Potential to Emit Operating Permit Application Evaluation Report
Union Sanitary District
Application #23372
Plant #A1209

Background:

Union Sanitary District aka Raymond A Boege/Alvarado Wastewater Treatment Plant owns and operates a municipal wastewater treatment plant, Plant #A1209, located at 5072 Benson Road, Union City, California. This plant was constructed in 1981 and expanded in 1988 & 1993. The plant treats municipal wastewater from the cities of Fremont, Newark and Union City. The facility's current Title V permit was issued on July 29, 2004 and expired on June 30, 2009.

The application (#19497) to renew the Major Facility Permit was received on December 29, 2008. Because a complete renewal application was submitted at least six months prior to the expiration of the Title V permit, it continues to be in force until final action is taken on the application. Union Sanitary District (USD) assumed that the facility has the potential to emit more than 100 TPY of NOx and CO and applied for a Title V permit pursuant to Regulation 2-6-212.2. However, the plant's actual annual emission levels, post-capture and control, in reality have been and are well below the Title V permitting thresholds. In addition, USD has removed two hot water sludge heating boilers (S-40 & S-41). USD operates two reciprocating engine generators (S# 15 & 16). S#16 is still in operation, but S#15 has been removed from service. USD is in the process of designing a replacement cogeneration system. They anticipate that the emissions from the new cogeneration system will be lower than those from the existing system. In light of the above, USD changed their renewal application to that for a synthetic minor operating permit (SMOP) on May 25, 2011(# 23372). However, it has been determined that USD's potential to emit is less than any major source threshold. Therefore, USD is not subject to Title V permitting requirements and no SMOP is required. This evaluation report documents the facility's potential to emit (PTE). The District will cancel the Title V permit for this facility and inform the EPA and CARB of USD's change in Title V status. USD understands that if for any reason, the new cogeneration system's fuel consumption causes USD's PTE to exceed any of the major source thresholds, they are prepared to apply for a SMOP or Title V Permit at that time.

As shown by the following emissions calculations, this site does not have a potential to emit any pollutant that exceeds any of the major facility emissions thresholds. The pollutant of concern at USD is NOx. This facility's PTE for NOx is approximately 57 tons. USD has not operated in a manner resulting in emissions close to 95 tons per year for CO or NOx, as there have been no curtailments in recent years. Therefore, this site is not a major facility.

The last Title V evaluation states that the District has reviewed the wastewater borne emissions potential of the most frequently seen HAPs and concludes that Union Sanitary District is not a major source for HAP emissions or for combined HAP emissions. A conservative estimate of HAP emissions may be obtained by using the 80^{th} % factors as developed by the BAAT-AMSA – CWEA studies in the 1990s. The Union Sanitary District peak flow rate is approximately 85 million gallons per day and average dry weather rate is 33 million gallons per day. Therefore, the facility is not a major source for HAP.

In addition, this POTW is an existing POTW that has not been reconstructed (as defined by 40 CFR 63.1595). Furthermore, the Union Sanitary District is not an Industrial POTW as defined by 40 CFR 63.1595. Union Sanitary District processes strictly domestic wastewater streams.

The permitted sources and abatement devices covered by this operating permit are listed below in Table 1A and 1B.

Table IA – Permitted Sources

S-#	Description	Make or Type	Capacity
S-5	Standby Engine/Generator #2	Cummins; Diesel Fired Model KTA 23005	1005 HP
S-6	Standby Engine/Generator #3	Cummins; Diesel Fired Model KTA 23006	1005 HP
S-16	Reciprocating Engine/Generator #9, Lean Burn	Waukesha IC Engine, Digester Gas Fueled	750 HP (Electrical Output = 535 KW)
S-30	Standby Engine/Generator #5	Cummins; Diesel Fired, Model KTA 38G1	1005 HP
S-31	Standby Engine/Generator #6	Cummins; Diesel Fired, Model KTA 38G1	1005 HP
S-43	Hot Water Boiler #6	Cleaver-Brooks; Digester or Natural Gas, Model 700-200-125/FGR	8370K Btu/hr max
S-44	Standby Engine/Generator #7	Detroit, Diesel Fired,	2578 HP 16.3 MMBTU/hr
S-45	Standby Engine/Generator #8	Detroit, Diesel Fired,	2578 HP 16.3 MMBTU/hr
S-100	Wastewater Treatment Plant	Custom	48 MM gal/day capacity
S-101	Gasoline Dispensing Facility G6873	Emco Wheaton, A3003/A3005	10,000 gal, 1 Nozzle
S-110	Preliminary Treatment	Custom	48 MM gal/day capacity
S-111	Preliminary Treatment, 3 Barscreens	Custom	48 MM gal/day capacity
S-120	Primary Treatment	Custom	48 MM gal/day capacity
S-130	Secondary Treatment-East, Aeration Basins	Custom	48 MM gal/day capacity

S-#	Description	Make or Type	Capacity
S-131	Secondary Treatment-West, Aeration Basins	Custom	48 MM gal/day capacity
S-140	Secondary Treatment; Clarifiers	Custom	48 MM gal/day capacity
S-150	Disinfection	Custom	48 MM gal/day capacity
S-161	Sludge Handling - Gravity Thickeners	Custom	3.56 MM gal/day capacity
S-164	Sludge Handling - Gravity Belt Thickeners	Custom	3.56 MM gal/day capacity
S-170	Anaerobic Digester	Custom	352,000 gal/day capacity
S-180	Sludge Dewatering Building, 4 Centrifuges	Custom	352,000 gal/day capacity

Table I B – Abatement Devices

A-#	Description	Source(s) Controlled	Applicable Requirement	Operating Parameters	Required Efficiency
A-1	Odor Scrubber	S-120	BAAQMD Reg. 1-301	none listed	N/A
A-2	Odor Scrubber	S-120	BAAQMD Reg. 1-301	none listed	N/A
A-20	Odor Scrubber	S-110	BAAQMD Reg. 1-301	none listed	N/A
A-21	Odor Scrubber	S-120	BAAQMD Reg. 1-301	none listed	N/A
A-22	Odor Scrubber	S-120	BAAQMD Reg. 1-301	none listed	N/A
A-23	Odor Scrubber	S-120	BAAQMD Reg. 1-301	none listed	N/A
A-24	Odor Scrubber	S-111	BAAQMD Reg. 1-301	none listed	N/A
A-25	Odor Scrubber	S-111	BAAQMD Reg. 1-301	none listed	N/A
A-26	Odor Scrubber	S-164	BAAQMD Reg. 1-301	none listed	N/A
A-27	Odor Scrubber	S-164	BAAQMD Reg. 1-301	none listed	N/A
A-28	Odor Scrubber	S-130	BAAQMD Reg. 1-301	none listed	N/A
A-29	Odor Scrubber	S-131	BAAQMD Reg. 1-301	none listed	N/A
A-30	Odor Scrubber	S-130,	BAAQMD Reg. 1-301	none listed	N/A

A-31	Odor Scrubber	S-180	BAAQMD Reg. 1-301	none listed	N/A
A-32	Odor Scrubber	S-131	BAAQMD Reg. 1-301	none listed	N/A
A-33	Odor Scrubber	S-161,	BAAQMD Reg. 1-301	none listed	N/A
A-34	Odor Scrubber	S-180	BAAQMD Reg. 1-301	none listed	N/A
A-35	Odor Scrubber	S-120	BAAQMD Reg. 1-301	none listed	N/A
A-401	Digester Gas Flare #1, 4.7 MM Btu/hr	S-170	BAAQMD Reg. 1-301, 8-2-301	none listed	< 15 lb/day & 300 ppm C
A-402	Digester Gas Flare #2, 4.7 MM Btu/hr	S-170	BAAQMD Reg. 1-301, 8-2-301	none listed	< 15 lb/day & 300 ppm C
A-403	Digester Gas Flare #3, 5.17 MM Btu/hr	S-170	BAAQMD Reg. 1-301, 8-2-301	none listed	< 15 lb/day & 300 ppm C

The exempted sources at this facility are:

S-32 6,000 gallon fixed roof tank, diesel fuel, exempted per Regulation 2-1-123.3.2
S-102 10,000 gallon underground storage tank, diesel fuel, exempted per Regulation 2-1-123.3.3

BACKGROUND INFORMATION OF SOURCE OPERATION

S-100 is the wastewater treatment plant processes that include both wastewater and solids treatment processes from cities of Fremont, Newark and Union City.

Wastewater treatment Processes
Wastewater flows by gravity from Union City service area to the Alvarado pump station where it receives preliminary treatment by bar screening before being pumped to the treatment plant headwork's building. The Alvarado Pump Station is S- 110 and is abated by odor scrubber A-20.

Wastewater pumped from the cities of Fremont and Newark combined with the effluent from the Alvarado Pump station at the treatment plant headwork's building where the wastewater receives preliminary treatment. Preliminary treatment processes within the headwork's building include influent sampling, bar screening by automatic Climber type bar screens, and flow

measurement by two Parshall flumes. Screenings removed by the bar screens are conveyed to the debris bin for disposal. The headwork's building is S-111 and is abated by scrubber A-24 and A-25.

Wastewater flow from the headwork's building combines with recycled water from plant drainage and other plant uses is conveyed to primary treatment. Solids are removed from the wastewater by gravity sedimentation in six primary clarifiers. Primary treatment is S-120 and is abated by odor scrubbers A-1, A-2, A-21, A-22, and A-23. Solids separated from the wastewater during primary treatment (primary solids) are subject to grit removal, a further preliminary treatment process, which is considered part of S-110 and abated by odor scrubber A-35.

Wastewater from primary treatment is conveyed to secondary treatment for removal of readily biodegradable organics by an activated sludge treatment process. The secondary treatment process is comprised of seven aeration basins arranged into east and west aeration trains. The East aeration train consists of four aeration basins and is known collectively as S-130, and is abated by A-28and A-30. The West aeration train consists of three aeration basins collectively known as S-131 and abated by scrubbers A-29 and A-32.

After secondary treatment the wastewater is conveyed to six secondary clarifiers for the removal of activated sludge aeration solids (secondary solids) from the wastewater by gravity sedimentation. The secondary clarifiers are collectively known as S-140. Most of the aeration solids are returned to secondary treatment. However, a small portion of aeration solids are removed (wasted) or sent to solids processing and disposal.

Clarified effluent from the secondary clarifiers is disinfected with sodium hypochlorite in the disinfection process S-150. After disinfection the wastewater is pumped offsite for dechlorination at the East Bay Dischargers San Leandro dechlorination station and disposal to a deep water discharge in the lower San Francisco Bay.

<u>Solids Handling Processes:</u>
Degritted solids from primary treatment and aeration solids from secondary treatment are sent to gravity pre-thickening to remove excess water before further processing. Gravity thickening is comprised of four gravity thickening tanks that are collectively S-161 and abated by A-33. After pre-thickening, primary solids are sent to anaerobic digestion.

Secondary solids are further treated to remove water by belt thickening before being sent to anaerobic digestion. The treatment plant has 3 gravity belt thickeners which are collectively S-164, and are abated by A-26 and A-27.

Solids from the thickening and pre-thickening processes are pumped to six anaerobic digesters where the solids are biologically fermented at controlled time and temperature to stabilize the solids and reduce the concentration of pathogenic organisms in the wastewater solids. The six anaerobic digesters are S-170. Carbon dioxide and methane are created as part of the anaerobic digestion process and are collectively known as digester gas. The digester gas is beneficially reused for cogeneration by S-16, a 750 hp internal combustion engine generator that creates electricity to offset the treatment plant electrical demand and hot water to keep the anaerobic digesters at a constant temperature or combusted in Industrial (back- up) boiler S-43

to provide hot water to heat the anaerobic digesters. Digester gas that cannot be beneficially reused is abated by process flares A-401, A-402, and A-403.

Residual solids (biosolids) that leave the anaerobic digestion process are conveyed to S-180 where they are dewatered by four high solids centrifuges to remove as much remaining water as possible before being hauled offsite for beneficial reuse.

Supporting Equipment and Miscellaneous Sources:
To prevent the spillage of wastewater and associated public health concerns, Union Sanitary District has several emergency diesel generators that are used to provide electricity for the treatment plant in the event of an electrical utility failure. S-5 and S-6 are twin 1005 hp diesel engine generators manufactured by Cummins, S-30 and S-31 are twin 1005 hp Cummins diesel engine generators, and S-44 and S-45 are twin 2518 hp Detroit diesel engine generators.

Fuel for the emergency diesel engine generators is stored in S-32, a 6,000 gallon fixed roof diesel fuel storage tank.

USD has a single nozzle gasoline dispensing station and a 10,000 gallon underground gasoline storage tank (G-6873), S-101, that dispenses gasoline and diesel fuel from S-102, 10,000 gallon diesel underground storage tank to fuel District vehicles.

Emission Limits Strategy

All the odor causing sources at this facility are abated by odor scrubbers. Emission factors for the combustible sources were taken from AP-42 for Chapter 3.4, Large Stationary Diesel and All Stationary Dual-fuel Engines. S-43, the industrial boiler was recently tested in May 2011. Source test data was used for the permitted boiler to determine the nitrogen oxide (NOx) and carbon monoxide (CO) combustion emissions. AP-42 emission factor were used for the other combustion sources and the other pollutants of the boiler. Emission factors for the GDF were derived from the annual throughput and AP-42 modeling program.

Emission factors for the Hazardous Air Pollutants were taken from the Pooled Emission Estimation Program (PEEP) study. In response to AB2588, twenty-four agencies with publicly owned Treatment Works (POTWs) initiated a voluntary Pooled Emission Estimation Program (PEEP) at 21 facilities for 18 unit processes in California. For majority of the unit processes, tests were conducted at three different facilities during each round. The target compounds were selected 21 volatile organic compounds (VOCs), formaldehyde and 2, 4, 6 tri-chloro-phenol. The program collected and analyzed approximately 2060 air samples and 1220 liquid samples to develop emission factors for estimating air emissions using liquid/sludge VOC concentrations for liquid, sludge and digester gas handling treatment facilities.

EPA has recently adopted Title V permitting thresholds for greenhouse gas (GHG) emission that became effective for all sites on July 11, 2011. Any site that has a potential to emit more than 100,000 tons per year of greenhouse gases (expressed as CO2 equivalent tons per year) will be deemed a major facility and required to obtain a Title V permit.

As shown by the following emissions calculations, this site does not have a potential to emit for any pollutant that exceeds any major source thresholds.

EMISSIONS SUMMARY

Combustion Sources:

The plant's combustion sources consist of one co-generation engine (S-16), one boiler (S-43), and six diesel powered emergency backup generators (S-5, S-6, S-30, S-31, S-44 & S-45).

Greenhouse Gas Emissions for Diesel Fueled Sources

S #	Source Name	Fuel usage (gal/hr)	Annual fuel usage (gal/yr)[1]	Tons $C0_2$ per year [2,3]	Tons CH_4 per year [2,4]	Tons N_20 Per year [2,4]	Total Tons CO2e per year [5]
S-5	Standby Engine/ Generator #2	50	25000	281	0.01	0.002	282
S-6	Standby Engine/ Generator #3	50	25000	281	0.01	0.002	282
S-30	Standby Engine/ Generator #5	50	25000	281	0.01	0.002	282
S-31	Standby Engine/ Generator #6	50	25000	281	0.01	0.002	282
S-44	Standby Engine/ Generator #7	117	58500	658	0.03	0.005	660
S-45	Standby Engine/ Generator #8	117	58500	658	0.03	0.005	660
Totals				**2440**	**0.10**	**0.018**	**2448**

[1] based on 500 hrs per year operating time

[2] fuel heat value of 0.138mmBtu/gal for no.2 diesel from 40 CFR 98.3 Table C 1

[3] emission factor of 73.96kgCO_2/mmbtu from 40 CFR 98.3 Table C 1

[4] emission factors .003kgCH_4/mmBtu and .0006 kgN_20/mmBtu from 40 CFR 98.3 Table C-2

[5] Global warming potential is 21 for CH_4 and 310 for N_20 per 40 CFR part 98 table A-1

Greenhouse Gas Emissions for Digester/Natural Gas Fueled Sources & Flares

S #	Source Name	Max. Firing Rate (MMBTU/yr)[1]	Rated Capacity (MMBTU/hr)[2]	Tons $C0_2$/yr[3]	Tons CH_4/yr[2,4,5]	Tons N_20/ yr[2,4,6]	Total Tons $C0_2e$ per year[7,8]
S-16	Engine/ Generator #9	51684		0	0.2	0.04	15
S-43	Hot Water Boiler	52800		3086	0.1	0.01	3089
A-401	Flare #1		4.7	0	0.1	0.03	12
A-402	Flare #2		4.7	0	0.1	0.03	12
A-403	Flare #3		5.17	0	0.2	0.03	13
Totals				**3,086**	**0.7**	**0.14**	**3,141**

[1] Maximum heat input per existing permit conditions

[2] assumes all heat input from natural gas which is the worst case scenario

[3] emission factor is 53.02kg CO2/mmBtu for natural gas per 40 CFR 98 table C-1

[4] emission factor is 52.07 kg CH4/mmBtu for biogas per 40 CFR 98 table C-1

[5] emission factors for Biogas is $3.2*10^{-3}$ kgCH4/mmbtu for biogas and $1.0*10^{-3}$ kgCH4 for Natural gas per CFR 40 CFR 98 table C-2

[6] emissions factors for N2O are $6.3X10^{-4}$ kgN2O/mmBtu for biogas and $1.0x10^{-4}$ kgN2O/mmBtu for natural gas

[7] Biogenic CO2 from Biogas excluded from calculations

[8] Global warming potential is 21 for CH4 and 310 for N20 per 40 CFR part 98 table A-1

Greenhouse gases from all the combustible sources including the flare consists ~96% biogenic CO_2. The remaining components are minute quantities of methane and nitrous oxide In light of the above, the difference between CO_2 and CO_2 equivalent are negligible.

Total potential to emit CO_2 equivalent emissions are: 2448 + 3141 TPY = 5589 TPY

Criteria Pollutants:

Diesel-fired emergency standby generators (S-5, S-6, S-30, S-31 S-44 & S-45)

Total fuel use based on 500 hr/yr operation of each engine and fuel usage rates of 50 gal/yr (S-5, S-6, S-30 & S-31) and 117 gal/yr (S-44 & S-45)

Emission Factors

	AP-42 Table 3.4-1 EF[(1)] (lb/MM BTU)	Calculated EF (lb/gallon)
NOx	3.2	0.438
CO	0.85	0.116
POC	0.09	0.012
PM_{10}	0.1	0.014
SO_2		0.000213[(2)]

[(1)] diesel fuel density 7.1 lbs/gal and heat content (0.019300 MMBTU/lb)
[(2)] calculated based on 15 ppm sulfur in fuel by weight; diesel fuel density 7.1 lbs/gal
calculation: EF (lbs/gal) = (0.000015 * 7.1) /(32/64)

Emissions

Source	NOx (lb/hr)	NOx (TPY)	CO (lb/hr)	CO (TPY)	POC (lb/hr)	POC (TPY)	PM_{10} (lb/hr)	PM_{10} (TPY)	SO_2 (lb/hr)	SO_2 (TPY)
S-5	1.25	5.48	0.33	1.46	0.04	0.15	0.04	0.17	6.08 E-04	2.66 E-03
S-6	1.25	5.48	0.33	1.46	0.04	0.15	0.04	0.17	6.08 E-04	2.66 E-03
S-30	1.25	5.48	0.33	1.46	0.04	0.15	0.04	0.17	6.08 E-04	2.66 E-03
S-31	1.25	5.48	0.33	1.46	0.04	0.15	0.04	0.17	6.08 E-04	2.66 E-03
S-44	2.93	12.83	0.78	3.41	0.08	0.36	0.09	0.40	1.42 E-03	6.23 E-03
S-45	2.93	12.83	0.78	3.41	0.08	0.36	0.09	0.40	1.42 E-03	6.23 E-03
Total		**47.6**		**12.6**		**1.3**		**1.5**		**0.02**

Digester Gas Combustion

USD's plant capacity is limited by its National Pollutant Discharge Elimination System (NPDES) permit to 33 MGD dry weather flow. Based on 33 MGDs of influent wastewater flow, the maximum annual digester gas generation is estimated to be 264 million standard cubic feet (MMscf) per year. Assuming a digester gas average heat content of 600 BTU/scf, this represents a maximum of 158,400 million BTU per year of digester gas. Digester gas is combusted in S-16 (lean burn internal combustion engine), S-43 hot water boiler and A-401, A-402 & A-403 digester gas flares. The thermal throughput limit for S-16 is 51,684 million BTU/year (86.14 MMscf/yr) and the heat input limit for S-43 is 52,800 million BTU/yr (88 MM scf/yr). The balance of digester gas is burned in the flares, A-401, A-402 & A-403 which is 53,916 million BTU/yr (~90 MM scf/yr)

S-16 Lean Burn Internal Combustion (IC) Engine Generator #9
Rated 750 HP

Pollutant	**Emission factor (g/bhp-hr)** [(1)]	**Emissions (lb/hr)**	**Emissions (TPY)** [(2)]
NOx	1.0[(1)]	1.65	7.24
CO	2.65[(1)]	4.38	19.2
POC	0.12[(3)]	0.20	0.87
PM10	0.08[(3)]	0.13	0.58
SO2		0.05	0.22

[(1)] based on permit condition # 20905
[(2)] calculated based on full time operation of engine
[(3)]Permit Application # 9735 submitted 9/92
SO2 Emission factor 0.00481 based on max fuel usage rate of 10.2 mscf/hr and digester gas total reduced sulfur value of 27 ppmv (as H2S) from a sample collected on 5/15/2008 (Digester Gas Composition Report)
Emission Factor lb/cu.ft. = [TRS as H2S]/(1E6)*(1 lbmole/359 cu.ft.)*(64 lb/lb-mole)

S-43 Hot Water Boiler
S-43 Boiler is dual fuel fired. It has a maximum allowable firing rate of 52,800 MMBtu/yr which is imposed by permit condition # 18803. The boiler is fired mainly on digester gas and will fire on natural gas if digester gas is not available. S-43 was source tested most recently on May 27, 2011. The following average emission factors for digester gas were derived from that source test. The emission factors for natural gas are from AP-42 Chapter 1 Table 1.4-1 & 1.4-2.

Basis:
Natural Gas
Firing Rate: 52,800 MMBtu/yr [(1)]

Pollutant	**Emission factor (lb/Mscf)**[(1)]	**Calculated Emission Factor (lb/MMBtu)**	**Emissions (TPY)**
NOx	100	0.098	2.59
CO	84	0.082	2.17
POC	5.5	0.0054	0.142
PM10	7.6	0.075	0.197
SO2	0.6	0.0059	0.016

[(1)] AP-42; tables 1.4-1 for NOx and CO (uncontrolled small boiler) & table 1.4-2 for POC (as VOC), PM10 (as total PM), and SO2. Note that this boiler does have flue gas recirculation, so emissions are less.

Basis:
Digester Gas
Max digester gas consumption - 88,000,000 ft^3/yr

Pollutant	Corrected ppm@3%O2 (ppm) (1)	Calculated lb/MMBtu	Emissions (lb/hr)	Emissions (TPY)
NOx	27.3	0.033(1)	0.16	0.87
CO	<1.3	<0.001(1)	<0.005	<0.03
POC		0.0114(2)	0.069	0.301
PM10		0.005(2,3)	0.030	0.132
SO2		0.00481(2,3)	0.005	0.212

High Heating Value of Digester Gas -600 BTU/scf
Emission Factor Reference – Permit Application # 9735 submitted 9/92
Maximum digester gas consumption **-** Annual fuel usage is from 2006 BAAQMD Annual Update Report submitted 11/15/2007
(1)Average values based on source testing conducted May 27, 2011
(2) calculation = EF (lbs/MMBtu)/1,000,000 * heating value (BTU/scf)*1000
(3) SO2 Emission factor based on digester gas total reduced sulfur value of 27 ppmv (as H2S) from a sample collected on 5/15/2008

Natural Gas vs. Digester Gas

Pollutant	Emissions when fired on Digester Gas(TPY)	Emissions when fired on Natural Gas (TPY)
NOx	0.87	2.59*
CO	< 0.03	2.17*
POC	0.301*	0.142
PM10	0.132	0.197*
SO2	0.212*	0.016

*Highest
S-43 is a dual fuel boiler. The above table shows the maximum PTE for either fuel (CO and PM10 are based on natural gas, remainder of emission based on digester gas as fuel)

A-401, A-402 & A-403 Digester Gas Flares
Maximum digester gas consumption – 90,000,000 ft^3/yr

Pollutant	Emission factor (lb/MMscf CH_4)	Calculated Emission Factor (lb/MMBtu)	Emissions (TPY)
NOx	39.3(1)	0.04	1.06
CO	46.0(1)	0.05	1.24
POC	0.0068	0.0113	0.31
PM10	14.8(1)	0.01	0.40
SO2	0.00481	0.26	Neg

(1)AP-42; Tables 3-4, 3-5 & 3-6 for NOx, CO & PM for flares (September 2008 update)
(2) calculation = EF (lbs/mscf)*1,000,000/(heating value (BTU/scf)*1000)
Digester gas average heat content of 600 BTU/scf
SO2 Emission factor 0.00481 based on max fuel usage rate of 10.2 mscf/hr and digester gas total reduced sulfur value of 27 ppmv (as H2S) from a sample collected on 5/15/2008 (Digester Gas Composition Report)
Emission Factor lb/cu.ft. = [TRS as H2S]/(1E6)*(1 lbmole/359 cu.ft.)*(64 lb/lb-mole)

POC:

Other than combustion sources discussed above, there is only one permitted precursor organic compound (POC) source. The permitted source is S-101 Gasoline Dispensing Facility (GDF). The two exempted sources are two diesel storage tanks. Both sources are exempted per Regulation 2-1-123.2.

Emission Factors

	Emission Factor (lb/gallon dispensed)	Emission Factor Reference
POC	0.00106	BAAQMD Permit Handbook (5% of 21.2 lb/thousand gallons)

S-#	Source Description	Max Monthly Gasoline Dispensed[1] (gallons)	Permitted Annual Gasoline Dispensed (gallons)	POC (TPM*)	POC (TPY)
101	GDF	150,000	600,000	0.080	0.318

[1]Assume 25% of annual permitted value.

*tons per month

No additional record keeping will be required for the permitted sources to limit POC emissions.

Union Sanitary District USA will be required to keep a record of daily throughput, summarized on a monthly basis and monthly year-to-date summaries. The sum of twelve months of operation would not exceed the rolling annual throughput limit. Union Sanitary District USA will submit a usage report every year to the District's Compliance and Enforcement Division for review and inspection EPA is also free to inspect the records at any time.

Summary of Criteria Pollutants:

The total potential to emit emissions (TPY) from all permitted sources are:

		Emissions (TPY)				
Source #	**Source Name**	**NOx**	**CO**	**SO2**	**POC**	**PM10**
S-5	Standby Engine/Generator #2	5.48	1.46	<0.01	0.15	0.17
S-6	Standby Engine/Generator # 3	5.48	1.46	<0.01	0.15	0.17
S-30	Standby Engine/Generator # 5	5.48	1.46	<0.01	0.15	0.17
S-31	Standby Engine/Generator # 6	5.48	1.46	<0.01	0.15	0.17
S-44	Standby Engine/Generator # 7	12.83	3.41	0.01	0.36	0.40
S-45	Standby Engine/Generator # 8	12.83	3.41	0.01	0.36	0.40
S-16	Engine/Generator # 9	7.24	19.20	0.22	0.87	0.58
S-43	Hot Water Boiler #6	2.59	2.17	0.21	0.30	0.20
S-101	Gasoline Dispensing Facility, G-6873	Neg.	Neg.	Neg.	0.50	Neg.
S-100	Municipal Wastewater Treatment Plant	Neg.	Neg.	Neg.	Neg.	Neg.
Total		**58.47**	**35.27**	**0.45**	**3.30**	**2.66**

As shown by the above emissions calculations, this site's does not have the potential for emit any criteria pollutants that exceeds any threshold.

Hazardous Air Pollutants (HAPS):

Six emergency standby generators are diesel fired only,

S-#	Description	Max. Diesel Fuel Usage (gal/hr)	Max. annual operating time (hr/yr)	Max. Diesel Fuel Usage (gal/yr)	Diesel Fuel (MMBtu/hr)	Diesel Fuel (MMBTU/yr
5	Standby Engine/ Generator # 2	50	500	25000	6.8515	3425.75
6	Standby Engine/ Generator # 3	50	500	25000	6.8515	3425.75
30	Standby Engine/ Generator # 5	50	500	25000	6.8515	3425.75
31	Standby Engine/ Generator # 6	50	500	25000	6.8515	3425.75
44	Standby Engine/ Generator # 7	117	500	58,500	16.033	8016.23
45	Standby Engine/ Generator # 8	117	500	58,500	16.033	8016.23

Digester Gas

HAP	EF[1] (lb/MMBTU)	HAP Emissions (lb/yr)					
		S-5	S-6	S-30	S-31	S-44	S-45
Acetaldehyde	2.52E-05	8.63E-02	8.63E-02	8.63E-02	8.63E-02	2.02E-01	2.02E-01
Acrolein	7.88E-06	2.70E-02	2.70E-02	2.70E-02	2.70E-02	6.32E-02	6.32E-02
Benzene	7.76E-04	2.66E+00	2.66E+00	2.66E+00	2.66E+00	6.22E+00	6.22E+00
Formaldehyde	7.89E-05	2.70E-01	2.70E-01	2.70E-01	2.70E-01	6.32E-01	6.32E-01
Toluene	2.81E-04	9.63E-01	9.63E-01	9.63E-01	9.63E-01	2.25E+00	2.25E+00
Xylenes	1.93E-04	6.61E-01	6.61E-01	6.61E-01	6.61E-01	1.55E+00	1.55E+00
Naphthalene	1.30E-04	4.45E-01	4.45E-01	4.45E-01	4.45E-01	1.04E+00	1.04E+00
Acenaphthylene	9.23E-06	3.16E-02	3.16E-02	3.16E-02	3.16E-02	7.40E-02	7.40E-02
Acenaphthene	4.68E-06	1.60E-02	1.60E-02	1.60E-02	1.60E-02	3.75E-02	3.75E-02
Fluorene	1.28E-05	4.38E-02	4.38E-02	4.38E-02	4.38E-02	1.03E-01	1.03E-01
Phenanthrene	4.08E-05	1.40E-01	1.40E-01	1.40E-01	1.40E-01	3.27E-01	3.27E-01
Anthracene	1.23E-06	4.21E-03	4.21E-03	4.21E-03	4.21E-03	9.86E-03	9.86E-03
Fluoranthene	4.03E-06	1.38E-02	1.38E-02	1.38E-02	1.38E-02	3.23E-02	3.23E-02
Pyrene	3.71E-06	1.27E-02	1.27E-02	1.27E-02	1.27E-02	2.97E-02	2.97E-02
Benz(a)anthra	6.22E-07	2.13E-03	2.13E-03	2.13E-03	2.13E-03	4.99E-03	4.99E-03

cene							
Chrysene	1.53E-06	5.24E-03	5.24E-03	5.24E-03	5.24E-03	1.23E-02	1.23E-02
Benzo(b)fluoranthene	1.11E-06	3.80E-03	3.80E-03	3.80E-03	3.80E-03	8.90E-03	8.90E-03
Benzo(k)fluoranthene	2.18E-07	7.47E-04	7.47E-04	7.47E-04	7.47E-04	1.75E-03	1.75E-03
Benzo(a)pyrene	2.57E-07	8.80E-04	8.80E-04	8.80E-04	8.80E-04	2.06E-03	2.06E-03
Indeno(1,2,3-cd)pyrene	4.14E-07	1.42E-03	1.42E-03	1.42E-03	1.42E-03	3.32E-03	3.32E-03
Dibenz(a,h)anthracite	3.46E-07	1.19E-03	1.19E-03	1.19E-03	1.19E-03	2.77E-03	2.77E-03
Benzo(g,h,i)perylene	5.56E-07	1.90E-03	1.90E-03	1.90E-03	1.90E-03	4.46E-03	4.46E-03
PAH	2.12E-04	7.26E-01	7.26E-01	7.26E-01	7.26E-01	1.70E+00	1.70E+00
Total HAPs (lb/yr)		6.12E+00	6.12E+00	6.12E+00	6.12E+00	1.43E+01	1.43E+01
Total HAPs (ton/yr)		**3.06E-03**	**3.06E-03**	**3.06E-03**	**3.06E-03**	**7.16E-03**	**7.16E-03**

[1]Emission factors from EPA AP-42 Chapter 3.4 Table 3.4-4

S-#	Description	Size (hp)	Max. Monthly Hours of Operation	Max. Yearly Hours of Operation
S-16	Engine/Generator # 9 (digester gas)	750	744	8760

HAP	EF* (lb/1000hp-hr)	S-16
Acetaldehyde	2.50E-05	1.64E-01
Acrolein	2.50E-05	1.64E-01
Benzene	5.20E-03	3.42E+01
Formaldehyde	5.70E-04	3.74E+00
Methylene chloride	7.30E-04	4.80E+00
Styrene	4.60E-04	3.02E+00
Toluene	2.40E-03	1.58E+01
Trichloroethylene	2.00E-05	1.31E-01
Xylenes	6.95E-04	4.57E+00
Vinyl chloride	5.60E-05	3.68E-01
Total HAPs (lb/yr)		6.69E+01
Total (ton/yr)		**3.34E-02**

*EFs from PEEP Study
Emission factors from EPA AP-42 Chapter 3.4 Table 3.4-4

S-43 – Boiler

Digester Gas	EF (lb/MM CF)[1]	HAP Emissions (lb/month)	HAP Emissions (lb/yr)
Benzene	2.10E-03	2.19E-02	1.85E-01
Formaldehyde	7.50E-02	7.81E-01	6.60E+00
Toluene	3.40E-03	3.54E-02	2.99E-01
Naphthalene	6.10E-04	6.35E-03	5.37E-02
Acenaphthylene	1.80E-06	1.87E-05	1.58E-04
Acenaphthene	1.80E-06	1.87E-05	1.58E-04
Fluorene	2.80E-06	2.92E-05	2.46E-04
Phenanthrene	1.70E-05	1.77E-04	1.50E-03
Anthracene	2.40E-06	2.50E-05	2.11E-04
Fluoranthene	3.00E-06	3.12E-05	2.64E-04
Pyrene	5.00E-06	5.21E-05	4.40E-04
Benz(a)anthracene	1.80E-06	1.87E-05	1.58E-04
Chrysene	1.80E-06	1.87E-05	1.58E-04
Benzo(b)fluoranthene	1.80E-06	1.87E-05	1.58E-04
Benzo(k)fluoranthene	1.80E-06	1.87E-05	1.58E-04
Benzo(a)pyrene	1.20E-06	1.25E-05	1.06E-04
Indeno(1,2,3-cd)pyrene	1.80E-06	1.87E-05	1.58E-04
Dibenz(a,h)anthracene	1.20E-06	1.25E-05	1.06E-04
Benzo(g,h,i)perylene	1.20E-06	1.25E-05	1.06E-04
Dichlorobenzene	1.20E-03	1.25E-02	1.06E-01
Hexane	1.80E+00	1.87E+01	1.58E+02
Total HAPs (lb/yr)		1.96E+01	1.66E+02
Total HAPs (ton/yr)		9.80E-03	8.28E-02

[1]Emission Factors from EPA AP-42 Chapter 1.4, Table 1.4-3.

S-100 – Waste Water Treatment Plant

	B Treatment Plant 1990 AB2588 Emissions (lb/yr)[1]	C Maximum Treatment Plant Influent Loading (lb/yr)[2]	Treatment Plant HAP for Application (lb/yr)[3]
Acetaldehyde	1.9		1.90E+00
Acrolein	1.2	<417	4.17E+02
Benzene	85.2	152	1.52E+02
Formaldehyde	10.1		1.01E+01
Toluene	142.4	377	3.77E+02
Xylenes	67.7		6.77E+01
Fluoranthene	10.1		1.01E+01
Methylene chloride	649.5	160	6.50E+02
Trichloroethylene	90.4		9.04E+01
Chloroform	314.3	731	7.31E+02
1,1,1-Trichloroethane	108.1	<65	1.08E+02
Tetrachloroethylene	364.7	165	3.65E+02
Totals			**2979.5**
Total (tons/yr)			**1.49**

1. Treatment Plant HAP Emissions from USD TV 1995 Application Package (AB2588)
2. HAP Emissions from USD Pretreatment Semi-Annual Organic Pollutant Test Results (Jan 2003-Feb 2006)
3. Estimated emissions are the highest of columns B and C

S-101 Gasoline Dispensing Facility

S-#	Description	VOC Emission* (ton/month)	VOC Emission* (ton/yr)
S101	GDF	7.95E-02	3.18E-01

HAPs	Vapor Phase Mass Fraction**	Total Emissions (lb/month)	Total Emissions (lb/yr)
Benzene	5.60E-03	0.89	3.56E+00
Ethylbenzene	4.00E-04	0.06	2.54E-01
Hexane	5.10E-03	0.81	3.24E+00
Cumene	1.00E-04	0.02	6.36E-02
Toluene	6.20E-03	0.99	3.94E+00
Xylenes	1.70E-03	0.27	1.08E+00
Total HAPs (lb/yr)		3.04	1.21E+01
Total (tons/yr)		0.00	6.07E-03

*From criteria pollutant emissions
**Vapor phase mass fraction from EPA Tanks model

A-401, A-402 & A-403 Digester Gas Flares

Digester gas may contain small quantities of numerous HAPs such as toluene, benzene,

methylene chloride, and vinyl chloride. Digester gas flares will have residual emissions of these HAPs. In addition, the flares may emit secondary HAPs such as formaldehyde, which results from the combustion of methane, and acid gases such as hydrogen chloride and hydrogen fluoride that result from the combustion of halogenated compounds. As a worst case assumption, all of the NMOC in the flare exhaust is assumed to be HAPs, and the maximum potential organic HAP emission factor is 0.0169 lbs/MM BTU.

Worst case emission rates for acid gases are be determined based on AP-42 default concentrations (using landfill gas) for halogenated compounds and the assumption that all chloride and fluoride ions will be converted to HCl and HF, respectively. The AP-42 default concentrations result in a total of 127 ppmv of Cl ions and 37.4 ppmv of F ions. The default methane content for AP-42 is 55% with a heat content of 546.638 BTU/ft^3 at 70 ^oF. Based on testing of the digester gas at USD, the heat content has been adjusted to 600 MMBtu/scf.

(127 ft^3 Cl/MM ft^3 LFG)/(600 MM BTU/MM ft^3 LFG)/(387.006 ft^3 Cl/lbmol Cl)*
(1 lbmol HCl/1 lbmol Cl)*(36.461 lbs HCl/lbmol HCl) = 0.0199 lbs HCl/MM BTU

(37.4 ft^3 F/MM ft^3 LFG)/(600 MM BTU/MM ft^3 LFG)/(387.006 ft^3 F/lbmol F)*
(1 lbmol HF/1 lbmol F)*(20.006 lbs HF/lbmol HF) = 0.00322 lbs HF/MM BTU

The total HAP emissions rate is the sum of the organic and acid gas HAPs, which is 0.0401 lbs HAP/MM BTU or 2.00 E-05 TPY.

Since there are no site-specific analytical data for these compounds, worst cast emission rates will be assumed for both PTE and actual emission calculations.

Summary of HAPS

Sources	Total Combined HAP emissions (TPY)
S-5	3.06E-03
S-6	3.06E-03
S-16	3.34E-02
S-30	3.06E-03
S-31	3.06E-03
S-43	8.28E-02
S-44	7.16E-03
S-45	7.16E-03
S-100	1.49E-00
S-101	6.07E-03
A-401, A-402 & A-403	2.00E-05
Total	**1.64E+00**

The cumulative total HAPs do not even exceed the 9 TPY limit for any single hazardous air pollution. As shown by the following emissions calculations, this site's does not have the potential for emit any HAP that exceeds any threshold.

STATEMENT OF COMPLIANCE:

This facility does not have the potential to emit at or above the thresholds for a major facility as defined in Regulation 2-6-212.

RECOMMENDATION:

The PTE determination analysis shows that USD does not emit any criteria pollutants, HAPs, or greenhouse gas emissions at or above the thresholds for a major facility. In light of the above, it is recommended that the Union Sanitary District's Title V permit be cancelled. This facility will continue to operate all the permitted sources in compliance with the District's rules and regulations and the existing permit conditions.

PERMIT TO OPERATE
UNION SANITARY DISTRICT
PLANT A1209
5072 BENSON ROAD
UNION CITY, CA 94587

PERMIT SOURCES

Permitted Sources:

S-#	Description
S-5	Standby Engine/Generator #2
S-6	Standby Engine/Generator #3
S-16	Reciprocating Engine/Generator #9, Lean Burn
S-30	Standby Engine/Generator #5
S-31	Standby Engine/Generator #6
S-43	Hot Water Boiler #6
S-44	Standby Engine/Generator #7
S-45	Standby Engine/Generator #8
S-100	Wastewater Treatment Plant
S-101	Gasoline Dispensing Facility G6873
S-110	Preliminary Treatment
S-111	Preliminary Treatment, 3 Barscreens
S-120	Primary Treatment
S-130	Secondary Treatment-East, Aeration Basins
S-131	Secondary Treatment-West, Aeration Basins
S-140	Secondary Treatment; Clarifiers
S-150	Disinfection
S-161	Sludge Handling - Gravity Thickeners
S-164	Sludge Handling - Gravity Belt Thickeners

S-#	Description
S-170	Anaerobic Digester
S-180	Sludge Dewatering Building, 4 Centrifuges

A-1	Odor Scrubber
A-2	Odor Scrubber
A-20	Odor Scrubber
A-21	Odor Scrubber
A-22	Odor Scrubber
A-23	Odor Scrubber
A-24	Odor Scrubber
A-25	Odor Scrubber
A-26	Odor Scrubber
A-27	Odor Scrubber
A-28	Odor Scrubber
A-29	Odor Scrubber
A-30	Odor Scrubber
A-31	Odor Scrubber
A-32	Odor Scrubber
A-33	Odor Scrubber
A-34	Odor Scrubber
A-35	Odor Scrubber
A-401	Digester Gas Flare #1, 4.7 MM Btu/hr
A-402	Digester Gas Flare #2, 4.7 MM Btu/hr
A-403	Digester Gas Flare #3, 5.17 MM Btu/hr

Exempted Sources:
S-32 6,000 gallon fixed roof tank, diesel fuel
S-102 10,000 gallon underground storage tank, diesel fuel

Nancy Yee Date
Senior Air Quality Engineer

h:\pub_data\titlev\synmin\evals\23372eva.doc