Bay Area Air Quality Management District

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Statement of Basis
for
MAJOR FACILITY REVIEW PERMIT
MINOR REVISION

for

City of Mountain View (Shoreline)
Facility #A2740

Facility Address:
2600 Shoreline Boulevard
Mountain View, CA 94043

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Mountain View, CA 94039

Application Engineer: Judith Cutino
Site Engineer: Judith Cutino

Application: 24259

TABLE OF CONTENTS

STATEMENT OF BASIS

City of Mountain View (Shoreline); PLANT # 2740

APPLICATION # 24259

A. BACKGROUND

Site Description:

The City of Mountain View's Shoreline complex (Facility # A2740) is located, east of Highway 101, on Shoreline Boulevard. Shoreline is a recreational and wildlife area constructed over approximately 600 acres of closed landfills. The individual landfills are referred to as the 544-Acre Landfill, which includes the golf course and sailing lake areas, the Crittenden Landfill, and the Vista Landfill. A small portion of the Vista Landfill was leased to Shoreline Amphitheatre (Facility # A2561). The City of Mountain View includes the following permitted operations: the closed Shoreline Landfills with Gas Collection Systems (S-1), three Landfill Gas Flares (A-3, A-4, and A-5), two Diesel Engines for Emergency Generators (S-11 and S-14), and two new landfill gas fired Microturbines (S-16 and S-17), which replaced microturbines S-12 and S-13.

Landfills generate landfill gas due to the waste decomposition process. The landfill gas contains methane, carbon dioxide, and small amounts of non-methane organic compounds (NMOC) and sulfur compounds. Many of the NMOCs are precursor organic compounds (POC) and/or toxic air contaminants (TACs). District and EPA regulations require that landfill gas from larger landfills be collected and controlled to reduce emissions of NMOCs to the atmosphere. In accordance with these requirements, the City of Mountain View's Closed Landfills (S-1) are equipped with landfill gas collection systems and landfill gas control systems. The current landfill gas collection system includes 264 vertical wells and 7 horizontal collectors. During 2006, the City of Mountain View collected an average of 1520 cfm of landfill gas from S-1. Most of this collected landfill gas is controlled by combustion in enclosed ground flares (A-3, A-4, and A-5). Between 35 to 45% of the collected gas is delivered to Google Corporation for combustion in off-site IC engines. A small portion of the collected landfill gas (about 4%) is delivered to the on-site microturbines.

Current Project (Application #24259):

The City of Mountain View submitted this application to request revisions of the MFR Permit related to the landfill gas fired microturbines (S-16 and S-17). These microturbines provide power to sewage, leachate, and irrigation pumping equipment in two separate locations on the site. During 2007, an average of 117 cfm of collected landfill gas was burned in the microturbines. Prior to combustion at the microturbines, the landfill gas is routed to a treatment system that filters and compresses the gas.

In December 2005, the City of Mountain View requested that EPA consider this landfill gas treatment system to be the approved control method under the Emission Guidelines for MSW Landfills (40 CFR, Part 60, Subpart Cc) for any gas that is not delivered to the enclosed flares. In a letter dated June 14, 2006, EPA concurred that the City's landfill gas treatment system met the requirements of 40 CFR 60.752(b)(2)(iii)(C). Consequently, the microturbines are no longer subject to 40 CFR 60.752(b)(2)(iii)(B) or any of the associated monitoring, record keeping, or reporting requirements in 40 CFR, Part 60, Subpart WWW or 40 CFR, Part 63, Subpart AAAA.

The City of Mountain View requested that the District delete all requirements from both the District and Title V permits that no longer apply to the microturbines due to EPA's determination that these microturbines are not subject to the Emission Guidelines for MSW Landfills. In addition, the City requested that the District delete several existing permit limits and monitoring requirements, because these limits are either unnecessary or overly burdensome for these low emission level microturbines.

The proposed permit condition revision are discussed in detail in the Engineering Evaluation for Application #234124, which is attached as Appendix A. Proposed revisions to other sections of the Title V permit are discussed in this Statement of Basis for Application #24259.

B. EMISSIONS

The proposed revisions to Sections IV, V, VI, and VII of the Title V permit will clarify requirements and eliminate language that is now obsolete. The new microturbines meet the CARB Executive Order DG-020 certified emission levels for NOx, CO and VOC. The new microturbines did not trigger BACT, as the small emissions increase did not exceed 10 lb/day.

Detailed emission calculations are presented in the Engineering Evaluation for Application #24259.

C. PROPOSED MFR PERMIT MODIFICATIONS

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Volume 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review because it is a designated facility as defined by BAAQMD Regulation 2-6-204. The Emission Guidelines for Municipal Solid Waste Landfills (40 CFR Part 60, Subpart Cc) require the owner or operator of a landfill that is subject to this part and that has a design capacity of greater than or equal to 2.5 million megagrams and 2.5 million cubic meters to obtain an operating permit pursuant to Part 70. As discussed in more detail below, this facility is subject to these emission guidelines and meets the designated facility criteria listed in 40 CFR § 60.32c(c).

In accordance with 40 CFR § 60.32c(c), the landfill size thresholds (design capacity of at least 2.5 million m^3 and at least 2.5 million Mg of waste) that trigger the Emission Guidelines for MSW Landfills and the Title V permitting requirements apply to all solid waste disposal sites located on contiguous property. Since the Vista Landfill, the 544-Acre Landfill, and the Crittenden Landfill are located on contiguous property, the combined size of these three landfills was used to determine Title V applicability for these landfills. The combined size of the three contiguous landfills is 19.4 million yd^3 (14.8 million m^3) and 13.1 million tons (11.9 million Mg). Therefore, a Title V Permit is required for all three landfills. The MFR permit for Site # A2740 covers all equipment that is operated by the City of Mountain View. A separate MFR Permit for Facility # A2561 covers the equipment that is operated by Shoreline Amphitheatre.

The initial MFR Permit for this facility was issued on July 28, 2003 and was revised on September 10, 2003, April 1, 2004, June 17, 2004, March 16, 2006 and renewed on July 16, 2009. Pursuant to Application #24259, the District is proposing to revise the current MFR Permit for Site # A2740. This application involves replacing the two existing microturbines with two new microturbines. The District has determined that Application # 24259 does not require a significant revision and should be handled as a minor revision.

The significant revision definition is discussed in detail below to explain this decision. Regulation 2-6-226 defines a significant permit revision as follows:

> **2-6-226 Significant Permit Revision:** Any revision to a federally enforceable condition contained in a major facility review permit that can be defined as follows:
>
> 226.1 The incorporation of a change considered a major modification under 40 CFR Parts 51 (NSR) or 52 (PSD);

226.2 The incorporation of a change considered a modification under 40 CFR Parts 60 (NSPS), 61 (NESHAPS), or Section 112 of the Clean Air Act (HAP);
226.3 Any significant change or relaxation of any applicable monitoring, reporting or recordkeeping condition;
226.4 The establishment of or change to a permit term or condition allowing a facility to avoid an applicable requirement, including:
4.1 a federally enforceable emission limit assumed in order to avoid classification as a modification under any provision of Title I of the federal Clean Air Act, or
4.2 an alternative hazardous air pollutant emission limit pursuant to Section 112(i)(5) of the Clean Air Act;
226.5 The establishment of or change to a case-by-case determination of any emission limit or other standard;
226.6 The establishment of or change to a facility-specific determination for ambient impacts, visibility analysis, or increment analysis on portable sources; or
226.7 The incorporation of any requirement promulgated by the U. S. EPA under the authority of the Clean Air Act provided that three or more years remain on the permit term.

(Amended 10/20/99)

Each section of the above definition was reviewed for applicability to Application #24259:

- Regulation 2-6-226.1: This application does involve small emission increases for PM_{10}, POC, SO_2, and HAPs, but these emission increases are less than 1 ton/year per pollutant, except for CO, which is 3.4 tons per year), and are far below the major modification thresholds for 40 CFR Parts 51 and 52, which are: 100 tons/year of CO, 40 tons/year of NO_x or SO_2, and 15 tons/year of PM_{10}. Therefore, Section 226.1 does not apply to this application.
- Regulation 2-6-226.2: This application does not involve a modification under NSPS or NESHAPs, or Section 112.
- Regulation 2-6-226.3: This application does not involve the elimination of any formally applicable monitoring, record keeping or reporting requirements.
- Regulation 2-6-226.4: This application does not involve the establishment of or change to any permit terms of conditions that would allow the facility to avoid a federally applicable requirement. The facility's potential to emit is far below the thresholds for Title 1 or Section 112 applicability.
- Regulation 2-6-226.5: This application does not involve the establishment of or change to any case-by-case emission limits or standards. The S-16 and S-17 Microturbines do not have any such case-by-case limits.
- Regulation 2-6-226.6: This facility has no facility-specific determinations concerning ambient impacts, visibility, or increments.
- Regulation 2-6-226.7: This application does not involve the incorporation of any Clean Air Act requirements.

As discussed above, this application does not involve any permit revisions that are significant, as defined in Regulation 2-6-226. Since this permit revision involves changes other than those described in the Regulation 2-6-201 definition of administrative permit amendment, this permit revision constitutes a minor permit revision pursuant to Regulation 2-6-215.

The proposed MFR permit revisions related to this application are described below.

Section I

The District is not proposing any changes to this section.

Section II

In Table II-A of the MFR Permit for Site # A2740, the District is proposing to delete S-12 and S-13 microturbines, and replace them with new microturbines, S-16 and S-17. The proposed revisions to Table II-A are identified by strikeout and underline formatting in the attached proposed MFR Permit for Site # A2740.

Section III

The District is not proposing any changes to this section.

Section IV

As discussed in the Background Section, the City of Mountain View collects landfill gas from the Shoreline Landfills. After collection, the gas is either routed to the on-site landfill gas flares or to an on-site landfill gas treatment system. Treated landfill gas is delivered to two on-site microturbines or to three off-site IC engines for use as fuel at these combustion devices. This application concerns the replacement microturbines, and the applicable requirements are cited in Table IV-C.

The District is proposing to revise Table IV-C by replacing Condition # 23579 with Condition # 24989. All proposed changes to Table IV-C are identified by strikeout and underline formatting in the attached proposed MFR Permit for Site # A2740.

In the initial Title V permit for this facility, the District stated that the S-12 and S-13 Microturbines were subject to 40 CFR 60.752(b)(2)(iii)(B), which requires these microturbines to meet an NMOC outlet concentration or an NMOC destruction efficiency limit. Although landfill gas was compressed prior to combustion in S-12 and S-13, it was not clear whether or not this compression system was sufficient to meet the landfill gas treatment requirements of 40 CFR 60.752(b)(2)(iii)(C). Consequently, the District concluded that the microturbines must meet the requirements of 60.752(b)(2)(iii)(B). Tables IV-C and VII-C contain numerous citations of applicable federal NSPS (Subparts A and Cc) and NESHAP (Subparts A and AAAA) requirements that stem from this determination.

In June 2006, EPA determined that the recently improved landfill gas treatment system for this site satisfies the requirements of 40 CFR 60.752(b)(2)(iii)(C). As a result, the downstream microturbines and off-site engines are not subject to 40 CFR 60.752(b)(2)(iii)(B) or any of the associated monitoring, record keeping, or reporting requirements in 40 CFR, Part 60, Subparts A, Cc, or WWW or 40 CFR, Part 63, Subparts A or AAAA.

BAAQMD Regulation 8-34-508 requires continuous monitoring of landfill gas flow rate to the landfill gas control SYSTEM. It does not require flow rate monitoring for each individual control device. The City of Mountain View complies with Regulation 8-34-508 by monitoring the landfill gas flow rate to the landfill gas treatment system and to the flares. Only a small percentage of the collected landfill gas is diverted to the microturbines. Since the microturbines are permitted at the maximum firing rate and maximum operating rates and have low emissions, the District has determined that individual landfill gas flow rate monitoring at each microturbine is not necessary. .

Regulation 8, Rule 34, Section 509 requires that the permit holder for any devices subject to this section monitor and record a key emission control system operating parameter that will demonstrate on-going compliance with the Regulation 8-34-301.4 NMOC emission limits. Annual source testing at each microturbine is sufficient to verify compliance with the NMOC outlet concentration limit Annual source testing alone is adequate for demonstrating compliance with the NMOC outlet concentration limit. The NMOC outlet concentration limit will be used as the Regulation 8-34-509 key emission control system operating parameter for these microturbines, with source testing annually as the monitoring method and monitoring frequency.

Landfill gas throughput to the microturbines will be determined using daily operating records and will be reported to the District on an annual basis.

By Regulation 9, Rule 9, Section 110, Exemption, Small Gas Turbines, the two new microturbines are exempt from the NOx requirements of this rule. Both microturbines have a power rating of less than 5.0 MW.

For 40 CFR Part 60, New Source Performance Standards, Subpart GG, All stationary gas turbines with a heat input at peak load equal to or greater than 10 million Btu per hour based on the lower heating value of the fuel fired, are subject to this standard. Since both microturbines have a maximum firing rate of 1 MMBtu/hr, they are not subject to this NSPS.

These permit condition revisions are reflected in the list of applicable permit conditions contained in Table IV-C. In summary, the District is proposing to delete Condition 23579, Parts 1- 4, and add Condition 24989, Parts 1-3.

Section V

The District is not proposing any changes to this section.

Section VI

As discussed above for Section IV, the District is proposing to replace Condition # 23579, Parts 1-4, with Condition #24989, Parts 1-3. In Condition 16065 for Source 1, Landfill, the reference to the offsite IC Engines was corrected. Google acquired the previous facilities from Alza. All proposed changes to Section VI are identified by strikeout and underline formatting in the attached proposed MFR Permit for Site # A2740.

Section VII

The District is proposing to delete Condition # 23579, Parts 1-4 and to replace them with Condition #24989, Parts 1-3. In Condition #24989, Part 1, the NO_x and CO limits for the microturbines are based on the CARB certification by Executive Order DG-020 .

As indicated in Table IV-C the sulfur dioxide emission limits in BAAQMD Regulation 9-1-301 and 9-1-302 are applicable limits for the S-16 and S-17 microturbines. The cross reference to these limits is in Table VII-C to reflect that these SO_2 limits apply to the microturbines. Compliance with these limits is demonstrated by measuring the landfill gas sulfur content at the main landfill gas header on a quarterly basis and ensuring that this sulfur content does not exceed 1300 ppmv (expressed as H_2S). These monitoring and record keeping requirements are identified in Condition # 16065, Parts 12 and 15, which is an applicable requirement for the S-1 Landfill. No additional sulfur content monitoring is necessary for the landfill gas that is diverted to the microturbines.

All proposed changes to Table VII-C are identified by strikeout and underline formatting in the attached proposed MFR Permit for Site # A2740.

Section VIII

As discussed above in Sections IV and VI, the District is proposing to delete the limits in Condition #23579, Parts 1-3 and to revise the condition and part numbers for the NOx and CO emission limits and compliance demonstration test for the microturbines. These changes will be reflected in Table VIII by

deleting or revising the citations related to the microturbines. All proposed changes to Table VIII are identified by strikeout and underline formatting in the attached proposed MFR Permit for Site # A2740.

Section IX

The District is not proposing any changes to this section.

Section X

The District is proposing to summarize the revisions described above in the revision history section. All proposed changes to Section X are identified by strikeout and underline formatting in the attached proposed MFR Permit for Site # A2740.

Sections XI-XII

The District is not proposing any changes to these sections.

D. SUMMARY OF PROPOSED ACTIONS

The District recommends approval of a proposed minor revision of the MFR Permit for Site # A2740 that will:

- Delete Sources S-12 and S-13 and Add S-16 and S-17 to Table II-A in Section II
- Revise Table IV-C to Delete S-12 and S-13, and to add S-16 and S-17 in Section IV
- Changed Y to N in Table IV-C for BAAQMD Regulation 9, Rule 9
- Included in Table IV-C SIP Regulation 9, Rule 9,
- Revise Condition 16065, Part 2, to correct the microturbine source numbers and the facility reference for the offsite IC Engines.
- Delete Condition # 23579 for S-12 and S-13 in Section VI
- Add Condition # 24989 for S-16 and S-17 in Section VI
- Revise Table VII-C to Delete S-12 and S-13, and to add S-16 and S-17 in Section VII
- Revise Table VIII to delete requirements for deleted Condition #23579
- Update Revision History in Section X

APPENDIX A

ENGINEERING EVALUATION

APPLICATION # 23124

Engineering Evaluation

City of Mountain View
Plant No. 2740
Application No. 23124

Equipment Location: 2600 Shoreline Blvd.
Mountain View, California 94043

The City of Mountain View has applied for an authority to construct the following sources:

S-16 Microturbine, Capstone CR65, 65KW, Maximum Firing Rate 1,000,000 Btu/Hr, 87 Hp
S-17 Microturbine, Capstone CR65, 65KW, Maximum Firing Rate 1,000,000 Btu/Hr, 87 Hp

BACKGROUND

These new microturbines will replace Sources 12 and 13, Microturbines, Ingersoll-Rand 70 KW, which were installed in 2005 to generate electricity for city facilities in the North Bayshore Area using treated landfill gas as a fuel source. One microturbine provides electricity to the Sewage Pump Station and the second provides electricity to the Flare Station and Shoreline Golf Course Irrigation Pump Station. PG&E provides backup power when demand at the facilities is lower than the amount generated. The Ingersoll-Rand five-year maintenance warranty for the existing microturbines expired last year. Both microturbines failed in 2010 and require extensive and costly repairs. Therefore, City of Mountain View is replacing them with new Capstone 65KW microturbines.

The landfill gas will be treated near the Flare Station and supplied through a new pipeline to microturbines at the Flare Station and Sewage Pump Station. The closed loop treatment system will process landfill gas through filtration, compression, dewatering and siloxane removal stages prior to supplying the landfill gas to the microturbines.

FACILITY DESCRIPTION

The City of Mountain View complex is a recreational wildlife area constructed over approximately 600 acres of closed landfill sites with approximately 13 million tons of refuse in place. The landfill stopped accepting refuse in October 1993. The City of Mountain View landfill includes the following sites: 544-Acre Site, which includes the golf course and sailing lake areas, the Vista Site, and Crittenden Site. The Vista Site was leased to Shoreline Amphitheatre (Plant #2561). The main landfill areas, S-1 Shoreline landfills, at Plant 2740, are controlled by landfill gas collection systems. The current landfill gas collection system includes 264 vertical wells and 7 horizontal collectors. Collected landfill gas may be vented to the Landfill Gas Flares (A-3, A-4, or A-5). The combined capacity of the A-3, A-4 and A-5 Flares is 129 MMBtu/hr or 4200 cfm of landfill gas.

EMISSION CALCULATIONS

Basis:

Maximum Firing Rate: 1 MM BTU/Hr
Maximum rated net output: 65 KW
Operation: 24 hours/day, 7 days/wk, 52 weeks/yr

Nitrogen Oxides (NOx)

By Air Resources Board Executive Order DG-020, the Capstone CR65 Landfill Gas Microturbine has been certified to meet a nitrogen oxides emission standard of 0.5 pounds per megawatt-hour. Based upon the maximum rated net output of 65 KW, the corresponding mass emission rate is calculated as follows:

NOx = (0.5 lb/ MW-hr) (65 KW) (MW/1E3 KW)
= 0.0325 lb/hr = 0.78 lb/day = 285 lb/yr

Carbon Monoxide (CO)

According to Air Resources Board Executive Order DG-020, the Capstone CR65 Landfill Gas Microturbine has been certified to meet a carbon monoxide emission standard of 6.0 pounds per megawatt-hour. Based upon the maximum rated net output of 65 KW, the corresponding mass emission rate is calculated as follows:

CO = (6.0 lb/MW-hr) (65 KW) (MW/1E3 KW)
= 0.39 lb/hr = 9.36 lb/day = 3,416 lb/yr

Precursor Organic Compounds (POC)
Non-Methane Organic Compounds (NMOC)

According to Air Resources Board Executive Order DG-020, the Capstone CR65 Landfill Gas Microturbine has been certified to meet a volatile organic compounds emission standard of 1.0 pounds per megawatt-hour. Based upon the maximum rated net output of 65 KW, the corresponding mass emission rate is calculated as follows:

POC = (1.0 lb/MW-hr)(65 KW) (MW/1E3 KW)
= 0.065 lb/hr = 1.56 lb/day = 569 lb/yr

However, per Regulation 8-34-301.4 NMOC collected from landfill gas processed in an emission control devise other than a flare is limited to less than 120 ppmv expressed as methane, corrected to 3% oxygen, or NMOC is to be reduced by at least 98% by weight.

(120 ft^3 methane/MM ft^3 flue gas) / (1E6 ft^3 flue gas/MM ft^3) (11420 ft^3 flue gas/hr) = 1.37 ft^3/hr NMOC as methane
1.37 ft^3/hr (16.04 lb/lbmole) /(385 ft^3/lb mole) = 0.057 lb/hr NMOC as methane.

Particulate Matter (PM_{10})

The microturbines will result in secondary particulate matter emissions (PM_{10}). The maximum permitted PM_{10} emission rates will be equal to cumulative emission increases.

From EPA AP-42, Table 3.1.2b, for stationary Landfill Gas-Fired Turbines, the PM_{10} emission factor is 2.3E -2 lb/MMBTU. Based on the maximum rated net output of 65 KW, the corresponding mass emission rate is calculated as follows:

PM_{10} = (2.3E-2 lb/MMBTU) (1 MMBTU/hr)
= 0.023 lb/hr = 0.55 lb/day = 202 lb/yr

Sulfur Dioxide (SO_2)

The microturbines will result in secondary sulfur dioxide (SO_2) emissions due to the combustion of sulfur compounds (primarily hydrogen sulfide) that are present in the landfill gas. Maximum permitted SO_2 emission rates will be equal to cumulative emission increases.

The August 2006 source tests measured 21 ppmv of total reduced sulfur compounds (TRS) in the landfill gas. Hydrogen sulfide was reported as 19 ppmv. The maximum expected TRS concentration for landfill gas collected from this site is 65 ppmv of TRS expressed as H_2S. Assuming all of the TRS is converted to SO_2 during combustion, the maximum SO_2 emission rate will be:

(65 scf H_2S/MM scf LFG)/(385.5 scf H_2S/lbmol)(1 lbmol SO2/1 lbmol H_2S) (64.06 lbs SO_2/lbmol) / 455 MM BTU/MM scf LFG) = 0.0237 lbs SO2/MM BTU

1 MM BTU/hour (0.0237 lbs SO2/MM BTU) = 0.0237 lbs SO_2/hour

Table 1 - Summary of Emission Calculations

	For each microturbine				For 2 microturbines				
		Daily Maximum Emissions for Each Source				Daily Maximum Emissions for two sources	Annual Average Project Emissions Increase		Annual Average Project Emissions Increase
	lb/hr	lb/day	lb/yr		lb/hr	lb/day	lb/yr		tpy
NOx	0.0325	0.78	284.7		0.065	1.56	569.4		0.2847
CO	0.39	9.36	3416.4		0.78	18.72	6832.8		3.4164
POC	0.057	1.37	499.32		0.11	2.74	998.6		0.4993
PM10	0.023	0.552	201.48		0.046	1.104	402.96		0.20148
SO2	0.024	0.570	207.95		0.047	1.14	415.9		0.207

CONTEMPORANEOUS EMISSION REDUCTIONS

City of Mountain View has ceased operation of 2 existing microturbines, S-12 and S-13, as of March 24, 2011. The reduction in emissions from these sources will offset the emission increases from this project. The procedures for calculating emission reduction credits are defined in Regulation 2, Rule 2, Section 605. The calculation is based on a baseline period of the 3 years immediately preceding the date that the application is complete. The emission reduction credits are calculated from the average baseline usage and the emission rate during the baseline period.

The existing microturbines were permitted under Application 6697 in April 2005.
The emission reduction credits are calculated below based on the actual average baseline throughput.

Table 2 Contemporaneous Emission Reductions

		2008	2009	2010		Avg landfill gas thruput		NOx	CO	NMOC	PM10	SO2
		thous cu ft/yr	thous cu ft/yr	thous cu ft/yr		thous cu ft/yr		lb/yr	lb/yr	lb/yr	lb/yr	lb/yr
S-12		12413	14952	6046		11137		44.8	51.2	12.8	235.5	78.7
S-13		10441	11075	1992		7836		79.5	28.3	17.0	209	69.8
Total	lbs/yr							124.3	79.5	29.8	444.5	148.5
Total	tons/yr							0.062	0.040	0.015	0.222	0.074

For S-12 the average landfill gas throughput from 1/2008 through 12/2010 was 11137 thousand ft^3/yr. The recorded fuel flow rate from source test OS-2945 was 29 std ft^3/min.

For S-13 the average landfill gas throughput from 1/2008 through 12/2010 was 7836 thousand ^{ft3}/yr. The recorded fuel flow rate from source test OS-2946 was 23 std ft^3/min

The NOx, CO and NMOC emission factors are based on Source Test Results from 7/8/09. The SO2 emission factor is based on the August 2006 source tests for TRS of 21 ppmv. The PM emission factor is based on AP-42 Table 3.1.2b for stationary Landfill Gas-Fired Turbines.

(21 scf H_2S/MM scf LFG)/(385.5 scf H_2S/lbmol)(1 lbmol SO2/1 lbmol H_2S) (64.06 lbs SO_2/lbmol) / 455 MM BTU/MM scf LFG) = 0.00766 lbs SO2/MM BTU

SO2: (0.00766 lbs SO_2/MM Btu) (1.6 MMBtu/hr) = 0.0123 lbs/hr
S-12 0.0123 lbs/hr / [(29 sft^3/min) (60 min/hr)]* (11137 thous ft^3/yr) * 1000 = 78.7 lb/yr
S-13 0.0123 lbs/hr / [(23 sft^3/min) (60 min/hr)]* (7836 thous ft^3/yr) * 1000 = 69.8 lb/yr

PM: (2.3E-2 lb/MMBtu) (1.6 MMBtu/hr) = 0.0368 lb/hr
S-12 0.0368 lbs/hr / [(29 sft^3/min) (60 min/hr)]* (11137 thous ft^3/yr) * 1000 = 235.5 lb/yr
S-13 0.0368 lbs/hr / [(23 sft^3/min) (60 min/hr)]* (7836 thous ft^3/yr) * 1000 = 209.0 lb/yr

CO:
S-12 (0.008 lb/hr) / [(29 sft^3/min)(60 min/hr)] * 11137 thous ft^3/yr) * 1000 = 51.2 lbs/yr
S-13 (0.005 lbs/hr) / [(23 sft^3/min)/(60 min/hr)] * 7836 thous ft^3/yr) * 1000 = 28.3 lbs/yr

NOx
S-12 (0.007 lbs/hr) / [(29 sft^3/min)(60min/hr)] * (11137 thous ft^3/yr)* 1000 = 44.8 lbs/yr
S-13 (0.014 lbs/hr) / [(23 sft^3/min)/(60 min/hr)] * 7836 thous ft^3/yr) * 1000 = 79.5 lbs/yr

NMOC:
S-12 (0.002 lbs/hr) / [(29 sft^3/min)(60min/hr)] * (11137 thous ft^3/yr) * 1000 = 12.8 lbs/yr
S-13 (0.003 lbs/hr) / [(23 sft^3/min)/(60 min/hr)] * 7836 thous ft^3/yr) * 1000 = 17.0 lbs/yr

PLANT CUMULATIVE INCREASE

The cumulative increases for all facilities in the district were reset in 1991, so the post 4/5/1991 increases are shown below in Table 3 as the current cumulative increase for this facility. The cumulative emission increases for the new microturbines are included below, as well as the contemporaneous emissions reductions for removal of S-12 and S-13 Microturbines.

Table 3 Net Project Emissions Increase and Cumulative Increase Balance

		Cumulative Increase Current Balance	Annual Average Project Emissions Increase	Total Onsite Emission Reductions	Net Project Emissions Increase	Offsets Required from Small Facility Bank	Cumulative Increase New Balance
		tpy	tpy	tpy	tpy		
NOx		0	0.285	0.062	0.223	0.223	0.000
CO		25.345	3.416	0.040	3.376		28.721
POC		0	0.499	0.015	0.484	0.484	0.000
PM10		3.039	0.201	0.222	0.000		3.039
SO2		0.59	0.207	0.074	0.133		0.723

TOXIC RISK SCREENING

The landfill gas characterization tests of August 31, 2006 (Test #OS-1658-1660) and July 9, 2009 (Test #OS 2945-2949) were used to determine the emission of toxic compounds from this project. The microturbines are assumed to reduce organic compounds by 98% as demonstrated in source tests of the previous microturbines S-12 and S-13. The CATEF emission factor for formaldehyde emissions from stationary gas turbines was used to calculate formaldehyde emissions from the new microturbines.

See Table 4 for Toxic Emissions Calculations

e.g. From Gas Characterization Test
Benzene – 360 ppbv

(360 ppbv)(1 E-9)(78.11 lbs/lb mole)(1/385.5 ft^3/lb mole)(36.6 std cu ft/min)(1440 min/day) = 3.84E-3 lb/day unabated
(3.84E-3 lb/day)/(24 hrs/day) = 1.6 E-4 lbs/hr unabated. With 98% control = 3.2 E-6 lbs/hr
Acute 1-hr Max Trigger 2.9 lb/hr

(3.84 E-3 lb/day)(365 days/yr) = 1.403 lb/yr unabated.
With 98% control, 1.403 lb/yr)(0.02) = 2.81E-2 lb/yr abated
Chronic Trigger Level = 3.8 lbyr

No risk screening analysis is required since the toxic air contaminants listed in Table 4 are not emitted at rates in excess of the risk screening trigger levels shown in Regulation 2, Rule 5, Table 1. TBACT does not apply.

STATEMENT OF COMPLIANCE

Regulation 2, Rule 1, Public Notice Requirements

The public notification requirements of Regulation 2-1-412 apply to modifications which result in an increase in toxic air contaminant or hazardous air contaminant emission at facilities within 1,000 feet of the boundary of a K-12 school. The applicant has reported no K-12 school within that radius of this facility, and the District's database confirms there is no K-12 school within one-half mile of the facility. Therefore, the public notice requirements do not apply.

Regulation 2, Rule 1 California Environmental Quality Act (CEQA)

This project is categorically exempt from District CEQA Regulation 2-1-311 pursuant to Regulation 2-1-312.7, Permit applications for the replacement or reconstruction of existing sources or facilities where the new source or facility will be located on the same site as the source or facility replaced and will have substantially the same purpose and capacity as the source or facility replaced.

Regulation 2, Rule 2, Best Available Control Technology (BACT)

Regulatioon 2, Rule 2, Section 301, requires BACT for any new or modified source with the potential to emit 10.0 pounds or more per highest day of any of the criteria pollutants. Based on 24-hour per day operation at the maximum firing rate of 1 MMBTU/hr, the proposed two new microturbines do not have the potential to emit 10 pounds per highest day of any of the criteria pollutants. Therefore, BACT requirements of Regulation 2-2-301.1 do not apply to this project.

Regulation 2, Rule 2, Section 302 and 303, Offset Requirements

In accordance with Regulation 2, Rule 2, Section 302, for the new microturbines at this facility, the emissions are more than 10 tons per years but less than 35 tons per year of precursor organic compounds and nitrogen oxides.
Therefore, emission offsets will be provided, by the District from the Small Facility Bank account at a 1.0 to 1.0 ratio. Onsite contemporaneous emission reduction credits for the previous microturbines were determined in accordance with section 2-2-605, and have been subtracted from the emission increase due to the proposed new microturbines.

For Regulation 2, Rule 2, Section 303, City of Mountain View is not considered a Major Facility, as the emissions of PM_{10} and SO_2 are below 100 tons per year. Therefore, offsets are not required for PM_{10} and SO_2 for this project.

Regulation 2, Rule 2, Section 304, Prevention of Significant Deterioration (PSD

A review for Prevention of Significant Deterioration (PSD) requirements in Regulation 2, Rule 2, Section 304, is required to determine if the facility is a new major facility or a major modification of an existing major facility. A major facility is defined as one which will emit 100 tons per year or more of a regulated air pollutant, if it is one of the 28 PSD source categories listed in Section 169(1) of the federal Clean Air Act. For an unlisted source category, a major facility is defined as one which will emit 250 tons per year or more of a regulated air pollutant. Since landfills are not one of the 28 listed source categories, a landfill would be considered major for PSD review if it will emit 250 tons per year or more of a regulated air pollutant. Since the maximum emissions from this facility will be less than 250 tons per year for each pollutant, City of Mountain View is not a major PSD facility and is not subject to PSD review. See Table 5 – Total Potential Expected Emissions for Plant # A2740.

Major Facility Review, Regulation 2, Rule 6
40 CFR Part 70, State Operating Permit Programs (Title V)

The City of Mountain View is a designated facility subject to Title V of the federal Clean Air Act, 40 CFR Part 70 and District Regulation 2, Rule 6. The renewal MFR permit was issued July 16, 2009 and expires on July 15, 2014. The permit will be revised to reflect the new microturbines S-16 and S-17, and the removal of microturbines, S-12 and S-13. The revision to the MFR Permit will be a Minor Revision.

Regulation 6, Particulate Matter and Visible Emissions

The new microturbines will be subject to the Ringelmann 1 limit and visible emissions limit in Section 301 and 305. Visible particulate emissions are normally not associated with combustion of gaseous fuels, such as natural gas and landfill gas, so compliance with these sections is expected. The microturbines are also subject to the Particulate Weight Limitation of 0.15 grains per dry standard cubic foot of exhaust volume and are expected to comply with this limit. At the

permitted emission rate, the grain loading in the turbine exhaust will be 0.0165 grain/dscf. Since this emission rate is far less than the Regulation 6-1-310 limit and PM_{10} emissions are very low, on-going compliance demonstration is not necessary.

Regulation 8, Rule 34, Organic Compounds – Solid Waste Disposal Sites

Regulation 8-34-301.4 requires that for collected landfill gas processed in an abatement device other than a flare, the NMOC in the collected gases must be reduced by at least 98% by weight or emit less than 120 ppm by volume of NMOC on a dry basis, expressed as methane and corrected to 3% oxygen. The previous microturbines (S12 and S13) were in compliance with this requirement. Compliance with the 98% reduction requirement for the new microturbines is expected.

An initial Compliance Demonstration Test and annual compliance tests for the NMOC limit are required by Section 8-34-412. These requirements will be included in the permit conditions for these sources.

Regulation 9, Rule 1, Inorganic Gasous Pollutants – Sulfur Dioxide

The new microturbines will be subject to Regulation 9, Rule 1, Section 301 and 302. Section 9-1-301 limits sulfur dioxide emissions to no more than 300 ppmv in the exhaust. . The maximum expected TRS concentration for landfill gas collected from this site is 65 ppmv of TRS expressed as H_2S. At 45.6% methane, the SO2 concentration of the flue gas will be approximately one-quarter of 65 ppm or about 16 ppm, which is well below 300 ppmv; therefore, monitoring is not required.

R**egulation 9, Rule 9, Section 110, Exemption, Small Gas Turbines**
The two Microturbines, Sources 16 and 17, each have a power rating of less than 5.0 MW, therefore, these microturbines are not subject to the requirements of Regulation 9, Rule 9, NOx from Stationary Gas Turbines.

Health and Safety Code, Title 17 Section 94200-94214

The microturbines are distributed generation units manufactured after January 1, 2003, and are certified by Executive Order DG-020 to meet the Waste Gas Emission Standards in Section 94203 (c) Table 3. No additional monitoring or recordkeeping is required.

40 CFR Part 60, New Source Performance Standards, Subpart GG
All stationary gas turbines with a heat input at peak load equal to or greater than 10 million Btu per hour (10.7 gigajoules per hour), based on the lower heating value of the fuel fired, are subject to this standard. The microturbines for this project have a maximum firing rate of 1 MMBtu/hr, and therefore are not subject to this NSPS.

PERMIT CONDITIONS

The new microturbines comply with the CARB certified NOx and CO emission factors. Therefore, ongoing compliance testing for NOx and CO is not necessary. For NMOC, the limit in Regulation 8, Rule 34 is more stringent than the CARB certified limit, and Regulation 8, Rule 34, Section 412 requires annual testing.

Condition # 24989

For: S-16 Microturbine and S-17 Microturbine

1. The nitrogen oxide (NOx) emissions from each Microturbine (S-12 and S-13) shall not exceed 10.0 pounds per day calculated as NO2. Compliance with this emission limit may be demonstrated by having no emissions exceeding 62 ppmv of NOx at 15% oxygen, dry basis. (Basis: Offsets)

2. The carbon monoxide (CO) emissions from each Microturbine (S-12 and S-13) shall not exceed 10.0 pounds per day. Compliance with this emission limit may be demonstrated by having no emissions exceeding 100 ppmv of CO at 15% oxygen, dry basis. (Basis: Cumulative increase)

1. The Permit Holder shall ensure that each microturbine does not exceed the emission levels listed below:

   a. NOx = 0.5 lbs/MW-hr
   b. VOC = 1.0 lb/MW-hr
   c. CO = 6.0 lb/MW-hr
   (basis for a through c: CARB Certification, H&SC Title 17, Section 94203c)

   d. NMOC less than 120 ppm by volume on a dry basis, expressed as methane and corrected to 3% oxygen or the amount of NMOC in the collected gases is reduced by at least 98% by weight (Basis: Regulation 8-34-301.4)

2. Within 60 days of startup of each Microturbine, the Permit Holder shall perform an initial Compliance Demonstration Test on each source to demonstrate compliance with the NMOC emission limits in Part 1 above. The NMOC testing shall be performed in accordance with the requirements of 40 CFR Parts 60.8 and 60.752(b)(2)(iii)(B), using the test methods identified in 40 CFR Part 60.754(d). (Basis: Regulation 8-34-412, BACT)

2. To demonstrate compliance with Part 1 and 2

above and Regulation 8, Rule 34, Sections 301.4, 412, and 509, the Permit Holder shall conduct an initial compliance demonstration test within 60 days of start-up of each microturbine and annual compliance demonstration tests on S-12 and S-13 S-16 and S-17 Microturbines.

In order to allow this facility to synchronize the source test dates for the landfill gas flares and the microturbines, the microturbine source tests that would normally have been conducted in January 2008 may be delayed, provided the 2008 microturbine source tests are conducted no later than September 30, 2008. The Source Test Section of the District shall be contacted to obtain approval of the source test procedures at least 14 days in advance of each source test. The Source Test Section shall be notified of the scheduled test date at least 7 days in advance of each source test. The source test report shall be submitted to the Source Test Section within 45 days of the test date. The source tests shall determine the following:

a. landfill gas flow rate (dry basis) and heat input rate to the microturbine;
b. concentrations (dry basis) of carbon dioxide (CO2), nitrogen (N2), oxygen (O2), and methane (CH4) in the landfill gas;
c. stack gas flow rate from the microturbine (dry basis); and
d. concentrations (dry basis) of NOx, CO, CH4, NMOC, and O2 in the stack gas.

(Basis: Cumulative Increase, Offsets, and Regulations 8-34-301.4, 8-34-412, and 8-34-509)

3. The Permit Holder shall maintain records of all test dates and test results for any tests that are conducted to demonstrate compliance with these conditions or any other applicable rule or regulation. All records shall be maintained on site in an APCO approved logbook or shall be made readily available to District staff upon request for a period of at least 5 years from the date of entry. These record keeping requirements do not replace the record keeping requirements contained in any applicable rules or regulations. (Basis: Cumulative Increase, Offsets, and Regulations 2-6-501, 8-34-301.4, 8-34-412, 8-34-501.11, 8-34-501.12, and 8-34-509)

RECOMMENDATION

I recommend issuing an Authority to Construct for the following two sources:

S-16 Microturbine, Capstone CR65, 65KW, Maximum Firing Rate 1,000,000 Btu/Hr and
S-17 Microturbine, Capstone CR65, 65KW, Maximum Firing Rate 1,000,000 Btu/Hr

_____ _____

Judith Cutino, PE
Senior Air Quality Engineer

Date