DRAFT Engineering Evaluation
Anchor Brewing
330 Carolina Street, San Francisco, CA 94107
Plant No. 1446
Application No. 29792
Project Description: Brewery Wastewater Treatment and Reuse

BACKGROUND

Anchor Brewing has applied to obtain an Authority to Construct (A/C) and/or Permit to Operate (P/O) for the following equipment:

S-100 Brewery Wastewater Treatment Plant

including:

Preliminary Treatment
Rotary Screen, Make: IPEC, Model: IFU3048
Maximum Flow Rate: 200 gpm

and

Equalization Tank; 56,000 gallons

abated by:

A-2 Carbon Adsorption
Make: Continental Carbon Group; Foul Air Flow Rate: 400 CFM; Carbon Content: 225 lbs

also

Solids Handling; Rotary Fan Press

abated by:

A-1 Carbon Adsorption (two units); Foul Air Flow Rate: 1,000 CFM/unit; Carbon Content: 1,100 lbs/unit

in addition

Membrane Bioreactor (MBR) Treatment
Make: Cambrian; Model: Ecovolt MBR; Capacity: 147,000 gallons; Maximum Flow Rate: 50 gpm

Stack parameters: #1: 2,000 cfm, outlet at 21 feet, open, vertical; #2: 280 cfm, outlet at 11.33 feet, open vertical

Preliminary Treatment and Equalization Tank

The preliminary treatment will consist of a rotary screen. Currently, a liquid waste stream from the facility brewing operations is discharged to the City of San Francisco Public Utilities Commission (SFPUC) collection system and the brewery is charged based on volume, chemical oxygen demand (COD), total suspended solids (TSS), and oil and grease content. A 56,000-gallon equalization tank will be used to equalize flows from the brewing facility to the wastewater treatment system. The facility will process 60,000 gallons of wastewater per day on average, and 75,000 gallons per day at maximum demand. In order to reduce wastewater surcharges, wastewater discharge volume, and freshwater consumption, Anchor has partnered with Cambrian to design, install, maintain, and operate an onsite treatment and reuse system. A carbon adsorber, A-2, will abate the odor from the tank headspaces at the wastewater treatment plant, including preliminary treatment and the equalization tank. A condition limiting the H_2S concentration in the abatement device effluent will be added to ensure that the device is operating properly and to ensure compliance with Regulation 9-2 and Regulation 2-5. This condition will be set at 1.0 ppmv in accordance with permits previously given to wastewater treatment facilities.

Solids Handling

The solids handling system will consist of solids dewatering, which takes place in the Solids Handling Building and includes a rotary fan press to dewater waste activated sludge from the aerobic treatment process of the MBR, and a solids bin. The Solids Handling Building also houses the rotary screen, screenings bin, and the carbon adsorbers. Two carbon adsorption units, collectively A-1, will abate odor from the Solids Handling Building. A condition limiting the H_2S concentration in the abatement device effluent will be added to ensure that the device is operating properly and to ensure compliance with Regulation 9-2 and Regulation 2-5. This condition will be set at 1.0 ppmv in accordance with permits previously given to wastewater treatment facilities.

MBR Treatment

The MBR treatment process will consist of an aeration tank and a series of membranes in a filtration skid. The equalization tank will feed pH-adjusted wastewater to the aeration tank. Process air blowers in the aeration tank will provide sufficient dissolved oxygen to facilitate aerobic digestion, which will convert organic matter in the wastewater into biomass. The biomass then falls to the bottom of the tank as organic matter is consumed and is sent to solids handling as waste activated sludge. The treated effluent from the aeration tank is then sent to the filtration skid, where filterable particulate is removed.

Effluent from the MBR is sent to an enclosed reverse osmosis system to purify the water. The reject water is sent to a local sump which directs the flow back to the sewer system. No emissions are expected from this system. The purified water is then disinfected with UV

radiation and is treated with sodium hypochlorite, which is injected inline from a sealed tank to prevent emissions, to allow for some residual chlorine in the line to control potential harmful regrowth in the system. A storage tank collects the treated effluent, which will be pumped to the brewery for onsite reuse purposes.

The MBR treatment process will not be abated. Due to the aerobic nature of the treatment process, the system is not expected to produce significant organic or odorous emissions when functioning properly. However, H_2S and organics limits will be implemented to ensure that the device is operating properly and to ensure compliance with Regulation 9-2 and Regulation 2-5. An H_2S limit of 2 ppmv will keep H_2S below the Regulation 2-5 trigger levels. An organics, measured as methane, limit will be set at 10 ppmv in accordance with previous projects. From discussions with the facility, a properly aerobic treatment system will not produce large amounts of methane.

Auxiliary fans will be added on to MBR filtration and aeration to maintain a consistent air dispersion plume. As the bacteria present in the aerobic treatment process require specific levels of dissolved oxygen at different times, the aeration systems for MBR aeration and filtration will not operate at full flow capacity all the time. The auxiliary fans will allow MBR filtration and aeration to operate with at least the flow rates specified below.

EMISSIONS CALCULATIONS

While preliminary treatment and the equalization tank are not expected to generate considerable emissions, a limit of 1 ppmv will be placed on A-2, which will abate odors from the headspaces of preliminary treatment and the equalization tank. In order to confirm compliance with Regulation 9-2, hydrogen sulfide emissions from A-2, were calculated as shown below. Calculations were made using the Ideal Gas Law and assuming 1.0 ppmv H_2S and standard conditions at the abatement device outlet.

Similarly, solids handling is not expected to generate considerable emissions. However, A-1, which abates solids handling, will be given a limit of 1 ppmv H_2S to ensure that odors are adequately controlled. Hydrogen sulfide emissions from A-1 were calculated in order to confirm compliance with Regulation 9-2. Calculations were made using the Ideal Gas Law and assuming 1.0 ppmv H_2S and standard conditions at the abatement device outlet.

The MBR has emission points at the aeration tank and the filtration tank. The facility has agreed to a limit of 2 ppmv on H_2S at the MBR. Hydrogen sulfide emissions from the MBR were calculated in order to confirm compliance with Regulation 9-2. Calculations were made using the Ideal Gas Law and assuming 2.0 ppmv H_2S and standard conditions at the source outlet.

H_2S emissions at A-1 outlet:

Where: P is the pressure of a gaseous compound, which is assumed to be at 1 atm;
V is the volume of a gaseous compound in dscf;
n is the amount of a gaseous compound in mol_{lb};

R is a gas constant, which is 0.7302 (atm·scf)/(mol$_{lb}$·°R); and,
T is the temperature of a gaseous compound in °R, which is assumed to be 528°R

$$n = \frac{PV}{RT}$$

$$\frac{\mathbf{1}\ \cancel{atm}\ \times \left(\frac{\mathbf{1.0}\ \cancel{scf\ H_2S}}{\mathbf{10^6}\ \cancel{scf}} \times \frac{\mathbf{2{,}000}\ \cancel{scf}}{\cancel{min}} \times \frac{\mathbf{60}\ \cancel{min}}{\mathbf{hr}}\right)}{\frac{\mathbf{0.7302}\ \cancel{atm} \cdot \cancel{scf}}{\cancel{°R} \cdot \cancel{mol_{lb}}} \times \mathbf{528}\cancel{°R}} \times \frac{\mathbf{34.081}\ \boldsymbol{lb}\ H_2S}{\cancel{mol_{lb}\ H_2S}} = 0.0106\ lb\ H_2S/hr$$

Yearly H_2S emissions from the abatement device = 92.70 lb H_2S per year

H_2S emissions at A-2 outlet:

Where: P is the pressure of a gaseous compound, which is assumed to be at 1 atm;
V is the volume of a gaseous compound in dscf;
n is the amount of a gaseous compound in mol$_{lb}$;
R is a gas constant, which is 0.7302 (atm·scf)/(mol$_{lb}$·°R); and,
T is the temperature of a gaseous compound in °R, which is assumed to be 528°R

$$n = \frac{PV}{RT}$$

$$\frac{\mathbf{1}\ \cancel{atm}\ \times \left(\frac{\mathbf{1.0}\ \cancel{scf\ H_2S}}{\mathbf{10^6}\ \cancel{scf}} \times \frac{\mathbf{400}\ \cancel{scf}}{\cancel{min}} \times \frac{\mathbf{60}\ \cancel{min}}{\mathbf{hr}}\right)}{\frac{\mathbf{0.7302}\ \cancel{atm} \cdot \cancel{scf}}{\cancel{°R} \cdot \cancel{mol_{lb}}} \times \mathbf{528}\cancel{°R}} \times \frac{\mathbf{34.081}\ \boldsymbol{lb}\ H_2S}{\cancel{mol_{lb}\ H_2S}} = 0.00212\ lb\ H_2S/hr$$

Yearly H_2S emissions from the abatement device = 18.54 lb H_2S per year

H_2S emissions at MBR Aeration Tank outlet:

Where: P is the pressure of a gaseous compound, which is assumed to be at 1 atm;
V is the volume of a gaseous compound in dscf;
n is the amount of a gaseous compound in mol$_{lb}$;
R is a gas constant, which is 0.7302 (atm·scf)/(mol$_{lb}$·°R); and,
T is the temperature of a gaseous compound in °R, which is assumed to be 528°R

$$n = \frac{PV}{RT}$$

$$\frac{\mathbf{1}\ \cancel{atm}\ \times \left(\frac{\mathbf{2.0}\ \cancel{scf\ H_2S}}{\mathbf{10^6}\ \cancel{scf}} \times \frac{\mathbf{2{,}000}\ \cancel{scf}}{\cancel{min}} \times \frac{\mathbf{60}\ \cancel{min}}{\mathbf{hr}}\right)}{\frac{\mathbf{0.7302}\ \cancel{atm} \cdot \cancel{scf}}{\cancel{°R} \cdot \cancel{mol_{lb}}} \times \mathbf{528}\cancel{°R}} \times \frac{\mathbf{34.081}\ \boldsymbol{lb}\ H_2S}{\cancel{mol_{lb}\ H_2S}} = 0.0212\ lb\ H_2S/hr$$

DRAFT

Yearly H_2S emissions from the aeration tank = 185.40 lb H_2S per year

H_2S emissions at MBR Filtration Tank outlet:

Where: P is the pressure of a gaseous compound, which is assumed to be at 1 atm;
V is the volume of a gaseous compound in dscf;
n is the amount of a gaseous compound in mol_{lb};
R is a gas constant, which is 0.7302 (atm·scf)/(mol_{lb}·°R); and,
T is the temperature of a gaseous compound in °R, which is assumed to be 528°R

$$n = \frac{PV}{RT}$$

$$\frac{\mathbf{1}\ \cancel{atm} \times \left(\frac{\mathbf{2.0}\ \cancel{scf\ H_2S}}{\mathbf{10^6}\ \cancel{scf}} \times \frac{\mathbf{280}\ \cancel{scf}}{\cancel{min}} \times \frac{\mathbf{60}\ \cancel{min}}{\mathbf{hr}}\right)}{\frac{\mathbf{0.7302}\ \cancel{atm} \cdot \cancel{scf}}{\cancel{°R} \cdot \cancel{mol_{lb}}} \times \mathbf{528}\cancel{°R}} \times \frac{\mathbf{34.081}\ \boldsymbol{lb}\ H_2S}{\cancel{mol_{lb}\ H_2S}} = 0.00296\ lb\ H_2S/hr$$

Yearly H_2S emissions from the filtration tank = 25.96 lb H_2S per year

To provide a baseline as a reference point for future permit changes at this facility, organic emissions from the MBR filtration tank and aeration tank, modeled as methane, were calculated as shown below. Organics emissions from A-1 and A-2 were also calculated. Calculations were made using the Ideal Gas Law and assuming standard conditions and an organic emissions concentration modeled as 10 ppmv methane at the source outlets.

Organic emissions at MBR Aeration Tank:

Where: P is the pressure of a gaseous compound, which is assumed to be 1 atm;
V is the volume of a gaseous compound in dscf;
n is the amount of a gaseous compound in mol_{lb};
R is a gas constant, which is 0.7302 (atm·scf)/(mol_{lb}·°R); and,
T is the temperature of a gaseous compound in °R, which is assumed to be 528°R

$$n = \frac{PV}{RT}$$

$$\frac{\mathbf{1}\ \cancel{atm} \times \left(\frac{\mathbf{10}\ \cancel{scf\ CH_4}}{\mathbf{10^6}\ \cancel{scf}} \times \frac{\mathbf{2,000}\ \cancel{scf}}{\cancel{min}} \times \frac{\mathbf{60}\ \cancel{min}}{\mathbf{hr}}\right)}{\frac{\mathbf{0.7302}\ \cancel{atm} \cdot \cancel{scf}}{\cancel{°R} \cdot \cancel{mol_{lb}}} \times \mathbf{528}\cancel{°R}} \times \frac{\mathbf{16.043}\ \boldsymbol{lb}\ CH_4}{\cancel{mol_{lb}\ CH_4}} = 0.0498\ lb\ CH_4/hr$$

Yearly organic emissions from the aeration tank = 436.24 lb POC as CH_4 per year

Organic emissions at MBR Filtration Tank:

Where: P is the pressure of a gaseous compound, which is assumed to be 1 atm;
V is the volume of a gaseous compound in dscf;
n is the amount of a gaseous compound in mol_{lb};
R is a gas constant, which is 0.7302 (atm·scf)/(mol_{lb}·°R); and,
T is the temperature of a gaseous compound in °R, which is assumed to be 528°R

$$n = \frac{PV}{RT}$$

$$\frac{\mathbf{1}\ \cancel{atm}\ \times \left(\frac{\mathbf{10}\ \cancel{scf\ CH_4}}{\mathbf{10^6}\ \cancel{scf}} \times \frac{\mathbf{280}\ \cancel{scf}}{\cancel{min}} \times \frac{\mathbf{60}\ \cancel{min}}{\mathbf{hr}}\right)}{\frac{\mathbf{0.7302}\ \cancel{atm} \cdot \cancel{scf}}{\cancel{°R} \cdot \cancel{mol_{lb}}} \times \mathbf{528}\cancel{°R}} \times \frac{\mathbf{16.043\ lb}\ CH_4}{\cancel{mol_{lb}\ CH_4}} = 0.00697\ lb\ CH_4/hr$$

Yearly organic emissions from the filtration tank = 61.07 lb POC as CH_4 per year

Organic emissions at A-1:

Where: P is the pressure of a gaseous compound, which is assumed to be 1 atm;
V is the volume of a gaseous compound in dscf;
n is the amount of a gaseous compound in mol_{lb};
R is a gas constant, which is 0.7302 (atm·scf)/(mol_{lb}·°R); and,
T is the temperature of a gaseous compound in °R, which is assumed to be 528°R

$$n = \frac{PV}{RT}$$

$$\frac{\mathbf{1}\ \cancel{atm}\ \times \left(\frac{\mathbf{10}\ \cancel{scf\ CH_4}}{\mathbf{10^6}\ \cancel{scf}} \times \frac{\mathbf{2000}\ \cancel{scf}}{\cancel{min}} \times \frac{\mathbf{60}\ \cancel{min}}{\mathbf{hr}}\right)}{\frac{\mathbf{0.7302}\ \cancel{atm} \cdot \cancel{scf}}{\cancel{°R} \cdot \cancel{mol_{lb}}} \times \mathbf{528}\cancel{°R}} \times \frac{\mathbf{16.043\ lb}\ CH_4}{\cancel{mol_{lb}\ CH_4}} = 0.0498\ lb\ CH_4/hr$$

Yearly organic emissions from the abatement device = 436.24 lb POC per year, calculated as methane

Organic emissions at A-2:

Where: P is the pressure of a gaseous compound, which is assumed to be 1 atm;
V is the volume of a gaseous compound in dscf;
n is the amount of a gaseous compound in mol_{lb};
R is a gas constant, which is 0.7302 (atm·scf)/(mol_{lb}·°R); and,
T is the temperature of a gaseous compound in °R, which is assumed to be 528°R

DRAFT

$$n = \frac{PV}{RT}$$

$$\frac{\mathbf{1}\ \cancel{atm}\ \times \left(\frac{\mathbf{10}\ \cancel{scf\ CH_4}}{\mathbf{10^6}\ \cancel{scf}} \times \frac{\mathbf{400}\ \cancel{scf}}{\cancel{min}} \times \frac{\mathbf{60}\ \cancel{min}}{\mathbf{hr}}\right)}{\frac{\mathbf{0.7302}\ \cancel{atm} \cdot \cancel{scf}}{\cancel{^\circ R} \cdot \cancel{mol_{lb}}} \times \mathbf{528}\cancel{^\circ R}} \times \frac{\mathbf{16.043}\ \boldsymbol{lb}\ CH_4}{\cancel{mol_{lb}\ CH_4}} = 0.00996\ lb\ CH_4/hr$$

Yearly organic emissions from the abatement device = 87.25 lb POC per year, calculated as methane

TOXIC RISK SCREENING ANALYSIS

H2S is a Toxic Air Contaminant. S-100 will be limited by permit condition to ensure that H_2S emissions are below the trigger levels in Regulation 2-5. The annual H2S emissions are expected to be about 323 lb/yr, which is less than the annual trigger level of 390 lb/yr in Table 2-5-1. The hourly H2S emissions are expected to be about 0.037 lb/hr, which is less than the hourly (acute) trigger level of 0.093 lb/hr. No other toxic air contaminants are expected to be emitted.

PLANT CUMULATIVE EMISSIONS

The facility has no cumulative increase because all previous applications were completed before 1991, when the cumulative increase was forgiven. Organic emissions from S-100 at A-1, A-2, and the MBR are added to the cumulative increase.

Table 1. Cumulative increase in tons/yr

Pollutant	Existing, tpy	New, tpy	Total, tpy
NOx	0.000	0.000	0.000
CO	0.000	0.000	0.000
PM10 and 2.5	0.000	0.000	0.000
SO_2	0.000	0.000	0.000
POC	0.000	0.510	0.510

BEST AVAILABLE CONTROL TECHNOLOGY

The wastewater plant will emit less than 10 lb POC/day, so it is not subject to BACT. S-100 is expected to emit about 2.80 lb POC/day.

OFFSETS

DRAFT

Pursuant to Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that emits, or is permitted to emit, more than 10 tons per year of POC or NO_X. As seen below in Table 3, offsets for POC or NO_X will not be required for this application.

The offsets requirements for $PM_{10,}$ $PM_{2.5}$, and SOx are specified in Regulation 2, Rule 2, Section 303. Per Section 303, $PM_{10,}$ $PM_{2.5}$, and SOx emission offsets are required for any new or modified source that is a major facility for $PM_{10,}$ $PM_{2.5}$, or SOx emissions. Anchor Brewing is not a major facility for PM_{10}, $PM_{2.5}$, or SO_X emissions. Therefore, offsets for PM_{10}, $PM_{2.5}$, and SO_X are not required for this application.

The potential to emit (PTE) for the facility is estimated below. Emissions for S-1 are part of the PTE but not part of the cumulative increase, as S-1 was permitted before 1991. S-1 is a grandfathered source with no permit condition limits. Emissions for S-1 are estimated using emission factors from EPA's AP-42 Chapter 9.12.1, Table 2.

Table 2. S-1 Potential to Emit, VOC

Process	EF [lb VOC/1000 bbl][1] (AP-42 9.12.1-2)	EF [lb VOC/1000 gallons]	S1 Throughput[2] [1000 gallons]	VOC Emissions [lb/yr]	
aging tank-filling	0.57	0.0184	6,717	123.51	
brew kettle	0.64	0.0206	6,717	138.67	
cereal cooker	0.0075	0.000242	6,717	1.63	
fermenter venting	2	0.0645	6,717	433.35	
hot wort settling tank	0.075	0.00242	6,717	16.25	
bottle filling line	17	0.548	6,717	3,683.52	
lauter tun	0.0055	0.000177	6,717	1.19	
mash tun	0.054	0.00174	6,717	11.70	
open wort cooler	0.022	0.000710	6,717	4.77	
Total				4414.59	**lb/yr**
				2.207	**ton/yr**

[1]1 bbl = 31 gallons
[2]S1 throughput from DataBank emissions inventory: 12-month period ending 12/31/2013

Table 3. Plant 1446 Potential to Emit

Source	Source Description	VOC PTE (tpy)
1	Brew Kettle	2.207
100	Brewery Wastewater Treatment Plant	0.510
Total		**2.717**

NEW SOURCES PERFORMANCE STANDARDS (NSPS)

40 CFR Part 60 Subpart O – Standards of Performance for Sewage Treatment Plants
Pursuant to §60.150, the provisions of this part apply to incinerators that combust wastes containing more than 10 percent sewage sludge (dry basis) produced by municipal sewage treatment plants, or incinerators that charge more than 1000 kg (2205 lb) per day municipal sewage sludge (dry basis), which commenced construction or modification after June 11, 1973. Anchor Brewing does not operate a sewage sludge incinerator and is not subject to the requirements of this subpart.

40 CFR Part 60 Subpart QQQ – Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems
Pursuant to §60.690 the provisions of this subpart apply to affected facilities located in petroleum refineries for which construction, modification, or reconstruction is commenced after May 4, 1987. Since the Anchor does not operate at a refinery, it is not subject to the requirements of this subpart.

STATEMENT OF COMPLIANCE

Regulation 1
The treatment system is subject to the public nuisance requirements of Regulation 1-301, which states the following:

"No person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or 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. For purposes of this section, three or more violation notices validly issued in a 30-day period to a facility for public nuisance shall give rise to a rebuttable presumption that the violations resulted from negligent conduct."

The operation of the treatment system and its abatement is expected to meet the requirement of Regulation 1-301.

Regulation 2, Rule 1
Pursuant to Regulation 2-1-412, a public notice is required for any new or modified source located within 1,000 feet of the outer boundary of a K-12 schoolsite and which results in the increase in emissions of any Toxic Air Contaminant or Hazardous Air Contaminant into the ambient air. This equipment is located within 1,000 feet of the nearest school and therefore is subject to the requirements of Regulation 2-1-412. The public comment period will start on January 22, 2021 and end on February 22, 2021.

Regulation 2, Rule 2
Pursuant to Regulation 2-2-301, BACT is required for a new source with PTE emission increases that equal 10 lb or greater of POC, NPOC, NO_X, SO_2, PM_{10}, $PM_{2.5}$, or CO

The wastewater plant will emit less than 10 lb/day of all BACT pollutants. Therefore, the requirements of BACT do not apply to this project. However, a permit condition will be included for the wastewater plant limiting the throughput, which is based on the maximum design capacity as reported by the facility.

Lastly, the PSD requirements of Regulation 2-2-304 through 2-2-306 are not applicable because this is not a major source.

Regulation 2, Rule 5
Pursuant to Regulation 2-5-110, the provisions of this rule do not apply to sources with an increase in emissions less than the trigger levels listed in Table 2-5-1. This project will not result in an increase in toxic air contaminant emissions at a rate greater than those listed in Table 2-5-1. Therefore, the requirements of Regulation 2-5 do not apply to this project.

Regulation 9, Rule 2
Per Regulation 9-2-301, a person shall not emit during any 24-hour period, hydrogen sulfide (H2S) in such quantities as to result in ground level concentration in excess of 0.06 ppmv averaged over three consecutive minutes or 0.03 ppmv averaged over any 60 consecutive minutes.

A study examining ground level H_2S dispersion was conducted on March 23, 2020 to confirm compliance with this rule. The study assumed an H_2S emission rate of 1.0 ppmv at 2,000 cfm from A-1, which produces emissions of 0.0106 lbs/hour, and 1.0 ppmv at 400 cfm from A-2, which produces emissions of 0.00212 lb/hr. It also assumed an H_2S emission rate of 2.0 ppmv at 2,000 cfm from S-190(a) (MBR aeration tank – now part of S-100), which produces emissions of 0.0212 lb/hr, and 2.0 ppmv at 280 cfm from S-190(b) (MBR filtration tank – now part of S-100), which produces emissions of 0.00296 lb//hr. The maximum modeled 1-hour H_2S concentrations from this study are shown below:

Maximum modeled 1-hour concentration from A-1: 170 $\mu g/m^3$ = 0.12 ppmv
Maximum modeled 1-hour concentration from A-2: 34 $\mu g/m^3$ = 0.024 ppmv
Maximum modeled 1-hour concentration from MBR Aeration Tank: 5.0 $\mu g/m^3$ = 0.0036 ppmv
Maximum modeled 1-hour concentration from MBR Filtration Tank: 7.2 $\mu g/m^3$ = 0.0052 ppmv
Maximum modeled 1-hour concentration from all four sources: 205 $\mu g/m^3$ = 0.15 ppmv

Because the initial study showed non-compliance with Regulation 9-2, the stacks at the two abatement devices, A-1 and A-2, originally designed to emit horizontally with a rain cap 12 feet above grade, were reconfigured to emit vertically without a rain cap at 15 feet above grade. A new study with the reconfigured design of A-1 and A-2 was conducted on May 7, 2020. The study assumed the same H_2S emissions rates but updated the stack parameters as previously mentioned. The maximum modeled 1-hour H_2S concentrations from the updated study are shown below:

Maximum modeled 1-hour concentration from A-1: 9.5 $\mu g/m^3$ = 0.0068 ppmv

Maximum modeled 1-hour concentration from A-2: 1.8 µg/m^3 = 0.0013 ppmv
Maximum modeled 1-hour concentration from MBR Aeration Tank: 5.0 µg/m^3 = 0.0036 ppmv
Maximum modeled 1-hour concentration from MBR Filtration Tank: 7.2 µg/m^3 = 0.0052 ppmv
Maximum modeled 1-hour concentration from all four sources: 18 µg/m^3 = 0.013 ppmv

The facility will be limited to an H_2S emission concentration of 1.0 ppmv from A-1 and A-2, and 2.0 ppmv from the MBR Aeration Tank and the MBR Filtration Tank. This project is in compliance with the H_2S ground level concentration requirements at these concentrations with the reconfigured stack design.

California Environmental Quality Act (CEQA) and Regulation 2-1
On March 12, 2019, the City of San Francisco Planning Department determined that this project is categorically exempt under CEQA. It was determined that no further environmental review is required, and that there are no unusual circumstances that would result in a reasonable possibility of a significant effect.

PERMIT CONDITIONS

[S-100 Preliminary Treatment, Equalization Tank, Solids Handling; Rotary Fan Press, & MBR Treatment]
Permit Condition #27299

1. The owner/operator of the brewery wastewater treatment plant at plant #1446 shall ensure the throughput at S-100 does not exceed the following design capacities:

   a. Total average effluent flow of 60,000 gallons per day on a calendar 3-month average; and,
   b. Peak effluent flow of 75,000 gallons per day, on a calendar month average.
   [Basis: Cumulative Increase]

2. To demonstrate compliance with Part 1 of this condition, the owner/operator shall record the following:

   a. Daily and monthly records of the quantity of effluent processed at this facility; and,
   b. Consecutive 12-month period quantity of effluent processed at this facility by totaling the monthly records of Part 2(a) of this condition.
   [Basis: Regulation 9-2]

3. The owner/operator shall ensure that the abated hydrogen sulfide (H_2S) emissions from preliminary treatment, the equalization tank, and solids handling, do not exceed 1.0 ppmv, measured at the exhaust of A-1 and A-2.
   [Basis: Regulation 9-2]

DRAFT

4. The owner/operator shall ensure that the H_2S concentration of the gases emitted from the MBR does not exceed 2.0 ppmv at the exhaust of the aeration tank or the filtration tank. [Basis: Regulation 9-2]

5. To demonstrate compliance with Parts 3 and 4 of this condition, the owner/operator shall measure the concentration of H_2S at the outlet stack of A-1, A-2, the MBR aeration tank, and the MBR filtration tank 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 for the first two months of operation and on a weekly basis thereafter, if all daily concentrations show compliance. The results from the first two months of testing shall be submitted to the Engineering Division to reduce the testing frequency from daily to weekly. The owner/operator can submit a petition to the District asking for a reduction in monitoring frequency if all readings are below one quarter of the emission limits of the respective devices.
[Basis: Regulation 2-1-403, Regulation 9-2]

6. The owner/operator shall maintain the following records:

   a. Daily and monthly records of the quantity of effluent processed at this facility;
   b. Consecutive 12-month period quantity of effluent processed at this facility;
   c. H_2S volumetric concentration records from Part 5; and,
   d. NMHC 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]

7. The owner/operator shall ensure that the abated non-methane hydrocarbon (NMHC) emissions from S-100, Brewery Wastewater Treatment Plant, do not exceed 10 ppmv, measured as methane, at the exhaust of A-1, A-2, the MBR aeration tank, and the MBR filtration tank.
   [Basis: Cumulative Increase]

8. To demonstrate compliance with the limits in Part 7 of this condition, the owner/operator shall measure NMHC, as methane, with an FID at the outlet of each carbon bed of A-1, and at the outlet of A-2, the MBR aeration tank, and the MBR filtration tank on a daily basis for the first two months of operation of A-1, A-2, and the MBR and on a weekly basis thereafter, if all daily concentrations show compliance. The results from the first week of testing shall be submitted to the Engineering Division within 30 days of startup of A-1, A-2, and the MBR. The results from the first two months of testing shall be submitted to the Engineering Division and must be approved in writing to reduce the testing frequency from daily to weekly. The owner/operator can submit a petition to the District asking for a reduction in

monitoring frequency if all readings are below one quarter of the emission limits of the respective devices.
[Basis: Cumulative Increase, Regulation 2-1-403]

9. The owner/operator shall abate the emissions from preliminary treatment, the equalization tank, and solids handling of S-100 with A-1 and A-2 at all times, except that A-1 and A-2 can be out of service for up to four hours per calendar quarter for the changing out of media or other maintenance.
[Basis: Cumulative Increase, Regulation 2-1-320]

10. The owner/operator shall ensure that the gas flow to A-1 is at least 1000 cfm per unit (of two) and A-2 is at least 400 cfm at all times while A-1 and A-2 are in operation.
[Basis: Cumulative Increase, Regulation 2-1-320]

11. The owner/operator shall ensure that the stacks of A-1 and A-2 are at least 15 feet above grade and emit vertically. The owner/operator shall ensure that the height of the MBR aeration tank is at least 21 feet above grade. The owner/operator shall ensure that the height of the MBR filtration tank is at least 11.33 feet above grade. All stacks shall have a vertical release orientation and no rain cap. The wastewater system, S-100, may have a canopy but shall not have enclosed sides.
[Basis: Regulation 9-2, Regulation 2-1-320]

12. The owner/operator shall ensure that the gas flow from the MBR aeration tank, is at least 2,000 cfm and that the gas flow from the MBR filtration tank, is at least 280 cfm at all times while the MBR is in operation.
[Basis: Cumulative Increase, Regulation 2-1-320]

13. The owner/operator of A-1 and A-2 shall use the monitoring results obtained from part 8 to estimate the frequency of A-1 and A-2 carbon changeout necessary to maintain compliance with part 14.
[Basis: Cumulative Increase, Regulation 9-2]

14. The owner/operator of A-1 and A-2 shall immediately change out with unspent carbon each carbon bed exhibiting breakthrough, defined as detection at its outlet of 10 ppmv NMHC (measured as methane, using the measurements from part 8).
[Basis: Cumulative Increase, Regulation 9-2]

End of Conditions

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. However, the proposed source will be located within 1,000 feet of a

school, which triggers the public notification requirements of District Regulation 2-1-412. After the comments are received and reviewed, the District will make a final determination on the permit. The public comment period will start on January 22, 2021 and end on February 22, 2021.

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:

S-100 Brewery Wastewater Treatment Plant

including:

Preliminary Treatment
Rotary Screen, Make: IPEC, Model: IFU3048
Maximum Flow Rate: 200 gpm

and

Equalization Tank; 56,000 gallons

abated by:

A-2 Carbon Adsorption
Make: Continental Carbon Group; Foul Air Flow Rate: 400 CFM; Carbon Content: 225 lbs

also

Solids Handling; Rotary Fan Press

abated by:

A-1 Carbon Adsorption (two units); Foul Air Flow Rate: 1,000 CFM/unit; Carbon Content: 1,100 lbs/unit

in addition

Membrane Bioreactor (MBR) Treatment
Make: Cambrian; Model: Ecovolt MBR; Capacity: 147,000 gallons; Maximum Flow Rate: 50 gpm
Stack parameters: #1: 2,000 cfm, outlet at 21 feet, open, vertical; #2: 280 cfm, outlet at 11.33 feet, open vertical

DRAFT

By: _____ Date: _____

Ryan Atterbury
Air Quality Engineer

DRAFT