



9400 Holly Ave NE, Bldg 3, Ste B, Albuquerque, NM 87122 / P 505.266.6611 / trinityconsultants.com

VIA E-MAIL: R6AirPermits@epa.gov & ledoux.eric@epa.gov & Layton.mary@epa.gov

December 6, 2024

Air Permits Section (ARPE)
Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270

RE: *Farmington Electric Utility Systems - Bluffview Power Plant
Operating Permit Application Number P-228R3M1
TEMP/Idea ID Number 3535-PRT20240002*

Dear Madam/Sir:

Pursuant to 20.2.70.404.C of the New Mexico Administrative Code, we are submitting a Title V significant modification for Farmington Electric Utility Systems – Bluffview Power Plant.

The significant modification application was declared complete on December 5, 2024 by the New Mexico Environment Department (NMED). The attached complete permit application is being submitted to EPA Region-6 within five (5) days of the receipt of the determination letter from the NMED.

This application submittal contains the Title V significant modification application and transmittal form for Farmington Electric Utility Systems – Bluffview Power Plant Permit Number P228R3M1. As requested, the file is in word-searchable PDF format.

If you have any questions, or require additional information, please do not hesitate to contact me at (505) 266-6611.

Sincerely,

Adam Erenstein
Manager of Consulting Services

Cc: Ann Woods (Farmington Electric Utility Systems) – awoods@farmingtonnm.gov
Adam Erenstein (Trinity) – aerenstein@trinityconsultants.com
Andrew Jones (NMED) – andrew.jones@env.nm.gov

Trinity Project File: 243201.0066

HEADQUARTERS

12700 Park Central Dr, Ste 2100, Dallas, TX 75251 / P 800.229.6655 / P 972.661.8100 / F 972.385.9203

New Mexico Environmental Department
Completeness Letter with Permit
Transmittal Form



December 5, 2024

Certified Mail No. 7022 0410 0001 8044 3226

Ann Woods
Environmental Scientist
Farmington Electric Utility Systems
101 N. Browning Parkway
Farmington, NM 87401

RE: Air Quality Operating Permit Application Number P228R3M1
Agency Interest Number 3535 – PRT20240002
Bluffview Power Plant

Dear Ms. Woods:

This letter acknowledges the receipt of your operating permit application for the Bluffview Power Plant near Farmington, New Mexico. The Department received this application on October 10, 2024 and assigned it number P228R3M1.

The Department has determined that the information submitted in the application is sufficient to process the requested operating permit. Therefore, this application is ruled complete on December 5, 2024.

Regardless of whether or not an application has been deemed to be complete, if the Department determines that additional information is necessary to evaluate the application or to take final action, it may request such information in writing and set a reasonable deadline for a response.

20.2.70 NMAC Section 401 requires the Department to provide thirty (30) days for public and affected programs comment. When the draft permit becomes available, the Department will publish a legal notice in a regional daily newspaper and mail letters to concerned citizens and affected programs to accomplish this purpose. The Department may hold a public hearing. The Department will determine the time, date, and place of any hearing and will give notice of the hearing to the applicant and the public.

Application Submittals to EPA

In accordance with 20.2.70 NMAC, Section 402.A.1, within five (5) days from the date of receipt of this letter, the applicant shall provide a copy of the complete permit application (including the compliance plan and all additional materials submitted to the Department) directly to EPA.

- EPA Region 6 has requested that all applications, including any updates, be submitted to EPA through electronic mail (email) and in electronic format.
- In the subject line of the email, include the Operating Permit Application Number shown in this letter, the facility name, and permittee name.
- Preferred formats are Microsoft Word for text, Excel for spreadsheets, and a searchable Adobe Acrobat (pdf) files.
- Do not submit any compressed or zip files, files with an “.exe” extension or files that contain any confidential information.
- Do not submit any files larger than 10 megabytes via email and the total size of all attachments cannot exceed 25 megabytes per email. If file size limitations are a problem, documents can be sent in separate emails or by regular mail to the address below on a readable media (CD, flash drive, etc.).

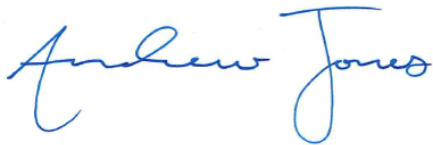
Applications, updates to applications, and compliance plans should be submitted via email to EPA at: R6AirPermits@epa.gov and to Erica Le Doux (ledoux.eric@epa.gov) and Elizabeth Layton (Layton.mary@epa.gov). Please contact Elizabeth Layton, EPA Region 6 at (214) 665-2136 if you have any questions pertaining to electronic submittals. Applications or updates containing **confidential business information** (CBI) must be submitted by regular mail to EPA at the address below in hard copy or on a readable media such as CD, DVD, or flash drive. Mail CBI information to:

Air Permits Section (ARPE)
Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270

Please note that the Air Quality Bureau will not issue your operating permit until you inform the Department that you have sent the application package to EPA.

If you have any questions, please email me at andrew.jones@env.nm.gov.

Sincerely,



Andrew Jones
Air Permitting Specialist
Permits Section
Air Quality Bureau

Enclosure: 'Application Transmittal Form'
cc via email: US EPA Region-6, 6PD-R

Operating Permit Application Transmittal Form
New Mexico Environment Department
~ Air Quality Bureau ~

Part A – Administrative Information

General Information:

Transmittal Date: December 5, 2024

Air Quality Bureau Permit Specialist: Andrew Jones

Facility Name: Bluffview Power Plant

Facility Location - City: Farmington

Facility Location - County: San Juan

Facility Location - State: New Mexico, 87401

State Operating Permit Number: P228M3R1

Facility Primary SIC Code: 4911: Electric services, ENRG-Power Plant

Air Permit Contact Person: Ann Woods

Air Permit Contact - Telephone: 505-599-8350

Air Permit Contact E-mail address: awoods@farmingtonnm.gov

Company Name: Farmington Electric Utility Systems

Company Address: 800 Municipal Drive
Farmington, NM 87401

Distance from Facility to Nearest Class I Area: 53.0 km

Is the Facility Within 50 Miles (80.467 km) of a Class I Area? Yes

Is the Facility Within 50 Miles of Indian Land? Yes: Navajo Tribal Lands (1 km), Mountain Ute Tribal Lands (15 km), Southern Ute Tribal Lands (31 km), Jicarilla Apache Tribal Lands (75 km)

Transmittal Description

	New Permit
	Renewal
X	Modification
	Acid Rain Source (TIV)

Part B – Technical Information

TV Regulated Pollutants

X	CO Source (COS)
X	TSP/PM-10 Source (PM ₁₀)
X	VOC Source (VOC)
	112(b) Pollutants (112B)
X	NO _x Source (NO _x)
X	SO ₂ Source (SO ₂)
	Lead Source (Lead)
	Green House Gases (GHG)

Source Description

	PSD (PSD)
	Nonattainment Area (NNSR)
X	Acid Rain Source (TIV)
	Chlorofluorocarbons (CFC)
	Compliance Schedule (CSS)
	Federal Facility (FED)
X	Combustion Source (CMBS)

Regulatory Specifications

Units Subject to Enhanced Monitoring (40 CFR 64) (Number): none
Applicable NSPS (60): Subparts Db and GG
Applicable NESHAP (61): none
Applicable MACT (63): none

Complete Permit Application Submitted to New Mexico Environmental Department

**NMED AIR QUALITY
TITLE V SIGNIFICANT MODIFICATION
PERMIT NO. P228-R3
FARMINGTON ELECTRIC UTILITY SYSTEMS
BLUFFVIEW POWER PLANT**

Prepared By:

Adam Erenstein – Manager of Consulting Services

TRINITY CONSULTANTS

9400 Holly Ave NE
Bldg 3, Suite B
Albuquerque, NM 87122
(505) 266-6611

September 2024

Project 243201.0066





9400 Holly Ave NE, Bldg 3, Ste B, Albuquerque, NM 87122 / P 505.266.6611 / trinityconsultants.com

October 4, 2024

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

*RE: Title V Permit # P228-R3 Significant Modification Application
Farmington Electric Utility Systems – Bluffview Power Plant*

Permit Programs Manager:

Farmington Electric Utility Systems is submitting a significant modification to Title V Permit #P228-R3 for the Bluffview Power Plant. The facility is located at 755 West Murray Dr., Farmington, NM 87401. The facility has a total production of 609.20 MMBtu/hr energy and includes one (1) natural gas fired combustion turbine generator, one (1) Forney heat recovery steam generator (HRSG), one (1) cooling tower, and one (1) emergency fire pump.

This modification looks to incorporate two (2) new natural gas-fired reciprocating internal combustion engines rated at 9 megawatts each for a total of nominal 18 megawatts, both equipped with a selective catalytic reduction system and oxidation catalyst system, and a new exempt 262 kW diesel engine driven fire water pump for emergencies.

The format and content of this application are consistent with the Bureau's current policy regarding Title V Significant Modification applications; it is a complete application package using the most current application forms. Enclosed are two hard copies of the application, including the original certification. Please feel free to contact either myself at (505) 266-6611 or by email at aerenstein@trinityconsultants.com if you have any questions regarding this application. Alternatively, you may contact Ann Woods, Environmental Scientist for Farmington Electric Utility Systems, at (505) 599-8345 or by email at awoods@farmingtonnm.gov.

Sincerely,

Adam Erenstein
Manager of Consulting Services

Trinity Project File 243201.0066

HEADQUARTERS

12700 Park Central Dr, Ste 600, Dallas, TX 75251 / P 800.229.6655 / P 972.661.8100 / F 972.385.9203

Mail Application To: 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		For Department use only:
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Universal Air Quality Permit Application

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

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

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

Acknowledgements:

- ☒ I acknowledge that a pre-application meeting is available to me upon request. ☒ Title V Operating, Title IV Acid Rain, and NPR applications have no fees.
- ☐ \$500 NSR application Filing Fee enclosed **OR** ☐ The full permit fee associated with 10 fee points (required w/ streamline applications).
- ☐ Check No.: 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.
- ☒ I acknowledge there is an annual fee for permits in addition to the permit review fee: www.env.nm.gov/air-quality/permit-fees-2/.
- ☐ This facility qualifies for the small business fee reduction per 20.2.75.11.C. NMAC. The full \$500.00 filing fee is included with this application and I understand the fee reduction will be calculated in the balance due invoice. The Small Business Certification Form has been previously submitted or is included with this application. (Small Business Environmental Assistance Program Information: www.env.nm.gov/air-quality/small-biz-eap-2/.)

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.70.404.C 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: 3535	Updating Permit/NOI #: P228-R3
1	Facility Name: Bluffview Power Plant	Plant primary SIC Code (4 digits): 4911	
		Plant NAIC code (6 digits): 22112	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): 755 West Murray Drive, Farmington, NM 87401		
2	Plant Operator Company Name: City of Farmington	Phone/Fax: (505) 599-8345 / N/A	

a	Plant Operator Address: 800 Municipal Drive, Farmington, NM 87401	
b	Plant Operator's New Mexico Corporate ID or Tax ID: 85-6000129	
3	Plant Owner(s) name(s): Farmington Electric Utility Systems	Phone/Fax: (505) 599-8345 / N/A
a	Plant Owner(s) Mailing Address(s): 800 Municipal Drive, Farmington, NM 87401	
4	Bill To (Company): Farmington Electric Utility Systems	Phone/Fax: (505) 599-8345/ N/A
a	Mailing Address: 800 Municipal Drive, Farmington, NM 87401	E-mail: bchesnut@farmingtonnm.gov
5	☒ Preparer: Adam Erenstein ☒ Consultant: Trinity Consultants Inc.	Phone/Fax: (505) 266-6611
a	Mailing Address: 9400 Holly Ave NE, Bldg. 3, Ste. B, Albuquerque, NM 87122	E-mail: aerenstein@trinityconsultants.com
6	Plant Operator Contact: Britt Chesnut	Phone/Fax: (505) 599-8345 / N/A
a	Address: 501 McCormick School Rd., Farmington, NM 87401	E-mail: bchesnut@farmingtonnm.gov
7	Air Permit Contact: Ann Woods	Title: Environmental Scientist
a	E-mail: awoods@farmingtonnm.gov	Phone/Fax: (505) 599-8350 / N/A
b	Mailing Address: 101 N Browning Parkway, Farmington, NM 87401.	
c	The designated Air permit Contact will receive all official correspondence (i.e. letters, permits) from the Air Quality Bureau.	

Section 1-B: Current Facility Status

1.a	Has this facility already been constructed? ☒ Yes ☐ No	1.b If yes to question 1.a, is it currently operating in New Mexico? ☒ Yes ☐ No
2	If yes to question 1.a, was the existing facility subject to a Notice of Intent (NOI) (20.2.73 NMAC) before submittal of this application? ☐ Yes ☒ No	If yes to question 1.a, was the existing facility subject to a construction permit (20.2.72 NMAC) before submittal of this application? ☒ Yes ☐ No
3	Is the facility currently shut down? ☐ Yes ☒ No	If yes, give month and year of shut down (MM/YY): N/A
4	Was this facility constructed before 8/31/1972 and continuously operated since 1972? ☐ Yes ☒ No	
5	If Yes to question 3, has this facility been modified (see 20.2.72.7.P NMAC) or the capacity increased since 8/31/1972? ☐ Yes ☐ No ☒ N/A	
6	Does this facility have a Title V operating permit (20.2.70 NMAC)? ☒ Yes ☐ No	If yes, the permit No. is: P-228-R3
7	Has this facility been issued a No Permit Required (NPR)? ☐ Yes ☒ No	If yes, the NPR No. is: N/A
8	Has this facility been issued a Notice of Intent (NOI)? ☐ Yes ☒ No	If yes, the NOI No. is: N/A
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ☒ Yes ☐ No	If yes, the permit No. is: 2831-M3
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ☐ Yes ☒ No	If yes, the register No. is: N/A

Section 1-C: Facility Input Capacity & Production Rate

1	What is the facility's maximum input capacity, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly: 455.00 x 10 ⁶ Btu	Daily: 10.92 x 10 ⁹ Btu	Annually: 3.99 x 10 ¹²
b	Proposed	Hourly: 609.20 x 10 ⁶ Btu	Daily: 14.62 x 10 ⁹ Btu	Annually: 5.34 x 10 ¹²
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: 455.00 x 10 ⁶ Btu	Daily: 10.92 x 10 ⁹ Btu	Annually: 3.99 x 10 ¹²
b	Proposed	Hourly: 609.20 x 10 ⁶ Btu	Daily: 14.62 x 10 ⁹ Btu	Annually: 5.34 x 10 ¹²

Section 1-D: Facility Location Information

1	Latitude (decimal degrees): 36.716847°	Longitude (decimal degrees): -108.214936°	County: San Juan	Elevation (ft): 5290 ft
2	UTM Zone: ☒ 12 or ☐ 13		Datum: ☐ NAD 83 ☒ WGS 84	
a	UTM E (in meters, to nearest 10 meters): 748,748 m		UTM N (in meters, to nearest 10 meters): 4,067,078 m	
3	Name and zip code of nearest New Mexico town: Farmington, NM 87401			
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): Head south onto US-64 BYP E/W Murray Drive, turn right onto S Lake St. after 1.3 mi, facility gate is on the left after 0.2 mi.			
5	The facility is located within the city of Farmington, NM 87401			
6	Land Status of facility (check one): ☐ Private ☐ Indian/Pueblo ☒ Government (City of Farmington) ☐ BLM ☐ Forest Service ☐ Military			
7	List all municipalities, Indian tribes, and counties within a ten (10) mile radius (20.2.72.203.B.2 NMAC) of the property on which the facility is proposed to be constructed or operated: Navajo Nation, City of Farmington, and San Juan County			
8	20.2.72 NMAC applications only : Will the property on which the facility is proposed to be constructed or operated be closer than 50 km (31 miles) to other states, Bernalillo County, or a Class I area (see www.env.nm.gov/air-quality/modeling-publications/)? ☐ Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers: N/A - This application is being submitted under 20.2.70 NMAC.			
9	Name nearest Class I area: Mesa Verde National Park			
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): 53.0 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: 125m			
12	Method(s) used to delineate the Restricted Area: Fence "Restricted Area" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area.			
13	Does the owner/operator intend to operate this source as a portable stationary source as defined in 20.2.72.7.X NMAC? ☐ Yes ☒ No A portable stationary source is not a mobile source, such as an automobile, but a source that can be installed permanently at one location or that can be re-installed at various locations, such as a hot mix asphalt plant that is moved to different job sites.			
14	Will this facility operate in conjunction with other air regulated parties on the same property? ☒ No ☐ Yes If yes, what is the name and permit number (if known) of the other facility?			

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

1	Facility maximum operating ($\frac{\text{hours}}{\text{day}}$): 24	($\frac{\text{days}}{\text{week}}$): 7	($\frac{\text{weeks}}{\text{year}}$): 52	($\frac{\text{hours}}{\text{year}}$): 8760
2	Facility's maximum daily operating schedule (if less than 24 $\frac{\text{hours}}{\text{day}}$)? Start: N/A		☐ AM ☐ PM	End: N/A ☒ AM ☒ PM
3	Month and year of anticipated start of construction: Upon receipt of permit			
4	Month and year of anticipated construction completion: TBD			
5	Month and year of anticipated startup of new or modified facility: TBD			
6	Will this facility operate at this site for more than one year? ☒ Yes ☐ No			

Section 1-F: Other Facility Information

1	Are there any current Notice of Violations (NOV), compliance orders, or any other compliance or enforcement issues related to this facility? ☐ Yes ☒ No If yes, specify: N/A		
a	If yes, NOV date or description of issue: N/A	NOV Tracking No: N/A	
b	Is this application in response to any issue listed in 1-F, 1 or 1a above? ☐ Yes ☒ No If Yes, provide the 1c & 1d info below: N/A		
c	Document Title: N/A	Date: N/A	Requirement # (or page # and paragraph #): N/A
d	Provide the required text to be inserted in this permit: N/A		
2	Is air quality dispersion modeling or modeling waiver being submitted with this application? ☐ Yes ☒ No		
3	Does this facility require an "Air Toxics" permit under 20.2.72.400 NMAC & 20.2.72.502, Tables A and/or B? ☐ Yes ☒ No		
4	Will this facility be a source of federal Hazardous Air Pollutants (HAP)? ☒ Yes ☐ No		
a	If Yes, what type of source? ☐ Major (☐ ≥10 tpy of any single HAP OR ☐ ≥25 tpy of any combination of HAPS) OR ☒ Minor (☒ <10 tpy of any single HAP AND ☒ <25 tpy of any combination of HAPS)		
5	Is any unit exempt under 20.2.72.202.B.3 NMAC? ☒ Yes ☐ No		
a	If yes, include the name of company providing commercial electric power to the facility: <u>Farmington Electric Utility Systems</u> 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.)
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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): Britt Chesnut		Phone: (505) 599-8342
a	R.O. Title: Generation Manager	R.O. e-mail: bchesnut@farmingtonnm.gov	
b	R. O. Address: 501 McCormick School Rd., Farmington, NM 87401		
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC): N/A		Phone: N/A
a	A. R.O. Title: N/A	A. R.O. e-mail: N/A	
b	A. R. O. Address: N/A		
3	Company's Corporate or Partnership Relationship to any other Air Quality Permittee (List the names of any companies that have operating (20.2.70 NMAC) permits and with whom the applicant for this permit has a corporate or partnership relationship): N/A		
4	Name of Parent Company ("Parent Company" means the primary name of the organization that owns the company to be permitted wholly or in part.): City of Farmington		
a	Address of Parent Company: 800 Municipal Drive, Farmington, NM 87401		
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.): Farmington Electric Utility System		
6	Telephone numbers & names of the owners' agents and site contacts familiar with plant operations: Britt Chesnut (505) 599-8342		

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: Navajo Nation (8.1 km) and Colorado (31.0 km)
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Section 1-I – Submittal Requirements

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

Hard Copy Submittal Requirements:

- 1) One hard copy **original signed and notarized application package printed double sided 'head-to-toe' 2-hole punched** as we bind the document on top, not on the side; except Section 2 (landscape tables), which should be **head-to-head**. Please use **numbered tab separators** in the hard copy submittal(s) as this facilitates the review process. For NOI submittals only, hard copies of UA1, Tables 2A, 2D & 2F, Section 3 and the signed Certification Page are required. **Please include a copy of the check on a separate page.**
- 2) If the application is for a minor NSR, PSD, NNSR, or Title V application, include one working hard **copy** for Department use. This **copy** should be printed in book form, 3-hole punched, and **must be double sided**. Note that this is in addition to the head-to-to 2-hole punched copy required in 1) above. Minor NSR Technical Permit revisions (20.2.72.219.B NMAC) only need to fill out Sections 1-A, 1-B, 3, and should fill out those portions of other Section(s) relevant to the technical permit revision. TV Minor Modifications need only fill out Sections 1-A, 1-B, 1-H, 3, and those portions of other Section(s) relevant to the minor modification. NMED may require additional portions of the application to be submitted, as needed.
- 3) The entire NOI or Permit application package, including the full modeling study, should be submitted electronically. Electronic files for applications for NOIs, any type of General Construction Permit (GCP), or technical revisions to NSRs must be submitted with compact disk (CD) or digital versatile disc (DVD). For these permit application submittals, **two CD** copies are required (in sleeves, not crystal cases, please), with additional CD copies as specified below. NOI applications require only a **single CD** submittal. Electronic files for other New Source Review (construction) permits/permit modifications or Title V permits/permit modifications can be submitted on CD/DVD or sent through AQB's secure file transfer service.

Electronic files sent by (check one):

☐ CD/DVD attached to paper application

☒ Secure electronic transfer: Air Permit Contact Name: Adam Erenstein
Email: Aerenstein@trinityconsultants.com
Phone number (505) 266-6611

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

- 4) Optionally, the applicant may submit the files with the application on compact disk (CD) or digital versatile disc (DVD) following the instructions above and the instructions in 5 for applications subject to PSD review.
- 5) If **air dispersion modeling** is required by the application type, include the **NMED Modeling Waiver** and/or electronic air dispersion modeling report, input, and output files. The dispersion modeling **summary report only** should be submitted as hard copy(ies) unless otherwise indicated by the Bureau.
- 6) If the applicant submits the electronic files on CD and the application is subject to PSD review under 20.2.74 NMAC (PSD) or NNSR under 20.2.79 NMC include,
 - a. one additional CD copy for US EPA,
 - b. one additional CD copy for each federal land manager affected (NPS, USFS, FWS, USDI) and,
 - c. one additional CD copy for each affected regulatory agency other than the Air Quality Bureau.

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

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

- 1) All required electronic documents shall be submitted as 2 separate CDs or submitted through the AQB secure file transfer service. Submit a single PDF document of the entire application as submitted and the individual documents comprising the application.
- 2) The documents should also be submitted in Microsoft Office compatible file format (Word, Excel, etc.) allowing us to access the text and formulas in the documents (copy & paste). Any documents that cannot be submitted in a Microsoft Office compatible format shall be saved as a PDF file from within the electronic document that created the file. If you are unable to provide Microsoft office compatible electronic files or internally generated PDF files of files (items that were not created electronically: i.e. brochures, maps, graphics, etc.), submit these items in hard copy format. We must be able to review the formulas and inputs that calculated the emissions.
- 3) It is preferred that this application form be submitted as 4 electronic files (**3 MSWord docs**: Universal Application section 1 [UA1], Universal Application section 3-19 [UA3], and Universal Application 4, the modeling report [UA4]) and **1 Excel file** of the tables (Universal Application section 2 [UA2]). Please include as many of the 3-19 Sections as practical in a single MS Word electronic document. Create separate electronic file(s) if a single file becomes too large or if portions must be saved in a file format other than MS Word.
- 4) The **electronic file names** shall be a maximum of 25 characters long (including spaces, if any). The format of the electronic Universal Application shall be in the format: "A-3423-FacilityName". The "A" distinguishes the file as an application submittal, as opposed to other documents the Department itself puts into the database. Thus, all electronic application submittals should begin with "A-". Modifications to existing facilities should use the **core permit number** (i.e. '3423') the Department assigned to the facility as the next 4 digits. Use 'XXXX' for new facility applications. The format of any separate electronic submittals (additional submittals such as non-Word attachments, re-submittals, application updates) and Section document shall be in the format: "A-3423-9-description", where "9" stands for the **section #** (in this case Section 9-Public Notice). Please refrain, as much as possible, from submitting any scanned documents as this file format is extremely large, which uses up too much storage capacity in our database. Please take the time to fill out the **header information** throughout all submittals as this will identify any loose pages, including the Application Date (date submitted) & Revision number (0 for original, 1, 2, etc.; which will help keep track of subsequent partial update(s) to the original submittal. Do not use special symbols (#, @, etc.) in file names. The footer information should not be modified by the applicant.

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Table 2-A: Regulated Emission Sources

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

Unit Number ¹	Source Description	Make	Model #	Serial #	Manufacturer's Rated Capacity ³ (Specify Units)	Requested Permitted Capacity ³ (Specify Units)	Date of		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.
							Manufacture ²	Date of Construction/ Reconstruction ²						
PD-CTG-1	Natural Gas Fired Combustion Turbine Generator	General Electric	7LM6000 PD- NGDG03	192-352	338 MMBtu/hr	338 MMBtu/hr	11/3/2021	GT-X-SCR-1	20100201		☒ Existing (unchanged) ☐ New/Additional ☐ To Be Modified	☐ To Be Removed ☐ Replacement ☐ To Be Replaced	N/A	N/A
							5/5/2022	GT-1						
PD-DB-1	Duct Burner	Forney	90-E	N/A	144 MMBtu/hr	144 MMBtu/hr	1/1/2004	GT-X-SCR-1	31000414		☒ Existing (unchanged) ☐ New/Additional ☐ To Be Modified	☐ To Be Removed ☐ Replacement ☐ To Be Replaced	N/A	N/A
							1/1/2004	GT-1						
PD-CT-1	Cooling Tower	Evapco	AT428048	12 individual cells A1- A4 W037812 cells B1-B4 W037813 cells C1-C4 W037814	31,123 gpm	31,123 gpm	5/1/2005	N/A	38500101		☒ Existing (unchanged) ☐ New/Additional ☐ To Be Modified	☐ To Be Removed ☐ Replacement ☐ To Be Replaced	N/A	N/A
							5/1/2005	N/A						
ENG-1	Compressor Engine	Wartsila	W20V34SG	TBD	9 MW	9 MW	TBD	SCR-2, CAT-1	20200254		☐ Existing (unchanged) ☒ New/Additional ☐ To Be Modified	☐ To Be Removed ☐ Replacement ☐ To Be Replaced	4SLB	N/A
							TBD	ENG-1						
ENG-2	Compressor Engine	Wartsila	W20V34SG	TBD	9 MW	9 MW	TBD	SCR-3, CAT-2	20200254		☐ Existing (unchanged) ☒ New/Additional ☐ To Be Modified	☐ To Be Removed ☐ Replacement ☐ To Be Replaced	4SLB	N/A
							TBD	ENG-2						
											☐ Existing (unchanged) ☐ New/Additional ☐ To Be Modified	☐ To Be Removed ☐ Replacement ☐ To Be Replaced		
											☐ Existing (unchanged) ☐ New/Additional ☐ To Be Modified	☐ To Be Removed ☐ Replacement ☐ To Be Replaced		
											☐ Existing (unchanged) ☐ New/Additional ☐ To Be Modified	☐ To Be Removed ☐ Replacement ☐ To Be Replaced		

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

² Specify dates required to determine regulatory applicability.

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

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

Table 2-B: Insignificant Activities¹ (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		For Each Piece of Equipment, Check Once
			Serial No.			Insignificant Activity citation (e.g. IA List Item #1.a)		Manufacture / Reconstruction ² Date of Installation / Construction ²		
TK-1	Dimineralized Water Storage Tank	Pittsburg Tank & Tower Co.	N/A		90,000 Gallons	Insignificant List Item #1.a		2004	☒ Existing (unchanged)	☐ To be Removed
			111M200		90,000 Gallons			2004	☐ New/Additional	☐ Replacement Unit
TK-2	Turbine Washdown Tank	Four Corners Pre-Cast, Inc.	N/A		2,000 Gallons	Insignificant List Item #1.a		2014	☒ Existing (unchanged)	☐ To be Removed
			N/A		2,000 Gallons			2014	☐ New/Additional	☐ Replacement Unit
TK-3	29% Aqua Ammonia Storage Tank	Baker Tank Co.	N/A		7,000 Gallons	Insignificant List Item #1.a		2004	☒ Existing (unchanged)	☐ To be Removed
			4208		7,000 Gallons			2004	☐ New/Additional	☐ Replacement Unit
PUMP-1	Diesel-Fired Firewater Pump	TBD	TBD		262 kW	Insignificant List Item #1.a		TBD	☒ Existing (unchanged)	☐ To be Removed
			TBD		262 kW			TBD	☐ New/Additional	☐ Replacement Unit
									☐ Existing (unchanged)	☐ To be Removed
									☐ New/Additional	☐ Replacement Unit
									☐ Existing (unchanged)	☐ To be Removed
									☐ New/Additional	☐ Replacement Unit
									☐ Existing (unchanged)	☐ To be Removed
									☐ New/Additional	☐ Replacement Unit
									☐ Existing (unchanged)	☐ To be Removed
									☐ New/Additional	☐ Replacement Unit
									☐ Existing (unchanged)	☐ To be Removed
									☐ New/Additional	☐ Replacement Unit
									☐ Existing (unchanged)	☐ To be Removed
									☐ New/Additional	☐ Replacement Unit
									☐ Existing (unchanged)	☐ To be Removed
									☐ New/Additional	☐ Replacement Unit

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.

³ For information purposes only. These engines satisfy the federal definition of "nonroad engine" under 40 CFR §§ 89.2 and 90.3 (for compression and spark-ignition engines, respectively) and are therefore regulated by EPA as mobile sources and not subject to state NSR and Title V permitting for stationary sources.

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
PD-SCR-1	Selective Catalytic Reduction	9/24/2019	NOx	PD-CTG-1, PD-DB-1	Variable, 47% (ann. average basis)	Mfg. data
PD-CATOX-1	Catalytic Oxidation	4/9/2017	CO	PD-CTG-1, PD-DB-1	Variable, 47% (ann. average basis)	Mfg. data
PD-CATOX-1	Catalytic Oxidation	4/9/2017	VOC	PD-CTG-1, PD-DB-1	Variable, 70% (ann. average basis)	Mfg. data
SCR-2	Selective Catalytic Reduction	TBD	NOx	ENG-1	NOx= 96.9%	Mfg. data
SCR-3	Selective Catalytic Reduction	TBD	NOx	ENG-2	NOx= 96.9%	Mfg. data
CAT-1	Catalytic Oxidation	TBD	HCHO, VOC, CO	ENG-1	HCHO= 88.9% CO = 96.0% VOC = 59.9%	Mfg. data
CAT-2	Catalytic Oxidation	TBD	HCHO, VOC, CO	ENG-2	HCHO= 88.9% CO = 96.0% VOC = 59.9%	Mfg. 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)

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 (TAPs in Table 2-1). Unit and stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-". symbol. A "-". symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM ^f		PM10 ^f		PM2.5 ^f		H ₂ S		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
PD-CTG-1 + PD-DB-1	42.80	187.5	42.8	187.5	5.50	24.09	2.62	11.46	12.83	56.20	12.83	56.20	12.83	56.20	-	-	-	-
PD-CT-1	-	-	-	-	-	-	-	-	3.11	13.64	0.19	0.83	0.19	0.83	-	-	-	-
ENG-1	66.98	293.38	105.15	460.55	26.80	117.38	0.44	1.93	1.61	7.05	1.61	7.05	1.61	7.05	-	-	-	-
ENG-2	66.98	293.38	105.15	460.55	26.80	117.38	0.44	1.93	1.61	7.05	1.61	7.05	1.61	7.05	-	-	-	-
Totals	176.77	774.27	253.10	1,108.60	59.10	258.85	3.50	15.32	19.16	83.95	16.24	71.14	16.24	71.14	-	-	-	-

¹ Significant Figures Examples: One significant figure – 0.03, 3, 0.3. Two significant figures – 0.34, 34, 3400, 3.4

² **Condensables:** Include condensable particulate matter emissions in particulate matter calculations.

"*" Indicates that an hourly limit is not appropriate for this operating situation and is not being requested

" - Indicates emissions of this pollutant are not expected

ed. Numbers shall be

Lead	
lb/hr	ton/yr
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
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84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

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:

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:

[illegible]

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 permit 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 "u," symbol. A "u," 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 HAP's		Formaldehyde ☑️ HAP or □ TAP		Acetaldehyde ☑️ HAP or □ TAP		Acrolein ☑️ HAP or □ TAP		n-Hexane ☑️ HAP or □ TAP		Benzene ☑️ HAP or □ TAP		Toluene ☑️ HAP or □ TAP		Ethylbenzene ☑️ HAP or □ TAP		Xylenes ☑️ 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
GT-1	PD-CTG-1 + PD-DB-1	0.61	2.69	0.25	1.10	0.01	0.06	0.002	0.01	0.25	1.11	0.004	0.02	0.04	0.19	0.01	0.05	0.02	0.09
ENG-1	ENG-1	1.57	6.90	0.39	1.71	0.63	2.77	0.39	1.70	0.08	0.37	0.03	0.15	0.03	0.13	0.003	0.01	0.01	0.06
ENG-2	ENG-2	1.57	6.90	0.39	1.71	0.63	2.77	0.39	1.70	0.08	0.37	0.03	0.15	0.03	0.13	0.003	0.01	0.01	0.06
	Totals:	3.76	16.48	1.03	4.51	1.28	5.59	0.78	3.41	0.42	1.85	0.07	0.31	0.11	0.46	0.02	0.07	0.05	0.22

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

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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)
			N/A - This facility does not store any applicable liquids.						

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

[illegible]

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)	
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	
Note: 1.00 bbl = 0.159 M ³ = 42.0 gal					MG: Medium Gray	
					BL: Black	
					OT: Other (specify)	

Note: $1.00 \text{ bbl} = 0.159 \text{ M}^3 = 42.0 \text{ gal}$

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

[illegible]

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.

[illegible]

Table 2-P: Greenhouse Gas Emissions

Applicants 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 ₂ O ton/yr	CH ₄ ton/yr	SF ₆ ton/yr	PFC/HFC ton/yr ²				Total GHG Mass Basis ton/yr ⁴	Total CO ₂ e ton/yr ⁵
Unit No.	GWP _s ¹	1	298	25	22,800	footnote 3					
PD-CTG-1 + PD-DB-1	mass GHG	273,822	0.52	5.16	-	-				273,828	
	CO ₂ e	273,822	154.96	129	-	-					274,106
ENG-1	mass GHG	39477	0.07	0.74	-	-				39478	
	CO ₂ e	39477	22.17	18.60	-	-					39518
ENG-2	mass GHG	39477	0.07	0.74	-	-				39478	
	CO ₂ e	39477	22.17	18.60	-	-					39518
	mass GHG										
	CO ₂ e										
	mass GHG										
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Figure 1

Section 3

Application Summary

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

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

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

The Farmington Electric Utility Systems is submitting this application and accompanying materials pursuant to 20.2.70.404.C NMAC for a Title V significant modification to permit (Permit No. P228-R3) for the Bluffview Power Plant. The plant is a natural-gas fired electric generation facility and is located within Farmington City limits. The facility is currently operating under NSR 2831-M3, Title V Permit No. P228-R3, and Acid Rain permit P228-AR3. The facility is currently an existing minor PSD source as well as a major source under the Title V program.

The proposed revision to the Bluffview Power Plant consists of the installation of two (2) new natural gas-fired reciprocating internal combustion engines (RICE) manufactured by Wartsila, rated at 9 megawatts each for a total of nominal 18 megawatts electrical demand. Each new engine will be equipped with a selective catalytic reduction system to reduce emissions of nitrogen oxides and an oxidation catalyst system to reduce emissions of carbon monoxide and volatile organic compounds. A new exempt 262 kW diesel engine driven fire water pump will also be installed for fire protection during emergencies.

Existing regulated emission sources include One (1) General Electric model LM6000-PD natural gas fired combustion turbine generator (PD-CTG-1) rated at 338 million British thermal units per hour (MMBtu/hr), One (1) Forney heat recovery steam generator (HRSG), including a 144 MMBtu/hr supplemental duct burner (PD-DB-1) also firing natural gas, and One (1) Evapco auxiliary wet surface cooling tower (PD-CT-1).

After the installation of the RICE units, and upon initial startup of these new units, the Bluffview Power Plant will be considered a major PSD and Title V source with regards to any future projects.

Startup, Shutdown, and Maintenance (SSM) routine or predictable emissions: Separate allowable startup, shutdown, and maintenance (SSM) emission limits are not required for this facility since the SSM emissions are predicted to be less than the established steady state emissions for this facility.

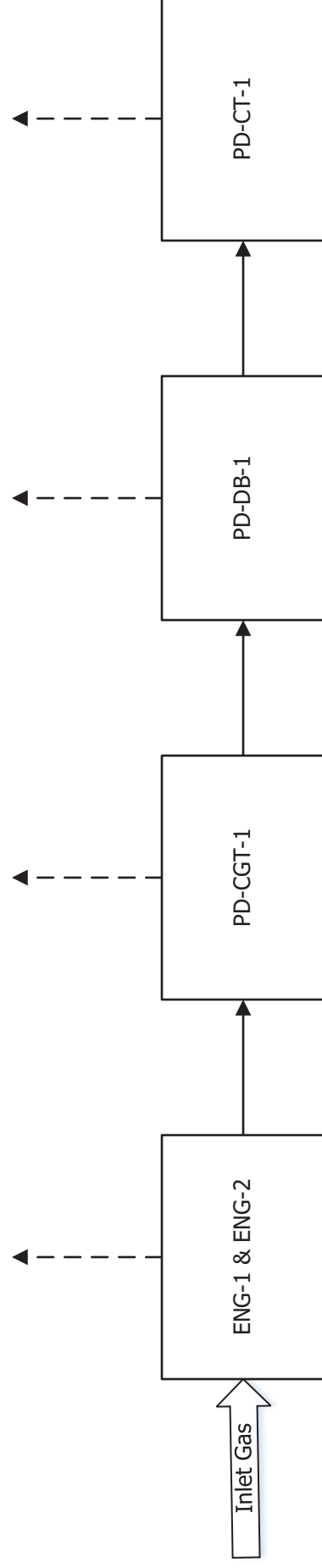
Section 4

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 sheet is attached.

Legend



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 detailed plot plan is attached.

Section 6

All Calculations

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

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

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

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

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

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

Significant Figures:

A. All emissions standards are deemed to have at least two significant figures, but not more than three significant figures.
B. At least 5 significant figures shall be retained in all intermediate calculations.
C. In calculating emissions to determine compliance with an emission standard, the following rounding off procedures shall be used:

- (1) If the first digit to be discarded is less than the number 5, the last digit retained shall not be changed;
- (2) If the first digit discarded is greater than the number 5, or if it is the number 5 followed by at least one digit other than the number zero, the last figure retained shall be increased by one unit; **and**
- (3) If the first digit discarded is exactly the number 5, followed only by zeros, the last digit retained shall be rounded upward if it is an odd number, but no adjustment shall be made if it is an even number.
- (4) The final result of the calculation shall be expressed in the units of the standard.

Control Devices: In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device regardless if the applicant takes credit for the reduction in emissions. The applicant can indicate in this section of the application if they chose to not take credit for the reduction in emission rates. For notices of intent submitted under 20.2.73 NMAC, only uncontrolled emission rates can be considered to determine applicability unless the state or federal Acts require the control. This information is necessary to determine if federally enforceable conditions are necessary for the control device, and/or if the control device produces its own regulated pollutants or increases emission rates of other pollutants.

Wartsila W20V24SG Engines (Unit ID: ENG-1 and ENG-2)

NO_x, CO, VOC, PM, PM₁₀, and PM_{2.5} emission rates were calculated using the highest emission factors based on the emission simulation data. SO₂ emissions are based on a conservative fuel sulfur content estimated of 2 gr S/100 scf and 100% conversion of elemental sulfur to SO₂. Table 3.2-2. Greenhouse gas emissions are estimated using emission factors from 40 CFR 98 Subpart C Tables C-1 and C-2. HAPs were calculated using AP-42 emission factors for 4SLB (Table 3.2-2).

Exempt Fire-Pump (Unit ID: PUMP-1)

CO and PM were estimated referenced from 40 CFR Part 60 Subpart III Table 4. SO₂ is calculated based on AP 42 Table 3.3-1. NO_x and NMHC were derived from NO_x + NMHC based on the assumption of 95% NO_x and 5% NMHC according to Table D-25 on California Environmental Protection Agency (Revised date: Dec 18, 2011). HAPs were calculated using AP-42 emission factors from Table 3.3-1 & 3.3-2.

Combustion Turbine (Unit ID: PD-CTG-1)

Emissions of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compound (VOC), and particulate emissions PM₁₀ and PM_{2.5} from the turbine are calculated from manufacturer's data and HRSG performance modeling, as brought forward from the 2019 Title V renewal application. SO₂ emissions are based on a conservative fuel sulfur content estimated of 2 gr S/100 scf and 100% conversion of elemental sulfur to SO₂. Uncontrolled hazardous air pollutants (HAP) from the turbine are calculated using AP-42 Natural Gas Combustion Tables 1.4-3 and 1.4-4 emission factors.

HRSG Duct Burners (Unit ID: PD-DB-1)

Emissions of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compound (VOC), and particulate emissions PM₁₀ and PM_{2.5} from the HRSG duct burners are calculated from manufacturer's data and HRSG performance modeling, as brought forward from the 2019 Title V renewal application. SO₂ emissions are based on a conservative fuel sulfur content estimated of 2 gr S/100 scf and 100% conversion of elemental sulfur to SO₂. Uncontrolled hazardous air pollutants (HAP) from the turbine are calculated using AP-42 Natural Gas Combustion Tables 1.4-3 and 1.4-4 emission factors.

Cooling Tower (PD-CT-1)

Particulate matter emissions PM₁₀ and PM_{2.5} from the cooling tower are calculated using drift emission factors from NSR permit 2831-M1 condition 1.q, as brought forward from the 2019 Title V renewal application. PM₁₀ emissions are calculated using emission factors provided in paper "Calculating Realistic PM₁₀ Emissions from Cooling Towers" presented at the 2001 Air and Waste Management Association (AWMA) annual meeting. PM_{2.5} emissions are assumed to be equal to PM₁₀ emissions.

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 (CO₂), nitrous oxide (N₂O), methane (CH₄), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

Calculating GHG Emissions:

1. Calculate the ton per year (tpy) GHG mass emissions and GHG CO₂e 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 CO₂e 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 CO₂e 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 CO₂ 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)

Farmington Electric Utility System - Bluffview Power Plant

Emission Calculation Inputs

Fuel Gas			
Fuel Sulfur Content	2	gr S / 100 scf	NMED
Engines			
	Uncontrolled ¹	Controlled ¹	Unit
NOx	2.45	0.08	g/hp-hr
CO	3.85	0.16	g/hp-hr
VOC	0.83	0.33	g/hp-hr
PM ₁₀	1.60	1.60	lb/hr
PM _{2.5}	1.60	1.60	lb/hr
Formaldehyde (approx)	3.50	0.39	lb/hr
Exhaust Parameters			
	Exhaust Temperature	636 F	
	Stack Height	70 ft	
	Stack Diameter	4 ft	
	Flowrate	17162 acfm	

¹ Uncontrolled and Controlled emission factor is based on the highest emission factors based on "Performace & Emission on Natural Gas" report data, August 2019

Emissions Summary

Notes:

"-" Indicates emissions of this pollutant are not expected.

¹ Controlled emission data are based on "Allowable Emissions" on the Title V operating Permits #P228-R2.

conferences, seminars, and courses on the topic of "The Role of the Teacher in the 21st Century".

Engines Emissions

Units: ENG-1 and ENG-2
Description: W20V245G Reciprocating Compressor Engines
Control Equipment: Wartsila Selective catalytic reduction (SCR) and Oxidation Catalyst
Type: 4SLB

Engine Data	Value	Unit	Notes
horsepower:	2250	hp	Conversion factor: 1 kW = 1.34 hp
Fuel consumption:	92.46	lb Btu/lb-hr	Manufacturer Specification MFC Data
Fuel heat value: HHV	1000	Btu/scf	Site Specification Technical Data
Fuel heat value: LHV	-	Btu/scf	Site Specification Technical Data
Heating rates:	77.1	MMBtu/hr	
Fuel usage:	0.08	MMscf/hr	
Operating hours:	675	MMscf/yr	
	8760	hours/year	

Emission Rates for each engine²

Uncontrolled Emissions	NO _x ¹	CO ¹	VOC ¹⁻⁴	SO ₂	PM ₁₀ ¹	PM _{2.5} ¹	HCHO ²	Acetaldehyde ⁵	Acrolein ⁵	Benzene ⁵	Ethylbenzene ⁵	n-Hexane ⁵	Toluene ⁵	Xylene ⁵	Total HAPs ⁵	Units	Notes
Combustion Emission Factors	2.45	3.85	0.83					8.36E-03	5.14E-03	4.40E-04	3.97E-05	1.11E-03	4.08E-04	1.84E-04		lb/hp-hr	Simulation data AP-42 Table A-1
					1.61	1.61	3.50	8.20E-03	5.04E-03	4.31E-04	3.85E-05	1.09E-03	4.00E-04	1.80E-04		lb/MMBtu	AP-42 Table A-1
				2.0				0%	0%	0%	0%	0%	0%	0%		gr S / 100 scf	Simulation data
Safety Factor	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Total Emissions	66.98	105.15	26.80	0.44	1.61	1.61	3.50	0.63	0.39	0.03	3.00E-03	0.08	0.03	0.01	4.68	lb/hr	
	292.38	460.55	117.38	1.93	7.05	7.05	15.33	2.77	1.70	0.15	0.01	0.37	0.13	0.06	20.52	tpy	

Controlled Emissions	NO _x ¹	CO ¹	VOC ¹⁻⁴	SO ₂	PM ₁₀ ¹	PM _{2.5} ¹	HCHO ²	Acetaldehyde ⁵	Acrolein ⁵	Benzene ⁵	Ethylbenzene ⁵	n-Hexane ⁵	Toluene ⁵	Xylene ⁵	Total HAPs ⁵	Units	Notes
Combustion Emission Factors	0.08	0.16	0.33		1.60	1.60	89%	0%	0%	0%	0%	0%	0%	0%		lb/hp-hr	Simulation data AP-42 Table A-1
	97%	96%	66%					8.36E-03	5.14E-03	4.40E-04	3.97E-05	1.11E-03	4.08E-04	1.84E-04		lb/MMBtu	AP-42 Table A-1
					1.61	1.61	0.39	8.20E-03	5.04E-03	4.31E-04	3.85E-05	1.09E-03	4.00E-04	1.80E-04		gr S / 100 scf	Simulation data
Safety Factor	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Combustion Emissions	2.07	4.25	10.11	0.44	1.61	1.61	0.39	0.63	0.39	0.03	3.00E-03	0.08	0.03	0.01	1.57	lb/hr	
	9.08	18.60	44.27	1.93	7.05	7.05	1.71	2.77	1.70	0.15	0.01	0.37	0.13	0.06	6.90	tpy	

GHG Calculations

CO ₂ ¹	N ₂ O ¹	CH ₄ ¹	CO ₂ e ³	Units	Notes
53.06	0.0001	0.001	-	kg/MMBtu	48 CFR 98 Subpart C Tables C-1 and C-2
1	298	25	-	GWP	48 CFR 98 Table A-1
39477	0	19	39518	lb/yr	Engine
39477	22	19	39518	lb/yr CO ₂ e	
Total:				39518	lb/yr CO ₂ e

* N₂O, CH₄, and CO₂ by Emission Rate= EF⁴ Fuel Usage * Fuel Heat Value * 2.0462 lb/1 kg * 1 ton/2000 lb
CO₂e by Emission Rate = CO₂ Emission Rate* GWP Factor + N₂O Emission Rate*GWP Factor +CH₄ Emission Rate*GWP Factor

Notes

- 1 Simulation data provided by Farmington electric. Emission factors are based on highest emissions regardless of load percentage. File name: Exhibit C(Filled out by Wartsila)
- 2 Uncontrolled and controlled emissions are based on the highest lb/hr rate on "Performance & Emission on Natural Gas" report , dated August 2019.
- 3 Emission rates represent of each compressor engine emissions
- 4 VOC emissions included aldehydes
- 5 Total HAPs are calculated using AP-42 emissions factors for a 4-Stroke Lean Burn Engine.

Exhaust Parameters			Notes
Parameter	Units		
velocity	22.78 ft/s		
velocity	1385.74 ft/min		
flow rate	17.53 m ³ /min		Engine Manufacturer @ 10% load
Stack diameter	11.57 ft=2		
Stack diameter	4.00 ft		Per Client
Stack height	70 ft		
Stack Temperature	63.6 F		Catalyst Guarantee

Farmington Electric Utility System - Bluffview Power Plant
Turbine and Duct Burner Emissions

Values provided by manufacturer (turbine) or values determined by modeling HRSG performance

Uncontrolled Emission Summary												
Unit	NO _x		CO		VOC		SO ₂		PM		H ₂ S	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
PD-CTG-1 + PD-DB-1	42.76	187.28	28.47	121.20	1.79	7.12	2.62	11.48	12.83	56.19	-	-

Controlled Emission Summary												
Unit	NO _x		CO		VOC		SO ₂		PM		H ₂ S	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
PD-CTG-1 + PD-DB-1	23.43	99.11	23.50	99.42	1.79	7.12	2.62	11.48	12.83	56.19	-	-

Allowable Emissions ¹												
Unit	NO _x		CO		VOC		SO ₂		PM		H ₂ S	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
PD-CTG-1 + PD-DB-1	23.4	99.1	23.5	99.4	1.8	7.1	2.6	11.5	13.0	56.2	-	-

Notes:

¹ Title V Permit # P228-R2/P228-AR3

Turbine and Duct Burner Emissions

LM6000 PD-Sprint

Stack Diameter:	13.0 ft 3.96 m
Stack Height:	70 ft 21.33 m
Stack Area:	132.73 ft²

Average Annual Operation		
	52°F / 100%	95°F / 100%
Exhaust Component	chiller load	heat load
	Exhaust Analysis (mole%)	Exhaust Analysis (mole%)
Acron	0.89	0.90
Nitrogen (N ₂)	75.06	75.72
Oxygen (O ₂)	13.95	14.28
Carbon Dioxide	3.22	3.14
Water	6.87	5.94
Sulfur Dioxide	-	-
MW of Exhaust (lb/(lb-mole))	28.49	28.59
Exhaust Flow (lb/hr)	861,480	857,840
Exhaust Temperature (°F)	841	837
Exhaust Temperature (K)	723.7	720.4
Density of Exhaust (lb/ft³)	0.025	0.025
Exhaust Flow (acfm)	574,252	597,980
Exhaust Flow Wet (lb-mol/hr)	30,239	31,409
Exhaust Flow Dry (lb-mol/hr)	28,161	29,542
Heat Input (MMBtu/hr)	319	326
Heat Input (Btu/KWH)	8375	8228

Duct Burning	97.5
Duct Burner Heat Input (MMBtu/hr)	19,000
Fuel Heating Value (BTU/lb, LHV)	5,132
Duct Burner Gas Input (lb/hr)	17.9
Gas MW (lb/(lb-mole) (1)	286.7
Duct Burner Gas Input (lb-mole/hr)	266.9
DB Gas CH ₄ Input (lb-mole/hr) (2)	12.61
DB Gas C ₂ H ₆ Input (lb-mole/hr) (3)	2.01
DB Gas C ₃ H ₈ Input (lb-mole/hr) (4)	0.86
DB Gas CO ₂ Input (lb-mole/hr) (5)	4.30
DB Gas N ₂ Input (lb-mole/hr) (6)	

CH₄ + 2O₂ = CO₂ + 2H₂O
C₃H₈ + 5O₂ = 3CO₂ + 4H₂O

- (1) calculated from fuel analysis (Alstom GTX100)
(2) 93.10%
(3) 4.40% assuming 4.4% C₂ from Kern River analysis
(4) 0.70% assuming 0.7% C₃ from Kern River
(5) 0.30% assuming 0.3% CO₂ from Kern River Analysis
(6) 1.50% assuming 1.5% N₂ from Kern River Analysis

Short-Term Operation											
52°F / 100%		6°F / 100%		6°F / 50%		52°F / 50%		52°F / 50%		95°F / 50%	
chiller load	Exhaust Analysis (mole%)	heat load	Exhaust Analysis (mole%)	none	Exhaust Analysis (mole%)	chiller load	Exhaust Analysis (mole%)	none	Exhaust Analysis (mole%)	chiller load	Exhaust Analysis (mole%)
	0.89		0.90		0.91	0.90	0.90		0.9	0.89	0.8815
	75.06		75.75		75.58	75.03	75.04		75.04	74.77	73.8776
	13.95		14.33		13.87	13.87	13.9		13.9	13.79	13.6538
	3.22		3.12		3.33	3.26	3.24		3.26	3.26	3.209
	6.87		5.89		6.30	6.94	6.91		6.91	7.28	8.3721
	-		-		-	-	-		-	0.00	-
	28.49		28.59		28.56	28.49	28.49		28.49	28.45	28.33
	861,480		857,840		560,880	546,480	543,960		545,760	545,760	521,640
	841		837		963	970	976		976	971	985
	723.7		720.4		790.4	794.3	797.6		797.6	794.8	802.6
	0.025		0.026		0.023	0.023	0.023		0.023	0.023	0.022
	574,252		597,980		410,170	402,683	402,500		402,500	402,965	390,626
	30,239		31,409		19,636	19,183	19,095		19,095	19,183	18,416
	28,161		29,542		18,398	17,853	17,775		17,775	17,786	16,874
	319		326		217	207	201		201	207	195
	8375		8228		10929	10836	10894		10894	10844	11062

	97.5	127.1	97.9	97.5	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	19,000	19,000	19,000	19,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	5,132	6,689	5,153	5,132	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	17.9	17.9	17.9	17.9	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	286.7	373.7	287.9	286.7	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	266.9	347.9	268.0	266.9	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	12.61	16.44	12.67	12.61	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	2.01	2.62	2.01	2.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	0.86	1.12	0.86	0.86	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	4.30	5.61	4.32	4.30	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Average Annual Operation			Short-Term Operation															
52°F / 100%	Load		52°F / 100%	Load	6°F / 100%	Load	6°F / 100%	Load	95°F / 100%	Load	95°F / 100%	Load	52°F / 50%	Load	52°F / 50%	Load	95°F / 50%	Load
Turbine and Duct Burner Emissions																		
Exhaust Before Duct Burning																		
267.2		269.1	283.8	286.6					251.8	269.8			n/a	n/a	n/a	n/a	n/a	n/a
Nitrogen (lb-mol/hr)		22,697.2	23,784.1	24,121.1					21,140.5	22,616.0			n/a	n/a	n/a	n/a	n/a	n/a
Oxygen (lb-mol/hr)	4,186.3	4,218.5	4,383.1	4,583.1					3,963.6	4,193.1			n/a	n/a	n/a	n/a	n/a	n/a
Carbon Dioxide (lb-mol/hr)	2,062.6	2,073.7	2,086.9	2,101.5					1,975.6	2,031.5			n/a	n/a	n/a	n/a	n/a	n/a
Water (lb-mol/hr)		2,077.4	1,867.2						2,398.2	2,182.3			n/a	n/a	n/a	n/a	n/a	n/a
Exhaust After Duct Burning																		
267.2		269.1	283.8	286.6					251.8	269.8			n/a	n/a	n/a	n/a	n/a	n/a
Nitrogen (lb-mol/hr)	22,540.2	22,701.5	23,789.7	24,125.4					21,146.1	22,620.3			n/a	n/a	n/a	n/a	n/a	n/a
Oxygen (lb-mol/hr)	3,600.4	3,630.3	3,718.8	3,972.7					3,137.1	3,605.2			n/a	n/a	n/a	n/a	n/a	n/a
Carbon Dioxide (lb-mol/hr)	1,264.9	1,271.8	1,375.6	1,292.9					1,304.5	1,273.6			n/a	n/a	n/a	n/a	n/a	n/a
Water (lb-mol/hr)	2,642.3	2,657.1	2,622.9	2,457.6					3,153.9	2,762.0			n/a	n/a	n/a	n/a	n/a	n/a
Total (lb-mol/hr)	30,315.0	30,529.8	31,790.7	32,135.2					28,993.4	30,531.0			n/a	n/a	n/a	n/a	n/a	n/a
MW of Fired Exhaust	28.38	28.38	28.44	28.48					28.17	28.34			n/a	n/a	n/a	n/a	n/a	n/a
Combined Cycle Operation																		
860,491		866,338	904,172.20	915,231					817,053	865,258			n/a	n/a	n/a	n/a	n/a	n/a
Fired Exhaust Flow (lb/hr)		204		225					205				n/a	n/a	n/a	n/a	n/a	n/a
Fired Exhaust Temperature (°F)	368.7	368.7	380.4	368.7					369.3	368.7			n/a	n/a	n/a	n/a	n/a	n/a
MW of Fired Exhaust (lb/lb-mole)	28.38	28.38	28.38	28.48					28.18	28.34			n/a	n/a	n/a	n/a	n/a	n/a
Density of Fired Exhaust (lb/ft³)	0.049	0.049	0.049	0.047					0.048	0.048			n/a	n/a	n/a	n/a	n/a	n/a
Fired Exhaust Flow (acfm)	295,401	297,494	323,046	323,046					282,948	297,505			n/a	n/a	n/a	n/a	n/a	n/a
Fired Exhaust Flow (scfm)	181,223	182,507	182,514	182,514					182,514	182,514			n/a	n/a	n/a	n/a	n/a	n/a
Fired Exhaust Flow (dscfm)	165,427	166,623	166,623	166,623					166,002	166,002			n/a	n/a	n/a	n/a	n/a	n/a
Fired Exit Velocity (ft/s)	37.09	37.36	37.36	37.36					35.53	37.36			n/a	n/a	n/a	n/a	n/a	n/a
Fired Exit Velocity (m/s)	11.3	11.4	11.4	12.4					10.8	11.4			n/a	n/a	n/a	n/a	n/a	n/a
Unfired Exhaust Flow (lb/hr)																		
855,360		861,480	897,840	910,080					810,360	860,400			598,320	546,480	543,960	545,760	521,640	195
Unfired Exhaust Temperature (°F)	226	226	226	226					228	226			205	194	194	194	194	363.7
Unfired Exhaust Temperature (K)	380.9	380.9	380.9	380.9					382.0	380.9			369.3	363.2	363.2	363.2	363.7	363.7
MW of Unfired Exhaust (lb/lb-mole)	28.49	28.49	28.49	28.59					28.32	28.49			28.61	28.49	28.49	28.49	28.33	28.33
Density of Unfired Exhaust (lb/ft³)	0.047	0.047	0.047	0.047					0.047	0.047			0.049	0.049	0.049	0.049	0.049	0.049
Unfired Exhaust Flow (acfm)	302,262	304,424	320,492	320,492					288,954	304,424			204,090	184,114	183,261	184,114	177,017	177,017
Unfired Exhaust Flow (scfm)													114,678	114,678	114,678	106,324	106,324	106,324
Unfired Exhaust Flow (dscfm)													106,723	106,723	106,723	106,723	106,723	106,723
Unfired Exit Velocity (ft/s)	37.95	38.23	40.24	40.24					36.28	38.23			25.63	23.12	23.12	23.12	23.12	23.12
Unfired Exit Velocity (m/s)	11.6	11.7	12.3	12.3					11.1	11.7			7.8	7.0	7.0	7.0	7.0	7.0

[illegible]

[illegible]

Average Annual Operation			Short-Term Operation											
52°F / 100%			6°F / 100%		6°F / 100%		6°F / 50%		52°F / 50%		52°F / 50%		95°F / 50%	
load			load		Load		Load		Load		Load		Load	
Turbine and Duct Burner Emissions														
Fired CO Calculation														
Flowrate	lb-mol/hr dry (Turb+duct burn)	27.673	27.673		29.678	25.839	27.769	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Oxygen	vol % dry	13.0	13.0		13.4	12.1	13.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
uncontrolled:														
CO	lb/hr	19.64	20.00		20.00	18.00	20.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Duct Burner Factor (b/MMBtu, AP-42, Tab. 1.4-1)		0.0824	0.0824		0.0824	0.0824	0.0824	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Duct Burner Emissions (lb/hr)		8.03	8.03		8.06	10.47	8.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Emissions (lb/hr, turb. + duct burn.)		27.67	28.03		28.06	28.47	28.03							
Total Emissions (tpy, turb. + duct burn.)		121.20	122.91		122.91	124.69	122.77							
controlled:														
CO	ppmvd@15%O2	22.0	22.0		22.0	22.0	22.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CO	ppmvd (actual O2%)	29.29	29.24		27.92	32.48	29.40	n/a	n/a	n/a	n/a	n/a	n/a	n/a
H2O	vol %	8.72	8.70		7.65	10.88	9.05	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CO	ppmw	26.74	26.70		25.78	28.95	26.74	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CO	lb/hr	22.70	22.82		23.20	23.50	22.86	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Emissions (tpy, turb. + duct burn.)		99.42												
Reduction (%)		18%												
Fired SO2 Calculation														
uncontrolled:														
Gas Turbine Emissions (lb/hr)*		1.99	2.01		2.06	1.89	2.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Duct Burner Emissions (lb/hr)*		0.6	0.6		0.6	0.7	0.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Emissions (lb/hr, turb. + duct burn.)		2.55	2.56		2.62	2.62	2.57							
Total Emissions (tpy, turb. + duct burn.)		11.16	11.16		11.48									
Fired PM10 Calculation														
uncontrolled:														
Gas Turbine Emissions (lb/hr)**		12.1	12.1		12.1	12.1	12.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Duct Burner Factor (b/MMBtu, AP-42, Tab. 1.4-2)		0.007	0.007		0.007	0.007	0.007	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Duct Burner Emissions (lb/hr)		0.73	0.73		0.73	0.95	0.73	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Emissions (lb/hr, turb. + duct burn.)		12.83	12.83		12.83	13.05	12.83	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Emissions (tpy, turb. + duct burn.)		56.18	56.2		56.2									
Fired VOC Calculation														
uncontrolled:														
Gas Turbine Emissions (lb/hr)		1.1	1.1		1.1	1.1	1.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Duct Burner Factor (b/MMBtu, AP-42, Tab. 1.4-2)		0.005	0.005		0.005	0.005	0.005	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Duct Burner Emissions (lb/hr)		0.53	0.53		0.53	0.69	0.53	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Emissions (lb/hr, turb. + duct burn.)		1.63	1.63		1.63	1.79	1.63	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Emissions (tpy, turb. + duct burn.)		7.12	7.12		7.13									
Fired NH3 in Stack Gas Calculation														
NH3 (ppmw) ***		10.0	10.0		10.0	10.0	10.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NH3 (lb/hr)		5.1	5.1		5.4	4.9	5.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Emissions (tpy)		22.4	23.7		23.7	21.3	21.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* SO2 emission rate calculated using the default factor for Sulfur content in pipeline quality natural gas [2gr/100scf * fuel use (scfh) *64/32/7000]

* 64 = MW of SO2

* 32 = MW of S

** Reported PM10 emissions are estimate of filterable+condensable fraction (i.e. front and back-half emissions)

*** based on Manufacturer data from the FT8 TwinPac, LM6000 manufacturer did not provide PM data)

*** based on ammonia slip of 10 ppmw @ 15 % O2

Notes

Exhaust flow (acfm) = mass flow (lb/hr) / density of exhaust (lb/ft³) / 60 min/hr

Density of exhaust (lb/ft³) = MW * Pa / R / T

where: MW = molecular weight of exhaust (lb/lb-mole)
Pa = 12.18 psi (pressure at ~5,300 ft msl)
R = 10.73 gas constant
Ta = temperature of exhaust (K)

Farmington Electric Utility System - Bluffview Power Plant

Turbine Exhaust HAP Emissions Calculations

Unit Number: PD-CTG-1
Description: GE turbine

Fuel Consumption

Capacity: 338.00 MMBtu/hr Mfg. data - worst case heat input
Annual operating time: 8,760 hr/yr City of Farmington
Annual fuel consumption: 2,960,880 MMBtu/yr MMBtu/hr x hr/yr

Steady-State Emission Rates

Pollutants	Emission Factors lb/MMBtu	Uncontrolled Emission Rates	
		pph	tpy
1,3-Butadiene	4.30E-07	0.00014534	6.37E-04
Acetaldehyde	4.00E-05	0.01352	5.92E-02
Acrolein	6.40E-06	0.0021632	9.47E-03
Benzene	1.20E-05	0.004056	1.78E-02
Ethylbenzene	3.20E-05	0.010816	4.74E-02
Formaldehyde	7.10E-04	0.23998	1.05E+00
Naphthalene	1.30E-06	0.0004394	1.92E-03
PAH	2.20E-06	0.0007436	3.26E-03
Propylene Oxide	2.90E-05	0.009802	4.29E-02
Toluene	1.30E-04	0.04394	1.92E-01
Xylenes	6.40E-05	0.021632	9.47E-02
	HAP Total	0.35	1.52

Emission factors taken from AP-42, Table 3.1-3

Uncontrolled Emission Rates (pph) = lb/MMBtu x MMBtu/hr

Uncontrolled Emission Rates (tpy) = Uncontrolled Emission Rates (pph) x hr/yr / 2,000 lb/ton

Note: The data on this worksheet applies to each individual emissions unit identified above.

Farmington Electric Utility System - Bluffview Power Plant

HRSG Duct Burner Exhaust HAP Emissions Calculations

Unit Number: PD-DB-1
Description: HRSG Duct Burner

Fuel Consumption

Capacity:	144.00 MMBtu/hr	Mfg. data - worst case heat input
Fuel gas heating value:	1,020 Btu/scf	Nominal heat content
Hourly fuel consumption:	141,176 scf/hr	MMBtu/hr x 1,000,000 / Btu/scf
Annual operating time:	8,760 hr/yr	City of Farmington
Annual fuel consumption:	1,261,440 MMBtu/yr	MMBtu/hr x hr/yr
Annual fuel consumption:	1,236.71 MMscf/yr	scf/hr x hr/yr / 1,000,000

Steady-State Emission Rates

Pollutants	Emission Factors, lb/mmcf	Uncontrolled Emission Rates,	
		pph	tpy
Arsenic	2.00E-04	2.82353E-05	1.24E-04
Benzene	2.10E-03	0.000296471	1.30E-03
Beryllium	1.20E-05	1.69412E-06	7.42E-06
Cadmium	1.10E-03	0.000155294	6.80E-04
Chromium	1.40E-03	0.000197647	8.66E-04
Cobalt	8.40E-05	1.18588E-05	5.19E-05
Dichlorobenzene	1.20E-03	0.000169412	7.42E-04
Formaldehyde	7.50E-02	0.010588235	4.64E-02
Hexane	1.80E+00	0.254117647	1.11E+00
Manganese	3.80E-04	5.36471E-05	2.35E-04
Mercury	2.60E-04	3.67059E-05	1.61E-04
Naphthalene	6.10E-04	8.61176E-05	3.77E-04
Nickel	2.10E-03	0.000296471	1.30E-03
POM	8.82E-05	1.24518E-05	5.45E-05
Selenium	2.40E-05	3.38824E-06	1.48E-05
Toluene	3.40E-03	0.00048	2.10E-03
HAP Total		0.27	1.17

Emission factors taken from AP-42, Tables 1.4-3 and 1.4-4

Uncontrolled Emission Rates (pph) = lb/MMBtu x MMBtu/hr

Uncontrolled Emission Rates (tpy) = Uncontrolled Emission Rates (pph) x hr/yr / 2,000 lb/ton

Note: The data on this worksheet applies to each individual emissions unit identified above.

Cooling Tower Emissions

Unit Number: PD-CT-1

Description: Cooling Tower

Dissolved Solids

	Units	Notes	Source
10,000	ppmw	Water solids content by weight	City of Farmington
31,123	gal/min	Water circulation rate	City of Farmington
8,760	hr/yr	Annual operating time	City of Farmington

Steady-State Emission Rates

Pollutants	Drift	Flow Rates	TDS	Drift Solids	Uncontrolled Emission Rates	
	gal drift/gal flow	gal/hr	lb/gal drift	%	pph	tpy
TSP	2.00E-05	1,867,380	0.0834	100	3.11	13.64
PM10	2.00E-05	1,867,380	0.0834	6	0.19	0.83
PM2.5	2.00E-05	1,867,380	0.0834	6	0.19	0.83

Cooling tower is an induced draft, cross flow tower

Drift rate based on NSR permit 2831-M1, condition 1.q

Flow Rate (gal/hr) = gal/min x 60 min/hr

Total dissolved solids (TDS) are calculated as follows:

$$\text{TDS (lb/gal drift)} = \text{ppmw} \times \text{density}_{\text{H}_2\text{O}} / 1,000,000$$

TSP emissions are calculated assuming all dissolved solids in the drift are emitted as TSP (Drift Solids Emitted = 100)

PM10 emissions are obtained from Figure 1 of the "Frisbie" paper, for a circulating water TDS concentration of 10,000 ppmw as brought forward from 2011 TV renewal application

PM2.5 emissions are assumed to be equal to PM10 emissions

Uncontrolled Emission Rates (pph) = gal drift/gal x gal/hr x lb/gal drift x (% / 100)

Uncontrolled Emission Rates (tpy) = Uncontrolled Emission Rates (pph) x hr/yr / 2,000 lb/ton

Note: The data on this worksheet applies to each individual emissions unit identified above.

Exempt Firewater Pump (Insignificant Activity per 20.2.70.300.D.6)

Emission Unit: PUMP-1
Source Description: Diesel-Fired Firewater Pump
Manufacturer: TBD
Model: TBD
Type: N/A

Fuel Consumption

Rated Engine Power (BHP) 262 kW
351 hp
Fuel consumption 19.00 gal/hr 2.54 scf/hr
Max operating hours 500 hr
Diesel Heat Value ⁴ 137000 Btu/gal
Heat Input: 0.26 MMBtu/hr

Manufacturer Site Rating
Manufacturer Spec Sheet

Uncontrolled Emissions															
	NO _x ⁵	CO ¹	NMHC ⁵	SO ₂ ²	NO _x +NMHC ¹	PM ¹	Formaldehyde ³	Acetaldehyde ³	Acrolein ³	Benzene ³	E-Benzene ³	Toluene ³	Xylene ³	Total HAP	Units
Emission Factors	3.80	3.50	0.20	0.29	4	0.20	1.18E-03	7.67E-04	9.25E-05	9.33E-04	-	4.09E-04	2.85E-04		g/kW-hr lb/MMBtu
Hourly Totals	2.19	2.02	0.12	0.08		0.12	3.07E-04	2.00E-04	2.41E-05	2.43E-04	-	1.06E-04	7.42E-05	9.54E-04	lb/hr
Annual Totals	0.55	0.51	0.03	0.02		0.03	7.68E-05	4.99E-05	6.02E-06	6.07E-05	-	2.66E-05	1.85E-05	2.39E-04	ton/yr

Notes

¹ Emissions factors are referenced from 40 CFR Part 60 Subpart IIII Table 4.

² SO₂ is calculated based on AP 42 Table 3.3-1.

³ HAPs emissions factors are referenced from AP-42 Table 3.3-1 & 3.3-2

⁴ Appendix A, AP 42

⁵ NO_x and NMHC are derived from NO_x+NMHC based on the assumption of 95% NO_x and 5% NMHC according to Table D-25 on California Environmental Protection Agency (Revised date: Dec 18, 2011)

Ammonia Storage Tank - (Insignificant Activity per 20.2.70.300.D.6)

Produced Water Tank Input Information

Unit(s):	TK-3	
Description:	7000 gallon Ammonia Storage Tank	
Number of Tanks:	1	
Tank Volume	7,000	Gallons
Tank Capacity at 90%	6,300	Gallons
Frequency Filled	1	per week
Frequency Filled	52	per year

Uncontrolled Working and Breathing Emissions

Parameters:	per tank	
Total working and breathing losses (lb/yr)	95.7	
Emissions of ammonia (lb/yr)	19	
Emissions of ammonia (lb/hr)	0.0021	
Emissions of ammonia (tons/yr)	0.0093	

Working Losses

Parameters:	values	units	Equations
Annual throughput (Q_w)	43793.76	ft ₃ /yr	$V_T/\text{wk} = 6000, 90\% \text{ capacity}$
Tank Capacity (V_T)	935.8	ft ₃	
Ambient Temperature (T)	286.7	degrees K	avg high 73.8 F, avg low 38.9
Vapor Pressure of liquid at ambient temperature (VP)	43.51	mmHg	$(P_A * X_A) + (P_W * X_W)$
Partial pressure of ammonia (P_A)	177	mmHg	
Molal percent of ammonia (X_A)	20%	%	
Partial pressure of water (P_W)	9.3	mmHg	
Molal percent of water (X_W)	80%	%	
Molecular weight of liquid (MW)	17.80	lb/lb-mole	
Weight percent of ammonia (W_A)	19.5%	%	$1/(W_A/MW_A + W_W/MW_W)$
Molecular weight of ammonia (MW_A)	17	lb/lb-mole	
Weight percent of water (W_W)	80.5%	%	
Molecular weight of water (MW_W)	18	lb/lb-mole	
N	47	dimensionless	$N = Q_w/V_T$
Annual turnover factor (K_N)	0.81	dimensionless	$(180 + N)/6N$
Working loss product factor (K_P)	1	dimensionless	
Working losses (L_W)	95.7	lb/yr	$Q_w * (1/359) * (263.15/T) * (VP/760) * (MW) * (K_N) * (K_P)$

Breathing Losses

Parameters:	values	units	Equations
Air displaced from tank due to expansion (M_{air})	0.017	lb-mole/day	$V_v * (1/359) * K_E * (273.15/T)$
Vapor Space in tank (V_v)	93.6	scf	10% of V_T
Vapor space expansion factor (K_E)	0.068	dimensionless	T_R/T
Day-night temperature fluctuation (T_R)	19.4	degrees K	avg high - avg low
Breathing Losses (L_B)	6.2	lb/yr	$365 * M_{air} * (VP/760) * MW$

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.
-

Documentation used to support calculation in this permit application

Combustion Turbine (PD-CTG-1 & PD-DB-1)

- AP-42 Subsection 1.4 – Natural Gas Combustion (Table 1.4-3 & 1.4-4)
- Turbine manufacturer data

HRSB Duct Burner (PD-DB-1)

- AP-42 Subsection 1.4 – Natural Gas Combustion (Table 1.4-3 & 1.4-4)
- Duct Burner manufacturer data

Pump (PUMP-1)

- AP-42 Subsection 3.3 – Gasoline and Diesel Industrial Engines (Table 3.3-1 & 13.3-2)
- 40 CFR Part 60 Subpart III (Table 4)

Compressor Engines (ENG-1 & ENG-2)

- AP-42 Subsection 3.2 – Natural Gas-Fired Reciprocating Engines (Table 3.2-2)
- Compressor emission simulation data
- 40 CFR Subpart C (Table C-1 and C-2)

Cooling Tower (PD-CT-1)

- Cooling Tower manufacturer data

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

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

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

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

^a Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from lb/10⁶ scf to kg/10⁶ m³, multiply by 16. To convert from lb/10⁶ scf to lb/MMBtu, divide by 1,020. Emission Factors preceded with a less-than symbol are based on method detection limits.

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

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

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

TABLE 1.4-4. EMISSION FACTORS FOR METALS FROM NATURAL GAS COMBUSTION^a

CAS No.	Pollutant	Emission Factor (lb/10 ⁶ scf)	Emission Factor Rating
7440-38-2	Arsenic ^b	2.0E-04	E
7440-39-3	Barium	4.4E-03	D
7440-41-7	Beryllium ^b	<1.2E-05	E
7440-43-9	Cadmium ^b	1.1E-03	D
7440-47-3	Chromium ^b	1.4E-03	D
7440-48-4	Cobalt ^b	8.4E-05	D
7440-50-8	Copper	8.5E-04	C
7439-96-5	Manganese ^b	3.8E-04	D
7439-97-6	Mercury ^b	2.6E-04	D
7439-98-7	Molybdenum	1.1E-03	D
7440-02-0	Nickel ^b	2.1E-03	C
7782-49-2	Selenium ^b	<2.4E-05	E
7440-62-2	Vanadium	2.3E-03	D
7440-66-6	Zinc	2.9E-02	E

^a Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. Emission factors preceded by a less-than symbol are based on method detection limits. To convert from lb/10⁶ scf to kg/10⁶ m³, multiply by 16. To convert from lb/10⁶ scf to 1b/MMBtu, divide by 1,020.

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

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

Pollutant	Emission Factor (lb/MMBtu) ^b (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO _x ^c 90 - 105% Load	4.08 E+00	B
NO _x ^c <90% Load	8.47 E-01	B
CO ^c 90 - 105% Load	3.17 E-01	C
CO ^c <90% Load	5.57 E-01	B
CO ₂ ^d	1.10 E+02	A
SO ₂ ^e	5.88 E-04	A
TOC ^f	1.47 E+00	A
Methane ^g	1.25 E+00	C
VOC ^h	1.18 E-01	C
PM10 (filterable) ⁱ	7.71 E-05	D
PM2.5 (filterable) ⁱ	7.71 E-05	D
PM Condensable ^j	9.91 E-03	D
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane ^k	<4.00 E-05	E
1,1,2-Trichloroethane ^k	<3.18 E-05	E
1,1-Dichloroethane	<2.36 E-05	E
1,2,3-Trimethylbenzene	2.30 E-05	D
1,2,4-Trimethylbenzene	1.43 E-05	C
1,2-Dichloroethane	<2.36 E-05	E
1,2-Dichloropropane	<2.69 E-05	E
1,3,5-Trimethylbenzene	3.38 E-05	D
1,3-Butadiene ^k	2.67E-04	D
1,3-Dichloropropene ^k	<2.64 E-05	E
2-Methylnaphthalene ^k	3.32 E-05	C
2,2,4-Trimethylpentane ^k	2.50 E-04	C
Acenaphthene ^k	1.25 E-06	C

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

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

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

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

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

^b Emission factors were calculated in units of (lb/MMBtu) based on procedures in EPA Method 19. To convert from (lb/MMBtu) to (lb/10⁶ scf), multiply by the heat content of the fuel. If the heat content is not available, use 1020 Btu/scf. To convert from (lb/MMBtu) to (lb/hp-hr) use the following equation:

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

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

^d Based on 99.5% conversion of the fuel carbon to CO₂. CO₂ [lb/MMBtu] = (3.67)(%CON)(C)(D)(1/h), where %CON = percent conversion of fuel carbon to CO₂, C = carbon content of fuel by weight (0.75), D = density of fuel, 4.1 E+04 lb/10⁶ scf, and

- h = heating value of natural gas (assume 1020 Btu/scf at 60°F).
- ^e Based on 100% conversion of fuel sulfur to SO₂. Assumes sulfur content in natural gas of 2,000 gr/10⁶ scf.
- ^f Emission factor for TOC is based on measured emission levels from 22 source tests.
- ^g Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor. Measured emission factor for methane compares well with the calculated emission factor, 1.31 lb/MMBtu vs. 1.25 lb/MMBtu, respectively.
- ^h VOC emission factor is based on the sum of the emission factors for all speciated organic compounds less ethane and methane.
- ⁱ Considered $\leq 1 \mu\text{m}$ in aerodynamic diameter. Therefore, for filterable PM emissions, PM₁₀(filterable) = PM_{2.5}(filterable).
- ^j PM Condensable = PM Condensable Inorganic + PM-Condensable Organic
- ^k Hazardous Air Pollutant as defined by Section 112(b) of the Clean Air Act.
- ^l For lean burn engines, aldehyde emissions quantification using CARB 430 may reflect interference with the sampling compounds due to the nitrogen concentration in the stack. The presented emission factor is based on FTIR measurements. Emissions data based on CARB 430 are available in the background report.

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

Pollutant	Gasoline Fuel (SCC 2-02-003-01, 2-03-003-01)		Diesel Fuel (SCC 2-02-001-02, 2-03-001-01)		EMISSION FACTOR RATING
	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	
NO _x	0.011	1.63	0.031	4.41	D
CO	6.96 E-03 ^d	0.99 ^d	6.68 E-03	0.95	D
SO _x	5.91 E-04	0.084	2.05 E-03	0.29	D
PM-10 ^b	7.21 E-04	0.10	2.20 E-03	0.31	D
CO ₂ ^c	1.08	154	1.15	164	B
Aldehydes	4.85 E-04	0.07	4.63 E-04	0.07	D
TOC					
Exhaust	0.015	2.10	2.47 E-03	0.35	D
Evaporative	6.61 E-04	0.09	0.00	0.00	E
Crankcase	4.85 E-03	0.69	4.41 E-05	0.01	E
Refueling	1.08 E-03	0.15	0.00	0.00	E

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

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

^c Assumes 99% conversion of carbon in fuel to CO₂ with 87 weight % carbon in diesel, 86 weight % carbon in gasoline, average BSFC of 7,000 Btu/hp-hr, diesel heating value of 19,300 Btu/lb, and gasoline heating value of 20,300 Btu/lb.

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

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

EMISSION FACTOR RATING: E

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

^a Based on the uncontrolled levels of 2 diesel engines from References 6-7. Source Classification Codes 2-02-001-02, 2-03-001-01. To convert from lb/MMBtu to ng/J, multiply by 430.

^b Hazardous air pollutant listed in the *Clean Air Act*.

^c Based on data from 1 engine.

Calculating Realistic PM₁₀ Emissions from Cooling Towers

Abstract No. 216 Session No. AM-1b

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ABSTRACT

Particulate matter less than 10 micrometers in diameter (PM₁₀) emissions from wet cooling towers may be calculated using the methodology presented in EPA's AP-42¹, which assumes that all total dissolved solids (TDS) emitted in "drift" particles (liquid water entrained in the air stream and carried out of the tower through the induced draft fan stack.) are PM₁₀. However, for wet cooling towers with medium to high TDS levels, this method is overly conservative, and predicts significantly higher PM₁₀ emissions than would actually occur, even for towers equipped with very high efficiency drift eliminators (e.g., 0.0006% drift rate). Such over-prediction may result in unrealistically high PM₁₀ modeled concentrations and/or the need to purchase expensive Emission Reduction Credits (ERCs) in PM₁₀ non-attainment areas. Since these towers have fairly low emission points (10 to 15 m above ground), over-predicting PM₁₀ emission rates can easily result in exceeding federal Prevention of Significant Deterioration (PSD) significance levels at a project's fence line. This paper presents a method for computing realistic PM₁₀ emissions from cooling towers with medium to high TDS levels.

INTRODUCTION

Cooling towers are heat exchangers that are used to dissipate large heat loads to the atmosphere. Wet, or evaporative, cooling towers rely on the latent heat of water evaporation to exchange heat between the process and the air passing through the cooling tower. The cooling water may be an integral part of the process or may provide cooling via heat exchangers, for example, steam condensers. Wet cooling towers provide direct contact between the cooling water and air passing through the tower, and as part of normal operation, a very small amount of the circulating water may be entrained in the air stream and be carried out of the tower as "drift" droplets. Because the drift droplets contain the same chemical impurities as the water circulating through the tower, the particulate matter constituent of the drift droplets may be classified as an emission. The magnitude of the drift loss is influenced by the number and size of droplets produced within the tower, which are determined by the tower fill design, tower design, the air and water patterns, and design of the drift eliminators.

AP-42 METHOD OF CALCULATING DRIFT PARTICULATE

EPA's AP-42¹ provides available particulate emission factors for wet cooling towers, however, these values only have an emission factor rating of "E" (the lowest level of confidence acceptable). They are also rather high, compared to typical present-day manufacturers' guaranteed drift rates, which are on the order of 0.0006%. (Drift emissions are typically

expressed as a percentage of the cooling tower water circulation rate). AP-42 states that “a *conservatively high* PM₁₀ emission factor can be obtained by (a) multiplying the total liquid drift factor by the TDS fraction in the circulating water, and (b) assuming that once the water evaporates, all remaining solid particles are within the PM₁₀ range.” (Italics per EPA).

If TDS data for the cooling tower are not available, a source-specific TDS content can be estimated by obtaining the TDS for the make-up water and multiplying it by the cooling tower cycles of concentration. [The cycles of concentration is the ratio of a measured parameter for the cooling tower water (such as conductivity, calcium, chlorides, or phosphate) to that parameter for the make-up water.]

Using AP-42 guidance, the total particulate emissions (PM) (after the pure water has evaporated) can be expressed as:

$$\text{PM} = \text{Water Circulation Rate} \times \text{Drift Rate} \times \text{TDS} \quad [1]$$

For example, for a typical power plant wet cooling tower with a water circulation rate of 146,000 gallons per minute (gpm), drift rate of 0.0006%, and TDS of 7,700 parts per million by weight (ppmw):

$$\text{PM} = 146,000 \text{ gpm} \times 8.34 \text{ lb water/gal} \times 0.0006/100 \times 7,700 \text{ lb solids}/10^6 \text{ lb water} \times 60 \text{ min/hr} = \underline{3.38 \text{ lb/hr}}$$

On an annual basis, this is equivalent to almost 15 tons per year (tpy). Even for a state-of-the-art drift eliminator system, this is not a small number, especially if assumed to all be equal to PM₁₀, a regulated criteria pollutant. However, as the following analysis demonstrates, only a very small fraction is actually PM₁₀.

COMPUTING THE PM₁₀ FRACTION

Based on a representative drift droplet size distribution and TDS in the water, the amount of solid mass in each drop size can be calculated. That is, for a given initial droplet size, assuming that the mass of dissolved solids condenses to a spherical particle after all the water evaporates, and assuming the density of the TDS is equivalent to a representative salt (e.g., sodium chloride), the diameter of the final solid particle can be calculated. Thus, using the drift droplet size distribution, the percentage of drift mass containing particles small enough to produce PM₁₀ can be calculated. This method is conservative as the final particle is assumed to be perfectly spherical; hence as small a particle as can exist.

The droplet size distribution of the drift emitted from the tower is critical to performing the analysis. Brentwood Industries, a drift eliminator manufacturer, was contacted and agreed to provide drift eliminator test data from a test conducted by Environmental Systems Corporation (ESC) at the Electric Power Research Institute (EPRI) test facility in Houston, Texas in 1988 (Aull², 1999). The data consist of water droplet size distributions for a drift eliminator that achieved a tested drift rate of 0.0003 percent. As we are using a 0.0006 percent drift rate, it is reasonable to expect that the 0.0003 percent drift rate would produce smaller droplets, therefore,

this size distribution data can be assumed to be conservative for predicting the fraction of PM₁₀ in the total cooling tower PM emissions.

In calculating PM₁₀ emissions the following assumptions were made:

- Each water droplet was assumed to evaporate shortly after being emitted into ambient air, into a single, solid, spherical particle.
- Drift water droplets have a density (ρ_w) of water; 1.0 g/cm³ or 1.0 * 10⁻⁶ $\mu\text{g} / \mu\text{m}^3$.
- The solid particles were assumed to have the same density (ρ_{TDS}) as sodium chloride, (i.e., 2.2 g/cm³).

Using the formula for the volume of a sphere, $V = 4\pi r^3 / 3$, and the density of pure water, $\rho_w = 1.0 \text{ g/cm}^3$, the following equations can be used to derive the solid particulate diameter, D_p , as a function of the TDS, the density of the solids, and the initial drift droplet diameter, D_d :

$$\text{Volume of drift droplet} = (4/3)\pi(D_d/2)^3 \quad [2]$$

$$\text{Mass of solids in drift droplet} = (\text{TDS})(\rho_w)(\text{Volume of drift droplet}) \quad [3]$$

substituting,

$$\text{Mass of solids in drift} = (\text{TDS})(\rho_w)(4/3)\pi(D_d/2)^3 \quad [4]$$

Assuming the solids remain and coalesce after the water evaporates, the mass of solids can also be expressed as:

$$\text{Mass of solids} = (\rho_{\text{TDS}})(\text{solid particle volume}) = (\rho_{\text{TDS}})(4/3)\pi(D_p/2)^3 \quad [5]$$

Equations [4] and [5] are equivalent:

$$(\rho_{\text{TDS}})(4/3)\pi(D_p/2)^3 = (\text{TDS})(\rho_w)(4/3)\pi(D_d/2)^3 \quad [6]$$

Solving for D_p :

$$D_p = D_d [(\text{TDS})(\rho_w / \rho_{\text{TDS}})]^{1/3} \quad [7]$$

Where,

TDS is in units of ppmw

D_p = diameter of solid particle, micrometers (μm)

D_d = diameter of drift droplet, μm

Using formulas [2] – [7] and the particle size distribution test data, Table 1 can be constructed for drift from a wet cooling tower having the same characteristics as our example; 7,700 ppmw TDS and a 0.0006% drift rate. The first and last columns of this table are the particle size distribution derived from test results provided by Brentwood Industries. Using straight-line interpolation for a solid particle size 10 μm in diameter, we conclude that approximately 14.9 percent of the mass emissions are equal to or smaller than PM₁₀. The balance of the solid

particulate are particulate greater than 10 μm . Hence, PM_{10} emissions from this tower would be equal to PM emissions x 0.149, or 3.38 lb/hr x 0.149 = 0.50 lb/hr. The process is repeated in Table 2, with all parameters equal except that the TDS is 11,000 ppmw. The result is that approximately 5.11 percent are smaller at 11,000 ppm. Thus, while total PM emissions are larger by virtue of a higher TDS, overall PM_{10} emissions are actually lower, because more of the solid particles are larger than 10 μm .

Table 1. Resultant Solid Particulate Size Distribution (TDS = 7700 ppmw)

EPRI Droplet Diameter (μm)	Droplet Volume (μm^3) [2] ¹	Droplet Mass (μg) [3]	Particle Mass (Solids) (μg) [4]	Solid Particle Volume (μm^3)	Solid Particle Diameter (μm) [7]	EPRI % Mass Smaller
10	524	5.24E-04	4.03E-06	1.83	1.518	0.000
20	4189	4.19E-03	3.23E-05	14.66	3.037	0.196
30	14137	1.41E-02	1.09E-04	49.48	4.555	0.226
40	33510	3.35E-02	2.58E-04	117.29	6.073	0.514
50	65450	6.54E-02	5.04E-04	229.07	7.591	1.816
60	113097	1.13E-01	8.71E-04	395.84	9.110	5.702
70	179594	1.80E-01	1.38E-03	628.58	10.628	21.348
90	381704	3.82E-01	2.94E-03	1335.96	13.665	49.812
110	696910	6.97E-01	5.37E-03	2439.18	16.701	70.509
130	1150347	1.15E+00	8.86E-03	4026.21	19.738	82.023
150	1767146	1.77E+00	1.36E-02	6185.01	22.774	88.012
180	3053628	3.05E+00	2.35E-02	10687.70	27.329	91.032
210	4849048	4.85E+00	3.73E-02	16971.67	31.884	92.468
240	7238229	7.24E+00	5.57E-02	25333.80	36.439	94.091
270	10305995	1.03E+01	7.94E-02	36070.98	40.994	94.689
300	14137167	1.41E+01	1.09E-01	49480.08	45.549	96.288
350	22449298	2.24E+01	1.73E-01	78572.54	53.140	97.011
400	33510322	3.35E+01	2.58E-01	117286.13	60.732	98.340
450	47712938	4.77E+01	3.67E-01	166995.28	68.323	99.071
500	65449847	6.54E+01	5.04E-01	229074.46	75.915	99.071
600	113097336	1.13E+02	8.71E-01	395840.67	91.098	100.000

¹ Bracketed numbers refer to equation number in text.

The percentage of PM_{10} /PM was calculated for cooling tower TDS values from 1000 to 12000 ppmw and the results are plotted in Figure 1. Using these data, Figure 2 presents predicted PM_{10} emission rates for the 146,000 gpm example tower. As shown in this figure, the PM emission rate increases in a straight line as TDS increases, however, the PM_{10} emission rate increases to a maximum at around a TDS of 4000 ppmw, and then begins to decline. The reason is that at higher TDS, the drift droplets contain more solids and therefore, upon evaporation, result in larger solid particles for any given initial droplet size.

CONCLUSION

The emission factors and methodology given in EPA's AP-42¹ Chapter 13.4 *Wet Cooling Towers*, do not account for the droplet size distribution of the drift exiting the tower. This is a critical factor, as more than 85% of the mass of particulate in the drift from most cooling towers will result in solid particles larger than PM_{10} once the water has evaporated. Particles larger than PM_{10} are no longer a regulated air pollutant, because their impact on human health has been shown to be insignificant. Using reasonable, conservative assumptions and a realistic drift

droplet size distribution, a method is now available for calculating realistic PM₁₀ emission rates from wet mechanical draft cooling towers equipped with modern, high-efficiency drift eliminators and operating at medium to high levels of TDS in the circulating water.

Table 2. Resultant Solid Particulate Size Distribution (TDS = 11000 ppmw)

EPRI Droplet Diameter (μm)	Droplet Volume (μm^3) [2] ¹	Droplet Mass (μg) [3]	Particle Mass (Solids) (μg) [4]	Solid Particle Volume (μm^3)	Solid Particle Diameter (μm) [7]	EPRI % Mass Smaller
10	524	5.24E-04	5.76E-06	2.62	1.710	0.000
20	4189	4.19E-03	4.61E-05	20.94	3.420	0.196
30	14137	1.41E-02	1.56E-04	70.69	5.130	0.226
40	33510	3.35E-02	3.69E-04	167.55	6.840	0.514
50	65450	6.54E-02	7.20E-04	327.25	8.550	1.816
60	113097	1.13E-01	1.24E-03	565.49	10.260	5.702
70	179594	1.80E-01	1.98E-03	897.97	11.970	21.348
90	381704	3.82E-01	4.20E-03	1908.52	15.390	49.812
110	696910	6.97E-01	7.67E-03	3484.55	18.810	70.509
130	1150347	1.15E+00	1.27E-02	5751.73	22.230	82.023
150	1767146	1.77E+00	1.94E-02	8835.73	25.650	88.012
180	3053628	3.05E+00	3.36E-02	15268.14	30.780	91.032
210	4849048	4.85E+00	5.33E-02	24245.24	35.909	92.468
240	7238229	7.24E+00	7.96E-02	36191.15	41.039	94.091
270	10305995	1.03E+01	1.13E-01	51529.97	46.169	94.689
300	14137167	1.41E+01	1.56E-01	70685.83	51.299	96.288
350	22449298	2.24E+01	2.47E-01	112246.49	59.849	97.011
400	33510322	3.35E+01	3.69E-01	167551.61	68.399	98.340
450	47712938	4.77E+01	5.25E-01	238564.69	76.949	99.071
500	65449847	6.54E+01	7.20E-01	327249.23	85.499	99.071
600	113097336	1.13E+02	1.24E+00	565486.68	102.599	100.000

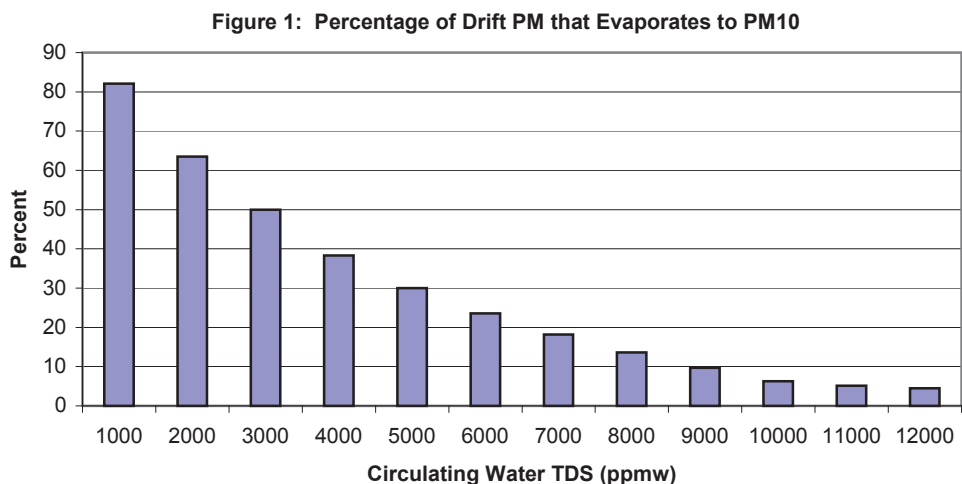
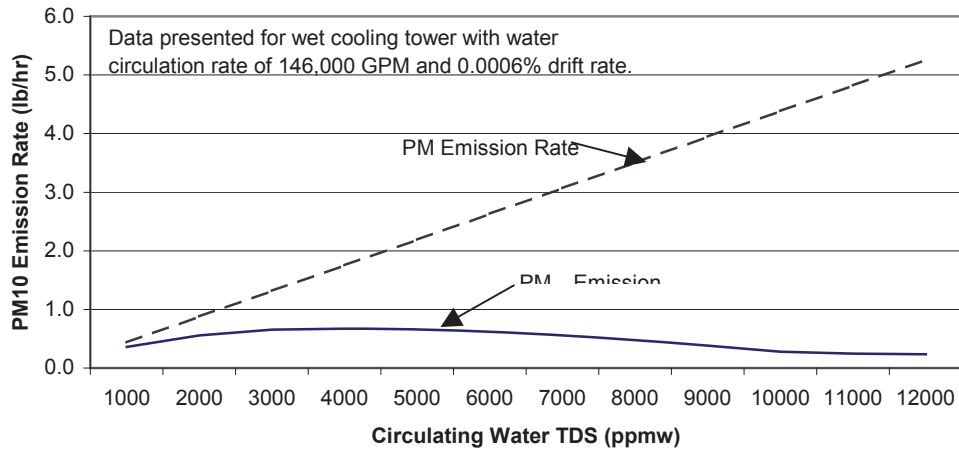


Figure 2: PM₁₀ Emission Rate vs. TDS



REFERENCES

1. EPA, 1995. Compilation of Air pollutant Emission Factors, AP-42 Fifth edition, Volume I: *Stationary Point and Area Sources*, Chapter 13.4 Wet Cooling Towers, <http://www.epa.gov/ttn/chief/ap42/>, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, January.
2. Aull, 1999. Memorandum from R. Aull, Brentwood Industries to J. Reisman, Greystone, December 7, 1999.

KEY WORDS

Drift
Drift eliminators
Cooling tower
PM₁₀ emissions
TDS

TABLE 1.4-4. EMISSION FACTORS FOR METALS FROM NATURAL GAS COMBUSTION^a

CAS No.	Pollutant	Emission Factor (lb/10 ⁶ scf)	Emission Factor Rating
7440-38-2	Arsenic ^b	2.0E-04	E
7440-39-3	Barium	4.4E-03	D
7440-41-7	Beryllium ^b	<1.2E-05	E
7440-43-9	Cadmium ^b	1.1E-03	D
7440-47-3	Chromium ^b	1.4E-03	D
7440-48-4	Cobalt ^b	8.4E-05	D
7440-50-8	Copper	8.5E-04	C
7439-96-5	Manganese ^b	3.8E-04	D
7439-97-6	Mercury ^b	2.6E-04	D
7439-98-7	Molybdenum	1.1E-03	D
7440-02-0	Nickel ^b	2.1E-03	C
7782-49-2	Selenium ^b	<2.4E-05	E
7440-62-2	Vanadium	2.3E-03	D
7440-66-6	Zinc	2.9E-02	E

^a Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. Emission factors preceded by a less-than symbol are based on method detection limits. To convert from lb/10⁶ scf to kg/10⁶ m³, multiply by 16. To convert from lb/10⁶ scf to lb/MMBtu, divide by 1,020.

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

Table A-1 to Subpart A of Part 98—Global Warming Potentials

GLOBAL WARMING POTENTIALS

[100-Year Time Horizon]

Name	CAS No.	Chemical formula	Global warming potential (100 yr.)
Carbon dioxide	124-38-9	CO ₂	1
Methane	74-82-8	CH ₄	^a 25
Nitrous oxide	10024-97-2	N ₂ O	^a 298
HFC-23	75-46-7	CHF ₃	^a 14,800
HFC-32	75-10-5	CH ₂ F ₂	^a 675
HFC-41	593-53-3	CH ₃ F	^a 92
HFC-125	354-33-6	C ₂ HF ₅	^a 3,500
HFC-134	359-35-3	C ₂ H ₂ F ₄	^a 1,100
HFC-134a	811-97-2	CH ₂ FCF ₃	^a 1,430
HFC-143	430-66-0	C ₂ H ₃ F ₃	^a 353
HFC-143a	420-46-2	C ₂ H ₃ F ₃	^a 4,470
HFC-152	624-72-6	CH ₂ FCH ₂ F	53
HFC-152a	75-37-6	CH ₃ CHF ₂	^a 124
HFC-161	353-36-6	CH ₃ CH ₂ F	12
HFC-227ea	431-89-0	C ₃ HF ₇	^a 3,220
HFC-236cb	677-56-5	CH ₂ FCF ₂ CF ₃	1,340
HFC-236ea	431-63-0	CHF ₂ CHFCF ₃	1,370
HFC-236fa	690-39-1	C ₃ H ₂ F ₆	^a 9,810
HFC-245ca	679-86-7	C ₃ H ₃ F ₅	^a 693
HFC-245fa	460-73-1	CHF ₂ CH ₂ CF ₃	1,030
HFC-365mfc	406-58-6	CH ₃ CF ₂ CH ₂ CF ₃	794
HFC-43-10mee	138495-42-8	CF ₃ CFHCFHCF ₂ CF ₃	^a 1,640
Sulfur hexafluoride	2551-62-4	SF ₆	^a 22,800
Trifluoromethyl sulphur pentafluoride	373-80-8	SF ₅ CF ₃	17,700
Nitrogen trifluoride	7783-54-2	NF ₃	17,200
PFC-14 (Perfluoromethane)	75-73-0	CF ₄	^a 7,390
PFC-116 (Perfluoroethane)	76-16-4	C ₂ F ₆	^a 12,200
PFC-218 (Perfluoropropane)	76-19-7	C ₃ F ₈	^a 8,830
Perfluorocyclopropane	931-91-9	C-C ₃ F ₆	17,340
PFC-3-1-10 (Perfluorobutane)	355-25-9	C ₄ F ₁₀	^a 8,860
PFC-318 (Perfluorocyclobutane)	115-25-3	C-C ₄ F ₈	^a 10,300
PFC-4-1-12 (Perfluoropentane)	678-26-2	C ₅ F ₁₂	^a 9,160
PFC-5-1-14 (Perfluorohexane, FC-72)	355-42-0	C ₆ F ₁₄	^a 9,300
PFC-9-1-18	306-94-5	C ₁₀ F ₁₈	7,500
HCFE-235da2 (Isoflurane)	26675-46-7	CHF ₂ OCHClCF ₃	350
HFE-43-10pccc (H-Galden 1040x, HG-11)	E1730133	CHF ₂ OCF ₂ OC ₂ F ₄ OCHF ₂	1,870

HFE-125	3822-68-2	CHF ₂ OCF ₃	14,900
HFE-134 (HG-00)	1691-17-4	CHF ₂ OCHF ₂	6,320
HFE-143a	421-14-7	CH ₃ OCF ₃	756
HFE-227ea	2356-62-9	CF ₃ CHFOCF ₃	1,540
HFE-236ca12 (HG-10)	78522-47-1	CHF ₂ OCF ₂ OCHF ₂	2,800
HFE-236ea2 (Desflurane)	57041-67-5	CHF ₂ OCHF ₂ CF ₃	989
HFE-236fa	20193-67-3	CF ₃ CH ₂ OCF ₃	487
HFE-245cb2	22410-44-2	CH ₃ OCF ₂ CF ₃	708
HFE-245fa1	84011-15-4	CHF ₂ CH ₂ OCF ₃	286
HFE-245fa2	1885-48-9	CHF ₂ OCH ₂ CF ₃	659
HFE-254cb2	425-88-7	CH ₃ OCF ₂ CHF ₂	359
HFE-263fb2	460-43-5	CF ₃ CH ₂ OCH ₃	11
HFE-329mcc2	134769-21-4	CF ₃ CF ₂ OCF ₂ CHF ₂	919
HFE-338mcf2	156053-88-2	CF ₃ CF ₂ OCH ₂ CF ₃	552
HFE-338pcc13 (HG-01)	188690-78-0	CHF ₂ OCF ₂ CF ₂ OCHF ₂	1,500
HFE-347mcc3 (HFE-7000)	375-03-1	CH ₃ OCF ₂ CF ₂ CF ₃	575
HFE-347mcf2	171182-95-9	CF ₃ CF ₂ OCH ₂ CHF ₂	374
HFE-347pcf2	406-78-0	CHF ₂ CF ₂ OCH ₂ CF ₃	580
HFE-356mec3	382-34-3	CH ₃ OCF ₂ CHF ₂ CF ₃	101
HFE-356pcc3	160620-20-2	CH ₃ OCF ₂ CF ₂ CHF ₂	110
HFE-356pcf2	50807-77-7	CHF ₂ CH ₂ OCF ₂ CHF ₂	265
HFE-356pcf3	35042-99-0	CHF ₂ OCH ₂ CF ₂ CHF ₂	502
HFE-365mcf3	378-16-5	CF ₃ CF ₂ CH ₂ OCH ₃	11
HFE-374pc2	512-51-6	CH ₃ CH ₂ OCF ₂ CHF ₂	557
HFE-449s1 (HFE-7100)	163702-07-6	C ₄ F ₉ OCH ₃	297
Chemical blend	163702-08-7	(CF ₃) ₂ CFCF ₂ OCH ₃	
HFE-569sf2 (HFE-7200)	163702-05-4	C ₄ F ₉ OC ₂ H ₅	59
Chemical blend	163702-06-5	(CF ₃) ₂ CFCF ₂ OC ₂ H ₅	
Sevoflurane (HFE-347mmz1)	28523-86-6	CH ₂ FOCH(CF ₃) ₂	345
HFE-356mm1	13171-18-1	(CF ₃) ₂ CHOCH ₃	27
HFE-338mmz1	26103-08-2	CHF ₂ OCH(CF ₃) ₂	380
(Octafluorotetramethyl-ene) hydroxymethyl group	NA	X-(CF ₂) ₄ CH(OH)-X	73
HFE-347mmy1	22052-84-2	CH ₃ OCF(CF ₃) ₂	343
Bis(trifluoromethyl)-methanol	920-66-1	(CF ₃) ₂ CHOH	195
2,2,3,3,3-pentafluoropropanol	422-05-9	CF ₃ CF ₂ CH ₂ OH	42
PPFMIE (HT-70)	NA	CF ₃ OCF(CF ₃)CF ₂ OCF ₂ OCF ₃	10,300

^aThe GWP for this compound is different than the GWP in the version of Table A-1 to subpart A of part 98 published on October 30, 2009.

Table C-1 to Subpart C of Part 98—Default CO₂ Emission Factors and High Heat Values for Various Types of Fuel

DEFAULT CO₂ EMISSION FACTORS AND HIGH HEAT VALUES FOR VARIOUS TYPES OF FUEL

Fuel type	Default high heat value	Default CO₂ emission factor
Coal and coke	mmBtu/short ton	kg CO₂/mmBtu
Anthracite	25.09	103.69
Bituminous	24.93	93.28
Subbituminous	17.25	97.17
Lignite	14.21	97.72
Coal Coke	24.80	113.67
Mixed (Commercial sector)	21.39	94.27
Mixed (Industrial coking)	26.28	93.90
Mixed (Industrial sector)	22.35	94.67
Mixed (Electric Power sector)	19.73	95.52
Natural gas	mmBtu/scf	kg CO₂/mmBtu
(Weighted U.S. Average)	1.026×10^{-3}	53.06
Petroleum products	mmBtu/gallon	kg CO₂/mmBtu
Distillate Fuel Oil No. 1	0.139	73.25
Distillate Fuel Oil No. 2	0.138	73.96
Distillate Fuel Oil No. 4	0.146	75.04
Residual Fuel Oil No. 5	0.140	72.93
Residual Fuel Oil No. 6	0.150	75.10
Used Oil	0.138	74.00
Kerosene	0.135	75.20
Liquefied petroleum gases (LPG) ¹	0.092	61.71
Propane ¹	0.091	62.87
Propylene ²	0.091	67.77
Ethane ¹	0.068	59.60
Ethanol	0.084	68.44
Ethylene ²	0.058	65.96
Isobutane ¹	0.099	64.94
Isobutylene ¹	0.103	68.86
Butane ¹	0.103	64.77
Butylene ¹	0.105	68.72
Naphtha (<401 deg F)	0.125	68.02
Natural Gasoline	0.110	66.88
Other Oil (>401 deg F)	0.139	76.22
Pentanes Plus	0.110	70.02

Petrochemical Feedstocks	0.125	71.02
Petroleum Coke	0.143	102.41
Special Naphtha	0.125	72.34
Unfinished Oils	0.139	74.54
Heavy Gas Oils	0.148	74.92
Lubricants	0.144	74.27
Motor Gasoline	0.125	70.22
Aviation Gasoline	0.120	69.25
Kerosene-Type Jet Fuel	0.135	72.22
Asphalt and Road Oil	0.158	75.36
Crude Oil	0.138	74.54
Other fuels—solid	mmBtu/short ton	kg CO ₂ /mmBtu
Municipal Solid Waste	9.95 ³	90.7
Tires	28.00	85.97
Plastics	38.00	75.00
Petroleum Coke	30.00	102.41
Other fuels—gaseous	mmBtu/scf	kg CO ₂ /mmBtu
Blast Furnace Gas	0.092 × 10 ⁻³	274.32
Coke Oven Gas	0.599 × 10 ⁻³	46.85
Propane Gas	2.516 × 10 ⁻³	61.46
Fuel Gas ⁴	1.388 × 10 ⁻³	59.00
Biomass fuels—solid	mmBtu/short ton	kg CO ₂ /mmBtu
Wood and Wood Residuals (dry basis) ⁵	17.48	93.80
Agricultural Byproducts	8.25	118.17
Peat	8.00	111.84
Solid Byproducts	10.39	105.51
Biomass fuels—gaseous	mmBtu/scf	kg CO ₂ /mmBtu
Landfill Gas	0.485 × 10 ⁻³	52.07
Other Biomass Gases	0.655 × 10 ⁻³	52.07
Biomass Fuels—Liquid	mmBtu/gallon	kg CO ₂ /mmBtu
Ethanol	0.084	68.44
Biodiesel (100%)	0.128	73.84
Rendered Animal Fat	0.125	71.06
Vegetable Oil	0.120	81.55

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

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

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

⁴Reporters subject to subpart X of this part that are complying with §98.243(d) or subpart Y of this part may only use the default HHV and the default CO₂ emission factor for fuel gas combustion under the conditions prescribed in §98.243(d)(2)(i) and (d)(2)(ii) and §98.252(a)(1) and (a)(2), respectively. Otherwise, reporters subject to subpart X or subpart Y shall use either Tier 3 (Equation C-5) or Tier 4.

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

[78 FR 71950, Nov. 29, 2013]

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Table C-2 to Subpart C of Part 98—Default CH₄ and N₂O Emission Factors for Various Types of Fuel

Fuel type	Default CH ₄ emission factor (kg CH ₄ /mmBtu)	Default N ₂ O emission factor (kg N ₂ O/mmBtu)
Coal and Coke (All fuel types in Table C-1)	1.1×10^{-02}	1.6×10^{-03}
Natural Gas	1.0×10^{-03}	1.0×10^{-04}
Petroleum (All fuel types in Table C-1)	3.0×10^{-03}	6.0×10^{-04}
Fuel Gas	3.0×10^{-03}	6.0×10^{-04}
Municipal Solid Waste	3.2×10^{-02}	4.2×10^{-03}
Tires	3.2×10^{-02}	4.2×10^{-03}
Blast Furnace Gas	2.2×10^{-05}	1.0×10^{-04}
Coke Oven Gas	4.8×10^{-04}	1.0×10^{-04}
Biomass Fuels—Solid (All fuel types in Table C-1, except wood and wood residuals)	3.2×10^{-02}	4.2×10^{-03}
Wood and wood residuals	7.2×10^{-03}	3.6×10^{-03}
Biomass Fuels—Gaseous (All fuel types in Table C-1)	3.2×10^{-03}	6.3×10^{-04}
Biomass Fuels—Liquid (All fuel types in Table C-1)	1.1×10^{-03}	1.1×10^{-04}

Note: Those employing this table are assumed to fall under the IPCC definitions of the “Energy Industry” or “Manufacturing Industries and Construction”. In all fuels except for coal the values for these two categories are identical. For coal combustion, those who fall within the IPCC “Energy Industry” category may employ a value of 1g of CH₄/mmBtu.

CLIENT NAME: Bluffview Expansion Project B&V PROJECT:

198479

REVISION: 0 | DATE: 28-MAY-2019

TITLE: PERFORMANCE & EMISSIONS ON NATURAL GAS

[illegible]

SCR Ammonia Consumption														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
NOx reduction	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pure Ammonia Consumption for Nox Removal	lb/hr													
Ammonia Slip Concentration	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Pure Ammonia Slip	lb/hr	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Aqueous Ammonia Consumption	82	64	46	25	18	92	51	28	20	92	72	51	28	20
CONTROLLED ENGINE EMISSIONS														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
NOx	ppmvd @ 15% O2	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
NOx AS NO2	lb/hr	1.10	0.87	0.61	0.35	1.23	0.97	0.68	0.39	1.23	0.97	0.68	0.39	0.21
NOx AS NO2	g/hp-hr	0.04	0.05	0.05	0.06	0.04	0.05	0.05	0.06	0.04	0.05	0.05	0.06	0.08
CO	ppmvd @ 15% O2	15	15	15	15	15	15	15	15	15	15	15	15	15
CO	lb/hr	2.23	1.76	1.24	0.70	2.5	1.97	1.39	0.78	2.5	1.97	1.39	0.78	0.43
CO	g/hp-hr	0.09	0.09	0.10	0.11	0.36	0.09	0.10	0.11	0.16	0.09	0.10	0.11	0.16
VOC	ppmvd @ 15% O2	26	26	37	49	26	26	37	49	26	26	37	49	56
VOC	lb/hr	2.22	1.75	1.75	1.30	2.48	1.96	1.96	1.46	2.48	1.96	1.96	1.46	0.92
VOC	g/hp-hr	0.09	0.09	0.14	0.21	0.33	0.09	0.14	0.21	0.33	0.09	0.14	0.21	0.33
Particulates (PM10 Front half)	lb/hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Particulates (PM10 Total)	lb/hr	1.43	1.13	1.19	0.86	1.6	1.26	1.33	0.88	1.6	1.26	1.33	0.88	0.53
Particulates (PM2.5 Front half)	lb/hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Particulates (PM2.5 Total)	lb/hr	1.43	1.13	1.19	0.86	1.6	1.26	1.33	0.88	1.6	1.26	1.33	0.88	0.53
Formaldehyde /Acrooxyl	lb/hr	0.39	0.31	0.33	0.24	0.39	0.31	0.33	0.24	0.39	0.31	0.33	0.24	0.15
Formaldehyde /Acrooxyl	%	88.86%	91.14%	90.57%	93.14%	88.86%	91.14%	90.57%	93.14%	88.86%	91.14%	90.57%	93.14%	95.71%
SITE CONDITIONS														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Site Elevation	feet	5395	5395	5395	5395	5395	5395	5395	5395	5395	5395	5395	5395	5395
Site Pressure	psia	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05
Power Factor (lag)		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85

Notes:

MECL = Minimum emissions compliance load.

No tolerance applied to Gross Electrical Heat Rate (HHV) per ISO 3046.

¹ Based on the "performance & Emissions On Natural Gas" report on Bluffview Expansion Project report, date August 2019

Section 8

Map(s)

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

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

A topographic map is attached.

Section 10

Written Description of the Routine Operations of the Facility

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

The Bluffview Power Plant produces electrical power using a General Electric model LM6000-PD combustion turbine to generate a nominal 60 megawatts (MW) for the Farmington system. The turbine also utilizes a heat recovery steam generator (HRSG) with duct burners to produce additional power during peak electrical demand. Both the combustion turbine and the HRSG duct burners are fired exclusively with pipeline quality natural gas fired and are rated at 338 MMBtu/hr and 144 MMBtu/hr, respectively.

The new RICE units will only fire pipeline natural gas. Selective catalytic reduction (SCR) for NO_x control and an oxidation catalyst for CO and VOC control is included in the design of the RICE units. Each unit will exhaust through their own individual stack. Each unit is intended to operate in base load fashion, with nearly continuous operation.

The Bluffview Power Plant uses the following emissions control equipment:

- Dry low-NO_x burners in the combustion turbine and a selective catalytic reduction (SCR) system to reduce NO_x emissions from the combustion turbine and HRSG duct burners; and
- An oxidation catalyst to reduce CO, VOC, and HAP emissions from the combustion turbine and HRSG duct burners.

The plant also operates a wet surface cooling tower to remove heat from the facility's ancillary equipment.

The facility includes several exempt storage tanks containing water, wastewater, and aqueous ammonia, which are used in the SCR system to control NO_x emissions from the combustion turbine and HRSG duct burners. This facility will have an exempt diesel-fired firewater pump after proposed revision.

The facility is permitted to operate continuously.

Section 11

Source Determination

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

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

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

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

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

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

☒ **Yes** ☐ **No**

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

☒ **Yes** ☐ **No**

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

☒ **Yes** ☐ **No**

C. Make a determination:

- ☒ The source, as described in this application, constitutes the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes. If in "A" above you evaluated only the source that is the subject of this application, all **"YES"** boxes should be checked. If in "A" above you evaluated other sources as well, you must check **AT LEAST ONE** of the boxes **"NO"** to conclude that the source, as described in the application, is the entire source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes.
- ☐ The source, as described in this application, **does not** constitute the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes (A permit may be issued for a portion of a source). The entire source consists of the following facilities or emissions sources (list and describe):

Section 13

Determination of State & Federal Air Quality Regulations

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

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

Required Information for Specific Equipment:

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

Required Information for Regulations that Apply to the Entire Facility:

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

Regulatory Citations for Regulations That Do Not, but Could Apply:

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

Regulatory Citations for Emission Standards:

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

Federally Enforceable Conditions:

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

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

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

Table for State Regulations:

<u>State Regulation Citation</u>	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.1 NMAC	General Provisions	Yes	Facility	General Provisions apply to Notice of Intent, Construction, and Title V permit applications.
20.2.3 NMAC	Ambient Air Quality Standards NMAAQS	Yes	Facility	20.2.3 NMAC is a State Implementation Plan (SIP) approved regulation that limits the maximum allowable concentration of Sulfur Compounds, Carbon Monoxide and Nitrogen Dioxide.
20.2.7 NMAC	Excess Emissions	Yes	Facility	This regulation establishes requirements for the facility if operations at the facility result in any excess emissions. The owner or operator will operate the source at the facility having an excess emission, to the extent practicable, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions. The facility will also notify the NMED of any excess emission per 20.2.7.110 NMAC.
20.2.23 NMAC	Fugitive Dust Control	No	N/A	This facility is authorized under a construction permit pursuant to the New Mexico Air Quality Control Act and is therefore not subject to this regulation.
20.2.33 NMAC	Gas Burning Equipment - Nitrogen Dioxide	Yes	PD-DB-1	This facility has a gas burning equipment (external combustion emission sources, such as gas fired boilers and heaters) having a heat input of greater than 1,000,000 million British Thermal Units per year per unit.
20.2.34 NMAC	Oil Burning Equipment: NO ₂	No	N/A	This facility does not have oil burning equipment having a heat input of greater than 1,000,000 million British Thermal Units per year per unit. The facility is not subject to this regulation and does not have emission sources that meet the applicability requirements under 20.2.34.108 NMAC.
20.2.35 NMAC	Natural Gas Processing Plant – Sulfur	No	N/A	The purpose of this regulation is to establish sulfur emissions standards for natural gas processing plants [20.2.35.6 NMAC]. This facility is not a natural gas processing plant, as defined in the regulation [20.2.35.7 NMAC]. As this facility is not defined as a natural gas processing plant under this regulation, the facility is not subject to this regulation.
20.2.37 and 20.2.36 NMAC	Petroleum Processing Facilities and Petroleum Refineries	N/A	N/A	The purpose of this regulation is to minimize emissions from petroleum or natural gas processing facilities [20.2.37.6 NMAC]. This facility is not a natural gas or petroleum processing facility, as defined in the regulation [20.2.37.7 NMAC]. As this facility is not defined as a natural gas or petroleum processing facility, the facility is not subject to this regulation.
20.2.38 NMAC	Hydrocarbon Storage Facility	No	N/A	This regulation applies to storage facilities which are operated in conjunction with a petroleum production or petroleum processing facility. The Bluffview Power Plant facility is not a petroleum production or processing facility; therefore, this regulation does not apply.
20.2.39 NMAC	Sulfur Recovery Plant - Sulfur	No	N/A	This regulation establishes sulfur emission standards for sulfur recovery plants which are not part of petroleum or natural gas processing facilities. This regulation does not apply to this facility because it does not have elements of a sulfur recovery plant.
20.2.61.109 NMAC	Smoke & Visible Emissions	Yes	PD-CTG-1, PD-DB-1, ENG-1, and ENG-2	This regulation limits opacity to 20% applies to Stationary Combustion Equipment, including the combustion turbine, its duct burners and reciprocating engines.
20.2.70 NMAC	Operating Permits	Yes	Facility	The facility's PTE emissions are greater than the major source thresholds for all regulated air pollutants and hazardous air pollutants (HAP) and is an 'acid rain source' or an affected source in the regulations promulgated under Title IV of the federal act, the facility is also subject to the Title V Part 70 program and must obtain an operating permit (20.2.70.200.C NMAC)
20.2.71 NMAC	Operating Permit Fees	Yes	Facility	Because the facility is subject to 20.2.70 NMAC and its permit includes numerical ton per year emission limits, the facility is subject to 20.2.71 NMAC.
20.2.72 NMAC	Construction Permits	Yes	Facility	This regulation applies because the facility's potential emission rate (PER) is greater than 10 pph or greater than 25 tpy for NO _x , CO, PM ₁₀ and PM _{2.5} . Therefore, the

State Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
				facility is required to apply for and obtain an NSR permit. The facility construction permit issued under 20.2.72 NMAC complies with the requirement.
20.2.73 NMAC	NOI & Emissions Inventory Requirements	Yes	Facility	The facility is a Title V major source and must meet the requirements of 20.2.73.300 NMAC for emissions inventory reporting.
20.2.74 NMAC	Permits – Prevention of Significant Deterioration (PSD)	No	N/A	This facility will become a major PSD source after this modification. Therefore, this regulation is not applicable for this facility.
20.2.75 NMAC	Construction Permit Fees	Yes	Facility	This facility is applying for signification revisions to its NSR permit (Permit No. 2831-M2R1). Therefore, this regulation applies to this facility.
20.2.77 NMAC	New Source Performance	Yes	PD-CTG-1, PD-DB-1, ENG-1, and ENG-2	The Bluffview Power Plant facility includes stationary sources that are subject to the requirements of 40 CFR Part 60, therefore this regulation applies.
20.2.78 NMAC	Emission Standards for HAPS	No	N/A	This facility emits hazardous air pollutants which are subject to the requirements of 40 CFR Part 61. However, the facility is a minor source of HAPs and therefore not subject to this regulation.
20.2.79 NMAC	Permits – Nonattainment Areas	No	N/A	This regulation establishes the requirements for obtaining a nonattainment area permit. The facility is not located in a non-attainment area and therefore is not subject to this regulation.
20.2.80 NMAC	Stack Heights	No	Facility	This regulation establishes requirements for the evaluation of stack heights and other dispersion techniques. This regulation does not apply as all stacks at the facility follow good engineering practice.
20.2.82 NMAC	MACT Standards for source categories of HAPS	No	N/A	This regulation applies to all sources emitting hazardous air pollutants, which are subject to the requirements of 40 CFR Part 63. There are no units subject to 40 CFR 63, therefore not subject to this regulation.
20.2.84 NMAC	Acid Rain Program	Yes	PD-CTG-1, PD-DB-1, ENG-1 and ENG-2	This facility is a power generation plant and Units PD-CTG-1, PD-DB-1, ENG-1 and ENG-2 are subject to 40 CFR 72. Thus, this regulation applies to this facility.

Table for Applicable Federal Regulations:

Federal Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
40 CFR 50	NAAQS	No	N/A	The modeling and conditions developed from the modeling are the applicable requirements to demonstration compliance with the NAAQs.
NSPS 40 CFR 60, Subpart A	General Provisions	Yes	PD-CTG-1, PD-DB-1, ENG-1, and ENG-2	The facility includes turbines, steam generation units and spark ignite internal compressor engines that are subject to the 40 CFR 60 Subpart GG, Subpart Db and Subpart JJJJ respectively. Thus, this regulation is applicable to this facility.

<u>Federal Regulation Citation</u>	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
NSPS 40 CFR60.40a, Subpart Da	Subpart Da, Performance Standards for Electric Utility Steam Generating Units	No	N/A	Since the HRSG duct burner (unit # PD-DB-1) is associated with a stationary combustion turbine, only emissions from the duct burners are potentially subject to this regulation ((§60.40Da(e)(2)). This unit # PD-DB-1 has a 144 MMBtu/hr heat input, which is less than the 250 MMBtu/hr applicability threshold (§60.40Da(e)(1)).
NSPS 40 CFR60.40b Subpart Db	Electric Utility Steam Generating Units	Yes	PD-DB-1	The affected facility (unit # PD-DB-1) commenced construction in 2005, after the June 19, 1984 applicability date, and has a heat input capacity from fuels combusted (natural gas) of 144 MMBtu/hr, greater than the 100 MMBtu/hr threshold ((§60.40b(a)). The regulation establishes NO _x standards for Unit PD-DB-1 at §60.44b(a)(4). Since the unit fires only natural gas, there are no applicable SO ₂ or PM standards (§60.42b and §60.43b, respectively).
40 CFR 60.40c, Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	No	N/A	The affected facility (unit # PD-DB-1) commenced construction in 2005, after the June 9, 1989 applicability date, and has a heat input capacity from fuels combusted (natural gas) of 144 MMBtu/hr, which exceeds the 100 MMBtu/hr threshold of applicability, therefore this regulation does not apply.
NSPS 40 CFR 60, Subpart Ka	Standards of Performance for Storage Vessels for Petroleum Liquids for which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984	No	N/A	This regulation establishes performance standards for storage vessels for petroleum liquids for which construction, reconstruction, or modification commenced after May 18, 1978, and prior to July 23, 1984. There are no petroleum liquid storage vessels located at the facility which are an affected facility under this subpart. Therefore, this regulation does not apply.
NSPS 40 CFR 60, Subpart Kb	Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	No	N/A	This regulation establishes performance standards for storage vessels with a capacity greater than or equal to 75 cubic meters (m ³) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984. There are no storage vessels which are affected under this subpart; therefore, this regulation is not applicable §60.110b(b)].
NSPS 40 CFR 60.330 Subpart GG	Stationary Gas Turbines	Yes	PD-CTG-1	The affected facility (unit # PD-CTG-1) commenced construction in 2005, after the October 3, 1977 applicability date, and has a heat input capacity from fuels combusted (natural gas) of 338 MMBtu/hr, greater than the 10 MMBtu/hour threshold (§60.330). The regulation establishes NO _x standards for Unit PD-CTG-1 at 60.332(a)(1) and SO ₂ standards at §60.333.
NSPS 40 CFR 60, Subpart KKK	Leaks of VOC from Onshore Gas Plants	No	N/A	This facility is a power generation plant. Thus, this regulation is not applicable to this regulation.

<u>Federal Regulation Citation</u>	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
NSPS 40 CFR Part 60 Subpart LLL	Standards of Performance for Onshore Natural Gas Processing: SO ₂ Emissions	No	N/A	This facility is a power generation plant. Thus, this regulation is not applicable to this regulation.
NSPS 40 CFR Part 60 Subpart OOOO	Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution for which construction, modification or reconstruction commenced after August 23, 2011 and before September 18, 2015	No	N/A	The rule applies to “affected” facilities that are constructed, modified, or reconstructed after Aug 23, 2011: gas wells, including fractured and hydraulically refractured wells, centrifugal compressors, reciprocating compressors, pneumatic controllers, certain equipment at natural gas processing plants, sweetening units at natural gas processing plants, and storage vessels. This facility does not contain any “affected” facilities. This regulation is not applicable to this facility.
NSPS 40 CFR Part 60 Subpart OOOOa	Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015	No	N/A	The rule applies to “affected” facilities that are constructed, modified, or reconstructed after September 18, 2015: gas wells, including fractured and hydraulically refractured wells, centrifugal compressors, reciprocating compressors, pneumatic controllers, certain equipment at natural gas processing plants, sweetening units at natural gas processing plants, and storage vessels. This facility does not contain any “affected” facilities. This regulation is not applicable to this facility.
NSPS 40 CFR 60 Subpart IIII	Standards of performance for Stationary Compression Ignition Internal Combustion Engines	Yes	PUMP-1	PUMP-1 is a diesel-fired firewater pump and is manufactured after July 1, 2006. Thus, this facility is subject to this regulation.
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	Yes	ENG-1 & ENG-2	The new reciprocating engines are spark ignite internal combustion engines. Thus, this regulation is applicable to this facility.
NSPS 40 CFR 60 Subpart TTTT	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units	No	N/A	The stationary combustion turbine (unit # PD-CTG-1) and the steam generating unit (unit # PD-DB-1) were constructed in 2005, prior to the January 8, 2014 applicability date of this regulation (§60.5508).
NSPS 40 CFR 60 Subpart UUUU	Emissions Guidelines for Greenhouse Gas Emissions and Compliance Times for Electric Utility Generating Units	No	N/A	The stationary combustion turbine (unit # PD-CTG-1) and the steam generating unit (unit # PD-DB-1) that could potentially be affected by this regulation were constructed in 2005, prior to the January 8, 2014 applicability date (§60.5710).

<u>Federal Regulation Citation</u>	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
NSPS 40 CFR 60, Subparts WWW, XXX, Cc, and Cf	Standards of performance for Municipal Solid Waste (MSW) Landfills	No	N/A	This facility is a power generation plant. Thus, this regulation is not applicable to this regulation.
NESHAP 40 CFR 61 Subpart A	General Provisions	No	N/A	No other Subpart in 40 CFR 61 applies.
NESHAP 40 CFR 61 Subpart E	National Emission Standards for Mercury	No	N/A	This regulation establishes a national emission standard for mercury. The facility does not have stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge [40 CFR Part 61.50]. The facility is not subject to this regulation.
NESHAP 40 CFR 61 Subpart V	National Emission Standards for Equipment Leaks (Fugitive Emission Sources)	No	N/A	This regulation establishes national emission standards for equipment leaks (fugitive emission sources). The facility does not have equipment that operates in volatile hazardous air pollutant (VHAP) service [40 CFR Part 61.240]. The regulated activities subject to this regulation do not take place at this facility. The facility is not subject to this regulation.
MACT 40 CFR 63, Subpart A	General Provisions	Yes	ENG-1 & ENG-2	ENG-1 & ENG-2 are subject to 40 CFR Part 63 Subpart ZZZZ.
MACT 40 CFR 63.760 Subpart HH	Oil and Natural Gas Production Facilities	No	N/A	This facility is a power generation plant and does not have any applicable units defined in this regulation. Thus, this regulation is not applicable to this regulation.
MACT 40 CFR 63 Subpart DDDDD	National Emission Standards for Hazardous Air Pollutants for Major Industrial, Commercial, and Institutional Boilers & Process Heaters	No	N/A	This subpart establishes national emission limitations and work practice standards for hazardous air pollutants (HAP) emitted from industrial, commercial, and institutional boilers and process heaters located at major sources of HAP. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and work practice standards. However, Bluffview Power Plant does not operate any boilers or process heaters that would be subject to this regulation.
MACT 40 CFR 63 Subpart UUUUU	National Emission Standards for Hazardous Air Pollutants Coal & Oil Fire Electric Utility Steam Generating Unit	No	N/A	The Bluffview Power Place does not utilize coal or oil-fired utility steam generating units that would be applicable under this subpart, therefore this regulation does not apply.
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE MACT)	Yes	ENG-1 & ENG-2	ENG-1 & ENG-2 are internal combustion engines. The facility will comply with this regulation via being in compliance with 40 CFR 60 Subpart JJJJ.

<u>Federal Regulation Citation</u>	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
40 CFR 64	Compliance Assurance Monitoring	No	N/A	PTE emissions from this facility are permitted at less than Part 70 Title V major source thresholds. CAM applies only to Title V Major Sources. The facility is a major Title V source. The facility is subject to Part 70 permitting because it is an acid rain source (20.2.70.200.A and C NMAC).
40 CFR 68	Chemical Accident Prevention	No	N/A	This facility does not store more than a threshold quantity of a regulated substance in a process (§68.115).
Title IV – Acid Rain 40 CFR 72	Acid Rain	Yes	PD-CTG-1, PD-DB-1, ENG-1, and ENG-2	The generator (PD-CTG-1) at this facility is new and greater than 25 MW total and thus, an affected unit (§72.6(a)).
Title IV – Acid Rain 40 CFR 73	Sulfur Dioxide Allowance Emissions	Yes	PD-CTG-1, PD-DB-1, ENG-1, and ENG-2	This facility is subject to this requirement as an affected unit (PD-CTG-1, PDDB-1, ENG-1, & ENG-2) pursuant to §72.6 (§73.2(a)).
Title IV-Acid Rain 40 CFR 75	Continuous Emissions Monitoring	Yes	PD-CTG-1 & PD-DB-1	This facility is subject to this requirement as an affected unit (PD-CTG-1 & PDDB-1) pursuant to §72.6 (§75.2(a)).
Title IV – Acid Rain 40 CFR 76	Acid Rain Nitrogen Oxides Emission Reduction Program	No	N/A	The potentially affected units (PD-CTG-1 & PD-DB-1) are natural gas fired and not coal-fired (§76.1).
Title VI – 40 CFR 82	Protection of Stratospheric Ozone	No	N/A	This facility does not produce, manufacture, transform, destroy, import, or export ozone-depleting substances; does not maintain or service motor vehicle air conditioning units or refrigeration equipment; and does not sell, distribute, or offer for sale or distribution any product that contains ozone-depleting substances.

Section 14

Operational Plan to Mitigate Emissions

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

- ☒ **Title V Sources** (20.2.70 NMAC): By checking this box and certifying this application the permittee certifies that it has developed an Operational Plan to Mitigate Emissions During Startups, Shutdowns, and Emergencies defining the measures to be taken to mitigate source emissions during startups, shutdowns, and emergencies as required by 20.2.70.300.D.5(f) and (g) NMAC. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.
- ☐ **NSR** (20.2.72 NMAC), **PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has developed an Operational Plan to Mitigate Source Emissions During Malfunction, Startup, or Shutdown defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown as required by 20.2.72.203.A.5 NMAC. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.
- ☒ **Title V** (20.2.70 NMAC), **NSR** (20.2.72 NMAC), **PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has established and implemented a Plan to Minimize Emissions During Routine or Predictable Startup, Shutdown, and Scheduled Maintenance through work practice standards and good air pollution control practices as required by 20.2.7.14.A and B NMAC. This plan shall be kept on site or at the nearest field office to be made available to the Department upon request. This plan should not be submitted with this application.
-

Startup and shutdown procedures are performed according to guidelines, which dictate proper procedural sequence to minimize emissions from the facility during such activities.

Equipment located at the plant is equipped with various safety devices that aid in preventing excess emissions to the atmosphere in the event of an operational emergency. In the event of a malfunction, startup, shutdown, or scheduled maintenance in which emission rates from the facility exceed permitted allowable emissions, the City of Farmington will notify the AQB in accordance with 20.2.7 NMAC and the equipment responsible for the exceedance will be repaired as soon as possible.

Section 15

Alternative Operating Scenarios

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

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

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

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

N/A - There will be no alternative operation scenarios being requested for the existing facility.

Section 17

Compliance Test History

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

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

Compliance Test History Table

Unit No.	Test Description	Test Date
PD-CTG-1 & PD-DB-1	Tested in accordance with EPA 40 CFR 75 Linearity Check and Relative Accuracy Test Audit (RATA) test methods for NO _x and CO as required by Title V permit P228-R1.	3/15/2017

Section 19

Requirements for Title V Program

Who Must Use this Attachment:

- * Any major source as defined in 20.2.70 NMAC.
 - * Any source, including an area source, subject to a standard or other requirement promulgated under Section 111 - Standards of Performance for New Stationary Sources, or Section 112 Hazardous Air Pollutants, of the 1990 federal Clean Air Act ("federal Act"). Non-major sources subject to Sections 111 or 112 of the federal Act are exempt from the obligation to obtain an 20.2.70 NMAC operating permit until such time that the EPA Administrator completes rulemakings that require such sources to obtain operating permits. In addition, sources that would be required to obtain an operating permit solely because they are subject to regulations or requirements under Section 112(r) of the federal Act are exempt from the requirement to obtain an Operating Permit.
 - * Any Acid Rain source as defined under title IV of the federal Act. The Acid Rain program has additional forms. See www.env.nm.gov/air-quality/air-quality-title-v-operating-permits-guidance-page/. Sources that are subject to both the Title V and Acid Rain regulations are encouraged to submit both applications simultaneously.
 - * Any source in a source category designated by the EPA Administrator ("Administrator"), in whole or in part, by regulation, after notice and comment.
-
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19.1 - 40 CFR 64, Compliance Assurance Monitoring (CAM) (20.2.70.300.D.10.e NMAC)

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

This facility is not subject to 40 CFR 64 requirements because it is exempt based on continuous monitoring requirements under the Acid Rain Program.

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

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

Based on information provided, the City of Farmington believes that the Bluffview Power Plant is in compliance with each applicable requirement identified in Section 13. In the event that the City of Farmington should discover new information affecting the compliance status of the facility, the City of Farmington will make appropriate notifications and/or take corrective actions.

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

Provide a statement that your facility will continue to be in compliance with requirements for which it is in compliance at the time of permit application. This statement must also include a commitment to comply with other applicable requirements as they come into effect during the permit term. This compliance must occur in a timely manner or be consistent with such schedule expressly required by the applicable requirement.

The facility will continue to be in compliance with requirements for which it is in compliance at the time of this permit application and will comply with other applicable requirements as they come into effect during the permit term.

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

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

Compliance certification will be submitted annually, as required by Title V Permit P0228-R2, Condition A109.B.

19.5 - Stratospheric Ozone and Climate Protection

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

1. Does your facility have any air conditioners or refrigeration equipment that uses CFCs, HCFCs or other ozone-depleting substances? ☒ Yes ☐ No
 2. Does any air conditioner(s) or any piece(s) of refrigeration equipment contain a refrigeration charge greater than 50 lbs? ☐ Yes ☒ No
(If the answer is yes, describe the type of equipment and how many units are at the facility.)
 3. Do your facility personnel maintain, service, repair, or dispose of any motor vehicle air conditioners (MVACs) or appliances ("appliance" and "MVAC" as defined at 82. 152)? ☐ Yes ☒ No
 4. Cite and describe which Title VI requirements are applicable to your facility (i.e. 40 CFR Part 82, Subpart A through G.)
-

The Bluffview Power Plant does not produce, manufacture, transform, destroy, import, or export any stratospheric ozone-depleting substances (CFCs, HCFCs); does not maintain or service motor vehicle air conditioning units or refrigeration equipment; and does not sell, distribute, or offer for sale any product that may contain stratospheric ozone-depleting substances.

The City of Farmington shall continue to maintain compliance with the conditions stipulated in 40 CFR 82, Subparts A-G of the Stratospheric Ozone Protection Program (Title VI of the Clean Air Act Amendments).

19.6 - Compliance Plan and Schedule

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

A. Description of Compliance Status: (20.2.70.300.D.11.a NMAC)

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

B. Compliance plan: (20.2.70.300.D.11.B NMAC)

A narrative description of the means by which your facility will achieve compliance with applicable requirements with which it is not in compliance at the time you submit your permit application package.

C. Compliance schedule: (20.2.70.300D.11.c NMAC)

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

D. Schedule of Certified Progress Reports: (20.2.70.300.D.11.d NMAC)

A proposed schedule for submission to the department of certified progress reports must also be included in the compliance schedule. The proposed schedule must call for these reports to be submitted at least every six (6) months.

E. Acid Rain Sources: (20.2.70.300.D.11.e NMAC)

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

NOTE: The Acid Rain program has additional forms. See www.env.nm.gov/air-quality/air-quality-title-v-operating-permits-guidance-page/. Sources that are subject to both the Title V and Acid Rain regulations are **encouraged** to submit both applications **simultaneously**.

The Bluffview Power Plant is in compliance with all applicable requirements; consequently, a compliance plan, a compliance schedule, and a schedule of certified progress reports is not required. As an Acid Rain Program source, the Bluffview Power Plant is submitting an application to renew its 40 CFR 72 Acid Rain permit simultaneously with this Title V renewal application.

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

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

The Bluffview Power Plant is not subject to 40 CFR 68, Chemical Accident Prevention Provisions; consequently, a Risk Management Plan is not required.

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

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

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

Yes, the Bluffview Power Plant is 31 kilometers from Colorado, 53 kilometers from the Mesa Verde National Park, 1 kilometer from the Navajo Tribal Lands, 15 kilometers from the Mountain Ute Tribal Lands, 31 kilometers from the Southern Ute Tribal Lands, 74 kilometers from Arizona, and 75 kilometers from the Jicarilla Apache Tribal Lands.

19.9 - Responsible Official

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

Britt D. Chesnut - Generation Manager
(505) 599-8342
bchestnut@farmingtonnm.gov
800 Municipal Drive, Farmington, NM 87401

Section 20

Other Relevant Information

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

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

N/A - No other relevant information

Section 22: Certification

Company Name: City of Farmington

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

Signed this 7 day of October, 2024, upon my oath or affirmation, before a notary of the State of

New Mexico

Britt D. Chesnut
*Signature

10/7/2024
Date

Britt D. Chesnut
Printed Name

Generation Manager
Title

Scribed and sworn before me on this 7th day of October, 2024.

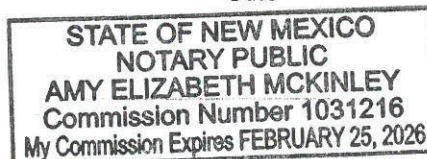
My authorization as a notary of the State of New Mexico expires on the

25th day of February, 2026.

Amy Elizabeth McKinley
Notary's Signature

10/7/2024
Date

Amy Elizabeth McKinley
Notary's Printed Name



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