

FACT SHEET FOR: OP26R2-029**DATE:****DWEE ID:** 64753**Name of Source:** City of Nebraska City**Source Classification:** Class II Synthetic Minor 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.

The source is subject to and will comply with all applicable requirements found in Title 40 Protection of Environment, Code of Federal Regulations that apply to the source including those found at 40 CFR Part 52, Subpart CC or 40 CFR Part 70, Appendix A (federally enforceable requirements); the State Implementation Plan (SIP) approved Title 129 as amended September 28, 2022 cited in this permit and denoted by an asterisk () are federally enforceable; and the Environmental Protection Act, Neb. Rev. Stat. §§ 81-1501 to 81-1532, and Nebraska Administrative Code Title 129 as amended June 28, 2026. When Title 129 as amended June 28, 2026, cited in this permit becomes SIP approved and federally enforceable it will supersede Title 129 as amended September 28, 2022.*

DESCRIPTION OF THE SOURCE OR ACTIVITY:

This operating permit OP26R2-029 approves the operation of a municipal electric generation power plant. Nebraska City Utilities – Power Plant #3 operates under the standard industrial classification (SIC) code 4911 for Electric Services.

PERMIT HISTORY

Date Issued	Number	Status
3/17/1998	CP96-0032	Active
7/29/2003	SP-0341	Not active; superseded by OPSPR1-0042
6/20/2008	OPSPR1-0042	Not active; superseded by OP12R1-053
3/22/2016	CP15-014	Active
6/22/2016	OP12R1-053	Not active; superseded by OP21S1-001
9/30/2021	OP21S1-001	Not active; superseded by OP26R2-029
Tbd	OP26R2-029	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#: Unit 11			
Maxim silencer with Diesel Oxidation Catalyst 100 CPSI, minimum 70% reduction of CO, installed in February 2012	EU-1: Unit 11, 6,420 hp; maximum capacity: 16.3 MMBtu/hr. [4,777.06 kWh]: permitted fuel type: diesel or dual fuel	None	40 CFR Part 63, Subpart A; Title 129, Chapter 13, Section <u>002.01</u> *; Title 129; Chapter 13, Section <u>002.01</u>
			40 CFR Part 63, Subpart ZZZZ; Title 129, Chapter 13, Section <u>002.78</u> *; Title 129, Chapter 13, Section <u>002.79</u>
Emission Point ID#: Unit 12			
Maxim silencer with Diesel Oxidation Catalyst 100 CPSI, minimum 70% reduction of CO, installed in February 2012	EU-2: Unit 12, 6,420 hp; maximum capacity: 16.3 MMBtu/hr. [4,777.06 kWh]: permitted fuel type: diesel or dual fuel	None	40 CFR Part 63, Subpart A; Title 129, Chapter 13, Section <u>002.01</u> *; Title 129; Chapter 13, Section <u>002.01</u>
			40 CFR Part 63, Subpart ZZZZ; Title 129, Chapter 13, Section <u>002.78</u> *; Title 129, Chapter 13, Section <u>002.79</u>
Emission Point ID#: Unit 13			
N/A	EU-3: Unit 13, 6,148 hp; maximum capacity: 15.6 MMBtu/hr. [4,618.69 kWh]: permitted fuel type: diesel	None	40 CFR Part 63, Subpart A; Title 129, Chapter 13, Section <u>002.01</u> *; Title 129; Chapter 13, Section <u>002.01</u>
			40 CFR Part 63, Subpart ZZZZ; Title 129, Chapter 13, Section <u>002.78</u> *; Title 129, Chapter 13, Section <u>002.79</u>

Control Equipment ID# and Description	Emission Unit Description	Applicable NSPS Requirements	Applicable NESHAP Requirements
Emission Point ID#: Unit 14			
N/A	EU-4: Unit 14, 923 hp; maximum capacity: 2.3 MMBtu/hr. [674.06 kWh]; permitted fuel type: diesel	40 CFR Part 60, Subpart A; Title 129, Chapter 12, Section <u>001.01</u>	40 CFR Part 63, Subpart A; Title 129, Chapter 13, Section <u>002.01</u> *; Title 129; Chapter 13, Section <u>002.01</u>
		40 CFR Part 60, Subpart III; Title 129, Chapter 12, Section <u>001.80</u> *; Title 129, Chapter 12, Section <u>001.81</u>	40 CFR Part 63, Subpart ZZZZ; Title 129, Chapter 13, Section <u>002.78</u> *; Title 129, Chapter 13, Section <u>002.79</u>

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)	1.90	--[^{3]}
Particulate Matter less than or equal to 10 microns (PM ₁₀)	1.75	0.011
Particulate Matter less than or equal to 2.5 microns (PM _{2.5})	1.70	0.011
Sulfur Dioxide (SO ₂)	0.05	0.005
Oxides of Nitrogen (NO _x)	98.00	0.57
Carbon Monoxide (CO)	35.53	0.05
Volatile Organic Compounds (VOCs)	6.13	0.03
Greenhouse Gases (GHGs) ^[1]	12,285.69	--[^{3]}
Carbon Dioxide Equivalents (CO ₂ e) ^[1]	12,326.14	--[^{3]}
Hazardous Air Pollutants (HAPs)		
Greatest Individual HAP(s)		
Acetaldehyde	0.24	0.0005
Acrolein	0.24	0.0005
Formaldehyde	1.69	0.0036

Regulated Pollutant	Potential Emissions as limited by permit (tons/year)	Actual Emissions^[2] (tons/year)
All Other HAPs	0.25	0.0002
Total HAPs	2.42	0.005

^[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 March 31, 2025, air emissions inventory.

^[3] Not reported in Actual Emissions from March 31, 2025 air emissions inventory.

SUPPLEMENTAL INFORMATION:

Title 129, Chapter 4*; Title 129, Chapter 4 - Prevention of Significant Deterioration (PSD) of Air Quality

This existing source was constructed in 1998 and is not in one of the 28 source categories defined in 40 CFR 52.21(b)(1)(iii). The unlimited potential to emit NO_x from this source is greater than two hundred fifty (250) tons per year. In the 1998 Construction Permit (CP96-0032), the permittee elected to limit the operating hours for each engine to ensure that the potential to emit NO_x from the entire source is less than 250 tons/yr. The source was modified in 2013 with the addition of Unit #14 (EU-4) and Unit #14 Tank. The source was evaluated as emitting less than PSD major modification threshold. Therefore, a PSD-Construction Permit was not required to be issued.

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

Subpart A – General Provisions: This subpart, adopted by reference in Title 129, Chapter 12, Section 001.01*; Title 129, Chapter 12, Section 001.01, applies to those units covered by the specific NSPS as discussed below. The owner or operator is required to notify the Department when several milestones occur including, but not limited to, the date construction commenced postmarked no later than thirty (30) days after such date {40 CFR 60.7(a)(1)}, the actual date of initial start-up of the equipment postmarked within fifteen (15) days after such date {40 CFR 60.7(a)(3)}, and any physical or operational change to an existing facility which may increase the emission rate of any air pollutant to which a standard applies, unless that change is specifically exempted under an applicable subpart {40 CFR 60.7(a)(4)}.

Subpart IIII (adopted by reference in Title 129, Chapter 12, Section 001.80*; Title 129, Chapter 12, Section 001.81) - 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 owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) with displacement of less than 30 liters per cylinder that commenced construction, modification or reconstruction after July 11, 2005. Units #11, 12, and 13 were constructed prior to July 11, 2005, and the source indicated these units have not been modified since their installation. Therefore, Units #11, 12, and 13 are not subject to the requirements of this subpart. Unit #14 was installed in March 2013 thus is subject to NSPS Subpart IIII as an emergency engine.

The following NSPS appear to apply to the source, but do not:

Subpart Kb (adopted by reference in Title 129, Chapter 12, Section 001.19*; Title 129, Chapter 12, Section 001.20) - Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984: The diesel storage tanks (Tank #5 and Unit #14 Tank) were constructed after July 23, 1984, but each has a capacity less than 151 cubic meters (39,890 gallons).

Therefore, the requirements of NSPS Subpart Kb are not applicable to the diesel storage tanks at this source.

Note that NSPS rules are subject to change. Detailed information related to NSPS subparts can be found on the DWEE NSPS Notebook located on the DWEE website (<https://dwee.nebraska.gov/>). It is the source's obligation to comply with applicable NSPS subparts and requirements whether they are identified in this permitting action or Title 129.

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

Subpart A – General Provision: This subpart, adopted by reference in Title 129, Chapter 13, Section 002.01*; Title 129, Chapter 13, Section 002.01, applies to the owner or operator of any stationary source that emits or has the potential to emit any hazardous air pollutant listed in or pursuant to section 112(b) of the Act; and is subject to any standard, limitation, prohibition, or federally enforceable requirement established pursuant to Part 63. This source is subject to this subpart because it is subject to one of the subparts contained in Part 63 and emits hazardous air pollutants listed in section 112(b) of the Act.

Subpart ZZZZ - Stationary Reciprocating Internal Combustion Engines: This subpart, adopted by reference in Title 129, Chapter 13, Section 002.78*; Title 129, Chapter 13, Section 002.79, currently applies to existing, new, or reconstructed stationary reciprocating internal combustion engines (RICE) located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand. The four engines at this facility are subject to NESHAP Subpart ZZZZ.

This facility is an area source for HAPs. The Units #11, 12, and 13 are identified as existing, non-black, 4-stroke, and compression ignition engines. Units #11 and 12 are dual-fired (98% natural gas and 2% diesel), and Unit #13 is diesel fired. Per April 7, 2014, phone call to NMPP Energy (contact for Nebraska City Utilities), Unit #13 is an emergency engine, and Units #11 and 12 are non-emergency engines with add-on control devices (diesel oxidation catalyst, installed in February 2012).

Existing stationary non-emergency RICE located at an area source of HAP emissions must comply with the emission limitations, operating limitations, and other requirements in §63.6603. The non-emergency engines must limit concentration of CO exhaust to 23 ppmvd at 15 percent O₂; or reduce CO emissions by 70 percent or more, per Table 2c, item 5 in NESHAP Subpart ZZZZ. The emergency RICE is subject to operating limitations.

The non-emergency engines were tested from August 23, 2022. Engine #11 had an average CO reduction of 83.54%. Engine #12 had an average CO reduction of 83.55%.

Engine #14 is a new non-black, 4-stroke, compression ignition, emergency engine. This engine is subject to NESHAP ZZZZ; however, the engine is considered a new engine under the NESHAP. Per §63.6590(c)(1), new stationary RICE located at an area source for HAPs must comply with NESHAP ZZZZ by complying with the requirements of NSPS Subpart IIII. No further requirements of the NESHAP apply to engines that meet these criteria.

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 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 Title 129, Chapter 15, Section 001.02*; Title 129, 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, Section 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.

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.

(A) Non-Emergency Engines

- (A)(2) Engines #11 and 12 are not subject to NSPS Subpart IIII because they were constructed prior to July 11, 2005, and have not been modified or reconstructed since July 11, 2005. The two engines, Units #11 and 12, are subject to NESHAP Subpart ZZZZ.

All of engines are subject to PM limitations per Title 129, Chapter 15, Section 001.02*; Title 129, Chapter 15, Section 001.02. The non-emergency engines (Units # 11 and 12) have CO limitations per NESHAP Subpart ZZZZ. Both of these engines are subject to opacity limitations per Title 129, Chapter 15, Section 001.04*; Title 129, Chapter 15, Section 001.04. The non-emergency engines (Units #11 and 12) are required to conduct CO testing in accordance with NESHAP Subpart ZZZZ.

- (A)(3) This section addresses operational and monitoring requirements.
- Condition (a) requires compliance with NESHAP Subparts A and ZZZZ requirements for emission units Unit #11 and 12.
 - Condition (c) restricts the operation of Units #11 and 12 (hrs. and fuel type) to demonstrate compliance with the 1998 CP Condition VIII.(A).
 - Condition (c) establishes requirement for the operation of Units #11 and 12 on 100% diesel fuel during periods of natural gas supply interruption beyond the control of Nebraska City Utilities, as specified in the 1998 CP Condition VIII.(D).
 - Condition (e) requires an hour meter and flow meter to demonstrate compliance with Conditions (c) through (f) to demonstrate compliance with the 1998 CP Conditions VII.(E) and (F).
 - Condition (f) establishes fuel requirements for the units. The condition insures only low sulfur fuel is used in the units to maintain compliance with the New Unit Exemption requirements of 40 CFR Part 72. This condition demonstrates compliance with the 1998 CP Condition VIII.(H). The sulfur content of the diesel fuel was updated to the more stringent standard from NSPS Subpart IIII and NESHAP Subpart ZZZZ (both reference 40 CFR 80.510(b)).
 - Condition (g) specifies opacity periodic monitoring requirements to demonstrate compliance with the 1998 CP Condition VIII.(K).
- (A)(4) This condition identifies all the recordkeeping and reporting required for these engines.
- Condition (a) requires compliance with NESHAP Subparts A and ZZZZ requirements for recordkeeping and reporting for emission units Unit #13 and 14.

- Conditions (b) and (c) require the recordkeeping of the operating hours and fuel usage to demonstrate compliance with Condition III.(A)(4)(c) through (f) of this permit, and as specified in the 1998 CP Conditions VIII.(L)(2) and (L)(3).
- Conditions (d) and (e) require documentation of the type of fuel in each engine, and documentation showing the sulfur weight percent of the diesel fuel.
- Condition (f) requires the documentation of the visible emissions survey and any corrective action taken, if applicable.

(B) Emergency Engines

- (B)(2) Engine #14 is subject to NSPS Subpart IIII. Engine #14 demonstrates compliance with NESHAP Subpart ZZZZ by complying with NSPS Subpart IIII. These engines have a New Unit Exemption under the Acid Rain rule. Engine #13 is not subject to NSPS Subpart IIII because it was constructed prior to July 11, 2005, and has not been modified or reconstructed since July 11, 2005. The two engines, Units #13 and 14, are subject to NESHAP Subpart ZZZZ.

All of engines are subject to PM limitations per Title 129, Chapter 15, Section 001.02*; Title 129, Chapter 15, Section 001.02. Engine #13 does not have an emission limit in NESHAP Subpart ZZZZ. Engine #14 has emission limitation from NSPS Subpart IIII. Both engines are subject to opacity limitations per Title 129, Chapter 15, Section 001.04*; Title 129, Chapter 15, Section 001.04.

- (B)(3) This section addresses operational and monitoring requirements.
- Condition (a) requires compliance with NESHAP Subparts A and ZZZZ requirements for emission units, Units #13 and 14.
 - Condition (a) requires compliance with NSPS Subparts A and IIII requirements for Emission Unit #14.
 - Condition (c) restricts the operation of Unit #13 (hrs. and fuel type) to demonstrate compliance with the 1998 CP Condition VIII.(B).
 - Condition (d) allows flexibility in the operation of the engines, as specified in the 1998 CP Condition VIII.(C), by allowing operational hours of Unit #13 to be transferred to Units #11 or 12 when they are operated in dual-fuel mode.
 - Condition (c) establishes requirement for the operation of Unit #13 on diesel fuel and limited operational hours, as specified in the 1998 CP Condition VIII.(B).
 - Condition (f) restricts operating hours of Emission Unit #14 to demonstrate compliance with 2016 CP Condition III.(A)(3)(a).
 - Condition (g) establishes fuel requirements for the units. The condition insures only low sulfur fuel is used in the units to maintain compliance with the New Unit Exemption requirements of 40 CFR Part 72. This condition demonstrates compliance with the 1998 CP Condition VIII.(H). The sulfur content of the diesel fuel was updated to the more stringent standard from NSPS Subpart IIII and NESHAP Subpart ZZZZ (both reference 40 CFR 80.510(b)).
 - Condition (h) specifies opacity periodic monitoring requirements to demonstrate compliance with the 1998 CP Condition VIII.(K).
- (B)(4) This condition identifies all the recordkeeping and reporting required for these engines.
- Condition (a) requires compliance with NSPS Subparts A and IIII requirements for recordkeeping and reporting for Emission Unit #14.
 - Condition (b) requires compliance with NESHAP Subparts A and ZZZZ requirements for recordkeeping and reporting for all four emission units.
 - Conditions (c) and (d) require the recordkeeping of the operating hours and fuel usage to demonstrate compliance with Condition III.(A)(4)(c) through (f) of this permit, and as specified in the 1998 CP Conditions VIII.(L)(2) and (L)(3).

- Condition (d) requires the recordkeeping of the operating hours for Emission Unit #14 to demonstrate compliance with Condition III.(A)(4)(i).
- Conditions (e) and (f) require the documentation of the type of fuel in each engine, and documentation showing the sulfur weight percent of the diesel fuel.
- Condition (g) requires the documentation of the visible emissions survey and any corrective action taken, if applicable.

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 OP26R2-029, received June 22, 2026, including any supporting information received prior to issuance of the permit:

Insignificant Activity ID	Unit Description	Insignificance Criteria
Tank 5	Diesel Fuel Storage Tank (underground), 30,000-gallon capacity, installed in 1997, associated with Units #11, 12, and 13	Annual source-wide throughput of less than 1 million gallons
Unit #14 Tank	Diesel Fuel Storage Tank, 513-gallon capacity, installed in March 2013, located in the base frame for Unit #14	

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 Operating Permit Application Forms, are 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).

Fact Sheet Attachment
Potential Emissions Summary

Pollutant	Potential Emissions					Total Potential Emissions (tons/yr)	Emission Factor (lb/MMBtu) ⁽¹⁾	Limited Potential Emissions ⁽²⁾ (tons/yr)
	(tons/yr)							
	Unit #11	Unit #12	Unit #13	Unit #14	Tanks			
PM	1.220	1.220	4.045	0.018		6.50	6.20E-02	1.90
PM ₁₀	1.220	1.220	4.045	0.018		6.50	5.73E-02	1.75
PM _{2.5}	1.220	1.220	4.045	0.018		6.50	5.56E-02	1.70
SO _x	0.242	0.242	3.237	0.003		3.72	1.52E-03	0.05
NO _x	48.923	48.923	145.346	2.971		246.16	3.20E+00	98.00
CO	11.016	11.016	19.453	0.244		41.73	1.16E+00	35.53
VOC	55.802	55.802	6.475	0.005	2.58E-02	118.11	2.00E-01	6.13
Hazardous Air Pollutants								
Acetaldehyde	0.231	0.231	4.70E-04	1.48E-05		0.46	7.76E-03	2.38E-01
Acrolein	0.142	0.142	1.47E-04	4.62E-06		0.28	7.78E-03	2.38E-01
Benzene	1.26E-02	1.26E-02	1.45E-02	4.55E-04	1.25E-05	0.04	1.94E-03	5.94E-02
Biphenyl	5.86E-03	5.86E-03				1.17E-02	3.95E-06	1.21E-04
1,3-Butadiene	7.38E-03	7.38E-03				1.48E-02	2.62E-04	8.01E-03
Carbon tetrachloride	1.01E-03	1.01E-03				2.03E-03	6.07E-05	1.86E-03
Chlorobenzene	8.40E-04	8.40E-04				1.68E-03	4.44E-05	1.36E-03
Chloroform	7.88E-04	7.88E-04				1.58E-03	4.71E-05	1.44E-03
Chrysene	1.92E-05	1.92E-05				3.83E-05	6.79E-07	2.08E-05
1,3-Dichloropropene	7.30E-04	7.30E-04				1.46E-03	2.59E-05	7.92E-04
Ethyl benzene	1.10E-03	1.10E-03			8.50E-05	2.28E-03	1.08E-04	3.31E-03
Ethylene dibromide	1.22E-03	1.22E-03				2.45E-03	7.34E-05	2.25E-03
Formaldehyde	1.460	1.460	1.47E-03	4.63E-05		2.92	5.52E-02	1.69E+00
Hexane	3.07E-02	3.07E-02			2.23E-04	0.06	4.45E-04	1.36E-02
Methanol	6.91E-02	6.91E-02				0.14	2.48E-03	7.60E-02
Methylene Chloride	5.53E-04	5.53E-04				1.11E-03	1.47E-04	4.50E-03
Naphthalene	2.13E-03	2.13E-03	2.43E-03	7.63E-05	2.23E-04	6.99E-03	1.30E-04	3.98E-03
Phenol	6.63E-04	6.63E-04				1.33E-03	4.21E-05	1.29E-03
Polycyclic Organic Matter	1.69E-03	1.69E-03	1.52E-03	4.78E-05		4.95E-03	8.14E-05	2.49E-03
Styrene	6.52E-04	6.52E-04				1.30E-03	5.48E-05	1.68E-03
Toluene	1.14E-02	1.14E-02	5.24E-03	1.65E-04	8.59E-05	0.03	9.63E-04	2.95E-02
1,1,2,2-Tetrachloroethane	1.11E-03	1.11E-03				2.21E-03	6.63E-05	2.03E-03
1,1,2-Trichloroethane	8.79E-04	8.79E-04				1.76E-03	5.27E-05	1.61E-03
2,2,4-Trimethylpentane	6.91E-03	6.91E-03				1.38E-02	8.46E-04	2.59E-02
Vinyl Chloride	4.12E-04	4.12E-04				8.24E-04	2.47E-05	7.56E-04
Xylenes	5.19E-03	5.19E-03	3.60E-03	1.13E-04	1.63E-04	1.43E-02	2.68E-04	8.21E-03
Total HAPs	2.00	2.00	0.03	0.00	8.71E-04	4.02		2.42
Greenhouse Gases (GHGs)								
Total GHGs (mass basis: tons/yr)	4,573.33	4,573.33	3,043.36	95.67		12,285.69		
Total GHGs (CO ₂ equivalents: tons CO ₂ e/yr) ⁽³⁾	4,587.99	4,587.99	3,053.21	95.98		12,325.16		

(1) Emission Factors from AP-42 Chapter 3.2 Natural Gas-fired Reciprocating Engines, Table 3.2-1 (10/2024) and Chapter 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines, Tables 3.4-1 and 3.4-2 (4/2025) - using the largest emission factor between diesel and dual fuel to calculate the worst case scenario.

Limited Facility Wide MMBtu/yr⁽²⁾ = 61,250.00

(2) Limiting NO_x emissions to 98 ton/yr: 98 tons/yr*2000 lbs/ton*(1 MMBtu/3.2 lbs) = x MMBtu/yr

(3) Total GHGs CO₂e = tons CO₂e/yr = [(tons/yr CO₂)*1]+[(tons/yr CH₄)*28]+[(tons/yr N₂O)*265]; CO₂ equivalents are found in 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials published on January 1, 2025 (Title 129, Chapter 1*; Title 129, Chapter 1). The CO₂e for CO₂ =1, for CH₄ =28, and for N₂O = 265.

Fact Sheet Attachment

Emission Calculations for Engines - Unit # 11

Sulfur content:	15 ppm	diesel fuel ^[2]	0.00068	natural gas
Heat content of diesel:	137,000	Btu/gal	Diesel Btu/gal value from AP-42, Appendix A (9/85(Reformatted 1/95)), page A-5.	

Unit ID	Maximum Capacity	Maximum Heat Input ^[1]	Diesel Fuel Limitation ^[2]	Diesel Operating Hour Limit	Dual Fuel Operating Hour Limit ^[2]	Total Annual Heat Input for Diesel	Total Annual Heat Input for Dual Fuel	CO Control Efficiency (NESHAP Subpart ZZZZ) ^[3]
	(hp)	(MMBtu/hr)	(gal/yr)	(hrs/yr)	(hrs/yr)	(MMBtu/yr)	(MMBtu/yr)	%
11	6,420	16.3	20,390	171.1	3,456	2,793	56,411.8	70%

^[1] Maximum Heat Input (MMBtu/hr) = [Maximum Capacity hp]*(0.0025425 MMBtu/hp)

^[2] The diesel sulfur content, diesel fuel limits, and operating hours limits were established in CP #96-0032 issued on March 17, 1998.

^[3] NESHAP Subpart ZZZZ requires either ≤ 23 ppmvd CO or 70% or more reduction of CO for existing non-emergency engines. Based on the August 23, 2022 stack test, the non-emergency engines (Units #11 and 12) are in compliance with the CO reduction limit.

Pollutant	Fuel Type	Emission Factor		Unit #11		
				Potential Hourly Rate by Fuel	Potential Annual Rate by Fuel	Worst-Case Potential Emissions
				(lb/hr) ^[5]	(tons/yr) ^[6]	(tons/yr) ^[7]
PM	diesel	5.51E-04	lb/hp-hr ^[4]	3.54	0.303	1.22
	dual fuel	1.10E-04	lb/hp-hr ^[4]	0.71	1.220	
PM ₁₀	diesel	5.51E-04	lb/hp-hr ^[4]	3.54	0.303	1.22
	dual fuel	1.10E-04	lb/hp-hr ^[4]	0.71	1.220	
PM _{2.5}	diesel	5.51E-04	lb/hp-hr ^[4]	3.54	0.303	1.22
	dual fuel	1.10E-04	lb/hp-hr ^[4]	0.71	1.220	
SO _x	diesel	4.41E-04	lb/hp-hr ^[4]	2.83	0.242	0.24
	dual fuel	1.10E-05	lb/hp-hr ^[4]	0.07	0.122	
NO _x	diesel	1.98E-02	lb/hp-hr ^[4]	127.12	10.877	48.92
	dual fuel	4.41E-03	lb/hp-hr ^[4]	28.31	48.923	
CO	diesel	2.65E-03	lb/hp-hr ^[4]	5.10	0.437	11.02
	dual fuel	3.31E-03	lb/hp-hr ^[4]	6.38	11.016	
VOC	diesel	8.82E-04	lb/hp-hr ^[4]	5.66	0.485	55.80
	dual fuel	5.03E-03	lb/hp-hr ^[4]	32.29	55.802	
Hazardous Air Pollutants				(lb/hr) ^[10]	(tons/yr) ^[11]	(tons/yr) ^[6]
Acetaldehyde	diesel	2.52E-05	lb/MMBtu ^[8]	4.11E-04	3.52E-05	0.23
	dual fuel	8.19E-03	lb/MMBtu ^[9]	0.13	0.23	
Acrolein	diesel	7.88E-06	lb/MMBtu ^[8]	1.29E-04	1.10E-05	0.14
	dual fuel	5.04E-03	lb/MMBtu ^[9]	8.22E-02	0.14	
Benzene	diesel	7.76E-04	lb/MMBtu ^[8]	1.27E-02	1.08E-03	1.26E-02
	dual fuel	4.47E-04	lb/MMBtu ^[9]	7.29E-03	1.26E-02	
Biphenyl	dual fuel	2.08E-04	lb/MMBtu ^[9]	3.39E-03	5.86E-03	5.86E-03
1,3-Butadiene	dual fuel	2.62E-04	lb/MMBtu ^[9]	4.27E-03	7.38E-03	7.38E-03
Carbon tetrachloride	dual fuel	3.60E-05	lb/MMBtu ^[9]	5.87E-04	1.01E-03	1.01E-03
Chlorobenzene	dual fuel	2.98E-05	lb/MMBtu ^[9]	4.86E-04	8.40E-04	8.40E-04
Chloroform	dual fuel	2.79E-05	lb/MMBtu ^[9]	4.56E-04	7.88E-04	7.88E-04
Chrysene	dual fuel	6.79E-07	lb/MMBtu ^[9]	1.11E-05	1.92E-05	1.92E-05
1,3-Dichloropropene	dual fuel	2.59E-05	lb/MMBtu ^[9]	4.22E-04	7.30E-04	7.30E-04
Ethyl benzene	dual fuel	3.89E-05	lb/MMBtu ^[9]	6.35E-04	1.10E-03	1.10E-03
Ethylene dibromide	dual fuel	4.34E-05	lb/MMBtu ^[9]	7.09E-04	1.22E-03	1.22E-03

Fact Sheet Attachment

Emission Calculations for Engines - Unit # 11 (Continued)

Pollutant	Fuel Type	Emission Factor		Unit #11		
				Potential Hourly Rate by Fuel	Potential Annual Rate by Fuel	Worst-Case Potential Emissions
				(lb/hr) ^[10]	(tons/yr) ^[11]	(tons/yr) ^[7]
Formaldehyde	diesel	7.89E-05	lb/MMBtu ^[8]	1.29E-03	1.10E-04	1.46
	dual fuel	5.17E-02	lb/MMBtu ^[9]	0.84	1.46	
Hexane	dual fuel	1.09E-03	lb/MMBtu ^[9]	1.78E-02	3.07E-02	3.07E-02
Methanol	dual fuel	2.45E-03	lb/MMBtu ^[9]	4.00E-02	0.07	0.07
Methylene Chloride	dual fuel	1.96E-05	lb/MMBtu ^[9]	3.20E-04	5.53E-04	5.53E-04
Naphthalene	diesel	1.30E-04	lb/MMBtu ^[8]	2.12E-03	1.82E-04	2.13E-03
	dual fuel	7.55E-05	lb/MMBtu ^[9]	1.23E-03	2.13E-03	
Phenol	dual fuel	2.35E-05	lb/MMBtu ^[9]	3.84E-04	6.63E-04	6.63E-04
Polycyclic Organic Matter (POM)	diesel	8.14E-05	lb/MMBtu ^[8]	1.33E-03	1.14E-04	1.69E-03
	dual fuel	6.00E-05	lb/MMBtu ^[9]	9.79E-04	1.69E-03	
Styrene	dual fuel	2.31E-05	lb/MMBtu ^[9]	3.78E-04	6.52E-04	6.52E-04
Toluene	diesel	2.81E-04	lb/MMBtu ^[8]	4.59E-03	3.92E-04	1.14E-02
	dual fuel	4.05E-04	lb/MMBtu ^[9]	6.62E-03	1.14E-02	
1,1,2,2-Tetrachloroethane	dual fuel	3.92E-05	lb/MMBtu ^[9]	6.40E-04	1.11E-03	1.11E-03
1,1,2-Trichloroethane	dual fuel	3.12E-05	lb/MMBtu ^[9]	5.09E-04	8.79E-04	8.79E-04
2,2,4-Trimethylpentane	dual fuel	2.45E-04	lb/MMBtu ^[9]	4.00E-03	6.91E-03	6.91E-03
Vinyl Chloride	dual fuel	1.46E-05	lb/MMBtu ^[9]	2.38E-04	4.12E-04	4.12E-04
Xylenes	diesel	1.93E-04	lb/MMBtu ^[8]	3.15E-03	2.70E-04	5.19E-03
	dual fuel	1.84E-04	lb/MMBtu ^[9]	3.01E-03	5.19E-03	
Total HAPs	diesel			0.026	2.20E-03	2.00
	dual fuel			1.15	2.00	
Greenhouse Gases (GHGs)				(lb/hr)^[13]	(tons/yr)^[11]	(tons/yr)^[7]
CO ₂	diesel	73.96	kg/MMBtu ^[12]	2,661.52	227.74	4,573.33
CH ₄	diesel	3.00E-03	kg/MMBtu ^[12]	0.11	9.24E-03	
N ₂ O	diesel	6.00E-04	kg/MMBtu ^[12]	2.16E-02	1.85E-03	
Total GHGs	diesel		kg/MMBtu ^[12]	2,661.65	227.75	
CO ₂	dual fuel	73.54	kg/MMBtu ^[12]	2,646.48	4,573.11	
CH ₄	dual fuel	2.96E-03	kg/MMBtu ^[12]	0.11	0.18	
N ₂ O	dual fuel	5.90E-04	kg/MMBtu ^[12]	2.12E-02	3.67E-02	
Total GHGs	dual fuel			2,646.60	4,573.33	
Total GHGs (CO₂ equivalents) (tons CO₂e/yr)^[14]	diesel				228.49	4,587.99
	dual fuel				4,587.99	

^[4] The engine manufacturer submitted emission factors per the application for the 1998 construction permit for PM, PM₁₀, NOx, SO₂, CO, and VOC. It is assumed PM_{2.5} = PM₁₀.

^[5] lbs/hr = [hp for specified engine]*[Emission Factor (lb/hp-hr)]; for CO for Units #11 and #12, lbs/hr = [hp for specified engine]*[Emission Factor (lb/hp-hr)]*(1-[Control Efficiency %])

^[6] tons/yr = [lb/hr for specific engine and specific fuel]*[Operating Hour Limit (hrs/yr)]/(2000 lbs/ton)

^[7] Worst-Case Emissions = Maximum of [Potential Annual Rate for Diesel (tons/yr)] or [Potential Annual Rate for Dual Fuel (tons/yr)]

^[8] Diesel HAP emission factors are from AP-42 Chapter 3.4 (10/96), Tables 3.4-3 and 3.4-4; The HAP identified as PAH (poly aromatic hydrocarbons) in Table 3.4-4 is identified a polycyclic organic matter (POM) {as identified in Title 129} in the table above; any individual POM (i.e. naphthalene) that is listed as a separate HAP is not included in the POM emission factor.

^[9] Dual fuel for the Enviro-Design modification of engine consists of 98% natural gas and 2% diesel. Units #11 & 12 are 4-stroke engines. Natural gas emission factors are from AP-42 Chapter 3.2 (7/2000), Tables 3.2.1 and 3.2.2. Dual fired emission factor = (0.98 * emission factor for natural gas)+(0.02 * emission factor for diesel). The HAP identified as PAH (poly aromatic hydrocarbons) in Tables 3.2-1 and 3.2-2 is identified a polycyclic organic matter (POM) {as identified in Title 129} in the table above; any individual POM (i.e. naphthalene) that is listed as a separate HAP is not included in the POM emission factor.

^[10] lbs/hr = (MMBtu/hr for specified engine)*[Emission Factor (lb/MMBtu)]

^[11] tons/yr = (MMBtu/yr for specified engine)*[Emission Factor (lb/MMBtu)]/(2000 lbs/ton); The MMBtu/hr takes into account the hrs/yr per engine, and the gal/hr limitation of diesel per engine.

^[12] GHG emissions were taken from 40 CFR Part 98 Subpart C, Table C-2 for *Petroleum (All fuel types in Table C-1)*. Dual fuel for the Enviro-Design modification of engine consists of 98% natural gas and 2% diesel.

^[13] lbs/hr = (MMBtu/hr for specified engine)*[Emission Factor (kg/MMBtu)]/(907.18 kg/ton)*(2000 lbs/ton)

^[14] tons CO₂e/yr = [(tons/yr CO₂)*1]+[(tons/yr CH₄)*28]+[(tons/yr N₂O)*265]; CO₂ equivalents are found in 40 CFR Part 98 Subpart A Table A-1 *Global Warming Potentials* published on January 1, 2025 (Title 129, Chapter 1*; Title 129, Chapter 1*; Title 129, Chapter 1). The CO₂e for CO₂=1, for CH₄=28, and for N₂O=265.

Fact Sheet Attachment

Emission Calculations for Engines - Unit # 12

Sulfur content:	15 ppm	diesel fuel ^[2]	0.00068	natural gas
Heat content of diesel:	137,000	Btu/gal	Diesel Btu/gal value from AP-42, Appendix A (9/85(Reformatted 1/95)), page A-5.	

Unit ID	Maximum Capacity	Maximum Heat Input ^[1]	Diesel Fuel Limitation ^[2]	Diesel Operating Hour Limit	Dual Fuel Operating Hour Limit ^[2]	Total Annual Heat Input for Diesel	Total Annual Heat Input for Dual Fuel	CO Control Efficiency (NESHAP Subpart ZZZZ) ^[3]
	(hp)	(MMBtu/hr)	(gal/yr)	(hrs/yr)	(hrs/yr)	(MMBtu/yr)	(MMBtu/yr)	%
12	6,420	16.3	20,390	171.1	3,456	2,793	56,411.8	70%

^[1] Maximum Heat Input (MMBtu/hr) = [Maximum Capacity hp]*(0.0025425 MMBtu/hp)

^[2] The diesel sulfur content, diesel fuel limits, and operating hours limits were established in CP #96-0032 issued on March 17, 1998.

^[3] NESHAP Subpart ZZZZ requires either ≤ 23 ppmvd CO or 70% or more reduction of CO for existing non-emergency engines. Based on the August 23, 2022 stack test, the non-emergency engines (Units #11 and 12) are in compliance with the CO reduction limit.

Pollutant	Fuel Type	Emission Factor		Unit #12		
				Potential Hourly Rate by Fuel	Potential Annual Rate by Fuel	Worst-Case Potential Emissions
				(lb/hr) ^[5]	(tons/yr) ^[6]	(tons/yr) ^[7]
PM	diesel	5.51E-04	lb/hp-hr ^[4]	3.54	0.303	1.22
	dual fuel	1.10E-04	lb/hp-hr ^[4]	0.71	1.220	
PM ₁₀	diesel	5.51E-04	lb/hp-hr ^[4]	3.54	0.303	1.22
	dual fuel	1.10E-04	lb/hp-hr ^[4]	0.71	1.220	
PM _{2.5}	diesel	5.51E-04	lb/hp-hr ^[4]	3.54	0.303	1.22
	dual fuel	1.10E-04	lb/hp-hr ^[4]	0.71	1.220	
SO _x	diesel	4.41E-04	lb/hp-hr ^[4]	2.83	0.242	0.24
	dual fuel	1.10E-05	lb/hp-hr ^[4]	0.07	0.122	
NO _x	diesel	1.98E-02	lb/hp-hr ^[4]	127.12	10.877	48.92
	dual fuel	4.41E-03	lb/hp-hr ^[4]	28.31	48.923	
CO	diesel	2.65E-03	lb/hp-hr ^[4]	5.10	0.437	11.02
	dual fuel	3.31E-03	lb/hp-hr ^[4]	6.38	11.016	
VOC	diesel	8.82E-04	lb/hp-hr ^[4]	5.66	0.485	55.80
	dual fuel	5.03E-03	lb/hp-hr ^[4]	32.29	55.802	
Hazardous Air Pollutants				(lb/hr)^[10]	(tons/yr)^[11]	(tons/yr)^[6]
Acetaldehyde	diesel	2.52E-05	lb/MMBtu ^[8]	4.11E-04	3.52E-05	0.23
	dual fuel	8.19E-03	lb/MMBtu ^[9]	0.13	0.23	
Acrolein	diesel	7.88E-06	lb/MMBtu ^[8]	1.29E-04	1.10E-05	0.14
	dual fuel	5.04E-03	lb/MMBtu ^[9]	8.22E-02	0.14	
Benzene	diesel	7.76E-04	lb/MMBtu ^[8]	1.27E-02	1.08E-03	1.26E-02
	dual fuel	4.47E-04	lb/MMBtu ^[9]	7.29E-03	1.26E-02	
Biphenyl	dual fuel	2.08E-04	lb/MMBtu ^[9]	3.39E-03	5.86E-03	5.86E-03
1,3-Butadiene	dual fuel	2.62E-04	lb/MMBtu ^[9]	4.27E-03	7.38E-03	7.38E-03
Carbon tetrachloride	dual fuel	3.60E-05	lb/MMBtu ^[9]	5.87E-04	1.01E-03	1.01E-03
Chlorobenzene	dual fuel	2.98E-05	lb/MMBtu ^[9]	4.86E-04	8.40E-04	8.40E-04
Chloroform	dual fuel	2.79E-05	lb/MMBtu ^[9]	4.56E-04	7.88E-04	7.88E-04
Chrysene	dual fuel	6.79E-07	lb/MMBtu ^[9]	1.11E-05	1.92E-05	1.92E-05
1,3-Dichloropropene	dual fuel	2.59E-05	lb/MMBtu ^[9]	4.22E-04	7.30E-04	7.30E-04
Ethyl benzene	dual fuel	3.89E-05	lb/MMBtu ^[9]	6.35E-04	1.10E-03	1.10E-03
Ethylene dibromide	dual fuel	4.34E-05	lb/MMBtu ^[9]	7.09E-04	1.22E-03	1.22E-03

Fact Sheet Attachment

Emission Calculations for Engines - Unit # 12 (Continued)

Pollutant	Fuel Type	Emission Factor		Unit #12		
				Potential Hourly Rate by Fuel	Potential Annual Rate by Fuel	Worst-Case Potential Emissions
				(lb/hr) ^[10]	(tons/yr) ^[11]	(tons/yr) ^[7]
Formaldehyde	diesel	7.89E-05	lb/MMBtu ^[8]	1.29E-03	1.10E-04	1.46
	dual fuel	5.17E-02	lb/MMBtu ^[9]	0.84	1.46	
Hexane	dual fuel	1.09E-03	lb/MMBtu ^[9]	1.78E-02	3.07E-02	3.07E-02
Methanol	dual fuel	2.45E-03	lb/MMBtu ^[9]	4.00E-02	0.07	0.07
Methylene Chloride	dual fuel	1.96E-05	lb/MMBtu ^[9]	3.20E-04	5.53E-04	5.53E-04
Naphthalene	diesel	1.30E-04	lb/MMBtu ^[8]	2.12E-03	1.82E-04	2.13E-03
	dual fuel	7.55E-05	lb/MMBtu ^[9]	1.23E-03	2.13E-03	
Phenol	dual fuel	2.35E-05	lb/MMBtu ^[9]	3.84E-04	6.63E-04	6.63E-04
Polycyclic Organic Matter (POM)	diesel	8.14E-05	lb/MMBtu ^[8]	1.33E-03	1.14E-04	1.69E-03
	dual fuel	6.00E-05	lb/MMBtu ^[9]	9.79E-04	1.69E-03	
Styrene	dual fuel	2.31E-05	lb/MMBtu ^[9]	3.78E-04	6.52E-04	6.52E-04
Toluene	diesel	2.81E-04	lb/MMBtu ^[8]	4.59E-03	3.92E-04	1.14E-02
	dual fuel	4.05E-04	lb/MMBtu ^[9]	6.62E-03	1.14E-02	
1,1,2,2-Tetrachloroethane	dual fuel	3.92E-05	lb/MMBtu ^[9]	6.40E-04	1.11E-03	1.11E-03
1,1,2-Trichloroethane	dual fuel	3.12E-05	lb/MMBtu ^[9]	5.09E-04	8.79E-04	8.79E-04
2,2,4-Trimethylpentane	dual fuel	2.45E-04	lb/MMBtu ^[9]	4.00E-03	6.91E-03	6.91E-03
Vinyl Chloride	dual fuel	1.46E-05	lb/MMBtu ^[9]	2.38E-04	4.12E-04	4.12E-04
Xylenes	diesel	1.93E-04	lb/MMBtu ^[8]	3.15E-03	2.70E-04	5.19E-03
	dual fuel	1.84E-04	lb/MMBtu ^[9]	3.01E-03	5.19E-03	
Total HAPs	diesel			0.026	2.20E-03	2.00
	dual fuel			1.15	2.00	
Greenhouse Gases (GHGs)				(lb/hr)^[13]	(tons/yr)^[11]	(tons/yr)^[7]
CO ₂	diesel	73.96	kg/MMBtu ^[12]	2,661.52	227.74	4,573.33
CH ₄	diesel	3.00E-03	kg/MMBtu ^[12]	0.11	9.24E-03	
N ₂ O	diesel	6.00E-04	kg/MMBtu ^[12]	2.16E-02	1.85E-03	
Total GHGs	diesel		kg/MMBtu ^[12]	2,661.65	227.75	
CO ₂	dual fuel	73.54	kg/MMBtu ^[12]	2,646.48	4,573.11	
CH ₄	dual fuel	2.96E-03	kg/MMBtu ^[12]	0.11	0.18	
N ₂ O	dual fuel	5.90E-04	kg/MMBtu ^[12]	2.12E-02	3.67E-02	
Total GHGs	dual fuel			2,646.60	4,573.33	
Total GHGs (CO₂ equivalents) (tons CO₂e/yr)^[14]	diesel				228.49	4,587.99
	dual fuel				4,587.99	

^[4] The engine manufacturer submitted emission factors per the application for the 1998 construction permit for PM, PM₁₀, NOx, SO₂, CO, and VOC. It is assumed PM_{2.5} = PM₁₀.

^[5] lbs/hr = [hp for specified engine]*[Emission Factor (lb/hp-hr)]; for CO for Units #11 and #12, lbs/hr = [hp for specified engine]*[Emission Factor (lb/hp-hr)]*(1-[Control Efficiency %])

^[6] tons/yr = [lb/hr for specific engine and specific fuel]*[Operating Hour Limit (hrs/yr)]/(2000 lbs/ton)

^[7] Worst-Case Emissions = Maximum of [Potential Annual Rate for Diesel (tons/yr)] or [Potential Annual Rate for Dual Fuel (tons/yr)]

^[8] Diesel HAP emission factors are from AP-42 Chapter 3.4 (10/96), Tables 3.4-3 and 3.4-4; The HAP identified as PAH (poly aromatic hydrocarbons) in Table 3.4-4 is identified as polycyclic organic matter (POM) {as identified in Title 129} in the table above; any individual POM (i.e. naphthalene) that is listed as a separate HAP is not included in the POM emission factor.

^[9] Dual fuel for the Enviro-Design modification of engine consists of 98% natural gas and 2% diesel. Units #11 & 12 are 4-stroke engines. Natural gas emission factors are from AP-42 Chapter 3.2 (7/2000), Tables 3.2.1 and 3.2.2. Dual fired emission factor = (0.98 * emission factor for natural gas)+(0.02 * emission factor for diesel). The HAP identified as PAH (poly aromatic hydrocarbons) in Tables 3.2-1 and 3.2-2 is identified as polycyclic organic matter (POM) {as identified in Title 129} in the table above; any individual POM (i.e. naphthalene) that is listed as a separate HAP is not included in the POM emission factor.

^[10] lbs/hr = (MMBtu/hr for specified engine)*[Emission Factor (lb/MMBtu)]

^[11] tons/yr = (MMBtu/yr for specified engine)*[Emission Factor (lb/MMBtu)]/(2000 lbs/ton); The MMBtu/hr takes into account the hrs/yr per engine, and the gal/hr limitation of diesel per engine.

^[12] GHG emissions were taken from of 40 CFR Part 98 Subpart C, Table C-2 for *Petroleum (All fuel types in Table C-1)*. Dual fuel for the Enviro-Design modification of engine consists of 98% natural gas and 2% diesel.

^[13] lbs/hr = (MMBtu/hr for specified engine)*[Emission Factor (kg/MMBtu)]/(907.18 kg/ton)*(2000 lbs/ton)

^[14] tons CO₂e/yr = [(tons/yr CO₂)*1]+[(tons/yr CH₄)*28]+[(tons/yr N₂O)*265]; CO₂ equivalents are found in 40 CFR Part 98 Subpart A Table A-1 *Global Warming Potentials* published on January 1, 2025 (Title 129, Chapter 1* Title 129, Chapter 1). The CO₂e for CO₂=1, for CH₄=28, and for N₂O=265.

Fact Sheet Attachment

Emission Calculations for Engines - Unit # 13

Sulfur content:

15 ppm	diesel fuel ^[2]
137,000	Btu/gal

Heat content of diesel:

Diesel Btu/gal value from AP-42, Appendix A (9/85(Reformatted 1/95)), page A-5.

Unit ID	Maximum Capacity	Maximum Heat Input ^[1]	Diesel Operating Hour Limit ^[2]	Diesel Fuel (as limited)	Total Annual Heat Input for Diesel	CO Control Efficiency (NESHAP Subpart ZZZZ) ^[3]
	(hp)	(MMBtu/hr)	(hrs/yr)	(gallons/yr)	(MMBtu/yr)	%
13	6,148	15.6	2,388.0	272,463.7	37,328	0%

^[1] Maximum Heat Input (MMBtu/hr) = [Maximum Capacity hp]*(0.0025425 MMBtu/hp)

^[2] The diesel sulfur content and operating hours limits were established in CP #96-0032 issued on March 17, 1998.

^[3] NESHAP Subpart ZZZZ has no emission limitation requirement for existing emergency engines.

Pollutant	Fuel Type	Emission Factor		Unit #13	
				Potential Hourly Rate by Fuel	Potential Annual Rate by Fuel
				(lb/hr) ^[5]	(tons/yr) ^[6]
PM	diesel	5.51E-04	lb/hp-hr ^[4]	3.39	4.045
PM ₁₀	diesel	5.51E-04	lb/hp-hr ^[4]	3.39	4.045
PM _{2.5}	diesel	5.51E-04	lb/hp-hr ^[4]	3.39	4.045
SO _x	diesel	4.41E-04	lb/hp-hr ^[4]	2.71	3.237
NO _x	diesel	1.98E-02	lb/hp-hr ^[4]	121.73	145.346
CO	diesel	2.65E-03	lb/hp-hr ^[4]	16.29	19.453
VOC	diesel	8.82E-04	lb/hp-hr ^[4]	5.42	6.475
Hazardous Air Pollutants				(lb/hr)^[8]	(tons/yr)^[6]
Acetaldehyde	diesel	2.52E-05	lb/MMBtu ^[7]	3.94E-04	4.70E-04
Acrolein	diesel	7.88E-06	lb/MMBtu ^[7]	1.23E-04	1.47E-04
Benzene	diesel	7.76E-04	lb/MMBtu ^[7]	1.21E-02	1.45E-02
Formaldehyde	diesel	7.89E-05	lb/MMBtu ^[7]	1.23E-03	1.47E-03
Naphthalene	diesel	1.30E-04	lb/MMBtu ^[7]	2.03E-03	2.43E-03
Polycyclic Organic Matter	diesel	8.14E-05	lb/MMBtu ^[7]	1.27E-03	1.52E-03
Toluene	diesel	2.81E-04	lb/MMBtu ^[7]	4.39E-03	5.24E-03
Xylenes	diesel	1.93E-04	lb/MMBtu ^[7]	3.02E-03	3.60E-03
Total HAPs	diesel			0.025	2.94E-02
Greenhouse Gases (GHGs)				(lb/hr)^[10]	(tons/yr)^[6]
CO ₂	diesel	73.96	kg/MMBtu ^[9]	2,548.76	3,043.21
CH ₄	diesel	3.00E-03	kg/MMBtu ^[9]	0.10	1.23E-01
N ₂ O	diesel	6.00E-04	kg/MMBtu ^[9]	2.07E-02	2.47E-02
Total GHGs	diesel		kg/MMBtu ^[9]	2,548.88	3,043.36
Total GHGs (CO₂ equivalents) (tons CO₂e/yr)^[11]	diesel				3,053.21

^[4] The engine manufacturer submitted emission factors per the application for the 1998 construction permit for PM, PM₁₀, NO_x, SO₂, CO, and VOC. It is assumed PM_{2.5} = PM₁₀.

^[5] lbs/hr = [hp for specified engine]*[Emission Factor (lb/hp-hr)]

^[6] tons/yr = [lb/hr for specific engine and specific fuel]*[Operating Hour Limit (hrs/yr)]/(2000 lbs/ton)

^[7] Diesel HAP emission factors are from AP-42 Chapter 3.4 (10/96), Tables 3.4-3 and 3.4-4; The HAP identified as PAH (poly aromatic hydrocarbons) in Table 3.4-4 is identified as polycyclic organic matter (POM) {as identified in Title 129} in the table above; any individual POM (i.e. naphthalene) that is listed as a separate HAP is not included in the POM emission factor.

^[8] lbs/hr = (MMBtu/hr for specified engine)*[Emission Factor (lb/MMBtu)]

^[9] GHG emissions were taken from of 40 CFR Part 98 Subpart C, Table C-2 for *Petroleum (All fuel types in Table C-1)*.

^[10] lbs/hr = (MMBtu/hr for specified engine)*[Emission Factor (kg/MMBtu)]/(907.18 kg/ton)*(2000 lbs/ton)

^[11] tons CO₂e/yr = [(tons/yr CO₂)*1]+[(tons/yr CH₄)*28]+[(tons/yr N₂O)*265]; CO₂ equivalents are found in 40 CFR Part 98 Subpart A Table A-1 *Global Warming Potentials* published on January 1, 2025 (Title 129, Chapter 1*; Title 129, Chapter 1). The CO₂e for CO₂ =1, for CH₄ =28, and for N₂O = 265.

Fact Sheet Attachment

Emission Calculations for Engines - Unit # 14

Sulfur content:

15 ppm	diesel fuel
137,000 Btu/gal	

Heat content of diesel:

Diesel Btu/gal value from AP-42, Appendix A (9/85(Reformatted 1/95)), page A-5.

Unit ID	Maximum Capacity	Maximum Heat Input ^[1]	Diesel Operating Hour Limit	Total Annual Heat Input for Diesel
	(hp)	(MMBtu/hr)	(hrs/yr)	(MMBtu/yr)
14	923	2.3	500	1,173

^[1] Maximum Heat Input (MMBtu/hr) = [Maximum Capacity hp]*(0.0025425 MMBtu/hp)

^[2] The diesel sulfur content and operating hours limits were established in this operating permit.

Pollutant	Fuel Type	Emission Factor		Unit #14	
				Potential Hourly Rate by Fuel	Potential Annual Rate by Fuel
				(lb/hr) ^[6]	(tons/yr) ^[7]
PM	diesel	0.035	g/hp-hr ^{[3],[4]}	0.07	0.018
PM ₁₀	diesel	3.50E-02	g/hp-hr ^[4]	0.07	0.018
PM _{2.5}	diesel	3.50E-02	g/hp-hr ^[4]	0.07	0.018
SO _x	diesel	1.21E-05	lb/hp-hr ^[5]	0.01	0.003
NO _x	diesel	5.84	g/hp-hr ^{[3],[4]}	11.89	2.971
CO	diesel	0.48	g/hp-hr ^{[3],[4]}	0.98	0.244
VOC	diesel	0.01	g/hp-hr ^{[3],[4]}	0.02	0.005
Hazardous Air Pollutants				(lb/hr)^[6]	(tons/yr)^[7]
Acetaldehyde	diesel	2.52E-05	lb/MMBtu ^[5]	5.91E-05	1.48E-05
Acrolein	diesel	7.88E-06	lb/MMBtu ^[5]	1.85E-05	4.62E-06
Benzene	diesel	7.76E-04	lb/MMBtu ^[5]	1.82E-03	4.55E-04
Formaldehyde	diesel	7.89E-05	lb/MMBtu ^[5]	1.85E-04	4.63E-05
Naphthalene	diesel	1.30E-04	lb/MMBtu ^[5]	3.05E-04	7.63E-05
Polycyclic Organic Matter	diesel	8.14E-05	lb/MMBtu ^[5]	1.91E-04	4.78E-05
Toluene	diesel	2.81E-04	lb/MMBtu ^[5]	6.59E-04	1.65E-04
Xylenes	diesel	1.93E-04	lb/MMBtu ^[5]	4.53E-04	1.13E-04
Total HAPs	diesel			0.004	9.23E-04
Greenhouse Gases (GHGs)				(lb/hr)^[9]	(tons/yr)^[7]
CO ₂	diesel	73.96	kg/MMBtu ^[8]	382.65	95.66
CH ₄	diesel	3.00E-03	kg/MMBtu ^[8]	0.02	3.88E-03
N ₂ O	diesel	6.00E-04	kg/MMBtu ^[8]	3.10E-03	7.76E-04
Total GHGs	diesel		kg/MMBtu ^[8]	382.66	95.67
Total GHGs (CO₂ equivalents) (tons CO₂e/yr)^[10]	diesel				95.98

^[3] NESHAP Subpart ZZZZ has PM, CO, NO_x, and VOC (as non-methane hydrocarbons NMHC) emission limitation requirements for new emergency engines. This engine was certified to meet the emission limitations per the manufacturer.

^[4] The engine manufacturer submitted emission factors per the application for this operating permit for PM, NO_x, CO, and VOC. It is assumed PM_{2.5} and PM₁₀ equal PM.

^[5] Diesel SO_x and HAP emission factors are from AP-42 Chapter 3.4 (10/96), Tables 3.4-1, 3.4-3 and 3.4-4. The SO_x emission factor is based on 0.0089*S, where S is the sulfur content percentage of the diesel fuel. The HAP identified as PAH (poly aromatic hydrocarbons) in Table 3.4-4 is identified a polycyclic organic matter (POM) {as identified in Title 129} in the table above; any individual POM (i.e. naphthalene) that is listed as a separate HAP is not included in the POM emission factor.

^[6] Hourly emission rates: lbs/hr for SO_x = [hp for specified engine]*[Emission Factor (lb/hp-hr)]

lbs/hr for PM, PM₁₀, PM_{2.5}, NO_x, CO and VOC = [hp for specified engine] * [Emission Factor (g/hp-hr)]*[0.002205 lb/g]

lbs/hr for HAPs = (MMBtu/hr for specified engine)*[Emission Factor (lb/MMBtu)]

^[7] tons/yr = [lb/hr for specific engine]*[Operating Hour Limit (hrs/yr)]/(2000 lbs/ton)

^[8] GHG emissions were taken from of 40 CFR Part 98 Subpart C, Table C-2 for *Petroleum (All fuel types in Table C-1)*.

^[9] lbs/hr = (MMBtu/hr for specified engine)*[Emission Factor (kg/MMBtu)]/(907.18 kg/ton)*(2000 lbs/ton)

^[10] tons CO₂e/yr = [(tons/yr CO₂)*1]+[(tons/yr CH₄)*28]+[(tons/yr N₂O)*265]; CO₂ equivalents are found in 40 CFR Part 98 Subpart A Table A-1 *Global Warming Potentials* published on January 1, 2025 (Title 129, Chapter 1*; Title 129, Chapter 1). The CO₂e for CO₂=1, for CH₄=28, and for N₂O=265.

Fact Sheet Attachment

Emission Calculations for Diesel Storage Tanks

	Tank 5	Unit #14 Tank
Tank Size (gallons)	30,000	513
Tank Throughput (gallons) ^[1]	313,244	21,500

Product Stored: Diesel Fuel

Pollutant	% by Weight in Diesel^[2]	Tank 5 Emissions (lbs/yr)	Unit #14 Tank Emissions (lbs/yr)	Total PTE from Tanks (tons/yr)
Volatile Organic Compounds ^[3]	-	48.22	3.31	2.58E-02
Hazardous Air Pollutants				
Benzene	0.05	2.33E-02	1.60E-03	1.25E-05
Cumene	0.30	0.14	9.93E-03	7.73E-05
Ethylbenzene	0.33	0.16	1.09E-02	8.50E-05
n-Hexane	0.87	0.42	2.87E-02	2.23E-04
Naphthalene	0.87	0.42	2.87E-02	2.23E-04
Toluene	0.33	0.16	1.10E-02	8.59E-05
Xylenes	0.63	0.31	2.10E-02	1.63E-04
Total Hazardous Air Pollutants	3.38	1.63	0.11	8.71E-04

^[1] Based on annual hour limitations from the permit for each engine.

^[2] DWEE Standard Values

^[3] From the EPA's *Tanks 4.0.9.d* program for Unit #14 Tank as shown in CP15-014 Fact Sheet Attachment. Tank 5 calculated based on the same emission rate as Unit #14 Tank.