Permit to Construct (New Construction)

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 513835 FACILITY ID 007417
Equipment Description

ENCLOSED FLARE, 12 MMBTU/HR MAXIMUM HEAT INPUT, 3'-8" W. X 3'-8" L. X 23'-4" H, BEKAERT MODEL CEB 350, WITH 7.5 HP COMBUSTION BLOWER, AUTOMATIC AIR CONTROL SYSTEM, DIGESTER GAS FIRED, WITH DIGESTER AND NATURAL GAS PILOTS, TEMPERATURE CONTROLLER, AUTOMATIC FLARE SHUT DOWN SYSTEM, FLARE FAILURE ALARM, AUTOMATIC RESTART.

Background/Process Description

The above application was submitted on August 18, 2010 as a Change of Conditions application, but then was determined to be a Proposed Alteration/Modification to Permitted Equipment application type by AQMD staff, since the equipment was listed in the previous permit was incorrect. The equipment description was for a 9.32 mmBtu/hr and will be updated to a 12 mmBtu/hr flare. Additionally the applicant requested to increase the emission limits of the digester gas flaring system from A/N 475857. After further review AQMD staff determined that this equipment should be issued a New Construction Permit to Construct since the equipment is new equipment.

A/N 475857 Permit to Construct was issued on March 27, 2008. The initial Title V facility permit was issued October 31, 2008. A/N 475857 Permit to Construct expired on March 27, 2009. A request for extension of the Permit to Construct was dated May 5, 2009. In accordance with Condition no. 3 of the Permit the final design specifications for the flare were submitted on July 9, 2009. Assuming the request from May 5, 2009 was granted, a year extension would expire on March 27, 2010. An email was sent on June 28, 2010 indicating construction was completed. This application A/N 513835 was submitted on August 18, 2010. As of October 15, 2010 the flare had not been operated, nor was a source test conducted. Through discussion with SCAQMD staff it was determined that the flare was constructed under a valid Permit to Construct. Although, since the constructed equipment differed (heat capacity, mmBtu/hr, which determines emission calculations) from the equipment description under A/N 475857 and Title V is now applicable to the flare, the flare is open to BACT/LAER requirements.

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. Digester gas is produced from secondary treatment during anaerobic digestion of sewage sludge. Most of the digester gas will be used as fuel in boilers and the fuel cell system. Digester gas not used in this equipment will be combusted in the flare or if the digester gas storage tank needs to release some digester gas to maintain a safe working pressure. 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.

Emission Calculations

Assume R1 = R2. Emissions are based on operating schedule of 24 hrs/day, 7 day/week, 52 weeks/year.
Assume digester gas is 600 Btu/scf.
12 mmBtu/hr x 1E6Btu/mmBtu / 600Btu/scf = 20,000 scfh digester gas flow rate
12 mmBtu/hr x 1E6Btu/mmBtu / 600Btu/scf / 60mins/hr = 333.3 scfm digester gas flow rate

1,449 dscfm* x 12mmBtu/hr / 4.14mmBtu/hr* = 4,200 dscfm
4,200 dscfm x (460 + 1,900) / (460 +60) = 19,062 acfm
*A/N 457924, ID10983 March 8, 2007 Source test

CO emissions
Rule 407 requirement: 2,000 ppmvd

Rule 409 requirement: 0.1 grain/cf
0.1 grain/cf x lb/7,000grains x 4,200 dscfm x 60mins/hr = 3.60 lbs/hr > 0.72 lbs/hr

Rule 1303 LAER/BACT requirement (see A/N 02-540ML issued by US EPA): 0.06 lbs/mmBtu
0.06 lbs/mmBtu x 12 mmBtu/hr = 0.72 lbs/hr =17.52 lb /day (NSR)

Rule 1303 modeling requirement: 47.3 lbs/hr for >10 < 20 mmBtu

NOx emissions
Rule 409 requirement: 0.1 grain/cf
0.1 grain/cf x lb/7,000grains x 4,200 dscfm x 60mins/hr = 3.60 lbs/hr > 0.30 lbs/hr

Rule 1303 BACT requirement: 0.06 lbs/mmBtu
0.06 lbs/mmBtu x 12 mmBtu/hr = 0.72 lbs/hr = 17.52 lb /day (NSR)

Rule 1303 LAER/BACT requirement (see A/N 02-540ML issued by US EPA): 0.025 lbs/mmBtu
0.025 lbs/mmBtu x 12 mmBtu/hr = 0.30 lbs/hr = 7.30 lb /day (NSR)

Rule 1303 modeling requirement: 0.860 lbs/hr for >10 < 20 mmBtu

PM10 emissions
A/N 457924, ID 10983 Bekaert CEB 350 DG flare permit limit: 0.0054 grains/dscf
0.0054 grains/dscf x 4,200 dscfm x 60min/hr x lb/7,000grains = 0.19 lbs/hr = 4.62 lbs/day (NSR)

Rule 1303 modeling requirement: 5.2 lbs/hr for >10 < 20 mmBtu; 5.20 lbs/hr > 0.19 lbs/hr

Rule 404 requirement: Exhaust flow rate: 1618 dcfm, 0.157 grains/scf

0.157 grains/scf x lb/7,000grains x 4,200 dscfm x 60min/hr = 5.65 lbs/hr > 0.19 lbs/hr

Rule 409 requirement: 0.1 grain/cf
0.1 grain/cf x lb/7,000grains x 4,200 dscfm x 60mins/hr = 3.60 lbs/hr > 0.19 lbs/hr

ROG emissions
Rule 1303 LAER/BACT requirement (see A/N 9788 issued by SBCAPCD): 0.038 lbs/mmBtu OR 15 ppmvd 3% O2 as hexane
0.038 lbs/mmBtu x 12 mmBtu/hr = 0.46 lbs/hr = 11.19 lb /day (NSR)
OR
15 ppmv @ 3%O2
15 ppmv @ 3%O2 x (20.9 – 8.79*)/ (20.9 – 3) = 10 ppmv
10 ppm x 4,200 dscfm x 60mins/hr x lbmole/379E6 cf x 86 lbs/lbmole
= 0.57 lbs/hr = 13.87 lbs/day(NSR)
*A/N 457924, ID10983 March 8, 2007 Source test

Rule 409 requirement: 0.1 grain/cf
0.1 grain/cf x lb/7,000grains x 4,200 dscfm x 60mins/hr = 3.60 lbs/hr > 0.46 lbs/hr

SOx emissions
Rule 407 requirement: 500 ppmvd

Rule 409 requirement: 0.1 grain/cf
0.1 grain/cf x lb/7,000grains x 4,200 dscfm x 60mins/hr = 3.60 lbs/hr > 0.39 lbs/hr

BACT requirement: Rule 431.1 compliance: 1) Natural gas ≤ 16 ppmv (flare is to operate with DG and only NG to assist, not applicable), 2) Facility wide emission < 5 lbs/day
2) **5 lbs/day H2S x lb-mole/34.08 lbsH2S x 64.07 lbsSOx/lb-mole = 9.40 lbs/day SOx (as SO2)**
= 0.39 lbs/hr SOx (as SO2)

Annual Emissions (AER 2009) SOx emission: 0.017 tons/yr
0.017 tons/yr x 2000lbs/ton x 1yr/365days = 0.09 lbs/day SOx
= 0.00 lbs/hr SOx

Toxic Risk Analysis

Nearest Residential Receptor Distance: 1214 m
Nearest Commercial Receptor Distance: 400 m
Stack height: 23.33 ft. (7.11 m)
Exhaust flow rate: 4,200 dscfm
Rain cap on exhaust stack: No

Compound	MW (lb/mole)	Outlet Emissions (lbs/hr)
Acetaldehyde	44.06	6.31E-4
Benzene	78.11	8.15E-5
Benzyl chloride	126.58	6.73E-5
1,3-Butadiene	54.09	7.65E-6
Chloroform	119.38	4.76E-5
Carbon disulfide	76.14	1.08E-5
Carbon tetrachloride	153.24	6.11E-5

Chlorobenzene	112.56	5.99E-5
1,2-Dibromomethane	187.88	7.50E-5
1,4-Dichlorobenzene	147.01	5.86E-5
1,1-Dichloroethane	98.96	5.26E-5
1,2-Dichloroethane	98.96	5.26E-5
1,1-Dichloroethylene	96.95	5.16E-5
1,4-Dioxane	88.10	1.66E-5
Ethyl benzene	106.16	1.50E-5
Formaldehyde	30.03	1.33E-4
Isopropyl alcohol	60.09	8.50E-6
Methyl tertiary butyl ether	88.15	1.66E-5
Methylene chloride	84.94	1.25E-3
PAHs	252.30	1.84E-7
Styrene	104.16	1.47E-5
1,1,2,2-Tetrachloroethane	167.86	2.38E-5
Tetrachloroethylene	165.83	6.62E-5
Toluene	92.13	4.29E-4
1,1,1-Trichloroethane	133.42	5.32E-5
1,1,2-Trichloroethane	133.42	1.89E-5
Trichloroethylene	130.40	5.20E-5
Vinyl acetate	86.09	1.62E-5
Vinyl chloride	62.50	2.49E-5
Xylenes	106.20	1.85E-4

Outlet emission is based on the maximum emission between 1) the TAC concentration from the source test dated 3/8/2007 for a portable Bekaert, Model CEB 350 digester gas flare under A/N 457924, ID 10983 and the exhaust flow rate listed above and 2) TAC emission rates from the source test dated 10/26/2005 for a digester gas flare under A/N 415794, ID 1703, which was used in the engineering evaluation for a digester gas flare under A/N 457924, ID 10983 Permit to Construct.

Tier II analysis was used since the nearest receptor is greater than 25m from the exhaust stack with no rain cap. Tier II risk analysis was based on the outlet emission listed in the above table. MICR was calculated to be 1.29E-8 for residential and 1.39E-8 for commercial receptors. HIC and HIA are less than 1 and Cancer Burden is less than 0.5.

Rules Evaluation

Rule 212: Rule 212 (c)(1)- There is no school within 1000 feet of the facility.
Rule 212 (c)(2)- On-site emission increases do not exceed 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)(A)(i)- MICR is below 1 in a million.
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 404: Particulate Matter
No violations are expected limits are listed under Rule 404 Table 404(a).

Rule 407: Liquid and Gaseous Air Contaminants
Rule 407 (a)(1)- CO < 2000 ppmvd.
Rule 407(a)(2)- SOx < 500 ppmvd.
Compliance is expected.

Rule 409: Combustion Contaminants
< 0.1 grains/cf of gas
0.1 grain/cf x lb/7,000grains x 4,200 dscfm x 60mins/hr = 3.60 lbs/hr

Rule 431.1: Sulfur Content of Gaseous Fuels
Rule 431.1(c)(1)- Natural gas contains ≤ 16 ppmv sulfur compounds as H2S. The flare is to operate with DG and only NG to assist not only NG, therefore this is not applicable.
Rule 431.1(g)(8)- Any facility which emits less than 5 pounds per day total sulfur compounds, calculated as H2S from the burning of gaseous fuels other than natural gas (not applicable to (c)(1)).
Compliance is expected.

Rule 53A: Riverside County – Specific Contaminants (Contained in Addendum to Reg IV)
Rule 53(a)- Sulfur compound emission, as SO_2 50,000 ppmv.
Rule 53(b)- Fluorine compounds shall be controlled to the maximum degree technically feasible. No fluorine potential emission from this equipment.
Compliance is expected.

Rule 1147 NOx Reductions From Miscellaneous Sources
Rule 1147(a)- Applicability: This equipment is exempt under Rule 1147(d)(3)(B) since the fuel (natural gas) is used only to maintain a pilot for vapor ignition.

Reg XIII: Rule 1303(a)- BACT is required, since emission increase is greater than 1.0 lbs/day.
LAER/BACT is required, since the facility is a major source of criteria pollutants.
BACT: CO: Ground level, shrouded, ≥ 0.6 sec. retention time at ≥ 1400 F, auto combustion air control; NOx: 0.06 lbs/mmBtu; VOC: Ground level, shrouded, ≥ 0.6 sec. retention time at ≥ 1400 F, auto combustion air control, automatic shutoff gas valve and automatic restart system; and PM10: knockout tank.
LAER/BACT: CO: 0.06 lb/mmBtu, NOx: 0.025 lb/mmBtu (see BACT determinations A/N 02-540ML issued by USEPA) & NOx: 35 ppmvd @ 3% or 0.048 lb/mmBtu; and VOC: 15 ppmvd@3% O2 as hexane or 0.038 lb/mmBtu (see BACT determinations A/N 9788 issued by SBCAPCD).
Rule 1303(b)(1)- Modeling for VOC and SOx is not required (1303 Appendix A). NOx, CO and PM10 are less than the allowable emissions in Table A-1, no further analysis is required (1303 Appendix A).
Rule 1303(b)(2)- Since the facility is an essential public service, required offsets shall be provided through priority reserve. Pursuant to Rule 1309.1(a)(3)(B), EMWD has

demonstrated that modification to its candidate retrofit source to BARCT levels is not required, since the modification is not cost effective. Please see BARCT cost effectiveness documents in the application folder.

Rule 1401: Toxic Air Contaminants
Rule 1401(d)(1)(A)- MICR less than 1.0 x 10^{-6} limit.
Rule 1401(d)(1)(C)- Cancer burden is 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.

Rule 1703: PSD Analysis
Rule 1703(a)(3)- This permit unit is exempt under Rule 1704(a)(1). This source or modification is used exclusively for providing essential public services.

Rule 1714: Prevention of Significant Deterioration for Greenhouse Gases
Rule 1714(d)(1)- Requirements are not applicable, since the facility is not a major source per 40 CFR 52.21 (b) (1) and (b) (2).The emissions of criteria pollutants do not exceed major source thresholds. Furthermore the PTE of CO2 equivalent emissions is less than:

A/N 513835, ID 7417 Digester Gas Flare GHG Calculations for PSD			
Heat input of flare (MMBtu/hr)	12.00	CO2% in DG from analysis of similar facility	35.00
Estimated Btu/scf of DG	600.00		
Flow rate of DG Flared/Flare (scfm)	333.33	Destruction efficiency %	99.00
Calculated methane% in DG	60.00	Density of CH4 lb/cu. ft.	0.0423
Methane in DG (scfm)	200.00	Density of CO2 lb/cu. ft.	0.1234
Total methane from DG (metric tons/year)	2,016.95		
Methane destroyed in flare (metric tons/year)	1,996.78		
Methane uncombusted in flare (metric tons/year)	20.17		
CO2 produced from methane destroyed in flare (metric tons/year)	5,491.16	CO2 produced from methane destroyed in flare (short ton/year)	6,051.25
CO2e of methane uncombusted in flare (metric tons/year)	55.47	CO2e produced from methane uncombusted in flare (short tons/year)	61.12
CO2 in DG (metric tons/year)	3,432.32	CO2 in DG (short tons/year	3,782.41
		Total CO2 in short tons	9,894.79

GHG PSD Applicability Based on Tailoring Rule:
Permit shall be issued after July 1, 2011. The facility is an existing minor source of PSD. The CO2 equivalent emissions from the total project < 75,000 TPY. Limiting the amount of DG flared shall limit the GHG emissions from this equipment. Monitoring and

recordkeeping conditions shall be imposed to ensure compliance. GHG gases are not subject to PSD per this review.
Furthermore, EPA has deferred PSD requirements to biogenic CO2 emission until July 21, 2014.

Reg. XXX: The Permit to Construct for the digester gas flare is considered a Title V De Minimis Significant permit revision under Rule 3000(b)(6), since the cumulative emission increases of non-RECLAIM pollutants or HAPs do not exceed the emissions in Table 5-4 of the Draft Title V TDG March 2005 and 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 & Recommendations

The equipment is in compliance with the Rules and Regulations of the AQMD. A Permit to Construct is recommended for application 513835. For Permit Conditions please see Sample Permits. A revised Title V permit is recommended after EPA review.