1512 Larimer
Street
Suite 540
Denver, CO 80202

September 11, 2019

Mr. Ted Schooley
Air Permits Program Manager
Air Quality Bureau
New Mexico Environment Department
525 Camino De los Marquez, Suite 1
Santa Fe, New Mexico 87505

Re: New Source Review (NSR) Construction Permit Application Revision for the 3Bear Libby Gas Plant

Dear Mr. Schooley,

This application and accompanying material is a revision of New Source Review (NSR) Construction Permit No. 7482 for the 3Bear Libby Gas Plant (Libby), owned and operated by 3 Bear Delaware Operating – NM, LLC (3Bear). NSR Permit No. 7482 was issued on January 8, 2018. The attached application describes the equipment and processes proposed and includes an alternate operating scenario to allow flexibility in engine installation.

Please note that Sections 18, 19, and 21 of the Universal Application were not applicable to the facility in question and so were omitted from this application.

If you have any questions regarding this submittal, please contact me at (303) 862-3967 or stephanie@3bearllc.com.

Sincerely,

Stephanie Swanson

Manager of Engineering
3 Bear Delaware Operating – NM, LLC
1512 Larimer St. Suite 540
Denver, CO 80202
Cell: (303) 862-3967
stephanie@3bearllc.com

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

Universal Air Quality Permit Application

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

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

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

Acknowledgements:
☑ I acknowledge that a pre-application meeting is available to me upon request. ☐ Title V Operating, Title IV Acid Rain, and NPR applications have no fees.
☑ $500 NSR application Filing Fee enclosed OR ☐ The full permit fee associated with 10 fee points (required w/ streamline applications).
☑ Check No.: 41602 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.
☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance program (SBEAP) and qualifies for 50% of the normal application and permit fees. Enclosed is a check for 50% of the normal application fee which will be verified with the Small Business Certification Form for your company.
☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance Program (SBEAP) but does not qualify for 50% of the normal application and permit fees. To see if you qualify for SBEAP assistance and for the small business certification form go to https://www.env.nm.gov/aqb/sbap/small_business_criteria.html).

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

Section 1 – Facility Information

Section 1-A: Company Information

		AI # if known (see 1st 3 to 5 #s of permit IDEA ID No.): 38067	Updating Permit/NOI #: 7482
1	Facility Name: 3Bear Libby Gas Plant	Plant primary SIC Code (4 digits): 1321	
		Plant NAIC code (6 digits): 211130	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): From the intersection of US-180 W/US-62 and W/W Marland Blvd in Hobbs, NM, head west on US-180 W/US-62 for 22.6 miles. Turn Left (Southerly) onto Co Rd 27A for 6.5 miles. The facility location will be on the right.		

2	Plant Operator Company Name: 3 Bear Delaware Operating – NM, LLC	Phone/Fax: (303) 626-8290
a	Plant Operator Address: 1512 Larimer St. Suite 540, Denver, CO 80202	
b	Plant Operator's New Mexico Corporate ID or Tax ID: 5501695	
3	Plant Owner(s) name(s): 3 Bear Delaware Operating – NM, LLC	Phone/Fax: (303) 626-8290
a	Plant Owner(s) Mailing Address(s): 1512 Larimer St. Suite 540, Denver, CO 80202	
4	Bill To (Company): 3 Bear Delaware Operating – NM, LLC	Phone/Fax: (303) 626-8290
a	Mailing Address: 1512 Larimer St. Suite 540, Denver, CO 80202	E-mail: info@3bearllc.com
5	☐ Preparer: ☑ Consultant: Barr Engineering Co.	Phone/Fax: (303) 503-4735
a	Mailing Address: 1600 Broadway Suite 1600, Denver, CO 80202	E-mail: LMarquez@barr.com
6	Plant Operator Contact: Stephanie Swanson	Phone/Fax: (303) 862-3967
a	Address: 1512 Larimer St. Suite 540, Denver, CO 80202	E-mail: stephanie@3bearllc.com
7	Air Permit Contact: Lori Marquez	Title: Senior Air Quality Consultant
a	E-mail: LMarquez@barr.com	Phone/Fax: (303) 503-4735
b	Mailing Address: 1600 Broadway Suite 1600, Denver, CO 80202	
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: P-
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: 7482
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: 2.5 MMscf	Daily: 60 MMScf	Annually: 21,900 MMScf
b	Proposed	Hourly: 2.5 MMscf	Daily: 60 MMScf	Annually: 21,900 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: 2.5 MMscf	Daily: 60 MMScf	Annually: 21,900 MMScf
b	Proposed	Hourly: 2.5 MMscf	Daily: 60 MMScf	Annually: 21,900 MMScf

Section 1-D: Facility Location Information

1	Section: NESE 26	Range: 34E	Township: 20S	County: Lea	Elevation (ft): 3,713
2	UTM Zone: ☐ 12 or ☑ 13			Datum: ☐ NAD 27 ☐ NAD 83 ☑ WGS 84	
a	UTM E (in meters, to nearest 10 meters): 638430			UTM N (in meters, to nearest 10 meters): 3601510	
b	**AND** Latitude (deg., min., sec.): 32° 32' 32.49" N			Longitude (deg., min., sec.): 103° 31' 32.62" W	
3	Name and zip code of nearest New Mexico town: Monument, 88240				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): From the intersection of US-180 W/US-62 and W/W Marland Blvd in Hobbs, NM, head west on US-180 W/US-62 for 22.6 miles. Turn Left (Southerly) onto Co Rd 27A for 6.5 miles. The facility location will be on the right.				
5	The facility is 16.2 (distance) miles SW (direction) of Monument (nearest town).				
6	Status of land at facility (check one): ☑ Private ☐ Indian/Pueblo ☐ Federal BLM ☐ Federal Forest Service ☐ Other (specify)				
7	List all municipalities, Indian tribes, and counties within a ten (10) mile radius (20.2.72.203.B.2 NMAC) of the property on which the facility is proposed to be constructed or operated: Lea County				
8	**20.2.72** NMAC applications **only**: Will the property on which the facility is proposed to be constructed or operated be closer than 50 km (31 miles) to other states, Bernalillo County, or a Class I area (see www.env.nm.gov/aqb/modeling/class1areas.html)? ☑ Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers: Texas - 43 km				
9	Name nearest Class I area: Carlsbad Cavern National Park				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): 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: 17,940 m				
12	Method(s) used to delineate the Restricted Area: Signs and 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 ($\frac{\text{hours}}{\text{day}}$): 24	($\frac{\text{days}}{\text{week}}$): 7	($\frac{\text{weeks}}{\text{year}}$): 52	($\frac{\text{hours}}{\text{year}}$): 8,760			
2	Facility's maximum daily operating schedule (if less than 24 $\frac{\text{hours}}{\text{day}}$)?	Start:	☐AM ☐PM	End:	☐AM ☐PM		
3	Month and year of anticipated start of construction: 11/2017						
4	Month and year of anticipated construction completion: Upon approval of NSR Construction Permit						

5	Month and year of anticipated startup of new or modified facility: Upon approval of NSR Construction Permit
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:		
a	If yes, NOV date or description of issue:		NOV Tracking No:
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:	Date:	Requirement # (or page # and paragraph #):
d	Provide the required text to be inserted in this permit:		
2	Is air quality dispersion modeling or modeling waiver being submitted with this application? ☑ Yes ☐ No		
3	Does this facility require an "Air Toxics" permit under 20.2.72.400 NMAC & 20.2.72.502, Tables A and/or B? ☐ Yes ☑ No		
4	Will this facility be a source of federal Hazardous Air Pollutants (HAP)? ☑ Yes ☐ No		
a	If Yes, what type of source? ☐ **Major** (☐ ≥10 tpy of any single HAP **OR** ☐ ≥25 tpy of any combination of HAPS) **OR** ☑ **Minor** (☑ <10 tpy of any single HAP **AND** ☑ <25 tpy of any combination of HAPS)		
5	Is any unit exempt under 20.2.72.202.B.3 NMAC? ☐ Yes ☑ No		
a	If yes, include the name of company providing commercial electric power to the facility: _____ Commercial power is purchased from a commercial utility company, which specifically does not include power generated on site for the sole purpose of the user.		

Section 1-G: Streamline Application **(This section applies to 20.2.72.300 NMAC Streamline applications only)**

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

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

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

1	Responsible Official (R.O.) (20.2.70.300.D.2 NMAC):		Phone:
a	R.O. Title:	R.O. e-mail:	
b	R. O. Address:		
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC):		Phone:
a	A. R.O. Title:	A. R.O. e-mail:	
b	A. R. O. Address:		
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):		
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.):		
a	Address of Parent Company:		
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.):		

6	Telephone numbers & names of the owners' agents and site contacts familiar with plant operations:
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:

Section 1-I – Submittal Requirements

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

Hard Copy Submittal Requirements:

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

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

3) The entire NOI or Permit application package, including the full modeling study, should be submitted electronically. Upon receipt of the application fee, the Bureau will email the applicant with instructions for submitting the electronic files through a secure file transfer service. Optionally, the applicant may submit the files with the application on compact disk (CD) or digital versatile disc (DVD).

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

5) 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. 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, Universal Application section 3-19, and Universal Application 4, the modeling report) and 1 Excel file of the tables (Universal Application section 2). 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 # (0 for original, 1, 2, etc.; which will help keep track of subsequent partial update(s) to the original submittal. 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 #	Manufacturer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2] / Date of Construction/ Reconstruction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
ENG-1	Inlet Compressor Engine, x1	Caterpillar	G3508	TBD	690 hp	690 hp	> 7/1/2010 >6/12/2006	N/A ENG-1	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
ENG 2-4	Inlet Compressor Engine, x3	Caterpillar	G3516	TBD	1,380 hp	1,380 hp	11/20/2017 , > 7/1/2010, TBD >6/12/2006	N/A ENG 2-4	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
ENG 5-8	Residue Compressor Engine, x4	Caterpillar	G3516	TBD	1,380 hp	1,380 hp	> 7/1/2010 >6/12/2006	N/A ENG 5-8	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
ENG-9	Generator Engine, x1	Olympian	250LG6	TBD	374 hp	374 hp	> 7/1/2010 >6/12/2006	N/A ENG-9	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SRB	N/A
TK-1	Gunbarrel Tank, x1	TBD	TBD	TBD	500 bbl	500 bbl	4/2018 4/2018	FL-2 TK-1	40400301 / 40400302	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
TK 2-5	Stabilized Condensate Tanks, x4	TBD	TBD	TBD	400 bbl	400 bbl	4/2018 1/8/2018	FL-2 TK 2-5	31000212	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
TK-6	Slop Oil Tanks, x1	TBD	TBD	TBD	400 bbl	400 bbl	4/2018 1/8/2018	FL-2 TK-6	40400301 / 40400302	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
PWTK-1	Produced Water Tank, x1	TBD	TBD	TBD	400 bbl	400 bbl	4/2018 4/2018	FL-2 PWTK-1	40400301 / 40400302	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
HTR-1	Hot Oil Heater, x1	TBD	TBD	TBD	50 MMBtu/hr	50 MMBtu/hr	4/2018 1/8/2018	N/A HTR-1	30600105	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
HTR-2	Regen Gas Heater, x1	TBD	TBD	TBD	11 MMBtu/hr	11 MMBtu/hr	4/2018 1/8/2018	N/A HTR-2	30600105	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
CONDLOAD-1	Truck Loading (Cond Loadout)	N/A	N/A	N/A	N/A	N/A	N/A N/A	FL-2 N/A	2310021030	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
OILLOAD-1	Truck Loading (Oil Loadout)	N/A	N/A	N/A	N/A	N/A	N/A N/A	FL-2 N/A	2310021030	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
FUG-1	Equipment Leaks (OOOOa Fugitives)	N/A	N/A	N/A	N/A	N/A	N/A > 9/18/2015	N/A N/A	31088811	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
FUG-2	Equipment Leaks (Residue Fugitives)	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	N/A
AMINE-1	Amine Unit, x1	TBD	TBD	TBD	60 MMScf/d	60 MMScf/d	2018 1/8/2018	TO-1 AMINE-1	31000305	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
COMP	Compressor Blowdowns, x7	TBD	TBD	N/A	N/A	N/A	N/A N/A	FL-1 N/A	31000313	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
PLANT BD	Plant Blowdown, x1	TBD	TBD	N/A	N/A	N/A	N/A N/A	FL-1 N/A	31000199	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
TO-1	Thermal Oxidizer, x1	TBD	TBD	TBD	N/A	N/A	2/2018 1/8/2018	N/A TO-1	31000199	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
FL-1	Upset/Maintenance Flare, x1	TBD	TBD	TBD	N/A	N/A	N/A 1/8/2018	N/A FL-1	31000160	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
FL-2	Tank Flare, x1	TBD	TBD	TBD	N/A	N/A	N/A 1/8/2018	N/A FL-2	31000160	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
HR 1	Road Dust, x1	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31000199	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
MAIN-1	Maintenance Activities	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31000199	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
UP/MAL	Upsets/Malfunctions	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31000199	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	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. Date of construction/reconstruction is the approval date of NSR Permit No. 7482.

[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 igni

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

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

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

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

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

Table 2-C: Emissions Control Equipment

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

Control Equipment Unit No.	Control Equipment Description	Date Installed	Controlled Pollutant(s)	Controlling Emissions for Unit Number(s)[1]	Efficiency (% Control by Weight)	Method used to Estimate Efficiency
ENG-1	Oxidation Catalyst amd Air Fuel Ratio Controller	>6/12/2006	VOC, CO and CH2O	ENG-1	19% VOC, 22% CO and 50% CH2O	Subpart JJJJ (VOC and CO) / Permit Condition (CH2O)
ENG 2-8	Oxidation Catalyst amd Air Fuel Ratio Controller	>6/12/2006	VOC, CO and CH2O	ENG 2-8	31% VOC, 68% CO and 80% CH2O	Subpart JJJJ (VOC) / Permit Condition (CO and CH2O)
TO-1	Thermal Oxidizer	1/8/2018	VOC, H2S	AMINE-1	98%	Engineering Assumption
FL-1	Upset/Maintenance Flare	1/8/2018	VOC	AMINE-1 (Backup), COMP, PLANT BD, Misc Maintenance	95%	Engineering Assumption
FL-2	Tank Flare	1/8/2018	VOC	TK 1-6, PWTK-1, CONDLOAD-1, OILLOAD-1	95%	Engineering Assumption

[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
ENG-1	1.52	6.66	3.93	17.19	1.70	7.46	0.02	0.07	0.06	0.25	0.06	0.25	0.06	0.25	--	--	--	--
ENG-2	3.04	13.33	7.39	32.39	3.47	15.19	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG*	**3.04**	**13.33**	**7.39**	**32.39**	**3.47**	**15.19**	**0.03**	**0.14**	**0.11**	**0.50**	**0.11**	**0.50**	**0.11**	**0.50**	**--**	**--**	**--**	**--**
ENG-3	3.04	13.33	7.39	32.39	3.47	15.19	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-4	3.04	13.33	7.39	32.39	3.47	15.19	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-5	3.04	13.33	7.39	32.39	3.47	15.19	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-6	3.04	13.33	7.39	32.39	3.47	15.19	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-7	3.04	13.33	7.39	32.39	3.47	15.19	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-8	3.04	13.33	7.39	32.39	3.47	15.19	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-9	0.82	3.61	1.65	7.22	0.67	2.92	0.01	0.05	0.09	0.38	0.09	0.38	0.09	0.38	--	--	--	--
TK-1	--	--	--	--	22.64	99.18	--	--	--	--	--	--	--	--	--	--	--	--
TK 2-5	--	--	--	--	7.98	34.95	--	--	--	--	--	--	--	--	--	--	--	--
TK-6	--	--	--	--	0.85	3.72	--	--	--	--	--	--	--	--	--	--	--	--
PWTK-1	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
HTR-1	1.69	7.40	2.84	12.43	0.19	0.81	0.10	0.42	0.26	1.12	0.26	1.12	0.26	1.12	--	--	--	--
HTR-2	0.74	3.26	0.62	2.73	0.04	0.18	0.02	0.09	0.06	0.25	0.06	0.25	0.06	0.25	--	--	--	--
CONDLOAD-1	--	--	--	--	99.91	27.35	--	--	--	--	--	--	--	--	--	--	--	--
OILLOAD-1	--	--	--	--	99.91	0.19	--	--	--	--	--	--	--	--	--	--		
FUG-1	--	--	--	--	11.30	51.24	--	--	--	--	--	--	--	--	0.00	0.00	--	--
FUG-2	--	--	--	--	0.01	0.06	--	--	--	--	--	--	--	--	0.00	0.00		
AMINE-1	--	--	--	--	41.44	181.50	--	--	--	--	--	--	--	--	--	--	--	--
COMP	--	--	--	--	2.27	9.95	--	--	--	--	--	--	--	--	--	--	--	--
PLANT BD	--	--	--	--	32803.52	16.40	--	--	--	--	--	--	--	--	--	--	--	--
TO-1	1.63	7.15	1.37	6.01	4.26	18.64	64.45	235.24	0.00	0.00	0.00	0.00	0.00	0.00	--	--	--	--
FL-1	170.49	26.44	777.23	120.53	93.36	16.00	6.30	1.34	5.75	0.88	5.75	0.88	5.75	0.88	--	--	--	--
FL-2	0.89	3.91	4.07	17.82	0.09	0.39	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	--	--	--	--
HR-1	--	--	--	--	--	--	--	--	12.49	0.23	3.18	0.06	0.32	0.01	--	--	--	--
MAIN-1	--	--	--	--	--	10.00	--	--	--	--	--	--	--	--	--	--	--	--
UP/MAL	--	--	--	--	--	10.00	--	--	--	--	--	--	--	--	--	--	--	--
Totals	197.57	145.06	839.55	393.45	33212.71	589.85	71.10	238.11	19.44	6.35	10.13	6.18	7.27	6.13	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).

* - Composite emissions represent worse case compressor engine emissions

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
ENG-1	1.52	6.66	3.04	13.33	1.38	6.06	0.02	0.07	0.06	0.25	0.06	0.25	0.06	0.25	--	--	--	--
ENG-2	3.04	13.33	2.37	10.40	2.40	10.50	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG*	**3.04**	**13.33**	**3.04**	**13.33**	**2.40**	**10.50**	**0.03**	**0.14**	**0.11**	**0.50**	**0.11**	**0.50**	**0.11**	**0.50**	**--**	**--**	**--**	**--**
ENG-3	3.04	13.33	2.37	10.40	2.40	10.50	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-4	3.04	13.33	2.37	10.40	2.40	10.50	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-5	3.04	13.33	2.37	10.40	2.40	10.50	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-6	3.04	13.33	2.37	10.40	2.40	10.50	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-7	3.04	13.33	2.37	10.40	2.40	10.50	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-8	3.04	13.33	2.37	10.40	2.40	10.50	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	--	--
ENG-9	0.82	3.61	1.65	7.22	0.67	2.92	0.01	0.05	0.09	0.38	0.09	0.38	0.09	0.38	--	--	--	--
TK-1	--	--	--	--	1.13	4.96	--	--	--	--	--	--	--	--	--	--	--	--
TK 2-5	--	--	--	--	0.40	1.75	--	--	--	--	--	--	--	--	--	--	--	--
TK-6	--	--	--	--	0.04	0.19	--	--	--	--	--	--	--	--	--	--	--	--
PWTK-1	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
HTR-1	1.69	7.40	2.84	12.43	0.19	0.81	0.10	0.42	0.26	1.12	0.26	1.12	0.26	1.12	--	--	--	--
HTR-2	0.74	3.26	0.62	2.73	0.04	0.18	0.02	0.09	0.06	0.25	0.06	0.25	0.06	0.25	--	--	--	--
ONDLOAD-	--	--	--	--	33.47	9.16	--	--	--	--	--	--	--	--	--	--	--	--
OILLOAD-1	--	--	--	--	33.47	0.06	--	--	--	--	--	--	--	--	--	--		
FUG-1	--	--	--	--	3.37	14.97	--	--	--	--	--	--	--	--	0.00	0.00	--	--
FUG-2	--	--	--	--	0.01	0.06	--	--	--	--	--	--	--	--	0.00	0.00		
AMINE-1	--	--	--	--	2.91	4.09	--	--	--	--	--	--	--	--	--	--	--	--
COMP	--	--	--	--	0.11	0.50	--	--	--	--	--	--	--	--	--	--	--	--
PLANT BD	--	--	--	--	1640.18	0.82	--	--	--	--	--	--	--	--	--	--	--	--
TO-1	1.63	7.15	1.37	6.01	4.26	18.64	64.45	235.24	0.00	0.00	0.00	0.00	0.00	0.00	--	--	--	--
FL-1	170.49	26.44	777.23	120.53	93.36	16.00	6.30	1.34	5.75	0.88	5.75	0.88	5.75	0.88	--	--	--	--
FL-2	0.89	3.91	4.07	17.82	0.09	0.39	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	--	--	--	--
HR-1	--	--	--	--	--	--	--	--	12.49	0.23	3.18	0.06	0.32	0.01	--	--	--	--
MAIN-1	--	--	--	--	--	10.00	--	--	--	--	--	--	--	--	--	--	--	--
UP/MAL	--	--	--	--	--	10.00	--	--	--	--	--	--	--	--	--	--	--	--
Totals	197.57	145.06	805.07	242.44	1830.48	169.02	71.10	238.11	19.44	6.35	10.13	6.18	7.27	6.13	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).

* - Composite emissions represent worse case compressor engine emissions

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
COMP	--	--	--	--	0.11	0.50	--	--	--	--	--	--	--	--	--	--	--	--
PLANT BD-1	--	--	--	--	1640.18	0.82	--	--	--	--	--	--	--	--	--	--	--	--
FL-1	0.05	0.22	0.23	1.01	0.04	0.16	0.01	0.05	0.00	0.01	0.00	0.01	0.00	0.01	--	--	--	--
MAIN-1	--	--	--	--	--	10.00	--	--	--	--	--	--	--	--	--	--	--	--
Totals	0.05	0.22	0.23	1.01	1640.33	11.48	0.01	0.05	0.00	0.01	0.00	0.01	0.00	0.01				

[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)			
ENG-1	ENG-1	V	No	15	931	73.6	53.2	9.3	136.1	0.8
ENG 2-8	ENG 2-8	V	No	25	992	152.1	110.2	9.0	193.7	1.0
ENG-9	ENG-9	V	No	6	1350	26.4	21.0	0.0	399.6	0.3
TK-1	TK-1	V	No	25	70	0.0	0.0	0.0	0.0	0.7
TK 2-5	TK 2-5	V	No	20	70	0.0	0.0	0.0	0.0	0.7
TK-6	TK-6	V	No	20	70	0.0	0.0	0.0	0.0	0.7
PWTK-1	PWTK-1	V	No	20	70	0.0	0.0	0.0	0.0	0.7
HTR-1	HTR-1	V	No	30	664	88.9	70.7	0.0	12.6	3.0
HTR-2	HTR-2	V	No	12	500	25.8	20.5	0.0	8.2	2.0
TO-1	TO-1	V	No	50	1400	256.9	204.5	0.0	15.0	4.7
FL-1	FL-1	V	No	100	1832	4343.6	3457.1	0.0	65.6	9.2
FL-2	FL-2	V	No	30	1832	261.6	208.2	0.0	65.6	2.3

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		Acetaldehyde ☑ HAP or ☐ TAP		Acrolein ☑ HAP or ☐ TAP		Benzene ☑ HAP or ☐ TAP		Toluene ☑ HAP or ☐ TAP		Ethylbenzene ☑ HAP or ☐ TAP		Xylenes ☑ HAP or ☐ TAP		n-Hexane ☑ HAP or ☐ TAP		2,2,4 TMP ☑ HAP or ☐ TAP		Methanol ☑ 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	lb/hr	ton/yr	lb/hr	ton/yr
ENG-1	ENG-1	0.4	1.8	0.3	1.4	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	--
ENG-2	ENG-2	0.4	2.0	0.3	1.2	0.1	0.4	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	--	--	--	--
ENG*	**ENG***	**0.4**	**2.0**	**0.3**	**1.4**	**0.1**	**0.4**	**0.1**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**--**	**--**	**--**	**--**
ENG-3	ENG-3	0.4	2.0	0.3	1.2	0.1	0.4	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	--	--	--	--
ENG-4	ENG-4	0.4	2.0	0.3	1.2	0.1	0.4	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	--	--	--	--
ENG-5	ENG-5	0.4	2.0	0.3	1.2	0.1	0.4	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	--	--	--	--
ENG-6	ENG-6	0.4	2.0	0.3	1.2	0.1	0.4	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	--	--	--	--
ENG-7	ENG-7	0.4	2.0	0.3	1.2	0.1	0.4	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	--	--	--	--
ENG-8	ENG-8	0.4	2.0	0.3	1.2	0.1	0.4	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	--	--	--	--
ENG-9	ENG-9	0.1	0.5	0.1	0.4	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A			--	--
TK-1	TK-1	0.1	0.3	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	--	--
TK 2-5	TK 2-5	0.0	0.1	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	--	--
TK-6	TK-6	0.0	0.0	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
PWTK-1	PWTK-1	0.0	0.0	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
HTR-1	HTR-1	0.1	0.3	0.0	0.0	--	--	--	--	0.0	0.0	0.0	0.0	--	--	--	--	0.1	0.3	--	--	--	--
HTR-2	HTR-2	0.0	0.1	0.0	0.0	--	--	--	--	0.0	0.0	0.0	0.0	--	--	--	--	0.0	0.1	--	--	--	--
CONDLOAD-1	CONDLOAD-1	2.1	0.6	--	--	--	--	--	--	0.3	0.1	0.3	0.1	0.0	0.0	0.0	0.0	1.3	0.4	0.0	0.0	--	--
OILLOAD-1	OILLOAD-1	2.1	0.0	--	--	--	--	--	--	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	--	--
FUG-1	FUG-1	0.0	0.1	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	--	--
FUG-2	FUG-2	0.0	0.0	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
AMINE-1	AMINE-1	0.0	0.0	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
COMP	COMP	0.0	0.0	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
PLANT BD	PLANT BD	15.1	0.0	--	--	--	--	--	--	5.3	0.0	0.8	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	0.0	--	--
TO-1	TO-1	0.0	0.2	--	--	--	--	--	--	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	--	--
FL-1	FL-1	0.0	0.0	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
FL-2	FL-2	0.0	0.0	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
HR-1	HR-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAIN-1	MAIN-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
UP/MAL-1	UP/MAL-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Totals:		22.9	15.9	2.0	8.8	0.7	3.0	0.4	1.8	6.0	0.5	1.5	0.3	0.1	0.0	0.1	0.1	12.0	1.6	0.1	0.0	--	--

* - Composite emissions represent worse case engine emissions

Table 2-J: Fuel

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

Unit No.	Fuel Type (low sulfur Diesel, ultra low sulfur diesel, Natural Gas, Coal, …)	Fuel Source: purchased commercial, pipeline quality natural gas, residue gas, raw/field natural gas, process gas (e.g. SRU tail gas) or other	Specify Units				
			Lower Heating Value	Hourly Usage (scf)	Annual Usage (scf)	% Sulfur	% Ash
ENG-1	Natural Gas	Residue Gas	1479.8 btu/scf	3,825.00	33,507,000.00	N/A	N/A
ENG 2-8	Natural Gas	Residue Gas	1479.8 btu/scf	7,669.20	67,182,192.00	N/A	N/A
ENG-9	Natural Gas	Residue Gas	1479.8 btu/scf	2,983.00	26,131,080.00	N/A	N/A
HTR-1	Natural Gas	Residue Gas	1479.8 btu/scf	33,788.35	295,985,944.05	N/A	N/A
HTR-2	Natural Gas	Residue Gas	1479.8 btu/scf	7,433.44	65,116,907.69	N/A	N/A
TO-1	Natural Gas	Residue Gas	1479.8 btu/scf	8,109.20	71,036,626.57	N/A	N/A
FL-1	Natural Gas	Residue Gas	1479.8 btu/scf	337.88	2,959,859.44	N/A	N/A
FL-2	Natural Gas	Residue Gas	1479.8 btu/scf	67.58	591,971.89	N/A	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	40400301 / 40400302	Oil / Produced Water	Mixed Hydrocarbons	5.6	64	72.3	8.0	86.3	10.2
TK-2	31000212	Condensate	Mixed Hydrocarbons	5.6	64	72.3	8.0	86.3	10.2
TK-3	31000212	Condensate	Mixed Hydrocarbons	5.6	64	72.3	8.0	86.3	10.2
TK-4	31000212	Condensate	Mixed Hydrocarbons	5.6	64	72.3	8.0	86.3	10.2
TK-5	31000212	Condensate	Mixed Hydrocarbons	5.6	64	72.3	8.0	86.3	10.2
TK-6	40400301 / 40400302	Oil	Mixed Hydrocarbons	5.6	64	72.3	3.6	86.3	4.7
PWTK-1	40400301 / 40400302	Produced Water	Water / Mixed Hydrocarbons	8.3	19.8	72.3	0.4	86.3	0.64

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	4/2018	Oil / Produced Water	N/A	FX	500	79	3.7	3.81	OT (Green)	OT (Green)	Good	32,172	1.53
TK-2	1/8/2018	Condensate	N/A	FX	400	64	3.7	3.05	OT (Green)	OT (Green)	Good	2,299,500	136.88
TK-3	1/8/2018	Condensate	N/A	FX	400	64	3.7	3.05	OT (Green)	OT (Green)	Good	2,299,500	136.88
TK-4	1/8/2018	Condensate	N/A	FX	400	64	3.7	3.05	OT (Green)	OT (Green)	Good	2,299,500	136.88
TK-5	1/8/2018	Condensate	N/A	FX	400	64	3.7	3.05	OT (Green)	OT (Green)	Good	2,299,500	136.88
TK-6	1/8/2018	Oil	N/A	FX	400	64	3.7	3.05	OT (Green)	OT (Green)	Good	64,344	3.83
PWTK-1	4/2018	Produced Water	N/A	FX	400	64	3.7	3.05	OT (Green)	OT (Green)	Good	64,344	3.83

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

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

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

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

Material Processed				Material Produced			
Description	**Chemical Composition**	**Phase (Gas, Liquid, or Solid)**	**Quantity (specify units)**	**Description**	**Chemical Composition**	**Phase**	**Quantity (specify units)**
Condensate	Mixed Hydrocarbons	Liquid	219,000 bbl/yr				
Slop Oil	Mixed Hydrocarbons	Liquid	1,532 bbl/yr				
Produced Water	Mixed Hydrocarbons	Liquid	1,532 bbl/yr				
Gas	Mixed Hydrocarbons	Gas	60 MMScf/day				

Table 2-N: CEM Equipment

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

Stack No.	Pollutant(s)	Manufacturer	Model No.	Serial No.	Sample Frequency	Averaging Time	Range	Sensitivity	Accuracy
TBD									

Table 2-O: Parametric Emissions Measurement Equipment

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

Unit No.	Parameter/Pollutant Measured	Location of Measurement	Unit of Measure	Acceptable Range	Frequency of Maintenance	Nature of Maintenance	Method of Recording	Averaging Time
N/A								

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**										
ENG-1	**mass GHG**	2900	0	0											2900	
	CO_2e	2900	2	1												2903
ENG-2	**mass GHG**	5837	0	0											5838	
	CO_2e	5837	3	3												5843
ENG-3	**mass GHG**	5837	0	0											5838	
	CO_2e	5837	3	3												5843
ENG-4	**mass GHG**	5837	0	0											5838	
	CO_2e	5837	3	3												5843
ENG-5	**mass GHG**	5837	0	0											5838	
	CO_2e	5837	3	3												5843
ENG-6	**mass GHG**	5837	0	0											5838	
	CO_2e	5837	3	3												5843
ENG-7	**mass GHG**	5837	0	0											5838	
	CO_2e	5837	3	3												5843
ENG-8	**mass GHG**	5837	0	0											5838	
	CO_2e	5837	3	3												5843
ENG-9	**mass GHG**	2262	0	0											2262	
	CO_2e	2262	1	1												2264
TK-1	**mass GHG**	0	0	0											0	
	CO_2e	0	0	7												7
TK 2-5	**mass GHG**	18	0	0											18	
	CO_2e	18	0	2												20
TK-6	**mass GHG**	2	0	0											2	
	CO_2e	2	0	0												2
PWTK-1	**mass GHG**	0	0	0											0	
	CO_2e	0	0	0												0
HTR-1	**mass GHG**	25618	0	0											25619	
	CO_2e	25618	14	12												25644
HTR-2	**mass GHG**	5636	0	0											5636	
	CO_2e	5636	3	3												5642
CONDLOAD-1	**mass GHG**	14	0	0											15	
	CO_2e	14	0	9												23
OILLOAD-1	**mass GHG**	0	0	0											0	
	CO_2e	0	0	0												0
FUG-1	**mass GHG**	122	0	828											950	
	CO_2e	122	0	20693												20815
AMINE-1	**mass GHG**	57169	0	347											57516	
	CO_2e	57169	0	8677												65846
COMP	**mass GHG**	1	0	1											2	
	CO_2e	1	0	34												35
PLANT BD	**mass GHG**	1	0	1											2	
	CO_2e	1	0	20												21
TO-1	**mass GHG**	8530	0	0											8530	
	CO_2e	8530	5	4												8539
FL-1	**mass GHG**	75685	0	1											75687	
	CO_2e	75685	43	36												75763
FL-2	**mass GHG**	6723	0	0											6723	
	CO_2e	6723	4	3												6730
HR-1	**mass GHG**	--	--	--											0	
	CO_2e	--	--	--												0
MAIN-1	**mass GHG**	0	0	10											10	
	CO2e	0	0	250												250
UP/MAL-1	**mass GHG**	0	0	10											10	
	CO2e	0	0	250												250
Total	**mass GHG**	222643	0	1201											223844	
	CO_2e	222643	93	30022												252758

[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.

Application Summary:

This application and accompanying material is a revision of New Source Review (NSR) Construction Permit No. 7482 for the 3Bear Libby Gas Plant (Libby), owned and operated by 3 Bear Delaware Operating – NM, LLC (3Bear). NSR Permit No. 7482 was issued on January 8, 2018. The facility will receive up to 60 MMscf/day of gas from three surrounding compressor stations owned and operated by 3Bear. Libby will separate natural gas liquids (NGL's) from the field gas, producing natural gas liquids and a residue gas for transmission to a pipeline owned by others. The process utilizes a cryogenic gas separation plant and associated compressors for collecting field gas from the gathering system nearby. Gas and NGL's will be piped to the respective nearby interconnect metering stations, by others. The plant is to be located within 5 miles of the residue gas and NGL pipelines. Changes to the application

The facility will consist of one of the compressor engine options listed in Table 3-1.

Table 3-1: Compressor Engine Options

Option No.	Unit Name	Make & Model
1	ENG-1	Caterpillar G3508
2	ENG-2	Caterpillar G3516

Notes:
The worst-case emissions are included in the total facility emissions.

In addition to the compressor engine option, the facility will consist of the following emission units: six additional compressor engines (3 inlet compressors and 3 residue compressors), one generator engine, one gunbarrel tank, four condensate tanks, one slop oil tank, one produced water tank, one hot oil heater, one regen gas heater, one amine unit, one condensate loadout, one oil loadout, one thermal oxidizer, one upset/maintenance flare, one tank flare, process piping fugitives, and haul road fugitives.

SSM Overview:

SSM emissions are expected at the facility and are included in the total facility wide emissions. The compressor blowdowns and plant blowdowns will be controlled by the maintenance flare. Additional maintenance flaring has been included in the application to account for other maintenance activities. Maintenance activities that cannot be controlled, such as painting and tank degassing, have been included in the application as well. An estimated 10 tpy has been used for these uncontrolled maintenance activities. In the event that the thermal oxidizer is down, the maintenance flare (FL-1) is used as a backup control device for the amine unit.

Section 4

Process Flow Sheet

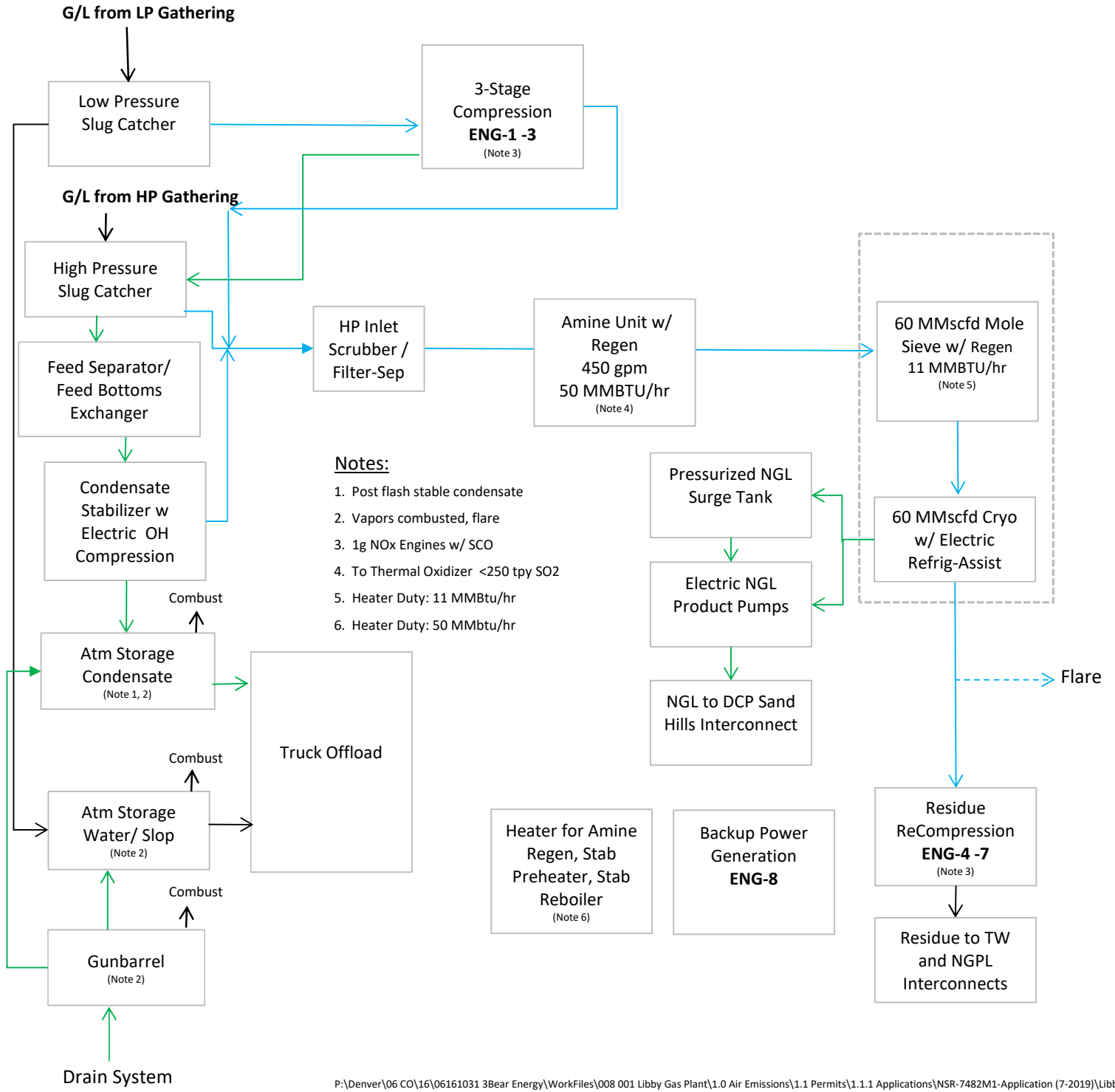
A **process flow sheet** and/or block diagram indicating the individual equipment, all emission points and types of control applied to those points. The unit numbering system should be consistent throughout this application.

The facility process flow sheet is provided on the next page.

Lea County NM

3Bear Libby - 60 MMscfd Cryo Plant

BFD Plant Site



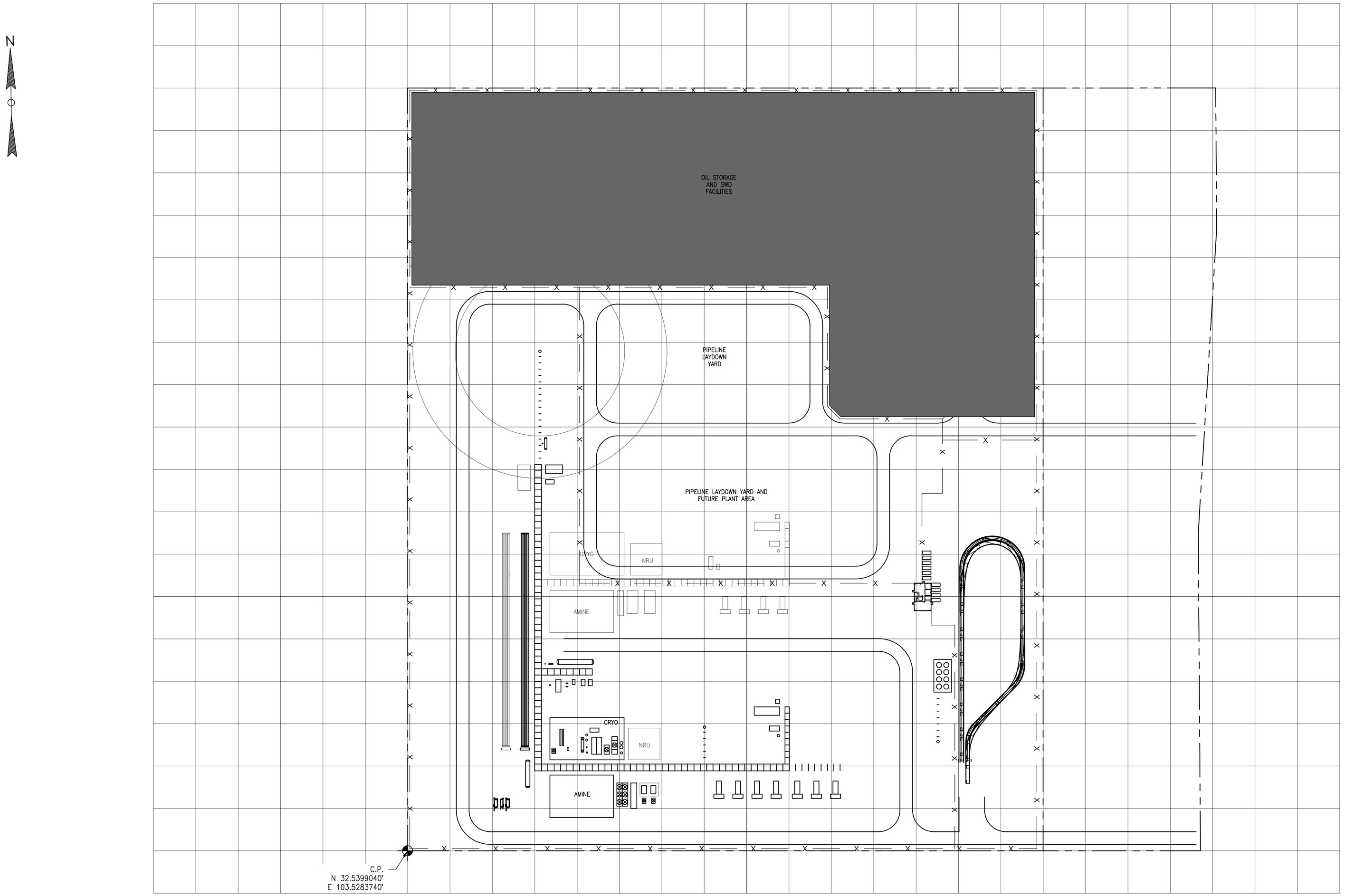
P:\Denver\06 CO\16\06161031 3Bear Energy\WorkFiles\008 001 Libby Gas Plant\1.0 Air Emissions\1.1 Permits\1.1.1 Applications\NSR-7482M1-Application (7-2019)\Libby Block Flow Diagram rev 07012019.xlsx

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.

The facility plot plan is provided on the next page.



PLOT PLAN
SCALE: 1/128" = 1'-0"

REFERENCED DRAWINGS

DRAWING NUMBER	TITLE
–	–

DRAWING REVISIONS

REV	DESCRIPTION	BY	CHK	APVD	DATE
A	ISSUED FOR REVIEW	ALS	RGJ	CES	07/19/17
B	ISSUED FOR REVIEW	ALS	RGJ	CES	07/28/17
C	ISSUED FOR PERMIT	ALS	RGJ	CES	08/02/17
D	ISSUED FOR PERMIT	ALS	RGJ	CES	09/05/17

ZAP ENGINEERING & CONSTRUCTION SERVICES, INC.

3Bear Energy

3BEAR ENERGY
LIBBY GAS PLANT
PLOT PLAN

JOB NO: 17101
DRAWING NO: 17101-SK-1001
REV: D
PLOT SIZE: ANSI D
SCALE: AS NOTED

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.

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)

Summary of Uncontrolled Air Emission Units

Unit Name	Unit Description	Qty	Potential Emissions Uncontrolled + No Product Recovered																	
			NOx		CO		VOC		SO2		PM		PM10		PM2.5		H2S		HAPs	
			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
ENG*	Worst-Case Composite Engine Emissions	N/A	3.04	13.33	7.39	32.39	3.47	15.19	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	1.52	6.65
ENG 3-4	Inlet Compression	2	6.09	26.66	14.79	64.77	6.94	30.39	0.06	0.28	0.23	1.00	0.23	1.00	0.23	1.00	--	--	3.03	13.29
ENG 5-8	Residue Compression	4	12.17	53.31	29.58	129.55	13.88	60.78	0.13	0.56	0.46	1.99	0.46	1.99	0.46	1.99	--	--	6.07	26.58
ENG-9	Generator Engine	1	0.82	3.61	1.65	7.22	0.67	2.92	0.01	0.05	0.09	0.38	0.09	0.38	0.09	0.38	--	--	0.12	0.55
TK-1	Gunbarrel Tank	1	--	--	--	--	22.64	99.18	--	--	--	--	--	--	--	--	--	--	1.43	6.25
TK 2-5	Stabilized Condensate Tank	4	--	--	--	--	7.98	34.95	--	--	--	--	--	--	--	--	--	--	0.50	2.20
TK-6	Slop Oil Tank	1	--	--	--	--	0.85	3.72	--	--	--	--	--	--	--	--	--	--	0.05	0.23
PWTK-1	Produced Water Tank	1	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.00	0.00
HTR-1	Hot Oil Heater	1	1.69	7.40	2.84	12.43	0.19	0.81	0.10	0.42	0.26	1.12	0.26	1.12	0.26	1.12	--	--	0.06	0.28
HTR-2	Regen Gas Heater	1	0.74	3.26	0.62	2.73	0.04	0.18	0.02	0.09	0.06	0.25	0.06	0.25	0.06	0.25	--	--	0.01	0.06
CONDLOAD-1	Condensate Loadout	1	--	--	--	--	99.91	27.35	--	--	--	--	--	--	--	--	--	--	6.29	1.72
OILLOAD-1	Oil Loadout	1	--	--	--	--	99.91	0.19	--	--	--	--	--	--	--	--	--	--	6.29	0.01
FUG-1	Fugitives - OOOOa	N/A	--	--	--	--	11.30	51.24	--	--	--	--	--	--	--	--	0.00	0.00	0.10	0.47
FUG-2	Fugitives - Residue	N/A	--	--	--	--	0.01	0.06	--	--	--	--	--	--	--	--	0.00	0.00	0.00	0.00
AMINE-1	Amine Unit	1	--	--	--	--	41.44	181.50	--	--	--	--	--	--	--	--	--	--	0.29	1.25
COMP	Compressor Blowdowns	8	--	--	--	--	2.27	9.95	--	--	--	--	--	--	--	--	--	--	0.02	0.09
PLANT BD	Gas Plant Blowdown	1	--	--	--	--	32,803.52	16.40	--	--	--	--	--	--	--	--	--	--	302.73	0.15
TO-1	Thermal Oxidizer	1	1.18	5.15	0.99	4.33	4.26	18.64	--	--	--	--	--	--	--	--	--	--	0.04	0.17
FL-1	Upset/Maintenance Flare	1	0.03	0.15	0.16	0.68	0.44	1.94	--	--	--	--	--	--	--	--	--	--	0.00	0.00
FL-2	Tank Flare	1	0.01	0.03	0.03	0.14	0.09	0.39	--	--	--	--	--	--	--	--	--	--	0.00	0.00
HR-1	Road Dust	N/A	--	--	--	--	--	--	--	--	12.49	0.23	3.18	0.06	0.32	0.01	--	--	--	--
MAIN-1	Maintenance Activities	N/A	--	--	--	--	--	10.00	--	--	--	--	--	--	--	--	--	--	--	--
UP/MAL-1	Upsets/Malfunctions	N/A	--	--	--	--	--	10.00	--	--	--	--	--	--	--	--	--	--	--	--
	Facility-Wide Total Emissions		25.78	112.89	58.05	254.24	33119.80	575.79	0.35	1.53	13.68	5.47	4.38	5.30	1.51	5.24	0.00	0.00	328.57	59.96

Summary of Controlled Air Emission Units

Unit Name	Unit Description	Qty	Potential Emissions Controlled + Product Recovery																		
			NOx		CO		VOC		SO2		PM		PM10		PM2.5		H2S		HAPs		
			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	CO2e
ENG*	Worst-Case Composite Engine Emissions	N/A	3.04	13.33	3.04	13.33	2.40	10.50	0.03	0.14	0.11	0.50	0.11	0.50	0.11	0.50	--	--	0.45	1.96	5,843
ENG 3-4	Inlet Compression	2	6.09	26.66	4.75	20.79	4.80	21.00	0.06	0.28	0.23	1.00	0.23	1.00	0.23	1.00	--	--	0.89	3.91	11,687
ENG 5-8	Residue Compression	4	12.17	53.31	9.49	41.58	9.59	42.01	0.13	0.56	0.46	1.99	0.46	1.99	0.46	1.99	--	--	1.79	7.82	23,374
ENG-9	Generator Engine	1	0.82	3.61	1.65	7.22	0.67	2.92	0.01	0.05	0.09	0.38	0.09	0.38	0.09	0.38	--	--	0.12	0.55	2,264
TK-1	Gunbarrel Tank	1	--	--	--	--	1.13	4.96	--	--	--	--	--	--	--	--	--	--	0.07	0.31	7
TK 2-5	Stabilized Condensate Tank	4	--	--	--	--	0.40	1.75	--	--	--	--	--	--	--	--	--	--	0.03	0.11	20
TK-6	Slop Oil Tank	1	--	--	--	--	0.04	0.19	--	--	--	--	--	--	--	--	--	--	0.00	0.01	2
PWTK-1	Produced Water Tank	1	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0
HTR-1	Hot Oil Heater	1	1.69	7.40	2.84	12.43	0.19	0.81	0.10	0.42	0.26	1.12	0.26	1.12	0.26	1.12	--	--	0.06	0.28	25,644
HTR-2	Regen Gas Heater	1	0.74	3.26	0.62	2.73	0.04	0.18	0.02	0.09	0.06	0.25	0.06	0.25	0.06	0.25	--	--	0.01	0.06	5,642
CONDLOAD-1	Condensate Loadout	1	--	--	--	--	33.47	9.16	--	--	--	--	--	--	--	--	--	--	2.11	0.58	23
OILLOAD-1	Oil Loadout	1	--	--	--	--	33.47	0.06	--	--	--	--	--	--	--	--	--	--	2.11	0.00	0
FUG-1	Fugitives - OOOOa	N/A	--	--	--	--	3.37	14.97	--	--	--	--	--	--	--	--	0.00	0.00	0.03	0.14	20815
FUG-2	Fugitives - Residue	N/A	--	--	--	--	0.01	0.06	--	--	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0
AMINE-1	Amine Unit	1	--	--	--	--	2.91	4.09	--	--	--	--	--	--	--	--	--	--	0.01	0.03	65,846
COMP	Compressor Blowdowns	3	--	--	--	--	0.11	0.50	--	--	--	--	--	--	--	--	--	--	0.00	0.00	35
PLANT BD	Gas Plant Blowdown	1	--	--	--	--	1,640.18	0.82	--	--	--	--	--	--	--	--	--	--	15.14	0.01	21
TO-1	Thermal Oxidizer	1	1.63	7.15	1.37	6.01	4.26	18.64	64.45	235.24	0.00	0.00	0.00	0.00	0.00	0.00	--	--	0.04	0.17	8,539
FL-1	Upset/Maintenance Flare	1	170.49	26.44	777.23	120.53	93.36	16.00	6.30	1.34	5.75	0.88	5.75	0.88	5.75	0.88	--	--	0.00	0.00	75,763
FL-2	Tank Flare	1	0.89	3.91	4.07	17.82	0.09	0.39	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	--	--	0.00	0.00	6,730
HR-1	Road Dust	N/A	--	--	--	--	--	--	--	--	12.49	0.23	3.18	0.06	0.32	0.01	--	--	--	--	--
MAIN-1	Maintenance Activities	N/A	--	--	--	--	--	10.00	--	--	--	--	--	--	--	--	--	--	--	--	250
UP/MAL-1	Upsets/Malfunctions	N/A	--	--	--	--	--	10.00	--	--	--	--	--	--	--	--	--	--	--	--	250
	Facility-Wide Total Emissions		197.57	145.06	805.07	242.44	1,830.48	169.02	71.10	238.11	19.44	6.35	10.13	6.18	7.27	6.13	0.00	0.00	22.86	15.94	252,758

* - Composite emissions represent worse case engine emissions

Summary of Uncontrolled HAP Emissions

Unit Name	Unit Description	Qty	Potential Emissions Uncontrolled + No Product Recovered																	
			Formaldehyde		Acetaldehyde		Acrolein		Benzene		Toluene		Ethylbenzene		Xylenes		n-Hexane		2,2,4-TMP	
			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
ENG*	Worst-Case Composite Engine Emissions	N/A	1.34	5.86	0.10	0.42	0.06	0.26	0.01	0.02	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.06	--	--
ENG 3-4	Inlet Compression	2	2.68	11.73	0.19	0.83	0.12	0.51	0.01	0.04	0.01	0.04	0.00	0.00	0.00	0.02	0.03	0.11	--	--
ENG 5-8	Residue Compression	4	5.35	23.45	0.38	1.67	0.23	1.03	0.02	0.09	0.02	0.08	0.00	0.01	0.01	0.04	0.05	0.22	--	--
ENG-9	Generator Engine	1	0.09	0.40	0.01	0.05	0.01	0.05	0.01	0.03	0.00	0.01	0.00	0.00	0.00	0.00	N/A	N/A	--	--
TK-1	Gunbarrel Tank	1	--	--	--	--	--	--	0.23	0.99	0.23	0.99	0.02	0.10	0.02	0.10	0.91	3.97	0.02	0.10
TK 2-5	Stabilized Condensate Tank	4	--	--	--	--	--	--	0.08	0.35	0.08	0.35	0.01	0.03	0.01	0.03	0.32	1.40	0.01	0.03
TK-6	Slop Oil Tank	1	--	--	--	--	--	--	0.01	0.04	0.01	0.04	0.00	0.00	0.00	0.00	0.03	0.15	0.00	0.00
PWTK-1	Produced Water Tank	1	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HTR-1	Hot Oil Heater	1	0.00	0.01	--	--	--	--	0.00	0.00	0.00	0.00	--	--	--	--	0.06	0.27	--	--
HTR-2	Regen Gas Heater	1	0.00	0.00	--	--	--	--	0.00	0.00	0.00	0.00	--	--	--	--	0.01	0.06	--	--
CONDLOAD-1	Condensate Loadout	1	--	--	--	--	--	--	1.00	0.27	1.00	0.27	0.10	0.03	0.10	0.03	4.00	1.09	0.10	0.03
OILLOAD-1	Oil Loadout	1	--	--	--	--	--	--	1.00	0.00	1.00	0.00	0.10	0.00	0.10	0.00	4.00	0.01	0.10	0.00
FUG-1	Fugitives - OOOOa	N/A	--	--	--	--	--	--	0.04	0.16	0.01	0.02	0.00	0.00	0.00	0.00	0.06	0.28	0.00	0.00
FUG-2	Fugitives - Residue	N/A	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMINE-1	Amine Unit	1	--	--	--	--	--	--	0.03	0.15	0.03	0.15	0.00	0.01	0.01	0.04	0.17	0.73	0.04	0.17
COMP	Compressor Blowdowns	3	--	--	--	--	--	--	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
PLANT BD	Gas Plant Blowdown	1	--	--	--	--	--	--	105.62	0.05	15.19	0.01	0.00	0.00	0.00	0.00	181.91	0.09	0.00	0.00
TO-1	Thermal Oxidizer	1	--	--	--	--	--	--	0.01	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.10	0.00	0.00
FL-1	Upset/Maintenance Flare	1	--	--	--	--	--	--	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
FL-2	Tank Flare	1	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HR-1	Road Dust	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAIN-1	Maintenance Activities	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
UP/MAL-1	Upsets/Malfunctions	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Facility-Wide Total HAP Emissions		9.46	41.45	0.68	2.97	0.42	1.85	108.07	2.28	17.58	2.00	0.24	0.19	0.26	0.28	191.58	8.56	0.27	0.34

Summary of Controlled HAP Emissions

Unit Name	Unit Description	Qty	Potential Emissions Controlled + Product Recovery																	
			Formaldehyde		Acetaldehyde		Acrolein		Benzene		Toluene		Ethylbenzene		Xylenes		n-Hexane		2,2,4-TMP	
			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
ENG*	Worst-Case Composite Engine Emissions	N/A	0.32	1.40	0.10	0.42	0.06	0.26	0.01	0.02	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.06	--	--
ENG 3-4	Inlet Compression	2	0.54	2.35	0.19	0.83	0.12	0.51	0.01	0.04	0.01	0.04	0.00	0.00	0.00	0.02	0.03	0.11	--	--
ENG 5-8	Residue Compression	4	1.07	4.69	0.38	1.67	0.23	1.03	0.02	0.09	0.02	0.08	0.00	0.01	0.01	0.04	0.05	0.22	--	--
ENG-9	Generator Engine	1	0.09	0.40	0.01	0.05	0.01	0.05	0.01	0.03	0.00	0.01	0.00	0.00	0.00	0.00	N/A	N/A	--	--
TK-1	Gunbarrel Tank	1	--	--	--	--	--	--	0.01	0.05	0.01	0.05	0.00	0.00	0.00	0.00	0.05	0.20	0.00	0.00
TK 2-5	Stabilized Condensate Tank	4	--	--	--	--	--	--	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.07	0.00	0.00
TK-6	Slop Oil Tank	1	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
PWTK-1	Produced Water Tank	1	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HTR-1	Hot Oil Heater	1	0.00	0.01	--	--	--	--	0.00	0.00	0.00	0.00	--	--	--	--	0.06	0.27	--	--
HTR-2	Regen Gas Heater	1	0.00	0.00	--	--	--	--	0.00	0.00	0.00	0.00	--	--	--	--	0.01	0.06	--	--
CONDLOAD-1	Condensate Loadout	1	--	--	--	--	--	--	0.33	0.09	0.33	0.09	0.03	0.01	0.03	0.01	1.34	0.37	0.03	0.01
OILLOAD-1	Oil Loadout	1	--	--	--	--	--	--	0.33	0.00	0.33	0.00	0.03	0.00	0.03	0.00	1.34	0.00	0.03	0.00
FUG-1	Fugitives - OOOOa	N/A	--	--	--	--	--	--	0.01	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.08	0.00	0.00
FUG-2	Fugitives - Residue	N/A	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMINE-1	Amine Unit	1	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
COMP	Compressor Blowdowns	3	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PLANT BD	Gas Plant Blowdown	1	--	--	--	--	--	--	5.28	0.00	0.76	0.00	0.00	0.00	0.00	0.00	9.10	0.00	0.00	0.00
TO-1	Thermal Oxidizer	1	--	--	--	--	--	--	0.01	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.10	0.00	0.00
FL-1	Upset/Maintenance Flare	1	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FL-2	Tank Flare	1	--	--	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HR-1	Road Dust	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAIN-1	Maintenance Activities	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
UP/MAL-1	Upsets/Malfunctions	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Facility-Wide Total HAP Emissions		2.02	8.85	0.68	2.97	0.42	1.85	6.03	0.46	1.48	0.33	0.07	0.03	0.08	0.09	12.04	1.56	0.07	0.02

* - Composite emissions represent worse case engine emissions

Summary of Compressor Engine Air Emission Units

Option Number	Unit Name	Make & Model	Qty	Potential Emissions Uncontrolled + No Product Recovered NOx lb/hr	NOx tpy	CO lb/hr	CO tpy	VOC lb/hr	VOC tpy	SO2 lb/hr	SO2 tpy	PM10 lb/hr	PM10 tpy
1	ENG-1	Caterpillar G3508B		1.52	6.66	3.93	17.19	1.70	7.46	0.02	0.07	0.06	0.25
		Option 1 Total:	1	1.52	6.66	3.93	17.19	1.70	7.46	0.02	0.07	0.06	0.25
2	ENG-2	Caterpillar G3516		3.04	13.33	7.39	32.39	3.47	15.19	0.03174	0.13902	0.11	0.50
		Option 2 Total:	1	3.04	13.33	7.39	32.39	3.47	15.19	0.03	0.14	0.11	0.50
		Worst-Case Composite Engine Emissions		3.04	13.33	7.39	32.39	3.47	15.19	0.03	0.14	0.11	0.50

Option Number	Unit Name	Make & Model	Qty	Potential Emissions Controlled + Product Recovery NOx lb/hr	NOx tpy	CO lb/hr	CO tpy	VOC lb/hr	VOC tpy	SO2 lb/hr	SO2 tpy	PM10 lb/hr	PM10 tpy	CO2e tpy
1	ENG-1	Caterpillar G3508B		1.52	6.66	3.04	13.33	1.38	6.06	0.02	0.07	0.06	0.25	2903
		Option 1 Total:	1	1.52	6.66	3.04	13.33	1.38	6.06	0.02	0.07	0.06	0.25	2903
2	ENG-2	Caterpillar G3516		3.04	13.33	2.37	10.40	2.40	10.50	0.03	0.14	0.11	0.50	5843
		Option 2 Total:	1	3.04	13.33	2.37	10.40	2.40	10.50	0.03	0.14	0.11	0.50	5843
		Worst-Case Composite Engine Emissions		3.04	13.33	3.04	13.33	2.40	10.50	0.03	0.14	0.11	0.50	5843

Engine Emission Detail Sheet

Item	Value
Source Name	ENG-1
Description	Compressor Engine
Engine Use	Inlet Compression
Quantity	1
Make	Caterpillar
Model	Caterpillar G3508B
Serial Number	TBD
Manufacture Date	After 7/1/2010
Fuel Type	Natural Gas
Engine Type	4SLB

Item	Value	Units	Source
Rated Horsepower	690	hp	Manufacturer
Heat Rate	5.66	MMBtu/hr	Calculated
Fuel Consumption	8203	Btu/hp-hr	Manufacturer
Fuel Use	3825	scf/hr	Calculated
Fuel Heat Value	1479.8	btu/scf	Gas Analysis
Emisson Controls	Catalyst/AFR		Manufacturer
Control Efficiency CH2O	50%		Manufacturer/Permit Condition
Control Efficiency NOx	0%		Manufacturer/JJJJ
Control Efficiency VOC	19%		Manufacturer/JJJJ
Control Efficiency CO	22%		Manufacturer/JJJJ
Engine Speed	1400	RPM	Manufacturer
Potential Operation	8760	hr/yr	
Sulfur Content	9,476	grains/MMscf	Gas Analysis with Margin
Sulfur Margin	400%	%	

Total Potential Emissions

Pollutant	Uncontrolled Emissions		Controlled Emissions	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)
NOx	1.52	6.66	1.52	6.66
VOC (less formaldehyde)	1.07	4.66	1.07	4.66
Total VOC	1.70	7.46	1.38	6.06
CO	3.93	17.19	3.04	13.33
SO2	0.02	0.07	0.02	0.07
PM10	0.06	0.25	0.06	0.25
Formaldehyde	0.64	2.80	0.32	1.40
Acetaldehyde	0.05	0.21	0.05	0.21
Acrolein	0.03	0.13	0.03	0.13
Benzene	0.00	0.01	0.00	0.01
Toluene	0.00	0.01	0.00	0.01
Ethylbenzene	0.00	0.00	0.00	0.00
Xylene	0.00	0.00	0.00	0.00
n-Hexane	0.01	0.03	0.01	0.03
Total HAPs	0.73	3.19	0.41	1.79

Potential Emissions Per Engine

Pollutant	Uncontrolled Emissions				Controlled Emissions				Source of Emission Factor
	EF	Units	(lb/hr)	(tpy)	EF	Units	(lb/hr)	(tpy)	
NOx	1.00*	g/hp-hr	1.52	6.66	1.00	g/hp-hr	1.52	6.66	40 CFR 60 Subpart JJJJ
VOC (less formaldehyde)	0.70*	g/hp-hr	1.07	4.66	0.70	g/hp-hr	1.07	4.66	40 CFR 60 Subpart JJJJ
Total VOC***	1.12	g/hp-hr	1.70	7.46	0.91	g/hp-hr	1.38	6.06	40 CFR 60 Subpart JJJJ + CH2O
CO	2.58**	g/hp-hr	3.93	17.19	2.00	g/hp-hr	3.04	13.33	40 CFR 60 Subpart JJJJ
SO2****	2.79E-03	lb/mmBtu	0.02	0.07	2.79E-03	lb/mmBtu	0.02	0.07	EPA AP-42 Table 3.2-2
PM10*****	9.99E-03	lb/mmBtu	0.06	0.25	9.99E-03	lb/mmBtu	0.06	0.25	EPA AP-42 Table 3.2-2
Formaldehyde	0.42	g/hp-hr	0.64	2.80	0.21	g/hp-hr	0.32	1.40	Permit Condition
Acetaldehyde	8.36E-03	lb/mmBtu	0.05	0.21	8.36E-03	lb/mmBtu	0.05	0.21	EPA AP-42 Table 3.2-2
Acrolein	5.14E-03	lb/mmBtu	0.03	0.13	5.14E-03	lb/mmBtu	0.03	0.13	EPA AP-42 Table 3.2-2
Benzene	4.40E-04	lb/mmBtu	0.00	0.01	4.40E-04	lb/mmBtu	0.00	0.01	EPA AP-42 Table 3.2-2
Toluene	4.08E-04	lb/mmBtu	0.00	0.01	4.08E-04	lb/mmBtu	0.00	0.01	EPA AP-42 Table 3.2-2
Ethylbenzene	3.97E-05	lb/mmBtu	0.00	0.00	3.97E-05	lb/mmBtu	0.00	0.00	EPA AP-42 Table 3.2-2
Xylene	1.84E-04	lb/mmBtu	0.00	0.00	1.84E-04	lb/mmBtu	0.00	0.00	EPA AP-42 Table 3.2-2
n-Hexane	1.11E-03	lb/mmBtu	0.01	0.03	1.11E-03	lb/mmBtu	0.01	0.03	EPA AP-42 Table 3.2-2
Total HAPs			0.73	3.19			0.41	1.79	

* - Uncontrolled and controlled NOx and VOC emission factors based on 40 CFR 60 Subpart JJJJ standards as manufacturer emission factors are lower than JJJJ standards.
** - Uncontrolled and controlled emission factors for CO were taken from the Manufacturer technical data sheets and 40 CFR 60 Subpart JJJJ emission standards, respectively.
*** - Total VOC emissions were calculated to include formaldehyde
**** - Sulfur emission factor from AP-42 Table 1.4-2 is ratio adjusted based on the max sulfur content when sulfur content is greater than 2,000 grains/MMsc
***** - PM10 emissions include filterable and condensable particulates

Sample Calculation for NOx
1.00 g/hp-hr * 690 hp / 453.59 g/lb * 8760 hr/yr / 2000 lb/ton = 6.66 tpy

Engine Emission Detail Sheet

Item	Value
Source Name	ENG-2
Description	Compressor Engine
Engine Use	Inlet Compression
Quantity	1
Make	Caterpillar
Model	Caterpillar G3516
Serial Number	TBD
Manufacture Date	After 7/1/2007
Fuel Type	Natural Gas
Engine Type	4SLB

Item	Value	Units	Source
Rated Horsepower	1380	hp	Manufacturer
Heat Rate	11.39	MMBtu/hr	Calculated
Fuel Consumption	8256	Btu/hp-hr	Manufacturer
Fuel Use	7699.20	scf/hr	Calculated
Fuel Heat Value	1479.8	btu/scf	Gas Analysis
Emisson Controls	Oxidation Catalyst		Manufacturer
Control Efficiency CH2O	80%		Manufacturer/Permit Condition
Control Efficiency NOx	0%		Manufacturer/JJJJ
Control Efficiency VOC	31%		Manufacturer/JJJJ
Control Efficiency CO	68%		Manufacturer/Permit Condition
Engine Speed	1400	RPM	Manufacturer
Potential Operation	8760	hr/yr	
Sulfur Content	9,476	grains/MMscf	Gas Analysis with Margin
Sulfur Margin	400%	%	

Total Potential Emissions

Pollutant	Uncontrolled Emissions		Controlled Emissions	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)
NOx	3.04	13.33	3.04	13.33
VOC (less formaldehyde)	2.13	9.33	2.13	9.33
Total VOC	3.47	15.19	2.40	10.50
CO	7.39	32.39	2.37	10.40
SO2	0.03	0.14	0.03	0.14
PM10	0.11	0.50	0.11	0.50
Formaldehyde	1.34	5.86	0.27	1.17
Acetaldehyde	0.10	0.42	0.10	0.42
Acrolein	0.06	0.26	0.06	0.26
Benzene	0.01	0.02	0.01	0.02
Toluene	0.00	0.02	0.00	0.02
Ethylbenzene	0.00	0.00	0.00	0.00
Xylene	0.00	0.01	0.00	0.01
n-Hexane	0.01	0.06	0.01	0.06
Total HAPs	1.52	6.65	0.45	1.96

Potential Emissions Per Engine

Pollutant	Uncontrolled Emissions				Controlled Emissions				Source of Emission Factor
	EF	Units	(lb/hr)	(tpy)	EF	Units	(lb/hr)	(tpy)	
NOx	1.00*	g/hp-hr	3.04	13.33	1.00	g/hp-hr	3.04	13.33	40 CFR 60 Subpart JJJJ
VOC (less formaldehyde)	0.70*	g/hp-hr	2.13	9.33	0.70	g/hp-hr	2.13	9.33	40 CFR 60 Subpart JJJJ
Total VOC***	1.14	g/hp-hr	3.47	15.19	0.79	g/hp-hr	2.40	10.50	40 CFR 60 Subpart JJJJ + CH2O
CO	2.43**	g/hp-hr	7.39	32.39	0.78****	g/hp-hr	2.37	10.40	Permit Condition
SO2*****	2.79E-03	lb/mmBtu	0.03	0.14	2.79E-03	lb/mmBtu	0.03	0.14	EPA AP-42 Table 3.2-2
PM10******	9.99E-03	lb/mmBtu	0.11	0.50	9.99E-03	lb/mmBtu	0.11	0.50	EPA AP-42 Table 3.2-2
Formaldehyde	4.40E-01	g/hp-hr	1.34	5.86	8.80E-02	g/hp-hr	0.27	1.17	Permit Condition
Acetaldehyde	8.36E-03	lb/mmBtu	0.10	0.42	8.36E-03	lb/mmBtu	0.10	0.42	EPA AP-42 Table 3.2-2
Acrolein	5.14E-03	lb/mmBtu	0.06	0.26	5.14E-03	lb/mmBtu	0.06	0.26	EPA AP-42 Table 3.2-2
Benzene	4.40E-04	lb/mmBtu	0.01	0.02	4.40E-04	lb/mmBtu	0.01	0.02	EPA AP-42 Table 3.2-2
Toluene	4.08E-04	lb/mmBtu	0.00	0.02	4.08E-04	lb/mmBtu	0.00	0.02	EPA AP-42 Table 3.2-2
Ethylbenzene	3.97E-05	lb/mmBtu	0.00	0.00	3.97E-05	lb/mmBtu	0.00	0.00	EPA AP-42 Table 3.2-2
Xylene	1.84E-04	lb/mmBtu	0.00	0.01	1.84E-04	lb/mmBtu	0.00	0.01	EPA AP-42 Table 3.2-2
n-Hexane	1.11E-03	lb/mmBtu	0.01	0.06	1.11E-03	lb/mmBtu	0.01	0.06	EPA AP-42 Table 3.2-2
Total HAPs			1.52	6.65			0.45	1.96	

* - Uncontrolled and controlled emission factors for NOx and VOC are based on JJJJ standards as manufacturer uncontrolled emission factors are lower than JJJJ emission standards
** - Uncontrolled emission factor for CO was taken from the Manufacturer technical data sheets. Controlled emission factor for CO is a permit condition requested in this applicatior
*** - Uncontrolled and controlled emission factor for Total VOC was calculated to include formaldehyde.
**** - Controlled CO emission factor is a permit condition requested in this application.
***** - Sulfur emission factor from AP-42 Table 1.4-2 is ratio adjusted based on the max sulfur content when sulfur content is greater than 2,000 grains/MMscf
****** - PM10 emissions include filterable and condensable particulates.

Sample Calculation for NOx
1.00 g/hp-hr * 1380 hp / 453.59 g/lb * 8760 hr/yr / 2000 lb/ton = 13.33 tp

Engine Emission Detail Sheet

Item	Value
Source Name	ENG 3-4
Description	Compressor Engine
Engine Use	Inlet Compression
Quantity	2
Make	Caterpillar
Model	Caterpillar G3516
Serial Number	TBD
Manufacture Date	After 7/1/2007
Fuel Type	Natural Gas
Engine Type	4SLB

Item	Value	Units	Source
Rated Horsepower	1380	hp	Manufacturer
Heat Rate	11.39	MMBtu/hr	Calculated
Fuel Consumption	8256	Btu/hp-hr	Manufacturer
Fuel Use	7699.20	scf/hr	Calculated
Fuel Heat Value	1479.8	btu/scf	Gas Analysis
Emisson Controls	Oxidation Catalyst		Manufacturer
Control Efficiency CH2O	80%		Manufacturer/Permit Condition
Control Efficiency NOx	0%		Manufacturer/JJJJ
Control Efficiency VOC	31%		Manufacturer/JJJJ
Control Efficiency CO	68%		Manufacturer/Permit Condition
Engine Speed	1400	RPM	Manufacturer
Potential Operation	8760	hr/yr	
Sulfur Content	9,476	grains/MMscf	Gas Analysis with Margin
Sulfur Margin	400%	%	

Total Potential Emissions

Pollutant	Uncontrolled Emissions		Controlled Emissions	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)
NOx	6.09	26.66	6.09	26.66
VOC (less formaldehyde)	4.26	18.66	4.26	18.66
Total VOC	6.94	30.39	4.80	21.00
CO	14.79	64.77	4.75	20.79
SO2	0.06	0.28	0.06	0.28
PM10	0.23	1.00	0.23	1.00
Formaldehyde	2.68	11.73	0.54	2.35
Acetaldehyde	0.19	0.83	0.19	0.83
Acrolein	0.12	0.51	0.12	0.51
Benzene	0.01	0.04	0.01	0.04
Toluene	0.01	0.04	0.01	0.04
Ethylbenzene	0.00	0.00	0.00	0.00
Xylene	0.00	0.02	0.00	0.02
n-Hexane	0.03	0.11	0.03	0.11
Total HAPs	3.03	13.29	0.89	3.91

Potential Emissions Per Engine

Pollutant	Uncontrolled Emissions				Controlled Emissions				Source of Emission Factor
	EF	Units	(lb/hr)	(tpy)	EF	Units	(lb/hr)	(tpy)	
NOx	1.00*	g/hp-hr	3.04	13.33	1.00	g/hp-hr	3.04	13.33	40 CFR 60 Subpart JJJJ
VOC (less formaldehyde)	0.70*	g/hp-hr	2.13	9.33	0.70	g/hp-hr	2.13	9.33	40 CFR 60 Subpart JJJJ
Total VOC***	1.14	g/hp-hr	3.47	15.19	0.79	g/hp-hr	2.40	10.50	40 CFR 60 Subpart JJJJ + CH2O
CO	2.43**	g/hp-hr	7.39	32.39	0.78	g/hp-hr	2.37	10.40	Permit Condition
SO2*****	2.79E-03	lb/mmBtu	0.03	0.14	2.79E-03	lb/mmBtu	0.03	0.14	EPA AP-42 Table 3.2-2
PM10******	9.99E-03	lb/mmBtu	0.11	0.50	9.99E-03	lb/mmBtu	0.11	0.50	EPA AP-42 Table 3.2-2
Formaldehyde	4.40E-01	g/hp-hr	1.34	5.86	8.80E-02	g/hp-hr	0.27	1.17	Permit Condition
Acetaldehyde	8.36E-03	lb/mmBtu	0.10	0.42	8.36E-03	lb/mmBtu	0.10	0.42	EPA AP-42 Table 3.2-2
Acrolein	5.14E-03	lb/mmBtu	0.06	0.26	5.14E-03	lb/mmBtu	0.06	0.26	EPA AP-42 Table 3.2-2
Benzene	4.40E-04	lb/mmBtu	0.01	0.02	4.40E-04	lb/mmBtu	0.01	0.02	EPA AP-42 Table 3.2-2
Toluene	4.08E-04	lb/mmBtu	0.00	0.02	4.08E-04	lb/mmBtu	0.00	0.02	EPA AP-42 Table 3.2-2
Ethylbenzene	3.97E-05	lb/mmBtu	0.00	0.00	3.97E-05	lb/mmBtu	0.00	0.00	EPA AP-42 Table 3.2-2
Xylene	1.84E-04	lb/mmBtu	0.00	0.01	1.84E-04	lb/mmBtu	0.00	0.01	EPA AP-42 Table 3.2-2
n-Hexane	1.11E-03	lb/mmBtu	0.01	0.06	1.11E-03	lb/mmBtu	0.01	0.06	EPA AP-42 Table 3.2-2
Total HAPs			1.52	6.65			0.45	1.96	

* - Uncontrolled and controlled emission factors for NOx and VOC are based on JJJJ standards as manufacturer uncontrolled emission factors are lower than JJJJ emission standards
** - Uncontrolled emission factor for CO was taken from the Manufacturer technical data sheets. Controlled emission factor for CO is a permit condition requested in this applicatior
*** - Uncontrolled and controlled emission factor for Total VOC was calculated to include formaldehyde.
**** - Controlled CO emission factor is a permit condition requested in this application.
***** - Sulfur emission factor from AP-42 Table 1.4-2 is ratio adjusted based on the max sulfur content when sulfur content is greater than 2,000 grains/MMscf
****** - PM10 emissions include filterable and condensable particulates.

Sample Calculation for NOx
1.00 g/hp-hr * 1380 hp / 453.59 g/lb * 8760 hr/yr / 2000 lb/ton = 13.33 tp

Engine Emission Detail Sheet

Item	Value
Source Name	ENG 5-8
Description	Compressor Engine
Engine Use	Residue Compression
Quantity	4
Make	Caterpillar
Model	Caterpillar G3516
Serial Number	TBD
Manufacture Date	11/20/2017, After 7/1/2007
Fuel Type	Natural Gas
Engine Type	4SLB

Item	Value	Units	Source
Rated Horsepower	1380	hp	Manufacturer
Heat Rate	11.39	MMBtu/hr	Calculated
Fuel Consumption	8256	Btu/hp-hr	Manufacturer
Fuel Use	7699.20	scf/hr	Calculated
Fuel Heat Value	1479.8	btu/scf	Gas Analysis
Emisson Controls	Oxidation Catalyst		Manufacturer
Control Efficiency CH2O	80%		Manufacturer/Permit Condition
Control Efficiency NOx	0%		Manufacturer/JJJJ
Control Efficiency VOC	31%		Manufacturer/JJJJ
Control Efficiency CO	68%		Manufacturer/Permit Condition
Engine Speed	1400	RPM	Manufacturer
Potential Operation	8760	hr/yr	
Sulfur Content	9,476	grains/MMscf	AP42 with margin
Sulfur Margin	400%	%	

Total Potential Emissions

Pollutant	Uncontrolled Emissions		Controlled Emissions	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)
NOx	12.17	53.31	12.17	53.31
VOC (less formaldehyde)	8.52	37.32	8.52	37.32
Total VOC	13.88	60.78	9.59	42.01
CO	29.58	129.55	9.49	41.58
SO2	0.13	0.56	0.13	0.56
PM10	0.46	1.99	0.46	1.99
Formaldehyde	5.35	23.45	1.07	4.69
Acetaldehyde	0.38	1.67	0.38	1.67
Acrolein	0.23	1.03	0.23	1.03
Benzene	0.02	0.09	0.02	0.09
Toluene	0.02	0.08	0.02	0.08
Ethylbenzene	0.00	0.01	0.00	0.01
Xylene	0.01	0.04	0.01	0.04
n-Hexane	0.05	0.22	0.05	0.22
Total HAPs	6.07	26.58	1.79	7.82

Potential Emissions Per Engine

Pollutant	Uncontrolled Emissions				Controlled Emissions				Source of Emission Factor
	EF	Units	(lb/hr)	(tpy)	EF	Units	(lb/hr)	(tpy)	
NOx	1.00*	g/hp-hr	3.04	13.33	1.00	g/hp-hr	3.04	13.33	40 CFR 60 Subpart JJJJ
VOC (less formaldehyde)	0.70*	g/hp-hr	2.13	9.33	0.70	g/hp-hr	2.13	9.33	40 CFR 60 Subpart JJJJ
Total VOC***	1.14	g/hp-hr	3.47	15.19	0.79	g/hp-hr	2.40	10.50	40 CFR 60 Subpart JJJJ + CH2O
CO	2.43**	g/hp-hr	7.39	32.39	0.78	g/hp-hr	2.37	10.40	Permit Condition
SO2*****	2.79E-03	lb/mmBtu	0.03	0.14	2.79E-03	lb/mmBtu	0.03	0.14	EPA AP-42 Table 3.2-2
PM10******	9.99E-03	lb/mmBtu	0.11	0.50	9.99E-03	lb/mmBtu	0.11	0.50	EPA AP-42 Table 3.2-2
Formaldehyde	4.40E-01	g/hp-hr	1.34	5.86	8.80E-02	g/hp-hr	0.27	1.17	Permit Condition
Acetaldehyde	8.36E-03	lb/mmBtu	0.10	0.42	8.36E-03	lb/mmBtu	0.10	0.42	EPA AP-42 Table 3.2-2
Acrolein	5.14E-03	lb/mmBtu	0.06	0.26	5.14E-03	lb/mmBtu	0.06	0.26	EPA AP-42 Table 3.2-2
Benzene	4.40E-04	lb/mmBtu	0.01	0.02	4.40E-04	lb/mmBtu	0.01	0.02	EPA AP-42 Table 3.2-2
Toluene	4.08E-04	lb/mmBtu	0.00	0.02	4.08E-04	lb/mmBtu	0.00	0.02	EPA AP-42 Table 3.2-2
Ethylbenzene	3.97E-05	lb/mmBtu	0.00	0.00	3.97E-05	lb/mmBtu	0.00	0.00	EPA AP-42 Table 3.2-2
Xylene	1.84E-04	lb/mmBtu	0.00	0.01	1.84E-04	lb/mmBtu	0.00	0.01	EPA AP-42 Table 3.2-2
n-Hexane	1.11E-03	lb/mmBtu	0.01	0.06	1.11E-03	lb/mmBtu	0.01	0.06	EPA AP-42 Table 3.2-2
Total HAPs			1.52	6.65			0.45	1.96	

* - Uncontrolled and controlled emission factors for NOx and VOC are based on JJJJ standards as manufacturer uncontrolled emission factors are lower than JJJJ emission standards
** - Uncontrolled emission factor for CO was taken from the Manufacturer technical data sheets. Controlled emission factor for CO is a permit condition requested in this applicatior
*** - Uncontrolled and controlled emission factor for Total VOC was calculated to include formaldehyde.
**** - Controlled CO emission factor is a permit condition requested in this application.
***** - Sulfur emission factor from AP-42 Table 1.4-2 is ratio adjusted based on the max sulfur content when sulfur content is greater than 2,000 grains/MMscf
****** - PM10 emissions include filterable and condensable particulates.

Sample Calculation for NOx
1.00 g/hp-hr * 1380 hp / 453.59 g/lb * 8760 hr/yr / 2000 lb/ton = 13.33 tp

Engine Emission Detail Sheet

Item	Value
Source Name	ENG-9
Description	Generator Engine
Engine Use	Generator
Quantity	1
Make	Olympian
Model	250LG6
Serial Number	TBD
Manufacture Date	After 7/1/2010
Fuel Type	Natural Gas
Engine Type	4SRB

Item	Value	Units	Source
Rated Horsepower	374	hp	Manufacturer
Heat Rate	4.41	MMBtu/hr	Calculated
Fuel Consumption	11803	Btu/hp-hr	Manufacturer
Fuel Use	2983	scf/hr	Calculated
Fuel Heat Value	1479.8	btu/scf	Gas Analysis
Emission Controls	TBD		Manufacturer
Control Efficiency CH2O	0%		AP42
Control Efficiency NOx	0%		JJJJ
Control Efficiency VOC	0%		JJJJ
Control Efficiency CO	0%		JJJJ
Engine Speed	1800	RPM	Manufacturer
Potential Operation	8760	hr/yr	
Sulfur Content	8,000	grains/MMscf	AP42 with margin
Sulfur Margin	400%	%	

Potential Emissions Per Engine

Pollutant	Uncontrolled Emissions				Controlled Emissions				Source of Emission Factor
	EF	Units	(lb/hr)	(tpy)	EF	Units	(lb/hr)	(tpy)	
Nox	1.00*	g/hp-hr	0.82	3.61	1.00	g/hp-hr	0.82	3.61	40 CFR 60 Subpart JJJJ
VOC (less formaldehyde)	0.70*	g/hp-hr	0.58	2.53	0.70	g/hp-hr	0.58	2.53	40 CFR 60 Subpart JJJJ
Total VOC**	0.81	g/hp-hr	0.67	2.92	0.81	g/hp-hr	0.67	2.92	40 CFR 60 Subpart JJJJ + CH2O
CO	2.00*	g/hp-hr	1.65	7.22	2.00	g/hp-hr	1.65	7.22	40 CFR 60 Subpart JJJJ
SO2****	2.35E-03	lb/mmBtu	0.01	0.05	2.35E-03	lb/mmBtu	0.01	0.05	EPA AP-42 Table 3.2-3
PM10*****	1.94E-02	lb/mmBtu	0.09	0.38	1.94E-02	lb/mmBtu	0.09	0.38	EPA AP-42 Table 3.2-3
Formaldehyde	2.05E-02	lb/mmBtu	0.09	0.40	2.05E-02	lb/mmBtu	0.09	0.40	EPA AP-42 Table 3.2-3
Acetaldehyde	2.79E-03	lb/mmBtu	0.01	0.05	2.79E-03	lb/mmBtu	0.01	0.05	EPA AP-42 Table 3.2-3
Acrolein	2.63E-03	lb/mmBtu	0.01	0.05	2.63E-03	lb/mmBtu	0.01	0.05	EPA AP-42 Table 3.2-3
Benzene	1.58E-03	lb/mmBtu	0.01	0.03	1.58E-03	lb/mmBtu	0.01	0.03	EPA AP-42 Table 3.2-3
Toluene	5.58E-04	lb/mmBtu	0.00	0.01	5.58E-04	lb/mmBtu	0.00	0.01	EPA AP-42 Table 3.2-3
Ethylbenzene	2.48E-05	lb/mmBtu	0.00	0.00	2.48E-05	lb/mmBtu	0.00	0.00	EPA AP-42 Table 3.2-3
Xylene	1.95E-04	lb/mmBtu	0.00	0.00	1.95E-04	lb/mmBtu	0.00	0.00	EPA AP-42 Table 3.2-3
n-Hexane	N/A	lb/mmBtu	N/A	N/A	N/A	lb/mmBtu	N/A	N/A	EPA AP-42 Table 3.2-3
Total HAPs			0.12	0.55			0.12	0.55	

* - Uncontrolled and controlled emission factors for NOx, CO, and VOC are based on JJJJ standards as manufacturer uncontrolled emission factors are lower than JJJJ emission standards.
** - Uncontrolled emission factor for Total VOC was calculated to include formaldehyde.
*** - Controlled emission factors are permit conditions requested in this application.
**** - Sulfur emission factor from AP-42 Table 1.4-2 is ratio adjusted based on the max sulfur content when sulfur content is greater than 2,000 grains/MMscf.
***** - PM10 emissions include filterable and condensable particulates.

Sample Calculation for NOx
1.00 g/hp-hr * 374 hp / 453.59 g/lb * 8760 hr/yr / 2000 lb/ton = 3.61 tpy

Tank Detail Sheet

Equipment Source Name	TK-1		Tank Height	25	ft	
Source Description	Gunbarrel Tank		Tank Diameter	12	ft	
Quantity	1		Potential Operation	8,760	hr/yr	
Tank Capacity	500	bbl (each)	Potential Oil Throughput	766	bbl/yr	2.1 avg. bbl/day
Total Tank Capacity	500	bbl	Potential Throughput Per Tank	766	bbl/yr/tk	2.1 avg. bbl/day/tk
Control Efficiency	95%		Throughput Margin	0.00%		
			Calendar Year	2019		

Total Potential Emissions

Pollutant	Uncontrolled		Controlled	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
VOC	22.64	99.18	1.13	4.96
Benzene	0.23	0.99	0.01	0.05
Toluene	0.23	0.99	0.01	0.05
Ethylbenzene	0.02	0.10	0.00	0.00
Xylenes	0.02	0.10	0.00	0.00
n-Hexane	0.91	3.97	0.05	0.20
2,2,4-Trimethylpentane	0.02	0.10	0.00	0.00
Total HAPs	1.43	6.25	0.07	0.31

Potential Emissions Per Tank

Pollutant	EF	Uncontrolled		Controlled		Source of Emission Factor
	(lb/bbl)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	
VOC	258.95	22.64	99.18	1.13	4.96	Engineering Calculation
Benzene	2.59	0.23	0.99	0.01	0.05	Engineering Calculation
Toluene	2.59	0.23	0.99	0.01	0.05	Engineering Calculation
Ethylbenzene	0.26	0.02	0.10	0.00	0.00	Engineering Calculation
Xylenes	0.26	0.02	0.10	0.00	0.00	Engineering Calculation
n-Hexane	10.36	0.91	3.97	0.05	0.20	Engineering Calculation
2,2,4-Trimethylpentane	0.26	0.02	0.10	0.00	0.00	Engineering Calculation
Total HAPs		1.43	6.25	0.07	0.31	

Process Streams	**39 To Flare**	**40 To Slop Oil**
Composition	**Solved**	**Solved**
Phase: **Total**	**VSSL-105**	**VSSL-105**
	--	--
Mole Fraction	**%**	**%**
Methane	14.0050	0.095017
Ethane	15.1670	0.87808
Propane	28.5610	7.41773
i-Butane	9.11843	7.17785
n-Butane	26.0267	34.2548
i-Pentane	3.42445	12.6336
n-Pentane	2.60785	13.7462
n-Hexane	0.849356	20.9208
n-Heptane	0.0200098	1.87120
C8	0.00266528	1.00249
Water	0.00304587	0.000043916
N2	0.122357	0.000185748
CO2	0.091903	0.00194386
H2S	0.000283058	1.96086E-05
Triethylene Glycol	0	0
EG	0	0
MeOH	0	0
CHEMTHERM 550	0	0

Process Streams	**39 To Flare**	**40 To Slop Oil**
Composition	**Solved**	**Solved**
Phase: **Total**	**VSSL-105**	**VSSL-105**
Process Streams	**39 To Flare**	**40 To Slop Oil**
Mass Fraction	**%**	**%**
Methane	4.9915	0.0225109
Ethane	10.1321	0.389921
Propane	27.9801	4.83045
i-Butane	11.77447	6.16109
n-Butane	33.6078	29.4025
i-Pentane	5.48907	13.4610
n-Pentane	4.18014	14.6465
n-Hexane	1.62612	26.6246
n-Heptane	0.0445449	2.76896
C8	0.00676389	1.69113
Water	0.00121908	1.16839E-05
N2	0.076151	0.000076844
CO2	0.089858	0.00126337
H2S	0.000214321	9.86911E-06
Triethylene Glycol	0	0
EG	0	0
MeOH	0	0
CHEMTHERM 550	0	0

Process Streams		**39 To Flare**	**40 To Slop Oil**
Properties	**Status:**	**Solved**	**Solved**
Phase: **Total**	**From Block:**	**VSSL-105**	**VSSL-105**
	To Block:	--	--
Property	**Units**		
Temperature	°F	16.19949	16.19949
Pressure	psig	0.125*	0.125
Mole Fraction Vapor	%	100	0
Mole Fraction Light Liquid	%	0	100
Mole Fraction Heavy Liquid	%	0	0
Molecular Weight	lb/lbmol	45.0112	67.7141
Mass Density	lb/ft^3	0.1209179	40.1146
Molar Flow	lbmol/h	13.8689	6.79227
Mass Flow	lb/h	624.256	459.933
Vapor Volumetric Flow	ft^3/h	5162.64	11.4655
Liquid Volumetric Flow	gpm	643.654	1.42946
Std Vapor Volumetric Flow	MMSCFD	0.126313	0.0618614
Std Liquid Volumetric Flow	sgpm	2.45639	1.50085
Compressibility		0.978572	0.00443751
Specific Gravity		1.55412	0.643185
API Gravity			97.3979
Enthalpy	Btu/h	-665846	-501320
Mass Enthalpy	Btu/lb	-1066.62	-1089.99
Mass Cp	Btu/(lb*°F)	0.378222	0.521661
Ideal Gas CpCv Ratio		1.13354	1.08773
Dynamic Viscosity	cP	0.00739850	0.280324
Kinematic Viscosity	cSt	3.81972	0.436251
Thermal Conductivity	Btu/(h*ft*°F)	0.0089001	0.0713101?
Surface Tension	lbf/ft		0.00123561?
Net Ideal Gas Heating Value	Btu/ft^3	2353.24	3485.33
Net Liquid Heating Value	Btu/lb	19688.6	19372.5
Gross Ideal Gas Heating Value	Btu/ft^3	2557.29	3771.13
Gross Liquid Heating Value	Btu/lb	21409.2	20974.6

1 - Uncontrolled emissions were calculated from Promax output.

2- No HAP emissions are reported by Promax; therefore, these emissions were estimated based on the ration of HAP's to total VOC's from a conservative engineering assumption.

Tank Detail Sheet

Equipment Source Name	TK 2-5		Tank Height	20	ft		
Source Description	Stabilized Condensate Tank		Tank Diameter	12	ft		
Quantity	4		Potential Operation	8760	hr/yr		
Tank Capacity	400	bbl (each)	Potential Throughput	219,000	bbl/yr	600.0	avg. bbl/day
Total Tank Capacity	1600	bbl	Potential Throughput Per Tank	54,750	bbl/yr/tk	150.0	avg. bbl/day/tk
Control Efficiency	95%		Calendar Year	2019			

Total Potential Emissions

Pollutant	Uncontrolled		Controlled	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
VOC	7.98	34.95	0.40	1.75
Benzene	0.08	0.35	0.00	0.02
Toluene	0.08	0.35	0.00	0.02
Ethylbenzene	0.01	0.03	0.00	0.00
Xylenes	0.01	0.03	0.00	0.00
n-Hexane	0.32	1.40	0.02	0.07
2,2,4-Trimethylpentane	0.01	0.03	0.00	0.00
Total HAPs	0.50	2.20	0.03	0.11

Potential Emissions Per Tank

Pollutant	HAP Wt %	Uncontrolled		Controlled		Source of Emission Factor
	(%)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	
VOC		1.99	8.74	0.10	0.44	EPA TANKS 4.0.9d
Benzene	1.00%	0.02	0.09	0.00	0.00	Engineering Calculation
Toluene	1.00%	0.02	0.09	0.00	0.00	Engineering Calculation
Ethylbenzene	0.10%	0.00	0.01	0.00	0.00	Engineering Calculation
Xylenes	0.10%	0.00	0.01	0.00	0.00	Engineering Calculation
n-Hexane	4.00%	0.08	0.35	0.00	0.02	Engineering Calculation
2,2,4-Trimethylpentane	0.10%	0.00	0.01	0.00	0.00	Engineering Calculation
Total HAPs		0.13	0.55	0.01	0.03	

1 - Uncontrolled emissions were taken directly from the EPA TANKS 4.0.9d output.

2 - No HAP emissions are reported by EPA Tanks 4.0.9d; therefore, these emissions were estimated based on the ration of HAP's to total VOC's from a conservative engineering assumption.

Tank Detail Sheet

Equipment Source Name	TK-6		Tank Height	20	ft		
Source Description	Slop Oil Tank		Tank Diameter	12	ft		
Quantity	1		Potential Operation	8760	hr/yr		
Tank Capacity	400	bbl (each)	Potential Throughput	1,532	bbl/yr	4.2	avg. bbl/day
Total Tank Capacity	400	bbl	Potential Throughput Per Tank	1,532	bbl/yr/tk	4.2	avg. bbl/day/tk
Control Efficiency	95%		Margin	100%			
			Calendar Year	2019			

Total Potential Emissions

Pollutant	Uncontrolled		Controlled	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
VOC	0.85	3.72	0.04	0.19
Benzene	0.01	0.04	0.00	0.00
Toluene	0.01	0.04	0.00	0.00
Ethylbenzene	0.00	0.00	0.00	0.00
Xylenes	0.00	0.00	0.00	0.00
n-Hexane	0.03	0.15	0.00	0.01
2,2,4-Trimethylpentane	0.00	0.00	0.00	0.00
Total HAPs	0.05	0.23	0.00	0.01

Potential Emissions Per Tank

Pollutant	HAP Wt %	Uncontrolled		Controlled		Source of Emission Factor
	(%)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	
VOC		0.85	3.72	0.04	0.19	EPA TANKS 4.0.9d
Benzene	1.00%	0.01	0.04	0.00	0.00	Engineering Calculation
Toluene	1.00%	0.01	0.04	0.00	0.00	Engineering Calculation
Ethylbenzene	0.10%	0.00	0.00	0.00	0.00	Engineering Calculation
Xylenes	0.10%	0.00	0.00	0.00	0.00	Engineering Calculation
n-Hexane	4.00%	0.03	0.15	0.00	0.01	Engineering Calculation
2,2,4-Trimethylpentane	0.10%	0.00	0.00	0.00	0.00	Engineering Calculation
Total HAPs		0.05	0.23	0.00	0.01	

1 - Uncontrolled emissions were taken directly from the EPA TANKS 4.0.9d output.

2 - No HAP emissions are reported by EPA Tanks 4.0.9d; therefore, these emissions were estimated based on the ration of HAP's to total VOC's from a conservative engineering assumption.

Tank Detail Sheet

Equipment Source Name	PWTK-1		Tank Height	20	ft	
Source Description	Produced Water Tank		Tank Diameter	12	ft	
Quantity	1		Potential Operation	8760	hr/yr	
Tank Capacity	400	bbl (each)	Potential PW Throughput	1,532	bbl/yr	4.2 avg. bbl/day
Total Tank Capacity	400	bbl	Potential Oil from PW Throughput	15	bbl/yr	0.1 avg. bbl/day
Control Efficiency	95%		Potential Oil Throughput Per Tank	15	bbl/yr/tk	0.1 avg. bbl/day/tk
			Margin	100%		
			Calendar Year	2019		

Total Potential Emissions

Pollutant	Uncontrolled		Controlled	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
VOC	0.00	0.00	0.00	0.00
Benzene	0.00	0.00	0.00	0.00
Toluene	0.00	0.00	0.00	0.00
Ethylbenzene	0.00	0.00	0.00	0.00
Xylenes	0.00	0.00	0.00	0.00
n-Hexane	0.00	0.00	0.00	0.00
2,2,4-Trimethylpentane	0.00	0.00	0.00	0.00
Total HAPs	0.00	0.00	0.00	0.00

Potential Emissions Per Tank

Pollutant	HAP Wt %	Uncontrolled		Controlled		Source of Emission Factor
	(%)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	
VOC		0.00	0.00	0.00	0.00	EPA TANKS 4.0.9d
Benzene	1.00%	0.00	0.00	0.00	0.00	Engineering Calculation
Toluene	1.00%	0.00	0.00	0.00	0.00	Engineering Calculation
Ethylbenzene	0.10%	0.00	0.00	0.00	0.00	Engineering Calculation
Xylenes	0.10%	0.00	0.00	0.00	0.00	Engineering Calculation
n-Hexane	4.00%	0.00	0.00	0.00	0.00	Engineering Calculation
2,2,4-Trimethylpentane	0.10%	0.00	0.00	0.00	0.00	Engineering Calculation
Total HAPs		0.00	0.00	0.00	0.00	

1 - Uncontrolled emissions were taken directly from the EPA TANKS 4.0.9d output.
2 - Uncontrolled emissions were calculated based on the assumption that 1% of the produced water throughput is condensate.
3 - No HAP emissions are reported by EPA Tanks 4.0.9d; therefore, these emissions were estimated based on the ration of HAP's to total VOC's from a conservative engineering assumption.
4 - Throughput includes margin to account for additional water streams dumping into the tank.

Heater / Boiler Detail Sheet

Equipment Source Name	HTR-1			
Source Description	Hot Oil Heater			
Equipment Usage	Hot Oil Heater	Potential operation	8760	hr/yr
Equipment Make	TBD	Fuel Heating Value	1479.8	Btu/scf
Equipment Model	TBD	Heat Rate	50.00	MMBtu/hr
Serial Number	TBD	Sulfur Content	9,476	grains/MMscf Gas Analysis with Margin
Quantity	1	Sulfur Margin	400%	%
Emission Controls	None			

Total Potential Emissions

Pollutant	Estimated Emissions (lb/hr)	(tpy)
NOx	1.69	7.40
CO	2.84	12.43
VOC	0.19	0.81
SOx	0.10	0.42
PM10	0.26	1.12
Benzene	0.00	0.00
n-Hexane	0.06	0.27
Toluene	0.00	0.00
CH_2O	0.00	0.01
Total HAPs	0.06	0.28

Potential Emissions Per Heater

Pollutant	EF (lb/MMscf)	Estimated Emissions (lb/hr)	(tpy)	Source of Emission Factor
NOx[2]	50	1.69	7.40	AP-42 Table 1.4-1
CO	84	2.84	12.43	AP-42 Table 1.4-1
VOC	5.5	0.19	0.81	AP-42 Table 1.4-2
SOx[1]	2.84	0.10	0.42	AP-42 Table 1.4-2
PM10	7.6	0.26	1.12	AP-42 Table 1.4-2
Benzene	0.0021	0.00	0.00	AP-42 Table 1.4-3
n-Hexane	1.80	0.06	0.27	AP-42 Table 1.4-3
Toluene	0.0034	0.00	0.00	AP-42 Table 1.4-3
CH_2O	0.075	0.00	0.01	AP-42 Table 1.4-3
Total HAPs		0.06	0.28	

1 - Sulfur emission factor from AP-42 Table 1.4-2 is ratio adjusted based on the max sulfur content when sulfur content is greater than 2,000 grains/MMscf.
2 - This is a low NOx burner.

Sample Calculation for NOx
50 lb/MMscf / 1479.80 Btu/scf * 50.000 MMBtu/hr = 1.69 lb/hr

Heater / Boiler Detail Sheet

Equipment Source Name	HTR-2			
Source Description	Regen Gas Heater			
Equipment Usage	Regen Gas Heater	Potential operation	8760	hr/yr
Equipment Make	TBD	Fuel Heating Value	1479.8	Btu/scf
Equipment Model	TBD	Heat Rate	11.00	MMBtu/hr
Serial Number	TBD	Sulfur Content	9,476	grains/MMscf Gas Analysis with Margin
Quantity	1	Sulfur Margin	400%	%
Emission Controls	None			

Total Potential Emissions

Pollutant	Estimated Emissions (lb/hr)	(tpy)
NOx	0.74	3.26
CO	0.62	2.73
VOC	0.04	0.18
SOx	0.02	0.09
PM10	0.06	0.25
Benzene	0.00	0.00
n-Hexane	0.01	0.06
Toluene	0.00	0.00
CH_2O	0.00	0.00
Total HAPs	0.01	0.06

Potential Emissions Per Heater

Pollutant	EF (lb/MMscf)	Estimated Emissions (lb/hr)	(tpy)	Source of Emission Factor
NOx	100	0.74	3.26	AP-42 Table 1.4-1
CO	84	0.62	2.73	AP-42 Table 1.4-1
VOC	5.5	0.04	0.18	AP-42 Table 1.4-2
SOx[1]	2.84	0.02	0.09	AP-42 Table 1.4-2
PM10	7.6	0.06	0.25	AP-42 Table 1.4-2
Benzene	0.0021	0.00	0.00	AP-42 Table 1.4-3
n-Hexane	1.80	0.01	0.06	AP-42 Table 1.4-3
Toluene	0.0034	0.00	0.00	AP-42 Table 1.4-3
CH_2O	0.075	0.00	0.00	AP-42 Table 1.4-3
Total HAPs		0.01	0.06	

1 - Sulfur emission factor from AP-42 Table 1.4-2 is ratio adjusted based on the max sulfur content when sulfur content is greater than 2,000 grains/MMscf.

Sample Calculation for NOx

100 lb/MMscf / 1479.80 Btu/scf * 11.000 MMBtu/hr = 0.74 lb/hr

Loadout Emissions Detail Sheet

Equipment Source Name	CONDLOAD-1	
Source Description	Condensate Loadout	
Quantity	1	
Potential Throughput	219,000	bbl/yr
LACT On Site?	No	
Estimated LACT Downtime	NA	
Control Device	Vapor Balance	
Control Efficiencies	95%	
Capture Efficiency	70%	

Potential Emissions

Pollutant	HAP Wt %	Uncontrolled		Controlled		Source of Emission Calculations
	(%)	lb/hr	tpy	lb/hr	tpy	
VOC		99.91	27.35	33.47	9.16	AP-42 Section 5.2.1
Benzene	1.00%	1.00	0.27	0.33	0.09	Engineering Calculation
Toluene	1.00%	1.00	0.27	0.33	0.09	Engineering Calculation
Ethylbenzene	0.10%	0.10	0.03	0.03	0.01	Engineering Calculation
Xylenes	0.10%	0.10	0.03	0.03	0.01	Engineering Calculation
n-Hexane	4.00%	4.00	1.09	1.34	0.37	Engineering Calculation
2,2,4-Trimethylpentane	0.10%	0.10	0.03	0.03	0.01	Engineering Calculation
Total HAPs		6.29	1.72	2.11	0.58	

Molecular Weight of Vapors, MW	64.0	lb/lb-mol	EPA TANKS 4.0.9d
True Vapor Pressure, Pva @ T	6.48	psia	Interpolation from AP-42 Table 7.1-2
Temperature of Bulk Liquid Loaded, T	61	F	Ambient Temperature
	521	R	
Saturation Factor	0.6		AP-42 Table 5.2.1
Efficiency of controlled loading (%)	0.0%		
Potential Annual Throughput, v	9,198	1000 gallons	
Loading losses, L @ tank	5.95	lb/1000 gallons	
L = 12.46 S P MW / T (1-eff)			
Potential annual losses @ tank, L*v	54,699.81	lb/yr	**27.35 tpy**

Max hourly fill rate[1]	16.8	1000 gallons/hr	Trucking Company
Max hourly emissions	**99.9**	**lb/hr**	Calculated

1 - Max hourly fill rate based on a 200-bbl truck filling every 30 minutes.

Sample Calculation

219000 bbl/yr * 42 gal/bbl / 1000 gal * 5.95 lb/1000 gal / 2000 lb/ton = 27.35 tpy

Loadout Emissions Detail Sheet

Equipment Source Name	OILLOAD-1	
Source Description	Oil Loadout	
Quantity	1	
Potential Throughput	1,532	bbl/yr
LACT On Site?	No	
Estimated LACT Downtime	NA	
Control Device	Vapor Balance	
Control Efficiencies	95%	
Capture Efficiency	70%	

Potential Emissions

Pollutant	HAP Wt % (%)	Uncontrolled lb/hr	Uncontrolled tpy	Controlled lb/hr	Controlled tpy	Source of Emission Calculations
VOC		99.91	0.19	33.47	0.06	AP-42 Section 5.2.1
Benzene	1.00%	1.00	0.00	0.33	0.00	Engineering Calculation
Toluene	1.00%	1.00	0.00	0.33	0.00	Engineering Calculation
Ethylbenzene	0.10%	0.10	0.00	0.03	0.00	Engineering Calculation
Xylenes	0.10%	0.10	0.00	0.03	0.00	Engineering Calculation
n-Hexane	4.00%	4.00	0.01	1.34	0.00	Engineering Calculation
2,2,4-Trimethylpentane	0.10%	0.10	0.00	0.03	0.00	Engineering Calculation
Total HAPs		6.29	0.01	2.11	0.00	

Molecular Weight of Vapors, MW	64.0	lb/lb-mol	EPA TANKS 4.0.9d
True Vapor Pressure, Pva @ T	6.48	psia	Interpolation from AP-42 Table 7.1-2
Temperature of Bulk Liquid Loaded, T	61	F	Ambient Temperature
	521	R	
Saturation Factor	0.6		AP-42 Table 5.2.1
Efficiency of controlled loading (%)	0.0%		
Potential Annual Throughput, v	64	1000 gallons	
Loading losses, L @ tank	5.95	lb/1000 gallons	
L = 12.46 S P MW / T (1-eff)			
Potential annual losses @ tank, L*v	382.65	lb/yr	**0.19 tpy**

Max hourly fill rate[1]	16.8	1000 gallons/hr	Trucking Company
Max hourly emissions	**99.9**	**lb/hr**	Calculated

1 - Max hourly fill rate based on a 200-bbl truck filling every 30 minutes.

Sample Calculation

1532 bbl/yr * 42 gal/bbl / 1000 gal * 5.95 lb/1000 gal / 2000 lb/ton = 0.19 tpy

Fugitive Emissions Detail Sheet

Equipment Source Name FUG-1 Potential Operation 8760 hr/yr
Source Description Fugitives - OOOOa

Uncontrolled Potential Emissions

	HAP	Heavy Crude - Emissions		Light Crude - Emissions		Gas - Emissions		Total Emissions	
Pollutant	Wt. %	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
VOC		0.00	0.00	5.00	23.68	6.29	27.56	11.30	51.24
H2S		NA	NA	NA	NA	0.00	0.00	0.00	0.00
Benzene	0.32%	0.00	0.00	0.02	0.08	0.02	0.09	0.04	0.16
Toluene	0.05%	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.02
Ethylbenzene	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Xylenes	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Hexane	0.55%	0.00	0.00	0.03	0.13	0.03	0.15	0.06	0.28
2,2,4-Trimethylpentane	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total HAPs		0.00	0.00	0.05	0.22	0.06	0.25	0.10	0.47

Controlled Potential Emissions

	HAP	Heavy Crude - Emissions		Light Crude - Emissions		Gas - Emissions		Total Emissions	
Pollutant	Wt. %	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
VOC		0.00	0.00	0.96	4.41	2.41	10.56	3.37	14.97
H2S		NA	NA	NA	NA	0.00	0.00	0.00	0.00
Benzene	0.32%	0.00	0.00	0.00	0.01	0.01	0.03	0.01	0.05
Toluene	0.05%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Ethylbenzene	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Xylenes	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Hexane	0.55%	0.00	0.00	0.01	0.02	0.01	0.06	0.02	0.08
2,2,4-Trimethylpentane	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total HAPs		0.00	0.00	0.01	0.04	0.02	0.10	0.03	0.14

Gas

					Uncontrolled Emissions		Controlled Emissions	
Equipment Type	EF (kg/hr/source)	Source Count	VOC Wt. %	Control Efficiencies %	VOC (lb/hr)	VOC (tpy)	VOC (lb/hr)	VOC (tpy)
Valve	4.50E-03	763	48%	96%	3.66	16.04	0.15	0.64
Flanges	3.90E-04	495	48%	81%	0.21	0.90	0.04	0.17
Connectors	2.00E-04	1155	48%	81%	0.25	1.08	0.05	0.21
Open Ended Lines	2.00E-03	0	48%		0.00	0.00	0.00	0.00
Pump Seals	2.40E-03	0	48%		0.00	0.00	0.00	0.00
Other Components	8.80E-03	232	48%		2.18	9.54	2.18	9.54
VOC Emissions					**6.29**	**27.56**	**2.41**	**10.56**

Gas VOC Wt% Margin 20.00%

Light Liquid[3]

					Uncontrolled Emissions		Controlled Emissions	
Equipment Type	EF (kg/hr/source)	Source Count	VOC Wt. %	Control Efficiencies %	VOC (lb/hr)	VOC (tpy)	VOC (lb/hr)	VOC (tpy)
Valve	2.50E-03	684	100%	95%	3.77	16.51	0.19	0.83
Flanges	1.10E-04	417	100%	81%	0.10	0.44	0.02	0.08
Connectors	2.10E-04	1020	100%	81%	0.47	2.07	0.09	0.39
Open Ended Lines	1.40E-03	0	100%		0.00	0.00	0.00	0.00
Pump Seals	1.30E-02	14	100%	88%	0.00	1.76	0.00	0.21
Other Components	7.50E-03	40	100%		0.66	2.90	0.66	2.90
VOC Emissions					**5.00**	**23.68**	**0.96**	**4.41**

Heavy Liquid[3]

					Uncontrolled Emissions		Controlled Emissions	
Equipment Type	EF (kg/hr/source)	Source Count	VOC Wt. %	Control Efficiencies %	VOC (lb/hr)	VOC (tpy)	VOC (lb/hr)	VOC (tpy)
Valve	8.40E-06	0	100%		0.00	0.00	0.00	0.00
Flanges	3.90E-06	1	100%	81%	0.00	0.00	0.00	0.00
Connectors	7.50E-06	1	100%	81%	0.00	0.00	0.00	0.00
Open Ended Lines	1.40E-04	0	100%		0.00	0.00	0.00	0.00
Pump Seals	N/A							
Other Components	3.20E-05	0	100%		0.00	0.00	0.00	0.00
VOC Emissions					**0.00**	**0.00**	**0.00**	**0.00**

1 - Component counts are actual facility component counts determined by Dexter ATC Field Services.
2 - Component leak rates taken from EPA's Oil and Gas Production Operations average equipment leak emission factors (EPA 453/R-95-017 dated November 1995) Table 2-4.
3 - Assuming heavy and light crude weight percentage is 100% VOC to be conservative in heavy and light crude fugitive emission calculations.
4 - Control efficiencies were obtained from Table 4.1 in "EPA Leak Detection and Repair - A Best Practices Guide"
5 - HAP Weight percentages based on a conservative engineering estimation.

Sample Calculation:
0.00250 kg/hr-source * 684 Sources * 2.20462 lb/kg * 100 % VOC Wt% * 8760 hr/yr /2000 lb/ton = 16.51 tpy

Fugitive Emissions Detail Sheet

Equipment Source Name	FUG-2	Potential Operation	8760	hr/yr
Source Description	Fugitives - Residue	Emission Controls	None	

Uncontrolled Potential Emissions

	HAP	Gas - Emissions		Total Emissions	
Pollutant	Wt. %	lb/hr	tpy	lb/hr	tpy
VOC		0.01	0.06	0.01	0.06
H2S		0.00	0.00	0.00	0.00
Benzene	0.00%	0.00	0.00	0.00	0.00
Toluene	0.00%	0.00	0.00	0.00	0.00
Ethylbenzene	0.00%	0.00	0.00	0.00	0.00
Xylenes	0.00%	0.00	0.00	0.00	0.00
n-Hexane	0.01%	0.00	0.00	0.00	0.00
2,2,4-Trimethylpentane	0.00%	0.00	0.00	0.00	0.00
Total HAPs		0.00	0.00	0.00	0.00

Controlled Potential Emissions

	HAP	Gas - Emissions		Total Emissions	
Pollutant	Wt. %	lb/hr	tpy	lb/hr	tpy
VOC		0.01	0.06	0.01	0.06
H2S		0.00	0.00	0.00	0.00
Benzene	0.00%	0.00	0.00	0.00	0.00
Toluene	0.00%	0.00	0.00	0.00	0.00
Ethylbenzene	0.00%	0.00	0.00	0.00	0.00
Xylenes	0.00%	0.00	0.00	0.00	0.00
n-Hexane	0.01%	0.00	0.00	0.00	0.00
2,2,4-Trimethylpentane	0.00%	0.00	0.00	0.00	0.00
Total HAPs		0.00	0.00	0.00	0.00

Gas HAP Wt% Margin 100.00%

Gas

Equipment Type	EF[3] (kg/hr/source)	Source Count	VOC Wt. %	Control Efficiencies %	Uncontrolled Emissions VOC (lb/hr)	Uncontrolled Emissions VOC (tpy)	Controlled Emissions VOC (lb/hr)	Controlled Emissions VOC (tpy)
Valve	4.50E-03	4	4%	0%	0.00	0.01	0.00	0.01
Flanges	3.90E-04	8	4%		0.00	0.00	0.00	0.00
Connectors	2.00E-04	300	4%	0%	0.00	0.02	0.00	0.02
Open Ended Lines	2.00E-03	0	4%		0.00	0.00	0.00	0.00
Pump Seals	2.40E-03	0	4%		0.00	0.00	0.00	0.00
Other Components	8.80E-03	10	4%		0.01	0.03	0.01	0.03
VOC Emissions					**0.01**	**0.06**	**0.01**	**0.06**

Gas VOC Wt% Margin 100.00%

Component Counts[1]	
	Total
Valve	4
Flanges	8
Connectors	300
Open Ended Lines	0
Pump Seals	0
Other Components	10
Total	322

1 - Component counts are engineering estimations.
2 - Component leak rates taken from EPA's Oil and Gas Production Operations average equipment leak emission factors (EPA 453/R-95-017 dated November 1995) Table 2-4.
3 - Gas VOC and HAP wt % percentage is based on stream 47 from Promax run with margin.

Sample Calculation:
0.00450 kg/hr-source * 4 Sources * 2.20462 lb/kg * 4 % VOC Wt% * 8760 hr/yr /2000 lb/ton = 0.01 tpy

Process and compressor Fugitives GHG Emissions

Fugitive GHG Summary

	CH4	CO2	CO2e
Emissions TPY	827.73	122.06	**20,815.37**
Global Warming Potential (GWP)	25	1	

CH4 Emission Rate for Gas Processing Volume[1] = 2.5e-3 tonne CH4/MMscf processed
CH4 Emission Rate for Reciprocating Compressors[1] = 8.95e-3 tonne CH4/compressor-hr
CH4 Emission Rate for Centrifugal Compressors[1] = 1.7e-2 tonne CH4/compressor-hr

[1] API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry Table 6-5

Process gas CH4 molar percentage = 38.64% From modeled composition
Process gas CO2 molar percentage = 2.07% From modeled composition
CH4 molecular weight (lb/lb mol) 16
CO2 molecular weight (lb/lb mol) 44

Amount of gas throughput (MMscf/yr) = 21,900 (Max 60 MMSCFD * 365 days/yr)
Number of Reciprocating Compressors in Process = 7
Number of Centrifugal Compressors in Process = 1

CH4 Emission Calculation for Processing Volume

tonne CH4/MMscf processed	MMscf processed/year	ton CH4/ tonne CH4	ton CH4/year
0.0025	21,900	1.1	60.225

Total CH4 process emissions (ton/year) = 60.23

CO2 Emission Calculation for Processing Volume

ton CH4/year	CO2 mol % / CH4 mol %	CO2 mol wt/ CH4 mol wt	ton CO2 / year
60.225	0.05362	2.75	8.881

Total CO2 process emissions (ton/year) = 8.88

CH4 Emission Calculation for Reciprocating Compressors

tonne CH4/compressor-hr	hr/year	compressor number	ton CH4/ tonne CH4	ton CH4 /year
0.00895	8760.00	7	1.1	604

Total CH4 reciprocating compressor emissions (ton/year) = 603.70

CO2 Emission Calculation for Reciprocating Compressors

ton CH4/year	CO2 mol % / CH4 mol %	CO2 mol wt/ CH4 mol wt	ton CO2 / year
604	0.05362	2.75	89.023

Total CO2 reciprocating compressor emissions (ton/year) = 89.023

CH4 Emission Calculation for Centrifugal Compressors

tonne CH4/compressor-hr	hr/year	compressor number	ton CH4/ tonne CH4	ton CH4 /year
0.017	8760.00	1	1.1	164

Total CH4 centrifugal compressor emissions (ton/year) = 163.81

CO2 Emission Calculation for Centrifugal Compressors

ton CH4/year	CO2 mol % / CH4 mol %	CO2 mol wt/ CH4 mol wt	ton CO2 / year
164	0.05362	2.75	24.156

Total CO2 centrifugal compressor emissions (ton/year) = 24.156

Equipment Source Name	AMINE-1
Source Description	Amine Unit
Equipment Usage	Amine Unit
Equipment Make	TBD
Equipment Model	TBD
Serial Number	TBD
QTY	1

Potential Operation:	8760	hr/yr
TO Downtime Allowance:	438	hr/yr
TO Control Efficiency:	98%	
TO Downtime Control Efficiency:	95%	FL-1 Control Efficiency
Margin added for operational flexibility:	30%	

Emissions Summary

VOC Emissions Summary (tons/yr) with margin added

	Uncontrolled		Controlled		Uncontrolled TO Downtime		Controlled TO Downtime	
Emission Unit	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
AMINE-1 (Flash)	36.20	158.54	0.72	3.17	36.20	7.93	1.81	0.40
AMINE-1 (Still)	5.24	22.96	0.10	0.46	5.24	1.15	0.26	0.06

	Uncontrolled		Controlled	
	lb/hr	tons/yr	lb/hr	tons/yr
AMINE-1 Total	41.44	181.50	2.91	4.09

Uncontrolled HAP Emissions Summary (with margin)

Emission Unit	**BZ**	**Tol**	**EB**	**Xyl**	**n-Hex**	**224-TMP**	**Total**
AMINE-1 (Flash) (lb/hr)	0.03	0.03	0.00	0.01	0.14	0.03	0.25
AMINE-1 (Flash) (lb/yr)	254.97	258.97	14.66	75.38	1256.99	300.78	2161.75
AMINE-1 (Still) (lb/hr)	0.00	0.00	0.00	0.00	0.02	0.01	0.04
AMINE-1 (Still) (lb/yr)	39.89	40.52	2.29	11.79	196.68	47.06	338.24
Total AMINE-1 (lb/hr)	**0.03**	**0.03**	**0.00**	**0.01**	**0.17**	**0.04**	**0.29**
Total AMINE-1 (lb/yr)	**294.87**	**299.49**	**16.95**	**87.17**	**1453.66**	**347.85**	**2499.99**
Total AMINE-1 (TPY)	**0.15**	**0.15**	**0.01**	**0.04**	**0.73**	**0.17**	**1.25**

Controlled HAP Emissions (Normal Operation) Summary

Emission Unit	**BZ**	**Tol**	**EB**	**Xyl**	**n-Hex**	**224-TMP**	**Total**
AMINE-1 (Flash) (TO-1) (lb/yr)	5.48	5.57	0.32	1.62	27.03	6.47	46.48
AMINE-1 (Still) (TO-1) (lb/yr)	0.86	0.87	0.05	0.25	4.23	1.01	7.27
Total AMINE-1 (lb/hr)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**
Total AMINE-1 (lb/yr)	**6.34**	**6.44**	**0.36**	**1.87**	**31.25**	**7.48**	**53.75**
Total AMINE-1 (TPY)	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**	**0.00**	**0.03**

Equipment Source Name AMINE-1

ProMax Output File Summary

AMINE-1

Specie	Amine Flash Mass flow [lb/h]	Amine Flash Mole Fraction [%]	Amine Still Mass flow [lb/h]	Amine Still Mole Fraction [%]
Methane	71.85	55.84%	7.40	0.14%
Ethane	29.58	12.27%	4.09	0.04%
Propane	20.09	5.68%	3.01	0.02%
Iso-Butane	0.59	0.13%	0.02	0.00%
N-Butane	5.18	1.11%	0.75	0.00%
Iso-Pentane	0.44	0.08%	0.03	0.00%
N-Pentane	0.77	0.13%	0.10	0.00%
Other Hexanes	0.48	0.07%	0.07	0.00%
n-Hexane	0.11	0.02%	0.02	0.00%
Heptane	0.06	0.01%	0.01	0.00%
2,2,4-Trimethylpentane	0.03	0.00%	0.00	0.00%
Octanes +	0.05	0.01%	0.01	0.00%
Benzene	0.02	0.00%	0.00	0.00%
Toluene	0.02	0.00%	0.00	0.00%
Ethylbenzene	0.00	0.00%	0.00	0.00%
Xylenes	0.01	0.00%	0.00	0.00%
Water	8.93	6.18%	410.47	7.14%
Hydrogen Sulfide	0.03	0.01%	11.22	0.10%
Carbon Dioxide	59.46	16.85%	12992.85	92.54%
Nitrogen	3.65	1.62%	0.12	0.00%
TOTAL	**201.34**	**1.00**	**13430.17**	**1.00**

Equipment Source Name	AMINE-1	
Molar flow [lbmol/h]	8.02	319.02
Std volumetric flow [MMSCFD]	0.07	2.91
Std volumetric flow [MMSCFD] with margi	0.09	3.78
Std volumetric flow [SCFH]	3956.52	157376.36
mmscf/yr	34.66	1378.62
TO downtime throughput mmscf/yr	1.73	68.93
VOC flow [lb/h]	27.84	4.03
HAP flow [lb/h]	0.19	0.03
VOC flow [lb/h] with margin	36.20	5.24
HAP flow [lb/h] with margin	0.25	0.04
Benzene with margin	0.03	0.00
Toluene with margin	0.03	0.00
Ethylbenzene with margin	0.00	0.00
o-Xylene with margin	0.01	0.00
nC6 with margin	0.14	0.02
2,2,4-Trimethylpentane with margin	0.03	0.01
Net Ideal Gas Heating Value (Btu/ft^3)	888.18	3.27
Btu/lbmol	438143.41	1613.99

Gas Analysis - AMINE-1 Flash

Gas Constituent	Molecular Weight (lb/lb-mol)	Mole %	Mole % Without Water	Weight (lb/lbmole Gas)	Weight %	Weight % Without Water	Total HC Corrected Weight * %	Total VOC Corrected Weight ** %
Methane	16.04	55.84%	59.52%	8.96	35.68%	37.34%	55.58%	NA
Ethane	30.07	12.27%	13.07%	3.69	14.69%	15.37%	22.88%	NA
Total HC (Non-VOC)		**68.10%**	**72.59%**		**50.38%**	**52.71%**	**78.46%**	**NA**
Propane	44.10	5.68%	6.05%	2.50	9.98%	10.44%	15.54%	72.15%
Iso-Butane	58.12	0.13%	0.13%	0.07	0.29%	0.31%	0.46%	2.12%
N-Butane	58.12	1.11%	1.18%	0.65	2.57%	2.69%	4.01%	18.61%
Iso-Pentane	72.15	0.08%	0.08%	0.06	0.22%	0.23%	0.34%	1.60%
N-Pentane	72.15	0.13%	0.14%	0.10	0.38%	0.40%	0.59%	2.75%
Other Hexanes	86.18	0.07%	0.07%	0.06	0.24%	0.25%	0.37%	1.71%
n-Hexane	86.18	0.02%	0.02%	0.01	0.05%	0.06%	0.09%	0.40%
Heptane	100.21	0.01%	0.01%	0.01	0.03%	0.03%	0.05%	0.21%
2,2,4-Trimethylpentane	114.23	0.00%	0.00%	0.00	0.01%	0.01%	0.02%	0.09%
Octanes +	114.23	0.01%	0.01%	0.01	0.02%	0.02%	0.04%	0.17%
Benzene	78.11	0.00%	0.00%	0.00	0.01%	0.01%	0.02%	0.08%
Toluene	92.14	0.00%	0.00%	0.00	0.01%	0.01%	0.02%	0.08%
Ethylbenzene	106.17	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%
Xylenes	106.16	0.00%	0.00%	0.00	0.00%	0.00%	0.01%	0.02%
Total NMNE VOC		**7.23%**	**7.71%**	**3.47**	**13.83%**	**14.47%**	**21.54%**	**100.00%**
Total HAPs		**0.03%**	**0.03%**	**0.02**	**0.09%**	**0.10%**	**0.15%**	**0.68%**
Water	18.02	6.18%	NA	1.11	4.43%	NA	NA	NA
Hydrogen Sulfide	34.08	0.01%	0.01%	0.00	0.02%	0.02%	NA	NA
Carbon Dioxide	44.01	16.85%	17.96%	7.41	29.53%	30.90%	NA	NA
Nitrogen	28.01	1.62%	1.73%	0.45	1.81%	1.90%	NA	NA
Totals		100.00%	100.00%	25.10	100.00%	100.00%	100.00%	

Average Molecular Weight of VOCs: **47.98 lb/lb-mol**

Notes:

* Weight Percent corrected to remove Water, Carbon Dioxide,Nitrogen, and H2S content.

** Weight Percent corrected to remove non-VOC content.

Gas Analysis - AMINE-1 Still

Gas Constituent	Molecular Weight (lb/lb-mol)	Mole %	Mole % Without Water	Weight (lb/lbmole Gas)	Weight %	Weight % Without Water	Total HC Corrected Weight * %	Total VOC Corrected Weight ** %
Methane	16.04	0.14%	0.16%	0.02	0.06%	0.06%	47.67%	NA
Ethane	30.07	0.04%	0.05%	0.01	0.03%	0.03%	26.34%	NA
Total HC (Non-VOC)		**0.19%**	**0.20%**		**0.09%**	**0.09%**	**74.01%**	**NA**
Propane	44.10	0.02%	0.02%	0.01	0.02%	0.02%	19.38%	0.16%
Iso-Butane	58.12	0.00%	0.00%	0.00	0.00%	0.00%	0.15%	0.00%
N-Butane	58.12	0.00%	0.00%	0.00	0.01%	0.01%	4.82%	0.04%
Iso-Pentane	72.15	0.00%	0.00%	0.00	0.00%	0.00%	0.19%	0.00%
N-Pentane	72.15	0.00%	0.00%	0.00	0.00%	0.00%	0.66%	0.01%
Other Hexanes	86.18	0.00%	0.00%	0.00	0.00%	0.00%	0.48%	0.00%
n-Hexane	86.18	0.00%	0.00%	0.00	0.00%	0.00%	0.11%	0.00%
Heptane	100.21	0.00%	0.00%	0.00	0.00%	0.00%	0.06%	0.00%
2,2,4-Trimethylpentane	114.23	0.00%	0.00%	0.00	0.00%	0.00%	0.03%	0.00%
Octanes +	114.23	0.00%	0.00%	0.00	0.00%	0.00%	0.05%	0.00%
Benzene	78.11	0.00%	0.00%	0.00	0.00%	0.00%	0.02%	0.00%
Toluene	92.14	0.00%	0.00%	0.00	0.00%	0.00%	0.02%	0.00%
Ethylbenzene	106.17	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%
Xylenes	106.16	0.00%	0.00%	0.00	0.00%	0.00%	0.01%	0.00%
Total NMNE VOC		**0.03%**	**0.03%**	**0.01**	**0.03%**	**0.03%**	**25.99%**	**0.22%**
Total HAPs		**0.00%**	**0.00%**	**0.00**	**0.00%**	**0.00%**	**0.19%**	**0.00%**
Water	18.02	7.14%	NA	1.29	3.06%	NA	NA	NA
Hydrogen Sulfide	34.08	0.10%	0.11%	0.04	0.08%	0.09%	NA	NA
Carbon Dioxide	44.01	92.54%	99.66%	40.73	96.74%	99.79%	NA	NA
Nitrogen	28.01	0.00%	0.00%	0.00	0.00%	0.00%	NA	NA
Totals		100.00%	100.00%	42.10	100.00%	100.00%	100.00%	

Average Molecular Weight of VOCs: **0.17 lb/lb-mol**

Notes:

* Weight Percent corrected to remove Water, Carbon Dioxide,Nitrogen, and H2S content.

** Weight Percent corrected to remove non-VOC content.

SO2 Assumptions:

SO2 Emissions Calculations from combustion of AMINE Unit vent stream

Assumes all H2S in the gas stream is removed by the AMINE units and oxidized to SO2 by the thermal oxidizer.

H2S Assumptions:

Based on 98% control efficiency, 2% not oxidized

H2S content "Pipeline spec"

	8	Grains H2S/100scf		using conversion factor
	80,000.00	grains H2S/MMscf		(Sulfur Measurement Handbook Rev7)
	127.74	ppm		1 pound = 7000 grains
Conversion factor	1.43E-04	lb/grains		
				MW
			H2S	34.1
	1.14E-05	lb H2S/scf	S	32.1
	1.08E-05	lb S/scf	SO2	64.1

AMINE-1

Throughput	6.00E+07	scfd
	21900.00	MMSCF/yr
	125.14	TPY H2S uncontrolled
	28.57	lbs/hr H2S uncontrolled
	98.00%	Control Efficiency
	2.50	TPY H2S controlled
	0.57	lbs/hr H2S controlled

SO2 emissions		
lb/hr	**lb/day**	**tpy**
64.45	1288.98	235.24

lb/hr Margin 20%

Compressor Blowdown Detail Sheet

Equipment Source Name:	COMP		
Equipment Name	Compressor Blowdowns		
Inlet Compressor Quantity	3		
Residue Compressor Quantity	4		
Refrigeration Compressor Quantity	1		
Source Description	Reciprocating		
Equipment Usage	Reciprocating Compressor	Potential operation	8760 hr/yr
Control Efficiency	95%		

Total Potential Emissions

Pollutant	Uncontrolled Emissions		Controlled Emissions	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)
VOC	2.27	9.95	0.11	0.50
Benzene	0.01	0.03	0.00	0.00
Toluene	0.00	0.00	0.00	0.00
Ethylbenzene	0.00	0.00	0.00	0.00
Xylenes	0.00	0.00	0.00	0.00
n-Hexane	0.01	0.05	0.00	0.00
2 2 4-trimethylpentane	0.00	0.00	0.00	0.00
Total HAPs	0.02	0.09	0.00	0.00

Potential Emissions Per Inlet Compressor Blowdown

Pollutant	Emission Factor (Mscf/event)	Frequency (events/yr)	(ton/blowdown)	Uncontrolled Emissions (lb/hr)	Uncontrolled Emissions (tpy)	Controlled Emissions (lb/hr)	Controlled Emissions (tpy)	Source of Emission Factor
VOC	2.00	120	0.0262	0.72	3.15	0.04	0.16	Engineering Estimation
Benzene				0.00	0.01	0.00	0.00	Engineering Calculation
Toluene				0.00	0.00	0.00	0.00	Engineering Calculation
Ethylbenzene				0.00	0.00	0.00	0.00	Engineering Calculation
Xylenes				0.00	0.00	0.00	0.00	Engineering Calculation
n-Hexane				0.00	0.02	0.00	0.00	Engineering Calculation
2 2 4-trimethylpentane				0.00	0.00	0.00	0.00	Engineering Calculation
Total HAPs				0.01	0.03	0.00	0.00	

Potential Emissions Per Residue Compressor Blowdown

Pollutant	Emission Factor (Mscf/event)	Frequency (events/yr)	(ton/blowdown)	Uncontrolled Emissions (lb/hr)	Uncontrolled Emissions (tpy)	Controlled Emissions (lb/hr)	Controlled Emissions (tpy)	Source of Emission Factor
VOC	2.00	120	0.0008	0.02	0.10	0.00	0.00	Engineering Estimation
Benzene				0.00	0.00	0.00	0.00	Engineering Calculation
Toluene				0.00	0.00	0.00	0.00	Engineering Calculation
Ethylbenzene				0.00	0.00	0.00	0.00	Engineering Calculation
Xylenes				0.00	0.00	0.00	0.00	Engineering Calculation
n-Hexane				0.00	0.00	0.00	0.00	Engineering Calculation
2 2 4-trimethylpentane				0.00	0.00	0.00	0.00	Engineering Calculation
Total HAPs				0.00	0.00	0.00	0.00	

Based on 10%VOC

Potential Emissions Per Refrigeration Compressor Blowdown

Pollutant	Emission Factor (Mscf/event)	Frequency (events/yr)	(ton/blowdown)	Uncontrolled Emissions (lb/hr)	Uncontrolled Emissions (tpy)	Controlled Emissions (lb/hr)	Controlled Emissions (tpy)	Source of Emission Factor
VOC	2.00	1	0.1164	0.03	0.12	0.00	0.01	Engineering Estimation
Benzene				0.00	0.00	0.00	0.00	Engineering Calculation
Toluene				0.00	0.00	0.00	0.00	Engineering Calculation
Ethylbenzene				0.00	0.00	0.00	0.00	Engineering Calculation
Xylenes				0.00	0.00	0.00	0.00	Engineering Calculation
n-Hexane				0.00	0.00	0.00	0.00	Engineering Calculation
2 2 4-trimethylpentane				0.00	0.00	0.00	0.00	Engineering Calculation
Total HAPs				0.00	0.00	0.00	0.00	

Sample Calculation

2.000 Mscf/event * 1000 scf/Mscf / 379 scf/lb-mol * 9.95 lb/lb-mol * 1/2000 lb/ton * 120 events/year = 3.15 tpy

Compressor Blowdown Detail Sheet

Equipment Source Name:	PLANT BD		
Equipment Name	Gas Plant Blowdown		
Quantity	1		
Source Description	Gas Plant Blowdown	Plant Volume	60.0 MMscf/day
Equipment Usage	Gas Plant Blowdown	Potential operation	8760 hr/yr
Control Efficiency	95%		

Total Potential Emissions

Pollutant	Uncontrolled Emissions		Controlled Emissions	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)
VOC	32803.52	16.40	1640.18	0.82
Benzene	105.62	0.05	5.28	0.00
Toluene	15.19	0.01	0.76	0.00
Ethylbenzene	0.00	0.00	0.00	0.00
Xylenes	0.00	0.00	0.00	0.00
n-Hexane	181.91	0.09	9.10	0.00
2 2 4-trimethylpentane	0.00	0.00	0.00	0.00
Total HAPs	302.73	0.15	15.14	0.01

Potential Emissions Per Blowdown

Pollutant	Volume	Frequency	Event Duration	Uncontrolled Emissions		Controlled Emissions		Source of Emission Factor
	(MMScf/d)	(events/yr)	(hr/event)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	
VOC	60.00	1	0.5	32803.52	16.40	1640.18	0.82	Engineering Calculation
Benzene				105.62	0.05	5.28	0.00	Engineering Calculation
Toluene				15.19	0.01	0.76	0.00	Engineering Calculation
Ethylbenzene				0.00	0.00	0.00	0.00	Engineering Calculation
Xylenes				0.00	0.00	0.00	0.00	Engineering Calculation
n-Hexane				181.91	0.09	9.10	0.00	Engineering Calculation
2 2 4-trimethylpentane				0.00	0.00	0.00	0.00	Engineering Calculation
Total HAPs				302.73	0.15	15.14	0.01	

Sample Calculation

60.000 Mscf/event * 1000 scf/Mscf / 379 scf/lb-mol * 9.95 lb/lb-mol * 1/2000 lb/ton * 1 events/year = 16.40 tpy

Flare Detail Sheet

Equipment Source Name	TO-1	Stack Height	30	ft
Source Description	Thermal Oxidizer	Potential Operation	8760	hr/yr
Equipment Make	TBD			
Equipment Model	TBD			
Quantity	1			
Destruction Efficiency	98%			

Total Emissions

Pollutant	Estimated Emissions (lb/hr)	Estimated Emissions (tpy)
NOx	1.63	7.15
CO	1.37	6.01
VOC	4.26	18.64
SO2	64.45	235.24
PM10	0.00	0.00
Benzene	0.01	0.06
Toluene	0.00	0.01
Ethylbenzene	0.00	0.00
Xylenes	0.00	0.00
n-Hexane	0.02	0.10
2 2 4-trimethylpentane	0.00	0.00
Total HAPs	0.04	0.17

Pilot Stream

Pilot Rating	12.00	MMBtu/hr
Pilot Heat Value	1479.8	Btu/scf
Pilot Gas Flow Rate	8.109	Mscf/hr

Pollutant	EF (lb/MMBtu)	Estimated Emissions (lb/hr)	Estimated Emissions (tpy)	Source of Emission Factor
NOx	0.0980	1.18	5.15	AP-42 Table 1.4-1
CO	0.082	0.99	4.33	AP-42 Table 1.4-1
VOC	N/A	4.26	18.64	Engineering Calculation
Benzene	N/A	0.01	0.06	Engineering Calculation
Toluene	N/A	0.00	0.01	Engineering Calculation
Ethylbenzene	N/A	0.00	0.00	Engineering Calculation
Xylenes	N/A	0.00	0.00	Engineering Calculation
n-Hexane	N/A	0.02	0.10	Engineering Calculation
2 2 4-trimethylpentane	N/A	0.00	0.00	Engineering Calculation
Total HAPs		0.04	0.17	

Amine Flash Gas Waste Stream

Vapor Flow Rate	39.991	MMscf/yr	50.00% Margin
	4.565	Mscf/hr	
Total Emissions Heat Value	888.18	Btu/scf	Based on Amine Gas Analysis (Enerflex)

Pollutant	EF (lb/MMBtu)	Estimated Emissions (lb/hr)	Estimated Emissions (tpy)	Source of Emission Factor
NOx	0.0980	0.40	1.74	AP-42 Table 1.4-1
CO	0.082	0.33	1.46	AP-42 Table 1.4-1
VOC[1]	N/A	N/A	N/A	N/A
PM10	0.01	0.00	0.00	AP-42 Table 1.4-2

Amine Acid Gas Waste Stream

Vapor Flow Rate	1590.712	MMscf/yr	50.00% Margin
	181.588	Mscf/hr	
W&S Emissions Heat Value	3.272	Btu/scf	Based on Amine Gas Analysis (Enerflex)

Pollutant	EF (lb/MMBtu)	Estimated Emissions (lb/hr)	Estimated Emissions (tpy)	Source of Emission Factor
NOx	0.0980	0.06	0.26	AP-42 Table 1.4-1
CO	0.082	0.05	0.21	AP-42 Table 1.4-1
VOC[1]	N/A	N/A	N/A	N/A
PM10	0.01	0.00	0.00	AP-42 Table 1.4-2

1 - VOC emissions from produced gas stream are calculated using a mass balance and a 98% destruction efficiency. VOC emissions from waste streams are shown at the amine.

Sample Calculation for NOx from Tank Waste Stream

0.098 lb/MMBtu * 4.565 MMscf/yr * 0,888.2 Btu/scf / 8,760 hr/yr = 0.40 lb/hr

Flare Detail Sheet

Equipment Source Name	FL-1	Stack Height 100	ft
Source Description	Upset/Maintenance Flare	Potential Operation 8760	hr/yr
Equipment Make	TBD		
Equipment Model	TBD		
Quantity	1		
Destruction Efficiency	95%		

Total Emissions

Pollutant	Estimated Emissions (lb/hr)	(tpy)
NOx	170.49	26.44
CO	777.23	120.53
VOC	93.36	16.00
SO2	6.30	1.34
PM10	5.75	0.88
Benzene	0.00	0.00
Toluene	0.00	0.00
Ethylbenzene	0.00	0.00
Xylenes	0.00	0.00
n-Hexane	0.00	0.00
2 2 4-trimethylpentane	0.00	0.00
Total HAPs	0.00	0.00

Pilot Stream

Pilot Rating	0.50 MMBtu/hr
Pilot Heat Value	1479.8 Btu/scf
Pilot Gas Flow Rate	0.338 Mscf/hr

Pollutant	EF (lb/MMBtu)	Estimated Emissions (lb/hr)	(tpy)	Source of Emission Factor
NOx	0.0680	0.03	0.15	AP-42 Table 13.5-1
CO	0.310	0.16	0.68	AP-42 Table 13.5-2
VOC	N/A	0.44	1.94	Engineering Calculation
Benzene	N/A	0.00	0.01	Engineering Calculation
Toluene	N/A	0.00	0.00	Engineering Calculation
Ethylbenzene	N/A	0.00	0.00	Engineering Calculation
Xylenes	N/A	0.00	0.00	Engineering Calculation
n-Hexane	N/A	0.00	0.01	Engineering Calculation
2 2 4-trimethylpentane	N/A	0.00	0.00	Engineering Calculation
Total HAPs		0.00	0.02	

Residue Gas Stream

Produced Gas Flow Rate	693.4 MMscf/yr	
	79.2 Mscf/hr	
Max Hourly Gas Flow Rate	2291.7 Mscf/hr	
Gas Heating Value	1066.43 Btu/scf	Based on Residue Gas Analysis
Max Sulfur Content[2]	2,000 grains/MMscf	AP42 Chapter 3.2

Pollutant	EF (lb/MMBtu)	Estimated Emissions (lb/hr)	(tpy)	Source of Emission Factor
NOx	0.068	166.19	25.14	AP-42 Table 13.5-1
CO	0.31	757.61	114.62	AP-42 Table 13.5-2
VOC[1]	N/A	92.92	14.06	Engineering Calculation
SO2	N/A	1.31	0.20	Engineering Calculation
PM10[2]	40	5.72	0.87	AP-42 Table 13.5-1
Benzene	N/A	0.00	0.00	Engineering Calculation
Toluene	N/A	0.00	0.00	Engineering Calculation
Ethylbenzene	N/A	0.00	0.00	Engineering Calculation
Xylenes	N/A	0.00	0.00	Engineering Calculation
n-Hexane	N/A	0.00	0.00	Engineering Calculation
2 2 4-trimethylpentane	N/A	0.00	0.00	Engineering Calculation
Total HAPs		0.00	0.00	

Maintenance Waste Stream

Vapor Flow Rate		
Compressor Blowdown	1,682.000 Mscf/yr	
Plant Blowdown	2,500.000 Mscf/yr	
Misc. Pipeline Flaring[1]	240.000 Mscf/yr	
Total Vapor Flow Rate	4.422 MMscf/yr	
	0.505 Mscf/hr	
Waste Stream Heat Value	1479.8 Btu/scf	
Max Sulfur Content	80,000 grains/MMscf	Maximum measured H2S concentration

Pollutant	EF (lb/MMBtu)	Estimated Emissions (lb/hr)	(tpy)	Source of Emission Factor
NOx	0.068	0.05	0.22	AP-42 Table 13.5-1
CO	0.31	0.23	1.01	AP-42 Table 13.5-2
VOC	N/A	0.04	0.16	Engineering Calculation
SO2	N/A	0.01	0.05	Engineering Calculation
PM10[2]	40	0.00	0.01	AP-42 Table 13.5-1

Thermal Oxidizer Downtime Waste Stream

TO Potential Downtime	438.0 hr/yr	
Vapor Flow Rate	95.58 MMscf/yr	
	218.22 Mscf/hr	
Waste Stream Heat Value	284.4 Btu/scf	Engineering Calculation
Max Sulfur Content	80,000 grains/MMscf	Maximum measured H2S concentration

Pollutant	EF (lb/MMBtu)	Estimated Emissions (lb/hr)	(tpy)	Source of Emission Factor
NOx	0.068	4.22	0.92	AP-42 Table 13.5-1
CO	0.31	19.24	4.21	AP-42 Table 13.5-2
VOC	N/A	N/A	N/A	N/A
SO2	N/A	4.98	1.09	Engineering Calculation
PM10[2]	40	0.03	0.01	AP-42 Table 13.5-1

1 - VOC emissions from process gas stream and miscellaneous pipeline flaring are calculated using a mass balance and a 95% destruction efficiency. VOC emissions from maintenance and thermal oxidizer downtime waste streams are shown at compressor blowdowns, plant blowdowns and amine unit.
2 - PM10 emission factor in units of µg/L, assuming a lightly smoking flare.
3 - Maintenace volume includes 240 Mscf/yr for miscellaneous activities to be conservative in emission estimations.

Sample Calculation for NOx from Process Gas Stream
0.068 lb/MMBtu * 1E6 scf/MMscf * 693.44 MMscf/yr * 1,066.43 Btu/scf * MMBtu / 1E6 Btu / 8,760 hr/yr = 166.19 lb/hr

Sample Calculation for NOx from Tank Waste Stream
0.068 lb/MMBtu * 0.505 MMscf/yr * 1,479.8 Btu/scf / 8,760 hr/yr = 0.05 lb/hr

Flare Detail Sheet

Equipment Source Name	FL-2	Stack Height TBD	ft
Source Description	Tank Flare	Potential Operation 8760	hr/yr
Equipment Make	TBD		
Equipment Model	TBD		
Quantity	1		
Destruction Efficiency	95%		

Total Emissions

Pollutant	Estimated Emissions (lb/hr)	Estimated Emissions (tpy)
NOx	0.89	3.91
CO	4.07	17.82
VOC	0.09	0.39
SO2	0.00	0.00
PM10	0.00	0.01
Benzene	0.00	0.00
Toluene	0.00	0.00
Ethylbenzene	0.00	0.00
Xylenes	0.00	0.00
n-Hexane	0.00	0.00
2 2 4-trimethylpentane	0.00	0.00
Total HAPs	0.00	0.00

Pilot Stream

Pilot Rating	0.10	MMBtu/hr
Pilot Heat Value	1479.8	Btu/scf
Pilot Gas Flow Rate	0.068	Mscf/hr

Pollutant	EF (lb/MMBtu)	Estimated Emissions (lb/hr)	Estimated Emissions (tpy)	Source of Emission Factor
NOx	0.0680	0.01	0.03	AP-42 Table 13.5-1
CO	0.310	0.03	0.14	AP-42 Table 13.5-2
VOC	N/A	0.09	0.39	Engineering Calculation
Benzene	N/A	0.00	0.00	Engineering Calculation
Toluene	N/A	0.00	0.00	Engineering Calculation
Ethylbenzene	N/A	0.00	0.00	Engineering Calculation
Xylenes	N/A	0.00	0.00	Engineering Calculation
n-Hexane	N/A	0.00	0.00	Engineering Calculation
2 2 4-trimethylpentane	N/A	0.00	0.00	Engineering Calculation
Total HAPs		0.00	0.00	

Tank Waste Stream

Vapor Density:			
Gunbarrel	0.1209	lb/scf	Promax
Condensate	0.0893	lb/scf	TANKS 4.0.9d
Oil	0.0893	lb/scf	TANKS 4.0.9d
Produced Water	0.0014	lb/scf	TANKS 4.0.9d
Tank Emissions:			
Gunbarrel	5,468,485.42	lb/yr	Promax
Condensate	69,897.16	lb/yr	TANKS 4.0.9d
Oil	7,438.04	lb/yr	TANKS 4.0.9d
Produced Water	9.51	lb/yr	TANKS 4.0.9d
Uncontrolled Recovery- Vapor:	46,097,576.69	scf/yr	
Vapor Margin:	20.00%		
Uncontrolled Recovery- Vapor With Margin :	151,554	scf/day	
Total Emissions Heat Value:	2050	Btu/scf	Engineering Estimation
Total Heat Flow:	310,685,037	Btu/day	
Total Heat Flow:	12.95	MMBtu/hr	

Pollutant	EF (lb/MMBtu)	Estimated Emissions (lb/hr)	Estimated Emissions (tpy)	Source of Emission Factor
NOx	0.068	0.88	3.86	AP-42 Table 13.5-1
CO	0.31	4.01	17.58	AP-42 Table 13.5-2
VOC[1]	N/A	N/A	N/A	N/A
PM10[2]	40	0.00	0.01	AP-42 Table 13.5-1

Loadout Waste Stream

Potential Emissions	55082.5	lb/yr	Based on AP-42 Section 5.2.1
Vapor Molecular Weight	64.0	lb/lb-mol	Based on TANKS 4.0.9d
Vapor Flow Rate	0.326	MMscf/yr	
	0.037	Mscf/hr	
Emissions Heat Value	2050	Btu/scf	Engineering Estimation

Pollutant	EF (lb/MMBtu)	Estimated Emissions (lb/hr)	Estimated Emissions (tpy)	Source of Emission Factor
NOx	0.068	0.01	0.02	AP-42 Table 13.5-1
CO	0.31	0.02	0.10	AP-42 Table 13.5-2
VOC[1]	N/A	N/A	N/A	N/A
PM10[2]	40	0.00	0.00	AP-42 Table 13.5-1

1 - VOC emissions from waste streams are shown at tanks and loadout.

2 - PM10 emission factor in units of µg/L, assuming a lightly smoking flare.

Sample Calculation for NOx from Tank Waste Stream

0.068 lb/MMBtu * 12.945 MMBtu/hr = 0.88 lb/hr

Fugitive Dust Emissions Detail Sheet

Equipment Source Name: HR-1
Source Description: Road Dust
Operation: 24 hr/day 365 days/yr
Emission Controls: None

Potential Emissions

Pollutant	Estimated Potential Emissions				Source of Emission Calculations
	Uncontrolled		Controlled		
	lb/hr	tpy	lb/hr	tpy	
PM30*	12.49	0.23	12.49	0.23	AP-42 Section 13.2.2
PM10	3.18	0.06	3.18	0.06	AP-42 Section 13.2.2
PM 2.5	0.32	0.01	0.32	0.01	AP-42 Section 13.2.2

* Assumed equivalent to total suspended particulate matter (TSP)

Mean Vehicle Weight (W)	17.7	tons	Engineering Calculation
Surface Material Silt Content (s)	4.8	%	NMED Default[2]
Mean # of Days with > 0.01 inch of precipitation	70	Days	NMED Default[2]
Material moisture content (%water)	2	%	NMED Default[2]
Mean Wind Speed	11	mph	NMED Default[2]
Oil Production Trucked	100% of max throughput	4.2	bbl/day
Condensate Production Trucked	100% of max throughput	600.0	bbl/day
Produced Water Production trucked	100% of max throughput	4.2	bbl/day

Tech Truck[1]

5,000	lb	
1	trips/day	
0.26	miles/day	
1.49	lb/day	PM30
0.38	lb/day	PM10
0.04	lb/day	PM 2.5

Oil Hauler[3]

200	BBL Oil/trip	Truck capacity	12,000	lb Empty weight
41,820	lb		7.1	lb/gal (oil)
0.02	trips/day			
0.01	miles/day			
0.03	lb/day	PM30		
0.01	lb/day	PM10		
0.00	lb/day	PM 2.5		

Condensate Hauler[3]

200	BBL Condensate	Truck capacity	12,000	lb Empty weight
35,520	lb		5.6	lb/gal (Condensate RVP 12)
3	trips/day			
52	miles/day			
298.09	lb/day	PM30		
75.97	lb/day	PM10		
7.60	lb/day	PM 2.5		

Produced Water Hauler[4]

140	BBL PW/trip	Truck capacity	12,000	Empty weight
36,402	lb	(12,000 empty weight)	8.3	lb/gal (water)
0	trips/day			
0.01	miles/day			
0.04	lb/day	PM30		
0.01	lb/day	PM10		
0.00	lb/day	PM 2.5		

52.27	Total miles/day	(Tech Truck + Oil Hauler + Produced Water Hauler)
2.18	Total miles/hr	
19080	Total miles/yr	

Fugitive Dust (PM30) per mile traveled	5.73	lb/VMT	AP-42 Eqn 13.2.2-1a &2
Fugitive Dust (PM10) per mile traveled	1.46	lb/VMT	AP-42 Eqn 13.2.2-1a &2
Fugitive Dust (PM2.5) per mile traveled	0.15	lb/VMT	AP-42 Eqn 13.2.2-1a &2
Vehicle miles traveled	0.26	miles/trip	Engineering Estimation

Notes:
1 - Based on the weight of a Ford F-150
2 - NMED Department Accepted Values for: Aggregate Handling, Storage Pile, and Haul Road Emissions
3 - Based on the assumption each hauler can carry 200 bbls of oil per visit
4 - Based on the assumption each hauler can carry 140 bbls of produced water per visit

Sample Calculation for PM30
5.73 lb/VMT * (0.01 + 0.01 + 0.26) miles/day * 365 days/yr / 2000 lb/ton * (365-70)/ 365 = 0.23 tpy

Uncontrolled MSS Activities

Equipment Source Name MAIN-1
Source Description: Maintenance Activities

Emission Summary

Activity
Aerosol
Painting
Tank Degassing
Tank Cleaning
Engine Startup/Warmup
Sump Cleanout
Pipeline Degassing
Pigging
Filter Changes

	lb/hr*	tpy
TOTAL VOC Emissions	--	10.00

Notes:

* - Hourly emission limits are not appropriate for this operating situation.

Libby Gas Plant Gas Sample dated 1/9/2019

Gas Constituent	Molecular Weight (lb/lb-mol)	Mole %	Mole % Without Water	Weight (lb/lbmole Gas)	Weight %	Weight % Without Water	Total HC Corrected Weight * %	Total VOC Corrected Weight ** %
Methane	16.04	61.85%	61.85%	9.92	38.64%	38.64%	40.23%	NA
Ethane	30.07	15.96%	15.96%	4.80	18.69%	18.69%	19.45%	NA
Total HC (Non-VOC)		**77.81%**	**77.81%**		**57.33%**	**57.33%**	**59.68%**	**NA**
Propane	44.10	11.39%	11.39%	5.02	19.56%	19.56%	20.36%	50.50%
Iso-Butane	58.12	1.64%	1.64%	0.95	3.71%	3.71%	3.86%	9.58%
N-Butane	58.12	4.17%	4.17%	2.42	9.43%	9.43%	9.82%	24.35%
Iso-Pentane	72.15	0.85%	0.85%	0.62	2.40%	2.40%	2.50%	6.20%
N-Pentane	72.15	0.83%	0.83%	0.60	2.34%	2.34%	2.44%	6.04%
Other Hexanes	86.18	0.26%	0.26%	0.22	0.86%	0.86%	0.90%	2.23%
n-Hexane	86.18	0.0640%	0.06%	0.06	0.21%	0.21%	0.22%	0.55%
Heptane	100.21	0.0130%	0.01%	0.01	0.05%	0.05%	0.05%	0.13%
2,2,4-Trimethylpentane	114.23	0.0000%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%
Octanes	114.23	0.0020%	0.00%	0.00	0.01%	0.01%	0.01%	0.02%
Nonanes	128.20	0.0020%	0.00%	0.00	0.01%	0.01%	0.01%	0.03%
Decanes+	142.29	0.0000%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%
Benzene	78.11	0.0410%	0.04%	0.03	0.12%	0.12%	0.13%	0.32%
Toluene	92.14	0.0050%	0.01%	0.00	0.02%	0.02%	0.02%	0.05%
Ethylbenzene	106.17	0.0000%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%
Xylenes	106.16	0.0000%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%
Total NMNE VOC		**19.27%**	**19.27%**	**9.95**	**38.73%**	**38.73%**	**40.32%**	**100.00%**
Total HAPs		**0.11%**	**0.11%**	**0.09**	**0.36%**	**0.36%**	**0.37%**	**0.92%**
Water	18.02	0.00%	NA	0.00	0.00%	NA	NA	NA
Hydrogen Sulfide	34.08	0.00%	0.00%	0.00	0.00%	0.00%	NA	NA
Carbon Dioxide	44.01	1.21%	1.21%	0.53	2.07%	2.07%	NA	NA
Nitrogen	28.01	1.71%	1.71%	0.48	1.87%	1.87%	NA	NA
Totals		100.00%	100.00%	25.68	100.00%	100.00%	100.00%	

Average Molecular Weight of VOCs: **51.62 lb/lb-mol**

Notes:

* Weight Percent corrected to remove Water, Carbon Dioxide,Nitrogen, and H2S content.

** Weight Percent corrected to remove non-VOC content.

Libby Gas Plant - Promax Stream 47

Gas Constituent	Molecular Weight (lb/lb-mol)	Mole %	Weight (lb/lbmole Gas)	Weight %	Total HC Corrected Weight * %	Total VOC Corrected Weight ** %
Methane	16.04	88.38%	14.18	79.96%	82.72%	NA
Ethane	30.07	8.83%	2.66	14.97%	15.49%	NA
Total HC (Non-VOC)		97.21%		94.93%	98.21%	NA
Propane	44.10	0.62%	0.28	1.55%	1.61%	89.53%
Iso-Butane	58.12	0.02%	0.01	0.07%	0.07%	3.83%
N-Butane	58.12	0.03%	0.02	0.11%	0.11%	6.08%
Iso-Pentane	72.15	0.00%	0.00	0.01%	0.01%	0.31%
N-Pentane	72.15	0.00%	0.00	0.00%	0.00%	0.22%
Other Hexanes	86.18	0.00%	0.00	0.00%	0.00%	0.02%
n-Hexane	86.18	0.00%	0.00	0.00%	0.00%	0.00%
Heptane	100.21	0.00%	0.00	0.00%	0.00%	0.00%
2,2,4-Trimethylpentane	114.23	0.00%	0.00	0.00%	0.00%	0.00%
Octanes+	114.23	0.00%	0.00	0.00%	0.00%	0.00%
Benzene	78.11	0.00%	0.00	0.00%	0.00%	0.00%
Toluene	92.14	0.00%	0.00	0.00%	0.00%	0.00%
Ethylbenzene	106.17	0.00%	0.00	0.00%	0.00%	0.00%
Xylenes	106.16	0.00%	0.00	0.00%	0.00%	0.00%
Total NMNE VOC		**0.68%**	**0.31**	**1.73%**	**1.79%**	**100.00%**
Hydrogen Sulfide	34.08	0.00%	0.00	0.00%	NA	NA
Carbon Dioxide	44.01	0.01%	0.00	0.01%	NA	NA
Nitrogen	28.01	2.10%	0.59	3.32%	NA	NA
Totals		100.00%	17.73	100.00%	100.00%	

Average Molecular Weight of VOCs: **45.28 lb/lb-mol**

Lumped C6+ Natural Gas Analysis Conversion

Hexane+ Mol % from Gas Analysis	0.0001%

(Reference: Typical speciated C6+ from GRI-GLYCalc Help System)

	Production Weighted Mol % of C6***	Production Total Gas Mol %	Molecular Weight (lb/lb-mol)	Weight (lb/lb-mol Gas)	Weight% of C6+	Total Gas Weight%	Total VOC Corrected Weight%
Other Hexanes	63.85%	0.00005961%	86.18	55.03	62.25%	0.00%	0.002%
n-Hexane	14.79%	0.00001381%	86.18	12.75	14.42%	0.00%	0.001%
Heptane	6.87%	0.00000641%	100.2	6.88	7.79%	0.00%	0.000%
2,2,4-Trimethylpentane	2.67%	0.00000249%	114.23	3.05	3.45%	0.00%	0.000%
Octanes +	4.80%	0.00000448%	114.23	5.48	6.20%	0.00%	0.000%
Benzene	3.31%	0.00000309%	78.11	2.59	2.92%	0.00%	0.000%
Toluene	2.85%	0.00000266%	92.13	2.63	2.97%	0.00%	0.000%
Ethylbenzene	0.14%	0.00000013%	106.17	0.15	0.17%	0.00%	0.000%
Xylenes	0.72%	0.00000067%	106.17	0.76	0.86%	0.00%	0.000%
Totals C6+	**100.00%**	**0.0001%**					0.004%
Total HAPs						**0.0000%**	

Notes:
* Weight Percent corrected to remove Carbon Dioxide,Nitrogen, and H2S content.
** Weight Percent corrected to remove non-VOC content.
*** GRY-GLYCalc C6+ typical gas composition from Help System used to speciate Hexanes+ for HAP emissions.

Process Streams		**47**
Composition	**Status:**	**Solved**
Phase: **Total**	**From Block:**	**PIPE-1**
	To Block:	--
Mole Fraction		**%**
Methane		88.38%
Ethane		8.83%
Propane		0.62%
i-Butane		0.02%
n-Butane		0.03%
i-Pentane		0.0013388%
n-Pentane		0.0009551%
n-Hexane		0.0000918%
n-Heptane		0.0000014%
C8		0.0000001%
Water		0.00%
N2		2.10%
CO2		0.01%
H2S		0.00%
Triethylene Glycol		0.00%
EG		0.00%
MeOH		0.00%
MDEA		0.00%
CHEMTHERM 550		0.00%

Process Streams		**47**
Properties	**Status:**	**Solved**
Phase: **Total**	**From Block:**	**PIPE-1**
	To Block:	--
Property	**Units**	
Temperature	°F	75.1253
Pressure	psig	828.3127315
Mole Fraction Vapor	%	100
Mole Fraction Light Liquid	%	0
Mole Fraction Heavy Liquid	%	0
Molecular Weight	lb/lbmol	17.7327
Mass Density	lb/ft^3	2.99494
Molar Flow	lbmol/h	2275.60
Mass Flow	lb/h	40352.7
Vapor Volumetric Flow	ft^3/h	13473.6
Liquid Volumetric Flow	gpm	1679.83
Std Vapor Volumetric Flow	MMSCFD	20.7253
Std Liquid Volumetric Flow	sgpm	255.058
Compressibility		0.868260
Specific Gravity		0.612266
API Gravity		
Enthalpy	Btu/h	-7.37803E+07
Mass Enthalpy	Btu/lb	-1828.39
Mass Cp	Btu/(lb*°F)	0.617786
Ideal Gas CpCv Ratio		1.28750
Dynamic Viscosity	cP	0.01245206
Kinematic Viscosity	cSt	0.259557
Thermal Conductivity	Btu/(h*ft*°F	0.0218038
Surface Tension	lbf/ft	
Net Ideal Gas Heating Value	Btu/ft^3	962.820
Net Liquid Heating Value	Btu/lb	20579.0
Gross Ideal Gas Heating Value	Btu/ft^3	1066.43
Gross Liquid Heating Value	Btu/lb	22796.7

Section 7

Information Used To Determine Emissions

Information Used to Determine Emissions shall include the following:

- ☑ If manufacturer data are used, include specifications for emissions units and control equipment, including control efficiencies specifications and sufficient engineering data for verification of control equipment operation, including design drawings, test reports, and design parameters that affect normal operation.
- ☐ If test data are used, include a copy of the complete test report. If the test data are for an emissions unit other than the one being permitted, the emission units must be identical. Test data may not be used if any difference in operating conditions of the unit being permitted and the unit represented in the test report significantly effect emission rates.
- ☑ 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.

Information included in this section:

1. Promax information
2. Tanks 4.0.9d information
3. Amine Enerflex information
4. Equipment information
5. 40 CFR 60 Subpart JJJJ Table-1
6. AP-42 Tables/Figures/Equations:
    a. Table 1.4-1,1.4-2,1.4-3 – Heaters / Thermal Oxidizer
    b. Table 3.2-2 – Lean Burn Engines
    c. Table 5.2-1 – Loadout
    d. Table 7.1-2 – Loadout
    e. Table 13.5-1 & Table 13.5-2 – Flare
    f. Table 13.2.2-2, Figure 13.2.2-1, Equation 13.2.2-1a – Road Dust
7. Fugitives:
    a. Dexter ATC Field Services Fugitive Counts
    b. EPA Office of Air Quality Planning and Standards, Protocol for Equipment Leak Emission Estimates, Table 2-4, EPA-453/R-95-017, November 1995
    c. EPA Office of Enforcement and Compliance Assurance, Leak Detection and Repair, A Best Practices Guide, Table 4.1, EPA-305-D-07-001, October 2007
    d. API Publ 4615, Emission Factors for Oil and Gas Production Operations, Table 5, January 1995
    e. API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry Table 6-5
    f. 40 CFR 98 Subpart W, Tables W-1A and W-1C
8. Department Accepted Values For: Aggregate Handling, Storage Pile and Haul Road Emissions
9. Inlet Gas Analysis data – Sample dated 1/9/2019
10. Residue Gas Analysis data - Promax

Process Streams		39 To Flare	40 To Slop Oil
Composition	**Status:**	Solved	Solved
Phase: **Total**	**From Block:**	VSSL-105	VSSL-105
	To Block:	--	--
Mole Fraction		%	%
Methane		14.0050	0.0950170
Ethane		15.1670	0.878083
Propane		28.5610	7.41773
i-Butane		9.11843	7.17785
n-Butane		26.0267	34.2548
i-Pentane		3.42445	12.6336
n-Pentane		2.60785	13.7462
n-Hexane		0.849356	20.9208
n-Heptane		0.0200098	1.87120
C8		0.00266528	1.00249
Water		0.00304587	4.39162E-05
N2		0.122357	0.000185748
CO2		0.0919030	0.00194386
H2S		0.000283058	1.96086E-05
Triethylene Glycol		0	0
EG		0	0
MeOH		0	0
CHEMTHERM 550		0	0
Molar Flow		lbmol/h	lbmol/h
Methane		1.94234	0.00645381
Ethane		2.10350	0.0596418
Propane		3.96110	0.503833
i-Butane		1.26463	0.487539
n-Butane		3.60962	2.32668
i-Pentane		0.474933	0.858106
n-Pentane		0.361680	0.933682
n-Hexane		0.117796	1.42100
n-Heptane		0.00277514	0.127097
C8		0.000369645	0.0680921
Water		0.000422429	2.98291E-06
N2		0.0169696	1.26165E-05
CO2		0.0127460	0.000132032
H2S		3.92570E-05	1.33187E-06
Triethylene Glycol		0	0
EG		0	0
MeOH		0	0
CHEMTHERM 550		0	0
Mass Fraction		%	%
Methane		4.99151	0.0225109
Ethane		10.1321	0.389921
Propane		27.9801	4.83045
i-Butane		11.7745	6.16109
n-Butane		33.6078	29.4025
i-Pentane		5.48907	13.4610
n-Pentane		4.18014	14.6465
n-Hexane		1.62612	26.6246
n-Heptane		0.0445449	2.76896
C8		0.00676389	1.69113
Water		0.00121908	1.16839E-05
N2		0.0761510	7.68442E-05
CO2		0.0898578	0.00126337
H2S		0.000214321	9.86911E-06
Triethylene Glycol		0	0
EG		0	0
MeOH		0	0
CHEMTHERM 550		0	0

Process Streams		39 To Flare	40 To Slop Oil
Properties	**Status:**	Solved	Solved
Phase: **Total**	**From Block:**	VSSL-105	VSSL-105
	To Block:	--	--
Property	**Units**		
Temperature	°F	16.1995	16.1995
Pressure	psig	0.125*	0.125
Mole Fraction Vapor	%	100	0
Mole Fraction Light Liquid	%	0	100
Mole Fraction Heavy Liquid	%	0	0
Molecular Weight	lb/lbmol	45.0112	67.7141
Mass Density	lb/ft^3	0.120918	40.1146
Molar Flow	lbmol/h	13.8689	6.79227
Mass Flow	lb/h	624.256	459.933
Vapor Volumetric Flow	ft^3/h	5162.64	11.4655
Liquid Volumetric Flow	gpm	643.654	1.42946
Std Vapor Volumetric Flow	MMSCFD	0.126313	0.0618614
Std Liquid Volumetric Flow	sgpm	2.45639	1.50085
Compressibility		0.978572	0.00443751
Specific Gravity		1.55412	0.643185
API Gravity			97.3979
Enthalpy	Btu/h	-665846	-501320
Mass Enthalpy	Btu/lb	-1066.62	-1089.99
Mass Cp	Btu/(lb*°F)	0.378222	0.521661
Ideal Gas CpCv Ratio		1.13354	1.08773
Dynamic Viscosity	cP	0.00739850	0.280324
Kinematic Viscosity	cSt	3.81972	0.436251
Thermal Conductivity	Btu/(h*ft*°F)	0.00890005	0.0713101?
Surface Tension	lbf/ft		0.00123561?
Net Ideal Gas Heating Value	Btu/ft^3	2353.24	3485.33
Net Liquid Heating Value	Btu/lb	19688.6	19372.5
Gross Ideal Gas Heating Value	Btu/ft^3	2557.29	3771.13
Gross Liquid Heating Value	Btu/lb	21409.2	20974.6

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

Identification

User Identification:	400-bbl Condensate Tank
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Modeled for one tank

Tank Dimensions

Shell Height (ft):	20.00
Diameter (ft):	12.00
Liquid Height (ft) :	20.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	16,920.59
Turnovers:	135.90
Net Throughput(gal/yr):	2,299,500.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good
Roof Color/Shade:	Gray/Medium
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Roswell, New Mexico (Avg Atmospheric Pressure = 12.73 psia)

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

400-bbl Condensate Tank - Vertical Fixed Roof Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 12)	All	72.26	58.28	86.25	63.90	7.9687	6.1503	10.1886	64.0000			92.00	Option 4: RVP=12, ASTM Slope=3

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

400-bbl Condensate Tank - Vertical Fixed Roof Tank

Annual Emission Calcaulations	
Standing Losses (lb):	6,656.7261
Vapor Space Volume (cu ft):	1,145.1105
Vapor Density (lb/cu ft):	0.0893
Vapor Space Expansion Factor:	0.9405
Vented Vapor Saturation Factor:	0.1895
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,145.1105
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.1250
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
Roof Outage (ft):	0.1250
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1250
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0893
Vapor Molecular Weight (lb/lb-mole):	64.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.9687
Daily Avg. Liquid Surface Temp. (deg. R):	531.9348
Daily Average Ambient Temp. (deg. F):	60.8167
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	523.5667
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,810.0000
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.9405
Daily Vapor Temperature Range (deg. R):	55.9424
Daily Vapor Pressure Range (psia):	4.0383
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.9687
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	6.1503
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	10.1886
Daily Avg. Liquid Surface Temp. (deg R):	531.9348
Daily Min. Liquid Surface Temp. (deg R):	517.9492
Daily Max. Liquid Surface Temp. (deg R):	545.9204
Daily Ambient Temp. Range (deg. R):	29.8333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.1895
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	7.9687
Vapor Space Outage (ft):	10.1250
Working Losses (lb):	10,817.5647
Vapor Molecular Weight (lb/lb-mole):	64.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.9687
Annual Net Throughput (gal/yr.):	2,299,500.0000
Annual Turnovers:	135.8995
Turnover Factor:	0.3874
Maximum Liquid Volume (gal):	16,920.5925
Maximum Liquid Height (ft):	20.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	17,474.2907

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

Emissions Report for: Annual

400-bbl Condensate Tank - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 12)	10,817.56	6,656.73	17,474.29

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

Identification

User Identification:	400-bbl Oil Tank
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Modeled for one tank

Tank Dimensions

Shell Height (ft):	20.00
Diameter (ft):	12.00
Liquid Height (ft) :	20.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	16,800.00
Turnovers:	3.83
Net Throughput(gal/yr):	64,344.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good
Roof Color/Shade:	Gray/Medium
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Roswell, New Mexico (Avg Atmospheric Pressure = 12.73 psia)

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

400-bbl Oil Tank - Vertical Fixed Roof Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 12)	All	72.26	58.28	86.25	63.90	7.9687	6.1503	10.1886	64.0000			92.00	Option 4: RVP=12, ASTM Slope=3

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

400-bbl Oil Tank - Vertical Fixed Roof Tank

Annual Emission Calcaulations	
Standing Losses (lb):	6,656.7261
Vapor Space Volume (cu ft):	1,145.1105
Vapor Density (lb/cu ft):	0.0893
Vapor Space Expansion Factor:	0.9405
Vented Vapor Saturation Factor:	0.1895
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,145.1105
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.1250
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
Roof Outage (ft):	0.1250
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1250
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0893
Vapor Molecular Weight (lb/lb-mole):	64.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.9687
Daily Avg. Liquid Surface Temp. (deg. R):	531.9348
Daily Average Ambient Temp. (deg. F):	60.8167
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	523.5667
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,810.0000
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.9405
Daily Vapor Temperature Range (deg. R):	55.9424
Daily Vapor Pressure Range (psia):	4.0383
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.9687
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	6.1503
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	10.1886
Daily Avg. Liquid Surface Temp. (deg R):	531.9348
Daily Min. Liquid Surface Temp. (deg R):	517.9492
Daily Max. Liquid Surface Temp. (deg R):	545.9204
Daily Ambient Temp. Range (deg. R):	29.8333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.1895
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	7.9687
Vapor Space Outage (ft):	10.1250
Working Losses (lb):	781.3117

Vapor Molecular Weight (lb/lb-mole):	64.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.9687
Annual Net Throughput (gal/yr.):	64,344.0000
Annual Turnovers:	3.8300
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	16,800.0000
Maximum Liquid Height (ft):	20.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000

Total Losses (lb):	7,438.0377

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

Emissions Report for: Annual

400-bbl Oil Tank - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 12)	781.31	6,656.73	7,438.04

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

Identification

User Identification:	400-bbl Produced Water Tank
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Modeled for one tank

Tank Dimensions

Shell Height (ft):	20.00
Diameter (ft):	12.00
Liquid Height (ft) :	20.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	16,920.59
Turnovers:	3.80
Net Throughput(gal/yr):	64,344.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good
Roof Color/Shade:	Gray/Medium
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Roswell, New Mexico (Avg Atmospheric Pressure = 12.73 psia)

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

400-bbl Produced Water Tank - Vertical Fixed Roof Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Produced Water	All	72.26	58.28	86.25	63.90	0.4070	0.2525	0.6393	19.7975			18.17	
Gasoline (RVP 12)						7.9687	6.1503	10.1886	64.0000	0.0100	0.1250	92.00	Option 4: RVP=12, ASTM Slope=3
Water						0.3921	0.2408	0.6204	18.0200	0.9900	0.8750	18.02	Option 2: A=8.10765, B=1750.286, C=235

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

400-bbl Produced Water Tank - Vertical Fixed Roof Tank

Annual Emission Calcaulations	
Standing Losses (lb):	63.7690
Vapor Space Volume (cu ft):	1,145.1105
Vapor Density (lb/cu ft):	0.0014
Vapor Space Expansion Factor:	0.1317
Vented Vapor Saturation Factor:	0.8207
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,145.1105
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.1250
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
Roof Outage (ft):	0.1250
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1250
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0014
Vapor Molecular Weight (lb/lb-mole):	19.7975
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.4070
Daily Avg. Liquid Surface Temp. (deg. R):	531.9348
Daily Average Ambient Temp. (deg. F):	60.8167
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	523.5667
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,810.0000
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1317
Daily Vapor Temperature Range (deg. R):	55.9424
Daily Vapor Pressure Range (psia):	0.3868
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.4070
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.2525
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.6393
Daily Avg. Liquid Surface Temp. (deg R):	531.9348
Daily Min. Liquid Surface Temp. (deg R):	517.9492
Daily Max. Liquid Surface Temp. (deg R):	545.9204
Daily Ambient Temp. Range (deg. R):	29.8333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8207
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.4070
Vapor Space Outage (ft):	10.1250
Working Losses (lb):	12.3450
Vapor Molecular Weight (lb/lb-mole):	19.7975
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.4070
Annual Net Throughput (gal/yr.):	64,344.0000
Annual Turnovers:	3.8027
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	16,920.5925
Maximum Liquid Height (ft):	20.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	76.1140

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

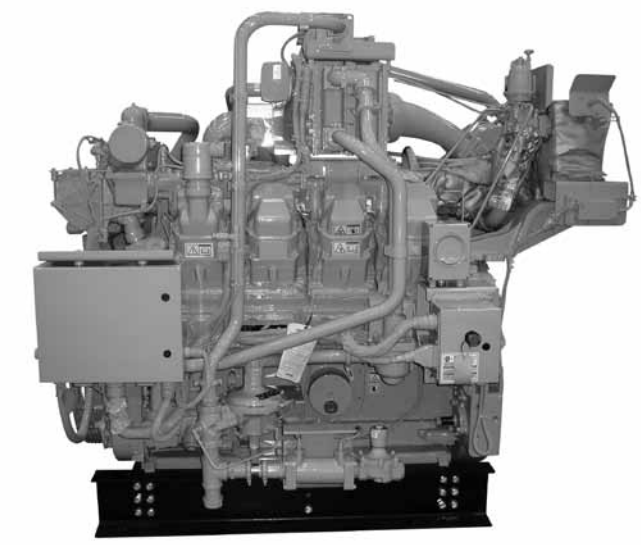
Emissions Report for: Annual

400-bbl Produced Water Tank - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Produced Water	12.34	63.77	76.11
Water	10.80	55.80	66.60
Gasoline (RVP 12)	1.54	7.97	9.51

G3508B LE Gas Petroleum Engine

515 bkW (690 bhp)
1400 rpm



0.5 g/bhp-hr NOx or 1.0 g/bhp-hr NOx (NTE)

CAT® ENGINE SPECIFICATIONS

V-8, 4-Stroke-Cycle

Bore	170 mm (6.7 in.)
Stroke	190 mm (7.5 in.)
Displacement	34.6 L (2115 cu. in.)
Aspiration	Turbocharged-2 Stage Aftercooled
Digital Engine Management	
Governor and Protection	Electronic (ADEM™ A3)
Combustion	Low Emissions (Lean Burn)
Engine Weight	
net dry (approx)	3941 kg (8688 lb)
Power Density	7.7 kg/kW (12.6 lb/hp)
Power per Displacement	19.9 bhp/L
Total Cooling System Capacity	130.5 L (34.4 gal)
Jacket Water	119 L (31.4 gal)
Aftercooler Circuit	11.5 L (3 gal)
Lube Oil System (refill)	220 L (58 gal)
Oil Change Interval	1000 hours
Rotation (from flywheel end)	Counterclockwise
Flywheel and Flywheel Housing	SAE No. 00
Flywheel Teeth	183

FEATURES

Engine Design
- Built on G3500 LE proven reliability and durability
- Ability to burn a wide spectrum of gaseous fuels
- Robust diesel strength design prolongs life and lowers owning and operating costs
- Broad operating speed range at lower site air densities (high altitude/hot ambient temperatures)
- Higher power density improves fleet management
- Quality engine diagnostics
- Detonation-sensitive timing control for individual cylinders

Ultra Lean Burn Technology (ULB)
ULB technology uses an advanced control system, a better turbo match, improved air and fuel mixing, and a more sophisticated combustion recipe to provide:
- Lowest engine-out emissions
- Highest fuel efficiency
- Improved altitude and speed turndown
- Stable load acceptance and load rejection

Emissions
- Meets U.S. EPA Spark Ignited Stationary NSPS emissions for 2010 and some non-attainment areas
- Lean air/fuel mixture provides best available emissions and fuel efficiency for engines of this bore size

Advanced Digital Engine Management
ADEM A3 engine management system integrates speed control, air/fuel ratio control, and ignition/detonation controls into a complete engine management system. ADEM A3 has improved: user interface, display system, shutdown controls, and system diagnostics.

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

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

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

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

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

Cat parts and labor warranty

Preventive maintenance agreements available for repair-before-failure options

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

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

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

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

G3508B

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
G3508ULB-Aaron Alvarez

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	8:1	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 2 INLET (°F):	130		
AFTERCOOLER - STAGE 1 INLET (°F):	201	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	203	FUEL:	Nat Gas
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig):	7.0-40.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	84.8
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	905
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	500
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	100
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	690 bhp@1400rpm
SET POINT TIMING:	30		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	690	690	517	345
INLET AIR TEMPERATURE			°F	100	100	100	100
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	7395	7395	7849	8535
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	8203	8203	8707	9468
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft3/min	1665	1664	1291	898
AIR FLOW	(WET)	(3)(4)	lb/hr	7073	7073	5491	3817
FUEL FLOW (60ºF, 14.7 psia)			scfm	94	94	75	54
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	95.3	95.3	77.0	54.1
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	931	931	929	999
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7)(4)	ft3/min	4455	4455	3458	2531
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	7330	7330	5695	3965
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(8)(9)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(8)(9)	g/bhp-hr	2.58	2.58	2.75	2.71
THC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	5.49	5.49	5.81	5.59
NMHC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	0.82	0.82	0.87	0.84
NMNEHC (VOCs) (mol. wt. of 15.84)		(8)(9)(10)	g/bhp-hr	0.55	0.55	0.58	0.56
HCHO (Formaldehyde)		(8)(9)	g/bhp-hr	0.42	0.42	0.46	0.48
CO2		(8)(9)	g/bhp-hr	477	477	505	547
EXHAUST OXYGEN		(8)(11)	% DRY	9.3	9.3	9.0	8.5
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	10787	10787	9234	8396
HEAT REJ. TO ATMOSPHERE		(12)	Btu/min	3498	3498	2915	2332
HEAT REJ. TO LUBE OIL (OC)		(12)	Btu/min	2650	2650	2405	2103
HEAT REJ. TO A/C - STAGE 1 (1AC)		(12)(13)	Btu/min	5988	5988	5102	1965
HEAT REJ. TO A/C - STAGE 2 (2AC)		(12)(13)	Btu/min	3222	3222	2991	1848

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(13)(14)	Btu/min	21333
TOTAL AFTERCOOLER CIRCUIT (2AC)	(13)(14)	Btu/min	3383
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

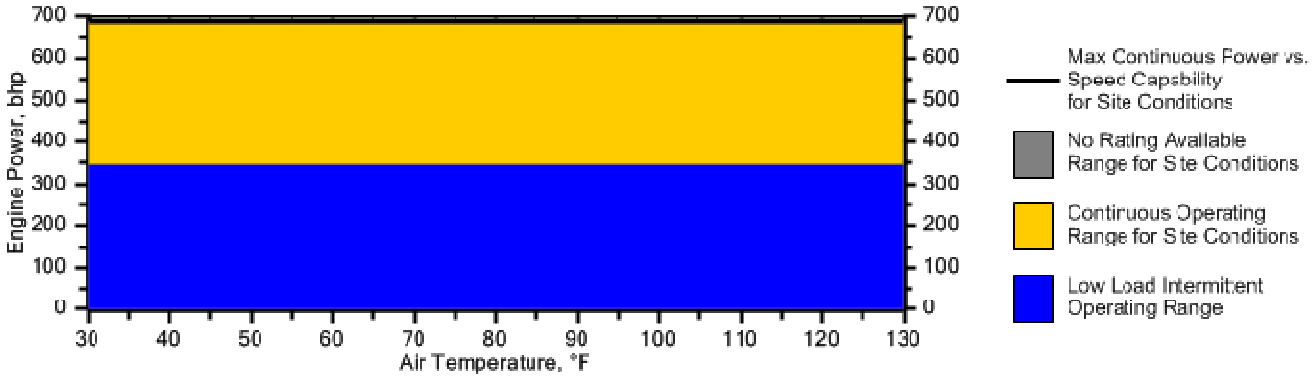
CONDITIONS AND DEFINITIONS

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. Max. rating is the maximum capability for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

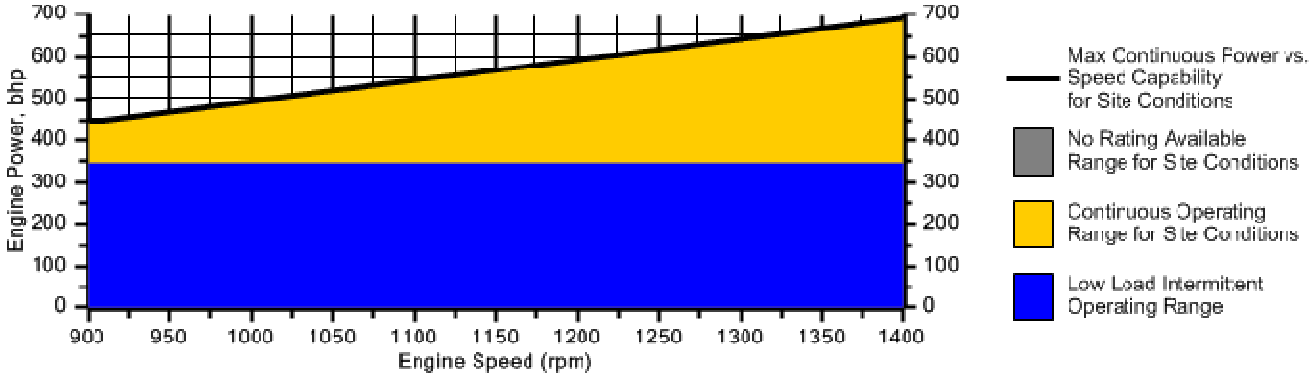
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1400 rpm



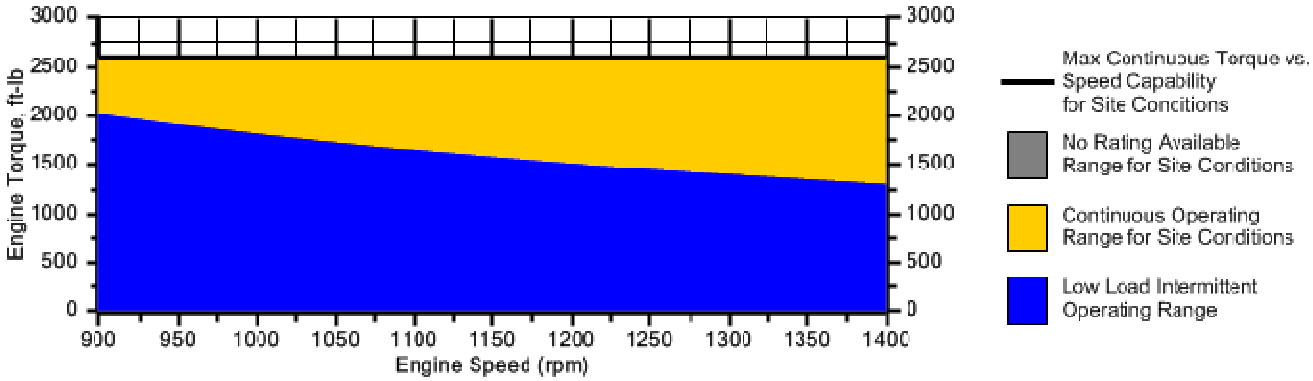
Engine Power vs. Engine Speed

Data represents speed sweep at 500 ft and 100 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 500 ft and 100 °F



Note: At site conditions of 500 ft and 100℉ inlet air temp., constant torque can be maintained down to 900 rpm. The minimum speed for loading at these conditions is 900 rpm.

NOTES

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

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

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

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

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

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

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

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

9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

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

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

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

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

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

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	92.2700	92.2700
Ethane	C2H6	2.5000	2.5000
Propane	C3H8	0.5000	0.5000
Isobutane	iso-C4H1O	0.0000	0.0000
Norbutane	nor-C4H1O	0.2000	0.2000
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.1000	0.1000
Hexane	C6H14	0.0500	0.0500
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	3.4800	3.4800
Carbon Dioxide	CO2	0.9000	0.9000
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:	Nat Gas
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	84.8
Lower Heating Value (Btu/scf):	905
Higher Heating Value (Btu/scf):	1004
WOBBE Index (Btu/scf):	1168
THC: Free Inert Ratio:	21.83
Total % Inerts (% N2, CO2, He):	4.38%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.45
Stoich A/F Ratio (Mass/Mass):	15.75
Specific Gravity (Relative to Air):	0.600
Specific Heat Constant (K):	1.313

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.

G3516B

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	8:1	FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL
AFTERCOOLER TYPE:	SCAC		
AFTERCOOLER - STAGE 2 INLET (°F):	130	**SITE CONDITIONS:**	
AFTERCOOLER - STAGE 1 INLET (°F):	201	FUEL:	Nat Gas
JACKET WATER OUTLET (°F):	210	FUEL PRESSURE RANGE(psig):	7.0-40.0
ASPIRATION:	TA	FUEL METHANE NUMBER:	84.8
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL LHV (Btu/scf):	905
CONTROL SYSTEM:	ADEM3	ALTITUDE(ft):	500
EXHAUST MANIFOLD:	DRY	MAXIMUM INLET AIR TEMPERATURE(°F):	77
COMBUSTION:	Low Emission	STANDARD RATED POWER:	1380 bhp@1400rpm
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5		
SET POINT TIMING:	30		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	1380	1380	1035	690
INLET AIR TEMPERATURE			°F	77	77	77	77
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	7443	7443	7972	8562
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	8256	8256	8843	9498
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft3/min	3126	3126	2452	1715
AIR FLOW	(WET)	(3)(4)	lb/hr	13862	13862	10874	7602
FUEL FLOW (60ºF, 14.7 psia)			scfm	189	189	152	109
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	94.6	94.6	76.8	54.0
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	992	992	986	1006
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7)(4)	ft3/min	9126	9126	7138	5065
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	14380	14380	11290	7900
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(8)(9)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(8)(9)	g/bhp-hr	2.43	2.43	2.61	2.56
THC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	4.77	4.77	5.11	5.19
NMHC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	0.72	0.72	0.77	0.78
NMNEHC (VOCs) (mol. wt. of 15.84)		(8)(9)(10)	g/bhp-hr	0.48	0.48	0.51	0.52
HCHO (Formaldehyde)		(8)(9)	g/bhp-hr	0.44	0.44	0.43	0.42
CO2		(8)(9)	g/bhp-hr	474	474	506	549
EXHAUST OXYGEN		(8)(11)	% DRY	9.0	9.0	8.7	8.3
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	23412	23412	21533	19930
HEAT REJ. TO ATMOSPHERE		(12)	Btu/min	6110	6110	5092	4074
HEAT REJ. TO LUBE OIL (OC)		(12)	Btu/min	4475	4475	3978	3363
HEAT REJ. TO A/C - STAGE 1 (1AC)		(12)(13)	Btu/min	10046	10046	8308	2813
HEAT REJ. TO A/C - STAGE 2 (2AC)		(12)(13)	Btu/min	5358	5358	5063	3334
COOLING SYSTEM SIZING CRITERIA							
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)		(13)(14)	Btu/min	41672			
TOTAL AFTERCOOLER CIRCUIT (2AC)		(13)(14)	Btu/min	5626			
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.							

CONDITIONS AND DEFINITIONS

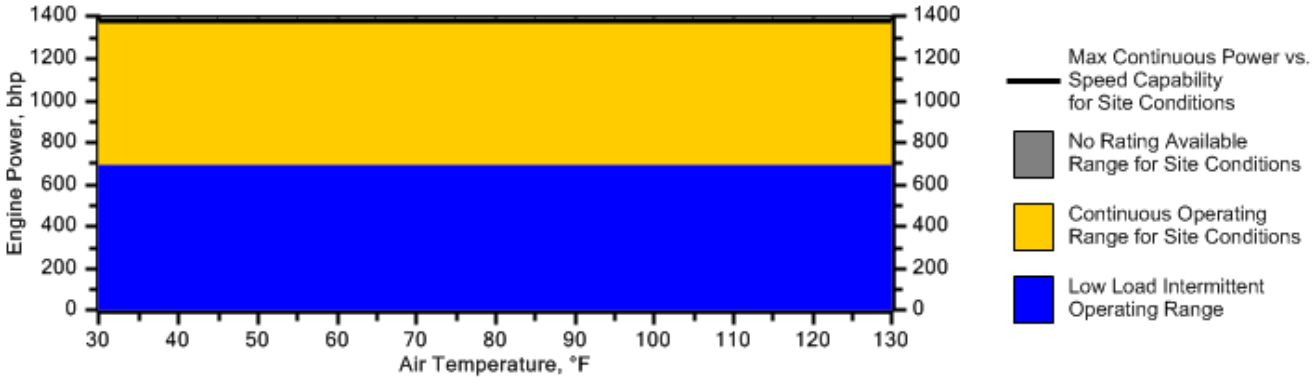
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Max. rating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

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 4.05.00
Ref. Data Set DM8800-07-001, Printed 19Aug2013

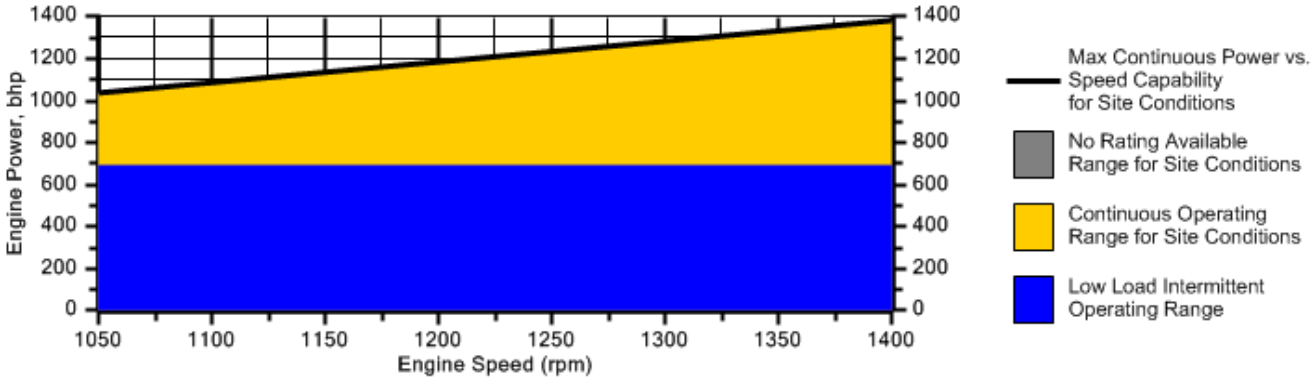
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1400 rpm



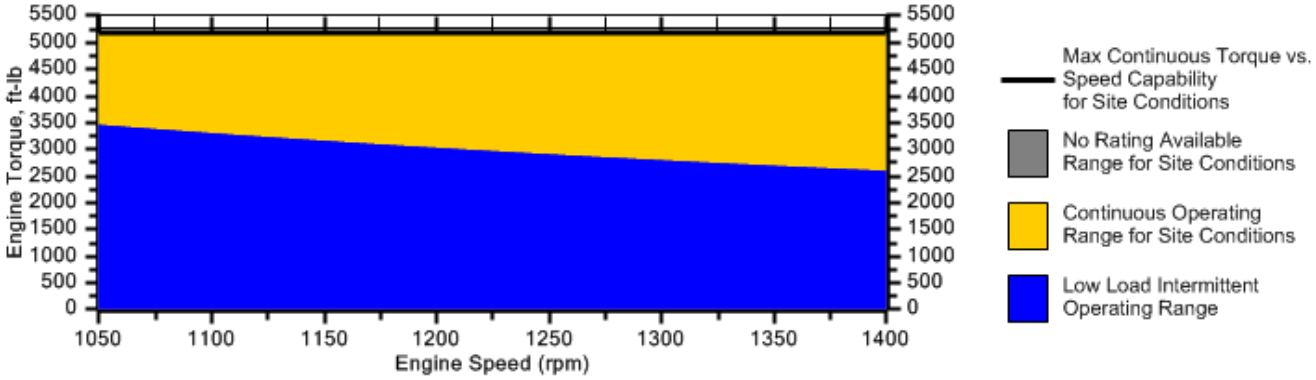
Engine Power vs. Engine Speed

Data represents speed sweep at 500 ft and 77 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 500 ft and 77 °F



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

NOTES

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

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

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

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

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

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

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

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

9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

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

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

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

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

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

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	92.2700	92.2700
Ethane	C2H6	2.5000	2.5000
Propane	C3H8	0.5000	0.5000
Isobutane	iso-C4H1O	0.0000	0.0000
Norbutane	nor-C4H1O	0.2000	0.2000
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.1000	0.1000
Hexane	C6H14	0.0500	0.0500
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	3.4800	3.4800
Carbon Dioxide	CO2	0.9000	0.9000
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:	Nat Gas
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	84.8
Lower Heating Value (Btu/scf):	905
Higher Heating Value (Btu/scf):	1004
WOBBE Index (Btu/scf):	1168
THC: Free Inert Ratio:	21.83
Total % Inerts (% N2, CO2, He):	4.38%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.45
Stoich A/F Ratio (Mass/Mass):	15.75
Specific Gravity (Relative to Air):	0.600
Specific Heat Constant (K):	1.313

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.

Table 1 to Subpart JJJJ of Part 60—NO_X, CO, and VOC Emission Standards for Stationary Non-Emergency SI Engines ≥100 HP (Except Gasoline and Rich Burn LPG), Stationary SI Landfill/Digester Gas Engines, and Stationary Emergency Engines >25 HP

Engine type and fuel	Maximum engine power	Manufacture date	Emission standards[a]					
			g/HP-hr			ppmvd at 15% O_2		
			NO_X	CO	VOC[d]	NO_X	CO	VOC[d]
Non-Emergency SI Natural Gas[b] and Non-Emergency SI Lean Burn LPG[b]	100≤HP<500	7/1/2008	2.0	4.0	1.0	160	540	86
		1/1/2011	1.0	2.0	0.7	82	270	60
Non-Emergency SI Lean Burn Natural Gas and LPG	500≤HP<1,350	1/1/2008	2.0	4.0	1.0	160	540	86
		7/1/2010	1.0	2.0	0.7	82	270	60
Non-Emergency SI Natural Gas and Non-Emergency SI Lean Burn LPG (except lean burn 500≤HP<1,350)	HP≥500	7/1/2007	2.0	4.0	1.0	160	540	86
	HP≥500	7/1/2010	1.0	2.0	0.7	82	270	60
Landfill/Digester Gas (except lean burn 500≤HP<1,350)	HP<500	7/1/2008	3.0	5.0	1.0	220	610	80
		1/1/2011	2.0	5.0	1.0	150	610	80
	HP≥500	7/1/2007	3.0	5.0	1.0	220	610	80
		7/1/2010	2.0	5.0	1.0	150	610	80
Landfill/Digester Gas Lean Burn	500≤HP<1,350	1/1/2008	3.0	5.0	1.0	220	610	80
		7/1/2010	2.0	5.0	1.0	150	610	80
Emergency	25<HP<130	1/1/2009	[c]10	387	N/A	N/A	N/A	N/A
	HP≥130		2.0	4.0	1.0	160	540	86

[a]Owners and operators of stationary non-certified SI engines may choose to comply with the emission standards in units of either g/HP-hr or ppmvd at 15 percent O_2.

[b]Owners and operators of new or reconstructed non-emergency lean burn SI stationary engines with a site rating of greater than or equal to 250 brake HP located at a major source that are meeting the requirements of 40 CFR part 63, subpart ZZZZ, Table 2a do not have to comply with the CO emission standards of Table 1 of this subpart.

[c]The emission standards applicable to emergency engines between 25 HP and 130 HP are in terms of NO_X + HC.

[d]For purposes of this subpart, when calculating emissions of volatile organic compounds, emissions of formaldehyde should not be included.

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. $CO_2[lb/10^6 \text{ scf}] = (3.67)(CON)(C)(D)$, where CON = fractional conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.76), and D = density of fuel, 4.2×10^4 $lb/10^6$ scf.

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

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

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

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
91-57-6	2-Methylnaphthalene[b, c]	2.4E-05	D
56-49-5	3-Methylchloranthrene[b, c]	<1.8E-06	E
	7,12-Dimethylbenz(a)anthracene[b,c]	<1.6E-05	E
83-32-9	Acenaphthene[b,c]	<1.8E-06	E
203-96-8	Acenaphthylene[b,c]	<1.8E-06	E
120-12-7	Anthracene[b,c]	<2.4E-06	E
56-55-3	Benz(a)anthracene[b,c]	<1.8E-06	E
71-43-2	Benzene[b]	2.1E-03	B
50-32-8	Benzo(a)pyrene[b,c]	<1.2E-06	E
205-99-2	Benzo(b)fluoranthene[b,c]	<1.8E-06	E
191-24-2	Benzo(g,h,i)perylene[b,c]	<1.2E-06	E
205-82-3	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

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
74-98-6	Propane	1.6E+00	E
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

Table 3.2-3. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE RICH-BURN ENGINES[a]
(SCC 2-02-002-53)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO_x[c] 90 - 105% Load	2.21 E+00	A
NO_x[c] <90% Load	2.27 E+00	C
CO[c] 90 - 105% Load	3.72 E+00	A
CO[c] <90% Load	3.51 E+00	C
CO_2[d]	1.10 E+02	A
SO_2[e]	5.88 E-04	A
TOC[f]	3.58 E-01	C
Methane[g]	2.30 E-01	C
VOC[h]	2.96 E-02	C
PM10 (filterable)[i,j]	9.50 E-03	E
PM2.5 (filterable)[j]	9.50 E-03	E
PM Condensable[k]	9.91 E-03	E
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane[l]	2.53 E-05	C
1,1,2-Trichloroethane[l]	<1.53 E-05	E
1,1-Dichloroethane	<1.13 E-05	E
1,2-Dichloroethane	<1.13 E-05	E
1,2-Dichloropropane	<1.30 E-05	E
1,3-Butadiene[l]	6.63 E-04	D
1,3-Dichloropropene[l]	<1.27 E-05	E
Acetaldehyde[l,m]	2.79 E-03	C
Acrolein[l,m]	2.63 E-03	C
Benzene[l]	1.58 E-03	B
Butyr/isobutyraldehyde	4.86 E-05	D
Carbon Tetrachloride[l]	<1.77 E-05	E

Table 3.2-3. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE RICH-BURN ENGINES (Concluded)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Chlorobenzene[l]	<1.29 E-05	E
Chloroform[l]	<1.37 E-05	E
Ethane[n]	7.04 E-02	C
Ethylbenzene[l]	<2.48 E-05	E
Ethylene Dibromide[l]	<2.13 E-05	E
Formaldehyde[l,m]	2.05 E-02	A
Methanol[l]	3.06 E-03	D
Methylene Chloride[l]	4.12 E-05	C
Naphthalene[l]	<9.71 E-05	E
PAH[l]	1.41 E-04	D
Styrene[l]	<1.19 E-05	E
Toluene[l]	5.58 E-04	A
Vinyl Chloride[l]	<7.18 E-06	E
Xylene[l]	1.95 E-04	A

[a] Reference 7. Factors represent uncontrolled levels. For NO_x, CO, and PM-10, "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. PM10 = 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/10^6 scf.

[f] Emission factor for TOC is based on measured emission levels from 6 source tests.

[g] Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor.

[h] VOC emission factor is based on the sum of the emission factors for all speciated organic compounds. Methane and ethane emissions were not measured for this engine category.

[i] No data were available for uncontrolled engines. PM10 emissions are for engines equipped with a PCC.

[j] Considered $\leq$ 1 μm in aerodynamic diameter. Therefore, for filterable PM emissions, PM10(filterable) = PM2.5(filterable).

[k] No data were available for condensable emissions. The presented emission factor reflects emissions from 4SLB engines.

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

[m] For rich-burn engines, no interference is suspected in quantifying aldehyde emissions. The presented emission factors are based on FTIR and CARB 430 emissions data measurements.

[n] Ethane emission factor is determined by subtracting the VOC emission factor from the NMHC emission factor.

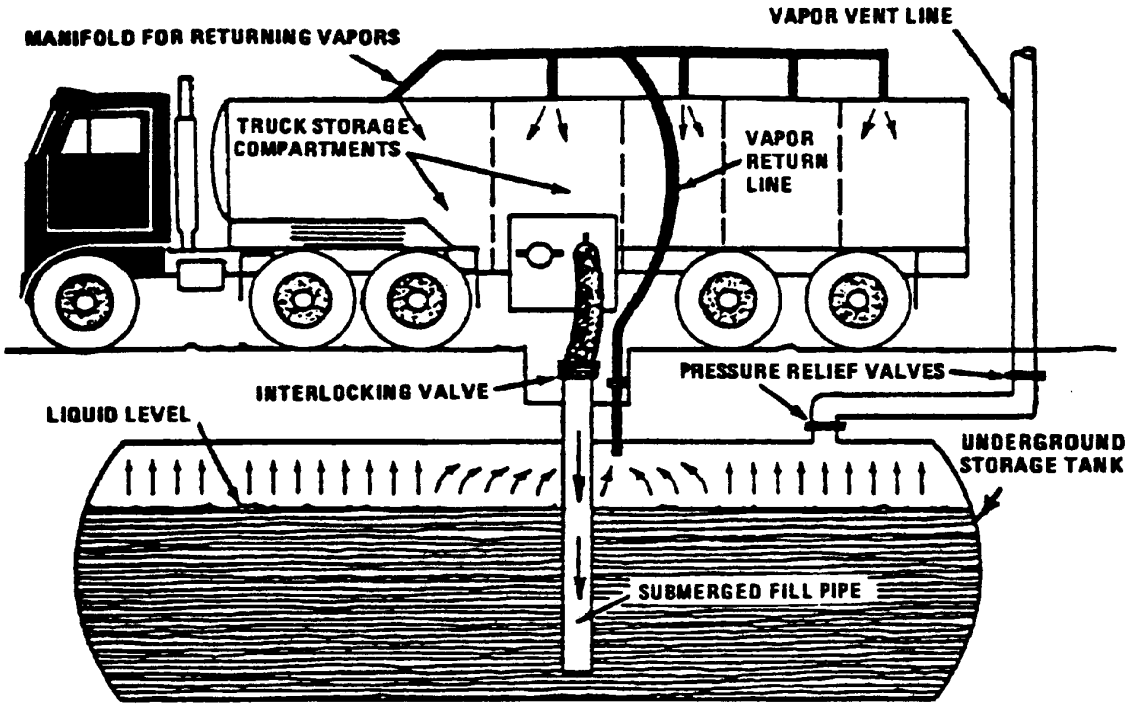


Figure 5.2-5. Tank truck unloading into a service station underground storage tank and practicing "vapor balance" form of emission control.

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.

Table 7.1-2. PROPERTIES (M_V, P_{VA}, W_L) OF SELECTED PETROLEUM LIQUIDS[a]

Petroleum Liquid	Vapor Molecular Weight at 60°F, M_V (lb/lb-mole)	Liquid Density At 60°F, W_L (lb/gal)	True Vapor Pressure, P_{VA} (psi)						
			40°F	50°F	60°F	70°F	80°F	90°F	100°F
Crude oil RVP 5	50	7.1	1.8	2.3	2.8	3.4	4.0	4.8	5.7
Distillate fuel oil No. 2	130	7.1	0.0031	0.0045	0.0065	0.0090	0.012	0.016	0.022
Gasoline RVP 7	68	5.6	2.3	2.9	3.5	4.3	5.2	6.2	7.4
Gasoline RVP 7.8	68	5.6	2.5929	3.2079	3.9363	4.793	5.7937	6.9552	8.2952
Gasoline RVP 8.3	68	5.6	2.7888	3.444	4.2188	5.1284	6.1891	7.4184	8.8344
Gasoline RVP 10	66	5.6	3.4	4.2	5.2	6.2	7.4	8.8	10.5
Gasoline RVP 11.5	65	5.6	4.087	4.9997	6.069	7.3132	8.7519	10.4053	12.2949
Gasoline RVP 13	62	5.6	4.7	5.7	6.9	8.3	9.9	11.7	13.8
Gasoline RVP 13.5	62	5.6	4.932	6.0054	7.2573	8.7076	10.3774	12.2888	14.4646
Gasoline RVP 15.0	60	5.6	5.5802	6.774	8.1621	9.7656	11.6067	13.7085	16.0948
Jet kerosene	130	7.0	0.0041	0.0060	0.0085	0.011	0.015	0.021	0.029
Jet naphtha (JP-4)	80	6.4	0.8	1.0	1.3	1.6	1.9	2.4	2.7
Residual oil No. 6	190	7.9	0.00002	0.00003	0.00004	0.00006	0.00009	0.00013	0.00019

[a] References 10 and 11

Table 13.5-1 (English Units). THC, NOx AND SOOT EMISSIONS FACTORS FOR FLARE OPERATIONS[a]

EMISSIONS FACTOR RATING: B

Pollutant	SCC[d]	Emissions Factor Value	Emissions Factor Units
Total hydrocarbons[b]	30190099; 30119701; 30119705; 30119709; 30119741	0.14	lb/10^6 Btu
Nitrogen oxides[c]		0.068	lb/10^6 Btu
Soot[c]		0 - 274	µg/L

[a] Reference 1. Based on tests using crude propylene containing 80% propylene and 20% propane.
[b] Measured as methane equivalent. The THC emissions factor may not be appropriate for reporting VOC emissions when a VOC emissions factor exists.
[c] Soot in concentration values: nonsmoking flares, 0 micrograms per liter (µg/L); lightly smoking flares, 40 µg/L; average smoking flares, 177 µg/L; and heavily smoking flares, 274 µg/L.
[d] See Table 13.5-3 for a description of these SCCs.

Table 13.5-2 (English Units). VOC and CO EMISSIONS FACTORS FOR FLARE OPERATIONS[a]

Pollutant	SCC[d]	Emissions Factor ($lb/10^6$ Btu)	Representativeness
Volatile organic compounds[b]	30190099; 30600904; 30119701; 30119705; 30119709; 30119741; 30119799; 30130115; 30600201; 30600401; 30600508; 30600903; 30600999; 30601701; 30601801; 30688801; 40600240	0.66	Poorly
Carbon monoxide[c]		0.31	Poorly

[a] These factors apply to well operated flares achieving at least 98% destruction efficiency and operating in compliance with the current General Provisions requirements of 40 CFR Part 60, i.e. >300 btu/scf net heating value in the vent gas and less than the specified maximum flare tip velocity. The VOC emissions factor data set had an average destruction efficiency of 98.9%, and the CO emissions factor data set had an average destruction efficiency of 99.1% (based on test reports where destruction efficiency was provided). These factors are based on steam-assisted and air-assisted flares burning a variety of vent gases.

[b] References 4-9 and 11.

[c] References 1, 4-8 and 11.

[d] See Table 13.5-3 for a description of these SCCs.

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

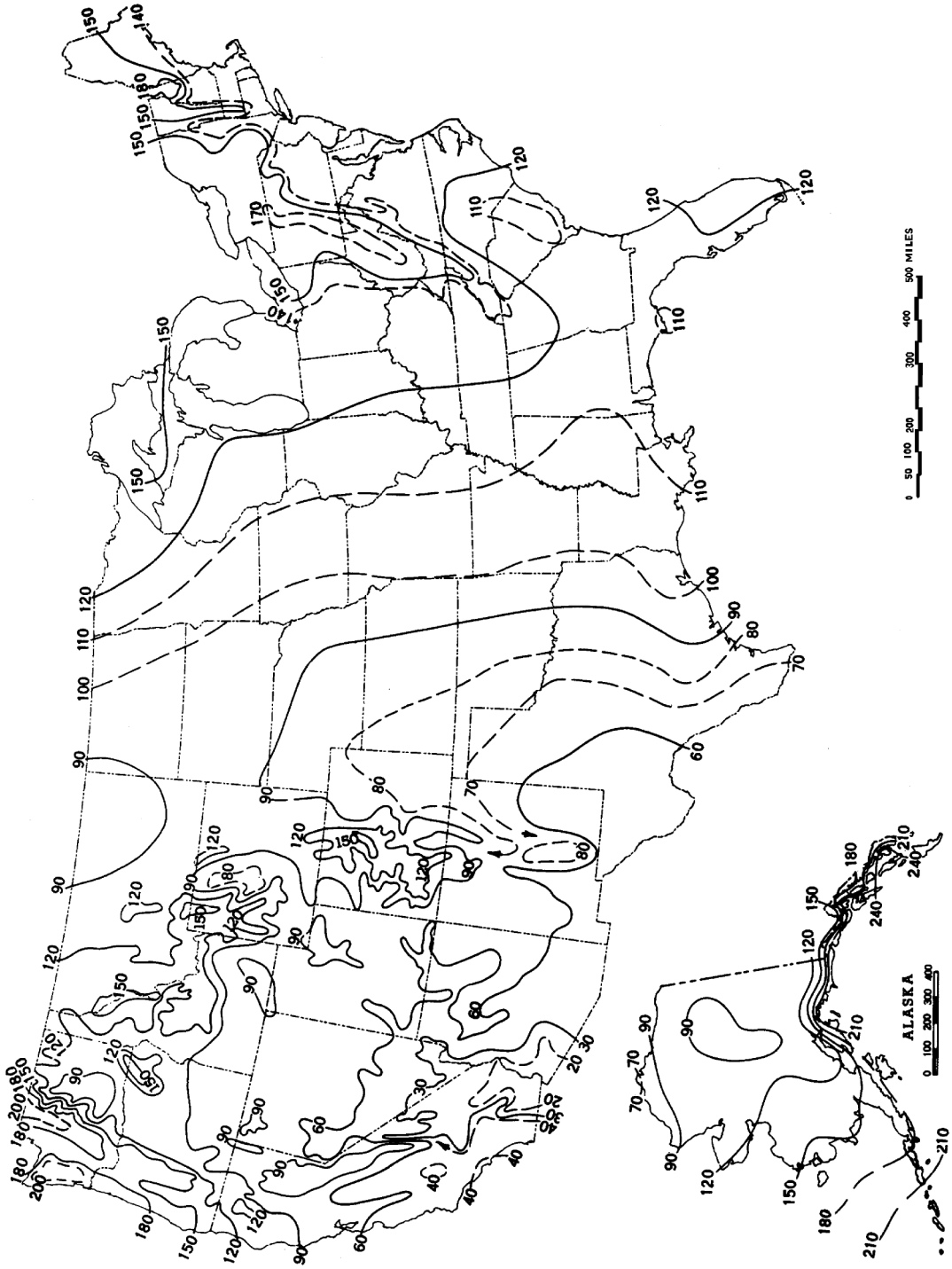


Figure 13.2.2-1. Mean number of days with 0.01 inch or more of precipitation in United States.

Component - Count Totals by Regulation-Proc Unit (RPT 570)

Count of components by regulation and Proc Unit

Site: **3 Bear Libby Gas Plant**
Proc Unit: CONDENSATE STABILIZATIO
Regulation: NSPS OOOOa
As of Date: 8/12/2019 11:59:59 PM

Equip Cat	Chemical State	Mon Frequency	Vis Frequency	EX	DM	UM	Explanation (EX | DM | UM)	CVS	NDE	Tag Count
Compressor	Vapor	Yearly (Mar)	Never (SS)	☐	☐	☐		☐	☑	1
Connector	Heavy Liquid	Yearly (Mar)	Never (SS)	☐	☐	☐		☐	☐	2
Connector	Light Liquid	Yearly (Mar)	Never (SS)	☐	☐	☐		☐	☐	302
Connector	Vapor	Yearly (Mar)	Never (SS)	☐	☐	☐		☐	☐	304
CVS w/Hard Pipi	Light Liquid	Yearly (Mar)	Never (SS)	☐	☐	☐		☐	☐	20
CVS w/Hard Pipi	Vapor	Yearly (Mar)	Never (SS)	☐	☐	☐		☐	☐	37
Press Relief Dev	Light Liquid	Never (SS)	Never (SS)	☑	☐	☐	ex:Vented to Flare (EV)	☐	☐	7
Press Relief Dev	Vapor	Never (SS)	Never (SS)	☑	☐	☐	ex:Vented to Flare (EV)	☐	☐	7
Press Relief Dev	Vapor	Never (SS)	Never (SS)	☑	☐	☐	ex:Exempt - to process (EV)	☐	☐	1
Pump	Light Liquid	Monthly (SS)	Weekly (SS)	☐	☐	☐		☐	☐	4
Valve	Light Liquid	3rd month Quarte	Never (SS)	☐	☐	☐		☐	☐	164
Valve	Vapor	3rd month Quarte	Never (SS)	☐	☐	☐		☐	☐	147
									Proc Unit Total:	**996**

Component - Count Totals by Regulation-Proc Unit (RPT 570)

Count of components by regulation and Proc Unit

Site: **3 Bear Libby Gas Plant**
Proc Unit: CRYOGENICS PROCESS
Regulation: NSPS OOOOa
As of Date: 8/12/2019 11:59:59 PM

Equip Cat	Chemical State	Mon Frequency	Vis Frequency	EX	DM	UM	Explanation (EX | DM | UM)	CVS	NDE	Tag Count
Compressor	Vapor	Yearly (Feb)	Never (SS)	☐	☐	☐		☐	☐	1
Connector	Light Liquid	Yearly (Feb)	Never (SS)	☐	☐	☐		☐	☐	896
Connector	Vapor	Yearly (Feb)	Never (SS)	☐	☐	☐		☐	☐	962
Connector	Light Liquid	Yearly (Mar)	Never (SS)	☐	☐	☐		☐	☐	156
Connector	Vapor	Yearly (Mar)	Never (SS)	☐	☐	☐		☐	☐	56
Connector	Vapor	Yearly (Mar)	Never (SS)	☐	☐	☐		☑	☐	10
CVS w/Hard Pipi	Vapor	Yearly (Feb)	Never (SS)	☐	☐	☐		☐	☐	104
Press Relief Dev	Vapor	3rd month Quarte	Never (SS)	☐	☐	☐		☐	☐	9
Press Relief Dev	Light Liquid	Never (SS)	Never (SS)	☑	☐	☐	ex:Vented to Flare (EV)	☑	☐	1
Press Relief Dev	Light Liquid	Never (SS)	Never (SS)	☑	☐	☐	ex:Exempt - to process (LL)	☐	☐	12
Press Relief Dev	Vapor	Never (SS)	Never (SS)	☑	☐	☐	ex:Vented to Flare (EV)	☑	☐	9
Press Relief Dev	Vapor	Never (SS)	Never (SS)	☑	☐	☐	ex:Exempt - to process (EV)	☐	☐	3
Pump	Light Liquid	Monthly (SS)	Weekly (SS)	☐	☐	☐		☐	☐	8
Pump	Light Liquid	Yearly (Mar)	Never (SS)	☐	☐	☐		☐	☑	2
Valve	Light Liquid	2nd month Quart	Never (SS)	☐	☐	☐		☐	☐	390
Valve	Vapor	2nd month Quart	Never (SS)	☐	☐	☐		☐	☐	415
Valve	Light Liquid	3rd month Quarte	Never (SS)	☐	☐	☐		☐	☐	70
Valve	Vapor	3rd month Quarte	Never (SS)	☐	☐	☐		☐	☐	18
Valve	Vapor	Yearly (Feb)	Never (SS)	☐	☑	☐	dm:Personnel elevated > 2M to monitor	☐	☐	1
Valve	Vapor	Yearly (Mar)	Never (SS)	☐	☐	☐		☑	☐	2
								Proc Unit Total:		**3125**

Component - Count Totals by Regulation-Proc Unit (RPT 570)

Count of components by regulation and Proc Unit

Site: **3 Bear Libby Gas Plant**
Proc Unit: GAS TREATING
Regulation: NSPS OOOOa
As of Date: 8/12/2019 11:59:59 PM

Equip Cat	Chemical State	Mon Frequency	Vis Frequency	EX	DM	UM	Explanation (EX | DM | UM)	CVS	NDE	Tag Count
Connector	Light Liquid	Yearly (Jan)	Never (SS)	☐	☐	☐		☐	☐	11
Connector	Vapor	Yearly (Jan)	Never (SS)	☐	☐	☐		☐	☐	161
CVS w/Hard Pipi	Vapor	Yearly (Jan)	Never (SS)	☐	☐	☐		☐	☐	46
Press Relief Dev	Vapor	Never (SS)	Never (SS)	☑	☐	☐	ex:Vented to Flare (EV)	☐	☐	11
Valve	Light Liquid	1st month Quarte	Never (SS)	☐	☐	☐		☐	☐	6
Valve	Vapor	1st month Quarte	Never (SS)	☐	☐	☐		☐	☐	96
Valve	Vapor	Yearly (Jan)	Never (SS)	☐	☑	☐	dm:Personnel elevated > 2M to monitor	☐	☐	1
Valve	Vapor	Yearly (Jan)	Never (SS)	☐	☐	☐		☐	☑	2
									Proc Unit Total:	**334**

Component - Count Totals by Regulation-Proc Unit (RPT 570)

Count of components by regulation and Proc Unit

Site: **3 Bear Libby Gas Plant**
Proc Unit: INLET GAS PROCESSING
Regulation: NSPS OOOOa
As of Date: 8/12/2019 11:59:59 PM

Equip Cat	Chemical State	Mon Frequency	Vis Frequency	EX	DM	UM	Explanation (EX | DM | UM)	CVS	NDE	Tag Count
Connector	Light Liquid	Yearly (Jan)	Never (SS)	☐	☐	☐		☐	☐	72
Connector	Vapor	Yearly (Jan)	Never (SS)	☐	☐	☐		☐	☐	157
CVS w/Hard Pipi	Vapor	Yearly (Jan)	Never (SS)	☐	☐	☐		☐	☐	2
Press Relief Dev	Vapor	Never (SS)	Never (SS)	☑	☐	☐	ex:Vented to Flare (EV)	☐	☐	1
Valve	Light Liquid	1st month Quarte	Never (SS)	☐	☐	☐		☐	☐	54
Valve	Vapor	1st month Quarte	Never (SS)	☐	☐	☐		☐	☐	81
									Proc Unit Total:	**367**
									Site Total:	**4822**

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.

4.0 What Are the Benefits of an LDAR Program?

When the LDAR requirements were developed, EPA estimated that petroleum refineries could reduce emissions from equipment leaks by 63% by implementing a facility LDAR program. Additionally, EPA estimated that chemical facilities could reduce VOC emissions by 56% by implementing such a program.

Table 4.1 presents the control effectiveness of an LDAR program for different monitoring intervals and leak definitions at chemical process units and petroleum refineries.

Emissions reductions from implementing an LDAR program potentially reduce product losses, increase safety for workers and operators, decrease exposure of the surrounding community, reduce emissions fees, and help facilities avoid enforcement actions.

Example – Emissions reductions at a typical SOCMI facility.

Applying the equipment modifications and LDAR requirements of the HON to the sources of uncontrolled emissions in the typical facility presented in Tables 3.2 and 3.3 would reduce the emissions per facility by approximately 582 tons per year of emissions, an 89% reduction.

Table 4.1 – Control effectiveness for an LDAR program at a chemical process unit and a refinery.

Equipment Type and Service	Control Effectiveness (% Reduction)		
	Monthly Monitoring 10,000 ppmv Leak Definition	Quarterly Monitoring 10,000 ppmv Leak Definition	500 ppm Leak Definition[a]
Chemical Process Unit			
Valves – Gas Service[b]	87	67	92
Valves – Light Liquid Service[c]	84	61	88
Pumps – Light Liquid Service[c]	69	45	75
Connectors – All Services			93
Refinery			
Valves – Gas Service[b]	88	70	96
Valves – Light Liquid Service[c]	76	61	95
Pumps – Light Liquid Service[c]	68	45	88
Connectors – All Services			81

Source: Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, Nov 1995.

[a] Control effectiveness attributable to the HON-negotiated equipment leak regulation (40 CFR 63, Subpart H) is estimated based on equipment-specific leak definitions and performance levels. However, pumps subject to the HON at existing process units have a 1,000 to 5,000 ppm leak definition, depending on the type of process.

[b] Gas (vapor) service means the material in contact with the equipment component is in a gaseous state at the process operating conditions.

[c] Light liquid service means the material in contact with the equipment component is in a liquid state in which the sum of the concentration of individual constituents with a vapor pressure above 0.3 kilopascals (kPa) at 20°C is greater than or equal to 20% by weight.

HEALTH AND
ENVIRONMENTAL
SCIENCES
DEPARTMENT

API PUBLICATION
NUMBER 4615

JANUARY 1995

Emission Factors for Oil and Gas Production Operations

STEP
Strategies for Today's Environmental Partnership

American
Petroleum
Institute

possible in all cases to determine whether the corrected screening values were zero or some number between 1 and 9 ppmv. To be conservative, they were assumed to have screening values of 10 ppmv above background. Emissions from connections and open end lines in this group were calculated using the appropriate EPA default zeros; emission rates for flanges, pumps, valves, and other components in this category were calculated at a screening value of 10 ppmv. Table 4 shows the emission rates used to calculate the emissions of these components.

Table 4. Emission Rates Used for "Non-Emitters" (lb/component-day)

	EPA Default Zero	Equivalent Equation ppmv	Non-Emitter ppmv used	Non-Emitter Emission Rate used
Connection	0.000441	10.25	10.25	0.000441
Flange	0.000528	3.18	10.00	0.001183
Open End	0.000671	12.40	12.40	0.000671
Pump	0.001621	0.48	10.00	0.010348
Valve	0.000644	9.50	10.00	0.000671
Others	0.000209	0.13	10.00	0.002703

"Others" category includes instruments, loading arms, pressure relief valves, stuffing boxes, compressor seals, dump lever arms, and vents.

Adjustment for Flange and Other Connector Designations. The API 1993 database separates components as connection, valve, open-ended line, pump seal, compressor seal, pressure relief valve, instrument, hatch, polished rod stuffing box, dump lever arm, vent, meter, and drain. The database does not differentiate between non-emitting connections and non-emitting flanges; both types of components are included in a single category. Calculations in this report are based on a division of the connections into two categories: flange and other connections. Table 5 shows the assumptions used for assigning components to each category. These assumptions were based on component counts at sites 21 through 24 and additional inventory work at two light crude production sites. The sensitivity of the emission factors to these assumptions is discussed later in this report.

Table 5. Assumptions for Dividing API Connections by Type

Type of Site	Connection	Flange
Onshore Light Crude Production	71%	29%
Onshore Heavy Crude Production	71%	29%
Onshore Gas Production	86%	14%
Onshore Gas Plants	70%	30%
Offshore Oil and Gas Production	79%	21%

Table 6–5. Fugitive CH_4 Emission Factors for Natural Gas Processing Equipment

Equipment Basis	Reference CH_4 Emission Factor [a,b], Original Units		Uncertainty [c] (± %)	CH_4 Emission Factor [d], Converted Units	
Gas processing volume [e]	130.563	scf/MMscf processed	58.1	2.50E-03	tonne/MMscf processed
				8.84E-02	tonne/10^6 m^3 processed
Reciprocating compressors	11,198	scfd/compressor	95.2	8.95E-03	tonne/compressor-hr
Centrifugal compressors	21,230	scfd/compressor	51.8	1.70E-02	tonne/compressor-hr

Footnotes and Sources:

[a] Harrison, M.R., L.M. Campbell, T.M. Shires, and R.M. Cowgill. *Methane Emissions from the Natural Gas Industry, Volume 2: Technical Report*, Final Report, GRI-94/0257.1 and EPA-600/R-96-080b. Gas Research Institute and U.S. Environmental Protection Agency, June 1996.

[b] Hummel, K.E., L.M. Campbell, and M.R. Harrison. *Methane Emissions from the Natural Gas Industry, Volume 8: Equipment Leaks,* Final Report, GRI-94/0257.25 and EPA-600/R-96-080h. Gas Research Institute and U.S. Environmental Protection Agency, June 1996.

[c] Uncertainty is based on a 95% confidence interval from the data used to develop the original emission factor.

[d] Emission factors converted from scfy are based on 60 °F and 14.7 psia. The average CH_4 concentration associated with these emission factors provided in Table E-4 is 86.8 mole %. If the actual CH_4 content differs from the default value, the emission factors shown above can be adjusted by the ratio of the site CH_4 content to the default concentration.

[e] See derivation in Appendix C.

and outer diameter greater than or equal to 2.375 inch.

Tubing systems means piping equal to or less than one half inch diameter as per nominal pipe size.

Turbine meter means a flow meter in which a gas or liquid flow rate through the calibrated tube spins a turbine from which the spin rate is detected and calibrated to measure the fluid flow rate.

Vented emissions means intentional or designed releases of CH_4 or CO_2 containing natural gas or hydrocarbon gas (not including stationary combustion flue gas), including process designed flow to the atmosphere through seals or vent pipes, equipment blowdown for maintenance, and direct venting of gas used to power equipment (such as pneumatic devices).

Vertical well means a well bore that is primarily vertical but has some unintentional deviation or one or more intentional deviations to enter one or more subsurface targets that are offset horizontally from the surface location, intercepting the targets either vertically or at an angle.

Well testing venting and flaring means venting and/or flaring of natural gas at the time the production rate of a well is determined for regulatory, commercial, or technical purposes. If well testing is conducted immediately after well completion or workover, then it is considered part of well completion or workover.

[75 FR 74488, Nov. 30, 2010, as amended at 76 FR 80590, Dec. 23, 2011]

TABLE W–1A OF SUBPART W—DEFAULT WHOLE GAS EMISSION FACTORS FOR ONSHORE PETROLEUM AND NATURAL GAS PRODUCTION

Onshore petroleum and natural gas production	Emission factor (scf/hour/component)
Eastern U.S.	
Population Emission Factors—All Components, Gas Service [1]	
Valve	0.640
Connector	0.083
Open-ended Line	1.46
Pressure Relief Valve	0.97
Low Continuous Bleed Pneumatic Device Vents [2]	1.39
High Continuous Bleed Pneumatic Device Vents [2]	37.3
Intermittent Bleed Pneumatic Device Vents [2]	13.5
Pneumatic Pumps [3]	10.3
Population Emission Factors—All Components, Light Crude Service [4]	
Valve	0.04
Flange	0.002
Connector	0.005
Open-ended Line	0.04
Pump	0.01
Other [5]	0.23
Population Emission Factors—All Components, Heavy Crude Service [6]	
Valve	0.0004
Flange	0.0007
Connector (other)	0.0002
Open-ended Line	0.004
Other [5]	0.002
Western U.S.	
Population Emission Factors—All Components, Gas Service [1]	
Valve	2.903
Connector	0.396
Open-ended Line	0.748
Pressure Relief Valve	4.631
Low Continuous Bleed Pneumatic Device Vents [2]	1.77
High Continuous Bleed Pneumatic Device Vents [2]	47.4
Intermittent Bleed Pneumatic Device Vents [2]	17.1
Pneumatic Pumps [3]	10.3

Onshore petroleum and natural gas production	Emission factor (scf/hour/component)
Population Emission Factors—All Components, Light Crude Service [4]	
Valve	0.04
Flange	0.002
Connector	0.005
Open-ended Line	0.04
Pump	0.01
Other [5]	0.23
Population Emission Factors—All Components, Heavy Crude Service [6]	
Valve	0.0004
Flange	0.0007
Connector (other)	0.0002
Open-ended Line	0.004
Other [5]	0.002

[1] For multi-phase flow that includes gas, use the gas service emissions factors.
[2] Emission Factor is in units of ''scf/hour/device.''
[3] Emission Factor is in units of ''scf/hour/pump.''
[4] Hydrocarbon liquids greater than or equal to 20°API are considered ''light crude.''
[5] ''Others'' category includes instruments, loading arms, pressure relief valves, stuffing boxes, compressor seals, dump lever arms, and vents.
[6] Hydrocarbon liquids less than 20°API are considered ''heavy crude.''

[76 FR 80591, Dec. 23, 2011]

TABLE W–1B TO SUBPART W OF PART 98—DEFAULT AVERAGE COMPONENT COUNTS FOR MAJOR ONSHORE NATURAL GAS PRODUCTION EQUIPMENT

Major equipment	Valves	Connectors	Open-ended lines	Pressure relief valves
Eastern U.S.				
Wellheads	8	38	0.5	0
Separators	1	6	0	0
Meters/piping	12	45	0	0
Compressors	12	57	0	0
In-line heaters	14	65	2	1
Dehydrators	24	90	2	2
Western U.S.				
Wellheads	11	36	1	0
Separators	34	106	6	2
Meters/piping	14	51	1	1
Compressors	73	179	3	4
In-line heaters	14	65	2	1
Dehydrators	24	90	2	2

TABLE W–1C TO SUBPART W OF PART 98—DEFAULT AVERAGE COMPONENT COUNTS FOR MAJOR CRUDE OIL PRODUCTION EQUIPMENT

Major equipment	Valves	Flanges	Connectors	Open-ended lines	Other components
Eastern U.S.					
Wellhead	5	10	4	0	1
Separator	6	12	10	0	0
Heater-treater	8	12	20	0	0
Header	5	10	4	0	0
Western U.S.					
Wellhead	5	10	4	0	1
Separator	6	12	10	0	0
Heater-treater	8	12	20	0	0
Header	5	10	4	0	0

TABLE W–1D OF SUBPART W OF PART 98—DESIGNATION OF EASTERN AND WESTERN U.S.

Eastern U.S.	Western U.S.
Connecticut	Alabama
Delaware	Alaska
Florida	Arizona
Georgia	Arkansas
Illinois	California
Indiana	Colorado
Kentucky	Hawaii
Maine	Idaho
Maryland	Iowa
Massachusetts	Kansas
Michigan	Louisiana
New Hampshire	Minnesota
New Jersey	Mississippi
New York	Missouri
North Carolina	Montana
Ohio	Nebraska
Pennsylvania	Nevada
Rhode Island	New Mexico
South Carolina	North Dakota
Tennessee	Oklahoma
Vermont	Oregon
Virginia	South Dakota
West Virginia	Texas
Wisconsin	Utah
	Washington
	Wyoming

TABLE W–2 OF SUBPART W—DEFAULT TOTAL HYDROCARBON EMISSION FACTORS FOR ONSHORE NATURAL GAS PROCESSING

Onshore natural gas processing plants	Emission factor (scf/hour/component)
Leaker Emission Factors—Compressor Components, Gas Service	
Valve [1]	14.84
Connector	5.59
Open-Ended Line	17.27
Pressure Relief Valve	39.66
Meter	19.33
Leaker Emission Factors—Non-Compressor Components, Gas Service	
Valve [1]	6.42
Connector	5.71
Open-Ended Line	11.27
Pressure Relief Valve	2.01
Meter	2.93

[1] Valves include control valves, block valves and regulator valves.

[76 FR 80592, Dec. 23, 2011]

TABLE W–3 OF SUBPART W—DEFAULT TOTAL HYDROCARBON EMISSION FACTORS FOR ONSHORE NATURAL GAS TRANSMISSION COMPRESSION

Onshore natural gas transmission compression	Emission factor (scf/hour/component)
Leaker Emission Factors—Compressor Components, Gas Service	
Valve [1]	14.84
Connector	5.59
Open-Ended Line	17.27
Pressure Relief Valve	39.66
Meter	19.33
Leaker Emission Factors—Non-Compressor Components, Gas Service	
Valve [1]	6.42
Connector	5.71
Open-Ended Line	11.27
Pressure Relief Valve	2.01
Meter	2.93
Population Emission Factors—Gas Service	
Low Continuous Bleed Pneumatic Device Vents [2]	1.37
High Continuous Bleed Pneumatic Device Vents [2]	18.20

Inlet Gas Analysis

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EXTENDED GAS REPORT
SUMMARY OF CHROMATOGRAPHIC ANALYSIS

Sample Name:	Libby Gas Plant	**For:**	3 Bear
Sample Date:	01/09/2019	**Identification:**	Before Upstream Amine
Sampled By:	RH	**Company:**	3 Bear
Time Sampled:	14:10	**Analysis Date:**	01/11/2019
Sample Temp:	63.5 F	**Analysis By:**	TG
Sample Press:	907.0	**Data File:**	LS_2253.D

H_2S (PPM) = 4.0

Component	Mole%	GPM REAL	GPM IDEAL
H_2S	0.000		
Nitrogen	1.712		
Methane	61.850		
CO2	1.209		
Ethane	15.957	4.266	4.257
Propane	11.391	3.137	3.130
Isobutane	1.639	0.536	0.535
N-Butane	4.167	1.313	1.310
Isopentane	0.854	0.312	0.312
N-Pentane	0.833	0.302	0.301
Hexanes+	0.388	0.148	0.148
Total	100.000	10.014	9.993

CALCULATED PARAMETERS

TOTAL ANALYSIS SUMMARY

MOLE WT:	25.679
VAPOR PRESS PSIA:	3245.3
SPECIFIC GRAVITY	
AIR = 1 (REAL):	0.8910
AIR = 1 (IDEAL):	0.8866
H2O = 1 (IDEAL):	0.389
REPORTED BASIS:	14.73
Unnormalized Total:	99.589

HEATING VALUE

BTU/CUFT (DRY)	1479.8
BTU/CUFT (WET)	1454.7

BTEX SUMMARY

WT% BENZENE	9.668
WT% TOLUENE	1.391
WT% E BENZENE	0.000
WT% XYLENES	0.000

LAB MANAGER

Constants: GPA 2145
Method(s): GPA 2286.m ; GPA 2172.m

Report Rev 18-05.16
Template: eC6+ Gas

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Sample Name: Libby Gas Plant
Company: 3 Bear

Data File: LS_2253.D

*ANALYSIS OF HEXANES PLUS

Component	MOLE%	WT%
2,2 DIMETHYL BUTANE	0.004	0.015
CYCLOPENTANE	0.051	0.155
2-METHYLPENTANE	0.081	0.260
3-METHYLPENTANE	0.039	0.129
HEXANE (C6)	0.064	0.216
DIMETHYLPENTANES	0.001	0.007
METHYLCYCLOPENTANE	0.036	0.117
2,2,3 TRIMETHYLBUTANE	0.000	0.000
BENZENE	0.041	0.123
CYCLOHEXANE	0.035	0.114
2-METHYLHEXANE	0.003	0.012
3-METHYLHEXANE	0.005	0.019
DIMETHYCYCLOPENTANES	0.002	0.007
HEPTANE (C7)	0.004	0.017
METHYLCYCLOHEXANE	0.009	0.036
2,5 DIMETHYLHEXANE	0.000	0.000
TOLUENE	0.005	0.019
2-METHYLHEPTANE	0.000	0.002
OTHER OCTANES	0.001	0.010
OCTANE (C8)	0.001	0.002
ETHYLCYCLOHEXANE	0.000	0.001
ETHYL BENZENE	0.000	0.001
M,P-XYLENE	0.000	0.001
O-XYLENE	0.000	0.000
OTHER NONANES	0.002	0.010
NONANE (C-9)	0.000	0.000
IC3 BENZENE	0.000	0.000
CYCLOOCTANE	0.000	0.000
NC3 BENZENE	0.000	0.000
TM BENZENE(S)	0.000	0.000
IC4 BENZENE	0.000	0.000
NC4 BENZENE	0.000	0.000
DECANES + (C10+)	0.000	0.002

*HEXANES PLUS SUMMARY

AVG MOLE WT	85.605
VAPOR PRESS PSIA	5.242
API GRAVITY @ 60F	67.8
SPECIFIC GRAVITY	
AIR = 1 (IDEAL):	2.952
H2O = 1 (IDEAL):	0.710

COMPONENT RATIOS

HEXANES (C6) MOLE%	60.745
HEPTANES (C7) MOLE%	33.955
OCTANES (C8) MOLE%	4.601
NONANES (C9) MOLE%	0.643
DECANES+ (C10+) MOLE%	0.056

HEXANES (C6) WT%	59.909
HEPTANES (C7) WT%	33.723
OCTANES (C8) WT%	5.341
NONANES (C9) WT%	0.932
DECANES+ (C10+) WT%	0.095

Remarks:

* Hexane+ portion calculated by Allocation Process

Constants: GPA 2145
Method(s): GPA 2286.m ; GPA 2172.m

Report Rev 18-05.16
Template: eC6+ Gas

Amine Gas Analysis

Stream		1	2	3	4	5	6	10	11	12	13
Water	mol %	0.04	90.11	0.29	86.48	6.18	7.14	86.56	86.56	86.56	90.05
Hydrogen Sulfide	mol %	0.01	0.00	0.0000004	0.00	0.01	0.10	0.00	0.00	0.00439	0.00
Carbon Dioxide	mol %	4.50	0.15	0.00010	4.06	16.85	92.54	4.04	4.04	4.04	0.16
GAS/SPEC CS-1160	mol %	0.00	9.74	0.00	9.37	0.00	0.00	9.38	9.38	9.38	9.79
Methane	mol %	65.72	0.00	68.64	0.07	55.84	0.14	0.01	0.01	0.01	0.00
Ethane	mol %	14.08	0.00	14.71	0.01	12.27	0.04	0.00	0.00	0.00	0.00
Propane	mol %	7.39	0.00	7.72	0.01	5.68	0.02	0.00	0.00	0.00	0.00
n-Butane	mol %	1.81	0.00	1.89	0.00	1.11	0.00	0.00	0.00	0.00	0.00
Isobutane	mol %	0.65	0.00	0.68	0.00	0.13	0.00	0.00	0.00	0.00	0.00
n-Pentane	mol %	0.28	0.00	0.29	0.00	0.13	0.00	0.00	0.00	0.00	0.00
Isopentane	mol %	0.29	0.00	0.30	0.00	0.08	0.00	0.00	0.00	0.00	0.00
n-Hexane	mol %	0.24	0.00	0.25	0.00	0.11	0.00	0.00	0.00	0.00	0.00
Nitrogen	mol %	5.00	0.00	5.23	0.00	1.62	0.00	0.00	0.00	0.00	0.00
** Total Flow	lbmol/hr	6588.22	7297.58	6300.82	7585.57	8.02	319.02	7577.55	7577.55	7577.55	7257.47
Frac Vapor		1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00	0.01	0.00
Molec Wt		23.47	27.17	22.50	27.84	25.10	42.10	27.84	27.84	27.84	27.22
Temperature	Fahrenheit	120.00	131.08	131.25	172.09	171.78	120.00	171.78	205.00	197.68	253.30
Pressure	psia	914.70	1014.70	910.54	914.70	89.70	24.04	89.70	84.70	34.70	27.96
Mass Flow	lb/hr	154646.71	198264.94	141744.57	211181.42	201.33	13430.16	210980.10	210980.10	210980.10	197531.27
Volume Flow	USgal/min		389.98		394.43			394.37			404.84
	MMSCFD	60.00		57.38		0.07	2.91				
Enthalpy	Btu/lb	-13.82	-694.34	-7.21	-657.11	35.93	8.50	-657.75	-631.26	-631.26	-585.30
Entropy	Btu/lb-R	-0.28	-0.96	-0.29	-0.91	0.03	0.01	-0.90	-0.86	-0.86	-0.78
Heat Capacity	Btu/lb-R	0.58	0.86	0.60	0.79	0.43	0.22	0.78			0.91
Density	lb/cuft	4.23	63.38	3.89	66.75	0.34	0.16	66.70	64.35	15.52	60.83
Viscosity	cP	0.01	2.40	0.01	1.52	0.01	0.02	1.52			0.71
Thermal Conductivity	Btu/hr-ft-F	0.02	0.26	0.02	0.27	0.02	0.01	0.27			0.28
Cp/Cv		1.52		1.48		1.25	1.29				
ZFactor		0.82		0.83		0.98	0.99				
Surface Tension	dyne/cm		47.70		44.76			44.78			38.63
Vapor Pressure	psi		2.02		867.32			89.70			27.96
pH			10.50		8.26			8.27			9.30
GAS/SPEC CS-1160	wt %		40.00		37.55			37.58			40.14
Hydrogen Sulfide	Loading		0.00		0.00			0.00			0.00
Carbon Dioxide	Loading		0.02		0.43			0.43			0.02

Residue Gas Analysis

Process Streams		47
Composition	**Status:**	**Solved**
Phase: **Total**	**From Block:**	**PIPE-1**
	To Block:	**--**
Mole Fraction		**%**
Methane		88.3822
Ethane		8.83026
Propane		0.623978
i-Butane		0.0202484
n-Butane		0.0321374
i-Pentane		0.00133883
n-Pentane		0.000955080
n-Hexane		9.18127E-05
n-Heptane		1.44007E-06
C8		1.09978E-07
Water		0
N2		2.10355
CO2		0.00508109
H2S		0.000132132
Triethylene Glycol		0
EG		0
MeOH		0
MDEA		0
CHEMTHERM 550		0

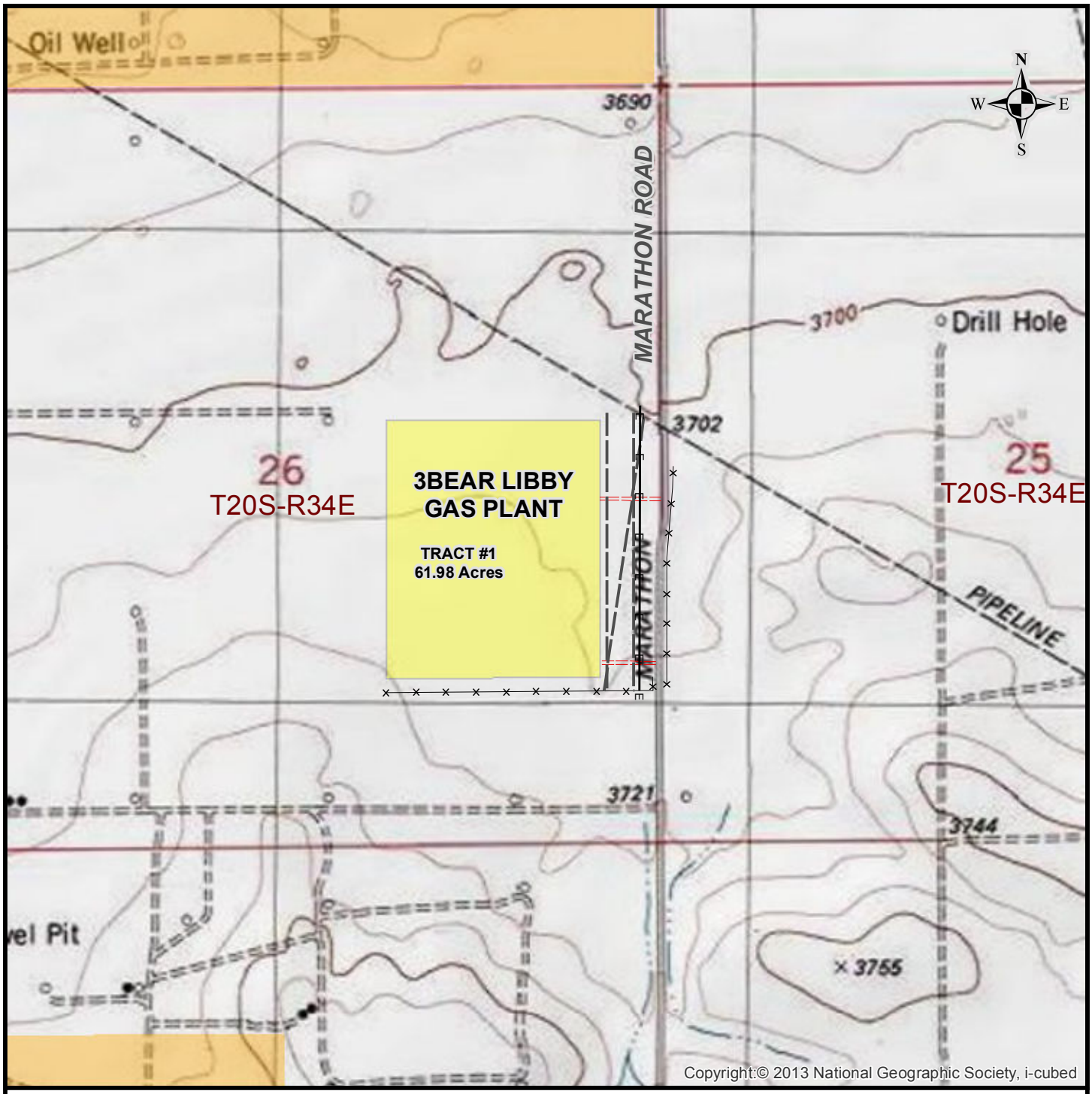
Section 8

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 provided on the following page.



3BEAR LIBBY GAS PLANT
3BEAR DELAWARE OPERATING - NM, LLC

SECTION 26, T20S, R34E
LEA COUNTY, NEW MEXICO

- PROPOSED ACCESS ROAD
- OVERHEAD ELECTRIC
- EXISING PIPELINE
- EXISTING FENCE
- 3BEAR LIBBY COMPLEX - TRACT 1
- BLM LAND

1,000 500 0 1,000
Feet Feet

DATE: 9/1/2017

FILE: 3Bear-Libby-Gas-Plant-Topo

Coordinate System: NAD 1983 2011 StatePlane New Mexico East FIPS 3001 Ft US
Projection: Transverse Mercator
Datum: NAD 1983 2011

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.

Certified Letter Receipts with Post Marks

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

7019 0140 0001 1140 8713

CARLSBAD, NM 88220

Certified Mail Fee	$3.50
Extra Services & Fees (check box, add fee as appropriate)	$2.80
☐ Return Receipt (hardcopy)	$0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$0.70
Total Postage and Fees	$7.00

0197 40

FORT COLLINS CO 80521 Postmark Here AUG 28 2019 USPS 08/30/2019

Sent To: Mr. + Mrs. Skeen

Street and Apt. No., or PO Box No.: 1508 Riverside Dr.

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

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

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OFFICIAL USE

7019 0140 0001 1140 8751

EUNICE, NM 88231

Certified Mail Fee	$3.50
Extra Services & Fees (check box, add fee as appropriate)	$2.80
☐ Return Receipt (hardcopy)	$0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$0.70
Total Postage and Fees	$7.00

0197 40

FORT COLLINS CO 80521 Postmark Here AUG 28 2019 USPS 08/30/2019

Sent To: The Merchant Livestock Co., Inc.

Street and Apt. No., or PO Box No.: PO Box 1105

City, State, ZIP+4®: Eunice, NM 88231

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

7019 0140 0001 1140 8706

CARLSBAD, NM 88220

Certified Mail Fee	$3.50
Extra Services & Fees (check box, add fee as appropriate)	$2.80
☐ Return Receipt (hardcopy)	$0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$0.70
Total Postage and Fees	$7.00

0197 40

FORT COLLINS CO 80521 Postmark Here AUG 28 2019 USPS 08/30/2019

Sent To: Ms. Skeen

Street and Apt. No., or PO Box No.: 301 S. Canyon

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

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

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OFFICIAL USE

7019 0140 0001 1140 8720

EUNICE, NM 88231

Certified Mail Fee	$3.50
Extra Services & Fees (check box, add fee as appropriate)	$2.80
☐ Return Receipt (hardcopy)	$0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$0.70
Total Postage and Fees	$7.00

0197 40

FORT COLLINS CO 80521 Postmark Here AUG 28 2019 USPS 08/30/2019

Sent To: Tover V Ranch Land LLLP

Street and Apt. No., or PO Box No.: PO Box 160

City, State, ZIP+4®: Eunice, NM 88231

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

7019 0140 0001 1140 8737

SANTA FE, NM 87508

Certified Mail Fee	$3.50
Extra Services & Fees (check box, add fee as appropriate)	$2.80
☐ Return Receipt (hardcopy)	$0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$0.70
Total Postage and Fees	$7.00

0197 40

FORT COLLINS CO 80521 Postmark Here AUG 28 2019 USPS 08/30/2019

Sent To: BLM

Street and Apt. No., or PO Box No.: 301 Dinosaur Trail

City, State, ZIP+4®: Santa Fe, NM 87508

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

7019 0140 0001 1140 8744

SANTA FE, NM 87501

Certified Mail Fee	$3.50
Extra Services & Fees (check box, add fee as appropriate)	$2.80
☐ Return Receipt (hardcopy)	$0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$0.70
Total Postage and Fees	$7.00

0197 40

FORT COLLINS CO 80521 Postmark Here AUG 28 2019 USPS 08/30/2019

Sent To: Land Office New Mexico State

Street and Apt. No., or PO Box No.: 310 old Santa Fe Trail

City, State, ZIP+4®: Santa Fe, NM 87501

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7019 0140 0001 1140 8690

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

EUNICE, NM 88231 OFFICIAL USE

Certified Mail Fee	$3.50
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☐ Return Receipt (hardcopy)	$0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
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☐ Adult Signature Restricted Delivery	$0.00
Postage	$0.70
Total Postage and Fees	$7.00

0197

FORT COLLINS CO 80521 AUG 28 2019 USPS

Postmark Here

08/30/2019

Sent To SJS Inc.

Street and Apt. No., or PO Box No. PO Box 1046

City, State, ZIP+4® Eunice, NM 88231

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

List of Public Notice Postings

1. Eunice Public Library - 1003 Avenue N, Eunice, NM 88231
2. Eunice City Hall - 1106 Ave J, Eunice, NM 88231
3. Lowe's Pay-N-Save - 1326 Ave J, Eunice, NM 88231

Property Tax Record

PLANT SITE

KENNETH SMITH, INC.
267 Smith Ranch Rd.
Hobbs, NM 88240
(575) 631-9739

First American Title Insurance Company
Commitment for Title Insurance No. FAM17-119
SCHEDULE B - Section Two
Exceptions

Date: August 15, 2017

Prepared by: Amanda Baker

GF#:**17-1193**
Borrower: **3 Bear Energy, LLC**

Property Tax Information:
2016 Tax Information
Tax ID Owner #: 40142
Bill #: 16-31882
Base Amount: $4,053.23
Taxes have been Paid in full

Sample Letter Sent To Owners, Counties, Municipalities, Indian Tribes

August 30, 2019

CERTIFIED MAIL 7019 0140 0001 1140 8751
RETURN RECEIPT REQUESTED *(certified mail is required, **return receipt is optional**)*

To Whom it May Concern,
3 Bear Delaware Operating – NM, LLC announces its application submittal to the New Mexico Environment Department for an air quality permit for the **construction** of its **3Bear Libby Gas Plant** facility. The expected date of application submittal to the Air Quality Bureau is **September, 2019.**

The exact location for the proposed facility known as, **3Bear Libby Gas Plant**, will be at latitude 32 deg**,** 32 min, 34.04 sec and longitude -103 deg**,** 31 min, 33.91 sec. From the intersection of US-180 W/US-62 and W/W Marland Blvd in Hobbs, NM, head west on US-180 W/US-62 for 22.6 miles. Turn Left (Southerly) onto Co Rd 27A for 6.5 miles. The facility location will be on the right. The approximate location of this facility is **16.2** miles **Southwest** of **Monument** in **Lea** county.

The proposed **construction** consists of: seven compressor engines, one generator engine, one gunbarrel tank, four condensate tanks, one slop oil tank, one produced water tank, one amine regenerator heater, one hot oil heater, one amine unit, one condensate loadout, one thermal oxidizer, one maintenance flare, one tank flare, process piping fugitives, and haul road fugitives.

The estimated maximum quantities of any regulated air contaminant will be as follows in pound per hour (pph) and tons per year (tpy) and may change slightly during the course of the Department's review:

Pollutant:	Pounds per hour	Tons per year
Total Suspended Particulates (TSP)	19.5 pph	6.6 tpy
PM_{10}	10.2 pph	6.2 tpy
$PM_{2.5}$	7.3 pph	6.1 tpy
Sulfur Dioxide (SO_2)	71.1 pph	238.0 tpy
Nitrogen Oxides (NO_x)	197.4 pph	144.4 tpy
Carbon Monoxide (CO)	804.4 pph	239.5 tpy
Volatile Organic Compounds (VOC)	1,842.9 pph	224.0 tpy
Total sum of all Hazardous Air Pollutants (HAPs)	23.7 pph	19.4 tpy
Green House Gas Emissions as Total CO_2e	n/a	251,995 tpy

The standard operating schedule of the facility will be from 12:00 a.m. to 11:59 p.m. 7 days a week and a maximum of 52 weeks per year. The maximum operating schedule will be from 12:00 a.m. to 11:59 p.m. 7days a week and a maximum of 52 weeks per year.

Owners and operators of the facility include
3 Bear Delaware Operating – NM, LLC
1512 Larimer St. Suite 540 Denver, CO 80202
Denver, CO 80202

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; (505) 476-4300; 1 800 224-7009; https://www.env.nm.gov/aqb/permit/aqb_draft_permits.html. Other comments and questions may be submitted verbally.

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.

Attención

Este es un aviso de la Agencia de Calidad de Aire del Departamento de Medio Ambiente de Nuevo México, acerca de las emisiones producidas por un establecimiento en esta área. Si usted desea información en español, por favor de comunicarse con la oficina de Calidad de Aire al teléfono 505-476-5557.

Sincerely,
Stephanie Swanson

1512 Larimer St. Suite 540
Denver, CO 80202

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, you may contact: Kristine Pintado, Non-Discrimination Coordinator, New Mexico Environment Department, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855, nd.coordinator@state.nm.us. If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator identified above or visit our website at https://www.env.nm.gov/NMED/EJ/index.html to learn how and where to file a complaint of discrimination.

Sample of Public Notice Posting and Verification of Posting

NOTICE

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Nitrogen Oxides (NO_x)	197.4 pph	144.4 tpy
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Volatile Organic Compounds (VOC)	1,842.9 pph	224.0 tpy
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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.

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SW W NW

210 240 270 300 33

260°W (T) 32°32'33"N, 103°31'25"W ±39ft ▲ 3677ft

NOTICE

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The exact location for the proposed facility known as, **3Bear Libby Gas Plant**, will be at latitude 32 deg, 32 min, 34.04 sec and longitude -103 deg, 31 min, 33.91 sec. From the intersection of US-180 W/US-62 and W/W Marland Blvd in Hobbs, NM, head west on US-180 W/US-62 for 22.6 miles. Turn Left (Southerly) onto Co Rd 27A for 6.5 miles. The facility location will be on the right. The approximate location of this facility is **16.2** miles **Southwest** of **Monument** in **Lea** county.

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Total Suspended Particulates (TSP)	19.5 pph	6.6 tpy
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$PM_{2.5}$	7.3 pph	6.1 tpy
Sulfur Dioxide (SO_2)	71.1 pph	238.0 tpy
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Carbon Monoxide (CO)	804.4 pph	239.5 tpy
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Green House Gas Emissions as Total CO_2e	n/a	251,995 tpy

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Owners and operators of the facility include
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1512 Larimer St. Suite 540 Denver, CO 80202
Denver, CO 80202

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; (505) 476-4300; 1 800 224-7009; https://www.env.nm.gov/aqb/permit/aqb_draft_permits.html. Other comments and questions may be submitted verbally.

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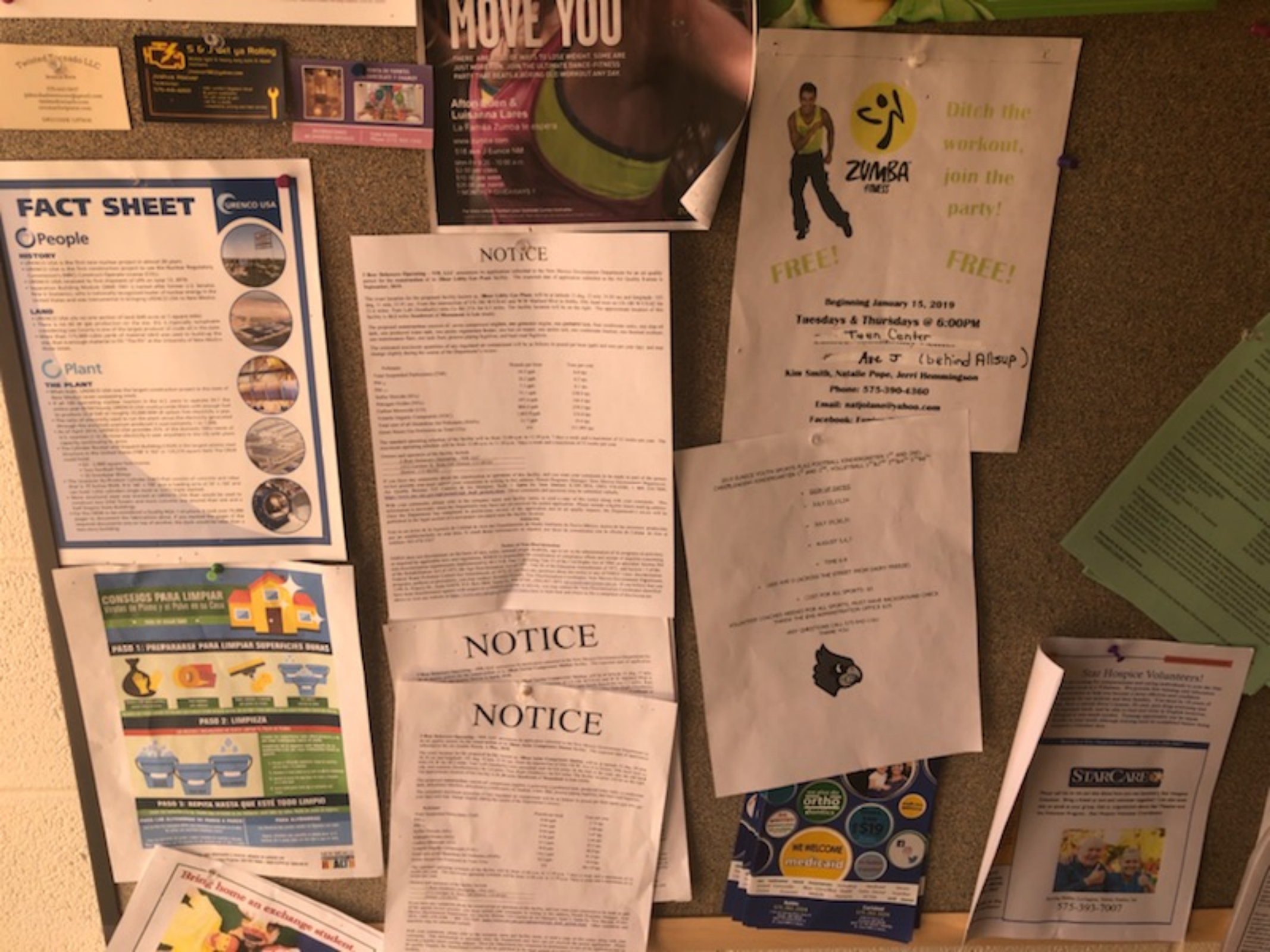
10 Sep 2019, 16:57:50


MOVE YOU
FACT SHEET
GRENCO USA
People
Plant
ZUMBA FITNESS
Ditch the workout, join the party!
FREE!
FREE!
Beginning January 15, 2019
Tuesdays & Thursdays @ 6:00PM
Teen Center
Ave J (behind Allsup)
NOTICE
NOTICE
NOTICE
CONSEJOS PARA LIMPIAR
PASO 1: PREPARARSE PARA LIMPIAR SUPERFICIES DURAS
PASO 2: LIMPIEZA
Bring home an exchange student
Star Hospice Volunteers!
STARCARE
575-393-7007

Market Community Bulletin Board

NOTICE

NOTICE

CONFERENCIA DE VERANO

FOR RENT

One bedroom studio apartment. For more information call (575)-318-5413

Our Lady of Guadalupe Family Fair 2019

Doggy Care

NOTICE

LOTS MORE!! ALL PRICES TO SALE! Come Look!

bow wow

Conner's Pet Services
Conner Clouse
575-263-5947

Loving Energetic Happy pups need homes

RV'S For Rent In Eunice!!!!
RV Includes utilities, cable,
Washer and dryer onsite
For more Information
Please call
(575)441-9318

Broadmoor TEFAP Mobile Food Bank

Free FOOD4A

MEET & GREET

Laundry Service
Pick-Up and Delivery
Ironing
• $2 per piece
$2 Per Pound
• Wash
• Fold
• Hang

Please call

Last in the 1800 Block of Ave S

Table Pope 575-631-2500

The Cleaning

We offer installment loans from $300 to $2,000*

Need persons to be willing to work and responsible and ready to work from:

ZUMBA

Story Hour for the Eunice Public Library starting August 14th

Wednesday Story Hour

City Clerk
Public
Information Board

CITY COUNCIL AGENDA

CITY OF EUNICE
CITY COUNCIL
September 9, 2019

6:00 pm — Council Chamber

I. Call to Order
II. Roll Call
III. Pledge & Invocation
IV. Public Comments
V. Manager Comments
VI. Consent Agenda
  A. Approval of the minutes from the August 12, 2019 meeting
  B. Approval of the minutes from the August 20, 2019 special meeting
VII. Old Business
  A. Discuss/Approve Ordinance #533 Amending Chapter 42 Article II, Nuisance Property, Section 42-19 through 42-36
  B. Discuss/Approve Ordinance #534 Creating Chapter 42 Article IV, Junked Motor Vehicles, Section 42-70 through 42-78
  C. Discuss/Approve Ordinance #535 Creating Chapter 42 Article V, Unsafe Structures, Section 42-90 through 42-120
  D. Discuss/Approve Ordinance #536 Creating Chapter 38 Article IV, Section 38-139, Paraphernalia-use, possession, delivery and advertisement
  E. Discuss/Approve Ordinance #537 Amending Chapter 38, Article IV, Section 38-131, Possession of Controlled Substances Prohibited
VIII. New Business
  A. Discuss/Approve the closure of Avenue J from Main Street to 11th Street for a festival on October 12, 2019
  B. Discuss/Approve the closure of Avenue J from 11th Street to 12th Street for a Fall Festival on October 31, 2019
  C. Discuss/Approve the purchase of playground equipment for Stevens Lake through a grant
  D. Discuss/Approve resolution #3215 ICIP for the Seniors Center

CITY OF EUNICE
COUNCIL BUDGET WORKSHOP
May 13, 2019

6:00 p.m. — Council Chamber

I. Call to Order
II. Discussion of fiscal year 2019/2020 budget
III. Adjournment

*This workshop is a work meeting only and there will be no votes taken on any item discussed during the budget workshop.

RFP #2019-1

REQUEST FOR PROPOSALS FOR PROFESSIONAL CONSULTING SERVICES TO INCLUDE LANDSCAPE ARCHITECUTRAL SERVICES AND ENGINEERING SERVICES FOR THE CITY OF EUNICE.

You may request City of Eunice RFP packet #2019-1 by emailing cbrito@cityofeunice.org or call 575-394-2576, Office of the City Clerk.

Proposal opening date will be September 17, 2019 @ 1:00 p.m., Eunice City Hall, 1106 Ave J, Eunice, NM 88231

Publish:
Albuquerque Journal: August 18, September 1, 15 2019
Hobbs News-Sun: August 18, September 1, 15, 2019

JOB OPENING

NOTICE

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Aviso en español

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SECTION 38-139, PARAPHERNALIA-USE, POSSESSION, DELIVERY AND ADVERTISEMENT.

A COPY OF ORDINANCE NO. 536 MAY BE OBTAINED AT CITY HALL, 1106 AVE J, OFFICE OF THE CITY CLERK, UPON REQUEST.

DATED THIS 23RD DAY OF AUGUST 2019.
Candy Brito, CMC

LEGAL NOTICE: AUGUST 23, 2019

NOTICE IS HEREBY GIVEN THAT THE CITY COUNCIL OF THE CITY OF EUNICE, NEW MEXICO, AT A SPECIAL MEETING AT CITY HALL, 1106 AVE J, EUNICE NEW MEXICO AT 6:00 P.M. ON THE 26TH DAY OF AUGUST 2019,

General Posting of Notices – Certification

I, Stephanie Swanson, the undersigned, certify that on **September 11, 2019** posted a true and correct copy of the attached Public Notice in the following publicly accessible and conspicuous places in the **City** of **Eunice** County, State of New Mexico on the following dates:

1. Facility entrance – 9/11/19

2. Public Library – 1003 Avenue N, Eunice, NM 88231 - 9/7/2019

3. City Hall – 1106 Ave J, Eunice, NM 88231 - 9/7/2019

4. Lowe's Pay-N-Save – 1326 Ave J, Eunice, NM 88231 - 9/7/2019

Signed this 11th day of Sept., 2019.

Signature

9/11/2019
Date

Stephanie Swanson
Printed Name

Manager of Engineering
Title

Table of Notified Citizens, Counties, Municipalities, Tribes

S & S Inc.
PO Box 1046
Eunice, NM 88231

Ms. Martha W. Skeen
301 South Canyon
Carlsbad, NM 80220

Mr. & Mrs. Curtis K. Skeen
1508 Riverside Drive
Carlsbad, NM 88220

T Over V Ranch Land LLLP
PO Box 160
Eunice, NM 88231

Bureau of Land Management
301 Dinosaur Trail
Santa Fe, NM 87508

Land Office New Mexico State
310 Old Santa Fe Trail
Santa Fe, NM 87501

The Merchant Livestock Co., Inc.
PO Box 1105
Eunice, NM 88231

Copy of Public Service Announcement

Submittal of Public Service Announcement – Certification

I, Stephanie Swanson, the undersigned, certify that on August 28, 2019, submitted a public service announcement to **KZOR Radio** that serves the City of **Hobbs**, **Lea** County, New Mexico, in which the source is or is proposed to be located and that **KZOR DID NOT RESPOND THAT IT WOULD AIR THE ANNOUNCEMENT.**

Signed this 5th day of September, 2019,

Signature

9/5/2019
Date

Stephanie Swanson
Printed Name

Manager of Engineering
Title

Copy of Classified or Legal Ad and Display Ad

Affidavit of Publication

STATE OF NEW MEXICO
COUNTY OF LEA

I, Daniel Russell, Publisher of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, solemnly swear that the clipping attached hereto was published in the regular and entire issue of said newspaper, and not a supplement thereof for a period of 1 issue(s).

Beginning with the issue dated
September 10, 2019
and ending with the issue dated
September 10, 2019.

Publisher

Sworn and subscribed to before me this 10th day of September 2019.

Business Manager

My commission expires
January 29, 2023
(Seal)

OFFICIAL SEAL
GUSSIE BLACK
Notary Public
State of New Mexico
My Commission Expires 1-29-23

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

NOTICE OF AIR QUALITY PERMIT APPLICATION

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67114577 00233236

STEPHANIE SWANSON
3 BEAR DELAWARE OPERATING - NM, LLC
1512 LARIMER ST., STE. 540
DENVER, CO 80202

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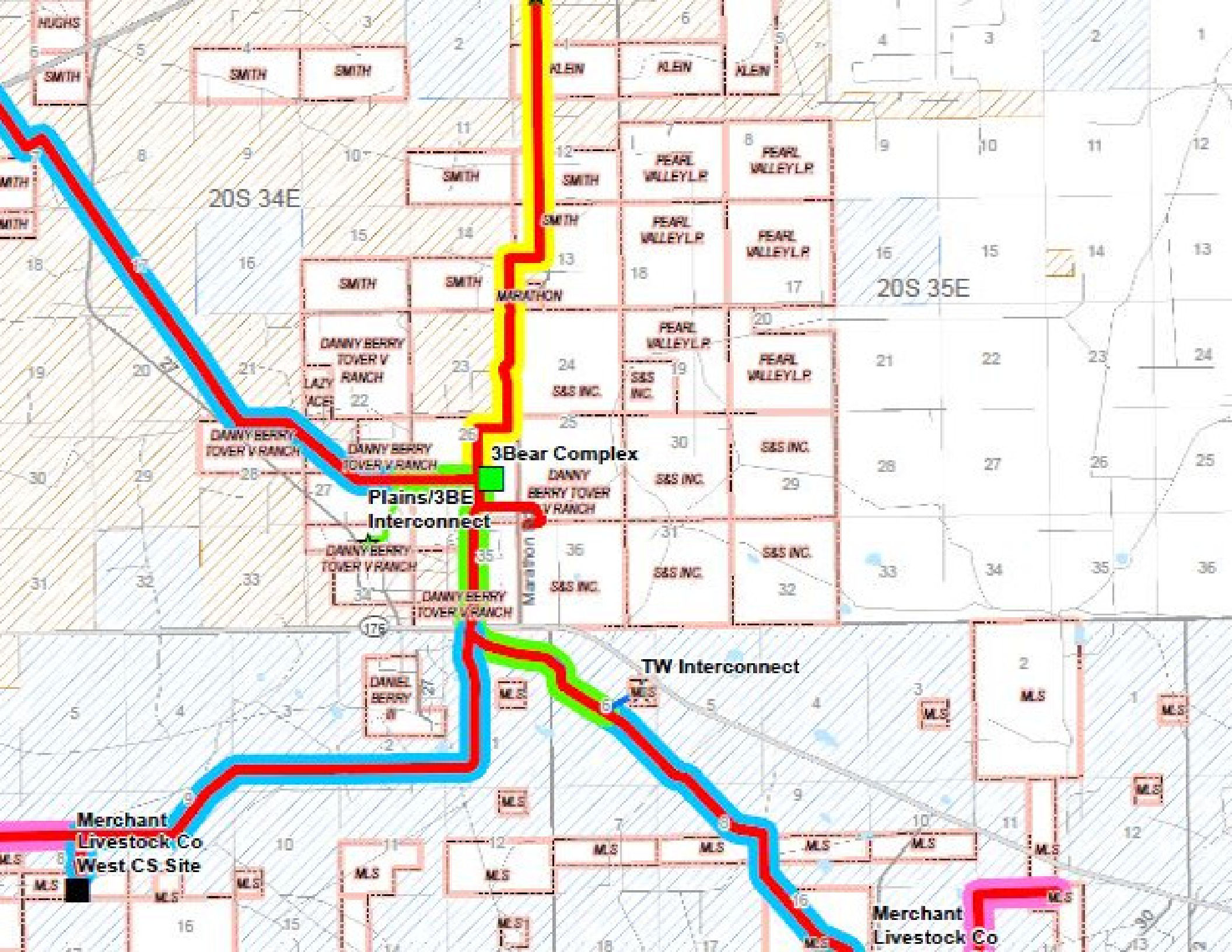
#34676

67114577 00233257

STEPHANIE SWANSON
3 BEAR DELAWARE OPERATING - NM, LLC
1512 LARIMER ST., STE. 540
DENVER, CO 80202

Map of Facility Boundary and Surrounding Area


20S 34E
20S 35E
3Bear Complex
Plains/3BE
Interconnect
TW Interconnect
Merchant
Livestock Co
West CS Site
Merchant
Livestock Co
SMITH
KLEIN
PEARL
VALLEY L.P.
MARATHON
DANNY BERRY
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Section 10

Written Description of the Routine Operations of the Facility

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

The 3Bear Libby Gas Plant will be equipped to gather natural gas from three surrounding compressor stations: 3Bear Aztec Compressor Station, 3Bear Outland Compressor Station, and 3Bear Lariat Compressor Station, which are owned and operated by 3Bear. The gas from the compressor stations is sent to the gas processing plant for treatment.

Libby will separate natural gas liquids (NGL's) from the field gas, producing natural gas liquids and a residue gas for transmission to a pipeline owned by others. The process utilizes a cryogenic gas separation plant and associated compressors for collecting field gas from the gathering system nearby. Gas and NGL's will be piped to the respective nearby interconnect metering stations, by others. The plant is to be located within 5 miles of the residue gas and NGL pipelines.

Compressor engines on site (ENG 1-4) will compress inlet gas and send the gas to the processing plant where an amine unit (AMINE-1) on site will treat and sweeten the gas. The amine unit is controlled by a thermal oxidizer (TO-1), and in the event that the thermal oxidizer is down, the gas will be sent to a flare (FL-1). The NGLs produced will be stored in pressurized vessels. Liquids from process drains will be sent to a gunbarrel tank (TK-1) for hydrocarbon separation. Oil from the gunbarrel separation will be stored in one 400-bbl slop oil tank (TK-6) and produced water will be stored in produced water tank (PWTK-1). Condensate tanks will store stabilized condensate (TK 2-5). A tank flare (FL-2) controls all tanks on site, and condensate and oil will be trucked off site (CONDLOAD-1 and OILLOAD-1). An emergency and maintenance flare (FL-1) will control compressor blowdowns (COMP), plant blowdowns (PLANT BD), and emergency upset conditions. Fugitive emissions occur from process piping and other components (FUG 1-2). Road dust emissions occur from daily routine traffic to the production facility (HR-1). Additional equipment on site will include: residue compressor engines (ENG 5-8), one generator engine (ENG-9), one 50 MMBtu/hr hot oil heater (HTR-1), and one 11 MMBtu/hr regen gas heater (HTR-2).

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)**:**
3Bear evaluated the Libby Gas Plant with respect to two nearby facilities that will also be owned and operated by 3Bear:

- The Libby plant site is located south of a new crude oil terminal, associated pipeline pumps, and containment area. The crude storage system pumps oil to a nearby oil pipeline.

- The plant site is also located south of a central liquid waste treatment and storage system that includes tank battery and containment with oil-water separators, filtration, and treatment equipment for receiving drill pad waste liquids for processing.

As defined by 40 CFR Part 70.2, "*Major source* means any stationary source (or any group of stationary sources that are located on one or more continuous or adjacent properties, and are under common control of the same person (or persons under common control)) belonging to a single major industrial grouping and that are described in paragraph (1), (2), or (3) of this definition. For the purposes of defining "major source," a stationary source or group of stationary sources shall be considered part of a single industrial grouping if all of the pollutant emitting activities at such source or group of sources on contiguous or adjacent properties belong to the same Major Group (*i.e.,* all have the same two-digit code) as described in the Standard Industrial Classification Manual, 1987. State programs may adopt the following provision: For onshore activities belonging to Standard Industrial Classification (SIC) Major Group 13: Oil and Gas Extraction, pollutant emitting activities shall be considered adjacent if they are located on the same surface site; or if they are located on surface sites that are located within 1⁄4 mile of one another (measured from the center of the equipment on the surface site) and they share equipment. Shared equipment includes, but is not limited to, produced fluids storage tanks, phase separators, natural gas dehydrators or emissions control devices. Surface site, as used in the introductory text of this definition, has the same meaning as in 40 CFR 63.761."

Per 40 CFR 63.761, *Surface site* means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed.

The crude oil terminal and liquid waste treatment and storage system are on the same property owned by 3Bear but are not associated with plant operations and do not share equipment. The facilities will each have their own separate fence-lines and entrances. The Libby plant site is separated from the liquid waste treatment site by a pipeline laydown yard and the crude oil terminal as well as the separate fence-lines and entrances.

The oil terminal operates under SIC 5171, whereas, the Libby plant and the liquid waste treatment and storage system both operate under 2-digit SIC 13.

Based on this analysis, the three facilities are not on the same surface site and do not share equipment, therefore, they are not adjacent as defined by the regulation. Air authorization/permit applications for both nearby facilities will be submitted under separate cover.

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]. The "project" emissions listed below [do not] 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. 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: 145.1 TPY**
b. **CO: 242.4 TPY**
c. **VOC: 169.0 TPY**
d. **SOx: 238.0 TPY**
e. **PM: 6.4 TPY**
f. **PM10: 6.2 TPY**
g. **PM2.5: 6.1 TPY**
h. **Fluorides: N/A TPY**
i. **Lead: N/A TPY**
j. **Sulfur compounds (listed in Table 2): N/A TPY**
k. **GHG: 252,758 TPY**

C. 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.

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/

Example of a Table for STATE REGULATIONS:

STATE REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.1 NMAC	General Provisions	Yes	Facility	General Provisions apply to Notice of Intent, Construction, and Title V permit applications.
20.2.3 NMAC	Ambient Air Quality Standards NMAAQS	Yes	Facility	This facility is located in New Mexico, therefore the requirements of this part applicable.
20.2.7 NMAC	Excess Emissions	Yes	Facility	This facility is subject to Air Quality Control Regulations, as defined in 20.2.7 NMAC, and is thus subject to the requirements of this regulation.
20.2.23 NMAC	Fugitive Dust Control	No	Facility	This is a permitted facility therefore this regulation does not apply.
20.2.33 NMAC	Gas Burning Equipment - Nitrogen Dioxide	No		This facility DOES NOT have 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 This facility DOES NOT have existing gas burning equipment having a heat input of greater than 1,000,000 million British Thermal Units per year per unit Note: "New gas burning equipment" means gas burning equipment, the construction or modification of which is commenced after February 17, 1972.
20.2.34 NMAC	Oil Burning Equipment: NO_2	No		This facility DOES NOT have oil burning equipment **(external combustion emission sources, such as oil fired boilers and heaters)** 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	Yes	Facility	This facility is a natural gas processing plant; therefore it is subject to the requirements of NMAC 2.35 for "New Natural **Gas Processing** Plants" as defined by the rule.
20.2.37 and 20.2.36 NMAC	Petroleum Processing Facilities and Petroleum Refineries	N/A	N/A	**These regulations were repealed by the Environmental Improvement Board. If you had equipment subject to 20.2.37 NMAC before the repeal, your combustion emission sources are now subject to 20.2.61 NMAC.**
20.2.38 NMAC	Hydrocarbon Storage Facility	Yes	TK 2-6	This regulation applies to the oil and condensate storage tanks at the facility. The tanks will be manifolded to a flare to meet the requirements of this regulation.
20.2.39 NMAC	Sulfur Recovery Plant - Sulfur	No		This facility is NOT a sulfur recovery plant.
20.2.61.109 NMAC	Smoke & Visible Emissions	Yes	ENG 1-9, HTR 1-2, TO-1, FL 1-2	Engines, generators, heaters, and flares are Stationary Combustion Equipment.
20.2.70 NMAC	Operating Permits	Yes	Facility	As proposed, this facility is a Title V Major source and is in turn subject to 20.2.70.
20.2.71 NMAC	Operating Permit Fees	Yes	Facility	This facility is subject to 20.2.70 NMAC and is in turn subject to 20.2.71 NMAC.
20.2.72 NMAC	Construction Permits	Yes	Facility	This facility is subject to 20.2.72 NMAC.
20.2.73 NMAC	NOI & Emissions Inventory Requirements	Yes	Facility	**Emissions Inventory Reporting:** 20.2.73.300 NMAC applies. This facility will be issued a permit under 20.2.72 NMAC, therefore it will meet the applicability requirements of 20.2.73.300 NMAC.

STATE REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.74 NMAC	Permits – Prevention of Significant Deterioration (PSD)	No	Facility	This facility is NOT a PSD major source.
20.2.75 NMAC	Construction Permit Fees	Yes	Facility	Subject to 20.2.72 NMAC and is in turn subject to 20.2.75 NMAC.
20.2.77 NMAC	New Source Performance	Yes	ENG 1-9, HTR 1-2, FUG-1, COMP, AMINE -1	HTR 1-2 are subject to NSPS Dc ENG 1-9 are subject to NSPS Subpart JJJJ. FUG-1, COMP, AMINE-1 are subject to NSPS Subpart OOOOa.
20.2.78 NMAC	Emission Standards for HAPS	No		This facility DOES NOT emit hazardous air pollutants which are subject to the requirements of 40 CFR Part 61, as amended through January 31, 2009.
20.2.79 NMAC	Permits – Nonattainment Areas	No		This facility is located in an attainment area for all regulated pollutants. PTE is major for NOx, CO, and SO2. The significance levels for NOx, CO and SO2 will meet the national ambient air quality standard, therefore this regulation is not applicable to those pollutants.
20.2.80 NMAC	Stack Heights	Yes		3Bear considered GEP requirements in the analysis. Stack heights do not exceed GEP.
20.2.82 NMAC	MACT Standards for source categories of HAPS	Yes	ENG 1-9	This regulation applies to all sources emitting hazardous air pollutants, which are subject to the requirements of 40 CFR Part 63. Applies if other MACT subpart applies. The MACT Subpart ZZZZ applies as discussed below.

Example of a Table for Applicable FEDERAL REGULATIONS (Note: This is not an exhaustive list):

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
40 CFR 50	NAAQS	Yes	Facility	Applies since the source emits air pollutants subject to NAAQS. Defined as applicable at 20.2.70.7.E.11, any national ambient air quality standard. See Section 16 for modeled demonstration of NAAQS compliance.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR 60, Subpart A	General Provisions	Yes	ENG 1-9, HTR 1-2, FUG-1, COMP, AMINE-1	HTR 1-2 are subject to NSPS Dc ENG 1-9 are subject to NSPS Subpart JJJJ. FUG-1, COMP, AMINE-1 are subject to NSPS Subpart OOOOa.
NSPS 40 CFR60.40a, Subpart Da	Subpart Da, Performance Standards for **Electric Utility Steam Generating Units**	No		There is not a steam generating unit that commenced construction, modification, or reconstruction after September 18, 1978, and that is capable of combusting more than 73 megawatts (MW) (250 million British thermal units per hour (MMBtu/hr)), therefore this facility is not applicable to this regulation.
NSPS 40 CFR60.40b Subpart Db	**Electric Utility Steam Generating Units**	No		There is not a steam generating unit that commenced construction, modification, or reconstruction after June 19, 1984, and that has a heat input capacity from fuels combusted in the steam generating unit of greater than 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hr)), therefore this facility is not applicable to this regulation.
40 CFR 60.40c, Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	Yes	HTR 1-2	This facility has steam generating units for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h). This regulation therefore, applies to the specified heaters.
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		This facility does not have storage vessels greater than 151,416 liters (40,000 gallons) that are used to store petroleum liquids for which construction is commenced after May 18, 1978, therefore the facility is not applicable to this regulation.
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	No		Gunbarrel TK-1 is a vessel with capacity greater than or equal to 75 cubic meters (m^3) but less than 1,589,874 m^3 but does not meet the definition of storage vessel, therefore is not applicable to this subpart. TK 2-6 and PWTK-1 are not storage vessels with capacities greater than or equal to 75 cubic meters (m^3) but less than 1,589,874 m^3 that are used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification commenced after July 23, 1984.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
	Modification Commenced **After** July 23, 1984			
NSPS 40 CFR 60.330 Subpart GG	**Stationary Gas Turbines**	No		There are no stationary gas turbines exceeding 10 MMBtu/hr at this facility.
NSPS 40 CFR 60, Subpart KKK	Leaks of VOC from **Onshore Gas Plants**	No		This facility is an onshore natural gas processing plant that will commence construction, reconstruction, or modification AFTER August 23, 2011, therefore the facility is not applicable to this subpart.
NSPS 40 CFR Part 60 Subpart LLL	Standards of Performance for **Onshore Natural Gas Processing**: SO_2 Emissions	No		This facility is an onshore natural gas processing plant that will commence construction, reconstruction, or modification AFTER August 23, 2011, therefore the facility is not applicable 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		The facility is NOT subject to the provisions of NSPS Subpart OOOO because the facility will be 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	FUG-1, COMP, AMINE-1	The facility IS subject to the provisions of NSPS Subpart OOOOa listed below because: - The compressors (COMP) are not co-located with a wellhead, so the reciprocating compressor requirements are applicable. - AMINE-1 is a sweetening unit located at onshore natural gas processing plants that process natural gas produced from onshore wells. - This is an onshore natural gas processing plant therefore the equipment leak standards apply to the affected facilities (FUG-1). The facility is NOT subject to the provisions of NSPS Subpart OOOOa listed below because: - There are no gas-fired, continuous high bleed pneumatic controllers at this site, so the pneumatic controller requirements are not applicable. - TK-1 is a process vessel not a storage vessel, therefore the storage vessel affected facility requirements are not applicable. - TK 2-6 and PWTK-1 are storage vessels that emit less than 6 tpy VOC, therefore the storage vessel affected facility requirements are not applicable.
NSPS 40 CFR 60 Subpart IIII	Standards of performance for Stationary Compression Ignition Internal Combustion Engines	No		The engines on site are not combustion ignition engines, therefore this facility is not subject to this subpart.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	Yes	ENG 1-9	ENG-1 is subject to NSPS Subpart JJJJ because the engine has a manufacture date after July 1, 2007 and has a maximum engine power greater than or equal to 500 hp and less than 1,350 hp. ENG 2-8 are subject to NSPS Subpart JJJJ because the engines have a manufacture date after July 1, 2007 and have a maximum engine power greater than 500 hp. ENG-9 is subject to NSPS Subpart JJJJ because the engine has a manufacture date after July 1, 2008 and has a maximum engine power less than 500 hp.
NSPS 40 CFR 60 Subpart TTTT	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units	No		There are not any steam generating units, integrated gasification combined cycle (IGCC), or stationary combustion turbines on site, therefore this facility is not subject to this subpart.
NSPS 40 CFR 60 Subpart UUUU	Emissions Guidelines for Greenhouse Gas Emissions and Compliance Times for Electric Utility Generating Units	No		There are not any steam generating units, integrated gasification combined cycle (IGCC), or stationary combustion turbines on site, therefore this facility is not subject to this subpart.
NSPS 40 CFR 60, Subparts WWW, XXX, Cc, and Cf	Standards of performance for Municipal Solid Waste (MSW) Landfills	No		This facility is not a landfill; therefore, it is not applicable to this subpart.
NESHAP 40 CFR 61 Subpart A	General Provisions	No		This facility DOES NOT emit HAP's in quantities that trigger these requirements.
NESHAP 40 CFR 61 Subpart E	National Emission Standards for **Mercury**	No		This facility DOES NOT 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		The provisions of this subpart apply to each of the following sources that are intended to operate in volatile hazardous air pollutant (VHAP) service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by this subpart. VHAP service means a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight of VHAP. VHAP means a substance regulated under this subpart for which a standard for equipment leaks of the substance has been promulgated. Benzene is a VHAP (See 40 CFR 61 Subpart J). Link to 40 CFR 61 Subpart V Note: If 40 CFR 60 also applies source only needs to comply with this part. No equipment at this facility contains or contacts a fluid with at least 10 percent by weight of a VHAP.
MACT 40 CFR 63, Subpart A	General Provisions	Yes	ENG 1-9	This regulation applies to all sources emitting hazardous air pollutants, which are subject to the requirements of 40 CFR Part 63. Applies if other MACT subpart applies. The MACT Subpart ZZZZ applies as discussed below.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
MACT 40 CFR 63.760 Subpart HH	**Oil and Natural Gas Production Facilities**	No		There are no dehydrators located at this facility. This facility is not a major source of HAPs.
MACT 40 CFR 63 Subpart HHH		No		This facility IS NOT a natural gas transmission and storage facility or a major source of HAPs.
MACT 40 CFR 63 Subpart DDDDD	National Emission Standards for Hazardous Air Pollutants for Major Industrial, Commercial, and Institutional Boilers & Process Heaters	No		This facility is not a major source of HAPs, therefore it is not subject to this subpart.
MACT 40 CFR 63 Subpart UUUUU	National Emission Standards for Hazardous Air Pollutants Coal & Oil Fire Electric Utility Steam Generating Unit	No		There are not any coal and oil fired electric utility steam generating units on site, therefore it is not subject to this subpart.
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (**RICE MACT**)	Yes	ENG 1-9	40 CFR 63, Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from existing, new, modified and reconstructed stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. The regulation contains provisions for initial and continuous compliance demonstration. The facility is an **area** source of HAP, as defined under the regulation. Under §63.6590(a)(2)(iii) and (a)(3)(iii), a RICE located at an area source of HAP is a *new* or *reconstructed* unit if it is constructed or reconstructed on or after June 12, 2006. Under §63.6590(c)(1), a *new* or *reconstructed* SI RICE at an area source of HAP must meet the requirements of the part by meeting the requirements of 40 CFR 60, Subpart JJJJ (NSPS for Stationary Spark Ignition Internal Combustion Engines).

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
40 CFR 64	**Compliance Assurance Monitoring**	No		The amine sweetening unit has pre-control VOC and H2S emissions greater than 100 TPY and uses a control device to achieve compliance with an emission limitation or standard. The amine sweetening unit is an affected facility under NSPS OOOOa, therefore, it is exempt under §64.2(b)(1)(i) for control of H2S. 3Bear believes the performance testing and compliance demonstrations required to confirm H2S destruction are adequate to also demonstrate VOC destruction. Therefore, 3Bear believes this facility IS NOT subject to 40 CFR 64.
40 CFR 68	**Chemical Accident Prevention**	Yes		This facility will handle naturally occurring hydrocarbon mixtures at a natural gas processing plant and the Accidental Release Prevention Provisions may be applicable to this facility. The facility may be required to submit the appropriate accidental release emergency response program plan prior to operation of the facility with more than the threshold quantity of a regulated substance.
Title IV – Acid Rain 40 CFR 72	**Acid Rain**	No		Not an affected facility.
Title IV – Acid Rain 40 CFR 73	**Sulfur Dioxide** Allowance Emissions	No		Not an affected facility.
Title IV-Acid Rain 40 CFR 75	**Continuous Emissions Monitoring**	No		Not an affected facility.
Title IV – Acid Rain 40 CFR 76	**Acid Rain** Nitrogen Oxides **Emission Reduction Program**	No		Not an affected facility.
Title VI – 40 CFR 82	Protection of **Stratospheric Ozone**	N/A	N/A	Not Applicable –facility will not “service”, “maintain” or “repair” class I or class II appliances nor “disposes” of the appliances.

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.

Section 15

Alternative Operating Scenarios

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

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

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

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

Please see Table 3-1.

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: 3Bear Libby Gas Plant
2	Name of company: 3 Bear Delaware Operating – NM, LLC
3	Current Permit number: NSR No. 7482
4	Name of applicant's modeler: Trenton Wade, Barr Engineering, Co.
5	Phone number of modeler: (970) 381-0564
6	E-mail of modeler: TWade@barr.com

16-B: Brief

1	Why is the modeling being done? Adding new equipment		
2	Describe the permit changes relevant to the modeling. Updated flaring volumes and engine emission rates.		
3	What geodetic datum was used in the modeling? WGS84		
4	How long will the facility be at this location? Permanently		
5	Is the facility a major source with respect to Prevention of Significant Deterioration (PSD)?	Yes	No **X**
6	Identify the Air Quality Control Region (AQCR) in which the facility is located. AQCR 155		

7	List the PSD baseline dates for this region (minor or major, as appropriate). The facility is located in AQCR 155 which has triggered the Minor Source Baseline Date for NO_2 (March 16, 1988), SO2 (July 28, 1978), PM10 (February 20, 1979), and PM2.5 (November 13, 2013).
8	Provide the name and distance to Class I areas within 50 km of the facility (300 km for PSD permits). There are no Class I areas within 50 km of the 3Bear Libby Gas Plant
9	Is the facility located in a non-attainment area? If so, describe. The facility is not located in a non-attainment area.
10	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	7482	January 8, 2018	NAAQs/NMAAQs
NO_2	7482	January 8, 2018	NAAQs/NMAAQs/PSD
SO_2	7482	January 8, 2018	NAAQs/NMAAQs/PSD
H_2S	N/A		
PM2.5	7482	January 8, 2018	NAAQs/NMAAQs/PSD
PM10	7482	January 8, 2018	NAAQs/NMAAQs/PSD
~~TSP~~[1]	N/A		
Lead	N/A		
Ozone (PSD only)	N/A		
NM Toxic Air Pollutants (20.2.72.402 NMAC)	N/A		

1. The New Mexico Ambient Air Quality Standard for TSP was repealed by the Environmental Improvement Board effective November 30, 2018.

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	N/A				
	NO_2	61.8 km	Background added			
	SO_2	54.2 km		X		
	H_2S	Combusted at thermal oxidizer			Submitted under Separate Cover	
	PM2.5	0.56 km	X			
	PM10	0.18 km	X			
	Lead					X
	Ozone					X
	State air toxic(s) (20.2.72.402 NMAC)					X

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.

The facility does not emit any toxic air pollutants listed in Tables A and B in 20.2.72.502 NMAC.

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 What model(s) were used for the modeling? Why?

The AerMod dispersion model was used in this analysis. BEEST for Windows (Version 11.14) was used to facilitate the modeling effort. BEEST for Windows is a modeling manager used to prepare and run AerMod.

2 What model options were used and why were they considered appropriate to the application?

3Bear ran the model in Regulatory Default mode with the following options:

	• the use of stack-tip downwash; • incorporating the effects of elevated terrain; • including the calms and missing data processing routines; • forcing the use of a 4-hour half-life when modeling SO in an urban source (not applicable for this location); and • disallowing for exponential decay for other applications. To estimate NO2 concentrations, the non-default mode was selected using the Ambient Ratio Method 2 (ARM2) technique. 3Bear used 0.5 as the national default for minimum ambient ratio and the default maximum ratio of 0.9.

16-G: Surrounding source modeling

1	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 unmerged list of sources to describe the changes. No changes to the NM database have been changed for these model runs.
2	Date of surrounding source retrieval. Near source information was obtained from the NMED (Supplied by email from Mr. Eric Peters to Mr. Trenton Wade on August 26, 2019).

	AQB Source ID	Description of Corrections

16-H: Building and structure downwash

1	How many buildings are present at the facility?	The following structures were included in the modeling scenario: • One Office Building • One MCC Building • One Instrument Air Building • One Condensate Storage Vessel • Three Slug Catchers • Seven Compressor Skids • One Generator Skid • Two Heater Skids • One Condensate Stabilizer Tower • One Amine Contactor • One Amine Still • One Demethanizer Tower • One Maintenance Building

2	How many above ground storage tanks are present at the facility?	The following tanks were included in the modeling scenario: • One Gunbarrel Tank • Four Condensate Tanks • One Slop Oil Tank • One Produced Water Tank	
3	Was building downwash modeled for all buildings?	Yes **X**	No
4	If not, explain why.		
5	Building comments		

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. 3Bear will install a continuous barrier around the 3Bear Libby Gas Plant with No Trespassing signage identifying the area as a limited access area.		
2	Receptors must be placed along publicly accessible roads in the restricted area. Are there public roads passing through the restricted area?	Yes	No **X**
3	Are restricted area boundary coordinates included in the modeling files?	Yes **X**	No
4	Describe the receptor grids and their spacing. The CO, NO2, SO2, PM2.5, and PM10 models used a Cartesian grid beyond the fence line as follows: 50-meter spacing was used out to 500 meters, 100-meter spacing was used out to 1 km, 250-meter spacing was used out to 5 km, and finally, an outer Cartesian grid with 1,000-meter spacing was used from 5 km out to a distance of 50km from the facility fence line in all directions. Insignificant receptors were deleted for cumulative NAAQS and PSD increment modeling.		
5	Describe receptor spacing along the fence line. Fence line receptors were spaced every 50 meters along the property boundary		
6	Describe the PSD Class I area receptors. The closest Class I area is Carlsbad Caverns National Park but is 88.8 km from the facility, so no receptors are analyzed there for this study.		

16-J: Sensitive areas

1	Are there schools or hospitals or other sensitive areas near the facility? This information is optional (and purposely undefined), but may help determine issues related to public notice.	Yes	No **X**
2	If so, describe.		
3	The modeling review process may need to be accelerated if there is a public hearing. Are there likely to be public comments opposing the permit application?	Yes	No **X**

16-K: 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). One engine scenario is included in the application. Only one of the engine scenarios will be included in any given run as proposed in the list of engine options listed earlier in the application.		
2	Which scenario produces the highest concentrations? Why? ENG-1 is the engine that was included in the modeling to capture worst case emissions for NO_2. ENG-1 and ENG-2 were modeled with the rest of the facility at a reduced receptor spacing of 1 km. ENG-2 had the highest concentration; therefore, it is the more conservative option. These modeling results are provided in the application.		
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 here:

6	Were different emission rates used for short-term and annual modeling?	Yes	No **X**
7	If yes, describe.		

16-L: NO_2 Modeling

1	Which types of NO_2 modeling were used? Check all that apply.	
		100% NO_X to NO_2 conversion
		ARM
		PVMRM
		OLM
	X	ARM2
		Other:
2	Describe the NO_2 modeling. To estimate NO2 concentrations, the non-default mode was selected using the Ambient Ratio Method 2 (ARM2) technique. 3Bear used 0.5 as the national default for minimum ambient ratio and the default maximum ratio of 0.9.	
3	In-stack NO_2/NO_X ratio(s) used in modeling. 3Bear used 0.5 as the national default for minimum ambient ratio and the default maximum ratio of 0.9.	
4	Equilibrium NO_2/NO_X ratio(s) used in modeling. Minimum – 0.5 Maximum – 0.9	
5	Describe/justify the use of the ratios chosen. The 2019 NM AQB Air Dispersion Modeling Guidelines state to use 0.5 as the national default for minimum ambient ratio and the default maximum ratio of 0.9.	
6	Describe the design value used for each averaging period modeled. 1-hour: High eighth high	

16-M: Particulate Matter Modeling

1	Select the pollutants for which plume depletion modeling was used.	
		PM2.5
		PM10

	X	None
2	Describe the particle size distributions used. Include the source of information. Particle size distribution was only used for haul road emissions which used AP42 eqn 13.2.2-1a and AP42 Table 13.2.2-2 to determine emissions for $PM_{2.5}$ and PM_{10}.	
3	Was secondary PM modeled for PM2.5? Only required for PSD major modifications that are significant for NOx and/or SOx. Optional for minor sources, but allows use of high eighth high.	Yes / No **X**

16-N: Setback Distances and Source Classification

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. Setback distances were not used at this facility.		
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		
3	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?	Yes **X**	No
4	Provide a cross-reference table between unit numbers if they do not match. It's ok to place the table below section 16-N for easier formatting. N/A		
5	The emission rates in the Tables 2-E and 2-F should match the ones in the modeling files. Do these match?	Yes	No **X**
6	If not, explain why. The max hourly emissions from haul road traffic listed in Tables 2-E and 2-F for $PM_{2.5}$ and PM_{10} do not match the emissions listed in the model. Hourly emissions from haul road traffic in the modeling files were calculated based on an hourly average of the annual emission rate.		
7	Have the minor NSR exempt sources or Title V Insignificant Activities" (Table 2-B) sources been modeled?	Yes **X**	No
8	Which units consume increment for which pollutants? See Table 16-1 for a list of units emitting increment consuming pollutants.		
9	PSD increment description for sources. (for unusual cases, i.e., baseline unit expanded emissions after baseline date). The facility is located in AQCR 155 which has triggered the Minor Source Baseline Date for NO_2 (March 16, 1988), SO2 (July 28, 1978), PM10 (February 20, 1979), and PM2.5 (November 13, 2013).		

10	Are all the actual installation dates included in Table 2A of the application form, as required?	Yes **X**	No
11	If not please explain how increment consumption status is determined for the missing installation dates. All sources at this facility are included in the increment consumption analysis since any unit will have an installation date after the baseline date for NO_2 (March 16, 1988), SO2 (July 28, 1978), PM10 (February 20, 1979), and PM2.5 (November 13, 2013).		

16-O: 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)
	FL-1	25.68 lb/lb-mol	7.83×10^6 cal/s	2.80 m
	FL-2	64.00 lb/lb-mol	5.66×10^4 cal/s	0.75 m

16-P: Volume and Related Sources

1	Were the dimensions of volume sources different from standard dimensions in the Air Quality Bureau (AQB) Modeling Guidelines?	Yes	No **X**
2	If the dimensions of volume sources are different from standard dimensions in the AQB Modeling Guidelines, describe how the dimensions were determined.		
3	Describe the determination of sigma-Y and sigma-Z for fugitive sources. Sigma-Y and Sigma-Z were determined by following the haul road guidelines listed in the NM AQB 2019 Air Dispersion Modeling Guidelines: Sigma-Y was calculated by dividing the width of the road (W) by 2.15 Sigma-Z was taken from the 'Large Trucks' information listed in Table 28 of the NM AQB 2019 Air Dispersion Modeling Guidelines.		
4	Describe how the volume sources are related to unit numbers. Or say they are the same. See Table 16-1 for cross-referencing of unit numbers.		
5	Describe any open pits. There are no open pits at this facility.		
6	Describe emission units included in each open pit. N/A		

16-Q: Background Concentrations

1	Identify and justify the background concentrations used. Background concentrations were added to NO_2, CO, $PM_{2.5}$, PM_{10}, and SO_2. The values used were provided by NM AQB Air Dispersion Modeling Guidelines (Revised June 6, 2019). These concentrations are shown in Section 16-V.		
2	Were background concentrations refined to monthly or hourly values?	Yes	No **X**

16-R: Meteorological Data

1	Identify and justify the meteorological data set(s) used. The one-year Hobbs met data set (HOBBS_Artesia-NWS_Midland-ua_2015. HOBBS_Artesia-NWS_Midland-ua_2015.PFL) collected from January 2015 to December 2015 was used for modeling as provided by NMED. It is a complete and recent data set representative of meteorological conditions in similar terrain of like elevation surrounding the 3Bear Libby Gas Plant.
2	Discuss how missing data were handled, how stability class was determined, and how the data were processed, if the Bureau did not provide the data. N/A

16-S: Terrain

1	Was complex terrain used in the modeling? If no, describe why. Yes
2	What was the source of the terrain data? The elevations of receptors were determined using the AERMAP terrain processor and seamless DEM terrain data downloaded from the USGS *The National Map* server. The DEM terrain data was processed such that an actual, true elevation is assigned to each receptor as determined through satellite data. The area within the inner property boundary will be graded and assumed to be constant elevation.

16-T: Modeling Files

Describe the modeling files:

	File name (or folder and file name)	Pollutant(s)	Purpose (ROI/SIA, cumulative, culpability analysis, other)
	ENG Option Test:		
	3Bear Libby Gas Plant_NOx_ENG1.BST	NOx	ROI/SIA
	3Bear Libby Gas Plant_NOx_ENG1_2015_NO2.GRF .LST	NOx	ROI/SIA
	Source Only:		
	3Bear Libby Gas Plant_CO.BST	CO	ROI/SIA
	3Bear Libby Gas Plant_CO_2015_CO.GRF .LST	CO	ROI/SIA
	3Bear Libby Gas Plant_NOx.BST	NOx	ROI/SIA
	3Bear Libby Gas Plant_NOx_2015_NO2.GRF .LST	NOx	ROI/SIA
	3Bear Libby Gas Plant_PM2.5.BST	$PM_{2.5}$	ROI/SIA
	3Bear Libby Gas Plant_PM2.5_2015_1993_PM2.5.GRF .LST	$PM_{2.5}$	ROI/SIA
	3Bear Libby Gas Plant_PM10.BST	PM_{10}	ROI/SIA
	3Bear Libby Gas Plant_PM10_2015_PM10.GRF .LST	PM_{10}	ROI/SIA
	3Bear Libby Gas Plant_SO2.BST	SO2	ROI/SIA
	3Bear Libby Gas Plant_SO2_2015_SO2.GRF .LST	SO2	ROI/SIA
	Near Source:		
1	3Bear Libby Gas Plant_PM2.5_Cumulative.BST	$PM_{2.5}$	Cumulative
	3Bear Libby Gas Plant_PM2.5_Cumulative_2015_PM2.5.GRF .LST	$PM_{2.5}$	Cumulative
	3Bear Libby Gas Plant_PM10-Cumulative.BST	PM_{10}	Cumulative
	3Bear Libby Gas Plant_ PM10-Cumulative_2015_PM10.GRF .LST	PM_{10}	Cumulative
	3Bear Libby Gas Plant_SO2_Cumulative.BST	SO2	Cumulative
	3Bear Libby Gas Plant_SO2_Cumulative_2015_SO2.GRF .LST	SO2	Cumulative
	Culpability:		
	3Bear Libby Gas Plant_SO2_Cumulative_Culpability.BST	SO2	Culpability
	3Bear Libby Gas Plant_SO2_Cumulative_Culpability_2015_SO2.GRF .LST	SO2	Culpability
	3Bear Libby Gas Plant_SO2_PSD_Culpability.BST	SO2	Culpability
	3Bear Libby Gas Plant_SO2_PSD_Culpability_2015_SO2.GRF .LST	SO2	Culpability
	PSD Increment:		
	3Bear Libby Gas Plant_PM2.5_PSD.BST	$PM_{2.5}$	Other (PSD Increment)
	3Bear Libby Gas Plant_PM2.5_PSD_2015_PM2.5.GRF .LST	$PM_{2.5}$	Other (PSD Increment)
	3Bear Libby Gas Plant_PM10-PSD.BST	PM_{10}	Other (PSD Increment)
	3Bear Libby Gas Plant_PM10-PSD_2015_PM10.GRF .LST	PM_{10}	Other (PSD Increment)
	3Bear Libby Gas Plant_SO2-PSD.BST	SO2	Other (PSD Increment)
	3Bear Libby Gas Plant_SO2-PSD_2015_SO2.GRF .LST	SO2	Other (PSD Increment)

16-U: 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.		
4	Describe the additional impacts analysis required at 20.2.74.304 NMAC.		
5	If required, have ozone and secondary PM2.5 ambient impacts analyses been completed?		

16-V: 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. Source only modeling was performed for NOx, CO, PM 2.5, PM10, and SO2. Near source modeling was performed for PM 2.5, PM10, and SO2. PSD increment modeling was performed for NOx, PM 2.5, PM10, and SO2. Inputs files (.BST) and Output files (.GRF, and .LST) are provided for each run.
2	Identify the maximum concentrations from the modeling analysis.

Pollutant	Period	Facility Concentration (µg/m3)	Total Modeled Concentration (µg/m3)	Total Modeled Concentration (PPM)	Background Concentration	Cumulative Concentration	Standard	Value of Standard	Units of Standard, Background, and Total	Percent of Standard
CO	1-hr	685.13	685.13	0.677	N/A	685.13	NAAQS	40,069.60	µg/m^3	1.7%
CO	1-hr	685.13	685.13	0.677	N/A	685.13	NMAAQS	14,997.50	µg/m^3	4.6%
CO	8-hr	229.78	229.78	0.227	N/A	229.78	NAAQS	10,303.60	µg/m^3	2.2%
CO	8-hr	229.78	229.78	0.227	N/A	229.78	NMAAQS	9,960.10	µg/m^3	2.3%
NO_2	1-hr	97.84	97.84	0.059	64.2	162.04	NAAQS	188.03	µg/m^3	86.2%
NO_2	24-hr	55.60	55.60	0.033	N/A	55.60	NMAAQS	188.03	µg/m^3	29.6%
NO_2	Annual	7.09	7.09	0.004	8.1	15.19	NAAQS	99.66	µg/m^3	15.2%
NO_2	Annual	7.09	7.09	0.004	8.1	15.19	NMAAQS	94.02	µg/m^3	16.2%
NO_2	Annual	7.09	7.09	0.004	8.1	15.19	PSD Class II Increment	25	µg/m^3	60.7%
$PM_{2.5}$	24-hr	3.94	8.25	N/A	13.4	21.65	NAAQS	35	µg/m^3	61.9%

$PM_{2.5}$	24-hr	3.94	3.95	N/A	N/A	3.95	PSD Class II Increment	9	$\mu g/m^3$	43.9%
$PM_{2.5}$	Annual	0.50	1.44	N/A	5.9	7.34	NAAQS	12	$\mu g/m^3$	61.2%
$PM_{2.5}$	Annual	0.50	0.54	N/A	N/A	0.54	PSD Class II Increment	4	$\mu g/m^3$	13.5%
PM_{10}	24-hr	4.20	4.20	N/A	N/A	4.20	NAAQS	150	$\mu g/m^3$	2.8%
PM_{10}	24-hr	4.20	4.23	N/A	N/A	4.23	PSD Class II Increment	30	$\mu g/m^3$	14.1%
PM_{10}	Annual	1.13	1.21	N/A	N/A	1.21	PSD Class II Increment	17	$\mu g/m^3$	7.1%
SO2	1-hr	184.18	184.18	0.07955	N/A	184.18	NAAQS	196.4	$\mu g/m^3$	93.8%
SO2	3-hr	157.19	157.19	0.06789	N/A	157.19	NAAQS	1309.3	$\mu g/m^3$	12.0%
SO2	24-hr	61.00	61.00	0.02635	N/A	61.00	NMAAQS	261.9	$\mu g/m^3$	23.3%
SO2	Annual	5.68	5.68	0.00245	0.67	6.35	NMAAQS	52.4	$\mu g/m^3$	12.1%
SO2	3-hr	157.19	157.19	0.06789	N/A	157.19	PSD Class II Increment	512	$\mu g/m^4$	30.7%
SO2	24-hr	61.00	61.00	0.02635	N/A	61.00	PSD Class II Increment	91	$\mu g/m^5$	67.0%
SO2	Annual	5.68	5.68	0.00245	0.67	6.35	PSD Class II Increment	20	$\mu g/m^6$	31.8%

1- Compliance with 1-hour NAAQS automatically demonstrates compliance with 24-hour NMAAQS
2- SO2 culpability analysis can be found in Table 16-2 and Table 16-3
3- of the Modeling Appendix

16-W: Location of maximum concentrations

1	Identify the locations of the maximum concentrations.

Pollutant	Period	UTM East (m)	UTM North (m)	Elevation (ft)	Distance (m)	Radius of Impact (ROI) (m)
NO_2	1-hr	638400	3601150	1133.53	362	61,769
NO_2	24-hr	638450	3601150	1133.26	361	6,897
NO_2	Annual	638646.7	3601488	1134.18	218	2,081
CO	1-hr	638300	3601100	1134.16	431	N/A
CO	8-hr	638300	3601100	1134.16	431	N/A
$PM_{2.5}$	24-hr	638646.7	3601438	1134.18	229	561
$PM_{2.5}$	Annual	638646.7	3601488	1134.18	218	464
PM_{10}	24-hr	638646.7	3601438	1134.18	229	N/A
PM_{10}	Annual	638646.7	3601438	1134.18	229	175
SO2	1-hr	638400	3601050	1134.2	461	54,201

SO2	3-hr	638350	3601200	1133.44	321	13,644
SO2	24-hr	638350	3601200	1133.44	321	5,981
SO2	Annual	638646.7	3601488	1134.18	218	1,580

16-X: Summary/conclusions

A statement that modeling requirements have been satisfied and that the permit can be issued.

The facility was modeled for NO2, CO, PM2.5, PM10, and SO2 impacts. Source-only modeling was completed for each pollutant to determine the existence of significant impacts. Then a cumulative NAAQS/NMAAQS analysis for each pollutant exceeding the significance levels was completed.

Source only NO2, CO, PM2.5, PM10, and SO2 modeling results are presented in Section 16-V for the proposed facility and define the air quality impacts associated with the proposed facility. NO2, PM2.5, PM10, and SO2 impacts are above the Significance Levels, while CO impacts are below the Significance Levels. A radius of impact analysis was performed for each pollutant as illustrated in Figures 1 through 10.

Additional background concentrations were added to 8th high 1-hr NO2 and the annual NO2. The results demonstrated compliance with both the NAAQS, NMAAQS, and PSD Class II as seen in Section 16-V. Compliance with 1-hour NAAQS automatically demonstrates compliance with 24-hour NMAAQS.

1 Additional modeling for cumulative impacts was performed for PM2.5 and PM10 which included appropriate background sources and background concentrations per NMED guidelines. The cumulative PM2.5 and PM10 modeling results demonstrated compliance with both the NAAQS, NMAAQS, and PSD Class II as seen in Section 16-V. The PSD increment modeling included impacts from appropriate increment consuming or expanding sources received from the NMED.

Additional modeling for cumulative impacts was performed for SO2 which included appropriate background sources per NMED guidelines. The cumulative SO2 modeling results did not demonstrate compliance with both the NAAQS, NMAAQS, and PSD so a culpability analysis was conducted as seen in Table 16-2 and Table 16-3. In the culpability analysis, receptors that exceeded the NAAQS were modeled with Libby Gas Plant and the background sources provided by Eric Peters. The receptors were also modeled with only the background sources without the sources at Libby Gas Plant. As shown in Table 16-2 and Table 16-3, Libby Gas Plant does not contribute to any exceedances.

The modeling results show that all modeled pollutants demonstrate compliance with the NAAQS, NMAAQS, and PSD Class II increment standards.

All figures and tables can be found in the attached modeling appendix.

Modeling Appendix

Source Only **NO_2 Annual ROI: 2.1 km** **Max: 7.1 ug/m^3**

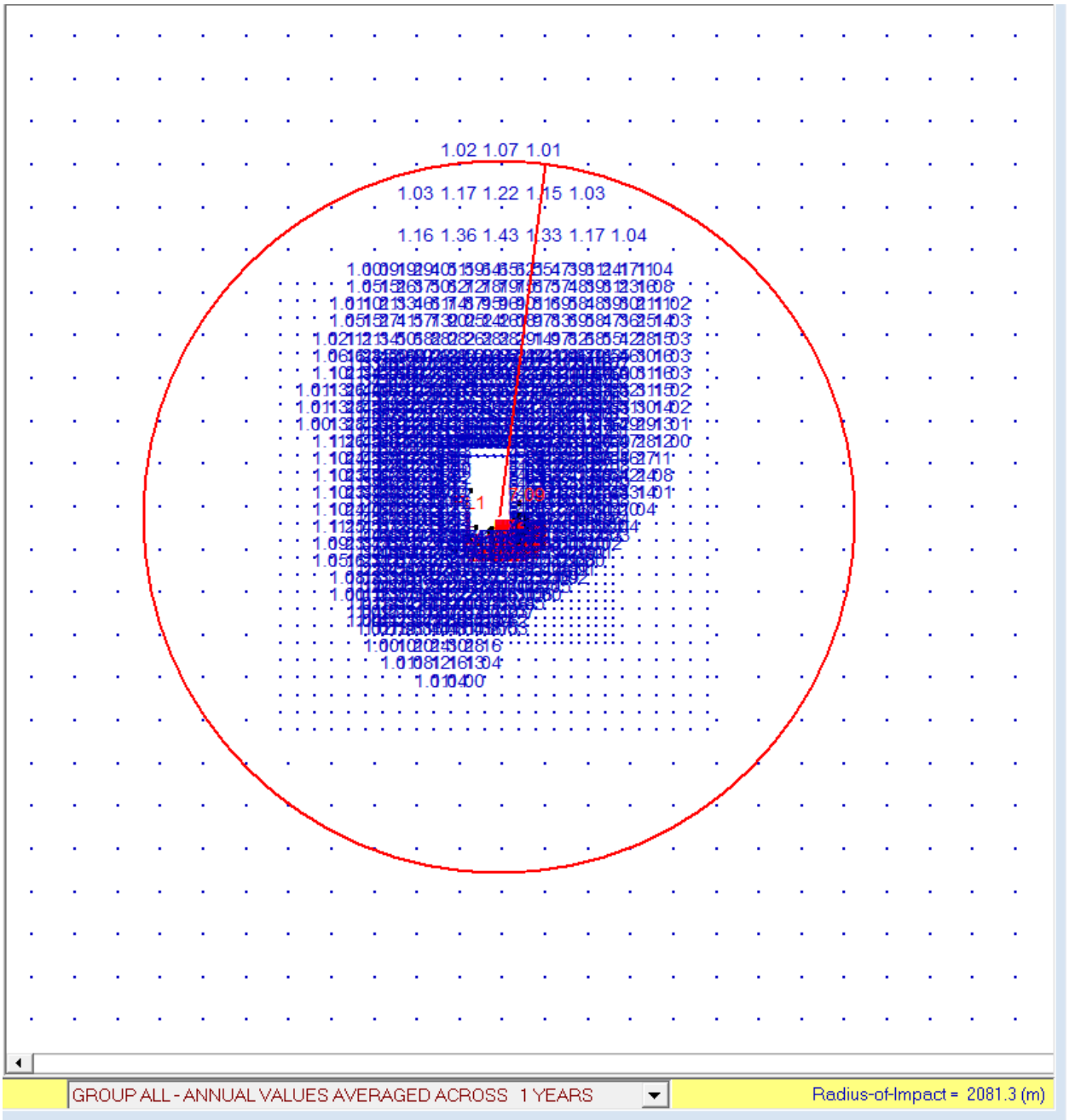

Figure 1

Source Only High 1ST High NO_2 24-hr ROI: 6.9 km Max: 55.6 ug/m³

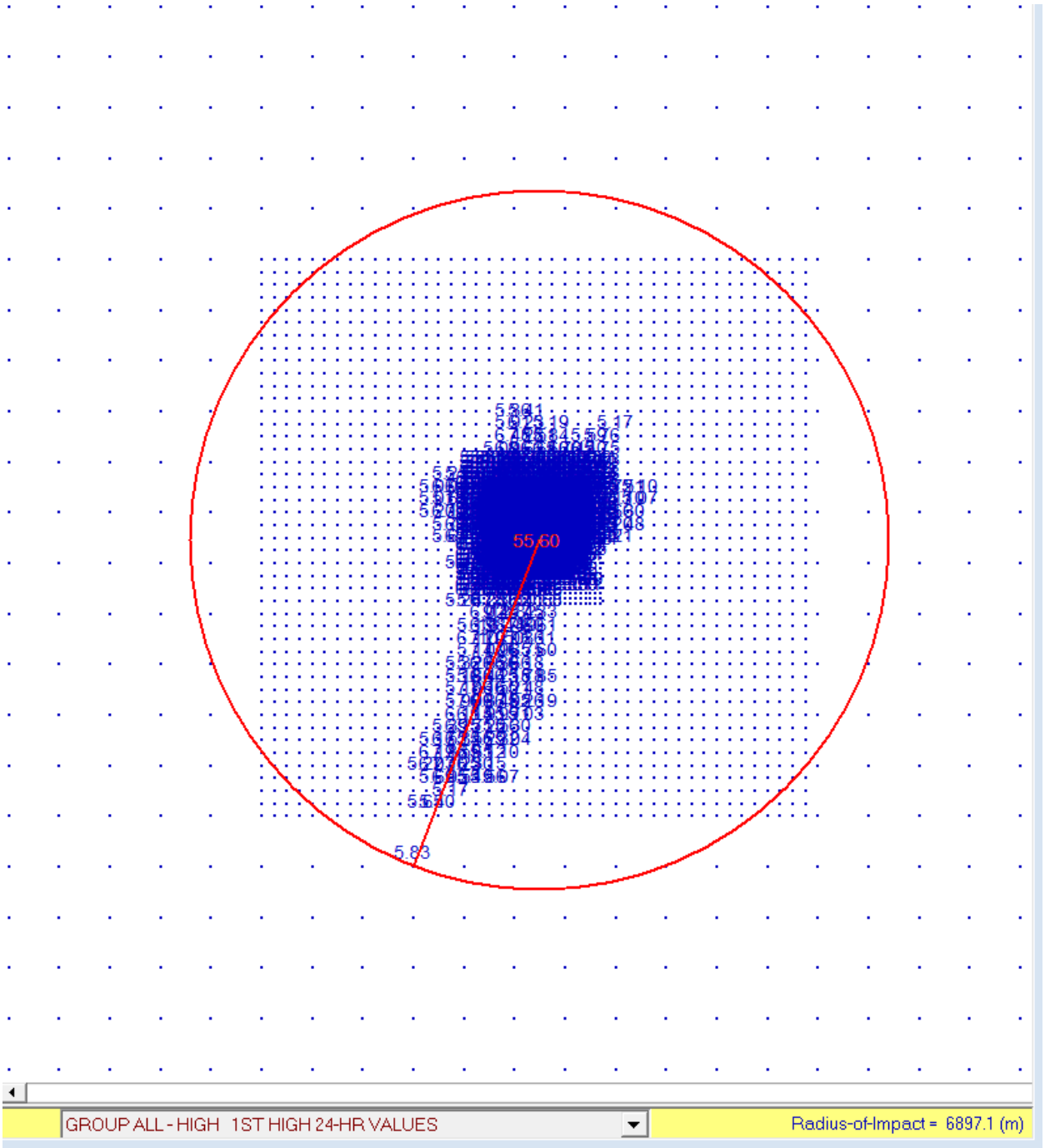

Figure 2

Source Only **High 1st High NO_2 1-hr** **ROI: 61.8 km** **Max: 255.2 ug/m^3**

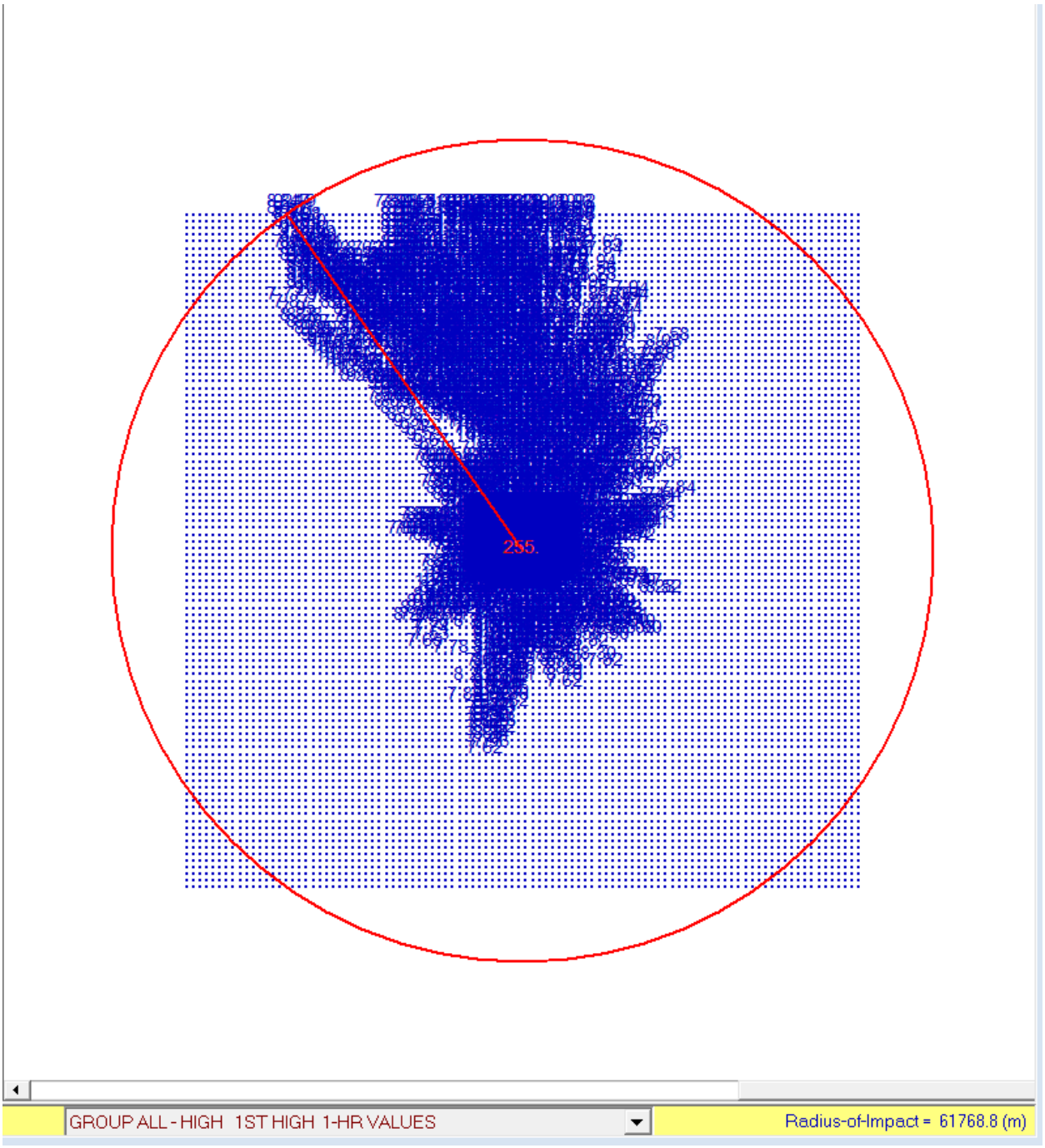

Figure 3

Source Only **$PM_{2.5}$ Annual ROI: 464.4 m** **Max: 0.50 ug/m^3**

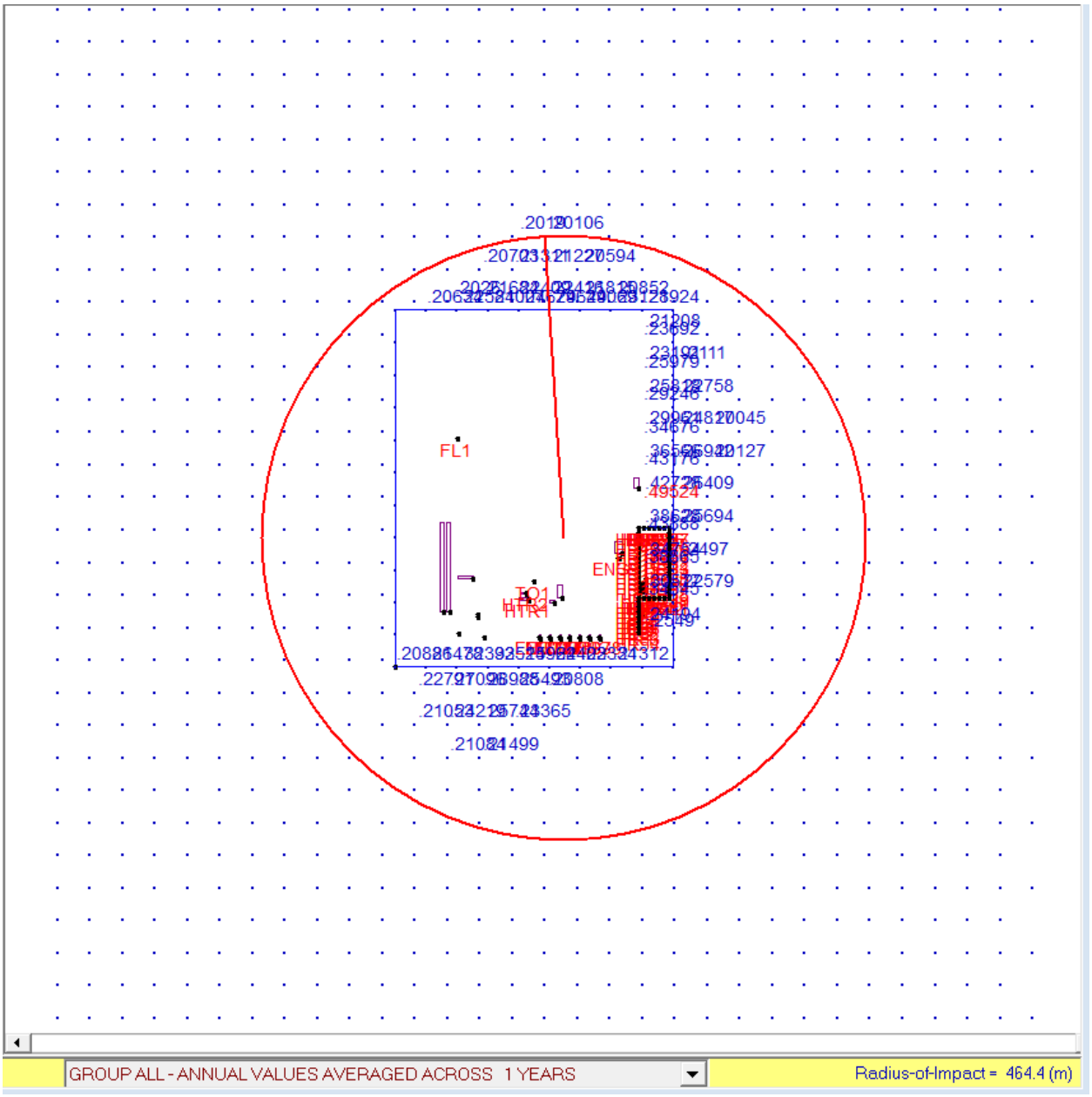

Figure 4

Source Only **High 1st High $PM_{2.5}$ 24-hr ROI: 560.5 m** **Max: 4.3 ug/m³**

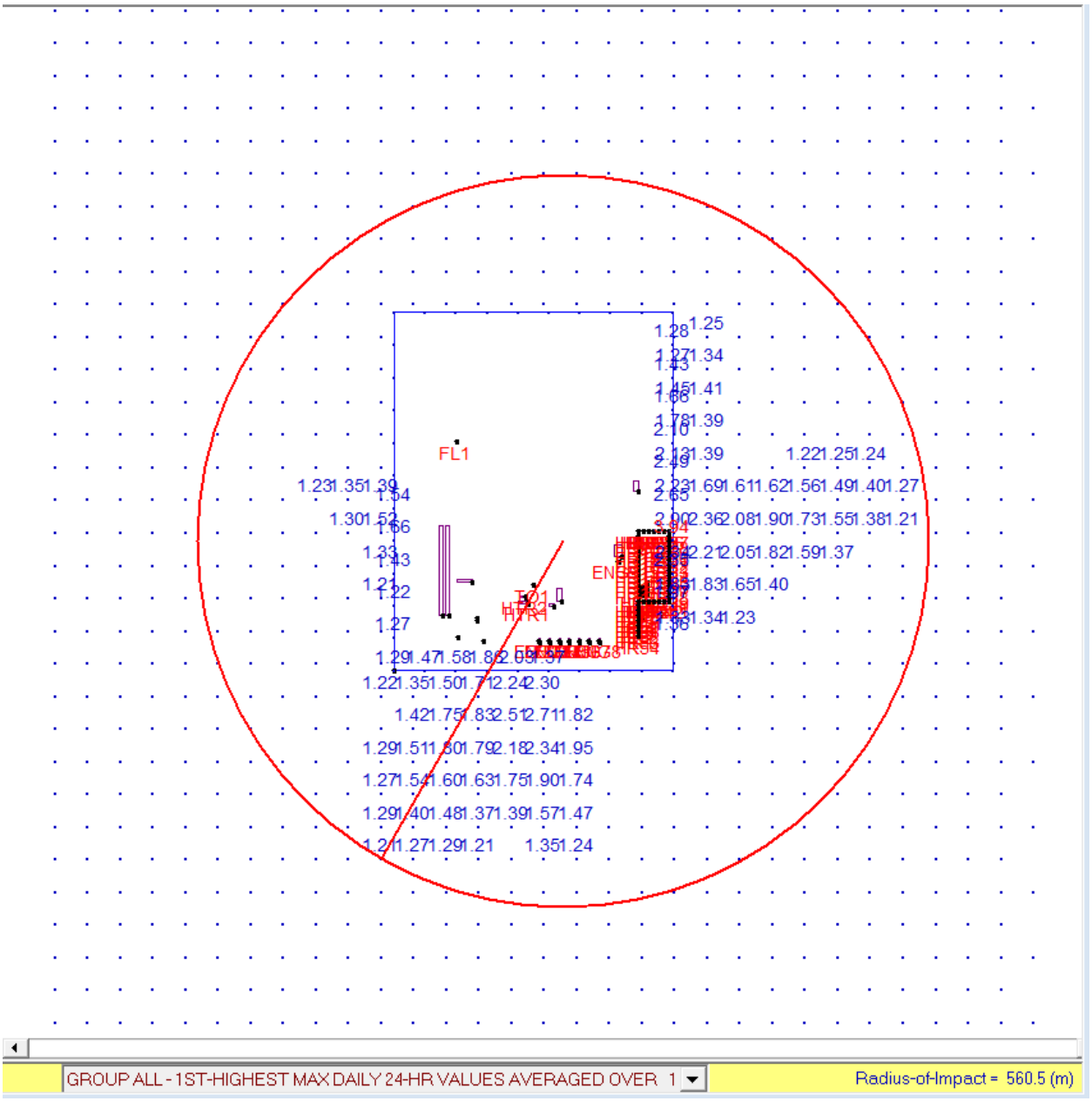

Figure 5

Source Only **PM_{10} Annual ROI: 175.2 m** **Max: 1.3 ug/m^3**

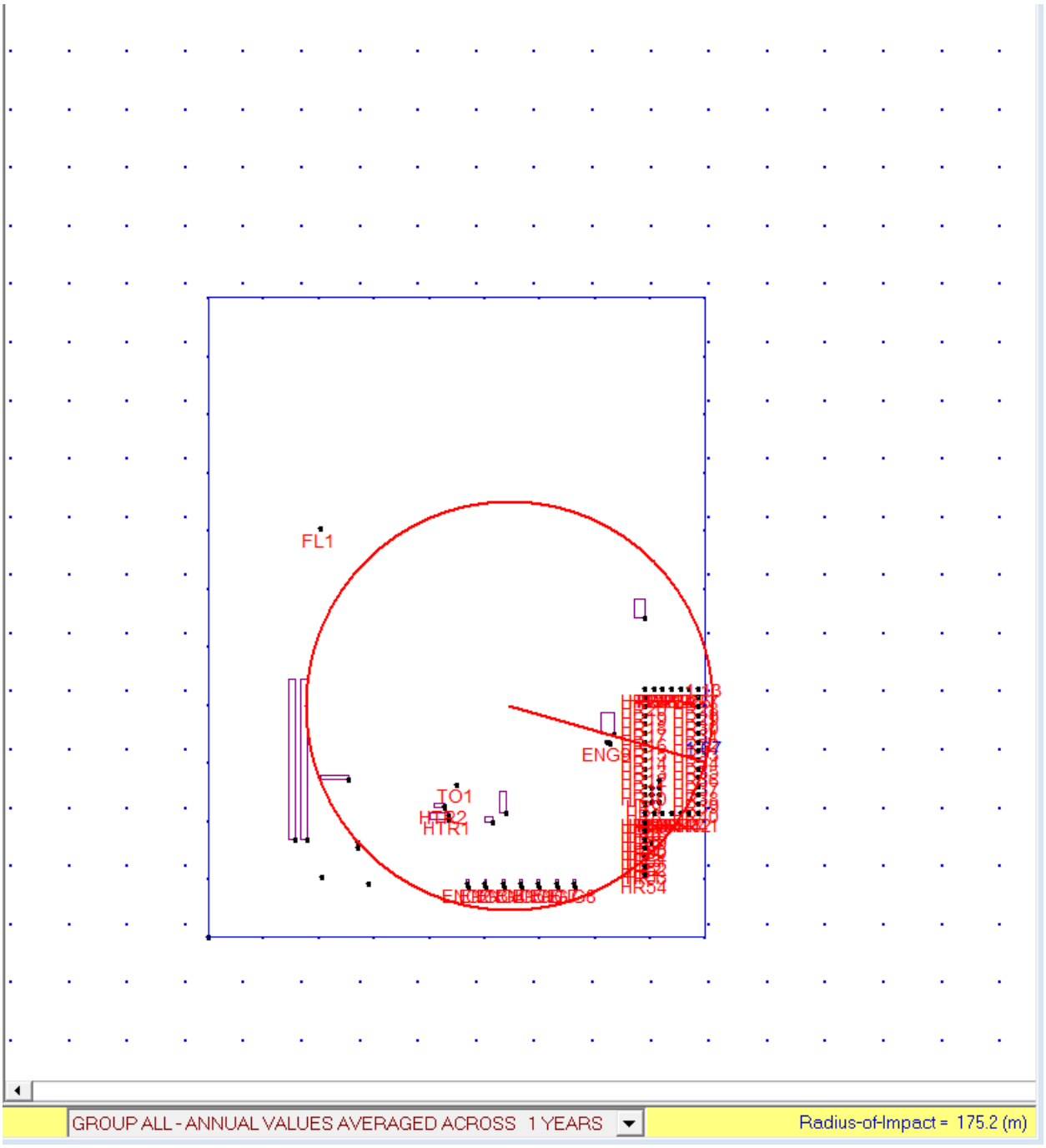

Figure 6

Source Only **SO2 Annual ROI: 1.6 km** **Max: 5.7 ug/m^3**

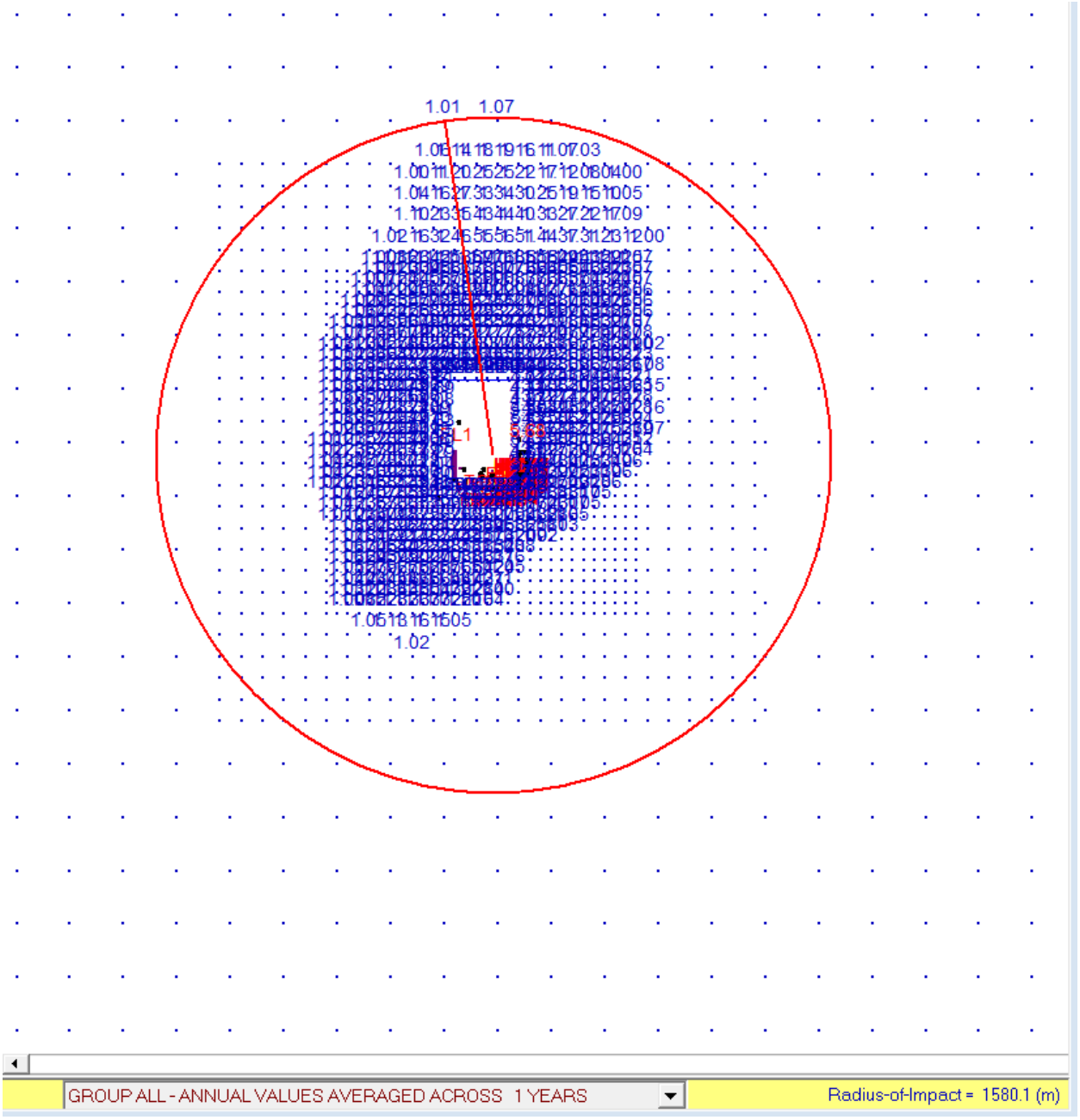

Figure 7

Source Only **High 1st High SO2 1-hr ROI: 54.2 km** **Max: 518.6 ug/m³**

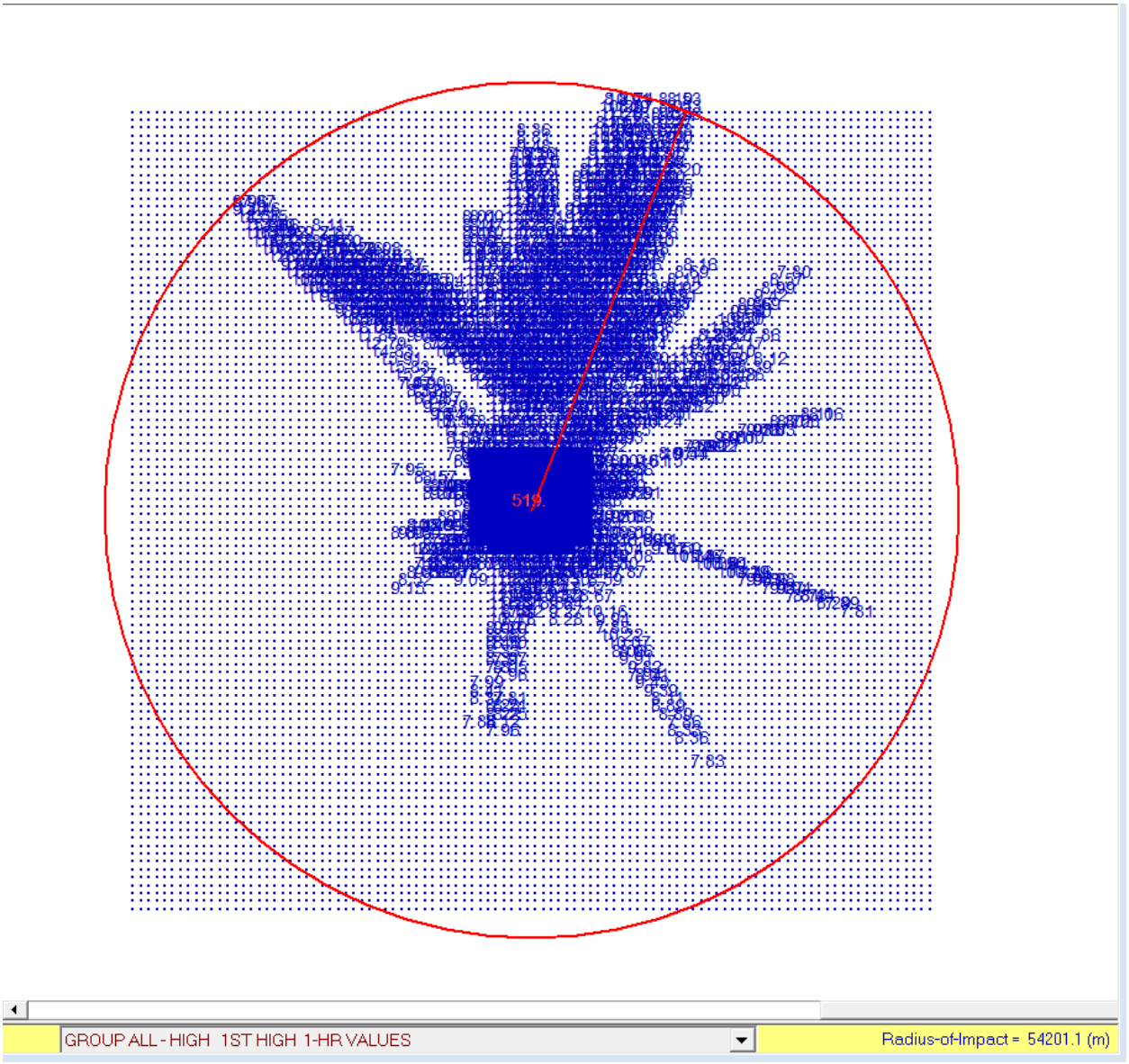

Figure 8

Source Only **High 1st High SO2 3-hr ROI: 13.6 km** **Max: 173.0 ug/m^3**

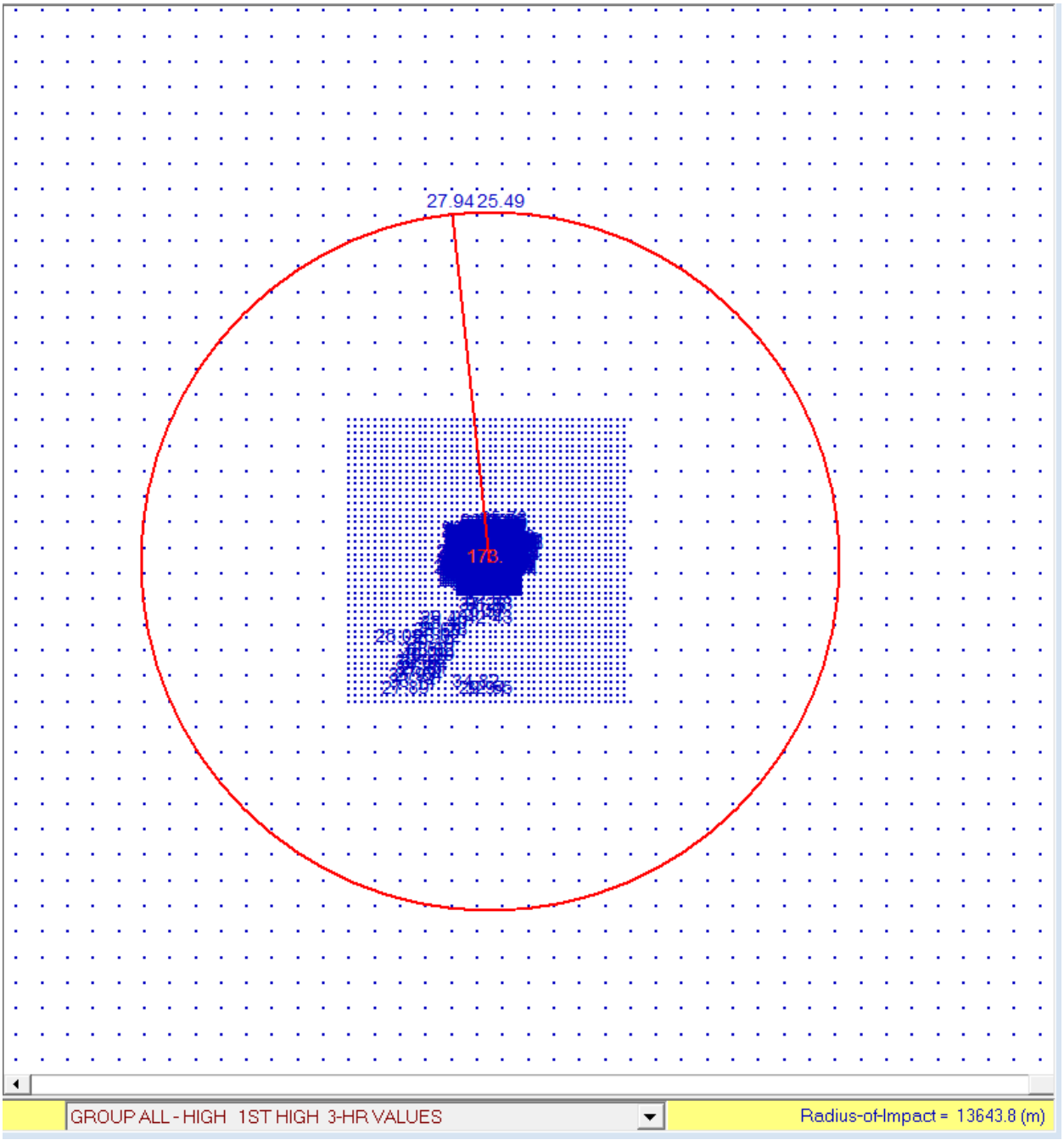

Figure 9

Source Only **High 1st High SO2 24-hr ROI: 6.0 km** **Max: 61.1 ug/m3**

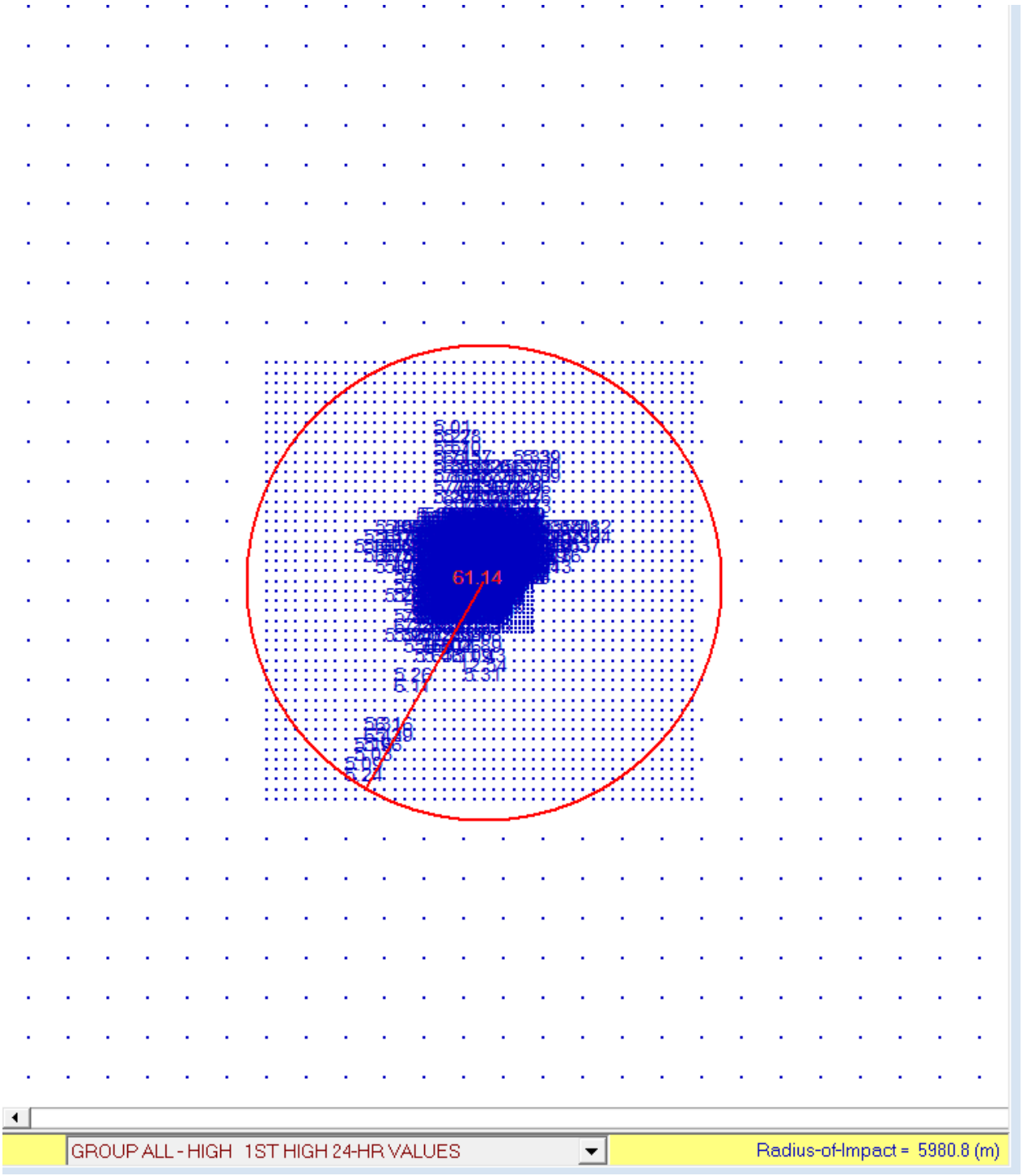

Figure 10

Table 16-1: Unit Number Cross Reference and PSD Increment Consumption

				PSD Increment Consumption			
				Emission Rate			
BEEST Source ID	Unit Number ID	Source Type	Emission Unit Description	NOx (lb/hr)	PM2.5 (lb/hr)	PM10 (lb/hr)	SO2 (lb/hr)
ENG1	ENG-1	Point	Compressor Engine	1.52E+00	5.65E-02	5.65E-02	1.58E-02
ENG2	ENG-2	Point	Compressor Engine	3.04E+00	1.14E-01	1.14E-01	3.17E-02
ENG3	ENG-3	Point	Compressor Engine	3.04E+00	1.14E-01	1.14E-01	3.17E-02
ENG4	ENG-4	Point	Compressor Engine	3.04E+00	1.14E-01	1.14E-01	3.17E-02
ENG5	ENG-5	Point	Compressor Engine	3.04E+00	1.14E-01	1.14E-01	3.17E-02
ENG6	ENG-6	Point	Compressor Engine	3.04E+00	1.14E-01	1.14E-01	3.17E-02
ENG7	ENG-7	Point	Compressor Engine	3.04E+00	1.14E-01	1.14E-01	3.17E-02
ENG8	ENG-8	Point	Compressor Engine	3.04E+00	1.14E-01	1.14E-01	3.17E-02
ENG9	ENG-9	Point	Compressor Engine	8.25E-01	8.57E-02	8.57E-02	1.04E-02
HTR1	HTR-1	Point	Hot Oil Heater	1.69E+00	2.57E-01	2.57E-01	9.61E-02
HTR2	HTR-2	Point	Regen Heater	7.43E-01	5.65E-02	5.65E-02	2.11E-02
TO	TO-1	Point	Thermal Oxidizer	1.63E+00	8.66E-05	8.66E-05	6.44E+01
FL1	FL-1	Point	Upset/Maintenance Flare	1.70E+02	5.75E+00	5.75E+00	6.30E+00
FL2	FL-2	Point	Tank Flare	8.92E-01	1.89E-03	1.89E-03	0.00E+00
HR1	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR2	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR3	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR4	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR5	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR6	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR7	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR8	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR9	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR10	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR11	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR12	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR13	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR14	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR15	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR16	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR17	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR18	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR19	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR20	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR21	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR22	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00

HR23	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR24	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR25	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR26	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR27	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR28	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR29	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR30	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR31	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR32	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR33	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR34	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR35	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR36	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR37	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR38	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR39	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR40	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR41	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR42	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR43	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR44	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR45	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR46	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR47	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR48	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR49	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR50	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR51	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR52	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR53	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00
HR54	HR-1	Volume	Road Dust	0.00E+00	4.76E-05	4.76E-04	0.00E+00

Table 16-2: Cumulative Culpability

Pollutant	Averaging Period	Cumulative Concentration	UTM E	UTM N	Source Description
SO2	Annual	12.91172	605000	3635000	Libby GP with Surrounding Sources
SO2	4th High 1-hr	3286.382	605000	3635000	Libby GP with Surrounding Sources
SO2	2nd High 3-hr	1718.759	605000	3635000	Libby GP with Surrounding Sources
SO2	2nd High 24-hr	235.7298	605000	3635000	Libby GP with Surrounding Sources

Pollutant	Averaging Period	Cumulative Concentration	UTM E	UTM N	Source Description
SO2	Annual	12.87682	605000	3635000	Surrounding Sources w/o Libby GP
SO2	4th High 1-hr	3286.339	605000	3635000	Surrounding Sources w/o Libby GP
SO2	2nd High 3-hr	1718.705	605000	3635000	Surrounding Sources w/o Libby GP
SO2	2nd High 24-hr	235.7195	605000	3635000	Surrounding Sources w/o Libby GP

Pollutant	Averaging Period	Cumulative Concentration Difference
SO2	Annual	0.03490
SO2	4th High 1-hr	0.04300
SO2	2nd High 3-hr	0.05400
SO2	2nd High 24-hr	0.01030

Table 16-3: PSD Culpability

Pollutant	Averaging Period	PSD Class II Concentration	UTM E	UTM N	Source Description
SO2	Annual	2123.659	661000	3620000	Libby GP with Surrounding Sources
SO2	4th High 1-hr	47846.88	660000	3619000	Libby GP with Surrounding Sources
SO2	2nd High 3-hr	42850.36	660000	3619000	Libby GP with Surrounding Sources
SO2	2nd High 24-hr	18065.78	660000	3619000	Libby GP with Surrounding Sources

Pollutant	Averaging Period	PSD Class II Concentration	UTM E	UTM N	Source Description
SO2	Annual	2123.616	661000	3620000	Surrounding Sources w/o Libby GP
SO2	4th High 1-hr	47846.87	660000	3619000	Surrounding Sources w/o Libby GP
SO2	2nd High 3-hr	42850.36	660000	3619000	Surrounding Sources w/o Libby GP
SO2	2nd High 24-hr	18065.77	660000	3619000	Surrounding Sources w/o Libby GP

Pollutant	Averaging Period	PSD Class II Concentration Difference
SO2	Annual	0.04300
SO2	4th High 1-hr	0.01000
SO2	2nd High 3-hr	0.00000
SO2	2nd High 24-hr	0.01000

Section 17

Compliance Test History

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

Compliance Test History Table

Unit No.	Test Description	Test Date
ENG-2 (Previously ENG-1b)	Tested in accordance with EPA test methods as required by NSR permit 7482.	4/16/2019
ENG-3 (Previously ENG-2)	Tested in accordance with EPA test methods as required by NSR permit 7482.	4/18/2019

EMISSIONS TEST REPORT
ON
EXHAUST EMISSIONS

FROM ONE
CATERPILLAR 3516B LE (ENG-1B)
RECIPROCATING INTERNAL COMBUSTION ENGINE

IN SERVICE AT
3BEAR LIBBY GAS PLANT

PREPARED FOR
3BEAR DELAWARE OPERATING

NEW MEXICO ENVIRONMENT DEPARTMENT AIR QUALITY BUREAU
PERMIT NUMBER 7482, AIRS NUMBER 35-025-1281

PREPARED BY
COMPLIANCE SERVICES AND TESTING, LLC

PROJECT NUMBER 1930

COMPLIANCE SERVICES & TESTING
P.O. Box 94191-87199
7108 Washington St. NE
Suite A
Albuquerque, NM 87109
(505) 681-4909 Phone
www.comptesting.com

Summary of Results

An exhaust emission test was performed on one spark-ignited reciprocating internal combustion engine operated by 3Bear Delaware Operating. The engine was operating at the maximum load available at the time of testing. Analytical analyzers specific for the criteria pollutants of NO_X, CO, THC, and diluents of O_2 and CO_2 were continuously monitored from the exhaust streams. CST's measured emissions are on a part per million basis or percent volume and the calculated mass emission rates of NO_X, CO, and VOC's in grams per horsepower-hour, pounds per hour, and tons per year.

Table 2 – Summarized Emissions Results

	NOx		***CO***		***VOC***
Limits	*(3.0/13.3)*	*(1.0)*	*(2.4/10.4)*	*(2.0)*	*(0.7)*
ENG-1b	0.81/3.55	0.37	0.18/0.80	0.08	0.54

EMISSIONS TEST REPORT
ON
EXHAUST EMISSIONS

FROM ONE
CATERPILLAR 3516B LE (ENG-2)
RECIPROCATING INTERNAL COMBUSTION ENGINE

IN SERVICE AT
3BEAR LIBBY GAS PLANT

PREPARED FOR
3BEAR DELAWARE OPERATING

NEW MEXICO ENVIRONMENT DEPARTMENT AIR QUALITY BUREAU
PERMIT NUMBER 7482, AIRS NUMBER 35-025-1281

PREPARED BY
COMPLIANCE SERVICES AND TESTING, LLC

PROJECT NUMBER 1930

COMPLIANCE SERVICES & TESTING
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Summary of Results

An exhaust emission test was performed on one spark-ignited reciprocating internal combustion engine operated by 3Bear Delaware Operating. The engine was operating at the maximum load available at the time of testing. Analytical analyzers specific for the criteria pollutants of NO_X, CO, THC, and diluents of O_2 and CO_2 were continuously monitored from the exhaust streams. CST's measured emissions are on a part per million basis or percent volume and the calculated mass emission rates of NO_X, CO, and VOC's in grams per horsepower-hour, pounds per hour, and tons per year.

Table 2 – Summarized Emissions Results

	NOx		***CO***		***VOC***
Limits	*(3.0/13.3)*	*(1.0)*	*(2.4/10.4)*	*(2.0)*	*(0.7)*
ENG-2	0.98/4.31	0.57	0.13/0.57	0.08	0.51

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.

The following permit conditions are requested for the 3Bear Libby Gas Plant:

1. Requesting emission limits as specified in the summary table in Section 6 that are greater than 0.5 lb/hr and 0.5 tpy.

2. Individual HAP emissions will be less than 10 tpy. Facility wide HAP emissions will be less than 25 tpy.

3. Engine Emission Limits:
   - CO emissions on ENG 2-8 will be limited to 0.78 g/hp-hr

4. TK 1-6 and PWTK-1 will be controlled with a 95% control efficiency.

Section 22: Certification

Company Name: 3 Bear Delaware Operating – NM, LLC

I, Stephanie Swanson, 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 ____ day of ~~July~~ Sept. 6, 2019, _____, upon my oath or affirmation, before a notary of the State of

_____.

*Signature

Sept. 6, 2019
Date

Stephanie Swanson
Printed Name

Manager of Engineering
Title

Scribed and sworn before me on this 6th day of September, 2019.

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

8th day of May, 2022.

Notary's Signature

09.06.2019
Date

Robin G Machholz
Notary's Printed Name

Robin G Machholz
Notary Public
State of Colorado
Notary ID 20024015288
My Commission Expires May 08, 2022

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