Permit to Operate (Change of conditions with SOX emission increase)

Applicant MM Lopez Energy, LLC

Mailing Address 5087 Junction Road
Lockport, NY 14094

Equipment Location 11950 Lopez Canyon Road
Sylmar, CA 91342

Equipment Description

A/N 525290, ID 104806
TV REVISION-De-minimis Significant

A/N 522394, ID 104806 (Previous Application/Permit 495797/G3704)
LANDFILL GAS CONTROL SYSTEM (NO. 1) CONSISTING OF:

1. INLET GAS SCRUBBER, COMMON TO ENGINE NO. 2.
2. TWO GAS COMPRESSORS, VILTER MODEL VSS1801, 200 H.P. EACH, COMMON TO ENGINE NO. 2.
3. HEAT EXCHANGER, GAS-TO-GAS REHEAT, KETEMA, COMMON TO ENGINE NO. 2.
4. GAS COOLER, AIR-X-CHANGERS, AERIAL COOLER, COMMON TO ENGINE NO. 2.
5. COALESCING FILTER, 0.5 MICRON FILTERING, COMMON TO ENGINE NO. 2.
6. INTERNAL COMBUSTION ENGINE NO. 1, CATERPILLAR, MODEL G3616, SIXTEEN CYLINDER, 4235 BHP, LEAN BURN, LANDFILL GAS FIRED, TURBOCHARGED AND AFTERCOOLED, DRIVING A 3050 KW ELECTRICAL GENERATOR.

A/N 522396, ID 104806 (Previous Application/Permit 495796/G3703)

LANDFILL GAS CONTROL SYSTEM (NO. 2) CONSISTING OF:

1. INLET GAS SCRUBBER, COMMON TO ENGINE NO. 1.
2. TWO GAS COMPRESSORS, VILTER MODEL VSS1801, 200 H.P. EACH, COMMON TO ENGINE NO. 1.
3. HEAT EXCHANGER, GAS-TO-GAS REHEAT, KETEMA, COMMON TO ENGINE NO. 1.
4. GAS COOLER, AIR-X-CHANGERS, AERIAL COOLER, COMMON TO ENGINE NO. 1.
5. COALESCING FILTER, 0.5 MICRON FILTERING, COMMON TO ENGINE NO. 1.

6. INTERNAL COMBUSTION ENGINE NO. 2, CATERPILLAR, MODEL G3616, SIXTEEN CYLINDER, 4235 BHP, LEAN BURN, LANDFILL GAS FIRED, TURBOCHARGED AND AFTERCOOLED, DRIVING A 3050 KW ELECTRICAL GENERATOR.

Background/Process Description

The MM LOPEZ ENERGY, LLC facility operates two Caterpillar G3616's to generate electricity for sale to the grid, fueled by landfill gas generated and collected on-site (Lopez Canyon landfill and gas collection system – owner/operator Los Angeles City Bureau of Sanitation – ID# 49805- Title V). The engines were installed in November 1998, and have a heat input capacity of 35 million BTU/hr each (about 1167 cfm at 500 btu/cf) and an output of 4235 HP (31% thermal efficiency). The landfill was closed in 1996, meaning that wastes were no longer accepted and landfill gas generation generally peaked about the time the project was starting.

The above applications were submitted on May 6, 2011 (TV revision app submitted 7/19/11) to increase the allowable SOX emission limit on the two engine permits. The existing permits, condition # 13, allow 6 lbs SOX/day from each engine. This request was to increase to 27 lbs Sox/day, based on the amount allowed by the engines at the MM Prima Deschecha Energy LLC facility (same owner, same engines).

In 2011, a source test report indicated emissions of 6.06 lbs/day SOX from ICE #2 and 6.37 lbs/day from ICE #1. Source tests from 2008, 2009, 2010, 2012 and 2013 have not been above 6 lbs/day/engine.

Sox is generated based on sulfur compounds present in landfill gas, which vary based on landfill wastes, decomposition characteristics and moisture contents. No method of sulfur control is employed at the site. SCAQMD Rule 431.1 limits the total reduced sulfur compound concentration in landfill gas combustion to 150 ppmv, as H2S. The landfill gas at Lopez landfill has ranged from 15 to 27 ppmv, as H2S. The permit limitation, as required by Rule 1303(b)(2)(A)-Offsets, Rule 1309.1(a)(3) – Priority Reserve for Essential Public Services, and 1313(g)(2) – permit limitation conditions, of 6 lbs Sox/day/engine, was proposed in the initial permit to construct applications, and have remained in the permits to operate.

In 2011,SCAQMD issued a Notice to Comply to MM LOPEZ ENERGY, LLC for not performing a Rule 1110.2 source test a three engine loads. In 2012, and 2013, this requirement was met and the facility has not been issued any NOV's or other Notices to Comply. The maximum operation schedule the equipment is 24 hours/day, 365 days/year.

MM LOPEZ ENERGY, LLC is a major source of emissions with 2012 reported emissions as follows:

Pollutant ID	Pollutant Description	Annual Emission
CO	Carbon Monoxide	86.372 tons
NOX	Nitrogen Oxides	29.259 tons
ROG	Reactive Organic Gases	6.381 tons
SOX	Sulfur Oxides	1.288 tons
TSP	Total Suspended Particulates	2.184 tons

Based on annualized emissions above, the combined emissions were about 7.1 lbs/day. But in 2011, a source test resulted in emissions of 6.06 lbs/day SOX from ICE #2 and 6.37 lbs/day from ICE #1. Source tests from 2008, 2009, 2010, 2012 and 2013 have not been above 6 lbs/day/engine.

The facility is subject to Title V permit requirements. The Title V permit was initial issued in January 2009 and is set to expire in January 2014. A timely renewal application is on file.

Emission Calculations

The most recent source tests (*) and permitted emission limits from the two LFG engines are:

Pollutant	ICE #1	ICE #2	Permitted Limits
CO, lbs/day	365	399	571
CO, ppmv @ 15% O_2	186.05	194.36	265
NOx, lbs/day	86.2	84	107.5
NOx ppmv @ 15% O_2	26.39	24.55	36
TNMOC, lbs/day	25.4	22.8	45.6
TNMOC, ppmv @ 15% O_2	29.8	25.63	40
TNMOC, ppm (as hexane) @ 3% O_2	15.1	12.99	20
PM, lbs/day	8.57	8.68	26
PM, gr/dscf	0.004	0.004	0.1
SO2, lbs/day	2.64	3.84	6
TRS as H2S, ppmv in LFG	10.6	14.8	150

*The source tests were conducted on 2/26/13, and report was dated 4/25/13. The values are at maximum load. The daily mass emissions are the measured hourly times 24.

SOX emissions

The total reduced sulfur as H2S in the landfill gas has fluctuated as reported by Fortistar, and in 2011 the resulting SOX emissions calculate to above the 6 lb/day limit.

Year	Total Reduced Sulfur, as H2S (higher of ICE 1 and 2)	Sox Emissionslb/day (higher of ICE 1 and 2)
2008	15.1	3.6
2009	21.4	5.8
2010	22.3	5.12
2011	**27.3**	**6.37**
2012	16.4	4.8
2013	14.8	3.8

Requested permitted emission limit: 27 lbs/day/engine

95 ppmv H2S(in LFG) x 1167 cfmLFG x 60 min/hr x lbmoleH2S/379E6cf x lbmoleSO2/lbmoleH2S x 64 lbsSO2/lbmoleSO2 = 1.125 lbs/hr = 27 lbs/day (NSR)

Proposed: 27 x 2 ICE = 54 lb/day
Existing : 6 x 2 ICE = 12 lb/day

Increase : 42 lb SOX/day (7.67 tons/yr)

GHG Emissions

One engine - based on source testing at maximum load, the CO2 and CH4 emissions are:
CO2: outlet 10% by volume of 11000 dscfm = 0.1*11000*44*60*8760/379/2000 = 33,561 short tons/yr
= 30446 metric tons/yr
CH4: 2000 ppmv of 11000 dscfm = 2000*11000*16*60*8760/379/1000000/2000 = 244 short tons/yr
= 221metric tons/yr

N2O: 1167 scfm * 0.00000117 lb/scf * 60 min/hr * 8760 hrs/yr /2000 = 0.359 short tons/yr
= 0.326 metric tons/yr

(Note: N2O emission factor taken from EPA GHG factors; LFG scfm taken from S/T)

CO2e = (21*244) + 33561 + (310 * 0.359) = 38,796 short tons CO2e
CO2e = (21*221) + 30446 + (310 * 0.326) = 35,195 metric tons CO2e

Two engines = 70188 metric tons CO2e.

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)- There is no increase of emissions.
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 odor related complaint has been received in the last two years against the facility.

Rule 404: Particulate Matter - Concentration
No violations are expected limits are listed under Rule 404 Table 404(a).

Rule 407: Liquid and Gaseous Air Contaminants
Rule 407(a)- This rule is not subject to stationary ICEs under Rule407(b)(1).

Rule 409: Combustion Contaminants
≤ 0.1 grain/cu. ft. @12% CO2, standard conditions averaged over a minimum of 15 minutes. Compliance is expected.

Rule 431.1: Sulfur Contents of Gaseous Fuels
Rule 431.1(c)(1)- Natural gas contains ≤ 16 ppmv sulfur compounds as H2S.
Rule 431.1(c)(2)- Landfill gas contains ≤ 150 ppmv sulfur compounds as H2S.
Compliance is expected.

Reg IX: Standards of Performance for New Stationary Sources
Part 60, Chapter I, Title 40 of Code of Federal Regulations, Subpart JJJJ Standards of Performance for Stationary Spark Ignition Internal Combustion Engines
60.4230-Applicability: not applicable.
60.4230(a)- Construction for these ICEs did not commence nor was the ICE modified or reconstructed after June 12, 2006.
60.4230(b)-These ICEs is not being tested at an engine test cell/stand.
60.4230(f)- These ICEs is not a temporary unit.

Reg IX: Part 63, Chapter I, Title 40 of Code of Federal Regulations, Subpart ZZZZ- National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines
63.6585- Applicability: Applicable. These engines are stationary RICE at an area source of HAP emissions.
63.6595(a)(1)- Existing stationary SI RICEs located at an area source of HAP shall comply with the applicable emission limitations and operating limitations no later than October 19, 2013.
63.6660(a)- Your records must be in a form suitable and readily available for expeditious review according to 63.10(b)(1).
63.6660(b)- Keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report or record.
63.6660(c)- Keep each record readily accessible in hard copy or electronic form for at least 5 years after the date of the occurrence, measurement, maintenance, corrective action, report, or record.
Compliance with this Regulation is expected. Existing permit already imposes conditions to comply with ZZZZ.

Rule 1110.2: Emissions From Gaseous and Liquid-Fueled Engines
Rule 1110.2(d)(1)(B)- Stationary LFG engines shall not exceed concentration limits: NOx 36 ppmvd 15% O2, VOC 40 ppmvd, measured as carbon 15% O2, CO 2000 ppmvd 15% O2.
Rule 1110.2(d)(1)(J)-Engine without Rule 218 approved CEMS shall equip and maintain engine w/ air-to-fuel ratio controller with an oxygen sensor and feedback control, or

equivalent technology approved by the Executive Officer, CARB and EPA. AFRCs are equipped on the engines, even though engines are equipped with CEMS.
Rule 1110.2(e)(3)- NOX CEMS is required and equipped on the engines.
Rule 1110.2(e)(4)- I&M Plan application has been submitted and recommended for approval under application 486782, which is a separate evaluation and submitted with this revision package.
Rule 1110.2(e)(5)- AFRCs are not required on the engines, since engines are equipped with CEMS.
Rule 1110.2(f)(1)(A)(i)- NOX CEMS are required for these engines. NOx CEMS are equipped on these engines. CO CEMs is not required pursuant to Rule 1110.2(f)(1)(A)(vii) – Lean burn engines.
Rule 1110.2(f)(1)(A)(iii)- CEMS shall comply with Rule 218.
Rule 1110.2(f)(1)(B)- Maintain operational non-resettable totalizing time meter to determine engine elapsed operating time.
Rule 1110.2(f)(1)(C)(i)-Effective August 1, 2008 shall conduct source test for NOx, VOC as carbon, and CO (ppmvd, 15% O2) every two years. Or every three years if engine operated less than 2000 hours since last test. If engine has not operated within 3 months of required source test date, source test shall be conducted when operation resumes for 7 consecutive days or 15 cumulative days.
Rule 1110.2(f)(1)(D)-I&M Plan application has been submitted and is recommended for approval.
Rule 1110.2(f)(1)(E)- Maintain a monthly engine operating log that includes: (i) Total hours of operation, (ii) Types of liquid and/or type of gaseous fuel, (iii) fuel consumption (cubic feet of gas and gallons of liquid), and (iv) Cumulative hours of operation since the last source test required in (f)(1)(C).
Rule 1110.2(f)(3)- All data, logs, test reports and other information required by this rule shall be maintained for at least five years and made available for inspection.

Compliance with Rule 1110.2 is expected.

Rule 1150.1 Control of Gaseous Emissions from Municipal Solid Waste Landfills

Rule 1150.1(d)(1)(C)(i)- Route all LFG to control system to reduce NMOC by at least 98% by weight or reduce the outlet of NMOC concentration to less than 20 ppmv, dry basis as hexane at 3% O2 established by an initial and subsequent annual source tests per 40 CFR 60.8 and using test methods in Rule 1150.1(j)(1). The annual source test shall be conducted no later than 45 days after the anniversary date of the initial source test.
Rule 1150.1(d)(1)(C)(iv)- If a gas control device is an enclosed combustor other than a flare then it shall: (I)- achieve a methane destruction efficiency of at least 99% by weight. Lean burn engines' outlet methane concentration shall be less than 3,000 ppmvd @ 15% O2. (II)- if a boiler or process heater is used, LFG shall be introduced into the flame zone. Where LFG is the primary fuel, introduction of the LFG into the flame zone is not required. (III)- be operated within the operating parameter ranges established during initial or most recent compliant source test. Parameters monitored are in (e)(7).

Rule 1150.1(e)(7)(A)- enclosed combustors and flares shall install, calibrate, maintain, and operate per manufacture specs (i) A temperature monitoring device with continuous recorder w/ +/-1%. Input capacity > 44MW boilers & process heaters don't required a

temperature monitoring device. (ii) Shall record flow to gas control device(s) at least every 15 minutes.
Rule 1150.1(e)(7)(B)- Open flares or non-combustion systems shall provide information of operation, parameters indicating proper performance, and monitoring procedures.
Rule 1150.1(e)(7)(C)- Quarterly monitoring for leaks for components under positive pressure. Component must be tagged and repairs in 10 calendar days. Gas to energy facilities may leak test prior to scheduled maintenance or during planned outages.
Rule 1150.1(f)- All records shall be kept up to day, readily accessible and maintained for at least 5 years.

Compliance is expected.

Reg XIII: Rule 1303(a)- There is an increase of emissions in SOX, BACT is required. For SCAQMD, BACT/LAER for Sox is compliance with Rule 431.1. No increase in firing rate – no increase in any other pollutant.
Rule 1303(b)(1)- Modeling for SOx is not required (1303 Appendix A).
Rule 1303(b)(2)- The is an increase of emissions in SOX. Since the facility is an essential public service, required offsets shall be provided through priority reserve.
Rule 1309.1 – Priority Reserve is used at 1:1. There are only two permitted equipment (two ICE) – both of which meet BARCT.

Compliance is expected.

Rule 1401: Toxic Air Contaminants (TAC)
Rule 1401(b)- There has been no modification or increase of TAC emissions due to the increase in the allowable SOX emissions. No increase in allowable LFG firing rate.

Compliance is expected

Rule 1401.1: Rule 1401.1(b)- Equipment is exempt since it is located at an existing facility.

Rule 1703: PSD: The landfill is not a major stationary source (no criteria pollutant over 100/250 tons, and the increase is not significant (< 40 tons/yr), therefore only these apply:
(a)(1) – Compliance with all applicable rules
(a)(2)- BACT for Sox is employed

Rule 1714: GHG PSD – The existing stationary source does not emit more than 100,000 tons per year of CO2e, and the modification does not cause any increase in CO2e.

Reg. XXX: CAM under 40 CFR Part 64 will be incorporated in the upcoming TV renewal.
This change in conditions/Sox emission increase is considered a de-mimins significant revision to the TV permit subject to EPA review. A public notice is not required.
Compliance is expected.

Conclusions & Recommendations

The equipment is in compliance with all the applicable Rules and Regulations of the AQMD. A Permit to Operate is recommended for applications 522394 and 522396. For Permit Conditions please see Sample Permit. A revised Title V permit is recommended after 45-day EPA review under revision application 525290.