Lane Regional Air Protection Agency
Standard Air Contaminant Discharge Permit

Review Report

University of Oregon **Permit No. 208557**
Campus Planning and Facilities Management
1260 University of Oregon
Eugene, Oregon 97403-1260
Website: http://uoregon.edu

Source Information:

Primary SIC	8221 – Colleges, Universities, and Professional Schools
NAICS	611310 – Colleges, Universities, and Professional Schools
Source Categories (LRAPA title 37, Table 1)	B: 12. Boilers and other fuel burning equipment over 10 MMBtu/hr heat input B: 25. Electrical power generation from combustion

	C: 3. All sources electing to maintain the source's netting basis C: 4. All sources that request a PSEL equal to or greater than the SER for a regulated pollutant
Public Notice Category	III

Compliance and Emissions Monitoring Requirements:

Unassigned Emissions	Y
Emission Credits	N
Compliance Schedule	N
Source Test [date(s)]	See Permit

COMS	N
CEMS	N
Ambient monitoring	N

Reporting Requirements

Annual Report (due date)	February 15
Semi-Annual Report (due date)	N
GHG Report (due date)	March 31
Monthly Report (due date)	N
Quarterly Report (due date)	N

Excess Emissions Report	Y
Other Reports (due date) • NSPS Fuel Oil Report	Postmarked by February 15, August 15

Air Programs

NSPS (list subparts)	A, Dc, IIII, JJJJ, KKKK
NESHAP (list subparts)	A, ZZZZ
CAM	N
Regional Haze (RH)	N
Synthetic Minor (SM)	N
SM-80	Y
Title V	N
Part 68 Risk Management	N
Major FHAP Source	N
Federal Major Source	N
NA New Source Review (NSR)	N
Prevention of Significant Deterioration (PSD)	N

Acid Rain	N
Clean Air Mercury Rule (CAMR)	N
TACT	N
>20 Megawatts	N

Permittee Identification

1. University of Oregon ("the facility" or "U of O") operates a state university. The main campus is located in Eugene, Oregon.

General Background

2. This facility operates a state university. In support of university operations, the facility operates a central power station for electrical power generation, utilizing two (2) boilers and a combined cycle cogeneration system with a combustion turbine and duct burner. The power station serves the heating and cooling needs of the University of Oregon campus and educational facilities, as well as implementing a market-based approach to the production and sale of power. The central power station utilizes primarily natural gas with fuel oil as a back-up fuel. Along with the central power station, the facility operates several small boilers in campus buildings that are either significant emission units or categorically insignificant activities. The facility also operates a number of both gas-fired and diesel-fired emergency generators. The facility has three (3) emission units that are considered aggregate insignificant activities.

   This facility is considered a synthetic minor source under Title V of the Clean Air Act. The facility is considered an area source of federal hazardous air pollutants.

Reasons for Permit Actions and Fee Basis

3. This permit action is a renewal for an existing Standard Air Contaminant Discharge Permit (Standard ACDP) which was issued on May 30, 2017 and expired on May 30, 2022. As the facility submitted a timely renewal application on November 29, 2021, the current permit will remain in effect until final action has been taken on the renewal application. The renewed Standard ACDP will be valid for up to five (5) years.

4. As part of this renewal, the facility PSELs will be changed from generic PSELs to source specific PSELs based on potential-to-emit (PTE). As of March 1, 2023, DEQ removed the ability to use generic PSELs from their regulations. By state statute, LRAPA cannot be less restrictive than DEQ.

5. As part of this renewal, LRAPA is performing an Agency-initiated Type 3 change and associated permit modification to correct the PSELs for PM, PM_{10}, $PM_{2.5}$, NO_X and GHGs. In the previous permit, LRAPA incorrectly set the PSELs as part of establishing a limit on natural gas and fuel oil usage for emission units EU-1, EU-2, and EU-3. The proposed PSELs for all criteria pollutants and GHGs now reflect potential emissions assuming the worst case scenario up to the usage limitations in the proposed permit. See the PSEL section for more discussion on this issue.

Attainment Status

6. The facility is located inside the Eugene-Springfield Air Quality Management Area. The facility is located in an area that has been designated attainment/unclassified for $PM_{2.5}$, ozone (VOC), NO_2, SO_2, and Pb and a maintenance area for CO and PM_{10}. The facility is located within 100 kilometers of two (2) Class I air quality protection areas: Diamond Peak Wilderness and Three Sisters Wilderness area.

Permitting History

7. LRAPA has reviewed and issued the following permitting actions to this facility:

Date Approved	Permit Action Type	Description
07/01/1977	ACDP	Initial
02/20/1987	Modified ACDP	Increase Boiler #4 steaming limitation

Date Approved	Permit Action Type	Description
01/19/1990	Modified ACDP	Add a PSEL
02/01/1990	Modified ACDP	Permitted source, electric power, generation or cogeneration
05/01/1992	ACDP	Renewal
01/07/1993	Modified ACDP	Terminate the use of Boilers #1, #2, and #3 effective June 1, 1993
08/19/1993	Modified ACDP	Permit modification
04/06/2000	NC-208557-A00	Installation of two diesel-fired 750 kW emergency generators at the Central Power Station
04/07/2000	Synthetic Minor (SM) ACDP	Renewal
06/29/2001	Administrative Amendment	Allow non-emergency operation of two diesel-fired 750 kW emergency generators at the Central Power Station
04/07/2005	Standard ACDP	Renewal
05/08/2009	Addendum 1	Establish expiration date for unassigned emissions and change permit from SM ACDP to Standard ACDP
12/10/2009	Addendum 2	Authorization for 54 MMBtu/hr temporary boiler
01/14/2011	Standard ACDP	Renewal
04/30/2012	ACDP	Installation of Baker Center Boiler
04/16/2013	NC-208557-A13	Installation of 2.1 MMBtu/hr Weil-McLain boiler
03/16/2016	NC-208557-A16	80 kw diesel-fired emergency generator for Emergency Operations Center
05/30/2017	Standard ACDP	Renewal
05/13/2021	Addendum 1	100 kW and 350 kW diesel-fired emergency generator
04/25/2023	NC-208557-A23	Maintenance paint booth
Upon Issuance	Standard ACDP	Renewal

Emission Unit Descriptions

8. The emission units regulated by this permit are the following:

Emission Unit ID	Description	Pollution Control Device (PCD ID)	Installed / Last Modified
Significant Emission Units			
EU-1	Boiler #1, Central Power Station, Nebraska, 79 MMBtu/hr, natural gas/diesel	None	1994
EU-2	Boiler #2, Central Power Station, Babcock & Wilcox, 78 MMBtu/hr, natural gas/diesel	None	2011
EU-3	8.6 MW combined cycle cogeneration plant, Central Power Station: Combustion turbine, Solar Taurus 70, 78 MMBtu/hr, natural gas/diesel and Duct Burner, 45 MMBtu/hr, natural gas and Rentec HRSG	None	2011
EU-5	Unpaved Roads (primarily Autzen Stadium)	None	<1978
	Emergency Generators:		
EU-10	CP Station, Caterpillar, 2.2 MW, diesel	None	2009
EU-11	CP Station, Caterpillar, 2.2 MW, diesel	None	2009

Emission Unit ID	Description	Pollution Control Device (PCD ID)	Installed / Last Modified
EU-12	CP Station, Caterpillar, 2.2 MW, diesel	None	2009
EU-13	Safety & Risk Services, Caterpillar, 80 kW, diesel (2015 model)	None	2016
EU-14	Knight Law, Cummins, 65 kW, natural gas	None	1988
EU-15	Mac Court, Kohler, 30 kW, LPG	None	1973
EU-16	UOPD, Olympian, 55 kW, natural gas (3/2010 model)	None	2012
EU-17	Rainier Building, Cummins, 80 kW, diesel (5/1998 model)	None	2013
EU-18	Willamette Hall, Waukesha, 325 kW, natural gas (1987 model)	None	1988
EU-19	Hatfield-Dowlin Complex, Kohler, 400 kW, diesel	None	2013
EU-20	Autzen-PK Park, Deere, 80 kW, diesel	None	2009
EU-21	Autzen, Caterpillar, 750 kW, diesel	None	2002
EU-22	Autzen-Moshofsky, Onan, 80 kW, diesel	None	1998
EU-23	Millrace Garage, 100 kW, diesel	None	2021
EU-24	Central Kitchen (Housing), 350 kW, diesel	None	2021
	Small Boilers:		
EU-30	Boiler, Casanova Center, Kewanee, 8.38 MMBtu/hr, natural gas	None	1990
EU-31	Boiler, Casanova Center, Kewanee, 4.18 MMBtu/hr, natural gas	None	1990
EU-32	Boiler, Agate Hall, Cleaver Brooks, 2.5 MMBtu/hr, natural gas	None	1993
EU-33	Boiler, Agate Hall, Cleaver Brooks, 2.5 MMBtu/hr, natural gas	None	1993
EU-34	Boiler, Practice Facility, A.O. Smith, 3.9 MMBtu/hr, natural gas	None	2013
EU-35	Make-up air heater, Practice Facility, 3.0 MMBtu/hr, natural gas	None	1998
EU-36	Boiler, Baker Center Downtown, 2.04 MMBtu/hr, natural gas	None	2012
EU-37	Boiler, Hatfield Dowlin Complex, Lochinvar Crest Model FBN2500, 2.3 MMBtu/hr, natural gas	None	2012
EU-38	Boiler, Hatfield Dowlin Complex, Lochinvar Crest Model FBN2500, 2.3 MMBtu/hr, natural gas	None	2012
Aggregate Insignificant Emissions			
AIE-4	Printing services, Baker Center Downtown	None	<1978
AIE-6	GDF, Autzen Stadium, 300-gal AST gasoline	None	2002
AIE-7	GDF, Central Power Station, 6,000-gal gasoline	None	1993

Significant Emission Units

9. Emission Unit EU-1

The facility operates a boiler with a heat input rating of 79 MMBtu per hour to provide for the heating and cooling needs of the facility. This boiler operates on natural gas with fuel oil backup. The PM, PM_{10} and $PM_{2.5}$ emissions are based on stack testing performed in 2011 on both natural gas and fuel oil. The NO_X emissions are based on stack testing performed in 2001, 2011, 2017, and 2019 on both natural gas and fuel oil. The CO emissions are based on stack testing performed in 2011, 2017, and 2019 on both natural gas and fuel oil. The VOC emissions are based on vendor specification. The other criteria pollutant and GHG emissions are based on emission factors derived from DEQ AQ-EF05 – Emission Factors Gas Fired Boilers, DEQ AQ-EF04 – Emission Factors Oil Fired Boilers, and US EPA 40 CFR part 98, Tables C-1 and C-2. The federal HAP or CAO TAC emissions are based on emission factors from DEQ's 2020 Air Toxics Emission Inventory Combustion Emission Factor Tool. This emission unit is subject to a combined fuel limit with EU-2 and EU-3 for natural gas and fuel oil.

10. Emission Unit EU-2

The facility operates a boiler with a heat input rating of 78 MMBtu per hour to provide for the heating and cooling needs of the facility. This boiler operates on natural gas with fuel oil backup. The PM, PM_{10} and $PM_{2.5}$ emissions are based on stack testing performed in 2011 on both natural gas and fuel oil. The NO_X emissions are based on stack testing performed in 2001, 2011, 2017, and 2019 on both natural gas and fuel oil. The CO emissions are based on stack testing performed in 2011, 2017, and 2019 on both natural gas and fuel oil. The other criteria pollutant and GHG emissions are based on emission factors derived from DEQ AQ-EF05 – Emission Factors Gas Fired Boilers, DEQ AQ-EF04 – Emission Factors Oil Fired Boilers, and US EPA 40 CFR part 98, Tables C-1 and C-2. The federal HAP or CAO TAC emissions are based on emission factors from DEQ's 2020 Air Toxics Emission Inventory Combustion Emission Factor Tool. This emission unit is subject to a combined fuel limit with EU-1 and EU-3 for natural gas and fuel oil.

11. Emission Unit EU-3

This emission unit generates electricity as part of a market-based approach to the production and sale of power and consists of a combustion turbine, a duct burner and a heat recovery steam generator (HRSG). Electrical output from the system is rated at 7.5 MW. The combustion turbine has a maximum fuel use of 0.078 MMcf per hour on natural gas and 520 gallons per hour with fuel backup. The duct burner has a maximum fuel use of 0.045 MMcf per hour on natural gas only. The NO_X emissions are based on stack testing performed in 2013, 2015, 2017, and 2019 on both natural gas and fuel oil. As the duct burner and HRSG are required to be operating during NO_X testing of the combustion turbine, the NO_X emissions from the duct burner are included in the results of the NO_X testing for the combustion turbine. The PM, PM_{10}, $PM_{2.5}$, CO, and VOC emissions from the combustion turbine or duct burner are based on vendor specifications. The SO_2 pollutant emissions from these sources are based on emission factors derived from DEQ AQ-EF05 – Emission Factors Gas Fired Boilers and US EPA 40 CFR part 98, Tables C-1 and C-2. The GHG pollutant emissions from this emission unit are based on emission factors derived from US EPA 40 CFR part 98, Tables C-1 and C-2. The federal HAP or CAO TAC emissions from this emission unit are based on emission factors from DEQ's 2020 Air Toxics Emission Inventory Combustion Emission Factor Tool. This emission unit is subject to a combined fuel limit with EU-1 and EU-2 for natural gas and fuel oil.

12. Emission Unit EU-5

This facility has a number of unpaved roads. Unpaved road emissions are calculated based on the methodology presented in US EPA AP-42, Section 13.2.2. Based on vehicle miles traveled (VMT), the unpaved areas of Autzen Stadium represent 87% of the total potential particulate matter.

13. Emission Units EU-10 through EU-24

These emission units provide emergency electrical power for various buildings around campus. These emission units vary in size and operate on fuel oil, natural gas, or liquified petroleum gas (LPG). The criteria pollutant emissions from the emission units that combust fuel oil or natural gas are based on emission factors derived from DEQ AQ-EF07 – Emission Factors – Power (Electric) Generators. The criteria pollutant emissions from the emission units that combust LPG are based on emission factors derived from US EPA AP-42, Section 1.5. The GHG pollutant emissions from these emission units are based on emission factors derived from US EPA 40 CFR part 98, Tables C-1 and C-2. The federal HAP or CAO TAC emissions from these emission units are based on emission factors from DEQ's 2020 Air Toxics Emission Inventory Combustion Emission Factor Tool.

14. Emission Units EU-30 through EU-38

These emission units provide convenience space heating and water heating in various buildings around campus. The criteria pollutant and GHG emissions from these emission units are based on emission factors derived from DEQ AQ-EF05 – Emission Factors Gas Fired Boilers and US

EPA 40 CFR part 98, Tables C-1 and C-2. The federal HAP or CAO TAC emissions from these emission units are based on emission factors from DEQ's 2020 Air Toxics Emission Inventory Combustion Emission Factor Tool.

Aggregate Insignificant Emissions (AIE)

15. Emission Unit AIE-4
This emission unit provides printing services for the university using offset printing. This process was previously known as EU-4, and was considered a significant emission unit. However, the facility more closely tracked VOC emissions in calendar year 2022 to determine that total VOC emissions were 0.012 tons per year. LRAPA has reclassed this emission unit to be an AIE unit. AIE and categorically insignificant activities are considered to be insignificant activities as defined under LRAPA title 12.

16. Emission Unit AIE-6
At Autzen Stadium, the facility has one (1) 300-gallon gasoline tank that was installed in 2002. This tank represents one (1) gasoline dispensing facility (GDF) subject to the requirements under LRAPA sections 44-170 through 44-280. Under this regulation, the GDF is considered an existing GDF. Based on 2022 data, the amount of gasoline dispensed at the GDF was approximately 2,192 gallons per year. The GDF is subject to the requirements for an existing GDF whose annual throughput is less than 480,000 gallons in any 12 consecutive months and the monthly throughput is less than 100,000 gallons as calculated on a rolling 30 day basis. This location also has a 300-gallon diesel tank.

17. Emission Unit AIE-7
At the Central Power Station, the facility has one (1) 6,000-gallon gasoline tank that was installed in 1993. This tank represents one (1) gasoline dispensing facility (GDF) subject to the requirements under LRAPA sections 44-170 through 44-280. Under this regulation, the GDF is considered an existing GDF. Based on 2022 data, the amount of gasoline dispensed at the GDF was approximately 35,000 gallons per year. The GDF is subject to the requirements for an existing GDF whose annual throughput is less than 480,000 gallons in any 12 consecutive months and the monthly throughput is less than 100,000 gallons as calculated on a rolling 30 day basis. This location also has a 2,500-gallon diesel tank.

Production Limitations

18. The facility has previously requested that Emission Units EU-1, EU-2, and EU-3 be subject to group fuel use restrictions when combusting natural gas or fuel oil. The fuel usage in emission units EU-1, EU-2 and EU-3 is limited to 1,165 million standard cubic feet of natural gas (MMscf) and 329 thousand gallons of fuel oil (kgal) on a 12-month rolling basis. This fuel use limit acts to limit the potential to emit for criteria and HAP/TAC emissions from these emission units. The fuel use limit also establishes the facility as a SM source for compliance purposes.

Nuisance, Deposition and Other Emission Limitations

19. Under LRAPA 49-010(1), the permittee must not cause or allow air contaminants from any source subject to regulation by LRAPA to cause a nuisance. Compliance is demonstrated through documentation of all complaints received by the facility from the general public and following procedures to notify LRAPA of receipt of these complaints.

20. Under LRAPA 32-055, the permittee must not cause or permit the emission of particulate matter which is larger than 250 microns in size at sufficient duration or quantity as to create an observable deposition upon the real property of another person. Compliance is demonstrated through documentation of all complaints received by the facility from the general public and following procedures to notify LRAPA of receipt of these complaints.

21. Under LRAPA 32-090(1), the permittee must not discharge from any source whatsoever such quantities of air contaminants which cause injury or damage to any persons, the public, business or property; such determination is to be made by LRAPA. Compliance is demonstrated through documentation of all complaints received by the facility from the general public and following procedures to notify LRAPA of receipt of these complaints.

General Emission Limitations

22. LRAPA 32-008(1) requires an existing unit at a facility prior to January 1, 1994, meet TACT if the emission unit meets the following criteria: The emission unit is not already subject to emission standards for the regulated pollutant under LRAPA title 30, title 32, title 33, title 38, title 39 or title 46 at the time TACT is required; the source is required to have a permit; the emission unit has emissions of criteria pollutants equal to or greater than five (5) tons per year of particulate or ten (10) tons per year of any gaseous pollutant; and LRAPA determines that air pollution control devices and emission reduction processes in use for the emissions do not represent TACT and that further emission control is necessary to address documented nuisance conditions, address an increase in emissions, ensure that the source is in compliance with other applicable requirements, or to protect public health or welfare, or the environment.
    22.a. The following emission units are not subject to TACT because they do not have emissions of criteria pollutants equal to or greater than five (5) tons per year of particulate or ten (10) tons per year of any gaseous pollutant: EU-14, EU-15, EU-18, EU-21, EU-22, and EU-30 through EU-33.
    22.b. The following emission unit is subject to TACT because it has emissions of criteria pollutants equal to or greater than five (5) tons per year of particulate matter: EU-5. While a formal TACT analysis has not been conducted, TACT for this emission unit would likely be the development of an Operations and Maintenance Plan (O&M Plan) that documents the activities that will be conducted to reduce fugitive emissions, when these activities are conducted, and who is conducting these activities.

23. LRAPA 32-008(2) requires new units installed or existing emission units modified on or after January 1, 1994, meet TACT if the emission unit meets the following criteria: The emission unit is not subject to Major NSR in title 38, Type A State NSR in LRAPA title 38, an applicable Standard of Performance for New Stationary Sources in title 46, or any other standard applicable only to new or modified sources in title 32, title 33, or title 39 for the regulated pollutant emitted; the source is required to have a permit; if new, the emission unit has emissions of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant; if modified, the emission unit would have an increase in emissions of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant; and LRAPA determines that the proposed air pollution control devices and emission reduction processes do not represent TACT.
    23.a. The following emission units are not subject to TACT because they are subject to an applicable Standard of Performance for New Stationary Sources in title 46: EU-1 through EU-3, EU-10 through EU-13, EU-16, EU-17, EU-19, EU-20, EU-23, and EU-24.
    23.b. The following emission units are not subject to TACT because they do not have emissions of criteria pollutants equal to or greater than one (1) ton per year: EU-36 through EU-38.
    23.c. The following emission unit are subject to TACT because they have emissions of criteria pollutants equal to or greater than one (1) ton per year: EU-34 and EU-35. While a formal TACT analysis has not been conducted, TACT for these emission units would likely be the development and use of an O&M plan and documentation of inspections and maintenance on these emission units. Controls are not considered economically feasible for such small boilers.

Conditions Specific to Emission Units EU-1 and EU-2

24. These emission units are subject to the visible emission requirements under LRAPA 32-010(3). The permittee must not emit or allow to be emitted any visible emissions from Emission Unit EU-1 or EU-2 that equal or exceed an average of 20 percent opacity for a period or periods aggregating more than three (3) minutes in any one (1) hour. Compliance demonstration for visible emissions when combusting natural gas will be based on the use of an Operation and Maintenance plan and documentation of inspections and maintenance. Additionally, the compliance demonstration requirements under 40 CFR part 60 subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (NSPS) to perform scheduled visible emissions testing when combusting fuel oil will also serve as the compliance demonstration requirements for this emission limitation when either Emission Unit EU-1 or EU-2 are combusting fuel oil.

25. These emission units are subject to the particulate matter emission requirements under LRAPA 32-030(1)(a). For fuel burning equipment sources installed, constructed, or modified after June 1, 1970, but prior to April 16, 2015, for except solid fuel burning devices that have been certified under OAR 340-262-0500, the permittee must not cause, suffer, allow, or permit particulate matter emissions in excess of 0.10 grains per dry standard cubic foot provided that all representative compliance source test results prior to April 16, 2015 demonstrate emissions no greater than 0.080 grains per dry standard cubic foot. The particulate matter emission testing in 2011 performed on these emission units on both natural gas and fuel oil demonstrated both emission units met this requirement on both fuels. Compliance demonstration for visible emissions when combusting natural gas will be based on the use of an Operation and Maintenance plan and documentation of inspections and maintenance.

26. Both of these boilers are subject to 40 CFR part 60 subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (NSPS). See the NSPS section of this review report for more information.

27. Neither of these boilers are subject to 40 CFR part 63 subpart JJJJJJ – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources (NESHAP). See the NESHAP section of this review report for more information.

Conditions Specific to Emission Unit EU-3

28. This emission unit is subject to the visible emission requirements under LRAPA 32-010(3). The permittee must not emit or allow to be emitted any visible emissions from Emission Unit EU-3 that equal or exceed an average of 20 percent opacity for a period or periods aggregating more than three (3) minutes in any one (1) hour. Compliance demonstration for visible emissions when combusting natural gas will be based on the use of an Operation and Maintenance plan and documentation of inspections and maintenance. Additionally, when the permittee is performing compliance testing as required under 40 CFR part 60 subpart KKKK – Standards of Performance for Stationary Combustion Turbines (NSPS) the permittee must perform visible emissions testing when combusting fuel oil as compliance demonstration for this emission limitation.

29. This emission unit is subject to the particulate matter emission requirements under LRAPA 32-015(2)(b). For any air contaminant sources installed, constructed or modified on or after June 1, 1970 but prior to April 16, 2015, for which there are no representative compliance source test results prior to April 16, 2015, the permittee must not cause, suffer, allow, or permit particulate matter emissions in excess of 0.14 grains per dry standard cubic foot. This emission unit is subject to LRAPA 32-015 rather than LRAPA 32-020 and 32-030 because the principal purpose of this emission unit is not to produce heat or power by indirect heat transfer based on the definition of ‘fuel burning equipment’ under LRAPA title 12. Compliance demonstration for visible emissions when combusting natural gas will be based on the use of an Operation and Maintenance plan and documentation of inspections and maintenance.

30. This emission unit is subject to 40 CFR part 60 subpart KKKK – Standards of Performance for Stationary Combustion Turbines (NSPS). See the NSPS section of this review report for more information.

31. This emission unit is not subject to 40 CFR part 63 subpart YYYY – National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines (NESHAP). See the NESHAP section of this review report for more information.

Conditions Specific to Emission Unit EU-5

32. The facility is subject to the general requirements for fugitive emissions under LRAPA 48-015 which primarily result from unpaved roads. The facility must not have visible emissions that leave the plant site boundary for a period or periods totaling more than 18 seconds in a six (6) minute period. The facility must follow, but is not limited to, the list of reasonable precautions under LRAPA 48-015(1)(a)-(g). Compliance will be demonstrated through development of an Operations and Maintenance Plan (O&M Plan) that documents the activities that will be conducted to reduce fugitive emissions, when these activities are conducted, and who is conducting these activities. If requested by LRAPA, the facility must develop a fugitive emission control plan.

    Typically, LRAPA would also require a facility to perform visual inspections of visible emissions at the property line periodically. However, the unpaved roads at this facility are not directly related to any production activities. The unpaved roads with the highest potential to emit particulate matter are related to the use of Autzen Stadium and occur during relatively infrequent game days. LRAPA believes it is more appropriate to perform activities to reduce the potential for fugitive emissions proactively prior to these infrequent periods of use.

Conditions Specific to Emission Units EU-14, EU-15, EU-16, and EU-18

33. These emission units are subject to the visible emission requirements under LRAPA 32-010(3). The permittee must not emit or allow to be emitted any visible emissions from these emission units that equal or exceed an average of 20 percent opacity for a period or periods aggregating more than three (3) minutes in any one (1) hour. Compliance for these emergency generators will be based on the use of an O&M plan and documentation of inspections and maintenance.

34. These emission units are subject to the particulate matter emission requirements under LRAPA 32-015(2)(B)(b). For any air contaminant sources installed, constructed or modified on or after June 1, 1970 but prior to April 16, 2015, for which there are no representative compliance source test results prior to April 16, 2015, the permittee must not cause, suffer, allow, or permit particulate matter emissions in excess of 0.14 grains per dry standard cubic foot. These emission units are subject to LRAPA 32-015 rather than LRAPA 32-020 and 32-030 because internal combustion engines are excluded from the definition of ‘fuel burning equipment’ under LRAPA title 12. Compliance for these emergency generators will be based on the use of an O&M plan and documentation of inspections and maintenance.

35. Emission Unit EU-16 is subject to 40 CFR part 60 subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (NSPS). See the NSPS section of this review report for more information.

36. Emission Unit EU-16 is subject to 40 CFR part 63 subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (NESHAP). Emission Units EU-14, EU-16, and EU-18 are not subject to 40 CFR part 63 subpart ZZZZ. See the NESHAP section of this review report for more information.

Conditions Specific to Emission Units EU-10 through EU-13, EU-17, EU-19 through EU-24

37. These emission units are subject to the visible emission requirements under LRAPA 32-010(3). The permittee must not emit or allow to be emitted any visible emissions from these emission units that equal or exceed an average of 20 percent opacity for a period or periods aggregating more than three (3) minutes in any one (1) hour. Compliance for these emergency generators will be based on the use of an O&M plan and documentation of inspections and maintenance.

38. Except for Emission Units EU-13, EU-23, and EU-24, these emission units are subject to the particulate matter emission requirements under LRAPA 32-015(2)(B)(b). For any air contaminant sources installed, constructed or modified on or after June 1, 1970 but prior to April 16, 2015, for which there are no representative compliance source test results prior to April 16, 2015, the permittee must not cause, suffer, allow, or permit particulate matter emissions in excess of 0.14 grains per dry standard cubic foot. These emission units are subject to LRAPA 32-015 rather than LRAPA 32-020 and 32-030 because internal combustion engines are excluded from the definition of 'fuel burning equipment' under LRAPA title 12. Compliance for these emergency generators will be based on the use of an O&M plan and documentation of inspections and maintenance.

39. Emission Units EU-13, EU-23, and EU-24 are subject to the particulate matter emission requirements under LRAPA 32-015(2)(c). For sources installed, constructed or modified after April 16, 2015, the permittee must not cause, suffer, allow, or permit particulate matter emissions in excess of 0.10 grains per dry standard cubic foot. These emission units are subject to LRAPA 32-015 rather than LRAPA 32-020 and 32-030 because internal combustion engines are excluded from the definition of 'fuel burning equipment' under LRAPA title 12. Compliance for these emergency generators will be based on the use of an O&M plan and documentation of inspections and maintenance.

40. Emission Units EU-10 through EU-13, EU-19, EU-20, EU-23, and EU-24 are subject to 40 CFR part 60 subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (NSPS). See the NSPS section of this review report for more information.

41. Emission Units EU-10 through EU-13, EU-19, EU-20, EU-23, and EU-24 are subject to 40 CFR part 63 subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (NESHAP). Emission Units EU-17, EU-21, and EU-22 are not subject to 40 CFR part 63 subpart ZZZZ. See the NESHAP section of this review report for more information.

Conditions Specific to Emission Units EU-30 through EU-38

42. These emission units are subject to the visible emission requirements under LRAPA 32-010(3). The permittee must not emit or allow to be emitted any visible emissions from these emission units that equal or exceed an average of 20 percent opacity for a period or periods aggregating more than three (3) minutes in any one (1) hour. Compliance for these emission units will be based on the use of an O&M plan and documentation of inspections and maintenance.

43. These emission units are subject to the particulate matter emission requirements under LRAPA 32-030(1)(b). For any air contaminant sources installed, constructed or modified on or after June 1, 1970 but prior to April 16, 2015, for which there are no representative compliance source test results prior to April 16, 2015, the permittee must not cause, suffer, allow, or permit particulate matter emissions in excess of 0.14 grains per dry standard cubic foot. Compliance for these emission units will be based on the use of an O&M plan and documentation of inspections and maintenance.

New Source Performance Standards (NSPS)

44. Emission Unit EU-1 and EU-2 are subject to 40 CFR part 60 subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units because these emission units are steam generating units for which construction commenced after June 9, 1989, and these emission units have a maximum design heat input of 100 MMBtu per hour or less, but greater than or equal to 10 MMBtu per hour.

45. The 40 CFR part 60 subpart Dc requirements that are applicable to Emission Units EU-1 and EU-2 are identified in the following table:

40 CFR part 60 subpart Dc Citation	Description	Applicable to Source (Yes/No)	Comments	Permit Condition
60.40c	Applicability and delegation of authority	Yes	Each boiler has a maximum heat input capacity between 10 and 100 MMBtu per hour.	NA
60.41c	Definitions	Yes	Each boiler meets the definition of a *steam generating unit*.	NA
60.42c	Standards for sulfur dioxide (SO_2)	Yes	The facility elected to limit the sulfur weight percent of the fuel oil.	15, 16
60.43c	Standard for particulate matter (PM)	Yes	Each boiler is subject to the opacity requirements.	17, 18
60.44c	Compliance and performance test methods and procedures for sulfur dioxide	No	--	NA
60.45c	Compliance and performance test methods and procedures for particulate matter	Yes	--	19
60.46c	Emission monitoring for sulfur dioxide	No	--	NA
60.47c	Emission monitoring for particulate matter	Yes	The facility is required to perform visible emission testing on a schedule when combusting fuel oil.	20, 21
60.48c	Reporting and recordkeeping requirements	Yes	Under the authority of 40 CFR 60.19(c), LRAPA has moved the postmark deadlines to align with the February 15 reporting.	22 – 28

46. Emission Unit EU-3 is subject to 40 CFR part 60 subpart KKKK - Standards of Performance for Stationary Combustion Turbines because this emission unit is a steam generating unit for which construction commenced after February 18, 2005, and the emission unit has a heat input at peak load equal to or greater than 10 MMBtu per hour, based on the higher heating value of the fuel.

47. The 40 CFR part 60 subpart KKKK requirements that are applicable to Emission Unit EU-3 are identified in the following table:

40 CFR part 60 subpart KKKK Citation	Description	Applicable to Source (Yes/No)	Comments	Permit Condition
60.4300	Purpose	Yes	--	NA
60.4305	Applicability	Yes	--	NA
60.4310	Operations that are exempt from this NSPS	No	--	NA
60.4315	Pollutants regulated by this subpart	Yes	--	NA
60.4320	Nitrogen oxides (NO_X) emission limits	Yes	The turbine has a heat input at peak load between > 50 MMBtu/hr and ≤ 850 MMBtu/hr	33
60.4325	NO_X emission limits for turbines that burn both natural gas and distillate oil (or some other combination of fuels)	Yes	--	34
60.4330	Sulfur dioxide (SO_2) emission limits	Yes	--	35
60.4333	General requirements	Yes	--	36
60.4335	Demonstrating compliance for NO_X if using water or steam injection	No	--	NA
60.4340	Demonstrating continuous compliance for NO_X if not using water or steam injection	Yes	This turbine is using annual performance testing to demonstrate compliance.	37
60.4345	Requirements for continuous emission monitoring system equipment options	No	--	NA
60.4350	Using data from the continuous emission monitoring equipment to identify excess emissions	No	--	NA
60.4355	Establishing and documenting a proper parameter monitoring plan	No	--	NA
60.4360	Determining the total sulfur content of the turbine's combustion fuel	No	--	NA
60.4365	Exemptions from monitoring the total sulfur content of the fuel	Yes	The turbine is using contracts or tariff sheets to demonstrate compliance.	38
60.4370	Determining the sulfur content of the fuel	No	--	NA
60.4375	Reports to submit	Yes	--	39
60.4380	Excess emissions and monitoring downtime for NO_X	No	--	NA
60.4385	Excess emissions and monitoring downtime for SO_2	No	--	NA

40 CFR part 60 subpart KKKK Citation	Description	Applicable to Source (Yes/No)	Comments	Permit Condition
60.4390	Reporting requirements for an emergency combustion turbine or research and development turbine	No	--	NA
60.4395	When to submit reports	No	--	NA
60.4400	How to conduct initial and subsequent performance tests for NO_X	Yes	--	40
60.4405	How to perform the initial performance test if installing a NO_X diluent CEMS	No	--	NA
60.4410	Establishing a valid parameter range if choosing to continuously monitor parameters	No	--	NA
60.4415	Conducting initial and subsequent performance tests for sulfur	Yes	--	41
60.4420	Definitions	Yes	--	NA

48. Emission Units EU-10 through EU-13, EU-19, EU-20, EU-23, and EU-24 are subject to 40 CFR part 60 subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (NSPS) because the facility commenced construction of these emission units after July 11, 2005 where the stationary CI ICE are manufactured after April 1, 2006 and are not fire pump engines.

49. The 40 CFR part 60 subpart IIII requirements that are applicable to Emission Units EU-10 through EU-13, EU-19, EU-20, EU-23, and EU-24 are identified in the following table:

40 CFR part 60 subpart IIII Citation	Description	Applicable to Source (Yes/No)	Comments	Permit Condition
60.4200	Subpart applicability	Yes	--	49
60.4201	Emission standards (non-emergency engines)	No	--	NA
60.4202	Emissions standards (emergency engine)	Yes	--	NA
60.4203	Emission standards (manufacturer)	No	--	NA
60.4204	Emission (non-emergency engine)	No	--	NA
60.4205	Emission standards (emergency engines)	Yes	Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder must comply with the	50

40 CFR part 60 subpart IIII Citation	Description	Applicable to Source (Yes/No)	Comments	Permit Condition
			emission standards in 40 CFR 89.112 and 40 CFR 89.113.	
60.4206	Emission standards	Yes	The emission standards are applicable for the life of the engine.	51
60.4207	Fuel requirements	Yes	Must use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel.	52
60.4208	Requirements	No	--	NA
60.4209	Monitoring requirements	Yes	Installation of a non-resettable hour meter.	53
60.4210	Compliance requirements (manufacturer)	No	--	NA
60.4211	Compliance requirements	Yes	--	54
60.4212	Testing requirements	No	--	NA
60.4213	Testing methods	No	--	NA
60.4214	Notification, reporting, and recordkeeping requirements	Yes	--	55
60.4215	Special requirements	No	Engine is not located in the listed geographic areas.	NA
60.4216	Special requirements	No	Engine is not located in the listed geographic areas.	NA
60.4217	Special requirements	No	Engine does not use special fuels.	NA
60.4218	General provisions	Yes	--	NA
60.4219	Definitions	Yes	--	NA

50. Emission Unit EU-16 is subject to 40 CFR part 60 subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (NSPS) because the facility commenced construction of this emission unit after June 12, 2006, where the stationary SI ICE is manufactured on or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 KW (25 Hp).

51. The 40 CFR part 60 subpart JJJJ requirements that are applicable to Emission Unit EU-16 are identified in the following table:

40 CFR part 60 subpart JJJJ Citation	Description	Applicable to Source (Yes/No)	Comments	Permit Condition
60.4230	Subpart applicability	Yes	--	56
60.4231	Emission standards (manufacturer)	No	--	NA
60.4232	How long to meet emission standards (manufacturer)	No	--	NA
60.4233	Emission standards (owner or operator)	Yes	EU-16 is subject to 40 CFR 60.4233(d).	57

40 CFR part 60 subpart JJJJ Citation	Description	Applicable to Source (Yes/No)	Comments	Permit Condition
60.4234	How long to meet emission standards (owner or operator)	Yes	--	58
60.4235	Fuel requirements for gasoline (owner or operator)	No	--	NA
60.4236	Deadline for importing or installing (owner or operator)	Yes	--	NA
60.4237	Monitoring requirements for emergency SI ICE (owner or operator)	Yes	--	59
60.4238	Compliance requirements ≤19 KW (25 Hp) (manufacturer)	No	--	NA
60.4239	Compliance requirements >19 KW (25 Hp) gasoline (manufacturer)	No	--	NA
60.4240	Compliance requirements >19 KW (25 Hp) LPG (manufacturer)	No	--	NA
60.4241	Compliance requirements voluntary certification (manufacturer)	No	--	NA
60.4242	Other requirements (manufacturer)	No	--	NA
60.4243	Compliance requirements (owner or operator)	Yes	--	60
60.4244	Testing requirements (owner or operator)	No	--	NA
60.4245	Notification, reporting and recordkeeping (owner or operator)	Yes	--	61
60.4246	General provisions	Yes	--	NA
60.4247	Mobile source provisions (manufacturer only)	No	--	NA
60.4248	Definitions	Yes	--	NA

National Emission Standards for Hazardous Air Pollutants (NESHAP)

52. Emission Unit EU-1 and EU-2 are not subject to 40 CFR part 63 subpart DDDDD – National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters because this facility is not considered to be a major source of federal HAPs.

53. Emission Unit EU-1 and EU-2 are not subject to 40 CFR part 63 subpart JJJJJJ – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources because both of these emission units meet the definition of a gas-fired boiler under 40 CFR 63.11237. Under 40 CFR 63.11195(e), gas-fired boilers as defined under 40 CFR 63.11237 are not subject to this NESHAP. The permittee is required to document that each boiler does not operate more than 48 hours per calendar year for periodic testing, maintenance, or operator training on fuel oil in order to remain classified as a gas-fired boiler under this regulation.

54. Emission Unit EU-3 is not subject to 40 CFR part 63 subpart YYYY – National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines because this facility is not considered to be a major source of federal HAPs.

55. Emission Units EU-14, EU-15, EU-17, EU-18, EU-21, and EU-22 are not subject to 40 CFR part 63 subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines because existing institutional emergency stationary RICE located at an area source of federal HAP emissions that do not operate for up to 50 hours per year in on-emergency situations to supply power as part of a financial arrangement with another entity are exempt under 40 CFR 63.6585(f)(3). *Institutional emergency stationary RICE* is defined as an emergency stationary RICE used in institutional establishments such as medical centers, nursing homes, research centers, institutions of higher education, correctional facilities, elementary and secondary schools, libraries, religious establishments, police stations, and fire stations.

56. Emission Units EU-10 through EU-13, EU-16, EU-19, EU-20, EU-23, and EU-24 are subject to 40 CFR part 63 subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines because these emission units are considered new stationary RICE under this regulation. However, under 40 CFR 63.6590(c)(1), a new or reconstructed stationary RICE at an area source of federal HAP emissions must meet the requirements of 40 CFR part 63 subpart ZZZZ by meeting the requirements of 40 CFR part 60 subpart IIII or 40 CFR part 60 subpart JJJJ, as applicable. No further requirements apply for these engines under 40 CFR part 63 subpart ZZZZ.

57. AIE-6 and AIE-7 are subject to 40 CFR part 63 subpart CCCCCC (6C) – National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities. This facility is an area source of federal HAPs. The facility includes on-site storage tanks (diesel and gasoline). The facility has one (1) 300-gallon gasoline tank located at Autzen Stadium and one (1) 6,000-gallon gasoline tank located at the Central Power Station that each represent a gasoline dispensing facility (GDF). Under the regulation, each GDF is considered an existing GDF because the GDFs started up prior to the applicable date of a new source of November 9, 2006. 40 CFR part 63 subpart 6C has not been adopted by LRAPA. Under LRAPA paragraph 37-066(3)(a), Standard ACDPs exclude federal requirements not adopted by the LRAPA Board of Directors. The 40 CFR part 63 subpart 6C requirements that are applicable to the existing GDF at the facility are identified in the following table:

40 CFR part 63 subpart 6C Citation	Description	Applicable to Source (Yes/No)	Comments	Permit Condition
63.11110	Purpose	Yes	--	--
63.11111	Applicability	Yes	The facility is a GDF and has a monthly throughput of less 10,000 gallons per month.	--
63.11112	Emission sources covered	Yes	--	--
63.11113	Compliance dates	Yes	The compliance date for an existing source is no later than January 10, 2008.	--
63.11115	General duties	Yes	--	--
63.11116	Requirements: <10,000 gallons per month	Yes	--	--
63.11117	Requirements: ≥ 10,000 gallons per month	No	--	--

40 CFR part 63 subpart 6C Citation	Description	Applicable to Source (Yes/No)	Comments	Permit Condition
63.11118	Requirements: ≥ 100,000 gallons per month	No	--	--
63.11120	Testing and monitoring	No	--	--
63.11124	Notifications	No	--	--
63.11125	Recordkeeping	Yes	Keep records of malfunctions as listed under 40 CFR 63.11125(d)	--
63.11126	Reporting	Yes	Report any malfunctions.	--
63.11130	General provisions	Yes	--	--
63.11131	Implementation and enforcement	Yes	--	--
63.11132	Definitions	Yes	--	--

Plant Site Emission Limits (PSELs)

58. Provided below is a summary of the baseline emissions rate, netting basis, plant site emission limit, and potential-to-emit:

Pollutant	Baseline Emission Rate (TPY)	Netting Basis		Plant Site Emission Limit (PSEL)		PTE (TPY)
		Previous (TPY)	Proposed (TPY)	Previous PSEL (TPY)	Proposed PSEL (TPY)	
PM	279	76	73	44	48	47.7
PM_{10}	230	36	35	17	20	20.5
$PM_{2.5}$	NA	19	19	9	13	12.8
CO	226	199	199	99	53	53.1
NO_x	116	89	89	53	83	82.8
SO_2	34	34	34	39	14	14.0
VOC	49	49	49	39	19	17.8
GHG (CO_2 eq)	21,880	21,880	21,880	74,000	92,069	92,069

59. The baseline emission rates for PM, PM_{10}, CO, NO_x, SO_2, and VOC represent estimated actual emissions from 1978 as determined under previous permit actions. A baseline emission rate is not established for $PM_{2.5}$ in accordance with subsection 42-0048(3). The facility baseline for GHGs is based upon actual emissions from the 2009 calendar year in accordance with subsection 42-0048(4).

60. Based on the 2017 ACDP permit review report, the netting basis for PM, PM_{10}, CO, and NO_X were reduced in 2010 and 2017 as required by section 42-0055 because the unassigned emissions for these regulated pollutants exceeded the SER. The proposed netting basis also includes a reduction for PM and PM_{10} because the unassigned emissions for these regulated pollutants exceeded the SER after the LRAPA-initiated modification. See item 64 for more discussion on this reduction.

61. Under paragraph 42-0046(2)(b), a source's initial netting basis for $PM_{2.5}$ is equal to the overall $PM_{2.5}$ fraction of the PM_{10} PSEL in effect on May 1, 2011 multiplied by the PM_{10} netting basis in effect on May 1, 2011. Based on the 2017 ACDP permit emission details, the fraction of PM_{10} in the netting basis that is $PM_{2.5}$ is assumed to be 52.84%.

62. The netting basis for SO_2, VOC and GHG are equivalent to the baseline emission rate for the given regulated pollutant in accordance with paragraph 42-0046(2)(a).

63. In accordance with OAR 340-222-0041(3), the PSEL for CO, SO_2 and VOC are set at the PTE for the source. In prior ACDPs, the PSEL for these pollutants were set at the generic PSEL level for the regulated pollutant. DEQ removed the ability to set generic PSELs in permits as part of a rule change that took effect on March 1, 2023.

64. As part of the LRAPA initiated modification, the PSELs for PM, PM_{10}, $PM_{2.5}$, NO_X and GHGs are increasing to reflect the PTE of this facility. Prior to this modification, the netting basis and unassigned emissions for PM and PM_{10} were to be reduced by seven (7) and four (4) tons per year, respectively, under the authority of section 42-0055 as part of the next renewal. As part of LRAPA-initiated modification, the PM PSEL increase is using four (4) tons per year of unassigned emissions and the PM_{10} PSEL increase is using three (3) tons per year of unassigned emissions. After performing the LRAPA-initiated modification, the netting basis for PM and PM_{10} and the unassigned emissions are being reduced by three (3) tons per year and one (1) tons per year, respectively, in accordance with section 42-0055 as part of this renewal.

Pollutant	2017 Netting Basis (TPY)	2017 PSEL (TPY)	2017 Unassigned Emissions (TPY)	2017 Unassigned Reduction (TPY)	Proposed PSEL (TPY)	2023 Unassigned Reduction (TPY)	SER (TPY)
PM	76	44	32	7	48	3	25
PM_{10}	36	17	19	4	20	1	15
$PM_{2.5}$	19	9	10	0	13	0	10
CO	199	99	100	0	53	0	100
NO_X	89	53	36	0	83	0	40
SO_2	34	39	0	0	14	0	40
VOC	49	39	10	0	19	0	40
GHGs	21,880	74,000	0	0	92,069	0	75,000

Unassigned Emissions and Emission Reduction Credits

65. The facility has unassigned emissions as shown in the table below. Unassigned emissions are equal to the netting basis minus the source's current PTE, minus any banked emission reduction credits. The facility has zero (0) tons of emission reduction credits. In accordance with section 42-0055, any unassigned emissions that exceed the SER shall be reduced upon the following permit renewal to no more than the SER for each regulated pollutant.

Pollutant	Proposed Netting Basis (TPY)	PTE (TPY)	2023 Unassigned Emissions (TPY)	Emission Reduction Credits (TPY)	SER (TPY)	Future Unassigned Reduction (TPY)
PM	73	48	25	0	25	0
PM_{10}	35	20	15	0	15	0
$PM_{2.5}$	19	13	6	0	10	0
CO	199	53	146	0	100	46
NO_X	89	83	6	0	40	0
SO_2	34	14	20	0	40	0
VOC	49	19	30	0	40	0
GHGs	21,880	92,069	0	0	75,000	0

New Source Review (NSR) and Prevention of Significant Deterioration (PSD)

66. This source is located in an area that is designated attainment or unclassified for all regulated pollutants other than CO and PM_{10}. For pollutants other than CO and PM_{10}, the proposed PSELs are less than the federal major source threshold for non-listed sources of 250 TPY per regulated pollutant and are not subject to Major NSR. For CO and PM_{10}, the source is located in a maintenance area. The proposed PSELs for CO and PM_{10} are less than the 100 TPY threshold that determines the applicability of Major NSR in a maintenance area.

67. The LRAPA-initiated modification is considered a Type 3 change under title 34 because the modification would increase emissions from the source above the PSEL by more than the de minimis emission level defined in title 12 before applying unassigned emissions but less than the SER after applying unassigned emissions. The LRAPA-initiated modification is not subject to NSR under title 38 because none of the regulated pollutants will increase by an amount that is equal to or greater than the SER over the netting basis.

Pollutant	Proposed PSEL (TPY)	PSEL Increase Over Netting Basis (TPY)	PSEL Increase Due to Utilizing Existing Baseline Period Capacity (TPY)	PSEL Increase Due to Modification (TPY)	SER (TPY)
PM	48	0	NA	NA	25
PM_{10}	20	0	NA	NA	15
$PM_{2.5}$	13	0	NA	NA	10
CO	53	0	NA	NA	100
NO_x	83	0	NA	NA	40
SO_2	14	0	NA	NA	40
VOC	19	0	NA	NA	40
GHGs	92,069	70,189	NA	70,189	75,000

Federal Hazardous Air Pollutants/Toxic Air Contaminants

68. Potential annual federal hazardous air pollutant emissions (FHAP) are based on the potential to emit of the facility operating under permit limitations. Formaldehyde has the highest single FHAP emissions at approximately 0.58 tons per year. The potential total FHAP emissions are 1.22 tons per year. A major source of FHAPs is defined as having potential FHAP emissions of at least 10 tons per year of any single HAP and 25 tons per year of the aggregate of all FHAPs. This facility does not have potential FHAP emissions exceeding these thresholds and is considered a minor or area source of FHAPs.

69. Under the Cleaner Air Oregon program, only existing sources that have been notified by LRAPA and new sources are required to perform risk assessments. This source has not been notified by LRAPA and, therefore, is not yet required to perform a risk assessment or report annual emissions of toxic air contaminants. LRAPA required reporting of approximately 600 toxic air contaminants in 2016 and regulates approximately 260 toxic air contaminants (TAC) that have Risk Based Concentrations established in rule. All FHAPs are on the list of approximately 600 TACs. The FHAPs and TACs listed below are based upon safety data sheets and standard emission factors for the types of emission units at this facility. After the source is notified by LRAPA, they must update their inventory and perform a risk assessment to see if they must reduce risk from their TACs. Until then, this source will be required to report TAC emissions triennially.

70. The table below represents the potential emissions of federal HAPs/TACs from this facility assuming operation at the permit allowable limitations:

CAS/DEQ Number	Pollutant	PTE (TPY)	FHAP	CAO TAC
Organics				
79-34-5	1,1,2,2-Tetrachloroethane	2.7E-06	Yes	Yes
79-00-5	1,1,2-Trichloroethane	1.6E-06	Yes	Yes
78-87-5	1,2-Dichloropropane	1.4E-06	Yes	Yes
542-75-6	1,3-Dichloropropene	1.4E-06	Yes	Yes
75-07-0	Acetaldehyde	1.7E-01	Yes	Yes
107-02-8	Acrolein	1.0E-02	Yes	Yes
71-43-2	Benzene	4.3E-02	Yes	Yes
50-32-8	Benzo(a)pyrene	4.5E-07	Yes	Yes
106-99-0	1,3-Butadiene	4.3E-02	Yes	Yes
56-23-5	Carbon Tetrachloride	1.9E-06	Yes	Yes
67-66-3	Chloroform	1.5E-06	Yes	Yes
200	Diesel PM	1.2E-02	No	Yes
100-41-4	Ethyl Benzene	1.5E-02	Yes	Yes
106-93-4	Ethylene Dibromide	2.3E-06	Yes	Yes
107-06-2	Ethylene Dichloride	1.2E-06	Yes	Yes
50-00-0	Formaldehyde	5.8E-01	Yes	Yes
110-54-3	Hexane	7.0E-03	Yes	Yes
67-56-1	Methanol	3.3E-04	Yes	Yes
75-09-2	Methylene Chloride	4.4E-06	Yes	Yes
91-20-3	Naphthalene	4.4E-03	Yes	Yes
401	POM (inc. PAHs)	7.4E-03	Yes	Yes
75-56-9	Propylene Oxide	2.0E-01	Yes	Yes
100-42-5	Styrene	1.3E-06	Yes	Yes
108-88-3	Toluene	7.3E-02	Yes	Yes
75-01-4	Vinyl Chloride	7.7E-07	Yes	Yes
1330-20-7	Xylenes	3.6E-02	Yes	Yes
Inorganic Gases				
7664-41-7	Ammonia	7.5E+00	No	Yes
7647-01-0	Hydrochloric Acid	3.7E-02	Yes	Yes
Metals				
7440-38-2	Arsenic	3.9E-04	Yes	Yes
7440-39-3	Barium	1.6E-03	No	Yes
7440-41-7	Beryllium	4.5E-06	Yes	Yes
7440-43-9	Cadmium	7.1E-04	Yes	Yes
18540-29-9	Chromium, Hexavalent	5.4E-04	Yes	Yes
7440-48-4	Cobalt	3.1E-05	Yes	Yes
7440-50-8	Copper	1.1E-03	No	Yes
7439-92-1	Lead Compounds	1.8E-03	Yes	Yes
7439-96-5	Manganese	7.5E-04	Yes	Yes
7439-97-6	Mercury	4.9E-04	Yes	Yes
1313-27-5	Molybdenum	6.2E-04	No	Yes
365	Nickel	1.6E-03	Yes	Yes
7782-49-2	Selenium	4.4E-04	Yes	Yes
7440-62-2	Vanadium	8.6E-04	No	Yes

CAS/DEQ Number	Pollutant	PTE (TPY)	FHAP	CAO TAC
7440-66-6	Zinc	1.1E-02	No	Yes
		Total (TPY) =	1.22	8.72

Toxic Release Inventory

71. The Toxics Release Inventory (TRI) is a federal program that tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. It is a resource for learning about toxic chemical releases and pollution prevention activities reported by certain industrial facilities. Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) created the TRI Program. In general, chemicals covered by the TRI Program are those that cause:

- Cancer or other chronic human health effects;
- Significant adverse acute human health effects; or
- Significant adverse environmental effects.

There are currently over 650 chemicals covered by the TRI Program. Facilities that manufacture, process or otherwise use these chemicals in amounts above established levels must submit annual TRI reports on each chemical. NOTE: The TRI Program is a federal program over which LRAPA has no regulatory authority. LRAPA does not guarantee the accuracy of any information copied from EPA's TRI website.

In order to report emissions to the TRI program, a facility must operate under a reportable NAICS code, meet a minimum employee threshold, and manufacture, process, or otherwise use chemicals in excess of the applicable reporting threshold for the chemical. This facility does not operate under a reportable NAICS code.

Compliance History

72. This facility is regularly inspected by LRAPA and occasionally by other regulatory agencies. The following table indicates the inspection history of this facility since 1993:

Type of Inspection	Date	Results
LRAPA - Full Compliance Evaluation	07/21/1993	No areas of non-compliance discovered
LRAPA - Full Compliance Evaluation	12/09/1994	No areas of non-compliance discovered
LRAPA - Full Compliance Evaluation	06/20/1995	No areas of non-compliance discovered
LRAPA - Full Compliance Evaluation	11/22/1996	No areas of non-compliance discovered
LRAPA - Full Compliance Evaluation	09/25/1997	No areas of non-compliance discovered
LRAPA - Full Compliance Evaluation	03/30/1998	No areas of non-compliance discovered
LRAPA - Full Compliance Evaluation	04/18/2003	No areas of non-compliance discovered
LRAPA - Full Compliance Evaluation	05/01/2008	No areas of non-compliance discovered
LRAPA - Full Compliance Evaluation	04/24/2013	No areas of non-compliance discovered
LRAPA - Full Compliance Evaluation	08/30/2018	No areas of non-compliance discovered

73. LRAPA has issued the following violation notices and/or taken the following enforcement actions against this facility since the facility began operation:

73.a. On December 9, 2009, the facility informed LRAPA that EU-1 in the central power station had failed and, as a result, they had operated a newly installed, 54 MMBtu/hr temporary boiler. The temporary boiler installation began on October 28, 2009 and was completed on November 25, 2009. The Notice of Intent to Construct for the temporary boiler was received by LRAPA on December 8, 2009, therefore; a permit had not been issued for

the new emission unit before its operation. On December 10, 2009, LRAPA issued Notice of Non-Compliance No. 3162 (NON 3162) to the facility for operating a boiler without a permit. The violation was resolved with the issuance of an addendum to the permit for the temporary boiler and a fine of $2250 was assessed. The facility paid the full amount of the fine, $2250, on April 16, 2010 and the case was closed.

73.b. The facility was issued a Stipulated Final Penalty and Stipulated Final Order (SFO No. 91-47) on March 5, 1992 for asbestos abatement violations at the University of Oregon Knight Library. The facility paid a civil penalty in the amount of $4,000 and the file was closed.

73.c. The facility was issued a Notice of Civil Penalty (NCP 91-43) on November 25, 1991, for exceeding the opacity limit for Boiler #1 at the Central Power Station. The facility paid a civil penalty in the amount of $1,200 and the file was closed.

73.d. The facility was issued a Notice of Non-Compliance (NON 90-10) for exceeding the opacity limit for Boiler #3 at the Central Power Station.

73.e. On November 19, 1990, visible emissions in excess of the permitted limits were observed from the stack of Boiler #3 at the University of Oregon Physical Plant. Opacity was observed and documented by an LRAPA employee at 90% black smoke, which violated the permitted opacity limitation of 40%. Once made aware of the situation, the facility made adjustments to Boiler #3 to remedy the low oxygen conditions that were causing inefficient combustion. The facility was issued Notice of Non-Compliance No. 90-13 (NON 90-13) on December 3, 1990. The facility was required to repair and calibrate the opacity meters and to ensure that an alarm system was in place to indicate when the system was operating incorrectly. No penalty was assessed for this violation and the case was closed.

Performance Test Results

74. Emission Units EU-1 and EU-2 have been tested for PM, CO and NO_X emissions. Emission Unit EU-3 has been tested repeatedly for NO_X emissions. Please see the Emission Details for a summary of the results of this testing for each emission unit.

Recordkeeping Requirements

75. The permittee must keep and maintain records for a period of at least five (5) years from the date of entry of the following information:

Activity	Units	Minimum Recording Frequency
PSEL Recordkeeping		
The amount of natural gas combusted by each Emission Unit EU-1 and EU-2.	Therms or MMcf	Monthly
The amount of fuel oil combusted by each Emission Unit EU-1 and EU-2.	1000 Gallons	Monthly
The amount of natural gas combusted by Emission Unit EU-3.	Therms or MMcf	Monthly
The amount of fuel oil combusted by Emission Unit EU-3.	1000 Gallons	Monthly
The total amount of fuel oil combusted by Emission Units EU-10 through EU-24, other than EU-13, EU-14, EU-16 and EU-18.	1000 Gallons	Monthly
The total amount of natural gas combusted by Emission Units EU-14, EU-16 and EU-18.	Therms or MMcf	Monthly
The total amount of LPG combusted by Emission Unit EU-13.	1000 Gallons	Monthly
The total amount of natural gas combusted by Emission Units EU-30 through EU-39.	Therms or MMcf	Monthly
General Limitation Recordkeeping		

Activity	Units	Minimum Recording Frequency
Operation and Maintenance Plan for Emission Unit EU-1 and EU-2.	NA	Maintain current documentation
Operation and Maintenance Plan for Emission Unit EU-3.	NA	Maintain current documentation
Operation and Maintenance Plan for Emission Unit EU-5.	NA	Maintain current documentation
Operation and Maintenance Plan for Emission Units EU-10 through EU-24.	NA	Maintain current documentation
Operation and Maintenance Plan for Emission Units EU-30 through EU-38.	NA	Maintain current documentation
Records of how many hours Emission Unit EU-1 and EU-2 are individually operated on fuel oil. The records must also indicate how many of the hours were for periodic testing, maintenance, or operator training on fuel oil and how many hours were for periods of gas curtailment, gas supply interruptions or startups.	Hours	Monthly
Visible emission testing records for Emission Unit EU-3, as required under Condition 30.	NA	Each occurrence
40 CFR part 60 subpart Dc Recordkeeping		
The amount of natural gas combusted by each Emission Unit EU-1 and EU-2.	Therms or MMcf	Monthly
The amount of fuel oil combusted by each Emission Unit EU-1 and EU-2.	1000 Gallons	Monthly
Fuel oil supplier certifications for Emission Unit EU-1 and EU-2.	NA	Each delivery of fuel oil
Visible emission testing records for Emission Unit EU-1 and EU-2, as required under Conditions 22 and 23.	NA	Each occurrence
40 CFR par 63 subpart KKKK Recordkeeping		
Maintenance performed for Emission Unit EU-3.	NA	Each occurrence
Performance test results for Emission Unit EU-3.	NA	Each performance test
A current, valid purchase contract, tariff sheet or transportation contract for each fuel, specifying the maximum total sulfur content.	Weight percent (ppmw) and grains of sulfur per 100 scf	Annually
40 CFR part 60 subpart IIII Recordkeeping		
Documentation of maintenance performed on each engine.	NA	Each occurrence
Documentation that each engine combusts diesel fuel that meets the specifications in Condition 52.	NA	Maintain current documentation
Records of how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation for each engine.	Hours	Monthly
40 CFR part 60 subpart JJJJ Recordkeeping		

Activity	Units	Minimum Recording Frequency
Documentation of maintenance performed on each engine.	NA	Each occurrence
Documentation from the manufacturer that each engine is certified to meet the applicable emission standards.	NA	Maintain documentation
Records of how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation for each engine.	Hours	Monthly
LRAPA Title 44 Recordkeeping		
Initial notification.	NA	One time
The monthly gasoline throughput of each GDF.	1000 Gallons	Monthly
The annual gasoline throughput of each GDF in any 12 consecutive months.	1000 Gallons	Monthly
Documentation of the distance the submerged fill pipe extends from the bottom of each gasoline storage tank.	NA	Documentation
Records of permanent changes made at each GDF which may affect emissions.	NA	Each occurrence
Records of the occurrence and duration of each malfunction of operation at each GDF.	NA	Each occurrence
Records of actions taken during periods of malfunction to minimize emissions at each GDF.	NA	Each occurrence

Reporting Requirements

76. The facility must submit to LRAPA the following reports by no later than the dates indicated in the table below:

Report	Reporting Period	Due Date
Excess emission reports as required by 40 CFR part 60 subpart Dc for Emission Units EU-1 and EU-2	Semiannual	Postmarked by February 15, August 15
Semiannual fuel oil report as required by 40 CFR part 60 subpart Dc for Emission Unit EU-1 and EU-2.	Semiannual	Postmarked by February 15, August 15
Results of each performance test as required by 40 CFR part 60 subpart KKKK for Emission Unit EU-3.	Annual / Biennial	COB 60 days from the test date
Title 44 Report, if monthly gasoline throughput is greater than or equal to 10,000 gallons in a calendar year for any GDF.	Annual	February 15
The upset log information required by Condition G14 of the proposed permit, if required by Condition G14.	Annual	February 15
PSEL pollutant emissions as calculated according to Conditions 6 and 7 of the proposed permit, including supporting calculations.	Annual	February 15
GHG Report, if required by Condition 86 of the proposed permit.	Annual	March 31

Public Notice

77. Pursuant to LRAPA 37-0066(4)(a)(A), issuance of renewed Standard Air Contaminant Discharge Permit requires public notice in accordance with LRAPA 31-0033(3)(c), which requires LRAPA to

provide notice off the proposed permit action and a minimum of 35 days for interested persons to submit written comments.

The draft permit was on public notice January 4, 2024 to February 8, 2024. No written comments were submitted during the 35-day comment period.

JJW/cmw
01/09/2024

Emission Details

University of Oregon 208557
Emission Details
Facility Potential Emissions Summary

Criteria Pollutant Emissions

	PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	CO (TPY)	NO_x (TPY)	SO_2 (TPY)	VOC (TPY)*	GHGs (TPY)
Capacity	55.5	28.3	20.6	73.6	124	164	20.6	172,466
PTE	47.7	20.5	12.8	53.1	82.8	14.0	17.8	92,069
Aggregate Insignificant	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0

FHAP/TAC Emissions

Pollutant	CAS/DEQ Number	Federal HAP	CAO Air Toxic	Total HAP Capacity (TPY)	Total HAP PTE (TPY)
Organics					
1,1,2,2-Tetrachloroethane	79-34-5	Yes	Yes	2.7E-06	2.7E-06
1,1,2-Trichloroethane	79-00-5	Yes	Yes	1.6E-06	1.6E-06
1,2-Dichloropropane	78-87-5	Yes	Yes	1.4E-06	1.4E-06
1,3-Dichloropropene	542-75-6	Yes	Yes	1.4E-06	1.4E-06
Acetaldehyde	75-07-0	Yes	Yes	3.6E+00	1.7E-01
Acrolein	107-02-8	Yes	Yes	1.8E+00	1.0E-02
Benzene	71-43-2	Yes	Yes	4.6E-01	4.3E-02
Benzo(a)pyrene	50-32-8	Yes	Yes	9.6E-07	4.5E-07
1,3-Butadiene	106-99-0	Yes	Yes	5.8E-01	4.3E-02
Carbon Tetrachloride	56-23-5	Yes	Yes	1.9E-06	1.9E-06
Chloroform	67-66-3	Yes	Yes	1.5E-06	1.5E-06
Diesel PM	200	No	Yes	1.2E-02	1.2E-02
Ethyl Benzene	100-41-4	Yes	Yes	3.7E-02	1.5E-02
Ethylene Dibromide	106-93-4	Yes	Yes	2.3E-06	2.3E-06
Ethylene Dichloride	107-06-2	Yes	Yes	1.2E-06	1.2E-06
Formaldehyde	50-00-0	Yes	Yes	5.9E+00	5.8E-01
Hexane	110-54-3	Yes	Yes	8.0E-02	7.0E-03
Methanol	67-56-1	Yes	Yes	3.3E-04	3.3E-04
Methylene Chloride	75-09-2	Yes	Yes	4.4E-06	4.4E-06
Naphthalene	91-20-3	Yes	Yes	7.2E-02	4.4E-03
POM (inc. PAHs)	401	Yes	Yes	3.1E-01	7.4E-03
Propylene Oxide	75-56-9	Yes	Yes	4.3E-01	2.0E-01
Styrene	100-42-5	Yes	Yes	1.3E-06	1.3E-06
Toluene	108-88-3	Yes	Yes	3.0E-01	7.3E-02
Vinyl Chloride	75-01-4	Yes	Yes	7.7E-07	7.7E-07
Xylenes	1330-20-7	Yes	Yes	1.3E-01	3.6E-02
Inorganic Gases					
Ammonia	7664-41-7	No	Yes	2.5E+01	7.5E+00
Hydrochloric Acid	7647-01-0	Yes	Yes	1.4E+00	3.7E-02
Metals					
Arsenic	7440-38-2	Yes	Yes	1.2E-02	3.9E-04
Barium	7440-39-3	No	Yes	3.5E-03	1.6E-03
Beryllium	7440-41-7	Yes	Yes	9.6E-06	4.5E-06
Cadmium	7440-43-9	Yes	Yes	1.1E-02	7.1E-04
Chromium, Hexavalent	18540-29-9	Yes	Yes	1.4E-03	5.4E-04
Cobalt	7440-48-4	Yes	Yes	6.7E-05	3.1E-05
Copper	7440-50-8	No	Yes	3.0E-02	1.1E-03
Lead Compounds	7439-92-1	Yes	Yes	6.1E-02	1.8E-03
Manganese	7439-96-5	Yes	Yes	2.3E-02	7.5E-04
Mercury	7439-97-6	Yes	Yes	1.5E-02	4.9E-04
Molybdenum	1313-27-5	No	Yes	1.3E-03	6.2E-04
Nickel	365	Yes	Yes	2.9E-02	1.6E-03
Selenium	7782-49-2	Yes	Yes	1.6E-02	4.4E-04
Vanadium	7440-62-2	No	Yes	1.8E-03	8.6E-04
Zinc	7440-66-6	No	Yes	2.3E-02	1.1E-02
			Total HAPs =	**15.17**	**1.22**
			Max Single HAP =	**5.88**	**0.58**
			Total TACs =	40.4	8.72

University of Oregon 208557
Emission Details
Small Boilers

Avg. Natural Gas Heat Value
1026 MMBtu/MMcf

EU-ID	Location	Source	Fuel Type	Max Heat Input (MMBtu/hr)	Criteria Pollutant Emission Estimates (tons/yr) PM	PM10	PM2.5	CO	NOx	SO2	VOC	GHGs
EU-30	Casanova Center	Boiler #1	Natural Gas	8.38	0.09	0.09	0.09	3.01	3.58	0.06	0.20	4,298
EU-31	Casanova Center	Boiler #2	Natural Gas	4.18	0.04	0.04	0.04	1.50	1.78	0.03	0.10	2,144
EU-32	Agate Hall	Boiler #1	Natural Gas	2.5	0.03	0.03	0.03	0.90	1.07	0.02	0.06	1,282
EU-33	Agate Hall	Boiler #2	Natural Gas	2.5	0.03	0.03	0.03	0.90	1.07	0.02	0.06	1,282
EU-34	Practice Facility	Boiler	Natural Gas	3.9	0.04	0.04	0.04	1.40	1.66	0.03	0.09	2,000
EU-35	Practice Facility	MAU	Natural Gas	3.0	0.03	0.03	0.03	1.08	1.28	0.02	0.07	1,539
EU-36	Baker Center	Boiler #1	Natural Gas	2.04	0.02	0.02	0.02	0.73	0.87	0.01	0.05	1,046
EU-37	Hatfield Dowlin Complex	Boiler #1	Natural Gas	2.3	0.02	0.02	0.02	0.82	0.98	0.02	0.05	1,180
EU-38	Hatfield Dowlin Complex	Boiler #2	Natural Gas	2.3	0.02	0.02	0.02	0.82	0.98	0.02	0.05	1,180
			Total =	**31.10**	**0.33**	**0.33**	**0.33**	**11.15**	**13.28**	**0.23**	**0.73**	**15,951**

Criteria Pollutant Emission Factors

Pollutant	Emission Factor	Units
PM/PM10/PM2.5	2.5	lb/MMcf
CO	84	lb/MMcf
NOx	100	lb/MMcf
SOx	1.7	lb/MMcf
VOC	5.5	lb/MMcf
GHG	117	lb/MMBtu

Greenhouse Gas Emission Factors

Pollutant	Emission Factor	Units	GWP
CO2	53.06	kg CO2/MMBtu	1
CH4	1.00E-03	kg CH4/MMBtu	25
N2O	1.00E-04	kg N2O/MMBtu	298

FHAP/TAC Emissions

Pollutant	CAS/DEQ Number	NG Emission Factor (lbs/MMCF)	FO Emission Factor (lbs/1000 Gal)	Potential Annual Emissions (TPY)	Federal HAP	CAO Air Toxic
Organics						
1,1,2,2-Tetrachloroetha	79-34-5			0.0E+00	Yes	Yes
1,1,2-Trichloroethane	79-00-5			0.0E+00	Yes	Yes
1,2-Dichloropropane	78-87-5			0.0E+00	Yes	Yes
1,3-Dichloropropene	542-75-6			0.0E+00	Yes	Yes
Acetaldehyde	75-07-0	0.0031	0.3506	4.1E-04	Yes	Yes
Acrolein	107-02-8	0.0027	0.3506	3.6E-04	Yes	Yes
Benzene	71-43-2	0.0058	0.0044	7.7E-04	Yes	Yes
Benzo(a)pyrene	50-32-8	1.2E-06		1.6E-07	Yes	Yes
1,3-Butadiene	106-99-0		0.0148	0.0E+00	Yes	Yes
Carbon Tetrachloride	56-23-5			0.0E+00	Yes	Yes
Chloroform	67-66-3			0.0E+00	Yes	Yes
Diesel PM	200			0.0E+00	No	Yes
Ethyl Benzene	100-41-4	0.0069	0.0002	9.2E-04	Yes	Yes
Ethylene Dibromide	106-93-4			0.0E+00	Yes	Yes
Ethylene Dichloride	107-06-2			0.0E+00	Yes	Yes
Formaldehyde	50-00-0	0.0123	0.3506	1.6E-03	Yes	Yes
Hexane	110-54-3	0.0046	0.0035	6.1E-04	Yes	Yes
Methanol	67-56-1			0.0E+00	Yes	Yes
Methylene Chloride	75-09-2			0.0E+00	Yes	Yes
Naphthalene	91-20-3	0.0003	0.0053	4.0E-05	Yes	Yes
POM (inc. PAHs)	401	0.0001	0.0445	1.3E-05	Yes	Yes
Propylene Oxide	75-56-9	0.5300		7.0E-02	Yes	Yes
Styrene	100-42-5			0.0E+00	Yes	Yes
Toluene	108-88-3	0.0265	0.0044	3.5E-03	Yes	Yes
Vinyl Chloride	75-01-4			0.0E+00	Yes	Yes
Xylenes	1330-20-7	0.0197	0.0016	2.6E-03	Yes	Yes
Inorganic Gases						
Ammonia	7664-41-7	3.2000	2.9	4.2E-01	No	Yes
Hydrochloric Acid	7647-01-0		0.1863	0.0E+00	Yes	Yes
Metals						
Arsenic	7440-38-2	2.0E-04	0.0016	2.7E-05	Yes	Yes
Barium	7440-39-3	4.4E-03		5.8E-04	No	Yes
Beryllium	7440-41-7	1.2E-05		1.6E-06	Yes	Yes
Cadmium	7440-43-9	1.1E-03	0.0015	1.5E-04	Yes	Yes
Chromium, Hexavalent	18540-29-9	1.4E-03	0.0001	1.9E-04	Yes	Yes
Cobalt	7440-48-4	8.4E-05		1.1E-05	Yes	Yes
Copper	7440-50-8	8.5E-04	0.0041	1.1E-04	No	Yes
Lead Compounds	7439-92-1	5.0E-04	0.0083	6.6E-05	Yes	Yes
Manganese	7439-96-5	3.8E-04	0.0031	5.0E-05	Yes	Yes
Mercury	7439-97-6	2.6E-04	0.002	3.5E-05	Yes	Yes
Molybdenum	1313-27-5	1.7E-03		2.2E-04	No	Yes
Nickel	365	2.1E-03	0.0039	2.8E-04	Yes	Yes
Selenium	7782-49-2	2.4E-05	0.0022	3.2E-06	Yes	Yes
Vanadium	7440-62-2	2.3E-03		3.1E-04	No	Yes
Zinc	7440-66-6	2.9E-02		3.9E-03	No	Yes
			Total Emissions =	0.51	8.2E-02	0.51

Notes:
Natural gas combustion emission factors from ODEQ AQ-EF05 for uncontrolled medium boilers.
GHG emission factors are from 40 CFR 98, Tables C-1 and C-2.
Toxics emission factors from DEQ 2020 Air Toxics Emission Inventory Combustion Emission Factor Tool.
Chromium assumed to be hexavalent.
Fuel high heat values are from ODEQ Fuel Combustion Greenhouse Gas Calculator (6/2021).

University of Oregon 208557
Emission Details
Emergency Generators

Inputs

100	Maximum Hours per Year
138	MMBtu/1000 gal (diesel)
1,026	MMBtu/MMcf (natural gas)
91.5	MMBtu/1000 gal (LPG)

EU-ID	Location	Source	Fuel Type	Max Rating	Max. Rating Units	Max Fuel	Max Fuel Units	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2	VOC	GHGs
								Criteria Pollutant Emission Estimates (tons/yr)							
EU-10	CP Station	Caterpillar	Diesel	2200	kW	157.5	gal/hr	0.33	0.33	0.33	1.02	4.76	0.31	0.39	178
EU-11	CP Station	Caterpillar	Diesel	2200	kW	157.5	gal/hr	0.33	0.33	0.33	1.02	4.76	0.31	0.39	178
EU-12	CP Station	Caterpillar	Diesel	2200	kW	157.5	gal/hr	0.33	0.33	0.33	1.02	4.76	0.31	0.39	178
EU-13	S&RS	Caterpillar	Diesel	80	kW	6.5	gal/hr	1.4E-02	1.4E-02	1.4E-02	4.2E-02	0.20	1.3E-02	1.6E-02	7
EU-17	Rainier Building	Cummins	Diesel	80	kW	6.6	gal/hr	0.01	0.01	0.01	0.04	0.20	0.01	0.02	7
EU-19	Hatfield-Dowlin	Kohler	Diesel	400	kW	52	gal/hr	0.11	0.11	0.11	0.34	1.57	0.10	0.13	59
EU-20	Autzen-PK Park	Deere	Diesel	80	kW	6.13	gal/hr	0.01	0.01	0.01	0.04	0.19	0.01	0.02	7
EU-21	Autzen	Caterpillar	Diesel	750	kW	53.5	gal/hr	0.11	0.11	0.11	0.35	1.62	0.11	0.13	60
EU-22	Autzen-Moshofsky	Cummins	Diesel	80	kW	6.1	gal/hr	0.01	0.01	0.01	0.04	0.18	0.01	0.02	7
EU-23	Millrace Garage	--	Diesel	100	kW	8.2	gal/hr	0.02	0.02	0.02	0.05	0.25	0.02	0.02	9
EU-24	Central Kitchen	--	Diesel	350	kW	24	gal/hr	0.05	0.05	0.05	0.16	0.72	0.05	0.06	27
					Total =	**635.53**	**gal/hr**								
EU-15	Mac Court	Kohler	LPG	30	kW	7.05	gal/hr	2.5E-04	2.5E-04	2.5E-04	2.6E-03	4.6E-03	7.1E-06	3.5E-04	4
					Total =	**7.05**	**gal/hr**								
EU-14	Knight Law	Cummins	Natural Gas	65	kW	0.22	MMBtu/hr	1.1E-04	1.1E-04	1.1E-04	4.3E-03	3.0E-02	6.4E-06	1.2E-03	1
EU-16	UOPD	Olympian	Natural Gas	55	kW	0.19	MMBtu/hr	9.3E-05	9.3E-05	9.3E-05	3.7E-03	2.6E-02	5.6E-06	1.1E-03	1
EU-18	Willamette Hall	Waukesha	Natural Gas	325	kW	1.1	MMBtu/hr	5.4E-04	5.4E-04	5.4E-04	2.1E-02	1.5E-01	3.2E-05	6.2E-03	6
			Total =	**8,995**	**Total =**	**1.51**	**MMBtu/hr**	**1.35**	**1.35**	**1.35**	**4.16**	**19.41**	**1.26**	**1.58**	**731**

Pollutant	Diesel Emission Factor lb/1000 gal	Natural Gas Emission Factor lb/MMcf	LPG Emission Factor lb/1000 gal
PM	42.5	10	0.7
PM10	42.5	10	0.7
PM2.5	42.5	10	0.7
CO	130	399	7.5
NOx	604	2,840	13
SO2	39.7	0.6	0.02
VOC	49.3	116	1.0
	lb/MMBtu	**lb/MMBtu**	**lb/MMBtu**
GHG (CO2 eq.)	164	117	139

GHG-Related Emission Factors

Pollutant	Diesel (kg/MMBtu)	Natural Gas (kg/MMBtu)	LPG (kg/MMBtu)	GWP
Carbon Dioxide (CO_2)	73.96	53.06	62.87	1
Methane (CH_4)	3.0E-03	1.0E-03	3.0E-03	25
Nitrous Oxide (N_2O)	6.0E-04	1.0E-04	6.0E-04	298

FHAP/TAC Emissions

Pollutant	CAS/DEQ Number	NG Emission Factor (lbs/MMCF)	FO Emission Factor (lbs/1000 Gal)	LPG Emission Factor (lbs/1000 gal)	PTE Emissions (TPY)	Federal HAP	CAO Air Toxic
Organics							
1,1,2,2-Tetrachloroethane	79-34-5	0.0258		0.00229	2.7E-06	Yes	Yes
1,1,2-Trichloroethane	79-00-5	0.0156		0.00138	1.6E-06	Yes	Yes
1,2-Dichloropropane	78-87-5	0.0133		0.00118	1.4E-06	Yes	Yes
1,3-Dichloropropene	542-75-6	0.013		0.00115	1.4E-06	Yes	Yes
Acetaldehyde	75-07-0	2.8500	0.7833	0.252	2.5E-02	Yes	Yes
Acrolein	107-02-8	2.6800	0.0339	0.238	1.4E-03	Yes	Yes
Benzene	71-43-2	1.6100	0.1863	0.143	6.1E-03	Yes	Yes
Benzo(a)pyrene	50-32-8				0.0E+00	Yes	Yes
1,3-Butadiene	106-99-0	0.6760	0.2174	0.06	7.0E-03	Yes	Yes
Carbon Tetrachloride	56-23-5	0.0181		0.0016	1.9E-06	Yes	Yes
Chloroform	67-66-3	0.0140		0.00124	1.5E-06	Yes	Yes
Diesel Particulate Matter	200			33.5	1.2E-02	No	Yes
Ethyl Benzene	100-41-4	0.0253	0.0109	0.00224	3.5E-04	Yes	Yes
Ethylene Dibromide	106-93-4	0.0217		0.00193	2.3E-06	Yes	Yes
Ethylene Dichloride	107-06-2	0.0115		0.00102	1.2E-06	Yes	Yes
Formaldehyde	50-00-0	20.9000	1.7261	1.86	5.7E-02	Yes	Yes
Hexane	110-54-3		0.0269		8.5E-04	Yes	Yes
Methanol	67-56-1	3.1200		0.277	3.3E-04	Yes	Yes
Methylene Chloride	75-09-2	0.0420		0.00373	4.4E-06	Yes	Yes
Naphthalene	91-20-3	0.0990	0.0197	0.00879	6.4E-04	Yes	Yes
POM (inc. PAHs)	401		0.0362		1.2E-03	Yes	Yes
Propylene Oxide	75-56-9				0.0E+00	Yes	Yes
Styrene	100-42-5	0.0121		0.00108	1.3E-06	Yes	Yes
Toluene	108-88-3	0.5690	0.1054	0.0505	3.4E-03	Yes	Yes
Vinyl Chloride	75-01-4	0.0073		0.00065	7.7E-07	Yes	Yes
Xylenes	1330-20-7	0.1990	0.0424	0.0176	1.4E-03	Yes	Yes
Inorganic Gases							
Ammonia	7664-41-7	3.2000	2.9	0.3	9.2E-02	No	Yes
Hydrochloric Acid	7647-01-0		0.1863		5.9E-03	Yes	Yes
Metals							
Arsenic	7440-38-2		0.0016		5.1E-05	Yes	Yes
Barium	7440-39-3				0.0E+00	No	Yes
Beryllium	7440-41-7				0.0E+00	Yes	Yes
Cadmium	7440-43-9		0.0015		4.8E-05	Yes	Yes
Chromium, Hexavalent	18540-29-9		0.0001		3.2E-06	Yes	Yes
Cobalt	7440-48-4				0.0E+00	Yes	Yes
Copper	7440-50-8		0.0041		1.3E-04	No	Yes
Lead Compounds	7439-92-1		0.0083		2.6E-04	Yes	Yes
Manganese	7439-96-5		0.0031		9.9E-05	Yes	Yes
Mercury	7439-97-6		0.002		6.4E-05	Yes	Yes
Molybdenum	1313-27-5				0.0E+00	No	Yes
Nickel	365		0.0039		1.2E-04	Yes	Yes
Selenium	7782-49-2		0.0022		7.0E-05	Yes	Yes
Vanadium	7440-62-2				0.0E+00	No	Yes
Zinc	7440-66-6				0.0E+00	No	Yes
					0.22	1.1E-01	0.22

Notes:
For diesel, the emission factors are from the emission factors are from Oregon DEQ AQ-EF07 - Emission Factors - Power (Electric) Generators (08/01/2011).
For natural gas, the emission factors are from Oregon DEQ AQ-EF07 - Emission Factors - Power (Electric) Generators (08/01/2011).
For LPG, the emission factors are from US EPA AP-42, Table 1.5-1 - Emission Factors for LPG Combustion. SO2 assumes 0.20 gr/100 ft^3.
GHG emission factors are from 40 CFR 98, Tables C-1 and C-2.
HAP/TAC emissions from 2020 ATEI Combustion Emission Factor Search Tool assuming diesel engines and rich burn NG and LPG engines.
Fuel high heat values are from ODEQ Fuel Combustion Greenhouse Gas Calculator (6/2021).

University of Oregon 208557
Emission Details
Nebraska Boiler (1994) Specifications (EU-1)

Max Heat Input	79	MMBtu/hr		**Max NG Use =**	675	MMcf/yr
Heat Value - Natural Gas	1,026	MMBtu/MMcf		**Max FO Use =**	5,015	1000 Gal/yr
Heat Value - Fuel Oil	138	MMBtu/1000 Gal				
Max Hrs Operation - NG	8,712	hr/yr				
Max Hrs Operation - FO	48	hr/yr				

Criteria Pollutants

Pollutant	NG Emission Factor	NG EF Units	FO Emission Factor	FO EF Units	NG Capacity (TPY)	FO Capacity (TPY)	Unit PTE (TPY)
PM	9.2	lb/MMcf	0.59	lb/1000 Gal	3.10	1.48	3.09
PM_{10}	9.2	lb/MMcf	0.59	lb/1000 Gal	3.10	1.48	3.09
$PM_{2.5}$	9.2	lb/MMcf	0.59	lb/1000 Gal	3.10	1.48	3.09
CO	0.7	lb/MMcf	0.17	lb/1000 Gal	0.25	0.43	0.25
NOx	111	lb/MMcf	18.3	lb/1000 Gal	37.40	45.95	37.45
SO_2	1.7	lb/MMcf	71	lb/1000 Gal	0.57	178.02	1.55
VOC	4.0	lb/MMcf	0.6	lb/1000 Gal	1.35	1.50	1.35
GHG (CO_2 eq)	117	lb/MMBtu	164	lb/MMBtu	40,518	56,613	40,606

FHAP/TAC Emissions

Pollutant	CAS/DEQ Number	NG Emission Factor (lbs/MMCF)	FO Emission Factor (lbs/1000 Gal)	NG Capacity (TPY)	FO Capacity (TPY)	Federal HAP	CAO Air Toxic
Organics							
1,1,2,2-Tetrachloroethane	79-34-5			0.0E+00	0.0E+00	Yes	Yes
1,1,2-Trichloroethane	79-00-5			0.0E+00	0.0E+00	Yes	Yes
1,2-Dichloropropane	78-87-5			0.0E+00	0.0E+00	Yes	Yes
1,3-Dichloropropene	542-75-6			0.0E+00	0.0E+00	Yes	Yes
Acetaldehyde	75-07-0	0.0031	0.3506	1.0E-03	8.8E-01	Yes	Yes
Acrolein	107-02-8	0.0027	0.3506	9.1E-04	8.8E-01	Yes	Yes
Benzene	71-43-2	0.0058	0.0044	2.0E-03	1.1E-02	Yes	Yes
Benzo(a)pyrene	50-32-8	1.2E-06		4.0E-07	0.0E+00	Yes	Yes
1,3-Butadiene	106-99-0		0.0148	0.0E+00	3.7E-02	Yes	Yes
Carbon Tetrachloride	56-23-5			0.0E+00	0.0E+00	Yes	Yes
Chloroform	67-66-3			0.0E+00	0.0E+00	Yes	Yes
Diesel PM	200			0.0E+00	0.0E+00	No	Yes
Ethyl Benzene	100-41-4	0.0069	0.0002	2.3E-03	5.0E-04	Yes	Yes
Ethylene Dibromide	106-93-4			0.0E+00	0.0E+00	Yes	Yes
Ethylene Dichloride	107-06-2			0.0E+00	0.0E+00	Yes	Yes
Formaldehyde	50-00-0	0.0123	0.3506	4.1E-03	8.8E-01	Yes	Yes
Hexane	110-54-3	0.0046	0.0035	1.6E-03	8.8E-03	Yes	Yes
Methanol	67-56-1			0.0E+00	0.0E+00	Yes	Yes
Methylene Chloride	75-09-2			0.0E+00	0.0E+00	Yes	Yes
Naphthalene	91-20-3	0.0003	0.0053	1.0E-04	1.3E-02	Yes	Yes
POM (inc. PAHs)	401	0.0001	0.0445	3.4E-05	1.1E-01	Yes	Yes
Propylene Oxide	75-56-9	0.5300		1.8E-01	0.0E+00	Yes	Yes
Styrene	100-42-5			0.0E+00	0.0E+00	Yes	Yes
Toluene	108-88-3	0.0265	0.0044	8.9E-03	1.1E-02	Yes	Yes
Vinyl Chloride	75-01-4			0.0E+00	0.0E+00	Yes	Yes
Xylenes	1330-20-7	0.0197	0.0016	6.6E-03	4.0E-03	Yes	Yes
Inorganic Gases							
Ammonia	7664-41-7	3.2000	2.9	1.1E+00	7.3E+00	No	Yes
Hydrochloric Acid	7647-01-0		0.1863	0.0E+00	4.7E-01	Yes	Yes
Metals							
Arsenic	7440-38-2	2.0E-04	0.0016	6.7E-05	4.0E-03	Yes	Yes
Barium	7440-39-3	4.4E-03		1.5E-03	0.0E+00	No	Yes
Beryllium	7440-41-7	1.2E-05		4.0E-06	0.0E+00	Yes	Yes
Cadmium	7440-43-9	1.1E-03	0.0015	3.7E-04	3.8E-03	Yes	Yes
Chromium, Hexavalent	18540-29-9	1.4E-03	0.0001	4.7E-04	2.5E-04	Yes	Yes
Cobalt	7440-48-4	8.4E-05		2.8E-05	0.0E+00	Yes	Yes
Copper	7440-50-8	8.5E-04	0.0041	2.9E-04	1.0E-02	No	Yes
Lead Compounds	7439-92-1	5.0E-04	0.0083	1.7E-04	2.1E-02	Yes	Yes
Manganese	7439-96-5	3.8E-04	0.0031	1.3E-04	7.8E-03	Yes	Yes
Mercury	7439-97-6	2.6E-04	0.002	8.8E-05	5.0E-03	Yes	Yes
Molybdenum	1313-27-5	1.7E-03		5.6E-04	0.0E+00	No	Yes
Nickel	365	2.1E-03	0.0039	7.1E-04	9.8E-03	Yes	Yes
Selenium	7782-49-2	2.4E-05	0.0022	8.1E-06	5.5E-03	Yes	Yes
Vanadium	7440-62-2	2.3E-03		7.8E-04	0.0E+00	No	Yes
Zinc	7440-66-6	2.9E-02		9.8E-03	0.0E+00	No	Yes
			Total HAP Emissions =	0.21	3.36		

GHG-Related Emission Factors

Pollutant	Natural Gas (kg/MMBtu)	Fuel Oil (kg/MMBtu)	GWP
Carbon Dioxide (CO_2)	53.06	73.96	1
Methane (CH_4)	1.0E-03	3.0E-03	25
Nitrous Oxide (N_2O)	1.0E-04	6.0E-04	298

Stack Test Data

Pollutant						
Natural Gas	**Units**	**12/13/2001**	**9/7/2011**	**4/5/2017**	**4/2-3/2019**	**Average**
PM	lb/MMcf	NA	9.2	NA	NA	9.20
CO	lb/MMcf	NA	0.22	1	1	0.74
NOx	lb/MMcf	101.4	113	131	98.2	111
Fuel Oil						
PM	lb/1000 gal	NA	0.59	NA	NA	0.59
CO	lb/1000 gal	NA	0.12	0.2	0.2	0.17
NOx	lb/1000 gal	19.8	18.5	18.3	16.7	18.3

Notes:

PM, PM10, PM2.5, CO and NOx emission factors based on average of all available stack test data. PM10 and PM2.5 assumed to be equal to PM.
VOC emission factors for both natural gas and fuel oil are based on vendor specifications.
Other natural gas emissions factors, except GHGs, are based on DEQ Emission Factors Gas Fired Boilers, AQ-EF05 (08/01/2011).
Other fuel oil emissions factors, except GHGs, are based on DEQ Emission Factors Oil Fired Boilers, AQ-EF04 (08/01/2011).
GHG emission factors are from 40 CFR 98, Tables C-1 and C-2.
Toxics emission factors from DEQ 2020 Air Toxics Emission Inventory Combustion Emission Factor Tool.
Chromium assumed to be hexavalent.
Fuel high heat values are from ODEQ Fuel Combustion Greenhouse Gas Calculator (6/2021).

University of Oregon 208557
Emission Details
Babcock & Wilcox Boiler (2011) Specifications (EU-2)

Max Heat Input	78	MMBtu/hr		**Max NG Use =**	666	MMcf/yr
Heat Value - Natural Gas	1,026	MMBtu/MMcf		**Max FO Use =**	4,951	1000 Gal/yr
Heat Value - Fuel Oil	138	MMBtu/1000 Gal				
Max Hrs Operation - NG	8,712	hr/yr				
Max Hrs Operation - FO	48	hr/yr				

Criteria Pollutants

Pollutant	NG Emission Factor	NG EF Units	FO Emission Factor	FO EF Units	NG Capacity (TPY)	FO Capacity (TPY)	Unit PTE (TPY)
PM	2.20	lb/MMcf	0.55	lb/1000 Gal	0.73	1.36	0.74
PM_{10}	2.20	lb/MMcf	0.55	lb/1000 Gal	0.73	1.36	0.74
$PM_{2.5}$	2.20	lb/MMcf	0.55	lb/1000 Gal	0.73	1.36	0.74
CO	14.8	lb/MMcf	0.19	lb/1000 Gal	4.94	0.47	4.91
NOx	11.8	lb/MMcf	10.8	lb/1000 Gal	3.93	26.61	4.05
SO_2	1.7	lb/MMcf	71	lb/1000 Gal	0.57	175.77	1.53
VOC	5.5	lb/MMcf	0.2	lb/1000 Gal	1.83	0.50	1.82
GHG (CO_2 eq)	117	lb/MMBtu	164	lb/MMBtu	40,005	55,897	40,092

FHAP/TAC Emissions

Pollutant	CAS/DEQ Number	NG Emission Factor (lbs/MMCF)	FO Emission Factor (lbs/1000 Gal)	NG Capacity (TPY)	FO Capacity (TPY)	Federal HAP	CAO Air Toxic
Organics							
1,1,2,2-Tetrachloroethane	79-34-5			0.0E+00	0.0E+00	Yes	Yes
1,1,2-Trichloroethane	79-00-5			0.0E+00	0.0E+00	Yes	Yes
1,2-Dichloropropane	78-87-5			0.0E+00	0.0E+00	Yes	Yes
1,3-Dichloropropene	542-75-6			0.0E+00	0.0E+00	Yes	Yes
Acetaldehyde	75-07-0	0.0031	0.3506	1.0E-03	8.7E-01	Yes	Yes
Acrolein	107-02-8	0.0027	0.3506	9.0E-04	8.7E-01	Yes	Yes
Benzene	71-43-2	0.0058	0.0044	1.9E-03	1.1E-02	Yes	Yes
Benzo(a)pyrene	50-32-8	1.2E-06		4.0E-07	0.0E+00	Yes	Yes
1,3-Butadiene	106-99-0		0.0148	0.0E+00	3.7E-02	Yes	Yes
Carbon Tetrachloride	56-23-5			0.0E+00	0.0E+00	Yes	Yes
Chloroform	67-66-3			0.0E+00	0.0E+00	Yes	Yes
Diesel PM	200			0.0E+00	0.0E+00	No	Yes
Ethyl Benzene	100-41-4	0.0069	0.0002	2.3E-03	5.0E-04	Yes	Yes
Ethylene Dibromide	106-93-4			0.0E+00	0.0E+00	Yes	Yes
Ethylene Dichloride	107-06-2			0.0E+00	0.0E+00	Yes	Yes
Formaldehyde	50-00-0	0.0123	0.3506	4.1E-03	8.7E-01	Yes	Yes
Hexane	110-54-3	0.0046	0.0035	1.5E-03	8.7E-03	Yes	Yes
Methanol	67-56-1			0.0E+00	0.0E+00	Yes	Yes
Methylene Chloride	75-09-2			0.0E+00	0.0E+00	Yes	Yes
Naphthalene	91-20-3	0.0003	0.0053	1.0E-04	1.3E-02	Yes	Yes
POM (inc. PAHs)	401	0.0001	0.0445	3.3E-05	1.1E-01	Yes	Yes
Propylene Oxide	75-56-9	0.5300		1.8E-01	0.0E+00	Yes	Yes
Styrene	100-42-5			0.0E+00	0.0E+00	Yes	Yes
Toluene	108-88-3	0.0265	0.0044	8.8E-03	1.1E-02	Yes	Yes
Vinyl Chloride	75-01-4			0.0E+00	0.0E+00	Yes	Yes
Xylenes	1330-20-7	0.0197	0.0016	6.6E-03	4.0E-03	Yes	Yes
Inorganic Gases							
Ammonia	7664-41-7	3.2000	2.9	1.1E+00	7.2E+00	No	Yes
Hydrochloric Acid	7647-01-0		0.1863	0.0E+00	4.6E-01	Yes	Yes
Metals							
Arsenic	7440-38-2	2.0E-04	0.0016	6.7E-05	4.0E-03	Yes	Yes
Barium	7440-39-3	4.4E-03		1.5E-03	0.0E+00	No	Yes
Beryllium	7440-41-7	1.2E-05		4.0E-06	0.0E+00	Yes	Yes
Cadmium	7440-43-9	1.1E-03	0.0015	3.7E-04	3.7E-03	Yes	Yes
Chromium, Hexavalent	18540-29-9	1.4E-03	0.0001	4.7E-04	2.5E-04	Yes	Yes
Cobalt	7440-48-4	8.4E-05		2.8E-05	0.0E+00	Yes	Yes
Copper	7440-50-8	8.5E-04	0.0041	2.8E-04	1.0E-02	No	Yes
Lead Compounds	7439-92-1	5.0E-04	0.0083	1.7E-04	2.1E-02	Yes	Yes
Manganese	7439-96-5	3.8E-04	0.0031	1.3E-04	7.7E-03	Yes	Yes
Mercury	7439-97-6	2.6E-04	0.002	8.7E-05	5.0E-03	Yes	Yes
Molybdenum	1313-27-5	1.7E-03		5.5E-04	0.0E+00	No	Yes
Nickel	365	2.1E-03	0.0039	7.0E-04	9.7E-03	Yes	Yes
Selenium	7782-49-2	2.4E-05	0.0022	8.0E-06	5.4E-03	Yes	Yes
Vanadium	7440-62-2	2.3E-03		7.7E-04	0.0E+00	No	Yes
Zinc	7440-66-6	2.9E-02		9.7E-03	0.0E+00	No	Yes
			Total HAP Emissions =	0.21	3.32		

GHG-Related Emission Factors

Pollutant	Natural Gas (kg/MMBtu)	Fuel Oil (kg/MMBtu)	GWP
Carbon Dioxide (CO_2)	53.06	73.96	1
Methane (CH_4)	1.0E-03	3.0E-03	25
Nitrous Oxide (N_2O)	1.0E-04	6.0E-04	298

Stack Test Data

Natural Gas					
Pollutant	**Units**	**9/7/2011**	**4/5/2017**	**4/2-3/2019**	**Average**
PM	lb/MMcf	2.2	NA	NA	2.20
CO	lb/MMcf	33.5	9.7	1.3	14.8
NOx	lb/MMcf	9.7	15.1	10.6	11.8
Fuel Oil					
PM	lb/1000 gal	0.55	NA	NA	0.55
CO	lb/1000 gal	0.18	NA	0.2	0.19
NOx	lb/1000 gal	10.1	NA	11.4	10.8

Notes:

PM, PM10, PM2.5, CO and NOx emission factors based on average of all available stack test data. PM10 and PM2.5 assumed to be equal to PM.
Other natural gas emissions factors, except GHGs, are based on DEQ Emission Factors Gas Fired Boilers, AQ-EF05 (08/01/2011).
Other fuel oil emissions factors, except GHGs, are based on DEQ Emission Factors Oil Fired Boilers, AQ-EF04 (08/01/2011).
GHG emission factors are from 40 CFR 98, Tables C-1 and C-2.
Toxics emission factors from DEQ 2020 Air Toxics Emission Inventory Combustion Emission Factor Tool.
Chromium assumed to be hexavalent.
Fuel high heat values are from ODEQ Fuel Combustion Greenhouse Gas Calculator (6/2021).

University of Oregon 208557
Emission Details
Combustion Turbine and HRSG (EU-3)

Combustion Turbine - NG	0.078	MMcf/hr		**Max NG Use =**	683.28	MMcfyr (turbine)	394.2	MMcf/yr (HRSG)
Combustion Turbine - FO	520	gal/hr		**Max FO and NG Use =**	4555.2	1000 Gal/yr (turbine)	394.2	MMcf/yr (HRSG)
HRSG Duct Burner - NG	0.045	MMcf/hr						
Heat Value - Natural Gas	1,026	MMBtu/MMcf						
Heat Value - Fuel Oil	138	MMBtu/1000 Gal						

Criteria Pollutants

Pollutant	Turbine NG Emission Factor	Duct Burner NG Emission Factor	NG EF Units	Turbine FO Emission Factor	FO EF Units	Natural Gas Capacity Emissions (TPY)	Fuel Oil Capacity Emissions (TPY)	Unit PTE (TPY)
PM	21	10	lb/MMcf	5.4	lb/1000 Gal	9.15	14.3	14.3
PM_{10}	21	10	lb/MMcf	5.4	lb/1000 Gal	9.15	14.3	14.3
$PM_{2.5}$	21	10	lb/MMcf	5.4	lb/1000 Gal	9.15	14.3	14.3
CO	61	73	lb/MMcf	17	lb/1000 Gal	35.23	53.1	53.1
NO_X	37	--	lb/MMcf	21.7	lb/1000 Gal	20.1	49.3	49.3
SO_2	1.7	1.7	lb/MMcf	69.7	lb/1000 Gal	0.92	159.1	159
VOC	35	16	lb/MMcf	4.9	lb/1000 Gal	15.11	14.3	15.1
GHG (CO_2 eq)	117	117	lb/MMBtu	164	lb/MMBtu	64,706	75,085	75,085

FHAP/TAC Emissions

Pollutant	CAS/DEQ Number	NG Emission Factor (lbs/MMCF)	FO Emission Factor (lbs/1000 Gal)	NG Capacity (TPY)	FO Capacity (TPY)	Federal HAP	CAO Air Toxic
Organics							
1,1,2,2-Tetrachloroethane	79-34-5			0.0E+00	0.0E+00	Yes	Yes
1,1,2-Trichloroethane	79-00-5			0.0E+00	0.0E+00	Yes	Yes
1,2-Dichloropropane	78-87-5			0.0E+00	0.0E+00	Yes	Yes
1,3-Dichloropropene	542-75-6			0.0E+00	0.0E+00	Yes	Yes
Acetaldehyde	75-07-0	0.0408	0.7833	2.2E-02	1.8E+00	Yes	Yes
Acrolein	107-02-8	0.00653	0.0339	3.5E-03	7.8E-02	Yes	Yes
Benzene	71-43-2	0.0122	0.1863	6.6E-03	4.3E-01	Yes	Yes
Benzo(a)pyrene	50-32-8			0.0E+00	0.0E+00	Yes	Yes
1,3-Butadiene	106-99-0	0.000439	0.2174	2.4E-04	5.0E-01	Yes	Yes
Carbon Tetrachloride	56-23-5			0.0E+00	0.0E+00	Yes	Yes
Chloroform	67-66-3			0.0E+00	0.0E+00	Yes	Yes
Diesel PM	200			0.0E+00	0.0E+00	No	Yes
Ethyl Benzene	100-41-4	0.0326	0.0109	1.8E-02	3.1E-02	Yes	Yes
Ethylene Dibromide	106-93-4			0.0E+00	0.0E+00	Yes	Yes
Ethylene Dichloride	107-06-2			0.0E+00	0.0E+00	Yes	Yes
Formaldehyde	50-00-0	0.724	1.7261	3.9E-01	4.1E+00	Yes	Yes
Hexane	110-54-3		0.0269	0.0E+00	6.1E-02	Yes	Yes
Methanol	67-56-1			0.0E+00	0.0E+00	Yes	Yes
Methylene Chloride	75-09-2			0.0E+00	0.0E+00	Yes	Yes
Naphthalene	91-20-3	0.00133	0.0197	7.2E-04	4.5E-02	Yes	Yes
POM (inc. PAHs)	401	0.000918	0.0362	4.9E-04	8.3E-02	Yes	Yes
Propylene Oxide	75-56-9			0.0E+00	0.0E+00	Yes	Yes
Styrene	100-42-5			0.0E+00	0.0E+00	Yes	Yes
Toluene	108-88-3	0.133	0.1054	7.2E-02	2.7E-01	Yes	Yes
Vinyl Chloride	75-01-4			0.0E+00	0.0E+00	Yes	Yes
Xylenes	1330-20-7	0.0653	0.0424	3.5E-02	1.1E-01	Yes	Yes
Inorganic Gases							
Ammonia	7664-41-7	18	2.9	9.7E+00	1.0E+01	No	Yes
Hydrochloric Acid	7647-01-0		0.1863	0.0E+00	4.2E-01	Yes	Yes
Metals							
Arsenic	7440-38-2		0.0016	0.0E+00	3.6E-03	Yes	Yes
Barium	7440-39-3			0.0E+00	0.0E+00	No	Yes
Beryllium	7440-41-7			0.0E+00	0.0E+00	Yes	Yes
Cadmium	7440-43-9		0.0015	0.0E+00	3.4E-03	Yes	Yes
Chromium, Hexavalent	18540-29-9		0.0001	0.0E+00	2.3E-04	Yes	Yes
Cobalt	7440-48-4			0.0E+00	0.0E+00	Yes	Yes
Copper	7440-50-8		0.0041	0.0E+00	9.3E-03	No	Yes
Lead Compounds	7439-92-1		0.0083	0.0E+00	1.9E-02	Yes	Yes
Manganese	7439-96-5		0.0031	0.0E+00	7.1E-03	Yes	Yes
Mercury	7439-97-6		0.002	0.0E+00	4.6E-03	Yes	Yes
Molybdenum	1313-27-5			0.0E+00	0.0E+00	No	Yes
Nickel	365		0.0039	0.0E+00	8.9E-03	Yes	Yes
Selenium	7782-49-2		0.0022	0.0E+00	5.0E-03	Yes	Yes
Vanadium	7440-62-2			0.0E+00	0.0E+00	No	Yes
Zinc	7440-66-6			0.0E+00	0.0E+00	No	Yes
		Total Emissions at Capacity =		0.55	7.94		

GHG-Related Emission Factors

Pollutant	Natural Gas (kg/MMBtu)	Fuel Oil (kg/MMBtu)	GWP
Carbon Dioxide (CO_2)	53.06	73.96	1
Methane (CH_4)	1.0E-03	3.0E-03	25
Nitrous Oxide (N_2O)	1.0E-04	6.0E-04	298

Stack Test Data

Natural Gas						
Pollutant	**Units**	**5/3/2013**	**4/14/2015**	**6/3/2017**	**12/18/2019**	**Average**
Fuel Flow	scfh	93,480	117,200	103,333	78,365	98,095
NO_X Emissions	lb/hr	3.03	4.3	3.8	3.4	3.63
NO_X EF	lb/MMcf	32.4	36.7	36.8	43.4	37.3
Fuel Oil						
Fuel Flow	gal/hr	595.8	581	546	582	576
NO_X Emissions	lb/hr	9.43	13.7	15.4	11.06	12.4
NO_X EF	lb/1000 gal	15.8	23.6	28.2	19.0	21.7

Notes:
NOx emission factors based on average of all available stack test data. Duct burner NOx emissions are included in the stack test data.
For natural gas and fuel oil in the turbine, PM, CO, and VOC emission factors are based on vendor specifications. PM10 and PM2.5 are assumed to be equivalent to PM.
For natural gas in the duct burner, PM, CO, and VOC emission factors are based on vendor specifications. PM10 and PM2.5 are assumed to be equivalent to PM.
For natural gas, the SO2 emission factors is based on DEQ Emission Factors Gas Fired Boilers, AQ-EF05 (08/01/2011).
For fuel oil, the SO2 emission factors is based on US EPA AP-42, Section 3.1 - Stationary Gas Turbines, Table 3.1-2a with S=0.5
GHG emission factors are from 40 CFR 98, Tables C-1 and C-2.
Toxics emission factors from DEQ 2020 Air Toxics Emission Inventory Combustion Emission Factor Tool.
Chromium assumed to be hexavalent.
Fuel high heat values are from ODEQ Fuel Combustion Greenhouse Gas Calculator (6/2021).

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Emission Details
Criteria Pollutant PTE - Fuel Limitations

1,165	= EU-1, EU-2, EU-3 Natural Gas Group Limit (MMcf/yr)	79	= EU-1 Max Heat Input (MMBtu/hr)
675	= EU-1 Max NG Use (MMcf/yr)	78	= EU-2 Max Heat Input (MMBtu/hr)
666	= EU-2 Max NG Use (MMcf/yr)		
683	= EU-3 Turbine Max NG Use (MMcf/yr)		
394.2	= EU-3 HRSG Max NG Use (MMcf/yr)		
1,026	= NG Heat Value (MMBtu/MMCF)		

PTE for Natural Gas Operational Scenario

Pollutant	EU-1 NG Emission Factor	EU-2 NG Emission Factor	EU-3 NG Turbine Emission Factor	EU-3 NG HRSG Emission Factor	NG EF Units	NG PTE Emissions (TPY)	Fuel Oil PTE Emissions (TPY)	Total PTE Emissions (TPY)
PM	9.2	2.2	21	10	lb/MMcf	9.55	1.6E-02	9.56
PM_{10}	9.2	2.2	21	10	lb/MMcf	9.55	1.6E-02	9.56
$PM_{2.5}$	9.2	2.2	21	10	lb/MMcf	9.55	1.6E-02	9.56
CO	0.7	14.8	61	73	lb/MMcf	35.9	5.0E-03	35.9
NOx	111	12	37	--	lb/MMcf	46.6	3.56	50.1
SO_2	1.7	1.7	1.7	1.7	lb/MMcf	0.99	1.94	2.93
VOC	4.0	5.5	35	16	lb/MMcf	15.4	1.1E-02	15.4
GHG (CO_2 eq)	117	117	117	117	lb/MMBtu	69,963	616	70,580

Notes:
Assumes all natural gas to the unit with the highest emission factor for a regulated pollutant. In practice this means EU-3 operates first with the balance of the NG to the worst emitting boiler, except for NOx.
NOx assumes EU-1 operating on natural gas, EU-3 operating on the balance of natural gas, and EU-3 operating on fuel oil.
All versions assume 48 hours of fuel oil operation each on the two boilers, except for NOx.

		Info for Pollutants Other than NOx		**Info for NOx**	
329	= EU-1, EU-2, EU-3 Fuel Oil Group Limit (1000 gal/yr)	675	= EU-1 Max Natural Gas (MMcf/yr)	1,165	= EU-1, EU-2, EU-3 Natural Gas Group Limit (MMcf/yr)
5015	= EU-1 Max NG Use (1000 gal/yr)	666	= EU-2 Max Natural Gas (MMcf/yr)	675	= EU-1 Max Natural Gas (MMcf/yr)
4951	= EU-2 Max NG Use (1000 gal/yr)	394.2	= EU-3 HRSG Max NG Use (MMcf/yr)	490	= Remaining NG Capacity - Turbine (MMcf/yr)
4,555	= EU-3 Turbine Max FO Use (1000 gal/yr)	634	= EU-3 Remaining NG Capacity - Turbine (MMcf/yr)		
394.2	= EU-3 HRSG Max NG Use (MMcf/yr)	366	= EU-3 Remaining NG Capacity - HRSG (MMcf/yr)		
1,026	= NG Heat Value (MMBtu/MMCF)	165	= Boiler Remaining NG Capacity (MMcf/yr)		
138	= Fuel Oil Heat Value (MMBtu/1000 Gal)				

PTE for Fuel Oil Operational Scenario

										Fuel Oil Operation		**Natural Gas Operation**			
Pollutant	**EU-1 FO Emission Factor**	**EU-2 FO Emission Factor**	**EU-3 FO Emission Factor**	**FO EF Units**	**EU-1 NG Emission Factor**	**EU-2 NG Emission Factor**	**EU-3 NG Turbine Emission Factor**	**EU-3 NG HRSG Emission Factor**	**NG EF Units**	**CT Fuel Oil PTE Emissions (TPY)**	**HRSG NG PTE Emissions (TPY)**	**CT NG PTE Emissions (TPY)**	**HRSG NG PTE Emissions (TPY)**	**Boiler NG PTE Emissions (TPY)**	**Total PTE Emissions (TPY)**
PM	0.59	0.55	5.4	lb/1000 gal	9.2	2.2	21	10	lb/MMcf	0.89	0.14	6.66	1.83	0.76	10.28
PM_{10}	0.59	0.55	5.4	lb/1000 gal	9.2	2.2	21	10	lb/MMcf	0.89	0.14	6.66	1.83	0.76	10.28
$PM_{2.5}$	0.59	0.55	5.4	lb/1000 gal	9.2	2.2	21	10	lb/MMcf	0.89	0.14	6.66	1.83	0.76	10.28
CO	0.17	0.19	17	lb/1000 gal	0.7	14.8	61	73	lb/MMcf	2.80	1.04	19.33	13.35	1.23	37.7
NOx	18.3	10.8	21.7	lb/1000 gal	111	11.8	37.3	--	lb/MMcf	3.56	--	9.15	--	37.40	50.1
SO_2	71	71	69.7	lb/1000 gal	1.7	1.7	1.7	1.7	lb/MMcf	11.46	0.02	0.54	0.31	0.14	12.5
VOC	0.6	0.2	4.9	lb/1000 gal	4.0	5.5	35	16	lb/MMcf	0.81	0.23	11.09	2.93	0.45	15.5
GHG (CO_2 eq)	164	164	164	lb/MMBtu	117	117	117	117	lb/MMBtu	3,714	1,709	38,081	21,951	9,932	75,388

Notes:
Assumes all fuel oil and natural gas to the unit with the highest emission factor for a regulated pollutant. In practice this means EU-3 operates first with the balance of the NG to the worst emitting boiler, except for NOx.
NOx assumes EU-1 operating on natural gas, EU-3 operating on fuel oil, and EU-3 operaitng on the balance of natural gas.
The emission factors for SO2 on fuel oil are essentially the same for all units.
Fuel high heat values are from ODEQ Fuel Combustion Greenhouse Gas Calculator (6/2021).

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Emission Details
HAP PTE Calculation - Fuel Limitations

1,165	= EU-1, EU-2, EU-3 Natural Gas Group Limit (MMcf/yr)	79	= EU-1 Max Heat Input (MMBtu/hr)
329	= EU-1, EU-2, EU-3 Fuel Oil Group Limit (1000 Gal/yr)	78	= EU-2 Max Heat Input (MMBtu/hr)
1,026	= NG Heat Value (MMBtu/MMCF)	675	= EU-1 Max NG Use (MMcf/yr)
138	= Fuel Oil Heat Value (MMBtu/1000 Gal)	666	= EU-2 Max NG Use (MMcf/yr)
		683	= EU-3 Turbine Max NG Use (MMcf/yr)
		394	= EU-3 HRSG Max NG Use (MMcf/yr)
		4,555	= EU-3 Turbine Max FO Use (1000 Gal/yr)

Total HAP FHAP/TAC Emissions

Pollutant	CAS/DEQ Number	Boiler NG Emission Factor (lbs/MMCF)	Boiler FO Emission Factor (lbs/1000 Gal)	Turbine NG Emission Factor (lbs/MMCF)	Turbine FO Emission Factor (lbs/1000 Gal)	HRSG NG Emission Factor (lbs/MMCF)	Federal HAP	CAO Air Toxic	Fuel Oil Scenario (TPY)	Natural Gas Scenario (TPY)
Organics										
1,1,2,2-Tetrachloroethane	79-34-5						Yes	Yes	0.0E+00	0.0E+00
1,1,2-Trichloroethane	79-00-5						Yes	Yes	0.0E+00	0.0E+00
1,2-Dichloropropane	78-87-5						Yes	Yes	0.0E+00	0.0E+00
1,3-Dichloropropene	542-75-6						Yes	Yes	0.0E+00	0.0E+00
Acetaldehyde	75-07-0	3.10E-03	3.51E-01	4.08E-02	7.83E-01	3.10E-03	Yes	Yes	1.4E-01	2.0E-02
Acrolein	107-02-8	2.70E-03	3.51E-01	6.53E-03	3.39E-02	2.70E-03	Yes	Yes	8.3E-03	7.8E-03
Benzene	71-43-2	5.80E-03	4.40E-03	1.22E-02	1.86E-01	5.80E-03	Yes	Yes	3.6E-02	5.6E-03
Benzo(a)pyrene	50-32-8	1.20E-06				1.20E-06	Yes	Yes	2.9E-07	2.9E-07
1,3-Butadiene	106-99-0		1.48E-02	4.39E-04	2.17E-01		Yes	Yes	3.6E-02	3.6E-04
Carbon Tetrachloride	56-23-5						Yes	Yes	0.0E+00	0.0E+00
Chloroform	67-66-3						Yes	Yes	0.0E+00	0.0E+00
Diesel PM	200						No	Yes	0.0E+00	0.0E+00
Ethyl Benzene	100-41-4	6.90E-03	2.00E-04	3.26E-02	1.09E-02	6.90E-03	Yes	Yes	1.4E-02	1.3E-02
Ethylene Dibromide	106-93-4						Yes	Yes	0.0E+00	0.0E+00
Ethylene Dichloride	107-06-2						Yes	Yes	0.0E+00	0.0E+00
Formaldehyde	50-00-0	1.23E-02	3.51E-01	7.24E-01	1.73E+00	1.23E-02	Yes	Yes	5.2E-01	2.6E-01
Hexane	110-54-3	4.60E-03	3.50E-03		2.69E-02	4.60E-03	Yes	Yes	5.5E-03	1.2E-03
Methanol	67-56-1						Yes	Yes	0.0E+00	0.0E+00
Methylene Chloride	75-09-2						Yes	Yes	0.0E+00	0.0E+00
Naphthalene	91-20-3	3.00E-04	5.30E-03	1.33E-03	1.97E-02	3.00E-04	Yes	Yes	3.7E-03	6.0E-04
POM (inc. PAHs)	401	1.00E-04	4.45E-02	9.18E-04	3.62E-02	1.00E-04	Yes	Yes	6.3E-03	9.6E-04
Propylene Oxide	75-56-9	5.30E-01				5.30E-01	Yes	Yes	1.3E-01	1.3E-01
Styrene	100-42-5						Yes	Yes	0.0E+00	0.0E+00
Toluene	108-88-3	2.65E-02	4.40E-03	1.33E-01	1.05E-01	2.65E-02	Yes	Yes	6.6E-02	5.2E-02
Vinyl Chloride	75-01-4						Yes	Yes	0.0E+00	0.0E+00
Xylenes	1330-20-7	1.97E-02	1.60E-03	6.53E-02	4.24E-02	1.97E-02	Yes	Yes	3.2E-02	2.7E-02
Inorganic Gases										
Ammonia	7664-41-7	3.2	2.9	18	2.9	3.2	No	Yes	7.0E+00	7.0E+00
Hydrochloric Acid	7647-01-0		0.1863		0.1863		Yes	Yes	3.1E-02	2.6E-03
Metals										
Arsenic	7440-38-2	2.0E-04	0.0016		0.0016	2.0E-04	Yes	Yes	3.1E-04	7.1E-05
Barium	7440-39-3	4.4E-03				4.4E-03	No	Yes	1.1E-03	1.1E-03
Beryllium	7440-41-7	1.2E-05				1.2E-05	Yes	Yes	2.9E-06	2.9E-06
Cadmium	7440-43-9	1.1E-03	0.0015		0.0015	1.1E-03	Yes	Yes	5.1E-04	2.9E-04
Chromium, Hexavalent	18540-29-9	1.4E-03	0.0001		0.0001	1.4E-03	Yes	Yes	3.5E-04	3.4E-04
Cobalt	7440-48-4	8.4E-05				8.4E-05	Yes	Yes	2.0E-05	2.0E-05
Copper	7440-50-8	8.5E-04	0.0041		0.0041	8.5E-04	No	Yes	8.8E-04	2.6E-04
Lead Compounds	7439-92-1	5.0E-04	0.0083		0.0083	5.0E-04	Yes	Yes	1.5E-03	2.4E-04
Manganese	7439-96-5	3.8E-04	0.0031		0.0031	3.8E-04	Yes	Yes	6.0E-04	1.3E-04
Mercury	7439-97-6	2.6E-04	0.002		0.002	2.6E-04	Yes	Yes	3.9E-04	9.1E-05
Molybdenum	1313-27-5	1.7E-03				1.7E-03	No	Yes	4.0E-04	4.0E-04
Nickel	365	2.1E-03	0.0039		0.0039	2.1E-03	Yes	Yes	1.1E-03	5.6E-04
Selenium	7782-49-2	2.4E-05	0.0022		0.0022	2.4E-05	Yes	Yes	3.7E-04	3.7E-05
Vanadium	7440-62-2	2.3E-03				2.3E-03	No	Yes	5.5E-04	5.5E-04
Zinc	7440-66-6	2.9E-02				2.9E-02	No	Yes	7.0E-03	7.0E-03
Total HAP EF (lb/MMBtu) =		6.0E-04	9.7E-03	9.9E-04	2.5E-02	6.0E-04	**Total HAP (TPY) =**		1.03	0.52

Notes:
Fuel oil scenario assumes full operation of the turbine on all fuel oil and the remaining capacity of the turbine using natural gas, the full operation of the HRSG on natural gas, and the balance of natural gas to boilers.
Natural gas scenario assumes full operation of the turbine and HRSG on natural gas with the balance of the natural gas and 48 hours of fuel oil to a boiler.
Fuel high heat values are from ODEQ Fuel Combustion Greenhouse Gas Calculator (6/2021).