

## FACILITY PERMIT TO CONSTRUCT LA COUNTY SANITATION DISTRICTS

### PERMIT TO CONSTRUCT

Granted as of  
A/N 483598

#### Equipment Description:

#### LANDFILL GAS MICROTURBINE SYSTEM CONSISTING OF:

1. LANDFILL GAS PRETREATMENT UNIT WITH EQUIPMENT EQUIVALENT TO THE FOLLOWING:
  - A. INLET CONTAMINANT REMOVAL
  - B. CHILLED LIQUID KNOCKOUT
  - C. GAS COMPRESSORS
  - D. SILOXANE REMOVAL
2. EIGHT MICROTURBINES, INGERSOLL RAND, MODEL NO. MT250, 3.3 MM BTU/HR, EACH LANDFILL GAS FIRED, AUGMENTED WITH NATURAL GAS, EACH DRIVING A 250 KW ELECTRIC GENERATOR

#### Conditions:

1. CONSTRUCTION AND 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. THIS EQUIPMENT SHALL BE OPERATED AND MAINTAINED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.  
[RULE 204]
4. A FLOW MONITORING AND RECORDING DEVICE SHALL BE INSTALLED AND OPERATED IN THE LANDFILL GAS SUPPLY LINE TO THIS SYSTEM TO CONTINUOUSLY MEASURE AND RECORD THE LANDFILL GAS CONSUMPTION IN STANDARD CUBIC FEET PER MINUTE.  
[RULE 1303(b)(2)-OFFSET]
5. THE MICROTURBINES SHALL ONLY BE FIRED WITH LANDFILL GAS OR A BLEND OF LANDFILL GAS AND NATURAL GAS FUEL. FOR THIS FUEL BLEND, THE HEAT INPUT FROM NATURAL GAS SHALL NOT EXCEED 25% OF THE TOTAL HEAT INPUT TO THE TURBINE ON AN ANNUAL BASIS. NATURAL GAS SHALL ONLY BE USED FOR START-UP AND FOR ADEQUATE PERFORMANCE OF THE TURBINE AS A LANDFILL GAS CONTROL DEVICE IN CASE THE QUALITY OF THE LANDFILL GAS IS NOT SUFFICIENT IN MEETING THE MANUFACTURER'S MINIMUM SPECIFICATIONS  
[RULE 1303(b)(2)-OFFSET]

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6. THE MAXIMUM HEATING VALUE TO EACH MICROTURBINE SHALL NOT EXCEED 3.3 MILLION BTU PER HOUR. THE METHANE CONTENT OF THE LANDFILL GAS SHALL BE MONITORED AND RECORDED WEEKLY AND RESULTS RECORDED BASED ON THE FOLLOWING EQUATION:

$$\text{MM BTU/HR} = \text{METHANE CONTENT (BTU/SCF)} \times \text{FLOW RATE (SCFM)} \times 60 \text{ MIN/HR.}$$

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

7. THIS EQUIPMENT SHALL COMPLY WITH RULES 431.1 AND 1150.1.  
[RULE 1150.1, 431.1]
8. A SAMPLING PORT SHALL BE INSTALLED AND MAINTAINED AT THE INLET GAS LINE TO THE SYSTEM TO ALLOW THE COLLECTION OF A LANDFILL GAS SAMPLE AND FOR FLOW RATE TESTING.  
[RULE 217]
9. SAMPLING PORTS SHALL BE MAINTAINED IN EACH MICROTURBINE EXHAUST DUCT 8-10 DUCT DIAMETERS DOWNSTREAM AND TWO (2) EQUIVALENT DUCT DIAMETERS UPSTREAM OF ANY FLOW DISTURBANCE AND SHALL CONSIST OF TWO 4-INCH WELDED NIPPLES WITH CAPS. THE OWNER/OPERATOR SHALL PROVIDE ADEQUATE AND SAFE ACCESS TO THE TEST PORTS. AN EQUIVALENT METHOD SHALL BE USED UPON PRIOR APPROVAL BY THE AQMD.  
[RULE 217]
10. EMISSIONS FROM EACH MICROTURBINE EXHAUST SHALL NOT EXCEED THE FOLLOWING:

POLLUTANT	LBS/HR
NMHC AS METHANE	0.16
NOX	0.12
SOX	0.08
CO	0.072
PM10	0.11

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

11. WITHIN 180 DAYS FROM INITIAL STARTUP, AND ANNUALLY THEREAFTER, UNLESS OTHERWISE APPROVED BY THE AQMD, APPLICANT SHALL CONDUCT PERFORMANCE TESTS IN ACCORDANCE WITH AQMD TEST PROCEDURES AND FURNISH THE AQMD WRITTEN RESULTS OF SUCH PERFORMANCE TESTS. WRITTEN RESULTS SHALL BE SUBMITTED WITHIN 45 DAYS OF INITIAL TEST. WRITTEN NOTICE OF THE PERFORMANCE TESTS SHALL BE PROVIDED TO THE AQMD 10 DAYS PRIOR TO TESTING SO THAT AN OBSERVER MAY BE PRESENT. ALL SOURCE TESTING AND ANALYTICAL METHODS SHALL BE SUBMITTED TO THE AQMD FOR APPROVAL AT LEAST 30 DAYS PRIOR TO START OF TESTS. THE TESTS SHALL BE CONDUCTED AT THE MAXIMUM RATED HEAT INPUT. THE TEST SHALL INCLUDE, BUT MAY NOT BE LIMITED TO A TEST OF THE INLET GAS TO THE MICROTURBINE AND EXHAUST OF THE MICROTURBINE FOR:
- A. METHANE
  - B. TOTAL NON-METHANE ORGANICS
  - C. OXIDES OF NITROGEN (EXHAUST ONLY)
  - D. CARBON MONOXIDE (EXHAUST ONLY)
  - E. TOTAL PARTICULATES (EXHAUST ONLY)

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- F. HYDROGEN SULFIDE (INLET ONLY)
- G. TOTAL SULFUR COMPOUNDS AS H<sub>2</sub>S
- H. FORMALDEHYDES (EXHAUST ONLY)
- I. CARBON DIOXIDE
- J. RULE 1150.1 TABLE 1 COMPOUNDS
- K. OXYGEN
- L. NITROGEN
- M. MOISTURE
- N. TEMPERATURE
- O. FLOW RATE
- P. NMOC DESTRUCTION EFFICIENCY
- Q. BTU CONTENT (INLET ONLY)

ALL MICROTURBINES SHALL BE TESTED UNLESS OTHERWISE APPROVED BY THE AQMD.  
[RULE 1303(B)(2)-OFFSET, 1401]

- 12. THE OPERATION OF THIS EQUIPMENT SHALL NOT RESULT IN THE RELEASE OF RAW LANDFILL GAS INTO THE ATMOSPHERE. ANY BREAKDOWN OR MALFUNCTION WHICH RESULTS IN EMISSION OF LANDFILL GAS SHALL BE REPORTED TO THE AQMD WITHIN ONE HOUR AFTER OCCURRENCE OR WITHIN ONE HOUR OF THE TIME THE OPERATING PERSONNEL KNEW OR REASONABLY SHOULD HAVE KNOWN OF THE OCCURRENCE. IMMEDIATE REMEDIAL MEASURES SHALL BE UNDERTAKEN TO CORRECT THE PROBLEM AND PREVENT FURTHER EMISSIONS INTO THE ATMOSPHERE  
[RULE 402, 430]
- 13. PRIOR TO INSTALLATION, THE SPECIFIC VENDOR DATA AND SPECIFICATIONS FOR EQUIPMENT IN THE PRETREATMENT UNIT SHALL BE SUBMITTED TO AND APPROVED BY THE AQMD. ADDITIONAL CONDITIONS MAY BE INCLUDED, IF NECESSARY TO ENSURE PROPER OPERATION.  
[RULE 204]
- 14. ALL RECORDS SHALL BE KEPT FOR AT LEAST FIVE YEARS AND MADE AVAILABLE TO AQMD PERSONEL UPON REQUEST  
[RULE 1150.1,303(b)(2)-OFFSET]

### Emissions and Requirements:

- 15. NMOC: 20 PPMV OR 98 % WEIGHT REDUCTION, RULE 1150.1
  - SO<sub>x</sub> 150 PPM, RULE 431.1
  - CO: 2000 PPMV, RULE 407
  - PM: RULE 404, SEE APPENDIX B FOR EMISSION LIMITS
  - PM: 0.1 GR/SCF, RULE 404

## FACILITY PERMIT TO CONSTRUCT LA COUNTY SANITATION DISTRICTS

### PERMIT TO CONSTRUCT

Granted as of  
A/N 483617

#### Equipment Description:

LANDFILL GAS FUEL CELL SYSTEM CONSISTING OF:

1. FUEL CELL LANDFILL GAS PRETREATMENT UNIT WITH EQUIPMENT EQUIVALENT TO A COMPRESSOR, COALESCING FILTER, GAS CHILLER AND A SORBENT BED.
2. FUEL CELL, FUEL CELL ENERGY, MODEL DFC300, 2.2MM BTU/HR, 300 KW POWER OUTPUT, LANDFILL GAS FIRED, AUGMENTED WITH NATURAL GAS.

#### Conditions:

1. CONSTRUCTION AND 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. A NON-RESETTABLE TOTALIZING FLOW METER SHALL BE INSTALLED AND MAINTAINED TO MEASURE AND RECORD THE TOTAL QUANTITY OF GAS TREATED  
[RULE 1303(a)(1)-BACT]
4. THE MAXIMUM HEATING VALUE TO THE FUEL CELL SHALL NOT EXCEED 2.2 MILLION BTU/HR. THE METHANE CONTENT OF THE LANDFILL GAS SHALL BE MONITORED AND RECORDED WEEKLY AND RESULTS RECORDED BASED ON THE FOLLOWING EQUATION:  
  
$$\text{MM BTU/HR} = \text{METHANE CONTENT (BTU/SCF)} \times \text{FLOW RATE (SCFM)} \times 60 \text{ MIN/HR.}$$
  
[RULE 1303(b)(2)-OFFSET]
5. THE FUEL CELL SHALL ONLY BE FIRED WITH LANDFILL GAS OR A BLEND OF LANDFILL GAS AND NATURAL GAS FUEL. FOR THIS FUEL BLEND, THE HEAT INPUT FROM NATURAL GAS SHALL NOT EXCEED 25% OF THE TOTAL HEAT INPUT TO THE FUEL CELL ON AN ANNUAL BASIS. NATURAL GAS SHALL ONLY BE USED FOR START-UP AND FOR ADEQUATE PERFORMANCE OF THE FUEL CELL AS A LANDFILL GAS CONTROL DEVICE IN CASE THE QUALITY OF THE LANDFILL GAS IS NOT SUFFICIENT IN MEETING THE MANUFACTURER'S MINIMUM SPECIFICATIONS [RULE 1303(b)(2)-OFFSET]

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6. TWO SAMPLING PORTS SHALL BE PROVIDED IN THE FUEL-CELL EXHAUST DUCT, 8-10 DUCT DIAMETERS DOWNSTREAM, AND TWO DUCT DIAMETERS UPSTREAM. THE SAMPLING PORT SHALL CONSIST OF TWO 4 INCH WELDED NIPPLES WITH PLUGS, SET 90 DEGREES APART. AN ALTERNATE SAMPLING LOCATION OR EQUIVALENT METHOD FOR EMISSION SAMPLING MAY BE USED UPON WRITTEN APPROVAL OF THE SCAQMD. ADEQUATE AND SAFE ACCESS TO THE TEST PORTS SHALL BE SUPPLIED BY THE APPLICANT  
[RULE 218]
7. SAMPLING PORTS SHALL BE INSTALLED AT THE INLET GAS LINE TO THE LANDFILL GAS TREATMENT SYSTEM AND TO THE FUEL-CELL PRE-CONVERTER TO ALLOW THE COLLECTION OF LANDFILL GAS SAMPLES.  
[RULE 218]
8. THE OPERATOR SHALL MEASURE THE CONCENTRATION OF TOTAL SULFUR AT THE INLET AND OUTLET OF THE LANDFILL GAS TREATMENT SYSTEM ONCE EACH QUARTER, USING METHODS APPROVED BY THE SCAQMD. ALL RESULTS SHALL BE RECORDED AND REPORTED IN PPMV AS H<sub>2</sub>S.  
[RULE 431.1]
9. THE CONCENTRATION OF SULFUR COMPOUNDS MEASURED AS HYDROGEN SULFIDE (H<sub>2</sub>S) AT THE INLET TO THE FUEL CELL PRE-CONVERTER SHALL NOT EXCEED 40 PPMV  
[RULE 431.1]
10. THE SPENT MEDIA WHICH IS REMOVED FROM THE SYSTEM SHALL BE MAINTAINED OR STORED IN CLOSED CONTAINERS PRIOR TO REMOVAL FROM THE FACILITY  
[RULE 402]
11. THE SULFUR AND SILOXANE TREATMENT MEDIA SHALL BE REPLACED AT A FREQUENCY NECESSARY TO MAINTAIN COMPLIANCE WITH THE EMISSION LIMITS IN THIS PERMIT AND TO OPERATE THE FUEL CELL IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.  
[RULE 1303(a)(1)-BACT, 431.1]
12. EMISSIONS RESULTING FROM THE FUEL CELL SHALL NOT EXCEED THE FOLLOWING:

POLLUTANT	LBS/HR
ROG, AS HEXANE	0.12
NOX	0.05
SOX	0.024
CO	0.027
PM	0.023

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

## FACILITY PERMIT TO CONSTRUCT LA COUNTY SANITATION DISTRICTS

13. WITHIN 180 DAYS FROM INITIAL STARTUP, AND ONCE EVERY 5 YEARS THEREAFTER, APPLICANT SHALL CONDUCT PERFORMANCE TESTS IN ACCORDANCE WITH AQMD TEST PROCEDURES AND FURNISH THE AQMD WRITTEN RESULTS OF SUCH PERFORMANCE TESTS. WRITTEN RESULTS SHALL BE SUBMITTED WITHIN 45 DAYS OF INITIAL TEST. WRITTEN NOTICE OF THE PERFORMANCE TESTS SHALL BE PROVIDED TO THE AQMD 10 DAYS PRIOR TO TESTING SO THAT AN OBSERVER MAY BE PRESENT. ALL SOURCE TESTING AND ANALYTICAL METHODS SHALL BE SUBMITTED TO THE AQMD FOR APPROVAL AT LEAST 30 DAYS PRIOR TO START OF TESTS. THE TESTS SHALL BE CONDUCTED AT THE MAXIMUM RATED HEAT INPUT. THE TEST SHALL INCLUDE, BUT MAY NOT BE LIMITED TO, A TEST OF THE OUTLET EXHAUST OF THE FUEL CELL, THE UNTREATED LANDFILL GAS, AND THE TREATED LANDFILL GAS, UNLESS OTHERWISE INDICATED BELOW. THE TEST SHALL INCLUDE THE FOLLOWING RESULTS AND PROCESS DATA:
- A. METHANE CONTENT OF THE RAW AND TREATED LANDFILL GAS
  - B. TOTAL NON-METHANE ORGANIC COMPOUNDS OF THE RAW LANDFILL GAS, TREATED LANDFILL GAS, AND FUEL CELL EXHAUST OUTLET
  - C. OXIDES OF NITROGEN AND OXIDES OF SULFUR (FUEL CELL OUTLET), IN PPM, AND LB/HR
  - D. CARBON MONOXIDE, (FUEL CELL OUTLET), IN PPM, AND LB/HR
  - E. TOXIC AIR CONTAMINANTS, INCLUDING BUT NOT LIMITED TO, BENZENE, CHLOROBENZENE, DICHLOROBENZENE, DICHLOROETHANE, DICHLOROETHYLENE, DICHLOROMETHANE, ETHYL BENZENE, TETRACHLOROETHYLENE, TRICHLOROETHYLENE, TOLUENE, AND XYLENE ISOMERS
  - F. OXYGEN CONTENT
  - G. NITROGEN CONTENT
  - H. MOISTURE CONTENT
  - I. TEMPERATURE OF THE REFORMER
  - J. TEMPERATURE AT INLET AND OUTLET OF THE PRE-CONVERTER
  - K. FLOW RATE OF THE FUEL CELL EXHAUST
  - L. TOTAL REDUCED SULFUR COMPOUNDS (RAW LANDFILL GAS AND TREATED LANDFILL GAS)
  - M. POWER OUTPUT OF THE FUEL CELL
  - N. BTU CONTENT OF THE TREATED LANDFILL GAS
  - O. FUEL UTILIZATION OF THE FUEL CELL
  - P. TREATED LANDFILL GAS FEED RATE TO THE PRE-CONVERTER.
- [RULE 1303(b)(2)-OFFSET, 1401, 431.1]
14. THE OPERATION OF THIS EQUIPMENT SHALL NOT RESULT IN THE RELEASE OF RAW LANDFILL GAS INTO THE ATMOSPHERE. ANY BREAKDOWN OR MALFUNCTION WHICH RESULTS IN EMISSION OF LANDFILL GAS SHALL BE REPORTED TO THE AQMD WITHIN ONE HOUR AFTER OCCURRENCE OR WITHIN ONE HOUR OF THE TIME THE OPERATING PERSONNEL KNEW OR REASONABLY SHOULD HAVE KNOWN OF THE OCCURRENCE. IMMEDIATE REMEDIAL MEASURES SHALL BE UNDERTAKEN TO CORRECT THE PROBLEM AND PREVENT FURTHER EMISSIONS INTO THE ATMOSPHERE
- [RULE 402, 431.1]

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15. PRIOR TO INSTALLATION, THE SPECIFIC VENDOR DATA AND SPECIFICATIONS FOR EQUIPMENT IN THE PRETREATMENT UNIT SHALL BE SUBMITTED TO AND APPROVED BY THE AQMD. ADDITIONAL CONDITIONS MAY BE INCLUDED, IF NECESSARY TO ENSURE PROPER OPERATION.  
[RULE 204]
16. THE OWNER OR OPERATOR OF THIS EQUIPMENT SHALL KEEP RECORDS OF OPERATING AND MONITORING DATA, AND TREATMENT MEDIA REPLACEMENT DATES. THESE RECORDS SHALL BE MAINTAINED FOR A MINIMUM OF FIVE YEARS AND MADE AVAILABLE TO AQMD PERSONNEL UPON REQUEST  
[RULE 3004(a)(4)-Periodic Monitoring]

### **Emissions and Requirements:**

17. NMOC: 20 PPMV OR 98 % WEIGHT REDUCTION, RULE 1150.1  
SOx: 150 PPMV, RULE 431.1  
CO: 2000 PPMV, RULE 407  
PM: RULE 404, SEE APPENDIX B FOR EMISSION LIMITS  
PM: 0.1 GR/SCF, RULE 404