

FACT SHEET FOR: CP26-011**DATE: DRAFT****NDWEE ID:** 121341**Name of Source:** Adams Lot 1 RNG LLC**Source Classification:** Minor New Source Review (NSR) source at time of issuance
Area Source of Hazardous Air Pollutants (HAPs)

Regulatory changes may supersede information in this document. If the source should add or change equipment or change processes such that a NESHAP or NSPS subpart becomes an applicable requirement, it is the source's obligation to comply with that subpart and applicable requirements whether or not they are identified in the associated permitting action or Title 129. Also note that the NESHAP and NSPS subparts are subject to change. Detailed information related to NESHAP and NSPS subparts can be found on the NDWEE Air Toxics Notebook and NDWEE NSPS Notebook located on the NDWEE website (<http://dwee.nebraska.gov/>). The NDWEE website can also be used to find other permit related and facility specific information that is not identified in this fact sheet.

DESCRIPTION OF THE SOURCE OR ACTIVITY:

Adams Lot 1 RNG LLC (Adams) is proposing to install an anaerobic digester and renewable natural gas processing facility to be located adjacent to the Adams Land & Cattle South Feedlot (FID 61705) (the Feedlot) near Broken Bow, Nebraska.

PERMIT HISTORY:

Date Issued	Number	Status
06/06/2025	CP24-036	Not Active, superseded by CP26-011
tbd	CP26-011	Active

PERMIT ACTION:

On March 9, 2026, the Department received a construction permit application (#26-011) from Adams for an expansion which changes previously permitted equipment. The following is a summary of all permitted equipment:

EP-1.1 and EP-1.2, Natural Gas Boiler:

Adams proposes two (2) 22.5 MMBtu/hr natural gas fired boilers (EU-1.1 and EU-1.2) to heat the influent and offset heat loss from the digester tanks. Each burner is proposed to throttle to match heat demand to meet digester heating needs. While the boilers are part of this permitting action, there is no specific condition for the boilers because there are no prescribed limits, testing, operational requirements, or recordkeeping beyond what is required by NSPS Subpart Dc.

EP-2.1 through EP-2.6, Building and Domestic Water Heating Boilers:

Each building that is part of this facility is proposed to include a 1 MMBtu/hr natural gas-fired building heat boiler with sidearm water heater for domestic water use. A total of six (6) boilers (EU-2.1 through EU-2.6) are part of this permitting action, there is no specific condition for the boilers because there are no prescribed limits, testing, operational requirements, or recordkeeping beyond what is required by NSPS Subpart Dc.

EP-3, Standby Generator:

A standby generator (EU-3) is proposed to be installed so that the facility can maintain operation during a power outage. Based on planned facility electrical loads, the generator has a maximum capacity of 1,000 kW. This generator is powered by a compression ignition diesel-fired engine subject to NSPS Subpart IIII. Adams requested a limit of 500 hours per year of operation for the generator.

EP-4, Tail Gas Vent:

Adams proposes to generate biogas from manure from the Feedlot through an anerobic digestion system that consists of a buffer tank (EU-6.9) which will take raw manure from the manure reception building, eight (8) anaerobic digesters (EU-6.1 through EU-6.8) that will take manure and any biogas initially generated in the buffer tank, and a covered lagoon (EU-6.10) that received digestate and biogas to be separated and controlled. All biogas produced in the buffer tank, digesters, and covered lagoon will manifold directly into a series of biological desulfurization towers (CE-4a) which will treat all gas flow. While the Bio-Scrubbers are part of the process, they are considered control equipment as their primary function is to reduce H₂S. The scrubbed biogas will be further processed through an activated carbon filter (CE-4b) for further VOC and H₂S control before being routed to the membrane filtration system (CE-4c) which will separate the biogas into two streams. The first stream is renewable natural gas (RNG) that is routed to the pipeline for injection.

The second stream of gas constituents, which are not passed into the product RNG stream, are anticipated to be combusted in a thermal oxidizing unit (TOU) discussed below. While not expected in normal operations, Adams is permitted to vent to the atmosphere through a tail gas vent (EP-4) when the TOU is not operational. This tail gas is anticipated to contain 4.9% methane, 95.1% CO₂, 0.002% H₂S, and 0.001% VOC.

Emissions were calculated based on the venting of 100% of the annual tail gas production. Potential emissions from EP-4, EP-5, and EP-6 are mutually exclusive, therefore only worst-case annual emissions are totaled in the potential to emit table below.

EP-5, Bypass Flare:

Adams proposes a bypass flare (EU-5) to combust biogas up to the anticipated maximum generation rate of 4,400 scfm when the gas processing equipment is not operational. For PTE calculations, flare emissions were calculated based on the combustion of 100% of the annual biogas production from the digesters. The biogas stream is required to be controlled by the desulfurization towers (CE-4a). Potential emissions from EP-4, EP-5, and EP-6 are mutually exclusive, therefore only worst-case annual emissions are totaled in the potential to emit table below.

EP-6, Tail Gas Thermal Oxidizing Unit (TOU):

Adams proposes a TOU (EU-6) to combust tail gas up to the anticipated maximum generation rate of 1,800 scfm. For PTE calculations, emissions were calculated based on the combustion of 100% of the annual Tail gas production. Potential emissions from EP-4, EP-5, and EP-6 are mutually exclusive, therefore only worst-case annual emissions are totaled in the potential to emit table below.

TYPE AND QUANTITY OF AIR CONTAMINANT EMISSIONS ANTICIPATED:

The emissions for this project, including fugitive emissions, are shown in the potential-to-emit (PTE) table below:

Regulated Pollutant	Pre-Project PTE (ton/yr)	Post-Project PTE (ton/yr)	Project PTE (ton/yr)
Particulate Matter (PM)	11.16	13.63	2.46
PM smaller than or equal to 10 microns (PM ₁₀)	11.14	13.63	2.49
PM smaller than or equal to 2.5 microns (PM _{2.5})	11.14	13.63	2.49
Sulfur Dioxide (SO ₂)	209.62	213.31	3.70
Oxides of Nitrogen (NO _x)	56.01	73.69	17.68
Carbon Monoxide (CO)	203.83	237.95	34.12
Volatile Organic Compounds (VOC)	10.20	14.39	4.19
Hazardous Air Pollutants (HAPs)			
Highest Individual HAP: Hexane	0.26	0.44	0.18
Total HAPs	0.79	1.16	0.37

^[1] Previous PTE obtained from CP24-036, issued June 6, 2025.

SUPPLEMENTAL INFORMATION:

Title 129, Chapter 2 – Ambient Air Quality Standards

1.0 General Discussion

Under the Clean Air Act, EPA's Office of State Air Partnerships (OSAP) is responsible for setting standards, also known as the National Ambient Air Quality Standards (NAAQS), for pollutants which are considered harmful to people and the environment. There are two types of standards: primary and secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation, and damage to buildings.

The NAAQS prescribed in 40 CFR §50 are identical to the majority of Nebraska's Ambient Air Quality Standards (AAQS) and include Carbon Monoxide (CO), Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), Particulate Matter (PM_{2.5} and PM₁₀), Lead (Pb), and Ozone (O₃). Nebraska's AAQS also includes a standard for Total Reduced Sulfur (TRS) where human exposure to TRS occurs.

Federal and state air pollution control regulations ensure that ambient air quality, including background concentrations and emissions from new and existing sources are in compliance with the NAAQS.

To meet that goal, air dispersion modeling is required for any new or existing source that intends to increase their emission rate(s) greater than or equal to the Significant Emission Rate (SER) listed in the table below:

Table 1.0a: Significant Emission Rate (SER)			
Pollutant	SER^[1] (ton/yr)	Project Emissions (ton/yr)	Modeling Required
CO	100	237.95	Yes
NO ₂	40	73.69	Yes
SO ₂	40	213.31	Yes
PM ₁₀	15	13.63	No
PM _{2.5}	10	13.63	Yes
Pb	0.6	5.26E-05	No
Ozone ^[2]	40 ton/yr of VOC or 40 ton/yr NO ₂	-	No
Total Reduced Sulfur (including H ₂ S)	10	0.85	No

^[1] As prescribed in 40 CFR §52.21(b)(23).

^[2] Ozone is not emitted directly into the air but is formed through chemical reactions between natural and anthropogenic emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight. NDWEE's "Ambient Air Impact Analysis Guideline" (August, 2017) does not require ozone to be considered for minor sources.

Facilities that are proposing to increase emissions above the SER can model the emission increase and compare the predicted impacts to the Significant Impact Level (SIL), a screening tool provided by the EPA to help identify which new pollutant increases have the potential to significantly impact air quality. All criteria air pollutants except Pb have SIL values.

If the predicted impact of the new or modified source is less than the SIL for a particular pollutant and averaging period, then the impact is considered "insignificant" for that pollutant and averaging period. However, if the predicted impact of the new or modified source is equal to or greater than the SIL for a particular pollutant and averaging period, then further evaluation is required. The SIL values for pollutants and averaging periods are listed in the table below:

Table 1.0b: Significant Impact Level ^[1] Modeling Results				
Pollutant	Averaging Period	Modeled Concentration	SIL	Exceeds SIL?
		(µg/m³)		
CO	1-hour	442.44	2000	No
	8-hour	180.69	500	No
NO ₂	1-hour ^[2]	130.07	7.5	Yes
	annual	6.91	1.0	Yes
PM _{2.5}	24-hour	7.35	5	Yes
	annual ^[3]	0.57	0.13	Yes
SO ₂	1-hour	50.71	7.9	Yes

^[1] Unless otherwise noted, significance levels are prescribed in 40 CFR §51.165(b)(2).

^[2] EPA’s Tyler Fox Memorandum entitled “*Additional Clarification Regarding Application of Appendix W modeling Guidance for the 1-hour NO₂ National Ambient Air Quality Standard*” dated March 1, 2011.

^[3] EPA’s Richard Wayland and Scott Mathias Memorandum entitled “*Supplement to the Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program*” dated April 30, 2024.

2.0 Modeling Approach and Significant Impact Analysis

Per Permit Condition III.(A)(3)(b)(ii), Adams is required to route all tail gas to the thermal oxidizer unit (EP-6) or tail gas vent (EP-4) and Permit Condition III.(A)(3)(b)(ii) requires the facility to flare all biogas when gas processing equipment is not operational. These requirements were foundational assumptions in the air dispersion modeling analysis.

Accordingly, the modeling evaluates two distinct operating scenarios: (1) operation of the bypass flare and (2) operation of the thermal oxidizer unit to combust tail gas. These scenarios were modeled independently to reflect the permit-required mutually exclusive operation of these emission sources.

Predicted impacts equal to or greater than the SIL are required to do further evaluation, called a cumulative impact analysis (CIA). A CIA must include emissions from the proposed new source, new and existing emissions from the proposed modification of an existing source, plus existing nearby sources that can cause a significant concentration gradient, and background concentration. An appropriate background concentration is added to the predicted ambient air impacts to include pollutant contributions from unidentified sources in the vicinity of the project, regional transport contributions from distant sources, and concentrations attributable to natural sources.

The concentration predicted by a CIA is then compared to the NAAQS for those pollutants with concentrations above its respective SIL. For reference:

Table 2.0: Nebraska & National Ambient Air Quality Standards (NAAQS) for NO₂, PM_{2.5}, and SO₂					
Pollutant	Averaging Period	Primary/Secondary	NAAQS ($\mu\text{g}/\text{m}^3$)	Design Value Form	Reference
NO ₂	1-hour	primary and secondary	188	Highest eighth high (H8H) of the 98th percentile of the annual distribution of maximum daily 1-hour concentrations, averaged across five years	U.S. EPA MCHM ^[1] , June 28, 2010a & U.S. EPA MCHM ^[1] , March 1, 2011d
	annual	primary and secondary	100	Highest first high (H1H) annual average concentration, each year analyzed separately	40 CFR Appendix W 9.1 (d) 2016
PM _{2.5}	annual	primary	9	Highest first High (H1H) of the modeled annual averages, averaged across five years	40 CFR Appendix W 7.2.1 (U.S. EPA, 2005)

Table 2.0: Nebraska & National Ambient Air Quality Standards (NAAQS) for NO₂, PM_{2.5}, and SO₂					
Pollutant	Averaging Period	Primary/Secondary	NAAQS (µg/m³)	Design Value Form	Reference
PM _{2.5}	24-hour	primary	35	Highest 8th high (H8H) of the 98th percentile of the annual distribution of 24-hour concentrations, averaged across five years	U.S. EPA MCHM ^[1] , March 4, 2013
SO ₂ ^[2]	1-hour	primary	196	Highest fourth high (H4H) of the 99th percentile of the annual distribution of maximum daily 1-hour concentrations, averaged across five years	U.S. EPA MCHM ^[1] , August 23, 2010.

^[1] Modelers Clearinghouse Memos, <https://www.epa.gov/scrpm/air-quality-models-clarification-memos-dispersion-models>

^[2] Permit applicants may demonstrate compliance with the 2010 primary 1-hour SO₂ NAAQS to satisfy the demonstration requirements of all three current SO₂ NAAQS (EPA memorandum “*Alternative Demonstration Approach for 1971 Secondary 3-hour Sulfur Dioxide NAAQS*” dated October 10, 2025).

For this project, CIAs were conducted for NO₂, PM_{2.5}, and SO₂. The required analyses were conducted in accordance with Appendix W of 40 CFR 51, 40 CFR 52.2, EPA’s “*Guideline on Air Quality Models*” (March, 2025), NDWEE’s “*Ambient Air Impact Analysis Guideline*” (August, 2017) and as described in the Air Quality Modeling Protocol submitted to NDWEE on April 1, 2026.

The EPA-recommended AERMOD model (current AERMOD version 24142 and AERMAP version 24142) was used to perform the air dispersion modeling. Air dispersion modeling was conducted to evaluate worst-case meteorological and operating conditions in an effort to predict the design concentration impact for each pollutant and averaging period.

The Air Quality Modeling Protocol along with supporting air dispersion modeling information is available via the NDWEE’s website under “Public Records Search” using the facility ID number for Adams (FID # 121341).

3.0 Meteorology

At the time the permit application was received, there were ten automated surface observing system (ASOS) stations with sufficient data to process 5-year meteorological (met) datasets in the State of Nebraska.

The Broken Bow Municipal Airport ASOS station (WBAN ID 94946) is approximately 9 km from Adams. The next closest met station is approximately 91 km away, located in Lincoln County. The Broken Bow Municipal Airport ASOS station is the closest in proximity to the project site, and therefore, the most representative of the Adams climate.

The 2016 through 2019 and 2022 dataset was processed by the NDWEE using AERMET v. 24142, AERSURFACE v. 20060, and AERMINUTE v. 24142. These years represent the most recent and complete data set available for the project. The 2020-2021 and 2023-2024 meteorological data was not included in the analysis because the years did not meet the data completeness requirements.

4.0 Background Concentrations

When choosing a monitor to use as background concentration, Appendix W to 40 CFR 51 Section 8.3.2.(b) prescribes:

“The EPA recommends use of the most recent quality assured air quality monitoring data collected in the vicinity of the source to determine the background concentration for the averaging times of concern.”

“(…) If there are no monitors located in the vicinity of the new or modifying source, a “regional site” maybe used to determine background concentrations. A regional site is one that is located away from the area of interest but is impacted by similar or adequately representative sources.”

In addition, NDWEE looks for representative nearby population, land use, terrain, climate, and the existence of large nearby sources, and traffic patterns that may be impacting the monitor. Also, consideration is given to the pollutant's residence time and how inert or reactive that pollutant is in the atmosphere.

The Adams is located adjacent to Adam's Land and Cattle-South Feedlot near Broken Bow, Nebraska in Custer County. Based on an evaluation of the surrounding area, the source site is categorized as rural. The population of Dundy County is approximately 10,550 people. Primary wind roses in the Broken Bow area are from the north-northwest and secondary wind roses from the south-southeast; calm conditions occur approximately 13% of the time.

4.1 PM_{2.5}:

PM_{2.5} background concentrations tend to remain in the atmosphere for relatively long periods, allowing them to disperse widely and form more uniform spatial patterns— especially when evaluated as annual averages. In contrast, 24-hour PM_{2.5} concentrations are more heavily affected by local conditions, such as traffic levels, population density, and nearby land use, leading to greater short-term variability. The PM_{2.5} monitoring site in Scottsbluff, Nebraska (ID#31-157-0004) was selected to represent the background concentration. This monitor is located at Highway 26 & 5th Avenue, Scottsbluff, Nebraska, approximately 337 km south of Adams.

4.2 NO₂:

As the State of Nebraska operates only a NO_x monitor rather than a NO₂ monitor, the NDWEE selected a NO₂ monitoring site located in the State of Kansas to determine background concentrations. The Sumner County, Kansas monitor (ID#20-091-00002) was chosen based on its similarity in land use, climate, terrain, and prevailing wind patterns, which are representative of the conditions surrounding Adams. The Kansas monitor (ID#20-091-00002) is located in the Sumner County, Kansas, with a population of approximately 22,300. Primary wind roses are out of the south to southeast and secondary wind roses from the north to northwest; calm conditions occur approximately 7% of the time. This monitor is about 475 km southeast of Adams.

4.3 SO₂:

The SO₂ monitor in Sumner County, Kansas (ID#20-191-0002) was chosen to represent background SO₂ concentration. This site was selected because it shares similar climate, terrain, and prevailing wind patterns with Adams.

The table below depicts background concentrations from the monitors selected:

Table 4.0: Monitor Background Concentrations			
Pollutant	Averaging Time	2022-24 DV Monitor location & ID#	Background Concentration (µg/m³)
PM _{2.5}	24-hour	Scottsbluff, NE (31-157-0004)	16.67
	Annual		4.26
NO ₂	1-hour	Summer, KS (20-191-0002)	43.90
	Annual		7.19
SO ₂	1-hour	Summer, KS (20-191-0002)	6.12

5.0 Nearby Sources

5.1 NAAQS

NDWEE takes into consideration all facilities within a 50 km radius of a project location as modeling domain. NDWEE utilizes the procedure described in the July 22, 1985 letter to EPA Region IV entitled "Screening Threshold" Method for PSD Modeling" from the North Carolina Air Quality Section to eliminate any nearbys that are unlikely to have a significant impact within the modeling domain.

The screening method takes into account the relationship between Q and D.

Where:

Q: is the most recent two-year average actual emission rate, representative of normal operations, obtained from NDWEE's Emission Inventory, in tons per year.

D: is the distance from the center of the project location to the center the possible nearby, in kilometers; 20D is twenty times this distance.

When $Q \text{ (in tpy)} > 20D \text{ (in km)}$, the nearby is included in the NAAQS modeling analysis. This screening method did not identify any nearby facilities within 50 km to be included in the NAAQS modeling analysis.

6.0 Analysis Results

This ambient air quality impact analysis takes into account the combined impacts of emissions from the proposed Adams project, contributions from nearby major and minor sources, and background concentrations due to distant major and minor sources and natural sources.

The modeling evaluated two distinct operating scenarios: (1) operation of the bypass flare and (2) operation of the thermal oxidizer unit to combust tail gas. These scenarios were modeled independently to reflect the permit-required mutually exclusive operation of these emission sources.

Based on the potential emissions from the proposed facility and other sources' allowable emissions, this analysis demonstrates that the facility is expected to be in compliance with the NAAQS standards for NO₂, SO₂, and PM_{2.5}.

6.1 NO₂ Results

The NO₂ results for NAAQS compliance for the Bypass scenario is shown in the following tables for 1-hour and annual concentrations, including contributions from existing sources of NO₂ emissions in the project area.

Table 6.1a: Bypass 1-Hour NO₂ NAAQS Concentration 98th Percentile, 1-Hour Daily Maximum Averaged Over 5-Years (H8H)				
Met Years	Background (µg/m³)	Modeled Impact (µg/m³)	Total (µg/m³)	NAAQS (µg/m³)
2016-2019, 2022	4.90	122.83	166.73	188

Table 6.1b: Bypass Annual Mean NO₂ NAAQS Concentration Not To Be Exceeded as a Highest First High (H1H)				
Met Years	Background (µg/m³)	Modeled Impact (µg/m³)	Total (µg/m³)	NAAQS (µg/m³)
2016	7.19	7.52	14.71	100
2017	7.19	7.46	14.66	
2018	7.19	6.50	13.70	
2019	7.19	6.34	13.53	
2022	7.19	6.72	13.92	

The NO₂ results for NAAQS compliance for the Tail Gas scenarios are shown in the following tables for 1-hour and annual concentrations, including contributions from existing sources of NO₂ emissions in the project area.

Table 6.1c: Tail Gas 1-Hour NO₂ NAAQS Concentration 98th Percentile, 1-Hour Daily Maximum Averaged Over 5-Years (H8H)				
Met Years	Background (µg/m³)	Modeled Impact (µg/m³)	Total (µg/m³)	NAAQS (µg/m³)
2016-2019, 2022	4.90	122.83	166.73	188

Table 6.1d: Tail Gas Annual Mean NO₂ NAAQS Concentration Not To Be Exceeded as a Highest First High (H1H)				
Met Years	Background (µg/m³)	Modeled Impact (µg/m³)	Total (µg/m³)	NAAQS (µg/m³)
2016	7.19	7.47	14.66	100
2017	7.19	7.42	14.61	
2018	7.19	6.44	13.63	
2019	7.19	6.28	13.47	
2020	7.19	6.63	13.83	

6.2 SO₂ Results

The SO₂ results for NAAQS compliance for the Bypass scenario is shown in table 6.2a below for the 99th percentile, highest 4th high 1-hour concentration, including contributions from existing sources of SO₂ emissions in the project area.

Table 6.2a: Bypass 1-Hour SO₂ NAAQS Concentration 99th Percentile of 1-Hour Daily Maximum Averaged Over 5-Years (H4H)				
Met Years	Background (µg/m³)	Modeled Impact (µg/m³)	Total (µg/m³)	NAAQS (µg/m³)
2016-2019, 2022	6.11	50.12	56.23	196

The SO₂ results for NAAQS compliance for the Tail Gas scenario is shown in table 6.2b below for the 99th percentile, highest 4th high 1-hour concentration, including contributions from existing sources of SO₂ emissions in the project area.

Table 6.2b: Tail Gas 1-Hour SO₂ NAAQS Concentration 99th Percentile of 1-Hour Daily Maximum Averaged Over 5-Years (H4H)				
Met Years	Background (µg/m³)	Modeled Impact (µg/m³)	Total (µg/m³)	NAAQS (µg/m³)
2016-2019, 2022	6.11	1.44	7.55	196

6.3 PM_{2.5} Results

The PM_{2.5} results for NAAQS compliance for the Bypass scenario is shown in tables 6.3a and 6.3b for 24-hour and annual concentrations, including contributions from existing sources of PM_{2.5} emissions in the project area.

Table 6.3a: Bypass 24-Hour PM_{2.5} NAAQS Concentration 98th Percentile Daily Maximum Averaged Over 5-Years (H8H)				
Met Years	Background (µg/m³)	Modeled Impact (µg/m³)	Total (µg/m³)	NAAQS (µg/m³)
2016-2019, 2022	16.67	4.20	20.87	35

Table 6.3b: Bypass Annual PM_{2.5} NAAQS Concentration Daily Maximum Averaged Over 5-Years (H1H)				
Met Years	Background (µg/m³)	Modeled Impact (µg/m³)	Total (µg/m³)	NAAQS (µg/m³)
2016-2019, 2022	4.27	0.55	4.82	9

The PM_{2.5} results for NAAQS compliance for the Tail Gas scenario is shown in tables 6.3c and 6.3d for 24-hour and annual concentrations, including contributions from existing sources of PM_{2.5} emissions in the project area.

Table 6.3c: Tail Gas 24-Hour PM_{2.5} NAAQS Concentration 98th Percentile Daily Maximum Averaged Over 5-Years (H8H)				
Met Years	Background (µg/m³)	Modeled Impact (µg/m³)	Total (µg/m³)	NAAQS (µg/m³)
2016-2019, 2022	16.67	4.13	20.79	35

Table 6.3d: Tail Gas Annual PM_{2.5} NAAQS Concentration Daily Maximum Averaged Over 5-Years (H1H)				
Met Years	Background (µg/m³)	Modeled Impact (µg/m³)	Total (µg/m³)	NAAQS (µg/m³)
2016-2019, 2022	4.27	0.53	4.80	9

The results from the CIA for NO₂, SO₂, and PM_{2.5} are less than the NAAQS, therefore this project is expected to demonstrate compliance with the NAAQS.

Title 129, Chapter 3 – Construction Permits

Project Aggregation Analysis

The following table summarizes the recent permit applications that Adams have submitted:

Permit App. #	Date App. Received	Project Description	Project PTE	Related Projects
CP24-036	7/10/2024	Construction of a new anaerobic digestion and renewable natural gas facility.	PM: 11.16 ton/yr PM ₁₀ : 11.14 ton/yr PM _{2.5} : 11.14 ton/yr SO _x : 209.62 ton/yr NO _x : 56.01 ton/yr CO: 203.83 ton/yr VOC: 10.20 ton/yr	Related to CP26-011
CP26-011	3/9/2026	Modification and redesign of the anaerobic digestion capacity and control technology.	PM: 2.46 ton/yr PM ₁₀ : 2.49 ton/yr PM _{2.5} : 2.49 ton/yr SO _x : 3.70 ton/yr NO _x : 17.68 ton/yr CO: 34.12 ton/yr VOC: 4.19 ton/yr	Related to CP24-036

The NDWEE analyzed the recent projects from Adams to determine if the projects were related and could be considered parts of the same project. If the projects were determined to be related, the project PTE change from the related projects would have to be evaluated together to determine if they were considered a major modification for purposes of NSR.

The NDWEE determined that the initial facility construction (CP24-036) and facility redesign (CP26-011) projects were related. As such, NDWEE evaluated PTE contributions from both projects as if they were proposed at the same time for evaluations in the air dispersion modeling section of Chapter 2 above. At this time the aggregate PTE from both projects do not exceed major modification thresholds for NSR purposes.

Title 129, Chapter 12 – New Source Performance Standards (NSPS)

The subparts which are applicable to the facility are summarized below.

Subpart A – General Provisions: This subpart, adopted by reference in Title 129, Chapter 12, Section 001.01, applies to those units subject to another NSPS subpart. Adams is subject to Subpart A because it is subject to Subparts Dc and IIII.

Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units: This subpart, adopted by reference in Title 129, Chapter 12, Section 001.05, applies to steam generating units with a design rate greater than 10 MMBtu/hr but less than or equal to 100 MMBtu/hr, installed after June 9, 1989. A steam-generating unit is defined as any device which combusts any fuel to produce steam, heat water, or heat any heat transfer medium. This does not include process heaters, which are devices with the primary purpose of heating materials to initiate or promote a chemical reaction in which the heated material participates as a reactant or catalyst. A heat transfer medium is any material which is used to transfer heat from one point to another point.

EU-1.1 and EU-1.2 have design rates of 22.5 MMBtu/hr each, therefore, the boilers are subject to this subpart.

Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines:

This subpart, adopted by reference in Title 129, Chapter 12, Section 001.80, applies to CI ICE at facilities that commence construction, modification, or reconstruction after July 2005, and manufacturers of CI ICE with a model year of 2007 or later, with additional applicability conditions for fire pump engines. The standby generator (EU-3) was manufactured after 2007 and is therefore subject to the requirements of this subpart.

A review of the potential applicability of OOOOb follows:

Subpart OOOOb – Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After December 6, 2022: This subpart, not yet adopted by reference in Title 129, establishes emission standards and compliance schedules for the control of the pollutant GHGs. The standard in this subpart is in the form of a limitation on emissions of methane from affected facilities in the crude oil and natural gas source category that commenced construction, modification, or reconstruction after December 6, 2022. This subpart also establishes emissions standards and compliance schedules for the control of VOCs and SO₂ emissions from affected facilities that commence construction, modification, or reconstruction after December 6, 2022.

As defined in §63.5430b, the natural gas portion of the crude oil and natural gas source category means “Natural gas production, processing, transmission, and storage, which include the well and extend to, but do not include, the local distribution company custody transfer station.” Furthermore, “Well” is defined in §63.5430b as *“a hole drilled for purpose of producing natural gas, or a well into which fluids are injected.”* By definition, the natural gas source category must include a well that is used in the natural gas production process. Adams does not utilize a well as defined in the rule and is therefore not part of the crude oil and natural gas source category. As such, Adams is not subject to this subpart.

Adams must comply with all applicable NSPS subparts and requirements regardless of their inclusion in this permitting action or Title 129. These rules are subject to change. Additional and updated information on all NSPS is available on the NDWEE NSPS Notebook, which can be located by visiting the NDWEE website at <https://dwee.nebraska.gov/>, by first selecting “Menu” at the top of the page, then “Air”, then “NSPS Program”, and then “NSPS Notebook”.

Title 129, Chapter 13 – National Emission Standards for Hazardous Air Pollutants (NESHAP)

The subparts which are applicable to the facility are summarized below.

Subpart A – General Provisions: This subpart, adopted by reference in Title 129, Chapter 13, Section 002.01, applies to all sources subject to a NESHAP standard unless otherwise stated in the rule. Adams is subject to Subpart A because it is subject to Subpart ZZZZ.

Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines: This subpart, adopted by reference in Title 129, Chapter 13, Section 002.78, applies to existing, new, or reconstructed stationary reciprocating internal combustion engines (RICE). Adams' standby generator (EU-3) is subject to this subpart, however, the applicable requirements at the time of issuance is to comply with all applicable requirements of NSPS Subpart IIII as detailed in 40 CFR 63.6590(c).

Adams must comply with all applicable NESHAP requirements regardless of their inclusion in this permitting action or Title 129. These rules are subject to change. Information regarding NESHAP is available on the NDWEE Air Toxics Notebook, which can be located by visiting the NDWEE website <https://dwee.nebraska.gov>, by first selecting "Menu" at the top of the page, then "Air", then "Air Toxics Program", and then "Air Toxics Notebook".

Title 129, Chapter 15, Section 001 - Particulate Emissions; Limitations and Standards

Process Weight Rate (Section 001.01)

Title 129, Chapter 15, Section 001.01, limits PM (filterable) emissions to the amounts shown in Table 15-1 during any one hour. These process weight rate limits, which are based on throughput of the emission units, vary as throughputs change. Since the potential to emit for each emission point is less than the process weight rate limitations, these PM limitations were not included in Condition III of this permit.

Particulate Emissions from Combustion Sources (Section 001.02)

All of the PM emission points subject to the Chapter 15, Section 001.02 limitations are in compliance with those limitations, as the PTE for each emission point is less than the limitations. Therefore, these PM limitations were not included in any Specific Condition of this permit.

Opacity Limitations from Emission Units (Section 001.04)

Specific Condition I.(J) specifies that no person shall cause or allow emissions, from any source, which has an opacity equal to or greater than twenty percent (20%). Opacity must be determined using an EPA-approved method or recorded by a continuous opacity monitoring system which has been operated and maintained pursuant to 40 CFR Part 60 Appendix B except as provided for in Chapter 15, Sections 001.05 and 001.06 (Title 129, Chapter 15, Section 001.04). Therefore, while not specifically stated in Condition III., this requirement is still applicable to all emission units at the source.

REVISED SPECIFIC PERMIT CONDITIONS:

Below is a mark-up that identifies all of the revisions to the original conditions. Additions are **bolded and underlined**, deletions are in ~~strikethrough~~, and NDWEE comments are in *italics*.

References to the "Nebraska Department of Environment and Energy" or "NDEE" have been revised to "Nebraska Department of Water, Energy, and Environment" or "NDWEE", respectively, to reflect the agency name change, effective July 1, 2025.

Condition III.(A)(1) now reads:

(A) Specific Conditions for Biogas Treatment

(1) Permitted ~~Equipment~~ Emission Points:

- (a)** The source is permitted to construct the emission points and associated emission units identified in the following table and controlled by the required control equipment as indicated:

Emission Point ID#	Required Control Unit ID# and Description	Equipment Description
EP-4: Tail Gas Vent OR ~~Rerouted for Combustion:~~ EP-5: Bypass Flare ^[1] OR <u>EP-6: Thermal Oxidizing Unit^[1]</u>	CE-4a: H ₂ S Bio-Scrubber ^[2] CE-4b: Carbon Filter ^[2] CE-4c: Membrane Filtration System ^[2] <u>CE-5: Bypass Flare^[2]</u> <u>CE-6: Thermal Oxidizing Unit^[2]</u>	EU-6.1 Digester 1 EU-6.2 Digester 2 EU-6.3 Digester 3 EU-6.4 Digester 4 EU-6.5 Digester 5 <u>EU-6.6 Digester 6</u> <u>EU-6.7 Digester 7</u> <u>EU-6.8 Digester 8</u> <u>EU-6.9 Buffer Tank</u> <u>EU-6.10 Covered Lagoon</u>

^[1] Emissions limitations and other applicable conditions for EP-5 **and EP-6** are found in Condition III.(B).

^[2] Required control devices vary depending on the operation scenario, these scenarios and their required control devices are prescribed in Condition III.(A)(3)(b) below.

This condition was modified to include the addition of new equipment and operating scenarios. The bypass flare and thermal oxidizing unit were added as control devices as well as separated in their own condition as emission units. This condition requires control devices that are dependent on the operating scenario in effect at that time and are described in Condition III.(A)(3)(b).

Condition III.(A)(2) now reads:

(2) Emission Limitations and Testing Requirements:

- (a) The volumetric concentration of Hydrogen Sulfide (H₂S) at the outlet of the H₂S Bio-Scrubber (CE-4a) shall not exceed ~~1,500~~ **1,200** parts per million on a dry basis (ppmvd) measured as a 3-hour rolling average. (Chapter 3)
- (b) The volumetric concentration of Hydrogen Sulfide (H₂S) ~~at the outlet of the~~ **in the tail gas that is routed to the** Tail Gas Vent (EP-5) **or combusted in the Thermal Oxidizing Unit (EP-6)** shall not exceed 20 parts per million on a dry basis (ppmvd) measured as a 3-hour rolling average. (Chapter 3)

Emission concentration limits were updated to the new guarantees provided with the application.

Condition III.(A)(3) now reads:

(3) Operational and Monitoring Requirements and Limitations:

- (a) Digesters (EU-6.1 through ~~EU-6.5~~ **EU-6.8**), **Buffer Tank (EU-6.9), and Covered Lagoon (EU-6.10)** shall only receive raw materials from Adams Land & Cattle South Feedlot (FID: 61705). (Chapter 3)
 - (i) Raw material shall be defined as cow manure only.
- (b) Biogas shall not be discharged directly to the atmosphere. All biogas shall be controlled by the H₂S Bio-Scrubber (CE-4a). (Chapter 3)
 - (i) Before exhausting out of the Tail Gas Vent (EP-4) **or being combusted in the Thermal Oxidizing Unit (EP-6)**, all biogas shall be controlled by the Carbon Filter (CE-4b) and the Membrane Filtration System (CE-4c) in addition to the H₂S Bio-Scrubber (CE-4a).
 - (ii) If any of the process equipment is off-line or unable to handle the incoming biogas stream, the ~~biogas will~~ **shall** be ~~diverted and~~ combusted at the Bypass Flare (EP-5) after ~~passing through~~ **being controlled by** the H₂S Bio-Scrubber (CE-4a).
- (c) The permittee shall install, operate, and maintain continuous H₂S monitors that measures H₂S concentration of biogas at the outlet of the H₂S Bio-Scrubber (CE-4a) and ~~the Tail Gas~~

- ~~Vent (EP-4)~~ **the tail gas that is separated by the Membrane Filtration System (CE-4c).**
The continuous H₂S monitors shall be operated in accordance with the following: (Chapter 3)
- (i) Each H₂S monitor shall be maintained, operated, and calibrated as recommended in the manufacturer's specifications.
 - (ii) Each monitor shall record H₂S concentrations a minimum of once every 15 minutes.
 - (iii) The biogas H₂S concentrations shall be used to calculate a 1-hour average of the biogas H₂S concentration at each outlet. The 1-hour average concentrations shall then be averaged into a 3-hour rolling average at each outlet.
- (d) The total combined flow rate of biogas exiting the ~~Digesters (EU-6.1, EU-6.2, EU-6.3, EU-6.4, and EU-6.5)~~ **Covered Lagoon (EU-6.10)** shall not exceed ~~1,835~~ **2,312.64** MMscf per any twelve (12) consecutive calendar months. At no time during the first eleven (11) calendar months after permit issuance shall the total flow rate of biogas exceed ~~1,835~~ **2,312.64** MMscf ~~of tail gas going to atmosphere~~ **exiting the Covered Lagoon.** (Chapter 3)
- (i) The permittee shall install, operate, and maintain a non-resettable flow meter that measures biogas at the outlet of the ~~Digesters~~ **Covered Lagoon.**
- (e) The total flow rate of the tail gas **separated by the Membrane Filtration System (CE-4c)** shall not exceed ~~633.35~~ **946.06** MMscf per any twelve (12) consecutive calendar months. At no time during the first eleven (11) calendar months after permit issuance shall the flow ~~are~~ **rate** exceed ~~633.35~~ **946.06** MMscf of tail gas. (Chapter 3)
- (i) The permittee shall install, operate, and maintain a non-resettable flow meter that measures biogas at ~~EP-4~~ **the tailgas separated by the Membrane Filtration System (CE-4c).**
- (f) The operation and maintenance of the ~~biogas filtration systems (CE-4b: Carbon Filter (CE-4b) and CE-4c: Membrane Filtration System (CE-4c))~~ shall be in accordance with the following requirements: (Chapter 3)
- (i) The ~~filtration systems (CE-4b and CE-4c)~~ **Carbon Filter and Membrane Filtration** shall be in operation and controlling emissions at all times ~~the associated emission units are in operation~~ **the biogas not being routed for combustion in the Bypass Flare (CE-5).**
 - (ii) The ~~filtration systems (CE-4b and CE-4c)~~ **Carbon Filter and Membrane Filtration System** shall be properly installed, operated, and maintained. The manufacturer's operation and maintenance manuals, or their equivalent, detailing proper operation, inspection, and maintenance of the filtration systems shall be kept on site and readily available to Department representatives.
 - (iii) **Routine observations of the Carbon Filter at least once each day of operations during daylight hours shall be conducted to determine whether there are visible emissions, leaks, noise, atypical operating parameters, or other indications that may necessitate corrective action. Corrective action shall be taken immediately, if necessary.**

Prescribed annual biogas and tail gas flow rates have been revised as requested to the anticipated maximum capacities following this project.

The biogas flow meter was prescribed on the exit of the Covered Lagoon because that is the final stage of digestion before controls and separation of the biogas and is anticipated to be the collective flow rate of the generated biogas in the buffer tank, digesters, and covered lagoon. PTE was calculated using this volume of raw biogas. The H₂S concentration monitor is prescribed to be at the outlet of the Desulfurization towers which must be in operation and controlling emissions at all times under each operating scenario.

The flow rate monitor and concentration monitor for tail gas is prescribed to be at the exit of the membrane filtration system rather than an emission point because the tail gas may be emitted directly through a vent or sent to the TOU for destruction. The venting of the total volume of tail gas generated is not otherwise restricted beyond flow rate and concentration.

Routine observations for the Carbon Filter is now required as these units are required to control TRS (H₂S).

Condition III.(4) and (5) now read:

(4) Applicable NSPS, NESHAP, and MACT Requirements:

The NDWEE has not identified any NSPS, NESHAP, or MACT requirements that apply to the emission points or emission units listed in Condition III.(A)(1).

(5) Reporting and Recordkeeping Requirements:

The owner or operator shall maintain the following records:

- (a) Records shall be kept documenting the average hourly and 3-hour rolling averages of H₂S concentrations of biogas, in ppmvd at the outlet of the Bio-Scrubber (CE-4a) and ~~the outlet of the Tail Gas Vent (EP-4)~~ **and tail gas separated by the Membrane Filtration System (CE-4c).**
- (b) Records shall be kept documenting the flow rate of total biogas generated from the Digesters (EU-6.1, EU-6.2, EU-6.3, EU-6.4, and EU-6.5 **through EU-6.8), Buffer Tank (EU-6.9), and Covered Lagoon (EU-6.10)** and tail gas flow rate ~~from the Tail Gas Vent (EP-4)~~ **separated by the Membrane Filter System (CE-4c)** for each calendar month and for each period of twelve (12) consecutive calendar months.
- (c) Recordkeeping and reporting associated with the continuous H₂S monitor and flow meters shall be as follows:
 - (i) Calibration records shall be kept on site and readily available to NDWEE representatives.
- (d) Records documenting when routine observations of the Carbon Filter (CE-4b) were performed with a description, including operating parameters and any atypical observations.**

Recordkeeping requirements were revised to be consistent with operational and monitoring requirements above.

Condition III.(B) now reads:

(B) Specific Conditions for the Bypass Flare

(1) Permitted Emission Points:

- (a)** The source is permitted to construct the emission points and associated emission units identified in the following table at the capacities and using the fuel types listed:

Emission Point ID#	Required Control Unit ID# and Description	Emission Unit ID# and Descriptions	Maximum Capacity (MMBtu/hr)	Permitted Fuel Type
EP-5	CE-5: Bypass Flare	EU-5: Bypass Flare ^[1]	~~140~~ <u>160</u>	Biogas (Flare)
				Natural Gas (Pilot)
<u>EP-6</u>	<u>CE-6: Thermal Oxidizing Unit (TOU)</u>	<u>EU-6: TOU^[1]</u>	<u>10</u>	<u>Tail Gas (TOU)</u>
				<u>Natural Gas (Pilot)</u>

^[1] The Bypass Flare receives emissions routed from emission units prescribed in the table in Condition III.(A)(1).

(2) Emission Limitations and Testing Requirements:

The NDWEE has not identified any emission limitations and testing requirements that apply to the emission units listed in Condition III.(B)(1).

(3) Operational and Monitoring Requirements and Limitations:

(a) A flame shall be present in the Bypass Flare (CE-5) when biogas is being routed to the flare. (Chapter 3)

(i) The permittee shall install an appropriate safety device or flame monitoring system to ensure the presence of a flame at the **Bypass** Flare.

(b) Operation and maintenance of the TOU (CE-6) shall be in accordance with the following requirements when tail gas is being routed to the TOU. (Chapter 3)

(i) **The TOU shall be equipped with a thermocouple or equivalent device capable of continuously monitoring and recording the temperature of the TOU. The thermocouple or equivalent device shall monitor temperature on a continuous basis, with the three-hour average temperature recorded once per hour. The thermocouple or equivalent device shall be properly installed, operated, and maintained in accordance with manufacturer recommendations. Manufacturer's documentation shall be kept on site and readily available to NDWEE representatives.**

(ii) **The one-hour average operating temperature of the TOU shall be maintained at a minimum 1,550°F.**

(iii) **Routine observations (at least once each day of TOU operation) shall be conducted to determine whether there are visible emissions from the stack, leaks, noise, atypical operating parameters (e.g., temperature), or other indications that may necessitate corrective action. Corrective action shall be taken immediately, if necessary.**

(4) Applicable NSPS, NESHAP, and MACT Requirements:

The NDWEE has not identified any NSPS, NESHAP, or MACT requirements that apply to the emission points or emission units listed in Condition III.(B)(1).

(5) Reporting and Recordkeeping Requirements:

The source shall maintain the following:

(a) Records shall be kept of a flame presence at the **Bypass** Flare (CE-5) when in use.

(b) **Records documenting the temperature of the TOU (CE-6), including three-hour average temperature readings while the associated emission units are in operation.**

(c) **Records documenting when routine observations of the TOU were performed with a description, including operating parameters (e.g., temperature) and any atypical observations.**

(d) **Records documenting when routine maintenance and preventive actions were performed with a description of the maintenance and/or preventive action performed.**

Condition III.(B) was revised to update the new maximum capacity of the proposed bypass flare and include requirements for the TOU. The one-hour average operating temperature was set at the minimum design temperature for the site specific MRW Technologies Thermal Oxidizer System. Performance testing is not being prescribed because PTE was calculated using worst-case AP-42 emission factors on criteria pollutants with the exception of SO₂ which was calculated from a mass balance of sulfur from H₂S which is being continuously monitored.

Condition III.(C) now reads:

(C) Specific Conditions for Emergency Engines

(1) Permitted Emission Points:

- (a)** The source is permitted to construct the emission points and associated emission units identified in the following table at the capacities, using the fuel types listed, and controlled by the required control equipment as indicated.

Emission Point ID#	Required Control Equipment ID# and Description	Emission Unit ID# and Description	Maximum Capacity (kW _{hp})	Permitted Fuel Type
EP-3	-	EU-3: ~~Back-up~~ Standby Generator	~~1,000~~ 1,483	~~Natural Gas~~ Diesel

(2) Emission Limitations and Testing Requirements:

- (a)** Refer to 40 CFR 60 Subpart ~~JJJIIII~~ and for any applicable emission limitations and testing requirements associated with the emission points identified in Condition III.(C)(1). (Chapter 12)

(3) Operational and Monitoring Requirements and Limitations:

- (a)** The ~~Back-up~~ **Standby** Generator (EU-3) shall be limited to 500 operating hours each per any period of twelve (12) consecutive calendar months. At no time during the first eleven (11) months after start-up shall the emergency genset operating hours exceed 500 hours. (Chapters 3 and 12)
- (i)** The ~~Back-up~~ **Standby** Generator (EU-3) shall be operated for no more than 100 hours per calendar year for non-emergency situations as prescribed 40 CFR Part 60 Subpart ~~JJJIIII~~.
- (ii)** The ~~Back-up~~ **Standby** Generator (EU-3) shall be equipped with a non-resettable hour meter to record the operating hours.
- (iii)** Non-emergency operation of the ~~Back-up~~ **Standby** Generator (EU-3) shall be limited to between the hours of 11:00 AM to 4:00 PM CDT/CST.
- (iv)** The source shall comply with the operational and monitoring requirements and limitations as specified in 40 CFR 60 Subpart ~~JJJIIII~~.

(4) Applicable NSPS, NESHAP, and MACT Requirements:

- (a)** The following standards apply to the ~~Back-up~~ **Standby** generator (EU-~~93~~):

Applicable Standard	Title	Rule Citation
NSPS Subpart A	General Provisions	Title 129, Chapter 12, Sec. <u>001.01</u> 40 CFR 60.1 through 60.19
NSPS Subpart ~~JJJIIII~~	Stationary Compression Ignition Internal Combustion Engines	Title 129, Chapter 12, Sec. <u>001.840</u> 40 CFR 60.4230 through 60.4248
<u>NESHAP Subpart A</u>	<u>General Provisions</u>	<u>Title 129, Chapter 13, Sec. 001.01 40 CFR 63.1</u>
<u>NESHAP Subpart ZZZZ</u>	<u>Stationary Reciprocating Internal Combustion Engines</u>	<u>Title 129, Chapter 13, Sec 002.80 40 CFR 63.6580</u>

(5) Reporting and Recordkeeping Requirements:

- (a)** Records shall be kept documenting hours of operation for the ~~Back-up~~ **Standby** Generator (EU-3) for each calendar month and for each period of twelve (12) consecutive calendar months.

- (b) Records shall be kept documenting hours and time of non-emergency operation for the ~~Back-up~~ **Standby** Generator (EU-3) for each calendar month and for each period of twelve (12) consecutive calendar months.
- (c) **The source shall comply with the applicable reporting and recordkeeping requirements as specified in 40 CFR Part 60 Subparts A and IIII.**

Condition III.(C) was revised to a diesel fired engine and the name of the unit was revised as requested. PTE was calculated using Teir II emission standards. At this time, performance testing has not been prescribed, this determination is based on a case-by-case review of the proposed facility and modeling analyses. Should a modification occur in the future, performance testing will be re-evaluated at that time.

EMISSION UNITS WITHOUT SPECIFIC CONDITIONS:

The following emission units/points have been identified at the facility and were included in the calculation of the facility's PTE. These units do not require specific permit conditions at this time as the potential emissions contributions associated with these units were calculated based on uncontrolled (i.e., no limitations) operations.

At this time, the Department has not identified any additional regulations that would apply to these units that are not otherwise already included in the Standard and General Construction Permit Conditions of the permit.

Emission Point ID#	Emission Unit Description	Capacity
EP-1.1	Natural gas fired boiler	22.5 MMBtu/hr
EP-1.2	Natural gas fired boiler	22.5 MMBtu/hr
EP-2.1	Natural gas fired boiler	1 MMBtu/hr
EP-2.2	Natural gas fired boiler	1 MMBtu/hr
EP-2.3	Natural gas fired boiler	1 MMBtu/hr
EP-2.4	Natural gas fired boiler	1 MMBtu/hr
EP-2.5	Natural gas fired boiler	1 MMBtu/hr
EP-2.6	Natural gas fired boiler	1 MMBtu/hr

Fact Sheet Attachment

PTE Summary

Facility-Wide PTE (ton/yr)											
Emission Point	Description	PM	PM ₁₀	PM _{2.5}	NO _x	SO _x	CO	VOC	Largest HAP (Hexane)	Total HAPs	CO ₂ e
EP-1.1	Natural Gas Boilers	0.73	0.73	0.73	9.66	0.06	8.12	0.53	0.17	0.18	11,540
EP-1.2		0.73	0.73	0.73	9.66	0.06	8.12	0.53	0.17	0.18	11,540
EP-2.1 through EP-2.6	Water heaters	0.20	0.20	0.20	2.58	1.55E-02	2.16	0.14	0.05	0.05	3,077
EP-3	Standby Generator	0.12	0.12	0.12	3.92	4.50E-03	2.13	3.92	-	3.88E-03	404
EP-4 ^[1]	Tail Gas	-	-	-	-	-	-	0.77	-	-	-
EP-5 ^[1]	Flare (Combustion)	11.83	11.83	11.83	47.65	213.18	217.25	9.25	0.04	0.74	139,507
	Flare (Pilot)	0.02	0.02	0.02	0.21	1.29E-03	0.18	1.18E-02	3.86E-03	4.05E-03	259
EP-6 ^[1]	Tail Gas TOU	0.39	0.39	0.39	2.98	1.43	13.58	0.58	0.01	0.30	57,071
	TOU (Pilot)	3.26E-03	3.26E-03	3.26E-03	0.04	2.58E-04	0.04	2.36E-03	7.73E-04	8.11E-04	52
Total		13.63	13.63	13.63	73.69	213.31	237.95	14.39	0.44	1.16	166,327
Previous PTE^[2]		11.16	11.14	11.14	56.01	209.62	203.83	10.20	0.26	0.79	126,618
Change in PTE		2.46	2.49	2.49	17.68	3.70	34.12	4.19	0.18	0.37	39,708

^[1] Emission Points EP-4, EP-5, and EP-6 generate their emissions from either combusting or releasing the same stream of scrubbed biogas from the digesters. Therefore, the total PTE only sums the greatest contributing emission point for each pollutant.

^[2] Previous PTE obtained from CP24-036.

Fact Sheet Attachment

Emission Point: EP-1.1 and EP-1.2 Natural Gas Boilers

PTE on this page is per unit. Total PTE for both units is shown on the PTE summary page.

Total Heat Input Capacity:	22.50	MMBtu/hr (each)
Heat Content of Natural Gas:	1,020	Btu/scf
Conversion using 1,020 Btu/scf:	0.02	MMscf/hr (each)
Annual Hours of Operation:	8,760	hr/yr (each)
Potential Natural Gas Throughput:	193.24	MMscf/yr (each)

Pollutant	Emission Factor ^[1] (lb/MMscf)	Emission Factor units	PTE (lb/hr)	PTE (ton/yr)
PM	7.60	lb/MMscf	0.17	0.73
PM ₁₀	7.60	lb/MMscf	0.17	0.73
PM _{2.5}	7.60	lb/MMscf	0.17	0.73
NO _x	100.00	lb/MMscf	2.21	9.66
SO ₂	0.60	lb/MMscf	0.01	0.06
CO	84.00	lb/MMscf	1.85	8.12
VOC	5.50	lb/MMscf	0.12	0.53
Individual Hazardous Air Pollutants (HAP)^[1]				
Benzene	2.10E-03	lb/MMscf	4.63E-05	2.03E-04
Dichlorobenzene	1.20E-03	lb/MMscf	2.65E-05	1.16E-04
Formaldehyde	7.50E-02	lb/MMscf	1.65E-03	7.25E-03
Hexane	1.80	lb/MMscf	0.04	0.17
Lead Compounds	5.00E-04	lb/MMscf	1.10E-05	4.83E-05
Naphthalene	6.10E-04	lb/MMscf	1.35E-05	5.89E-05
Toluene	3.40E-03	lb/MMscf	7.50E-05	3.29E-04
Arsenic Compounds	2.00E-04	lb/MMscf	4.41E-06	1.93E-05
Beryllium Compounds	1.20E-05	lb/MMscf	2.65E-07	1.16E-06
Cadmium Compounds	1.10E-03	lb/MMscf	2.43E-05	1.06E-04
Chromium Compounds	1.40E-03	lb/MMscf	3.09E-05	1.35E-04
Cobalt Compounds	8.40E-05	lb/MMscf	1.85E-06	8.12E-06
Manganese Compounds	3.80E-04	lb/MMscf	8.38E-06	3.67E-05
Mercury Compounds	2.60E-04	lb/MMscf	5.74E-06	2.51E-05
Nickel Compounds	2.10E-03	lb/MMscf	4.63E-05	2.03E-04
Selenium Compounds	2.40E-05	lb/MMscf	5.29E-07	2.32E-06
Polycyclic Organic Matter	8.82E-05	lb/MMscf	1.95E-06	8.52E-06
Total HAPs	-	-	0.04	0.18
GHGs^[2]				
CO ₂	53.06	kg/MMBtu	2,632	11,528
CH ₄	1.00E-03	kg/MMBtu	0.05	0.22
N ₂ O ^[3]	1.00E-04	kg/MMBtu	4.96E-03	0.02
GHGs (mass basis)	-	-	2,632	11,528
CO ₂ e ^[4]	-	-	2,635	11,540

^[1] Emission Factors are from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4 (4/26) unless otherwise specified.

^[2] Emission factors for Greenhouse Gases (GHG) are default values from 40 CFR 98 Tables C-1 and C-2. This PTE summary follows the methodologies prescribed in 40 CFR Part 98.

^[3] GHG (lb/hr) = [Emission Factor (kg/MMBtu)] x (Potential Heat Input Capacity (MMBtu/hr)) / (907.185 kg/ton) * (2000 lb/ton)

^[4] ton CO₂e/yr = [(ton/yr CO₂) * 1] + [(ton/yr CH₄) * 28] + [(ton/yr N₂O) * 265]; CO₂ equivalents are found in 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials published on April 25, 2024. The CO₂e for CO₂ = 1, for CH₄ = 28, and for N₂O = 265.

Fact Sheet Attachment

Emission Point: EP-2.1 through EP-2.6 Natural Gas Building and Domestic Water Heating Boilers

PTE on this page is per unit. Total PTE for all six units is shown on the PTE summary page.

Total Heat Input Capacity:	1.00	MMBtu/hr (each)
Heat Content of Natural Gas:	1,020	Btu/scf
Conversion using 1,020 Btu/scf:	9.80E-04	MMscf/hr (each)
Annual Hours of Operation:	8,760	hr/yr (each)
Potential Natural Gas Throughput:	8.59	MMscf/yr (each)

Pollutant	Emission Factor ^[1] (lb/MMscf)	Emission Factor units	PTE (lb/hr)	PTE (ton/yr)
PM	7.60	lb/MMscf	7.45E-03	0.03
PM ₁₀	7.60	lb/MMscf	7.45E-03	0.03
PM _{2.5}	7.60	lb/MMscf	7.45E-03	0.03
NO _x	100.00	lb/MMscf	0.10	0.43
SO _x	0.60	lb/MMscf	5.88E-04	2.58E-03
CO	84.00	lb/MMscf	0.08	0.36
VOC	5.50	lb/MMscf	5.39E-03	0.02
Individual Hazardous Air Pollutants (HAP)^[1]				
Benzene	2.10E-03	lb/MMscf	2.06E-06	9.02E-06
Dichlorobenzene	1.20E-03	lb/MMscf	1.18E-06	5.15E-06
Formaldehyde	7.50E-02	lb/MMscf	7.35E-05	3.22E-04
Hexane	1.80	lb/MMscf	1.76E-03	7.73E-03
Lead Compounds	5.00E-04	lb/MMscf	4.90E-07	2.15E-06
Naphthalene	6.10E-04	lb/MMscf	5.98E-07	2.62E-06
Toluene	3.40E-03	lb/MMscf	3.33E-06	1.46E-05
Arsenic Compounds	2.00E-04	lb/MMscf	1.96E-07	8.59E-07
Beryllium Compounds	1.20E-05	lb/MMscf	1.18E-08	5.15E-08
Cadmium Compounds	1.10E-03	lb/MMscf	1.08E-06	4.72E-06
Chromium Compounds	1.40E-03	lb/MMscf	1.37E-06	6.01E-06
Cobalt Compounds	8.40E-05	lb/MMscf	8.24E-08	3.61E-07
Manganese Compounds	3.80E-04	lb/MMscf	3.73E-07	1.63E-06
Mercury Compounds	2.60E-04	lb/MMscf	2.55E-07	1.12E-06
Nickel Compounds	2.10E-03	lb/MMscf	2.06E-06	9.02E-06
Selenium Compounds	2.40E-05	lb/MMscf	2.35E-08	1.03E-07
Polycyclic Organic Matter	8.82E-05	lb/MMscf	8.65E-08	3.79E-07
Total HAPs	-	-	1.85E-03	8.11E-03
GHGs^[2]				
CO ₂	53.06	kg/MMBtu	117	512
CH ₄	1.00E-03	kg/MMBtu	2.20E-03	9.66E-03
N ₂ O ^[3]	1.00E-04	kg/MMBtu	2.20E-04	9.66E-04
GHGs (mass basis)	-	-	117	512
CO ₂ e ^[4]	-	-	117	513

^[1] Emission Factors are from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4 (4/26) unless otherwise specified.

^[2] Emission factors for Greenhouse Gases (GHG) are default values from 40 CFR 98 Tables C-1 and C-2. This PTE summary follows the methodologies prescribed in 40 CFR Part 98.

^[3] GHG (lb/hr) = [Emission Factor (kg/MMBtu)] x (Potential Heat Input Capacity (MMBtu/hr)) / (907.185 kg/ton) * (2000 lb/ton)

^[4] ton CO₂e/yr = [(ton/yr CO₂) * 1] + [(ton/yr CH₄) * 28] + [(ton/yr N₂O) * 265]; CO₂ equivalents are found in 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials published on April 25, 2024. The CO₂e for CO₂ = 1, for CH₄ = 28, and for N₂O = 265.

Fact Sheet Attachment

Emission Point: EP-3 Diesel Standby Generator

Total Engine Capacity:	1,483	hp
Fuel Consumption:	71.50	gal/hr
Energy Content in Fuel:	0.138	MMBtu/gal
	9.867	MMBtu/hr
Sulfur Content in Fuel Oil:	0.0015	%
Annual Operating Hours:	500	hr/yr

Pollutant	Emission Factor ^[1]	PTE	
	(lb/hp-hr)	(lb/hr)	(ton/yr)
PM	3.31E-04	0.49	0.12
PM ₁₀	3.31E-04	0.49	0.12
PM _{2.5}	3.31E-04	0.49	0.12
NO _x	1.06E-02	15.69	3.92
SO ₂	1.21E-05	0.02	4.50E-03
CO	5.73E-03	8.50	2.13
VOC	1.06E-02	15.69	3.92
Individual HAP	(lb/MMBtu)^[1]	(lb/hr)	(ton/yr)
Acetaldehyde	2.52E-05	2.49E-04	6.22E-05
Acrolein	7.88E-06	7.78E-05	1.94E-05
Benzene	7.76E-04	7.66E-03	1.91E-03
Formaldehyde	7.89E-05	7.79E-04	1.95E-04
Naphthalene	1.30E-04	1.28E-03	3.21E-04
Polycyclic Aromatic Hydrocarbons	2.12E-04	2.09E-03	5.23E-04
Toluene	2.81E-04	2.77E-03	6.93E-04
Xylenes	1.93E-04	1.90E-03	4.76E-04
Total HAPs		1.55E-02	3.88E-03
Greenhouse Gases	(kg/MMBtu)^[2]	(lb/hr)^[3]	(ton/yr)
CO ₂	73.96	1,608.86	402.22
CH ₄	3.00E-03	0.07	1.63E-02
N ₂ O	6.00E-04	0.01	3.26E-03
Total GHGs (mass basis)		1,608.94	402.23
Total GHGs (tons CO ₂ e/yr) ^[4]		1,614.15	403.54

^[1] PM/PM₁₀/PM_{2.5}, NO_x, CO, and VOC emission standard obtained from Tier II emissions standards converting with 453.6 g/lb. Remaining diesel combustion AP-42 emission factors came from AP-42, Section 3.4 (04/2025), Tables 3.4-1, 3.4-3, and 3.1-4.

^[2] All emission factors for Greenhouse Gases (GHG) are default values from 40 CFR 98 Tables C-1 and C-2. This PTE summary follows the methodologies prescribed in 40 CFR Part 98.

^[3] GHG (lb/hr) = [Emission Factor (kg/MMBtu)] * (Potential Heat Input Capacity (MMBtu/hr)) / (907.18 kg/ton) * (2000 lb/ton)

^[4] ton CO₂e/yr = [(ton/yr CO₂)*1] + [(ton/yr CH₄)*28] + [(ton/yr N₂O)*265]; CO₂ equivalents are found in 40 CFR Part 98 Subpart A Table A-1 *Global Warming Potentials* published on April 25, 2024 (Title 129, Chapter 1). The CO₂e for CO₂ = 1, for CH₄ = 28, and for N₂O = 265.

Fact Sheet Attachment

Emission Point: EP-5 Bypass Flare

Flare Capacity ^[1] :	160.00	MMBtu/hr
Biogas Heat Content:	606.06	Btu/scf
Flare Capacity ^[1] :	0.264	MMscf/hr
Flare Operational hours:	8,760	hr/yr (each)
Methane Content ^[1] :	60.16%	percent by volume

Flare Biogas Combustion Emissions

Pollutant	Emission Factors	Units	Emission Rate	
			(lb/hr)	(ton/yr)
PM ^[2]	17.0	lb/MMscf	2.70	11.83
PM ₁₀ ^[2]	17.0	lb/MMscf	2.70	11.83
PM _{2.5} ^[2]	17.0	lb/MMscf	2.70	11.83
NO _x ^[3]	0.068	lb/MMBtu	10.88	47.65
SO ₂ ^[4]	184.36	lb/MMscf	48.67	213.18
CO ^[3]	0.31	lb/MMBtu	49.60	217.25
VOC ^[3]	0.66	lb/MMBtu	2.11	9.25
CO ₂ ^[5]	120,000	lb/MMscf	31,680	138,758
CH ₄ ^[5]	2.3	lb/MMscf	0.61	2.66
N ₂ O ^[5]	2.2	lb/MMscf	0.58	2.54
CO ₂ e ^[6]	-	-	31,851	139,507

^[1] Provided by source in application.

^[2] Emission factors for PM/PM₁₀/PM_{2.5} are obtained from AP-42 Chapter 2.4, Table 2.4-5 (8/24).

^[3] NO_x, CO, and VOC emission factors are from AP-42 Section 13.5, Tables 13.5-1 and 13.5-2 (February 2018) in lb/MMBtu. VOC assumes 98% destruction efficiency.

^[4] Sulfur Dioxide Calculation: SO₂ emissions are based on the amount of H₂S in the gas from the digesters after H₂S bioscrubbers (see calculations next page).

^[5] GHG Emission factors are from AP-42 Chapter 1.4 (4/26).

^[6] ton CO₂e/yr = [(ton/yr CO₂) * 1] + [(ton/yr CH₄) * 28] + [(ton/yr N₂O) * 265]; CO₂ equivalents are found in 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials published on April 25, 2024. The CO₂e for CO₂ = 1, for CH₄ = 28, and for N₂O = 265.

Fact Sheet Attachment

H₂S Mass Balance

H ₂ S Content:	1,200	ppmv ^[a]
H ₂ S Concentration:	ppmv*M/V _m	10 ⁻⁶ g/L or µg/L
Where V _m = standard molar volume of ideal gas or 22.414 L/mol @std temperature and pressure (STP)		
And M = molecular weight of gas or 34.1 g/mol for H ₂ S ^[c]		
Or H ₂ S Content:	1,826	µg/L
Converts to:	1.82564E-06	kg/L
Conversion Constant:	2.2046	lb/kg
Conversion Constant:	28.31684659	L/ft ³
Converts to Concentration @STP:	1.14E-04	lb/ft ³
Standard Temp:	491.67	°R
Operating Temp:	559.67	°R (100 °F)
Actual H ₂ S Concentration:	1.00E-04	lb/ft ³

Assume 98% conversion of H₂S to SO₂^(b)

Conversion:	98%	
Equals:	9.81E-05	lb/ft ³ H ₂ S
Converts to ^{(c)(d)} :	1.84E-04	lb/ft ³ SO ₂

^(a) Concentration of H₂S is based on manufacturer guarantee information for the biological desulfurization bioscrubber output.

^(b) Texas Commission on Environmental Quality (TCEQ) *Publication RG-360A*, Revised January 2007

^(c) Molecular Weight of H₂S is: 34.1 g/mol

^(d) Molecular Weight of SO₂ is: 64.07 g/mol

Fact Sheet Attachment

Emission Point: EP-5 Bypass Flare Speciated HAP

			Constants	
Biogas Flow Rate:	0.264	MMscf/hr	453.592	g/lb
Flare Operational Hours:	8,760	hr/yr	28.317	L/ft3
Annual Flow:	2,312.64	MMscf/yr	22.711	L/mol

Hazardous Air Pollutants ^[1]	Molecular Weight ^[1]	Default Concentration ^[1]	Emission Factor	Controlled Emission Rate
	(g/mol)	(ppmv)	(lb/MMscf)	(ton/yr)
1,1,1-Trichloroethane (methyl chloroform)	133.41	0.48	0.18	4.07E-03
1,1,2,2-Tetrachloroethane	167.85	1.11	0.51	1.18E-02
1,1-Dichloroethane (ethylidene dichloride)	98.97	2.35	0.64	1.48E-02
1,1-Dichloroethene (vinylidene chloride)	96.94	0.20	0.05	1.23E-03
1,2-Dichloroethane (ethylene dichloride)	98.96	0.41	0.11	2.58E-03
1,2-Dichloropropane (propylene dichloride)	112.99	0.18	0.06	1.29E-03
Acrylonitrile	53.06	6.33	0.92	0.02
Benzene	78.11	1.91	0.41	9.48E-03
Carbon disulfide	76.13	0.58	0.12	2.81E-03
Carbon tetrachloride	153.84	4.00E-03	1.69E-03	3.91E-05
Carbonyl sulfide	60.07	0.49	0.08	1.87E-03
Chlorobenzene	112.56	0.25	0.08	1.79E-03
Chloroethane (ethyl chloride)	64.52	1.25	0.22	5.13E-03
Chloroform	119.39	0.03	0.01	2.28E-04
Dichlorobenzene	147	0.21	0.08	1.96E-03
Dichloromethane (methylene chloride)	84.94	14.30	3.34	0.08
Ethylbenzene	106.16	4.61	1.35	3.11E-02
Hexane	86.18	6.57	1.56	0.04
Hydrogen Chloride	36.46	42.00	4.21	0.10
Mercury (total)	200.61	2.92E-04	0.00	3.72E-06
Methyl isobutyl ketone	100.16	1.87	0.51	1.19E-02
Perchloroethylene (tetrachloroethylene)	165.83	3.73	1.70	0.04
Toluene	92.13	39.30	9.95	0.23
Trichloroethylene (trichloroethene)	131.4	2.82	1.02	2.36E-02
Vinyl chloride	62.5	7.34	1.26	2.92E-02
Xylenes	106.16	12.10	3.53	0.08
Total HAP				0.74

^[1] HAP, molecular weight, and default concentrations from AP-42 Chapter 2.4, Table 2.4-1 (4/24).

Fact Sheet Attachment

Flare EP-5 (pilot)

Natural gas flowrate

4.90E-04 MMscf/hr

Pollutant	Emission Factor ^[1] (lb/MMscf)	Potential Uncontrolled Emissions (lb/hr)	Potential Uncontrolled Emissions (ton/yr)
PM	7.6	3.72E-03	1.63E-02
PM ₁₀	7.6	3.72E-03	1.63E-02
PM _{2.5}	7.6	3.72E-03	1.63E-02
SO ₂	0.6	2.94E-04	1.29E-03
NO _x	100	4.90E-02	0.21
CO	84	4.12E-02	0.18
VOC	5.5	2.70E-03	1.18E-02
CO ₂	120,000	58.80	257.54
CH ₄	2.3	1.13E-03	4.94E-03
N ₂ O	2.2	1.08E-03	4.72E-03
CO ₂ e	-	59.15	259.07
Individual HAP			
Arsenic	2.00E-04	9.80E-08	4.29E-07
Benzene	2.10E-03	1.03E-06	4.51E-06
Beryllium	1.20E-05	5.88E-09	2.58E-08
Cadmium	1.10E-03	5.39E-07	2.36E-06
Chromium	1.40E-03	6.86E-07	3.00E-06
Cobalt	8.40E-05	4.12E-08	1.80E-07
Dichlorobenzene	1.20E-03	5.88E-07	2.58E-06
Formaldehyde	7.50E-02	3.68E-05	1.61E-04
n-Hexane	1.8	8.82E-04	3.86E-03
Lead	5.00E-04	2.45E-07	1.07E-06
Manganese	3.80E-04	1.86E-07	8.16E-07
Mercury	2.60E-04	1.27E-07	5.58E-07
Naphthalene	6.10E-04	2.99E-07	1.31E-06
Nickel	2.10E-03	1.03E-06	4.51E-06
POM	8.82E-05	4.32E-08	1.89E-07
Selenium	2.40E-05	1.18E-08	5.15E-08
Toluene	3.40E-03	1.67E-06	7.30E-06
Total HAP		9.25E-04	4.05E-03

^[1] The emission factors are from AP-42, Chapter 1.4 (4/26).

Fact Sheet Attachment

Emission Point: EP-4 Tail Gas Vent

Biogas Reject Flow Rate ^[1] :	1,800	scfm
Tail Gas Flow Rate:	0.11	MMscf/hr
Hours of Operation:	8,760	hr/yr
Total Tail Gas:	946.08	MMscf/yr
Ideal Gas Molar Volume at STP:	359.10	scf/lb-mole

Pollutant	Emission Factors^[2]	Potential Emissions	
	lb/MMscf	(lb/hr)	(ton/yr)
CH ₄	2,181.97	236	1032
CO ₂	116,564.37	12,589	55,140
TRS ^[3]	1.90	0.20	0.90
VOC	1.63	0.18	0.77

^[1] Reject flow rate provided by the source in the application from the gas process designer.

^[2] Emission factors based on molecular mass conversion.

Pollutant	Molecular Weight^[1]	Concentration^[2]
	lb/lb-mol	%
CH ₄	16.04	4.88%
CO ₂	44.01	95.11%
TRS	34.08	0.002%
VOC	58.59	0.001%

^[1] Molecular weight retrieved from PubChem.

^[2] Concentrations provided by the source in the application from gas process designer.

Fact Sheet Attachment

Emission Point: EP-6 Tail Gas Thermal Oxidizer Unit

TOU Capacity ^[1] :	10.00	MMBtu/hr
Biogas Heat Content:	92.59	Btu/scf
TOU Capacity ^[1] :	0.108	MMscf/hr
TOU Operational hours:	8,760	hr/yr (each)
Methane Content ^[1] :	4.88%	percent by volume

Flare Biogas Combustion Emissions

Pollutant	Emission Factors	Units	Emission Rate	
			(lb/hr)	(ton/yr)
PM ^[2]	17.0	lb/MMscf	0.09	0.39
PM ₁₀ ^[2]	17.0	lb/MMscf	0.09	0.39
PM _{2.5} ^[2]	17.0	lb/MMscf	0.09	0.39
NO _x ^[3]	0.07	lb/MMBtu	0.68	2.98
SO ₂ ^[4]	3.03	lb/MMscf	0.33	1.43
CO ^[3]	0.31	lb/MMBtu	3.10	13.58
VOC ^[3]	0.66	lb/MMBtu	0.13	0.58
CO ₂ ^[5]	120,000	lb/MMscf	12,960	56,765
CH ₄ ^[5]	2.3	lb/MMscf	0.25	1.09
N ₂ O ^[5]	2.2	lb/MMscf	0.24	1.04
CO ₂ e ^[6]	-	-	13,030	57,071

^[1] Provided by source in application.

^[2] Emission factors for PM/PM₁₀/PM_{2.5} are obtained from AP-42 Chapter 2.4, Table 2.4-5 (8/24).

^[3] NO_x, CO, and VOC emission factors are from AP-42 Section 13.5, Tables 13.5-1 and 13.5-2 (February 2018) in lb/MMBtu. VOC assumes 98% destruction efficiency.

^[4] Sulfur Dioxide Calculation: SO₂ emissions are based on the amount of H₂S in the gas from the digesters after H₂S bioscrubbers and carbon filters (see calculations next page).

^[5] GHG Emission factors are from AP-42 Chapter 1.4 (4/26).

^[6] ton CO₂e/yr = [(ton/yr CO₂) * 1] + [(ton/yr CH₄) * 28] + [(ton/yr N₂O) * 265]; CO₂ equivalents are found in 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials published on April 25, 2024. The CO₂e for CO₂ = 1, for CH₄ = 28, and for N₂O = 265.

Fact Sheet Attachment

H₂S Mass Balance

H ₂ S Content:	20	ppmv ^[a]
H ₂ S Concentration:	ppmv*M/V _m	10 ⁻⁶ g/L or µg/L
Where V _m = standard molar volume of ideal gas or 22.414 L/mol @std temperature and pressure (STP)		
And M = molecular weight of gas or 34.1 g/mol for H ₂ S ^[c]		
Or H ₂ S Content:	30	µg/L
Converts to:	3.00294E-08	kg/L
Conversion Constant:	2.2046	lb/kg
Conversion Constant:	28.31684659	L/ft ³
Converts to Concentration @STP:	1.87E-06	lb/ft ³
Standard Temp:	491.67	°R
Operating Temp:	559.67	°R (100 °F)
Actual H ₂ S Concentration:	1.65E-06	lb/ft ³

Assume 98% conversion of H₂S to SO₂^(b)

Conversion:	98%	
Equals:	1.61E-06	lb/ft ³ H ₂ S
Converts to ^{(c)(d)} :	3.03E-06	lb/ft ³ SO ₂

^(a) Concentration of H₂S is based on manufacturer guarantee information for the biological desulfurization bioscrubber and DARCO BG 1 activated carbon filtration.

^(b) Texas Commission on Environmental Quality (TCEQ) *Publication RG-360A*, Revised January 2007

^(c) Molecular Weight of H₂S is: 34.1 g/mol

^(d) Molecular Weight of SO₂ is: 64.07 g/mol

Fact Sheet Attachment

Emission Point: EP-6 Tail Gas Thermal Oxidizer Speciated HAP

			Constants	
Biogas Reject Flow Rate:	0.108	MMscf/hr	453.592	g/lb
Flare Operational Hours:	8,760	hr/yr	28.317	L/ft3
Annual Flow:	946.08	MMscf/yr	22.711	L/mol

Hazardous Air Pollutants ^[1]	Molecular Weight ^[1]	Default Concentration ^[1]	Emission Factor	Controlled Emission Rate
	(g/mol)	(ppmv)	(lb/MMscf)	(ton/yr)
1,1,1-Trichloroethane (methyl chloroform)	133.41	0.48	0.18	1.67E-03
1,1,2,2-Tetrachloroethane	167.85	1.11	0.51	4.85E-03
1,1-Dichloroethane (ethylidene dichloride)	98.97	2.35	0.64	6.05E-03
1,1-Dichloroethene (vinylidene chloride)	96.94	0.20	0.05	5.04E-04
1,2-Dichloroethane (ethylene dichloride)	98.96	0.41	0.11	1.06E-03
1,2-Dichloropropane (propylene dichloride)	112.99	0.18	0.06	5.29E-04
Acrylonitrile	53.06	6.33	0.92	8.73E-03
Benzene	78.11	1.91	0.41	3.88E-03
Carbon disulfide	76.13	0.58	0.12	1.15E-03
Carbon tetrachloride	153.84	4.00E-03	0.00	1.60E-05
Carbonyl sulfide	60.07	0.49	0.08	7.65E-04
Chlorobenzene	112.56	0.25	0.08	7.32E-04
Chloroethane (ethyl chloride)	64.52	1.25	0.22	2.10E-03
Chloroform	119.39	0.03	0.01	9.31E-05
Dichlorobenzene	147	0.21	0.08	8.03E-04
Dichloromethane (methylene chloride)	84.94	14.30	3.34	0.03
Ethylbenzene	106.16	4.61	1.35	1.27E-02
Hexane	86.18	6.57	1.56	0.01
Hydrogen Chloride	36.46	42.00	4.21	0.04
Mercury (total)	200.61	2.92E-04	0.00	1.52E-06
Methyl isobutyl ketone	100.16	1.87	0.51	4.87E-03
Perchloroethylene (tetrachloroethylene)	165.83	3.73	1.70	0.02
Toluene	92.13	39.30	9.95	0.09
Trichloroethylene (trichloroethene)	131.4	2.82	1.02	9.64E-03
Vinyl chloride	62.5	7.34	1.26	1.19E-02
Xylenes	106.16	12.10	3.53	0.03
Total HAP				0.30

^[1] HAP, molecular weight, and default concentrations from AP-42 Chapter 2.4, Table 2.4-1 (4/24).

Fact Sheet Attachment
EP-6 Tail Gas Thermal Oxidizer (pilot)

Natural gas flowrate

9.80E-05 MMscf/hr

Pollutant	Emission Factor ^[1] (lb/MMscf)	Potential Uncontrolled Emissions (lb/hr)	Potential Uncontrolled Emissions (ton/yr)
PM	7.6	7.45E-04	3.26E-03
PM ₁₀	7.6	7.45E-04	3.26E-03
PM _{2.5}	7.6	7.45E-04	3.26E-03
SO ₂	0.6	5.88E-05	2.58E-04
NO _x	100	9.80E-03	0.04
CO	84	8.24E-03	0.04
VOC	5.5	5.39E-04	2.36E-03
CO ₂	120,000	11.76	51.53
CH ₄	2.3	2.25E-04	9.88E-04
N ₂ O	2.2	2.16E-04	9.45E-04
CO ₂ e	-	11.83	51.84
Individual HAP			
Arsenic	2.00E-04	1.96E-08	8.59E-08
Benzene	2.10E-03	2.06E-07	9.02E-07
Beryllium	1.20E-05	1.18E-09	5.15E-09
Cadmium	1.10E-03	1.08E-07	4.72E-07
Chromium	1.40E-03	1.37E-07	6.01E-07
Cobalt	8.40E-05	8.24E-09	3.61E-08
Dichlorobenzene	1.20E-03	1.18E-07	5.15E-07
Formaldehyde	7.50E-02	7.35E-06	3.22E-05
n-Hexane	1.8	1.76E-04	7.73E-04
Lead	5.00E-04	4.90E-08	2.15E-07
Manganese	3.80E-04	3.73E-08	1.63E-07
Mercury	2.60E-04	2.55E-08	1.12E-07
Naphthalene	6.10E-04	5.98E-08	2.62E-07
Nickel	2.10E-03	2.06E-07	9.02E-07
POM	8.82E-05	8.65E-09	3.79E-08
Selenium	2.40E-05	2.35E-09	1.03E-08
Toluene	3.40E-03	3.33E-07	1.46E-06
Total HAP		1.85E-04	8.11E-04

^[1] The emission factors are from AP-42, Chapter 1.4 (4/26).

Fact Sheet Attachment

Title 129, Chapter 15, Section 001.02

Total Heat Input (MMBtu/hr)	Maximum Allowable Emissions of PM (lbs/MMBtu)
10 or less	0.6
Between 10 and 10,000	$1.026/I^{0.233}$ Where I = total heat input in MMBtu/hr.
10,000 or more	0.12

Chapter 15, Section 001.02 Calculations

Emission Point	Description	Rating	Individual Emission Rate	Allowable PM, Individual Emissions
		MMBtu/hr	lb/MMBtu	lb/MMBtu
EP-1.1	Boiler 1	22.50	7.45E-03	0.50
EP-1.2	Boiler 2	22.50	7.45E-03	0.50
EP-2.1	Water Heater 1	1.00	7.45E-03	0.60
EP-2.2	Water Heater 2	1.00	7.45E-03	0.60
EP-2.3	Water Heater 3	1.00	7.45E-03	0.60
EP-2.4	Water Heater 4	1.00	7.45E-03	0.60
EP-2.5	Water Heater 5	1.00	7.45E-03	0.60
EP-2.6	Water Heater 6	1.00	7.45E-03	0.60
EP-3	Emergency Engine	9.87	0.05	0.60
EP-5	Bypass Flare	160.00	0.02	0.31
EP-6	Tail Gas TOU	10.00	9.03E-03	0.60