

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <b>ENGINEERING AND COMPLIANCE DIVISION</b>  <b>PERMIT APPLICATION EVALUATION AND CALCULATIONS</b>	PAGES 11	PAGE 1
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**PERMIT TO CONSTRUCT**

**APPLICANT'S NAME:** SUNSHINE CANYON LANDFILL

**MAILING ADDRESS:** 14747 SAN FERNANDO ROAD, SYLMAR, CA 91342

**EQUIPMENT ADDRESS:** 14747 SAN FERNANDO ROAD, SYLMAR, CA 91342

**FACILITY ID #:** 49111

**EQUIPMENT DESCRIPTION**

LANDFILL GAS FLARING SYSTEM NO. 9 CONSISTING OF:

1. ONE (1) SKID MOUNTED HDPE MOISTURE SEPARATOR, ZMS, WITH DEMISTER PAD ELEMENT FOR MOISTURE COLLECTION.
2. THREE (3) LANDFILL GAS EXTRACTION BLOWERS (ONE STAND-BY), MAKE/MODEL TBD, EACH WITH A TBD HP MOTOR VENTING LANDFILL GAS FROM COLLECTION WELLS AND TRENCHES.
3. THREE (3) LANDFILL GAS BLOWER VFD'S WITH PRESSURE TRANSMITTER FOR VFD VACUUM CONTROL.
4. COMBUSTION AIR BLOWER, MAKE/ MODEL TBD, MAX AIR FLOW TBD SCFM, CONTROL WITH INLET SILENCER AND FILTER.
5. ONE (1) COMBUSTION AIR BLOWER VFD.
6. TWO (2) INSERTION TYPE THERMAL MASS FLOW METERS, ONE EACH FOR LANDFILL GAS FLOW AND COMBUSTION AIR FLOW.
7. ONE (1) 10" DIAMETER, MAKE ENARDO, FLARE INLET FLAME ARRESTOR.
8. YOKOGAWA DIGITAL PAPERLESS CHART RECORDER FOR RECORDING VARIOUS PARAMETERS.
9. ENCLOSED A-36 CARBON STEEL FLARE, JOHN ZINK, MODEL ZULE, 13'-0" DIA. X 50'-0" H., RATED AT 5000 SCFM CAPACITY, 136.7 MMBTU PER HOUR WITH A FLAME ARRESTOR, TWO COMBUSTION AIR DAMPERS, AND FLARE ALARM SYSTEM.

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10. IGNITION CONTROL STATION AUTOMATED IGNITION SYSTEM WITH PROPANE GAS PILOT ASSEMBLY, ONE (1) SELF CHECKING ULTRAVIOLET FLAME SCANNER, ONE (1) HIGH TEMPERATURE SHUTDOWN THERMOCOUPLE, THREE (3) BURNER THERMOCOUPLES, FOUR (4) FLARE TEMPERATURE MONITORING THERMOCOUPLES AT DIFFERENT ELEVATIONS, IGNITION TRANSFORMER, AND TWO 5 GALLON CAPACITY PROPANE TANKS

**BACKGROUND:**

This application (A/N 526972) was filed by the applicant to install a new flare (Flare No. 9) in addition to the other existing flares at this landfill. This flare is designed to combustion 5000 scfm of landfill gas. Since this landfill is a Title V facility, the proposed flare will be subject to LAER.

This facility has been issued numerous NC's and NOV's during last year mainly due to large number of odor complaints received from nearby residents. The facility is currently operating under an order of abatement (OA, case # 3448-13). To address the increasing odor complaints in this landfill, applicant has added new wells and trenches which now require the operator to install additional LFG combustion capacity. Installation of this new flare in conjunction with the other existing flares operating at the site is part of the actions to address the complaints.

**PROCESS DESCRIPTION**

The proposed flare will be used to combust landfill gas (LFG) generated at this facility. LFG is collected mainly from various gas collection wells, and horizontal collectors with the help of enclosed, skid mounted, electric blowers. These blowers will be equipped with various control options such as inlet vacuum control to fine tune the gas collection operations. Back up blowers will also be installed in case one/more of the main blowers are out of service. The LFG is then passed through a moisture separator and routed through a flame arrestor to prevent back fire. LFG is then introduced to a pre-mix chamber which is equipped with its own dedicated combustion air blower. This premixed LFG is then distributed evenly through the burners inside the flare. After the combustion process the exhaust exits the flare at 50 feet above grade.

All blowers (LFG and combustion air) are equipped with variable frequency drives to adjust the speed of the blowers in order to ensure proper operation of the flare. The gas pilot apparatus in the flare is equipped with a pressure regulator, fail-closed shutdown valve, and manual block valve, UV flame scanner, and a pressure indicator. In case of power failure or other emergencies, there are pneumatic valves in the landfill gas and combustion air lines to completely cut off the gas and air flow to the flare. The proposed flare will also be equipped with a programmable logic controller (PLC) and a paperless chart recorder to record various flare parameters.

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**EMISSIONS:**

Assumptions:

- Flare design capacity = 5000 scfm
- Flare BTU rating of 136.7 MMBTU/hour.
- Methane content of LFG = 50% (HHV)- assumed by the applicant; (Apr-June 2010 – Lab sample report for flare 8 – Methane content of LFG concentration was 40.2% (LHV))
- BTU of methane = 1000 BTU/scf
- BTU for 50 % of methane in landfill gas = 500 BTU/SCF
- Exhaust volume was assumed to be 64,000 scfm @ 13% O2 based on similar size flare operating at another landfill. Exhaust volume will be determined during the source test.
- Inlet TNMOC: 8000 PPMV as methane based on Rule 1150.1, Year 2010, 2<sup>nd</sup> Quarter Compliance Report .
- CO emission factor: 0.06 lbs/MMBTU (BACT/LAER-guaranteed by flare manufacturer for ZULE flare)
- NOx emissions factor: 0.025 lbs/MMBTU (BACT/LAER-guaranteed by flare manufacturer for ZULE flare)
- SOx: 150 PPMV of H2S at inlet stream (Based on maximum allowable by Rule 431.1)
- PM-10 emission factor: 5 lbs/MMSCF (LAER- based on AQMD permit)
- 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 Rule 1150.1, Year 2010, 2<sup>nd</sup> quarter report (1150.1 core compounds analysis was used).

Calculations:

Calculated MMBTU/hr (HHV - 50% methane)=  
 $5000 \text{ scf/min} \times 60 \text{ min/hr} \times 500 \text{ BTU} \times 10^{-6} = 150 \text{ MMBTU/hr}$

Calculated MMBTU/hr (LHV -40.2% methane):  
 $(5,000 \text{ scf/min} \times 60 \text{ min/hr} \times 0.402 \times 1000 \text{ btu/scf}) = 120.6 \text{ MMBTU/hr}$

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The following tables summarize the emissions from the proposed flare based on 5000 scfm design capacity (Table 1). Table 2 will compare the increase of emissions with Rule 212(g) thresholds to determine if a public notice under Rule 212 is required.

Table 1 – Total Emissions from the Proposed Flare

No	Criteria Pollutant Name	Emission Factors	Emission factor Units	Flare Flow in scfm	MMBTU/hr of Flare	pollutant in lb/hr	pollutant in lb/day	pollutant in lb/year	pollutant in tons/year	pollutant in gram/sec
1	NOx	0.025	lbs/MMBTU	5000	136.70	3.42	82.02	29937	15	0.4313
2	CO	0.06	lbs/MMBTU	5000	136.70	8.2	196.85	71850	36	1.034
3	PM10	5	lbs/MMSCF	5000	136.70	1.5	36	13140	6.57	0.19
4	SOx	150	PPMV	5000	136.70	7.60	182.38	66569	33	
5	VOC - 98% destruction efficiency	8000	Inlet PPMV as Methane	5000	136.70	2.02	48.63	17751	8.88	
6	VOC -- 20 PPMV in exhaust	20 @3% O2	PPMV as Hexane	64000 @13% O2	136.70	7.75	186	67850	34	
7	VOC – BACT/LAER	0.0060	lbs/MMBTU	5000	136.70	0.82	19.68	7185	3.59	
8	HCHO	1.169	lbs/MMSCF	5000	136.70	0.36	8.42	3072	1.5	
9	PAH without Naphthalene	0.003	lbs/MMSCF	5000	136.70	0.00090	0.022	8	.004	
10	Naphthalene	0.008	lbs/MMSCF	5000	136.70	0.00240	0.058	21	0.015	
11	HCl	2.312	PPMV			0.155	3.73	1361	0.681	

Table 2 – Emissions from Flare No. 9 and Rule 212(g) Comparison.

Criteria pollutant	New Flare 9 emissions (lbs/hr)	New Flare 9 emissions (lbs/day)	Rule 212 (g) thresholds (lbs/day)	Public Notice Required per 212 (g) Yes/No
NOx	3.42	82.02	40	YES
CO	8.20	196.85	220	NO
PM10	1.5	36	30	YES
SOx	7.60	182.38	60	YES
VOC	0.82	19.7	30	NO

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**RULES EVALUATION:**

**CEQA Document:**

The final EIR document no. SEIR 91-0377-ZC/GPA, completed in December 1999 by the City of Los Angeles, anticipated installation of up to 5 flares for destruction of 4,167 scfm each for a total of 20,835 scfm of landfill gas. A condition will be imposed that limit the facility-wide gas collection treatment rate at 16, 1000 scfm at 50% methane (CH<sub>4</sub>) which is equivalent to 20,835 scfm at approximately 38.6 % methane (CH<sub>4</sub>). Installation of this proposed flare (Flare no. 9) will not exceed the limits specified in EIR. No further CEQA analysis is required.

- RULE 212:** Rule 212 (c)(1)- There is no school within 1000 feet of this site  
 Rule 212 (c)(2)- The anticipated emissions for this project will exceed 212(g) thresholds for various criteria pollutants. Therefore, the installation of this new flare is considered a significant project and a public notice is required (see Table 2).  
 Rule 212 (c)(3)(A)(i)- MICR is below 1 in a million.

Public Notice is 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 = 1.5 lbs/hr,  
 64000 scfm, assumed dry exhaust flow

$$C = \frac{1.5 \text{ lb/hr} \times (7,000 \text{ grains/lb})}{64,000 \text{ dscfm} \times (60 \text{ min/hr})}$$

$$C = 0.0027 \text{ grains/dscfm} < 0.038 \text{ grains/cu. ft for less than 64,000 dscfm}$$

Compliance with this rule is expected for this flare.

- RULE 407:** Estimated CO, ppmv =  $8.2 \text{ lbs CO/hr} \times 379 \times 10^6 / (64,000 \text{ dscfm} \times 60 \times 28)$   
 = 28.90 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 AQMD region. Compliance is expected.

- RULE 431.1:** LFG for this facility has been well below allowable 150 ppmv H<sub>2</sub>S levels. Also, facility wide condition will limit the H<sub>2</sub>S concentration in LFG fuel to be less than 150 ppmv. Compliance is expected.

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**RULE 1150.1:** The proposed LAER flare is expected to comply with either Total non-methane organic compounds (TNMOC) destruction efficiency of 98% by weight or TNMOC concentration to less than 20 ppmv (as hexane), dry basis as hexane at 3% oxygen at the exhaust. This requirement will be verified by initial and subsequent annual source tests. The flare manufacturer has guaranteed compliance with Rule 1150.1 TNMOC's and Methane destruction efficiency requirements. Compliance is expected.

**REG. XIII:**

1303 (a):

**BACT/LAER:** The proposed enclosed flare is expected to meet all BACT/LAER requirements:

**NO<sub>x</sub>:** The BACT/LAER for this pollutant is 0.025 lbs of NO<sub>x</sub>/MMBTU (see A/N 02-540ML issued by US EPA). The flare manufacturer has guaranteed compliance with this limit:

$$0.025 \text{ lbs/MMBTU} \times 136.7 \text{ MMBTU} = 3.42 \text{ lbs/hr}$$

**CO:** The BACT/LAER for this pollutant is 0.06 lbs of CO/MMBTU (see A/N 02-540ML issued by US EPA). The flare manufacturer has guaranteed compliance with this limit:

$$0.06 \text{ lbs of CO/MMBTU} \times 136.7 \text{ MMBTU} = 8.2 \text{ lbs/hr}$$

**ROG:** Applicant has proposed to use 39 percent ROG within 1000 ppmv of NMOC or 439 ppmv as hexane assuming a 98% destruction efficiency as BACT/LAER for the proposed flare. Using this assumption the ROG emissions from the proposed flare will be:

$$439 \text{ ppmv} \times 5000 \text{ SCFM} \times 86 \text{ lbs/lbmole} \times 1 \text{ lbmole}/379 \text{ scf} \times 60 \text{ min/hr} \times 0.02 = 0.6 \text{ lbs/hr or} \\ = 14.4 \text{ lbs/day}$$

Based on AQMD analysis, applicant's assumption that only 39 percent of NMOC in the LFG gas is ROG is incorrect and that 98% destruction efficiency does not meet the BACT/LAER standards. As a result, AQMD has performed its own analysis based on the existing permitted flares at this site and has determined that appropriate emission factor for LAER should be 0.006 lbs of ROG/MMBTU:

Flaring System No. 1 permitted limit: 23 lbs/day or 0.96 lbs/hr or 0.0091 lbs/MMBTU

Flaring System No. 8 permitted limit: 0.63 lbs/hr or 0.006 lbs/MMBTU

Therefore, LAER imposed emission limit based on 0.006 lbs/MMBTU for the proposed flare will be:

$$0.006 \text{ lbs/MMBTU} \times 136.7 \text{ MMBTU} = 0.82 \text{ lbs/hr or } 19.68 \text{ lbs per day.}$$

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**PM10:** Applicant has proposed to use a PM 10 emission factor of 12 lbs/MMSCF as Methane assuming 50 percent Methane in the LFG (or 6 lbs/MMSCF of LFG). Based on this emission factor, the PM10 emissions from the proposed flare will be:

$$6 \text{ lbs/MMSCF} \times 5000 \text{ SCFM} \times 60 \text{ min/hr} = 1.8 \text{ lbs/hr or } 43.2 \text{ lbs/day}$$

AQMD has also performed its own analysis based on the same assumptions (50% Methane in LFG) and the permitted limits on the existing permits at the site:

Flaring System No. 1 permitted limit:  $41 \text{ lbs/day} = 0.0285 \text{ lbs/min}$   
 $0.0285 \text{ lbs/min} \times \text{min}/(4167 \times 0.5) = 34 \text{ lbs/MMSCF}$

Flaring System No. 3 permitted limit:  $1.6 \text{ lbs/hour} = 0.0667 \text{ lbs/min}$   
 $0.0667 \text{ lbs/min} \times \text{min}/(4167 \times 0.5) = 8 \text{ lbs/MMSCF}$

Flaring System No. 8 permitted limit:  $0.64 \text{ lbs/hr} = 0.0107 \text{ lbs/min}$   
 $0.0107 \text{ lbs/min} \times \text{min}/(4167 \times 0.5) = \underline{5 \text{ lbs/MMSCF}}$

Since Flare No. 8 has a lower emission factor (5 lbs/MMSCF) than the one used by the applicant (6 lbs/MMSCF), the lower emission factor will be used for LAER. Based on 5 lbs/MMBTU emission factor the proposed flare PM10 emissions will be:

$$5 \text{ lbs/MMSCF} \times 5000 \text{ SCFM} \times 60 \text{ min/hr} = 1.5 \text{ lbs/hr or } 36 \text{ lbs/day.}$$

Compliance with BACT/LAER is expected.

Rule 1303 (b):

**Modeling:** Applicant submitted a Tier 4 air dispersion analysis to demonstrate compliance with modeling requirement of this rule. A formal request was submitted to Planning, Rule Development & Area Sources (PRDAS) to review this analysis. PRDAS has reviewed and approved the modeling analysis (See memo from Philip Fine, dated November 16, 2011). However, this modeling analysis was based on the applicant's original request to use the Flare No. 8 as a backup and incremental increase in emissions from Flare 8 and Flare 9. Since Flare No. 8 will no longer be used as a backup, AQMD re-evaluated the emissions from Flare No. 9 based on 5000 scfm of LFG(proposed new flare capacity). The increase in emissions as result of installation of this new flare will not result in exceedance of ambient air quality standards:

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Pollutant	Averaging Time	Air Quality Standard	Proposed Flare*	Compliance
PM10	24-hour ug/m <sup>3</sup>	2.5 <sup>+</sup>	0.45	Yes
	Annual ug/m <sup>3</sup>	1 <sup>+</sup>	0.09	Yes
NOx	1-hour ug/m <sup>3</sup>	500 <sup>++</sup>	153	Yes
	Annual ug/m <sup>3</sup>	100 <sup>++</sup>	37.1	Yes
CO	1-hour ug/m <sup>3</sup>	23000 <sup>++</sup>	2297	Yes
	8-hour ug/m <sup>3</sup>	10000 <sup>++</sup>	1608	Yes

- <sup>+</sup> - Significant Change in Air Quality Concentration
- <sup>++</sup> - Most Stringent Air Quality Standard
- \* - Based on AQMD emission factors. Modeling analysis adjusted to flare maximum capacity.

Emission Offsets:

The flare is a landfill gas control equipment, and is considered an Essential Public Service (ESP) per Rule 1302 Definitions, (m) (7). Therefore, required offsets will be provided from the Priority Reserve Account (Rule 1309.1). All existing flares comply with BARCT.

Statewide Compliance:

Republic has provided us the list of landfills being operated in CA and has affirmed that all the facilities are in compliance with Clean Air Act. Please see the list attached in email correspondence dated Dec 27, 2011.

Sensitive Zone Requirements:

Not applicable as credits will be provided from the Priority Reserve.

Major Polluting Facility Alternative Analysis:

Proposed flare will be located on the landfill adjacent to an existing flare (Flare No.8) which will be used as a back-up once the proposed flare is operational. A CEQA analysis was performed for the operation of this landfill and found that applicant proposed method of destruction of LFG to be acceptable. Emission from the proposed LAER flare will meet the current regulatory requirements for this type of combustion device and is considered the standard commercial practice for LFG control. Therefore, no further alternative analysis is required.

Protection of Visibility:

Not applicable. Sylmar 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.)

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**RULE 1401:**

Applicant has submitted a Tier 4 Modeling for Rule 1401 as part of their Health Risk Assessment (HRA). The model was reviewed by AQMD and was found acceptable. However, applicant's approach to the HRA analysis for compliance with this rule was found to be unacceptable since it calculated risk solely based on incremental increase of emissions rather than emissions from the full capacity of the proposed flare. As a result, AQMD conducted its own analysis based on the highest emissions from an extended list of contaminants (contaminants identified in AP-42 or recent source test data). Adjusting the risk values to flare's emissions at full capacity results in an MICR of 0.09 in a million, and HIA and HIC of less than 1 at the highest point of the impact. Cancer burden will not be applicable.

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

**REG. XVII: Preventative Significant Deterioration (PSD) :**

**Rule 1701:** This regulation sets forth preconstruction review requirements for stationary sources or modifications to an existing stationary source to comply with BACT and other requirements of this regulation where there is:

- An increase in potential to emit of an attained air contaminant at stationary sources or modification to a stationary source is at least 100 or 250 tons of attainment air contaminant per year depending on a source category,
- A significant emission increase at an existing stationary source, or
- A net emission increase at a major stationary source located within 10 km of a Class I area, if the emission increase would impact the Class I area by 1.0 ug/m3..

The source may be interpreted as "combinations of permitted units, a project, or a Facility, then the potential to emit (PTE) emission limit can be 100 or 250 tons per year (TPY) depending on a source category.

**Rule 1703:** The proposed project is not required to conduct PSD analysis because the new flare does not satisfy the Major Stationary Source definition:

Rule 1702 (m) (1) defines Major Stationary Source (different categories). The flaring of landfill gas or landfill operations in general, is not listed as a Major Stationary Source. However, 1702 (m)(2) states that an unlisted stationary source that emits or has potential to emit 250 TPY of an attained contaminant will be subject to PSD analysis. The emissions from the proposed flare would be subject to 250 TPY limitation. Estimated emissions of attainment pollutants from the proposed project are less than 250 TPY.

NOx emissions = 15 TPY < 250 TPY  
CO emissions = 36 TPY < 250 TPY

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Therefore this proposed project is not considered a Major Stationary Source or a modification at a stationary source which would constitute a Major Stationary Source by itself.

Also, the estimated emissions of attainment pollutants are less than significant levels at an existing source:

NOx emissions = 15 TPY < 40 TPY  
CO emissions = 36 TPY < 100 TPY

And, this landfill is not located within 10 km of a class I area.

No further analysis under this rule is required.

**RULE 1714:** The owner or operator must obtain a PSD permit for Greenhouse Gases (GHG) pursuant to this rule before beginning actual construction as defined in 40 CFR Part 52.21 (b)(11) of a new major stationary source or major modification to an existing major source as defined in 40 CFR part 52.21 (b)(1) [Major Stationary] and (b)(2) [Major Modification], respectively. Currently EPA has deferred biogenic carbon dioxide (CO2) emissions from combustion of biogenic sources. As such, GHG emission from the proposed project is less than 250 tons per year and CO2e emissions are less than 100,000 tons per year.

Compliance with requirements of Rule 1714 is expected.

**REG XXX:** Replacement of existing flare is expected to cause NOx, SOx and PM-10 emissions increase to be greater than the threshold levels listed under Rule 3000 (b) (6) Table 1 (see below). Therefore, this modification is considered a Significant Permit Revision per Rule 3000 (b) (28) (B) and subject to EPA 45 day commenting period and public notification.

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

**FEDERAL REGULATIONS: 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.

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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. Compliance is expected.

40 CCFR Part 64: Facility has submitted the CAM plan application with Title V renewal package. CAM requirements will be added to the permit conditions.

**CONCLUSION/RECOMMENDATION:**

This equipment is expected to be in compliance with applicable AQMD Rules and Regulations. Issue a permit to construct for installation of the proposed flare upon completion of required public notices (Rule 212 and Title V), EPA and public commenting period.