

FACT SHEET FOR: OP26R1-022**DATE:****DWEE ID:** 6272**Name of Source:** Cargill Meat Solutions Corporation**Source Classification:** Class I 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 DWEE Air Toxics Notebook and DWEE NSPS Notebook located on the DWEE website (<https://dwee.nebraska.gov/>). The DWEE 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:

This operating permit OP26R1-022 approves the operation of a beef slaughter, rendering, fabrication facility, and associated waste treatment plant. Cargill Meat Solutions Corporation (CMS) operates under the standard industrial classification (SIC) code: 2011, Meat Packing Plants.

PERMIT HISTORY

Date Issued	Number	Status
09/18/2000	CP98-0085	No Permit Required
01/08/2002	CP99-0059	Withdrawn
01/08/2002	CP01-0008	Partially Active; XIII.(A)(2), XIII.(A)(3), XIII.(A)(4), and XIII.(B) superseded by CP05-0053; XIII.(A)(5) and XIII.(J) superseded by CP02-002
11/14/2003	OPSP-0005	Withdrawn
06/15/2004	CP03-0049	Withdrawn
07/26/2005	CP02-0002/ CPM04-0008	Partially Active; XIII.(A)(5) superseded by CP05-0053
06/20/2006	OPSP-0351	Not Active; XXX.(A)(2), XXX.(A)(3), XXX.(A)(4), XXX.(A)(5), XXX.(B), XXX.(G), XXX.(M), XXX.(O) and XXX.(P) revised by OPSPMOD-0032/OPSPMOD-0045; entire OP superseded by OP10R1-046
08/04/2006	CP05-0053	Active
06/25/2007	OPSPMOD-0032/ OPSPMOD-0045	Not Active; superseded by OP10R1-046
11/15/2010	CP10-017	Not Active (unit removed)
09/07/2016	OP10R1-046	Not Active; III.(B) superseded by OP17M1-009; entire OP superseded by OP21R1-014
04/11/2017	OP17M1-009	Not Active; superseded by OP21R1-014
11/30/2021	OP21R1-014	Not Active; superseded by OP26R1-022
tbd	OP26R1-022	Active

PERMIT ACTION:

Permitted Emission Points are detailed in the table below:

Control Equipment ID# and Description	Emission Unit Description	Applicable NSPS Requirements	Applicable NESHAP Requirements
Emission Point ID#: EP-1			
N/a	EU-1: Boiler, maximum permitted capacity: 32.5 MMBtu/hr; permitted fuel type: natural gas or biogas from the anaerobic waste treatment lagoons, installed in 1992	40 CFR Part 60, Subpart A; Title 129, Chapter 12, Section <u>001.01</u> *; Title 129, Chapter 12, Section <u>001.01</u>	None
		40 CFR Part 60, Subpart Dc; Title 129, Chapter 12, Section <u>001.05</u> *; Title 129, Chapter 12, Section <u>001.06</u>	None
Emission Point ID#: EP-2			
N/a	EU-2: Boiler, maximum permitted capacity: 52 MMBtu/hr; permitted fuel type: natural gas or biogas from the anaerobic waste treatment lagoons, installed in 1982	None	None
		None	None
Emission Point ID#: EP-3			
CE-3: Low NO _x Burner	EU-3: Boiler, maximum permitted capacity: 52 MMBtu/hr; permitted fuel type: natural gas, installed in 1996	40 CFR Part 60, Subpart A; Title 129, Chapter 12, Section <u>001.01</u> *; Title 129, Chapter 12, Section <u>001.01</u>	None
		40 CFR Part 60, Subpart Dc; Title 129, Chapter 12, Section <u>001.05</u> *; Title 129, Chapter 12, Section <u>001.06</u>	None

Control Equipment ID# and Description	Emission Unit Description	Applicable NSPS Requirements	Applicable NESHAP Requirements
Emission Point ID#: EP-31			
N/a	EU-31: Boiler, maximum permitted capacity: 60.243 MMBtu/hr; permitted fuel type: natural gas, installed in 2020	40 CFR Part 60, Subpart A; Title 129, Chapter 12, Section <u>001.01</u> *; Title 129, Chapter 12, Section <u>001.01</u>	None
		40 CFR Part 60, Subpart Dc; Title 129, Chapter 12, Section <u>001.05</u> *; Title 129, Chapter 12, Section <u>001.06</u>	None
Emission Point ID#: EP-4			
CE4A: primary cyclone and CE4B: secondary cyclone	EU-4: Blood Dryer; maximum permitted capacity: 7.4 MMBtu/hr; permitted fuel type: natural gas	None	None
		None	None
Emission Point ID#: EP-5			
CE5A: Cyclone and CE5B: Scrubber	EU-5: Bone Dryer; maximum permitted capacity: 40 MMBtu/hr; permitted fuel type: natural gas	None	None
		None	None
Emission Point ID#: EP-13			
CE13a-b: Entrainment Traps followed by CE13c-d: Heat Exchangers followed by a CE13e: Venturi	EU-13: Dupps Steam Cooker #1	None	None
		None	None
	EU-14: Dupps Steam Cooker #2	None	None
		None	None
Emission Point ID#: EP-15			
N/a	EU-15: Dry Blood Storage	None	None
		None	None
Emission Point ID#: EP-16			
N/a	EU-16: Dry Blood Loadout	None	None
		None	None
Emission Point ID#: EP-17			
CE17A: Cyclone CE17B: Cyclone	EU-17: Separator	None	None
		None	None

Control Equipment ID# and Description	Emission Unit Description	Applicable NSPS Requirements	Applicable NESHAP Requirements
Emission Point ID#: EP-17			
CE17A: Cyclone CE17B: Cyclone	EU-17: Separator	None	None
		None	None
Emission Point ID#: EP-18			
N/a	EU-18: Gel Bone Storage	None	None
		None	None
Emission Point ID#: EP-19			
N/a	EU-19: Gel Bone Storage	None	None
		None	None
Emission Point ID#: EP-20			
N/a	EU-20: Sizing Shaker	None	None
		None	None
Emission Point ID#: EP-21			
N/a	EU-21: Meat and Bone Meal Vibrating Separators	None	None
		None	None
Emission Point ID#: EP-22			
N/a	EU-22: Meat and Bone Meal Grinding: two (2) hammermills	None	None
		None	None
Emission Point ID#: EP-23			
N/a	EU-23: Meat and Bone Meal Storage	None	None
		None	None
Emission Point ID#: EP-24			
N/a	EU-24: Meat and Bone Meal Loadout	None	None
		None	None

TYPE AND QUANTITY OF AIR CONTAMINANT EMISSIONS ANTICIPATED:

The following table summarizes the potential and actual emissions:

Regulated Pollutant	Potential Emissions as limited by permit (tons/year)	Actual Emissions^[2] (tons/year)
Particulate Matter (PM)	78.03	--
Particulate Matter less than or equal to 10 microns (PM ₁₀)	51.19	2.59
Particulate Matter less than or equal to 2.5 microns (PM _{2.5})	42.51	2.31
Sulfur Dioxide (SO ₂)	202.57	50.27

Regulated Pollutant	Potential Emissions as limited by permit (tons/year)	Actual Emissions^[2] (tons/year)
Oxides of Nitrogen (NO _x)	168.22	36.37
Carbon Monoxide (CO)	136.46	22.54
Volatile Organic Compounds (VOCs)	14.74	2.28
Greenhouse Gases (GHGs) ^[1]	154,777	400.44
Carbon Dioxide Equivalents (CO ₂ e) ^[1]	155,195	5,172.69
Hazardous Air Pollutants (HAPs)		
Hexane	1.92	Not reported
All Other HAPs	1.99	Not reported
Total HAPs	3.91	Not reported

^[1] The U.S. Supreme Court ruled in 2014 that greenhouse gases (GHGs) may not be used to determine whether a source is a Class I (major) source. Utility Air Regulatory Group v. EPA, 134 S.Ct. 2427 (2014). Therefore, potential emissions of GHGs will not be used to determine a source's operating permit classification at this time. However, GHGs are still regulated air pollutants so GHGs and CO₂e will continue to be calculated and reported in this fact sheet.

^[2]Actual Emissions are from (2025) air emissions inventory.

SUPPLEMENTAL INFORMATION:

Due to the merger of the Nebraska Department of Environment and Energy (NDEE) and the Department of Natural Resources, the agency name changed to the Nebraska Department of Water, Energy, and Environment (DWEE). The references to NDEE were changed to DWEE in all documents except Attachment A which is the CAM plan.

Title 129, Chapter 6, Section 010*; Title 129, Chapter 6, Section 009 – Compliance Assurance Monitoring

CAM applies to a pollutant-specific emission unit at major sources, i.e. sources that are required to obtain a Class I operating permit, if the emission unit satisfies all three of the following CAM applicability criteria (40 CFR 64.2):

1. The unit is subject to an emission limitation or standard. Applicable requirements that contain emission limitations or standards include, but are not limited to, BACT, NSPS, NESHAP, Acid Rain Program, and Title 129 requirements.
2. The unit uses a control device to achieve compliance with an emission limitation or standards; and
3. Potential pre-control emissions are equal to or greater than the amount required to be a major source.

The pre-control potential emissions were “back-calculated” using the specific pollutant emission limitation in conjunction with estimated control equipment efficiency. Based on the CAM applicability calculations, it was determined that the following emission sources and associated control equipment types must be included in the CAM plan (submitted March 25, 2016).

Emission Units Subject to CAM Requirements

Emission Unit I.D.	Emission Point Number	Emission Unit Description	Control Equipment	Applicable Pollutant
4	4	Blood Dryer	Primary Cyclone Secondary Cyclone	Particulate
5	5	Bone Dryer	Cyclone Wet Scrubber	Particulate

As indicated in Table 1, two different control equipment technologies were identified for inclusion in the CAM plan: scrubber and cyclone. CMS uses a scrubber (CE5B) to control emissions of particulate matter (PM/PM₁₀) generated from Bone Dryer (EU-5). The scrubber follows a receiving cyclone. The scrubber is the primary control device and is included in this CAM plan. CMS uses a cyclone (CE4B) to collect particulate matter generated from the Blood Dryer (EU-4). The secondary cyclone follows a receiving cyclone. The second cyclone is the primary control device and is included in this CAM plan (submitted March 25, 2016).

During this CAM evaluation CMS identified units that are subject to an emission limitation and have the potential to emit greater than 100 percent of the amount to be considered major, is boiler units # 1, #2, and #3 while combusting biogas and the biogas flare unit #12. Boiler units # 1, #2, and #3 and the biogas flare unit #12 are subject to emission limitations under Title 129, Chapters 15 and 16 of the Nebraska Air Quality Regulations. Boiler units #1 and #3 are also subject to emission limitations under New Source Performance Standard (NSPS) for Small Industrial-Commercial-Institutional Steam Generating Units, Subpart Dc (Title 40 Part 60.40c) however; there are no emission control devices associated with the units. Therefore, CAM is not applicable to these units.

Dupps Steam Cooker #1 and #2 (EP-13) have vapor separators and condensers. These are in the process stream to remove steam from the cookers and are necessary for proper operation. Each cooker has a vapor separator (entrainment trap) and non-contact condenser (heat exchangers). There is one direct condenser (Venturi) for the combined stream from the heat exchangers. These are inherent to the process. Uncontrolled emissions are estimated less than 100 tons per year (tpy); therefore, CAM does not apply.

Dry Blood storage (EU-15) has a baghouse. Filter receiver is inherent to process; therefore, CAM does not apply. Note that uncontrolled emissions are estimated to be below 100 tpy even at 99.9% removal efficiency.

Separator (EU-17) two control cyclones are for recover product. Cyclones are inherent to process; therefore, CAM does not apply.

Title 129, Chapter 12*; Title 129, Chapter 12 - New Source Performance Standards (NSPS) and Emission Limits for Existing Sources

Subpart A—General Provisions: 40 CFR 60 Subpart A, adopted by reference in Title 129, Chapter 12, Section 001.01*; Title 129, Chapter 12, Section 001.01, applies to those emission units subject to a NSPS. At CMS, Boilers #1, #3, and #31 (EU-1, EU-3, and EU-31, respectively) are subject to a NSPS and thus must comply with applicable parts of 40 CFR 60 Subpart A, such as the recordkeeping and reporting requirements in 40 CFR 60.7.

40 CFR 60 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*; Title 129, Chapter 12, Section 001.05, applies to Boilers #1, #3, and #31 (EU-1, EU-3, and EU-31, respectively) because the boilers were constructed after June 9, 1989, and the maximum design heat input capacity of each boiler is greater than or equal to 10 MMBtu/hr but less than 100 MMBtu/hr. Boiler #2 is not subject to subpart Dc because this boiler was installed in 1982, before the June 9, 1989 requirement. Boilers #1 and #2 have the capability to combust natural gas or biogas. Boilers #3 and #31 have the

capability to combust natural gas. All three boilers are subject to this subpart combust natural gas during normal operation. The applicable requirements of the NSPS for natural gas combustion is to track the amount of fuel combusted per month, per 40 CFR 60.48c(g)(2).

The construction permit for EP-1, EP-2, and EP-3 also allows the combustion of fuel oil and tallow. This operating permit doesn't allow the combustion of fuel EP-1, EP-2, and EP-3 per the request of the source. The source may request the operating permit to allow the combustion of fuel oil and/or tallow in the future, at which time the source will become subject to the applicable requirements from this NSPS for these fuels.

The NSPSs appears to be applicable requirements, but are not:

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*; Title 129, Chapter 12, Section 001.81, applies to the owner or operator of stationary compression ignition (CI) internal combustion engines (ICE) that commenced construction or have been modified or reconstructed after July 11, 2005 where the stationary CI ICE are manufactured after April 1, 2006 and are not fire pump engines, or manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006. Subpart IIII is not applicable, because EU-6 (installed 1995), EU-7 (installed 1989), EU-8 (installed 1992) and EU-9 (installed 1996) were constructed before July 11, 2005, and they are spark ignition engines. EU-10 (installed 2000) is a compression ignition engine but was installed in 2000.

Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines:

This subpart, adopted by reference in Title 129, Chapter 12, Section 001.81*; Title 129, Chapter 12, Section 001.82 applies to owners and operators of new stationary SI ICE manufactured on or after July 1, 2008 for non-emergency generators greater than 19 kW, or on or after January 2009 for emergency generators greater than 19 kW. Cargill operates engines EU-6 (installed 1995), EU-7 (installed 1989), EU-8 (installed 1992) and EU-9 (installed 1996) as emergency units, and they were installed before 2008. EU-10 (installed 2000) is a compression ignition emergency engine and therefore not subject to subpart JJJJ.

Title 129, Chapter 13, Sections 002* and 003*; Title 129, Chapter 13, Sections 002 and 003 - National Emission Standards for Hazardous Air Pollutants (NESHAP)

CMS is an area source of HAPs because emissions of each individual HAP are less than 10 tpy and combined HAP is less than 25 tpy. The following NESHAPs are applicable requirements.

40 CFR 63 Subpart A, General Provisions: This subpart, adopted by reference in Title 129, Chapter 13, Section 001.01*; Title 129, Chapter 13, Section 001.01, is an applicable requirement because some of the emission units are subject to a NESHAP.

40 CFR 63 Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, adopted by reference in Title 129, Chapter 13, Section 002.78*; Title 129, Chapter 13, Section 002.79, applies because CMS has four stationary spark ignition RICE (EP-6, EP-7, EP-8, and EP-9) and one diesel RICE (EP-10) that power emergency generators and is an area source of HAPs. All five RICE are emergency engines and are subject to operational, monitoring, maintenance and recordkeeping requirements.

The following NESHAP appears to be an applicable requirement, but is not:

40 CFR 63 Subpart JJJJJJ, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources is not an applicable requirement of the four boilers at CMS at the time of permit issuance.

Boilers 1 and 2 (EU-1 and EU-2, respectively) have the capability to be dual-fuel fired boilers under Subpart JJJJJJ because they can combust either gaseous or liquid fuels (distillate fuel oil and tallow both meet the definition of liquid fuel). However, the source has limited the fuels combusted in the boilers to gaseous fuels (option to use fuel oil and/or tallow was removed in this operating permit), and these boilers

have not combusted liquid fuel on or after June 4, 2020, therefore they are being classified as gas-fired boilers. Therefore, they are exempt from this subpart because they are gas fired boilers per 40 CFR 11195(e). If CMS decides to combust liquid fuels in the future, the boilers will be existing sources under Subpart JJJJJ because they were designed to burn either gaseous or liquid fuels per 40 CFR 63.11194(e) and this operating permit will have to be modified first. The source will have to comply with all notification, operational, monitoring, testing, recordkeeping, and reporting requirements that apply to liquid-fueled boilers.

Title 129, Chapter 15*; Title 129, Chapter 15 - Compliance**Process Weight Rate**

Title 129, Chapter 15, Section 001.01*; Title 129, Chapter 15, Section 001.01, limits PM (filterable) emissions to the amounts shown in Table 15-1*; 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

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

Opacity Limitations from Emission Units (Section 001.04)*; (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 001.05E*; Chapter 15, Sections 001.05 and 001.05E; (Title 129, Chapter 15, Section 001.04)*; (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.

Prevention of Accidental Releases of Title III, Section 112(r)

CMS is subject to the requirements of 40 CFR Part 68, Accidental Release Prevention because the source stores and uses ammonia in refrigeration units at the source. The amount of ammonia stored exceeds the threshold listed in Table 1, §68.130. CMS has developed a Risk Management Plan (RMP) as required by 40 CFR 68 Part G.

SPECIFIC PERMIT CONDITIONS DISCUSSION:

Condition III includes conditions that are specific to the emissions units and emission points listed in each respective condition. Permit conditions that require no additional discussion are not included in this section.

III.(A) Specific Conditions for Boilers

- (A)(1) At the time of permit issuance, there are no NESHAP requirements applicable to the emission units EU-1, EU-2, EU-3, and EU-31. Emission units EU-1, EU-2, EU-3, and EU-31 are not subject to NESHAP JJJJJ as long as the boilers combust gaseous fuels. Emission Units EU-1, EU-3, and EU-30 are subject to NSPS Subparts A and Dc [Title 129, Chapter 12, Sections 001.01* and 001.05*; Title 129, Chapter 12, Sections 001.01 and 001.05].
- (A)(2) This condition states the emission limitations that apply to the Boilers at CMS. Emission point EP-1, EP-2, EP-3, and EP-31 are each subject to a PM (filterable) limitation from Title 129, Chapter 15, Section 001.02*; Title 129, Chapter 15, Section 001.02. An opacity standard of less than 20 percent from Title 129, Chapter 15, Section 001.04*; Title 129,

Chapter 15, Section 001.04 is applicable to EP-1, EP-2, EP-3, and EP-31. Compliance with the PM (filterable) limitation is demonstrated by potential emission rates, which are less than the permitted limit. Compliance with the Opacity limitation for EP-1 and EP-2 is demonstrated by combusting only natural gas or biogas. Compliance with the Opacity limitation for EP-3 and EP-31 is demonstrated by combusting natural gas.

- (A)(3)(f) Low NO_x burners must be used when emission unit EU-3 is in operation as established in Construction Permit CP01-0008, Condition XIII.(I), issued January 8, 2002. This requirement places a federally enforceable control to account for the emissions reductions to stay under the 250 ton threshold for PSD.

III.(B) Specific Conditions for Rendering Processes

- (B)(2) This condition states the emission limitations that apply to the rendering processes at CMS. Emission points EP-4 and EP-5 are each subject to a PM (filterable) limitation from Title 129, Chapter 15, Section 001.02*; Title 129, Chapter 15, Section 001.02. Emission points EP-4, EP-5, EP-13, EP-15, EP-16, EP-17, EP-18, EP-19, EP-20, EP-21, EP-22, EP-23, and EP-24 are each subject to a PM (filterable) limitation from Title 129, Chapter 15, Section 001.01*; Title 129, Chapter 15, Section 001.01. An opacity standard of less than 20 percent from Title 129, Chapter 15, Section 001.04*; Title 129, Chapter 15, Section 001.04 is applicable to all emission points identified in Condition III.(B)(2). Compliance with the PM (filterable) limitation is demonstrated by potential emission rates, which are less than the permitted limit. Compliance with the Opacity limitation for EP-4, EP-5, EP-13, EP-15, EP-16, EP-17, EP-18, EP-19, EP-20, EP-21, EP-22, EP-23, and EP-24 are demonstrated by conducting visible emission surveys on a weekly basis for EP-4 and EP-5, and a tiered schedule for EP-13, EP-15, EP-16, EP-17, EP-18, EP-19, EP-20, EP-21, EP-22, EP-23, and EP-24 (Title 129, Chapter 6, Section 003.03* and 003.11*, and Chapter 15, Section 001.04*; Title 129, Chapter 6, Section 003.03 and 003.11, and Chapter 15, Section 001.04). Compliance with the opacity limitation is also demonstrated by the proper use and maintenance of control equipment when EU-4 and EU-5 are operational [Construction Permit, CP02-0002, Condition XIII.(L), issued July 26, 2005].

III.(C) Specific Conditions for Wastewater Treatment Operations

- (C)(2) This condition states the emission limitations that apply to the wastewater treatment operations at CMS. Emission point EP-12 is subject to a PM (filterable) limitation from Title 129, Chapter 15, Section 001.02*; Title 129, Chapter 15, Section 001.02. An opacity standard of less than 20 percent from Title 129, Chapter 15, Section 001.04*; Title 129, Chapter 15, Section 001.04 is applicable to EP-12. Compliance with the PM (filterable) limitation is demonstrated by potential emission rates, which are less than the permitted limit. In addition, EU-12 must only combust biogas or propane. Compliance with the Opacity limitation for EP-12 is demonstrated by combustion only biogas or propane.
- (C)(3) Emission unit EU-12 must only combust biogas or propane per Construction Permit CP01-0008, Condition XIII.(A)(8), issued January 8, 2002. The wastewater treatment lagoons must be covered, and the biogas shall be flared and or burned by emission units EU-1 and EU-2 [Construction Permit CP05-0053, Condition XIII.(B), issued August 4, 2006; Title 129, Chapter 6, Section 003.03*; Title 129, Chapter 6, Section 003.03].

III.(D) Specific Conditions for Reciprocating Internal Combustion Engines (RICE)

- (D)(1) Engines EU-6, EU-7, EU-8, EU-9, and EU-10 are subject to the requirements of NESHAP Subparts A and ZZZZ (Title 129, Chapter 13, Sections 002.01* and 002.78*; Title 129, Chapter 13, Sections 002.01 and 002.79). The source has identified these engines as emergency use. If at any time these engines are not operated in accordance with the emergency engine requirements found in NESHAP Subpart ZZZZ, the engine will not be

considered an emergency engine and must comply with all applicable requirements under NESHAP Subpart ZZZZ for non-emergency engines.

NESHAP Subpart ZZZZ has multiple options for compliance with the rule. As such, this condition allows the source to change compliance options for engines EU-6, EU-7, EU-8, EU-9, and EU-10 during the term of the operating permit when allowed by NESHAP Subpart ZZZZ. If changing compliance options, CMS must notify the DWEE, in writing, a minimum of 30 days prior to the change. The notification must include the date the change is planned to be made and the new compliance option that has been chosen under NESHAP Subpart ZZZZ for each emission unit (Title 129, Chapter 6, Section 003.11*; Title 129, Chapter 6, Section 003.11).

- (D)(2) This condition identifies the emissions limitations that apply to the engines at CMS. Each engine is subject to a PM (filterable) limitation from Title 129, Chapter 15, Section 001.02*; Title 129, Chapter 15, Section 001.02. Compliance with the PM limits is achieved through the combustion of natural gas and diesel fuel in the engines. In addition, compliance with this limit is demonstrated by potential emission rates, which are less than the permitted limits. Each engine is subject to an opacity standard of less than 20 percent from Title 129, Chapter 15, Section 001.04*; Title 129, Chapter 15, Section 001.04. Compliance for this limit is achieved through the use of visible emissions surveys for EU-10. Compliance for opacity limit is achieved through the combustion of natural gas for EU-6, EU-7, EU-8, and EU-9.
- (D)(3)(b) The requirements of NESHAP ZZZZ for diesel fuel is more stringent (15 ppm) than the removed CP01-0008 (issued January 8, 2002) conditions XIII.(A)(7) and (D) of 0.05 % by weight.

III.(E) Specific Conditions for Haul Roads

- (E)(3) This condition indicates that the haul roads are subject to the requirements of Title 129 Chapter 15*; Title 129 Chapter 15 as identified in Condition I.(L). The owner or operator must develop, maintain and implement Best Management Practices (BMPs) to control emissions from the haul roads. The specific BMPs have not been identified in this permit in order to allow CMS to be able to tailor their BMPs to their haul roads based on the conditions at the site. Examples of common BMPs include (but are not limited to): water spray, tire washing stations, etc. In addition, a representative of CMS must conduct weekly visible emission surveys during operation to determine if fugitive dust (PM) from the haul roads is drifting over the property line of CMS during daily operations. If fugitive PM emissions are observed crossing the property line, then the source will implement dust control procedures as per BMPs. Documentation of corrective actions and the weekly surveys must be maintained in a log on site.

IV.(A) Source-Wide Emissions Limitations

- (A)(2) This condition also establishes a SO₂ limit from the combustion of biogas. The source obtained a construction permit, #CP05-0053 (issued August 4, 2006), that limits SO₂ emissions from biogas combustion from emission units, EP-1, EP-2, and EP-12 to 196 tons per any twelve consecutive rolling calendar months.
- (A)(4) The source must collect and analyze biogas samples for sulfur concentration on a monthly basis. Biogas piping from the anaerobic lagoons to the flare and boilers must be equipped with an operation flow meter to record total biogas flow rate. The flow rate and sulfur concentration will be used for calculation of SO₂ emissions on a monthly basis.
- (A)(5) Records documenting biogas flow and manufacturer documentation for the flow meter must be kept on site and readily available to DWEE representatives

IV.(B) Source-Wide Facility Access Restrictions

- (B)(1) Permanent fencing must be installed and maintained to restrict public access and define the boundary between ambient and non-ambient air, in accordance with CP01-0008 (issued January 8, 2002).

Insignificant Activities

The following table contains a description of insignificant activities at the source at the time of permit issuance, in accordance with operating permit application OP26R1-022, received May 22, 2026, including any supporting information received prior to issuance of the permit:

Insignificant Activity ID	Unit Description	Insignificance Criteria
Process Cooling Tower	Kill Floor Cooling Tower, 700-800 gpm	Process cooling tower with a circulating water flow rate < 2,000 gpm
Space Heater	Natural Gas Space Heater, < 0.01 MMscf/hr	< 10 MMBtu/hr

Although not required, DWEE recommends that the source submit a written notification to DWEE if there are additions or changes to the list of insignificant activities identified above, containing the following suggested information:

- A brief description of the addition or change within the permitted source;
- The date on which the addition or change occurred;
- Any change in potential emissions; and
- The criteria, as defined in the Operating Permit Application Forms, used to determine that the addition or change to the list of insignificant activities qualifies as insignificant.

This notification helps the DWEE keep an up to date list on file for compliance purposes. In addition, because emissions from insignificant activities must be counted toward major source (Class I) applicability, it is important to know if a source makes additions or changes to the list of insignificant activities that would cause a change in potential to emit at the source, and ultimately whether the source has a change in classification (i.e., Class I vs. Class II).

The following terms and conditions from the construction permit(s) listed were not incorporated into this permit, or have been modified as discussed below:

Permit Number and Issuance Date	Specific Condition	Reason Modified or Not Included In Operating Permit
#CP01-0008 January 8, 2002	XIII.(A)(1)	Modified; removed, "No.1 fuel oil, No. 2 fuel oil, tallow" from the CP Condition. The source requested in air operating permit application OP21R1-014 (received March 4, 2021) to remove diesel and tallow from the air operating permit for all boilers and dryers. The flare (EU-12) MMBtu/hr was moved to the emission unit description in Condition III.(A)(1).
#CP01-0008 January 8, 2002	XIII.(A)(7)	Modified; the requirements of NESHAP Subpart ZZZZ for diesel fuel is more stringent (15 ppm) than the CP condition of 0.05 % by weight.
#CP01-0008 January 8, 2002	XIII.(A)(8)	Flare, EU-12, 40 MMBtu/hr was replaced with a 51 MMBtu/hr flare. In CP01-0008 the flare description was only listed on the first page of the CP. The CP did not mention the maximum capacity of flare EU-12. The DWEE air operating permit unit is allowed to change the flare description in the air operating permit and therefore no CP minor permit revision is required.

Permit Number and Issuance Date	Specific Condition	Reason Modified or Not Included In Operating Permit
#CP01-0008 January 8, 2002	XIII.(F)	Removed; this condition doesn't apply to any of the fossil fuel combustion units since they were all constructed after 1974.
#CP01-0008 January 8, 2002	XIII.(H)(1) XIII.(H)(2) XIII.(H)(3)	Removed; the source requested in air operating permit application OP21R1-014 (received March 4, 2021) to remove diesel from the air operating permit for all boilers. The source stated natural gas will remain as a permitted fuel for all boilers and dryers with biogas also included for Boilers EU-1 and EU-2. Quarterly fuel oil reports are no longer needed, because fuel oil will no longer be used for EU-1, EU-2, EU-3, EU-31.
#CP01-0008 January 8, 2002	XIII.(H)(4)	Removed; the source requested in air operating permit application OP21R1-014 (received March 4, 2021) to remove diesel and tallow from the air operating permit for all boilers and dryers. The source stated natural gas will remain as a permitted fuel for all boilers and dryers with biogas also included for Boilers EU-1 and EU-2.
#CP01-0008 January 8, 2002	XIII.(K)	Modified; removed "Records shall be maintained on-site for a minimum period of five (5) years," the sub-conditions to XIII.(K) will be evaluated individually.
#CP01-0008 January 8, 2002	XIII.(K)(1)	Removed second sentence since it relates to fuel oil in boilers subject to NSPS Subpart Dc. All of the boilers will no longer combust fuel oil, per request from the source.
#CP01-0008 January 8, 2002	XIII.(K)(2)	Changed "in weight percentage" to "in ppm" because the NESHAP Subpart ZZZZ limit is more stringent than the CP's limit, and it is in units of ppm.
#CP05-0053 August 4, 2006	XIII.(A)(2) XIII.(A)(4)	Modified; removed, "distillate fuel oil, tallow" from the CP Condition. The source requested in air operating permit application OP21R1-014 (received March 4, 2021) to remove diesel and tallow from the air operating permit for all boilers and dryers. The MMBtu/hr was moved to the emission unit description in Conditions III.(A)(1) and III.(B)(1).
#CP05-0053 August 4, 2006	XIII.(B)	Modified; removed, "EU-3". The source requested in air operating permit application OP21R1-014 (received March 4, 2021) that EU-3 only combust natural gas. Removed 3 rd sentence: the wastewater lagoons in existence prior to the year 2001 have been dissembled. This part of the condition is no longer necessary.
#CP05-0053 August 4, 2006	XIII.(N)	Modified; removed EP-3, from EP-30a and EP-30b from SO ₂ 196 tpy from Biogas Combustion. EP-3 Boiler now only combusts natural gas; and EP-30a and EP-30b have been removed from the source. Removed second sentence concerning first 11 months of operations: The biogas combustion has occurred for over 11 months, therefore this condition is no longer applicable.

Fact Sheet Attachment
Cargill Meat Solutions Corporation
Facility ID# 6272
Fact Sheet Attachment
PTE Summary

Pollutant	Boilers ^[1]				Flare ^[2]	Blood Dryer	Bone Dryer	Rendering Processes	Emergency Engines	Haul Roads	Total
	EP-1	EP-2	EP-3	EP-31							
PM(filterable)	0.27	0.43	0.43	0.50	3.31	5.19	23.73	29.01	4.08	11.07	78.03
PM ₁₀	1.08	1.73	1.73	2.01	3.31	8.34	13.56	13.21	4.00	2.23	51.19
PM _{2.5}	1.08	1.73	1.73	2.01	3.31	8.34	13.56	6.22	4.00	0.53	42.51
SO _x	0.09	0.14	0.14	0.16	196	0.02	0.11	2.33	3.60		202.57
NO _x	14.24	22.78	11.39	26.39	8.68	3.24	17.52	1.23	62.77		168.22
CO	11.96	19.13	19.13	22.16	10.19	2.72	14.72	0.86	35.59		136.46
VOCs	0.78	1.25	1.25	1.45	0.93	0.18	0.96	2.58	5.36		14.74
HAPs	*see calculations below										3.91
CO ₂	53.06	26,643	26,643	30,866	25,734	3,791	20,494		3,947		138,171
N ₂ O	1.00E-04	0.32	5.02E-02	5.82E-02	0.31	7.15E-03	3.86E-02		1.31E-02		0.79
CH ₄	1.00E-03	1.61	0.50	0.58	1.58	0.07	0.39		0.09		4.82
GHG (mass basis)	16,653	26,645	26,644	30,867	25,736	3,792	20,495		3,947		154,777
CO ₂ e ^[3]	16,736	26,772	26,670	30,898	25,856	3,795	20,515		3,953		155,195

^[1] Maximum potential emissions from natural gas or biogas. CP05-0053 allows tallow and distillate oil (#2 fuel oil) to be combusted in Boilers #2 and #3, and the bone dryer; and tallow in the blood dryer in addition to the natural gas (and biogas, as applicable); and CP01-0008 allows #1 & #2 fuel oil and tallow in Boiler #1. The source requested that fuel oil and tallow to be removed from the permit for the boilers and dryers. If the source requests that these fuels be added back in the future, then conditions may need to be added to the OP to avoid PSD thresholds.

^[2] SO_x is limited to 196 tpy from Biogas Combustion per Condition IV.(A)(1) of OP21R1-014. Worst-case emissions assumes all of the biogas combustion is from the flare, with the Boilers #1 and #2 combusting natural gas.

^[3] The Global Warming Potential are from Table A-1 – Global Warming Potentials at 40 CFR 98, Subpart A, June 8, 2026. CO₂=1, N₂O=265, CH₄=28

Fact Sheet Attachment
Cargill Meat Solutions Corporation
Facility ID# 6272
Fact Sheet Attachment
PTE Summary

Hazardous Air Pollutants	Boilers				Flare	Blood Dryer	Bone Dryer	Rendering Processes	Emergency Engines	Haul Roads	Total
	EP-1	EP-2	EP-3	EP-31							
Acetaldehyde					2.90E-02				8.18E-02		0.11
Acrolein					1.74E-02				6.93E-02		8.68E-02
Benz(a)anthracene		4.10E-07	4.10E-07	4.75E-07		5.83E-08	3.15E-07				1.67E-06
Benzene	2.99E-04	4.78E-04	4.78E-04	5.54E-04	0.78	6.81E-05	3.68E-04		5.25E-02		0.84
Benzo(a)pyrene	1.71E-07	2.73E-07	2.73E-07	3.17E-07		3.89E-08	2.10E-07				1.28E-06
Benzo(b)fluoranthene	2.56E-07	4.10E-07	4.10E-07	4.75E-07		5.83E-08	3.15E-07				1.92E-06
Carbon Tetrachloride									4.59E-04		4.59E-04
Chlorobenzene									3.34E-04		3.34E-04
Chloroform									3.55E-04		3.55E-04
Dibenzo(a,h)anthracene	1.71E-07	2.73E-07	2.73E-07	3.17E-07		3.89E-08	2.10E-07				1.28E-06
Dichloromethane					3.06E-02						3.06E-02
Ethylbenzene									6.43E-04		6.43E-04
Ethylene Dibromide									5.52E-04		5.52E-04
Formaldehyde	1.07E-02	1.71E-02	1.71E-02	1.98E-02	6.56E-02	2.43E-03	1.31E-02		0.55		0.69
Hexane	2.56E-01	0.41	0.41	0.47		5.83E-02	0.32				1.92
Indeno(1,2,3-cd)pyrene	2.56E-07	4.10E-07	4.10E-07	4.75E-07		5.83E-08	3.15E-07				1.92E-06
Lead Compounds	7.12E-05	1.14E-04	1.14E-04	1.32E-04		1.62E-05	8.76E-05				5.35E-04
Methanol									7.93E-02		7.93E-02
Methylene Chloride									1.07E-03		1.07E-03
Naphthalene	8.68E-05	1.39E-04	1.39E-04	1.61E-04		1.98E-05	1.07E-04		3.57E-03		4.22E-03
PAH									5.73E-03		5.73E-03
Toluene	4.84E-04	7.74E-04	7.74E-04	8.97E-04	2.43E-02	1.10E-04	5.96E-04		1.95E-02		4.75E-02
1,1,1-Trichloroethane					2.79E-02						2.79E-02
Styrene					1.71E-02				3.09E-04		1.74E-02
Vinyl Chloride									1.86E-03		1.86E-03
Xylenes					8.22E-03				8.58E-03		1.68E-02

Fact Sheet Attachment

PTE Summary

Hazardous Air Pollutants	Boilers				Flare	Blood Dryer	Bone Dryer	Rendering Processes	Emergency Engines	Haul Roads	Total
	EP-1	EP-2	EP-3	EP-30							
1,1,2,2-Tetrachloroethane									6.56E-04		6.56E-04
1,1,2-Trichloroethane									3.97E-04		3.97E-04
1,1-Dichloroethane									2.93E-04		2.93E-04
1,2-Dichloroethane									2.93E-04		2.93E-04
1,2-Dichloropropane									3.37E-04		3.37E-04
1,3-Butadiene									1.77E-02		1.77E-02
1,3-Dichloropropene									3.29E-04		3.29E-04
Arsenic Compounds	^[1]	4.56E-05	4.56E-05	5.28E-05		6.48E-06	3.50E-05				1.85E-04
Beryllium Compounds	^[1]	2.73E-06	2.73E-06	3.17E-06		3.89E-07	2.10E-06				1.11E-05
Cadmium Compounds	^[1]	2.51E-04	2.51E-04	2.90E-04		3.57E-05	1.93E-04				1.02E-03
Chromium Compounds	^[1]	3.19E-04	3.19E-04	3.69E-04		4.54E-05	2.45E-04				1.30E-03
Cobalt Compounds	^[1]	1.91E-05	1.91E-05	2.22E-05		2.72E-06	1.47E-05				7.79E-05
Manganese Compounds	^[1]	8.65E-05	8.65E-05	1.00E-04		1.23E-05	6.66E-05				3.52E-04
Mercury Compounds	^[1]	5.92E-05	5.92E-05	6.86E-05		8.43E-06	4.56E-05				2.41E-04
Nickel Compounds	^[1]	4.78E-04	4.78E-04	5.54E-04		6.81E-05	3.68E-04				1.95E-03
Selenium Compounds	^[1]	5.47E-06	5.47E-06	6.33E-06		7.78E-07	4.20E-06				2.22E-05
Total HAPs											3.91

Fact Sheet Attachment
Boiler: EU-1

Inputs/Assumptions

[A]	Operating hours =	8,760 hrs/yr		
[B]	Rated power =	32.5 MMBtu/hr		
			Natural Gas	Biogas
	Fuel unit =		MMscf	MMscf
[C]	Heating value (MMBtu/fuel unit) =	1,000	730	
[D]	Hourly throughput (fuel unit/hr) =	0.0325	0.0445	

Calculations:

Hourly throughput (lb/fuel unit) = [B]/[C]
PTE per fuel {except GHG} (lb/hr) = [E]*[D]=[F]
GHG PTE (lb/hr) = [E]*(2.20462 lb/kg)*[B]
Maximum PTE [G] (lb/hr) = Maximum value for [F] for each pollutant
Maximum PTE [G] (tpy) = (Max PTE lb/hr)*[A]/2000 lb/ton

Pollutant	Emission Factor [E]		Potential Emissions (lb/hr) [F]		Potential Emissions [G]	
	Natural Gas ^{[1][3]} (lb/MMscf)	Biogas ^{[1][2][3]} (lb/MMscf)	Natural Gas	Biogas	(lb/hr) ^[6]	(tpy)
PM(filterable)	1.9	1.39	0.06	0.06	0.06	0.27
PM ₁₀	7.6	5.55	0.25	0.25	0.25	1.08
PM _{2.5}	7.6	5.55	0.25	0.25	0.25	1.08
SO _x	0.6	0.44	0.02	0.02	0.02	8.54E-02
NO _x	100	73.00	3.25	3.25	3.25	14.24
CO	84	61.32	2.73	2.73	2.73	11.96
VOCs	5.5	4.02	0.18	0.18	0.18	0.78
	(kg/MMBtu) ^[4]	(kg/MMBtu) ^[4]				
CO ₂	53.06	52.07	3,802	3,730.82	3,801.76	16,651.70
N ₂ O	1.00E-04	6.30E-04	7.17E-03	4.51E-02	0.05	0.20
CH ₄	1.00E-03	3.20E-03	0.07	0.23	0.23	1.00
GHG (mass basis)					3,802.03	16,652.90
CO ₂ e ^[5]					3,820.14	16,732.21

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4: Natural Gas Combustion, Table 1.4-1 and Table 1.4-2. April 2026

^[2] The biogas emission factors are based on the natural gas emission factors from AP-42, Tables 1.4-1 and 1.4-2 (April 2026). These emission factors are adjusted using a biogas heating value of 730 Btu/scf, as provided in application #10R1-046. Adjusted biogas emission factor = AP-42 emission factor * (biogas heating value divided by the natural gas heating value), where the heating value of natural gas = 1,000 Btu/scf.

^[3] If the source chooses to use fuel oil or tallow, see Fact Sheet Attachment for OP10R1-046, issued September 7, 2016, for calculations.

^[4] Emission factors from 40 CFR Part 98, Subpart C, Mandatory Greenhouse Gas Reporting (June 2026). Conversion factor 1 kg = 2.20462 lbs.

^[5] The Global Warming Potential are from Table A-1 – Global Warming Potentials, June 8, 2026. CO₂=1, N₂O=265, CH₄=28

^[6] Maximum potential emissions between natural gas and biogas. The worst-case emissions for the facility is based on on biogas combusted in flare, and the biogas-permitted emission units combusting natural gas.

Fact Sheet Attachment
Boiler: EU-1

Calculations:

Hourly throughput (lb/fuel unit) = [B]/[C]
PTE per fuel (lb/hr) = [E]*[D]=[F]
Maximum PTE [G] (lb/hr) = Maximum value for [F] for each pollutant
Maximum PTE [G] (tpy) = (Max PTE lb/hr)*[A]/2000 lb/ton
PTE (tpy) = [F]*[A]/2000 lb/ton = [G]

Hazardous Air Pollutant	Emission Factor [E]		Potential Emissions (lb/hr) [F]		Potential Emissions [G]	
	Natural Gas ^[1] (lb/MMscf)	Biogas ^{[1][2]} (lb/MMscf)	Natural Gas ^[3]	Biogas ^[3]	(lb/hr) ^[4]	(tpy)
Benzene	2.10E-03	1.53E-03	6.83E-05	6.83E-05	6.83E-05	2.99E-04
Formaldehyde	7.50E-02	5.48E-02	2.44E-03	2.44E-03	2.44E-03	1.07E-02
Hexane	1.80	1.31	5.85E-02	5.85E-02	5.85E-02	0.26
Lead	5.00E-04	3.65E-04	1.63E-05	1.63E-05	1.63E-05	7.12E-05
Naphthalene	6.10E-04	4.45E-04	1.98E-05	1.98E-05	1.98E-05	8.68E-05
Polycyclic Organic Matter	8.72E-05	6.37E-05	2.83E-06	2.83E-06	2.83E-06	1.24E-05
Toluene	3.40E-03	2.48E-03	1.11E-04	1.11E-04	1.11E-04	4.84E-04
Arsenic Compounds	2.00E-04	1.46E-04	6.50E-06	6.50E-06	6.50E-06	2.85E-05
Beryllium Compounds	1.20E-05	8.76E-06	3.90E-07	3.90E-07	3.90E-07	1.71E-06
Cadmium Compounds	1.10E-03	8.03E-04	3.58E-05	3.58E-05	3.58E-05	1.57E-04
Chromium Compounds	1.40E-03	1.02E-03	4.55E-05	4.55E-05	4.55E-05	1.99E-04
Cobalt Compounds	8.40E-05	6.13E-05	2.73E-06	2.73E-06	2.73E-06	1.20E-05
Manganese Compounds	3.80E-04	2.77E-04	1.24E-05	1.24E-05	1.24E-05	5.41E-05
Mercury Compounds	2.60E-04	1.90E-04	8.45E-06	8.45E-06	8.45E-06	3.70E-05
Nickel Compounds	2.10E-03	1.53E-03	6.83E-05	6.83E-05	6.83E-05	2.99E-04
Selenium Compounds	2.40E-05	1.75E-05	7.80E-07	7.80E-07	7.80E-07	3.42E-06
Total HAPs					6.13E-02	0.27

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4 (4/2026): Natural Gas Combustion, Tables 1.4-2, 1.4-3 and 1.4-4.

^[2] The biogas emission factors for are based on the natural gas emission factors from AP-42, Tables 1.4-1 and 1.4-2 (April 2026). These emission factors are adjusted using a biogas heating value of 730 Btu/scf, as provided in application #10R1-046. Adjusted biogas emission factor = AP-42 emission factor * (biogas heating value divided by the natural gas heating value), where the heating value of natural gas = 1,000 Btu/scf.

^[3] OP21R1-014 removes the option to use fuel oil or tallow per a request from the source. If the source chooses to use fuel oil or tallow, see Fact Sheet Attachment for OP10R1-046, issued September 7, 2016, for calculations.

^[4] Maximum potential emissions between natural gas and biogas.

Fact Sheet Attachment

Boiler: EU-2

Inputs/Assumptions

[A]	Operating hours =	8,760 hrs/yr
[B]	Rated power =	52 MMBtu/hr
		Natural Gas Biogas
	Fuel unit =	MMscf MMscf
[C]	Heating value (MMBtu/fuel unit) =	1,000 730
[D]	Hourly throughput (fuel unit/hr) =	0.0520 0.0712

Calculations:

Hourly throughput (lb/fuel unit) = [B]/[C]

PTE per fuel {except GHG} (lb/hr) = [E]*[D]=[F]

GHG PTE (lb/hr) = [E]*(2.20462 lb/kg)*[B]

Maximum PTE [G] (lb/hr) = Maximum value for [F] for each pollutant

Maximum PTE [G] (tpy) = (Max PTE lb/hr)*[A]/2000 lb/ton

Pollutant	Emission Factor [E]		Potential Emissions (lb/hr) [F]		Potential Emissions [G]	
	Natural Gas ^[1] (lb/MMscf)	Biogas ^{[1][2]} (lb/MMscf)	Natural Gas ^[3]	Biogas ^[3]	(lb/hr) ^[6]	(tpy)
PM(filterable)	1.9	1.39	0.10	0.10	0.10	0.43
PM ₁₀	7.6	5.55	0.40	0.40	0.40	1.73
PM _{2.5}	7.6	5.55	0.40	0.40	0.40	1.73
SO _x	0.6	0.44	0.03	0.03	0.03	0.14
NO _x	100	73.00	5.20	5.20	5.20	22.78
CO	84	61.32	4.37	4.37	4.37	19.13
VOCs	5.5	4.02	0.29	0.29	0.29	1.25
	(kg/MMBtu) ^[4]					
CO ₂	53	52.07	6,083	5,969	6,083	26,643
N ₂ O	1.00E-04	6.30E-04	1.15E-02	7.22E-02	0.07	0.32
CH ₄	1.00E-03	3.20E-03	0.11	0.37	0.37	1.61
GHG (mass basis)					6,083	26,645
CO ₂ e ^[5]					6,112	26,772

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4: Natural Gas Combustion, Table 1.4-1 and Table 1.4-2. April 2026

^[2] The biogas emission factors are based on the natural gas emission factors from AP-42, Tables 1.4-1 and 1.4-2 (July 1998). These emission factors are adjusted using a biogas heating value of 730 Btu/scf, as provided in application #10R1-046. Adjusted biogas emission factor = AP-42 emission factor * (biogas heating value divided by the natural gas heating value), where the heating value of natural gas = 1,000 Btu/scf.

^[3] If the source chooses to use fuel oil or tallow, see Fact Sheet Attachment for OP10R1-046, issued September 7, 2016, for calculations.

^[4] Emission factors from 40 CFR Part 98, Subpart C, Mandatory Greenhouse Gas Reporting. Conversion factor 1 kg = 2.20462 lbs. (June 2026)

^[5] The Global Warming Potential are from Table A-1 – Global Warming Potentials at 40 CFR 98, Subpart A, June 8, 2026. CO₂=1, N₂O=265, CH₄=28

^[6] Maximum potential emissions between natural gas and biogas.

Fact Sheet Attachment

Boiler: EU-2

Calculations:

$$\text{Hourly throughput (lb/fuel unit)} = [B]/[C]$$

$$\text{PTE per fuel (lb/hr)} = [E]*[D]=[F]$$

$$\text{Maximum PTE [G] (lb/hr)} = \text{Maximum value for [F] for each pollutant}$$

$$\text{Maximum PTE [G] (tpy)} = (\text{Max PTE lb/hr})*[A]/2000 \text{ lb/ton}$$

$$\text{PTE (tpy)} = [F]*[A]/2000 \text{ lb/ton} = [G]$$

Hazardous Air Pollutant	Emission Factor [E]		Potential Emissions (lb/hr) [F]		Potential Emissions [G]	
	Natural Gas ^[1] (lb/MMscf)	Biogas ^{[1][2]} (lb/MMscf)	Natural Gas	Biogas	(lb/hr) ^[3]	(tpy)
Benz(a)anthracene	1.80E-06	1.31E-06	9.36E-08	9.36E-08	9.36E-08	4.10E-07
Benzene	2.10E-03	1.53E-03	1.09E-04	1.09E-04	1.09E-04	4.78E-04
Benzo(a)pyrene	1.20E-06	8.76E-07	6.24E-08	6.24E-08	6.24E-08	2.73E-07
Benzo(a)anthracene					0.00E+00	0.00E+00
Benzo(b)fluoranthene	1.80E-06	1.31E-06	9.36E-08	9.36E-08	9.36E-08	4.10E-07
Chrysene					0.00E+00	0.00E+00
Dibenzo(a,h)anthracene	1.20E-06	8.76E-07	6.24E-08	6.24E-08	6.24E-08	2.73E-07
Ethylbenzene					0.00E+00	0.00E+00
Formaldehyde	7.50E-02	5.48E-02	3.90E-03	3.90E-03	3.90E-03	1.71E-02
Hexane	1.80	1.31	9.36E-02	9.36E-02	9.36E-02	4.10E-01
Indeno(1,2,3-cd)pyrene	1.80E-06	1.31E-06	9.36E-08	9.36E-08	9.36E-08	4.10E-07
Lead	5.00E-04	3.65E-04	2.60E-05	2.60E-05	2.60E-05	1.14E-04
Naphthalene	6.10E-04	4.45E-04	3.17E-05	3.17E-05	3.17E-05	1.39E-04
Toluene	3.40E-03	2.48E-03	1.77E-04	1.77E-04	1.77E-04	7.74E-04
1,1,1-Trichloroethane					0.00E+00	0.00E+00
Xylenes					0.00E+00	0.00E+00
Arsenic Compounds	2.00E-04	1.46E-04	1.04E-05	1.04E-05	1.04E-05	4.56E-05
Beryllium Compounds	1.20E-05	8.76E-06	6.24E-07	6.24E-07	6.24E-07	2.73E-06
Cadmium Compounds	1.10E-03	8.03E-04	5.72E-05	5.72E-05	5.72E-05	2.51E-04
Chromium Compounds	1.40E-03	1.02E-03	7.28E-05	7.28E-05	7.28E-05	3.19E-04
Cobalt Compounds	8.40E-05	6.13E-05	4.37E-06	4.37E-06	4.37E-06	1.91E-05
Manganese Compounds	3.80E-04	2.77E-04	1.98E-05	1.98E-05	1.98E-05	8.65E-05
Mercury Compounds	2.60E-04	1.90E-04	1.35E-05	1.35E-05	1.35E-05	5.92E-05
Nickel Compounds	2.10E-03	1.53E-03	1.09E-04	1.09E-04	1.09E-04	4.78E-04
Selenium Compounds	2.40E-05	1.75E-05	1.25E-06	1.25E-06	1.25E-06	5.47E-06
Total HAPs					9.81E-02	0.43

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4 (7/1998): Natural Gas Combustion, Tables 1.4-2, 1.4-3 and 1.4-4.

^[2] The biogas emission factors are based on the natural gas emission factors from AP-42, Tables 1.4-1 and 1.4-2 (July 1998). These emission factors are adjusted using a biogas heating value of 730 Btu/scf, as provided in application #10R1-046. Adjusted biogas emission factor = AP-42 emission factor * (biogas heating value divided by the natural gas heating value), where the heating value of natural gas = 1,000 Btu/scf.

^[3] Maximum potential emissions between natural gas and biogas. The worst-case emissions for the facility is based on on biogas combusted in flare, and the biogas-permitted emission units combusting natural gas.

Fact Sheet Attachment
Boiler: EU-3

Inputs/Assumptions

[A]	Operating hours =	8,760 hrs/yr
[B]	Rated power =	52 MMBtu/hr
		Natural Gas
	Fuel unit =	MMscf
[C]	Heating value (MMBtu/fuel unit) =	1,000
[D]	Hourly throughput (fuel unit/hr) =	0.0520

Calculations:

Hourly throughput (lb/fuel unit) = [B]/[C]
PTE per fuel {except GHG} (lb/hr) = [E]*[D]=[F]
GHG PTE (lb/hr) = [E]*(2.20462 lb/kg)*[B]
Maximum PTE [G] (lb/hr) = Maximum value for [F] for each pollutant
Maximum PTE [G] (tpy) = (Max PTE lb/hr)*[A]/2000 lb/ton

Pollutant	Emission Factor [E]	Potential Emissions (lb/hr) [F]	Potential Emissions (tpy) [G]
	Natural Gas ^[1] (lb/MMscf)	Natural Gas ^[2]	(tpy)
PM(filterable)	1.9	0.10	0.43
PM ₁₀	7.6	0.40	1.73
PM _{2.5}	7.6	0.40	1.73
SO _x	0.6	0.03	0.14
NO _x	50	2.60	11.39
CO	84	4.37	19.13
VOCs	5.5	0.29	1.25
	(kg/MMBtu) ^[3]		
CO ₂	53	6,083	26,643
N ₂ O	1.00E-04	1.15E-02	0.05
CH ₄	1.00E-03	0.11	0.50
GHG (mass basis)		6,083	26,644
CO ₂ e ^[4]		6,089	26,670

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4: Natural Gas Combustion, Table 1.4-1 and Table 1.4-2. April 2026
^[2] If the source chooses to use fuel oil, tallow or biogas, see Fact Sheet Attachment for OP10R1-046, issued September 7, 2016, for calculations.
^[3] Emission factors from 40 CFR Part 98, Subpart C, Mandatory Greenhouse Gas Reporting. Conversion factor 1 kg = 2.20462 lbs. (June 2026)
^[4] The Global Warming Potential are from Table A-1 – Global Warming Potentials at 40 CFR 98, Subpart A, June 8, 2026. CO₂=1, N₂O=265, CH₄=28

Fact Sheet Attachment
Boiler: EU-3

Calculations:

Hourly throughput (lb/fuel unit) = [B]/[C]
PTE per fuel (lb/hr) = [E]*[D]=[F]
Maximum PTE [G] (lb/hr) = Maximum value for [F] for each pollutant
Maximum PTE [G] (tpy) = (Max PTE lb/hr)*[A]/2000 lb/ton
PTE (tpy) = [F]*[A]/2000 lb/ton = [G]

Hazardous Air Pollutant	Emission Factor [E]	Potential Emissions (lb/hr) [F]	Potential Emissions (tpy) [G]
	Natural Gas ^[1] (lb/MMscf)	Natural Gas ^[2]	Natural Gas
Benz(a)anthracene	1.80E-06	9.36E-08	4.10E-07
Benzene	2.10E-03	1.09E-04	4.78E-04
Benzo(a)pyrene	1.20E-06	6.24E-08	2.73E-07
Benzo(b)fluoranthene	1.80E-06	9.36E-08	4.10E-07
Dibenzo(a,h)anthracene	1.20E-06	6.24E-08	2.73E-07
Formaldehyde	7.50E-02	3.90E-03	1.71E-02
Hexane	1.80	9.36E-02	4.10E-01
Indeno(1,2,3-cd)pyrene	1.80E-06	9.36E-08	4.10E-07
Lead	5.00E-04	2.60E-05	1.14E-04
Naphthalene	6.10E-04	3.17E-05	1.39E-04
Toluene	3.40E-03	1.77E-04	7.74E-04
Arsenic Compounds	2.00E-04	1.04E-05	4.56E-05
Beryllium Compounds	1.20E-05	6.24E-07	2.73E-06
Cadmium Compounds	1.10E-03	5.72E-05	2.51E-04
Chromium Compounds	1.40E-03	7.28E-05	3.19E-04
Cobalt Compounds	8.40E-05	4.37E-06	1.91E-05
Manganese Compounds	3.80E-04	1.98E-05	8.65E-05
Mercury Compounds	2.60E-04	1.35E-05	5.92E-05
Nickel Compounds	2.10E-03	1.09E-04	4.78E-04
Selenium Compounds	2.40E-05	1.25E-06	5.47E-06
Total HAPs		9.81E-02	0.43

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4 (April 2026): Natural Gas Combustion, Tables 1.4-2, 1.4-3 and 1.4-4.

^[2] If the source chooses to use fuel oil or tallow, see Fact Sheet Attachment for OP10R1-046, issued September 7, 2016, for calculations.

Fact Sheet Attachment
Boiler: EU-31

Inputs/Assumptions

[A]	Operating hours =	8,760 hrs/yr
[B]	Rated power =	60.243 MMBtu/hr
		Natural Gas
	Fuel unit =	MMscf
[C]	Heating value (MMBtu/fuel unit) =	1,000
[D]	Hourly throughput (fuel unit/hr) =	0.0602

Calculations:

Hourly throughput (lb/fuel unit) = [B]/[C]

PTE per fuel {except GHG} (lb/hr) = [E]*[D]=[F]

GHG PTE (lb/hr) = [E]*(2.20462 lb/kg)*[B]

Maximum PTE [G] (lb/hr) = Maximum value for [F] for each pollutant

Maximum PTE [G] (tpy) = (Max PTE lb/hr)*[A]/2000 lb/ton

Pollutant	Emission Factor [E]	Potential Emissions (lb/hr) [F]	Potential Emissions [G]	
	Natural Gas ^[1] (lb/MMscf)	Natural Gas ^[2]	(lb/hr)	(tpy)
PM(filterable)	1.9	0.11	0.11	0.50
PM ₁₀	7.6	0.46	0.46	2.01
PM _{2.5}	7.6	0.46	0.46	2.01
SO _x	0.6	0.04	0.04	0.16
NO _x	100	6.02	6.02	26.39
CO	84	5.06	5.06	22.16
VOCs	5.5	0.33	0.33	1.45
	(kg/MMBtu) ^[3]			
CO ₂	53	7,047	7,047	30,866
N ₂ O	1.00E-04	1.33E-02	0.01	0.06
CH ₄	1.00E-03	0.13	0.13	0.58
GHG (mass basis)			7,047	30,867
CO ₂ e ^[4]			7,054	30,898

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4: Natural Gas Combustion, Table 1.4-1 and Table 1.4-2. (April 2026)

^[2] If the source chooses to use fuel oil, tallow or biogas, see Fact Sheet Attachment for OP10R1-046, issued September 7, 2016, for calculations.

^[3] Emission factors from 40 CFR Part 98, Subpart C, Mandatory Greenhouse Gas Reporting. Conversion factor 1 kg = 2.20462 lbs. (June 2026)

^[4] The Global Warming Potential are from Table A-1 – Global Warming Potentials at 40 CFR 98, Subpart A, June 8 ,2026. CO₂=1, N₂O=265, CH₄=28

Fact Sheet Attachment

Boiler: EU-31

Calculations:

$$\text{Hourly throughput (lb/fuel unit)} = [B]/[C]$$

$$\text{PTE per fuel (lb/hr)} = [E]*[D]=[F]$$

$$\text{Maximum PTE [G] (lb/hr)} = \text{Maximum value for [F] for each pollutant}$$

$$\text{Maximum PTE [G] (tpy)} = (\text{Max PTE lb/hr})*[A]/2000 \text{ lb/ton}$$

$$\text{PTE (tpy)} = [F]*[A]/2000 \text{ lb/ton} = [G]$$

Hazardous Air Pollutant	Emission Factor [E]	Potential Emissions (lb/hr) [F]	Potential Emissions [G]	
	Natural Gas ^[1] (lb/MMscf)	Natural Gas ^[2]	(lb/hr)	(tpy)
Benz(a)anthracene	1.80E-06	1.08E-07	1.08E-07	4.75E-07
Benzene	2.10E-03	1.27E-04	1.27E-04	5.54E-04
Benzo(a)pyrene	1.20E-06	7.23E-08	7.23E-08	3.17E-07
Benzo(b)fluoranthene	1.80E-06	1.08E-07	1.08E-07	4.75E-07
Dibenzo(a,h)anthracene	1.20E-06	7.23E-08	7.23E-08	3.17E-07
Formaldehyde	7.50E-02	4.52E-03	4.52E-03	1.98E-02
Hexane	1.80	1.08E-01	1.08E-01	4.75E-01
Indeno(1,2,3-cd)pyrene	1.80E-06	1.08E-07	1.08E-07	4.75E-07
Lead	5.00E-04	3.01E-05	3.01E-05	1.32E-04
Naphthalene	6.10E-04	3.67E-05	3.67E-05	1.61E-04
Toluene	3.40E-03	2.05E-04	2.05E-04	8.97E-04
Arsenic Compounds	2.00E-04	1.20E-05	1.20E-05	5.28E-05
Beryllium Compounds	1.20E-05	7.23E-07	7.23E-07	3.17E-06
Cadmium Compounds	1.10E-03	6.63E-05	6.63E-05	2.90E-04
Chromium Compounds	1.40E-03	8.43E-05	8.43E-05	3.69E-04
Cobalt Compounds	8.40E-05	5.06E-06	5.06E-06	2.22E-05
Manganese Compounds	3.80E-04	2.29E-05	2.29E-05	1.00E-04
Mercury Compounds	2.60E-04	1.57E-05	1.57E-05	6.86E-05
Nickel Compounds	2.10E-03	1.27E-04	1.27E-04	5.54E-04
Selenium Compounds	2.40E-05	1.45E-06	1.45E-06	6.33E-06
Total HAPs			1.14E-01	0.50

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4 (April 2026): Natural Gas Combustion, Tables 1.4-2, 1.4-3 and 1.4-4.

^[2] If the source chooses to use fuel oil or tallow, see Fact Sheet Attachment for OP10R1-046, issued September 7, 2016, for calculations.

Inputs/Assumptions

[A] Operating hours = 8,760 hrs/yr
[B] Rated power = 7.4 MMBtu/hr

		Natural Gas
	Fuel unit =	MMscf
[C]	Heating value (MMBtu/fuel unit) =	1,000
[D]	Hourly throughput (fuel unit/hr) =	0.0074

[E] Process Rate = 1.56 tph

Calculations:

Hourly throughput (lb/fuel unit) = [B]/[C]
PTE per fuel {except GHG} (lb/hr) = [F]*[D]=[G]
GHG PTE (lb/hr) = [F]*(2.20462 lb/kg)*[B]
Maximum PTE [H] (lb/hr) = Maximum value for [G] for each pollutant
Maximum PTE [H] (tpy) = (Max PTE lb/hr)*[A]/2000 lb/ton

PM PTE combustion of NG= (EF*fuel rate (mmscf/hr))=lb/hr
(7.6 lb/MMscf*[D]) = 0.056 lb/hr = 0.25 tpy
Process Emissions = [E]*[EF] = 1.19 lb/hr PM including natural gas combustion
= 1.90 lb/hr PM₁₀ and PM_{2.5} including natural gas combustion

Pollutant	Emission Factor [F]	Potential Emissions (lb/hr) [G]	Potential Emissions [H]	
	Natural Gas & Process Emissions Combined ^{[1][2]}	Natural Gas & Process Emissions	(lb/hr)	(tpy)
	(lb/ton)	(lb/hr)		
PM(filterable)	0.76	1.19	1.19	5.19
PM ₁₀	1.22	1.90	1.90	8.34
PM _{2.5}	1.22	1.90	1.90	8.34
H ₂ S	0.08			
	Natural gas (lb/MMscf) ^[1]	Natural Gas (lb/hr)		
SO _x	0.60	4.44E-03	4.44E-03	1.94E-02
NO _x	100	0.74	0.74	3.24
CO	84	0.62	0.62	2.72
VOCs	5.5	0.04	0.04	0.18
	(kg/MMBtu) ^[3]			
CO ₂	53.06	865.63	865.63	3,791.46
N ₂ O	1.00E-04	1.63E-03	1.63E-03	7.15E-03
CH ₄	1.00E-03	0.02	1.63E-02	7.15E-02
GHG (mass basis)			865.65	3,791.54
CO ₂ e ^[4]			866.52	3,795.36

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4: Natural Gas Combustion (April 2026), Tables 1.4-1 and 1.4-2.

^[2] Emission Factors for PM and PM₁₀ from AP-42: Chapter 9: Meat Rendering Plants, Section 9.5.3 (9/1995), Table 9.5.3-2. PM and PM₁₀ emission factor based on process, but includes natural gas combustion emissions. PM includes filterable PM₁₀ emissions only. PM₁₀ includes filterable PM₁₀ and condensable PM emissions. PM_{2.5} is assumed to equal PM₁₀ emissions.

^[3] Emission factors from 40 CFR Part 98, Subpart C, Mandatory Greenhouse Gas Reporting. Conversion factor 1 kg = 2.20462 lbs. (June 2026)

^[4] The Global Warming Potential are from Table A-1 – Global Warming Potentials at 40 CFR 98, Subpart A, June 8, 2026. CO₂=1, N₂O=265, CH₄=28

$$\begin{aligned}\text{Hourly throughput (lb/fuel unit)} &= [B]/[C] \\ \text{PTE per fuel (lb/hr)} &= [E]*[D]=[F] \\ \text{PTE (tpy)} &= [F]*[A]/2000 \text{ lb/ton} = [G]\end{aligned}$$

Hazardous Air Pollutants	Emission Factor [E]	Potential Emissions [F]	Potential Emissions [G]
	Natural Gas ^[1] (lb/MMscf)	(lb/hr)	(tons/yr)
Benz(a)anthracene	1.80E-06	1.33E-08	5.83E-08
Benzene	2.10E-03	1.55E-05	6.81E-05
Benzo(a)pyrene	1.20E-06	8.88E-09	3.89E-08
Benzo(b)fluoranthene	1.80E-06	1.33E-08	5.83E-08
Dibenzo(a,h)anthracene	1.20E-06	8.88E-09	3.89E-08
Formaldehyde	7.50E-02	5.55E-04	2.43E-03
Hexane	1.80	1.33E-02	5.83E-02
Indeno(1,2,3-cd)pyrene	1.80E-06	1.33E-08	5.83E-08
Lead Compounds	5.00E-04	3.70E-06	1.62E-05
Naphthalene	6.10E-04	4.51E-06	1.98E-05
Toluene	3.40E-03	2.52E-05	1.10E-04
Arsenic Compounds	2.00E-04	1.48E-06	6.48E-06
Beryllium Compounds	1.20E-05	8.88E-08	3.89E-07
Cadmium Compounds	1.10E-03	8.14E-06	3.57E-05
Chromium Compounds	1.40E-03	1.04E-05	4.54E-05
Cobalt Compounds	8.40E-05	6.22E-07	2.72E-06
Manganese Compounds	3.80E-04	2.81E-06	1.23E-05
Mercury Compounds	2.60E-04	1.92E-06	8.43E-06
Nickel Compounds	2.10E-03	1.55E-05	6.81E-05
Selenium Compounds	2.40E-05	1.78E-07	7.78E-07
Total		1.40E-02	6.12E-02

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4: Natural Gas Combustion (7/1998), Tables 1.4-1, 1.4-2 and 1.4-3.

Fact Sheet Attachment
Bone Dryer: EU-5

Inputs/Assumptions

[A]	Operating hours =	8,760 hrs/yr
[B]	Rated power =	40 MMBtu/hr
		Natural Gas
	Fuel unit =	MMscf
[C]	Heating value (MMBtu/fuel unit) =	1,000
[D]	Hourly throughput (fuel unit/hr) =	0.0400
[E]	Process Rate =	12.90 tph

Calculations:

Hourly throughput (lb/fuel unit) = [B]/[C]
PTE per fuel {except GHG} (lb/hr) = [F]*[D]=[G]
GHG PTE (lb/hr) = [F]*(2.20462 lb/kg)*[B]
Maximum PTE [H] (lb/hr) = Maximum value for [G] for each pollutant
Maximum PTE [H] (tpy) = (Max PTE lb/hr)*[A]/2000 lb/ton

PM PTE combustion of NG= (EF*fuel rate (mmscf/hr))=lb/hr
(7.6 lb/MMscf*[D]) = 0.304 lb/hr = 1.33 tpy
Process Emissions = [E]*[EF] = 5.42 lb/hr PM including natural gas combustion
= 3.10 lb/hr PM₁₀ and PM_{2.5} including natural gas combustion

Fact Sheet Attachment

Bone Dryer: EU-5

Pollutant	Emission Factor [F]	Potential Emissions [G]	Potential Emissions [H]	
	Natural Gas & Process Emissions Combined ^{[1][2]}	Natural Gas & Process Emissions	(lb/hr)	(tpy)
	(lb/ton)	lb/hr		
PM(filterable)	0.42	5.42	5.42	23.73
PM ₁₀	0.24	3.10	3.10	13.56
PM _{2.5}	0.24	3.10	3.10	13.56
H ₂ S	0.08			
	Natural Gas (lb/MMscf) ^[1]	Natural Gas (lb/hr)		
SO _x	0.60	2.40E-02	2.40E-02	1.05E-01
NO _x	100	4.00	4.00	17.52
CO	84	3.36	3.36	14.72
VOCs	5.5	0.22	0.22	0.96
	(kg/MMBtu) ^[3]			
CO ₂	53.06	4,679.09	4,679.09	20,494.39
N ₂ O	1.00E-04	8.82E-03	8.82E-03	3.86E-02
CH ₄	1.00E-03	8.82E-02	8.82E-02	3.86E-01
GHG (mass basis)			4,679.18	20,494.82
CO ₂ e ^[4]			4,683.89	20,515.45

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4: Natural Gas Combustion (7/1998), Tables 1.4-1 and 1.4-2. (April 2026)

^[2] Emission Factors (controlled) from Stack Test (1/16/2001) as provided in operating permit application #10R1-046. PM and PM₁₀ emission factor based on process, but includes natural gas combustion emissions. PM includes filterable PM₁₀ emissions only. PM₁₀ includes filterable PM₁₀ and condensable PM emissions. PM_{2.5} is assumed to equal PM₁₀ emissions.

^[3] Emission factors from 40 CFR Part 98, Subpart C, Mandatory Greenhouse Gas Reporting. Conversion factor 1 kg = 2.20462 lbs. (June 2026)

^[4] Title 129, Chapter 1 Section 064; Table A-1 – Global Warming Potentials at 40 CFR 98, Subpart A, June 8, 2026. CO₂=1, N₂O=265, CH₄=28

Fact Sheet Attachment

Bone Dryer: EU-5

Calculations:

$$\text{Hourly throughput (lb/fuel unit)} = [B]/[C]$$

$$\text{PTE per fuel (lb/hr)} = [E]*[D]=[F]$$

$$\text{Maximum PTE [G] (lb/hr)} = \text{Maximum value for [F] for each pollutant}$$

$$\text{Maximum PTE [G] (tpy)} = (\text{Max PTE lb/hr})*[A]/2000 \text{ lb/ton}$$

$$\text{PTE (tpy)} = [F]*[A]/2000 \text{ lb/ton} = [G]$$

Hazardous Air Pollutants	Emission Factor [E]	Potential Emissions (lb/hr) [F]	Potential Emissions [G] ^[2]	Potential Emissions [G]
	Natural Gas ^[1] (lb/MMscf)	Natural Gas	(lb/hr)	(tons/yr)
Benz(a)anthracene	1.80E-06	7.20E-08	7.20E-08	3.15E-07
Benzene	2.10E-03	8.40E-05	8.40E-05	3.68E-04
Benzo(a)pyrene	1.20E-06	4.80E-08	4.80E-08	2.10E-07
Benzo(b)fluoranthene	1.80E-06	7.20E-08	7.20E-08	3.15E-07
Dibenzo(a,h)anthracene	1.20E-06	4.80E-08	4.80E-08	2.10E-07
Formaldehyde	7.50E-02	3.00E-03	3.00E-03	1.31E-02
Hexane	1.80	7.20E-02	7.20E-02	3.15E-01
Indeno(1,2,3-cd)pyrene	1.80E-06	7.20E-08	7.20E-08	3.15E-07
Lead	5.00E-04	2.00E-05	2.00E-05	8.76E-05
Naphthalene	6.10E-04	2.44E-05	2.44E-05	1.07E-04
Toluene	3.40E-03	1.36E-04	1.36E-04	5.96E-04
Arsenic Compounds	2.00E-04	8.00E-06	8.00E-06	3.50E-05
Beryllium Compounds	1.20E-05	4.80E-07	4.80E-07	2.10E-06
Cadmium Compounds	1.10E-03	4.40E-05	4.40E-05	1.93E-04
Chromium Compounds	1.40E-03	5.60E-05	5.60E-05	2.45E-04
Cobalt Compounds	8.40E-05	3.36E-06	3.36E-06	1.47E-05
Manganese Compounds	3.80E-04	1.52E-05	1.52E-05	6.66E-05
Mercury Compounds	2.60E-04	1.04E-05	1.04E-05	4.56E-05
Nickel Compounds	2.10E-03	8.40E-05	8.40E-05	3.68E-04
Selenium Compounds	2.40E-05	9.60E-07	9.60E-07	4.20E-06
Total			7.55E-02	3.31E-01

^[1] Emission Factors from AP-42 Chapter 1: External Combustion Sources, Section 1.4: Natural Gas Combustion (April 2026), Tables 1.4-1, 1.4-2 and 1.4-3.

^[2] Maximum potential emissions for natural gas.

Fact Sheet Attachment

Rendering: EU-13, EU-14, EU-15, EU-16, EU-17, EU-18, EU-19, EU-20, EU-21, EU-22, EU-23, EU-24

All emission factors for Cooker 1 & 2 (EU-13 and EU-14) are from a performance test at a similar source Des Moines, Iowa facility in December, 1994 and accounts for Control Efficiency of scrubber CE13e

AP-42 emission factors are used for the emission units that do not have emission factors from performance tests. Few rendering emission factors exist, so emission factors from AP-42, Chapter 9.9.1, Grain Elevators and Processing, Tables 9.9.1-1 (Grain Elevators) and 9.9.1-2 (Animal Feed Mills) (3/2003) are used.

Rail and truck loadouts emissions do not include any control efficiency for enclosure by room or tarps because the emission units do not have federally enforceable requirements for the use of enclosure by room or tarps.

If PM₁₀ and/or PM_{2.5} emission factors are not available, then fractions were used from South Coast Air Quality Management District (SCAQMD), *Final - Methodology to Calculate Particulate Matter (PM) 2.5 and PM2.5 Significance Thresholds*, Appendix A, Table A, Food and Agriculture/Fermentation, Rendering, Fish and Nut Processing (October 2006), PM_{2.5} fractions, to calculate PM₁₀ and PM_{2.5} emission factors.

AP-42 Emission Factors:

Equipment or Process	Source of Emission Factor	Control Equipment in AP-42	USEPA Control Efficiency (%) ¹	Adjust for Tallow	PM Emission Factor (lb/ton)	PM ₁₀ Emission Factor (lb/ton)	PM _{2.5} Emission Factor (lb/ton)
Screens, different types	AP-42, Chapt 9: Food and Agricultural Industries, Section 9.9.1 (05/03), Table 9.9.1-1, cleaning by internal vibrating	Cyclone	80/60/20	Yes	0.075	0.019	0.0032
Hammermills	AP-42, Chapt 9: Food and Agricultural Industries, Section 9.9.1 (05/03), Table 9.9.1-2, hammermill ^[2]	Cyclone	80/60/20	Yes	0.067	0.0335	---
Storage silos	AP-42, Chapt 9: Food and Agricultural Industries, Section 9.9.1 (05/03), Table 9.9.1-1, storage bin (vent)	None	n/a	Yes, except for dried blood	0.025	0.0063	0.0011
Loadout, truck	AP-42, Chapt 9: Food and Agricultural Industries, Section 9.9.1 (05/03), Table 9.9.1-1, grain shipping, truck	None	n/a	Yes	0.086	0.029	0.0049
Loadout, rail	AP-42, Chapt 9: Food and Agricultural Industries, Section 9.9.1 (05/03), Table 9.9.1-1, grain shipping, rail	None	n/a	Yes, except for dried blood	0.027	0.0022	0.00037

^[1] Efficiencies from USEPA-Clean Air Technology Center (CATC) fact sheet on cyclones. Control efficiencies are given, in order, for PM/PM₁₀/PM_{2.5}.

^[2] AP-42, Chapter 9.9.1, Table 9.9.1-2, footnote "g", states "PM-10 test data are not available. PM-10 emission factors can be estimated by taking 50% of the filterable PM emission factor." May 2003

Fact Sheet Attachment

Rendering: EU-13, EU-14, EU-15, EU-16, EU-17, EU-18, EU-19, EU-20, EU-21, EU-22, EU-23, EU-24

Equation: Potential Emissions (tpy) = Emission factor (lb/ton) * (1-control efficiency/100) * limited or maximum throughput (tpy) * ton/2,000 lb or

Equation: Potential Emissions (tpy) = Emission factor (lb/ton) * limited or maximum throughput (tpy) * ton/2,000 lb

When multiple control units are in series: CE (overall) = [(1 - CE₁/100) * (1 - CE₂/100) * * (1 - CE_n/100)]

Emission Unit	Maximum Throughput (tph)	Maximum Throughput (tpy)	PM Emission Factor (lb/ton)	PM Potential Emissions (tpy)	PM ₁₀ Emission Factor (lb/ton)	PM ₁₀ Potential Emissions (tpy)	PM _{2.5} Emission Factor (lb/ton)	PM _{2.5} Potential Emissions (tpy)
EU-13 (Cooker 1 & 2) ^[1]	28	245,280	0.05	6.1320	0.05	6.1320	0.03	3.6792
EU-15 (Dry Blood Storage)	1.56	13,666	0.025	0.1708	0.0063	0.0430	0.0011	0.0075
EU-16 (Dry Blood Loadout)	1.56	13,666	0.086	0.5876	0.029	0.1982	0.0049	0.0335
EU-17 (Separator)	12.9	113,004	0.075	4.2377	0.019	1.0735	0.0032	0.1808
EU-18 (Bone Gel Storage)	3	26,280	0.025	0.3285	0.0063	0.0828	0.0011	0.0145
EU-19 (Bone Gel Loadout)	3	26,280	0.086	1.1300	0.029	0.3811	0.0049	0.0644
EU-20 (Shaker)	12.9	113,004	0.075	4.2377	0.019	1.0735	0.0032	0.1808
EU-21 (Meal Separator)	11	96,360	0.075	3.6135	0.019	0.9154	0.0032	0.1542
EU-22 (Meal Grinding)	11	96,360	0.067	3.2281	0.0335	1.6140	0.0335	1.6140
EU-23 (Meal Storage)	11	96,360	0.025	1.2045	0.0063	0.3035	0.0011	0.0530
EU-24 (Meal Loadout)	11	96,360	0.086	4.1435	0.029	1.3972	0.0049	0.2361
Total				29.01		13.21		6.22

^[1] PM_{2.5} emission factor based on ratio of PM_{2.5} to PM (60% of PM is PM_{2.5}) as per SCAQMD Appendix A, Table A: Fermentation, Rendering, Fish and Nut Processing Fractions. October 3, 2023

Potential emissions calculations for non-particulates emitted by the Cookers 1 & 2 (EU-13):

Equation: SO₂, NO_x, CO, or VOC potential emissions (tpy) = Emission factor (lb/ton) * maximum throughput (tpy) * ton/2,000 lb

Pollutant	Throughput (tpy)	Emission Factor (lb/ton) ^[1]	Potential Emissions (tpy)
SO ₂	245,280	0.019	2.330
NO _x	245,280	0.010	1.226
CO	245,280	0.007	0.858
VOC	245,280	0.021	2.575

^[1] Emission Factors from testing conducted at similar source.

Emergency Generator: EU-6, EU-7, EU-8, EU-9, EU-10

Inputs/Assumptions

[A]	Operating hours =	8,760 hrs/yr
[B]	Rated power (NG engines) =	5.92 MMBtu/hr
	Rated power (Diesel engine) =	2.82 MMBtu/hr

Engine	Rating (MMBtu/hr)
EU-6 (Natural Gas)	1.48
EU-7 (Natural Gas)	1.48
EU-8 (Natural Gas)	1.48
EU-9 (Natural Gas)	1.48
EU-10 (Diesel)	2.82

Emergency Generator: EU-6, EU-7, EU-8, EU-9, EU-10

Calculations:

$$\text{PTE per fuel \{except GHG\} (lb/hr)} = [C] * [B] = [D]$$

$$\text{GHG PTE (lb/hr)} = [C] * (2.20462 \text{ lb/kg}) * [B] = [D]$$

$$\text{PTE [D] (tpy)} = ([D] \text{ lb/hr}) * [A] / 2000 \text{ lb/ton}$$

$$\text{Total PTE [E] (tpy)} = (\text{NG [D] lb/hr} + \text{Diesel [D] lb/hr})$$

$$\text{Total PTE [E] (tpy)} = ([E] \text{ lb/hr}) * [A] / 2000 \text{ lb/ton}$$

Pollutant	Emission Factor [C]		Potential Emissions [D]				Total Potential Emissions [E]	
	Natural Gas ^{[1][3]} (lb/MMBtu)	Diesel ^[2] (lb/MMBtu)	Natural Gas Combined (lb/hr)	Natural Gas Combined (tpy)	Diesel (lb/hr)	Diesel (tpy)	(lb/hr) ^[6]	(tpy)
PM(filterable)	9.50E-03	0.31	5.62E-02	0.25	0.87	3.83	0.93	4.08
PM ₁₀	6.56E-03	0.31	3.88E-02	0.17	0.87	3.83	0.91	4.00
PM _{2.5}	6.55E-03	0.31	3.88E-02	0.17	0.87	3.83	0.91	4.00
SO _x	5.88E-04	0.29	3.48E-03	1.52E-02	0.82	3.58	0.82	3.60
NO _x	0.32	4.41	1.89	8.30	12.44	54.47	14.33	62.77
CO	0.92	0.95	5.45	23.86	2.68	11.73	8.13	35.59
VOCs	4.00E-02	0.35	0.24	1.04	0.99	4.32	1.22	5.36
HAPs							0.20	0.89
	(kg/MMBtu) ^[4]							
CO ₂	53	73.96	693	3033.17	208.57	913.52	901.07	3,947
N ₂ O	1.00E-04	6.00E-04	1.31E-03	5.72E-03	1.69E-03	7.41E-03	3.00E-03	1.31E-02
CH ₄	1.00E-03	3.00E-03	1.31E-02	5.72E-02	8.46E-03	3.71E-02	2.15E-02	9.42E-02
GHG (mass basis)							901	3,947
CO ₂ e ^[5]							902	3,953

^[1] Emission Factors from AP-42 Chapter 3: Internal Combustion Sources, Section 3.2 (10/2024): Natural Gas Combustion, Table 3.2-3. Emission Factors for NOx, CO, and VOC Emission Factors are vendor/manufacture guarantee provided by source in the CP application received 2/5/2001.

^[2] Emission Factors from AP-42 Chapter 3: Internal Combustion Sources, Section 3.3 (04/2025): Diesel Industrial Engines, Table 3.3-1. PM and PM_{2.5} are assumed to equal PM₁₀.

^[3] PM₁₀ and PM_{2.5} includes filterable + condensible. Emission factors are derived using the AP-42, PM (total) emission factor and the fractionization of PM₁₀ and PM_{2.5} from South Coast Air Quality Management District (also referred to as CEIDARS), Final - Methodology to Calculate Particulate PM and PM_{2.5} (Appendix A). (October 3, 2023)

^[4] Emission factors from 40 CFR Part 98, Subpart C, Mandatory Greenhouse Gas Reporting. Conversion factor 1 kg = 2.20462 lbs.(June 2026)

^[5] The Global Warming Potential are from Table A-1 – Global Warming Potentials at 40 CFR 98, Subpart A, June 8, 2026. CO₂=1, N₂O=265, CH₄=28 (June 8 2026)

^[6] Sum of emissions from natural gas and diesel engines

Emergency Generator: EU-6, EU-7, EU-8, EU-9, EU-10

Calculations:

$$\text{PTE per fuel (lb/hr)} = [\text{C}] * [\text{B}] = [\text{D}]$$

$$\text{PTE [D] (tpy)} = ([\text{D}] \text{ lb/hr}) * [\text{A}] / 2000 \text{ lb/ton}$$

$$\text{Total PTE [E] (tpy)} = (\text{NG [D] lb/hr} + \text{Diesel [D] lb/hr})$$

$$\text{Total PTE [E] (tpy)} = ([\text{E}] \text{ lb/hr}) * [\text{A}] / 2000 \text{ lb/ton}$$

Hazardous Air Pollutant	Emission Factor [C]		Potential Emissions [D]				Total Potential Emissions [E]	
	Natural Gas ^[1] (lb/MMBtu)	Diesel ^[2] (lb/MMBtu)	Natural Gas Combined (lb/hr)	Natural Gas Combined (tpy)	Diesel (lb/hr)	Diesel (tpy)	(lb/hr) ^[3]	(tpy)
1,1,2,2-Tetrachloroethane	2.53E-05		1.50E-04	6.56E-04			1.50E-04	6.56E-04
1,1,2-Trichloroethane	1.53E-05		9.06E-05	3.97E-04			9.06E-05	3.97E-04
1,1-Dichloroethane	1.13E-05		6.69E-05	2.93E-04			6.69E-05	2.93E-04
1,2-Dichloroethane	1.13E-05		6.69E-05	2.93E-04			6.69E-05	2.93E-04
1,2-Dichloropropane	1.30E-05		7.70E-05	3.37E-04			7.70E-05	3.37E-04
1,3-Butadiene	6.63E-04	3.91E-05	3.92E-03	1.72E-02	1.10E-04	4.83E-04	4.04E-03	1.77E-02
1,3-Dichloropropene	1.27E-05		7.52E-05	3.29E-04			7.52E-05	3.29E-04
Acetaldehyde	2.79E-03	7.67E-04	1.65E-02	7.23E-02	2.16E-03	9.47E-03	1.87E-02	8.18E-02
Acrolein	2.63E-03	9.25E-05	1.56E-02	6.82E-02	2.61E-04	1.14E-03	1.58E-02	6.93E-02
Benzene	1.58E-03	9.33E-04	9.35E-03	4.10E-02	2.63E-03	1.15E-02	1.20E-02	5.25E-02
Carbon Tetrachloride	1.77E-05		1.05E-04	4.59E-04			1.05E-04	4.59E-04
Chlorobenzene	1.29E-05		7.64E-05	3.34E-04			7.64E-05	3.34E-04
Chloroform	1.37E-05		8.11E-05	3.55E-04			8.11E-05	3.55E-04
Ethylbenzene	2.48E-05		1.47E-04	6.43E-04			1.47E-04	6.43E-04
Ethylene Dibromide	2.13E-05		1.26E-04	5.52E-04			1.26E-04	5.52E-04
Formaldehyde	2.05E-02	1.18E-03	0.12	0.53	3.33E-03	1.46E-02	0.12	0.55
Methanol	3.06E-03		1.81E-02	7.93E-02			1.81E-02	7.93E-02
Methylene Chloride	4.12E-05		2.44E-04	1.07E-03			2.44E-04	1.07E-03
Naphthalene	9.71E-05	8.48E-05	5.75E-04	2.52E-03	2.39E-04	1.05E-03	8.14E-04	3.57E-03
POM (aka PAH)	1.41E-04	1.68E-04	8.35E-04	3.66E-03	4.74E-04	2.08E-03	1.31E-03	5.73E-03
Styrene	1.19E-05		7.04E-05	3.09E-04			7.04E-05	3.09E-04
Toluene	5.58E-04	4.09E-04	3.30E-03	1.45E-02	1.15E-03	5.05E-03	4.46E-03	1.95E-02
Vinyl Chloride	7.18E-05		4.25E-04	1.86E-03			4.25E-04	1.86E-03
Xylenes	1.95E-04	2.85E-04	1.15E-03	5.06E-03	8.04E-04	3.52E-03	1.96E-03	8.58E-03
Total HAPs			0.19	0.84	1.12E-02	4.89E-02	0.20	0.89

^[1] Emission Factors from AP-42 Chapter 3: Internal Combustion Sources, Section 3.2 (October 2024): Natural Gas Combustion, Table 3.2-3.

^[2] Emission Factors from AP-42 Chapter 3: Internal Combustion Sources, Section 3.3 (April 2025): Diesel Industrial Engines, Table 3.3-2.

^[3] Sum of emissions from natural gas and diesel engines

Fact Sheet Attachment

Flare: EU-12

Total Potential Emissions from the Flare (flare + pilot light)

Pollutant	Flare (tpy)	Pilot Light (tpy)	Total (tpy)
PM	3.30	4.91E-03	3.31
PM ₁₀	3.30	4.91E-03	3.31
PM _{2.5}	3.30	4.91E-03	3.31
SO ₂	349.84	7.01E-03	349.84
NO _x	8.59	9.11E-02	8.68
CO	10.13	5.26E-02	10.19
VOC	0.92	7.01E-03	0.93
CO ₂	25,642.81	91.06	25734
N ₂ O	0.31	8.69E-04	0.31
CH ₄	1.58	4.35E-03	1.58
GHGs (mass basis)	25,644.70	91.07	25,735.76
CO ₂ e	25,764.42	91.42	25,855.84

Fact Sheet Attachment

Flare: EU-12

Inputs:

	Capacity (biogas) =	51 MMBtu/hr	
	LFG quality* =	730 MMBtu/MMscf	
[A]	Flow rate=	0.070 MMscf/hr	
	Capacity (propane) =	0.0016 Mgal/hr	0.15 MMBtu/hr

* The heat content was taken from calculations done for past permitting actions. The past permitting action assumed 72% methane concentration in the biogas. It is conservatively assumed one hundred (100) percent of the H₂S is converted to SO₂.

[B] H ₂ S (ppmv), from permittee	7000
[C] Molecular weight of SO ₂ (g/mole)	64
[D] Gas volume at standard conditions (m ³ /mole; 25°C and 1 atm)	0.024466
SO ₂ emission factor (lbs/MMscf) = ([B]) x ([C] / [D]) / (453.6 {g/lb} x 35.31 {ft ³ /m ³ })	

PTE Calculations:

[F] (lb/hr) = [E]*[A]

[G] PTE (tpy) = [F]*(8760 hr/yr)/(2000 lb/ton)

Biogas Calculations

Pollutant	Emission Factor	Potential Emissions	
	[E] Biogas (lbs/MMscf)	[F] (lbs/hr)	[G] (tpy)
PM ^[1]	10.80	0.75	3.30
PM ₁₀ ^[1]	10.80	0.75	3.30
PM _{2.5} ^[1]	10.80	0.75	3.30
SO ₂ ^[2]	1,143.26	79.87	349.84
NO _x ^[1]	28.08	1.96	8.59
CO ^[1]	33.12	2.31	10.13
VOC ^[3]	3.00	0.21	0.92
	(kg/MMBtu) ^[4]		
CO ₂	52.07	5,854.52	25,642.81
N ₂ O	6.30E-04	7.08E-02	0.31
CH ₄	3.20E-03	0.36	1.58
GHG (mass basis)		5,854.95	25,644.70
CO ₂ e ^[5]		5,882.29	25,764.42

^[1] The DWEE elected to use emission factors from AP-42, Draft Section 2.4: Municipal Solid Waste Landfills (October 2008) for PM, NO_x, and CO. This choice was made since the previously used emission factors from AP-42 Section 2.4 (November 1998) had an average emission factor rating value of a “C”. The AP-42 Draft Section 2.4 had an emission factor rating of an “A” for each of the pollutants listed above. The emission factor taken from AP-42 was multiplied by 72% to account for the amount of methane in the fuel.

^[2] Engineering Estimate (see calculation above)

^[3] The VOC and HAP emission factors were taken from EPA’s Factor Information Retrieval (FIRE) Database Version 6.25 for External Combustion Boilers Using Process Gas Coming From a Public Owned Treatment Works Digester Gas-Fired Boiler (SCC 10300701). The DWEE believes the VOC produced by the anaerobic lagoons is more comparable to a wastewater treatment plant than a landfill.

^[4] Emission factors from 40 CFR Part 98, Subpart C, Mandatory Greenhouse Gas Reporting. Conversion factor 1 kg = 2.20462 lbs. (June 2026)

^[5] Title 129, Chapter 1 Section 064; Table A-1 – Global Warming Potentials” at 40 CFR 98, Subpart A June 8 , 2026. CO₂=1, N₂O=265, CH₄=28

Fact Sheet Attachment

Flare: EU-12

Biogas Calculations

	Emission Factor [E] Biogas (lbs/MMbtu) ^[1]	Potential Emissions [F] (lbs/hr)	Potential Emissions [G] (tpy)
HAPs			
1,1,1-Trichloroethane	1.25E-04	6.36E-03	2.79E-02
Acetaldehyde	1.30E-04	6.63E-03	2.90E-02
Acrolein	7.80E-05	3.98E-03	1.74E-02
Benzene	3.50E-03	0.18	0.78
Dichloromethane	1.37E-04	6.98E-03	3.06E-02
Formaldehyde	2.94E-04	1.50E-02	6.56E-02
Styrene	7.64E-05	3.90E-03	1.71E-02
Toluene	1.09E-04	5.56E-03	2.43E-02
Xylene	3.68E-05	1.88E-03	8.22E-03
Total HAPs		0.23	1.00

^[1] The VOC and HAP emission factors were taken from EPA's Factor Information Retrieval (FIRE) Database Version 6.25 for External Combustion Boilers Using Process Gas Coming From a Public Owned Treatment Works Digester Gas-Fired Boiler. The NDEE believes the VOC produced by the anaerobic lagoons is more comparable to a wastewater treatment plant than a landfill.

Fact Sheet Attachment

Flare: EU-12

Flare Pilot Light Potential Emissions:

Pilot light combusts only propane.

sulfur content of propane 1 grain/100 cf propane.

Emission factors are from AP-42, Chapter 1, Section 1.5, Table 1.5-1.

PTE Calculations:

[F] (lb/hr) = [E]*[A]

[G] PTE (tpy) = [F]*(8760 hr/yr)/(2000 lb/ton)

Pollutant	Emission Factor (lb/Mgal) [E]	Potential Emissions (lb/hr) [F]	Potential Emissions (tpy) [G]
PM ^[1]	0.7	1.12E-03	4.91E-03
PM ₁₀ ^[1]	0.7	1.12E-03	4.91E-03
PM _{2.5} ^[1]	0.7	1.12E-03	4.91E-03
SO ₂ ^[2]	1	1.60E-03	7.01E-03
NO _x	13	2.08E-02	9.11E-02
CO	7.5	1.20E-02	5.26E-02
VOC	1	1.60E-03	7.01E-03
	(kg/MMBtu) ^[4]		
CO ₂	63	20.79	91
N ₂ O	0.0006	1.98E-04	8.69E-04
CH ₄	0.003	9.92E-04	4.35E-03

^[1] Footnote "d" of Table 1.5-1 states "For natural gas, a fuel with similar combustion characteristics, all PM is less than 10 microns in aerodynamic equivalent diameter." Thus the same emission factor is used for PM, PM₁₀, and PM_{2.5} just as it is in natural gas emissions calculations.

^[2] According to footnote "e" of Table 1.5-1, the SO₂ emission factor is calculated with the equation Emission Factor = 0.10S where S = the sulfur content expressed in

^[3] Emission factors from 40 CFR Part 98, Subpart C, Mandatory Greenhouse Gas Reporting. Conversion factor 1 kg = 2.20462 lbs.

Pollutant	GWP ^[1]	CO ₂ e (tpy)
CO ₂	1	91.06
N ₂ O	265	0.23
CH ₄	28	0.12
Total		91.42

^[1] The Global Warming Potential are from Table A-1 – Global Warming Potentials at 40 CFR 98, Subpart A, June 8, 2026. CO₂=1, N₂O=265, CH₄=28

Fact Sheet Attachment
Haul Roads

Paved roads {AP-42 Chapter 13.2.1 (1/11)}

Equation (2): $E = k \times (sL)^{0.91} \times (W)^{1.02} \times \left(1 - \frac{P}{4 \times 365}\right)$

	<i>k</i>
PM	0.011
PM ₁₀	0.0022
PM _{2.5}	0.00054

Unpaved roads {AP-42 Chapter 13.2.2 (11/06)}

Equation (1a):
(Modified) $E = k \times \left(\frac{sC}{12}\right)^a \times \left(\frac{W}{3}\right)^b \times \left(\frac{365-P}{365}\right) \times \left(\frac{S}{30}\right)^d \times (1-CE)$

	<i>k</i>	<i>a</i>	<i>b</i>	<i>d</i>
PM	4.9	0.7	0.45	0.3
PM ₁₀	1.5	0.9	0.45	0.5
PM _{2.5}	0.15	0.9	0.45	0.5

Haul Road / Traffic Parameters

Activity / Road Description	Road Type / Silt Value		Roundtrip Length (feet)		Truck Weight (tons)			Ave. Speed (mph)	Unrestricted Maximum Throughput (units/yr)	Ave. Truck Capacity (units/truck)		Annual VMT
			empty	full	empty	full	Ave.					
Cattle Road	p	5.00	10,560	10,560	15	45	30.0	15	65,000	25	ton	10,400
Blood/Bone ^[1]	p	5.00	3,010	3,010	15	45	30.0	15	40,000	25	ton	1,824
Blood/Bone ^[1]	p	5.00	1,162	1,162	15	45	30.0	15	40,000	25	ton	704
Blood Plasma	p	5.00	2,323	2,323	15	45	30.0	15	14,000	25	ton	493
Box (beef for distribution)	p	5.00	6,706	6,706	15	45	30.0	15	11,125	25	ton	1,130
Paunch (waste material)	p	5.00	1,267	1,267	15	45	30.0	15	20,000	25	ton	384
Paunch (waste material)	u	6.00	370	370	15	45	30.0	15	25,000	25	ton	140

^[1] Blood/Bone is listed twice because there are two different sizes of truck used to move the dried blood and bone meal.

Emission Calculations

	Emission Factors (lb/VMT)			Potential Emissions (tons/yr)		
	PM	PM ₁₀	PM _{2.5}	PM	PM ₁₀	PM _{2.5}
Cattle Road	1.43	0.29	0.07	7.46	1.49	0.37
Blood/Bone[1]	1.43	0.29	0.07	1.31	0.26	0.06
Blood/Bone[1]	1.43	0.29	0.07	0.50	0.10	0.02
Blood Plasma	1.43	0.29	0.07	0.35	0.07	0.02
Box (beef for distribution)	1.43	0.29	0.07	0.81	0.16	0.04
Paunch (waste material)	1.43	0.29	0.07	0.28	0.06	0.01
Paunch (waste material)	5.20	1.21	0.12	0.36	0.08	0.01

Total Annual Emissions: 11.07 2.23 0.53

Description of Constants/Variables

E: haul road emissions (lb/VMT)

k, d: dimensionless constants from Draft AP-42 Chapter 13.IV (paved)

k, a, b, c, d: dimensionless constants from AP-42 Tables 13.2.1-1 & 13.2.2-2 (unpaved)

sL: silt loading (g/m²) of paved road surface

sC: silt content (%) of unpaved road surface

W: average vehicle weight (tons)

P: days/yr with at least 0.01" of precipitation

P = 90 default = 90

S: mean vehicle speed on road (mph)
default = 30, minimum = 15

CE: unpaved road, dust control efficiency

CE = 0 % default = 0%

VMT: vehicle miles traveled

Fact Sheet Attachment

Chapter 20 PM Limitations

Title 129, Chapter 20, Section 002 - Combustion PM (Filterable) Limits

The PM (filterable) limit is calculated according to Table 20-1.

When total heat input is <10 MMBtu/hr, maximum allowable PM emissions = 0.6 lb/MMBtu

When total heat input is between 10 and 10,000 MMBtu/hr, use the following:

Maximum allowable PM emissions = $1.026 / (I^{0.233})$ where I = total heat input in MMBtu/hr

PM (filterable) emissions limit (lb/hr) = max. allowable PM emissions (lb/MMBtu) * total heat input (MMBtu/hr)

Engine conversion factor = 7,000 Btu/hp-hr from AP-42 Chapter 3 (10/96), Table 3.3.1, Footnote a

Emission Unit ID #	Total Heat Input (hp)	Total Heat Input (MMBtu/hr)	Maximum Allowable PM Emissions (lb/MMBtu)	PM (filterable) Emissions Limit (lb/hr)	PTE (lb/hr)
EP-1	4,643	32.5	0.46	14.82	0.06
EP-2	7,429	52	0.41	21.25	0.10
EP-3	7,429	52	0.41	21.25	#REF!
EP-31	8,606	60.243	0.39	23.79	0.11
EP-4	1,057	7.4	0.60	4.44	1.19
EP-5	5,714	40	0.43	17.38	5.42
EP-12	7,286	51	0.41	20.93	0.75
EP-6	211	1.48	0.60	0.89	1.00E-02
EP-7	211	1.48	0.60	0.89	1.00E-02
EP-8	211	1.48	0.60	0.89	1.00E-02
EP-9	211	1.48	0.60	0.89	1.00E-02
EP-10	403	2.82	0.60	1.69	0.87

Title 129, Chapter 20, Section 001 - Process Weight Rate PM (Filterable) Limits

Process weight rate limits are calculated with the equations from Table 20-2.

Equation: $E = 4.10 * p^{0.67}$ where E = Rate of emission in lb/hr

p = process weight rate in tons/hr

When process weight rates are in excess of 60,000 lb/hr, use the following equation.

Equation: $E = 55.0 p^{0.11} - 40$ where E = Rate of emission in lb/hr

p = process weight rate in tons/hr

Rendering Processes:

Emission Unit ID#	Maximum Throughput per Emission Unit (tpy)	Maximum Rate per Emission Point (ton/hr)	Process Weight Rate PM Limit per Unit (lb/hr)	PTE (lb/hr)
EP-4	13,666	1.56	5.52	1.13
EP-5	113,004	12.9	22.74	5.11
EP-13	245,280	28.0	38.23	1.40
EP-15	13,666	1.6	5.52	3.90E-02
EP-16	13,666	1.6	5.52	0.13
EP-17	113,004	12.9	22.74	0.97
EP-18	26,280	3.0	8.56	7.50E-02
EP-19	26,280	3.0	8.56	0.26
EP-20	113,004	12.9	22.74	0.97
EP-21	96,360	11.0	20.44	0.83
EP-22	96,360	11.0	20.44	0.74
EP-23	96,360	11.0	20.44	0.28
EP-24	96,360	11.0	20.44	0.95