0220	110.57	0.28
i-Pentane	1.8287	40.26	0.10
n-Pentane	2.0157	44.38	0.11
Neohexane	0.0279	0.61	1.54E-03
Cyclopentane	0.1789	3.94	9.85E-03
2-Methylpentane	0.7118	15.67	0.04
3-Methylpentane	0.4013	8.83	0.02
n-Hexane	0.9630	21.20	0.05
2,2-Dimethylpentane	0.0000	--	--
Methylcyclopentane	0.0000	--	--
2,2,3-Trimethylbutane	0.4422	9.74	0.02
Benzene	0.0000	--	--
Cyclohexane	0.4225	9.30	0.02
2-Methylhexane	0.0122	0.27	6.70E-04
3-Methylhexane	0.9494	20.90	0.05
1,1-Dimethylcyclopentar	0.2226	4.90	0.01
n-Heptane	0.1379	3.04	7.59E-03
Methylcyclohexane	0.6281	13.83	0.03
2,5-Dimethylhexane	0.0000	--	--
Toluene	0.0298	0.66	1.64E-03
2-Methylheptane	0.0000	--	--
n-Octane	2.5345	55.80	0.14
Ethylcyclohexane	0.5180	11.40	0.03
Ethylbenzene	0.0559	1.23	3.08E-03
p-Xylene	0.0000	--	--
o-Xylene	0.2106	4.64	0.01
n-Nonane	0.2804	6.17	0.02
Isopropylbenzene	0.0000	--	--
Cyclooctane	0.5725	12.60	0.03
Propylbenzene	0.1460	3.21	8.04E-03
1,3,5-Trimethylbenzene	0.0049	0.11	2.68E-04
Isobutylbenzene	0.0706	1.56	3.89E-03
Butylbenzene	0.0054	0.12	2.99E-04
n-Decane	1.2098	26.64	0.07
Water	0.0000	--	--
TEG	0.0000	--	--
MDEA	0.0000	--	--
Total VOC	**32.279**	**710.67**	**1.777**
H_2S	**0.003**	**0.076**	**1.90E-04**
Total HAP	**1.259**	**27.73**	**0.0693**

[1] This is a representative estimate of the amount of gas vented per blow down event.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Pipeline Blowdown

Basis of Calculation:
Emissions from pipeline maintenance operations are calculated based on a mass balance as follows:

Maximum Uncontrolled Hourly Emissions for each Unit (lb/hr) = [Volume of gas in pipe (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] * [events per hour (event/hr) / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions for each Unit (tpy) = [Volume of gas in pipe (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [frequency of events (events/yr)] / [379.5 (scf/lb-mol)] / [2,000 (lb/ton)]

Pipeline Blowdown Emissions

Pipeline Volume Vented =	396,987	scf/yr
Molecular Weight of Stream =	25	lb/lb-mol
Hours to Blowdown =	2	hrs/blowdown
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
H2S	0.0034	0.45	4.46E-04
Nitrogen	2.0553	265.73	0.27
CO2	6.5504	846.92	0.85
Methane	46.0203	5950.09	5.95
Ethane	13.0916	1692.65	1.69
Propane	10.5911	1369.35	1.37
i-Butane	2.0851	269.58	0.27
n-Butane	5.0220	649.32	0.65
i-Pentane	1.8287	236.44	0.24
n-Pentane	2.0157	260.61	0.26
Neohexane	0.0279	3.61	3.61E-03
Cyclopentane	0.1789	23.13	0.02
2-Methylpentane	0.7118	92.03	0.09
3-Methylpentane	0.4013	51.88	0.05
n-Hexane	0.9630	124.51	0.12
2,2-Dimethylpentane	0.0000	--	--
Methylcyclopentane	0.0000	--	--
2,2,3-Trimethylbutane	0.4422	57.18	0.06
Benzene	0.0000	--	--
Cyclohexane	0.4225	54.63	0.05
2-Methylhexane	0.0122	1.57	1.57E-03
3-Methylhexane	0.9494	122.75	0.12
1,1-Dimethylcyclopentane	0.2226	28.78	0.03
n-Heptane	0.1379	17.84	0.02
Methylcyclohexane	0.6281	81.21	0.08
2,5-Dimethylhexane	0.0000	--	--
Toluene	0.0298	3.86	3.86E-03
2-Methylheptane	0.0000	--	--
n-Octane	2.5345	327.70	0.33
Ethylcyclohexane	0.5180	66.97	0.07
Ethylbenzene	0.0559	7.23	7.23E-03
p-Xylene	0.0000	--	--
o-Xylene	0.2106	27.23	0.03
n-Nonane	0.2804	36.26	0.04
Isopropylbenzene	0.0000	--	--
Cyclooctane	0.5725	74.02	0.07
Propylbenzene	0.1460	18.88	0.02
1,3,5-Trimethylbenzene	0.0049	0.63	6.29E-04
Isobutylbenzene	0.0706	9.13	9.13E-03
Butylbenzene	0.0054	0.70	7.03E-04
n-Decane	1.2098	156.42	0.16
Water	0.0000	--	--
TEG	0.0000	--	--
MDEA	0.0000	--	--
Total VOC	**32.279**	**4173.45**	**4.173**
H_2S	**0.003**	**0.45**	**4.46E-04**
Total HAP	**1.259**	**162.83**	**0.163**

[1] This is a representative estimate of the amount of gas vented per blowdown event.

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Targa Northern Delaware, LLC - Big Lizard Compressor Statior

Pump Blowdowns

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

Maximum Uncontrolled Hourly Emissions (lb/hr) = [Volume of blowdown (scf/event/unit)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# units blowndown simultaneously (units)] / [event duration (hr/event)] / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions (tpy) = [Volume of blowdown (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# units blowndown at site (units)] x [frequency of events (events/yr/unit)] / [379.5 (scf/lb-mol)] / [2,000 (lb/ton)]

Pump BlowDown Emissions

Estimated Gas Vented per BlowDown Event [1] =	16	scf/event
Units at Site =	3	units
Units Blowndown Simultaneously =	1	units
Assumed BlowDown Duration =	1	hrs/event
Unit BlowDowns in One Year =	2	events/yr
Molecular Weight of Stream =	25	lb/lb-mol
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
H2S	0.0034	3.60E-05	3.60E-08
Nitrogen	2.0553	0.02	2.14E-05
CO2	6.5504	0.07	6.83E-05
Methane	46.0203	0.48	4.80E-04
Ethane	13.0916	0.14	1.36E-04
Propane	10.5911	0.11	1.10E-04
i-Butane	2.0851	0.02	2.17E-05
n-Butane	5.0220	0.05	5.23E-05
i-Pentane	1.8287	0.02	1.91E-05
n-Pentane	2.0157	0.02	2.10E-05
Neohexane	0.0279	2.91E-04	2.91E-07
Cyclopentane	0.1789	1.86E-03	1.86E-06
2-Methylpentane	0.7118	7.42E-03	7.42E-06
3-Methylpentane	0.4013	4.18E-03	4.18E-06
n-Hexane	0.9630	0.01	1.00E-05
2,2-Dimethylpentane	0.0000	--	--
Methylcyclopentane	0.0000	--	--
2,2,3-Trimethylbutane	0.4422	4.61E-03	4.61E-06
Benzene	0.0000	--	--
Cyclohexane	0.4225	4.40E-03	4.40E-06
2-Methylhexane	0.0122	1.27E-04	1.27E-07
3-Methylhexane	9.49E-01	9.89E-03	9.89E-06
1,1-Dimethylcyclopentar	2.23E-01	2.32E-03	2.32E-06
n-Heptane	1.38E-01	1.44E-03	1.44E-06
Methylcyclohexane	6.28E-01	6.55E-03	6.55E-06
2,5-Dimethylhexane	0.00E+00	--	--
Toluene	2.98E-02	3.11E-04	3.11E-07
2-Methylheptane	0.00E+00	--	--
n-Octane	2.53E+00	0.03	2.64E-05
Ethylcyclohexane	5.18E-01	5.40E-03	5.40E-06
Ethylbenzene	5.59E-02	5.82E-04	5.82E-07
p-Xylene	0.00E+00	--	--
o-Xylene	2.11E-01	2.20E-03	2.20E-06
n-Nonane	2.80E-01	2.92E-03	2.92E-06
Isopropylbenzene	0.00E+00	--	--
Cyclooctane	5.72E-01	5.97E-03	5.97E-06
Propylbenzene	1.46E-01	1.52E-03	1.52E-06
1,3,5-Trimethylbenzene	4.87E-03	5.07E-05	5.07E-08
Isobutylbenzene	7.06E-02	7.36E-04	7.36E-07
Butylbenzene	5.43E-03	5.66E-05	5.66E-08
n-Decane	1.21E+00	0.01	1.26E-05
Water	0.00E+00	--	--
TEG	0.00E+00	--	--
Total VOC	**32.279**	**0.336**	**3.36E-04**
H_2S	**0.003**	**3.60E-05**	**3.60E-08**
Total HAP	**1.259**	**0.0131**	**1.31E-05**

[1] This is a representative estimate of the amount of gas vented per blow down event.

TARGA

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Pigging Emissions

Basis of Calculation:
Emissions from pigging operations are calculated based on a mass balance as follows:

Maximum Uncontrolled Hourly Emissions for each Unit (lb/hr) = [Volume of gas in pipe (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] * [events per hour (event/hr) / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions for each Unit (tpy) = [Volume of gas in pipe (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [frequency of events (events/yr)] / [379.5 (scf/lb-mol)] / [2,000 (lb/ton)]

For sites with multiple units, the total annual emissions are calculated by summing emissions for all units. It is assumed only one unit can be pigged/purged in one hour; therefore, the maximum volume of the units is used for

Pigging and Purging Emissions

Unit #1 - Volume Vented =	640	scf/event
Unit #2 - Volume Vented =	120	scf/event
Unit #3 - Volume Vented =	100	scf/event
Unit #4 - Volume Vented =	100	scf/event
Maximum Number of Hourly Pigging/Purging Events	1	events/hr
Unit #1 - Annual Number of Events =	24	events/yr
Unit #2 - Annual Number of Events =	15	events/yr
Unit #3 - Annual Number of Events =	15	events/yr
Unit #4 - Annual Number of Events =	15	events/yr
Pipelines Purged Simultaneously =	1	lines
Molecular Weight of Stream =	25	lb/lb-mol
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
H2S	0.0034	1.44E-03	2.27E-05
Nitrogen	2.0553	0.86	0.01
CO2	6.5504	2.73	0.04
Methane	46.0203	19.18	0.30
Ethane	13.0916	5.46	0.09
Propane	10.5911	4.42	0.07
i-Butane	2.0851	0.87	0.01
n-Butane	5.0220	2.09	0.03
i-Pentane	1.8287	0.76	0.01
n-Pentane	2.0157	0.84	0.01
Neohexane	0.0279	0.01	1.83E-04
Cyclopentane	0.1789	0.07	1.17E-03
2-Methylpentane	0.7118	0.30	4.67E-03
3-Methylpentane	0.4013	0.17	2.63E-03
n-Hexane	0.9630	0.40	6.32E-03
2,2-Dimethylpentane	0.0000	--	--
Methylcyclopentane	0.0000	--	--
2,2,3-Trimethylbutane	0.4422	0.18	2.90E-03
Benzene	0.0000	--	--
Cyclohexane	0.4225	0.18	2.77E-03
2-Methylhexane	0.0122	5.07E-03	7.99E-05
3-Methylhexane	0.9494	0.40	6.23E-03
1,1-Dimethylcyclopentane	0.2226	0.09	1.46E-03
n-Heptane	0.1379	0.06	9.06E-04
Methylcyclohexane	0.6281	0.26	4.12E-03
2,5-Dimethylhexane	0.0000	--	--
Toluene	0.0298	0.01	1.96E-04
2-Methylheptane	0.0000	--	--
n-Octane	2.5345	1.06	0.02
Ethylcyclohexane	0.5180	0.22	3.40E-03
Ethylbenzene	0.0559	0.02	3.67E-04
p-Xylene	0.0000	--	--
o-Xylene	0.2106	0.09	1.38E-03
n-Nonane	0.2804	0.12	1.84E-03
Isopropylbenzene	0.0000	--	--
Cyclooctane	0.5725	0.24	3.76E-03
Propylbenzene	0.1460	0.06	9.59E-04
1,3,5-Trimethylbenzene	0.0049	2.03E-03	3.20E-05
Isobutylbenzene	0.0706	0.03	4.64E-04
Butylbenzene	0.0054	2.27E-03	3.57E-05
n-Decane	1.2098	0.50	7.94E-03
Water	0.0000	--	--
TEG	0.0000	--	--
Total VOC	**32.279**	**13.46**	**0.212**
H_2S	**0.003**	**1.44E-03**	**2.27E-05**
Total HAP	**1.259**	**0.53**	**0.0083**

[1] This is a representative estimate of the amount of gas vented per blowdown event.

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Surface Coating Emissions

Basis of Calculation:

TCEQ's Painting Basics and Emissions Calculations for TCEQ Air Quality Permit Applications, November 5, 2012

VOC calculations are based on the product usage, VOC or HAP content, and density of a general paint used for MSS. The paint chosen has the highest VOC content of all paints typically used for these activities. It has been assumed that all VOC in the solution escapes to atmosphere. Emissions are calculated using the following equations:

Hourly VOC Emissions (lb/hr) = [Usage Rate (gal/hr)] * [VOC or HAP Content (lb/gal)]

Annual VOC Emissions (tpy) = [Usage Rate (gal/yr)] * [VOC or HAP Content lb/gal)] / [2,000 (lb/ton)]

It is assumed that all surface coating products are sprayed. Particulate emissions are calculated based on the usage rate and solids content for the product, as well as a transfer efficiency and fallout factor obtained from TCEQ's Painting Basics and Emissions Calculations for TCEQ Air Quality Permit Applications. The following equations are used to calculated particulate emissions:

Short-term PM emissions (lb/hr) = Solids Content (%) x Density (lb/gal) x Volume of Product used (gal/hr) x (1 - Transfer Efficiency (%)) x (1-Fallout Factor (%))

Potential VOC and HAP Emissions from Paint Usage (MSS)

Product	Density (lb/gal) [1]	VOC Content (lb/gal) [1]	HAP Content (wt %) [1]	Usage Rates		VOC Emissions		HAP Emissions	
				(gal/hr)	(gal/yr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Paint	10.71	2.92	5.0	25	100	73.0	0.15	13.39	0.03
					Totals	**73.0**	**0.15**	**13.39**	**0.03**

[1] Based on representative characteristics of common paint.

Potential PM/PM_{10}/$PM_{2.5}$ Emissions from Spray Paint Usage (MSS)

Product	Solids Content [1] (wt %)	Usage Rates		Object Coated	Transfer Efficiency [2] (%)	Fallout Factor (%) [3]			PM Emissions		PM_{10} Emissions		$PM_{2.5}$ Emissions	
		(gal/hr)	(gal/yr)			PM	PM_{10}	$PM_{2.5}$	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Paint	80	25.00	100.00	Flat Surface	75	98.56	99.87	99.99	0.77	1.54E-03	0.07	1.39E-04	0.01	1.07E-05

[1] Per the representative Material Safety Data Sheet (MSDS)
[2] Transfer efficiency per TCEQ guidance (TCEQ's Painting Basics and Emissions Calculations for TCEQ Air Quality Permit Applications, November 5, 2012).
[3] Fallout factors per TCEQ's Painting Basics and Emissions Calculations for TCEQ Air Quality Permit Applications, November 5, 2012, Table 2.

Speciated Emissions

Composition	% by Weight	Emissions	
		(lb/hr)	(tpy)
Ethylbenzene	0.7	1.87	<0.01
Xylene	4.0	10.71	0.02
Medium Aromatic Hydrocarbons	2.0	5.36	0.01
Napthalene	0.3	0.80	<0.01
Methyl Ethyl Ketone	5.0	13.39	0.03
n-Butyl Acetate	9.0	24.10	0.05
1-methoxy-2-propanol Acetate	6.0	16.07	0.03
		72.29	**0.14**

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Abrasive Blasting

Basis of Calculation:
These calculations represent emissions resulting from dry abrasive blasting. Emission factors are based on U.S. EPA AP-42, Chapter 13.2.6, Abrasive Blasting.

Dry Abrasive Blasting

Blasting Material	Usage per Event (lb/event)	Duration of Event (hr/event)	Events per Year (event/yr)	Emissions Factor [1] (lb/1000 lb abrasive)			Hourly Emissions (lb/hr)			Annual Emissions (tpy)		
				PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Sand	3,100	6.00	1.00	91	13	1.3	47.02	6.72	0.67	0.14	0.02	<0.01
						Total Emissions:	**47.02**	**6.72**	**0.67**	**0.14**	**0.02**	**<0.01**

[1] Worst-case emission factor for PM based on 15 mph wind speed.
[2] Emission Factors from AP-42 13.2.6-1

mph	PM Emission Factor
5	27
10	55
15	91

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Dehydrator Blowdowns

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

Maximum Uncontrolled Hourly Emissions (lb/hr) = [Estimated blowdown volume (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] / [hour/event] / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions (tpy) = [Estimated blowdown volume (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] * [event/yr] / [379.5 (scf/lb-mol)] / [2,000 (lb/ton)]

The hourly volume is calculated from the sum of the blowdown volumes from each component of the dehydrator (i.e. the contactor, scrubber, flash tank, and filters).

Dehydrator BlowDown Emissions

Estimated Hourly BlowDown Volume [1] =	39,920	scf/event
Number of Units =	3	units
Assumed BlowDown Duration =	1	hr/event
Blowdowns Per Year =	3	event/yr
Molecular Weight of Stream =	25	lb/lb-mol
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
H2S	3.45E-03	0.09	0.0001
Nitrogen	2.06	53.44	0.0802
CO2	6.55	170.33	0.2555
Methane	46.02	1196.65	1.7950
Ethane	13.09	340.42	0.5106
Propane	10.59	275.40	0.4131
i-Butane	2.09	54.22	0.0813
n-Butane	5.02	130.59	0.1959
i-Pentane	1.83	47.55	0.0713
n-Pentane	2.02	52.41	0.0786
Neohexane	0.03	0.73	0.0011
Cyclopentane	0.18	4.65	0.0070
2-Methylpentane	0.71	18.51	0.0278
3-Methylpentane	0.40	10.43	0.0157
n-Hexane	0.96	25.04	0.0376
2,2-Dimethylpentane	--	--	0.0000
Methylcyclopentane	--	--	0.0000
2,2,3-Trimethylbutane	0.44	11.50	0.0172
Benzene	--	--	0.0000
Cyclohexane	0.42	10.99	0.0165
2-Methylhexane	0.01	0.32	0.0005
3-Methylhexane	0.95	24.69	0.04
1,1-Dimethylcyclopentan	0.22	5.79	0.01
n-Heptane	0.14	3.59	0.01
Methylcyclohexane	0.63	16.33	0.02
2,5-Dimethylhexane	--	--	--
Toluene	0.03	0.78	<0.01
2-Methylheptane	--	--	--
n-Octane	2.53	65.91	0.10
Ethylcyclohexane	0.52	13.47	0.02
Ethylbenzene	0.06	1.45	<0.01
p-Xylene	--	--	--
o-Xylene	0.21	5.48	0.01
n-Nonane	0.28	7.29	0.01
Isopropylbenzene	--	--	--
Cyclooctane	0.57	14.89	0.02
Propylbenzene	0.15	3.80	0.01
1,3,5-Trimethylbenzene	4.87E-03	0.13	<0.01
Isobutylbenzene	0.07	1.84	<0.01
Butylbenzene	0.01	0.14	<0.01
n-Decane	1.21	31.46	0.05
Water	--	--	--
TEG	--	--	--
Total VOC	**32.279**	**839.34**	**1.26**
H_2S	**0.003**	**0.09**	**1.35E-04**
Total HAP	**1.259**	**32.75**	**0.049**

Targa Northern Delaware, LLC - Big Lizard Compressor Statior

Reboiler Maintenance

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

Maximum Uncontrolled Hourly Emissions (lb/hr) = [Volume of Gas Vented (scf/event/unit)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# Reboilers worked on simultaneously (units)] / [event duration (hr/event)] / [379.5 (scf/lb-mol)]

Maximum Uncontrolled Annual Emissions (tpy) = [Volume of Gas Vented (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# Reboilers at site (units)] x [frequency of events

Reboiler Maintenance Emissions

Estimated Gas Vented per Event [1] =	65	scf/event
Reboilers at Site =	5	units
Reboilers Maintenance Events Occurring Simultaneously =	1	events
Assumed Reboiler Maintenance Duration =	1	hrs/event
Reboiler Maintenance Activities in One Year =	1	events/yr
Molecular Weight of Stream =	25	lb/lb-mol
Control Type =	None	

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
H2S	0.0034	1.46E-04	3.65E-07
Nitrogen	2.0553	0.09	2.18E-04
CO2	6.5504	0.28	6.93E-04
Methane	46.0203	1.95	4.87E-03
Ethane	13.0916	0.55	1.39E-03
Propane	10.5911	0.45	1.12E-03
i-Butane	2.0851	0.09	2.21E-04
n-Butane	5.0220	0.21	5.32E-04
i-Pentane	1.8287	0.08	1.94E-04
n-Pentane	2.0157	0.09	2.13E-04
Neohexane	0.0279	1.18E-03	2.95E-06
Cyclopentane	0.1789	7.57E-03	1.89E-05
2-Methylpentane	0.7118	0.03	7.53E-05
3-Methylpentane	0.4013	0.02	4.25E-05
n-Hexane	0.9630	0.04	1.02E-04
2,2-Dimethylpentane	0.0000	--	--
Methylcyclopentane	0.0000	--	--
2,2,3-Trimethylbutane	0.4422	0.02	4.68E-05
Benzene	0.0000	--	--
Cyclohexane	0.4225	0.02	4.47E-05
2-Methylhexane	0.0122	5.15E-04	1.29E-06
3-Methylhexane	0.9494	0.04	1.00E-04
1,1-Dimethylcyclopentane	0.2226	9.43E-03	2.36E-05
n-Heptane	0.1379	5.84E-03	1.46E-05
Methylcyclohexane	0.6281	0.03	6.65E-05
2,5-Dimethylhexane	0.0000	--	--
Toluene	0.0298	1.26E-03	3.16E-06
2-Methylheptane	0.0000	--	--
n-Octane	2.5345	0.11	2.68E-04
Ethylcyclohexane	0.5180	0.02	5.48E-05
Ethylbenzene	0.0559	2.37E-03	5.91E-06
p-Xylene	0.0000	--	--
o-Xylene	0.2106	8.92E-03	2.23E-05
n-Nonane	0.2804	0.01	2.97E-05
Isopropylbenzene	0.0000	--	--
Cyclooctane	0.5725	0.02	6.06E-05
Propylbenzene	0.1460	6.18E-03	1.55E-05
1,3,5-Trimethylbenzene	0.0049	2.06E-04	5.15E-07
Isobutylbenzene	0.0706	2.99E-03	7.48E-06
Butylbenzene	0.0054	2.30E-04	5.75E-07
n-Decane	1.2098	0.05	1.28E-04
Water	0.0000	--	--
TEG	0.0000	--	--
Total VOC	**32.279**	**1.37**	**3.42E-03**
H_2S	**0.003**	**1.46E-04**	**3.65E-07**
Total HAP	**1.259**	**0.053**	**1.33E-04**

[1] This is a representative estimate of the amount of gas vented per reboiler maintenance event.

TARGA

Targa Northern Delaware, LLC - Big Lizard Compressor Station

Tank Degassing

Basis of Calculation:
Emissions from tank degassing are calculated based on a mass balance as follows:

Maximum Uncontrolled Hourly Emissions (lb/hr) = [Volume of gas vented (scf/event/unit)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# tank degassing activities occurring simultaneously (units)] / [event duration (hr/event)] / [379.5 (scf/lb-mol)] + Clingage volume (scf/event) x Liquid density (lb/scf) / event duration (hr/event) x [# tank degassing activities occurring simultaneously (units)]

Maximum Uncontrolled Annual Emissions (tpy) = [Volume of gas vented (scf/event)] x [MW of stream (lb/lb-mol)] x [wt % VOC or speciated constituent] x [# tanks at site (units)] x [frequency of events (events/yr/unit)] / [379.5 (scf/lb-mol)] / [2,000 (lb/ton)] + Clingage volume (scf/event) x Liquid density (lb/scf) / Frequency of event (events/yr/unit) / 2,000 (lb/ton) x [# tanks at site (units)]

Tank Degassing Emissions - Non-Forced Ventilation

Estimated Gas Vented per Degassing Event =	1,697	scf/event
Number of Tanks =	3	units
Tank Degassing Events Occurring Simultaneously =	3	units
Degassing Event Duration =	24	hrs/event
Tank Degassing Events in One Year =	1	events/yr
Molecular Weight of Stream =	44	lb/lb-mol
Is Forced Ventilation used?	No	
Control Type =	Flare	

Clingage-to-vessel Volume		
Clingage volume [1] =	0.27	scf
Clingage thickness [2] =	0.0004	ft
Diameter =	12	ft
Height =	15	ft
Liquid Density [1] =	62.40	lb/scf

[1] The roof of the tank is not included in the clingage volume since no liquid will reach the roof. Liquid density for water is used as a surrogate since the density of each condensate sample is not available and will vary over time.

[2] Clingage thickness per TCEQ Maintenance, Startup and Shutdown (MSS) Guidance Document for terminals and chemical plants. http://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/mss/mss-guidance.pdf

Compound	Composition (wt %)	Maximum Uncontrolled Hourly Emissions (lb/hr)	Maximum Uncontrolled Annual Emissions (tpy)
Total VOC	**69%**	**52.42**	**0.22**
Total HAP	**2.8%**	**0.01**	**6.348E-05**
Total H_2S	**0.008%**	**0.00**	**1.86E-07**

[1] Speciations are based on the Promax output summary for tank breathing losses.

Section 7

Information Used to Determine Emissions

<u>Information Used to Determine Emissions</u> shall include the following:

- ☒ If manufacturer data are used, include specifications for emissions units <u>and</u> 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.
- ☒ 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.
- ☒ If an EPA document or other material is referenced, include a complete copy.
- ☒ Fuel specifications sheet.
- ☒ 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.

Documentation used to support calculations in this permit revision:

- Compressor manufacturer and catalyst specification sheets (for C-1 through C-10)
- Engine manufacturer specification sheet (for Trailer-1)
- Flare manufacturer specification sheet (for FL-1)
- ProMax report
- Inlet gas analysis
- Current version of AP-42 located online at: EPA AP-42 Compilation Air Emissions Factors
- Specific sections used in this application:
    - Section 1.3 – Natural Gas external Combustion Sources-Natural Gas (Table 1.4-1 through 1.4-3)
    - Section 3.2 – Natural Gas-fired Reciprocating Engines (Table 3.2-2)
    - Section 3.3 – Gasoline and Diesel Industrial Engines (Tables 3.3-1 & 2)
    - Section 5.2 – Transportation And Marketing Of Petroleum Liquids
    - Section 13.2-2 - Unpaved Haul Roads
- EPA Protocol for Equipment Leak Emissions Estimates, 1995 Table 2-4
- 40 CFR 98 Subpart C Tables C-1 and C-2

G3516J

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1400
COMPRESSION RATIO:	8
AFTERCOOLER TYPE:	SCAC
AFTERCOOLER - STAGE 2 INLET (°F):	130
AFTERCOOLER - STAGE 1 INLET (°F):	201
JACKET WATER OUTLET (°F):	210
ASPIRATION:	TA
COOLING SYSTEM:	JW+OC+1AC, 2AC
CONTROL SYSTEM:	ADEM3
EXHAUST MANIFOLD:	ASWC
COMBUSTION:	LOW EMISSION
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5
SET POINT TIMING:	28

RATING STRATEGY:	STANDARD
RATING LEVEL:	CONTINUOUS
FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL

SITE CONDITIONS:

FUEL:	Gas Analysis
FUEL PRESSURE RANGE(psig): (See note 1)	7.0-40.0
FUEL METHANE NUMBER:	52.3
FUEL LHV (Btu/scf):	1165
ALTITUDE(ft):	500
MAXIMUM INLET AIR TEMPERATURE(°F):	77
STANDARD RATED POWER:	1380 bhp@1400rpm

			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.

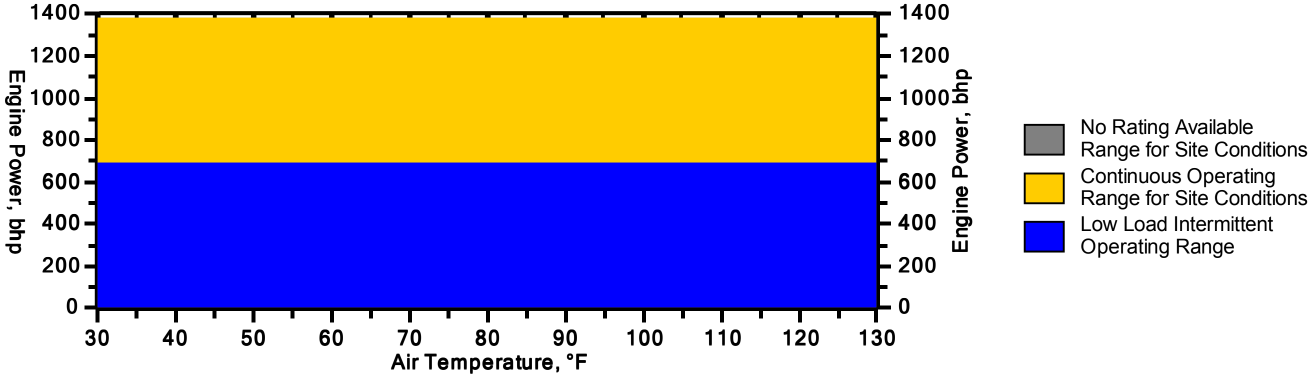
PREPARED BY:

Data generated by Gas Engine Rating Pro Version 6.08.00

Ref. Data Set EM1495-04-001, Printed 02Aug2018

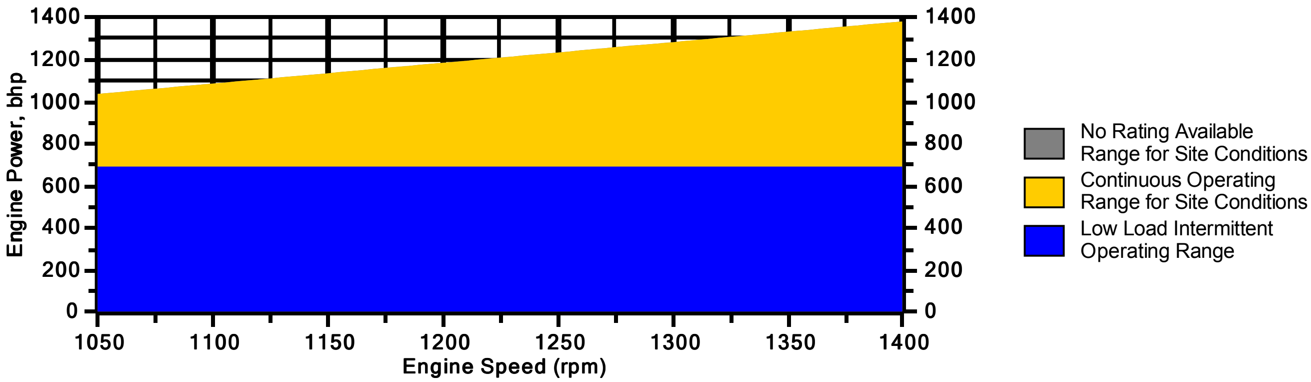
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1400 rpm



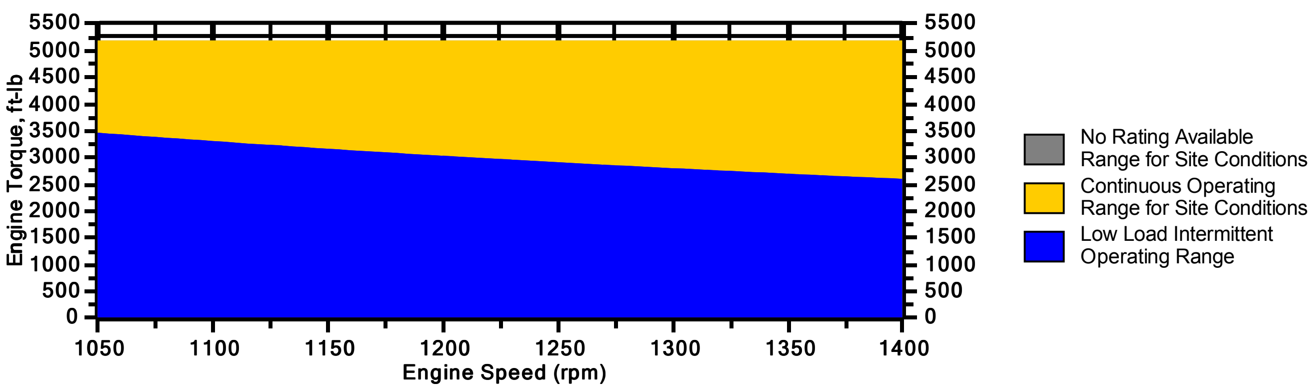
Engine Power vs. Engine Speed

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.

G3606

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000
COMPRESSION RATIO:	7.6
AFTERCOOLER TYPE:	SCAC
AFTERCOOLER - STAGE 2 INLET (°F):	130
AFTERCOOLER - STAGE 1 INLET (°F):	174
JACKET WATER OUTLET (°F):	190
ASPIRATION:	TA
COOLING SYSTEM:	JW+1AC, OC+2AC
CONTROL SYSTEM:	ADEM4
EXHAUST MANIFOLD:	DRY
COMBUSTION:	LOW EMISSION
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5
SET POINT TIMING:	16

RATING STRATEGY:	STANDARD
RATING LEVEL:	CONTINUOUS
FUEL SYSTEM:	GAV
	WITH AIR FUEL RATIO CONTROL

SITE CONDITIONS:

FUEL:	Gas Analysis
FUEL PRESSURE RANGE(psig): (See note 1)	58.0-70.3
FUEL METHANE NUMBER:	52.3
FUEL LHV (Btu/scf):	1165
ALTITUDE(ft):	500
MAXIMUM INLET AIR TEMPERATURE(°F):	77
STANDARD RATED POWER:	1875 bhp@1000rpm

			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

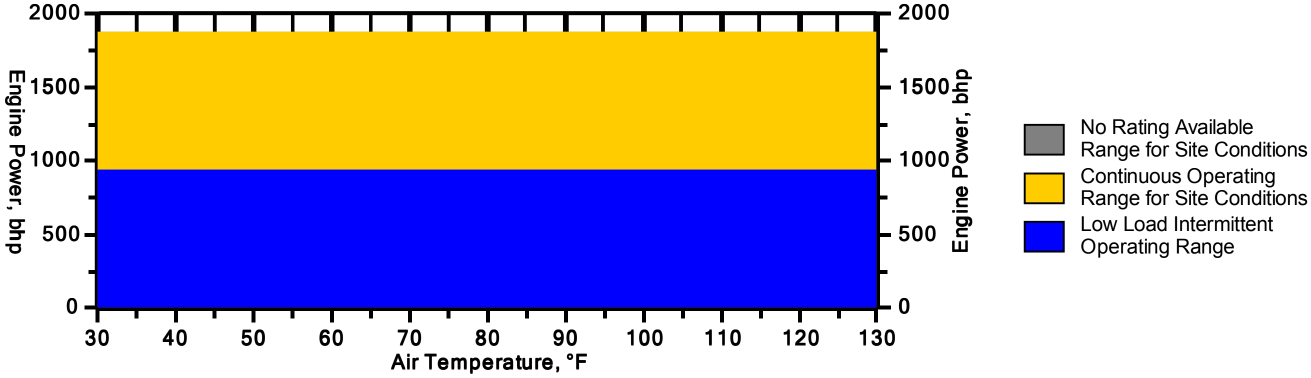
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating 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.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 6.08.00
Ref. Data Set EM0555-07-001, Printed 02Aug2018

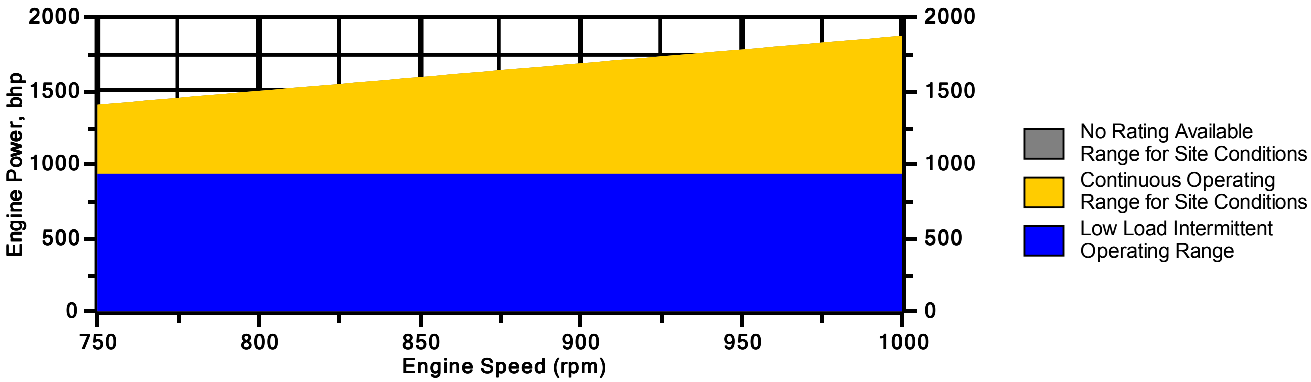
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1000 rpm



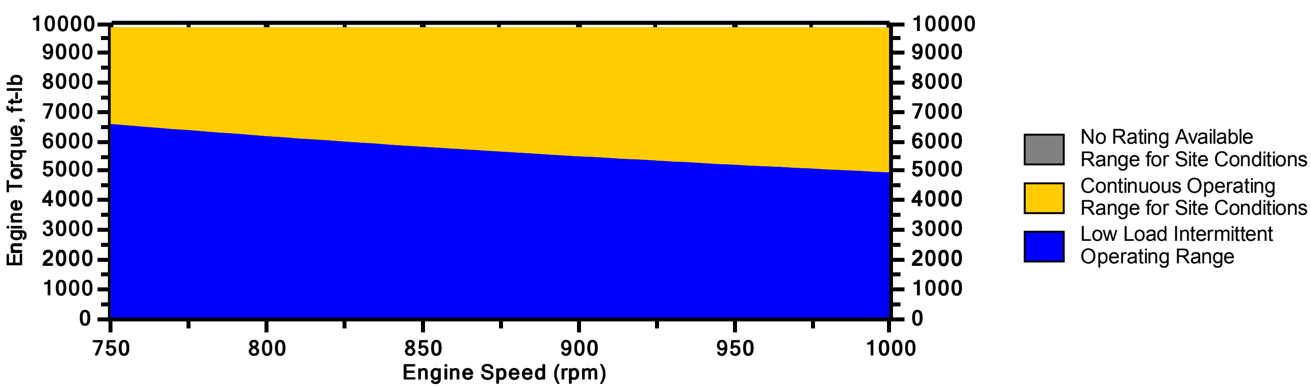
Engine Power vs. Engine Speed

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.

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

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.

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.

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

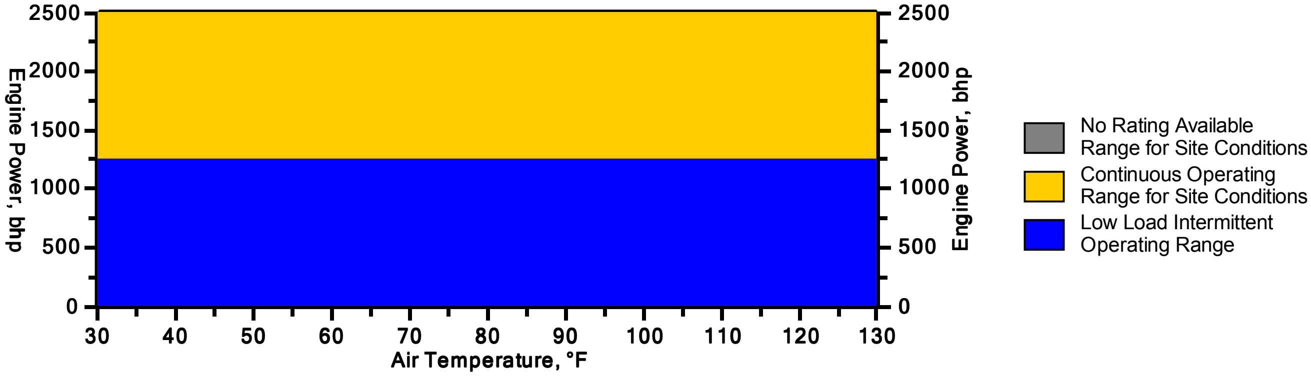
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating 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

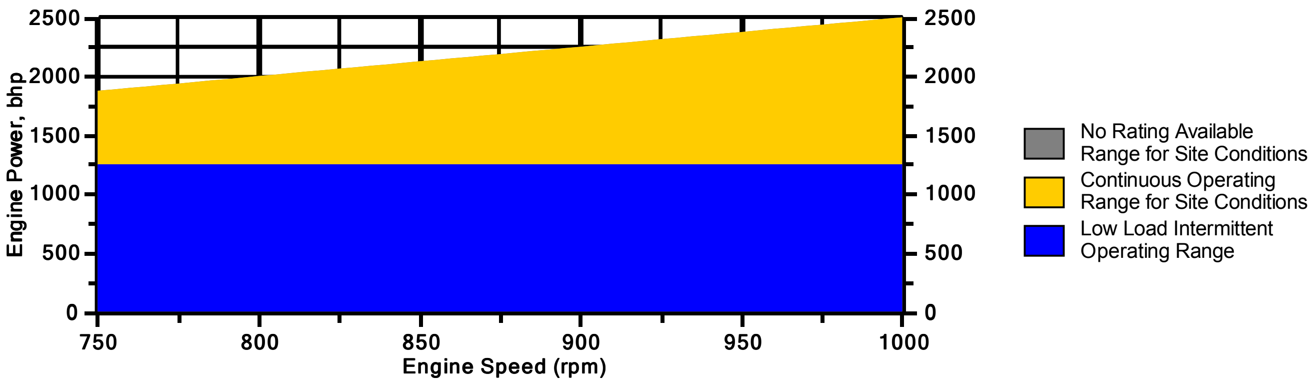
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1000 rpm



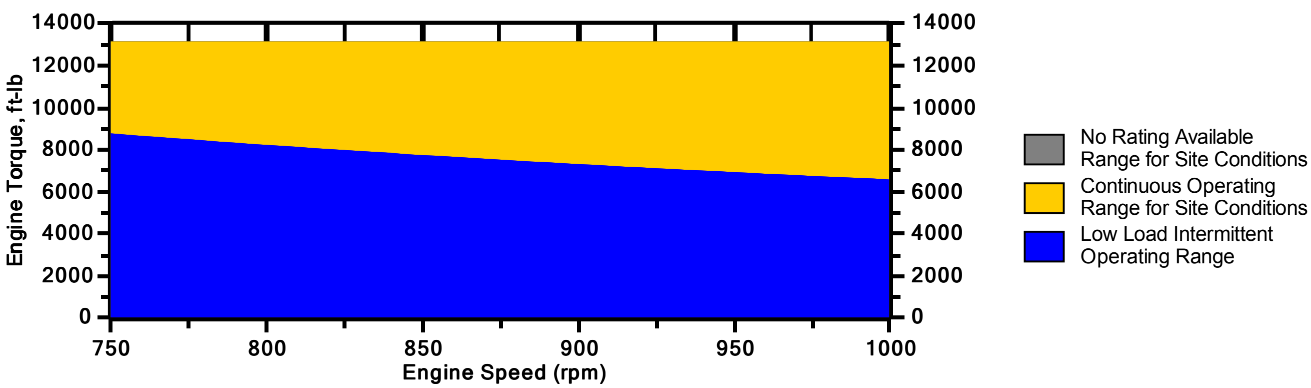
Engine Power vs. Engine Speed

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.

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

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.

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.

ICE CATALYST SIZING PROGRAM

rev 2.1.3

Report Date: 4/23/2024

POWERTHERM MAXIM SILENCERS

Customer	Kodiak	Housing	
Sales Person	MG	Element	APXP-OX-SQ-1500-2400-350
Project	Big Lizard G3516J	Contact	Joe Servantes
Engine Name	Caterpillar G3516J 1380bhp, 1400rpm		

Engine Power	1380.0	BHP	ACFM	8094.0	CU. FT/MIN	Exhaust O2	9	%
Exhaust Mass Flow	14373.0	LBS/HR	ACFH	485640	CU. FT/HR	Exhaust CO2	6.7	%
Process Temperature	837.0	F	SCFM	3250.2	CU. FT/MIN	Exhaust H2O	10.3	%
Exhaust Pressure	14.5	PSI	SCFH	195013	CU. FT/HR	Exhaust N2	74	%
Exhaust Density	0.0296	LBS/FT^3	Std Temp	68.0	F	Max Pressure Drop	12.0	in wc
Molecular Weight	28.40	AMU	Std Pressure	14.6959	PSI	Propane in Fuel	5.87	%

ACS Part Name	R14.875X23.875X3.500-400				
OEM Part Name	ERZ-1524-3-400				
Type	Propane Oxidation	Layers	1		
Geometry	Rectangular	Modules/Layer	3	Cell Count	400cpsi
X	14.875in	Guard Bed	No	Depth	3.500in
Y	23.875in				

Open Area	6.612	ft^2	Part Volume	0.643	ft^3	Part Weight	47	lbs
Linear Velocity	1224	ft/min	Total Volume	1.929	ft^3	Total Weight	142	lbs
Pressure Drop	2.2	in wc	Space Velocity	101117	GHSV			

Inlet Emissions

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd	ppmvd%O2
NOx	0.50	1.52	6.67	65.33	72.85	39.56
CO	2.51	7.64	33.47	538.69	600.64	326.16
VOC	1.04	3.16	13.87	141.77	158.07	85.84
H2CO	0.38	1.16	5.07	76.07	84.81	46.06

Target Emissions

	min %DRE	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd	ppmvd%O2
NOx	0.00	0.50	1.52	6.67	65.33	72.85	39.56
CO	80.08	0.50	1.52	6.67	107.31	119.65	64.97
VOC	32.69	0.70	2.13	9.33	95.42	106.39	57.77
H2CO	79.47	0.08	0.24	1.04	15.61	17.41	9.45

Emissions with Catalyst

	%DRE	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd	ppmvd%O2
NOx	0.00	<0.50	<1.52	<6.67	<65.33	<72.85	<39.56
CO	80.08	<0.50	<1.52	<6.67	<107.31	<119.65	<64.97
VOC	32.69	<0.70	<2.13	<9.33	<95.42	<106.39	<57.77
H2CO	79.47	<0.08	<0.24	<1.04	<15.61	<17.41	<9.45

Safety Value: 2 VOC Molecular Weight: 44.1 O2 Reference Value: 15 Uptime (TPY): 100% (8760 hours)

ICE CATALYST SIZING PROGRAM

rev 2.1.3

Report Date: 4/23/2024

POWERTHERM MAXIM SILENCERS

Customer	Kodiak	Housing	
Sales Person	MG	Element	APXP-OX-SQ-1500-3600-350
Project	Big Lizard G3606A4	Contact	Joe Servantes
Engine Name	Caterpillar G3606 A4 Caterpillar G3606 A4		

Engine Power	1875.0	BHP	ACFM	12100.0	CU. FT/MIN	Exhaust O2	11.3	%
Exhaust Mass Flow	21837.0	LBS/HR	ACFH	726000	CU. FT/HR	Exhaust CO2	6.4	%
Process Temperature	820.0	F	SCFM	4923.4	CU. FT/MIN	Exhaust H2O	11.6	%
Exhaust Pressure	14.5	PSI	SCFH	295404	CU. FT/HR	Exhaust N2	70.7	%
Exhaust Density	0.0301	LBS/FT^3	Std Temp	68.0	F	Max Pressure Drop	12.0	in wc
Molecular Weight	28.49	AMU	Std Pressure	14.6959	PSI	Propane in Fuel	5.87	%

ACS Part Name	R14.875X35.875X3.500-400				
OEM Part Name	ERZ-1536-3-400				
Type	Propane Oxidation	Layers	1		
Geometry	Rectangular	Modules/Layer	3	Cell Count	400cpsi
X	14.875in	Guard Bed	No	Depth	3.500in
Y	35.875in				

Open Area	10.081	ft^2	Part Volume	0.980	ft^3	Part Weight	70	lbs
Linear Velocity	1200	ft/min	Total Volume	2.940	ft^3	Total Weight	209	lbs
Pressure Drop	2.1	in wc	Space Velocity	100467	GHSV			

Inlet Emissions

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd	ppmvd%O2
NOx	0.30	1.24	5.44	35.16	39.77	28.91
CO	2.91	12.03	52.72	560.18	633.69	460.60
VOC	1.21	5.00	21.92	147.94	167.36	121.64
H2CO	0.19	0.79	3.44	34.11	38.59	28.05

Target Emissions

	min %DRE	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd	ppmvd%O2
NOx	0.00	0.50	2.07	9.06	58.60	66.29	48.18
CO	82.82	0.50	2.07	9.06	96.25	108.88	79.14
VOC	42.15	0.70	2.89	12.68	85.59	96.82	70.37
H2CO	78.95	0.04	0.17	0.72	7.18	8.12	5.91

Emissions with Catalyst

	%DRE	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd	ppmvd%O2
NOx	0.00	<0.50	<2.07	<9.06	<58.60	<66.29	<48.18
CO	82.82	<0.50	<2.07	<9.06	<96.25	<108.88	<79.14
VOC	42.15	<0.70	<2.89	<12.68	<85.59	<96.82	<70.37
H2CO	78.95	<0.04	<0.17	<0.72	<7.18	<8.12	<5.91

Safety Value: 2 VOC Molecular Weight: 44.1 O2 Reference Value: 15 Uptime (TPY): 100% (8760 hours)

ICE CATALYST SIZING PROGRAM

rev 2.1.3

Report Date: 4/23/2024

Customer Kodiak
Sales Person MG
Project Big Lizard G3608A4
Engine Name Caterpillar G3608 2500 BHP @ 1000 RPM

Housing
Element APXP-OX-SQ-1500-3600-350
Contact Joe Servantes

Engine Power	2500.0	BHP	ACFM	16249.0	CU. FT/MIN	Exhaust O2	11.6	%
Exhaust Mass Flow	29789.0	LBS/HR	ACFH	974940	CU. FT/HR	Exhaust CO2	6.4	%
Process Temperature	800.0	F	SCFM	6716.6	CU. FT/MIN	Exhaust H2O	11.1	%
Exhaust Pressure	14.5	PSI	SCFH	402994	CU. FT/HR	Exhaust N2	70.9	%
Exhaust Density	0.0306	LBS/FT^3	Std Temp	68.0	F	Max Pressure Drop	12.0	in wc
Molecular Weight	28.49	AMU	Std Pressure	14.6959	PSI	Propane in Fuel	5.87	%

ACS Part Name R14.875X35.875X3.500-400
OEM Part Name ERZ-1536-3-400
Type Propane Oxidation
Geometry Rectangular
X 14.875in
Y 35.875in

Layers 1
Modules/Layer 3
Guard Bed No

Cell Count 400cpsi
Depth 3.500in

Open Area	10.081	ft^2	Part Volume	0.980	ft^3	Part Weight	70	lbs
Linear Velocity	1612	ft/min	Total Volume	2.940	ft^3	Total Weight	209	lbs
Pressure Drop	2.8	in wc	Space Velocity	137058	GHSV			

Inlet Emissions

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd	ppmvd%O2
NOx	0.30	1.65	7.25	34.37	38.66	29.06
CO	3.03	16.70	73.20	570.08	641.34	482.03
VOC	0.70	3.86	16.91	83.65	94.11	70.73
H2CO	0.12	0.66	2.90	21.06	23.69	17.81

Target Emissions

	min %DRE	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd	ppmvd%O2
NOx	0.00	0.50	2.76	12.08	57.28	64.44	48.43
CO	83.50	0.50	2.76	12.08	94.07	105.83	79.54
VOC	0.00	0.70	3.86	16.91	83.65	94.11	70.73
H2CO	61.67	0.05	0.25	1.11	8.07	9.08	6.83

Emissions with Catalyst

	%DRE	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd	ppmvd%O2
NOx	0.00	<0.50	<2.76	<12.08	<57.28	<64.44	<48.43
CO	83.50	<0.50	<2.76	<12.08	<94.07	<105.83	<79.54
VOC	0.00	<0.70	<3.86	<16.91	<83.65	<94.11	<70.73
H2CO	61.67	<0.05	<0.25	<1.11	<8.07	<9.08	<6.83

Safety Value: 2 VOC Molecular Weight: 44.1 O2 Reference Value: 15 Uptime (TPY): 100% (8760 hours)

Design Data Sheet

Process Design Conditions

Waste Flare Stream	Flow Rate *(MMSCFD)*	Molecular Weight	Lower Heating Value *(Btu/SCF)*	Inlet Pressure *(psig)*	Temp. *(F)*
Maximum Design Flow	3.4	42	27	5	Amb.
Assist Gas	0.65*	21	1100	5	Amb.
*Assist gas is needed to raise the heating value to above 200 Btu/SCF to achieve proper combustion. Hero experience is that high CO2 applications often perform better when the heating value is raised between 200 and 300 Btu/SCF.					

Utilities Required

Pilot Gas (per pilot)	Natural Gas; 55 scfh @ 18 psig / Propane: 25 scfh @ 9 psig (Clean, dry gas)
Plant Air	No Plant Air Required
Electricity	120V / 1 Phase / 10 Amps is required to operate pilot ignition system
Blowers	Electric: No blower required Blower Size:N/A

Mechanical

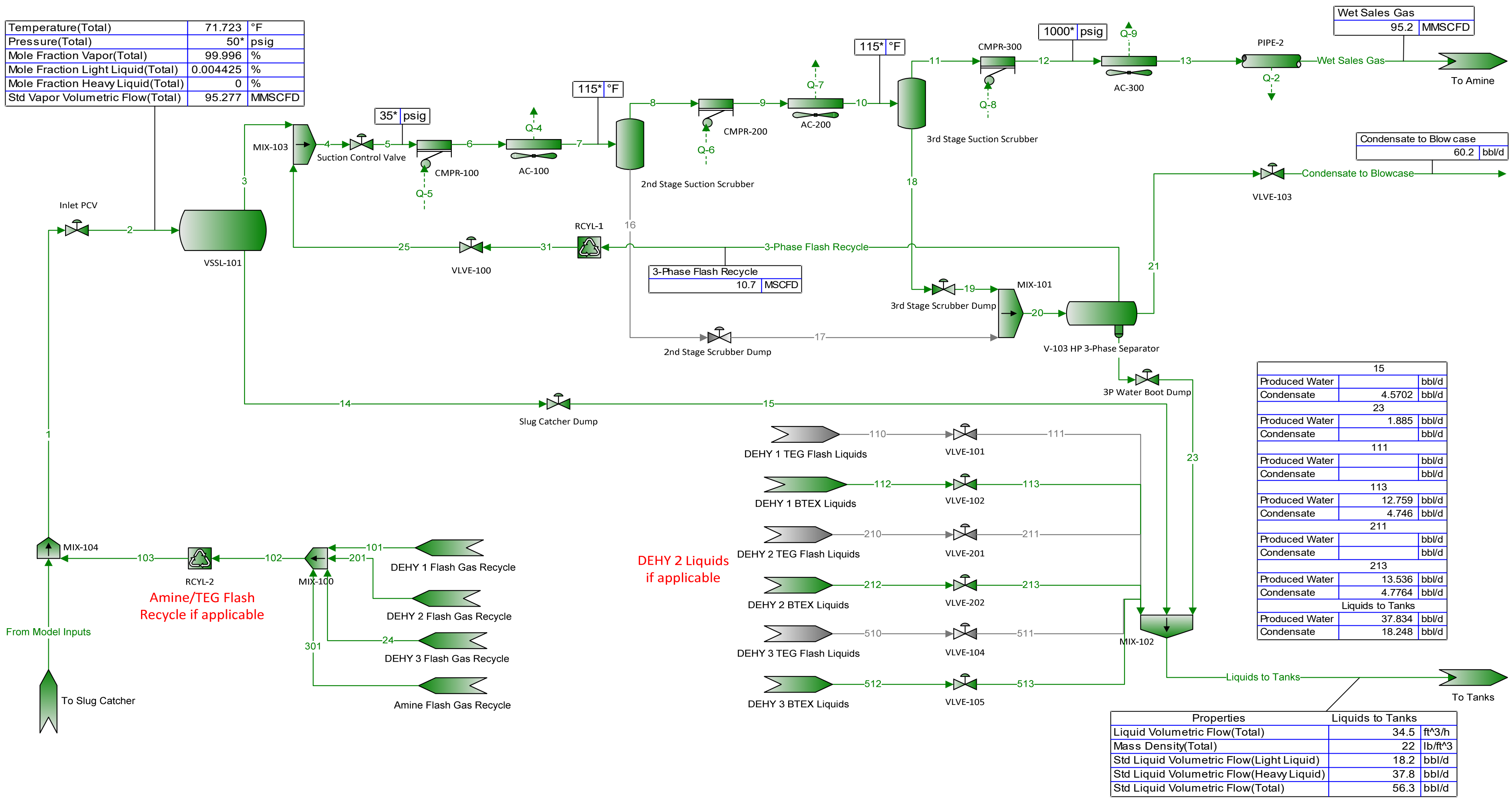
Design Wind Speed	120 mph ASCE 7-10
Site Conditions	Temp: 0 to 120ºF Elevation: 14.0 Psia
Corrosion Allowance	1/16" (standard)
Electrical Area	Non-classified area
Control Panel Type	Nema 4 (Painted)
Blower Motor	No blower included with this offer

Emission & Performance Guarantees

Destruction	98% or greater hydrocarbon destruction efficiency will be achieved
Stability	Flare will be stable over the entire operating range
Smokeless Rate	100% Smokeless
Max Radiation	Less than 500 Btu/hr/SF at normal & 1500 Btu/hr at max flow rates
Tip Velocity	Meets EPA regulations over normal operating range

Flare Construction

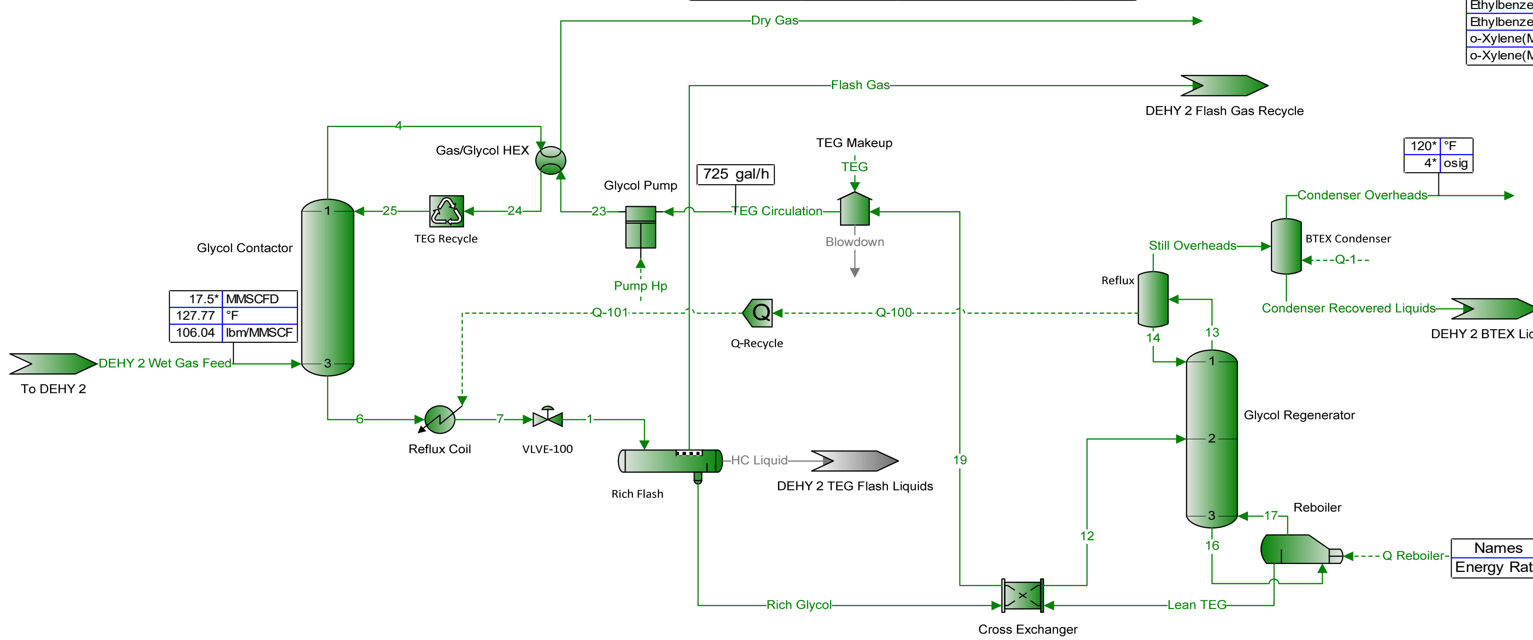
Component	**Dimension**	**Material**	**Connection @ Joints**	**Field Connection**	**Connection Elevation**
Flare Stack (Height)	20'	A-36/A53B	Full Pen. Buttweld		
Flare Tip	18"	304SS	Full Pen.	integral	---
Waste Gas Conn.	6" *(rev 1)*	CS	---	150# RFSO	6'
Pilots	~10' Long	Stainless Steel	NPT / SW	---	flare tip
Pilot Gas Supply Line	3/8"	SS tubing or SS flexhose	Swagelok	NPT at regulator	2.5'


Temperature(Total) 71.723 °F
Pressure(Total) 50* psig
Mole Fraction Vapor(Total) 99.996 %
Mole Fraction Light Liquid(Total) 0.004425 %
Mole Fraction Heavy Liquid(Total) 0 %
Std Vapor Volumetric Flow(Total) 95.277 MMSCFD
Inlet PCV
VSSL-101
MIX-103
Suction Control Valve
35* psig
CMPR-100
Q-5
AC-100
Q-4
115* °F
2nd Stage Suction Scrubber
CMPR-200
Q-6
AC-200
Q-7
115* °F
3rd Stage Suction Scrubber
CMPR-300
Q-8
1000* psig
AC-300
Q-9
PIPE-2
Q-2
Wet Sales Gas
Wet Sales Gas 95.2 MMSCFD
To Amine
Condensate to Blow case 60.2 bbl/d
Condensate to Blowcase
VLVE-103
RCYL-1
VLVE-100
3-Phase Flash Recycle
3-Phase Flash Recycle 10.7 MSCFD
3rd Stage Scrubber Dump
MIX-101
V-103 HP 3-Phase Separator
2nd Stage Scrubber Dump
3P Water Boot Dump
Slug Catcher Dump
15: Produced Water bbl/d; Condensate 4.5702 bbl/d
23: Produced Water 1.885 bbl/d; Condensate bbl/d
111: Produced Water bbl/d; Condensate bbl/d
113: Produced Water 12.759 bbl/d; Condensate 4.746 bbl/d
211: Produced Water bbl/d; Condensate bbl/d
213: Produced Water 13.536 bbl/d; Condensate 4.7764 bbl/d
Liquids to Tanks: Produced Water 37.834 bbl/d; Condensate 18.248 bbl/d
DEHY 1 TEG Flash Liquids
VLVE-101
DEHY 1 BTEX Liquids
VLVE-102
DEHY 2 TEG Flash Liquids
VLVE-201
DEHY 2 BTEX Liquids
VLVE-202
DEHY 3 TEG Flash Liquids
VLVE-104
DEHY 3 BTEX Liquids
VLVE-105
DEHY 2 Liquids if applicable
MIX-102
Liquids to Tanks
To Tanks
Properties / Liquids to Tanks
Liquid Volumetric Flow(Total) 34.5 ft^3/h
Mass Density(Total) 22 lb/ft^3
Std Liquid Volumetric Flow(Light Liquid) 18.2 bbl/d
Std Liquid Volumetric Flow(Heavy Liquid) 37.8 bbl/d
Std Liquid Volumetric Flow(Total) 56.3 bbl/d
MIX-104
RCYL-2
Amine/TEG Flash Recycle if applicable
MIX-100
DEHY 1 Flash Gas Recycle
DEHY 2 Flash Gas Recycle
DEHY 3 Flash Gas Recycle
Amine Flash Gas Recycle
From Model Inputs
To Slug Catcher

Names	Units	Condenser Overheads
Temperature	°F	120*
Pressure	psig	0.25*
Molecular Weight	lb/lbmol	51.74
Std Vapor Volumetric Flow	MMSCFD	0.006979
Net Ideal Gas Heating Value	Btu/ft^3	2395
H2S(Mole Fraction)	%	0.00074324
CO2(Mole Fraction)	%	6.3973
H2S(Mass Flow)	lb/h	0.0001941
H2S(Mass Flow)	ton/yr	0.00085017
Benzene(Mass Flow)	lb/h	0
Benzene(Mass Flow)	ton/yr	0
Toluene(Mass Flow)	lb/h	0.3286
Toluene(Mass Flow)	ton/yr	1.4393
Ethylbenzene(Mass Flow)	lb/h	0.13554
Ethylbenzene(Mass Flow)	ton/yr	0.59368
o-Xylene(Mass Flow)	lb/h	0.36527
o-Xylene(Mass Flow)	ton/yr	1.5999

Names	Units	Still Overheads		Still Overheads		Condenser Overheads		Condenser Overheads		Flash Gas		Flash Gas	
Mass Flow Sum	lb/h	(HAPs)	11.78	(VOCs)	78.26	(VOCs)	32.36	(HAPs)	2.532	(HAPs)	1.305	(VOCs)	41.94
Mass Flow Sum	ton/yr	(HAPs)	51.59	(VOCs)	342.8	(VOCs)	141.7	(HAPs)	11.09	(HAPs)	5.715	(VOCs)	183.7

Names	Units	DEHY 2 Wet Gas Feed	Dry Gas
Water Content	lbm/MMSCF	106	5.586



Names	Units	Q Reboiler	Q-100
Energy Rate	MMBtu/h	0.6261	0.01007

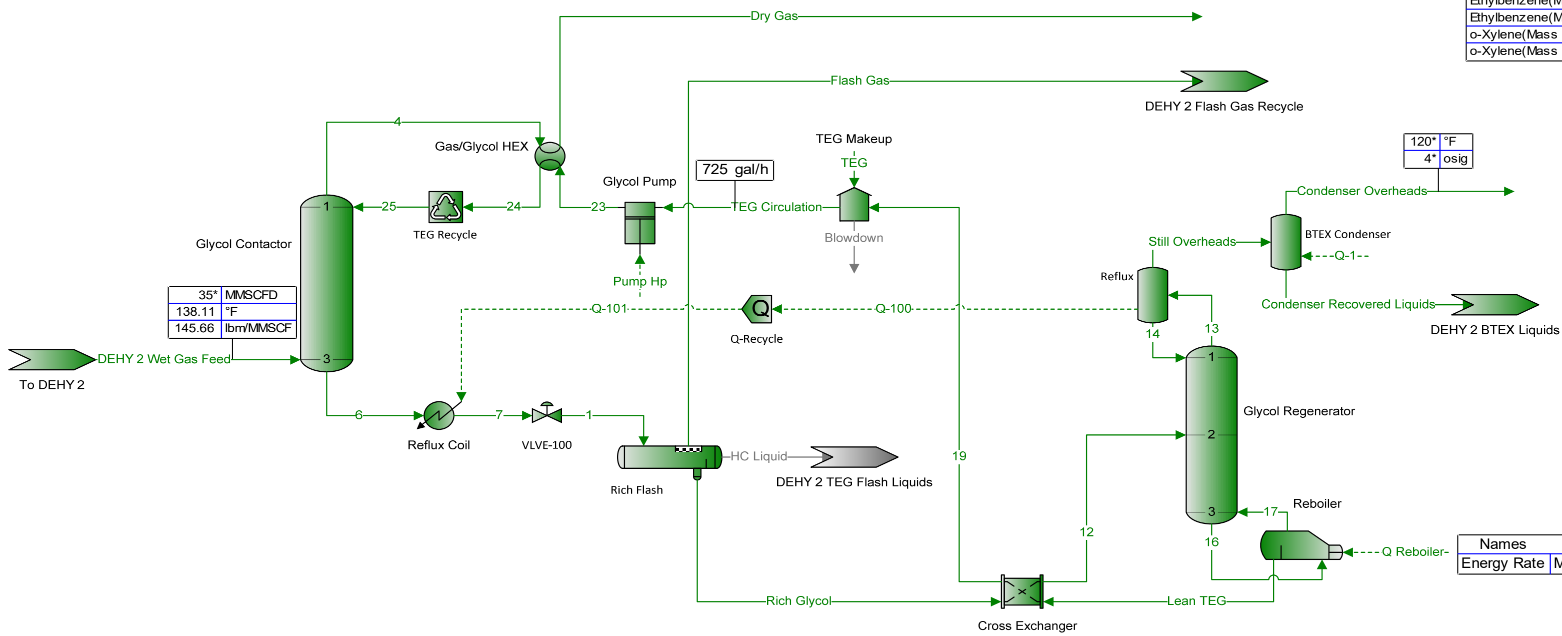
Names	Units	Dry Gas	Flash Gas	Still Overheads	Condenser Overheads	Condenser Recovered Liquids
H2S(Mass Flow)	lb/h	0.00844	9.59e-05	0.000198	0.000194	4.17e-06
H2S(Mass Flow)	lb/h	0.00844	9.59e-05	0.000198	0.000194	4.17e-06
Benzene(Mass Flow)	lb/h	0	0	0	0	0
Benzene(Mass Flow)	lb/h	0	0	0	0	0
Toluene(Mass Flow)	lb/h	2.52	0.0221	1.54	0.329	1.21
Toluene(Mass Flow)	lb/h	2.52	0.0221	1.54	0.329	1.21
Ethylbenzene(Mass Flow)	lb/h	1.76	0.014	1.56	0.136	1.42
Ethylbenzene(Mass Flow)	lb/h	1.76	0.014	1.56	0.136	1.42
o-Xylene(Mass Flow)	lb/h	4.72	0.0366	5.31	0.365	4.95
o-Xylene(Mass Flow)	lb/h	4.72	0.0366	5.31	0.365	4.95

Names	Units	Still Overheads	Condenser Recovered Liquids	Condenser Overheads
Temperature	°F	195	120	120*
Pressure	psig	0.5	0.25	0.25*
Volume Fraction Vapor	%	100	0	100
Volume Fraction Light Liquid	%	0	46.2	0
Volume Fraction Heavy Liquid	%	0	53.8	0
Molecular Weight	lb/lbmol	30.3	26.5	51.7
Mass Flow	lb/h	157	117	39.6
Std Vapor Volumetric Flow	MMSCFD	0.0471	0.0402	0.00698
Std Liquid Volumetric Flow	sgpm	0.393	0.262	0.131
Specific Gravity		1.05	0.877	1.79
API Gravity			26.1	

Names	Units	Condenser Overheads
Temperature	°F	120*
Pressure	psig	0.25*
Molecular Weight	lb/lbmol	49.99
Std Vapor Volumetric Flow	MMSCFD	0.006489
Net Ideal Gas Heating Value	Btu/ft^3	2216
H2S(Mole Fraction)	%	0.008621
CO2(Mole Fraction)	%	10.461
H2S(Mass Flow)	lb/h	0.0020934
H2S(Mass Flow)	ton/yr	0.0091692
Benzene(Mass Flow)	lb/h	0
Benzene(Mass Flow)	ton/yr	0
Toluene(Mass Flow)	lb/h	0.26014
Toluene(Mass Flow)	ton/yr	1.1394
Ethylbenzene(Mass Flow)	lb/h	0.11029
Ethylbenzene(Mass Flow)	ton/yr	0.48308
o-Xylene(Mass Flow)	lb/h	0.32552
o-Xylene(Mass Flow)	ton/yr	1.4258

Names	Units	Still Overheads		Still Overheads		Condenser Overheads		Condenser Overheads		Flash Gas		Flash Gas	
Mass Flow Sum	lb/h	(HAPs)	12.28	(VOCs)	81.96	(VOCs)	27.46	(HAPs)	2.096	(HAPs)	1.474	(VOCs)	44.25
Mass Flow Sum	ton/yr	(HAPs)	53.78	(VOCs)	359	(VOCs)	120.3	(HAPs)	9.182	(HAPs)	6.455	(VOCs)	193.8

Names	Units	DEHY 2 Wet Gas Feed	Dry Gas
Water Content	lbm/MMSCF	145.7	8.31



Names	Units	Q Reboiler	Q-100
Energy Rate	MMBtu/h	0.7586	0.02202

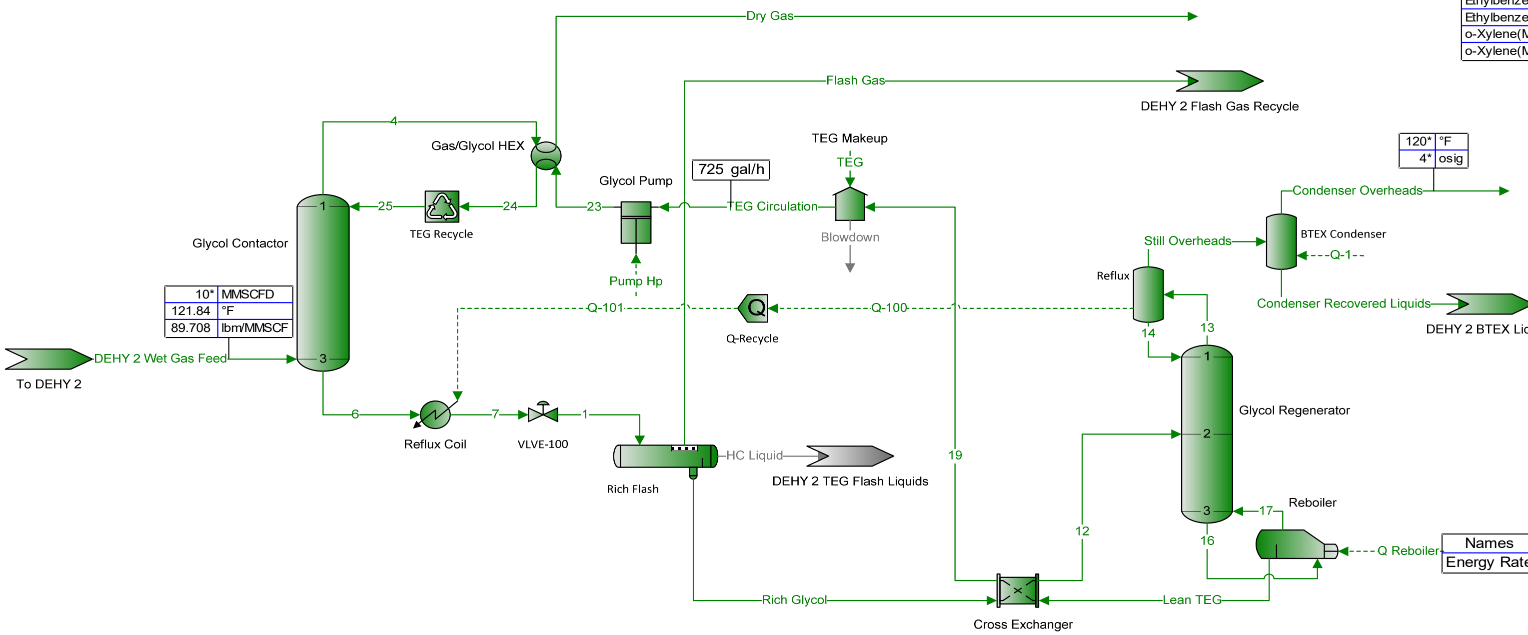
Names	Units	Dry Gas	Flash Gas	Still Overheads	Condenser Overheads	Condenser Recovered Liquids
H2S(Mass Flow)	lb/h	0.201	0.0012	0.00217	0.00209	7.44e-05
H2S(Mass Flow)	lb/h	0.201	0.0012	0.00217	0.00209	7.44e-05
Benzene(Mass Flow)	lb/h	0	0	0	0	0
Benzene(Mass Flow)	lb/h	0	0	0	0	0
Toluene(Mass Flow)	lb/h	6.89	0.029	1.51	0.26	1.25
Toluene(Mass Flow)	lb/h	6.89	0.029	1.51	0.26	1.25
Ethylbenzene(Mass Flow)	lb/h	5.05	0.0189	1.61	0.11	1.5
Ethylbenzene(Mass Flow)	lb/h	5.05	0.0189	1.61	0.11	1.5
o-Xylene(Mass Flow)	lb/h	14.3	0.0526	6.1	0.326	5.77
o-Xylene(Mass Flow)	lb/h	14.3	0.0526	6.1	0.326	5.77

Names	Units	Still Overheads	Condenser Recovered Liquids	Condenser Overheads
Temperature	°F	202	120	120*
Pressure	psig	0.5	0.25	0.25*
Volume Fraction Vapor	%	100	0	100
Volume Fraction Light Liquid	%	0	26.5	0
Volume Fraction Heavy Liquid	%	0	73.5	0
Molecular Weight	lb/lbmol	23.6	21.9	50
Mass Flow	lb/h	288	252	35.6
Std Vapor Volumetric Flow	MMSCFD	0.111	0.105	0.00649
Std Liquid Volumetric Flow	sgpm	0.652	0.534	0.118
Specific Gravity		0.813	0.928	1.73
API Gravity			18.2	

Names	Units	Still Overheads		Still Overheads		Condenser Overheads		Condenser Overheads		Flash Gas		Flash Gas	
Mass Flow Sum	lb/h	(HAPs)	8.613	(VOCs)	73.38	(VOCs)	36.38	(HAPs)	2.667	(HAPs)	1.207	(VOCs)	40.78
Mass Flow Sum	ton/yr	(HAPs)	37.73	(VOCs)	321.4	(VOCs)	159.4	(HAPs)	11.68	(HAPs)	5.287	(VOCs)	178.6

Names	Units	Condenser Overheads
Temperature	°F	120*
Pressure	psig	0.25*
Molecular Weight	lb/lbmol	53.09
Std Vapor Volumetric Flow	MMSCFD	0.007369
Net Ideal Gas Heating Value	Btu/ft^3	2529
H2S(Mole Fraction)	%	0.0010634
CO2(Mole Fraction)	%	3.4755
H2S(Mass Flow)	lb/h	0.00029323
H2S(Mass Flow)	ton/yr	0.0012843
Benzene(Mass Flow)	lb/h	0
Benzene(Mass Flow)	ton/yr	0
Toluene(Mass Flow)	lb/h	0.29462
Toluene(Mass Flow)	ton/yr	1.2904
Ethylbenzene(Mass Flow)	lb/h	0.119
Ethylbenzene(Mass Flow)	ton/yr	0.52122
o-Xylene(Mass Flow)	lb/h	0.26801
o-Xylene(Mass Flow)	ton/yr	1.1739

Names	Units	DEHY 2 Wet Gas Feed	Dry Gas
Water Content	lbm/MMSCF	89.71	4.739

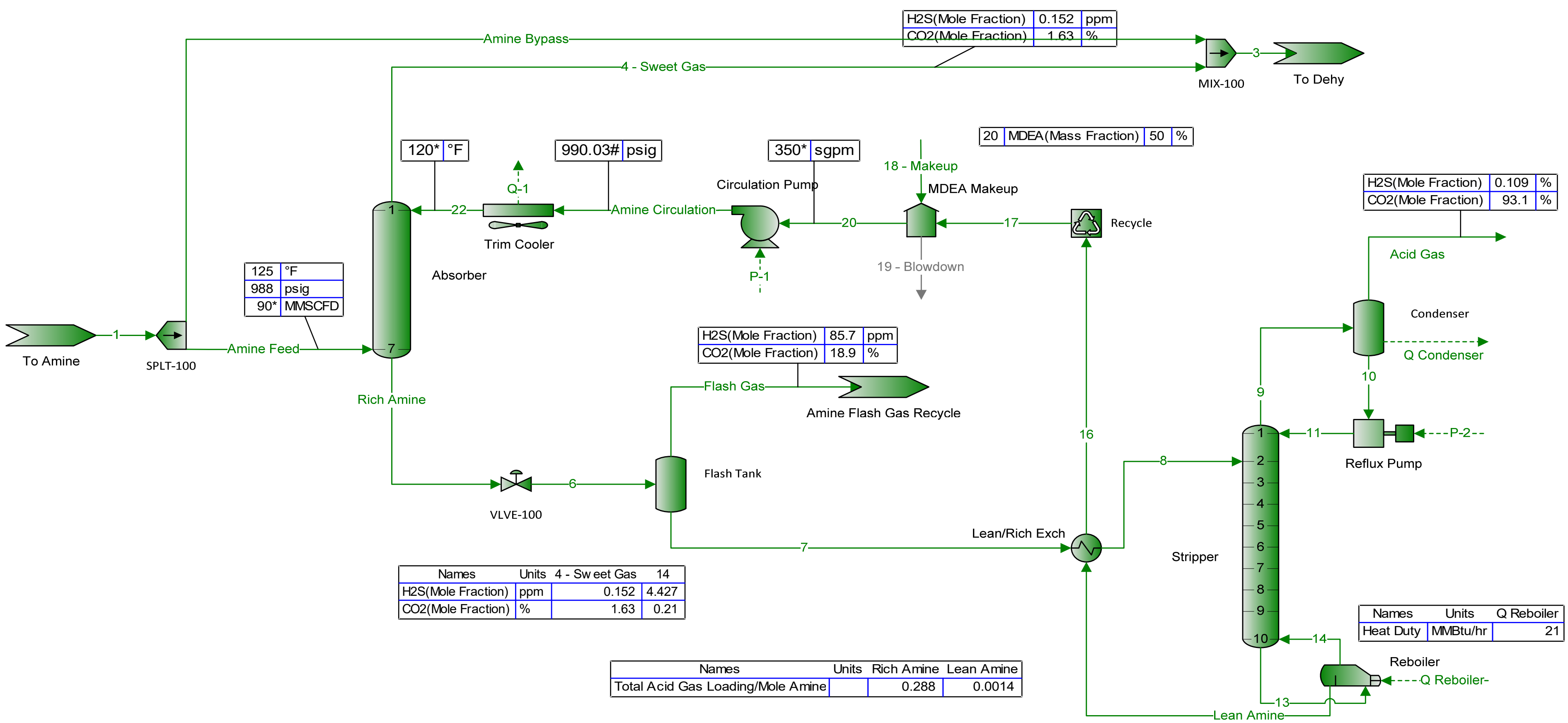


Names	Units	Q Reboiler	Q-100
Energy Rate	MMBtu/h	0.5861	0.006831

Names	Units	Dry Gas	Flash Gas	Still Overheads	Condenser Overheads	Condenser Recovered Liquids
H2S(Mass Flow)	lb/h	0.00669	0.000133	0.000298	0.000293	4.31e-06
H2S(Mass Flow)	lb/h	0.00669	0.000133	0.000298	0.000293	4.31e-06
Benzene(Mass Flow)	lb/h	0	0	0	0	0
Benzene(Mass Flow)	lb/h	0	0	0	0	0
Toluene(Mass Flow)	lb/h	0.758	0.014	1.11	0.295	0.81
Toluene(Mass Flow)	lb/h	0.758	0.014	1.11	0.295	0.81
Ethylbenzene(Mass Flow)	lb/h	0.583	0.00888	1.05	0.119	0.927
Ethylbenzene(Mass Flow)	lb/h	0.583	0.00888	1.05	0.119	0.927
o-Xylene(Mass Flow)	lb/h	1.55	0.0203	2.93	0.268	2.67
o-Xylene(Mass Flow)	lb/h	1.55	0.0203	2.93	0.268	2.67

Names	Units	Still Overheads	Condenser Recovered Liquids	Condenser Overheads
Temperature	°F	186	120	120*
Pressure	psig	0.5	0.25	0.25*
Volume Fraction Vapor	%	100	0	100
Volume Fraction Light Liquid	%	0	60.1	0
Volume Fraction Heavy Liquid	%	0	39.9	0
Molecular Weight	lb/lbmol	37.3	31.6	53.1
Mass Flow	lb/h	113	70.4	43
Std Vapor Volumetric Flow	MMSCFD	0.0277	0.0203	0.00737
Std Liquid Volumetric Flow	sgpm	0.307	0.165	0.142
Specific Gravity		1.29	0.833	1.83
API Gravity			33.6	

Names	Units	Acid Gas		Acid Gas		Flash Gas		Flash Gas	
Mass Flow Sum	lb/h	(HAPs)	5.1792	(VOCs)	11.223	(HAPs)	0.89629	(VOCs)	47.704
Mass Flow Sum	ton/yr	(HAPs)	22.685	(VOCs)	49.159	(HAPs)	3.9257	(VOCs)	208.94

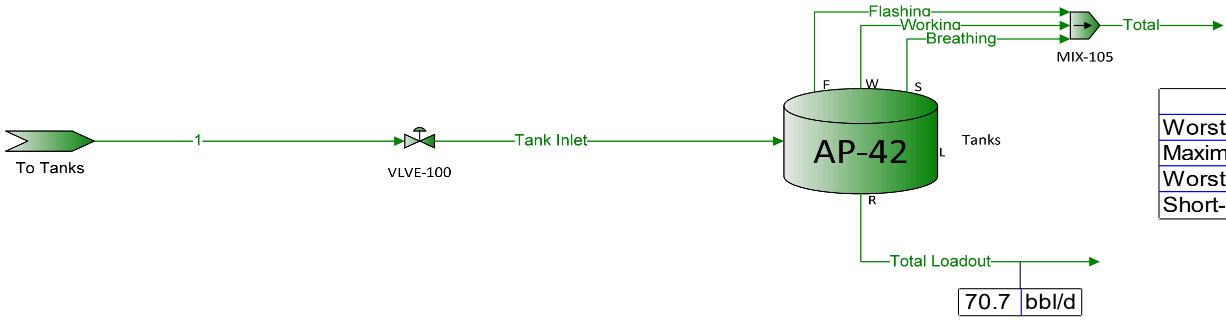


Names	Units	4 - Sweet Gas	14
H2S(Mole Fraction)	ppm	0.152	4.427
CO2(Mole Fraction)	%	1.63	0.21

Names	Units	Rich Amine	Lean Amine
Total Acid Gas Loading/Mole Amine		0.288	0.0014

Names	Units	Q Reboiler
Heat Duty	MMBtu/hr	21

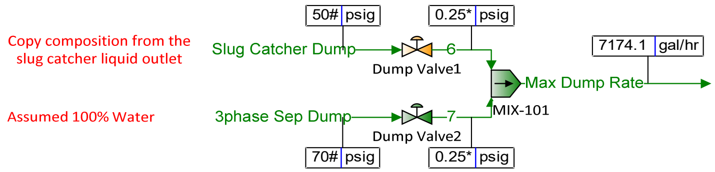
Names	Units	Flashing	Working	Breathing	Total
VOCs	ton/yr	3.5885	2.5329	3.4705	9.5919
Total	ton/yr	5.973	3.653	5.0052	14.631



Tanks		
Worst-Case Liquid Surface Temperature	95	°F
Maximum Battery Filling Rate	7174.1#	gal/hr
Worst Case Flashing Losses (VOCs)	142.64	lb/h
Short-Term Working Losses (VOCs)	80.542	lb/h

Total Loadout		
Produced Water	46.84	bbl/d
Condensate	23.857	bbl/d

Calculated Max Hourly Liquid Dump Rates



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EXTENDED GAS REPORT
SUMMARY OF CHROMATOGRAPHIC ANALYSIS

Sample Name:	Supreme Station Inlet		**For:**	18958G
Sample Date:	10/27/2023		**Cyl. Ident.:**	2023078002
Sampled By:	DJ		**Company:**	Targa
Time Sampled:	09:35		**Analysis Date:**	10/27/2023
Sample Temp:	76 F		**Analysis By:**	BH
Sample Press:	72 psi	**H2S (PPM)** = 2.0	**Data File:**	LS1_0012.D

Component	Mole%	GPM REAL	GPM IDEAL
H2S	0.000		
Nitrogen	1.812		
Methane	70.849		
CO2	3.676		
Ethane	10.753	2.875	2.868
Propane	5.932	1.634	1.630
Isobutane	0.886	0.290	0.289
N-Butane	2.134	0.673	0.671
Isopentane	0.626	0.229	0.228
N-Pentane	0.690	0.250	0.249
Hexanes+	2.642	1.196	1.194
Total	100.000	7.147	7.129

CALCULATED PARAMETERS

TOTAL ANALYSIS SUMMARY

MOLE WT:	24.807
VAPOR PRESS PSIA:	3641.7
SPECIFIC GRAVITY	
AIR = 1 (REAL):	0.8602
AIR = 1 (IDEAL):	0.8564
H2O = 1 (IDEAL):	0.395
REPORTED BASIS:	14.73
Unnormalized Total:	96.400

HEATING VALUE

BTU/CUFT (DRY)	1365.0
BTU/CUFT (WET)	1341.9

BTEX SUMMARY

WT% BENZENE	3.210
WT% TOLUENE	0.362
WT% E BENZENE	0.499
WT% XYLENES	1.882

LAB MANAGER

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Sample Name: Supreme Station Inlet
Company: Targa

Data File: LS1_0012.D

*ANALYSIS OF HEXANES PLUS

Component	MOLE%	WT%
2,2 DIMETHYL BUTANE	0.008	0.028
CYCLOPENTANE	0.063	0.198
2-METHYLPENTANE	0.204	0.708
3-METHYLPENTANE	0.115	0.400
HEXANE (C6)	0.276	0.970
DIMETHYLPENTANES	0.000	0.000
METHYLCYCLOPENTANE	0.000	0.000
2,2,3 TRIMETHYLBUTANE	0.109	0.440
BENZENE	0.000	0.000
CYCLOHEXANE	0.124	0.422
2-METHYLHEXANE	0.003	0.012
3-METHYLHEXANE	0.234	0.944
DIMETHYCYCLOPENTANES	0.056	0.220
HEPTANE (C7)	0.034	0.137
METHYLCYCLOHEXANE	0.158	0.629
2,5 DIMETHYLHEXANE	0.000	0.000
TOLUENE	0.008	0.032
2-METHYLHEPTANE	0.000	0.000
OTHER OCTANES	0.473	2.164
OCTANE (C8)	0.075	0.346
ETHYLCYCLOHEXANE	0.114	0.514
ETHYL BENZENE	0.013	0.054
M,P-XYLENE	0.000	0.000
O-XYLENE	0.049	0.212
OTHER NONANES	0.054	0.276
NONANE (C-9)	0.000	0.000
IC3 BENZENE	0.000	0.000
CYCLOOCTANE	0.126	0.606
NC3 BENZENE	0.030	0.145
TM BENZENE(S)	0.001	0.007
IC4 BENZENE	0.013	0.071
NC4 BENZENE	0.001	0.007
DECANES + (C10+)	0.210	1.186

*HEXANES PLUS SUMMARY

AVG MOLE WT	104.545
VAPOR PRESS PSIA	9.860
API GRAVITY @ 60F	54.4
SPECIFIC GRAVITY	
AIR = 1 (IDEAL):	2.975
H2O = 1 (IDEAL):	0.761

COMPONENT RATIOS

HEXANES	(C6)	MOLE%	25.327
HEPTANES	(C7)	MOLE%	24.626
OCTANES	(C8)	MOLE%	27.046
NONANES	(C9)	MOLE%	8.679
DECANES+	(C10+)	MOLE%	14.322
HEXANES	(C6)	WT%	20.692
HEPTANES	(C7)	WT%	23.194
OCTANES	(C8)	WT%	28.471
NONANES	(C9)	WT%	9.476
DECANES+	(C10+)	WT%	18.167

Remarks: NR=NOT REPORTED ON FIELD TAG

* Hexane+ portion calculated by Allocation Process

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 1b/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-Methylcholanthrene[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.

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:

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

[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

h = heating value of natural gas (assume 1020 Btu/scf at 60°F).

[e] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content in natural gas of 2,000 gr/10^6scf.

[f] Emission factor for TOC is based on measured emission levels from 22 source tests.

[g] Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor. Measured emission factor for methane compares well with the calculated emission factor, 1.31 lb/MMBtu vs. 1.25 lb/MMBtu, respectively.

[h] VOC emission factor is based on the sum of the emission factors for all speciated organic compounds less ethane and methane.

[i] Considered ≤ 1 μm in aerodynamic diameter. Therefore, for filterable PM emissions, PM10(filterable) = PM2.5(filterable).

[j] PM Condensable = PM Condensable Inorganic + PM-Condensable Organic

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

[l] For lean burn engines, aldehyde emissions quantification using CARB 430 may reflect interference with the sampling compounds due to the nitrogen concentration in the stack. The presented emission factor is based on FTIR measurements. Emissions data based on CARB 430 are available in the background report.

Table 3.3-1. EMISSION FACTORS FOR UNCONTROLLED GASOLINE AND DIESEL INDUSTRIAL ENGINES[a]

Pollutant	Gasoline Fuel (SCC 2-02-003-01, 2-03-003-01) Emission Factor (lb/hp-hr) (power output)	Gasoline Fuel Emission Factor (lb/MMBtu) (fuel input)	Diesel Fuel (SCC 2-02-001-02, 2-03-001-01) Emission Factor (lb/hp-hr) (power output)	Diesel Fuel Emission Factor (lb/MMBtu) (fuel input)	EMISSION FACTOR RATING
NO_x	0.011	1.63	0.031	4.41	D
CO	6.96 E-03[d]	0.99[d]	6.68 E-03	0.95	D
SO_x	5.91 E-04	0.084	2.05 E-03	0.29	D
PM-10[b]	7.21 E-04	0.10	2.20 E-03	0.31	D
CO_2[c]	1.08	154	1.15	164	B
Aldehydes	4.85 E-04	0.07	4.63 E-04	0.07	D
TOC					
Exhaust	0.015	2.10	2.47 E-03	0.35	D
Evaporative	6.61 E-04	0.09	0.00	0.00	E
Crankcase	4.85 E-03	0.69	4.41 E-05	0.01	E
Refueling	1.08 E-03	0.15	0.00	0.00	E

[a] References 2,5-6,9-14. When necessary, an average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr. To convert from lb/hp-hr to kg/kw-hr, multiply by 0.608. To convert from lb/MMBtu to ng/J, multiply by 430. SCC = Source Classification Code. TOC = total organic compounds.

[b] PM-10 = particulate matter less than or equal to 10 µm aerodynamic diameter. All particulate is assumed to be ≤ 1 µm in size.

[c] Assumes 99% conversion of carbon in fuel to CO_2 with 87 weight % carbon in diesel, 86 weight % carbon in gasoline, average BSFC of 7,000 Btu/hp-hr, diesel heating value of 19,300 Btu/lb, and gasoline heating value of 20,300 Btu/lb.

[d] Instead of 0.439 lb/hp-hr (power output) and 62.7 lb/mmBtu (fuel input), the correct emissions factors values are 6.96 E-03 lb/hp-hr (power output) and 0.99 lb/mmBtu (fuel input), respectively. This is an editorial correction. March 24, 2009

Table 3.3-2. SPECIATED ORGANIC COMPOUND EMISSION FACTORS FOR UNCONTROLLED DIESEL ENGINES[a]

EMISSION FACTOR RATING: E

Pollutant	Emission Factor (Fuel Input) (lb/MMBtu)
Benzene[b]	9.33 E-04
Toluene[b]	4.09 E-04
Xylenes[b]	2.85 E-04
Propylene	2.58 E-03
1,3-Butadiene[b,c]	<3.91 E-05
Formaldehyde[b]	1.18 E-03
Acetaldehyde[b]	7.67 E-04
Acrolein[b]	<9.25 E-05
Polycyclic aromatic hydrocarbons (PAH)	
Naphthalene[b]	8.48 E-05
Acenaphthylene	<5.06 E-06
Acenaphthene	<1.42 E-06
Fluorene	2.92 E-05
Phenanthrene	2.94 E-05
Anthracene	1.87 E-06
Fluoranthene	7.61 E-06
Pyrene	4.78 E-06
Benzo(a)anthracene	1.68 E-06
Chrysene	3.53 E-07
Benzo(b)fluoranthene	<9.91 E-08
Benzo(k)fluoranthene	<1.55 E-07
Benzo(a)pyrene	<1.88 E-07
Indeno(1,2,3-cd)pyrene	<3.75 E-07
Dibenz(a,h)anthracene	<5.83 E-07
Benzo(g,h,l)perylene	<4.89 E-07
TOTAL PAH	1.68 E-04

[a] Based on the uncontrolled levels of 2 diesel engines from References 6-7. Source Classification Codes 2-02-001-02, 2-03-001-01. To convert from lb/MMBtu to ng/J, multiply by 430.
[b] Hazardous air pollutant listed in the *Clean Air Act*.
[c] Based on data from 1 engine.

5.2 Transportation And Marketing Of Petroleum Liquids[1-3]

5.2.1 General

The transportation and marketing of petroleum liquids involve many distinct operations, each of which represents a potential source of evaporation loss. Crude oil is transported from production operations to a refinery by tankers, barges, rail tank cars, tank trucks, and pipelines. Refined petroleum products are conveyed to fuel marketing terminals and petrochemical industries by these same modes. From the fuel marketing terminals, the fuels are delivered by tank trucks to service stations, commercial accounts, and local bulk storage plants. The final destination for gasoline is usually a motor vehicle gasoline tank. Similar distribution paths exist for fuel oils and other petroleum products. A general depiction of these activities is shown in Figure 5.2-1.

5.2.2 Emissions And Controls

Evaporative emissions from the transportation and marketing of petroleum liquids may be considered, by storage equipment and mode of transportation used, in four categories:

1. Rail tank cars, tank trucks, and marine vessels: loading, transit, and ballasting losses.
2. Service stations: bulk fuel drop losses and underground tank breathing losses.
3. Motor vehicle tanks: refueling losses.
4. Large storage tanks: breathing, working, and standing storage losses. (See Chapter 7, "Liquid Storage Tanks".)

Evaporative and exhaust emissions are also associated with motor vehicle operation, and these topics are discussed in AP-42 *Volume II: Mobile Sources*.

5.2.2.1 Rail Tank Cars, Tank Trucks, And Marine Vessels -

Emissions from these sources are from loading losses, ballasting losses, and transit losses.

5.2.2.1.1 Loading Losses -

Loading losses are the primary source of evaporative emissions from rail tank car, tank truck, and marine vessel operations. Loading losses occur as organic vapors in "empty" cargo tanks are displaced to the atmosphere by the liquid being loaded into the tanks. These vapors are a composite of (1) vapors formed in the empty tank by evaporation of residual product from previous loads, (2) vapors transferred to the tank in vapor balance systems as product is being unloaded, and (3) vapors generated in the tank as the new product is being loaded. The quantity of evaporative losses from loading operations is, therefore, a function of the following parameters:

- Physical and chemical characteristics of the previous cargo;
- Method of unloading the previous cargo;
- Operations to transport the empty carrier to a loading terminal;
- Method of loading the new cargo; and
- Physical and chemical characteristics of the new cargo.

The principal methods of cargo carrier loading are illustrated in Figure 5.2-2, Figure 5.2-3, and Figure 5.2-4. In the splash loading method, the fill pipe dispensing the cargo is lowered only part way into the cargo tank. Significant turbulence and vapor/liquid contact occur during the splash

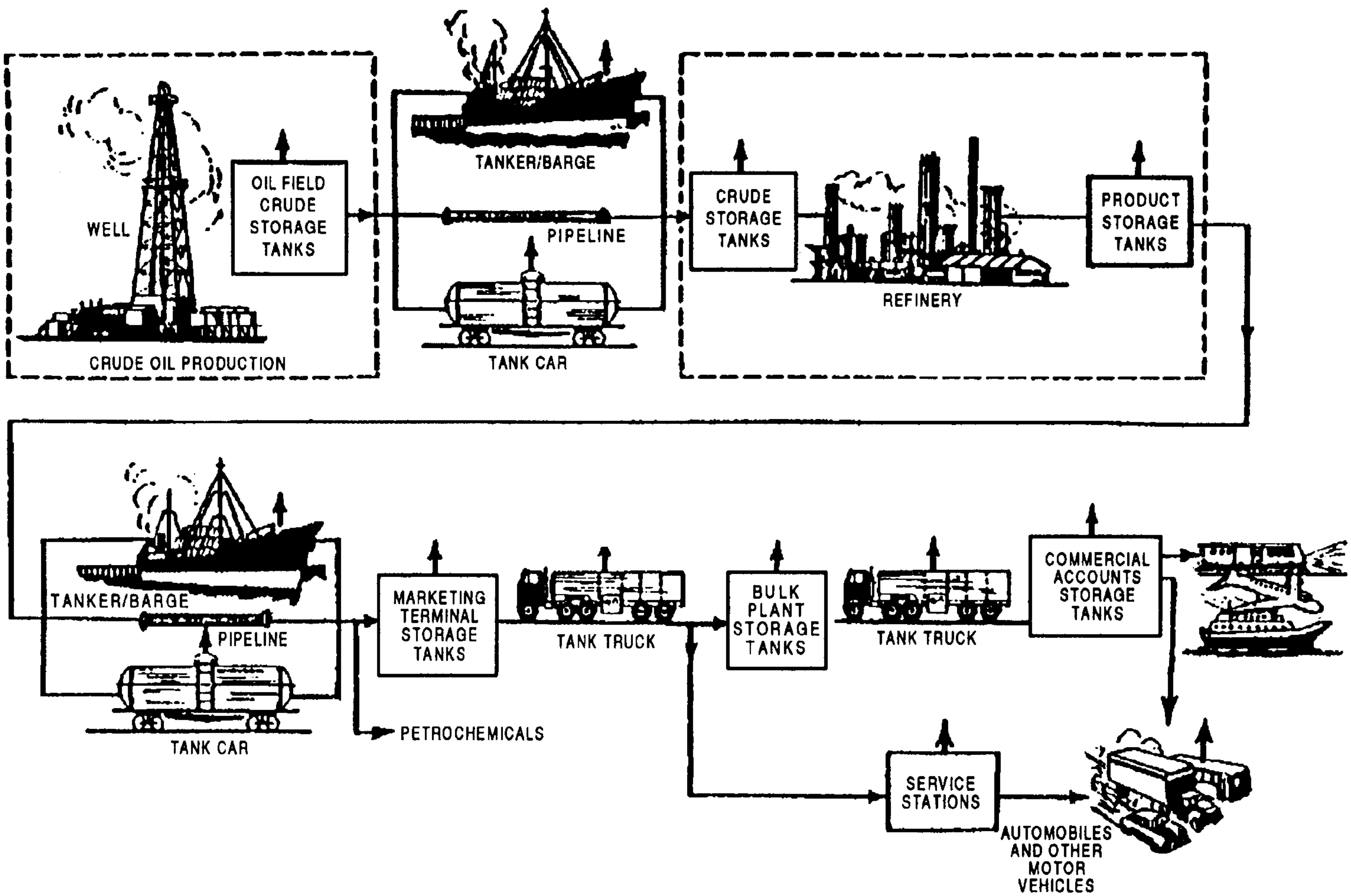

Figure 5.2-1. Flow sheet of petroleum production, refining, and distribution systems.
(Points of organic emissions are indicated by vertical arrows.)

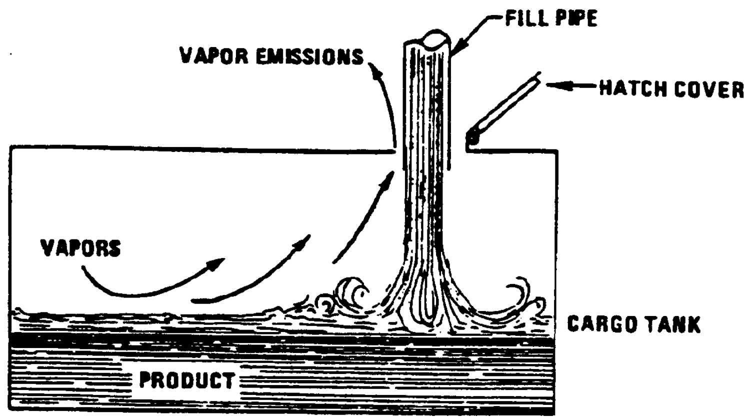

Figure 5.2-2. Splash loading method.

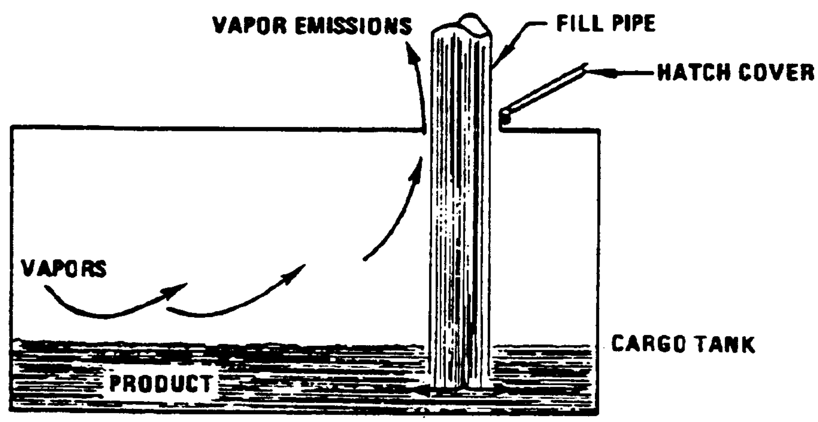

Figure 5.2-3. Submerged fill pipe.

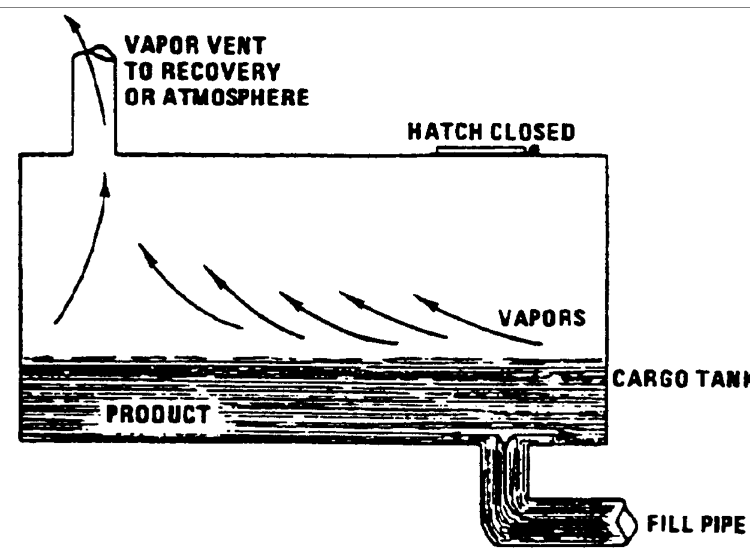

Figure 5.2-4. Bottom loading.

loading operation, resulting in high levels of vapor generation and loss. If the turbulence is great enough, liquid droplets will be entrained in the vented vapors.

A second method of loading is submerged loading. Two types are the submerged fill pipe method and the bottom loading method. In the submerged fill pipe method, the fill pipe extends almost to the bottom of the cargo tank. In the bottom loading method, a permanent fill pipe is attached to the cargo tank bottom. During most of submerged loading by both methods, the fill pipe opening is below the liquid surface level. Liquid turbulence is controlled significantly during submerged loading, resulting in much lower vapor generation than encountered during splash loading.

The recent loading history of a cargo carrier is just as important a factor in loading losses as the method of loading. If the carrier has carried a nonvolatile liquid such as fuel oil, or has just been cleaned, it will contain vapor-free air. If it has just carried gasoline and has not been vented, the air in the carrier tank will contain volatile organic vapors, which will be expelled during the loading operation along with newly generated vapors.

Cargo carriers are sometimes designated to transport only one product, and in such cases are practicing "dedicated service". Dedicated gasoline cargo tanks return to a loading terminal containing air fully or partially saturated with vapor from the previous load. Cargo tanks may also be "switch loaded" with various products, so that a nonvolatile product being loaded may expel the vapors remaining from a previous load of a volatile product such as gasoline. These circumstances vary with the type of cargo tank and with the ownership of the carrier, the petroleum liquids being transported, geographic location, and season of the year.

One control measure for vapors displaced during liquid loading is called "vapor balance service", in which the cargo tank retrieves the vapors displaced during product unloading at bulk plants or service stations and transports the vapors back to the loading terminal. Figure 5.2-5 shows a tank truck in vapor balance service filling a service station underground tank and taking on displaced gasoline vapors for return to the terminal. A cargo tank returning to a bulk terminal in vapor balance service normally is saturated with organic vapors, and the presence of these vapors at the start of submerged loading of the tanker truck results in greater loading losses than encountered during nonvapor balance, or "normal", service. Vapor balance service is usually not practiced with marine vessels, although some vessels practice emission control by means of vapor transfer within their own cargo tanks during ballasting operations, discussed below.

Emissions from loading petroleum liquid can be estimated (with a probable error of ±30 percent)[4] using the following expression:

$$L_L = 12.46 \frac{SPM}{T} \tag{1}$$

where:

L_L = loading loss, pounds per 1000 gallons (lb/10^3 gal) of liquid loaded

S = a saturation factor (see Table 5.2-1)

P = true vapor pressure of liquid loaded, pounds per square inch absolute (psia) (see Section 7.1, "Organic Liquid Storage Tanks")

M = molecular weight of vapors, pounds per pound-mole (lb/lb-mole) (see Section 7.1, "Organic Liquid Storage Tanks")

T = temperature of bulk liquid loaded, °R (°F + 460)

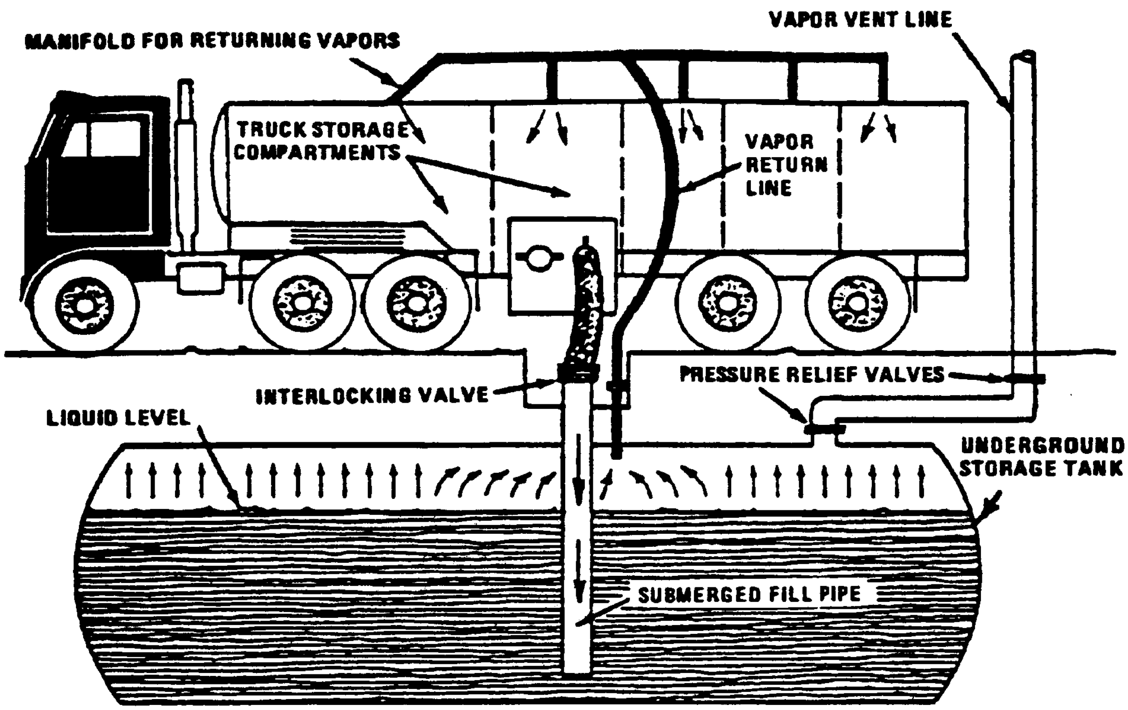

Figure 5.2-5. Tank truck unloading into a service station underground storage tank and practicing "vapor balance" form of emission control.

Table 5.2-1. SATURATION (S) FACTORS FOR CALCULATING PETROLEUM LIQUID LOADING LOSSES

Cargo Carrier	Mode Of Operation	S Factor
Tank trucks and rail tank cars	Submerged loading of a clean cargo tank	0.50
	Submerged loading: dedicated normal service	0.60
	Submerged loading: dedicated vapor balance service	1.00
	Splash loading of a clean cargo tank	1.45
	Splash loading: dedicated normal service	1.45
	Splash loading: dedicated vapor balance service	1.00
Marine vessels[a]	Submerged loading: ships	0.2
	Submerged loading: barges	0.5

[a] For products other than gasoline and crude oil. For marine loading of gasoline, use factors from Table 5.2-2. For marine loading of crude oil, use Equations 2 and 3 and Table 5.2-3.

The saturation factor, S, represents the expelled vapor's fractional approach to saturation, and it accounts for the variations observed in emission rates from the different unloading and loading methods. Table 5.2-1 lists suggested saturation factors.

Emissions from controlled loading operations can be calculated by multiplying the uncontrolled emission rate calculated in Equation 1 by an overall reduction efficiency term:

$$\left(1 - \frac{eff}{100}\right)$$

The overall reduction efficiency should account for the capture efficiency of the collection system as well as both the control efficiency and any downtime of the control device. Measures to reduce loading emissions include selection of alternate loading methods and application of vapor recovery equipment. The latter captures organic vapors displaced during loading operations and recovers the vapors by the use of refrigeration, absorption, adsorption, and/or compression. The recovered product is piped back to storage. Vapors can also be controlled through combustion in a thermal oxidation unit, with no product recovery. Figure 5.2-6 demonstrates the recovery of gasoline vapors from tank trucks during loading operations at bulk terminals. Control efficiencies for the recovery units range from 90 to over 99 percent, depending on both the nature of the vapors and the type of control equipment used.[5-6] However, not all of the displaced vapors reach the control device, because of leakage from both the tank truck and collection system. The collection efficiency should be assumed to be 99.2 percent for tanker trucks passing the MACT-level annual leak test (not more than 1 inch water column pressure change in 5 minutes after pressurizing to 18 inches water followed by pulling a vacuum of 6 inches water).[7] A collection efficiency of 98.7 percent (a 1.3 percent leakage rate) should be assumed for trucks passing the NSPS-level annual test (3 inches pressure change) A collection efficiency of 70 percent should be assumed for trucks not passing one of these annual leak tests[6].

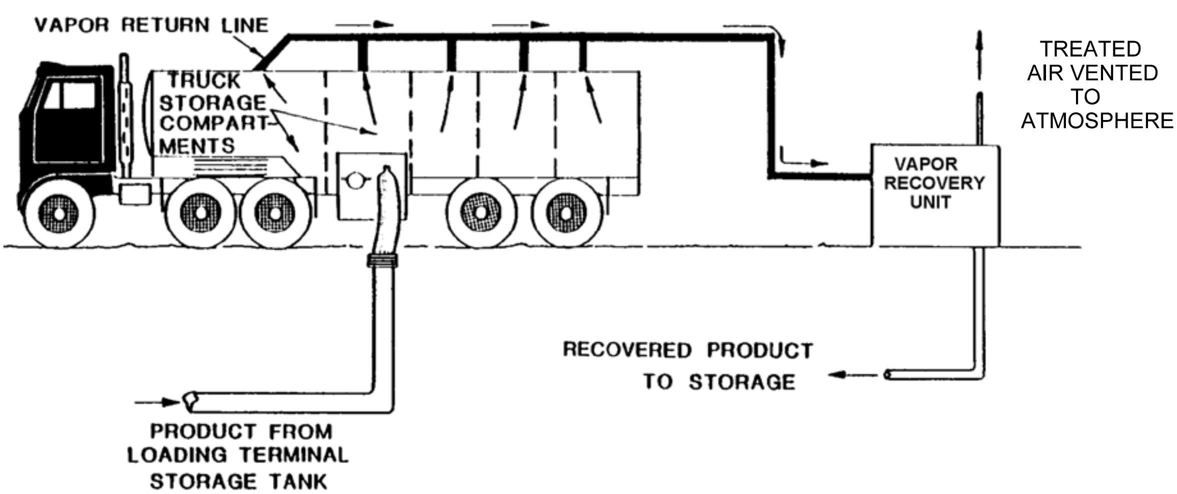

Figure 5.2-6. Tank truck loading with vapor recovery.

Sample Calculation -

Loading losses (L_L) from a gasoline tank truck in dedicated vapor balance service and practicing vapor recovery would be calculated as follows, using Equation 1:

Design basis -

Cargo tank volume is 8000 gal
Gasoline Reid vapor pressure (RVP) is 9 psia
Product temperature is 80°F
Vapor recovery efficiency is 95 percent
Vapor collection efficiency is 98.7 percent (NSPS-level annual leak test)

Loading loss equation -

$$L_L = 12.46 \frac{SPM}{T} \left(1 - \frac{eff}{100}\right)$$

where:

S = saturation factor (see Table 5.2-1) - 1.00
P = true vapor pressure of gasoline = 6.6 psia
M = molecular weight of gasoline vapors = 66
T = temperature of gasoline = 540°R
eff = overall reduction efficiency (95 percent control x 98.7 percent collection) = 94 percent

$$L_L = 12.46 \frac{(1.00)(6.6)(66)}{540} \left(1 - \frac{94}{100}\right)$$

$$= 0.60 \ \text{lb}/10^3 \text{gal}$$

Total loading losses are:

$$(0.60 \ \text{lb}/10^3 \ \text{gal})(8.0 \ \text{x} \ 10^3 \ \text{gal}) = 4.8 \ \text{pounds (lb)}$$

Measurements of gasoline loading losses from ships and barges have led to the development of emission factors for these specific loading operations.[8] These factors are presented in Table 5.2-2 and should be used instead of Equation 1 for gasoline loading operations at marine terminals. Factors are expressed in units of milligrams per liter (mg/L) and pounds per 1000 gallons (lb/10^3 gal).

Table 5.2-2 (Metric And English Units). VOLATILE ORGANIC COMPOUND (VOC) EMISSION FACTORS FOR GASOLINE LOADING OPERATIONS AT MARINE TERMINALS[a]

Vessel Tank Condition	Previous Cargo	Ships/Ocean Barges[b]		Barges[b]	
		mg/L Transferred	$lb/10^3$ gal Transferred	mg/L Transferred	$lb/10^3$ gal Transferred
Uncleaned	Volatile[c]	315	2.6	465	3.9
Ballasted	Volatile	205	1.7	—[d]	—[d]
Cleaned	Volatile	180	1.5	ND	ND
Gas-freed	Volatile	85	0.7	ND	ND
Any condition	Nonvolatile	85	0.7	ND	ND
Gas-freed	Any cargo	ND	ND	245	2.0
Typical overall situation[e]	Any cargo	215	1.8	410	3.4

[a] References 2,9. Factors are for both VOC emissions (which excludes methane and ethane) and total organic emissions, because methane and ethane have been found to constitute a negligible weight fraction of the evaporative emissions from gasoline. ND = no data.
[b] Ocean barges (tank compartment depth about 12.2 m [40 ft]) exhibit emission levels similar to tank ships. Shallow draft barges (compartment depth 3.0 to 3.7 m [10 to 12 ft]) exhibit higher emission levels.
[c] Volatile cargoes are those with a true vapor pressure greater than 10 kilopascals (kPa) (1.5 psia).
[d] Barges are usually not ballasted.
[e] Based on observation that 41% of tested ship compartments were uncleaned, 11% ballasted, 24% cleaned, and 24% gas-freed. For barges, 76% were uncleaned.

In addition to Equation 1, which estimates emissions from the loading of petroleum liquids, Equation 2 has been developed specifically for estimating emissions from the loading of crude oil into ships and ocean barges:

$$C_L = C_A + C_G \qquad (2)$$

where:

C_L = total loading loss, $lb/10^3$ gal of crude oil loaded
C_A = arrival emission factor, contributed by vapors in the empty tank compartment before loading, $lb/10^3$ gal loaded (see Note below)
C_G = generated emission factor, contributed by evaporation during loading, $lb/10^3$ gal loaded

Note: Values of C_A for various cargo tank conditions are listed in Table 5.2-3.

5.2-3 (English Units). AVERAGE ARRIVAL EMISSION FACTORS, C_A, FOR CRUDE OIL LOADING EMISSION EQUATION[a]

Ship/Ocean Barge Tank Condition	Previous Cargo	Arrival Emission Factor, lb/10^3 gal
Uncleaned	Volatile[b]	0.86
Ballasted	Volatile	0.46
Cleaned or gas-freed	Volatile	0.33
Any condition	Nonvolatile	0.33

[a] Arrival emission factors (C_A) to be added to generated emission factors (C_G) calculated in Equation 3 to produce total crude oil loading loss (C_L). Factors are for total organic compounds; VOC emission factors average about 15% lower, because VOC does not include methane or ethane.
[b] Volatile cargoes are those with a true vapor pressure greater than 10 kPa (1.5 psia).

This equation was developed empirically from test measurements of several vessel compartments.[8] The quantity C_G can be calculated using Equation 3:

$$C_G = 1.84\ (0.44\ P - 0.42)\ \frac{M\,G}{T} \tag{3}$$

where:

P = true vapor pressure of loaded crude oil, psia
M = molecular weight of vapors, lb/lb-mole
G = vapor growth factor = 1.02 (dimensionless)
T = temperature of vapors, °R (°F + 460)

Emission factors derived from Equation 3 and Table 5.2-3 represent total organic compounds. Volatile organic compound (VOC) emission factors (which exclude methane and ethane because they are exempted from the regulatory definition of "VOC") for crude oil vapors have been found to range from approximately 55 to 100 weight percent of these total organic factors. When specific vapor composition information is not available, the VOC emission factor can be estimated by taking 85 percent of the total organic factor.[3]

5.2.2.1.2 Ballasting Losses -

Ballasting operations are a major source of evaporative emissions associated with the unloading of petroleum liquids at marine terminals. It is common practice to load several cargo tank compartments with sea water after the cargo has been unloaded. This water, termed "ballast", improves the stability of the empty tanker during the subsequent voyage. Although ballasting practices vary, individual cargo tanks are ballasted typically about 80 percent, and the total vessel 15 to 40 percent, of capacity. Ballasting emissions occur as vapor-laden air in the "empty" cargo tank is displaced to the atmosphere by ballast water being pumped into the tank. Upon arrival at a loading port, the ballast water is pumped from the cargo tanks before the new cargo is loaded. The ballasting of cargo tanks reduces the quantity of vapors returning in the empty tank, thereby reducing the quantity of vapors emitted during subsequent tanker loading. Regulations administered by the U. S. Coast Guard require that, at marine terminals located in ozone nonattainment areas, large tankers with crude oil washing systems contain the organic vapors from ballasting.[10] This is accomplished principally by displacing the vapors during ballasting into a cargo tank being simultaneously unloaded. In other areas, marine vessels emit organic vapors directly to the atmosphere.

Equation 4 has been developed from test data to calculate the ballasting emissions from crude oil ships and ocean barges[8]:

$$L_B = 0.31 + 0.20\ P + 0.01\ PU_A \tag{4}$$

where:

L_B = ballasting emission factor, lb/10^3 gal of ballast water
P = true vapor pressure of discharged crude oil, psia
U_A = arrival cargo true ullage, before dockside discharge, measured from the deck, feet; (the term "ullage" here refers to the distance between the cargo surface level and the deck level)

Table 5.2-4 lists average total organic emission factors for ballasting into uncleaned crude oil cargo compartments. The first category applies to "full" compartments wherein the crude oil true ullage just before cargo discharge is less than 1.5 meters (m) (5 ft). The second category applies to lightered, or short-loaded, compartments (part of cargo previously discharged, or original load a partial fill), with an arrival true ullage greater than 1.5 m (5 ft). It should be remembered that these tabulated emission factors are examples only, based on average conditions, to be used when crude oil vapor pressure is unknown. Equation 4 should be used when information about crude oil vapor pressure and cargo compartment condition is available. The following sample calculation illustrates the use of Equation 4.

5.2-4 (Metric And English Units). TOTAL ORGANIC EMISSION FACTORS FOR CRUDE OIL BALLASTING[a]

Compartment Condition Before Cargo Discharge	Average Emission Factors			
	By Category		Typical Overall[b]	
	mg/L Ballast Water	lb/10^3 gal Ballast Water	mg/L Ballast Water	lb/10^3 gal Ballast Water
Fully loaded[c]	111	0.9	129	1.1
Lightered or previously short loaded[d]	171	1.4 A		

[a] Assumes crude oil temperature of 16°C (60°F) and RVP of 34 kPa (5 psia). VOC emission factors average about 85% of these total organic factors, because VOCs do not include methane or ethane.
[b] Based on observation that 70% of tested compartments had been fully loaded before ballasting. May not represent average vessel practices.
[c] Assumed typical arrival ullage of 0.6 m (2 ft).
[d] Assumed typical arrival ullage of 6.1 m (20 ft).

Sample Calculation -

Ballasting emissions from a crude oil cargo ship would be calculated as follows, using Equation 4:

Design basis -

Vessel and cargo description: 80,000 dead-weight-ton tanker, crude oil capacity 500,000 barrels (bbl); 20 percent of the cargo capacity is filled with ballast water after cargo discharge. The crude oil has an RVP of 6 psia and is discharged at 75°F.

Compartment conditions: 70 percent of the ballast water is loaded into compartments that had been fully loaded to 2 ft ullage, and 30 percent is loaded into compartments that had been lightered to 15 ft ullage before arrival at dockside.

Ballasting emission equation -

$$L_B = 0.31 + 0.20\ P + 0.01\ PU_A$$

where:

P = true vapor pressure of crude oil
= 4.6 psia

U_A = true cargo ullage for the full compartments = 2 ft, and true cargo ullage for the lightered compartments = 15 ft

$$L_B = 0.70\ [0.31 + (0.20)\ (4.6) + (0.01)\ (4.6)\ (2)] + 0.30\ [0.31 + (0.20)\ (4.6) + (0.01)\ (4.6)\ (15)]$$

$$= 1.5\ lb/10^3\ gal$$

Total ballasting emissions are:

$$(1.5\ lb/10^3\ gal)\ (0.20)\ (500{,}000\ bbl)\ (42\ gal/bbl) = 6{,}300\ lb$$

Since VOC emissions average about 85 percent of these total organic emissions, emissions of VOCs are about: (0.85)(6,300 lb) = 5,360 lb

5.2.2.1.3 Transit Losses -

In addition to loading and ballasting losses, losses occur while the cargo is in transit. Transit losses are similar in many ways to breathing losses associated with petroleum storage (see Section 7.1, "Organic Liquid Storage Tanks"). Experimental tests on ships and barges[4] have indicated that transit losses can be calculated using Equation 5:

$$L_T = 0.1\ PW \quad (5)$$

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]

Table 5.2-6 (Metric And English Units). TOTAL ORGANIC EMISSION FACTORS FOR PETROLEUM MARINE VESSEL SOURCES[a]

Emission Source	Gasoline[b]	Crude Oil[c]	Jet Naphtha (JP-4)	Jet Kerosene	Distillate Oil No. 2	Residual Oil No. 6
Loading operations						
Ships/ocean barges						
mg/L transferred	—[d]	73	60	0.63	0.55	0.004
lb/10^3 gal transferred	—[d]	0.61	0.50	0.005	0.005	0.00004
Barges						
mg/L transferred	—[d]	120	150	1.60	1.40	0.011
lb/10^3 gal transferred	—[d]	1.0	1.2	0.013	0.012	0.00009
Tanker ballasting						
mg/L ballast water	100	—[e]	ND	ND	ND	ND
lb/10^3 gal ballast water	0.8	—[e]	ND	ND	ND	ND
Transit						
mg/week-L transported	320	150	84	0.60	0.54	0.003
lb/week-10^3 gal transported	2.7	1.3	0.7	0.005	0.005	0.00003

[a] Factors are for a dispensed product of 16°C (60°F). ND = no data.
[b] Factors represent VOC as well as total organic emissions, because methane and ethane constitute a negligible fraction of gasoline evaporative emissions. All products other than crude oil can be assumed to have VOC factors equal to total organic factors. The example gasoline has an RVP of 69 kPa (10 psia).
[c] VOC emission factors for a typical crude oil are 15% lower than the total organic factors shown, in order to account for methane and ethane. The example crude oil has an RVP of 34 kPa (5 psia).
[d] See Table 5.2-2 for these factors.
[e] See Table 5.2-4 for these factors.

Emissions from underground tank filling operations at service stations can be reduced by the use of a vapor balance system such as in Figure 5.2-5 (termed Stage I vapor control). The vapor balance system employs a hose that returns gasoline vapors displaced from the underground tank to the tank truck cargo compartments being emptied. The control efficiency of the balance system ranges from 93 to 100 percent. Organic emissions from underground tank filling operations at a service station employing a vapor balance system and submerged filling are not expected to exceed 40 mg/L (0.3 lb/1000 gal) of transferred gasoline.

Table 5.2-7 (Metric And English Units). EVAPORATIVE EMISSIONS FROM GASOLINE SERVICE STATION OPERATIONS[a]

Emission Source	Emission Rate	
	mg/L Throughput	lb/10^3 gal Throughput
Filling underground tank (Stage I)		
Submerged filling	880	7.3
Splash filling	1,380	11.5
Balanced submerged filling	40	0.3
Underground tank breathing and emptying[b]	120	1.0
Vehicle refueling operations (Stage II)		
Displacement losses (uncontrolled)[c]	1,320	11.0
Displacement losses (controlled)	132	1.1
Spillage	80	0.7

[a] Factors are for VOC as well as total organic emissions, because of the methane and ethane content of gasoline evaporative emissions is negligible.
[b] Includes any vapor loss between underground tank and gas pump.
[c] Based on Equation 6, using average conditions.

A second source of vapor emissions from service stations is underground tank breathing. Breathing losses occur daily and are attributable to gasoline evaporation and barometric pressure changes. The frequency with which gasoline is withdrawn from the tank, allowing fresh air to enter to enhance evaporation, also has a major effect on the quantity of these emissions. An average breathing emission rate is 120 mg/L (1.0 lb/1000 gal) of throughput.

5.2.2.3 Motor Vehicle Refueling -

Service station vehicle refueling activity also produces evaporative emissions. Vehicle refueling emissions come from vapors displaced from the automobile tank by dispensed gasoline and from spillage. The quantity of displaced vapors depends on gasoline temperature, auto tank temperature, gasoline RVP, and dispensing rate. Equation 6 can be used to estimate uncontrolled displacement losses from vehicle refueling for a particular set of conditions.[14]

$$E_R = 264.2 \left[(-5.909) - 0.0949 (\Delta T) + 0.0884 (T_D) + 0.485 (RVP)\right] \qquad (6)$$

where:

E_R = refueling emissions, mg/L
ΔT = difference between temperature of fuel in vehicle tank and temperature of dispensed fuel, °F
T_D = temperature of dispensed fuel, °F
RVP = Reid vapor pressure, psia

Note that this equation and the spillage loss factor are incorporated into the *MOBILE* model. The *MOBILE* model allows for disabling of this calculation if it is desired to include these emissions in the stationary area source portion of an inventory rather than in the mobile source portion. It is estimated that the uncontrolled emissions from vapors displaced during vehicle refueling average 1320 mg/L (11.0 lb/1000 gal) of dispensed gasoline.[5,13]

Spillage loss is made up of contributions from prefill and postfill nozzle drip and from spit-back and overflow from the vehicles's fuel tank filler pipe during filling. The amount of spillage loss can depend on several variables, including service station business characteristics, tank configuration, and operator techniques. An average spillage loss is 80 mg/L (0.7 lb/1000 gal) of dispensed gasoline.[5,13]

Control methods for vehicle refueling emissions are based on conveying the vapors displaced from the vehicle fuel tank to the underground storage tank vapor space through the use of a special hose and nozzle, as depicted in Figure 5.2-7 (termed Stage II vapor control). In "balance" vapor control systems, the vapors are conveyed by natural pressure differentials established during refueling. In "vacuum assist" systems, the conveyance of vapors from the auto fuel tank to the underground storage tank is assisted by a vacuum pump. Tests on a few systems have indicated overall systems control efficiencies in the range of 88 to 92 percent.[5,13] When inventorying these emissions as an area source, rule penetration and rule effectiveness should also be taken into account. *Procedures For Emission Inventory Preparation, Volume IV: Mobile Sources*, EPA-450/4-81-026d, provides more detail on this.

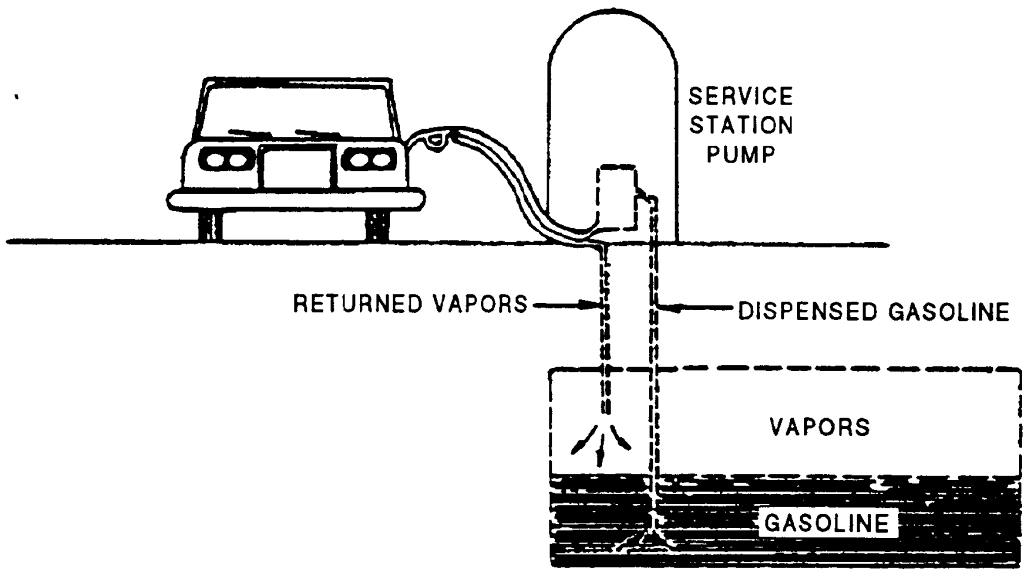

Figure 5.2-7. Automobile refueling vapor recovery system.

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13.2.2 Unpaved Roads

13.2.2.1 General

When a vehicle travels an unpaved road, the force of the wheels on the road surface causes pulverization of surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed.

The particulate emission factors presented in the previous draft version of this section of AP-42, dated October 2001, implicitly included the emissions from vehicles in the form of exhaust, brake wear, and tire wear as well as resuspended road surface material[25]. EPA included these sources in the emission factor equation for unpaved public roads (equation 1b in this section) since the field testing data used to develop the equation included both the direct emissions from vehicles and emissions from resuspension of road dust.

This version of the unpaved public road emission factor equation only estimates particulate emissions from resuspended road surface material [23, 26]. The particulate emissions from vehicle exhaust, brake wear, and tire wear are now estimated separately using EPA's MOBILE6.2 [24]. This approach eliminates the possibility of double counting emissions. Double counting results when employing the previous version of the emission factor equation in this section and MOBILE6.2 to estimate particulate emissions from vehicle traffic on unpaved public roads. It also incorporates the decrease in exhaust emissions that has occurred since the unpaved public road emission factor equation was developed. The previous version of the unpaved public road emission factor equation includes estimates of emissions from exhaust, brake wear, and tire wear based on emission rates for vehicles in the 1980 calendar year fleet. The amount of PM released from vehicle exhaust has decreased since 1980 due to lower new vehicle emission standards and changes in fuel characteristics.

13.2.2.2 Emissions Calculation And Correction Parameters[1-6]

The quantity of dust emissions from a given segment of unpaved road varies linearly with the volume of traffic. Field investigations also have shown that emissions depend on source parameters that characterize the condition of a particular road and the associated vehicle traffic. Characterization of these source parameters allow for "correction" of emission estimates to specific road and traffic conditions present on public and industrial roadways.

Dust emissions from unpaved roads have been found to vary directly with the fraction of silt (particles smaller than 75 micrometers [μm] in diameter) in the road surface materials.[1] The silt fraction is determined by measuring the proportion of loose dry surface dust that passes a 200-mesh screen, using the ASTM-C-136 method. A summary of this method is contained in Appendix C of AP-42. Table 13.2.2-1 summarizes measured silt values for industrial unpaved roads. Table 13.2.2-2 summarizes measured silt values for public unpaved roads. It should be noted that the ranges of silt content vary over two orders of magnitude. Therefore, the use of data from this table can potentially introduce considerable error. Use of this data is strongly discouraged when it is feasible to obtain locally gathered data.

Since the silt content of a rural dirt road will vary with geographic location, it should be measured for use in projecting emissions. As a conservative approximation, the silt content of the parent soil in the area can be used. Tests, however, show that road silt content is normally lower than in the surrounding parent soil, because the fines are continually removed by the vehicle traffic, leaving a higher percentage of coarse particles.

Other variables are important in addition to the silt content of the road surface material. For example, at industrial sites, where haul trucks and other heavy equipment are common, emissions are highly correlated with vehicle weight. On the other hand, there is far less variability in the weights of cars and pickup trucks that commonly travel publicly accessible unpaved roads throughout the United States. For those roads, the moisture content of the road surface material may be more dominant in determining differences in emission levels between, for example a hot, desert environment and a cool, moist location.

The PM-10 and TSP emission factors presented below are the outcomes from stepwise linear regressions of field emission test results of vehicles traveling over unpaved surfaces. Due to a limited amount of information available for PM-2.5, the expression for that particle size range has been scaled against the result for PM-10. Consequently, the quality rating for the PM-2.5 factor is lower than that for the PM-10 expression.

Table 13.2.2-1. TYPICAL SILT CONTENT VALUES OF SURFACE MATERIAL ON INDUSTRIAL UNPAVED ROADS[a]

Industry	Road Use Or Surface Material	Plant Sites	No. Of Samples	Silt Content (%)	
				Range	Mean
Copper smelting	Plant road	1	3	16 - 19	17
Iron and steel production	Plant road	19	135	0.2 - 19	6.0
Sand and gravel processing	Plant road	1	3	4.1 - 6.0	4.8
	Material storage area	1	1	-	7.1
Stone quarrying and processing	Plant road	2	10	2.4 - 16	10
	Haul road to/from pit	4	20	5.0-15	8.3
Taconite mining and processing	Service road	1	8	2.4 - 7.1	4.3
	Haul road to/from pit	1	12	3.9 - 9.7	5.8
Western surface coal mining	Haul road to/from pit	3	21	2.8 - 18	8.4
	Plant road	2	2	4.9 - 5.3	5.1
	Scraper route	3	10	7.2 - 25	17
	Haul road (freshly graded)	2	5	18 - 29	24
Construction sites	Scraper routes	7	20	0.56-23	8.5
Lumber sawmills	Log yards	2	2	4.8-12	8.4
Municipal solid waste landfills	Disposal routes	4	20	2.2 - 21	6.4

[a]References 1,5-15.

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 as shown in Table 13.2.2-4

Table 13.2.2-4. EMISSION FACTOR FOR 1980'S VEHICLE FLEET EXHAUST, BRAKE WEAR AND TIRE WEAR

Particle Size Range[a]	*C*, Emission Factor for Exhaust, Brake Wear and Tire Wear[b] lb/VMT
$PM_{2.5}$	0.00036
PM_{10}	0.00047
PM_{30}[c]	0.00047

[a] Refers to airborne particulate matter (PM-x) with an aerodynamic diameter equal to or less than x micrometers.
[b] Units shown are pounds per vehicle mile traveled (lb/VMT).
[c] PM-30 is sometimes termed "suspendable particulate" (SP) and is often used as a surrogate for TSP.

It is important to note that the vehicle-related source conditions refer to the average weight, speed, and number of wheels for all vehicles traveling the road. For example, if 98 percent of traffic on the road are 2-ton cars and trucks while the remaining 2 percent consists of 20-ton trucks, then the mean weight is 2.4 tons. More specifically, Equations 1a and 1b are *not* intended to be used to calculate a separate emission factor for each vehicle class within a mix of traffic on a given unpaved road. That is, in the example, one should *not* determine one factor for the 2-ton vehicles and a second factor for the 20-ton trucks. Instead, only one emission factor should be calculated that represents the "fleet" average of 2.4 tons for all vehicles traveling the road.

Moreover, to retain the quality ratings when addressing a group of unpaved roads, it is necessary that reliable correction parameter values be determined for the road in question. The field and laboratory procedures for determining road surface silt and moisture contents are given in AP-42 Appendices C.1 and C.2. Vehicle-related parameters should be developed by recording visual observations of traffic. In some cases, vehicle parameters for industrial unpaved roads can be determined by reviewing maintenance records or other information sources at the facility.

In the event that site-specific values for correction parameters cannot be obtained, then default values may be used.In the absence of site-specific silt content information, an appropriate mean value from Table 13.2.2-1 may be used as a default value, but the quality rating of the equation is reduced by two letters. Because of significant differences found between different types of road surfaces and between different areas of the country, use of the default moisture content value of 0.5 percent in Equation 1b is discouraged. The quality rating should be downgraded two letters when the default moisture content value is used. (It is assumed that readers addressing industrial roads have access to the information needed to develop average vehicle information in Equation 1a for their facility.)

The effect of routine watering to control emissions from unpaved roads is discussed below in Section 13.2.2.3, “Controls”. However, all roads are subject to some natural mitigation because of rainfall and other precipitation. The Equation 1a and 1b emission factors can be extrapolated to annual 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:

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

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;

2. Surface improvement, by measures such as (a) paving or (b) adding gravel or slag to a dirt road; and

3. Surface treatment, such as watering or treatment with chemical dust suppressants.

Available control options span broad ranges in terms of cost, efficiency, and applicability. For example, traffic controls provide moderate emission reductions (often at little cost) but are difficult to enforce. Although paving is highly effective, its high initial cost is often prohibitive. Furthermore, paving is not feasible for industrial roads subject to very heavy vehicles and/or spillage of material in transport. Watering and chemical suppressants, on the other hand, are potentially applicable to most industrial roads at moderate to low costs. However, these require frequent reapplication to maintain an acceptable level of control. Chemical suppressants are generally more cost-effective than water but not in cases of temporary roads (which are common at mines, landfills, and construction sites). In summary, then, one needs to consider not only the type and volume of traffic on the road but also how long the road will be in service when developing control plans.

Vehicle restrictions. These measures seek to limit the amount and type of traffic present on the road or to lower the mean vehicle speed. For example, many industrial plants have restricted employees from driving on plant property and have instead instituted bussing programs. This eliminates emissions due to employees traveling to/from their worksites. Although the heavier average vehicle weight of the busses increases the base emission factor, the decrease in vehicle-miles-traveled results in a lower overall emission rate.

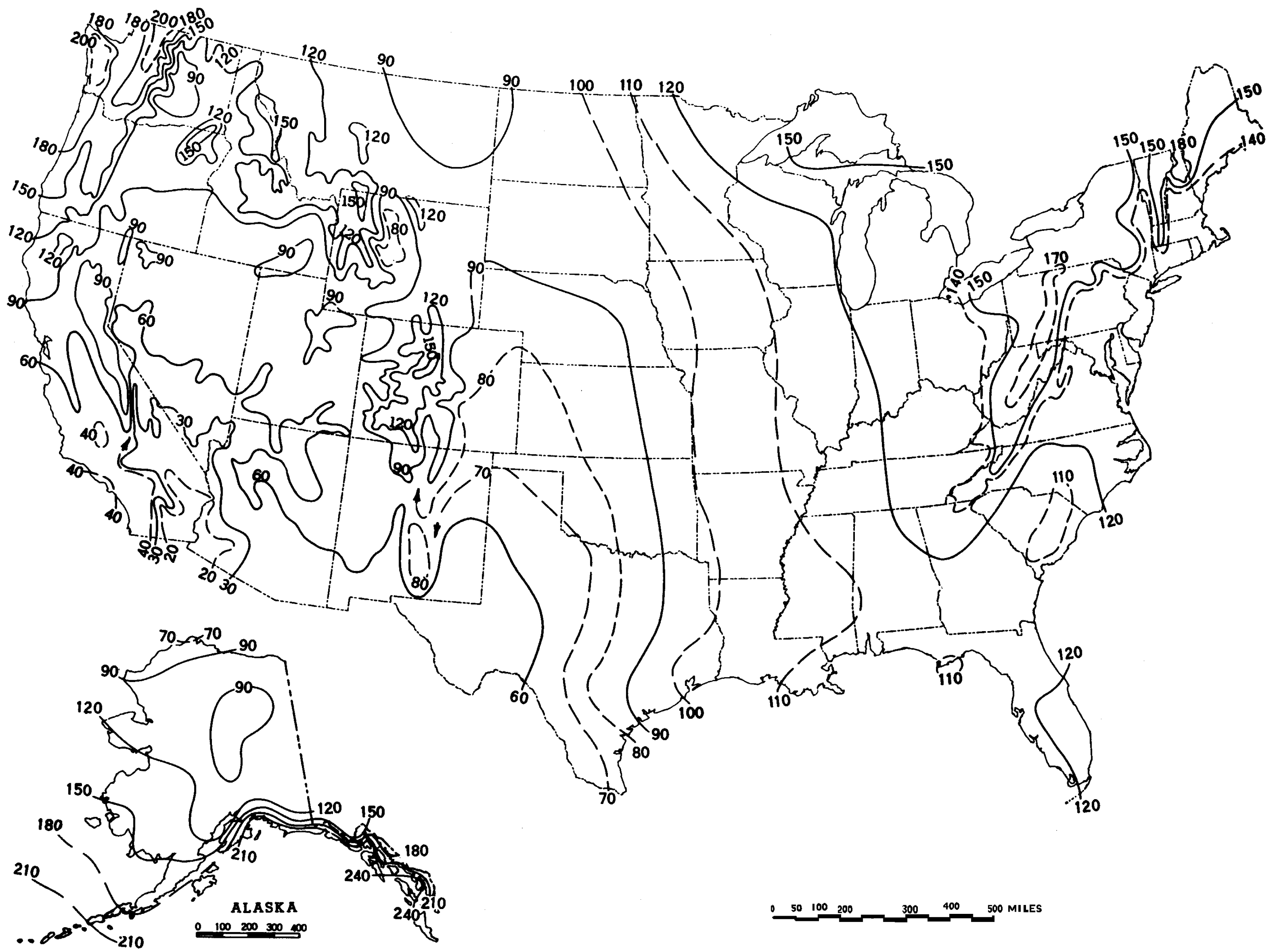

Figure 13.2.2-1. Mean number of days with 0.01 inch or more of precipitation in United States.

Surface improvements. Control options in this category alter the road surface. As opposed to the "surface treatments" discussed below, improvements are relatively "permanent" and do not require periodic retreatment.

The most obvious surface improvement is paving an unpaved road. This option is quite expensive and is probably most applicable to relatively short stretches of unpaved road with at least several hundred vehicle passes per day. Furthermore, if the newly paved road is located near unpaved areas or is used to transport material, it is essential that the control plan address routine cleaning of the newly paved road surface.

The control efficiencies achievable by paving can be estimated by comparing emission factors for unpaved and paved road conditions. The predictive emission factor equation for paved roads, given in Section 13.2.1, requires estimation of the silt loading on the traveled portion of the paved surface, which in turn depends on whether the pavement is periodically cleaned. Unless curbing is to be installed, the effects of vehicle excursion onto unpaved shoulders (berms) also must be taken into account in estimating the control efficiency of paving.

Other improvement methods cover the road surface with another material that has a lower silt content. Examples include placing gravel or slag on a dirt road. Control efficiency can be estimated by comparing the emission factors obtained using the silt contents before and after improvement. The silt content of the road surface should be determined after 3 to 6 months rather than immediately following placement. Control plans should address regular maintenance practices, such as grading, to retain larger aggregate on the traveled portion of the road.

Surface treatments refer to control options which require periodic reapplication. Treatments fall into the two main categories of (a) "wet suppression" (i. e., watering, possibly with surfactants or other additives), which keeps the road surface wet to control emissions and (b) "chemical stabilization/ treatment", which attempts to change the physical characteristics of the surface. The necessary reapplication frequency varies from several minutes for plain water under summertime conditions to several weeks or months for chemical dust suppressants.

Watering increases the moisture content, which conglomerates particles and reduces their likelihood to become suspended when vehicles pass over the surface. The control efficiency depends on how fast the road dries after water is added. This in turn depends on (a) the amount (per unit road surface area) of water added during each application; (b) the period of time between applications; (c) the weight, speed and number of vehicles traveling over the watered road during the period between applications; and (d) meteorological conditions (temperature, wind speed, cloud cover, etc.) that affect evaporation during the period.

Figure 13.2.2-2 presents a simple bilinear relationship between the instantaneous control efficiency due to watering and the resulting increase in surface moisture. The moisture ratio "M" (i.e., the x-axis in Figure 13.2.2-2) is found by dividing the surface moisture content of the watered road by the surface moisture content of the uncontrolled road. As the watered road surface dries, both the ratio M and the predicted instantaneous control efficiency (i.e., the y-axis in the figure) decrease. The figure shows that between the uncontrolled moisture content and a value twice as large, a small increase in moisture content results in a large increase in control efficiency. Beyond that, control efficiency grows slowly with increased moisture content.

Given the complicated nature of how the road dries, characterization of emissions from watered roadways is best done by collecting road surface material samples at various times between water truck passes. (Appendices C.1 and C.2 present the sampling and analysis procedures.) The moisture content measured can then be associated with a control efficiency by use of Figure 13.2.2-2. Samples that reflect average conditions during the watering cycle can take the form of either a series of samples between water applications or a single sample at the midpoint. It is essential that samples be collected during periods with active traffic on the road. Finally, because of different evaporation rates, it is recommended that samples be collected at various times during the year. If only one set of samples is to be collected, these must be collected during hot, summertime conditions.

When developing watering control plans for roads that do not yet exist, it is strongly recommended that the moisture cycle be established by sampling similar roads in the same geographic area. If the moisture cycle cannot be established by similar roads using established watering control plans, the more complex methodology used to estimate the mitigation of rainfall and other precipitation can be used to estimate the control provided by routine watering. An estimate of the maximum daytime Class A pan evaporation (based upon daily evaporation data published in the monthly Climatological Data for the state by the National Climatic Data Center) should be used to insure that adequate watering capability is available during periods of highest evaporation. The hourly precipitation values in the spreadsheet should be replaced with the equivalent inches of precipitation (where the equivalent of 1 inch of precipitation is provided by an application of 5.6 gallons of water per square yard of road). Information on the long term average annual evaporation and on the percentage that occurs between May and October was published in the Climatic Atlas (Reference 16). Figure 13.2.2-3 presents the geographical distribution for "Class A pan evaporation" throughout the United States. Figure 13.2.2-4 presents the geographical distribution of the percentage of this evaporation that occurs between May and October. The U. S. Weather Bureau Class A evaporation pan is a cylindrical metal container with a depth of 10 inches and a diameter of 48 inches. Periodic measurements are made of the changes of the water level.

The above methodology should be used <u>only for prospective analyses</u> and for designing watering programs for existing roadways. The quality rating of an emission factor for a watered road that is based on this methodology should be downgraded two letters. Periodic road surface samples should be collected and analyzed to verify the efficiency of the watering program.

As opposed to watering, chemical dust suppressants have much less frequent reapplication requirements. These materials suppress emissions by changing the physical characteristics of the existing road surface material. Many chemical unpaved road dust suppressants form a hardened surface that binds particles together. After several applications, a treated road often resembles a paved road except that the surface is not uniformly flat. Because the improved surface results in more grinding of small particles, the silt content of loose material on a highly controlled surface may be substantially higher than when the surface was uncontrolled. For this reason, the models presented as Equations 1a and 1b cannot be used to estimate emissions from chemically stabilized roads. Should the road be allowed to return to an uncontrolled state with no visible signs of large-scale cementing of material, the Equation 1a and 1b emission factors could then be used to obtain conservatively high emission estimates.

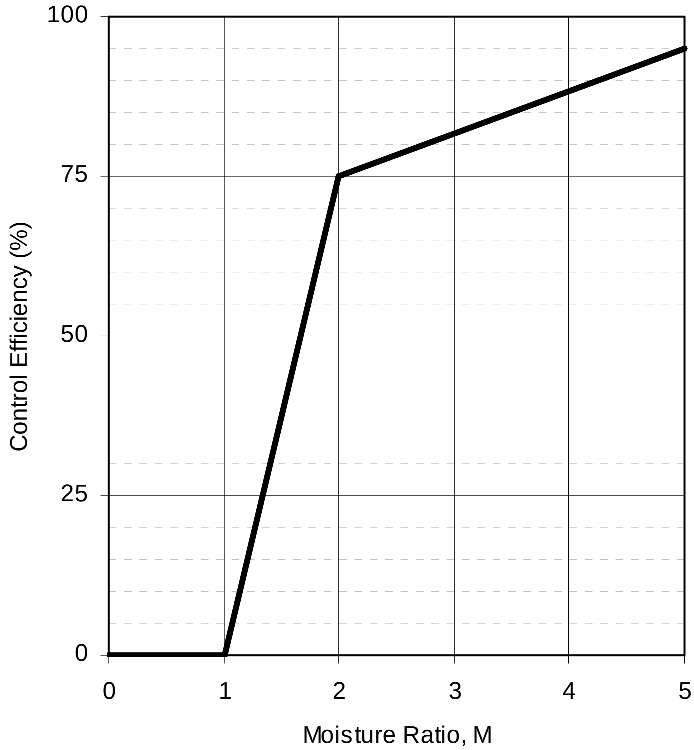

Figure 13.2.2-2. Watering control effectiveness for unpaved travel surfaces

The control effectiveness of chemical dust suppressants appears to depend on (a) the dilution rate used in the mixture; (b) the application rate (volume of solution per unit road surface area); (c) the time between applications; (d) the size, speed and amount of traffic during the period between applications; and (e) meteorological conditions (rainfall, freeze/thaw cycles, etc.) during the period. Other factors that affect the performance of dust suppressants include other traffic characteristics (e. g., cornering, track-on from unpaved areas) and road characteristics (e. g., bearing strength, grade). The variabilities in the above factors and differences between individual dust control products make the control efficiencies of chemical dust suppressants difficult to estimate. Past field testing of emissions from controlled unpaved roads has shown that chemical dust suppressants provide a PM-10 control efficiency of about 80 percent when applied at regular intervals of 2 weeks to 1 month.

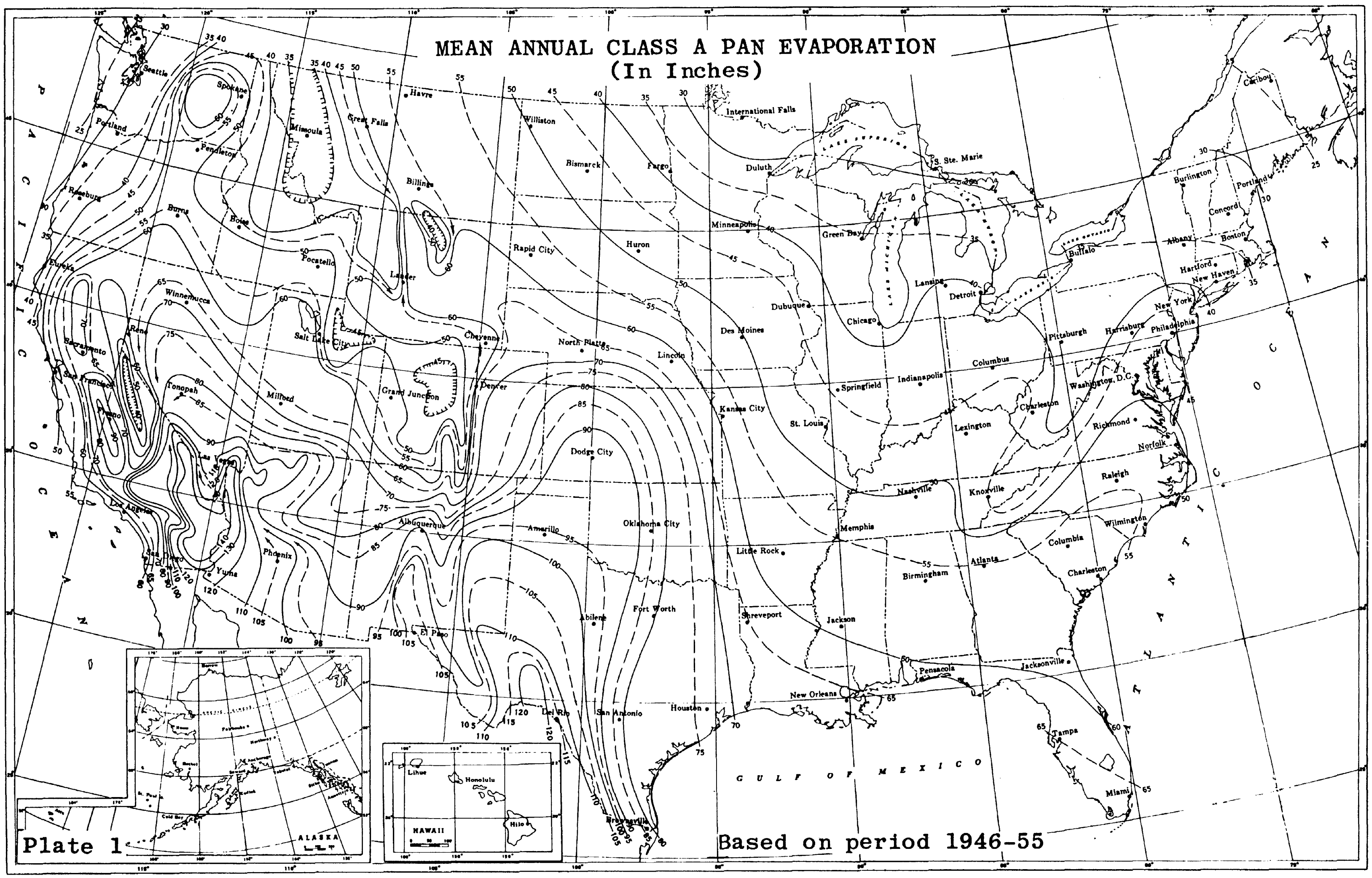

Figure 13.2.2-3. Annual evaporation data.

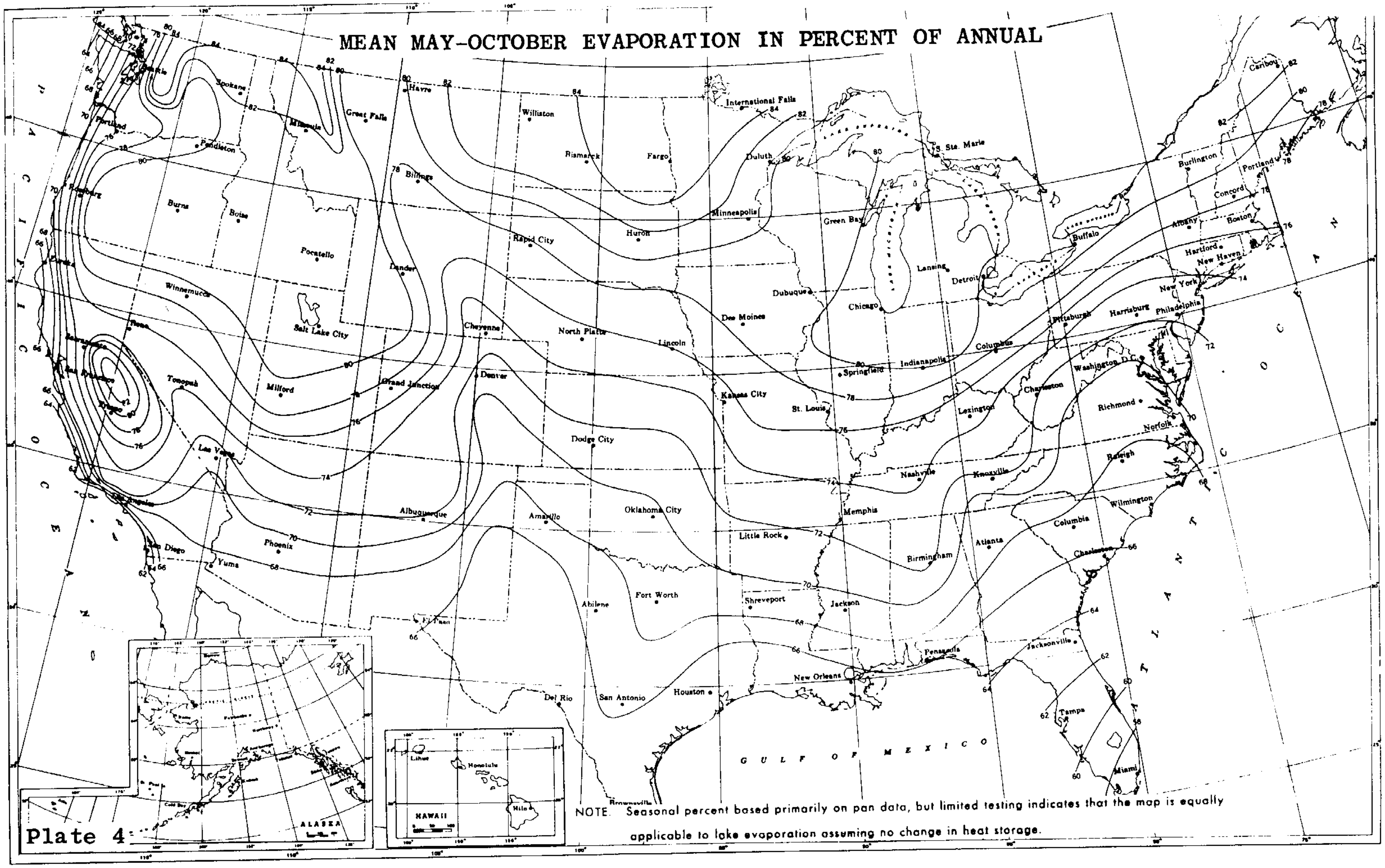

Figure 13.2.2-4. Geographical distribution of the percentage of evaporation occurring between May and October.

Petroleum resin products historically have been the dust suppressants (besides water) most widely used on industrial unpaved roads. Figure 13.2.2-5 presents a method to estimate average control efficiencies associated with petroleum resins applied to unpaved roads.[20] Several items should be noted:

1. The term "ground inventory" represents the total volume (per unit area) of petroleum resin concentrate (*not solution*) applied since the start of the dust control season.

2. Because petroleum resin products must be periodically reapplied to unpaved roads, the use of a time-averaged control efficiency value is appropriate. Figure 13.2.2-5 presents control efficiency values averaged over two common application intervals, 2 weeks and 1 month. Other application intervals will require interpolation.

3. Note that zero efficiency is assigned until the ground inventory reaches 0.05 gallon per square yard (gal/yd^2). Requiring a minimum ground inventory ensures that one must apply a reasonable amount of chemical dust suppressant to a road before claiming credit for emission control. Recall that the ground inventory refers to the amount of petroleum resin concentrate rather than the total solution.

As an example of the application of Figure 13.2.2-5, suppose that Equation 1a was used to estimate an emission factor of 7.1 lb/VMT for PM-10 from a particular road. Also, suppose that, starting on May 1, the road is treated with 0.221 gal/yd^2 of a solution (1 part petroleum resin to 5 parts water) on the first of each month through September. Then, the average controlled emission factors, shown in Table 13.2.2-5, are found.

Table 13.2-2-5. EXAMPLE OF AVERAGE CONTROLLED EMISSION FACTORS FOR SPECIFIC CONDITIONS

Period	Ground Inventory, gal/yd^2	Average Control Efficiency, %[a]	Average Controlled Emission Factor, lb/VMT
May	0.037	0	7.1
June	0.073	62	2.7
July	0.11	68	2.3
August	0.15	74	1.8
September	0.18	80	1.4

[a] From Figure 13.2.2-5, ≤10 μm. Zero efficiency assigned if ground inventory is less than 0.05 gal/yd^2. 1 lb/VMT = 281.9 g/VKT. 1 gal/yd^2 = 4.531 L/m^2.

Besides petroleum resins, other newer dust suppressants have also been successful in controlling emissions from unpaved roads. Specific test results for those chemicals, as well as for petroleum resins and watering, are provided in References 18 through 21.

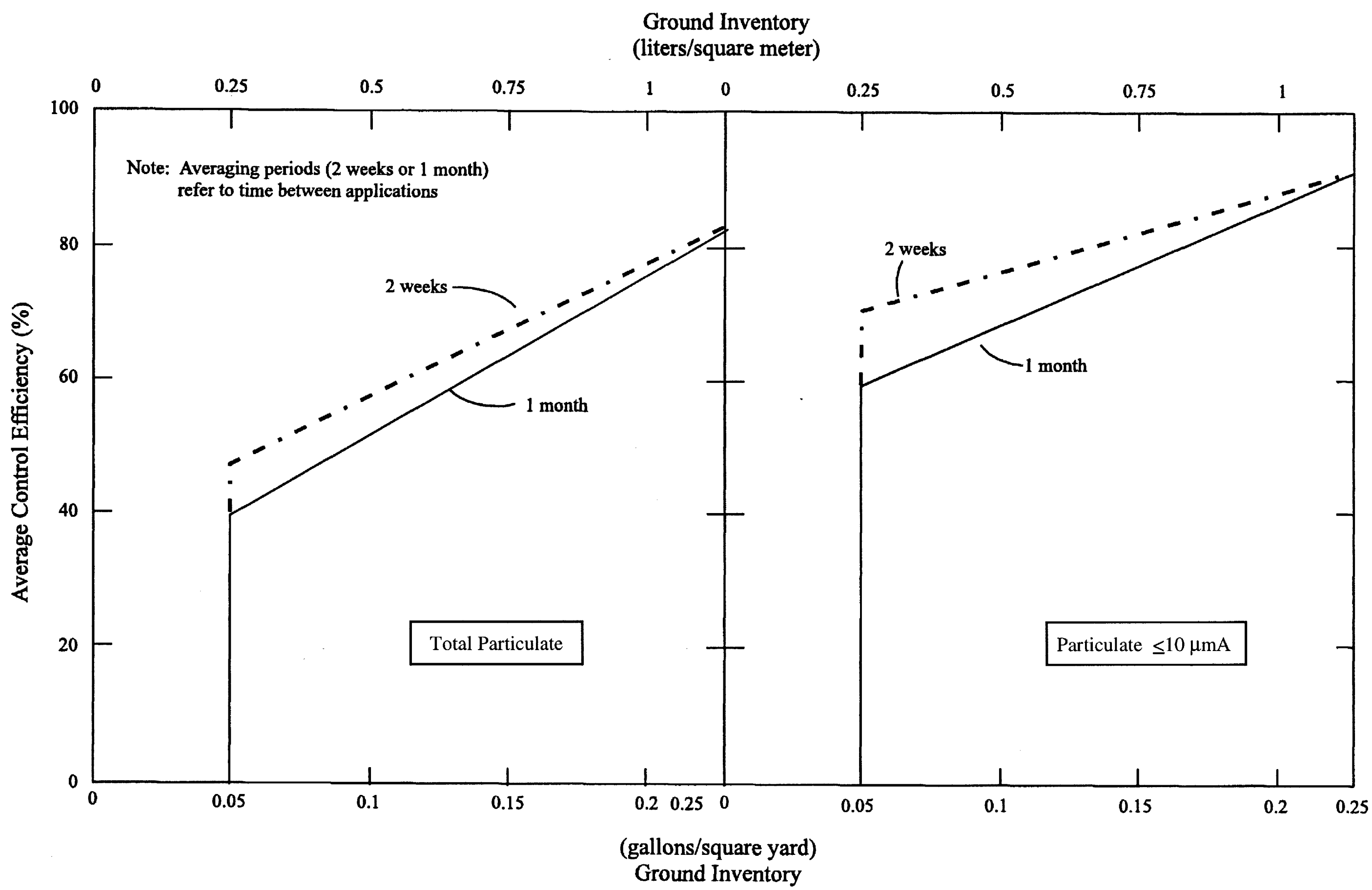

Figure 13.2.2-5. Average control efficiencies over common application intervals.

13.2.2.4 Updates Since The Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section since that date are summarized below. For further detail, consult the background report for this section (Reference 6).

October 1998 (Supplement E)– This was a major revision of this section. Significant changes to the text and the emission factor equations were made.

October 2001 – Separate emission factors for unpaved surfaces at industrial sites and publicly accessible roads were introduced. Figure 13.2.2-2 was included to provide control effectiveness estimates for watered roads.

December 2003 – The public road emission factor equation (equation 1b) was adjusted to remove the component of particulate emissions from exhaust, brake wear, and tire wear. The parameter C in the new equation varies with aerodynamic size range of the particulate matter. Table 13.2.2-4 was added to present the new coefficients.

January 2006 – The PM-2.5 particle size multipliers (i.e., factors) in Table 13.2.2-2 were modified and the quality ratings were upgraded from C to B based on the wind tunnel studies of a variety of dust emitting surface materials.

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12. *PM-10 Emission Inventory Of Landfills In The Lake Calumet Area*, EPA Contract 68-02-3891, Work Assignment 30, Midwest Research Institute, Kansas City, MO, September 1987.

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14. *PM-10 Emissions Inventory Data For The Maricopa And Pima Planning Areas*, EPA Contract No. 68-02-3888, Engineering-Science, Pasadena, CA, January 1987.

15. *Oregon Fugitive Dust Emission Inventory*, EPA Contract 68-D0-0123, Midwest Research Institute, Kansas City, MO, January 1992.

16. *Climatic Atlas Of The United States*, U. S. Department Of Commerce, Washington, DC, June 1968.

17. National Climatic Data Center, *Solar And Meteorological Surface Observation Network 1961-1990*; 3 Volume CD-ROM. Asheville, NC, 1993.

18. C. Cowherd, Jr. *et al.*, *Control Of Open Fugitive Dust Sources*, EPA-450/3-88-008, U. S. Environmental Protection Agency, Research Triangle Park, NC, September 1988.

19. G. E. Muleski, *et al.*, *Extended Evaluation Of Unpaved Road Dust Suppressants In The Iron And Steel Industry*, EPA-600/2-84-027, U. S. Environmental Protection Agency, Cincinnati, OH, February 1984.

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21. G. E. Muleski and C. Cowherd, Jr., *Evaluation Of The Effectiveness Of Chemical Dust Suppressants On Unpaved Roads*, EPA-600/2-87-102, U. S. Environmental Protection Agency, Cincinnati, OH, November 1986.

22. *Fugitive Dust Background Document And Technical Information Document For Best Available Control Measures*, EPA-450/2-92-004, Office Of Air Quality Planning And Standards, U. S. Environmental Protection Agency, Research Triangle Park, NC, September 1992.

23. Written communication (Technical Memorandum) from P. Hemmer, E.H. Pechan & Associates, Inc., Durham, NC to B. Kuykendal, U. S. Environmental Protection Agency, Research Triangle Park, NC, August, 21, 2003.

24. MOBILE6 User Guide, United States Environmental Protection Agency, Office of Transportation and Air Quality. EPA420-R-02-028, October 2002.

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United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-453/R-95-017
November 1995

Air

EPA

Protocol for Equipment Leak Emission Estimates

EPA-453/R-95-017

1995 Protocol for Equipment Leak Emission Estimates

Emission Standards Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

November 1995

TABLE 2-4. OIL AND GAS PRODUCTION OPERATIONS AVERAGE EMISSION FACTORS (kg/hr/source)

Equipment Type	Service[a]	Emission Factor (kg/hr/source)[b]
Valves	Gas	4.5E-03
	Heavy Oil	8.4E-06
	Light Oil	2.5E-03
	Water/Oil	9.8E-05
Pump seals	Gas	2.4E-03
	Heavy Oil	NA
	Light Oil	1.3E-02
	Water/Oil	2.4E-05
Others[c]	Gas	8.8E-03
	Heavy Oil	3.2E-05
	Light Oil	7.5E-03
	Water/Oil	1.4E-02
Connectors	Gas	2.0E-04
	Heavy Oil	7.5E-06
	Light Oil	2.1E-04
	Water/Oil	1.1E-04
Flanges	Gas	3.9E-04
	Heavy Oil	3.9E-07
	Light Oil	1.1E-04
	Water/Oil	2.9E-06
Open-ended lines	Gas	2.0E-03
	Heavy Oil	1.4E-04
	Light Oil	1.4E-03
	Water/Oil	2.5E-04

[a]Water/Oil emission factors apply to water streams in oil service with a water content greater than 50%, from the point of origin to the point where the water content reaches 99%. For water streams with a water content greater than 99%, the emission rate is considered negligible.

[b]These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane) and apply to light crude, heavy crude, gas plant, gas production, and off shore facilities. "NA" indicates that not enough data were available to develop the indicated emission factor.

[c]The "other" equipment type was derived from compressors, diaphrams, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents. This "other" equipment type should be applied for any equipment type other than connectors, flanges, open-ended lines, pumps, or valves.

Displaying title 40, up to date as of 8/24/2023. Title 40 was last amended 8/24/2023.

Title 40 —Protection of Environment
Chapter I —Environmental Protection Agency
Subchapter C —Air Programs
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

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—liquid	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

Fuel type	Default high heat value	Default CO_2 emission factor
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
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
Petroleum products—solid	mmBtu/short ton	kg CO_2/mmBtu.
Petroleum Coke	30.00	102.41.

Fuel type	Default high heat value	Default CO_2 emission factor
Petroleum products—gaseous	mmBtu/scf	kg CO_2/mmBtu.
Propane Gas	2.516×10^{-3}	61.46.
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
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
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, as amended at 81 FR 89252, Dec. 9, 2016]

Displaying title 40, up to date as of 8/24/2023. Title 40 was last amended 8/24/2023.

Title 40 —Protection of Environment
Chapter I —Environmental Protection Agency
Subchapter C —Air Programs
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

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 Products (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}
Other Fuels—Solid	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, as amended at 81 FR 89252, Dec. 9, 2016]

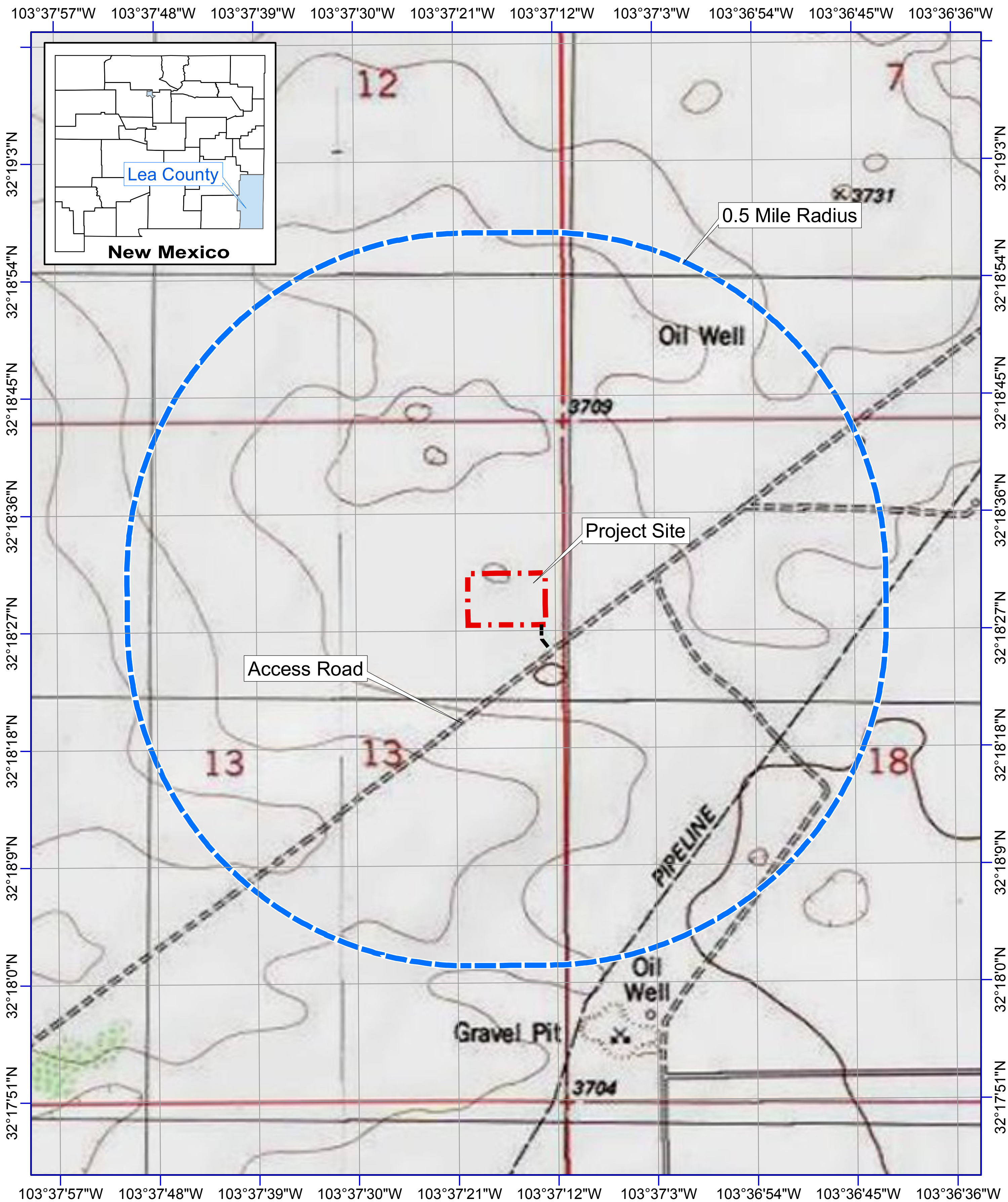
Section 8

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.



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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")

× **I have read the AQB "Guidelines for Public Notification for Air Quality Permit Applications"**
This document provides detailed instructions about public notice requirements for various permitting actions. It also provides public notice examples and certification forms. Material mistakes in the public notice will require a re-notice before issuance of the permit.

Unless otherwise allowed elsewhere in this document, the following items document proof of the applicant's Public Notification. Please include this page in your proof of public notice submittal with checkmarks indicating which documents are being submitted with the application.

New Permit and **Significant Permit Revision** public notices must include all items in this list.

Technical Revision public notices require only items 1, 5, 9, and 10.

Per the Guidelines for Public Notification document mentioned above, include:

1. × A copy of the certified letter receipts with post marks (20.2.72.203.B NMAC)
2. × A list of the places where the public notice has been posted in at least four publicly accessible and conspicuous places, including the proposed or existing facility entrance. (e.g: post office, library, grocery, etc.)
3. × A copy of the property tax record (20.2.72.203.B NMAC).
4. × A sample of the letters sent to the owners of record.
5. × A sample of the letters sent to counties, municipalities, and Indian tribes.
6. × A sample of the public notice posted and a verification of the local postings.
7. × A table of the noticed citizens, counties, municipalities and tribes and to whom the notices were sent in each group.
8. × A copy of the public service announcement (PSA) sent to a local radio station and documentary proof of submittal.
9. × A copy of the classified or legal ad including the page header (date and newspaper title) or its affidavit of publication stating the ad date, and a copy of the ad. When appropriate, this ad shall be printed in both English and Spanish.
10. × A copy of the display ad including the page header (date and newspaper title) or its affidavit of publication stating the ad date, and a copy of the ad. When appropriate, this ad shall be printed in both English and Spanish.
11. × A map with a graphic scale showing the facility boundary and the surrounding area in which owners of record were notified by mail. This is necessary for verification that the correct facility boundary was used in determining distance for notifying land owners of record.

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Extra Services & Fees *(check box, add fee as appropriate)*
- ☐ Return Receipt (hardcopy) $
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage
$

Total Postage and Fees
$

Postmark Here

Sent To Lea County - County Manager

Street and Apt. No., or PO Box No. 100 N. Main Avenue, Suite 4

City, State, ZIP+4® Lovington, NM 88260

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

9589 0710 5270 0786 5002 27

9589 0710 5270 0786 5002 27

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PLACE STICKER AT TOP OF ENVELOPE TO THE RIGHT OF THE RETURN ADDRESS, FOLD AT DOTTED LINE

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- ☐ Adult Signature Restricted Delivery $

Postage
$

Total Postage and Fees
$

Postmark Here

Sent To Eddy County - County Manager

Street and Apt. No., or PO Box No. 101 W Greene Street, Suite 110

City, State, ZIP+4® Carlsbad, NM 88220

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

9589 0710 5270 0786 5002 10

9589 0710 5270 0786 5002 10

CERTIFIED MAIL®

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9589 0710 5270 0786 5002 10

2. Table of Posted Public Notice Locations

Name	Address	City	State	Zip Code
Facility Entrance				
Woolword Community Library	100 E. Utah Ave	Jal	NM	88252
Jal City Hall	309 South Main Street	Jal	NM	88252
Jal United States Post Office	111 South 4th Street	Jal	NM	88252

7.1 Table of Noticed Citizens

Name	Address	City	State	Zip Code
N/A - There are no neighbors within 0.5 miles of the facility fenceline.				

7.2 Table of Noticed Counties

Name	Address	City	State	Zip Code
Lea County - County Manager	100 N. Main Avenue, Suite 4	Lovington	NM	88260
Eddy County - County Manager	101 W Greene Street, Suite 110	Carlsbad	NM	88220

7.3 Table of Noticed Municipalities

Name	Address	City	State	Zip Code
N/A - There are no municipalities located within 10 miles of the facility fenceline.				

7.4 Table of Noticed Tribes

Name	Address	City	State	Zip Code
N/A - There are no tribes located within 10 miles of the facility fenceline.				

CERTIFIED MAIL 9589 0710 5270 0786 5002 27
RETURN RECEIPT REQUESTED *(certified mail is required, **return receipt is optional)***

Dear **Lea County – County Manager**,
Targa Northern Delaware, LLC announces its application submittal to the New Mexico Environment Department for an air quality permit for the **modification** of its **Big Lizard Compressor Station** facility. The expected date of application submittal to the Air Quality Bureau is **June 27, 2024.**

The exact location for the proposed facility known as, **Big Lizard Compressor Station**, is at latitude **32** deg**, 18** min, **27.48** sec and longitude **103** deg**, 37** min, **11.64** sec. The approximate location of this facility is **28** miles north-west of Jal in Lea County, New Mexico.

The proposed **modification** consists of updating NSR Permit 7960-M2 to authorize additional startup, shutdown, and maintenance (SSM) and malfunction (M) activities. The estimated maximum quantities of any regulated air contaminant will be as follows in pound per hour (pph) and tons per year (tpy) and could change slightly during the course of the Department's review:

Pollutant:	Pounds per hour	Tons per year
Particulate Matter (PM)	57 pph	8.2 tpy
PM_{10}	10 pph	8 tpy
$PM_{2.5}$	2.7 pph	8 tpy
Sulfur Dioxide (SO_2)	21 pph	87 tpy
Nitrogen Oxides (NO_x)	30 pph	130 tpy
Carbon Monoxide (CO)	41 pph	174 tpy
Volatile Organic Compounds (VOC) (with fugitives)	4,874 pph	249 tpy
Volatile Organic Compounds (VOC) (without fugitives)	4,867 pph	219 tpy
Total sum of all Hazardous Air Pollutants (HAPs)	194 pph	24 tpy
Hydrogen Sulfide (H_2S)	0.76 pph	1.1 tpy
Toxic Air Pollutant (TAP)	n/a pph	n/a tpy
Green House Gas Emissions as Total CO_2e	n/a	131,817 tpy

The standard and maximum operating schedules of the facility will be 24 hours a day, 7 days a week and a maximum of 52 weeks per year.
The owner and/or operator of the Facility is: **Targa Northern Delaware, LLC; 201 S 4th Street, Artesia, NM, 88210**

If you have any comments about the construction or operation of this facility, and you want your comments to be made as part of the permit review process, you must submit your comments in writing to this address: Permit Programs Manager; New Mexico Environment Department; Air Quality Bureau; 525 Camino de los Marquez, Suite 1; Santa Fe, New Mexico; 87505-1816. Other comments and questions may be submitted verbally. (505) 476-4300; 1 800 224-7009.
Please refer to the company name and facility name, or send a copy of this notice along with your comments, since the Department may have not yet received the permit application. Please include a legible return mailing address with your comments. Once the Department has performed a preliminary review of the application and its air quality impacts, the Department's notice will be published in the legal section of a newspaper circulated near the facility location.

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Sincerely,
Targa Northern Delaware, LLC
PO Box 1689, Lovington, NM 88260

Notice of Non-Discrimination
NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Part 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non-discrimination programs, policies or procedures, or if you believe that you have been discriminated against with respect to a NMED program or activity, you may contact: Kathryn Becker, Non-Discrimination Coordinator, NMED, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855, nd.coordinator@state.nm.us. You may also visit our website at https://www.env.nm.gov/non-employee-discrimination-complaint-page/ to learn how and where to file a complaint of discrimination.

General Posting of Notices – Certification

I, CINDY KLEIN, the undersigned, certify that on 6-25-2024, posted a true and correct copy of the attached Public Notice in the following publicly accessible and conspicuous places in the **City of Jal** of **Lea** County, State of New Mexico on the following dates:

1. Facility entrance Date: 6/25/2024
2. Woolworth Community Library, 100 E. Utah Ave, Jal, NM 88252, Date: 6-25-2024
3. Jal City Hall, ~~309 South Main Street,~~ 710 W. WYOMING AVE Jal, NM 88252, Date 6-25-2024
4. Jal United States Post Office, 111 South 4th Street, Jal, NM 88252, Date: 6-25-2024

Signed this 25th day of JUNE, 2024

Cindy Klein
Signature

6-25-2024
Date

CINDY KLEIN
Printed Name

ESH MANAGER, DOU
Title {APPLICANT OR RELATIONSHIP TO APPLICANT}


NOTICE
Targa Northern Delaware, LLC announces its application submittal to the New Mexico Environment Department for an air quality permit for the modification of its Big Lizard Compressor Station facility. The expected date of application submittal to the Air Quality Bureau is June 24, 2024.
The exact location for the proposed facility known as, Big Lizard Compressor Station, is at latitude 32 deg, 18 min, 27.48 sec and longitude 103 deg, 37 min, 11.64 sec. The approximate location of this facility is 28 miles north-west of Jal in Lea County, New Mexico.
The proposed modification consists of updating NSR Permit 7960-M2 to authorize additional startup, shutdown, and maintenance (SSM) and malfunction (M) activities. The estimated maximum quantities of any regulated air contaminant will be as follows in pound per hour (pph) and tons per year (tpy) and could change slightly during the course of the Department's review
Pollutant: Pounds per hour Tons per year
Particulate Matter (PM) 57 pph 8.2 tpy
Sulfur Dioxide (SO_2) 30 pph 130 tpy
Nitrogen Oxides (NO_x) 41 pph 174 tpy
Carbon Monoxide (CO)
Volatile Organic Compounds (VOC) (with fugitives)
Volatile Organic Compounds (VOC) (without fugitives)
Total sum of all Hazardous Air Pollutants (HAPs)
Hydrogen Sulfide (H_2S)
Toxic Air Pollutant (TAP)
Green House Gas Emissions as Total CO_2e
The standard and maximum operating schedules of the facility will be 24 hours a day, 7 days a week and a maximum of 52 weeks per year.
The owner and/or operator of the Facility is: Targa Northern Delaware, LLC; 201 S 4th Street, Artesia, NM, 88210
Attención
Notice of Non-Discrimination
Big Lizard
Compressor Station
EMERGENCY # 575.748.4555
Latitude
32.30763
Longitude
-103.61990
TARGA

NOTICE

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If you have any comments about the construction or operation of this facility, and you want your comments to be made as part of the permit review process, you must submit your comments in writing to this address: Permit Programs Manager; New Mexico Environment Department; Air Quality Bureau; 525 Camino de los Marquez, Suite 1; Santa Fe, New Mexico; 87505-1816. Other comments and questions may be submitted verbally. (505) 476-4300; 1 800 224-7009.

With your comments, please refer to the company name and facility name, or send a copy of this notice along with your comments. This information is necessary since the Department may have not yet received the permit application. Please include a legible return mailing address. Once the Department has completed its preliminary review of the application and its air quality impacts, the Department's notice will be published in the legal section of a newspaper circulated near the facility location.

Atención

Este es un aviso de la oficina de Calidad del Aire del Departamento del Medio Ambiente de Nuevo México, acerca de las emisiones producidas por un establecimiento en esta área. Si usted desea información en español, por favor comuníquese con esa oficina al teléfono 505-372-8373.

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06/25/2024 11:19 AM
32.112974, -103.192794

Submittal of Public Service Announcement – Certification

I, Daniel Dolce, the undersigned, certify that on **April 17, 2024**, submitted a public service announcement to **Radio1Square** that serves the City\Town\Village of **Hobbs**, **Lea** County, New Mexico, in which the source is or is proposed to be located and that **Radio1Square DID NOT RESPOND.**

Signed this 17 day of April, 2024,

Daniel Dolce
Signature

04/17/2024
Date

Daniel Dolce
Printed Name

Consultant - Trinity Consultants
Title {APPLICANT OR RELATIONSHIP TO APPLICANT}

Affidavit of Publicati

STATE OF NEW MEXICO
COUNTY OF LEA

I, Wade Cavitt, Owner of the Hobbs New
Sun, a newspaper published at Hobbs, N
Mexico, solemnly swear that the clipping
attached hereto was published in the reg
and entire issue of said newspaper, and
a supplement thereof for a period of 1
issue(s).

Beginning with the issue dated
June 26, 2024
and ending with the issue dated
June 26, 2024.

Owner

Sworn and subscribed to before me this
26th day of June 2024.

Business Manager

My commission expires
~~January 29, 2027~~
(Seal)

STATE OF NEW MEXICO
NOTARY PUBLIC
GUSSIE RUTH BLACK
COMMISSION # 1087526
COMMISSION EXPIRES 01/29/2027

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937 and payment of fees for said publication has been made.

LEGAL NOTICE
June 26, 2024

NOTICE OF AIR QUALITY PERMIT APPLICATION

Targa Northern Delaware, LLC announces its application submittal to the New Mexico Environment Department for an air quality permit for the **modification** of its **Big Lizard Compressor Station** facility. The expected date of application submittal to the Air Quality Bureau is **June 24, 2024**.

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Please refer to the company name and site name, or send a copy of this notice along with your comments, since the Department may have not yet received the permit application. Please include a legible return mailing address with your comments. Once the Department has performed a preliminary review of the application and its air quality impacts, the Department's notice will be published in the legal section of a newspaper circulated near the facility location.

General information about air quality and the permitting process, and links to the regulations can be found at the Air Quality Bureau's website: www.env.nm.gov/air-quality/permitting-section-home-page/. The regulation dealing with public participation in the permit review process is 20.2.72.206 NMAC.

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#00291637

01100104 00291637

TRACY POWELL
TRINITY CONSULTANTS, INC.
12700 PARK CENTRAL DR., STE. 600
DALLAS, TX 75251

Affidavit of Publicatio

STATE OF NEW MEXICO
COUNTY OF LEA

I, Wade Cavitt, Owner of the Hobbs News Sun, a newspaper published at Hobbs, N Mexico, solemnly swear that the clipping attached hereto was published in the regu and entire issue of said newspaper, and r a supplement thereof for a period of 1 issue(s).

Beginning with the issue dated
June 26, 2024
and ending with the issue dated
June 26, 2024.

Owner

Sworn and subscribed to before me this 26th day of June 2024.

Business Manager

My commission expires
January 29, 2027
(Seal) STATE OF NEW MEXICO
NOTARY PUBLIC
GUSSIE RUTH BLACK
COMMISSION # 1087526
COMMISSION EXPIRES 01/29/2027

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01100104 00291640

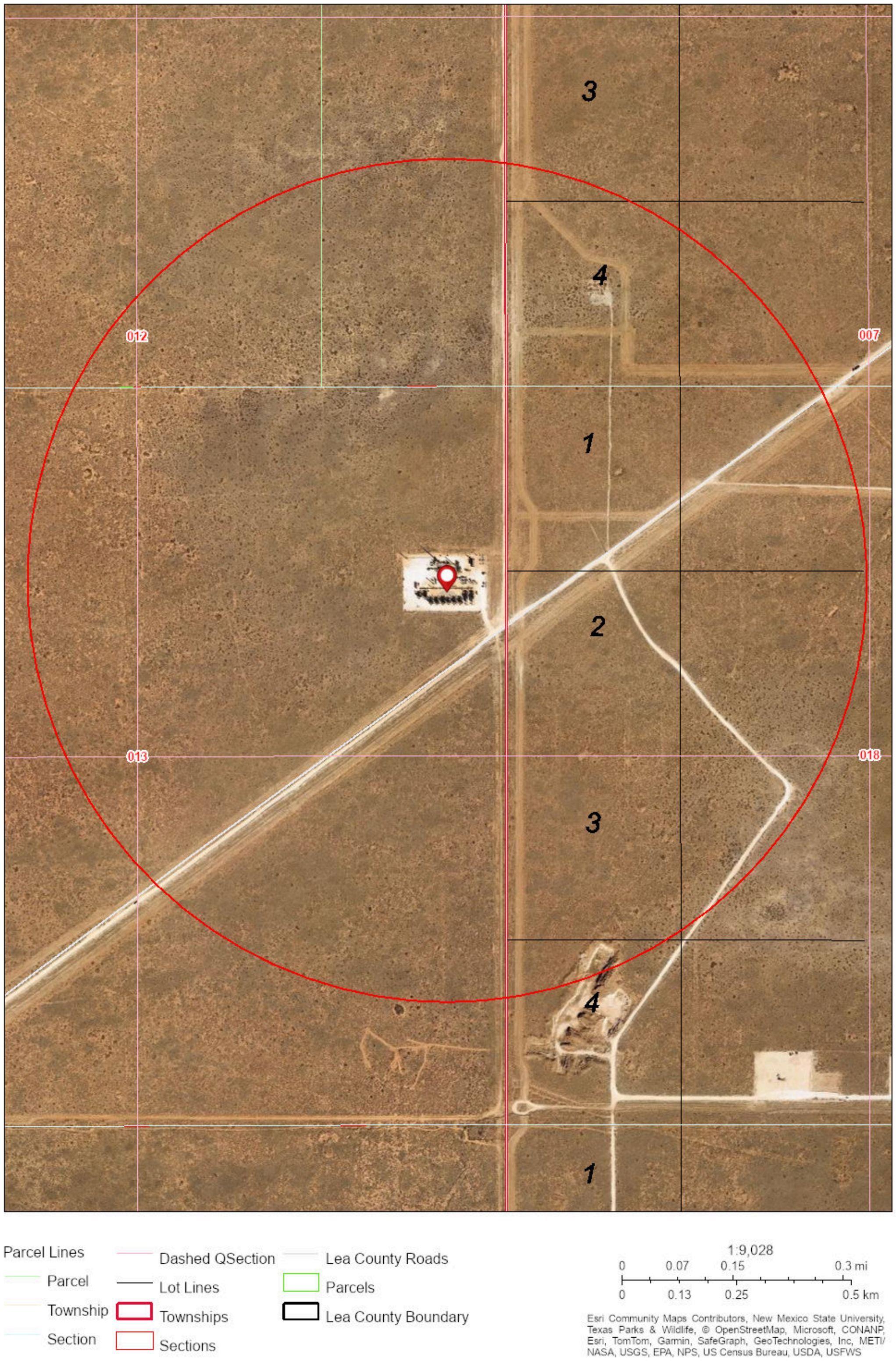
TRACY POWELL
TRINITY CONSULTANTS, INC.
12700 PARK CENTRAL DR., STE. 600
DALLAS, TX 75251

Big Lizard Compressor Station - Neighboring Parcel Report

Area of Interest (AOI) Information

Area : 652.47 acres

Apr 12 2024 13:42:28 Mountain Daylight Time



Parcels

#	Name	Mailing Address 1	Mailing City	Mailing State	Mailing Zipcode	Area(mi²)
1	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	0.06
2	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	0.08
3	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	0.09
4	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	0.33
5	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	0.47

Section 10

Written Description of the Routine Operations of the Facility

---

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 (NOx), 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 35 MMscfd for Dehy-1 and 2, and 25 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 35 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 98%, 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)**:**
Please see Table 2-A for an exhaustive list of sources that are evaluated in this section.

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.

× Yes ☐ **No**

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

× Yes ☐ **No**

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

× Yes ☐ **No**

C. Make a determination:

× 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)

A PSD applicability determination for all sources. For sources applying for a significant permit revision, apply the applicable requirements of 20.2.74.AG and 20.2.74.200 NMAC and to determine whether this facility is a major or minor PSD source, and whether this modification is a major or a minor PSD modification. It may be helpful to refer to the procedures for Determining the Net Emissions Change at a Source as specified by Table A-5 (Page A.45) of the EPA New Source Review Workshop Manual to determine if the revision is subject to PSD review.

A. This facility is:

- × **a minor PSD source before and after this modification (if so, delete C and D below).**
- ☐ **a major PSD source before this modification. This modification will make this a PSD minor source.**
- ☐ **an existing PSD Major Source that has never had a major modification requiring a BACT analysis.**
- ☐ **an existing PSD Major Source that has had a major modification requiring a BACT analysis**
- ☐ **a new PSD Major Source after this modification.**

B. **This facility is not one of the listed 20.2.74.501 Table I – PSD Source Categories. The "project" emissions** for this modification are **not significant. Project emission increases are less than 250 tpy for all criteria pollutants. The "project" emissions listed below do only result from changes described in this permit application, thus no emissions from other revisions or modifications, past or future to this facility. Also, specifically discuss whether this project results in "de-bottlenecking", or other associated emissions resulting in higher emissions. Debottlenecked emissions are not accounted for since the source is an existing minor NSR site. The project emissions (before netting) for this project are as follows [see Table 2 in 20.2.74.502 NMAC for a complete list of significance levels]:**

a. **NOx: 112.31 TPY**
b. **CO: 151.14 TPY**
c. **VOC: 216.50 TPY**
d. **SOx: 75.59 TPY**
e. **PM: 7.05 TPY**
f. **PM10: 6.93 TPY**
g. **PM2.5: 6.91 TPY**
h. **Fluorides: XX.X TPY**
i. **Lead: XX.X TPY**
j. **Sulfur compounds (listed in Table 2): H_2S 0.93 TPY**
k. **GHG: 114,615.25 TPY**

E. If this is an existing PSD major source, or any facility with emissions greater than 250 TPY (or 100 TPY for 20.2.74.501 Table 1 – PSD Source Categories), determine whether any permit modifications are related, or could be considered a single project with this action, and provide an explanation for your determination whether a PSD modification is triggered. **N/A**

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/

To save paper and to standardize the application format, delete this sentence, and begin your submittal for this attachment on this page.

Table for State Regulations:

State Regulation 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	20.2.3 NMAC is a SIP approved regulation that limits the maximum allowable concentration of Total Suspended Particulates, Sulfur Compounds, Carbon Monoxide and Nitrogen Dioxide. The facility meets maximum allowable concentrations of the TSP, SO_2, H_2S, NO_x, and CO under this regulation
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.
20.2.23 NMAC	Fugitive Dust Control	No for permitted facilities, possible for NOIs	Facility	This regulation may apply if, this is an application for a notice of intent (NOI) per 20.2.73 NMAC, if the activity or facility is a fugitive dust source listed at 20.2.23.108.A NMAC, **and** if the activity or facility is located in an area subject to a mitigation plan pursuant to 40 CFR 51.930. As of January 2019, the only areas of the State subject to a mitigation plan per 40 CFR 51.930 are in Doña Ana and Luna Counties. Sources exempt from 20.2.23 NMAC are activities and facilities subject to a permit issued pursuant to the NM Air Quality Control Act, the Mining Act, or the Surface Mining Act (20.2.23.108.B NMAC. **20.2.23.108 APPLICABILITY:** **A.** This part shall apply to persons owning or operating the following fugitive dust sources in areas requiring a mitigation plan in accordance with 40 CFR Part 51.930: **(1)** disturbed surface areas or inactive disturbed surface areas, or a combination thereof, encompassing an area equal to or greater than one acre; **(2)** any commercial or industrial bulk material processing, handling, transport or storage operations. **B.** The following fugitive dust sources are exempt from this part: **(1)** agricultural facilities, as defined in this part; **(2)** roadways, as defined in this part; **(3)** operations issued permits pursuant to the state of New Mexico Air Quality Control Act, Mining Act or Surface Mining Act; and **(4)** lands used for state or federal military activities. [20.2.23.108 NMAC - N, 01/01/2019]
20.2.33 NMAC	Gas Burning Equipment - Nitrogen Dioxide	No	N/A	This facility has no 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	This facility is not a natural gas processing plant.
20.2.37 and 20.2.36 NMAC	Petroleum Processing Facilities and	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.**

State Regulation 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.)
	Petroleum Refineries			
20.2.38 NMAC	Hydrocarbon Storage Facility	No	N/A	The Facility does not have any containers with a capacity of 20,000 gallons or a throughput of 30,000 gallons/week.
20.2.39 NMAC	Sulfur Recovery Plant - Sulfur	No	N/A	The Facility does not have a sulfur recovery plant.
20.2.50 NMAC	Oil and Gas Sector – Ozone Precursor Pollutants	Yes	Check the box for the subparts that are applicable: ☒ 113 – Engines and Turbines ☒ 114 – Compressor Seals ☒ 115 – Control Devices and Closed Vent Systems ☒ 116 – Equipment Leaks and Fugitive Emissions ☐ 117 – Natural Gas Well Liquid Unloading ☒ 118 – Glycol Dehydrators ☐ 119 – Heaters ☒ 120 – Hydrocarbon Liquid Transfers ☐ 121 – Pig Launching and Receiving ☒ 122 – Pneumatic Controllers and Pumps ☒ 123 – Storage Vessels ☐ 124 – Well Workovers ☐ 125 – Small Business Facilities ☐ 126 – Produced Water Management Unit ☐ 127 – Flowback Vessels and Preproduction Operations	113 – Units C-1-10 are subject to this subpart. The facility will comply with the requirements for engines. Trailer-1 is a diesel fired engine less than 500 hp; therefore, Trailer-1 is not subject to the requirements of this subpart. 114 – The reciprocating compressors associated with the engines (C-1-10) at this facility are subject to this subpart. Targa will comply with the applicable requirements of this subpart. 115 – Targa will comply with the applicable requirements of this subpart. 116 – Targa will comply with the applicable requirements of this subpart. 117 – There are no natural gas well liquid unloading activities at this facility; therefore, this subpart does not apply. 118 – Targa will comply with the requirements of this subpart. 119 – N/A – There are no heaters at this facility with a heat rating greater than 20 MMBtu/hr; therefore, this subpart does not apply. 120 – This facility is a gathering and boosting station with one or more controlled storage vessels and performs hydrocarbon liquid transfers and is therefore subject to the requirements of this subpart. 121 –N/A – Pigging activities at this unit are under 1 tpy VOC. Therefore, this subpart does not apply. 122 – Targa will comply with the applicable requirements of this subpart. 123 – The tanks at this facility will have a PTE of less than three tpy of VOC; therefore, this subpart does not apply. 124 – N/A – There are no well workovers at this facility; therefore, this subpart does not apply. 125 – N/A – This facility does not qualify as a small business facility; therefore, this subpart does not apply.

State Regulation 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.)
				126 – N/A – There are no produced water management units at this facility; therefore, this subpart does not apply. 127 – N/A – This is not a wellhead stie; therefore, this subpart does not apply.
20.2.61.109 NMAC	Smoke & Visible Emissions	Yes	C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10, RBL-1, RBL-2, RBL-3, AU-RB1, AU-RB2, FL-1, Trailer-1	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 and normally applies to the entire facility.
20.2.72 NMAC	Construction Permits	Yes	Facility	If subject, this would normally apply to the entire facility. Could apply if your facility's potential emission rate (PER) is greater than 10 pph or greater than 25 tpy for any pollutant subject to a state or federal ambient air quality standard (does not include VOCs or HAPs); if the PER of lead is 5 tpy or more; if your facility is subject to 20.2.72.400 NMAC; or if you have equipment subject to 40 CFR 60 Subparts I and OOO, 40 CFR 61 Subparts C and D. Include both stack and fugitive emissions to determine PER.
20.2.73 NMAC	NOI & Emissions Inventory Requirements	Yes	Facility	If subject, this would normally apply to the entire facility. **A Notice of Intent application 20.2.73.200 NMAC** could apply if your facility's PER of <u>any</u> regulated air pollutant, including VOCs and HAPs, is 10 tpy or more or if you have lead emissions of 1 tpy or more. Include both fugitive and stack emissions to determine your PER. You could be required to submit **Emissions Inventory Reporting per** 20.2.73.300 NMAC if your facility is subject to 20.2.73.200, 20.2.72, or emits more than 1 ton of lead or 10 tons of PM10, PM2.5, SOx, NOx CO, or VOCs in any calendar year. All facilities that are a Title V Major Source as defined at 20.2.70.7.R NMAC, are subject to Emissions Inventory Reporting.
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.

State Regulation 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.)
20.2.75 NMAC	Construction Permit Fees	Yes	Facility	This regulation establishes a schedule of operating permit emission fees. This facility is subject to 20.2.72 NMAC and in turn subject to 20.2.75 NMAC. The facility is exempt from annual fees under this part (20.2.75.11.E NMAC) as it is subject to fees pursuant to 20.2.71 NMAC.
20.2.77 NMAC	New Source Performance	Yes	C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10, AU-1	Engines and amine unit may be subject to NSPS JJJJ depending on manufacture dates. NSPS OOOO/OOOOa may apply depending on manufacture/construction date of compressors.
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	This regulation establishes requirements for the evaluation of stack heights and other dispersion techniques. This regulation does not apply as all stacks at the facility follow good engineering practice.
20.2.82 NMAC	MACT Standards for source categories of HAPS	Yes	C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10, Dehy-1, Dehy-2, Dehy-3, RBL-1, RBL-2, RBL-3, AU-1, AU-RB1, AU-RB2, FL-1, FUG-1, SSM, M	This regulation applies to all sources emitting hazardous air pollutants, which are subject to the requirements of 40 CFR Part 63.

Table for Applicable Federal Regulations:

Federal Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
40 CFR 50	NAAQS	No	N/A	The modeling and conditions developed from the modeling are the applicable requirements to demonstration compliance with the NAAQs.

Federal Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
NSPS 40 CFR 60, Subpart A	General Provisions	Yes	C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10, FUG-1, AU-1	Engines may be subject to NSPS JJJJ, compressors and amine unit may be subject to NSPS OOOO or OOOOa. [40 CFR §60.5385 and or 40 CFR §60.5385a] Applicability is dependent upon manufacture dates of equipment, which are TBD. Facility fugitives will be subject to NSPS OOOOa. [40 CFR §60.5400a] Tanks 1, 2, and 3 are not subject to 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	Yes	AU-RB1, AU-RB2	The listed units are steam generating units for which construction, modification or reconstruction is commenced after June 9, 1989 and that have a maximum design heat input capacity of 29 MW (100 MMBtu/hr) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr).
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.

Federal Regulation 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	The compressors associated with C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, and C-10 are not subject to 40 CFR §60.5385 due to construction dates after September 18, 2015. Fugitives and storage tanks are not subject to Subpart OOOO due to being constructed after September 18, 2015.
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	C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10, FUG-1	The compressors associated with C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, and C-10 are subject to this regulation. TK-1, TK-2, and TK-3 emit less than 6 tpy of VOC, therefore they are not subject to this subpart. Facility fugitives (FUG-1) 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 regulation establishes standards of performance for stationary compression ignition internal combustion engines. This rule applies to IC engines (diesel engines) that commenced construction after July 11, 2005. Trailer-1 is a diesel fired compression ignition engine, however, Trailer-1 will not be stationary for more than 12 months; therefore, this regulation does not apply.
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	Yes	C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10	The compressors associated with C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, and C-10 may be subject to 40 CFR §60.4320(a)(4) depending upon manufacture dates.
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.

Federal Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
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). Note: If 40 CFR 60 also applies source only needs to comply with this part.
MACT 40 CFR 63, Subpart A	General Provisions	Yes	C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10, Dehy-1, Dehy-2, Dehy-3	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
MACT 40 CFR 63 Subpart HHH		No	N/A	This facility is not a natural gas transmission or storage facility. Thus this subpart does not apply,

Federal Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
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.
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	C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10	C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, and C-10 are subject to this subpart, however this subpart may be superseded by NSPS 40 CFR Part 60 Subpart JJJJ depending on the dates of manufacture.
40 CFR 64	**Compliance Assurance Monitoring**	Yes	AU-1, FL-1, Dehy-1, Dehy-2, Dehy-3	Units will comply with CAM plans as outlined in the issued Title V permit, P289.
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	This regulation does not apply as this facility does not generate commercial electric power or electric power for sale.
Title IV – Acid Rain 40 CFR 73	**Sulfur Dioxide** Allowance Emissions	No	N/A	This regulation does not apply as this facility does not generate commercial electric power or electric power for sale.
Title IV-Acid Rain 40 CFR 75	**Continuous Emissions Monitoring**	No	N/A	This regulation does not apply as this facility does not generate commercial electric power or electric power for sale.
Title IV – Acid Rain 40 CFR 76	**Acid Rain** Nitrogen Oxides **Emission Reduction Program**	No	N/A	This regulation does not apply as this facility does not generate commercial electric power or electric power for sale.

Federal Regulation Citation	**Title**	**Applies? Enter Yes or No**	**Unit(s) or Facility**	**Justification:**
Title VI – 40 CFR 82	Protection of **Stratospheric Ozone**	No	N/A	EPA Guidance Page for 40 CFR 82: https://www.epa.gov/section608 40 CFR 82 may apply if you: **(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: www.env.nm.gov/air-quality/permitting-section-procedures-and-guidance/. 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.	X
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.	
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.

Universal Application 4

Air Dispersion Modeling Report

Refer to and complete Section 16 of the Universal Application form (UA3) to assist your determination as to whether modeling is required. If, after filling out Section 16, you are still unsure if modeling is required, e-mail the completed Section 16 to the AQB Modeling Manager for assistance in making this determination. If modeling is required, a modeling protocol would be submitted and approved prior to an application submittal. The protocol should be emailed to the modeling manager. A protocol is recommended but optional for minor sources and is required for new PSD sources or PSD major modifications. Fill out and submit this portion of the Universal Application form (UA4), the "Air Dispersion Modeling Report", only if air dispersion modeling is required for this application submittal. This serves as your modeling report submittal and should contain all the information needed to describe the modeling. No other modeling report or modeling protocol should be submitted with this permit application.

16-A: Identification		
1	Name of facility:	Big Lizard Compressor Station
2	Name of company:	Targa Northern Delaware, LLC
3	Current Permit number:	7960-M2
4	Name of applicant's modeler:	John Ke
5	Phone number of modeler:	651-275-9900 x2406
6	E-mail of modeler:	jke@trinityconsultants.com

16-B: Brief			
1	Was a modeling protocol submitted and approved?	Yes☒	No☐
2	Why is the modeling being done?	Adding New Equipment	
3	Describe the permit changes relevant to the modeling.		
	Adding one (1) heater trailer (Unit Trailer-1); removing three (3) generator engines (Units GEN-1, GEN-2, GEN-3); Adding Startup, shutdown, and maintenance emissions (Unit SSM), and malfunction emissions (Unit M); Updated emission factors for site compressor engines (Units C-1 through C-10), increase throughput for tanks and loading (Units TK-1-3 and Load-1), route emissions from tanks and loading to site flare (Unit FL-1); Increase fugitive components (Unit FUG-1); Incorporate updates from a inlet gas analysis (Units Dehy1-3, Rbl-1-3, AU-1, AU-RB 1-2).		
4	What geodetic datum was used in the modeling?	WGS84	
5	How long will the facility be at this location?	Longer than 1 year	

6	Is the facility a major source with respect to Prevention of Significant Deterioration (PSD)?	Yes☐	No☒
7	Identify the Air Quality Control Region (AQCR) in which the facility is located	155	
8	List the PSD baseline dates for this region (minor or major, as appropriate).		
	NO2	3/6/1988	
	SO2	7/28/1978	
	PM10	2/20/1979	
	PM2.5	11/13/2013	
9	Provide the name and distance to Class I areas within 50 km of the facility (300 km for PSD permits).		
	N/A – Carlsbad Caverns National Park – 72.0 KM		
10	Is the facility located in a non-attainment area? If so describe below	Yes☐	No☒
	N/A		
11	Describe any special modeling requirements, such as streamline permit requirements.		
	N/A		

16-C: Modeling History of Facility

1 Describe the modeling history of the facility, including the air permit numbers, the pollutants modeled, the National Ambient Air Quality Standards (NAAQS), New Mexico AAQS (NMAAQS), and PSD increments modeled. (Do not include modeling waivers).

Pollutant	Latest permit and modification number that modeled the pollutant facility-wide.	Date of Permit	Comments
CO	N/A	N/A	
NO_2	7960-M1	4/18/2019	
SO_2	7960-M1	4/18/2019	
H_2S	7960-M1	4/18/2019	
PM2.5	7960-M1	4/18/2019	
PM10	7960-M1	4/18/2019	
Lead	N/A	N/A	
Ozone (PSD only)	N/A	N/A	
NM Toxic Air Pollutants (20.2.72.402 NMAC)	N/A	N/A	

16-D: Modeling performed for this application

1 For each pollutant, indicate the modeling performed and submitted with this application.
Choose the most complicated modeling applicable for that pollutant, i.e., culpability analysis assumes ROI and cumulative analysis were also performed.

	Pollutant	ROI	Cumulative analysis	Culpability analysis	Waiver approved	Pollutant not emitted or not changed.
	CO	☒	☐	☐	☐	☐
	NO_2	☒	☒	☐	☐	☐
	SO_2	☒	☒	☐	☐	☐
	H_2S	☒	☒	☐	☐	☐
	PM2.5	☒	☒	☒	☐	☐
	PM10	☒	☒	☒	☐	☐
	Lead	☐	☐	☐	☐	☒
	Ozone	☐	☐	☐	☐	☒
	State air toxic(s) (20.2.72.402 NMAC)	☐	☐	☐	☐	☒

16-E: New Mexico toxic air pollutants modeling

1 List any New Mexico toxic air pollutants (NMTAPs) from Tables A and B in 20.2.72.502 NMAC that are modeled for this application.
N/A – No TAPs were modeled at this facility.

2 List any NMTAPs that are emitted but not modeled because stack height correction factor. Add additional rows to the table below, if required.

Pollutant	Emission Rate (pounds/hour)	Emission Rate Screening Level (pounds/hour)	Stack Height (meters)	Correction Factor	Emission Rate/ Correction Factor

16-F: Modeling options

1	Was the latest version of AERMOD used with regulatory default options? If not explain below.	Yes☒	No☐

16-G: Surrounding source modeling

1	Date of surrounding source retrieval	6/14/2024

2 If the surrounding source inventory provided by the Air Quality Bureau was believed to be inaccurate, describe how the sources modeled differ from the inventory provided. If changes to the surrounding source inventory were made, use the table below to describe them. Add rows as needed.

AQB Source ID	Description of Corrections
722E6	Updating coordinates to facility center
30051E7	Updating coordinates to facility center
30051E8	Updating coordinates to facility center

16-H: Building and structure downwash

1	How many buildings are present at the facility?	0		
2	How many above ground storage tanks are present at the facility?	3		
3	Was building downwash modeled for all buildings and tanks? If not explain why below.		Yes☐	No☒
	No point sources are located within 5 times of the width of the storage tanks, which is the lesser dimension between the width and height of the storage tanks.			
4	Building comments	N/A		

16-I: Receptors and modeled property boundary

1	"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 a 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. A Restricted Area is required in order to exclude receptors from the facility property. If the facility does not have a Restricted Area, then receptors shall be placed within the property boundaries of the facility. Describe the fence or other physical barrier at the facility that defines the restricted area.		
	The property is enclosed by a fence and receptors are placed starting along the fenceline.		
2	Receptors must be placed along publicly accessible roads in the restricted area. Are there public roads passing through the restricted area?	Yes☐	No☒
3	Are restricted area boundary coordinates included in the modeling files?	Yes☒	No☐
4	Describe the receptor grids and their spacing. The table below may be used, adding rows as needed.		

Grid Type	Shape	Spacing	Start distance from restricted area or center of facility	End distance from restricted area or center of facility	Comments
Variable Density	Square	50	0	800	
Variable Density	Square	100	800	3,000	
Variable Density	Square	250	3,000	6,000	
Variable Density	Square	500	6,000	10,000	
Variable Density	Square	1000	10,000	50,000	

5	Describe receptor spacing along the fence line.
	25 m spacing
6	Describe the PSD Class I area receptors.
	PSD Class I modeling is not required as the nearest Class I area is over 50 km away from the facility.

16-J: Modeling Scenarios

1	Identify, define, and describe all modeling scenarios. Examples of modeling scenarios include using different production rates, times of day, times of year, simultaneous or alternate operation of old and new equipment during transition periods, etc. Alternative operating scenarios should correspond to all parts of the Universal Application and should be fully described in Section 15 of the Universal Application (UA3).
	SSM/FUG/LOAD contains the combined emissions from SSM/M (not including compressor blowdowns), facility fugitives, and liquid loading. Abrasive blasting SSM/M occurs once a year for a total of six hours and can only occur between the hours of 7 am and 7pm. This activity produces 6.79 lb/hr PM_{10} and 0.68 lb/hr $PM_{2.5}$. According to the NMED modeling guidelines: "'…[W]hen n years are modeled, the (n+1)th highest concentration over the n-year period is the design value, since this represents an average or expected exceedance rate of one per year.' (https://www.epa.gov/sites/production/files/2020-09/documents/appw_05.pdf)" For NAAQS PM_{10}, since five meteorological years were modeled, the high sixth highest concentration was used as the design value. By definition, the high sixth high means the facility can be in exceedance of the NAAQS standard a total of six days of the year. Since abrasive blasting only occurs during one day of the year, Targa will count that day towards one of the six days of exceedance. Similarly, for PSD PM_{10} and $PM_{2.5}$, as the PSD threshold is based on the high second highest concentration, Targa will count that day towards one of the two days of exceedance. Thus SSM/FUG/LOAD were removed from the NAAQS and PSD PM_{10} and PSD $PM_{2.5}$ 24-hr models. The high fifth high concentration for the 24-hr PM_{10} model and the high first high concentration for the 24-hr PM_{10} and $PM_{2.5}$ PSD model was compared to the standards. SSM/FUG/LOAD are still included in the PM_{10} and $PM_{2.5}$ annual models. Targa also annualized the lb/hr abrasive blasting emissions for the annual models.
2	Which scenario produces the highest concentrations? Why?
	N/A

3	Were emission factor sets used to limit emission rates or hours of operation? (This question pertains to the "SEASON", "MONTH", "HROFDY" and related factor sets, not to the factors used for calculating the maximum emission rate.)	Yes☐	No☒
4	If so, describe factors for each group of sources. List the sources in each group before the factor table for that group. (Modify or duplicate table as necessary. It's ok to put the table below section 16-K if it makes formatting easier.) Sources:		

5	Hour of Day	Factor	Hour of Day	Factor								
	1		13									
	2		14									
	3		15									
	4		16									
	5		17									
	6		18									
	7		19									
	8		20									
	9		21									
	10		22									
	11		23									
	12		24									

	If hourly, variable emission rates were used that were not described above, describe them below.		
6	Were different emission rates used for short-term and annual modeling? If so describe below.	Yes☒	No☐
	Different lb/hr emission rates were used for the Trailer, the control flare, and combined fugitive sources. The trailer only operates 40 hours/yr, the control flare's hourly rate represents the worst-case hourly scenario, and the combined fugitive sources include abrasive blasting that only occurs 6 hours each year.		

16-K: NO_2 Modeling

1	Which types of NO_2 modeling were used? Check all that apply.			
	☒	ARM2		
	☐	100% NO_X to NO_2 conversion		
	☐	PVMRM		
	☐	OLM		
	☐	Other:		
2	Describe the NO_2 modeling.			
	The ARM2 Methodology was used with the default maximum and minimum ambient ratios			
3	Were default NO_2/NO_X ratios (0.5 minimum, 0.9 maximum or equilibrium) used? If not describe and justify the ratios used below.		Yes☒	No☐
4	Describe the design value used for each averaging period modeled.			
	1-hour: High eighth high Annual One Year Annual Average:			

16-L: Ozone Analysis

1	NMED has performed a generic analysis that demonstrates sources that are minor with respect to PSD do not cause or contribute to any violations of ozone NAAQS. The analysis follows. The basis of the ozone SIL is documented in *Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program*, EPA, April 17, 2018 and associated documents. NMED accepts this SIL basis and incorporates it into this permit record by reference. Complete documentation of the ozone concentration analysis using MERPS is included in the New Mexico Air Quality Bureau Air Dispersion Modeling Guidelines.
2	The MERP values presented in Table 10 and Table 11 of the NM AQB Modeling Guidelines that produce the highest concentrations indicate that facilities emitting no more than 250 tons/year of NO_X and no more than 250 tons/year of VOCs will cause less formation of O_3 than the O_3 significance level. $$[O_3]_{8-hour} = \left(\frac{250\,\frac{ton}{yr}}{340_{MERP_{NOX}}} + \frac{250\,\frac{ton}{yr}}{4679_{MERP_{VOC}}} \right) \times 1.96\ \mu g/m^3$$ =1.546 $\mu g/m^3$, which is below the significance level of 1.96 $\mu g/m^3$.

	Sources that produce ozone concentrations below the ozone SIL do not cause or contribute to air contaminant levels exceeding the ozone NAAQS.				
3	Does the facility emit at least 250 tons per year of NO_X or at least 250 tons per year of VOCs? Sources that emit at least 250 tons per year of NO_X or at least 250 tons per year of VOCs are covered by the analysis above and require an individual analysis.			Yes☐	No☒
5	For new PSD Major Sources or PSD major modifications, if MERPs were used to account for ozone fill out the information below. If another method was used describe below.				
	NO_X (ton/yr)	$MERP_{NOX}$	VOCs (ton/yr)	$MERP_{VOC}$	$[O_3]_{8\text{-hour}}$
	N/A	N/A	N/A	N/A	N/A

16-M: Particulate Matter Modeling

1	Select the pollutants for which plume depletion modeling was used.	
	☐	PM2.5
	☐	PM10
	☒	None

2	Describe the particle size distributions used. Include the source of information.		
	N/A		
3	Does the facility emit at least 40 tons per year of NO_X or at least 40 tons per year of SO_2? Sources that emit at least 40 tons per year of NO_X or at least 40 tons per year of SO_2 are considered to emit significant amounts of precursors and must account for secondary formation of PM2.5.	Yes☒	No☐
4	Was secondary PM modeled for PM2.5?	Yes☐	No☒

5	If MERPs were used to account for secondary PM2.5 fill out the information below. If another method was used describe below.			
	Pollutant	NO_X	SO_2	$[PM2.5]_{24\text{-hour}}$
	$MERP_{annual}$	26780	14978	0.064
	$MERP_{24\text{-hour}}$	7331	1981	$[PM2.5]_{annual}$
	Emission rate (ton/yr)	112.31	75.59	0.00185

16-N: Setback Distances

1	Portable sources or sources that need flexibility in their site configuration requires that setback distances be determined between the emission sources and the restricted area boundary (e.g. fence line) for both the initial location and future locations. Describe the setback distances for the initial location.
	N/A

2	Describe the requested, modeled, setback distances for future locations, if this permit is for a portable stationary source. Include a haul road in the relocation modeling.		
	N/A		

16-O: PSD Increment and Source IDs

1	The unit numbers in the Tables 2-A, 2-B, 2-C, 2-E, 2-F, and 2-I should match the ones in the modeling files. Do these match? If not, provide a cross-reference table between unit numbers if they do not match below.	Yes☐	No☒

Unit Number in UA-2	Unit Number in Modeling Files
C-10	18347
C-9	18346
C-3	18171
C-4	18155
C-7	18338
C-8	18339
C-1	ENG7
C-5	ENG8
C-2	ENG9
C-6	ENG10
RBL-1	RBL1
RBL-2	RBL2
RBL-3	RBL3
AU-RB1	AURB1
AU-Rb2	AURB2
FL-1	FL1
Trailer-1	Trailer
Load-1/FUG-1/SSM/M	SSM

2	The emission rates in the Tables 2-E and 2-F should match the ones in the modeling files. Do these match? If not, explain why below.	Yes☒	No☐
3	Have the minor NSR exempt sources or Title V Insignificant Activities" (Table 2-B) sources been modeled?	Yes☐	No☒
4	Which units consume increment for which pollutants?		

Unit ID	NO_2	SO_2	PM10	PM2.5
18347	Yes	Yes	Yes	Yes
18346	Yes	Yes	Yes	Yes
18171	Yes	Yes	Yes	Yes
18155	Yes	Yes	Yes	Yes
18338	Yes	Yes	Yes	Yes
18339	Yes	Yes	Yes	Yes
ENG7	Yes	Yes	Yes	Yes
ENG8	Yes	Yes	Yes	Yes
ENG9	Yes	Yes	Yes	Yes

	ENG10	Yes	Yes	Yes	Yes
	RBL1	Yes	Yes	Yes	Yes
	RBL2	Yes	Yes	Yes	Yes
	RBL3	Yes	Yes	Yes	Yes
	AURB1	Yes	Yes	Yes	Yes
	AURB2	Yes	Yes	Yes	Yes
	FL1	Yes	Yes	No	No
	Trailer	Yes	Yes	Yes	Yes
	SSM	No	No	Yes	Yes
5	PSD increment description for sources. (for unusual cases, i.e., baseline unit expanded emissions after baseline date).	N/A			
6	Are all the actual installation dates included in Table 2A of the application form, as required? This is necessary to verify the accuracy of PSD increment modeling. If not please explain how increment consumption status is determined for the missing installation dates below.	Yes☒	No☐		

16-P: Flare Modeling

1	For each flare or flaring scenario, complete the following			
	Flare ID (and scenario)	Average Molecular Weight	Gross Heat Release (cal/s)	Effective Flare Diameter (m)
	FL1	42.27 g/mol	1,600,941	1.049

16-Q: Volume and Related Sources

1	Were the dimensions of volume sources different from standard dimensions in the Air Quality Bureau (AQB) Modeling Guidelines? If not please explain how increment consumption status is determined for the missing installation dates below.	Yes☐	No☒
2	Describe the determination of sigma-Y and sigma-Z for fugitive sources.		
	The determination of the initial lateral dimension and initial vertical dimension was completed according to the guidance set forth in Section 5.3.2 of the NMED's Air Dispersion Modeling Guidelines (Revised December 2023).		
3	Describe how the volume sources are related to unit numbers. Or say they are the same.		
	Instead of modeling individual volume sources for condensate loading (LOAD-1), facility fugitives (Fug-1), and startup, shutdown, and maintenance emissions (SSM), the sources were grouped together as one source modeled at the center of the facility.		
4	Describe any open pits.		
	N/A		
5	Describe emission units included in each open pit.		
	N/A		

16-R: Background Concentrations

1	Were NMED provided background concentrations used? Identify the background station used below. If non-NMED provided background concentrations were used describe the data that was used.	Yes☒	No☐
	CO: N/A		
	NO_2: Outside Carlsbad (350151005)		
	PM2.5: Hobbs-Jefferson (350450019)		
	PM10: Hobbs-Jefferson (350250008)		
	SO_2: N/A		
	Other:		
	Comments: N/A		
2	Were background concentrations refined to monthly or hourly values? If so describe below.	Yes☐	No☒

16-S: Meteorological Data

1	Was NMED provided meteorological data used? If so select the station used. Carlsbad	Yes☒	No☐
2	If NMED provided meteorological data was not used describe the data set(s) used below. Discuss how missing data were handled, how stability class was determined, and how the data were processed.		
	N/A		

16-T: Terrain

1	Was complex terrain used in the modeling? If not, describe why below.	Yes☐	No☒
	N/A		
2	What was the source of the terrain data?		
	Terrain was incorporated into the modeling analysis through the use of AERMAP with the most recent 1/3 degree NED data currently available from https://apps.nationalmap.gov/downloader/#/		

16-U: Modeling Files

1 Describe the modeling files:

File name (or folder and file name)	Pollutant(s)	Purpose (ROI/SIA, cumulative, culpability analysis, other)
Big Lizard CS_CO SIL	CO	ROI/SIA
Big Lizard CS_H2S SIL	H_2S	ROI/SIA
Big Lizard CS_NO2 1hr SIL	NO_2	ROI/SIA
Big Lizard CS_NO2 Annual SIL	NO_2	ROI/SIA
Big Lizard CS_PM25 24hr SIL	$PM_{2.5}$	ROI/SIA
Big Lizard CS_PM25 Annual SIL	$PM_{2.5}$	ROI/SIA

	Big Lizard CS_PM10 24hr SIL	PM_{10}	ROI/SIA
	Big Lizard CS_PM10 Annual SIL	PM_{10}	ROI/SIA
	Big Lizard CS_SO2 1hr SIL	SO_2	ROI/SIA
	Big Lizard CS_SO2 3hr 24hr SIL	SO_2	ROI/SIA
	Big Lizard CS_SO2 Annual SIL	SO_2	ROI/SIA
	Big Lizard CS_H2S NMAAQS	H_2S	Cumulative – ½-hour H_2S NMAAQS
	Big Lizard CS_NO2 1hr NAAQS	NO_2	Cumulative – 1-hr NO_2 NAAQS
	Big Lizard CS_NO2 Annual NAAQS PSD Class II	NO_2	Cumulative – Annual NO_2 NAAQS/PSD
	Big Lizard CS_PM25 24hr NAAQS	$PM_{2.5}$	Cumulative – 24-hr $PM_{2.5}$ NAAQS
	Big Lizard CS_PM25 24hr PSD Class II	$PM_{2.5}$	Cumulative – 24-hr $PM_{2.5}$ PSD
	Big Lizard CS_PM25 24hr PSD Class II Culpability	$PM_{2.5}$	Culpability – 24-hr $PM_{2.5}$ PSD
	Big Lizard CS_PM25 Annual NAAQS	$PM_{2.5}$	Cumulative – Annual $PM_{2.5}$ NAAQS
	Big Lizard CS_PM25 Annual PSD Class II	$PM_{2.5}$	Cumulative – Annual $PM_{2.5}$ NAAQS
	Big Lizard CS_PM10 24hr NAAQS	PM_{10}	Cumulative – 24-hr PM_{10} NAAQS
	Big Lizard CS_PM10 24hr NAAQS Culpability	PM_{10}	Culpability – 24-hr PM_{10} NAAQS
	Big Lizard CS_PM10 24hr PSD Class II	PM_{10}	Cumulative – 24-hr PM_{10} PSD
	Big Lizard CS_PM10 24hr PSD Class II Culpability	PM_{10}	Culpability – 24-hr PM_{10} PSD
	Big Lizard CS_SO2 1hr NAAQS	SO_2	Cumulative – 1-hr SO_2 NAAQS
	Big Lizard CS_SO2 3hr 24hr PSD Class II	SO_2	Cumulative – 3-hr SO_2 PSD
	Big Lizard CS_SO2 24hr PSD Class II	SO_2	Cumulative – 24-hr SO_2 PSD
	Big Lizard CS_SO2 Annual PSD Class II	SO_2	Cumulative – Annual SO_2 PSD

16-V: PSD New or Major Modification Applications

1	A new PSD major source or a major modification to an existing PSD major source requires additional analysis. Was preconstruction monitoring done (see 20.2.74.306 NMAC and PSD Preapplication Guidance on the AQB website)?	Yes☐	No☒
2	If not, did AQB approve an exemption from preconstruction monitoring?	Yes☐	No☒
3	Describe how preconstruction monitoring has been addressed or attach the approved preconstruction monitoring or monitoring exemption.		
	N/A		
4	Describe the additional impacts analysis required at 20.2.74.304 NMAC.		
	N/A		
5	If required, have ozone and secondary PM2.5 ambient impacts analyses been completed? If so describe below.	Yes☐	No☒
	N/A		

16-W: Modeling Results

1	If ambient standards are exceeded because of surrounding sources, a culpability analysis is required for the source to show that the contribution from this source is less than the significance levels for the specific pollutant. Was culpability analysis performed? If so describe below.	Yes☒	No☐
	A culpability analysis was conducted for 24-hr PM_{10} NAAQS, 24-hr PM_{10} PSD Class II, and 24-hr $PM_{2.5}$ PSD Class II. The analysis showed that for all receptors that exceeded the NAAQS or PSD threshold, the Big Lizard Compressor Station contribution was less than the relevant SIL. Thus, the Big Lizard Compressor Station does not cause or contribute to an exceedance of the NAAQS or PSD Class II increment. An editable excel file is included with the modeling files, along with relevant postfiles.		
2	Identify the maximum concentrations from the modeling analysis. Rows may be modified, added and removed from the table below as necessary.		

Pollutant, Time Period and Standard	Modeled Facility Concentration (µg/m3)	Modeled Concentration with Surrounding Sources (µg/m3)	Secondary PM (µg/m3)	Background Concentration (µg/m3)	Cumulative Concentration (µg/m3)	Value of Standard (µg/m3)	Percent of Standard	Location		
								UTM E (m)	UTM N (m)	Elevation (ft)
CO 8-hr SIL	266.62	-	-	-	266.62	500	53.3%	629807	3575371	3710.04
CO 1-hr SIL	400.53	-	-	-	400.53	2000	20.0%	629649	3575533	3712.20
H_2S 1/2-hr SIL	118.66	-	-	-	118.66	5	Significant	629810	3575492	3711.45
NO_2 Annual SIL	9.98	-	-	-	9.98	1	Significant	629735	3575491	3712.04
NO_2 1-hr SIL	187.94	-	-	-	187.94	7.52	Significant	629649	3575383	3709.38
$PM_{2.5}$ Annual SIL	0.65	-	-	-	0.65	0.13	Significant	629735	3575491	3712.04
$PM_{2.5}$ 24-hr SIL	51.29	-	-	-	51.29	1.2	Significant	629785	3575492	3713.09
PM_{10} Annual SIL	0.72	-	-	-	0.72	1	72.2%	629735	3575491	3712.04
PM_{10} 24-hr SIL	588.49	-	-	-	588.48708	5	Significant	629785	3575492	3713.09
SO_2 Annual SIL	2.55	-	-	-	2.55	1	Significant	629860	3575493	3710.99

Pollutant, Time Period and Standard	Modeled Facility Concentration (µg/m3)	Modeled Concentration with Surrounding Sources (µg/m3)	Secondary PM (µg/m3)	Background Concentration (µg/m3)	Cumulative Concentration (µg/m3)	Value of Standard (µg/m3)	Percent of Standard	Location		
								UTM E (m)	UTM N (m)	Elevation (ft)
SO_2 24-hr SIL	47.68	-	-	-	47.68	5	Significant	629807	3575371	3710.04
SO_2 3-hr SIL	122.34	-	-	-	122.34	25	Significant	629810	3575492	3711.45
SO_2 1-hr SIL	119.08	-	-	-	119.08	7.8	Significant	629810	3575492	3711.45
H_2S 1/2-hr NMAAQS	-	120.71	-	-	120.71	139.3	86.7%	629785	3575492	3713.09
NO_2 Annual PSD Class II Increment	8.98	-	-	9.3	18.28	25	73.1%	629735	3575491	3712.04
NO_2 Annual NMAAQS	8.98	-	-	9.3	18.28	94.02	19.4%	629735	3575491	3712.04
NO_2 1-hr NAAQS	128.19	-	-	54.5	182.69	188.03	97.2%	629949	3575433	3709.61
$PM_{2.5}$ Annual PSD Class II Increment	-	2.49	0.00185	-	2.49	4	62.2%	629735	3575491	3712.04
$PM_{2.5}$ Annual NAAQS	-	1.70	0.00185	7.1	8.80	9	97.8%	629735	3575491	3712.04
$PM_{2.5}$ 24-hr PSD Class II Increment	-	9.94	0.064	-	10.01	9	Exceeds Standards - Refer to Culpability Analysis	630099	3576933	3728.51
$PM_{2.5}$ 24-hr NAAQS	-	4.44	0.064	16.5	21.00	35	60.0%	629949	3575433	3709.61
PM_{10} 24-hr PSD Class II Increment	-	106.52	-	-	106.52	30	Exceeds Standards - Refer to Culpability Analysis	627199	3574133	3708.33

Pollutant, Time Period and Standard	Modeled Facility Concentration (µg/m3)	Modeled Concentration with Surrounding Sources (µg/m3)	Secondary PM (µg/m3)	Background Concentration (µg/m3)	Cumulative Concentration (µg/m3)	Value of Standard (µg/m3)	Percent of Standard	Location		
								UTM E (m)	UTM N (m)	Elevation (ft)
PM_{10} 24-hr NAAQS	-	85.49	-	100.7	186.19	150	Exceeds Standards - Refer to Culpability Analysis	627199	3574133	3708.33
SO_2 Annual PSD Class II Increment	0.00	4.09	-	-	4.09	20	20.4%	629649	3575583	3711.81
SO_2 24-hr PSD Class II Increment	0.00	43.41	-	-	43.41	91	47.7%	630999	3576033	3717.13
SO_2 3-hr PSD Class II Increment	0.00	54.74	-	-	54.74	512	10.7%	631199	3575833	3715.78
SO_2 1-hr NAAQS	0.00	93.78	-	-	93.78	196	47.8%	631099	3575833	3716.17

16-X: Summary/conclusions	
1	A statement that modeling requirements have been satisfied and that the permit can be issued.
	Targa has demonstrated that the proposed changes to NSR Permit 7960-M2 would neither nor cause nor contribute to an exceedance of the standards for CO, H_2S, NO_2, $PM_{2.5}$, PM_{10}, and SO_2.

From: Kassanjee, Sahil, ENV <sahil.kassanjee@env.nm.gov>
Sent: Tuesday, July 2, 2024 9:24 AM
To: Daniel Dolce
Cc: Mustafa, Sufi A., ENV
Subject: Big Lizard Protocol Update

Daniel,

The protocol for Big Lizard compressor station was accepted. I'll be modeling it over the next week or so.

If you have any questions, feel free to contact me.

Regards,

Sahil Kassanjee

Environmental Scientist/Specialist – Air Modeling
(505)629-3808
Sahil.Kassanjee@env.nm.gov

AIR DISPERSION MODELING PROTOCOL

NSR Significant Revision Modeling Protocol

Targa Northern Delaware, LLC
Big Lizard Compressor Station

Prepared By:

Andrea Sayles – Managing Consultant

TRINITY CONSULTANTS
1800 W Loop S #1000
Houston, TX 77027

June 2024

Project 243201.0014

1. INTRODUCTION

The Big Lizard Compressor Station (Big Lizard) is a natural gas compressor station for transport of natural gas owned and operated by Targa Northern Delaware, LLC (Targa). Gas enters the facility through an inlet separator, is compressed, then sweetened, and then dehydrated before transported offsite via pipeline. The facility collects and stores condensate generated at the inlet separator and compressors, which will be transported offsite via truck. Big Lizard is located approximately 43.0 miles west-southwest of Eunice, NM in Lea County.

Targa is submitting an application pursuant to 20.2.72.219.D.(1)(a) NMAC for a significant revision of NSR Permit No. 7960-M2. The purpose of this revision is for: the addition of one (1) heater trailer (unit Trailer-1), startup, shutdown and maintenance emissions (unit SSM), and malfunction emissions (unit M); the removal of one (1) storage tank (Unit TK-4) and three (3) generators (GEN-1 through GEN-3); and the modification of all other units based on a recent inlet gas analysis (units C-1 through C-10, RBL-1 through RBL-3, AU-RB 1 & AU-RB 2, FL-1, Tk-1 through TK-3, LOAD-1, FUG-1).

Targa seeks to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS), New Mexico Ambient Air Quality Standards (NMAAQS), and PSD Increment standards as applicable for the following pollutants and averaging periods: NO_2 (1-hour and annual), CO (1-hour and 8-hour), SO_2 (1-hour, 3-hour, 24-hour, and annual), H_2S (1-hour), $PM_{2.5}$ (24-hour and annual), and PM_{10} (24-hour and annual).

1.1 Facility Description and Location

The approximate UTM coordinates of the facility are 629,930 meters East and 3,575,370 meters North with WGS84 datum at an elevation of approximately 3,715 feet above mean sea level.

2. PROPOSED MODELING

2.1 Model Input Options

The latest version of the AERMOD dispersion model (version 23122) will be used for this analysis. The model will be run in regulatory mode with all default options. The ARM2 method will be used to convert NO_X to NO_2. Default minimum and maximum ambient ratios will be utilized.

Tables 1 and 2 shows the emission sources and stack parameters for the facility including the new units. Please note that emissions and stack parameters may vary throughout the development of this application.

Table 1 - Emission point sources and stack parameters to be included in the air dispersion modeling.

Unit Number	NO_x lb/hr	CO lb/hr	SO_2 lb/hr	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	H_2S lb/hr	Height ft	Temp F	Velocity ft/s	Diam. ft
C-10	1.52	1.52	0.12	0.10	0.10	0.0033	22	849	173.9	1.00
C-9	1.52	1.52	0.12	0.10	0.10	0.0033	22	849	173.9	1.00
C-3	2.07	2.07	0.15	0.13	0.13	0.0041	22	812	111.8	1.50
C-4	2.07	2.07	0.15	0.13	0.13	0.0041	22	812	111.8	1.50
C-7	2.76	2.76	0.19	0.17	0.17	0.0054	22	825	151.2	1.50
C-8	2.76	2.76	0.19	0.17	0.17	0.0054	22	825	151.2	1.50
C-1	2.07	2.07	0.15	0.13	0.13	0.0041	22	812	111.8	1.50
C-5	2.07	2.07	0.15	0.13	0.13	0.0041	22	812	111.8	1.50
C-2	2.07	2.07	0.15	0.13	0.13	0.0041	22	812	111.8	1.50
C-6	2.07	2.07	0.15	0.13	0.13	0.0041	22	812	111.8	1.50
RBL-1	0.16	0.13	0.0073	0.012	0.012	0	20	600	9.5	0.83
RBL-2	0.16	0.13	0.0073	0.012	0.012	0	20	600	9.5	0.83
RBL-3	0.16	0.13	0.0073	0.012	0.012	0	20	600	9.47	0.83
AU-Rb 1	1.47	1.24	0.068	0.11	0.11	0	30	600	39.1	1.83
AU-Rb 2	1.47	1.24	0.068	0.11	0.11	0	30	600	39.1	1.83
FL-1	1.31	10.99	15.64	0	0	0.17	20	1832	65.6	3.44
Trailer-1	0.30	0.18	0.59	0.023	0.023	0	15	782	305.8	0.70

Table 2 - Emission volume sources to be included in the air dispersion modeling.

Volume Source	Averaging Period	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	H_2S lb/hr	Release Height ft	Initial lateral Dimension ft	Initial Vertical Dimension ft
SSM	1-hr	-	-	2.70	25	25.58	23.26
	24-hr *	0.070	0.0054	-	25	25.58	23.26
	Annual**	0.074	0.0058	-	25	25.58	23.26

* Abrasive blasting emissions were removed from the PM_{10} and $PM_{2.5}$ 24-hr models.
** Abrasive blasting emissions are included in the PM_{10} and $PM_{2.5}$ annual models but will contain annualized emissions.

Unit SSM contains a variety of startup, shutdown, maintenance, and malfunction activities, including compressor blowdowns, pipeline blowdowns, pigging, abrasive blasting, tank degassing, etc. All blowdowns are represented as a single volume source called SSM located at the center of the facility.

Abrasive blasting SSM/M occurs once a year for a total of six hours and can only occur between the hours of 7 am and 7pm. This activity produces 6.72 lb/hr PM_{10} and 0.67 lb/hr $PM_{2.5}$. According to the NMED modeling guidelines:

> "The 24-hour NAAQS is not to be exceeded more than once per year. Use high second high and a single year of representative meteorological data. This is approximately equivalent to the high fourth high specified in the multi-year analysis. '…[W]hen n years are modeled, the (n+1)th highest concentration over the n-year period is the design value, since this represents an average or expected exceedance rate of one per year.' (https://www.epa.gov/sites/production/files/2020-09/documents/appw_05.pdf)"

Since five meteorological years are being modeled, the high sixth highest concentration would be the design value. By definition, the high sixth high means the facility can be in exceedance of the NAAQS standard a total of six days of the year. Since abrasive blasting would only occur during one day of the year, Targa proposes for that day to count towards one of the six days of exceedance and to remove SSM from the NAAQS PM_{10} and $PM_{2.5}$ 24-hr models. The high fifth high concentration would then be the design value for the 24-hr models which would then be compared to the standard. Targa will still have to show compliance with the annual standard in which SSM would still be included in the annual models. Targa also proposes to annualize the lb/hr abrasive blasting emissions for the annual models. The unit will be represented with its reduced hours of operations within the models.

There are no structures located at this facility. The facility tanks will be modeled as volumes sources. Therefore, a downwash analysis using the latest version of BPIP is not required.

2.2 Receptor Grid Description and Elevation Data

The center point of the facility will be designated at 629,930 meters east and 3,575,370 meters north. This center point will serve as the center point for a variable density circular receptor grid. The facility fenceline will be modeled using 25-meter grid spacing. A 50-meter grid spacing will extend out to 800 meters in each direction from the facility center point for a very fine grid resolution. A 100-meter grid spacing will extend from 800 meters to 3,000 meters in each direction for a fine grid resolution. A 250-meter grid spacing will extend from 3,000 meters to 6,000 meters in each direction for a medium grid resolution. A 500-meter grid spacing will extend from 6,000 meters to 10,000 meters in each direction for a coarse grid resolution. A 1000-meter grid spacing will extend from 10,000 meters to 50,000 meters in each direction for a very coarse grid resolution. It is expected that the highest impacts from the proposed source will be at or near the facility property.

The elevations of receptors and facility sources will be determined using the most recent NED data currently available (1/3 arc-second DEM).

2.3 Meteorological Data

The Carlsbad NWS dataset will be used for five meteorological years (2017-2021) as available on the NMED website.

2.4 Significance Analysis (SIL) and Cumulative Impact Analysis (CIA)

The modeled ground-level concentrations will be compared to the corresponding significant impact levels (SILs) to determine whether any modeled ground-level concentrations at any receptor locations are greater than the SIL (i.e., "significant" receptors). If the significance analysis reveals that modeled ground-level concentrations for a particular pollutant and averaging period are greater than the applicable SIL, a Cumulative Impact Analysis (CIA) will be performed at the significant receptors. The CIA will include impacts from the facility sources and background concentrations/surround sources if applicable.

If necessary, the background concentration used for NO_2 from the Carlsbad Monitor (5ZR) will be used. The Hobbs-Jefferson Monitor (5ZS) dataset will be used for PM_{10} background concentrations. The inclusion of background concentrations will follow the guidance shown in Table 20: "Modeling the Design Value Summary (Default Modeling)" from the Modeling Guidelines[1].

For $PM_{2.5}$, the dataset for the Hobbs-Jefferson Monitor in the NMED modeling guidelines is based on data from 2017 to 2021. While this timeframe is adequate for 24-hour averaging period models, recent updates to the $PM_{2.5}$ annual standards by the EPA suggest that the Hobbs-Jefferson dataset from 2017 to 2021 may be outdated for annual background concentration assessments. Therefore, Targa believes it is necessary to update this dataset to include more recent data from 2021 to 2023. By using the most recent Hobbs-Jefferson data, Targa aims to calculate a new background concentration that better reflects the current conditions in the area. This is done by calculating the weighted annual mean concentration, averaged over the 3-year period, based on the methodology identified in 40 CFR 50, Appendix N.

Based on the NMED Modeling Guidelines for SO_2 modeling, if the facility is in the Pecos-Permian Basin Intrastate AQCR (AQCR 155), it will be modeled with surrounding sources, as representative monitoring is not available for background data.

For $PM_{2.5}$ and PM_{10} modeling, the facility will be modeled with nearby sources, secondary formation (if applicable), and a background concentration. For modeling nearby sources, all sources within 10 km of the facility will be included in the model. An inventory of the surrounding sources will be obtained from the NMED MergeMaster. Based on EPA's Guidance for $PM_{2.5}$ Permit Modeling and NMED'S Modeling Guidelines, sources that emit at least 40 tons per year of NO_x or at least 40 tons per year of SO_2 are considered to emit significant amounts of precursors. Sources with significant increases of $PM_{2.5}$ precursors must qualitatively and/or quantitatively account for the secondary formation of $PM_{2.5}$. The secondary formation of $PM_{2.5}$ will be calculated in this modeling following the NMED Modeling Guidelines.

For H_2S modeling, the engines, tanks, flare, truck loading, fugitives, and SSM/M are sources H_2S. The engines and flare will be modeled as point sources, and the tanks, truck loading, fugitives, and SSM/M will be modeled as volume sources. Based on the NMED Modeling Guidelines for H_2S modeling, if the facility is in the Pecos-Permian Basin Intrastate AQCR, H_2S will be modeling using the 1-hour averaging time and compared to the 1/2-hour averaging period.

2.5 PSD Increment Analysis

If the results of the ROI analysis for NO_X, SO_2, PM_{10}, or $PM_{2.5}$ indicate concentrations greater than significance levels, PSD increment analysis will be conducted for the appropriate averaging periods. If required, the PSD increment analysis will be conducted including all PSD increment consuming and

[1] New Mexico Air Quality Bureau Air Dispersion Modeling Guidelines Revised December 2023

expanding sources within 25 km of the facility, plus sources emitting over 1000 pounds per hour within 50 km of the facility. The surrounding source information will be obtained from NMED MergeMaster. The predicted maximum concentrations will be compared to the appropriate Class II PSD Standard.

2.6 Class I Areas Analysis

The nearest Class I area is Carlsbad Caverns National Park at 72.0 km from the facility. Since the nearest Class I area is more than 50 km away, a Class I analysis is not required.

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 No.	Test Description	Test Date
C-1	PEA	3/27/2024
C-2	PEA	3/26/2024
C-3	PEA	3/25/2024
C-4	PEA	3/22/2024
C-3	PEA	3/25/2024
C-6	PEA	12/8/2023
C-7	PEA	3/15/2024
C-8	PEA	12/8/2023
C-9	PEA	3/26/2024
C-10	PEA	3/24/2024

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 22: Certification

Company Name: Targa Northern Delaware, LLC

I, Jimmy E Oxford, 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 19th day of June, 2024, upon my oath or affirmation, before a notary of the State of

Texas.

*Signature Date 6/19/24

Jimmy E Oxford
Printed Name

VP Operations
Title

Scribed and sworn before me on this 19th day of June 2024.

My authorization as a notary of the State of Texas expires on the

13th day of March, 2026.

Notary's Signature Date 6/19/24

Neil Conway
Notary's Printed Name

NEIL P CONWAY
Notary ID #129737310
My Commission Expires
March 13, 2026
NOTARY PUBLIC STATE OF TEXAS

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