Notice of Construction (NOC) Worksheet

PUGET SOUND Clean Air Agency

Source: King Co Ntrl Res Wastewater Treatment	**NOC Number:** 12353
Installation Address: 1400 Discovery Park Blvd (West Point) | Seattle, WA 98199	**Registration Number:** 10088
Contact Name: Jesse Collins	**Contact Email:** Jesse.Collins@kingcounty.gov
Applied Date: 05/22/2023	**Contact Phone:** (206) 477-6449
Engineer: Madeline McFerran	**Inspector:** Gerard Van der Jagt

A. DESCRIPTION

For the Order of Approval:
Two 100 hp (4.46 MMBtu/hr) digester gas and propane-fired boilers and two 400 hp (17.82 MMBtu/hr) digester gas and propane-fired boilers as part of the heated water system at the existing secondary wastewater treatment plant.

Additional Information (if needed):

Facility

King County Natural Resources Wastewater Treatment Plant – Westpoint (WPTP) is a secondary municipal wastewater treatment plant with average annual design flow capacity of 143 MGD and secondary treatment flows up to 440 MGD during rain/storm season.

Proposed Equipment/Activities

The application proposes replacement of two 265 horsepower (hp) boilers and one 595 hp boiler serving the secondary heat loop at the facility. The replacement boilers proposed are two 100 hp units and two 400 hp units. The existing boiler operate on digester gas produced at the plant, with supplemental propane as needed to meet steam demands at the facility.

The purpose of the existing boilers has been to serve as back-up sources of heat to the cogeneration plant to heat the anaerobic digesters and provide heat to the heated water system. The current plant heat demand is provided by cogeneration (about 71%), raw sewage pump engines (about 13%) and boilers (about 16%). The plant is anticipating a switch from raw sewage pump engines with electric motor prime movers which will increase the utilization of boilers to provide about 30% of total plant heat demand. Given the increased utilization and age of the existing boilers, four new boilers are proposed. The existing boilers are located in the lower level of the Grit Building (building #705) and the new boilers will be installed in the same area.

The existing configuration showing boilers 1, 2, and 3 was summarized in the application with Figure 2-1 which is also shown below:

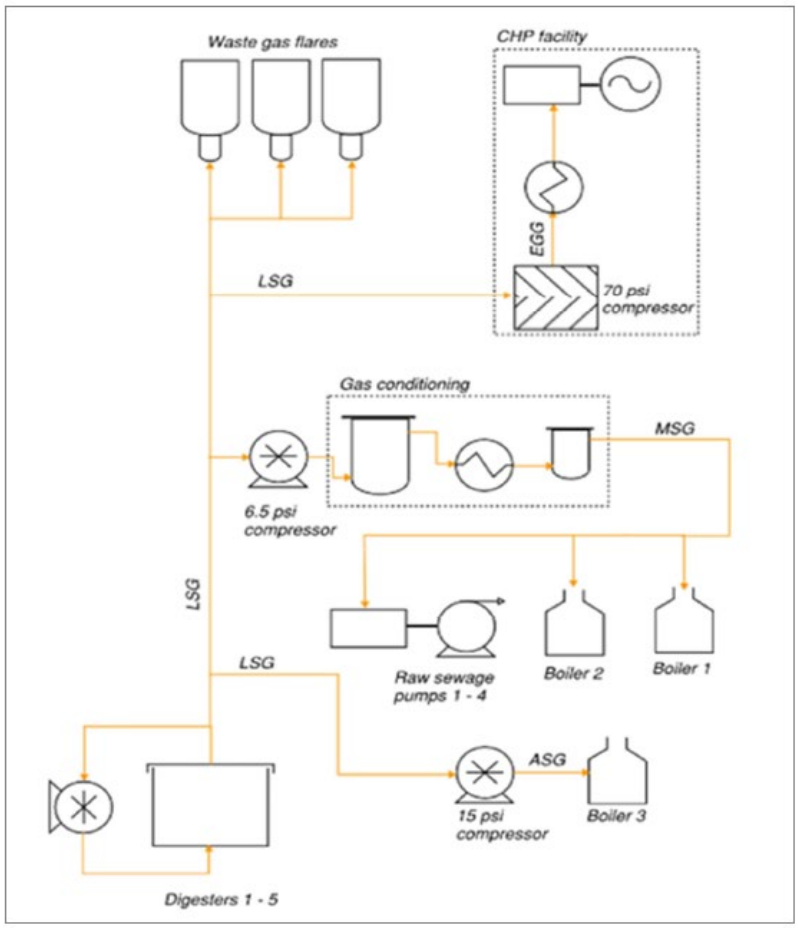

Figure 2-1. Existing Digester Gas Flow

The new proposed configuration as summarized in the application's Figure 2-2 is also shown below:

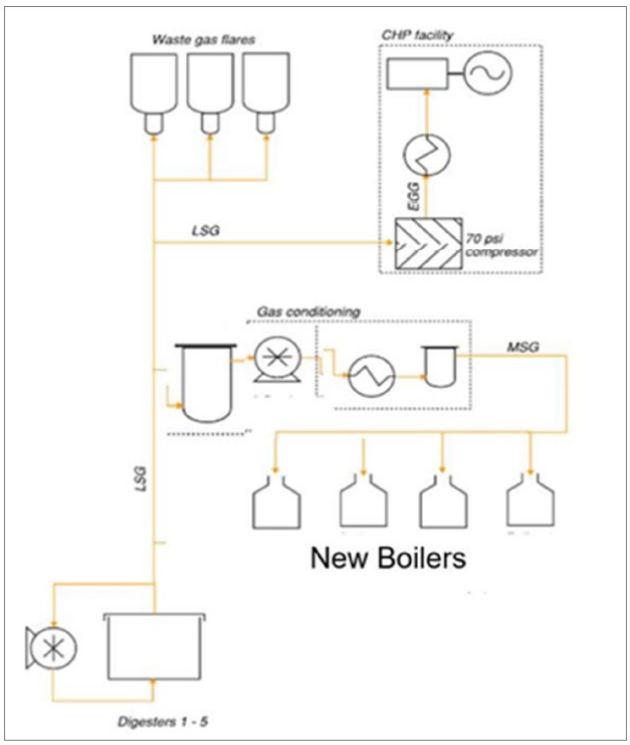

Figure 2-2. Digester Gas Flow with Replacement Boilers

Permit History

Boilers 1 and 2 (the existing 265 hp boilers) were permitted under NOC 10861 as 9.6 MMBtu/hr treated digester gas boilers with secondary fuel of propane. The three-way catalyst installed on the RSP engine exhausts in 2015 (permitting pending in NOC 10107) is also routed to Boiler 1 and Boiler 2.

Boiler 3 (the existing 595 hp boiler) was permitted under NOC 9069 as a 25.7 MMbtu/hr digester gas boiler with secondary fuel of propane. Boiler 3 is currently configured for combusting untreated digester gas. NOC 9069 cancelled and superseded NOC 4295, dated August 3, 1992.

NOCS 10861 needs to be cancelled and superseded upon installation and operation of the replacement boilers, as discussed in Section I of this review. NOC 9069 will remain in place, as it includes other equipment in addition to the 595 hp boiler being replaced under this NOC.

B. DATABASE INFORMATION

Reg: 10088 - King Co Ntrl Res Wastewater Treatment Item #: 15
Code: 6 - boiler, water heater or oil heater
Year Installed: 2024 Units Installed: 2 Rated Capacity: 400 Units: Hp
Primary Fuel: 7 - Other Fuel Standby Fuel: 6 - Propane
NC/Notification #: 12353 NOC Not Required? (b)(10) Exemption?
Removed?
Operating Requirements:
Comments: Digester gas fired Boilers 1 and 3 Cleaver Brooks CBX 3W

Reg: 10088 - King Co Ntrl Res Wastewater Treatment Item #: 16
Code: 6 - boiler, water heater or oil heater
Year Installed: 2024 Units Installed: 2 Rated Capacity: 100 Units: Hp
Primary Fuel: 7 - Other Fuel Standby Fuel: 6 - Propane
NC/Notification #: 12353 NOC Not Required? (b)(10) Exemption?
Removed?
Operating Requirements:
Comments: Digester gas fired Boilers 2 and 4, Cleaver Brooks CBX 3W

New NSPS due to this NOCOA?	**No**	**Applicable NSPS: Dc**	**Delegated? Yes**
New NESHAP due to this NOCOA?	**No**	**Applicable NESHAP: NA**	**Delegated? NA**
New Synthetic Minor due to this NOCOA?	**No**		

40 CFR 60 Subpart Dc will apply to the two 400 hp (17.82 MMBtu/hr) boilers and will not apply to the two 100 hp (4.46 MMBtu/hr) boilers. The PM, opacity, and SO_2 limits of Dc do not apply to the two 400 hp boilers given that the only fuels combusted are propane (natural gas under the definitions of 40 CFR 60 Subpart Dc) and digester gas (which is not a specified fuel for the PM, opacity and SO_2 limits of Dc). The initial notification and fuel consumption recordkeeping requirements of Dc will apply. This is not a newly applicable subpart; the existing Boiler 3 is subject to Dc.

40 CFR 63 Subpart JJJJJJ does not apply to the boilers at the facility. While the boilers are part of industrial commercial and institutional boilers located at an area source of HAP, as specified in 63.11195(e) gas-fired boilers are not subject to any requirements of the subpart. Gas-fired boiler "includes any boiler that burns gaseous fuels not combined with any solid fuels…" per the definitions of 63.11237. The digester gas and propane are both gaseous fuels.

C. NOC FEES AND ANNUAL REGISTRATION FEES

NOC Fees:

Fees have been assessed in accordance with the fee schedule in Regulation I, Section 6.04. All fees must be paid prior to issuance of the final Order of Approval.

Fee Description	Cost	Amount Received (Date)
Filing Fee	$ 1,550	
Equipment (4 boilers)	$4,000	
SEPA (Document collection to support conclusion that SEPA requirements were met by pervious environmental review (not provided by applicant))	$900	
NSPS Review 40 CFR 60 Subpart Dc	$1,050	
Public Notice	$750	
Filing received		$ 1,550 (5/22/23)
Additional fee received		$6,700 (11/15/23)
Total		**$8,250**

Registration Fees:
Registration fees are assessed to the facility on an annual basis. Fees are assessed in accordance with Regulation I, Section 7.07.

Registration fees will not change as a result of this order.

D. STATE ENVIRONMENTAL POLICY ACT (SEPA) REVIEW

State Environmental Policy Act (SEPA) review was conducted in accordance with Regulation I, Article 2. The SEPA review is undertaken to identify and help government decision-makers, applicants, and the public to understand how a project will affect the environment. A review under SEPA is required for projects that are not categorically exempt in WAC 197-11-800 through WAC 197-11-890. A new source review action which requires a NOC application submittal to the Agency is not categorically exempt.

A new SEPA determination is not required because the potential impacts from this project were reviewed under SEPA under two different permitting actions:

1. The 25.7 MMBtu/hr Boiler #3 was reviewed initially under NOC 4295 issued August 3, 1992. Along with this Order a Lead Agency Record was completed for the City of Seattle which is embedded below. Email records between PSCAA and King County Ntrl Res West Point indicate that the underlying Lead Agency Record was the 1988 EIS issued by King County for the secondary expansion of the WWTP.


FW_ SEPA docs from NC 4295.msg

4295-la.pdf

2. Boilers 1 and 2 (the existing 265 hp boilers) were permitted under NOC 10861. A DNS was issued by PSCAA on December 30,2014 and is embedded below.

10861-dns.pdf

A new SEPA determination is not needed because the combined output of the replacement boilers proposed under this NOC 12353 is 1,000 (two 400 hp units and two 200 hp units) and the combined output reviewed between boilers 1-3 under NOC 4295 and 10861 was 1,125 hp. Additionally, the installation will occur within the existing Grit Building and no new structures are proposed associated with this project. The fuels reviewed under the previous SEPA determinations are identical to the fuel use proposed for this permitting action.

E. TRIBAL CONSULTATION

On November 21, 2019, the Agency's Interim Tribal Consultation Policy was adopted by the Board. Criteria requiring tribal consultation are listed in Section II.A of the policy and include establishment of a new air operating permit source, establishment of a new emission reporting source, modification of an existing emission reporting source to increase production capacity, or establishment or modification of certain equipment or activities. In addition, if the Agency receives an NOC application that does not meet the criteria in Section II.A but may represent similar types and quantities of emissions, the Agency has the discretion to provide additional consultation opportunities.

This project does not meet any of the criteria for consultation listed in Section II.A of the Agency's Interim Tribal Consultation Policy.

F. BEST AVAILABLE CONTROL TECHNOLOGY (BACT) REVIEW

Best Available Control Technology (BACT)

New stationary sources of air pollution are required to use BACT to control all pollutants not previously emitted, or those for which emissions would increase as a result of the new source or modification. BACT is defined in WAC 173-400-030 as, "an emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under Chapter 70.94 RCW emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each pollutant."

An emissions standard or emissions limitation means "a requirement established under the Federal Clean Air Act or Chapter 70.94 RCW which limits the quantity, rate, or concentration of emissions of air contaminants on a continuous basis, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction and any design, equipment, work practice, or operational standard adopted under the Federal Clean Air Act or Chapter 70.94 RCW."

Best Available Control Technology for Toxics (tBACT)

New or modified sources are required to use tBACT for emissions control for TAP. Best available control technology for toxics (tBACT) is defined in WAC 173-460-020 as, "the term defined in WAC 173-400-030, as applied to TAP."

Each 100 hp and 400 hp boiler is reviewed for PM, CO, NOx, SO_2/H_2S and VOC. The applicant provided a BACT analysis with information from the BAAQMD Permit Handbook, CARB's BACT clearinghouse, SJVAPCD BACT clearinghouse, SCAQMD BACT determinations, TCEQ BACT guidelines, and EPA's RBLC database.

The applicant grouped the BACT analysis for NOX, CO and VOC as those pollutants are related. CO and VOC are directly associated with both VOC and CO increasing with less complete combustion, and thermal NOx inversely associated with CO and VOC. The applicant identified CO and VOC BACT as good combustion practices with associated limits of 50 ppm for CO @ 3% O_2 and 98% destruction of VOC in the digester gas. For NOx, a low NOx burner package was identified as BACT, capable of meeting a 30 ppm @ 3% O_2 NOx limit. The following review concurs with the applicant's proposed BACT.

Similar Permits

NOC	Description	BACT Limit	Compliance Method
12015 (1/29/21)	Three 10.21 mmbtu/hr each digester gas boilers	CO: 50.0 ppmv @3% O_2	Low NOx burner package, flue gas recirculation, good combustion practices. Testing once every 3 years using EPA Reference Methods, ASTM Methods or EMC Conditional Test Methods
		NO_x: 30.0 ppmv @ 3% O_2	
		PM: <0% opacity	Ecology Method 9A
12021 (1/29/21)	One 2.6 MMBtu/hr digester gas-fired boiler	NO_x: 30 ppmv @ 3% O_2	EPA Method 7E or alternate hand-held testing
		SO_2/H_2S: 500 ppmvd maximum H_2S digester content	Quarterly Drager tube testing, testing may be conducted semiannually after first operating year
		CO: 50 ppmvd @ 3% O_2	EPA method 10 or alternate hand-held testing
		PM: 0% opacity	Ecology Method 9A

Other Regulatory Agencies BACT

Regulatory Origin	Source of Emissions	BACT Determination
SWCAA's Camas WWTP: BACT Determination -	Natural gas-fired and digster gas-fired boiler	▪ NOx: 30 ppmvd @3% O_2 ▪ CO: 50 ppmvd @3% O_2 ▪ H_2S & SO_2: 94% H_2S removal prior to combustion

Regulatory Origin	Source of Emissions	BACT Determination
Boiler (SW CAA 09-2904 & SW CAA 13-3073		
MassDep BACT Guidelines	Thermal oxidizer for biomass digester gas to electricity operations	▪ NO_x – 2.70 lbs per Mscf/min gas oxidized ▪ CO – 13.70 lbs per Mscf/min gas oxidized ▪ PM – 0.15 lbs per Mscf/min gas oxidized ▪ CO_2 – 7,105 lbs per Mscf/min gas oxidized ▪ VOC – 0.55 lbs per Mscf/min gas oxidized ▪ SO_2 – 99.5 percent oxidation of 200 ppm H_2S inlet emissions ▪ H_2S – 200 ppm inlet concentration ▪ 100% capture efficiency determined by EPA Method 204 for permanent total enclosures
MaineDep (Permit No. A-1086-71-A-N)	Thermal oxidizer with biomass digester gas for fuel	▪ NO_x – 48.0 lbs per MMscf gas oxidized ▪ CO – 1.8 lbs per MMscf gas oxidized ▪ PM – 0.02 lbs/MMBtu ▪ VOC – 12.10 lbs per MMscf gas oxidized ▪ SO_2 – 2.0 lbs per MMscf gas oxidized ▪ Opacity – visible emissions from the oxidizer shall not exceed 10% on a 6 minute block average basis, except for no more than one (1) six (6) minute block average in a 3 hour period
SWCAA's Clark County Salmon Creek WWTP Boiler (SWCAA 07-2726)	Digester gas-fired and natural gas fired boilers	▪ NOx: 30 ppmvd @3% O_2 ▪ CO: 50 ppmvd @3% O_2
SCAQMD BACT Guideline Boilers 2-1-2019 Revision	Digester Gas Fired <75 MMBtu/hr	▪ Compliance with SCAQMD Rules 1146 and 1146.1: any units fired on digester gas limited to 15 ppm NOx @ 3% O_2
BAAQMD BACT Guideline 17.5.1 (4/21/93)	Boiler or Water Heater- Landfill or Digester Gas	▪ VOC: automatic combustion air control and retention time ≥0.3 seconds at ≥1600°F ▪ NOx: 20 ppm @ 3% O_2 dry with SNCR or 40 ppm @ 3% O_2 low NOx burners ▪ SO2: spray dryer + baghouse or fuel gas pretreatment system ▪ CO: 100 ppm @ 3% O_2 with good combustion practices

Analysis

NOx
Low NOx burner packages achieving 30 ppmvd @ 3% O_2 have been required and achieved in practice consistently across recently permitted boilers firing digester gas and natural gas or propane in recently issued PSCAA and SWCAA permits.

CO
A CO limit of 50 ppmvd @ 3% O_2 has been consistently required and achieved in practice across recently permitted boilers firing digester gas and natural gas or propane in recently issued PSCAA and SWCAA permits.

VOC
Quantified VOC emission limits have not been included in similar recently issued permits for boilers firing digester gas and natural gas or propane. The site sampling provided information about VOC composition of biogas suggesting biogas has similar emissions of VOC to propane and natural gas combustion (conservatively assuming 0% VOC reduction in the boiler, the measured VOC content corresponds to about 2e-04 lb/mmbtu for treated biogas and 6e-3 lb/mmbtu for untreated biogas, as compared with the AP-42 VOC emission factors for propane and natural gas of 8.84e-03 and 5.4e-03 lb/mmbtu, respectively).

The applicant specified that good combustion practices and meeting CO BACT would constitute VOC BACT, with an assumed 98% destruction efficiency of VOC used in emission calculations. The 98% destruction efficiency of VOC has been imposed in PSCAA permit conditions for flare or oxidizers, specifically controlling anaerobic digesters at wastewater treatment plants and similar facilities; however the boilers under review are combusting the digester gas for electrical generation and not to control emissions of VOC. As such, rather than a 98% destruction efficiency, good combustion practices through boiler operating requirements in alignment with the 1993 BAAQMD Guideline 17.5.1 boiler operating requirements of 1600°F and 0.3 second retention time will constitute BACT.

H2S and SO_2
The applicant did not complete a H_2S analysis for BACT; however the design of the boilers can handle only an upper limit of 200 ppm H_2S and the system is designed to send treated digester gas through the existing gas conditioning system (iron sponge), although the facility has requested operational flexibility to allow for untreated digester gas (up to 200 ppm H_2S) to be combusted in the boilers in cases when the treatment system is inoperable or when additional gas beyond the capacity of the existing gas conditioning system must be operated.

H_2S and SO_2 BACT varies across different permits and the H_2S content in the digester gas varies across facilities.

- NOC 12021 combusts digester gas which has been processed to reduce H_2S content. The untreated H_2S content provided on the application is 2,000 ppmvd H_2S. Boiler size of 2 MMBtu/hr.
- SWCAA Camas WWTP boiler review applicant included a proposal for a sulfur sponge to be installed upstream of the boiler and the flare at the facility, to achieve 94% removal efficiency. The boiler is sized at 0.653 MMBtu/hr and the inlet concentration specified in the technical review is 8,300 ppmvd.

- SWCAA Salmon Creek WWTP boiler review did not include review of hydrogen sulfide removal. The application included untreated H_2S content of 1,800 ppmvd which was used in calculation of H_2S and SO_2 emissions. The Salmon Creek WWTP boiler is rated at 5.23 MMBtu/hr.

Similar permits have utilized minimum sulfur removal requirements on treated digester gas or maximum allowable H_2S content in digester gas being combusted as H_2S BACT. The facility did not assess the potential to expand the gas treatment system to accommodate treatment of all digester gas with potential to be combusted in the boilers. In this case, a combination of use of treated digester gas (anticipated upper level of H_2S concentration from the treated gas is 125 ppm) and use of untreated digester gas with H_2S concentration not to exceed 200 ppm, with daily monitoring to track H_2S concentration of any untreated digester gas used in the boilers will constitute BACT for H_2S and SO_2.

PM
The applicant did not complete a PM analysis for BACT. Similar permits for digester gas-fired boilers have specified 0% opacity per Ecology Method 9A and will constitute PM BACT for this project.

Recommendations

Summary BACT/tBACT determination

Pollutant	Available Method That Meets BACT	Implementation of Method
NO_x	30 ppmvd @3%O_2 on 1 hour average	Source testing with EPA Method 7E
SO_2	200 ppm H_2S content limit on untreated digester gas 125 ppm H_2S content limit on treated digester gas	Gas Conditioning System (GCS) and monitoring during GCS downtime
H_2S		
CO	50 ppmvd @ 3%O_2 on 1 hour average	Source testing with EPA Method 10
Total VOCs	1,600°F minimum operating temperature and 0.3 second or more residence time	Temperature monitoring
PM	0% opacity	WA Ecology Method 9A & EPA Method 22

G. EMISSION ESTIMATES

Proposed Project Emissions

Actual Emissions

The historic actual emissions of the boilers being replaced indicated an average load of 120 HP. At that load, the boilers would be anticipated to utilize only treated digester gas and would have estimated actual emissions summarized in the table below:

Summary of Actual Emissions

Criteria Pollutants	Emission Rate lb/hr	lb/yr	tpy
Carbon Monoxide	0.21	1,812	0.9
Nitrogen Oxide	0.20	1786	0.9
Non Methane Organic Carbon	2.13E-05	1.86E-01	9.31E-05
Particulate Matter less than 10 microns	0.04	349	0.2
Particulate Matter less than 2.5 microns	0.04	349	0.2
Sulfur Dioxide	0.04	340	0.2
Carbon Dioxide equivalents	617	5,404,165	2,702
Hydrogen Sulfide	7.76E-04	6.8	0.003
Total Hazardous Air Pollutants	7.79E-04	6.82	0.003

Potential Emissions

Potential emissions were calculated assuming that the boilers need to produce a combined output of 1,000 HP, to be achieved through use of all available conditioned digester gas (470 scfm with assumed heat input of 602 Btu/scf based on sampling averages) with the remaining fuel to reach 1,000 HP output coming from either raw digester gas or propane (for each pollutant, the fuel type with the higher emission factor was utilized). This breakdown of fuel use was modeled in the calculations as 100% conditioned digester gas on one 100 HP boiler and 70% conditioned digester gas on one 400 HP boiler, with the remaining fuel on all boilers used being propane/raw digester gas worst case. The application specifies that the highest demand day could be 900 HP (with the cogen system offline) although the analysis is based on 1,000 HP for conservatism. The anticipated highest demand on the boilers for cases when the cogen system is also operating would be about 620 HP.

The applicant assumed 98% conversion from H_2S to SO_2 in the boiler per design specification and assumed 85% conversion of VOC in the boiler per design specification. Treated digester gas H_2S emissions are assumed to be 125 ppm and untreated digester gas is held to the 200 ppm limit design specification.

Summary of Potential Emissions - All Boilers			
	Emission Rate		
Criteria Pollutants	**lb/hr**	**lb/yr**	**tpy**
Carbon Monoxide	1.72	15,098	7.5
Nitrogen Oxide	1.70	14,880	7.4
Non Methane Organic Carbon	0.24	2,144	1.1
Particulate Matter less than 10 microns	0.34	2,977	1.5
Particulate Matter less than 2.5 microns	0.34	2,977	1.5
Sulfur Dioxide	1.11	9,743	4.9
Carbon Dioxide equivalents	5,799	50,796,373	25,398
Hydrogen Sulfide	0.02	195	0.097
Total Hazardous Air Pollutants	0.12	1019	0.51

Facility-wide Emissions

Actual Emissions

Facility-wide actual emissions as reported from 2018-2022 are shown below. The addition of the boilers is not anticipated to increase facility-wide emissions. The boilers are replacing three existing boilers used to meet total load requirements at the facility.

Pollutant	2022	2021	2020	2019	2018
CO	43.43	41.538	40.2215	47.2315	42.875
Toxic Air Contaminants (TAC)	10.4635	9.8565	9.196	7.954	9.108
HAP	1.272	1.268	1.166	1.0725	1.218
SO2	9.1915	8.5885	8.03	6.8815	7.89
VOC	5.669	5.6485	6.0785	6.526	6.186
PM10	1.2535	1.1665	1.184	1.3055	1.2865
NO2	12.411	11.072	15.913	16.593	20.501

Potential Emissions

Facility-wide NOx and CO emissions are limited to 249 ton/yr per Order of Approval 10470 #6 (out for public comment as of 1/25/24). Order of Approval 10470 cancels and supersedes Order of Approval 8914 which contained the same 249 ton/yr limits on NOx and CO as 10470.

H. OPERATING PERMIT OR PSD

The Title V Air Operating Permit (AOP) program applicability for the entire source has been reviewed.

The facility is a Title V "**air operating permit source**" and conditions of this Order will be incorporated into the AOP during the next AOP opening.
Emission increases associated with this project were reviewed for Prevention of Significant Deterioration (PSD) Program applicability. The facility is not an existing PSD major source and the increase in emissions from this permitting action is below PSD thresholds.

I. AMBIENT TOXICS IMPACT ANALYSIS

The estimated potential toxic air pollutant (TAP) emissions at operating at 100% rated capacity and 8760 hour per year for each new or modified emission unit (*or based on limit in permit*). The table below includes estimated potential emissions of all TAP and compares those to the Small Quantity Emission Rates (SQER) in WAC 173-460-150. This project utilizes the option to take reduction of TAPs from existing generation units under WAC 173-460-080(3) for the existing 3 boilers at the plant which are to be replaced under this NOC.

WAC 173-460-080(3) specifies that "An applicant may include in an acceptable source impact analysis proposed reductions in actual emissions of a particular TAP from emission units at the source that are not new or modified for the purpose of offsetting emissions of that TAP caused by the new or modified

source. The reductions in TAP emissions authorized by this subsection must be included in the approval order as enforceable emission limits and must meet all the requirements of WAC 173-460-071."

The TAP emissions from the new boilers are summarized below:

WA Toxics		Total			TAP Averaging Period	SQER (lb/averaging period)[2]	Above SQER?
		Emission Rate					
Compound	**CAS**	**(lb/hr)**	**(lb/day)**	**(lb/yr)**			
Benzene	71-43-2	1.6E-04	3.8E-03	1.4E+00	year	21	No
1,2,4-Trimethylbenzene	95-63-6	2.4E-05	5.7E-04	2.1E-01	24-hr	4.4	No
1,4-Dichlorobenzene	106-46-7	2.4E-05	5.7E-04	2.1E-01	year	15	No
4-Methyl-2-Pentanone (MiBK)	108-10-1	2.5E-05	6.0E-04	2.2E-01	24-hr	220	No
Ammonia	7664-41-7	9.2E-02	2.2E+00	8.0E+02	24-hr	37	No
Ethylbenzene	100-41-4	2.1E-05	5.1E-04	1.9E-01	year	65	No
Formaldehyde	50-00-0	3.3E-04	8.0E-03	2.9E+00	year	27	No
Hexane	110-54-3	1.8E-05	4.4E-04	1.6E-01	24-hr	52	No
PAH (Assume Benzo[a]pyrene)	50-32-8	1.2E-05	2.9E-04	1.1E-01	year	0.16	No
propylene	115-07-1	8.8E-04	2.1E-02	7.7E+00	24-hr	220	No
Toluene	108-88-3	1.8E-03	4.4E-02	1.6E+01	24-hr	370	No
m&p-Xylenes	1330-20-7	2.9E-05	7.0E-04	2.5E-01	24-hr	16	No
o-Xylene	95-47-6	1.6E-05	3.8E-04	1.4E-01	24-hr	16	No
Xylenes, Total	1330-20-7	2.9E-05	7.0E-04	2.5E-01	24-hr	16	No
CO	630-08-0	1.7E+00	4.1E+01	1.5E+04	1-hr	43	No
NOX	10102-44-0	1.7	4.08E+01	1.5E+04	1-hr	0.87	Yes
SO2	7446-09-5	1.1E+00	2.7E+01	9.7E+03	1-hr	1.2	No
Hydrogen sulfide	7783-06-4	2.2E-02	0.53	1.9E+02	24-hr	0.15	Yes

NOx and H_2S emissions are above the SQER and were further analyzed with emission reductions from the removal of the three existing boilers. Including the reductions from the existing boilers, emissions of NOx and H_2S are below the SQER and no further analysis is required (see tables below). Per WAC 173-460-071, there will be an enforceable condition requiring the removal of the existing boilers prior to installation and operation of the new boilers.

Comparison of Nitrogen Oxides to SQER

Toxic Air Pollutant	Averaging Period	Emissions (lb/averaging period)	SQER (lb/averaging period)
Nitrogen Oxides – Actual Emissions Existing Boilers	1-hr	2.54	0.87
Nitrogen Oxides – PTE New Boilers	1-hr	1.70	0.87
Change in Emissions	1-hr	-0.84	0.87

Comparison of Hydrogen Sulfide to SQER

Toxic Air Pollutant			SQER

	Averaging Period	Emissions (lb/averaging period)	(lb/averaging period)
Hydrogen Sulfide – Actual Emissions Existing Boilers	24-hr	0.39	0.15
Hydrogen Sulfide – PTE New Boilers	24-hr	0.53	0.15
Change in Emissions	24-hr	0.148	0.15

Since the 1000 HP is an overdesign, the applicant also provided a comparison of H_2S emissions at the maximum anticipated output of 900 HP for informational purposes.

Comparison of Hydrogen Sulfide to SQER - 900 hp

Toxic Air Pollutant	Averaging Period	Emissions (lb/averaging period)	SQER (lb/averaging period)
Hydrogen Sulfide – Actual Emissions Existing Boilers	24-hr	0.39	0.15
Hydrogen Sulfide – New Boilers at 900 hp	24-hr	0.47	0.15
Change in Emissions	24-hr	0.084	0.15

J. APPLICABLE RULES & REGULATIONS

Puget Sound Clean Air Agency Regulations

SECTION 7.09 (b): Operation and Maintenance Plan. Owners or operators of air contaminant sources subject to Article 7 of this regulation shall develop and implement an operation and maintenance plan to assure continuous compliance with Regulations I, II, and III. A copy of the plan shall be filed with the Control Officer upon request. The plan shall reflect good industrial practice and shall include, but not be limited to, the following: (1) Periodic inspection of all equipment and control equipment; (2) Monitoring and recording of equipment and control equipment performance; (3) Prompt repair of any defective equipment or control equipment; (4) Procedures for start up, shut down, and normal operation; (5) The control measures to be employed to assure compliance with Section 9.15 of this regulation; and (6) A record of all actions required by the plan. The plan shall be reviewed by the source owner or operator at least annually and updated to reflect any changes in good industrial practice.

SECTION 6.09: Within 30 days of completion of the installation or modification of a stationary source subject to the provisions of Article 6 of this regulation, the owner or operator or applicant shall file a Notice of Completion with the Agency. Each Notice of Completion shall be submitted on a form provided by the Agency, and shall specify the date upon which operation of the stationary source has commenced or will commence.

SECTION 9.03: (a) It shall be unlawful for any person to cause or allow the emission of any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour, which is: (1) Darker in shade than that designated as No. 1 (20% density) on the Ringelmann Chart, as published by the United States Bureau of Mines; or

(2) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Section 9.03(a)(1).
(b) The density or opacity of an air contaminant shall be measured at the point of its emission, except when the point of emission cannot be readily observed, it may be measured at an observable point of the plume nearest the point of emission.
(c) This section shall not apply when the presence of uncombined water is the only reason for the failure of the emission to meet the requirements of this section.

SECTION 9.09: General Particulate Matter (PM) Standard. It shall be unlawful for any person to cause or allow the emission of particulate matter in excess of the following concentrations:
Burning fuel other than wood..... 0.05 gr/dscf @ 7% O2

SECTION 9.11: It shall be unlawful for any person to cause or allow the emission of any air contaminant in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property.

SECTION 9.13: It shall be unlawful for any person to cause or allow the installation or use of any device or use of any means designed to mask the emission of an air contaminant which causes detriment to health, safety or welfare of any person.

SECTION 9.15: It shall be unlawful for any person to cause or allow visible emissions of fugitive dust unless reasonable precautions are employed to minimize the emissions. Reasonable precautions include, but are not limited to, the following:
(1) The use of control equipment, enclosures, and wet (or chemical) suppression techniques, as practical, and curtailment during high winds;
(2) Surfacing roadways and parking areas with asphalt, concrete, or gravel;
(3) Treating temporary, low-traffic areas (e.g., construction sites) with water or chemical stabilizers, reducing vehicle speeds, constructing pavement or rip rap exit aprons, and cleaning vehicle undercarriages before they exit to prevent the track-out of mud or dirt onto paved public roadways; or
(4) Covering or wetting truck loads or allowing adequate freeboard to prevent the escape of dust-bearing materials.

REGULATION I, SECTION 9.20(a): It shall be unlawful for any person to cause or allow the operation of any features, machines or devices constituting parts of or called for by plans, specifications, or other information submitted pursuant to Article 6 of Regulation I unless such features, machines or devices are maintained in good working order.

Washington State Administrative Code

WAC 173-400-040(3): Fallout. No person shall cause or allow the emission of particulate matter from any source to be deposited beyond the property under direct control of the owner or operator of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited.

WAC 173-400-040(4): Fugitive emissions. The owner or operator of any emissions unit engaging in materials handling, construction, demolition or other operation which is a source of fugitive emission:

(a) If located in an attainment area and not impacting any nonattainment area, shall take reasonable precautions to prevent the release of air contaminants from the operation.

WAC173-400-111(7): Construction limitations.

(a) Approval to construct or modify a stationary source becomes invalid if construction is not commenced within eighteen months after receipt of the approval, if construction is discontinued for a period of eighteen months or more, or if construction is not completed within a reasonable time. The permitting authority may extend the eighteen-month period upon a satisfactory showing by the permittee that an extension is justified.

Federal

40 CFR 60 Subpart Dc applies to both 400 hp boilers permitted under this NOC:
§60.40c Applicability and Delegation of Authority (a) except as provided in paragraphs (d), (e), (f), and (g) of this section, the affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h).
§60.41c Definitions
Natural gas means:
(1) A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth's surface, of which the principal constituent is methane; or
(2) Liquefied petroleum (LP) gas, as defined by the American Society for Testing and Materials in ASTM D1835 (incorporated by reference, see § 60.17); or
(3) A mixture of hydrocarbons that maintains a gaseous state at ISO conditions. Additionally, natural gas must either be composed of at least 70 percent methane by volume or have a gross calorific value between 34 and 43 megajoules (MJ) per dry standard cubic meter (910 and 1,150 Btu per dry standard cubic foot).

Process heater means a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst.

Steam generating unit means a device that combusts any fuel and produces steam or heats water or heats any heat transfer medium. This term includes any duct burner that combusts fuel and is part of a combined cycle system. This term does not include process heaters as defined in this subpart.

§60.48c Reporting and recordkeeping requirements
(a) The owner or operator of each affected facility shall submit notification of the date of construction or reconstruction and actual startup, as provided by § 60.7 of this part. This notification shall include:

(1) The design heat input capacity of the affected facility and identification of fuels to be combusted in the affected facility.
(2) If applicable, a copy of any federally enforceable requirement that limits the annual capacity factor for any fuel or mixture of fuels under § 60.42c, or § 60.43c.
(3) The annual capacity factor at which the owner or operator anticipates operating the affected facility based on all fuels fired and based on each individual fuel fired.
(4) Notification if an emerging technology will be used for controlling SO_2 emissions. The Administrator will examine the description of the control device and will determine whether the technology qualifies as an emerging technology. In making this determination, the Administrator may require the owner or operator of the affected facility to submit additional information concerning the control device. The affected facility is subject to the provisions of § 60.42c(a) or (b)(1), unless and until this determination is made by the Administrator.

(g)(1) except as provided under paragraphs (g)(2) and (g)(3) of this section, the owner or operator of each affected facility shall record and maintain records of the amount of each fuel combusted during each operating day.
(2) As an alternative to meeting the requirements of paragraph (g)(1) of this section, the owner or operator of an affected facility that combusts only natural gas, wood, fuels using fuel certification in § 60.48c(f) to demonstrate compliance with the SO_2 standard, fuels not subject to an emissions standard (excluding opacity), or a mixture of these fuels may elect to record and maintain records of the amount of each fuel combusted during each calendar month.

(i)All records required under this section shall be maintained by the owner or operator of the affected facility for a period of two years following the date of such record.

(j) The reporting period for the reports required under this subpart is each six-month period. All reports shall be submitted to the Administrator and shall be postmarked by the 30th day following the end of the reporting period.

K. PUBLIC NOTICE

This project meets the criteria for mandatory public notice under WAC 173-400-171(3). This project included emission offsets from the replacement of three existing boilers with the four new proposed boilers under WAC 173-460-080(3) which requires mandatory public notice under WAC 173-400-171(3). A notice of application was posted on the Agency's website for 15 days. No requests or responses were received. A copy of the website posting is below:

New Construction Projects

Company	Address	Project Description	Date Posted	Contact Engineer
King Co Ntrl Res Wastewater Treatment	1400 Discovery Park Blvd (West Point), Seattle, WA 98199	Application to replace three existing digester gas and propane-fired boilers with four total digester gas and propane-fired boilers at an existing wastewater treatment facility.	8/2/23	Madeline McFerran

A 30-day public comment period was held from DATE to DATE. Notices that the draft materials were open to comment were published in The Seattle Times and OTHER PUBLICATION?. The Agency posted the application draft worksheet on the Agency's website during the comment period. SUMMARY OF COMMENTS RECEIVED, AS APPLICABLE.

L. RECOMMENDED APPROVAL CONDITIONS

Standard Conditions:

1. Approval is hereby granted as provided in Article 6 of Regulation I of the Puget Sound Clean Air Agency to the applicant to install or establish the equipment, device or process described hereon at the installation address in accordance with the plans and specifications on file in the Engineering Division of the Puget Sound Clean Air Agency.

2. This approval does not relieve the applicant or owner of any requirement of any other governmental agency.

3. Staged replacement of the two existing 265 HP and 595 HP boilers with each of the two 4.46 MMBtu/hr and two 17.82 MMBtu/hr boilers must not result in output exceeding 1000 HP averaged during any 24-hour period. Replacement must not result in more than 4 total boilers in the east and west boiler rooms at a given time. Compliance with this condition shall be demonstrated through boiler operation and steam production records. This restriction becomes obsolete once the 595 HP and two 265 HP boilers have been decommissioned and removed from service.

4. Each 4.46 MMBtu/hr and 17.82 MMBtu/hr boiler must not exceed the following emission limits during combustion of treated digester gas, untreated digester gas, propane or combination of aforementioned fuels:
    a. CO must not exceed 50.0 ppmvd @ 3%O2 on a 1-hour average, as determined through EPA Method 10 and 3A.
    b. NOx must not exceed 30.0 ppmvd @3% O2 on a 1-hour average, as determined through EPA method 7E and 3A.
    c. Visible emissions from each boiler must not exceed zero percent opacity for more than 3 minutes in any 1 hour as determined by Ecology Method 9A.

5. Each 4.46 MMBtu/hr and 17.82 MMBtu/hr boiler must meet the following operational requirements:

a. Boilers must combust only treated digester gas, untreated digester gas, or propane.

b. Treated digester gas combusted must not contain H_2S concentrations exceeding 125 ppmv as measured by colormetric tube sampling or hand held instrument readings or alternative method approved by Puget Sound Clean Air Agency.

c. Untreated digester gas combusted must not contain H_2S concentrations exceeding 200 ppmv as measured by colormetric tube sampling or hand held instrument readings or alternative method approved by Puget Sound Clean Air Agency.

d. Maintain a minimum residence time of 0.3 seconds and a minimum firing temperature of 1,600°F on a 1-hour average, except during startup and shutdown.

6. The owner or operator shall have each boiler serviced annually (not to exceed 13 months from the previous servicing date). During that service, the owner or operator shall measure NO_x, CO and O_2 in the boiler exhaust at load levels representative of normal-low, normal-medium, and normal-high operating rates using a portable gas analyzer method (ASTM D6522-00, ANSI/ASME PTC 19.10-1981, EPA CTM-030, or EPA CTM-034, or other alternative approved in writing by the Puget Sound Clean Air Agency). Measurements of CO, O_2, and NO_x concentration shall be taken and recorded before and after adjustments are made. Annual measurements may be taken while firing treated digester gas, untreated digester gas, propane or combination of fuels.

7. If NO_x or CO measurements from a portable gas analyzer check taken after the tune-up adjustments are made as required by Condition #5 exceed the NO_x or CO limits specified in Conditions #3, then the boiler shall cease operation until corrective actions have been completed and a follow-up compliance test for NO_x and CO has demonstrated compliance with the limits of Conditions #3. The compliance testing shall utilize EPA Methods 3A, 7E, 10 and Ecology Method 9A and is subject to PSCAA Reg I 3.07.

8. Within 90 days of startup of each 17.82 MMBtu/hr boiler, the owner or operator must conduct initial compliance testing for the NO_x, CO, and visible emission limits of Condition #3. Testing shall be conducted using 40 CFR Part 60, Appendix A Reference Methods 1, 3A, 4, 7E, and 10, or alternatives approved by Puget Sound Clean Air Agency.

    a. The testing must be conducted shall be conducted in accordance with Puget Sound Clean Air Agency Regulation I, Section 3.07.

    b. The testing must be conducted at 90% or more of the boiler's maximum operational firing rate. The maximum firing rate is set by performance test and can be less than the maximum rated capacity.

    c. Testing for NOx and CO must consist of at least three separate test runs with each test run being at least one hour in duration and compliance based on the average of the three test runs. Testing for opacity must consist of at least one 1-hour observation.

    d. Performance tests may only be stopped for good cause, which includes forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances beyond the owner or operator's

control. Termination of a performance test without good cause after the first test run has commenced shall constitute a failure of the performance test.

9. Each 17.82 MMBtu/hr boiler is subject to the federal Standards of Performance for Small Industrial-Commercial Units under 40 CFR Part 60, Subpart Dc and General Provisions under Subpart A.
10. The owner or operator shall determine compliance with the digester gas H_2S content limits of Condition #4.b and #4.c as follows:
    a. Treated digester gas shall be sampled at least once per calendar month.
    b. Untreated digester gas shall be sampled once per operating day when untreated digester gas is routed to any of the boilers.
    c. Sampling of treated and untreated digester gas shall utilize colormetric tubes or a hand held instrument capable of detection concentrations at the required levels to accurately measure the concentration of H_2S in the biogas. The upper end of the reading range must be at least 250 ppm. An agency approved H_2S monitoring instrument of the same or greater sensitivity as the gas detection tubes may be used as an alternative. Results of sampling shall be maintained with the date of sampling and H_2S concentration recorded.
    d. If an exceedance of the emission limit in Condition #4.c is measured, the owner or operator shall cease firing the boilers with untreated digester gas until an untreated digester gas reading meets the limit of Condition #4.c.
    e. If an exceedance of the emission limit in Condition #4.b is measured, the owner or operator shall initiate corrective action including corrective maintenance of the sulfur removal system within 24 hours of identification.
11. The following records shall be kept in written and/or digital form for at least five years and made available to Agency personnel upon request:
    a. Boiler fuel type, fuel use and firing rate records for each boiler to demonstrate compliance with Condition #4.a.
    b. Treated digester gas and untreated digester gas H_2S sampling results as required in Condition #9.
    c. Results of annual NOx and CO measurements as required in Condition #5.
    d. Boiler firing temperature records for each boiler to demonstrate compliance with Condition #4.d.
12. This Notice of Construction Order of Approval 12353 shall cancel and supersede Notice of Construction Order of Approval 10861 upon decommissioning and removal of the two

M. CORRESPONDENCE AND SUPPORTING DOCUMENTS

N. REVIEWS

Reviews	Name	Date
Engineer:	Madeline McFerran	11/28/23
Inspector:	Gerard Van der Jagt	1/19/24
Second Review:	John Dawson	11/28/2023
Applicant Name:	Jesse Collins	1/25/24