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. For NOI applications, submit the entire UA1, UA2, and UA3 applications on a single CD (no copies are needed). For NOIs, hard copies of UA1, Tables 2A, 2D & 2F, Section 3 and the signed Certification Page are required.

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. ***A pre-application meeting was held on April 30, 2018 at 10:00AM at NMED in Santa Fe, NM.***
☒ $500 NSR application Filing Fee enclosed OR ☐ The full permit fee associated with 10 fee points (required w/ streamline applications).
☒ Check No.: ______ in the amount of ______
☒ I acknowledge the required submittal format for the hard copy application is printed double sided 'head-to-toe', 2-hole punched (except the Sect. 2 landscape tables is printed 'head-to-head'), numbered tab separators. Incl. a copy of the check on a separate page.
☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance program (SBEAP) and qualifies for 50% of the normal application and permit fees. Enclosed is a check for 50% of the normal application fee which will be verified with the Small Business Certification Form for your company.
☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance Program (SBEAP) but does not qualify for 50% of the normal application and permit fees. To see if you qualify for SBEAP assistance and for the small business certification form go to https://www.env.nm.gov/aqb/sbap/small_business_criteria.html).

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.72.200.A.(2) and 20.2.74.200.A 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.): **25726**	Updating Permit/NOI #: **PSD 3449-M4**
1	Facility Name: **Hobbs Generating Station**	Plant primary SIC Code (4 digits): **4911**	
		Plant NAIC code (6 digits): **221112**	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): **98 N. Twombly Lane, Hobbs, NM 88240**		
2	Plant Operator Company Name: **CAMS (New Mexico), LLC**	Phone/Fax: **(575) 397-6706 / (575) 993-5301**	

a	Plant Operator Address: **98 N. Twombly Lane, Hobbs, NM 88240**	
b	Plant Operator's New Mexico Corporate ID or Tax ID: **260471741**	
3	Plant Owner(s) name(s): **Lea Power Partners, LLC, c/o Mr. David Baugh**	Phone/Fax: **(713) 358-9733 / (713) 358-9730**
a	Plant Owner(s) Mailing Address(s): **98 N. Twombly Lane, Hobbs, NM 88240**	
4	Bill To (Company): **Mr. Roger Schnabel**	Phone/Fax: **(575) 397-6706 / (575) 993-5301**
a	Mailing Address: **98 N. Twombly Lane, Hobbs, NM 88240**	E-mail: **rschnabel@camstex.com**
5	☐ Preparer: ☒ Consultant: **Alliant Environmental, LLC**	Phone/Fax: **(505) 205-4819**
a	Mailing Address: **7804 Pan American Fwy. NE, Ste 5, Albuquerque, NM 87109**	E-mail: **mschluep@alliantenv.com**
6	Plant Operator Contact: **Mr. Roger Schnabel**	Phone/Fax: **(575) 397-6706 / (575) 993-5301**
a	Address: **98 N. Twombly Lane, Hobbs, NM 88240**	E-mail: **rschnabel@camstex.com**
7	Air Permit Contact: **Mr. Roger Schnabel**	Title: **Plant Manager**
a	E-mail: **rschnabel@camstex.com**	Phone/Fax: **(575) 397-6706 / (575) 993-5301**
b	Mailing Address: **98 N. Twombly Lane, Hobbs, NM 88240**	

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-244-R1**
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: **PSD-3449-M4**
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: **4,054 MMBtu/hr (LHV)**	Daily: **97,296 MMBtu/Day (LHV)**	Annually: **29,707,364 MMBtu/yr (LHV)**
b	Proposed	Hourly: **4,190 MMBtu/hr (LHV)**	Daily: **100,560 MMBtu/Day (LHV)**	Annually: **36,704,400 MMBty/yr (LHV)**
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: **604 MW nominal**	Daily: **14,496 MW nominal (Hourly * 24)**	Annually: 5**,291,040 MW nominal (Daily * 365)**
b	Proposed	Hourly: **634 MW nominal**	Daily: **15,216 MW nominal (Hourly * 24)**	Annually: **5,553,840 MW nominal (Daily * 365)**

Section 1-D: Facility Location Information

1	Section: **24**	Range: **36E**	Township: **18S**	County: **Lea**	Elevation (ft): **3,716**
2	UTM Zone: ☐ 12 or ☒ 13			Datum: ☐ NAD 27 ☐ NAD 83 ☒ WGS 84	
a	UTM E (in meters, to nearest 10 meters): **658,413 mE**			UTM N (in meters, to nearest 10 meters): **3,622,425 mE**	
b	**AND** Latitude (deg., min., sec.): **32º 43' 47.07" N**			Longitude (deg., min., sec.): **103º 18' 34.6" W**	
3	Name and zip code of nearest New Mexico town: **Hobbs, NM 88240**				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): **From Hobbs, drive approximately 8 miles west on the Carlsbad Highway, and turn north just before mile marker 95. Drive north for approximately 1.7 miles passing the Maddox Station on the left, and turn west for 0.3 miles. After passing through an access gate, drive north approximately 0.5 miles to the LPP site location.**				
5	The facility is **8** miles **West** of **Hobbs, NM**.				
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: **Hobbs, Lea County, NM and Gaines County, TX**				
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 (23 km)**				
9	Name nearest Class I area: **Carlsbad Caverns National Park**				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): **116.2 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: **1,680 m from Maddox Station**				
12	Method(s) used to delineate the Restricted Area: **Continuous Fencing.** "**Restricted Area**" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area.				
13	Does the owner/operator intend to operate this source as a portable stationary source as defined in 20.2.72.7.X NMAC? ☐ Yes ☒ No A portable stationary source is not a mobile source, such as an automobile, but a source that can be installed permanently at one location or that can be re-installed at various locations, such as a hot mix asphalt plant that is moved to different job sites.				
14	Will this facility operate in conjunction with other air regulated parties on the same property? ☒ No ☐ Yes If yes, what is the name and permit number (if known) of the other facility?				

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

1	Facility **maximum** operating ($\frac{hours}{day}$): **24**	($\frac{days}{week}$): **7**		($\frac{weeks}{year}$): **52**	($\frac{hours}{year}$): **8,760**	
2	Facility's maximum daily operating schedule (if less than 24 $\frac{hours}{day}$)?	Start: **N/A**	☐AM ☐PM	End: **N/A**		☐AM ☐PM
3	Month and year of anticipated start of construction: **Start of turbine upgrade project: March 15, 2019**					
4	Month and year of anticipated construction completion: **May 2019**					
5	Month and year of anticipated startup of new or modified facility: **May 2019**					
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 does not need to be 2-hole punched, but **must be double sided**. 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 on compact disk(s) (CD). For permit application submittals, **two** CD copies are required (in sleeves, not crystal cases, please), with additional CD copies as specified below. NOI applications require only a single CD submittal.

4) If **air dispersion modeling** is required by the application type, include the **NMED Modeling Waiver OR** one additional electronic copy of the air dispersion modeling including the input and output files. The dispersion modeling ***summary report only*** should be submitted as hard copy(ies) unless otherwise indicated by the Bureau. The complete dispersion modeling study, including all input/output files, should be submitted electronically as part of the electronic submittal.

5) If 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.

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

1) All required electronic documents shall be submitted in duplicate (2 separate CDs). 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 with the number of additional hard copies corresponding to the number of CD copies required. 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 3 electronic files (2 MSWord docs: Universal Application section 1 and Universal Application section 3-19) and 1 Excel file of the tables (Universal Application section 2) on the CD(s). 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	Manufacturer	Model #	Serial #	Maximum or Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture or Reconstruction[2] Date of Installation /Construction[2]	Controlled by Unit # Emissions vented to Stack #	Source Classi-fication Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
HOBB-1	Combustion Turbine	Mitsubishi Heavy Industries	M501F-F4	T-487	189 MW nominal	189 MW nominal	2001 September 2008	SCR-1 CAT-1 1	20200201	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☒ To Be Modified ☐ To be Replaced		N/A
HOBB-2	Combustion Turbine	Mitsubishi Heavy Industries	M501F-F4	T-488	189 MW nominal	189 MW nominal	2001 September 2008	SCR-2 CAT-2 2	20200201	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☒ To Be Modified ☐ To be Replaced		N/A
DB-1	Duct Burner	Forney	Standard	913864	330 MMBtu/hr	330 MMBtu/hr	2007 August 2008	SCR-1 CAT-1 1	10200601	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
DB-2	Duct Burner	Forney	Standard	913865	330 MMBtu/hr	330 MMBtu/hr	2007 August 2008	SCR-2 CAT-2 2	10200601	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
AC-1	Auxiliary Cooling Tower	Baltimore Air Cooler	FXV3-364-100	U014653101	1,780 gpm	1,780 gpm	2002 August 2008	N/A AC-1	38500101	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
AC-2	Auxiliary Cooling Tower	Baltimore Air Cooler	FXV3-364-100	U014653102	1,780 gpm	1,780 gpm	2002 August 2008	N/A AC-2	38500101	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
AC-3	Auxiliary Cooling Tower	Baltimore Air Cooler	FXV3-364-100	U014653103	1,780 gpm	1,780 gpm	2002 August 2008	N/A AC-3	38500101	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
IC-1	Inlet Chiller	Baltimore Aircoil	331132A	U014283404	15,448 gpm	15,448 gpm	2002 August 2008	N/A IC-1	38500101	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
IC-2	Inlet Chiller	Baltimore Aircoil	331132A	U014283405	15,448 gpm	15,448 gpm	2002 August 2008	N/A IC-2	38500101	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
IC-3	Inlet Chiller	Baltimore Aircoil	331132A	U014283406	15,448 gpm	15,448 gpm	2002 August 2008	N/A IC-3	38500101	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
FH-1	Fuel Gas Heater	Rheos	2400	A07193433	2.4 MMBtu/hr	2.4 MMBtu/hr	2008 August 2008	N/A FH-1	39990003	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
FH-2	Fuel Gas Heater	Rheos	2400	A07193435	2.4 MMBtu/hr	2.4 MMBtu/hr	2008 August 2008	N/A FH-2	39990003	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
FH-3	Fuel Gas Heater	Rheos	2400	A07193434	2.4 MMBtu/hr	2.4 MMBtu/hr	2008 August 2008	N/A FH-3	39990003	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
G-1	Standby Generator	Volvo Penta	D1641GEP	D16*021102* C3*A	565 kW (758 hp)	565 kW (758 hp)	2008 August 2008	N/A G-1	20100102	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A
FP-1	Diesel Fire Pump	Detroit Diesel	DDFP06FA-11V	6VF-300006	443 hp	443 hp	2001 September 2008	N/A FP-1	20100102	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		N/A

[1] Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provide

[2] Specify dates required to determine regulatory applicability

[3] To properly account for power conversion efficiencies, generator set rated capacity shall be reported as the rated capacity of the engine in horsepower, not the kilowatt capacity of the generator se

[4] "4SLB" means four stroke lean burn engine, "4SRB" means four stroke rich burn engine, "2SLB" means two stroke lean burn engine, "CI" means compression ignition, and "SI" means spark ignition

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

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

Unit Number	Source Description	Manufacturer	Model No.	Max Capacity	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5)	Date of Manufacture /Reconstruction[2]	For Each Piece of Equipment, Check Onc
			Serial No.	Capacity Units	Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Installation /Construction[2]	
T-1	Diesel Day Tank - Firewater Pump	unknown	unknown	300 gal	20.2.72.202.B(2)	unknown	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			unknown	300 gal	List Item #1.b.	unknown	
T-2	Diesel Day Tank - Standby Generator	unknown	unknown	1,250 gal	20.2.72.202.B(2)(a)	unknown	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			unknown	1,250 gal	List Item #1.b.	unknown	
T-3	Ammonia Tank	unknown	unknown	9,000 gal	20.2.72.402.C.9	unknown	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			unknown	9,000 gal	List Item #1.b.	unknown	
T-4	Caustic Bulk Storage Tank	unknown	unknown	7,000 gal	20.2.72.402.C.9	unknown	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			unknown	7,000 gal	List Item #1.b.	unknown	
T-5	Acid Bulk Storage Tank	unknown	unknown	7,000 gal	20.2.72.402.C.9	unknown	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			unknown	7,000 gal	List Item #1.b.	unknown	
T-6	Neutralization Tank	unknown	unknown	50,000 gal	20.2.72.402.C.9	unknown	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			unknown	50,000 gal	List Item #1.b.	unknown	
AE-1	Apex evaporation devices	unknown	unknown	unknown	20.2.72.402.C.9	unknown	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			unknown	unknown	List Item #1.a.	unknown	
T-7	Diesel Tank	unknown	unknown	500 gal	20.2.72.202.B(2)	unknown	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			unknown	500 gal	List Item #1.b.	unknown	
T-8	Diesel Tank	unknown	unknown	100 gal	20.2.72.202.B(2)	unknown	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			unknown	100 gal	List Item #1.b.	unknown	
T-9	Gasoline Tank	Patterson Welding Works	unknown	500 gal	20.2.72.202.B(5)	unknown	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			1096	500 gal	List Item #8	8/29/2016	
							☐ 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
SCR-1	Selective Catalytic Reduction	2008	NOx	HOBB-1, DB-1	Variable, max 91.9%	Manufacturer Data
SCR-2	Selective Catalytic Reduction	2008	NOx	HOBB-2, DB-2	Variable, max 91.9%	Manufacturer Data
CAT-1	Catalytic Oxidation	2008	CO, VOC, HAP	HOBB-1, DB-1	Variable; max CO 85%, max VOC 80%, max HAP 80%	Manufacturer Data
CAT-2	Catalytic Oxidation	2008	CO, VOC, HAP	HOBB-2, DB-2	Variable; max CO 85%, max VOC 80%, max HAP 80%	Manufacturer Data
N/A	High Efficiency Drift Eliminator	2008	PM_{10}	IC-1	N/A	N/A
N/A	High Efficiency Drift Eliminator	2008	PM_{10}	IC-2	N/A	N/A
N/A	High Efficiency Drift Eliminator	2008	PM_{10}	IC-3	N/A	N/A
N/A	Dry Low Burner	2008	NOx	FH-1	0.054 lb/MMbtu	Manufacturer Data
N/A	Dry Low Burner	2008	NOx	FH-2	0.054 lb/MMbtu	Manufacturer Data
N/A	Dry Low Burner	2008	NOx	FH-3	0.054 lb/MMbtu	Manufacturer Data
N/A	Dry Low Burner	2008	NOx	HOBB-1, DB-1	BACT	Manufacturer Data
N/A	Dry Low Burner	2008	NOx	HOBB-2, DB-2	BACT	Manufacturer Data

[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		TSP[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
HOBB-1 + DB-1	178.6	782.3	66.8	292.8	5.2	22.9	10.4	45.5	17.8	77.8	17.8	77.8	17.8	77.8				
HOBB-2 + DB-2	178.6	782.3	66.8	292.8	5.2	22.9	10.4	45.5	17.8	77.8	17.8	77.8	17.8	77.8				
IC-1, IC-2, IC-3	-	-	-	-	-	-	-	-	0.70	3.0	0.35	1.5	0.001	0.01				
FH-1, FH-2, FH-3	0.39	1.7	0.24	1.0	0.04	0.16	0.04	0.18	0.05	0.22	0.05	0.22	0.05	0.22				
FP-1	7.4	32.5	1.4	6.3	0.25	1.1	0.01	0.0	0.18	0.77	0.18	0.77	0.18	0.77				
G-1	6.5	28.3	0.86	3.8	0.20	0.87	0.01	0.0	0.12	0.52	0.12	0.52	0.12	0.52				
AC-1, AC-2, AC-3	-	-	-	-	-	-	-	-	0.08	0.35	0.04	0.18	0.0002	0.001				
Totals	371.5	1,627.1	136.2	596.6	10.9	47.9	20.8	91.2	36.6	160.5	36.3	158.8	35.9	157.1				

[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 TSP unless TSP is set equal to PM10 and PM2.5.

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		TSP[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
HOBB-1*	14.5	190.1	8.8	285.0	2.5	97.7	8.7	53.3	12.0	95.2	12.0	95.2	12.0	95.2				
HOBB-2*	14.5		8.8		2.5		8.7		12.0		12.0		12.0					
HOBB-1* + DB-1	18.1		11.0		2.9		10.7		17.8		17.8		17.8					
HOBB-2* + DB-2	18.1		11.0		2.9		10.7		17.8		17.8		17.8					
IC-1, IC-2, IC-3									0.70	2.1	0.35	1.1	0.001	0.004				
FH-1, FH-2, FH-3	0.39	1.7	0.24	1.0	0.04	0.16	0.04	0.18	0.05	0.22	0.05	0.22	0.05	0.22				
FP-1	7.4	0.37	1.4	0.1	0.25	0.01	0.01	0.0003	0.18	0.01	0.18	0.01	0.18	0.01				
G-1	6.5	1.6	0.86	0.21	0.20	0.05	0.01	0.002	0.12	0.03	0.12	0.03	0.12	0.03				
AC-1, AC-2, AC-3									0.08	0.35	0.04	0.18	0.0002	0.001				
Totals	50.5	193.8	24.5	286.4	6.3	97.9	21.5	53.4	36.6	97.9	36.3	96.6	35.9	95.4				

[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 TSP unless TSP is set equal to PM10 and PM2.5.

* HOBB-1 and HOBB-2 will either run with the DB or without DB.

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

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		TSP[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
HOBB-1	175.1	-	2,049.0	-	588.1	-	-	-	-	-	-	-	-	-				
HOBB-2	175.1		2,049.0		588.1		-		-		-		-					
Totals	350.1	-	4,098.0	-	1,176.1	-	-	-	-	-	-	-	-	-				

[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 TSP unless TSP is set equal to PM10 and PM2.5.

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		TSP		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
See emissions provided in Table 2-E																	
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 or L x W (ft)
						(acfs)	(dscfs)			
1	HOBB-1	V	No	165	179	20,299	12,533	8.1	79.8	18
1	HOBB-1+DB-1	V	No	165	179	20,446	12,435	9.5	80.3	18
2	HOBB-2	V	No	165	179	20,299	12,533	8.1	79.8	18
2	HOBB-2+DB-2	V	No	165	179	20,446	12,435	9.5	80.3	18
3	G-1	V	Yes	10.4	893	65.0	-	-	186.2	0.67
4	FP-1	H	No	11	820	54.6	-	-	123.6	0.75
5-6-7	FH-1, FH-2, FH-3	V	No	15	600	3,029	1,192	8.2		

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		Ammonia ☐ HAP or ☒ TAP		Formaldehyde ☒ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1	HOBB-1 + DB-1	0.54	3.4	32.1	281.3	0.14	1.1												
2	HOBB-2 + DB-2	0.54		32.1		0.14													
3	FP-1	0.02	0.001			0.004	0.0002												
4	G-1	0.02	0.006			0.0004	0.0001												
5	FH-1 + FH-2 + FH-3	0.01	0.06			0.001	0.002												
6	T-7	0.10	0.002			-	-												
7	T-8	0.1	0.002																
8	T-9	3.4	0.1																
Totals:		4.7	3.5	64.2	281.3	0.3	1.1												

Table 2-J: Fuel

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

Unit No.	Fuel Type (No. 2 Diesel, Natural Gas, Coal, …)	Specify Units				
		Lower Heating Value	Hourly Usage	Annual Usage	% Sulfur	% Ash
HOBB-1	Natural Gas	932 Btu/scf	1,765 MMBtu/hr (LHV)	14,403,425 MMBtu/yr (LHV)	1.7 gr-S/100scf	0
HOBB-2	Natural Gas	932 Btu/scf	1,765 MMBtu/hr (LHV)	14,403,425 MMBtu/yr (LHV)	1.7 gr-S/100scf	0
DB-1	Natural Gas	932 Btu/scf	330 MMBtu/hr (LHV)	1,188,096 MMBtu/yr (LHV)	1.7 gr-S/100scf	0
DB-2	Natural Gas	932 Btu/scf	330 MMBtu/hr (LHV)	1,188,096 MMBtu/yr (LHV)	1.7 gr-S/100scf	0
FH-1, FH-2, FH-3	Natural Gas	932 Btu/scf	2.4 MMBtu/hr	21,024 MMBtu/yr	1.7 gr-S/100scf	0
FP-1	Diesel	19,300 Btu/lb	24.9 gph	2,490 gpy	0.0015%	0
G-1	Diesel	19,300 Btu/lb	37.2 gph	18,600 gpy	0.0015%	0

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)
All tanks at the facility are exempt from permitting; See Table 2-B.									

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			
All tanks at the facility are exempt from permitting; See Table 2-B.													

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

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

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

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

Material Processed				Material Produced			
Description	**Chemical Composition**	**Phase (Gas, Liquid, or Solid)**	**Quantity (specify units)**	**Description**	**Chemical Composition**	**Phase**	**Quantity (specify units)**
Natural Gas	Mixed Hydrocarbons	Gas	100,618 MMBtu/day	Electricity (Power Generation)	Megawatts	N/A	15,422 MW daily
Diesel	Mixed Hydrocarbons	Liquid	62.1 gph				

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
HOBB-1 and HOBB-1 + DB1	NOx/O_2	Teledyne Monitor Labs	TML41-O2	NO169	15 min	1 hour	NOx: min 0 - 10ppm max 0 - 100ppm CO: 0 - 25%	0 @ < 20ppb < 0.2% @ > 20ppm	0.5% of reading
HOBB-1 and HOBB-1 + DB1	CO - high	Thermo	48iQ	1180930111	15 min	1 hour	0 - 3,200ppm	0 @ < 20ppb < 0.5% @ > 20ppm	0.5% of reading
HOBB-1 and HOBB-1 + DB1	CO - low	Thermo	48iQ	1180930111	15 min	1 hour	0 - 10 ppm	0 @ < 20ppb < 0.5% @ > 20ppm	0.5% of reading
HOBB-2 and HOBB-2 + DB2	NOx/O2	Teledyne Monitor Labs	TML41-O2	NO268	15 min	1 hour	NOx: min 0 - 10ppm max 0 - 100ppm CO: 0 - 25%	0 @ < 20ppb < 0.2% @ > 20ppm	0.5% of reading
HOBB-2 and HOBB-2 + DB2	CO - high	Thermo	48iQ	1180930111	15 min	1 hour	0 - 3,200ppm	0 @ < 20ppb < 0.5% @ > 20ppm	0.5% of reading
HOBB-2 and HOBB-2 + DB2	CO - low	Thermo	48iQ	1180930111	15 min	1 hour	0 - 10ppm	0 @ < 20ppb < 0.5% @ > 20ppm	0.5% of reading

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
HOBB-1	Fuel Flowrate	Feed to Combustor	Hundred SCF/hr	0 - 18,000.0	Annual	Calibration	Plant DCS	6 sec to record to 1 min avg.
HOBB-2	Fuel Flowrate	Feed to Combustor	Hundred SCF/hr	0 - 18,000.0				
HOBB-1 +DB-1	Fuel Flowrate	Feed to Combustor	Hundred SCF/hr	0 - 4,850.0				
HOBB-2 +DB-2	Fuel Flowrate	Feed to Combustor	Hundred SCF/hr	0 - 4,850.0				

Table 2-P: Green House 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**	**23,900**	**footnote 3**										
HOBB-1 + DB-1	mass GHG	991,991	1.84	18.4											992,011	
	CO_2e	991,991	548	460												992,999
HOBB-2 + DB-2	mass GHG	991,991	1.84	18.4											992,011	
	CO_2e	991,991	548	460												992,999
FP-1	mass GHG	25.3	2.05E-04	0.001											25.3	
	CO_2e	25.3	0.06	0.03												25.4
G-1	mass GHG	216.2	0.002	0.009											216.2	
	CO_2e	216.2	0.52	0.22												216.9
FH-1, FH-2, FH-3	mass GHG	3,686	0.01	0.07											3,686	
	CO_2e	3,686	2.07	1.74												3,690
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO2e															
	mass GHG															
	CO_2e															
Totals	mass GHG														1,987,950	
	CO_2e															1,989,930

[1] **GWP** means Global Warming Potential. Applicant's 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] You must enter the appropriate GWP for each HFC or PFC compound from Table A-1 in 40 CFR 98.

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

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

Section 3

Application Summary

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

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

INTRODUCTION

This application proposes a major modification to NSR Permit PSD 3449-M4 for Lea Power Partners, LLC (LPP) Hobbs Generating Station (HGS).

HGS is a natural gas fueled, nominal 604 MW net output power plant with two advanced firing temperature, Mitsubishi 501F combustion turbine generators (CTGs), each provided with its own heat recovery steam generator (HRSG) including duct burners, a single condensing, reheat steam turbine generator (STG), and an air cooled condenser serving the STG. The plant generates electricity for sale to Southwestern Public Service Company, its successors or assigns. The facility is located approximately 8 miles West of Hobbs, New Mexico in Lea County.

The site holds both a New Source Review (NSR)/Prevention of Significant Deterioration (PSD) and a Federal Title V Operating permit in the State of New Mexico: PSD3449-M4 and P244-R1/P244-AR2. Emissions for each unit are controlled using carbon monoxide (CO) catalyst and Selective Catalytic Reduction (SCR) with injection of 28% aqueous ammonia.

Mitsubishi Hitachi Power System Americas (MHPSA) proposes to upgrade the two combustion turbines to the F4+ compressor upgrade. The upgrade consists of replacing the Inlet Guide Vanes (IGVs) and first six stages of the compressor, resulting in increased air flow. The expected impact of the upgrade on performance is an increase of 5% in output, no change in heat rate, and a 6.7% increase in turbine exhaust flow.

BACKGROUND

The subject units are three-pressure level reheat HRSG's originally designed for NEPCO in 2000 and then moved to the Hobbs site in 2007. The site consists of two triangular pitch, dual train, outdoor HRSGs. Combustion turbines are Mitsubishi 501F machines fueled by natural gas. The HRSG's supply steam to a single steam turbine and operate in floating pressure mode based on steam turbine conditions.

Each HRSG is triple pressure level with reheat, natural circulation, and equipped with auxiliary heat input via a Forney Corporation duct burner. The duct burner system is located between the secondary and primary stages of superheater and reheater heat transfer sections. The HRSG has been designed for duct firing with gas turbine near full load operation. The heat transfer sections are composed of extended surface, triangular pitched, finned tubes.

PROPOSED PROJECT REVIEW

The proposed project at LPP allows for an upgrade to both combustion turbine generators (CTGs), which is expected to increase power output by approximately 5% and increase the turbine flow rate by 6.7%. This change is expected to result in an increase in fuel consumption, exhaust flow rate, and temperature. The F4+ upgrade project is a completely stand-alone project, not tied in any way to previous projects that required a permit modification, including the permit modifications dated 9-23-2011 and 9-5-2014. It is our understanding that this compressor upgrade package has only been made available for commercial use by MHPSA since 2017.

Due to the increased exhaust flow rate, short term (lb/hr) and/or long term (tpy) emission rates for oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), volatile organic compounds (VOC), particulate matter (PM_{10} and $PM_{2.5}$), sulfuric acid mist (H_2SO_4 mist), and carbon dioxide equivalent (CO_2e) will increase. However, a review of anticipated emission rate changes shows that the currently permitted short term emission rates for NO_2 and CO will not have to be changed or increased. Stack exhaust NO_x emissions will continue to be controlled to 2 parts per million volume dry basis corrected to 15 percent oxygen (ppmvdc) on a 24-hour average basis, using selective catalytic reduction (SCR) with aqueous ammonia (NH_3). Stack exhaust CO and VOC emissions will continue to be controlled to 2 ppmvdc on a 1-hour average basis and to 1 ppmvdc on a 24-hour average basis, respectively, by means of oxidation catalyst. SO_2 emissions will continue to be controlled using pipeline quality natural gas.

Hobbs, NM is located in Lea County, an area that is classified by the US EPA as in attainment with the National Ambient Air Quality Standards (NAAQS) for all regulated pollutants. The facility is included as one of the 28-named sources under PSD rules and is a major source as defined by the PSD rules under 40 CFR §52.21. The estimated annual emission rate increases and PSD applicability analysis for the proposed compressor upgrade project are summarized in Table 1 below:

Table 1: PSD Applicability Analysis Both Units Combined

Pollutant	Past Actuals (tpy)	Proposed Project Annual w/o SSM (tpy)	Proposed Project Increase (tpy)	PSD SER (tpy)	PSD Review Required?
NO_x	89.9	124.9	35.0	40	No
CO	9.5	76.0	66.5	100	No
VOC	3.9	13.1	9.2	40	No
SO_2	17.2	50.7	33.5	40	No
H_2SO_4 (mist)	2.6	7.77	5.1	7	No
TSP/PM_{10}	48.6	90.5	41.9	15	Yes
$PM_{2.5}$	48.6	90.5	41.9	10	Yes
CO_2e	1,604,421	1,985,998	381,577	75,000	Yes

Since no emission rate decreases occurred during the contemporaneous period, the net emission rate increases are based on the proposed project emission rate increases. The PSD Significant Emission Rate (SER) is exceeded for TSP/PM_{10}/$PM_{2.5}$ and CO_2e. Therefore, this modification constitutes a major modification of the existing major source and a PSD review is required for the pollutants with significant emissions per 40 CFR §52.21(b)(23)(i) and New Mexico Administrative Code (NMAC) 20.2.74.302. The main reason why a PSD review for TSP/PM_{10}/$PM_{2.5}$ and CO_2e is being triggered, is because the actual emissions from the past five (5) years are much lower than the permitted emission rates, thus the delta between the post-project allowable and the pre-project actual emission rates are greater than the SER.

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.

A process flow diagram is attached.

RESPONSIBLE ENGINEER

PE#

NO.	DATE	REVISION	BY	CHK
P1	09/07/06	ISSUED FOR PRELIMINARY DESIGN	EFC	BR
A	09/21/06	ISSUED FOR REVIEW	EFC	BR

REVISION APPROVAL — REV A — DATE 09/21/06

DISCIPLINE	REVIEWED	DISCIPLINE	REVIEWED
CIVIL		ELECTRICAL	
STRUCTURAL		INST & CONTROL	
MECHANICAL		ARCHITECTURAL	
PROCESS		ENVIRONMENTAL	
PIPING		GEN. ARRANG.	

STATUS

ISSUED	REV	DATE	DM	SDE	PEM
PRELIMINARY	P1	09/07/06	RP	BR	AW
FOR REVIEW AND APPROVAL	A				
APPROVED FOR CONSTRUCTION					
REVISED & APPROVED FOR CONSTRUCTION					

SCALE NONE

SPS-EXCEL
Colorado Energy Management
HOBBS POWER STATION
Hobbs, NM

PROJECT NO. 349552

LG Constructors

PROCESS FLOW DIAGRAM

HEAT BALANCE SHEET 1
2 x 1 MHI 501 F

DWG. NO. HB-PR-10-10-01

REV. A

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

FILENAME: hbpr101001.dlv

PLOT DATE: 21-SEP-2006

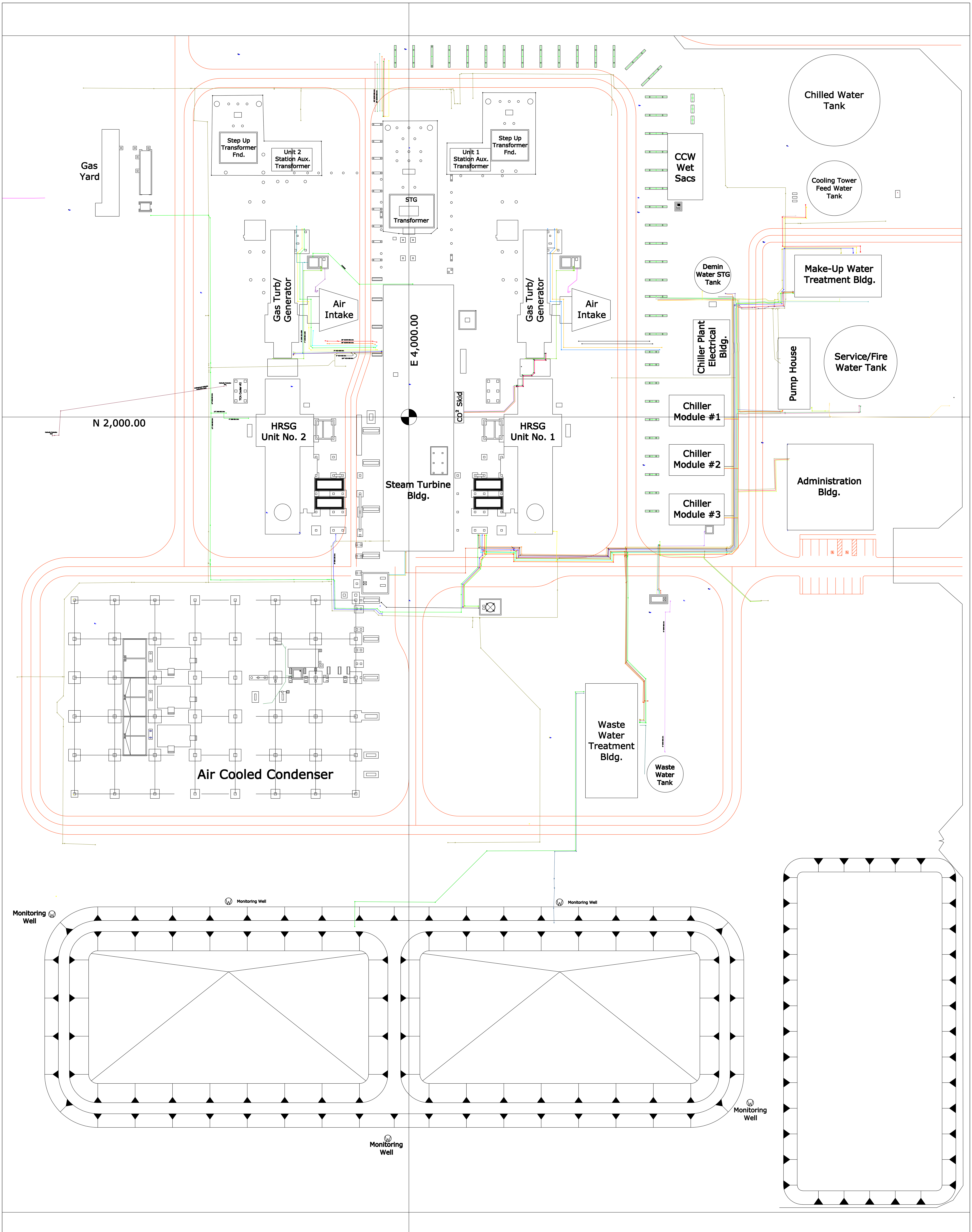
PLOT TIME:

Section 5

Plot Plan Drawn To Scale

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

A Plot Plan drawn to scale is attached.



Hobbs Generating Station
Underground Pipe Asbuilt
Field: LPR Survey Group
Drawing: Josh Truxall / Date:6-16-08

Section 6

All Calculations

<u>Show all calculations</u> 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.

As required by NMED, emission rate calculations are provided in the UA2 spreadsheet workbook. The only changes proposed relate to the emissions of the combustion turbine generators (CTGs) and duct burners (Unit Nos. HOBB-1, HOBB-2, DB-1 and DB-2). All other permitted emission sources remain unchanged.

Combustion emissions associated with the combustion turbines and duct burners include NO_x, CO, VOC, SO_2, $PM_{10}/PM_{2.5}$, Greenhouse Gas (GHG) emissions, and hazardous air pollutants (HAPs). There may also be ammonia slip from the SCR systems. Emission rate estimates for the CTG/HRSG train stacks are based on vendor estimated data, fuel analysis data, and regulatory requirements.

Detailed emission rate calculations are provided on the following pages. For each pollutant, the total emission rate out of the stack considers the combined flow from the CTG exhaust and the duct burner exhaust, controlled by the SCR and the oxidation catalyst. The proposed hourly emission rate limit for each pollutant is based on the ambient conditions which result in the maximum hourly emission rates.

Annual emission rates are estimated assuming continuous annual operation (8,760 hour per year per unit) as well as cases with maximum annual startups and shutdowns. The UA2 workbook includes all permitted sources and associated emissions.

HOBBS PSD APPLICABILITY ANALYSIS

PSD Summary Table

Air Pollutant	Past Actuals Both Units Combined w/o SSM (tpy)	Past Actuals Both Units Combined w/ SSM (tpy)	Proposed Project Annual Both Units Combined w/o SSM (tpy)	Proposed Project Annual Both Units Combined w/SSM (tpy)	PSD Analysis Both Units Combined w/o SSM		
					Project Increase (tpy)	PSD Significance Level (tpy)	Is PSD Significance Level Exceeded?
NOx	89.9	90.8	124.9	190.1	35.0	40	No
CO	9.5	11.3	76.0	285.0	66.5	100	No
VOC	3.9	5.4	13.1	97.7	9.2	40	No
SO_2	17.2	17.3	50.7	53.3	33.5	40	No
H_2SO_4 (mist)(1)	2.6	2.64	7.77	8.15	5.1	7	No
TSP/PM_{10}	48.6	48.7	90.5	95.2	46.5	15	**Yes**
$PM_{2.5}$	48.6	48.7	90.5	95.2	46.5	10	**Yes**
CO_2e	1,604,421	1,604,421	1,985,998	1,923,330	381,577	75,000	**Yes**

Notes:

(1) Sulfuric acid mist is calculated assuming a 10% oxidation from SO_2 to SO_3 and 100% oxidation from SO_3 to H_2SO_4

SO_3 Oxidation = 10%
SO_2 MW = 64 lb/lbmole
SO_3 MW = 80 lb/lbmole
SO_3 to H2SO4 = 100%
H_2SO_4 MW = 98 lb/lbmole

Hobbs Past Actuals both Units Combined w/SSM (tpy)

Air Pollutant	2013-2014	2014-2015	2015-2016	2016-2017	Max. Baseline Actuals	Baseline Year
NOx	73.6	79.6	90.8	84.1	90.8	2015-2016
CO	7.6	11.3	10.9	6.8	11.3	2014-2015
VOC	1.9	2.1	2.4	5.4	5.4	2016-2017
SO_2	6.6	11.5	17.3	10.4	17.3	2015-2016
TSP/PM_{10}	37.7	42.0	48.7	46.3	48.7	2015-2016
CO_2e	1,308,640	1,445,310	1,604,421	1,509,882	1,604,421	2015-2016

Hobbs Past Actuals both Units Combined w/o SSM (tpy)

Air Pollutant	2013-2014	2014-2015	2015-2016	2016-2017	Max. Baseline Actuals	Baseline Year
NOx	72.4	78.3	89.9	81.4	89.9	2015-2016
CO	4.8	8.8	9.5	2.7	9.5	2015-2016
VOC	1.8	2.0	2.4	3.9	3.9	2016-2017
SO_2	6.5	11.3	17.2	10.2	17.2	2015-2016
TSP/PM_{10}	37.7	41.9	48.6	46.3	48.6	2015-2016
CO_2e	1,308,640	1,445,310	1,604,421	1,509,882	1,604,421	2015-2016

Hobbs Past Actuals per Unit

Air Pollutant	Both Units Combined w/SSM (tpy)								
	2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017
NOx	79.6	67.6	91.6	90.0	78.2	73.6	79.6	90.8	84.1
CO	8.8	6.4	16.1	5.7	7.9	7.6	11.3	10.9	6.8
VOC	2.1	1.7	2.5	2.3	8.5	1.9	2.1	2.4	5.4
SO_2	6.9	6.3	16.6	17.9	2.8	6.6	11.5	17.3	10.4
TSP/PM_{10}	39.5	35.9	48.0	49.3	43.3	37.7	42.0	48.7	46.3
CO_2e	1,369,681	1,247,598	1,643,022	1,565,821	1,453,943	1,308,640	1,445,310	1,604,421	1,509,882

Air Pollutant	Both units Combined w/o SSM (tpy)								
	2013	2014	2015	2016	2017	2013-2014	2014-2015	2015-2016	2016-2017
NOx	78.6	66.1	90.6	89.2	73.6	72.4	78.3	89.9	81.4
CO	6.1	3.5	14.0	5.0	0.3	4.8	8.8	9.5	2.7
VOC	2.1	1.5	2.5	2.3	5.4	1.8	2.0	2.4	3.9
SO_2	6.9	6.1	16.5	17.8	2.5	6.5	11.3	17.2	10.2
TSP/PM_{10}	39.4	35.9	48.0	49.3	43.3	37.7	41.9	48.6	46.3
CO_2e	1,369,681	1,247,598	1,643,022	1,565,821	1,453,943	1,308,640	1,445,310	1,604,421	1,509,882

Hobbs SSM Emissions per Unit

Air Pollutant	HOBB-1 SSM Emissions (tpy)				
	2013	2014	2015	2016	2017
NOx	1.0	1.5	1.0	0.8	4.6
CO	2.7	2.9	2.1	0.7	7.6
VOC	0.00	0.16	0.00	0.004	3.080
SO_2	0.0	0.2	0.1	0.1	0.3
TSP/PM_{10}	0.06	0.03	0.02	0.03	0.02

Air Pollutant	HOBB-2 SSM Emissions (tpy)				
	2013	2014	2015	2016	2017
NOx	0.9	1.8	0.9	1.1	1.8
CO	3.4	2.6	3.7	1.3	3.6
VOC	0.00	0.01	0.00	0.002	2.607
SO_2	0.0	0.1	0.1	0.1	0.16
TSP/PM_{10}	0.04	0.02	0.02	0.02	0.01

HOBBS EMISSION RATE SUMMARY

Summary of Emission Rates

Air Pollutant	Averaging Period	Table 106.A PSD 3449-M3 (July 11, 2016)			Combustion Turbines Emission Rates		
		CT w/o Duct Burner	CT w/ Duct Burner	CTG Startup & Shutdown	CT w/o Duct Burner	CT w/ Duct Burner	CTG Startup & Shutdown
NO_2 (lbs/hr), each [1]	Hourly rolling 24-hour average based on CEMS data (SSM limits are based on a 1-hour block average)	14.5	18.1	193.2	14.5	18.1	193.2
NO_2 (ppmv) dry @ 15% O_2, each [2],[3]	Hourly rolling 24-hour average based on CEMS data	2.0 BACT		96 BACT	2.0		96
NO_2 (lb/MWh), each [4]	Daily rolling 30-day average (NSPS KKKK)	0.43		Per NSPS KKKK	0.43		Per NSPS KKKK
NO_2 (tons/yr), combined	Daily rolling 365-day total (includes SSM emissions)	181.0			190.1		
CO (lbs/hr), each	1-hour block average (Normal operation and SSM)	8.8	11.0	2,060	8.8	11.0	2,060
CO (ppmv) dry @ 15% O_2, each [5],[6]	1-hour block average (Normal operation and SSM)	2.0 BACT		3,000 BACT	2.0		3,000
CO (tons/yr), combined	Daily rolling 365-day total (includes SSM emissions)	279.5			285.0		
VOC (lbs/hr), each	Hourly rolling 24-hour average, calculation based on emission factor determined from compliance test. (compliance with VOC SSM limit will be demonstrated through compliance with CO SSM limits on a 1-hour block average basis).	2.4	2.8	591.0	2.5	2.9	591.0
VOC (ppmv) dry @ 15% O_2, each [7],[8]	Hourly rolling 24-hour average (data (compliance with VOC SSM limit will be demonstrated through compliance with CO SSM limits on a 1-hour block average basis.)	1.0 BACT		900 BACT	1.0		900
VOC (tons/yr), combined	Daily rolling 365-day total (includes SSM emissions)	96.4			97.7		
SO_2 (lbs/hr), each [9]	1-hour block average, calculation based on Sulfur content of fuel	8.4	10.7	N/A	8.7	10.7	N/A
SO_2 (lbs/MMBtu), each [10]	Daily rolling 30-day average (NSPS KKKK)	0.06		Per NSPS KKKK	0.06		Per NSPS KKKK
SO_2 (tons/yr), combined	Daily rolling 365-day total (includes SSM emissions)	48.2			53.3		
TSP/PM_{10}/$PM_{2.5}$ (lbs/hr), each	Hourly rolling 24-hour average, calculation based on emission factor determined from compliance test data	11.3	17.1	N/A	12.0	17.8	N/A
TSP/PM_{10} (lbs/MMBtu), each	Hourly rolling 24-hour average	0.0071	0.0089	N/A	0.0071	0.0089	N/A
TSP/PM_{10}/$PM_{2.5}$ (tons/yr), combined	Daily rolling 365-day total (includes SSM emissions)	85.8			95.2		
NH_3 (lbs/hr), each	Calculation based on compliance test data	32.1		N/A	32.1		N/A
NH_3 (tons/yr), combined	Daily rolling 365-day total	281.3		N/A	281.3		N/A

Notes:

(1) Nitrogen oxide emissions include all oxides of nitrogen expressed as NO_2

(2) The NO_2 limit of 2.0 ppmvd @ 15% O_2 is based on the SCR BACT determination.

(3) The NO_2 limit of 96 ppmvd @ 15% O_2 during Startup & Shutdown is based on CTG performance manufacturer's data plus a 20% safety factor.

(4) NO_2 output base limit in accordance with Table 1 to NSPS Subpart KKKK.

(5) The CO limit of 2.0 ppmvd @ 15% O_2 is based on the oxidation catalyst BACT determination.

(6) The CO limit of 3,000 ppmvd @ 15% O_2 during Startup & Shutdown is based on CTG performance manufacturer's data plus a 20% safety factor.

(7) The VOC limit of 1.0 ppmvd @ 15% O_2 is based on the oxidation catalyst BACT determination.

(8) The VOC limit of 900 ppmvd @ 15% O2 during Startup & Shutdown is based on CTG performance manufacturer's data plus a 20% safety factor.
Compliance with VOC limits is to be demonstrated through compliance with CO limits.

(9) The proposed post-project SO_2 allowable emission rate is based in total sulfur content in the fuel (40 CFR Part 75).

(10) SO_2 input base limit in accordance with NSPS Subpart KKKK, §60.4330.

(11) Cold, warm and hot startup hourly mass emission rates (lb/hr) maximum expected emissions during SSM events.

Rollling average period was used to identify worst case scenario and is not intended to be an operational restriction.

(2) Emission factor (lb/event) represents the total mass emission during the event duration based on vendor performance data. Represented number reflects an average annual value.

Air Pollutant	Status	CT w/o Duct Burner ppmvd @ 15% O_2	CT w/ Duct Burner ppmvd @ 15% O_2	CT w/o Duct Burner per Unit		CT w/Duct Burner per Unit	
				Min. Hourly (lb/hr)	Max. Hourly (lb/hr)	Min. Hourly (lb/hr)	Max. Hourly (lb/hr)
NOx	pre-control	27.9	23.8	141.0	172.0	147.60	178.6
	post-control	2.0	2.0	11.8	14.2	14.4	16.8
CO	pre-control	16.7	14.5	52.0	63.0	55.8	66.8
	post-control	2.0	2.0	7.2	8.6	8.8	10.2
VOC	pre-control	2.2	2.0	3.9	4.8	4.3	5.2
	post-control	1.0	1.0	2.1	2.5	2.5	2.9
SO_2	-	0.9	0.9	7.3	8.7	9.0	10.4
TSP/PM_{10}/$PM_{2.5}$	-	-	-	10.4	12.0	16.2	17.8
NH_3	-	10	10	22	26.2	26.7	31.1

Notes:

(1) Estimated post-project hourly mass emission rates. Refer to "100% Load CTG Hourly" for detailed calculations.

HOBBS EMISSION RATE SUMMARY

Estimated Post-Project Annual Emission Rates Summary

Air Pollutant	Status	Annual Emission Rates Per Unit w/o SSM [(1)]			Annual Emission Rates Per Unit w/SSM [(2)]			Annual Both Units Combined w/o SSM (tpy)[(3)]	Annual Both Units Combined w/SSM (tpy)[(4)]
		CT w/o Duct Burner (tpy)	CT w/Duct Burner (tpy)	Annual per Unit (tpy)	CT w/o Duct Burner (tpy)	CT w/Duct Burner (tpy)	Annual per Unit (tpy)		
NOx	pre-control	392.2	310.4	702.7	355.2	310.4	665.6		
	post-control	32.8	29.7	62.4	29.7	29.7	59.3	124.86	190.1
CO	pre-control	143.7	116.3	259.9	130.1	116.3	246.3		
	post-control	20.0	18.1	38.0	18.1	18.1	36.1	76.0	285.0
VOC	pre-control	10.9	9.1	20.0	9.9	9.1	18.9		
	post-control	3.4	3.1	6.5	3.1	3.1	6.2	13.1	97.7
SO_2		13.3	12.1	25.4	12.0	12.1	24.1	50.7	53.3
$TSP/PM_{10}/PM_{2.5}$		19.8	25.5	45.3	17.9	25.5	43.4	90.5	95.2
NH_3		60.6	54.9	115.5	54.9	54.9	109.8	231.1	219.6
CO_2		518,809	473,182	991,991	469,786	473,182	942,968	1,983,981	1,921,377
N_2O		1.0	0.9	1.8	0.9	0.9	1.7	3.7	3.6
CH_4		9.6	8.8	18.4	8.7	8.8	17.5	36.8	35.6
GHG		518,820	473,191	992,011	469,796	473,191	942,987	1,984,022	1,921,416
CO_2e		519,336	473,663	992,999	470,264	473,663	943,926	1,985,998	1,923,330

Notes:

(1) Estimated post-project annual mass emission rates without SSM events per unit.

CTG w/o DB annual operational hours	4,974 hr/yr	(outage = 0 hr/yr)
CTG w/DB annual operational hours	3,786 hr/yr	(outage = 0 hr/yr)
CTG SSM annual operating hours	0 hr/yr	
CTG Annual Outage days	15 days/yr	
CTG Annual Outage hours	0 hr/yr	(No outage hours accounted for GHG calculations)
Total CTG annual operating hours	8,760 hr/yr	

Annual Total (w/o SSM) = CTG w/o DB (tpy) + CTG w/DB (tpy) - [Hourly (lb/hr) * Outage Hours (hr/yr) * 1 ton/2,000lb]$_{w/o\ DB}$ - [Hourly (lb/hr) * Outage Hours (hr/yr) * 1ton/2,000lb]$_{w/DB}$

NOx Post-Control Annual Total (w/o SSM) = 32.8 tpy + 29.7 tpy - [11.8 lb/hr * 0 hr/yr * 1 ton/2,000 lb] - [14.4 lb/hr * 0 hr/yr * 1 ton/2,000lb] = 62.4 tpy per unit

(2) Estimated post-project annual mass emission rates including SSM events per unit.

CTG w/o DB annual operational hours	4,504 hr/yr	(outage = 0 hr/yr)
CTG w/DB annual operational hours	3,786 hr/yr	(outage = 0 hr/yr)
CTG SSM annual operating hours	470 hr/yr	
CTG Outage days	0 days/yr	
CTG Outage hours	0 hr/yr	(No outage hours accounted for GHG calculations)
Total CTG annual operating hours	7,820 hr/yr	

Annual Total (w/SSM) = CTG w/o DB (tpy) + CTG w/DB (tpy) - [Hourly (lb/hr) * Outage Hours (hr/yr) * 1 ton/2,000lb]$_{w/o\ DB}$ - [Hourly (lb/hr) * Outage Hours (hr/yr) * 1ton/2,000lb]$_{w/DB}$

NOx Post-Control Annual Total (w/SSM) = 29.7 tpy + 29.7 tpy - [11.8 lb/hr * 0 hr/yr * 1 ton/2,000 lb] - [14.4 lb/hr * 0 hr/yr * 1 ton/2,000lb] = 59.3 tpy per unit

(3) Estimated post-project annual mass emission rates without SSM events. Represents an operation at 100% load for 8,760 hr/yr (0 hr of outage per year).
NOx Post-Control Annual Total w/o SSM = 62.4 tpy/unit * 2 units = 124.9 tpy both units combined

(4) Estimated post-project annual mass emission rates with SSM events. Represents an operation at 100% load for 7,820 hr/yr (470 hr/yr SSM and 0 hr of outage per year).
NOx Post-Control Annual Total (w/SSM) = (59.3 tpy/unit + 35.7 tpy/unit SSM) * 2 units = 190.1 tpy both units combined

Estimated Post-Project SSM Emission Rates Summary [(1)]

Air Pollutant	CTG Startup & Shutdown		
	ppmvd @ 15% O_2	lb/hr	tpy
NOx	96	193.2	35.7
CO	3,000	2,060.0	106.4
VOC	900	591.0	42.6
SO_2	-	10.7	2.5
$TSP/PM_{10}/PM_{2.5}$	-	17.8	4.2
CO_2	-	-	17,720.8
N_2O	-	-	0.033
CH_4	-	-	0.33
GHG	-	-	17,721.2
CO_2e	-	-	17,738.8

Notes:

(1) Estimated post-project hourly and annual SSM mass emission rates. Refer to "CTG SSM Events" for detailed calculations.

HOBBS 501F4+ Hourly Emission Rate Calculation (100% Load)

		Case 4 Unfired Winter Chillers Off	Case 4 Fired Winter Chillers Off	Case 5 Unfired Summer Chillers On	Case 5 Fired Summer Chillers On	Case 6 Unfired Summer Chillers Off	Case 6 Fired Summer Chillers Off
SITE CONDITIONS							
Ambient Temperature	ºF	30	30	95	95	95	95
Ambient Relative Humidity	%	60	60	20	20	20	20
Barometric Pressure	psia	12.83	12.83	12.83	12.83	12.83	12.83
Compressor Inlet Temperature	ºF	30	30	95	95	46	46
FACILITY CONDITIONS							
GT Power Output	MW	189.0	189.0	151.1	151.1	180.1	180.1
GT Model		Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+
GT Load		Base	Base	Base	Base	Base	Base
Chillers ON/OFF		Off	Off	**On**	**On**	Off	Off
GT Fuel Flow Rate	lb/hr	86,940	86,940	72,720	72,720	83,592	83,592
GT Heat Input (LHV)	MMBtu/hr	1,765	1,765	1,477	1,477	1,697	1,697
GT Heat Input (HHV)	MMBtu/hr	1,884	1,884	1,576	1,576	1,812	1,812
GT Fuel Flow Rate	MMscf/hr	1.82	1.82	1.53	1.53	1.75	1.75
DB Model		Forney	Forney	Forney	Forney	Forney	Forney
DB Status		Off	On	Off	On	Off	On
DB Heat Input (LHV)	MMBtu/hr	-	330	-	330	-	330
DB Heat Input (HHV)	MMBtu/hr	-	366	-	366	-	366
DB Fuel Flow Rate	MMscf/hr	-	0.35	-	0.35	-	0.35
FUEL ANALYSIS							
Fuel Type		PNG	PNG	PNG	PNG	PNG	PNG
Fuel Molecular Weight	lb/lbmole	17.3	17.3	17.3	17.3	17.3	17.3
Sulfur Content	grains/100scf	1.7	1.7	1.7	1.7	1.7	1.7
Fuel Heat Content (LHV)	Btu/scf	932	932	932	932	932	932
Fuel Heat Content (HHV)	Btu/scf	1,033	1,033	1,033	1,033	1,033	1,033
HHV/LHV Ratio		1.1	1.1	1.1	1.1	1.1	1.1
GT EXHAUST GAS ANALYSIS							
Oxygen, O2	%vol	12.5	12.5	12.7	12.7	12.5	12.5
Carbon Dioxide, CO2	%vol	3.9	3.9	3.7	3.7	3.9	3.9
Water, H2O	%vol	7.7	7.7	8.3	8.3	8.4	8.4
Nitrogen, N2	%vol	74.9	74.9	74.4	74.4	74.3	74.3
Argon, Ar	%vol	0.9	0.9	0.9	0.9	0.9	0.9
Total	%vol	100.00	100.00	100.00	100.00	100.00	100.00
Molecular Weight (GT Exhaust Gases)	lb/lbmole	28.5	28.5	28.4	28.4	28.4	28.4
GT Exhaust Temperature	ºF	1,121	1,121	1,155	1,155	1,130	1,130
GT Exhaust Flow Rate	lb/hr	3,834,000	3,834,000	3,330,000	3,330,000	3,704,400	3,704,400
GT Exhaust Flow Rate	lbmole/hr	134,651	134,651	117,304	117,304	130,437	130,437
GT Exhaust Flow Rate	MMscf/hr	51.9	51.9	45.2	45.2	50.3	50.3
GT Exhaust Flow Rate	Nm3/hr	1,469,123	1,469,123	1,279,858	1,279,858	1,423,144	1,423,144
GT Exhaust Oxygen, O2	lbmole/hr	16,895	16,895	14,902	14,902	16,247	16,247
GT Exhaust Carbon Dioxide, CO2	lbmole/hr	5,255	5,255	4,345	4,345	5,090	5,090
GT Exhaust Water, H2O	lbmole/hr	10,374	10,374	9,747	9,747	10,962	10,962
GT Exhaust Nitrogen, N2	lbmole/hr	100,914	100,914	87,253	87,253	96,963	96,963
GT Exhaust Argon, Ar	lbmole/hr	1,213	1,213	1,057	1,057	1,175	1,175

HOBBS 501F4+ Hourly Emission Rate Calculation (100% Load)

		Case 4 Unfired Winter Chillers Off	Case 4 Fired Winter Chillers Off	Case 5 Unfired Summer Chillers On	Case 5 Fired Summer Chillers On	Case 6 Unfired Summer Chillers Off	Case 6 Fired Summer Chillers Off
GT EMISSION RATES							
NOx	ppmvd @ 15% O2	25	25	25	25	25	25
NOx	ppmvd	31	31	30	30	31	31
NOx (as NO2)	lb/hr	172	172	165	165	141	141
CO	ppmvd @ 15% O2	15	15	15	15	15	15
CO	ppmvd	19	19	18	18	19	19
CO	lb/hr	63	63	60	60	52	52
VOC	ppmvd @ 15% O2	2.0	2.0	2.0	2.0	2.0	2.0
VOC	ppmvd	2.5	2.5	2.4	2.4	2.5	2.5
VOC (as CH4)	lb/hr	4.8	4.8	4.6	4.6	3.9	3.9
Sulfur Content	grains/100scf	1.7	1.7	1.7	1.7	1.7	1.7
SO2	lb/hr	8.7	8.7	7.3	7.3	8.4	8.4
PM10	mg/Nm3	3.7	3.7	3.7	3.7	3.7	3.7
PM10	lb/hr	12.0	12.0	10.4	10.4	11.6	11.6
Formaldehyde, HCHO	ppbvd @ 15% O2	91	91	91	91	91	91
Formaldehyde, HCHO	ppmvd	0.1	0.1	0.1	0.1	0.1	0.1
Formaldehyde, HCHO	lb/hr	0.4	0.4	0.4	0.4	0.4	0.4
DB EMISSION RATES							
NOx	lb/MMBtu (LHV)	-	0.02	-	0.02	-	0.02
NOx	lb/hr	-	6.6	-	6.6	-	6.6
CO	lb/MMBtu (LHV)	-	0.012	-	0.012	-	0.012
CO	lb/hr	-	3.8	-	3.8	-	3.8
VOC	lb/MMBtu (LHV)	-	0.0013	-	0.0013	-	0.0013
VOC (as CH4)	lb/hr	-	0.4	-	0.4	-	0.4
Sulfur Content	grains/100scf	-	1.67	-	1.67	-	1.67
SO2	lb/hr	-	1.7	-	1.7	-	1.7
PM10	lb/MMBtu (LHV)	-	0.0175	-	0.0175	-	0.0175
PM10	lb/hr	-	5.8	-	5.8	-	5.8
Formaldehyde, HCHO	lb/MMscf (HHV)	-	7.50E-02	-	7.50E-02	-	7.50E-02
Formaldehyde, HCHO	lb/MMBtu (HHV)	-	7.35E-05	-	7.35E-05	-	7.35E-05
Formaldehyde, HCHO	lb/hr	-	0.03	-	0.03	-	0.03
STACK EXHAUST GAS							
Fuel x, in CxHy		1.04	1.04	1.04	1.04	1.04	1.04
Fuel y, in Cx,Hy		4.02	4.02	4.02	4.02	4.02	4.02
DB Fuel Flow Rate	lbmole/hr	-	919	-	919	-	919
Oxygen Consumed at DB, O2	lbmole/hr	-	1,875	-	1,875	-	1,875
Carbon Dioxide Produced at DB, CO2	lbmole/hr	-	951	-	951	-	951
Water Produced at DB, H2O	lbmole/hr	-	1,847	-	1,847	-	1,847
Stack Exhaust Oxygen, O2	lbmole/hr	16,895	15,021	14,902	13,027	16,247	14,373
Stack Exhaust Carbon Dioxide, CO2	lbmole/hr	5,255	6,206	4,345	5,296	5,090	6,041
Stack Exhaust Water, H2O	lbmole/hr	10,374	12,221	9,747	11,594	10,962	12,809
Stack Exhaust Nitrogen, N2	lbmole/hr	100,914	100,914	87,253	87,253	96,963	96,963
Stack Exhaust Argon, Ar	lbmole/hr	1,213	1,213	1,057	1,057	1,175	1,175
Stack Exhaust Flow Rate	lbmole/hr	134,651	135,574	117,304	118,227	130,437	131,360
Stack Exhaust Oxygen, O2	%vol	12.5	11.1	12.7	11.0	12.5	10.9
Stack Exhaust Carbon Dioxide, CO2	%vol	3.9	4.6	3.7	4.5	3.9	4.6
Stack Exhaust Water, H2O	%vol	7.7	9.0	8.3	9.8	8.4	9.8
Stack Exhaust Nitrogen, N2	%vol	74.9	74.4	74.4	73.8	74.3	73.8
Stack Exhaust Argon, Ar	%vol	0.9	0.9	0.9	0.9	0.9	0.9
Stack Exhaust Flow Rate	%vol	100.0	100.0	100.0	100.0	100.0	100.0
Molecular Weight (Stack Exhaust Gases)	lb/lbmole	28.5	28.4	28.4	28.3	28.4	28.3
Stack Exhaust Flow Rate	scfm	864,693	870,623	753,296	759,226	837,631	843,560
Stack Exhaust Flow Rate	dscfm	798,072	792,142	690,704	684,774	767,235	761,305
Stack Exit Temperature	ºF	179	179	179	179	179	179
Stack Exit Pressure	psia	12.83	12.83	12.83	12.83	12.83	12.83
Stack Exhaust Flow Rate	acfm	1,286,582	1,295,404	1,120,833	1,129,656	1,246,315	1,255,138
Stack Diameter	ft	18.0	18.0	18.0	18.0	18.0	18.0
Stack Velocity	fps	84.3	84.8	73.4	74.0	81.6	82.2

HOBBS 501F4+ Hourly Emission Rate Calculation (100% Load)

		Case 4 Unfired Winter Chillers Off	Case 4 Fired Winter Chillers Off	Case 5 Unfired Summer Chillers On	Case 5 Fired Summer Chillers On	Case 6 Unfired Summer Chillers Off	Case 6 Fired Summer Chillers Off
STACK EMISSION RATES							
NOx (pre-SCR)	ppmvd @ 15% O2	24.3	21.3	27.9	23.8	20.7	18.2
NOx (pre-SCR)	ppmvd	30.1	31.5	33.3	35.0	25.7	27.1
NOx (pre-SCR as NO2)	lb/hr	172.0	178.6	165.0	171.6	141.0	147.6
NOx (post-SCR)	ppmvd @ 15% O2	2.0	2.0	2.0	2.0	2.0	2.0
NOx (post-SCR)	ppmvd	2.5	3.0	2.4	2.9	2.5	3.0
NOx (post-SCR as NO2)	lb/hr	14.2	16.8	11.8	14.4	13.6	16.2
CO (pre-Catalytic Oxidation)	ppmvd @ 15% O2	14.6	13.1	16.7	14.5	12.6	11.3
CO (pre-Catalytic Oxidation)	ppmvd	18.1	19.3	19.9	21.4	15.5	16.8
CO (pre-Catalytic Oxidation)	lb/hr	63.0	66.8	60.0	63.8	52.0	55.8
CO (post-Catalytic Oxidation)	ppmvd @ 15% O2	2.0	2.0	2.0	2.0	2.0	2.0
CO (post-Catalytic Oxidation)	ppmvd	2.5	3.0	2.4	2.9	2.5	3.0
CO (post-Catalytic Oxidation)	lb/hr	8.6	10.2	7.2	8.8	8.3	9.9
VOC (pre-Catalytic Oxidation)	ppmvd @ 15% O2	1.9	1.8	2.2	2.0	1.6	1.5
VOC (pre-Catalytic Oxidation)	ppmvd	2.4	2.6	2.7	2.9	2.0	2.3
VOC (pre-Catalytic Oxidation as CH4)	lb/hr	4.8	5.2	4.6	5.0	3.9	4.3
VOC (post-Catalytic Oxidation)	ppmvd @ 15% O2	1.0	1.0	1.0	1.0	1.0	1.0
VOC (post-Catalytic Oxidation)	ppmvd	1.2	1.5	1.2	1.5	1.2	1.5
VOC (post-Catalytic Oxidation as CH4)	lb/hr	2.5	2.9	2.1	2.5	2.4	2.8
SO2	ppmvd @ 15% O2	0.9	0.9	0.9	0.9	0.9	0.9
SO2	ppmvd	1.1	1.3	1.1	1.3	1.1	1.3
SO2	lb/hr	8.7	10.4	7.3	9.0	8.4	10.0
PM10	lb/hr	11.98	17.76	10.44	16.21	11.61	17.38
PM10	lb/MMBtu (LHV)	0.0068	0.0085	0.0071	0.0090	0.0068	0.0086
PM10	lb/MMBtu (HHV)	0.0064	0.0079	0.0066	0.0084	0.0064	0.0080
HCHO	lb/hr	0.4	0.4	0.4	0.4	0.4	0.4
NH3	ppmvd @ 15% O2	10.0	10.0	10.0	10.0	10.0	10.0
NH3	ppmvd	12.4	14.8	11.9	14.7	12.4	14.9
NH3	lb/hr	26.2	31.1	21.9	26.7	25.2	30.0

Vendor Data
Process Input Data

HOBBS 501F4 Hourly Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

FACILITY CONDITIONS
GT Fuel Flow Rate (MMscf/hr) = GT Heat Input (MMBtu/hr) / Fuel Heat Content (Btu/scf)
GT Fuel Flow Rate = 1,884 MMBtu/hr / 1,033 Btu/scf = 1.82 MMscf/hr

DB Heat Input (HHV) (MMBtu/hr) = DB Heat Input (LHV) (MMBtu/hr) * HHV/LHV Ratio
DB Heat Input (HHV) = 330 MMBtu/hr * 1.1 = 366 MMBtu/hr

DB Fuel Flow Rate (MMscf/hr) = DB Heat Input (MMBtu/hr) / Fuel Heat Content (Btu/scf)
DB Fuel Flow Rate = 366 MMBtu/hr / 1,033 Btu/scf = 0.35 MMscf/hr

FUEL ANALYSIS
HHV/LHV Ratio = Fuel Heat Content (HHV) (Btu/scf) / Fuel Heat Content (LHV) (Btu/scf)
HHV/LHV Ratio = 1,033 Btu/scf / 932 Btu/scf = 1.1

GT EXHAUST GAS ANALYSIS
Molecular Weight (GT Exhaust Gases) = Sum (%vol * MW)
Molecular Weight (GT Exhaust Gases) = 12.5 %vol * 32.0 lb/lbmole + 3.9 % vol * 44.0 lb/lbmole + 7.7 %vol * 18.0 lb/lbmole + 74.9 %vol * 28.0 lb/lbmole + 0.9 %vol * 39.9 lb/lbmole = 28.5 lb/lbmole

GT Exhaust Flow Rate (lbmole/hr) = GT Exhaust Flow Rate (lb/hr) / MW GT Exhaust Gases (lb/lbmole)
GT Exhaust Flow Rate = 3,834,000 lb/hr / 28.5 lb/lbmole = 134,651 lbmole/hr

GT Exhaust Flow Rate (MMscf/hr) = GT Exhaust Flow Rate (lbmole/hr) * Standard Molar Volume (scf/lbmole) * 1 MMscf/1,000,000 scf
GT Exhaust Flow Rate = 134,651 lbmole/hr * 385.3 scf/lbmole * 1MMscf / 1,000,000scf = 51.9 MMscf/hr

GT Exhaust Flow Rate (Nm^3/hr) = GT Exhaust Flow Rate (MMscf/hr) * 1,000,000 scf/MMscf / 35.3 scf/Nm^3
GT Exhaust Flow Rate = 51.9 MMscf/hr * 1,000,000 scf/MMscf / 35.3 scf/Nm3 = 1,469,123 Nm3/hr

GT Exhaust O_2 (lbmole/hr) = GT Exhaust (lbmole/hr) * O_2%
GT Exhaust O2 = 134,651 lbmole/hr * 12.5% = 16,895 lbmole/hr

GT Exhaust CO_2 (lbmole/hr) = GT Exhaust (lbmole/hr) * CO_2%
GT Exhaust CO2 = 134,651 lbmole/hr * 3.9% = 5,255 lbmole/hr

GT Exhaust H_2O (lbmole/hr) = GT Exhaust (lbmole/hr) * H_2O%
GT Exhaust H2O = 134,651 lbmole/hr * 7.7% = 10,374 lbmole/hr

GT Exhaust N_2 (lbmole/hr) = GT Exhaust (lbmole/hr) * N_2%
GT Exhaust N2 = 134,651 lbmole/hr * 74.9% = 100,914 lbmole/hr

GT Exhaust Ar (lbmole/hr) = GT Exhaust (lbmole/hr) * Ar%
GT Exhaust Ar = 134,651 lbmole/hr * 0.9% = 1,213 lbmole/hr

HOBBS 501F4 Hourly Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

GT EMISSION RATES

NOx (ppmvd) = NOx (ppmvd @ 15% O2) * (20.9-O2 vol%/(1-H2O vol%/100))/(20.9-15)
NOx = 25 ppmvd @ 15% O2 * (20.9 - 12.5 / (1 - 7.7/100)) / (20.9-15) = 31 ppmvd

CO (ppmvd) = CO (ppmvd @ 15% O2) * (20.9-O2 vol%/(1-H2O vol%/100))/(20.9-15)
CO = 15 ppmvd @ 15% O2 * (20.9 - 12.5 / (1 - 7.7/100)) / (20.9-15) = 19 ppmvd

VOC (ppmvd) = VOC (ppmvd @ 15% O2) * (20.9-O2 vol%/(1-H2O vol%/100))/(20.9-15)
VOC = 2.0 ppmvd @ 15% O2 * (20.9 - 12.5 / (1 - 7.7/100)) / (20.9-15) = 2.5 ppmvd

SO_2 (lb/hr) = Sulfur Content (grains/Hscf) * 1 Hscf/100scf * 1 lb_S/7,000 grains / MW_S (lb_S/$lbmole_S$) * 1$lbmole_{SO2}$/$lbmole_S$ * MW_{SO2} (lb_{SO2}/$lbmole_{SO2}$) * GT Fuel Flow Rate (MMScf/hr) * 1,000,000 scf/MMscf
SO2 = 1.7 grains/Hscf * 1 Hscf/100scf * 1 lbS/7,000grains / 32.1 lbS/lbmoleS * 1lbmoleSO2/lbmoleS * 64.1 lbSO2/lbmoleSO2 * 1.8 MMscf/hr * 1,000,000 scf/MMscf = 8.7 lb/hr

PM_{10} (lb/hr) = PM_{10} (mg/Nm^3) * GT Exhaust Flow Rate (Nm^3/hr) * 1g/1,000 mg * 1 lb/453,59g
PM10 = 3.7 mg/Nm3 * 1,469,123 Nm3/hr * 1g/1,000mg * 1lb/453.59g = 12.0 lb/hr

HCHO (ppmvd) = HCHO (ppbvd @ 15% O2) * (20.9-O2 vol%/(1-H2O vol%/100))/(20.9-15) * 1 ppmvd/1,000 ppbvd
HCHO = 91 ppbvd @ 15% O2 * (20.9 - 12.5 / (1 - 7.7/100)) / (20.9-15) * 1 ppmvd/1,000 ppbvd = 0.1 ppmvd

HCHO (lb/hr) = GT Exhaust Flow Rate (lbmole/hr) * (1 - H_2O vol%/100) * HCHO (ppmvd) / 1,000,000 * MW_{HCHO} (lb/lbmole)
HCHO = 134,651 lbmole/hr * (1 - 7.7/100) * 0.1 ppmvd/1,000,000 * 30.0 lb/lbmole = 0.4 lb/hr

DB EMISSION RATES

NOx (lb/hr) = NOx (lb/MMBtu) (LHV) * DB Heat Input (LHV) (MMBtu/hr)
NOx = 0.02 lb/MMBtu (LHV) * 330 MMBtu/hr (LHV) = 6.6 lb/hr

CO (lb/hr) = CO (lb/MMBtu) (LHV) * DB Heat Input (LHV) (MMBtu/hr)
CO= 0.012 lb/MMBtu (LHV) * 330 MMBtu/hr (LHV) = 3.8 lb/hr

VOC (lb/hr) = VOC (lb/MMBtu) (LHV) * DB Heat Input (LHV) (MMBtu/hr)
VOC= 0.0013 lb/MMBtu (LHV) * 330 MMBtu/hr (LHV) = 0.4 lb/hr

SO_2 (lb/hr) = Sulfur Content (grains/Hscf) * 1 Hscf/100scf * 1 lb_S/7,000 grains / MW_S (lb_S/$lbmole_S$) * 1$lbmole_{SO2}$/$lbmole_S$ * MW_{SO2} (lb_{SO2}/$lbmole_{SO2}$) * DB Fuel Flow Rate (MMScf/hr) * 1,000,000 scf/MMscf
SO2 = 1.7 grains/Hscf * 1 Hscf/100scf * 1 lbS/7,000grains / 32.1 lbS/lbmoleS * 1lbmoleSO2/lbmoleS * 64.1 lbSO2/lbmoleSO2 * 0.35 MMscf/hr * 1,000,000 scf/MMscf = 1.7 lb/hr

PM_{10} (lb/hr) = PM_{10} (lb/MMBtu) (LHV) * DB Heat Input (LHV) (MMBtu/hr)
PM10= 0.0175 lb/MMBtu (LHV) * 330 MMBtu/hr (LHV) = 5.8 lb/hr

HCHO Emission Factor (lb/MMBtu) (HHV) = HCHO Emission Factor (lb/MMscf) (HHV) / 1,020 Btu/scf
HCHO Emission Factor = 7.50 E-02 lb/MMscf (HHV) / 1,020 Btu/scf = 7.35E-05 lb/MMBtu (HHV)

HCHO (lb/hr) = HCHO (lb/MMBtu) (HHV) * DB Heat Input (HHV) (MMBtu/hr)
HCHO= 7.35E-05 lb/MMBtu (HHV) * 366 MMBtu/hr (HHV) = 0.03 lb/hr

HOBBS 501F4 Hourly Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

STACK EXHAUST GAS
Fuel x, in CxHy = stoichiometric lbmoles of carbon in fuel
Fuel y, in Cx,Hy = stoichiometric lbmoles of hydrogen in fuel

DB Fuel Flow Rate (lbmole/hr) =DB Heat Input (HHV) (MMBtu/hr) * 1,000,000 Btu/MMBtu / Fuel Heat Content (HHV) (Btu/scf) / Standard Molar Volume (scf/lbmole)
DB Fuel Flow Rate = 366 MMBtu/hr * 1,000,000 Btu/MMBtu / 1,033 Btu/scf / 385.3 scf/lbmole = 919 lbmole/hr

O_2 Consumed at DB (lbmole/hr) = (Fuel x + Fuel y/4) * DB Fuel Flow Rate (lbmole/hr)
O2 Consumed at DB) = (1.04 + 4.02 / 4) * 919 lbmole/hr = 1,875 lbmole/hr

CO_2 Produced at DB (lbmole/hr) = Fuel x * DB Fuel Flow Rate (lbmole/hr)
CO2 Produced at DB = 1.04 * 919 lbmole/hr = 951 lbmole/hr

H_2O Produced at DB (lbmole/hr) = Fuel y / 2 * DB Fuel Flow Rate (lbmole/hr)
H2O Produced at DB = 4.02 / 2 * 919 lbmole/hr = 1,847 lbmole/hr

Stack Exhaust O_2 (lbmole/hr) = GT Exhaust O_2 (lbmole/hr) - DB Consumed O_2 (lbmole/hr)
Stack Exahust O2 = 16,895 lbmole/hr - 1,875 lbmole/hr = 15,021 lbmole/hr

Stack Exhaust CO_2 (lbmole/hr) = GT Exhaust CO_2 (lbmole/hr) + DB Produced CO_2 (lbmole/hr)
Stack Exhaust CO2 = 5,255 lbmole/hr + 951 lbmole/hr = 6,206 lbmole/hr

Stack Exhaust H_2O (lbmole/hr) = GT Exhaust H_2O (lbmole/hr) + DB Produced H_2O (lbmole/hr)
Stack Exahust H2O = 10,374 lbmole/hr + 1,847 lbmole/hr = 12,221 lbmole/hr

Stack Exhaust N_2 (lbmole/hr) = GT Exhaust N_2 (lbmole/hr)
Stack Exhaust N2 = 100,914 lbmole/hr

Stack Exhaust Ar (lbmole/hr) = GT Exhaust Ar (lbmole/hr)
Stack Exhaust Ar = 1,213 lbmole/hr

Stack Exhaust Flow Rate (lbmole/hr) = Sum Stack Exhaust Pollutants Flow Rates (lbmole/hr)
Stack Exhaust Flow Rate = 15,021 lbmole/hr + 6,206 lbmole/hr + 12,221 lbmole/hr + 100,914 lbmole/hr + 1,213 lbmole/hr = 135,574 lbmole/hr

Stack Exhaust i %vol = Stack Exhaust i (lbmole/hr) * 100 / Stack Exhaust Flow Rate (lbmole/hr)
Stack Exhaust O2 = 15,021 lbmole/hr * 100 /135,574 lbmole/hr = 11.1 %vol
Stack Exhaust CO2 = 6,206 lbmole/hr * 100 /135,574 lbmole/hr = 4.6 %vol
Stack Exhaust H2O = 12,221 lbmole/hr * 100 /135,574 lbmole/hr = 9.0 %vol
Stack Exhaust N2 = 100,914 lbmole/hr * 100 /135,574 lbmole/hr = 74.4 %vol
Stack Exhaust Ar = 1,213 lbmole/hr * 100 /135,574 lbmole/hr = 0.9 %vol

Molecular Weight (Stack Exhaust Gases) = Sum (%vol * MW)
Molecular Weight (GT Exhaust Gases) = 11.1 %vol * 32.0 lb/lbmole + 4.6 % vol * 44.0 lb/lbmole + 9.0 %vol * 18.0 lb/lbmole + 74.4 %vol * 28.0 lb/lbmole + 0.9 %vol * 39.9 lb/lbmole = 28.4 lb/lbmole

Stack Exhaust Flow Rate (scfm) = Stack Exhaust Flow Rate (lbmole/hr) * Standard Molar Volume (scf/lbmole) * 1hr/60min
Stack Exhaust Flow Rate = 135,574 lbmole/hr * 385.3 scf/lbmole * 1hr/60min = 870,623 scfm

Stack Exhaust Dry Flow Rate (dscfm) = Stack Exhaust Flow Rate (scfm) * (1 - H_2O/100)
Stack Exhaust Dry Flow Rate = 870,623 scfm * (1 - 9.0 %vol / 100) = 792,142 dscfm

Stack Exhaust Flow Rate (acfm) = Stack Exhaust Flow Rate (scfm) *((5/9*(Stack Exit Temp (F)-32)+273.15)/273.15)*(14.696/Stack Exit Pressure (psia))
Stack Exhaust Flow Rate = 870,623 * ((5/9*(179-32)+273.15) K / 273.15 K) *(14.696 psia / 12.83 psia) = 1,295,404 acfm

Stack Exit Velocity (fps) =Stack Exhaust Flow Rate (acfm) / (PI()/4 * Stack Diameter^2) (ft)^2 * 1min/60sec
Stack Exit Velocity = 1,295,404 / (PI()/4 * 18.0^2) ft^2 * 1min/60sec = 84.8 fps

HOBBS 501F4 Hourly Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

STACK EMISSION RATES

NOx (pre-SCR as NO_2) (lb/hr) = GT NOx Exhaust (lb/hr) + DB NOx Exhaust (lb/hr)
NOx (pre-SCR as NO2) = 172.0 lb/hr + 6.6 lb/hr = 178.6 lb/hr

NOx (pre-SCR) (ppmvd) = NOx (pre-SCR as NO_2) (lb/hr) / (Stack Exhaust Flow Rate (lbmole/hr) * (1 - Stack Exhaust H_2O vol%/100) * 1/1,000,000 * MW_{NO2} (lb/lbmole))
NOx (pre-SCR) = 178.6 lb/hr /(135,574 lbmole/hr * (1 - 9.0 /100) * 1 / 1,000,000 * 46.0 lb/lbmole) = 31.5 ppmvd

NOx (pre-SCR) (ppmvd @ 15% O_2) = NOx (pre-SCR) (ppmvd) * (20.9 - 15) / (20.9 - Stack Exhaust O_2%/(1 - H_2O%/100))
NOx (pre-SCR) = 31.5 ppmvd * (20.9 - 15) / (20.9 - 11.1 / (1 - 9.0/100)) = 21.3 ppmvd @ 15% O2

NOx (post-SCR) (ppmvd) = NOx (post-SCR) (ppmvd @ 15% O_2) * (20.9-O_2 vol%/(1-H_2O vol%/100))/(20.9-15)
NOx (post-SCR) = 2.0 ppmvd @ 15% O2 * (20.9 - 11.1 / (1 - 9.0/100)) / (20.9 - 15) = 3.0 ppmvd

NOx (post-SCR as NO_2) (lb/hr) = NOx (post-SCR) (ppmvd) * (1 - H_2O %vol/100) * Stack Exhaust Flow Rate (lbmole/hr) /1,000,000 * MW_{NO2} (lb/lbmole)
NOx (post-SCR as NO2) = 3.0 ppmvd * (1 - 9.0/100) * 135,574 lbmole/hr / 1,000,000 * 46.0 lb/lbmole = 16.8 lb/hr

CO (pre-Catalytic Oxidation) (lb/hr) = GT CO Exhaust (lb/hr) + DB CO Exhaust (lb/hr)
CO (pre-Catalytic Oxydation) = 63.0 lb/hr + 3.8 lb/hr = 66.8 lb/hr

CO (pre-Catalytic Oxidation) (ppmvd) = CO (pre-Catalytic Oxidation) (lb/hr) / (Stack Exhaust Flow Rate (lbmole/hr) * (1 - Stack Exhaust H_2O vol%/100) * 1/1,000,000 * MW_{CO} (lb/lbmole))
CO (pre-Catalytic Oxidation) = 66.8 lb/hr /(135,574 lbmole/hr * (1 - 9.0 /100) * 1 / 1,000,000 * 28.0 lb/lbmole) = 19.3 ppmvd

CO (pre-Catalytic Oxidation) (ppmvd @ 15% O_2) = CO (pre-Catalytic Oxidation) (ppmvd) * (20.9 - 15) / (20.9 - Stack Exhaust O_2%/(1 - H_2O%/100))
CO (pre-Catalytic Oxidation) = 19.3 ppmvd * (20.9 - 15) / (20.9 - 11.1 / (1 - 9.0/100)) = 13.1 ppmvd @ 15% O2

CO (post-Catalytic Oxidation) (ppmvd) = CO (post-Catalytic Oxidation) (ppmvd @ 15% O_2) * (20.9-O_2 vol%/(1-H_2O vol%/100))/(20.9-15)
CO (post-Catalytic Oxidation) = 2.0 ppmvd @ 15% O2 * (20.9 - 11.1 / (1 - 9.0/100)) / (20.9 - 15) = 3.0 ppmvd

CO (post-Catalytic Oxidation) (lb/hr) = CO (post-Catalytic Oxidation) (ppmvd) * (1 - H_2O %vol/100) * Stack Exhaust Flow Rate (lbmole/hr) /1,000,000 * MW_{CO} (lb/lbmole)
CO (post-Catalytic Oxidation) = 3.0 ppmvd * (1 - 9.0/100) * 135,574 lbmole/hr / 1,000,000 * 28.0 lb/lbmole = 10.2 lb/hr

VOC (pre-Catalytic Oxidation) (lb/hr) = GT VOC Exhaust (lb/hr) + DB VOC Exhaust (lb/hr)
VOC (pre-Catalytic Oxydation) = 4.8 lb/hr + 0.4 lb/hr = 5.2 lb/hr

VOC (pre-Catalytic Oxidation) (ppmvd) = VOC (pre-Catalytic Oxidation) (lb/hr) / (Stack Exhaust Flow Rate (lbmole/hr) * (1 - Stack Exhaust H_2O vol%/100) * 1/1,000,000 * MW_{VOC} (lb/lbmole))
VOC (pre-Catalytic Oxidation) = 5.2 lb/hr /(135,574 lbmole/hr * (1 - 9.0 /100) * 1 / 1,000,000 * 16.0 lb/lbmole) = 2.6 ppmvd

VOC (pre-Catalytic Oxidation) (ppmvd @ 15% O_2) = VOC (pre-Catalytic Oxidation) (ppmvd) * (20.9 - 15) / (20.9 - Stack Exhaust O_2%/(1 - H_2O%/100))
VOC (pre-Catalytic Oxidation) = 2.6 ppmvd * (20.9 - 15) / (20.9 - 11.1 / (1 - 9.0/100)) = 1.8 ppmvd @ 15% O2

VOC (post-Catalytic Oxidation) (ppmvd) = VOC (post-Catalytic Oxidation) (ppmvd @ 15% O_2) * (20.9-O_2 vol%/(1-H_2O vol%/100))/(20.9-15)
VOC (post-Catalytic Oxidation) = 1.0 ppmvd @ 15% O2 * (20.9 - 11.1 / (1 - 9.0/100)) / (20.9 - 15) = 1.5 ppmvd

VOC (post-Catalytic Oxidation) (lb/hr) = VOC (post-Catalytic Oxidation (ppmvd) * (1 - H_2O %vol/100) * Stack Exhaust Flow Rate (lbmole/hr) /1,000,000 * MW_{VOC} (lb/lbmole)
VOC (post-Catalytic Oxidation) = 1.5 ppmvd * (1 - 9.0/100) * 135,574 lbmole/hr / 1,000,000 * 16.0 lb/lbmole = 2.9 lb/hr

HOBBS 501F4 Hourly Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

SO_2 (lb/hr) = GT SO_2 Exhaust (lb/hr) + DB SO_2 Exhaust (lb/hr)
SO2 - 8.7 lb/hr + 1.7 lb/hr = 10.4 lb/hr

SO_2(ppmvd) = SO_2 (lb/hr) / (Stack Exhaust Flow Rate (lbmole/hr) * (1 - Stack Exhaust H_2O vol%/100) * 1/1,000,000 * MW_{VOC} (lb/lbmole))
SO2 = 10.4 lb/hr /(135,574 lbmole/hr * (1 - 9.0 /100) * 1 / 1,000,000 * 64.1 lb/lbmole) = 1.3 ppmvd

SO_2 (ppmvd @ 15% O_2) = SO_2 (pre-Catalytic Oxidation) (ppmvd) * (20.9 - 15) / (20.9 - Stack Exhaust O_2%/(1 - H_2O%/100))
SO2 = 1.3 ppmvd * (20.9 - 15) / (20.9 - 11.1 / (1 - 9.0/100)) = 0.9 ppmvd @ 15% O2

PM_{10} (lb/hr) = GT PM_{10} Exhaust (lb/hr) + DB PM_{10} Exhaust (lb/hr)
PM10 - 12.0 lb/hr + 5.8 lb/hr = 17.8 lb/hr

PM_{10} (lb/MMBtu) = PM_{10} (lb/hr) / (GT Heat Input (MMBtu/hr) + DB Heat Input (MMBtu/hr))
PM10 = 17.8 lb/hr / (1,765 MMBtu/hr (LHV) + 330 MMBtu/hr (LHV)) = 0.0085 lb/MMBtu (LHV)
PM10 = 17.8 lb/hr / (1,884 MMBtu/hr (LHV) + 366 MMBtu/hr (LHV)) = 0.0079 lb/MMBtu (HHV)

HCHO (lb/hr) = GT HCHO Exhaust (lb/hr) + DB HCHO Exhaust (lb/hr)
HCHO = 0.4 lb/hr + 0.03 lb/hr = 0.4 lb/hr

NH_3 (ppmvd) = NH_3 (ppmvd @ 15% O_2) * (20.9-O_2 vol%/(1-H_2O vol%/100))/(20.9-15)
NH3 = 10.0 ppmvd @ 15% O2 * (20.9 - 11.1 / (1 - 9.0/100)) / (20.9 - 15) = 14.8 ppmvd

NH_3 (lb/hr) = NH_3 (ppmvd) * (1 - H_2O %vol/100) * Stack Exhaust Flow Rate (lbmole/hr) /1,000,000 * MW_{NH3} (lb/lbmole)
NH3) = 14.8 ppmvd * (1 - 9.0/100) * 135,574 lbmole/hr / 1,000,000 * 17.0 lb/lbmole = 31.1 lb/hr

HOBBS 501F4+ Annual Emission Rate Calculation (100% Load) (8,760 hr/yr)

		Case 4 Unfired Winter Chillers Off	Case 4 Fired Winter Chillers Off	Case 5 Unfired Summer Chillers On	Case 5 Fired Summer Chillers On	Case 6 Unfired Summer Chillers Off	Case 6 Fired Summer Chillers Off
SITE CONDITIONS							
Ambient Temperature	ºF	30	30	95	95	95	95
Ambient Relative Humidity	%	60	60	20	20	20	20
Barometric Pressure	psia	12.83	12.83	12.83	12.83	12.83	12.83
Compressor Inlet Temperature	ºF	30	30	95	95	46	46
FACILITY CONDITIONS							
Annual Hours of Operation	hr/yr	1,419	1,080	1,632	1,242	1,923	1,464
GT Power Output	MW	189	189	151	151	180	180
GT Model		Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+
GT Load		Base	Base	Base	Base	Base	Base
Chillers	On/Off	Off	Off	**On**	**On**	Off	Off
GT Fuel Flow Rate	lb/hr	86,940	86,940	72,720	72,720	83,592	83,592
GT Heat Input (LHV)	MMBtu/hr	1,765	1,765	1,477	1,477	1,697	1,697
GT Heat Input (HHV)	MMBtu/hr	1,884	1,884	1,576	1,576	1,812	1,812
GT Heat Input (LHV)	MMBtu/yr	2,504,342	1,906,200	2,410,057	1,834,434	3,263,985	2,484,408
GT Heat Input (HHV)	MMBtu/yr	2,673,190	2,034,720	2,571,597	1,957,392	3,485,174	2,652,768
GT Fuel Flow Rate	MMscf/yr	2,588	1,970	2,489	1,895	3,374	2,568
DB Model		Forney	Forney	Forney	Forney	Forney	Forney
DB Status		Off	On	Off	On	Off	On
DB Heat Input (LHV)	MMBtu/yr	-	345,600	-	397,440	-	445,056
DB Heat Input (HHV)	MMBtu/yr	-	383,187	-	440,665	-	493,459
DB Fuel Flow Rate	MMscf/yr	-	371	-	427	-	478
GT+DB Heat Input (LHV)	MMBtu/yr	2,504,342	2,251,800	2,410,057	2,231,874	3,263,985	2,929,464
GT+DB Heat Input (HHV)	MMBtu/yr	2,673,190	2,417,907	2,571,597	2,398,057	3,485,174	3,146,227
FUEL ANALYSIS							
Fuel Type		PNG	PNG	PNG	PNG	PNG	PNG
Fuel Molecular Weight	lb/lbmole	17.29	17.29	17.29	17.29	17.29	17.29
Sulfur Content	grains/100scf	1.1	1.1	1.1	1.1	1.1	1.1
Fuel Heat Content (LHV)	Btu/scf	932	932	932	932	932	932
Fuel Heat Content (HHV)	Btu/scf	1,033	1,033	1,033	1,033	1,033	1,033
HHV/LHV Ratio		1.1	1.1	1.1	1.1	1.1	1.1
GT EXHAUST GAS ANALYSIS							
Oxygen, O2	%vol	12.5	12.5	12.7	12.7	12.5	12.5
Carbon Dioxide, CO2	%vol	3.9	3.9	3.7	3.7	3.9	3.9
Water, H2O	%vol	7.7	7.7	8.3	8.3	8.4	8.4
Nitrogen, N2	%vol	74.9	74.9	74.4	74.4	74.3	74.3
Argon, Ar	%vol	0.9	0.9	0.9	0.9	0.9	0.9
Total	%vol	100.0	100.0	100.0	100.0	100.0	100.0
Molecular Weight (GT Exhaust Gases)	lb/lbmole	28.5	28.5	28.4	28.4	28.4	28.4
GT Exhaust Temperature	ºF	1,121	1,121	1,155	1,155	1,130	1,130
GT Exhaust Flow Rate	lb/hr	3,834,000	3,834,000	3,330,000	3,330,000	3,704,400	3,704,400
GT Exhaust Flow Rate	lbmole/yr	191,054,814	145,422,904	191,407,758	145,691,551	250,879,911	190,959,257
GT Exhaust Flow Rate	MMscf/yr	73,614	56,032	73,750	56,136	96,665	73,577
GT Exhaust Flow Rate	Nm3/yr	2,084,524,985	1,586,652,914	2,088,375,824	1,589,584,011	2,737,253,425	2,083,482,402
GT Exhaust Oxygen, O2	lbmole/yr	23,972,657	18,246,980	24,316,393	18,508,617	31,250,174	23,786,321
GT Exhaust Carbon Dioxide, CO2	lbmole/yr	7,455,611	5,674,898	7,089,886	5,396,524	9,789,211	7,451,137
GT Exhaust Water, H2O	lbmole/yr	14,720,053	11,204,286	15,904,339	12,105,715	21,084,455	16,048,602
GT Exhaust Nitrogen, N2	lbmole/yr	143,185,967	108,987,147	142,372,574	108,368,027	186,497,023	141,953,705
GT Exhaust Argon, Ar	lbmole/yr	1,720,526	1,309,592	1,724,567	1,312,668	2,259,049	1,719,493

HOBBS 501F4+ Annual Emission Rate Calculation (100% Load) (8,760 hr/yr)

		Case 4 Unfired Winter Chillers Off	Case 4 Fired Winter Chillers Off	Case 5 Unfired Summer Chillers On	Case 5 Fired Summer Chillers On	Case 6 Unfired Summer Chillers Off	Case 6 Fired Summer Chillers Off
GT EMISSION RATES							
NOx	ppmvd @ 15% O2	25	25	25	25	25	25
NOx	ppmvd	31	31	30	30	31	31
NOx (as NO2)	lb/hr	172	172	165	165	141	141
NOx (as NO2)	lb/yr	244,049	185,760	269,235	204,930	271,197	206,424
CO	ppmvd @ 15% O2	15	15	15	15	15	15
CO	ppmvd	19	19	18	18	19	19
CO	lb/hr	63	63	60	60	52	52
CO	lb/yr	89,390	68,040	97,903	74,520	100,016	76,128
VOC	ppmvd @ 15% O2	2.0	2.0	2.0	2.0	2.0	2.0
VOC	ppmvd	2.5	2.5	2.4	2.4	2.5	2.5
VOC (as CH4)	lb/hr	4.8	4.8	4.6	4.6	3.9	3.9
VOC (as CH4)	lb/yr	6,811	5,184	7,506	5,713	7,501	5,710
Sulfur Content	grains/100scf	1.1	1.1	1.1	1.1	1.1	1.1
SO2	lb/yr	8,125	6,184	7,816	5,949	10,592	8,062
PM10	mg/Nm3	2.6	2.6	2.6	2.6	2.6	2.6
PM10	lb/yr	11,949	9,095	11,971	9,112	15,690	11,943
Formaldehyde, HCHO	ppbvd @ 15% O2	91	91	91	91	91	91
Formaldehyde, HCHO	ppmvd	0.1	0.1	0.1	0.1	0.1	0.1
Formaldehyde, HCHO	lb/yr	597	454	573	436	777	591
DB EMISSION RATES							
NOx	lb/MMBtu (LHV)	0.02	0.02	0.02	0.02	0.02	0.02
NOx	lb/yr	-	6,912	-	7,949	-	8,901
CO	lb/MMBtu (LHV)	0.012	0.012	0.012	0.012	0.012	0.012
CO	lb/yr	-	4,020	-	4,624	-	5,177
VOC	lb/MMBtu (LHV)	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
VOC (as CH4)	lb/yr	-	438	-	503	-	564
Sulfur Content	grains/100scf	1.1	1.1	1.1	1.1	1.1	1.1
SO2	lb/yr	-	1,165	-	1,339	-	1,500
PM10	lb/MMBtu (LHV)	0.0175	0.0175	0.0175	0.0175	0.0175	0.0175
PM10	lb/yr	-	6,048	-	6,955	-	7,788
Formaldehyde, HCHO	lb/MMscf (HHV)	7.50E-02	7.50E-02	7.50E-02	7.50E-02	7.50E-02	7.50E-02
Formaldehyde, HCHO	lb/MMBtu (HHV)	7.35E-05	7.35E-05	7.35E-05	7.35E-05	7.35E-05	7.35E-05
Formaldehyde, HCHO	lb/yr	-	28.2	-	32.4	-	36.3
STACK EXHAUST GAS							
Fuel x, in CxHy		1.04	1.04	1.04	1.04	1.04	1.04
Fuel y, in Cx,Hy		4.02	4.02	4.02	4.02	4.02	4.02
DB Fuel Flow Rate	lbmole/yr	-	962,713	-	1,107,120	-	1,239,760
Oxygen Consumed at DB, O2	lbmole/yr	-	1,963,401	-	2,257,911	-	2,528,424
Carbon Dioxide Produced at DB, CO2	lbmole/yr	-	996,423	-	1,145,886	-	1,283,171
Water Produced at DB, H2O	lbmole/yr	-	1,933,956	-	2,224,050	-	2,490,506
Stack Exhaust Oxygen, O2	lbmole/yr	23,972,657	16,283,580	24,316,393	16,250,706	31,250,174	21,257,897
Stack Exhaust Carbon Dioxide, CO2	lbmole/yr	7,455,611	6,671,321	7,089,886	6,542,410	9,789,211	8,734,308
Stack Exhaust Water, H2O	lbmole/yr	14,720,053	13,138,242	15,904,339	14,329,765	21,084,455	18,539,108
Stack Exhaust Nitrogen, N2	lbmole/yr	143,185,967	108,987,147	142,372,574	108,368,027	186,497,023	141,953,705
Stack Exhaust Argon, Ar	lbmole/yr	1,720,526	1,309,592	1,724,567	1,312,668	2,259,049	1,719,493
Stack Exhaust Flow Rate	lbmole/yr	191,054,814	146,389,882	191,407,758	146,803,575	250,879,911	192,204,510
Stack Exhaust Oxygen, O2	%vol	12.5	11.1	12.7	11.1	12.5	11.1
Stack Exhaust Carbon Dioxide, CO2	%vol	3.9	4.6	3.7	4.5	3.9	4.5
Stack Exhaust Water, H2O	%vol	7.7	9.0	8.3	9.8	8.4	9.6
Stack Exhaust Nitrogen, N2	%vol	74.9	74.4	74.4	73.8	74.3	73.9
Stack Exhaust Argon, Ar	%vol	0.9	0.9	0.9	0.9	0.9	0.9
Stack Exhaust Flow Rate	%vol	100.0	100.0	100.0	100.0	100.0	100.0
Molecular Weight (Stack Exhaust Gases)	lb/lbmole	28.5	28.4	28.4	28.3	28.4	28.3

HOBBS 501F4+ Annual Emission Rate Calculation (100% Load) (8,760 hr/yr)

		Case 4 Unfired Winter Chillers Off	Case 4 Fired Winter Chillers Off	Case 5 Unfired Summer Chillers On	Case 5 Fired Summer Chillers On	Case 6 Unfired Summer Chillers Off	Case 6 Fired Summer Chillers Off
STACK EMISSION RATES							
NOx (pre-SCR)	ppmvd @ 15% O2	24.3	21.4	27.9	23.9	20.7	18.4
NOx (pre-SCR)	ppmvd	30.1	31.4	33.3	34.9	25.7	27.0
NOx (pre-SCR as NO2)	lb/yr	244,049	192,672	269,235	212,879	271,197	215,325
NOx (pre-SCR as NO2)	tpy	122.0	96.3	134.6	106.4	135.6	107.7
NOx (post-SCR)	ppmvd @ 15% O2	2	2	2	2	2	2
NOx (post-SCR)	ppmvd	2.5	2.9	2.4	2.9	2.5	2.9
NOx (post-SCR as NO2)	lb/yr	20,089	18,037	19,281	17,835	26,164	23,452
NOx (post-SCR as NO2)	tpy	10.0	9.0	9.6	8.9	13.1	11.7
CO (pre-Catalytic Oxidation)	ppmvd @ 15% O2	14.6	13.1	16.7	14.6	12.6	11.4
CO (pre-Catalytic Oxidation)	ppmvd	18.1	19.3	19.9	21.3	15.5	16.7
CO (pre-Catalytic Oxidation)	lb/yr	89,390	72,060	97,903	79,144	100,016	81,305
CO (pre-Catalytic Oxidation)	tpy	44.7	36.0	49.0	39.6	50.0	40.7
CO (post-Catalytic Oxidation)	ppmvd @ 15% O2	2	2	2	2	2	2
CO (post-Catalytic Oxidation)	ppmvd	2.5	2.9	2.4	2.9	2.5	2.9
CO (post-Catalytic Oxidation)	lb/yr	12,231	10,982	11,740	10,859	15,930	14,279
CO (post-Catalytic Oxidation)	tpy	6.1	5.5	5.9	5.4	8.0	7.1
VOC (pre-Catalytic Oxidation)	ppmvd @ 15% O2	1.9	1.8	2.2	2.0	1.6	1.5
VOC (pre-Catalytic Oxidation)	ppmvd	2.4	2.6	2.7	2.9	2.0	2.3
VOC (pre-Catalytic Oxidation as CH4)	lb/yr	6,811	5,622	7,506	6,217	7,501	6,273
VOC (pre-Catalytic Oxidation as CH4)	tpy	3.4	2.8	3.8	3.1	3.8	3.1
VOC (post-Catalytic Oxidation)	ppmvd @ 15% O2	0.6	0.6	0.6	0.6	0.6	0.6
VOC (post-Catalytic Oxidation)	ppmvd	0.7	0.9	0.7	0.9	0.7	0.9
VOC (post-Catalytic Oxidation as CH4)	lb/yr	2,102	1,887	2,017	1,866	2,737	2,453
VOC (post-Catalytic Oxidation as CH4)	tpy	1.1	0.9	1.0	0.9	1.4	1.2
SO2	ppmvd @ 15% O2	0.6	0.6	0.6	0.6	0.6	0.6
SO2	ppmvd	0.7	0.9	0.7	0.9	0.7	0.9
SO2	lb/yr	8,125	7,349	7,816	7,288	10,592	9,562
SO2	tpy	4.1	3.7	3.9	3.6	5.3	4.8
PM10	lb/yr	11,949	15,143	11,971	16,067	15,690	19,731
PM10	tpy	6.0	7.6	6.0	8.0	7.8	9.9
HCHO	lb/yr	597	482	573	468	777	628
HCHO	tpy	0.3	0.2	0.3	0.2	0.4	0.3
NH3	ppmvd @ 15% O2	10	10	10	10	10	10
NH3	ppmvd	12.4	14.7	11.9	14.6	12.4	14.7
NH3	lb/yr	37,180	33,384	35,687	33,010	48,425	43,406
NH3	tpy	18.6	16.7	17.8	16.5	24.2	21.7
CO2	lb/MMBtu (HHV)	118.9	118.9	118.9	118.9	118.9	118.9
N2O	lb/MMBtu (HHV)	2.2E-04	2.2E-04	2.2E-04	2.2E-04	2.2E-04	2.2E-04
CH4	lb/MMBtu (HHV)	2.2E-03	2.2E-03	2.2E-03	2.2E-03	2.2E-03	2.2E-03
CO2	tpy	158,864	143,693	152,826	142,513	207,119	186,976
N2O	tpy	0.29	0.27	0.28	0.26	0.38	0.35
CH4	tpy	2.95	2.67	2.83	2.64	3.84	3.47
CO2 Global Warming Potential	-	1	1	1	1	1	1
N2O Global Warming Potential	-	298	298	298	298	298	298
CH4 Global Warming Potential	-	25	25	25	25	25	25
Total GHG	tpy	158,867	143,696	152,829	142,516	207,123	186,980
Total CO2e	tpy	159,025	143,839	152,982	142,658	207,329	187,166

Vendor Data

Process Input Data

HOBBS 501F4 Annual Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

FACILITY CONDITIONS
Annual Hours of Operation with Duct Firing:
12 hr/day December, January, February, June, July, August and September
9 hr/day March, April, May, November
12 days annual outage (9 hr/day)

Case 4 Fired - Winter - Chillers Off = 12 hr/day * (31 days + 31days + 28 days) = 1,080 hr/yr
Case 4 Unfired - Winter - Chillers Off = 1,080 hr fired/yr * 4,974 total hr unfired/yr / 3,786 total hrfired/yr = 1,419 hr/yr

Case 5 Fired - Summer- Chillers On = 9 hr/day * (31 days + 30 days + 31days + 31 days + 30 days - 12 days) = 1,269 hr/yr
Case 5 Unfired - Summer - Chillers On = 1,242 hr fired/yr * 4,974 total hr unfired/yr / 3,786 total hrfired/yr = 1,632 hr/yr

Case 6 Fired - Summer- Chillers Off = 12 hr/day * (30 days + 31 days + 31 days + 30 days) = 1,464 hr/yr
Case 6 Unfired - Summer - Chillers On = 1,464 hr fired/yr * 4,974 total hr unfired/yr / 3,786 total hrfired/yr = 1,923 hr/yr

GT Heat Input (MMBtu/yr) = GT Heat Input (MMBtu/hr) * Annual Hours of Operation (hr/yr)
GT Heat Input (LHV) = 1,765 MMBtu/hr * 1,080 hr/yr = 1,906,200 MMBtu/yr
GT Heat Input (LHV) = 1,884 MMBtu/hr * 1,080 hr/yr = 2,034,720 MMBtu/yr

GT Fuel Flow Rate (MMscf/yr) = GT Heat Input (MMBtu/yr) (HHV) / Fuel Heat Content (HHV) (Btu/scf)
GT Fuel Flow Rate = 2,034,720 MMBtu/yr / 1,033 Btu/scf = 1,970 MMscf/yr

DB Heat Input (MMBtu/yr) = DB Heat Input (MMBtu/hr) * Annual Hours of Operation (hr/yr)
Case 4 DB Heat Input = 320 MMBtu/hr * 1,080 hr/yr = 345,600 MMBtu/yr
Case 5 DB Heat Input = 320 MMBtu/hr * 1,242 hr/yr = 397,440 MMBtu/yr
Case 6 DB Heat Input = 304 MMBtu/hr * 1,464 hr/yr = 445,056 MMBtu/yr

DB Heat Input (MMBtu/yr) (HHV) = DB Heat Input (MMBtu/yr) (LHV) * HHV/LHV Ratio
DB Heat Input (HHV) = 345,600 MMBtu/yr * 1.1 = 383,187 MMBtu/yr

DB Fuel Flow Rate (MMscf/yr) = DB Heat Input (MMBtu/yr) (HHV) / Fuel Heat Content (HHV) (Btu/scf)
DB Fuel Flow Rate = 383,187 MMBtu/yr / 1,033 Btu/scf = 371 MMscf/yr

GT+DB Heat Input (MMBtu/yr) = GT Heat Input (MMBtu/yr) + DB Heat Input (MMBtu/yr)
GT+DB Heat Input (LHV) = 1,906,200 MMBtu/yr + 345,600 MMBtu/yr = 2,251,800 MMBtu/yr
GT+DB Heat Input (HHV) = 2,034,720 MMBtu/yr + 383,187 MMBtu/yr = 2,417,907 MMBtu/yr

HHV/LHV Ratio = Fuel Heat Content (HHV) (Btu/scf) / Fuel Heat Content (LHV) (Btu/scf)
HHV/LHV Ratio = 1,033 Btu/scf / 932 Btu/scf = 1.1

GT EXHAUST GAS ANALYSIS
Molecular Weight (GT Exhaust Gases) = Sum (%vol * MW)
Molecular Weight (GT Exhaust Gases) = 12.5% vol * 32.0 lb/lbmole + 3.9% vol * 44.0 lb/lbmole + 7.7% vol * 18.0 lb/lbmole + 74.9% vol * 28.0 lb/lbmole + 0.9% vol * 39.9 lb/lbmole = 28.5 lb/lbmole

GT Exhaust Flow Rate (lbmole/yr) = GT Exhaust Flow Rate (lb/hr) / MW (GT Exhaust Gases) * Annual Hours of Operation (hr/yr)
GT Exhaust Flow Rate = 3,834,000 lb/hr / 28.5 lb/lbmole * 1,080 hr/yr = 145,422,904 lbmole/yr

GT Exhaust Flow Rate (MMscf/yr) = GT Exhaust Flow Rate (lbmole/yr) * Standard Molar Volume (scf/lbmole) * 1MMscf/1,000,000scf
GT Exhaust Flow Rate = 145,422,904 lbmole/yr * 385.3 scf/lbmole * 1 MMscf/1,000,000 scf = 56,032 MMscf/yr

GT Exhaust Flow Rate (Nm^3/yr) = GT Exhaust Flow Rate (MMscf/yr) * 1,000,000 scf/MMscf / 35.3 scf/Nm^3
GT Exhaust Flow Rate = 56,032 MMscf/yr * 1,000,000 scf/MMscf / 35.3 scf/Nm3 = 1,586,652,914 Nm3/yr

HOBBS 501F4 Annual Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

GT Exhaust O_2 (lbmole/hr) = GT Exhaust (lbmole/hr) * O_2%
GT Exhaust O2 = 145,422,904 lbmole/yr * 12.5% = 18,246,980 lbmole/yr

GT Exhaust CO_2 (lbmole/hr) = GT Exhaust (lbmole/hr) * CO_2%
GT Exhaust CO2 = 145,422,904 lbmole/yr * 3.9% = 5,674,898 lbmole/yr

GT Exhaust H_2O (lbmole/hr) = GT Exhaust (lbmole/hr) * H_2O%
GT Exhaust H2O = 145,422,904 lbmole/yr * 7.7% = 11,204,286 lbmole/yr

GT Exhaust N_2 (lbmole/hr) = GT Exhaust (lbmole/hr) * N_2%
GT Exhaust N2 = 145,422,904 lbmole/yr * 74.9% = 108,987,147 lbmole/yr

GT Exhaust Ar (lbmole/hr) = GT Exhaust (lbmole/hr) * Ar%
GT Exhaust Ar = 145,422,904 lbmole/yr * 0.9% = 1,309,592 lbmole/yr

GT EMISSION RATES
NOx (ppmvd) = NOx (ppmvd @ 15% O2) * (20.9-O2 vol%/(1-H2O vol%/100))/(20.9-15)
NOx = 25 ppmvd @ 15%O2 * (20.9 - 12.5 / (1 - 7.7 / 100)) / (20.9 - 15) = 31 ppmvd

NOx (lb/yr) = NOx (lb/hr) * Annual Hours of Operation (hr/yr)
NOx (lb/yr) = 172 lb/hr * 1,080 hr/yr = 185,760 lb/yr

CO (ppmvd) = CO (ppmvd @ 15% O2) * (20.9-O2 vol%/(1-H2O vol%/100))/(20.9-15)
CO = 15 ppmvd @ 15%O2 * (20.9 - 12.5 / (1 - 7.7 / 100)) / (20.9 - 15) = 19 ppmvd

CO (lb/yr) = CO (lb/hr) * Annual Hours of Operation (hr/yr)
CO (lb/yr) = 63 lb/hr * 1,080 hr/yr = 68,040 lb/yr

VOC (ppmvd) = VOC (ppmvd @ 15% O2) * (20.9-O2 vol%/(1-H2O vol%/100))/(20.9-15)
VOC = 2 ppmvd @ 15%O2 * (20.9 - 12.5 / (1 - 7.7 / 100)) / (20.9 - 15) = 2.5 ppmvd

VOC (lb/yr) = VOC (lb/hr) * Annual Hours of Operation (hr/yr)
VOC (lb/yr) = 5 lb/hr * 1,080 hr/yr = 5,184 lb/yr

SO_2 (lb/yr) = Sulfur Content (grains/Hscf) * 1 Hscf/100scf * 1 lb_S/7,000 grains / MW_S (lb_S/$lbmole_S$) * 1$lbmole_{SO2}$/$lbmole_S$ * MW_{SO2} (lb_{SO2}/$lbmole_{SO2}$) * GT Fuel Flow Rate (MMScf/yr) * 1,000,000 scf/MMscf
SO2 = 1.1 grains/Hscf * 1Hscf/100scf * 1lb/7,000grains / 32.1 lb/lbmole * 1lbmoleSO2/lbmoleS * 64.1 lb/lbmole * 1,970 MMscf/yr * 1,000,000 scf/MMscf = 6,184 lb/yr

PM_{10} (lb/yr) = PM_{10} (mg/Nm^3) * GT Exhaust Flow Rate (Nm^3/yr) * 1g/1,000 mg * 1 lb/453,59g
PM10 = 2.6 mg/Nm3 * 1,586,652,914 Nm3/yr * 1g/1,000mg * 1lb/453.59g = 9,095 lb/yr

HCHO (ppmvd) = HCHO (ppbvd @ 15% O2) * (20.9-O2 vol%/(1-H2O vol%/100))/(20.9-15) * 1 ppmvd/1,000 ppbvd
HCHO = 91 ppbvd @ 15%O2 * (20.9 - 12.5 / (1 - 7.7 / 100)) / (20.9 - 15) * 1 ppmvd/1,000 ppbvd = 0.1 ppmvd

HCHO (lb/yr) = GT Exhaust Flow Rate (lbmole/yr) * (1 - H_2O vol%/100) * HCHO (ppmvd) / 1,000,000 * MW_{HCHO} (lb/lbmole)
HCHO = 145,422,904 lbmole/yr * (1 - 7.7/100) * 0.1 ppmvd/1,000,000 * 30.0 lb/lbmole = 454 lb/yr

DB EMISSION RATES
NOx (lb/yr) = NOx (lb/MMBtu) (LHV) * DB Heat Input (LHV) (MMBtu/yr)
NOx = 0.02 lb/MMBtu (LHV) * 345,600 MMBtu/yr (LHV) = 6,912 lb/yr

CO (lb/yr) = CO (lb/MMBtu) (LHV) * DB Heat Input (LHV) (MMBtu/yr)
CO = 0.012 lb/MMBtu (LHV) * 345,600 MMBtu/yr (LHV) = 4,020 lb/yr

HOBBS 501F4 Annual Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

VOC (lb/yr) = VOC (lb/MMBtu) (LHV) * DB Heat Input (LHV) (MMBtu/yr)
VOC = 0.0013 lb/MMBtu (LHV) * 345,600 MMBtu/yr (LHV) = 438 lb/yr

SO_2 (lb/yr) = Sulfur Content (grains/Hscf) * 1 Hscf/100scf * 1 lb_S/7,000 grains / MW_S (lb_S/$lbmole_S$) * 1$lbmole_{SO2}$/$lbmole_S$ * MW_{SO2} (lb_{SO2}/$lbmole_{SO2}$) * GT Fuel Flow Rate (MMScf/yr) * 1,000,000 scf/MMscf
SO2 = 1.1 grains/Hscf * 1Hscf/100scf * 1lb/7,000grains / 32.1 lb/lbmole * 1lbmoleSO2/lbmoleS * 64.1 lb/lbmole * 371 MMscf/yr * 1,000,000 scf/MMscf = 1,165 lb/yr

PM_{10} (lb/yr) = PM_{10} (lb/MMBtu) (LHV) * DB Heat Input (LHV) (MMBtu/yr)
PM10 = 0.0175 lb/MMBtu (LHV) * 345,600 MMBtu/yr (LHV) = 6,048 lb/yr

HCHO Emission Factor (lb/MMBtu) (HHV) = HCHO Emission Factor (lb/MMscf) (HHV) / 1,020 Btu/scf
HCHO Emission Factor = 7.50E-02 lb/MMscf (HHV) / 1,020 Btu/scf = 7.35E-05 lb/MMBtu (HHV)

HCHO (lb/yr) = HCHO (lb/MMBtu) (HHV) * DB Heat Input (HHV) (MMBtu/yr)
HCHO = 7.353E-05 lb/MMBtu (HHV) * 383,187 MMBtu/yr (HHV) = 28.2 lb/yr

STACK EXHAUST GAS
Fuel x, in CxHy = stoichiometric lbmoles of carbon in fuel
Fuel y, in Cx,Hy = stoichiometric lbmoles of hydrogen in fuel

DB Fuel Flow Rate (lbmole/yr) =DB Heat Input (HHV) (MMBtu/yr) * 1,000,000 Btu/MMBtu / Fuel Heat Content (HHV) (Btu/scf) / Standard Molar Volume (scf/lbmole)
DB Fuel Flow Rate = 383,187 MMBtu/hr * 1,000,000 Btu/MMBtu / 1,033 Btu/scf / 385.3 scf/lbmole = 962,712.8 lbmole/yr

O_2 Consumed at DB (lbmole/yr) = (Fuel x + Fuel y/4) * DB Fuel Flow Rate (lbmole/yr)
O2 Consumed at DB = (1.04 + 4.02 / 4) * 962,713 lbmole/yr = 1,963,401 lbmole/yr

CO_2 Produced at DB (lbmole/yr) = Fuel x * DB Fuel Flow Rate (lbmole/yr)
CO2 Produced at DB = 1.04 * 962,713 lbmole/hr = 996,423 lbmole/hr

H_2O Produced at DB (lbmole/yr) = Fuel y / 2 * DB Fuel Flow Rate (lbmole/yr)
H2O Produced at DB = 4.02 / 2 * 962,713 lbmole/hr = 1,933,956 lbmole/hr

Stack Exhaust O_2 (lbmole/yr) = GT Exhaust O_2 (lbmole/yr) - DB Consumed O_2 (lbmole/yr)
Stack Exahust O2 = 18,246,980 lbmole/yr - 1,963,401 lbmole/yr = 16,283,580 lbmole/yr

Stack Exhaust CO_2 (lbmole/yr) = GT Exhaust CO_2 (lbmole/yr) + DB Produced CO_2 (lbmole/yr)
Stack Exhaust CO2 = 5,674,898 lbmole/yr + 996,423 lbmole/yr = 6,671,321 lbmole/yr

Stack Exhaust H_2O (lbmole/yr) = GT Exhaust H_2O (lbmole/yr) + DB Produced H_2O (lbmole/yr)
Stack Exahust H2O = 11,204,286 lbmole/yr + 1,933,956 lbmole/yr = 13,138,242 lbmole/yr

Stack Exhaust N_2 (lbmole/yr) = GT Exhaust N_2 (lbmole/yr)
Stack Exhaust N2 = 108,987,147 lbmole/yr

Stack Exhaust Ar (lbmole/yr) = GT Exhaust Ar (lbmole/yr)
Stack Exhaust Ar = 1,309,592 lbmole/yr

Stack Exhaust Flow Rate (lbmole/yr) = Sum Stack Exhaust Pollutants Flow Rates (lbmole/yr)
Stack Exhaust Flow Rate = 16,283,580 lbmole/yr + 6,671,321 lbmole/yr + 13,138,242 lbmole/yr + 108,987,147 lbmole/yr + 1,309,592 lbmole/yr = 146,389,882 lbmole/yr

HOBBS 501F4 Annual Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

Stack Exhaust i %vol = Stack Exhaust i (lbmole/yr) * 100 / Stack Exhaust Flow Rate (lbmole/yr)
Stack Exhaust O2 = 16,283,580 lbmole/yr * 100 /146,389,882 lbmole/yr = 11.1 %vol
Stack Exhaust CO2 = 6,671,321 lbmole/yr * 100 /146,389,882 lbmole/yr = 4.6 %vol
Stack Exhaust H2O = 13,138,242 lbmole/yr * 100 /146,389,882 lbmole/yr = 9.0 %vol
Stack Exhaust N2 = 108,987,147 lbmole/yr * 100 /146,389,882 lbmole/yr = 74.4 %vol
Stack Exhaust Ar = 1,309,592 lbmole/yr * 100 /146,389,882 lbmole/yr = 0.9 %vol

Molecular Weight (Stack Exhaust Gases) = Sum (%vol * MW)
Molecular Weight (GT Exhaust Gases) = 11.1% vol * 32.0 lb/lbmole + 4.6% vol * 44.0 lb/lbmole + 9.0% vol * 18.0 lb/lbmole + 74.4% vol * 28.0 lb/lbmole + 0.9% vol * 39.9 lb/lbmole = 28.4 lb/lbmole

NOx (pre-SCR as NO_2) (lb/yr) = GT NOx Exhaust (lb/yr) + DB NOx Exhaust (lb/yr)
NOx (pre-SCR as NO2) = 185,760.0 lb/yr + 6,912.0 lb/yr = 192,672 lb/yr

NOx (pre-SCR) (ppmvd) = NOx (pre-SCR as NO_2) (lb/yr) / (Stack Exhaust Flow Rate (lbmole/yr) * (1 - Stack Exhaust H_2O vol%/100) * 1/1,000,000 * MW_{NO2} (lb/lbmole))
NOx (pre-SCR) = 192,672 lb/yr /(146,389,882 lbmole/yr * (1 - 9.0 /100) * 1 / 1,000,000 * 46.0 lb/lbmole) = 31.4 ppmvd

NOx (pre-SCR) (ppmvd @ 15% O_2) = NOx (pre-SCR) (ppmvd) * (20.9 - 15) / (20.9 - Stack Exhaust O_2%/(1 - H_2O%/100))
NOx (pre-SCR) = 31.4 ppmvd * (20.9 - 15) / (20.9 - 11.1 / (1 - 9.0/100)) = 21.4 ppmvd @ 15% O2

NOx (pre-SCR as NO_2) (tpy) = NOx (pre-SCR as NO_2) (lb/yr) * 1 ton / 2,000 lb
NOx (pre-SCR as NO2) = 192,672 lb/yr * 1ton / 2,000 lb = 96.3 tpy

NOx (post-SCR) (ppmvd) = NOx (post-SCR) (ppmvd @ 15% O_2) * (20.9-O_2 vol%/(1-H_2O vol%/100))/(20.9-15)
NOx (post-SCR) = 2.0 ppmvd @ 15% O2 * (20.9 - 11.1 / (1 - 9.0/100)) / (20.9 - 15) = 2.9 ppmvd

NOx (post-SCR as NO_2) (lb/yr) = NOx (post-SCR) (ppmvd) * (1 - H_2O %vol/100) * Stack Exhaust Flow Rate (lbmole/yr) /1,000,000 * MW_{NO2} (lb/lbmole)
NOx (post-SCR as NO2) = 2.9 ppmvd * (1 - 9.0/100) * 146,389,882 lbmole/yr / 1,000,000 * 46.0 lb/lbmole = 18,037 lb/yr

NOx (post-SCR as NO_2) (tpy) = NOx (post-SCR as NO_2) (lb/yr) * 1 ton / 2,000 lb
NOx (post-SCR as NO2) = 18,037 lb/yr * 1ton / 2,000 lb = 9.0 tpy

CO (pre-Catalytic Oxidation) (lb/yr) = GT CO Exhaust (lb/yr) + DB CO Exhaust (lb/yr)
CO (pre-Catalytic Oxidation) = 68,040.0 lb/yr + 4,020.5 lb/yr = 72,060 lb/yr

CO (pre-Catalytic Oxidation) (ppmvd) = CO (pre-Catalytic Oxidation) (lb/yr) / (Stack Exhaust Flow Rate (lbmole/yr) * (1 - Stack Exhaust H_2O vol%/100) * 1/1,000,000 * MW_{CO} (lb/lbmole))
CO (pre-Catalytic Oxidation) = 72,060 lb/yr /(146,389,882 lbmole/yr * (1 - 9.0 /100) * 1 / 1,000,000 * 28.0 lb/lbmole) = 19.3 ppmvd

CO (pre-Catalytic Oxidation) (ppmvd @ 15% O_2) = CO (pre-Catalytic Oxidation) (ppmvd) * (20.9 - 15) / (20.9 - Stack Exhaust O_2%/(1 - H_2O%/100))
CO (pre-Catalytic Oxidation) = 19.3 ppmvd * (20.9 - 15) / (20.9 - 11.1 / (1 - 9.0/100)) = 13.1 ppmvd @ 15% O2

CO (pre-Catalytic Oxidation) (tpy) = CO (pre-Catalytic Oxidation) (lb/yr) * 1 ton / 2,000 lb
CO (pre-Catalytic Oxidation) = 72,060 lb/yr * 1ton / 2,000 lb = 36.0 tpy

CO (post-Catalytic Oxidation) (ppmvd) = CO (post-Catalytic Oxidation) (ppmvd @ 15% O_2) * (20.9-O_2 vol%/(1-H_2O vol%/100))/(20.9-15)
CO (post-Catalytic Oxidation) = 2.0 ppmvd @ 15% O2 * (20.9 - 11.1 / (1 - 9.0/100)) / (20.9 - 15) = 2.9 ppmvd

CO (post-Catalytic Oxidation) (lb/yr) = CO (post-Catalytic Oxidation) (ppmvd) * (1 - H_2O %vol/100) * Stack Exhaust Flow Rate (lbmole/yr) /1,000,000 * MW_{CO} (lb/lbmole)
CO (post-Catalytic Oxidation) = 2.9 ppmvd * (1 - 9.0/100) * 146,389,882 lbmole/yr / 1,000,000 * 28.0 lb/lbmole = 10,982 lb/yr

CO (post-Catalytic Oxidation) (tpy) = CO (post-Catalytic Oxidation) * 1 ton / 2,000 lb
CO (post-Catalytic Oxidation)= 10,982 lb/yr * 1ton / 2,000 lb = 5.5 tpy

HOBBS 501F4 Annual Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

VOC (pre-Catalytic Oxidation) (lb/yr) = GT VOC Exhaust (lb/yr) + DB VOC Exhaust (lb/yr)
VOC (pre-Catalytic Oxidation) = 5,184.0 lb/yr + 437.8 lb/yr = 5,622 lb/yr

VOC (pre-Catalytic Oxidation) (ppmvd) = VOC (pre-Catalytic Oxidation) (lb/yr) / (Stack Exhaust Flow Rate (lbmole/yr) * (1 - Stack Exhaust H2O vol%/100) * 1/1,000,000 * MW_{VOC} (lb/lbmole))
VOC (pre-Catalytic Oxidation) = 5,622 lb/yr /(146,389,882 lbmole/yr * (1 - 9.0 /100) * 1 / 1,000,000 * 16.0 lb/lbmole) = 2.6 ppmvd

VOC (pre-Catalytic Oxidation) (ppmvd @ 15% O2) = VOC (pre-Catalytic Oxidation) (ppmvd) * (20.9 - 15) / (20.9 - Stack Exhaust O2%/(1 - H2O%/100))
VOC (pre-Catalytic Oxidation) = 2.6 ppmvd * (20.9 - 15) / (20.9 - 11.1 / (1 - 9.0/100)) = 1.8 ppmvd @ 15% O2

VOC (pre-Catalytic Oxidation) (tpy) = VOC (pre-Catalytic Oxidation) (lb/yr) * 1 ton / 2,000 lb
VOC (pre-Catalytic Oxidation) = 5,622 lb/yr * 1ton / 2,000 lb = 2.8 tpy

VOC (post-Catalytic Oxidation) (ppmvd) = VOC (post-Catalytic Oxidation) (ppmvd @ 15% O2) * (20.9-O2 vol%/(1-H2O vol%/100))/(20.9-15)
VOC (post-Catalytic Oxidation) = 0.6 ppmvd @ 15% O2 * (20.9 - 11.1 / (1 - 9.0/100)) / (20.9 - 15) = 0.9 ppmvd

VOC (post-Catalytic Oxidation) (lb/yr) = VOC (post-Catalytic Oxidation) (ppmvd) * (1 - H2O %vol/100) * Stack Exhaust Flow Rate (lbmole/yr) /1,000,000 * MWVOC (lb/lbmole)
VOC (post-Catalytic Oxidation) = 0.9 ppmvd * (1 - 9.0/100) * 146,389,882 lbmole/yr / 1,000,000 * 16.0 lb/lbmole = 1,887 lb/yr

VOC (post-Catalytic Oxidation) (tpy) = VOC (post-Catalytic Oxidation) * 1 ton / 2,000 lb
VOC (post-Catalytic Oxidation)= 1,887 lb/yr * 1ton / 2,000 lb = 0.9 tpy

SO_2 (lb/yr) = GT SO_2 Exhaust (lb/yr) + DB SO_2 Exhaust (lb/yr)
SO2 = 6,184.0 lb/yr + 1,164.6 lb/yr = 7,349 lb/yr

SO_2 (ppmvd) = SO_2 (lb/yr) / (Stack Exhaust Flow Rate (lbmole/yr) * (1 - Stack Exhaust H_2O vol%/100) * 1/1,000,000 * MW_{SO2} (lb/lbmole))
SO2 = 7,349 lb/yr /(146,389,882 lbmole/yr * (1 - 9.0 /100) * 1 / 1,000,000 * 64.1 lb/lbmole) = 0.9 ppmvd

SO_2 (ppmvd @ 15% O_2) = SO_2 (ppmvd) * (20.9 - 15) / (20.9 - Stack Exhaust O_2%/(1 - H_2O%/100))
SO2 = 0.9 ppmvd * (20.9 - 15) / (20.9 - 11.1 / (1 - 9.0/100)) = 0.6 ppmvd @ 15% O2

SO_2 (tpy) = SO_2 (lb/yr) * 1 ton / 2,000 lb
SO2= 7,349 lb/yr * 1ton / 2,000 lb = 3.7 tpy

PM_{10} (lb/yr) = GT PM_{10} Exhaust (lb/yr) + DB PM_{10} Exhaust (lb/yr)
PM10 = 9,094.7 lb/yr + 6,048.0 lb/yr = 15,143 lb/yr

PM_{10} (tpy) = PM_{10} (lb/yr) * 1 ton / 2,000 lb
PM10 = 15,143 lb/yr * 1ton / 2,000 lb = 7.6 tpy

NH_3 (ppmvd) = NH_3 (ppmvd @ 15% O2) * (20.9-O2 vol%/(1-H2O vol%/100))/(20.9-15)
NH3 = 10.0 ppmvd @ 15% O2 * (20.9 - 11.1 / (1 - 9.0/100)) / (20.9 - 15) = 14.7 ppmvd

NH_3 (lb/yr) = NH_3 (ppmvd) * (1 - H2O %vol/100) * Stack Exhaust Flow Rate (lbmole/yr) /1,000,000 * MW_{NH3} (lb/lbmole)
NH3 = 14.7 ppmvd * (1 - 9.0/100) * 146,389,882 lbmole/yr / 1,000,000 * 17.0 lb/lbmole = 33,384 lb/yr

NH_3 (tpy) = NH_3 (lb/yr) * 1 ton / 2,000 lb
NH3 = 33,384 lb/yr * 1ton / 2,000 lb = 16.7 tpy

HOBBS 501F4 Annual Emission Rate (100% Load) Example Calculation
(Example calculations for Case 4 Fired unless otherwise noted)

CO_2 (lb/MMBtu) = Fc (scf/MMBtu) * Uf (lbmole/scf) * MW_{CO2} (lb/lbmole)
CO2 Emission Factor = 1,040 scf/MMBtu * 1 lbmole/385 scf * 44 lb/lbmole = 118.9 lb/MMBtu

N_2O (lb/MMBtu) = N_2O (kg/MMBtu) * 1 metric ton / 1,000 kg * 1.1023 short tons / metric ton * 2,000 lb / short ton
N2O Emission Factor = 1.00E-04 kg/MMBtu * 1 metric ton / 1,000 kg * 1.1023 short tons / metric tons * 2,000 lb / short tons = 2.2E-04 lb/MMBtu

CH_4 (lb/MMBtu) = CH_4 (kg/MMBtu) * 1 metric ton / 1,000 kg * 1.1023 short tons / metric ton * 2,000 lb / short ton
CH4 Emission Factor = 1.00E-04 kg/MMBtu * 1 metric ton / 1,000 kg * 1.1023 short tons / metric tons * 2,000 lb / short tons = 2.2E-03 lb/MMBtu

CO_2 (tpy) = CO_2 (lb/MMBtu) (HHV) * GT+DB Heat Input (MMBtu/yr) (HHV) * 1 ton / 2,000 lb
CO2 = 118.9 lb/MMBtu (HHV) * 2,417,907 MMBtu/yr (HHV) * 1 ton / 2,000 lb = 143,693 tpy

N_2O (tpy) = N_2O (lb/MMBtu) (HHV) * GT+DB Heat Input (MMBtu/yr) (HHV) * 1 ton / 2,000 lb
N2O = 2.2E-04 lb/MMBtu (HHV) * 2,417,907 MMBtu/yr (HHV) * 1 ton / 2,000 lb = 0.27 tpy

CH_4 (tpy) = CH_4 (lb/MMBtu) (HHV) * GT+DB Heat Input (MMBtu/yr) (HHV) * 1 ton / 2,000 lb
CH4 = 22.0E-04 lb/MMBtu (HHV) * 2,417,907 MMBtu/yr (HHV) * 1 ton / 2,000 lb = 2.67 tpy

Total GHG (tpy) = CO_2 (tpy) + N_2O (tpy) + CH_4 (tpy)
Total GHG = 143,693 tpy + 0.27 tpy + 2.67 tpy = 143,696 tpy

Total CO_2e (tpy) = CO_2 (tpy) * GWP_{CO2} + N_2O (tpy) * GWP_{N2O} + CH_4 (tpy) * GWP_{CH4}
Total GHG = 143,693 tpy * 1 + 0.27 tpy * 298 + 2.67 tpy * 25 = 143,839 tpy

HOBBS 501F4+ Annual Emission Rate Calculation (100% Load) (8,290 hr/yr)

		Case 4 Unfired Winter Chillers Off	Case 4 Fired Winter Chillers Off	Case 5 Unfired Summer Chillers On	Case 5 Fired Summer Chillers On	Case 6 Unfired Summer Chillers Off	Case 6 Fired Summer Chillers Off
SITE CONDITIONS							
Ambient Temperature	ºF	30	30	95	95	95	95
Ambient Relative Humidity	%	60	60	20	20	20	20
Barometric Pressure	psia	12.83	12.83	12.83	12.83	12.83	12.83
Compressor Inlet Temperature	ºF	30	30	95	95	46	46
FACILITY CONDITIONS							
Annual Hours of Operation	hr/yr	1,285	1,080	1,478	1,242	1,742	1,464
GT Power Output	MW	189	189	151	151	180	180
GT Model		Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+	Hobbs 501F4+
GT Load		Base	Base	Base	Base	Base	Base
Chillers	On/Off	Off	Off	**On**	**On**	Off	Off
GT Fuel Flow Rate	lb/hr	86,940	86,940	72,720	72,720	83,592	83,592
GT Heat Input (LHV)	MMBtu/hr	1,765	1,765	1,477	1,477	1,697	1,697
GT Heat Input (HHV)	MMBtu/hr	1,884	1,884	1,576	1,576	1,812	1,812
GT Heat Input (LHV)	MMBtu/yr	2,267,703	1,906,200	2,182,327	1,834,434	2,955,566	2,484,408
GT Heat Input (HHV)	MMBtu/yr	2,420,597	2,034,720	2,328,604	1,957,392	3,155,855	2,652,768
GT Fuel Flow Rate	MMscf/yr	2,343	1,970	2,254	1,895	3,055	2,568
DB Model		Forney	Forney	Forney	Forney	Forney	Forney
DB Status		Off	On	Off	On	Off	On
DB Heat Input (LHV)	MMBtu/yr	-	345,600	-	397,440	-	445,056
DB Heat Input (HHV)	MMBtu/yr	-	383,187	-	440,665	-	493,459
DB Fuel Flow Rate	MMscf/yr	-	371	-	427	-	478
GT+DB Heat Input (LHV)	MMBtu/yr	2,267,703	2,251,800	2,182,327	2,231,874	2,955,566	2,929,464
GT+DB Heat Input (HHV)	MMBtu/yr	2,420,597	2,417,907	2,328,604	2,398,057	3,155,855	3,146,227
FUEL ANALYSIS							
Fuel Type		PNG	PNG	PNG	PNG	PNG	PNG
Fuel Molecular Weight	lb/lbmole	17.29	17.29	17.29	17.29	17.29	17.29
Sulfur Content	grains/100scf	1.1	1.1	1.1	1.1	1.1	1.1
Fuel Heat Content (LHV)	Btu/scf	932	932	932	932	932	932
Fuel Heat Content (HHV)	Btu/scf	1,033	1,033	1,033	1,033	1,033	1,033
HHV/LHV Ratio		1.1	1.1	1.1	1.1	1.1	1.1
GT EXHAUST GAS ANALYSIS							
Oxygen, O2	%vol	12.55	12.55	12.70	12.70	12.46	12.46
Carbon Dioxide, CO2	%vol	3.90	3.90	3.70	3.70	3.90	3.90
Water, H2O	%vol	7.70	7.70	8.31	8.31	8.40	8.40
Nitrogen, N2	%vol	74.94	74.94	74.38	74.38	74.34	74.34
Argon, Ar	%vol	0.90	0.90	0.90	0.90	0.90	0.90
Total	%vol	100.00	100.00	100.00	100.00	100.00	100.00
Molecular Weight (GT Exhaust Gases)	lb/lbmole	28.5	28.5	28.4	28.4	28.4	28.4
GT Exhaust Temperature	ºF	1,121	1,121	1,155	1,155	1,130	1,130
GT Exhaust Flow Rate	lb/hr	3,834,000	3,834,000	3,330,000	3,330,000	3,704,400	3,704,400
GT Exhaust Flow Rate	lbmole/yr	173,001,786	145,422,904	173,321,380	145,691,551	227,173,929	190,959,257
GT Exhaust Flow Rate	MMscf/yr	66,658	56,032	66,782	56,136	87,531	73,577
GT Exhaust Flow Rate	Nm3/yr	1,887,555,395	1,586,652,914	1,891,042,363	1,589,584,011	2,478,606,639	2,083,482,402
GT Exhaust Oxygen, O2	lbmole/yr	21,707,448	18,246,980	22,018,704	18,508,617	28,297,303	23,786,321
GT Exhaust Carbon Dioxide, CO2	lbmole/yr	6,751,120	5,674,898	6,419,953	5,396,524	8,864,215	7,451,137
GT Exhaust Water, H2O	lbmole/yr	13,329,135	11,204,286	14,401,516	12,105,715	19,092,156	16,048,602
GT Exhaust Nitrogen, N2	lbmole/yr	129,656,131	108,987,147	128,919,597	108,368,027	168,874,666	141,953,705
GT Exhaust Argon, Ar	lbmole/yr	1,557,951	1,309,592	1,561,610	1,312,668	2,045,588	1,719,493

HOBBS 501F4+ Annual Emission Rate Calculation (100% Load) (8,290 hr/yr)

		Case 4 Unfired Winter Chillers Off	Case 4 Fired Winter Chillers Off	Case 5 Unfired Summer Chillers On	Case 5 Fired Summer Chillers On	Case 6 Unfired Summer Chillers Off	Case 6 Fired Summer Chillers Off
GT EMISSION RATES							
NOx	ppmvd @ 15% O2	25	25	25	25	25	25
NOx	ppmvd	31	31	30	30	31	31
NOx (as NO2)	lb/hr	172	172	165	165	141	141
NOx (as NO2)	lb/yr	220,989	185,760	243,794	204,930	245,571	206,424
CO	ppmvd @ 15% O2	15	15	15	15	15	15
CO	ppmvd	19	19	18	18	19	19
CO	lb/hr	63	63	60	60	52	52
CO	lb/yr	80,944	68,040	88,652	74,520	90,565	76,128
VOC	ppmvd @ 15% O2	2.0	2.0	2.0	2.0	2.0	2.0
VOC	ppmvd	2.5	2.5	2.4	2.4	2.5	2.5
VOC (as CH4)	lb/hr	4.8	4.8	4.6	4.6	3.9	3.9
VOC (as CH4)	lb/yr	6,167	5,184	6,797	5,713	6,792	5,710
Sulfur Content	grains/100scf	1.1	1.1	1.1	1.1	1.1	1.1
SO2	lb/yr	7,357	6,184	7,077	5,949	9,591	8,062
PM10	mg/Nm3	2.6	2.6	2.6	2.6	2.6	2.6
PM10	lb/yr	10,820	9,095	10,839	9,112	14,207	11,943
Formaldehyde, HCHO	ppbvd @ 15% O2	91	91	91	91	91	91
Formaldehyde, HCHO	ppmvd	0.1	0.1	0.1	0.1	0.1	0.1
Formaldehyde, HCHO	lb/yr	540	454	518	436	704	591
DB EMISSION RATES							
NOx	lb/MMBtu (LHV)	0.02	0.02	0.02	0.02	0.02	0.02
NOx	lb/yr	-	6,912	-	7,949	-	8,901
CO	lb/MMBtu (LHV)	0.012	0.012	0.012	0.012	0.012	0.012
CO	lb/yr	-	4,020	-	4,624	-	5,177
VOC	lb/MMBtu (LHV)	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
VOC (as CH4)	lb/yr	-	438	-	503	-	564
Sulfur Content	grains/100scf	1.10	1.10	1.10	1.10	1.10	1.10
SO2	lb/yr	-	1,165	-	1,339	-	1,500
PM10	lb/MMBtu (LHV)	0.0175	0.0175	0.0175	0.0175	0.0175	0.0175
PM10	lb/yr	-	6,048	-	6,955	-	7,788
Formaldehyde, HCHO	lb/MMscf (HHV)	7.50E-02	7.50E-02	7.50E-02	7.50E-02	7.50E-02	7.50E-02
Formaldehyde, HCHO	lb/MMBtu (HHV)	7.35E-05	7.35E-05	7.35E-05	7.35E-05	7.35E-05	7.35E-05
Formaldehyde, HCHO	lb/yr	-	28.18	-	32.40	-	36.28
STACK EXHAUST GAS							
Fuel x, in CxHy		1.04	1.04	1.04	1.04	1.04	1.04
Fuel y, in Cx,Hy		4.02	4.02	4.02	4.02	4.02	4.02
DB Fuel Flow Rate	lbmole/yr	-	962,713	-	1,107,120	-	1,239,760
Oxygen Consumed at DB, O2	lbmole/yr	-	1,963,401	-	2,257,911	-	2,528,424
Carbon Dioxide Produced at DB, CO2	lbmole/yr	-	996,423	-	1,145,886	-	1,283,171
Water Produced at DB, H2O	lbmole/yr	-	1,933,956	-	2,224,050	-	2,490,506
Stack Exhaust Oxygen, O2	lbmole/yr	21,707,448	16,283,580	22,018,704	16,250,706	28,297,303	21,257,897
Stack Exhaust Carbon Dioxide, CO2	lbmole/yr	6,751,120	6,671,321	6,419,953	6,542,410	8,864,215	8,734,308
Stack Exhaust Water, H2O	lbmole/yr	13,329,135	13,138,242	14,401,516	14,329,765	19,092,156	18,539,108
Stack Exhaust Nitrogen, N2	lbmole/yr	129,656,131	108,987,147	128,919,597	108,368,027	168,874,666	141,953,705
Stack Exhaust Argon, Ar	lbmole/yr	1,557,951	1,309,592	1,561,610	1,312,668	2,045,588	1,719,493
Stack Exhaust Flow Rate	lbmole/yr	173,001,786	146,389,882	173,321,380	146,803,575	227,173,929	192,204,510
Stack Exhaust Oxygen, O2	%vol	12.5	11.1	12.7	11.1	12.5	11.1
Stack Exhaust Carbon Dioxide, CO2	%vol	3.9	4.6	3.7	4.5	3.9	4.5
Stack Exhaust Water, H2O	%vol	7.7	9.0	8.3	9.8	8.4	9.6
Stack Exhaust Nitrogen, N2	%vol	74.9	74.4	74.4	73.8	74.3	73.9
Stack Exhaust Argon, Ar	%vol	0.9	0.9	0.9	0.9	0.9	0.9
Stack Exhaust Flow Rate	%vol	100.0	100.0	100.0	100.0	100.0	100.0
Molecular Weight (Stack Exhaust Gases)	lb/lbmole	28.5	28.4	28.4	28.3	28.4	28.3

HOBBS 501F4+ Annual Emission Rate Calculation (100% Load) (8,290 hr/yr)

		Case 4 Unfired Winter Chillers Off	Case 4 Fired Winter Chillers Off	Case 5 Unfired Summer Chillers On	Case 5 Fired Summer Chillers On	Case 6 Unfired Summer Chillers Off	Case 6 Fired Summer Chillers Off
STACK EMISSION RATES							
NOx (pre-SCR)	ppmvd @ 15% O2	24.3	21.4	27.9	23.9	20.7	18.4
NOx (pre-SCR)	ppmvd	30.1	31.4	33.3	34.9	25.7	27.0
NOx (pre-SCR as NO2)	lb/yr	220,989	192,672	243,794	212,879	245,571	215,325
NOx (pre-SCR as NO2)	tpy	110.5	96.3	121.9	106.4	122.8	107.7
NOx (post-SCR)	ppmvd @ 15% O2	2	2	2	2	2	2
NOx (post-SCR)	ppmvd	2.5	2.9	2.4	2.9	2.5	2.9
NOx (post-SCR as NO2)	lb/yr	18,190	18,037	17,460	17,835	23,692	23,452
NOx (post-SCR as NO2)	tpy	9.1	9.0	8.7	8.9	11.8	11.7
CO (pre-Catalytic Oxidation)	ppmvd @ 15% O2	14.6	13.1	16.7	14.6	12.6	11.4
CO (pre-Catalytic Oxidation)	ppmvd	18.1	19.3	19.9	21.3	15.5	16.7
CO (pre-Catalytic Oxidation)	lb/yr	80,944	72,060	88,652	79,144	90,565	81,305
CO (pre-Catalytic Oxidation)	tpy	40.5	36.0	44.3	39.6	45.3	40.7
CO (post-Catalytic Oxidation)	ppmvd @ 15% O2	2	2	2	2	2	2
CO (post-Catalytic Oxidation)	ppmvd	2.5	2.9	2.4	2.9	2.5	2.9
CO (post-Catalytic Oxidation)	lb/yr	11,075	10,982	10,630	10,859	14,425	14,279
CO (post-Catalytic Oxidation)	tpy	5.5	5.5	5.3	5.4	7.2	7.1
VOC (pre-Catalytic Oxidation)	ppmvd @ 15% O2	1.9	1.8	2.2	2.0	1.6	1.5
VOC (pre-Catalytic Oxidation)	ppmvd	2.41	2.63	2.7	2.9	2.0	2.3
VOC (pre-Catalytic Oxidation as CH4)	lb/yr	6,167	5,622	6,797	6,217	6,792	6,273
VOC (pre-Catalytic Oxidation as CH4)	tpy	3.1	2.8	3.4	3.1	3.4	3.1
VOC (post-Catalytic Oxidation)	ppmvd @ 15% O2	0.6	0.6	0.6	0.6	0.6	0.6
VOC (post-Catalytic Oxidation)	ppmvd	0.7	0.9	0.7	0.9	0.7	0.9
VOC (post-Catalytic Oxidation as CH4)	lb/yr	1,903	1,887	1,826	1,866	2,478	2,453
VOC (post-Catalytic Oxidation as CH4)	tpy	1.0	0.9	0.9	0.9	1.2	1.2
SO2	ppmvd @ 15% O2	0.58	0.59	0.58	0.59	0.58	0.59
SO2	ppmvd	0.72	0.86	0.70	0.86	0.72	0.86
SO2	lb/yr	7,357	7,349	7,077	7,288	9,591	9,562
SO2	tpy	3.7	3.7	3.5	3.6	4.8	4.8
PM10	lb/yr	10,820	15,143	10,839	16,067	14,207	19,731
PM10	tpy	5.4	7.6	5.4	8.0	7.1	9.9
HCHO	lb/yr	540	482	518	468	704	628
HCHO	tpy	0.3	0.2	0.3	0.2	0.4	0.3
NH3	ppmvd @ 15% O2	10	10	10	10	10	10
NH3	ppmvd	12.38	14.71	11.94	14.63	12.37	14.68
NH3	lb/yr	33,667	33,384	32,315	33,010	43,849	43,406
NH3	tpy	16.8	16.7	16.2	16.5	21.9	21.7
CO2	lb/MMBtu (HHV)	118.9	118.9	118.9	118.9	118.9	118.9
N2O	lb/MMBtu (HHV)	2.2E-04	2.2E-04	2.2E-04	2.2E-04	2.2E-04	2.2E-04
CH4	lb/MMBtu (HHV)	2.2E-03	2.2E-03	2.2E-03	2.2E-03	2.2E-03	2.2E-03
CO2	tpy	143,853	143,693	138,386	142,513	187,548	186,976
N2O	tpy	0.27	0.27	0.26	0.26	0.35	0.35
CH4	tpy	2.67	2.67	2.57	2.64	3.48	3.47
CO2 Global Warming Potential	-	1	1	1	1	1	1
N2O Global Warming Potential	-	298	298	298	298	298	298
CH4 Global Warming Potential	-	25	25	25	25	25	25
Total GHG	tpy	143,856	143,696	138,388	142,516	187,552	186,980
Total CO2e	tpy	143,999	143,839	138,526	142,658	187,739	187,166

Vendor Data

Process Input Data

HOBBS 501F4+ Hazardous Air Pollutants

HAPs Emission Rates Summary Table per Unit

Hazardous Air Pollutants (HAPs)	Max. Hourly Emission Rate (lb/hr)(1)	Annual Emission Rate (tpy)(2)
Formaldehyde	0.14	0.56
Hexane	0.21	0.36
Total HAPs	0.54	1.68

Notes:

(1) Max. Hourly Emission Rate (lb/hr) = CTG + HRSG DB Max. Hourly Emisison Rate (lb/hr) * (1 - Control Efficiency)

Oxidation Catalyst Reduction Control = 68% Sims Roy, Emission Standards Division (Docket A-95-51, December 30, 1990)

Formaldehyde Max. Hourly Emission Rate= 0.45 lb/hr * (1 - 0.68) = 0.14 lb/hr

(2) Annual Emission Rate (tpy) = CTG + HRSG DB Annual Emission Rate (tpy) * (1 - Control Efficiency)

Formaldehyde Annual Emission Rate = 1.76 tpy * (1 - 0.68) = 0.56 tpy

CTG + HRSG DB Speciated HAP Emission Rates per Unit

Hazardous Air Pollutants (HAPs)	Max. Hourly Emission Rate (lb/hr)(1)	Annual Emission Rate (tpy)(2)
1,3-Butadiene	< 8.20E-04	< 0.003
Acetaldehyde	0.08	0.30
Acrolein	0.01	0.05
Benzene	0.02	0.09
Dichlorobenzene	4.30E-04	7.43E-04
Ethylbenzene	0.06	0.24
Formaldehyde	**0.45**	**1.76**
Hexane	**0.65**	**1.11**
Naphthalene	0.003	0.01
PAHs	4.23E-03	0.02
Propylene Oxide	< 0.06	< 0.22
Toluene	0.25	0.97
Xylenes	0.12	0.48
Arsenic	7.17E-05	1.24E-04
Beryllium	< 4.30E-06	< 7.43E-06
Cadmium	3.95E-04	6.81E-04
Chromium	5.02E-04	8.67E-04
Cobalt	3.01E-05	5.20E-05
Manganese	1.36E-04	2.35E-04
Nickel	7.53E-04	0.001
Selenium	< 8.61E-06	< 1.49E-05

Notes:

(1) Max. Hourly Emssion Rate (lb/hr) = CTG Hourly Emission Rate (lb/hr) + DB Hourly Emission Rate (lb/hr)

Benzene Max. Hourly Emission Rate = 0.02 lb/hr + 7.53E-04 lb/hr = 0.02 lb/hr

(2) Annual Emission Rate (tpy) = CTG Annual Emission Rate (tpy) + DB Annual Emission Rate (tpy)

Benzene Annual Emission Rate = 0.09 tpy + 1.30E-03 tpy = 0.09 tpy

CTG HAPs Emission Rates per Unit

Hazardous Air Pollutants (HAPs)	Emission Factor (lb/MMBtu) (2)	Emission Factor (lb/MMBtu) (3)	Max. Hourly Emission Rate (lb/hr) (4)	Annual Emission Rate (tpy) (5)
1,3-Butadiene	< 4.30E-07	< 4.35E-07	< 0.001	< 0.003
Acetaldehyde	4.00E-05	4.05E-05	0.08	0.30
Acrolein	6.40E-06	6.48E-06	0.01	0.05
Benzene	1.20E-05	1.22E-05	0.02	0.09
Ethylbenzene	3.20E-05	3.24E-05	0.06	0.24
Formaldehyde(1)	-	-	-	-
Naphthalene	1.30E-06	1.32E-06	0.002	0.01
PAHs	2.20E-06	2.23E-06	0.00	0.02
Propylene Oxide	< 2.90E-05	< 2.94E-05	< 0.06	< 0.22
Toluene	1.30E-04	1.32E-04	0.25	0.97
Xylenes	6.40E-05	6.48E-05	0.12	0.48

CTG Characteristics

		Mitsubishi 501F4+
Fuel Heating Content (HHV)	Btu/scf	1,033
Max. CTG Heat Rate (HHV) (6)	MMBtu/hr	1,884
Annual CTG Heat Rate (HHV) (7)	MMBtu/yr	14,742,998

Notes:

(1) Formaldehyde: refer to combined cycle hourly and annual calculations.

(2) Emission factors as published by US EPA AP42, Chapter 3.1, Table 3.1-3 (April, 2000)

(3) Per AP 42 Chapter 3.1, Table 3.1-3 note c. Emission factors can be converted to actual natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to 1,020 Btu/scf.

(4) Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/MMBtu) * Max. GT Heat Rate (MMBtu/hr)

Max. Benzene Emission Rate = 1.22E-05 lb/MMBtu * 1,884 MMBtu/hr = 0.02 lb/hr

(5) Annual Emission Rate (tpy) = Emission Factor (lb/MMBtu) * Annual GT Heat Rate (MMBtu/hr) * GT Annual Hours of Operation (hr/yr) * 1ton/2,000lb

Annual. Benzene Emission Rate = 1.22E-05 lb/MMBtu * 14,742,998 MMBtu/yr * 1ton/2,000lb = 0.09 tpy

(6) Maximum Heat Rate for evaluated scenarios.

(7) Annual Heat Rate for evaluated scenarios.

HOBBS 501F4+ Hazardous Air Pollutants

DB HAPs Emission Rates per Unit

Hazardous Air Pollutants (HAPs)	Emission Factor (lb/MMscf) (3)	Emission Factor (lb/MMscf) (4)	Max. Hourly Emission Rate (lb/hr) (5)	Annual Emission Rate (tpy) (6)
2-Methylnaphthalene (1)	2.40E-05	2.43E-05	8.61E-06	1.49E-05
3-Methylchloranthrene (1)	< 1.80E-06	< 1.82E-06	< 6.46E-07	1.11E-06
7,12-Dimethylbenz(a)anthracene (1)	1.60E-05	1.62E-05	5.74E-06	9.91E-06
Acenaphthene (1)	< 1.80E-06	< 1.82E-06	< 6.46E-07	1.11E-06
Acenaphthylene (1)	< 1.80E-06	< 1.82E-06	< 6.46E-07	1.11E-06
Anthracene (1)	< 2.40E-06	< 2.43E-06	< 8.61E-07	1.49E-06
Benz(a)anthracene (1)	< 1.80E-06	< 1.82E-06	< 6.46E-07	1.11E-06
Benzene	2.10E-03	2.13E-03	7.53E-04	1.30E-03
Benzo(a)pyrene (1)	< 1.20E-06	< 1.22E-06	< 4.30E-07	7.43E-07
Benzo(b)fluoranthene (1)	< 1.80E-06	< 1.82E-06	< 6.46E-07	1.11E-06
Benzo(g,h,i)perylene (1)	< 1.20E-06	< 1.22E-06	< 4.30E-07	7.43E-07
Benzo(k)fluoranthene (1)	< 1.80E-06	< 1.82E-06	< 6.46E-07	1.11E-06
Chrysene (1)	< 1.80E-06	< 1.82E-06	< 6.46E-07	1.11E-06
Dibenzo(a,h)anthracene (1)	< 1.20E-06	< 1.22E-06	< 4.30E-07	7.43E-07
Dichlorobenzene	1.20E-03	1.22E-03	4.30E-04	7.43E-04
Fluoranthene (1)	3.00E-06	3.04E-06	1.08E-06	1.86E-06
Fluorene (1)	2.80E-06	2.84E-06	1.00E-06	1.73E-06
Formaldehyde (2)	-	-	-	-
Hexane	1.80	1.82	0.65	1.11
Indeno(1,2,3-cd)pyrene (1)	< 1.80E-06	< 1.82E-06	< 6.46E-07	1.11E-06
Naphthalene	6.10E-04	6.18E-04	2.19E-04	3.78E-04
Phenanathrene (1)	1.70E-05	1.72E-05	6.10E-06	1.05E-05
Pyrene (1)	5.00E-06	5.06E-06	1.79E-06	3.10E-06
Toluene	3.40E-03	3.44E-03	1.22E-03	2.11E-03
Arsenic	2.00E-04	2.03E-04	7.17E-05	1.24E-04
Beryllium	< 1.20E-05	< 1.22E-05	< 4.30E-06	7.43E-06
Cadmium	1.10E-03	1.11E-03	3.95E-04	6.81E-04
Chromium	1.40E-03	1.42E-03	5.02E-04	8.67E-04
Cobalt	8.40E-05	8.51E-05	3.01E-05	5.20E-05
Manganese	3.80E-04	3.85E-04	1.36E-04	2.35E-04
Nickel	2.10E-03	2.13E-03	7.53E-04	1.30E-03
Selenium	< 2.40E-05	< 2.43E-05	< 8.61E-06	1.49E-05

DB Characteristics

		Forney
Fuel Heating Content (HHV)	Btu/scf	1,033
Max. DB Heat Rate (HHV) (7)	MMBtu/hr	366
Annual DB Heat Rate (HHV) (8)	MMBtu/yr	1,263,174

Notes:

(1) HAP because it is Polycyclic Aromatic Hydrocarbon (PAH).

(2) Formaldehyde: refer to combined cycle hourly and annual calculations.

(3) Emission factors as published by US EPA AP42, Chapter 1.4, Tables 1.4-3 and 1.4-4 (July 1998)

(4) Per AP 42 Chapter 1.4 Tables 1.4-3 and 1.4-4 emission factors are based on 1,020 Btu/scf heating value. Emissions factor have been adjusted to actual heat content by multiplying the given emission factor by the ratio of the specified heating value to 1,020 Btu/scf.

(5) Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/MMscf) * Max. DB Heat Rate (MMBtu/hr) / Fuel Heating Content (Btu/scf)
Max. DB Benzene Emission Rate = 2.13E-03 lb/MMscf * 366 MMBtu/hr / 1,033 Btu/scf = 7.53E-04 lb/hr

(6) Annual Em. Rate (tpy) = Em. Factor (lb/MMscf) * Annual DB Heat Rate (MMBtu/yr) / Fuel Heating Cont. (Btu/scf) * 1ton/2,000lb
Annual DB Benzene Emission Rate = 2.13E-03 lb/MMscf * 1,263,174 MMBtu/yr / 1,033 Btu/scf * 1ton/2,000lb = 1.30E-03 tpy

(7) Maximum Heat Rate for evaluated scenarios.

(8) Annual Heat Rate for evaluated scenarios.

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)

All GHG emissions are reported on Table 2-P of the UA2 Form.

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.

The following information was used to determine the CTG/HRSG emission rates post-upgrade. All relevant documentation is included. The detailed emission rate calculations are provided in Section 6 and the UA2 Form. The information is as follows:

- Mitsubishi Hitachi Power System Americas (MHPSA) CTG performance data, Effective date 10/11/2017. (MHPSA_Hobbs_Compressor_Upgrade_rev1)
- Formaldehyde emission factor as published by 40 CFR 63, Subpart YYYY Table 1 (§63.6100).
- HAPs turbine emission factors as published by U.S. EPA AP-42 Chapter 3.1, Table 3.1-3 (April, 2000).
- HAPs emission control percentage as published in the December 30, 1990 Memorandum "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines", Sims Roy, Emission Standards Division, Combustion Group (Docket A-95-51).
- HAPs duct burner emission factors as published by U.S. EPA AP-42 Chapter 1.4, Tables 1.4-3 and 1.4-4 (July 1998).
- 40 CFR Part 75, Appendix G, Equation G-4 (§98.43(a)), CO2 emission factor. 40 CFR 98, Subpart C, Table C-2, CH4 and N2O emission factors.
- 40 CFR 98, Subpart A, Table A-1, Global Warming Potential.

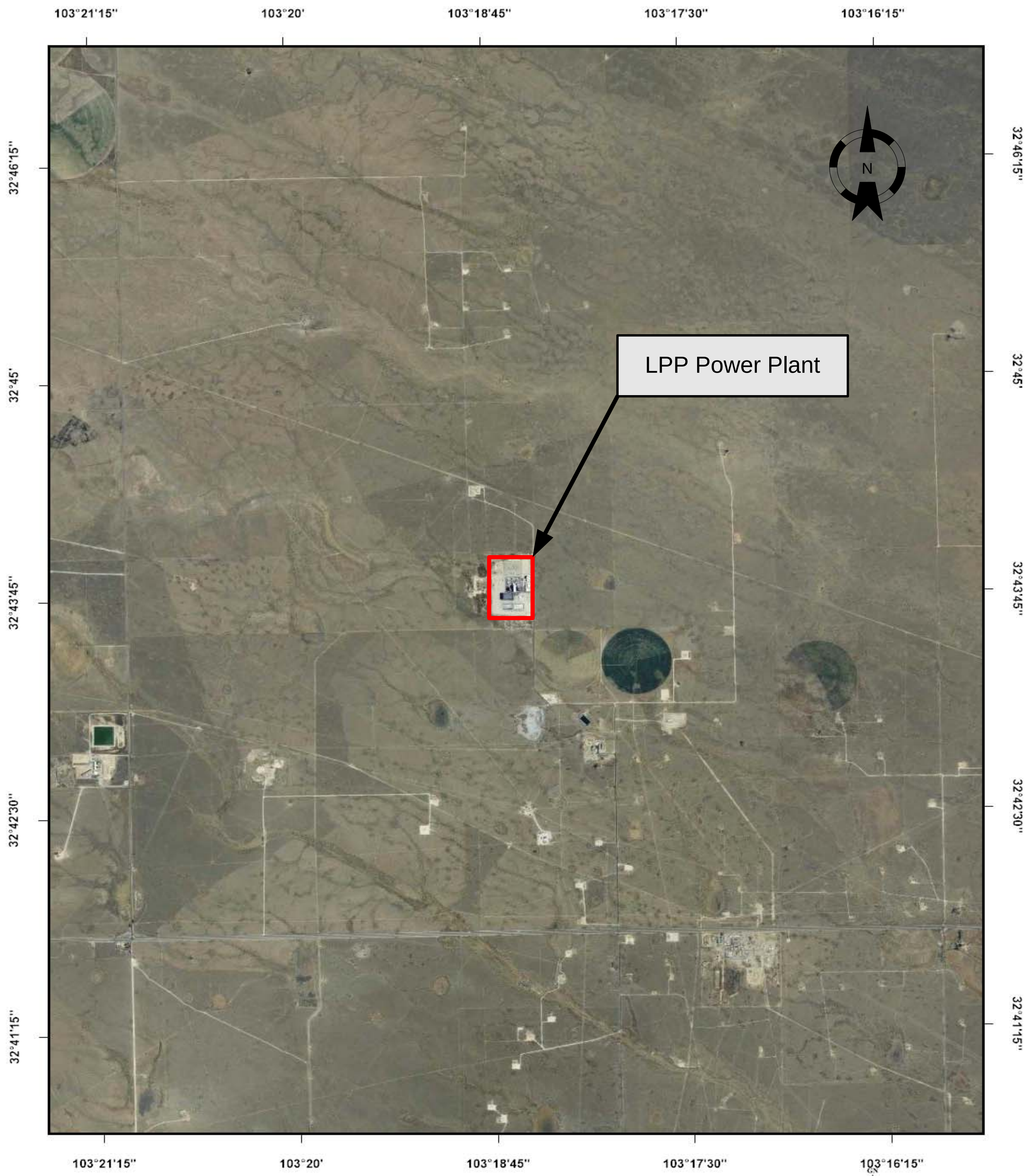
Section 8

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	

An area map of the facility is attached.



1:50000 scale

Universal Transverse Mercator (UTM) Projection Zone 13
North American Datum of 1983

0 0.25 0.5 0.75 1 1.25 1.5 1.75 2 Miles

0 0.25 0.5 0.75 1 1.25 1.5 1.75 2 Kilometers

Magnetic declination of 6E at center of map on March 17, 2011

ALLIANT ENVIRONMENTAL, LLC

ALLIANT ENVIRONMENTAL, LLC			**Area Map**	**Lea Power Partners, LLC**		
Scale: **1:50,000**	Drawn by: MRS	Date: 5/30/2018	**LPP Power Plant** N 32° 43' 47.1" Latitude W -103° 18' 34.6" Longitude	Project No.: 085-002	File Name: **LPP Power Plant Area Map**	Figure: 2-1
	Chk'd by:	Date:				