SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT	PAGES 8	PAGE 1
ENGINEERING AND COMPLIANCE DIVISION	APPL NO 544182	DATE 1/15/2014
PERMIT APPLICATION EVALUATION AND CALCULATIONS	PROCESSED BY AK07	CHECKED BY CDT

PERMIT TO OPERATE

APPLICANT'S NAME: Riverside County Waste Management Department

MAILING ADDRESS: 14310 Frederick Street,
Moreno Valley, CA 92553

EQUIPMENT ADDRESS: 16411 Lamb Canyon Road, Highway 79,
Beaumont, CA 92223

FACILITY ID #: **015793**

BACKGROUND:

This application was filed by RCWMD as a change of condition application for A/N 500899 (P/N G7361) as they had installed a lower Heat input rate flare compared to the one permitted.

Initially when P/N G7361 was issued, the MMBTU rating of the flare was assumed to be 54.6 as per the information provided by the applicant. At the time of completing source test, applicant identified that the flare sent to them was only designed for 25 MMBTU/hour. After long negotiations with the manufacturer, RCWMD was able to get the flare replaced and now they have 40 MMBTU/hr flare instead of the originally permitted 54.6 MMBTU/hr flare. Applicant had completed a source test on 25 MMBTU/hour flare and they also recently (10/08/2013, copy of results summary attached in CAM A/N folder) completed a source test on newer flare.

Now the applicant has filed for change of condition application to get the equipment description, permit conditions and emissions limits corrected. Since this a Title V facility and the 40 MMBTU flare was "new", it is subject to LAER standards. The net emissions are not higher, so no offsets are required.

As per the equipment specifications sheet attached in the folder, this flare can handle up to 2,000 scfm with a fuel LHV of 350 BTU.

BTU = 2,000 scfm x 350 btu/scf x 60 min/hour = 42 MMBTU/hour

Assumptions: June 9, 2011 source test data will be used as a basis for emissions calculations.

- Flare design capacity = 2000 scfm based on LHV of 350 BTU/SCF.
- Flare BTU rating of 42 MMBTU/hour Net BTU Rating (based on LHV, lower heating value Assumption)
- Methane content of LFG = 50% (HHV) as per the information sent by applicant (design number provided by manufacturer)

As per June 9, 2011 source test methane content was 39.4 %, with LFG BTU rating of 404/scf

- BTU of methane = 1011 BTU/scf (HHV, high heating value) ; 910 BTU/scf (LHV, lower heating value)
- Based on 404 BTU/SCF, Inlet BTU rating = 1044 scfm x 404 BTU/SCF x 60 min/hour = 25.36 MMBTU/hour
- Exhaust volume of approximately 10 times the inlet flow shall be assumed. Source test (ST) Inlet flow = 1044 scfm, exhaust flow = 9325 dscfm. Ratio of Outlet to Inlet is = (9325/1044) = 8.93
- ST Inlet TNMOC: 5227 PPMV as methane, for calculations purposes inlet concentration of VOC's shall be assumed to be 8000 PPMV.
- CO emission factor: 0.06 lbs/MMBTU (BACT/LAER)
- NOx emissions factor: 0.025 lbs/MMBTU (BACT/LAER)
- SOx: 150 PPMV of H2S at inlet stream (Based on maximum allowable by Rule 431.1), For this change of condition application, same inlet H2S PPMV number of 40 PPMV will be used (same as when A/N 500899 was processed), source test result was also around 43 PPMV.
- PM-10 emission factor: 6 lbs/MMSCF (LAER- based on AQMD permits)
- VOC in the exhaust: 20 ppmv as hexane at 3% O2 or 98% destruction efficiency (Rule 1150.1)
- VOC in the exhaust: 0.006 lbs/MMBTU (BACT/LAER - based on AQMD permit).
- Formaldehyde emission factor: 1.169 lbs HCHO/MMSCF (AB2588 default for LFG flare)
- PAH emission factor: 0.003 lbs Total PAH/MMSCF (without Naphthalene) ; 0.011 lbs/MMSCF with Naphthalene (Ventura Air Pollution Control District)
- HCl emission calculated based on average of the concentrations of chlorinated compounds as reported in ST report (see attached spreadsheet), HCl emissions were used for Rule 1401 analysis

As per conversation with the applicant (08/21/2013 @ 1100 AM), this landfill is going to be open for long time and the applicant expects to reach the maximum load for this flare in next 7-8 years. Applicant mentioned if we keep the Sox emissions (as H2S) numbers at the same level as under A/N 500899, they should not be failing the source test even though the H2S concentration in the raw inlet gas is going up.

EMISSIONS:

Assumptions: The flare has a BTU rating of 42 MMBTU.
Methane content of landfill gas = 40 % as per ST
BTU content = 404/scf as per ST
Calculated Landfill gas flow rate = (42 x 10^6 BTU/hour) /(404 BTU/SCF) = 103960 scf/hour
= 1732 scf/minute
Exhaust flow as per ST was 9325 DSCFM

We will assume inlet flow at 2000 scfm and LHV value at 350 as landfill is dry. All emissions calculation shall be completed with these numbers as basis. Exhaust flow of 18,000 DCSFM shall be assumed as per the ratio of exhaust/inlet flow calculated above based on ST exhaust/inlet flow ratio number.

Formaldehyde emissions shall not be considered as combustion is at very high temperature.

No.	Criteria Pollutant Name	Emission Factors	Emission factor Units	Flare Flow in scfm	MMBTU/hour of Flare	pollutant in lb/hr	pollutant in lb/day	pollutant in lb/year	pollutant in tons/year
1	Nox	0.025	lb/MMBTU	2000	42.00	1.0500	25.2000	9198.0000	4.5990
2	CO	0.06	lb/MMBTU	2000	42.00	2.5200	60.4800	22075.2000	11.0376
3	PM10	6	lbs/MMCFM	2000	42.00	0.7200	17.2800	6307.2000	3.1536
4	Sox - Based on Previous A/N 500899 Limit	40	PPMV	2000	42.00	0.8106	19.4533	7100.4538	3.5502
5	VOC - 98% destruction efficiency	8000.00	PPMV	2000	42.00	0.8106	19.4533	7100.4538	3.5502
6	VOC -- 20 PPMV in exhaust	20	PPMV @ 13% O2	18000	42.00	2.1632	51.9156	18949.2122	9.4746
7	VOC – BACT/LAER	0.006	lbs/MMBTU	2000	42.00	0.2520	6.0480	2207.5200	1.1038
8	HCHO	1.169	lbs/MMSCF	2000	42.00	0.1403	3.3667	1228.8528	0.6144
9	PAH without Napthalene	0.003	lbs/MMSCF	2000	42.00	0.0004	0.0086	3.1536	0.0016
10	Napthalene	0.008	lbs/MMSCF	2000	42.00	0.0010	0.0230	8.4096	0.0042
11	HCl	2.312	PPMV	2000	42.00	0.155	3.73	1361	0.681

***AB2588 default E F for LFG flare = 1.169 lbs HCHO/MMscf (email, Sept. 12, 2006 from Charles Tupac)
Ventura Air Pollution Control District: 0.003 lbs Total PAH/MMscf (without Napthalene)
0.011 lbs/MMscf with Napthalene

This landfill gas collection system flare will be complying with 20 PPMV NMOC effluent limits measured at 3 % excess oxygen limit or 98% destruction efficiency as the exhaust limits of VOC's are much lower.

Pollutant (numbers in lbs/hour)	Previous PO NSR entry	Change of Condition PO	Difference In Emissions	2011 ST Numbers (ST was completed at 25 MMBTU/hour)	Pro-rating the 2011 ST Numbers to 42 MMBTU/hour	October 8, 2013 ST Numbers lb/hour (ST was completed at 31.2 MMBTU/hour)
CO	10.92	2.52	(-) 8.4	1.033	1.74	0.27
NOX	2.88	1.05	(-) 1.83	0.54	0.91	0.69
PM-10	2.12	0.72	(-) 1.4	0.26	0.44	0.39
ROG	1.01	0.252	(-) 0.758	0.113	0.19	0.071
SOX	0.81	0.81	0	0.46	0.77	0.47

TOXIC AIR CONTAMINANT EMISSIONS:

This site is at a remote location and there are no residential or commercial receptors nearby with nearest receptors almost more than one mile away. To be conservative both residential and commercial receptor distances were assumed to be 500 meters.

Please see the risk evaluation completed when A/N 500899 permit was issued.

Residential Receptor = 500 meter
Commercial Receptor = 500 meter

Stack Height = 40 feet (see attached air quality impact/risk assessment section)

Rule 1401 evaluation will be completed with HCHO included in the toxics list. The MICR values are determined to be 3.50×10^{-6} for residential and 6.84×10^{-7} for commercial receptors based on Tier II analysis. Tier II analysis was completed on assumption that landfill gas inlet will have 0.015 PPMV of all of Rule 1150.1 core toxics compounds in addition to HCHO emissions of 1.5 PPMV. As per the source test report, all of the toxics in the exhaust stream were non-detect. Our analysis is extremely conservative.

PAH's, & Napthalene emissions have not been included in rule 1401 analysis. PAH's, & Napthalene were not detected in the exhaust stream in the June 2011 ST report.

There is no other piece of equipment permitted at this facility.

RULES EVALUATION:

RULE 212:

Rule 212 (c)(1)- There are no schools within 1000 feet of emission source. There is no emissions increase.

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)(A)(i)- MICR is below 10 in a million. Public Notice is not required.

RULE 401: With proper operation and maintenance, equipment is expected to comply with this rule.

RULE 402: With proper operation, maintenance and monitoring of equipment, compliance is expected.

RULE 404: For proposed new flare, estimated PM (PM10) emission = 0.72 lbs/hr, 18,000 scfm, assumed dry exhaust flow

$$C = \frac{0.72 \text{ lb/hr} \times (7{,}000 \text{ grains/lb})}{18000 \text{ dscfm} \times (60 \text{ min/hr})}$$

C = 0.0047 grains/dscfm < 0.067 grains/cu. ft for less than 18,000 dscfm

Compliance with this rule is expected for this flare.

RULE 407: Estimated CO, ppmv = 2.52 lbs CO/hr x 379 x 10^6 / (18,000 dscfm x 60 x 28)
= 31.5 ppmv, dry basis < 2000 ppmv rule limit.

RULE 409: Combustion contaminants emissions are expected to be < 0.1 grains/cubic feet of gas based on the existing permitted flare and other flares permitted in the SCAQMD region. Compliance is expected.

RULE 431.1: LFG for this facility has been well below allowable 150 ppmv H2S levels. Also, facility wide condition under Title V FP requires H2S concentration in LFG fuel to be less than 150 ppmv. Compliance is expected.

RULE 1150.1: The proposed low emission LAER flare is expected to comply with either non-methane organic compounds (NMOC) destruction efficiency of 98% by weight or is expected to reduce outlet NMOC concentration to less than 20 ppmv (as hexane), dry basis as hexane at 3% oxygen. This requirement will be determined by initial source test, and then conducting source test on an annual basis. Compliance is expected.

REG. XIII: BACT/LAER: The proposed enclosed flare is expected to meet all BACT/LAER requirements for LFG flare. Flare will meet 0.025 lb NOx /mmbtu, 0.06 lb CO/mmbtu emission limit, and DRE of 99%.

Rule 1303 Modeling: Detailed Modeling was completed last time when PO under A/N 500899 was issued. Please see attached evaluation. We are not raising any of the emissions limits. Compliance is expected. There is no receptor for more than a mile away from this site.

Emission Offsets: This is a municipal solids waste landfill operations facility, and is considered an Essential Public Service (ESP) per Rule 1302 Definitions, (m) (7). There is no increase in emissions.

Sensitive Zone Requirements: Not applicable as credits will be provided from the Priority Reserve.

Major Polluting Facility: Proposed flare will be located on the landfill adjacent to the existing flare. Low emission LAER flare is proposed to meet the current requirement. Enclosed flare is considered the standard commercial practice for LFG control and to comply with other rules. Therefore, no further alternative analysis is required.

Protection of Visibility: Not applicable. Beaumont is not near any of the specified Federal Class I area, and estimated NOx and PM10 net emissions increase are 14.34 TPY and 10.51 TPY, respectively (threshold limit >40 TPY NOx and > 15 TPY PM10 emissions.)

RULE 1401: As described under TAC emissions, risk due to incremental emissions is estimated to be less than ten in a million, and HIC & HIA indices < 1 each. Compliance is expected.

RULE 1401.1: Not applicable. This is an existing facility.

RULE 1703 The facility is exempt from rule 1703 Requirements as it is an essential public service.

RULE 1714 The facility is exempt per rule 1714 requirements as per 1714 (d) as it is a not major source as per 40 CFR 52.21 (b) (1) and (b) (2). Please see the emissions table of criteria pollutants in this evaluation. Further the PTE of the equipment as CO2 equivalent tons is 52,000 tons per year.

Flare Scenario			
No. of Flares	1		
Amount of Lanfill Gas Allowed to be Flared in Each Flare (SCFM)	2,000.00		
Total Landfill Gas Usage (SCFM)	2,000.00		
Methane % ge in landfill gas	40.00		
BTU/SCF of Landfill Gas (HHV)	1,011.00		
Calculated MMBtu/hr	48.53		
CO2 percentage in Landfill gas as per June 2011 source test report	40.00		
Density of CH4 lb/cubic feet	0.04		
Density of CO2 lb/cubic feet	0.12		

Methane in the Landfill gas (SCFM)	800.00		
Destruction Efficiency % ge	99		
Metric Tons of Methane destroyed assuming 99% destruction in a year	7,994.23		
Metric Tons of CO2 generated from methane destroyed in flare in a year	21,984.14	Short Ton of CO2 Generated from Methane destroyed in a year	24,226.52
Metric Ton of CO2 eq of methane not Destroyed in flare in a Year	1,695.75	Short Ton of CO2e generated from methane not Destroyed in a Year	1,868.71
Metric Ton of CO2 in LFG	23,556.80	Short Ton of CO2 in LFG	25,959.60
		Total CO2 in short tons	52,054.83

GHG PSD applicability based on the Tailoring rule:

Modified Source: Permit will 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. Since LFG is the only source of fuel for this equipment, limiting amount of LFG flared will limit the GHG emissions from this equipment. Monitoring and recordkeeping conditions will also be imposed to ensure compliance. GHG gases are not subject to PSD as part of this review.

REG XXX: There is no emissions increase. Replacement of existing flare is not going to cause annual NOx and ROG emissions increase to be greater than the threshold levels listed under Rule 3000 (b) (6) Table 1 (see below). Therefore, this is considered a De Minimis Significant Permit Revision per Rule 3000 (b) (28) (B) and subject to commenting period -EPA (45 days).

Air Contaminant	Daily Maximum (Pounds/day)
VOC	30
NOx	40
SOx	60
CO	220
PM-10	30

FEDERAL REGS: 40 CFR PART 60 SUBPART WWW AND AAAA:

Title 40 part 63 subpart AAAA - 63.1955 – If the landfill is operated in compliance with 40 CFR part 60 subpart WWW, it is in compliance with Title 40 part 63 subpart AAAA.

Title 40 part 60 subpart WWW - 60.752 - the site has a gas collection and control system installed in compliance with this subpart and is able to destroy NMOC by 98 percent or 20 PPMV by volume. The site is in Title V program and the applicant is aware of federal requirements for compliance with title 40 part 60 subpart WWW. Gas collection system is expected to be operated in accordance with the provisions of 60.753, 60.755, & 60.756.

Title 40 Part 64 - CAM plan requirements will be added as applicant has also filed for TV renewal and CAM plan application.

CONCLUSION:

This equipment is expected to be in compliance with applicable SCAQMD Rules and Regulations.

RECOMMENDATION:

Issue a permit to construct, for the proposed modification after EPA commenting period.