

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 17	PAGE 1
	APPL. NO. 515473	DATE September 15, 2011
	PROCESSED BY: Jon Uhl	CHECKED BY

Evaluation for Change of Conditions

COMPANY NAME, LOCATION ADDRESS:

NM Mid Valley Genco LLC, SCAQMD ID # 129660
30 Bohnert Road
Rialto, CA 92377

MAILING ADDRESS:

FORTISTAR Methane Group
NM Mid Valley Genco LLC
5087 Junction Road
Lockport, NY 14094

Equipment Description:

RESOURCE RECOVERY SYSTEM NO. 2 CONSISTING OF:

1. INTERNAL COMBUSTION ENGINE NO. 2, DEUTZ, MODEL TBG620V16K, SIXTEEN CYLINDER, 1850 BHP, LEAN BURN, LANDFILL GAS FIRED, TURBOCHARGED AND INTERCOOLED DRIVING AN ELECTRICAL GENERATOR.
2. RADIATOR WITH FANS.
3. ANCILLARY SKID WITH MUFFLER, HEAT EXCHANGER, FILTER, INTERCOOLER AND EXHAUST STACK.

Conditions:

- 1) OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.
[RULE 204]
- 2) THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
[RULE 204]
- 3) OPERATION OF THIS EQUIPMENT SHALL NOT RESULT IN THE EMISSION OF RAW LANDFILL GAS TO THE ATMOSPHERE.
[RULE 1150.1]
- 4) A SAMPLING PORT SHALL BE INSTALLED IN THE LANDFILL GAS LINE TO THE ENGINE TO ALLOW THE COLLECTION OF A GAS SAMPLE.
[RULE 431.1]
- 5) A FLOW INDICATING AND RECORDING DEVICE SHALL BE INSTALLED IN THE LANDFILL GAS SUPPLY LINE TO THE ENGINE.
[RULE 1303(b)(2)-OFFSETS]

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- 6) ~~THE HEATING VALUE OF LANDFILL GAS TO THE ENGINE SHALL NOT EXCEED 14.7 MM BTU/HR. A WEEKLY LOG OF THE LANDFILL GAS HEATING VALUE SHALL BE KEPT FOR AT LEAST TWO YEARS AND MADE AVAILABLE TO AQMD PERSONNEL UPON REQUEST.~~
THE HEATING VALUE OF LANDFILL GAS BURNED IN THIS ENGINE SHALL NOT EXCEED 16.0 MMBTU/HR, BASED ON A 1-HOUR AVERAGE. THE LANDFILL GAS FLOW RATE TO THE ENGINE, THE METHANE CONTENT OF THE LANDFILL GAS AND THE GROSS ELECTRICAL OUTPUT (KW) SHALL BE MEASURED EVERY 15-MINUTES. THE HEATING VALUE OF THE LANDFILL GAS SHALL BE CALCULATED BY TWO METHODS:

METHOD 1:

(MEASURED METHANE VOLUME FRACTION) X (MEASURED FLOW RATE) X (1,010 BTU/SCF)

METHOD 2:

(MEASURED GROSS KW OUTPUT) X (12,950 BTU/KW-HR)

THE OPERATOR SHALL KEEP A LOG OF THE AVERAGE HOURLY HEATING VALUE OF THE LANDFILL GAS BURNED, CALCULATED BY BOTH METHODS. THE OPERATOR SHALL INDICATE IN THE LOG THE METHOD USED TO DETERMINE COMPLIANCE.

[RULE 1303 (b)(2)-OFFSETS]

- 7) ~~READINGS OF THE HEATING VALUE (BTU/HR) OF THE LANDFILL GAS AT THE INLET TO THE ENGINE SHALL BE TAKEN WEEKLY WITH AN AQMD APPROVED INSTRUMENT AND THE RESULTS RECORDED.~~

~~[RULE 1303(b)(2) OFFSETS]~~

THE OPERATOR SHALL INSTALL AND MAINTAIN A NON-RESETTABLE ELAPSED TIME METER TO ACCURATELY INDICATE THE ELAPSED OPERATING TIME OF THE ENGINE.

[RULE 1110.2]

- 8) THE ENGINE SHALL ONLY USE LANDFILL GAS AS A FUEL.

[RULE 204]

- 9) ~~THE ENGINE SHALL BE EQUIPPED WITH AN AIR TO FUEL RATIO CONTROLLER APPROVED BY THE AQMD.~~

~~[RULE 1303(a)(1) BACT]~~

THE OPERATOR SHALL KEEP A MONTHLY OPERATING LOG THAT INCLUDES:

A. TOTAL HOURS OF OPERATION.

B. TOTAL CUBIC FEET OF LANDFILL GAS CONSUMED.

C. CUMULATIVE HOURS OF OPERATION SINCE THE LAST SOURCE TEST.

[RULE 1110.2]

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- 10) ~~THE AIR TO FUEL RATIO MUST BE CHECKED WEEKLY TO ENSURE THAT THE MANUFACTURER SPECIFIED OXYGEN CONCENTRATION IS MAINTAINED. THIS MAINTENANCE SCHEDULE MAY BE CHANGED UPON APPROVAL OF THE AQMD. [RULE 1303(a)(1)-BACT]~~
THE OPERATOR SHALL REPORT ANY BREAKDOWN RESULTING IN EMISSIONS IN EXCESS OF RULE OR PERMIT LIMITS PER THE REQUIREMENTS OF SCAQMD RULE 1110.2.
[RULE 1110.2]
- 11) TWO SAMPLING PORTS MUST BE PROVIDED IN THE ENGINE EXHAUST DUCT, 8-10 DUCT DIAMETERS DOWNSTREAM AND TWO DUCT DIAMETERS UPSTREAM OF ANY FLOW DISTURBANCE, AND SHALL CONSIST OF TWO 4 INCH WELD NIPPLES WITH PLUGS, 90 DEGREES APART. AN EQUIVALENT METHOD FOR EMISSION SAMPLING MAY BE USED UPON APPROVAL OF THE AQMD. ADEQUATE AND SAFE ACCESS TO THE TEST PORTS MUST BE SUPPLIED BY THE APPLICANT.
[RULE 217]
- 12) APPLICANT SHALL CONDUCT ANNUAL PERFORMANCE TEST OF THE ENGINE IN ACCORDANCE WITH AQMD TEST PROCEDURES AND FURNISH THE AQMD A WRITTEN RESULT OF SUCH PERFORMANCE TEST. WRITTEN NOTICE OF THE PERFORMANCE TEST SHALL BE PROVIDED TO THE AQMD 10 DAYS PRIOR TO THE TEST SO THAT AN OBSERVER MAY BE PRESENT. A TEST PROTOCOL SHALL BE SUBMITTED FOR APPROVAL AT LEAST 60 DAYS PRIOR TO TESTING.

THE PERFORMANCE TEST SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO A TEST OF THE INLET AND EXHAUST GASES, FOR THE FOLLOWING:

- A. METHANE
- B. TOTAL NON-METHANE HYDROCARBONS
- C. OXIDES OF NITROGEN (EXHAUST ONLY)
- D. CARBON MONOXIDE (EXHAUST ONLY)
- E. PARTICULATES (EXHAUST ONLY)
- F. TOTAL SULFUR COMPOUNDS AS H₂S (INLET ONLY)
- G. FLOW RATE
- H. OXYGEN
- I. NITROGEN
- J. CARBON DIOXIDE
- K. MOISTURE
- L. TEMPERATURE
- M. TOXIC AIR CONTAMINANTS INCLUDING BENZENE, CHLOROBENZENE, 1,2-DICHLOROETHANE, 1,1-DICHLOROETHANE, DICHLOROMETHANE, TETRACHLOROETHYLENE, TETRACHLOROMETHANE, TOLUENE, 1,1,1-TRICHLOROETHANE, TRICHLOROETHYLENE, TRICHLOROMETHANE, VINYL CHLORIDE AND XYLENES (EXHAUST ONLY).
- N. **GROSS ELECTRICAL POWER OUTPUT**
- O. **ENGINE HOUR-METER READING**

[RULE 1110.2, 1150.1, 218, 1303(a)(1)-BACT, 1303(b)(2)-OFFSETS, 1401]

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13) THE EMISSIONS FROM THE ENGINE SHALL NOT EXCEED THE FOLLOWING:

AIR CONTAMINANT	LBS/HR
REACTIVE HYDROCARBONS	3.27
NITROGEN OXIDE	2.44
SULFUR DIOXIDE	0.47
CARBON MONOXIDE	10.2
PARTICULATES	0.32
[RULE 1303(b)(2)-OFFSETS]	

14) REACTIVE HYDROCARBON EMISSIONS FROM THE ENGINE SHALL NOT EXCEED ~~0.80~~
~~GRAM/BHP-HR~~ **391 PPMV AS METHANE, WITH NO OXYGEN CORRECTION.**
[RULE 1303(a)(1)-BACT]

15) OXIDES OF NITROGEN EMISSIONS FROM THE ENGINE SHALL NOT EXCEED ~~0.60~~
~~GRAM/BHP-HR~~ **102 PPMV, WITH NO OXYGEN CORRECTION.**
[RULE 1303(a)(1)-BACT]

16) CARBON MONOXIDE EMISSIONS FROM THE ENGINE SHALL NOT EXCEED ~~2.5~~
~~GRAM/BHP-HR~~ **697 PPMV, WITH NO OXYGEN CORRECTION.**
[RULE 1303(a)(1)-BACT]

17) A CONTINUOUS EMISSIONS MONITORING SYSTEM (CEMS) SHALL BE INSTALLED AND OPERATED TO MEASURE THE ENGINE EXHAUST CONCENTRATION FOR NOX AND O2 ON A DRY BASIS. IN ADDITION, THE SYSTEM SHALL CONVERT THE ACTUAL NOX CONCENTRATION TO A CORRECTED NOX CONCENTRATION AT 15% O2. THIS MONITORING SYSTEM SHALL COMPLY WITH THE REQUIREMENTS OF AQMD RULE 218. PRIOR TO INSTALLATION, THIS MONITORING SYSTEM SHALL BE APPROVED IN WRITING BY THE AQMD.
[RULE 218, 1110.2]

18) ALL RECORDS, SUCH AS ~~FUEL USAGE~~, **MONTHLY OPERATING LOG, GROSS ELECTRICAL POWER OUTPUT**, MAINTENANCE RECORDS AND PERFORMANCE TEST RESULTS, SHALL BE MAINTAINED FOR FIVE YEARS AND MADE AVAILABLE TO AQMD PERSONNEL UPON REQUEST.
[RULE 1110.2, 1150.1, 1303(b)(2)-OFFSETS]

19) THIS ENGINE SHALL NOT BE OPERATED IN SUCH A MANNER AS TO UNREASONABLY INTERFERE WITH THE OWNER'S/OPERATOR'S ABILITY TO COMPLY WITH AQMD RULE 1150.1 OR ANY OTHER AQMD RULE LIMITING LANDFILL GAS MIGRATION OR SURFACE EMISSIONS.
[RULE 1150.1]

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Emissions and Requirements:

20) THIS EQUIPMENT IS SUBJECT TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING RULES AND REGULATIONS:

NMOC: 20 PPMV AS HEXANE @ **3% O2** OR 98% WEIGHT REDUCTION, RULE 1150.1,
1303(a)(1)-BACT, 40CFR60 SUBPART WWW, 40CFR63 SUBPART AAAA
VOC: ~~320~~ **40 PPMV AS CARBON** @ 15% O2 AND ~~32% EFFICIENCY~~, RULE 1110.2
METHANE: 3000 PPMV @ 15% O2, RULE 1150.1
NOx: ~~46~~ **38 PPMV** @ 15% O2 AND ~~32% EFFICIENCY~~ **ECF=1.069**, RULE 1110.2
CO: 2000 PPMV @ 15% O2, RULE 1110.2
~~CO: 2000 PPMV, RULE 407~~
PM: RULE 404, SEE APPENDIX B FOR EMISSION LIMITS

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REVIEW OF COMPLIANCE DATABASE:

As of September 13, 2011, the AQMD Compliance Database shows that this facility has one open Notice of Violation (NOV – P54923, see Attachment #1). This NOV pertains to the annual compliance test on 5/12/2010 (Attachment #2). Applicant submitted source test results for 9/10/2010 (Attachment #3) and 3/8/2011 (Attachment #4) showing compliance with the Rule 1110.2 and 1150.1 limits.

Rule	Limit	5/12/2010 test	9/10/2010 test	3/8/2011 test	
1110.2 – VOC	40 ppmv	58.6 ppmv	33.9 ppmv	22.2 ppmv	as CH4 @ 15% O2
1150.1 – VOC	20 ppmv	29.62 ppmv	17.2 ppmv	11.2 ppmv	as hexane @ 3% O2

PERMITTING HISTORY:

A/N	Date	Permit/ Status	Permit Action
377534	12/6/2000	Cancelled	Application for new IC engine at the Mid-Valley landfill – submitted by San Bernardino County Solid Waste Management. Superseded by A/N 391007.
391007	6/12/2002	PTC Cancelled	Permit to Construct for a new LFG-fueled IC engine at the Mid-Valley landfill to be operated by a third party.
425887	12/21/2007	F94435 Active	Change of Conditions – Annual Source Test Requirements
515473	10/15/2010	Pending	Change of Conditions : <ul style="list-style-type: none"> • Clarify calculation methods, maximum limit and recordkeeping for the hourly heating value of landfill gas burned in this IC engine. • Add non-resettable elapsed time meter. • Remove air/fuel ratio controller requirement; engine is equipped with a NOx CEMS. • Update VOC & NOx concentration limits based on Rule 1110.2 requirements. • Add Methane concentration limit based on Rule 1150.1 requirement • Convert RHC, NOx & CO BACT emission limits from gram/bhp-hr to ppmv with no O₂ correction

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BACKGROUND

The Mid-Valley landfill is an active Class III municipal waste landfill (MSW) operated by the County of San Bernardino Waste System Division (WSD, FacID 50299). The gas collection, condensate collection and flare systems are operated by WSD. This resource recovery system is operated by NM Mid Valley Genco, which operates two internal combustion engines (ICE) fueled with landfill gas driving electrical generators. This ICE currently operates under PTO F94435, A/N 425887. NM Mid Valley Genco LLC was issued a Title V permit renewal effective on December 21, 2007 (A/N 466763). This is not a RECLAIM facility.

NM Mid Valley Genco LLC submitted application number 515473 for a change of conditions for this ICE. This application was received 10/15/2010 and deemed complete 10/22/2010. The evaluation for the second identical ICE at this facility is found under A/N 515472. Change of conditions include:

1. Clarify the calculation methods, maximum limit and recordkeeping for the hourly heating value of the landfill gas burned in this IC engine.

The applicant has found that the landfill gas flow meter is sensitive to changes in the landfill gas quality, mainly due to moisture condensation on the probe. This leads to inaccurate flowrate readings, and heating value input to this engine. Therefore, the applicant requested using the electrical power output readings to limit the maximum operation of this engine; electrical power meters require less maintenance than gas flow meters.

The 14.7 MMBtu/hr limit for landfill gas input was based on the 1850 bhp engine rating and an assumed engine energy efficiency of 32%.

$$(1850 \text{ bhp})(2547 \text{ BTU/hp-hr})/(0.32) = 14.7 \text{ MMbtu/hr}$$

Based on the engineering evaluation for A/N 391007, this calculation was only used to show that NOx modeling was required by Table A-1 for Rule 1303. The modeling was done and changing the maximum MMBtu/hr does not require additional NOx modeling. In addition, the permit conditions (#5, 6, 7) are somewhat vague on how to determine the heating value of the landfill gas.

The assumed engine energy efficiency of 32% has proved to be overly optimistic. The results of the 2010 and 2011 sources tests (see Attachments #2, 3, 4) are used to calculate the engine net specific energy consumption (q_a) based on the higher heating value (HHV = 1010 BTU/cf) of methane, the landfill gas methane fraction and the gross electrical output of the generator.

2010: Methane fraction = 0.4485, Flow rate = 535.8 cf/min, Output = 1022.0 kW

$$q_a = (0.4485)(1010 \text{ BTU/cf})(535.8 \text{ cf/min})(60 \text{ min/hr})/(1022.0 \text{ kW}) = 14,249 \text{ BTU/kW-hr}$$

2011: Methane fraction = 0.4169, Flow rate = 415 cf/min, Output = 900 kW

$$q_a = (0.4169)(1010 \text{ BTU/cf})(415 \text{ cf/min})(60 \text{ min/hr})/(900 \text{ kW}) = 11,650 \text{ BTU/kW-hr}$$

$$\text{Average } q_a = (14,249 + 11,650)/2 = 12,950 \text{ BTU/kW-hr}$$

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From the Deutz specifications (Attachment #10), the generator rating on landfill gas is 1262 kW.

$$(1262 \text{ kW})(12,950 \text{ BTU/kW-hr}) = 16.0 \text{ MMBTU/hr}$$

Therefore, condition #6 is revised to limit the heating value of the landfill gas burned in this engine to 16.0 mmBTU/hr, based on a 1-hour average. The landfill gas flow rate to the engine and the methane content of the landfill gas are measured at 15-minute intervals. The heating value of the landfill gas is calculated using the HHV of methane (1,010 BTU/scf):

METHOD 1:
(MEASURED METHANE VOLUME FRACTION) X (MEASURED FLOW RATE) X (1,010 BTU/SCF)

NM Genco requested an alternate heating value calculation based on the electrical output of the generator. The heating value of the landfill gas is calculated using the average q_a from the 2010 & 2011 source tests (13,080 Btu/kW-hr):

METHOD 2:
(MEASURED GROSS KW OUTPUT) X (12,950 BTU/KW-HR)

NM Genco submitted sample data for an identical engine operating at another landfill in January 2011, showing the landfill gas heating value calculated using both methods (see email dated 9/1/2011, A/N 508654). The methods generally agree within $\pm 5\%$. The operator shall indicate, in the operating log, which method is used to determine compliance.

2. "Gross Electrical Power Output" to be measured and recorded at 15-minute intervals.
3. Add the engine hour-meter, monthly operating log and breakdown reporting requirements of Rule 1110.2.
4. Delete the air-to-fuel ratio controller requirement; a Rule 218-approved CEMS is installed and the exhaust oxygen concentration is not a manufacturer specified parameter. The engine is tuned to meet the NOx limit, not a specific air-to-fuel ratio or exhaust oxygen concentration, see letter dated 9/28/2010.
5. Add "Engine Hour-meter Reading and Gross Electrical Power Output" to the annual performance test
6. Add "Monthly Operating Log and Gross Electrical Power Output" to the recordkeeping requirements.
7. Change the Emissions and Requirements condition to reflect the current provisions of 40CFR60 Subpart WWW, Rule 1150.1 and Rule 1110.2. Rule 407 does not apply to stationary internal combustion engines.
8. Convert RHC, NOx & CO BACT emission limits from gram/bhp-hr to ppmv with no O₂ correction.

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FEE EVALUATION:

The fees paid for this application are:

Table 2 – Application Fees Paid

A/N	Equipment	BCAT	Type	Status	Fee Schedule	Fees Required, \$	Fees Paid, \$
515473	Non-emergency IC engine – landfill gas	056737	60	20	D	1,535.68	1,535.68
515618	Facility Permit Revision – Title V only	555007	55	21	--	861.52	861.52

PROCESS DESCRIPTION:

This resource recovery system is operated by NM Mid Valley Genco, which operates one internal combustion engine fueled with landfill gas driving an electrical generator.

EMISSIONS:

There are no changes to the potential-to-emit (PTE) emission calculations for this engine. The VOC, NOx and CO emissions are based on the BACT requirements for the original PC (see A/N 425887), and the nominal exhaust gas flow rate (3300 scfm) from applicant data (see A/N 391007):

$$\begin{aligned}
\text{VOC : } & (0.8 \text{ g/bhp-hr BACT limit}) \\
& (0.8 \text{ g/bhp-hr})(1850 \text{ bhp})/(453.6 \text{ g/lb}) = 3.27 \text{ lb/hr} = 78.4 \text{ lb/day} \\
& (3.27 \text{ lb/hr})(379 \text{ cf/lbmol})(1 \times 10^6 \text{ ppmv})/(60 \text{ min/hr})/(3300 \text{ cf/min})/(16 \text{ lb/lbmol}) \\
& = 391 \text{ ppmv as methane with no O}_2 \text{ correction}
\end{aligned}$$

$$\begin{aligned}
\text{NOx : } & (0.6 \text{ g/bhp-hr BACT limit}) \\
& (0.6 \text{ g/bhp-hr})(1850 \text{ bhp})/(453.6 \text{ g/lb}) = 2.44 \text{ lb/hr} = 58.6 \text{ lb/day} \\
& (2.44 \text{ lb/hr})(379 \text{ cf/lbmol})(1 \times 10^6 \text{ ppmv})/(60 \text{ min/hr})/(3300 \text{ cf/min})/(46 \text{ lb/lbmol}) \\
& = 102 \text{ ppmv with no O}_2 \text{ correction}
\end{aligned}$$

$$\begin{aligned}
\text{CO : } & (2.5 \text{ g/bhp-hr BACT limit}) \\
& (2.5 \text{ g/bhp-hr})(1850 \text{ bhp})/(453.6 \text{ g/lb}) = 10.2 \text{ lb/hr} = 245 \text{ lb/day} \\
& (10.2 \text{ lb/hr})(379 \text{ cf/lbmol})(1 \times 10^6 \text{ ppmv})/(60 \text{ min/hr})/(3300 \text{ cf/min})/(28 \text{ lb/lbmol}) \\
& = 697 \text{ ppmv with no O}_2 \text{ correction}
\end{aligned}$$

The SOx emissions are based on a maximum of 75 ppmv H₂S in the landfill gas at 607 cf/min flowrate:

$$\begin{aligned}
\text{SOx} & = (75 \text{ ppmv})(64 \text{ lb} / 379 \text{ cf})(607 \text{ cf/min})(60 \text{ min/hr}) \\
& = 0.47 \text{ lb/hr} \\
& = 11 \text{ lb/day}
\end{aligned}$$

The PM10 emissions are based on a data survey from various landfills (range is 0.19 to 0.32 lb/hr, see A/N 425886):

$$\begin{aligned}
\text{PM10} & = 0.32 \text{ lb/hr} \\
& = 7.7 \text{ lb/day}
\end{aligned}$$

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EVALUATION:

PART 1 SCAQMD REGULATIONS

Rule 212	Standards for Approving Permits	November 14, 1997
	<p>This project is not considered a significant project due to the change of conditions proposed. In accordance with Rule 219(c), a significant project is a new or modified facility in which:</p> <p>(1) the new or modified permit unit is located within 1000 feet of a school;</p> <p>(2) the new or modified facility has on-site emission increases exceeding the daily maximums specified in subdivision (g); or</p> <p>(3) the new or modified permit unit has an increased cancer risk greater than, or equal to, one in a million (1×10^{-6}) during a lifetime of 70 years or pose a risk of nuisance.</p> <p>The IC engine is not within 1,000 feet of a school; there are no emission increases exceeding the daily maximums specified in Rule 212(g); and there is no increased cancer risk greater than, or equal to, one in a million (1×10^{-6}) during a lifetime of 70 years nor a risk of nuisance. Therefore, a Rule 212 public notice is not required.</p>	
Rule 401	Visible Emissions	November 9, 2001
	<p>Visible emissions are not expected under normal operation.</p>	
Rule 402	Nuisance	May 7, 1976
	<p>Nuisance complaints are not expected under normal operating conditions.</p>	
Rule 404	Particulate Matter – Concentration	February 7, 1986
	<p>Based on the manufacturer's data, the exhaust flow rate for each engine is 3,300 cfm. By interpolation at this flow rate, the maximum concentration of particulate matter allowed according to Table 404(a) is approximately 0.120 grains per cubic feet (gr/cf).</p> <p>The permit limit is 0.32 lb/hr for PM.</p> <p>The 2010 source test was 0.021 lb/hr PM10 (see Attachment #2).</p> <p>The 2011 source test was 0.054 lb/hr PM10 (see Attachment #4).</p> <p>$(0.32 \text{ lb/hr})(7000 \text{ gr/lb}) / [(3300 \text{ cf/min})(60 \text{ min/hr})] = 0.011 \text{ gr/cf} < 0.12 \text{ gr/cf maximum.}$</p> <p>The engine complies with Rule 404.</p>	
Rule 407	Liquid and Gaseous Air Contaminants	April 2, 1982
	<p>In accordance with Rule 407(b)(1), the provisions of this rule do not apply to emissions from stationary internal combustion engines.</p>	

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Rule 409	Combustion Contaminants	August 7, 1981
	The provisions of this rule do not apply to emissions from internal combustion engines.	

Rule 431.1	Sulfur Content of Gaseous Fuels	June 12, 1998
	Per Table 1, the landfill gas sulfur limit is 150 ppmv, as H ₂ S, based on a daily average.	
	This engine is fueled with landfill gas (LFG) from the Mid-Valley Landfill operated by County of San Bernardino Waste System Division (WSD, FacID 50299). WSD utilizes a Rule 431.1 Alternative Monitoring Plan (AMP), approved April 1, 2003, to demonstrate compliance with Rule 431.1 (see Attachment #5, A/N 406148 for the AMP). Per Rule 431.1(g)(9), this engine is exempt from the continuous sulfur monitoring requirement of paragraphs (d)(1) and (d)(2) since the supplier of the LFG fuel has complied with the monitoring requirements of subdivision (d) for the LFG fuel.	
	The exhaust permit limit is 0.47 lb/hr for SO _x . The 2010 annual performance test was 0.02 lb/hr SO _x (see Attachment #2). The 2011 annual performance test was 0.127 lb/hr SO _x (see Attachment #4).	
	The fuel gas permit limit is 150 ppmv as H ₂ S. The 2010 annual performance test was 8.28 ppmv as H ₂ S (see Attachment #2). The 2011 annual performance test was 30.1 ppmv as H ₂ S (see Attachment #4).	

Rule 1110.2	Emissions from Gaseous- and Liquid-Fueled Engines	July 9, 2010
	This is an 1850 bhp, lean-burn stationary spark-ignited IC engine fueled with land fill gas.	
1110.2(d)(1)(C)	<p>The results of the 2010 and 2011 sources tests (see Attachments #2,3,4) are used to calculate the engine net specific energy consumption (q_a) based on the lower heating value (LHV = 905 BTU/cf) of the landfill gas and the gross electrical output of the generator.</p> <p>2010: Methane fraction = 0.4485, Flow rate = 535.8 cf/min, Output = 1022.0 kW $q_a = (0.4485)(905 \text{ BTU/cf})(535.8 \text{ cf/min})(60 \text{ min/hr}) / [(1022.0 \text{ kW})(1.341 \text{ hp/kW})] = 9,521 \text{ BTU/hp-hr}$</p> <p>2011: Methane fraction = 0.4169, Flow rate = 415 cf/min, Output = 900 kW $q_a = (0.4169)(905 \text{ BTU/cf})(415 \text{ cf/min})(60 \text{ min/hr}) / [(900 \text{ kW})(1.341 \text{ hp/kW})] = 7,784 \text{ BTU/hp-hr}$</p> <p>Average q_a = (9521 + 7784)/2 = 8653 BTU/hp-hr</p> <p>The Energy Correction Factor (ECF) is: $ECF = (9250/8653) = 1.069$</p> <p>Table III specifies the emission limits for landfill gas- fired engines:</p>	

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Rule 1110.2	Emissions from Gaseous- and Liquid-Fueled Engines	July 9, 2010
	<p>NO_x = 36 x ECF = 38 ppmvd @ 15% oxygen</p> <p>VOC = 40 ppmvd as carbon @ 15% oxygen</p> <p>CO = 2000 ppmvd @ 15% oxygen</p> <p>The 2011 source test (conducted on 3/8/2011, Attachment #4) shows:</p> <p>NO_x = 30.7 ppmvd @ 15 % oxygen</p> <p>VOC = 22.2 ppmvd @ 15% oxygen</p> <p>CO = 207 ppmvd @ 15% oxygen</p>	
1110.2(d)(1)(E)	This spark-ignited engine has a Rule 218-approved continuous emission monitoring system (CEMS), Attachment #6. The air-to-fuel ratio controller is no longer required.	
1110.2(e)(4)	The Inspection & Monitoring Plan was submitted by August 1, 2008 (A/N 486801).	
1110.2(f)(1)(A)	This engine is greater than 1000 bhp and operates more than two million bhp-hr per calendar year. A NO _x CEMS is installed. The CO CEMS is not required per Rule 1110.2(e)(1)(A)(vii) for lean-burn engines.	
1110.2(f)(1)(B)	This engine has an operational non-resettable totalizing time meter.	
1110.2(f)(1)(C)	An annual source test is required. The 2011 source test was conducted on 3/8/2011.	
1110.2(f)(1)(D)	The Inspection & Monitoring Plan was submitted (A/N 486801).	
1110.2(f)(1)(E)	A monthly engine operating log is required.	
1110.2(f)(1)(H)	Any breakdown resulting in emissions in excess of rule or permit limits is subject to reporting requirements.	
	Based on the permit conditions, this engine is expected to comply with the provisions of Rule 1110.2	

Rule 1150.1	Control of Gaseous Emissions from Municipal Solid Waste Landfills	April 1, 2011
	While this facility does not own or operate a municipal waste (MSW) landfill, the IC engine is part of the landfill gas (LFG) control for the Mid-Valley Landfill operated by County of San Bernardino Waste System Division (WSD, FacID 50299).	

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Rule 1150.1	Control of Gaseous Emissions from Municipal Solid Waste Landfills	April 1, 2011
1150.1(d)(1)(C)(i)	<p>Control system designed and operated to either reduce non-methane organic compounds (NMOC) by at least 98 percent by weight or reduce the outlet NMOC concentration to less than 20 ppmv, dry basis as hexane at 3 percent oxygen. An initial source test as well as an annual source test is required.</p> <p>The earliest performance test found in District files (test date 9/8/2006) shows 19.86 ppmv NMOC as hexane at 3 percent oxygen (see Attachment #7).</p> <p>The exhaust permit limit is 20 ppmvd NMOC as hexane @ 3% O₂. The 2010 annual performance test was 17.2 ppmvd as hexane NMOC @ 3% O₂. The 2011 annual performance test was 11.2 ppmvd as hexane NMOC @ 3% O₂.</p>	
1150.1(d)(1)(C)(iv)(I)	<p>Lean burn engines shall reduce the outlet methane concentration to less than 3,000 ppmv, dry basis at 15 percent oxygen.</p> <p>The exhaust permit limit is 3,000 ppmvd methane @ 15% O₂. The 2010 annual performance test was 621 ppmvd methane @ 15% O₂. The 2011 annual performance test was 534 ppmvd methane @ 15% O₂.</p>	
1150.1(e)(6)(A)(ii)	<p>Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes. See permit condition 5, which requires a flow meter.</p>	
	Therefore, compliance with Rule 1150.1 is expected.	

REG XIII	New Source Review	December 6, 2002
		Application Deem Complete Date: October 22, 2010
Rule 1303(a): BACT & Rule 1303(b)	<p>The requirements of Rules 1303(a) and 1303(b) do not apply, since there is no emission increase due to the change of conditions.</p> <p>No offsets are required.</p> <p>The BACT permit conditions (#14, 15, 16) are converted to the equivalent ppmv values to facilitate field measurements.</p>	

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REG XIII	New Source Review December 6, 2002 Application Deem Complete Date: October 22, 2010
	<p>The RHC, NOx and CO emissions are based on the BACT requirements for the original PC (see A/N 425887), and the nominal exhaust gas flow rate (3300 scfm) from applicant data (see A/N 391007):</p> <p>RHC : (0.8 g/bhp-hr BACT limit) $(0.8 \text{ g/bhp-hr})(1850 \text{ bhp})/(453.6 \text{ g/lb}) = 3.27 \text{ lb/hr} = 78.4 \text{ lb/day}$ $(3.27 \text{ lb/hr})(379 \text{ cf/lbmol})(1 \times 10^6 \text{ ppmv})/(60 \text{ min/hr})/(3300 \text{ cf/min})/(16 \text{ lb/lbmol})$ = 391 ppmv as methane with no O₂ correction</p> <p>The exhaust permit limit is 391 ppmv RHC as methane with no O₂ correction. The 2010 annual performance test was 75.8 ppmv RHC as methane with no O₂ correction. The 2011 annual performance test was 54.4 ppmv RHC as methane with no O₂ correction.</p> <p>NOx : (0.6 g/bhp-hr BACT limit) $(0.6 \text{ g/bhp-hr})(1850 \text{ bhp})/(453.6 \text{ g/lb}) = 2.44 \text{ lb/hr} = 58.6 \text{ lb/day}$ $(2.44 \text{ lb/hr})(379 \text{ cf/lbmol})(1 \times 10^6 \text{ ppmv})/(60 \text{ min/hr})/(3300 \text{ cf/min})/(46 \text{ lb/lbmol})$ = 102 ppmv with no O₂ correction</p> <p>The exhaust permit limit is 102 ppmv NOx with no O₂ correction. The 2010 annual performance test was 69.6 ppmv NOx with no O₂ correction. The 2011 annual performance test was 75.1 ppmv NOx with no O₂ correction.</p> <p>CO : (2.5 g/bhp-hr BACT limit) $(2.5 \text{ g/bhp-hr})(1850 \text{ bhp})/(453.6 \text{ g/lb}) = 10.2 \text{ lb/hr} = 245 \text{ lb/day}$ $(10.2 \text{ lb/hr})(379 \text{ cf/lbmol})(1 \times 10^6 \text{ ppmv})/(60 \text{ min/hr})/(3300 \text{ cf/min})/(28 \text{ lb/lbmol})$ = 697 ppmv with no O₂ correction</p> <p>The exhaust permit limit is 697 ppmv CO with no O₂ correction. The 2010 annual performance test was 493.8 ppmv CO with no O₂ correction. The 2011 annual performance test was 506 ppmv CO with no O₂ correction.</p>

Rule 1401	New Source Review of Toxic Air September 10, 2010 Contaminants Application Deem Complete Date: October 22, 2010
	<p>There is no increase in MICR, cancer burden, chronic HI and acute HI, since there is no emission increase due to the change of conditions.</p>
	<p>Federal NSR for toxics does not apply since this vapor recovery system is not located at a plant site that is a major source as defined in 40CFR63, Subpart A, §63.2. This facility emits less than 10 tons per year of any HAP and 25 tons per year of all hazardous air pollutants (HAPs).</p>

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Rule 1401.1	Requirements for New and Relocated Facilities Near Schools	November 4, 2005
1401.1(b)	Rule 1401.1 applies to new and relocated, but not existing facilities. This is an existing facility.	

REG XX	RECLAIM	May 6, 2005
	This is not a NO _x or SO _x RECLAIM facility.	

REG XXX	Title V	November 5, 2010
	<p>NM Mid Valley Genco LLC was issued a Title V permit renewal effective on December 21, 2007. This is a minor permit revision as defined in Rule 3000(b)(15).</p>	
	Rule 3000 (b)(15)(A)(i)	This revision does not require or change a case-by-case evaluation of: reasonably available control technology (RACT) pursuant to Title I of the federal Clean Air Act; or maximum achievable control technology (MACT) pursuant to 40 CFR Part 63, Subpart B.
	(b)(15)(A)(ii)	This revision does not violate a regulatory requirement.
	(b)(15)(A)(iii)	This revision does not require any significant change in monitoring terms or conditions in the permit.
	(b)(15)(A)(iv)	This revision does not require relaxation of any recordkeeping, or reporting requirement, or term, or condition in the permit.
	(b)(15)(A)(v)	This revision does not result in an emission increase of RECLAIM pollutants.
	(b)(15)(A)(vi)	This revision does not result in an increase in emissions of a pollutant subject to Regulation XIII – New Source Review or a hazardous air pollutant.
	(b)(15)(A)(vii)	This revision does not result in an increase in GHG emissions of >75,000 tpy CO ₂ e.
	(b)(15)(A)(viii)	This revision does not establish or change a permit condition that the facility has assumed to avoid an applicable requirement.
	(b)(15)(A)(ix)	This revision is not an installation of a new permit unit subject to a New Source Performance Standard (NSPS) pursuant to 40 CFR Part 60, or a National Emission Standard for Hazardous Air Pollutants (NESHAP) pursuant to 40 CFR Part 61 or 40 CFR Part 63.
	(b)(15)(A)(x)	This revision is not a modification or reconstruction of an existing permit unit, resulting in new or additional NSPS requirements pursuant to 40 CFR Part 60, or new or additional NESHAP requirements pursuant to 40 CFR Part 61 or 40 CFR Part 63.
	A minor permit revision is subject to a 45-day EPA review , Rule 3003(j) and not subject to public participation requirements, Rule 3006(b).	

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PART 2 STATE REGULATIONS

California Environmental Quality Act (CEQA)

This change of permit conditions does not trigger CEQA and is exempt from further CEQA action since it does not have the potential to generate significant adverse environmental impacts.

PART 3 FEDERAL REGULATIONS

40 CFR Part 60	Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills	October 17, 2000
	While this facility does not own or operate a municipal waste (MSW) landfill, the IC engine is part of the landfill gas (LFG) control for the Mid-Valley Landfill operated by County of San Bernardino Waste System Division (WSD, FacID 50299).	
§60.752 (b)(2)(iii)(B)	A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in §60.754(d). The earliest performance test found in District files (test date 9/8/2006) shows 19.86 ppmv NMOC as hexane at 3 percent oxygen (see Attachment #7).	
§60.756 (b)(2)(i)	The owner or operator shall install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes. See permit condition 5, which requires a flow meter.	
	Therefore compliance with this regulation is expected.	

40 CFR Part 60	Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	July 11, 2006
§60.4230 (a)(4) & (a)(5)	Subpart JJJJ regulates stationary spark ignition (SI) IC engines. This subpart does not apply to engines constructed, modified or reconstructed prior to June 12, 2006.	

40 CFR Part 63	Subpart AAAA - National Emissions Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills	April 20, 2006
§63.1930 - §63.1990	While this facility does not own or operate a municipal waste (MSW) landfill, the IC engine is part of the landfill gas (LFG) control for the Mid-Valley Landfill operated by County of San Bernardino Waste System Division (WSD, FacID 50299). The requirements of 40 CFR Part 63 Subpart AAAA are met by complying with the requirements of 40 CFR Part 60 Subpart WWW [§63.1955(a)(1)].	

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40 CFR Part 63	Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines	January 18, 2008
§63.6580 - §63.6675	Subpart ZZZZ, otherwise known as RICE MACT, regulates stationary reciprocating internal combustion engines (RICE). This IC engine is subject to the RICE MACT regulation as an existing (constructed before June 12, 2006) spark ignition RICE located at an area source of HAP Emissions (NM Mid Valley Genco is not a major HAP source). In accordance with §63.6595(a), an existing stationary, spark ignition RICE that is located at an area source of HAP emissions, must comply with the applicable emission limitations and operating limitations no later than October 19, 2013. No further requirements apply for such engines under this part at this time.	

CONCLUSION:

Based on the evaluation above, this IC engine will comply with all applicable District, State, and Federal rules and regulations. Therefore, the following is recommended upon completion of the 45-day EPA review period:

A/N	Equipment	Recommendation
515473	Internal Combustion Engine, Landfill gas fueled, Non-emergency Electrical Generation	Approve PO with change of conditions
515618	Title V Facility Permit Amendment	Approve Plan

ATTACHMENTS:

1. Notice of Violation – P54923 – for both ICE No. 1 & No. 2
2. 5/12/2010 source test results
3. 9/10/2010 source test results
4. 3/8/2011 source test results
5. Rule 431.1 Alternative Monitoring Plan
6. Rule 218.1 CEMS approval
7. 2006 source test results
8. AEIS data sheet – A/N 425887
9. NSR – A/N 425887
10. Engine manufacturer’s literature