

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION PERMIT APPLICATION EVALUATION AND CALCULATIONS	PAGES 10	PAGE 1
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Permit to Construct (Alteration/Modification)

Applicant Eastern Municipal Water District (EMWD) –Perris Valley
Regional Water Reclamation Facility (PVRWRF)

Mailing Address 2270 Trumble Road
P.O. Box 8300
Perris, CA 92572

Equipment Location 1301 Case Road
Perris, CA 92570

APPLICATION 514066 FACILITY ID 007417

Equipment Description

ALTERATION OF APPLICATION NO. 466467

WASTEWATER TREATMENT PLANT, 25 MGD CAPACITY, CONSISTING OF THE FOLLOWING:

- I. CONVENTIONAL ACTIVATED SLUDGE PLANT NO. 1, 3 MGD CAPACITY, AEROBIC DIGESTION CONSISTING OF:
 1. LIFT STATION WITH ASSOCIATED PUMPS AND MOTORS.
 2. HEADWORKS WITH RAW SEWAGE PUMPING AND GRINDING SYSTEM, WET WELL AND ASSOCIATED PUMPS.
 3. GRIT REMOVAL CHAMBER, 14'-0" W. X 15'-0" L. X 13'-0" D., WITH A SCREW AUGER AND ASSOCIATED PUMPS.
 4. TWO PRIMARY CLARIFIERS, EACH 15'-0" W. X 65'-0" L. X 10'-0" D. WITH ASSOCIATED PUMPS.
 5. EQUALIZATION BASIN, 1 MILLION GALLON CAPACITY.
 6. TWO AERATION TANKS, EACH 30'-0" W. X 150'-0" L. X 15'-0" D.
 7. THREE SECONDARY CLARIFICATION TANKS, EACH 16'-0" W. X 84'-0" L. X 10'-0" D., WITH ASSOCIATED PUMPS.
 8. SECONDARY SLUDGE WET WELL, 15'-0" W. X 15'-0" L. 15'-0" D. WITH ASSOCIATED PUMPS.
 9. AEROBIC DIGESTER, 30'-0" W. X 150'-0" L. X 15'-0" D.
 10. SEPTAGE RECEIVING SYSTEM WITH A 20,000 GALLON HOLDING TANK.
 11. SLUDGE PUMPING STATION AND ASSOCIATED PUMPS.
 12. AQUA BELT AND POLYMER ADDITION STATION.
 13. TREATED EFFLUENT DISCHARGE SYSTEM WITH FIVE EVAPORATION PERCOLATION PONDS WITH A TOTAL STORAGE VOLUME OF 263 MILLION GALLONS.
 14. TERTIARY FILTER, 10'-0" W. X 20'-0" L.
 15. CHLORINE CONTACT BASIN, 86'-9" W. X 86'-9" L.
 16. TWELVE SLUDGE DRYING BEDS, EACH 100'-0" W. X 160'-0" L.

- II. CONVENTIONAL ACTIVATED SLUDGE PLANT NO. 2, 12 MGD CAPACITY, ANAEROBIC CONSISTING OF:
 1. INFLUENT PUMP STATION WITH ASSOCIATED PUMPS AND MOTORS.
 2. HEADWORKS BUILDING WITH BAR SCREENS, ASSOCIATED PUMPS AND

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CONVEYORS.

3. GIRT CHAMBERS, THREE TANKS, EACH 18'-0" W. X 11'-4" D.
4. PRIMARY INFLUENT SPLITTER BOX, 26'-7" W. X 16'-10" L. X 24'-3" D.
5. THREE PRIMARY CLARIFIERS, EACH 100'-0" DIA. X 14'-0" D.
6. PRIMARY EFFLUENT SPLITTER BOX, 29'0" W. X 20'-9" L. X 20'-3" D.
7. BARDENPHO PROCESS AREA, SECONDARY TREATMENT CONSISTING OF:
 - A. FERMENTATION BASINS, EACH 170,000 GALLONS CAPACITY WITH ASSOCIATED MIXERS.
 - B. PRIMARY DENITRIFICATION BASIN, 1,100,000 GALLONS CAPACITY, WITH ASSOCIATED PUMPS AND BUBBLE AERATION SYSTEM.
 - C. NITRIFICATION BASIN, 3,600,000 GALLONS CAPACITY WITH ASSOCIATED PUMPS AND BUBBLE AERATION SYSTEM.
 - D. TWO SECONDARY DENITRIFICATION BASINS, EACH 500,000 GALLONS WITH ASSOCIATED PUMPS AND BUBBLE AERATION SYSTEM.
 - E. ONE REAERATION BASIN, 140,000 GALLONS WITH ASSOCIATED AERATION BLOWER.
8. THREE SECONDARY CLARIFIERS, 125'-0" DIA. X 10'-0" D.
9. RAS/WAS PUMP STATION WITH ASSOCIATED PUMPS AND GRINDERS.
10. SLUDGE DEWATERING FACILITY WITH THREE BELT PRESSES, EACH 2 METERS, A 150 GALLON POLYMER STORAGE TANK, A 710 CUBIC FEET SLUDGE HOPPER WITH TRUCK LOADOUT, ASSOCIATED PUMPS AND CONVEYORS.
11. ONE SLUDGE DRYING BED, 240'-0" W. X 625'-0" L. X 0'-8" D.
12. ONE SEPTAGE RECEIVING SYSTEM.

III. CONVENTIONAL ACTIVATED SLUDGE PLANT, NO. 3, 10 MGD, ANAEROBIC, CONSISTING OF:

1. AERATION BASIN, 189'-0" W. X 311'-0" L. X 15'-7" D.
2. TWO SECONDARY CLARIFIERS, 125'-0" DIA. X 10'-0" D.
3. STORAGE TANK, FERRIC CHLORIDE.
4. ANAEROBIC DIGESTER, 35'-0" H. X 90'-0" D.
5. STORAGE TANK, DIGESTER GAS, LOW PRESSURE, 7,500 CU. FT.,
6. KNOCKOUT TANK.
7. COMPRESSOR.
8. SLUDGE STORAGE TANK, 1.29 MGAL.

IV. TERTIARY TREATMENT PLANT, 22 MGD CAPACITY, CONSISTING OF:

1. TERTIARY INFLUENT PUMP STATION, 14'-2" W., X 14'-2" L.
2. TWO FLOW EQUALIZATION BASINS, EACH 1,800,000 GALLONS CAPACITY WITH ASSOCIATED MIXERS/AERATORS.
3. TWO FLOW EQUALIZATION BASINS, EACH 4,800,000 GALLONS CAPACITY WITH ASSOCIATED MIXERS/AERATORS.
4. OUT-OF-COMPLIANCE POND, 12,300,000 GALLON CAPACITY.
5. FLASH MIX PUMP STATION WITH A FLASH MIXING PUMP, CHLORINE, ALUM AND POLYMER INJECTION POINTS.
6. FLOCCULATION BASIN, 45,000 GALLONS, CAPACITY.
7. FLOCCULATION BASIN, 87,000 GALLONS, CAPACITY.
8. TWO ALUM AND TWO POLYMER MIX FEED PUMPS.
9. SIX TERTIARY FILTERS, EACH 200 SQUARE FEET, SAND BED TYPE.
10. FIVE TERTIARY FILTERS, EACH 636 SQUARE FEET, ROTARY DISC CLOTH TYPE.
11. FOUR CHLORINE CONTACT BASINS, 110'-0" L. (EA. PASS) X 11'-0" W. (EA. PASS) WITH FIVE PASSES, WITH ASSOCIATED PUMPS.
12. CHLORINE INJECTION/SPLITTER BOX.
13. SO2 INJECTION BOX.

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14. EFFLUENT PUMPING STATION AND ASSOCIATED PUMPS.
15. TREATED EFFLUENT DISCHARGE SYSTEM WITH FIVE EVAPORATION PERCOLATION PONDS WITH A TOTAL STORAGE VOLUME OF 263 MILLION GALLONS.
16. LIQUID ALUM STORAGE TANK, 12'-0" DIA. X 24'-0" H., 18,000 GALLON CAPACITY.
17. POLYMER SOLUTION STORAGE TANK, 8'-0" DIA. X 18'-0" H., 6,000 GALLON CAPACITY.
18. POLYMER EMULSION STORAGE TANK, 3'-0" DIA. X 4'-0" H., 150 GALLON CAPACITY.
19. SODIUM HYDROXIDE STORAGE TANK, 2210 GALLON CAPACITY WITH ASSOCIATED PUMPS.

BY THE ADDITION OF:

1. CENTRIFUGE, CENTRISYS, MODEL CS10-4.01. [II. CONVENTIONAL ACTIVATED SLUDGE PLANT NO. 2, ITEM NO. 10]
2. STORAGE TANK, FERRIC CHLORIDE. [III. CONVENTIONAL ACTIVATED SLUDGE PLANT NO. 3, ITEM NO. 3]
3. TWO ANAEROBIC DIGESTERS, 35'-0" H. X 90'-0" D. [III. CONVENTIONAL ACTIVATED SLUDGE PLANT NO. 3, ITEM NO. 4]
4. ONE ALUM AND ONE POLYMER MIX FEED PUMPS. [IV. TERTIARY TREATMENT PLANT, ITEM NO. 8]
5. ONE TERTIARY FILTER, 636 SQUARE FEET, ROTARY DISC CLOTH TYPE.

BY THE REMOVAL OF:

1. FOUR SLUDGE DRYING BEDS, EACH 100'-0"W .X 160'-0" L. [I. CONVENTIONAL ACTIVATED SLUDGE PLANT NO. 1, ITEM NO. 16]

Background/Process Description

The above application for the modification of the sewage treatment plant (>5 MGD) anaerobic was submitted on August 24, 2010 as an alteration/modification to Permitted Equipment application type, since there is a change of process by the installation of the new equipment. The facility is a municipal water district which accepts and treats municipal sewage and produces recycled water for a 120 square mile area in Perris, Sun City, Romoland, and part of Moreno Valley. Eastern Municipal Water District-Perris Valley Regional Water Reclamation Facility (EMWD-PVRWRF) currently consists of two separate wastewater treatment facilities, a 3 MGD and 8 MGD facility. The 3 MGD facility was originally built in 1982 as a 1 MGD until the capacity was optimized to 3 MGD in 1991. The 8 MGD treatment facility has been in operation since 1994. EMWD is in the process of installing a new plant (Plant 3) and modifying the other two plants. Plant expansion is planned for 24.2 MGD. The current sewage treatment plant located at this facility operates under A/N 466467 Permit to Construct and is permitted to accept 25 MGD of raw sewage. There is no school within 1000 feet of emission source. There is no school within 1000 feet of emission source. NOV #P49737 was issued March 31, 2009 for operating a stationary internal combustion engine in a manner that exceeds the emission concentration limits for NOx on July 8, 2008. Since then, the facility has been in compliance.

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Sludge Digestion – Aerobic	10.25	10.25	10.25	10.25	10.25	0	0
Sludge Digestion - Anaerobic - Fixed Covers	0.04	0.01	0.38	0	0	0.04	0
Sludge Dewatering – Centrifuges	6.65	0.93	11.54	11.54	11.54	11.54	0
Sludge Dewatering - Belt Presses	58.81	3.38	252.56	0	252.56	252.56	0
Sludge Cake Handling - Conveyor Belts	0.03	0	0.1	0	0.1	0.1	0
Sludge Cake Storage	6.1	0.05	19.74	0	19.74	19.74	0
Digested Sludge Storage	14.77	14.14	15.02	0	0	0	0
Sludge Cake Truck Loading Operations	1.73	0	13.17	1.73	1.73	1.73	0
Sludge Dehydration – Multieffect Evaporation	8.14	8.14	8.14	0	8.14	8.14	0
Sludge Drying Bed - Static	13.01	13.01	13.01	0	0	0	0
Sludge Drying Bed – Mechanically Mixed	32.69	32.69	32.69	0	0	0	0
Primary Skimmings Concentration Box	0.07	0	0.07	0	0	0	0
Secondary Sludge Thickening Mechanical	0.02	0.02	0.02	0	0	0	0
Digester Cleaning Storage	0.18	0.18	0.18	0	0	0	0
Sludge Screening	8.53	2.50	6.03	0	0	0	0
Sludge Blending	1.96	1.96	1.96	0	0	0	0
Primary Effluent Screening Dewatering Station	0.56	0.56	0.56	0.56	0.56	0.56	0
Digester Cleaning Screenings Building	0.45	0.45	0.45	0	0	0	0
Facility Total VOC Emissions (calculated) (lb/yr)	176.51	88.62	421.33	582.91	1220.35	1210.48	0
Facility Rated Capacity (mgd)				3	12	10	25
Facility Total VOC Emissions (calculated) (lb/yr)				1,748.73	14,644.20	12,104.80	0

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Controlled emissions	50% control efficiency			Mass Emission Rate			
	Ave.	Min.	Max.	Modified Emission Factor based on A/N 466467 (lb/yr/mgd)			
				Plant			
				No. 1	No. 2	No. 3	No. 4
Preliminary/Primary Treatment							
Headworks-Ducted	86.37	1.08	357.14	0	178.57	178.57	0
Headworks- Non ducted	0.1	0.03	0.24	0.24	0	0	0
Inlet Open Channel Flow Meter	0.07	0.02	0.12	0	0	0	0
Septage Dumping Facility	0.29	0.09	0.5	0	0	0	0
Grit Removal - Aerated	7.54	0.27	37.82	18.91	18.91	18.91	0
Grit Removal - Nonaerated	0.6	0.6	0.6	0	0	0	0
Primary Sedimentation	36.69	6.06	139.35	69.675	69.675	69.675	0
Flow Equalization- Primary Effluent	106.96	61.56	152.35	76.175	76.175	76.175	0
Biological Treatment							
Activated Sludge – Diffused Air	185.75	124.38	1342.31	185.75	185.75	185.75	0
Activated Sludge – Mechanical	27.27	17.81	32.98	0	0	0	0
Activated Sludge – HPO	5.55	0.26	10.64	0	0	0	0
Trickling Filters	111.7	46.82	188.2	0	0	0	0
Post – Biological Treatment							
Flow Equalization – Secondary Effluent	29.98	27.36	33.5	29.98	29.98	29.98	0
Secondary Clarifiers	12.29	3.17	36.64	12.29	12.29	12.29	0
Gravity Filtration	0.58	0.13	2.72	0	0	0	0
Chlorination	0.91	0.18	2.67	0.91	0.91	0.91	0
Final Effluent Discharge Weir	0.14	0.01	1.51	0	0	0	0
Final Effluent Evaporation Ponds	523.56	234.31	1091.1	0	0	0	0
Solids Handling							
Dissolved Air Floatation	12.28	0.21	35.32	0	0	0	0
Primary Sludge Thickening – Gravity	0.14	0.14	0.14	0.14	0.14	0.14	0
Sludge Digestion – Aerobic	10.25	10.25	10.25	10.25	10.25	0	0
Sludge Digestion - Anaerobic - Fixed Covers	0.04	0.01	0.38	0	0	0.04	0
Sludge Dewatering – Centrifuges	6.65	0.93	11.54	5.77	5.77	5.77	0

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Sludge Dewatering - Belt Presses	58.81	3.38	252.56	0	126.28	126.28	0
Sludge Cake Handling - Conveyor Belts	0.03	0	0.1	0	0.05	0.05	0
Sludge Cake Storage	6.1	0.05	19.74	0	9.87	9.87	0
Digested Sludge Storage	14.77	14.14	15.02	0	0	0	0
Sludge Cake Truck Loading Operations	1.73	0	13.17	1.73	1.73	1.73	0
Sludge Dehydration – Multieffect Evaporation	8.14	8.14	8.14	0	8.14	8.14	0
Sludge Drying Bed - Static	13.01	13.01	13.01	0	0	0	0
Sludge Drying Bed – Mechanically Mixed	32.69	32.69	32.69	0	0	0	0
Primary Skimmings Concentration Box	0.07	0	0.07	0	0	0	0
Secondary Sludge Thickening Mechanical	0.02	0.02	0.02	0	0	0	0
Digester Cleaning Storage	0.18	0.18	0.18	0	0	0	0
Sludge Screening	8.53	2.50	6.03	0	0	0	0
Sludge Blending	1.96	1.96	1.96	0	0	0	0
Primary Effluent Screening Dewatering Station	0.56	0.56	0.56	0.56	0.56	0.56	0
Digester Cleaning Screenings Building	0.45	0.45	0.45	0	0	0	0
Facility Total VOC Emissions (calculated) (lb/yr)	176.51	88.62	421.33	412.38	735.05	725.18	0
Facility Rated Capacity (mgd)				3	12	10	25
Facility Total VOC Emissions (calculated) (lb/yr)				1,237.14	8,820.60	7,251.80	0

$$R1 = (1,748.73 \text{ lbs/year} + 14,644.20 \text{ lbs/year} + 12,104.80 \text{ lbs/year}) \times \text{year}/365\text{days} \times \text{day}/24 \text{ hours}$$

$$= 3.25 \text{ lbs/hr} = 79.08 \text{ lbs/day (NSR)}$$

$$R2 = (1,237.14 \text{ lbs/year} + 8,820.60 \text{ lbs/year} + 7,251.80 \text{ lbs/year}) \times \text{year}/365\text{days} \times \text{day}/24 \text{ hours}$$

$$= 1.98 \text{ lbs/hr} = 48.18 \text{ lbs/day (NSR)}$$

Previous emission under A/N 466467's engineering evaluation:

$$R1 = 3.25 \text{ lbs/hr} = 78 \text{ lbs/day (NSR)}$$

$$R2 = 2.27 \text{ lbs/hr} = 55 \text{ lbs/day (NSR)}$$

There is no increase in VOC emissions due to the requested modifications to the sewage treatment plant.

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Ammonia Emissions

$$R1 = 25\text{Mgallons/day} \times 16.0 \text{ lbs/Mgallons}^* \times \text{day}/24\text{hours} = 16.67 \text{ lbs/hr}$$

$$R2 = 16.67 \text{ lbs/hr} \times 0.01 = 0.1667 \text{ lbs/hr}$$

*CARB Ammonia emission factor from emission inventory, see evaluation from A/N 466467

H2S Emissions

All H2S emission will be associated with the biofilter application (A/N 471708).

$$R2 = 1\text{ppmv} \times 70,000 \text{ cfm}^{**} \times 60 \text{ min/hr} \times \text{lb-mole}/379 \times 10^6 \text{ ft}^3 \times 34.08 \text{ lbs/lb-mole} = 0.3777 \text{ lbs/hr}$$

$$R1 = 0.3777 \text{ lbs/hr} / (1 - 0.85) = 2.518 \text{ lbs/hr}$$

**Maximum capacity of exhaust system of biofilter under A/N 471708, see evaluation from A/N 466467.

Toxic Risk Analysis

There is no expected increase in emissions of Toxic Air Contaminants (TAC) since there is no increase in rated influent flow capacity and no increase of emissions for this equipment. Rule 1401 analysis shown below was conducted using the BASTE modeling emissions rates of the entire sewage treatment plant in the previous application folder under A/N 466467 to demonstrate compliance.

Nearest Residential Receptor Distance: 901 m

Nearest Commercial Receptor Distance: 80 m

Compound	MW (lbs/lbmole)	Total Emission (lb/hr)	A/N 466467 Emission Increase (lbs/hr)
Ammonia	17.03	2.68E-1	0.002
Chloroform	119.38	7.51E-2	0.007
1,4-Dichlorobenzene	147.01	2.55E-3	0.0003
Tetrachloroethylene	165.83	2.74E-2	0.01
Toluene	92.13	1.54E-3	0.0001

The emission rates for the toxic air contaminants (TACs) were based on A/N 466467 BASTE modeling emission rates for Ammonia, Chloroform, 1,4-Dichlorobenzene, Tetrachloroethylene and Toluene developed by the applicant.

Tier II analysis was used since the nearest receptor is greater than 25 m from the emission source. Tier II risk analysis was based on the emission rates listed in the above table. The MICR values are determined to be 3.07×10^{-7} for residential and 3.65×10^{-6} for commercial receptors for the sewage treatment plant's total emission rate. The MICR values are determined to be 5.18×10^{-8} for residential and 6.15×10^{-7} for commercial receptors for the increase of emissions of the sewage treatment plant under A/Ns 466467 alteration. HIA and HIC were less than 1 respectively. Cancer Burden was less than 0.5.

Emissions Summary

Emission Total (based on NSR lbs/day values)

A/N 514066 (Sewage Treatment Plant (>5 MGD, anaerobic))

CO = 0 lbs/hr = 0 lbs/day

NOx = 0 lbs/hr = 0 lbs/day

PM10 = 0 lbs/hr = 0 lbs/day

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ROG = 1.98 lbs/hr = 48.18 lbs/day
 SOx = 0 lbs/hr = 0 lbs/day

Previous Emission Total (based on NSR lbs/day values)

A/N 466467 (Sewage Treatment Plant (>5 MGD, anaerobic))

CO = 0 lbs/hr = 0 lbs/day
 NOx = 0 lbs/hr = 0 lbs/day
 PM10 = 0 lbs/hr = 0 lbs/day
 ROG = 2.27 lbs/hr = 55 lbs/day
 SOx = 0 lbs/hr = 0 lbs/day

Emission Increase (based on NSR lbs/day values)

CO = 0 lbs/hr = 0 lbs/day
 NOx = 0 lbs/hr = 0 lbs/day
 PM10 = 0 lbs/hr = 0 lbs/day
 ROG = -0.29 lbs/hr = -6.82 lbs/day
 SOx = 0 lbs/hr = 0 lbs/day

Evaluation

Rule 212: Rule 212 (c)(1)- There is no school within 1000 feet of the facility.
 Rule 212 (c)(2)- Not exceeding the following:
 Volatile Organic Compounds 30 lbs/day
 Nitrogen Oxides 40 lbs/day
 PM10 30 lbs/day
 Sulfur Dioxide 60 lbs/day
 Carbon Monoxide 220 lbs/day
 Lead 3 lbs/day
 Rule 212(c)(3) – There is no emission increase.
 Public Notice is not required.

Rule 401: Visible Emissions
 No violations are expected limits are listed under Rule 401(b)(1).

Rule 402: Nuisance
 Nuisance is not expected with proper operation, monitoring and maintenance. Based on previous operation of the facility for the last two years, compliance is expected. No complaints have been received against the facility in the past 4 years.

Rule 431.1: Sulfur Content of Gaseous Fuels
 Rule 431.1(g)(8)- Any facility which emits < 5 pounds per day total sulfur compounds, calculated as H2S from the burning of gaseous fuels other than natural gas is exempt from this rule. Facility emission < 5 lbs/day, see facility-wide condition in Section D of facility permit pertaining to the Rule 431.1 exemption. Compliance is expected.

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- Reg. XIII: Rule 1303(a)(1)- Equipment is equipped with BACT.
Rule 1303(a)(2)- BACT includes a carbon adsorber or scrubbing system, covers for primary raw sewage processing, and digester gas incineration or recovery for VOC and ferrous chloride injection and caustic scrubber for hydrogen removal.
Rule 1303(b)(1)- Modeling for VOC and SO_x is not required (1303 Appendix A). NO_x, CO and PM₁₀ are less than the allowable emissions in Table A-1, no further analysis is required (1301 Appendix A).
Rule 1303(b)(2)- There is no increase of emissions. Offsets are not required. Furthermore, since the facility is an essential public service, any required offsets shall be provided through priority reserve.
Compliance with Regulation XIII is expected.
- Rule 1401: Toxic Air Contaminants
No increases in emissions of toxic air contaminants are expected. Previous evaluation Rule 1401 assessment is assumed.
Rule 1401(d)(1)(A)- Increase in MICR is estimated to be less than 1.0×10^{-6} limit.
Rule 1401(d)(1)(B)- Total MICR for the sewage treatment plant is estimated to be less than 10×10^{-6} limit with T-BACT.
Rule 1401(d)(1)(C)- Cancer burden is estimated to be less than 0.5.
Rule 1401(d)(2) and Rule 1401(d)(3)- HIC and HIA values are estimated to be less than 1 respectively.
- Rule 1401.1: Requirements for New and Relocated Facilities Near Schools
Rule 1401.1(b)- Not applicable, since the facility is an existing facility.
- Reg. XXX: The modification of the sewage treatment plant to update equipment is considered a Title V Minor permit revision under Rule 3000(b)(12), since there is no emission increase and the modification of the equipment does not result in new or additional NSPS or NESHAP requirements and will be subject to an EPA review (Rule 3003 (j)). A public notice is not required.
Compliance is expected.

Conclusions and Recommendations

The equipment is in compliance with the Rules and Regulations of the AQMD. A Permit to Construct is recommended for application 514066. For Permit Conditions please see Sample Permits. A revised Title V permit is recommended after EPA review.