

**Draft Engineering Evaluation  
West County Wastewater District  
2377 Garden Tract Road, Richmond, California 94801  
Application No. 31560  
Plant No. 1271**

**Project Description: Comprehensive Energy and Sustainability Upgrades Project**

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**1. BACKGROUND**

The West County Wastewater District (WCWD, Plant 1271) has applied for an Authority to Construct and/or Permit to Operate for the following:

**S34 Cogeneration Engine**

**Make: 2G Energy, Model: Agenitor 412, Model Year: 2022  
629 bhp, 4.01 MMBtu/hr HHV, EPA engine family: P2GEB25.0A12**

Abated by

**A34, SCR, and A134, Oxidation Catalyst**

**S35 Cogeneration Engine**

**Make: 2G Energy, Model: Agenitor 412, Model Year: 2022  
629 bhp, 4.01 MMBtu/hr HHV, EPA engine family: P2GEB25.0A12**

Abated by

**A35, SCR, and A135, Oxidation Catalyst**

**S170 Sludge Handling Processes**

**Two new Rotary Drum Thickeners (RDT), two new centrifuges**

RDTs abated by

**A170 Carbon Adsorption, abating RDTs  
1,000 cfm, 1,000 lbs carbon**

**S171 Sludge Dryer**

**Gryphon Drying Unit, Model 1050, 7.5 MMBtu/hr including 1,200 gpm cooling tower**

Abated by

**A171 Carbon Adsorption  
Abates S171 and A180, Digester Gas Pretreatment Desorption  
2,000 cfm, 1,200 lbs carbon**

**S180 Anaerobic Digesters**

**Two new digesters, 0.878 MG each replacing two old digesters**

Abated by

**A5 Enclosed Digester Flare  
Varec Biogas 244ELC, 200 cfm, 7.32 MMBtu/hr**

And

**A180 Digester Gas Pretreatment, GraniteFuel, abated by A171, Carbon Absorption**

**Registered Sources**

**S36 Natural Gas Boiler, 2.64 MMBtu/hr  
Parker Water Wall Hot Water Boiler,  
Supplying heat to S180, Anaerobic Digesters**

**S37 Natural Gas Boiler, 2.64 MMBtu/hr  
Parker Water Wall Hot Water Boiler,  
Supplying heat to S180, Anaerobic Digesters**

The sources above will be located at 2377 Garden Tract Road, Richmond, California 94801.

WCWD is a municipal wastewater treatment plant that provides primary and secondary treatment of wastewater from the City of San Pablo, Tara Hills, Richmond (northern subdivisions), East Richmond Heights, the City of Pinole (designated sectors), El Sobrante, Rollingwood, Bayview, and parts of unincorporated Contra Costa County. The treated effluent from WCWD is combined with treated effluent from the Richmond Water Pollution Control District (RWPCD, Plant 2482), dechlorinated, and disposed of through a shared deep-water outfall into the San Francisco Bay. WCWD currently has sludge lagoons and sludge drying beds that are used to store and dry sludge from both WCWD and the Richmond RWPCD. The dry weather average design wastewater flow is 12.5 MGD for WCWD and 16 MGD for the Richmond RWPCD in the NDPES permit No. CA0038539. The peak wet weather design wastewater flow is 21 MGD for WCWD and 20 MGD for the Richmond RWPCD. The wastewater flows will not be changing in this project.

**Anaerobic Digesters, S180**

The facility will install two new domed roof anaerobic digesters, each with a capacity of 878,000 gallons, that will replace the existing digesters, which were taken offline in 2021 due to failure. Because influent wastewater loading will not be increasing, the facility does not expect that digester gas production will be increasing. The installation of the two new digesters will include auxiliary equipment, i.e. a digester mixing apparatus, digester cover, and digester heating elements (heat exchangers, piping, etc.). The maximum expected annual digester gas production capacity is expected to be 82 million standard cubic feet per year (MMscf/yr). The peak expected digester gas production capacity (peak instantaneous maximum digester gas production rate and

peak future digester gas production rate) is 180 scfm. The heat content of the digester gas is reported by the applicant to be 610 Btu/scf. Each digester will have two PRVs. Each PRV will release at a height of 35 feet and will have an inner diameter of 4 inches. The PRVs are only expected to vent in emergency circumstances. It is therefore assumed that a maximum of one PRV will be venting at a time. The maximum flow rate for the PRVs is based on the set point of 42 in H<sub>2</sub>O. At this pressure, the flow rate out of the PRVs will be 340 cfm. While the PRVs do not have a specified maximum flow rate due to their design, the manufacturer has provided a pressure-flow rate curve that will identify the PRV flow rate at a given pressure. The digesters will be equipped with pressure monitors, so in the event of an emergency release, the PRV flow rate will be known and the emitted pollutant mass will be able to be calculated. The set point of the PRVs is driven by the structural integrity of the digesters, making the flow at that pressure the theoretical maximum release rate of the PRVs, as higher pressure could result in the failure of the digesters. The facility has provided a stamped engineering design drawing of the system with the specified PRV release pressure set point.

#### Cogeneration Engines, S34 and S35

The new four stroke, lean burn cogeneration engines will fire on pretreated digester gas only, although natural gas will be used to commission the engines. They will be equipped with an oxidation catalyst to control carbon monoxide (CO), volatile organic compounds (VOCs), and formaldehyde emissions. The engine will also be equipped with a selective catalytic reduction (SCR) system to control emissions of nitrogen oxides (NO<sub>x</sub>). A new gas pretreatment system reduces hydrogen sulfide (H<sub>2</sub>S), precursor organic compounds (POC), siloxanes, and moisture. The facility is also going to add ferric chloride or ferric sulfate at the digesters to reduce H<sub>2</sub>S concentrations in the digester gas before the gas pretreatment system. The facility has agreed to accept a 100 ppm limit on inlet H<sub>2</sub>S to S34 and S35. One engine will operate at a time. Together, the two engines will operate for a total of 8,760 hours per year. They will receive a combined operational limit based on this scenario.

#### Sludge Handling Processes, S170

S170 will be upgraded in multiple ways. Currently, a Dissolved Air Flotation (DAF) system, permitted as part of S170, separates sludge from the wastewater. Due to the 2021 failure of the digesters, the sludge is being treated as hazardous waste and is disposed off-site. Before this failure, the facility sent the sludge to the digesters, S180.

Because only one of the DAF tanks is currently operable and is nearing the end of its useful life, the DAF system will be replaced by two new ThickTech Rotary Drum Thickeners (RDTs) that will treat the 12.5 MGD average dry weather wastewater flow from this facility.

Prior to 2021, the digested sludge, was sent to the sludge drying lagoons at approximately 2% solids (part of S170), where it would stay for about a year. It was then removed from the lagoons and sent to the sludge drying beds (a paved area), where it dried further to about 16% solids.

The sludge drying beds and lagoons will eventually be replaced, or at least greatly reduced in use, by two new centrifuges, which can each process between 70-100 gpm (depending on the water content of the sludge). They will receive the digested sludge generated both by this facility and plant #2482, Richmond WWTP. Digested sludge comes over from plant 2482 in a pipeline

and is stored in a fully enclosed tank before it is pumped to the centrifuges. While the combined average dry weather wastewater flow from these facilities is 28.5 MGD, the digested sludge flow treated by the new centrifuges will be approximately 36.8 million gallons per year, assuming the maximum equipment flow rate of 70 gpm.

The RDTs will each treat up to 140 gpm of waste activated sludge at 1-2% solids to 4-6% solids. They will have a capture efficiency of 98%. Emissions from the RDTs will be captured and sent to A170, Carbon Adsorption. The facility has agreed to an outlet H<sub>2</sub>S limit of 1 ppm at A170. Ammonia emissions at A170 will be limited to a maximum hourly concentration of 120 ppmv and an annual average concentration of 60 ppmv.

The RDTs will send the thickened sludge to the digesters.

The centrifuges will concentrate the digested solids up to about 22% solids. The water removed from the sludge will be sent back to headworks. The thickened solids will then be sent to the Sludge Dryer, S171. The centrifuges will be uncovered, and any fugitive emissions will be unabated. However, the equipment is not open to the air and fugitive emissions are expected to be minimal.

#### Sludge Dryer, S171

A natural gas-fired sludge dryer will be installed to dry the dewatered solids generated by the centrifuge. Solids coming from the sludge dryer will be treated to Class A and Class B standards. The proposed dryer is a Gryphon 1050 and will have a firing rate of 7.5 MMBtu/hr. The dryer will be direct-fired and will heat the drying chamber to around 300 deg F. The exhaust air will be somewhat cooled using heat exchangers to preheat combustion air and cool the exhaust prior to passing through A171. The sludge dryer package contains a small 1,200 gpm cooling tower for the heat exchangers. The water that is condensed from the exhaust air is returned to the headworks by gravity feed. The cooled exhaust air will pass through A171, Carbon Adsorption, before exhausting to the atmosphere. The facility has agreed to an outlet H<sub>2</sub>S limit of 1 ppm at A171. Ammonia emissions at A171 will be limited to a maximum hourly concentration of 120 ppmv and an annual average concentration of 60 ppmv. The facility has also agreed to mercury limits that are less than 0.00027 lb/hr and 0.21 lb/yr, which are the triggers in Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants. VOC emissions at the outlet of A171 will be limited to 42 ppmv.

#### Enclosed Digester Flare, A5

WCWD will be replacing the two existing anaerobic digesters that have failed with two new anaerobic digesters, each with a capacity of 878,000 gallons. Digester gas generated by the digesters had been used in S3, Internal Combustion Engine to drive Aeration Blower, S4, Internal Combustion Engine to drive Aeration Blower, S5, Waste Gas Burner, S6 Sludge Heater, and S7, Sludge Heater. S5, S6, and S7 have already been shut down. S5 will be replaced with A5, the new enclosed flare, and S6 and S7 will be replaced with two new exempt natural gas boilers. The boilers each have a capacity of 2.64 MMBtu/hr and will be registered. S3 and S4 will be replaced with exempt electrical motors. The digesters have been offline since 2020, during which time the biosolids have been disposed of off-site and no digester gas has been generated.

The facility proposes to install a Varec Biogas 244ELC Flare, with a maximum capacity of 200 scfm digester gas. The flare will combust excess digester gas when more gas is produced by the digesters than can be consumed in one of the cogeneration engines, when both engines are down, or when the gas pretreatment system is down for an extended period. The flare will operate as needed but will be assumed to operate 24 hours per day, 365 days per year. While the flare will typically burn digester gas that has gone through the gas pretreatment system, which will be able to maintain the digester gas H<sub>2</sub>S content below 100 ppm, the digester gas sent to the flare will be able to bypass the gas pretreatment system if the pretreatment system is down. Therefore, the H<sub>2</sub>S content in the digester gas combusted by the flare will be assumed to be 200 ppm, which is the expected maximum H<sub>2</sub>S content of the digester gas with only ferric addition in the digesters and without passing through the gas pretreatment system.

#### Digester Gas Pretreatment, A180

The Digester Gas Pretreatment, A180, will treat digester gas generated by the Anaerobic Digesters, S180. The facility is expecting to use ferric chloride or ferric sulfate at the digesters to reduce H<sub>2</sub>S concentrations in the digester gas before it passes through A180. Ferric addition is expected to result in H<sub>2</sub>S concentrations in the digester gas below 200 ppm. The digester gas will then go through a pretreatment system to remove POC, H<sub>2</sub>S, siloxanes, and moisture. The gas pretreatment system will be designed to reduce H<sub>2</sub>S in the digester gas to 100 ppm or less and is expected to run 24 hours/day, 365 days per year. However, if the pretreatment system is down, S34 and S35 will not operate and the digester gas will be flared.

An iron rich compound media will remove H<sub>2</sub>S from the digester gas. The iron rich compound media will be shipped off site and replaced as needed. The siloxane removal media will be regenerated on site at A171. The carbon media for A171 will be replaced and shipped off site when it has been spent. During regeneration, S34 and S35 will be able to continue operating, allowed by redundancy in the siloxane removal system, which will be able to be regenerated in place. The manufacturer expects regeneration to occur every 12 to 72 hours (average 48 hours) for 10 to 16 hours (average 14 hours), with adjustments to be made for efficiency optimization.

## **2. EMISSIONS CALCULATIONS**

WCWD has submitted supporting documents for the above equipment, including manufacturer specifications and emissions data. The emissions for each of the sources are described below.

#### ***S34 and S35, Cogeneration Engines***

Criteria pollutant emissions for NO<sub>x</sub>, POC, and CO are determined using emission factors provided by the engine manufacturer and abatement efficiencies provided by the manufacturer of the SCR/oxidation catalyst.

Initially, the manufacturer proposed a CO emission factor of 0.89 g /bhp-hr to meet BACT 96.2.4, released on May 30, 2013. In application 31318, an Authority to Construct was recently issued for S64, Cogeneration Engine #3, abated by A3, Oxidation Catalyst, and A4, SCR, the

cogeneration engine was given a CO emission factor of 0.11 g/bhp-hr. S64 has not yet been given its Permit to Operate, so this emission factor is not yet achieved in practice, but it has been demonstrated to be technologically feasible for digester gas-fueled cogeneration engines. Therefore, WCWD has conducted a cost-effectiveness study to determine the lowest cost-effective CO emission factor for S34 and S35. This study found that S34 and S35 can comply with a CO emission factor permit condition limit of 0.70 g/bhp-hr without exceeding the cost-effectiveness limit of \$400/ton of CO reduced. The study is part of the application file.

The SO<sub>2</sub> emission factor is determined assuming that 100 ppm sulfur is present in the digester gas, as the engines will burn only digester gas that has gone through the pretreatment system, and that 99% of the digester gas sulfur will be converted to SO<sub>2</sub>, guaranteed by the manufacturer. (Documentation of the guarantee is in the applicant's letter of March 14, 2022, which is in the application file.) The PM emission factor is from the manufacturer specifications. The two engines are redundant and will not be operated concurrently, so the emissions calculations are based on one engine operating 24 hours per day, 365 days per year. The following table provides a summary of the engine information that was provided by the applicant.

**Table 1. Annual and Daily Emissions from Manufacturer Guaranteed Data from S34 and S35 Combined**

Pollutant	Abated Emission Factor (g/bhp-hr)	Abated Emission Factor (lb/mmSCF)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)
NO <sub>x</sub>	0.15	--	5.0	1,820.5	0.910
POC	0.12	--	4.0	1,456.4	0.728
CO	0.70	--	23.3	8,495.7	4.248
PM <sub>10</sub>	0.07	--	2.3	849.6	0.425
PM <sub>2.5</sub>	0.07	--	2.3	849.6	0.425
SO <sub>2</sub>	--	16.44 <sup>1</sup>	2.6	946.7	0.473

Basis:

- Annual emissions: 8,760 hours of operation for S34 and S35 combined
- Max daily emissions: 24-hour operation
- 1 pound = 454 grams
- <sup>1</sup>100 ppm – Concentration specified by facility

### ***S170, Sludge Handling Processes***

#### ***Centrifuges***

The main criteria pollutant emitted by the two new centrifuges will be POC. POC emissions from the centrifuges are estimated using SCAQMD's Joint Emission Inventory Program (JEIP) Table 1-7, "Sludge Dewatering – Centrifuge". The centrifuges will be uncovered and unabated, however, the equipment allows minimal or no contact of the sludge with the atmosphere.

**Table 2. Annual and Daily Emissions from S170, Centrifuges**

Pollutant	Emission Factor (lb/yr-MGD)	Wastewater Flow Rate (MGD)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)
POC	6.65	28.5 <sup>1</sup>	0.52	189.5	0.095

➤ <sup>1</sup>NPDES No. CA0038539 – includes WCWD and Richmond WWTP. Average dry weather wastewater flow rate.

#### *A170, Carbon Adsorption abating RDTs*

The new RDTs will emit POC. POC emissions from the RDTs are estimated using SCAQMD's JEIP Table 1-7, "Primary Sludge Thickening – Gravity". Foul air from the RDTs will be captured and sent to A170, Carbon Adsorption abating RDTs. The POC emissions estimated here are only for information use, to show what emissions are expected, and are not the permitted emissions.

**Table 3. Expected Annual and Daily Emissions from A170, Carbon Adsorption abating RDTs**

Pollutant	Emission Factor (lb/yr-MGD)	Wastewater Flow Rate (MGD)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)
POC	0.14	12.5 <sup>1</sup>	0.005	1.75	0.001

➤ <sup>1</sup>NPDES No. CA0038539 – Average dry weather wastewater flow rate from WCWD.

Permitted emissions of POC from A170 are calculated assuming 10 ppmv POC, measured as methane, and a flow rate of 1,000 cfm. 10 ppmv POC, measured as methane, was assumed as a lowest reasonably acceptable permit condition limit. A permit condition limit based on POC emissions calculated from JEIP Table 1-7 would have been too low and would not have accounted for natural peaks in concentration.

**Table 4. Annual and Daily Permitted Emissions from A170, Carbon Adsorption abating RDTs**

Pollutant	POC Concentration, as methane (ppmv)	Foul Air Flow Rate (cfm)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)
POC	10	1,000	0.598	218	0.109

***S171, Sludge Dryer***

The sludge dryer will be a Gryphon 1050 and will have a maximum firing rate of 7.5 MMBtu/hr. It will be fired on natural gas. Combustion emissions from the dryer of NO<sub>x</sub> and CO are estimated by the manufacturer to be 30 and 400 ppm at 3% O<sub>2</sub>, respectively. Combustion emissions of POC, PM, and SO<sub>x</sub> are estimated using AP-42, Table 1.4-2 as 5.5 lb/MMscf, 7.6 lb/MMscf, and 0.6 lb/MMscf, respectively.

**Table 5. Annual and Daily Combustion Emissions from S171, Sludge Dryer**

Pollutant	Emission Factor (lb/MMBtu)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)
NO <sub>x</sub>	0.0364	6.56	2,393.08	1.197
POC	0.00539	0.97	354.26	0.177
CO	0.296	53.21	19,422.08	9.711
PM <sub>10</sub>	0.00745	1.34	489.53	0.245
PM <sub>2.5</sub>	0.00745	1.34	489.53	0.245
SO <sub>2</sub>	0.000588	0.11	38.65	0.019

***A171, Carbon Adsorption abating sludge dryer***

As the dewatered solids from the centrifuge are dried, they will emit POC. These emissions will be captured and sent to A171. POC emissions from the organic process at the sludge dryer are estimated using SCAQMD's JEIP Table 1-7, "Sludge Drying Bed – Mechanically Mixed".

**Table 6. Expected Annual and Daily Emissions from A171, Carbon Adsorption abating sludge dryer (organic process)**

Pollutant	Emission Factor (lb/yr-MGD)	Wastewater Flow Rate (MGD)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)
POC	32.69	28.5 <sup>1</sup>	2.55	931.67	0.466

<sup>1</sup>NPDES No. CA0038539 – includes WCWD and Richmond WWTP. Average dry weather wastewater flow rate.

***Digester Gas Pretreatment Desorption***

A171 will also receive emissions from the desorption of the siloxane removal media of A180, Digester Gas Pretreatment. Emissions were calculated assuming emissions would be similar to those of an equivalent system at a comparable facility ("Site 1"). Emissions from the comparable facility were provided by WCWD. The regeneration events will be assumed to have a regeneration gas flow rate equal to the peak digester gas generation rate, 180 scfm, will be assumed to have an average regeneration duration of 14 hours, and regeneration cycle length of 48 hours.

**Table 7. Expected Annual and Daily Emissions from A171, Digester Gas Pretreatment Desorption**

Site 1 digester gas flow rate	590 scfm			
WCWD digester gas flow rate	180 scfm	Scaling factor	0.305	
Regeneration Cycle length	48 hours	Regenerations per year*	182.5	*8,760 hours of operation/yr
Site 1 POC emissions	1,488 lb/yr			
<b>WCWD expected POC emissions</b>	<b>454 lb/yr</b>	<b>2.49 lb/regen = lb/day</b>	<b>0.227 tpy</b>	

The permitted emissions will be based on a permit condition limit that will be equivalent to the combined POC emissions from solids drying at S171 (2.55 lb/day) and digester gas pretreatment desorption emissions (2.49 lb/day). This equivalent limit occurs at 42 ppmv POC, measured as methane, and assuming a flow rate of 2,000 cfm.

**Table 8. Annual and Daily Permitted Emissions from A171, Carbon Adsorption**

<b>Pollutant</b>	<b>POC Concentration, as methane (ppmv)</b>	<b>Foul Air Flow Rate (cfm)</b>	<b>Max Daily Emissions (lb/day)</b>	<b>Annual Emissions (lb/yr)</b>	<b>Annual Emissions (tons/yr)</b>
POC	42	2,000	5.02	1,832	0.916

***A5, Enclosed Digester Flare***

The flare will have a maximum capacity of 200 scfm digester gas and it will be allowed to operate 8,760 hours per year. Due to the construction of A180, which will have increased production capacity compared to the previous equipment, emissions from A5 will be assumed to be increasing compared to the flare that is being replaced, S5, Waste Gas Burner.

**Table 9. Flare and Gas Flow Assumptions**

Digester gas heat content	610 Btu/scf
Digester gas maximum production rate	200 scfm
Flare exhaust flow rate	29,088.0 cfm at 4% moisture, 20.5% O <sub>2</sub>
	27,924.5 dscfm @ 20.5% O <sub>2</sub>
	534.4 dscfm @ 0% O <sub>2</sub>
A5 permitted annual hours of operation	8,760 hours/yr
A5 Maximum heat input	7.32 MMBtu/hr
(at 8,760 hrs/yr)	64,123 MMBtu/yr
	0.122 MMBtu/min
(at 24 hrs/day)	175.68 MMBtu/day

NO<sub>x</sub> and CO Emissions, A5:

NO<sub>x</sub> and CO emission factors for A5 come from manufacturer submitted specifications and are equivalent to the RACT standard for flares of 0.06 pounds of NO<sub>x</sub> per MMBtu and 0.10 pounds of CO per MMBtu. The manufacturer originally promised 0.20 pounds of CO per MMBtu for A5 in accordance with the previous RACT standard, but consented to a limit of 0.10 pounds of CO per MMBtu when informed of the current RACT standard.

$$\begin{aligned} \text{CO} \quad (64,123 \text{ MMBtu/yr}) \cdot (0.10 \text{ lbs/MMBtu}) &= \mathbf{6,412.3 \text{ lb/yr}} = \mathbf{3.206 \text{ tons/yr}} \\ (175.7 \text{ MMBtu/day}) \cdot (0.10 \text{ lbs/MMBtu}) &= \mathbf{17.6 \text{ lb/day}} \end{aligned}$$

$$\begin{aligned} \text{NO}_x \quad (64,123 \text{ MMBtu/yr}) \cdot (0.06 \text{ lbs/MMBtu}) &= \mathbf{3,847.4 \text{ lb/yr}} = \mathbf{1.924 \text{ tons/yr}} \\ (175.7 \text{ MMBtu/day}) \cdot (0.10 \text{ lbs/MMBtu}) &= \mathbf{10.5 \text{ lb/day}} \end{aligned}$$

PM Emissions, A5:

The PM emission factor is taken from the EPA's AP-42, Table 2.4-5, "Emission Rates for Secondary Compounds Exiting Control Devices".

$$\begin{aligned} \text{PM} \quad (64,123 \text{ MMBtu/yr}) \cdot (17 \text{ lb/MMscf CH}_4) \cdot (0.60 \text{ scf CH}_4/\text{scf DG}) / (610 \text{ Btu/scf}) \\ = \mathbf{1,068.7 \text{ lb/yr}} = \mathbf{0.534 \text{ tons/yr}} \\ (175.7 \text{ MMBtu/day}) \cdot (17 \text{ lb/MMscf CH}_4) \cdot (0.60 \text{ scf CH}_4/\text{scf DG}) / (610 \text{ Btu/scf}) \\ = \mathbf{2.9 \text{ lb/day}} \end{aligned}$$

POC Emissions, A5:

The POC emission factor is from BAAQMD Regulation 8, Rule 34, Section 301.3, which limits NMOC emissions at the outlet of flares to 30 ppm at 3% oxygen, on a dry basis.

$$\begin{aligned}
 \text{POC} & (30 \text{ scf POC}/10^6 \text{ scf exhaust}) * (16.04 \text{ lb CH}_4/\text{lb-mole}) * (624.0 \text{ dscfm exhaust, } 3\% \text{ O}_2) * (60 \\
 & \text{ min/hr}) / (385.3 \text{ scf/lb-mole}) = 0.047 \text{ lb POC/hr (as methane)} \\
 & 0.047 \text{ lb POC/hr (as methane)} / (7.32 \text{ MMBtu/hr}) = 0.01 \text{ lb POC/MMBtu} \\
 & (64,123 \text{ MMBtu/yr}) * (0.01 \text{ lb POC/MMBtu}) = \mathbf{641.2 \text{ lb/yr} = \mathbf{0.321 \text{ tons/yr}} \\
 & (175.7 \text{ MMBtu/day}) * (0.01 \text{ lb POC/MMBtu}) = \mathbf{1.76 \text{ lb/day}}
 \end{aligned}$$

### H<sub>2</sub>S, SO<sub>2</sub> Emissions, A5:

The SO<sub>2</sub> emission factor assumes that the flare will receive digester gas with the highest possible concentration of sulfur. The facility has said that there will be an emergency bypass in case the flare is required to be run while the gas pretreatment system is down. Therefore, although the flare will sometimes burn digester gas that has passed through the gas pretreatment system, which will have an H<sub>2</sub>S concentration of 100 ppm, it will occasionally burn digester gas that has not passed through gas pretreatment occasion, which will have an H<sub>2</sub>S concentration of 200 ppm. The digester gas burned by the flare will be assumed to have an H<sub>2</sub>S content of 200 ppm.

This is equivalent to the current flare RACT standard, which is 200 ppm total reduced sulfur in the digester gas to be combusted. The total concentration of sulfur compounds in digester gas, or total reduced sulfur (TRS) content is typically expressed as an equivalent concentration to hydrogen sulfide (H<sub>2</sub>S). When the digester gas is combusted in A5, the sulfur in these compounds is oxidized and forms sulfur dioxide (SO<sub>2</sub>). For SO<sub>2</sub> emission calculations, the District assumes that 100% of the inlet TRS will be converted to sulfur dioxide at a ratio of 1 mole of SO<sub>2</sub> formed per 1 mole of TRS (expressed as H<sub>2</sub>S) in digester gas.

$$\begin{aligned}
 \text{SO}_2 & (200 \text{ scf H}_2\text{S}/10^6 \text{ scf fuel}) * (34.08 \text{ lb H}_2\text{S}/\text{lb-mole}) / (385.3 \text{ scf/lb-mole}) \\
 & = 17.69 \text{ lb H}_2\text{S/MMscf fuel} \\
 & (17.69 \text{ lb H}_2\text{S/MMscf fuel}) * (64.059 \text{ lb SO}_2/\text{lb-mole}) / (34.08 \text{ lb H}_2\text{S}/\text{lb-mole}) \\
 & = 33.25 \text{ lb SO}_2/\text{MMscf exhaust} \\
 & (33.25 \text{ lb SO}_2/\text{MMscf exhaust}) / (610 \text{ Btu/scf}) = 0.0545 \text{ lb SO}_2/\text{MMBtu} \\
 & (64,123 \text{ MMBtu/yr}) * (0.0545 \text{ lb SO}_2/\text{MMBtu}) = \mathbf{3,495.4 \text{ lb/yr} = \mathbf{1.748 \text{ tons/yr}} \\
 & (175.7 \text{ MMBtu/day}) * (0.0545 \text{ lb SO}_2/\text{MMBtu}) = \mathbf{9.58 \text{ lb/day}}
 \end{aligned}$$

$$\begin{aligned}
 \text{H}_2\text{S} & (17.69 \text{ lb H}_2\text{S}/\text{MMscf fuel}) * (1-0.98) = 0.354 \text{ lb H}_2\text{S}/\text{MMscf exhaust} \\
 & (0.354 \text{ lb H}_2\text{S}/\text{MMscf exhaust}) / (610 \text{ Btu/scf}) = 5.80\text{E-}04 \text{ lb H}_2\text{S}/\text{MMBtu} \\
 & (64,123 \text{ MMBtu/yr}) * (5.80\text{E-}04 \text{ lb H}_2\text{S}/\text{MMBtu}) = \mathbf{37.2 \text{ lb H}_2\text{S/yr}} \\
 & (7.32 \text{ MMBtu/hr}) * (5.80\text{E-}04 \text{ lb H}_2\text{S}/\text{MMBtu}) = \mathbf{0.00425 \text{ lb H}_2\text{S/hr}}
 \end{aligned}$$

### **3. TOXIC RISK SCREENING**

The emission rates of several pollutants at several sources exceed the risk-assessment triggers set forth in Table 2-5-1.

There have been no other permitted projects within the last five years.

The two cogeneration engines are redundant and identical, so they will operate for a maximum total of 8,760 hours per year and will not operate at the same time. Their emissions are therefore calculated assuming one engine is running full time. The cogeneration engines will burn only digester gas. The TAC emission factors for the cogeneration engines are from AP-42 Table 3.2-2, with the exception of ammonia, which was calculated using the assumptions shown below. The manufacturer has stated that the system will be designed to meet an ammonia slip limit of 10 ppm at 15% O<sub>2</sub> after the SCR's.

**Table 10. Ammonia Emission Factor Assumptions for S34 and S35**

Description	Source	Value
<b>Ammonia Emissions Due to Combustion of Digester Gas</b>		
NH <sub>3</sub> concentration (ppm)	BACT 96.2.4	10
F <sub>d</sub> factor (natural gas & digester gas)	Calculated (dscf/MMBtu)	9,349
Molecular Weight NH <sub>3</sub>	Constant (lb/lbmol)	17
Reference O <sub>2</sub> %	BACT 96.2.4	15
E.F. NH <sub>3</sub> (combustion)	Calculated (lb/MMBtu)	1.44E-02
<b>Ammonia Emissions Due to Ammonia Slip through Abatement</b>		
NH <sub>3</sub> Concentration (ppm)	Applicant Reported	10
Molecular Weight NH <sub>3</sub>	Constant (lb/lbmol)	17
E.F. NH <sub>3</sub> (slip)	Calculated (lb/MMBtu)	7.24E-04
<b>E.F. NH<sub>3</sub> (total)</b>	<b>Calculated (lb/MMBtu)</b>	<b>1.52E-02</b>

**Table 11. Toxic Air Contaminant Emissions for S34 and S35**

TAC	E.F. (lb/MMBtu)	Assumed Abatement Eff. (%)	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
<b>1,1,2,2-Tetrachloroethane</b>	4.00E-05	85	2.41E-05	-	N	2.11E-01	1.40E+00	N
<b>1,1,2-Trichloroethane</b>	3.18E-05	85	1.91E-05	-	N	1.68E-01	5.00E+00	N
<b>1,1-Dichloroethane</b>	2.36E-05	85	1.42E-05	-	N	1.24E-01	5.00E+01	N
<b>1,2-Dichloroethane</b>	2.36E-05	85	1.42E-05	-	N	1.24E-01	4.00E+00	N
<b>1,3-Butadiene</b>	2.67E-04	85	1.61E-04	2.90E-01	N	1.41E+00	4.80E-01	YES
<b>Acetaldehyde</b>	8.36E-03	85	5.03E-03	2.10E-01	N	4.40E+01	2.90E+01	YES
<b>Ammonia (combustion)</b>	1.44E-02	0	5.79E-02	1.40E+00	N	5.07E+02	7.70E+03	N
<b>Ammonia (slip)</b>	7.24E-04	0	2.90E-03	1.40E+00	N	2.54E+01	7.70E+03	N
<b>Ammonia (total)</b>	1.52E-02	0	6.08E-02	1.40E+00	N	5.32E+02	7.70E+03	N
<b>Benzene</b>	4.40E-04	85	2.65E-04	1.20E-02	N	2.32E+00	2.90E+00	N
<b>Carbon Tetrachloride</b>	3.67E-05	85	2.21E-05	8.40E-01	N	1.93E-01	1.90E+00	N
<b>Chlorobenzene</b>	3.04E-05	85	1.83E-05	-	N	1.60E-01	3.90E+04	N
<b>Chloroform</b>	2.85E-05	85	1.71E-05	6.60E-02	N	1.50E-01	1.50E+01	N
<b>Ethylbenzene</b>	3.97E-05	85	2.39E-05	-	N	2.09E-01	3.30E+01	N
<b>Ethylene Dibromide</b>	4.43E-05	85	2.66E-05	-	N	2.33E-01	1.10E+00	N
<b>Formaldehyde</b>	5.28E-02	50 <sup>1</sup>	1.06E-01	2.40E-02	YES	9.27E+02	1.40E+01	YES

TAC	E.F. (lb/MMBtu)	Assumed Abatement Eff. (%)	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Hydrogen Sulfide <sup>2</sup>	1.45E-04	85	5.80E-04	1.90E-02	N	5.08E+00	3.90E+02	N
Methanol	2.50E-03	85	1.50E-03	1.20E+01	N	1.32E+01	1.50E+05	N
Methylene Chloride	2.00E-05	85	1.20E-05	6.20E+00	N	1.05E-01	8.20E+01	N
n-Hexane	1.11E-03	85	6.67E-04	-	N	5.85E+00	2.70E+05	N
Naphthalene	7.44E-05	85	4.47E-05	-	N	3.92E-01	2.40E+00	N
PAH (AP-42)	2.69E-05	85	1.62E-05	-	N	1.42E-01	3.30E-03	YES
Phenol	2.40E-05	85	1.44E-05	2.60E+00	N	1.26E-01	7.70E+03	N
Styrene	2.36E-05	85	1.42E-05	9.30E+00	N	1.24E-01	3.50E+04	N
Toluene	4.08E-04	85	2.45E-04	2.20E+00	N	2.15E+00	1.60E+04	N
Vinyl Chloride	1.49E-05	85	8.96E-06	8.00E+01	N	7.85E-02	1.10E+00	N
Xylene	1.84E-04	85	1.11E-04	9.70E+00	N	9.69E-01	2.70E+04	N

<sup>1</sup>Per the applicant, the oxidation catalyst will abate 85% of organic toxics other than formaldehyde. Per BACT 96.2.4, formaldehyde reduction is expected to be approximately 50%. The facility is willing to accept a formaldehyde mass emissions limit based on 50% reduction.

<sup>2</sup>Hydrogen sulfide emissions are only due to the combustion of digester gas. To be conservative, 85% of sulfur in DG is assumed to be converted to SO<sub>2</sub>.

The following is a description of the emission points and exhaust flow rates coming from each source.

**Table 12. Emissions Points Summary**

Modified/New Source	Description	Emission Point	Exhaust Flow Rate	
S34	Cogeneration Engine	A134	1,189 acfm	
S35	Cogeneration Engine	A135	1,189 acfm	
S170	Sludge Handling Processes			
	Centrifuges	[fugitive]		
A170	Carbon Adsorption, abating RDTs	P170	1,000 acfm	
S171	Sludge Dryer			
A171	Carbon Adsorption, abating the sludge dryer	P171	2,000 acfm	
S180	PRVs for the new Digesters	S180	340 acfm	
A5	Enclosed Digester Flare	P10	29,088 acfm	4% moisture, 20.5% O <sub>2</sub>

Modified/New Source	Description	Emission Point	Exhaust Flow Rate	
A180	Digester Gas Pretreatment	P171	180 acfm (regeneration gases to A171)	(flow does not add to the 2,000 cfm of A171)

The TAC emission factors for A170 (carbon adsorption abating the RDTs) were calculated assuming a magnitude of organic emissions equal to the estimated POC emissions, which are from SCAQMD's Joint Emission Inventory Program (JEIP) Table 1-7, "Primary Sludge Thickening – Gravity", and an organic TAC speciation according to AP-42's WebFire, "POTW: Gravity Sludge Thickener". The TAC emission factors for the centrifuges (part of S170, fugitive) and carbon adsorption abating the sludge dryer (A171, the organic process) were derived in the same way, but using JEIP Table 1-7's, "Sludge Dewatering – Centrifuge" and "Sludge Drying Bed – Mechanically Mixed" and WebFire's, "POTW: Sludge Centrifuge" and "POTW: Sludge Drying Bed", respectively.

H<sub>2</sub>S for the same sources, with the exception of the centrifuges, was calculated assuming 1 ppm outlet H<sub>2</sub>S concentration per the applicant for the carbon adsorption abating the RDTs and the carbon adsorption abating the sludge dryer. The flow rate for carbon adsorption abating the RDTs was assumed to be 1,000 cfm.

**Table 13. Toxic Air Contaminant Emissions for A170, Carbon Adsorption abating RDTs at S170**

TAC	% of toxic VOCs	lb per MGD-yr	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Ammonia		1.11E+02	3.17E-01	1.40E+00	N	1.39E+03	7.70E+03	N
Benzene	0.49%		1.20E-06	1.20E-02	N	2.61E-03	2.90E+00	N
Chloroform	32.43%		7.84E-05	6.60E-02	N	1.71E-01	1.50E+01	N
Dichloromethane	31.01%		7.50E-05	6.20E+00	N	1.64E-01	8.20E+01	N
Formaldehyde	0.12%		2.86E-07	2.40E-02	N	6.25E-04	1.40E+01	N
Hydrogen Sulfide		3.50E+00	5.00E-03	1.90E-02	N	4.38E+01	3.90E+02	N
Xylenes	2.96%		7.15E-06	9.70E+00	N	1.56E-02	2.70E+04	N
Perchloroethylene	10.37%		2.51E-05	8.80E+00	N	5.48E-02	1.40E+01	N
Styrene	0.03%		6.87E-08	9.30E+00	N	1.50E-04	3.50E+04	N
Toluene	6.51%		1.57E-05	2.20E+00	N	3.44E-02	1.60E+04	N
1,1,1 - Trichloroethane	6.01%		1.45E-05	3.00E+01	N	3.18E-02	3.90E+04	N
Trichloroethylene	8.29%		2.00E-05	-	N	4.38E-02	4.10E+01	N
Vinylidene Chloride	1.78%		4.29E-06	-	N	9.38E-03	2.70E+03	N

**Table 14. Toxic Air Contaminant Emissions for S170, Centrifuges**

TAC	% of toxic VOCs	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
<b>Benzene</b>	0.10%	8.69E-05	1.20E-02	N	1.90E-01	2.90E+00	N
<b>Carbon Tetrachloride</b>	0.09%	7.55E-05	8.40E-01	N	1.65E-01	1.90E+00	N
<b>Chloroform</b>	0.30%	2.64E-04	6.60E-02	N	5.77E-01	1.50E+01	N
<b>Dichloromethane</b>	0.29%	2.51E-04	6.20E+00	N	5.48E-01	8.20E+01	N
<b>Formaldehyde</b>	0.62%	5.38E-04	2.40E-02	N	1.18E+00	1.40E+01	N
<b>Xylenes</b>	0.71%	6.18E-04	9.70E+00	N	1.35E+00	2.70E+04	N
<b>Perchloroethylene</b>	0.07%	6.28E-05	8.80E+00	N	1.37E-01	1.40E+01	N
<b>Styrene</b>	0.17%	1.46E-04	9.30E+00	N	3.20E-01	3.50E+04	N
<b>Toluene</b>	96.82%	8.40E-02	2.20E+00	N	1.84E+02	1.60E+04	N
<b>1,1,1 - Trichloroethane</b>	0.08%	7.17E-05	3.00E+01	N	1.57E-01	3.90E+04	N
<b>Trichloroethylene</b>	0.09%	8.02E-05	-	N	1.75E-01	4.10E+01	N
<b>Vinyl Chloride</b>	0.25%	2.21E-04	8.00E+01	N	4.82E-01	1.10E+00	N
<b>Vinylidene Chloride</b>	0.39%	3.40E-04	-	N	7.42E-01	2.70E+03	N

**Table 15. Toxic Air Contaminant Emissions for S170, Total (including A170)**

TAC	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
<b>Ammonia</b>	3.17E-01	1.40E+00	N	1.39E+03	7.70E+03	N
<b>Benzene</b>	8.81E-05	1.20E-02	N	1.92E-01	2.90E+00	N
<b>Carbon Tetrachloride</b>	7.55E-05	8.40E-01	N	1.65E-01	1.90E+00	N
<b>Chloroform</b>	3.43E-04	6.60E-02	N	7.49E-01	1.50E+01	N
<b>Dichloromethane</b>	3.26E-04	6.20E+00	N	7.12E-01	8.20E+01	N
<b>Formaldehyde</b>	5.38E-04	2.40E-02	N	1.18E+00	1.40E+01	N
<b>Hydrogen Sulfide</b>	5.00E-03	1.90E-02	N	4.38E+01	3.90E+02	N
<b>Xylenes</b>	6.26E-04	9.70E+00	N	1.37E+00	2.70E+04	N
<b>Perchloroethylene</b>	8.78E-05	8.80E+00	N	1.92E-01	1.40E+01	N
<b>Styrene</b>	1.46E-04	9.30E+00	N	3.20E-01	3.50E+04	N
<b>Toluene</b>	8.40E-02	2.20E+00	N	1.84E+02	1.60E+04	N
<b>1,1,1 - Trichloroethane</b>	8.63E-05	3.00E+01	N	1.88E-01	3.90E+04	N
<b>Trichloroethylene</b>	1.00E-04	-	N	2.19E-01	4.10E+01	N
<b>Vinyl Chloride</b>	2.21E-04	8.00E+01	N	4.82E-01	1.10E+00	N
<b>Vinylidene Chloride</b>	3.44E-04	-	N	7.52E-01	2.70E+03	N

The flow rate for carbon adsorption abating the sludge dryer was assumed to be 2,000 cfm.

**Table 16. Toxic Air Contaminant Emissions for A171, Carbon Adsorption abating S171, Sludge Drying (organic process)**

TAC	% of toxic VOCs	lb per MGD-yr	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Acetaldehyde	99.68%		1.72E-01	2.10E-01	N	3.76E+02	2.90E+01	YES
Ammonia		9.76E+01	6.35E-01	1.40E+00	N	2.78E+03	7.70E+03	N
Benzene	0.02%		3.65E-05	1.20E-02	N	7.98E-02	2.90E+00	N
Dichloromethane	0.04%		7.44E-05	6.20E+00	N	1.62E-01	8.20E+01	N
Formaldehyde	0.01%		1.57E-05	2.40E-02	N	3.42E-02	1.40E+01	N
Hydrogen Sulfide		3.07E+00	1.00E-02	1.90E-02	N	8.76E+01	3.90E+02	N
Xylenes	0.08%		1.44E-04	9.70E+00	N	3.14E-01	2.70E+04	N
Perchloroethylene	0.02%		3.52E-05	8.80E+00	N	7.70E-02	1.40E+01	N
Toluene	0.10%		1.70E-04	2.20E+00	N	3.71E-01	1.60E+04	N
1,1,1 - Trichloroethane	0.04%		7.44E-05	3.00E+01	N	1.62E-01	3.90E+04	N

The TAC emission factors for combustion emissions from S171 were taken from the BAAQMD TAC Emission Factor Guidelines, Appendix A, Table A-1.1 for natural gas boilers. Mercury emissions are assumed to be at the toxic trigger levels, as agreed to by the facility.

**Table 17. Toxic Air Contaminant Emissions for S171, Sludge Dryer (combustion)**

TAC	E.F. (lb/MMBtu)	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Acetaldehyde	4.22E-06	3.17E-05	2.10E-01	N	2.77E-01	2.90E+01	N
Acrolein	2.65E-06	1.99E-05	1.10E-03	N	1.74E-01	1.40E+01	N
Arsenic	1.96E-07	1.47E-06	8.80E-05	N	1.29E-02	1.60E-03	YES
Benzene	7.84E-06	5.88E-05	1.20E-02	N	5.15E-01	2.90E+00	N
Beryllium	5.88E-09	4.41E-08	-	N	3.86E-04	3.40E-02	N
Cadmium	1.08E-06	8.10E-06	-	N	7.10E-02	1.90E-02	YES
Copper	8.33E-07	6.25E-06	4.40E-02	N	5.47E-02	-	N
Ethyl Benzene	9.31E-06	6.98E-05	-	N	6.12E-01	3.30E+01	N
Formaldehyde	2.17E-04	1.63E-03	2.40E-02	N	1.43E+01	1.40E+01	YES
n-Hexane	6.18E-06	4.64E-05	-	N	4.06E-01	2.70E+05	N
Lead	4.90E-07	3.68E-06	-	N	3.22E-02	2.90E-01	N
Manganese	3.73E-07	2.80E-06	-	N	2.45E-02	3.50E+00	N
Mercury	N/A	2.70E-04	2.70E-04	N	2.10E-01	2.10E-01	N
Naphthalene	5.98E-07	4.49E-06	-	N	3.93E-02	2.40E+00	N
Nickel	2.06E-06	1.55E-05	8.80E-05	N	1.35E-01	3.10E-01	N

TAC	E.F. (lb/MMBtu)	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
PAH (as benzo(a)pyrene-equiv.)	6.60E-09	4.95E-08	-	N	4.34E-04	3.30E-03	N
Propylene	7.17E-04	5.38E-03	-	N	4.71E+01	1.20E+05	N
Selenium	1.18E-08	8.85E-08	-	N	7.75E-04	8.00E+00	N
Toluene	3.59E-05	2.69E-04	2.20E+00	N	2.36E+00	1.60E+04	N
Vanadium	2.25E-06	1.69E-05	1.30E-02	N	1.48E-01	-	N
Xylenes	2.67E-05	2.00E-04	9.70E+00	N	1.75E+00	2.70E+04	N

Emissions from A171 due to the desorption of digester gas pretreatment were calculated assuming emissions would be similar to those of an equivalent system at a comparable facility. Emissions from the comparable facility were provided by the applicant. There are no sulfur emissions due to desorption because H<sub>2</sub>S is removed from the digester gas by an iron rich media that is upstream of the siloxane removal unit. The H<sub>2</sub>S is turned into ferric sulfide and the media is replaced and shipped off-site.

**Table 18. Toxic Air Contaminant Emissions for A171, Digester Gas Pre-treatment Desorption**

TAC	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Xylenes	4.57E-04	9.70E+00	N	1.17E+00	2.70E+04	N
Ethylbenzene	2.05E-03	-	N	5.24E+00	3.30E+01	N
Toluene	1.11E-01	2.20E+00	N	2.83E+02	1.60E+04	N
n-Hexane	4.24E-04	-	N	1.08E+00	2.70E+05	N
Benzene	8.14E-04	1.20E-02	N	2.08E+00	2.90E+00	N

**Table 19. Toxic Air Contaminant Emissions for S171, Total (including A171)**

TAC	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Acetaldehyde	1.72E-01	2.10E-01	N	3.76E+02	2.90E+01	YES
Acrolein	1.99E-05	1.10E-03	N	1.74E-01	1.40E+01	N
Ammonia	6.35E-01	1.40E+00	N	2.78E+03	7.70E+03	N
Arsenic	1.47E-06	8.80E-05	N	1.29E-02	1.60E-03	YES
Benzene	9.09E-04	1.20E-02	N	2.67E+00	2.90E+00	N
Beryllium	4.41E-08	-	N	3.86E-04	3.40E-02	N
Cadmium	8.10E-06	-	N	7.10E-02	1.90E-02	YES
Copper	6.25E-06	4.40E-02	N	5.47E-02	-	N

TAC	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Dichloromethane	7.44E-05	6.20E+00	N	1.62E-01	8.20E+01	N
Ethyl Benzene	2.12E-03	-	N	5.85E+00	3.30E+01	N
Formaldehyde	1.64E-03	2.40E-02	N	1.43E+01	1.40E+01	YES
n-Hexane	4.70E-04	-	N	1.49E+00	2.70E+05	N
Hydrogen Sulfide	1.00E-02	1.90E-02	N	8.76E+01	3.90E+02	N
Lead	3.68E-06	-	N	3.22E-02	2.90E-01	N
Manganese	2.80E-06	-	N	2.45E-02	3.50E+00	N
Mercury	2.70E-04	2.70E-04	N	2.10E-01	2.10E-01	N
Naphthalene	4.49E-06	-	N	3.93E-02	2.40E+00	N
Nickel	1.55E-05	8.80E-05	N	1.35E-01	3.10E-01	N
PAH (as benzo(a)pyrene-equiv.)	4.95E-08	-	N	4.34E-04	3.30E-03	N
Perchloroethylene	3.52E-05	8.80E+00	N	7.70E-02	1.40E+01	N
Propylene	5.38E-03	-	N	4.71E+01	1.20E+05	N
Selenium	8.85E-08	-	N	7.75E-04	8.00E+00	N
Toluene	1.11E-01	2.20E+00	N	2.86E+02	1.60E+04	N
1,1,1 - Trichloroethane	7.44E-05	3.00E+01	N	1.62E-01	3.90E+04	N
Vanadium	1.69E-05	1.30E-02	N	1.48E-01	-	N
Xylenes	8.01E-04	9.70E+00	N	3.24E+00	2.70E+04	N

H<sub>2</sub>S emissions from the PRVs of the new digesters were calculated assuming 200 ppm H<sub>2</sub>S in the raw digester gas and a maximum flow rate of 340 cfm. The PRVs are only expected to vent in emergency circumstances. It is therefore assumed that a maximum of one PRV will be venting at a time. Twelve venting events are conservatively assumed to happen in a year.

**Table 20. Toxic Air Contaminant Emissions for S180, PRVs for the new Digesters**

TAC	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Hydrogen Sulfide	3.40E-01	1.90E-02	YES	4.08E+00	3.90E+02	YES

The TAC factors for the flare, A5, are taken from the SCAQMD supplementary instructions for AB2588, Table B-1, with the exception of H<sub>2</sub>S. H<sub>2</sub>S emissions from the flare were calculated assuming 200 ppm H<sub>2</sub>S in the digester gas going to the flare and a 98% sulfur destruction efficiency in the flare. While the applicant stated that digester gas going to the flare will typically

be after digester gas pre-treatment (100 ppm H<sub>2</sub>S), raw digester gas (200 ppm H<sub>2</sub>S) can be sent to the flare in an emergency.

**Table 21. Toxic Air Contaminant Emissions for A5**

TAC	E.F. (lb/MMBtu)	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Acetaldehyde	4.22E-05	3.09E-04	2.10E-01	N	2.70E+00	2.90E+01	N
Acrolein	9.80E-06	7.18E-05	1.10E-03	N	6.29E-01	1.40E+01	N
Benzene	1.56E-04	1.14E-03	1.20E-02	N	1.00E+01	2.90E+00	YES
Ethyl Benzene	1.42E-03	1.04E-02	-	N	9.08E+01	3.30E+01	YES
Formaldehyde	1.15E-03	8.39E-03	2.40E-02	N	7.35E+01	1.40E+01	YES
n-Hexane	2.84E-05	2.08E-04	-	N	1.82E+00	2.70E+05	N
Hydrogen Sulfide	5.80E-04	4.25E-03	1.90E-02	N	3.72E+01	3.90E+02	N
Napthalene	1.08E-05	7.89E-05	-	N	6.92E-01	2.40E+00	N
PAH (as benzo(a)pyrene- equiv.)	2.94E-06	2.15E-05	-	N	1.89E-01	3.30E-03	YES
Toluene	5.69E-05	4.16E-04	2.20E+00	N	3.65E+00	1.60E+04	N
Xylenes	2.84E-05	2.08E-04	9.70E+00	N	1.82E+00	2.70E+04	N

**Table 22. Cumulative Project Toxic Air Contaminant Emissions**

TAC	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Acetaldehyde	1.78E-01	2.10E-01	N	4.23E+02	2.90E+01	YES
Acrolein	9.16E-05	1.10E-03	N	8.03E-01	1.40E+01	N
Ammonia	1.01E+00	1.40E+00	N	4.70E+03	7.70E+03	N
Arsenic	1.47E-06	8.80E-05	N	1.29E-02	1.60E-03	YES
Benzene	2.40E-03	1.20E-02	N	1.52E+01	2.90E+00	YES
Beryllium	4.41E-08	-	N	3.86E-04	3.40E-02	N
1,3-Butadiene	1.61E-04	2.90E-01	N	1.41E+00	4.80E-01	YES
Cadmium	8.10E-06	-	N	7.10E-02	1.90E-02	YES
Carbon Tetrachloride	9.76E-05	8.40E-01	N	3.58E-01	1.90E+00	N
Chlorobenzene	1.83E-05	-	N	1.60E-01	3.90E+04	N
Chloroform	3.60E-04	6.60E-02	N	8.99E-01	1.50E+01	N
Copper	6.25E-06	4.40E-02	N	5.47E-02	-	N
1,1- Dichloroethane	1.42E-05	-	N	1.24E-01	5.00E+01	N
1,2- Dichloroethane	1.42E-05	-	N	1.24E-01	4.00E+00	N

TAC	Emissions (lb/hr)	Acute Trigger Level (lb/hr)	TAC Trigger (Y/N)	Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	TAC Trigger (Y/N)
Dichloromethane	4.13E-04	6.20E+00	N	9.80E-01	8.20E+01	N
Ethyl Benzene	1.25E-02	-	N	9.68E+01	3.30E+01	YES
Ethylene Dibromide	2.66E-05	-	N	2.33E-01	1.10E+00	N
Formaldehyde	1.16E-01	2.40E-02	YES	1.02E+03	1.40E+01	YES
n-Hexane	1.35E-03	-	N	9.16E+00	2.70E+05	N
Hydrogen Sulfide	3.60E-01	1.90E-02	YES	1.78E+02	3.90E+02	N
Lead	3.68E-06	-	N	3.22E-02	2.90E-01	N
Manganese	2.80E-06	-	N	2.45E-02	3.50E+00	N
Mercury	2.70E-04	2.70E-04	N	2.10E-01	2.10E-01	N
Methanol	1.50E-03	1.20E+01	N	1.32E+01	1.50E+05	N
Naphthalene	4.92E-05	-	N	4.31E-01	2.40E+00	N
Nickel	1.55E-05	8.80E-05	N	1.35E-01	3.10E-01	N
PAH (as benzo(a)pyrene-equiv.)	3.78E-05	-	N	3.31E-01	3.30E-03	YES
Perchloroethylene	1.23E-04	8.80E+00	N	2.69E-01	1.40E+01	N
Phenol	1.44E-05	2.60E+00	N	1.26E-01	7.70E+03	N
Propylene	5.38E-03	-	N	4.71E+01	1.20E+05	N
Selenium	8.85E-08	-	N	7.75E-04	8.00E+00	N
Styrene	1.61E-04	9.30E+00	N	4.44E-01	3.50E+04	N
Toluene	1.96E-01	2.20E+00	N	4.75E+02	1.60E+04	N
1,1,2,2-Tetrachloroethane	2.41E-05	-	N	2.11E-01	1.40E+00	N
1,1,1-Trichloroethane	1.61E-04	3.00E+01	N	3.51E-01	3.90E+04	N
1,1,2-Trichloroethane	1.91E-05	-	N	1.68E-01	5.00E+00	N
Trichloroethylene	1.00E-04	-	N	2.19E-01	4.10E+01	N
Vanadium	1.69E-05	1.30E-02	N	1.48E-01	-	N
Vinyl Chloride	2.30E-04	8.00E+01	N	5.61E-01	1.10E+00	N
Vinylidene Chloride	3.44E-04	-	N	7.52E-01	2.70E+03	N
Xylenes	1.75E-03	9.70E+00	N	7.39E+00	2.70E+04	N

The HRA estimates residential risk assuming exposure to annual average toxic air contaminant concentrations occurring 350 days per year, for 30 years. Risk estimate for offsite workers assumes an exposure that occurs 8 hours per day, 250 days per year, for 25 years. The stack heights and diameters used for this analysis are listed on the HRA forms in the application file.

Results from this HRA indicate that the maximum project cancer risk is estimated at 0.87 in a million, the project chronic hazard index (HI) is estimated at 0.070, and the project acute HI is estimated at 0.83. In accordance with District Regulation 2-5-301, the proposed new sources do not require TBACT because the estimated individual source risk is less than a cancer risk of 1.0 in a million and a chronic HI of 0.20. Since the estimated project cancer risk does not exceed 6.0 in a million and hazard indices do not exceed 1.0, this project complies with the District's Regulation 2-5-302 project risk requirements, for project located within an Overburdened Community as defined in Regulation 2-1-243.

#### **4. PLANT CUMULATIVE EMISSION**

The following tables summarize the cumulative increase in BACT pollutant emissions that will result from this application.

**Table 23. Cumulative increase in tons/yr for Plant 1271**

<b>Pollutant</b>	<b>Existing, tpy</b>	<b>New, tpy</b>	<b>Total, tpy</b>
NO <sub>x</sub>	0.607	4.030	4.637
POC	0.066	2.347	2.413
CO	0.070	17.165	17.235
PM <sub>10</sub>	0.012	1.204	1.216
PM <sub>2.5</sub>	0.010	1.204	1.214
SO <sub>2</sub>	0.001	2.240	2.241

#### **5. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)**

Pursuant to Regulation 2-2-301, BACT is required for a new source with emission increases that equal 10.0 lbs per day or greater of any BACT pollutant. Similarly, abatement devices with secondary emission increases that equal 10.0 lbs or greater of any BACT pollutant are subject to Reasonable Available Control Technology (RACT), which is defined in Regulation 2-2-225. The engines, S34 and S35, the sludge dryer, S171, and the enclosed digester flare, A5, are expected to exceed the BACT threshold (RACT for A5) for CO. A5 is expected to also exceed the RACT threshold for NO<sub>x</sub>.

BACT for the cogeneration engines was presented in the current Bay Area Air Quality Management District (BAAQMD) BACT/TBACT Workbook for IC Engine – Biogas Fired, Document #96.2.4, Revision 1, dated 5/30/2013. The BACT standards can be reached by implementing gas pretreatment and an oxidation catalyst. Application 31318 included a digester gas fired cogeneration engine with a CO emission factor of 0.11 g/bhp-hr, which is lower than what is present in BACT #96.2.4. However, the engine in application 31318 has not yet received its Permit to Operate, so this standard has only been demonstrated as technologically feasible and is subject to cost-effectiveness. The current cost effectiveness threshold being used for CO is \$400/ton of pollutant reduced, taken from SCAQMD. Per the manufacturer, the engines, S34 and S35, as currently configured, can meet a CO emission factor limit of 0.7 g/bhp-hr. To lower CO

emissions any more would require additional catalyst, which the manufacturer has demonstrated would not be cost effective (see application file). Therefore, the CO emission factor of 0.7 g/bhp-hr will meet the requirements of Regulation 2-2-301 for S34 and S35.

There is no current BACT determination in the BAAQMD BACT/TBACT Workbook for natural gas fired sludge dryers similar to S171. After searching the CARB BACT Clearinghouse and the District database, no sufficiently similar permitted source was found to exist for use as precedent for CO BACT for S171. The manufacturer originally proposed 500 ppm CO @ 3% O<sub>2</sub>, then reported that they would be able to meet 400 ppm CO @ 3% O<sub>2</sub> without a compromise to NO<sub>x</sub> emissions. Therefore, the CO emissions of 400 ppm @3% O<sub>2</sub> will meet the requirements of Regulation 2-2-301 for S171.

The current NO<sub>x</sub> and CO RACT standards for Publicly Owned Treatment Works (POTW) flares are 0.06 lb/MMBtu and 0.1 lb/MMBtu, respectively. The CO RACT standard was recently lowered to its current level when source tests of installed POTW and landfill flares were examined. The source tests showed that POTW and landfill flares were meeting the new RACT standard of 0.1 lb CO/MMBtu, independent of the age and size of the flare. The manufacturer has guaranteed that the flare will meet the RACT standard of 0.1 lb/MMBtu. Therefore, A5 will meet the requirements of Regulation 2-2-301 for NO<sub>x</sub> and CO.

None of the other sources in the project will meet or exceed 10 lb/day of any BACT pollutant. Therefore, they are not subject to Regulation 2-2-301.

## 6. OFFSETS

Emission offset requirements for POC and NO<sub>x</sub> are set out in Regulation 2, Rule 2, Section 302. POC and NO<sub>x</sub> offsets are required for new or modified sources at a facility that emits or will be permitted to emit 10 tons per year or more of that pollutant.

Following is a table of the potential to emit for NO<sub>x</sub> for Plant 1271. The calculations are in Appendix A.

Source No.	Name	PTE, NO <sub>x</sub> , tpy
S1	Natural gas prime engine	3.023
S2	Natural gas prime engine	3.023
S25	Portable diesel backup generator	0.054
S26	Portable diesel backup generator	0.054
S30	Natural gas backup generator	0.510
S31	Diesel backup generator	1.849
S32	Portable diesel backup generator	0.001
S34	Cogeneration engine	0.910
S35	Cogeneration engine	0.910
S36	Registered Boiler	0.421

Source No.	Name	PTE, NO <sub>x</sub> , tpy
S37	Registered Boiler	0.421
S171	Sludge dryer	1.196
A5	Flare	1.924
Total		14.296

Following is a table of the potential to emit for POC for Plant 1271. The calculations are in Appendix A.

Source No.	Name	PTE, POC, tpy
S1	Natural gas prime engine	2.375
S2	Natural gas prime engine	2.375
S25	Portable diesel backup generator	0.003
S26	Portable diesel backup generator	0.003
S30	Natural gas backup generator	0.029
S31	Diesel backup generator	0.097
S32	Portable diesel backup generator	0.000
S34	Cogeneration engine	0.728
S35	Cogeneration engine	0.728
S36	Registered Boiler	0.062
S37	Registered Boiler	0.062
S100	Sewage treatment plant	2.044
S171	Sludge dryer	0.916
A5	Flare	0.321
Total		9.744

The offsets requirements for PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>x</sub> are specified in Regulation 2, Rule 2, Section 303. Per Section 303, PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>x</sub> emission offsets are required for any new or modified source that is a major facility for PM<sub>10</sub>, PM<sub>2.5</sub>, or SO<sub>x</sub> emissions. WCWD is not a major facility for PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>x</sub> emissions. Therefore, offsets for PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>x</sub> are not required for this application.

Contemporaneous offsets have not been calculated for S3 through S7, which have recently ceased operation, because no usage has been reported in the last three years.

As noted in Section 1 of this evaluation, Plant 1271, WCWD, and Plant 2482, RWPCD, share some operations. The District inquired whether the two facilities were in a support facility relationship. In this case, the potential to emit of both facilities would be aggregated to determine the applicability of offsets.

WCWD submitted a demonstration dated November 6, 2024, showing that 75% of the water that they process, their principal project, is recycled. The water that is sent to RWPCD to its outfall in the SF Bay is chlorinated at WCWD. Only the dechlorination is done by RWPCD.

The District accepts WCWD’s demonstration that the two facilities are not in a support facility relationship at this time. The demonstration is in the application file.

The existing cumulative increase for NOx of 0.607 tons and the new cumulative increase of 4.030 tons, totaling 4.637 tons will be offset by the District’s Small Facilities Bank.

**7. STATEMENT OF COMPLIANCE**

The owner/operator is expected to comply with all applicable requirements. Key requirements are listed below:

**New Source Performance Standards (NSPS)  
40 CFR Part 60 Subpart JJJJ**

According to §60.4230(a)(4)(ii), as engines that commenced construction after June 12, 2006, where the engines are lean burn with a maximum engine power rating is greater than or equal to 500 hp and less than 1,350 hp and the engines are manufactured after January 1, 2008, the engines are subject to the requirements of 40 CFR Part 60 Subpart JJJJ, *“Standards of Performance of Stationary Spark Ignition Internal Combustion Engines.”* The proposed engines meet these criteria. In accordance with 40 CFR Part 60.4233(e), SI ICE meeting the above criteria must comply with the emission limits in Table 1 of Subpart JJJJ. Table 1 of Subpart JJJJ includes standards for landfill/digester gas fired engines between 500 and 1,350 bhp and non-emergency spark ignition natural gas engines between 500 and 1,350 bhp. Because the proposed engines will fire both natural gas and digester gas, the more stringent natural gas standards will be used. Note that natural gas will only be burned during initial commissioning. The proposed engines are expected to meet these standards:

**Table 24. Proposed Engine Limits Compared to Applicable NSPS Limits**

Pollutant	Proposed Engine Limits	NSPS Limits:	
		40 CFR Part 60, Subpart JJJJ, Table 1	
	g/bhp-hr	g/bhp-hr	ppmv at 15% O2
NOx	0.15	1.0	82
CO	0.70	2.0	270
VOC	0.12	0.7	60

Pursuant to 60.4243(b)(2)(i), the operator must keep a maintenance plan and records of maintenance conducted. These requirements were added as Condition #100512, Part 18.

The engines have an EPA certification to run on natural gas, but do not have one to run on digester gas. Therefore, the operator must also conduct an initial performance test for Subpart JJJJ. The testing requirements in Condition #100512, Part 14 will satisfy this requirement.

In accordance with 40 CFR 60.4245(a), the operator must maintain records of: all notifications, all maintenance conducted on the engines, and all performances tests. The record keeping and notification requirements in Condition #100512, Part 18 will satisfy these provisions.

### **National Emissions Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 63 Subpart ZZZZ**

The cogeneration engine is not subject to the emission or operating limitations in 40 CFR 63, Subpart ZZZZ, NESHAPs for Stationary Reciprocating Internal Combustion Engines, because they are subject to Subpart JJJJ (See 40 CFR 63.6590(c)(1)). The engine complies with Subpart ZZZZ by meeting Subpart JJJJ requirements.

### **District Rules**

#### Regulation 1

The sources in this project are subject to and expected to be in compliance with the requirements of Regulation 1-301 (Public Nuisance), which states that no person shall emit such quantities of air contaminants or other material which cause significant nuisance to the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause injury or damage to business or property.

#### Regulation 6, Rule 1

Pursuant to Regulation 6-1-301 a person shall not emit, from any source, for a period or periods aggregating more than three minutes in any hour, a visible emission that is as dark or darker than No. 1 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree, nor shall said emission, as perceived by an opacity sensing device in good working order, where such device is required by District Regulations, be equal to or greater than 20% opacity. The sources are expected to meet the requirements of Regulation 6-1-303.

#### Regulation 9, Rule 1

In accordance to Regulation 9-1-301, a person shall not emit from sources, other than ships, SO<sub>2</sub> in quantities which result in ground level concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. In accordance with Regulation 9-1-302, a person shall not emit from any source, a gas stream containing SO<sub>2</sub> in excess of 300 ppm (dry). The treated digester gas will have a reduced sulfur content of 100 ppm due to the proposed gas pretreatment system and the untreated gas will have a reduced sulfur content of 200 ppm due to ferric addition. Natural gas has an average sulfur content of 3 ppm. Therefore, the gas stream cannot exceed 300 ppm SO<sub>2</sub> at any of the sources. Permit conditions will require annual source testing and quarterly analyses of the fuel sulfur content to ensure compliance with these limits.

#### Regulation 9, Rule 2

S34/S35:

This rule limits ground level concentrations of hydrogen sulfide to 0.06 ppm averaged over three consecutive minutes or 0.03 ppm averaged over any 60 consecutive minutes. The engines will be fired on digester gas from S180. Natural gas will only be used during the commissioning period. The digester gas will have a reduced sulfur content of 100 ppm due to the proposed gas pretreatment system. The H<sub>2</sub>S emission rate is estimated to be 0.00058 lb/hr. Dispersion modeling conducted by the BAAQMD on January 17, 2024 resulted in a maximum project acute health index of 1.0, which is generally considered to be equivalent to a 0.03 ppm 1-hour average concentration. A subsequent analysis, conducted on October 24, 2024 resulted in a maximum project acute health index of 0.83. Therefore, the engines will be in compliance.

*S180, PRVs:*

The digesters each have two PV valves, but will only operate one of them at a time. They are 4" in diameter. The maximum flow rate for the PRVs is based on the set point of 42 in H<sub>2</sub>O. At this pressure, the flow rate out of the PRVs will be 340 cfm. While the PRVs do not have a specified maximum flow rate due to their design, the manufacturer has provided a pressure-flow rate curve that will identify the PRV flow rate at a given pressure. The digesters will be equipped with pressure monitors, so in the event of an emergency release, the PRV flow rate will be known and the emitted pollutant mass will be able to be calculated.

The mass emissions for one digester will be limited by permit condition to 0.34 lb/hr. According to the modeled H<sub>2</sub>S emissions, the Air District determined that the facility would comply with Regulation 9, Rule 2 and Regulation 2, Rule 5 with a stack outlet of 35 feet above ground level at the maximum H<sub>2</sub>S emission rate of 0.34 lb/hr. These requirements will be imposed in the permit conditions. The P/V valve is not expected to vent as a regular occurrence. P/V valve venting will be recorded and monitored. Dispersion modeling conducted by the BAAQMD on January 17, 2024 resulted in a maximum project acute health index of 1.0, which is generally considered to be equivalent to a 0.03 ppm 1-hour average concentration. A subsequent analysis, conducted on October 24, 2024 resulted in a maximum project acute health index of 0.83. The model assumed that the H<sub>2</sub>S concentration will not exceed 200 ppm. Therefore, S180 will be in compliance.

*A5:*

On January 17, 2024, the Air District modeled H<sub>2</sub>S emissions to determine whether S180 will comply with the Rule due to emissions from A5. The flare has one stack. The stack outlet is 4.5 feet in diameter and has an exhaust flowrate of 29,088.0 cfm at 4% moisture and 20.5% oxygen. The H<sub>2</sub>S concentration in the digester gas to be combusted at A5 will be limited by permit condition to 200 ppm. According to the modeled H<sub>2</sub>S emissions, the Air District determined that the facility would comply with regulation 9, Rule 2 with a stack outlet of 23 feet above ground level and an H<sub>2</sub>S concentration of 200 ppm in the digester gas to be combusted. Dispersion modeling conducted by the BAAQMD on January 17, 2024 resulted in a maximum project acute health index of 1.0, which is generally considered to be equivalent to a 0.03 ppm 1-hour average concentration. A subsequent analysis, conducted on October 24, 2024 resulted in a maximum project acute health index of 0.83. The model assumed that the H<sub>2</sub>S concentration in the digester gas to be combusted did not exceed 200 ppm. Therefore, S180 will be in compliance.

Note that the oxygen content is high because the flare uses dilution air after combustion. The permit conditions will require that the source tests measure flow rather than using EPA Method 19 to calculate flow.

#### Regulation 9, Rule 8

This rule limits the emissions of NO<sub>x</sub> and CO from stationary internal combustion engines with an output rated by the manufacturer at more than 50 brake horsepower.

Digester gas qualifies as a waste-derived fuel per Regulation 9-8-302. In accordance with Regulation 9-8-302, a person shall not operate a spark-ignited stationary internal combustion engine fired on waste derived fuels or any combination of waste and fossil-derived gaseous fuels and liquid fuels unless the following emission limits are met:

- For lean-burn engines, NO<sub>x</sub> emissions shall not exceed 70 ppmv as corrected to 15% O<sub>2</sub>, dry basis, per Section 9-8-302.1.
- CO emissions shall not exceed 2,000 ppmv as corrected to 15% O<sub>2</sub>, dry basis, per Section 9-8-302.3.

Natural gas will only be used at the engines during the initial commissioning.

Anticipated emissions of NO<sub>x</sub> and CO from the stationary spark ignited internal combustion engines would be 10.9 ppmv and 101 ppmv @ 15% O<sub>2</sub>, dry basis, respectively. Therefore, the proposed engines will comply with the requirements of Regulation 9, Rule 8. The initial source test and quarterly monitoring required by the permit conditions will satisfy the requirements of Regulation 9-8-501 and 9-8-503, respectively.

#### **California Environmental Quality Act (CEQA)**

This project, consisting of the proposed upgrades to WCWD, plant 1271, was the subject of an Initial Study/Mitigated Negative Declaration was conducted. The Initial Study/Mitigated Negative Declaration (IS/MND) was approved by the lead agency (West County Wastewater) on August 4, 2021 in Resolution of the Board of Directors of West County Wastewater, County of Contra Costa California, Resolution No. 2021-8.

This permit application was subject to a Mitigated Negative Declaration prepared by an agency other than the Air District. Prior to approving the permit application, the Air District reviewed and considered the Negative Declaration adopted by the lead agency, including public comments.

#### **Prevention of Significant Deterioration (PSD)**

This application is not part of a PSD project as defined in Regulation 2-2.

#### **California Health & Safety Code §42301.6 and Regulation 2-1-412**

Pursuant to California Health & Safety Code §42301.6(a), prior to approving an application for a permit to construct or modification of a source, which is located within 1,000 feet from the outer boundary of a school site, the District shall prepare a public notice as detailed in §42301.6.

§42301.9(a) defines a “school” as any public or private school used for the purposes of the education of more than 12 children in kindergarten or any grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.

Using the GreatSchools.org website and searching with Google Maps, it has been determined that the source will not be located within 1,000 feet of the outer boundary of any K-12 school site. Therefore, the project is not subject to the public notice requirements due to proximity to a school.

This project is in an overburdened community as defined by Regulation 2-1-243 and a Health Risk Assessment is required pursuant to Regulation 2-5-401, so it is subject to the public notification requirements in Regulation 2-1-412. The details of the public notice are in the Recommendation Section at the end of this evaluation.

## **8. CONDITIONS**

### **Permit Condition 100512 for S34/S35**

Equipment included in this permit condition:

S34 Cogeneration Engine, 4.01 MMbtu/hr (HHV)  
 A34 SCR  
 A134 Oxidation Catalyst  
 S35 Cogeneration Engine, 4.01 MMbtu/hr (HHV)  
 A35 SCR  
 A135 Oxidation Catalyst  
 A180 Digester Gas Pretreatment  
 S180 Anaerobic Digesters  
 A171 Carbon Adsorption

1. The owner/operator shall fire S34 and S35, Cogeneration Engines, exclusively on digester gas from S180, Anaerobic Digesters, except that natural gas can be used for commissioning and testing purposes.  
 [Basis: Cumulative Increase]
2. The owner/operator of S34 and S35, Cogeneration Engines, shall not allow the hourly heat input for each engine to exceed 4.01 million BTU during any consecutive 60-minute period. S34 and S35 shall not be fired concurrently.
3. The owner/operator of S34 and S35, Cogeneration Engines, shall not allow the combined heat input to exceed 35,200 million BTU (HHV) during any consecutive 12-month period. S34 and S35 shall not be fired concurrently.  
 [Basis: Cumulative Increase]

4. The owner/operator shall ensure that all digester gas combusted in S34 and S35, Cogeneration Engines, is treated by A180, Digester Gas Pretreatment, prior to combustion. The owner/operator shall not allow the concentration of total sulfur in the gas exiting A180 to exceed 100 ppm.  
[Basis: Cumulative Increase, Regulations 9-1, 9-2]
5. The owner/operator shall properly maintain and operate A180, Digester Gas Pretreatment, in accordance with the manufacturer's specifications during all periods of operation of S34 or S35, Cogeneration Engines. The owner/operator shall not regenerate the iron rich compound media of A180 on-site. The siloxane removal media of A180 can be regenerated on site at A171, Carbon Adsorption.  
[Basis: Cumulative Increase]
6. The owner/operator shall abate NO<sub>x</sub> from S34, Cogeneration Engine, by A34, SCR, at all times of operation except during startup and shutdown of S34. The owner/operator shall abate NO<sub>x</sub> from S35, Cogeneration Engine, by A35, SCR, at all times of operation except during startup and shutdown of S35.  
[Basis: Cumulative Increase, 2-1-320]
7. The owner/operator shall properly maintain and operate:
  - a. A34 and A35, SCRs, in accordance with manufacturer's specifications during all periods of operation of S34 or S35.
  - b. A134 and A135, Oxidation Catalysts, in accordance with manufacturer's specifications during all periods of operation of S34 or S35.[Basis: Cumulative Increase, 2-1-320]
8. The owner/operator shall abate CO and organic compound emissions from S34, Cogeneration Engine, by A134, Oxidation Catalyst, at all times of operation except startup and shutdown of S34. The owner/operator shall abate CO and organic compound emissions from S35, Cogeneration Engine, by A135, Oxidation Catalyst, at all times of operation except startup and shutdown of S35.  
[Basis: Cumulative Increase, Regulations 2-1-320, 2-5]
9. The owner/operator shall not allow NO<sub>x</sub> emissions from S34 or S35, Cogeneration Engines, to exceed an emission rate of 0.15 grams of NO<sub>x</sub> (calculated as NO<sub>2</sub>) per brake-horsepower-hour, or the equivalent of outlet concentration of 13.2 ppmv of NO<sub>x</sub>, corrected to 15% oxygen, dry basis, averaged over the test period. The owner/operator shall not allow total NO<sub>x</sub> emissions from S34 and S35 to exceed 0.910 tons per year, combined, or 0.208 lb/hr. The concentration and grams per brake-horsepower-hour limits

do not apply during periods of startup or shutdown. The startup period shall not exceed 2 hours and the shutdown period shall not exceed 1 hour.

[Basis: Cumulative Increase, Regulation 2-1-320]

10. The owner/operator shall not allow CO emissions from S34 or S35, Cogeneration Engines, to exceed an emission rate of 0.70 grams of CO per brake-horsepower-hour, or the equivalent of outlet concentration of 100.6 ppmv of CO, corrected to 15% oxygen, dry basis, averaged over the test period. The owner/operator shall not allow total CO emissions from S34 and S35 to exceed 4.248 tons per year, combined, or 0.970 lb/hr. The concentration and grams per brake-horsepower-hour limits do not apply during periods of startup or shutdown. The startup period shall not exceed 2 hours and the shutdown period shall not exceed 1 hour.

[Basis: Cumulative Increase, Regulation 2-1-320, BACT]

11. The owner/operator shall use a portable analyzer to take NO<sub>x</sub> and CO emission readings to verify compliance with Parts 8 and 9 and Regulation 9, Rule 8, for each engine at least once every calendar quarter in which a source test is not performed for that engine unless the owner/operator has not operated that engine in the entire quarter. All emissions readings shall be taken with the engine to be analyzed operating at conditions representative of normal operations. The owner/operator shall ensure that the monitoring complies with Regulation 9-8-503.

[Basis: Cumulative Increase, Regulation 2-1-403, Regulation 9-8-503]

12. The owner/operator shall not allow POC emissions from S34 or S35, Cogeneration Engines, to exceed 0.12 grams of POC per brake-horsepower-hour, or the equivalent outlet concentration of 30.2 ppmv of POC (as methane), corrected to 15% oxygen, dry basis, averaged over the source test period. The owner/operator shall not allow formaldehyde emissions from S34 or S35 to exceed 0.11 pounds per hour.

[Basis: Cumulative Increase, Regulation 2-1-403, Regulation 2-5]

13. The owner/operator shall not allow the ammonia (NH<sub>3</sub>) concentration in the exhaust from S34 or S35, Cogeneration Engines, to exceed 10 ppmv, corrected to 15% oxygen, dry basis.

[Basis: Regulation 2-5]

14. In order to demonstrate compliance with Parts 8, 9, 11, and 12 above and Regulations 9-1-302, 9-8-302.1, 9-8-302.3, the owner/operator shall ensure that a District approved source test is conducted on S34 and S35, Cogeneration Engines, after startup and once every 8,760 hours of operation or three years, whichever comes first. Each source test shall be conducted at the exhaust stack after control while the engine being tested is operating under normal operating conditions while fired on digester gas and shall not include startup

or shutdown periods. Each source test shall determine all items identified below for each engine. The Source Test Section of the District shall be contacted to obtain approval of source test procedures at least 14 days in advance of each source test. The Source Test Section shall be notified of the scheduled test date at least 7 days in advance of each source test. Source test reports for compliance testing shall be submitted to the Source Test Section within 60 days of the test date.

- a. Actual gross electrical output (kW-hrs) from the engine during the test period and the calculated power output (bhp) from the engine determined using the following equation:  $\text{bhp} = 1.34 * \text{kW}$ ;
- b. Total flow rate (standard cubic feet per minute, dry basis, or scfm) of all gaseous fuel to the engine;
- c. Concentrations (percent by volume or ppmv, dry basis) of carbon dioxide (CO<sub>2</sub>), nitrogen (N<sub>2</sub>), oxygen (O<sub>2</sub>), methane (CH<sub>4</sub>), total non-methane organic compounds (NMOC), and total sulfur compounds (TS) in the gaseous fuel burned in the engine;
- d. Higher heating value (Btu/scf) for the digester gas;
- e. Heat input rate (Btu/hour) to the engine averaged over the test period;
- f. Exhaust gas flow rate (scfm) from the engine based on EPA Method 2 or Method 19;
- g. Concentrations (ppmv or percent by volume, dry basis) of NO<sub>x</sub>, CO, CH<sub>4</sub>, NMOC, SO<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, formaldehyde, and O<sub>2</sub> in the exhaust gas from the engine;
- h. Corrected concentrations (ppmv, corrected to 15% O<sub>2</sub>, dry basis) of CO, NO<sub>x</sub>, and NH<sub>3</sub> in the exhaust gas from the engine;
- i. Corrected concentration (ppmv, dry basis) of NMOC in the fuel to the engine;
- j. NMOC destruction efficiency (weight percent) achieved by the engine;
- k. Emission rates (grams/bhp-hour) of NO<sub>x</sub>, CO, and POC from the engine;
- l. Emission rate (pounds/hour) of formaldehyde from the engine;
- m. Average temperature of the SCR catalyst exhaust gas temperature for the engine during the test period;
- n. During the source test, the owner/operator shall also measure concentrations of NO<sub>x</sub>, CO, and O<sub>2</sub> (ppmv) in the exhaust from the engine using the portable analyzer procedures described in Part 11. The portable analyzer measurements of corrected NO<sub>x</sub> and CO concentrations shall be compared to the values measured pursuant to Part 14.h.



the heat input calculations. The calculated heat input rates shall be recorded in a data acquisition system or electronic spreadsheet.

- b. Records of all monitoring or source testing conducted to demonstrate compliance with this permit condition and District rules.
- c. Records of startups, shutdowns, and malfunctions for the engines. For any malfunction, the records shall include the cause of the malfunction, the actions taken to correct the malfunction, the date and time that the malfunction was corrected, and the actions taken to prevent such malfunctions in the future.

[Basis: Regulation 9-8-500, Regulation 9-1-501]

### **Permit Condition 100513 for S180, Digesters, A5, Flare**

1. The owner/operator shall ensure that emissions from S180, Anaerobic Digesters, are abated at all times by combustion at any of the following sources except as specified in part 2: S34, S35, Cogeneration Engines. (Basis: Regulation 1-301)
2. The owner/operator may only combust digester gas from S180 in the flare, A5, under the following circumstances:
  - a. During equipment failure or other emergencies which require the flaring of digester gas.
  - b. During maintenance, testing, and/or emergencies which require the flaring of digester gas.(Basis: Regulation 1-301)
3. The owner/operator shall ensure that the digester gas total sulfur content does not exceed 200 ppm. (Basis: Cumulative Increase)
4. The owner/operator shall ensure that total digester gas production from S180 does not exceed 82 million scf in any consecutive 12-month period. (Basis: Cumulative Increase)
5. To demonstrate compliance with the standard noted in part 3, the owner/operator shall monitor and record the H<sub>2</sub>S content of the digester gas at a frequency of at least once every calendar month. If the observed H<sub>2</sub>S content of the digester gas meets or exceeds 100 ppm, the permit holder shall automatically increase the monitoring frequency to at least once every calendar week. The monitoring frequency may return to a calendar month basis with four consecutive digester gas H<sub>2</sub>S content measurements less than 100 ppm. In addition, the owner/operator shall measure the H<sub>2</sub>S concentration in the digester gas on the day of any release from the digester PV valves. (Basis: Regulation 1-441)
6. The owner/operator shall record the dates, hours of use, and purpose of flaring in a District approved logbook, whenever the flare is used. (Basis: Regulation 2-6-409.2)

7. The owner/operator shall install pressure sensors at each of the two digesters, S180. Over-pressurization is assumed to cause opening of the pressure/vacuum valve and thus digester gas release. The owner/operator shall perform an inspection of the pressure/vacuum valve in all instances of over-pressurization to confirm proper functioning of the valve following the event. The owner/operator shall record the dates, the times, the H<sub>2</sub>S concentration, pressures, and whatever information is needed to determine the volume of the digester gas release in a District approved logbook whenever digester gas is vented from any pressure relief valve at S180, Anaerobic Digesters. (Basis: 2-1-403)
8. A release of digester gas at a pressure relief valve on a digester shall not be considered a violation of Regulation 2, Rule 5, or Regulation 9, Rule 2, under the following conditions:
  - a. H<sub>2</sub>S emissions from the digester gas release are less than 0.34 lb per hour, or
  - b. The owner/operator prepares an air dispersion modeling analysis within 30 days of the incident that shows that the limits in BAAQMD Regulation 9, Rule 2, were not exceeded.The owner/operator shall ensure that, if detected and known, the occurrence, duration, and cause of emissions of digester gas from any cause or activity are recorded. Notwithstanding this part 8, the owner/operator shall not cause or allow any digester gas emissions otherwise allowed by this Part to create a violation of District regulations. (Basis: 2-1-403, Regulation 2-5, Regulation 9-2)
9. The owner/operator shall ensure that the fuel input to A5, Enclosed Digester Flare, does not exceed 288 thousand cubic feet/day. (Basis: Cumulative Increase)
10. The owner/operator shall ensure that the minimum destruction efficiency for H<sub>2</sub>S at A5, Enclosed Digester Flare, is 98%. The owner/operator shall ensure that the minimum destruction efficiency for NMOC at A5 is 99%. (Basis: Cumulative Increase; Regulation 9, Rule 2)
11. The owner/operator shall install flow meters and recorders to monitor the digester gas flow to A5, Enclosed Digester Flare. (Basis: Cumulative Increase)
12. The owner/operator shall equip A5, Enclosed Digester Flare, with a combustion temperature readout monitor and continuous recorder to measure and record the temperature in the combustion zone. (Basis: 2-1-403)
13. The owner/operator shall ensure that the emissions of Nitrogen Oxides (NO<sub>x</sub>) from A5, Enclosed Digester Flare, do not exceed 0.06 pounds per million BTU (calculated as NO<sub>2</sub>). (Basis: Cumulative Increase, RACT)
14. The owner/operator shall ensure that the emissions of Carbon Monoxide (CO) from A5, Enclosed Digester Flare, do not exceed 0.1 pounds per million BTU. (Basis: Cumulative Increase, RACT)

15. The combustion zone temperature of A5 shall be maintained at a minimum of 1400 degrees F while digester gas is being fed to the flare. The owner/operator may perform a source test to determine if the flare can operate at a lower temperature while complying with parts 10, 13, and 14. The flare shall be at the minimum temperature within 15 minutes of digester gas introduction to the flare and for one minute after flow of digester gas is discontinued. (Basis: Regulation 2-1-403)
16. The temperature limit in Part 15 shall not apply during a 16-hour period of optional source testing conducted by the owner/operator. The owner/operator shall notify the District's Engineering Division, in writing, of the projected test date at least 7 days in advance. The owner/operator shall submit the source test results to the District's Engineering Division no later than 30 days after the source test. (Basis: 2-1-403, Cumulative Increase)
17. In order to demonstrate compliance with parts 10, 13 and 14, the owner/operator shall conduct an initial District approved source test on A5, Enclosed Waste Gas Flare within 60 days of startup. The source test shall determine the following:
  - a. Digester gas flow rate (dry basis)
  - b. Concentration (dry basis) of hydrogen sulfide (H<sub>2</sub>S) and total sulfur in the digester gas to be combusted at A5
  - c. Concentration (dry basis) of non-methane organic compounds (NMOC) in the digester gas to be combusted at A5
  - d. Stack gas flow rate (dry basis). The stack gas flow rate shall be measured, not calculated.
  - e. Concentration (dry basis) of nitrogen (NO<sub>x</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), hydrogen sulfide (H<sub>2</sub>S), methane (CH<sub>4</sub>) and total non-methane organic compounds (NMOC) in the stack gas
  - f. The H<sub>2</sub>S, CH<sub>4</sub>, and NMOC destruction efficiencies achieved by A5
  - g. The average combustion temperature during the test period.In addition, source tests shall be repeated every 8,760 of operation or every five years, whichever comes first. The periodic source test is not required if the flare has not been operated since the last District-approved source test. (Basis: BACT, Cumulative Increase, Regulation 2-5)
18. The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements as specified in Volume IV of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section, in writing, of the source test protocols and procedures at least 14 days in advance of each source test. The Source Test Section shall be notified of the scheduled test dates at least 7 days prior to testing. The source test report shall be submitted to the Compliance and Enforcement Division and to the Source Test Section within 60 days of the test date. (Basis: BACT, Cumulative Increase)

19. The owner/operator shall record and maintain the following in a District approved log for a period of 24 months from the date of entry and shall make them readily available to District staff upon request:
- Digester gas production
  - H<sub>2</sub>S monitoring
  - Overpressure events at the digester and related monitoring
  - Daily digester gas flow to the flare, A5.
  - A5 combustion zone temperature.
- (Basis: Recordkeeping)
20. The owner/operator shall maintain records of all source tests for the flare for a period of five years after District approval.  
(Recordkeeping)

**Permit Condition 100514 for S170, Sludge Handling Processes, A170, Carbon Absorption**

- The owner/operator shall ensure that the sewage sludge throughput to S170, Sludge Handling Processes, at the centrifuges does not exceed 100.8 thousand gallons per day. The owner/operator may process digested sludge from Plant 2482 in addition to sludge from Plant 1271.  
[Basis: Cumulative Increase]
- The owner/operator shall ensure that the abated hydrogen sulfide (H<sub>2</sub>S) concentration at S170, Sludge Handling Processes, does not exceed 1 ppmv, measured at the exhaust of A170, Carbon Adsorption.  
[Basis: Regulation 2-5, Regulation 9-2]
- To demonstrate compliance with Part 2 of this condition, the owner/operator shall measure the concentration of H<sub>2</sub>S at the outlet stack of A170 using Draeger tubes, a Jerome meter (provided the instrument is maintained and calibrated per manufacturer's specs and a bump test is performed and recorded prior to data collection), or other District approved method on a daily basis at least 5 days per week for the first two months of operation and on a weekly basis thereafter, if all daily concentrations show compliance with the full emission limit. The results from the first two months of testing shall be submitted to the Engineering Division to initially reduce the testing frequency from daily to weekly. The owner/operator can reduce the monitoring frequency from weekly to monthly if all readings are below one half of the emission limit for two months and the results of this testing are submitted to the Engineering Division. If readings rise above the emission limits, monitoring frequency will return to daily until two months of consecutive compliance can be demonstrated, at which point testing shall again be submitted to the Engineering Division to reduce testing frequency from daily to weekly. The reduction in monitoring frequency will be handled administratively.  
[Basis: Regulation 2-1-403, Regulation 2-5, Regulation 9-2]
- The owner/operator shall maintain the following records:

- a. H<sub>2</sub>S volumetric concentration records from Part 3;
- b. POC volumetric concentration records from Part 6; and,
- c. NH<sub>3</sub> volumetric concentration records from Part 8.

All records shall be retained onsite for two years from the date of entry and made available for inspection by District staff upon request. These recordkeeping requirements do not replace the recordkeeping requirements contained in any applicable District regulation. [Basis: Cumulative Increase, Regulation 9-2]

5. The owner/operator shall ensure that the abated precursor organic compounds (POC) concentration at S170 does not exceed 10 ppmv, measured as methane, at the exhaust of A170 on an annual average basis. [Basis: Cumulative Increase]
6. To demonstrate compliance with the limits in Part 5 of this condition, the owner/operator shall measure POC, as methane, with an FID or PID at the outlet of A170 on a daily basis at least 5 days per week for the first two months of operation of A170 and on a weekly basis thereafter, if all daily concentrations show compliance with the full emission limit. The results from the first week of testing shall be submitted to the Engineering Division within 30 days of startup of A170. The results from the first two months of testing shall be submitted to the Engineering Division to initially reduce the testing frequency from daily to weekly. The owner/operator can reduce the monitoring frequency from weekly to monthly if all readings are below one half of the emission limit for two months and the results of this testing are submitted to the Engineering Division. If readings rise above the emission limits, monitoring frequency will return to daily until two months of consecutive compliance can be demonstrated, at which point testing shall again be submitted to the Engineering Division to reduce testing frequency from daily to weekly. The reduction in monitoring frequency will be handled administratively.
  - a. If the measured concentration is over 10 ppm, the owner/operator may subtract the methane from the concentration with a portable flame ionization detector (FID) equipped with an activated carbon filter tip, or District approved instrument.
  - b. A POC measurement by the FID exceeding 10 ppm shall not be deemed a violation but shall trigger a requirement to test a sample from the outlet using EPA Method 18 or District approved equivalent method to demonstrate compliance. The owner/operator shall ensure that the detection limit of the testing method chosen is comparable to the results of the FID and the limit as per Part 5 of this condition. The sample for the confirmation test shall be collected on the same day an exceedance is measured. The owner/operator shall follow proper sample collection methodology for the laboratory method chosen, including but not limited to; proper sample media, and hold times. The owner/operator shall obtain the results of the test within two weeks of gathering the sample. If the results of the test show non-compliance, the owner/operator shall report the results to the Compliance and Enforcement Division of the Air District.[Basis: Cumulative Increase, BACT, Regulation 2-1-403]
7. The owner/operator shall ensure that the abated ammonia (NH<sub>3</sub>) concentration at S170 does not exceed 120 ppmv, measured at the exhaust of A170. The owner/operator shall ensure that

the abated ammonia (NH<sub>3</sub>) concentration at S170 does not exceed 60 ppmv on an annual average basis, measured at the exhaust of A170.

[Basis: Regulation 2, Rule 5]

8. To demonstrate compliance with the limits in Part 7 of this condition, the owner/operator shall measure ammonia (NH<sub>3</sub>) with a portable monitor or other suitable District approved method at the outlet of A170 on a daily basis at least 5 days per week for the first two months of operation of A170 and on a weekly basis thereafter, if all daily concentrations show compliance with the full emission limit. The results from the first week of testing shall be submitted to the Engineering Division within 30 days of startup of A170. The results from the first two months of testing shall be submitted to the Engineering Division to initially reduce the testing frequency from daily to weekly. The owner/operator can reduce the monitoring frequency from weekly to monthly if all readings are below one half of the emission limit for two months and the results of this testing are submitted to the Engineering Division. If readings rise above the emission limits, monitoring frequency will return to daily until two months of consecutive compliance can be demonstrated, at which point testing shall again be submitted to the Engineering Division to reduce testing frequency from daily to weekly. The reduction in monitoring frequency will be handled administratively.  
[Basis: Regulation 2, Rule 5, Regulation 2-1-403]
9. The owner/operator shall abate the emissions from the RDTs at S170 with A170 at all times, except that A170 can be out of service for up to 24 hours per calendar year for the changing out of media or other maintenance.  
[Basis: Cumulative Increase, BACT, Regulation 2-1-320]
10. The owner/operator shall ensure that the gas flow to A170 is at least 1,000 cfm at all times while A170 is in operation, except during carbon changeout or required maintenance.  
[Basis: Cumulative Increase, BACT, Regulation 2-1-320]
11. The owner/operator shall ensure that the stack of A170 is at least 9 feet above grade and emits vertically with no rain cap.  
[Basis: Regulation 9-2, Regulation 2-5, Regulation 2-1-320]
12. The owner/operator of A170 shall use the monitoring results obtained from part 3 and/or part 6 to estimate the frequency of A170 carbon changeout necessary to maintain compliance with the H<sub>2</sub>S limit and POC limit in parts 2 and 5 and part 13.  
[Basis: Cumulative Increase, Regulation 9-2]
13. The owner/operator of A170 shall immediately schedule change out with unspent carbon for each carbon vessel exhibiting breakthrough, defined as detection at its outlet of whichever occurs first of the following:
  - a. 10 ppmv POC (measured as methane, using the measurements from part 6) averaged over 1 week, or
  - b. 1 ppmv H<sub>2</sub>S (using the measurements from part 3) averaged over 1 week.[Basis: Cumulative Increase, Regulation 9-2]

14. The owner/operator shall not desorb A180, Digester gas Pretreatment, to A170, Carbon Adsorption.  
[Basis: Cumulative Increase]

**Permit Condition 100515 for S-171, Sludge Dryer, A171 Carbon Adsorption, A180 Digester Gas Pretreatment**

1. The owner/operator shall not allow the temperature of the air exiting S171, Sludge Dryer, and entering A171, Carbon Adsorption, to exceed 160 degrees F. [Basis: 2-1-403]
2. The owner/operator shall ensure that the sewage sludge throughput to S171, Sludge Dryer, does not exceed 55.2 tons per day. The owner/operator may process sludge from Plant 2482 in addition to sludge from Plant 1271. The dryer may only process digested sludge. [Basis: Cumulative Increase, 2-1-320]
3. The owner/operator of S171 shall not allow the heat input to this source to exceed 65,700 MMBtu during any consecutive twelve month period. The owner/operator shall fire S171 with only natural gas. [Basis: Cumulative Increase]
4. The owner/operator shall ensure that the gas flow to A171, Carbon Adsorption, is at least 2,000 cfm at all times while A171 is in operation, except during carbon changeout or required maintenance. [Basis: Cumulative Increase, BACT, Regulation 2-1-320]
5. The owner/operator shall ensure that the stack of A171, Carbon Adsorption, is at least 32 feet above grade and emits vertically with no rain cap. [Basis: Regulation 9-2, Regulation 2-5, Regulation 2-1-320]
6. The owner/operator shall ensure that the abated hydrogen sulfide (H<sub>2</sub>S) concentration at the exhaust of A171, Carbon Adsorption, including the desorption of A180, Digester Gas Pretreatment, does not exceed 1 ppmv. [Basis: Regulation 2-5, Regulation 9-2]
7. To demonstrate compliance with Part 6 of this condition, the owner/operator shall measure the concentration of H<sub>2</sub>S at the outlet stack of A171, Carbon Adsorption, using Draeger tubes, a Jerome meter (provided the instrument is maintained and calibrated per manufacturer's specs and a bump test is performed and recorded prior to data collection), or other District approved method on a daily basis at least 5 days per week for the first two months of operation and on a weekly basis thereafter, if all daily concentrations show compliance with the full emission limit. The results from the first two months of testing shall be submitted to the Engineering Division to initially reduce the testing frequency from daily to weekly. The owner/operator can reduce the monitoring frequency from weekly to monthly if all readings are below one half of the emission limit for two months and the results of this testing are submitted to the Engineering Division. If readings rise above the emission limits, monitoring frequency will return to daily until two months of consecutive compliance can be demonstrated, at which point testing shall again be submitted to the Engineering Division to reduce testing frequency from daily to weekly. The reduction in monitoring frequency will be

handled administratively. If a desorption event occurs on a day when monitoring is required, the monitoring shall take place during the desorption event. If the frequency is adjusted to weekly or monthly monitoring, the monitoring shall take place during a desorption event if desorption is completed during that week or month. [Basis: Regulation 2-1-403, Regulation 2-5, Regulation 9-2]

8. The owner/operator shall ensure that the abated precursor organic compounds (POC) concentration at S171 including the desorption of A180, does not exceed 42 ppmv, measured as methane, at the exhaust of A171 on an annual average basis. [Basis: Cumulative Increase]
9. To demonstrate compliance with the limits in Part 8 of this condition, the owner/operator shall measure POC, as methane, with an FID or PID at the outlet of A171 on a daily basis at least 5 days per week for the first two months of operation of A171 and on a weekly basis thereafter, if all daily concentrations show compliance with the full emission limit. The results from the first week of testing shall be submitted to the Engineering Division within 30 days of startup of A171. The results from the first two months of testing shall be submitted to the Engineering Division to initially reduce the testing frequency from daily to weekly. The owner/operator can reduce the monitoring frequency from weekly to monthly if all readings are below one half of the emission limit for two months and the results of this testing are submitted to the Engineering Division. If readings rise above the emission limit, monitoring frequency will return to daily until two months of consecutive compliance can be demonstrated, at which point testing shall again be submitted to the Engineering Division to reduce testing frequency from daily to weekly. The reduction in monitoring frequency will be handled administratively. If a desorption event occurs on a day when monitoring is required, the monitoring shall take place during the desorption event. If the frequency is adjusted to weekly or monthly monitoring, the monitoring shall take place during a desorption event if desorption is completed during that week or month.
  - a. If the measured concentration is over 42 ppm, the owner/operator may subtract the methane from the concentration with a portable flame ionization detector (FID) equipped with an activated carbon filter tip, or District approved instrument.
  - b. A POC measurement by the FID exceeding 42 ppm shall not be deemed a violation but shall trigger a requirement to test a sample from the outlet using EPA Method 18 or District approved equivalent method to demonstrate compliance. The owner/operator shall ensure that the detection limit of the testing method chosen is comparable to the results of the FID and the limit as per Part 8 of this condition. The sample for the confirmation test shall be collected on the same day an exceedance is measured. The owner/operator shall follow proper sample collection methodology for the laboratory method chosen, including but not limited to; proper sample media, and hold times. The owner/operator shall obtain the results of the test within two weeks of gathering the sample. If the results of the test show non-compliance, the owner/operator shall report the results to the Compliance and Enforcement Division of the Air District.[Basis: Cumulative Increase, Regulation 2-1-403]

10. The owner/operator shall ensure that the abated ammonia (NH<sub>3</sub>) concentration at S171 and the resulting from the desorption of A180 does not exceed 120 ppmv, measured at the

exhaust of A171. The owner/operator shall ensure that the abated ammonia ( $\text{NH}_3$ ) concentration at S171 and resulting from the desorption of A180 does not exceed 60 ppmv on an annual average basis, measured at the exhaust of A171. [Basis: Regulation 2, Rule 5]

11. To demonstrate compliance with the limits in Part 10 of this condition, the owner/operator shall measure ammonia ( $\text{NH}_3$ ) with a portable monitor or other suitable District approved method at the outlet of A171 on a daily basis at least 5 days per week for the first two months of operation of A171 and on a weekly basis thereafter, if all daily concentrations show compliance with the full emission limit. The results from the first week of testing shall be submitted to the Engineering Division within 30 days of startup of A171. The results from the first two months of testing shall be submitted to the Engineering Division to initially reduce the testing frequency from daily to weekly. The owner/operator can reduce the monitoring frequency from weekly to monthly if all readings are below one half of the emission limit for two months and the results of this testing are submitted to the Engineering Division. If readings rise above the emission limits, monitoring frequency will return to daily until two months of consecutive compliance can be demonstrated, at which point testing shall again be submitted to the Engineering Division to reduce testing frequency from daily to weekly. The reduction in monitoring frequency will be handled administratively. If a desorption event occurs on a day when monitoring is required, the monitoring shall take place during the desorption event. If the frequency is adjusted to weekly or monthly monitoring, the monitoring shall take place during a desorption event if desorption is completed during that week or month. [Basis: Regulation 2, Rule 5, Regulation 2-1-403]
12. The owner/operator of A171 shall use the monitoring results obtained from part 7 and/or part 9 to estimate the frequency of A171 carbon changeout necessary to maintain compliance with part 13 and the  $\text{H}_2\text{S}$  limit and POC limit in parts 6 and 8. [Basis: Cumulative Increase, Regulation 9-2]
13. The owner/operator of A171 shall immediately schedule change out with unspent carbon for each carbon vessel exhibiting breakthrough, defined as detection at its outlet of whichever occurs first of the following:
  - a. 42 ppmv POC (measured as methane, using the measurements from part 9) averaged over 1 week, or
  - b. 1 ppmv  $\text{H}_2\text{S}$  (using the measurements from part 7) averaged over 1 week.[Basis: Cumulative Increase, Regulation 9-2]
14. The owner/operator shall ensure that the following pollutant concentrations in the combustion gases exhausting from S171 and entering the atmosphere at the stack of A171 are less than the following limits:
  - a.  $\text{NO}_x$ : 30 ppmv @ 3%  $\text{O}_2$ , on a dry basis, or 6.6 lb/day, whichever is lower
  - b. CO: 400 ppmv @ 3%  $\text{O}_2$ , on a dry basis, or 53.3 lb/day, whichever is lower[Basis: Cumulative Increase, BACT]

15. To demonstrate compliance with Part 14 of this condition, within 90 days from the startup (first introduction of sludge into the dryer, S171) of S171, and within a frequency of no less than once every calendar quarter (in which S171 operates) after each subsequent reading, the owner/operator shall measure NO<sub>x</sub> and CO volumetric concentrations and oxygen content (%) using a portable analyzer. [Basis: 2-1-403]
16. The owner/operator of S171 shall ensure that mercury emissions do not exceed 2.7E-04 lb/hr or 2.1E-01 lb/yr, measured at the stack of A171. If either limit is exceeded, a new risk screen shall be conducted using the emission rate from the source test (conducted per Part 7 of this condition). The owner/operator shall submit a new application for the risk assessment within 60 days of obtaining final results for the mercury source test. The sludge throughput limit for S171 shall be lowered, as necessary, to ensure compliance with BAAQMD Regulation 2, Rule 5. The limit will not be raised until a permit application is approved. [Basis: Regulation 2, Rule 5]
17. To demonstrate compliance with Part 16 of this condition, the owner/operator shall conduct a startup source test within 90 days of the startup of S171. The source test shall be done at the stack of A171 and shall give results of lb mercury/hr. The source test does not need to be done concurrently with any other startup source tests. The source test must be run long enough to give fully quantified results. After reviewing the results of the source test, the District may impose periodic mercury testing. [Basis: Regulation 2, Rule 5]
18. To demonstrate compliance with the limit of 7.1 lb/day of mercury emissions to the atmosphere in 40 CFR 61, Subpart E, the owner/operator shall either:
  - a. Conduct a startup source test within 90 days of the startup of S171. The source test shall be done at the stack of A171 and shall give results of lb mercury/24 hr. The source test does not need to be done concurrently with any other startup source tests. The source test shall be performed in accordance with the requirements of 40 CFR 61.53(d); or
  - b. Conduct a sludge test in accordance with 40 CFR 61.54.
  - c. If the tests above show that daily emissions are over 3.5 lb/day, the owner/operator shall perform the test on an annual basis as required by 40 CFR 61.55(a).[Basis: 40 CFR 61, Subpart E]
19. The owner/operator shall abate the emissions from S171, Sludge Dryer, with A171, Carbon Adsorption, at all times, except that A171 can be out of service for up to 24 hours per calendar year for the changing out of media or other maintenance. Desorption of A180 shall be abated by A171 at all times. [Basis: Cumulative Increase, BACT Regulation 2-1-320]
20. The owner/operator shall use only potable water in the cooling tower associated with S171. No biocide shall be used. [Basis: Regulation 2, Rule 5]
21. The owner/operator shall ensure that the cooling water in the cooling tower is used in a heat exchanger and does not contact the gas that exits the dryer. [Basis: 2-1-403]

22. The owner/operator shall ensure that the cooling tower water does not exceed a dissolved solids concentration of 2500 ppmw. [Basis: 2-1-319]
23. The owner/operator shall ensure that the condensate from the cooling tower condenser flows to S110, Preliminary Treatment. [Basis: 2-1-320]
24. The owner/operator shall ensure that the cooling tower water does exceed a flow rate of 1200 gpm. [Basis: 2-1-403]
25. The owner/operator of S171 shall maintain the following records for a minimum of two (2) years and be made available to the District upon request:
  - a. Records of heat input to the burner for each calendar month and for each rolling 12-month period.
  - b. Records of all monitoring or source testing conducted to demonstrate compliance with this permit condition, District rules, and Federal rules.
  - c. Records of startups, shutdowns, and malfunctions for the dryer. For any malfunction, the records shall include the cause of the malfunction, the actions taken to correct the malfunction, the date and time that the malfunction was corrected, and the actions taken to prevent such malfunctions in the future.
  - d. Records of dissolved solids content in the cooling water on a monthly basis.
  - e. Records of sludge throughput on a monthly basis.
  - f. Records of temperature monitoring at the inlet of A171, Carbon Adsorption.
  - g. Records of cooling water flow at the cooling tower. Reports shall be in units of thousand gallons/yr and shall include total flow, not just makeup water.
  - h. H<sub>2</sub>S volumetric concentration records from Part 7;
  - i. POC volumetric concentration records from Part 9; and,
  - j. NH<sub>3</sub> volumetric concentration records from Part 11.[Basis: Regulation 2-1-403]

***End of Conditions***

**9. RECOMMENDATION**

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all

applicable requirements of District, state, and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct/Permit to Operate for the equipment listed below. The proposed sources will be located within an overburdened community, which triggers the public notification requirements of District Regulation 2-1-412. After comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of an Authority to Construct/Permit to Operate for the following sources:

**S34 Cogeneration Engine**

**Make: 2G Energy, Model: Agenitor 412, Model Year: 2022  
629 bhp, 4.01 MMBtu/hr HHV, EPA engine family: P2GEB25.0A12**

Abated by

**A34, SCR, and A134, Oxidation Catalyst**

**S35 Cogeneration Engine**

**Make: 2G Energy, Model: Agenitor 412, Model Year: 2022  
629 bhp, 4.01 MMBtu/hr HHV, EPA engine family: P2GEB25.0A12**

Abated by

**A35, SCR, and A135, Oxidation Catalyst**

**S170 Sludge Handling Processes**

**Two new Rotary Drum Thickeners (RDT), two new centrifuges**

RDTs abated by

**A170 Carbon Adsorption, abating RDTs  
1,000 cfm, 1,000 lbs carbon**

**S171 Sludge Dryer**

**Gryphon Drying Unit, Model 1050, 7.5 MMBtu/hr including 1,200 gpm cooling tower**

Abated by

**A171 Carbon Adsorption  
Abates S171 and A180, Digester Gas Pretreatment Desorption  
2,000 cfm, 1,200 lbs carbon**

**S180 Anaerobic Digesters**

**Two new digesters, 0.878 MG each replacing two old digesters**

Abated by

**A5**            **Enclosed Digester Flare**  
**Varec Biogas 244ELC, 200 cfm, 7.32 MMBtu/hr**

And

**A180**          **Digester Gas Pretreatment, GraniteFuel, abated by A171, Carbon**  
**Absorption**

**Registered Sources**

**S36**            **Natural Gas Boiler, 2.64 MMBtu/hr**  
**Parker Water Wall Hot Water Boiler,**  
**Supplying heat to S180, Anaerobic Digesters**

**S37**            **Natural Gas Boiler, 2.64 MMBtu/hr**  
**Parker Water Wall Hot Water Boiler,**  
**Supplying heat to S180, Anaerobic Digesters**

By:     Ryan Atterbury      
Ryan Atterbury  
Air Quality Engineer

Date: \_\_\_\_\_

**APPENDIX A, POTENTIAL TO EMIT CALCULATIONS**

Plant 1271NOx

Following is a table of the potential to emit for NOx.

Source No.	Name	PTE, NOx, tpy
S1	Natural gas prime engine	3.023
S2	Natural gas prime engine	3.023
S25	Portable diesel backup generator	0.054
S26	Portable diesel backup generator	0.054
S30	Natural gas backup generator	0.510
S31	Diesel backup generator	1.849
S32	Portable diesel backup generator	0.001
S34	Cogeneration engine	0.910
S35	Cogeneration engine	0.910
S36	Registered Boiler	0.421
S37	Registered Boiler	0.421
S171	Sludge dryer	1.196
A5	Flare	1.924
Total		14.296

The calculations for different sources were done using different emission factors or methods. The calculations are presented by type of calculation.

Following are calculations in terms of 1000 scf. Scf means standard cubic feet. NG means natural gas.

Source No.	Name	EF Lb/1000 scf	Fuel	scf/hr	Hours/yr	NOx, tpy
S1	Natural gas prime engine	0.244	NG	2828	8760	3.023
S2	Natural gas prime engine	0.244	NG	2828	8760	3.023
S30	Natural gas backup generator	3.4	NG	2000	150	0.510

The emission factor for S1 and S2 is based on the limit in Regulation 9, Rule 8. The emission factor for S30 is taken from the District's database.

Following are calculations in terms of grams/brake-horsepower-hr.

Source No.	Name	hp	EF g/bhp-hr	Fuel	Hours/yr	NOx, tpy
S25	Portable diesel backup generator	98	3.33	Diesel	150	0.054
S26	Portable diesel backup generator	98	3.33	Diesel	150	0.054
S31	Diesel backup generator	2922	3.83	Diesel	150	1.849
S32	Portable diesel backup generator	215	0.04	Diesel	150	0.001
S34	Cogeneration engine	629	0.15	DG	8760	0.910
S35	Cogeneration engine	629	0.15	DG	8760	0.910

The emission factors for S25, S26, S31, and S32 are taken from the District's database.  
The emission factor for S34 and S35 is taken from Section 2 above.

Following are calculations in terms of pound/million btu. NG means natural gas. DG means digester gas.

Source No.	Name	EF lb/MMbtu	Fuel	Hours/yr	NOx, tpy
S171	Sludge dryer	0.0364	NG	8760	1.196
A5	Flare	0.06	DG	8760	1.924
S36	Registered Boiler	0.036	NG	8760	0.421
S37	Registered Boiler	0.036	NG	8760	0.421

The emission factor for S171 is taken from Section 2 above.  
The emission factor for A5 is based on the RACT limit.  
The emission factor for S36 and S37 is based on the limit in Regulation 9, Rule 7.

### **POC**

Following is a table of the potential to emit for POC.

Source No.	Name	PTE, POC, tpy
S1	Natural gas prime engine	2.375
S2	Natural gas prime engine	2.375
S25	Portable diesel backup generator	0.003
S26	Portable diesel backup generator	0.003
S30	Natural gas backup generator	0.029
S31	Diesel backup generator	0.097
S32	Portable diesel backup generator	0.000

Source No.	Name	PTE, POC, tpy
S34	Cogeneration engine	0.728
S35	Cogeneration engine	0.728
S36	Registered Boiler	0.062
S37	Registered Boiler	0.062
S100	Sewage treatment plant	2.044
S171	Sludge dryer	0.916
A5	Flare	0.321
Total		9.744

The calculations for different sources were done using different emission factors or methods. The calculations are presented by type of calculation.

Following are calculations in terms of million scf. Scf means standard cubic feet. NG means natural gas.

S#	Name	EF, lb/ MMscf	Fuel	MMscf/ yr	POC, tpy
S36	Registered Boiler	5.5	NG	22.6729	0.062
S37	Registered Boiler	5.5	NG	22.6729	0.062

The emission factor is taken from AP-42 Table 1.4-2.

Following are calculations in terms of grams/brake-horsepower-hr.

S#	Name	hp	EF, g/bhp- hr	Fuel	hr/yr	POC, tpy
S25	Portable diesel backup generator	98	0.175	Diesel	150	0.003
S26	Portable diesel backup generator	98	0.175	Diesel	150	0.003
S31	Diesel backup generator	2922	0.2	Diesel	150	0.097
S32	Portable diesel backup generator	215	0.01	Diesel	150	0.000
S34	Cogeneration engine	629	0.12	DG	8760	0.728
S35	Cogeneration engine	629	0.12	DG	8760	0.728

The emission factors for S25, S26, S31, and S32 are taken from the District's database. The emission factor for S34 and S35 is taken from Section 2 above.

Following are calculations in terms of pound/million btu. NG means natural gas. DG means digester gas.

S#	Name	Factor lb/MMbtu	Fuel	EF, scf/hr	Btu/scf	MMbtu/hr	hr/yr	POC, tpy
S1	Natural gas prime engine	0.188	NG	2828	1020	2.88	8760	2.375
S2	Natural gas prime engine	0.188	NG	2828	1020	2.88	8760	2.375
S30	Natural gas backup generator	0.188	NG	2000	1020	2.04	150	0.029
A5	Flare	0.01	DG			7.32	8760	0.321

The emission factors for S1, S2, and S30 are taken from AP-42 Table 3.2-2. The emission factor for A5 is taken from Section 2 above.

Following is a calculation in terms of pound/million gallons.

S#	Name	EF, lb/MMgal	MMgal/day	Days/yr	POC, tpy
S100	Sewage treatment plant	0.7	16	365	2.044

The emission factor for S100 is taken from the District's database.

The sludge dryer emissions were taken from Section 2 of this evaluation.