Bay Area Air Quality Management District

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Permit Evaluation
and
Statement of Basis
for
MAJOR FACILITY REVIEW PERMIT
MINOR REVISION

for

Waste Management of Alameda County
Facility #A2066

Facility Address:
10840 Altamont Pass Road
Livermore, CA 94550

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ENGINEERING EVALUATION and STATEMENT of BASIS

Waste Management of Alameda, Inc.; PLANT #2066

APPLICATION #9326

A. BACKGROUND

Waste Management of Alameda, Inc. operates the Altamont Landfill Facility in Livermore, CA. This facility includes the Bay Area's largest active landfill (S-2 with more than 30 million tons of refuse in place), two 3 MW Gas Turbines (S-6 and S-7, landfill gas fired) equipped with Fogging Systems (A-6 and A-7), two 1877 bhp IC Engines (S-23 and S-24, landfill gas fired), one 71 MM BTU/hour Landfill Gas Flare (A-15), waste water treatment operations (permitted: S-19, S-140, and S-141; exempt: S-12, S-20, S-28, S-130, A-130, and S-180), a non-retail gasoline dispensing facility (S-99), and nine diesel engines providing portable or standby power (S-190, S-191, S-192, S-193, S-194, and S-195, S-196, S-197, and S-198).

Waste Management submitted this application to request a Change of Conditions at the S-6 and S-7 Gas Turbines. These turbines control landfill gas emissions from the S-2 Altamont Landfill and are required to meet the non-methane organic compound (NMOC) emission limits cited in Regulation 8-34-301.4 (either 98% NMOC destruction efficiency or a maximum outlet concentration of 120 ppmv of NMOC, expressed as methane, at 3% O_2, dry). In order to demonstrate on-going compliance with this NMOC requirement, Regulation 8-34-509 requires that the facility monitor one or more key emission control system operating parameters on a frequency approved by the APCO. For these turbines, the key emission control system operating parameter is combustion chamber discharge temperature, and Waste Management is monitoring this temperature on a continuous basis.

The combustion chamber discharge temperature limit and monitoring requirements are described in Condition # 18773, Part 9 (see below). This condition was imposed during the evaluation of the initial Title V permit for this facility based on October 2002 source test data.

Condition # 18773
FOR: S-6 GAS TURBINE WITH A-6 FOGGING SYSTEM AND
FOR: S-7 GAS TURBINE WITH A-7 FOGGING SYSTEM

9. The combustion chamber discharge temperature for each Gas Turbine shall be maintained between 1120 and 1220 degrees Fahrenheit, averaged over any 3-hour period. If a source test demonstrates compliance with all applicable requirements at different minimum or maximum temperatures, the APCO may revise these temperature limits, in accordance with the procedures identified in Regulation 2-6-414 or 2-6-415, based on the following criteria. The minimum combustion chamber discharge temperature for S-6 and S-7 shall be equal to the average combustion chamber discharge temperature measured during a complying source test (NMHC and CO emission limits were met) minus 50 degrees F. The maximum combustion chamber discharge temperature for S-6 and S-7 shall be equal to the average combustion chamber discharge temperature measured during a complying source test (NOx emission limit was met) plus 50 degrees F. To demonstrate compliance with these temperature limits and Regulations 8-34-501.11 and 509, each Gas Turbine shall be equipped with a continuous temperature monitor and recorder, which will accurately measure the combustion chamber discharge temperature for each Gas Turbine. (Basis: Regulations 8-34-301.4, 8-34-501.11 and 8-34-509)

During the October 2002 source test the turbines were operating at typical conditions, and the NMOC destruction efficiency was far above the minimum required efficiency. Waste Management has conducted additional source testing at these turbines in order to determine the minimum combustion chamber discharge temperature that is necessary to meet the Regulation 8, Rule 34 NMOC limit. The January 2004 source test demonstrated compliance with the 8-34-301.4 NMOC limits at a lower combustion chamber discharge temperature. Specifically, the S-6 Gas Turbine was emitting <30 ppmv of NMOC (expressed as methane at 3% O_2, dry) and 31 ppmv of CO (at 15% O_2, dry) with a discharge temperature ranging from 895-905 °F during the test. The S-7 Gas Turbine was emitting <30 ppmv of NMOC (expressed as methane at 3% O_2, dry) and 37 ppmv of CO (at 15% O_2, dry) with a discharge temperature ranging from 890-900 °F during the test. The NMOC and CO emission rates measured during the January 2004 source tests are about one-fourth of the limits.

Waste Management has proposed that the minimum combustion chamber discharge temperature (CCDT) be changed from 1120 °F to 855 °F. The new limit of 855 °F was determined using the highest temperature measured for either turbine (905 °F) and the criteria described in Part 9 above:

$CCDT_{(min.\ limit)} = CCDT_{(measured)} - 50 = 905 - 50 = 855$ °F

The large difference in the current minimum temperature limit of 1120 °F and the proposed minimum temperature of 855 °F results from the difference between turbine operating conditions. In the first test, the turbines were operated under typical conditions with an NMOC emission rate that was far below the maximum allowable rate. While in the second test, the turbines were operated under worst-case conditions for NMOC emissions. The January 2004 source test indicates that the turbines will still have a high compliance margin (at least 4:1 for the NMOC limit) at the proposed lower temperature. Waste Management will continue to maintain continuous monitoring of the combustion chamber discharge temperature to show compliance with the proposed minimum temperature limit.

B. EMISSIONS

The S-6 and S-7 Gas Turbines are expected to comply with all NMOC and CO emission limits at the proposed minimum combustion chamber discharge temperature. Waste Management is not requesting any emission limit or throughput limit modifications for this application. Therefore, this application will not result in any emission increases.

Cumulative emission increases for this facility and this application are summarized in Table 1.

Table 1. Summary of Plant Cumulative Emission Increases

		Current Balance for Site # A2066 Tons/Year		Application # 9326 Emission Increases Tons/Year		New Balance for Site # A2066 Tons/Year
POC	=	0.017	+	0.000	=	0.017
NO_x	=	0.000	+	0.000	=	0.000
CO	=	76.124	+	0.000	=	76.124
PM_{10}	=	7.404	+	0.000	=	7.404
SO_2	=	9.284	+	0.000	=	9.284
NPOC	=	0.538	+	0.000	=	0.538

A. STATEMENT OF COMPLIANCE

Regulation 2, Rule 1:

This application is for a change of permit conditions at the turbines, which does not involve any emission increases or physical changes to the turbines. There is no possibility that this project will have any adverse environmental impacts. Therefore, in accordance with Regulation 2-1-312.1, this application is categorically exempt from CEQA review.

The project is over 1000 feet from the nearest school and is therefore not subject to the public notification requirements of Regulation 2-1-412.

Regulation 2, Rule 2:

Since this application does not result in any emission increases, this project is not subject to New Source Review (NSR). The BACT, MACT, Offsets, and PSD requirements of Regulation 2, Rule 2 do not apply.

New Source Review for Toxic Air Contaminants:

The District's Toxic Risk Management Policy does not apply to projects with no emission increases.

Regulation 2, Rule 6:

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act (40 CFR, Part 70) and BAAQMD Regulation 2, Rule 6, Major Facility Review (MFR), because it is a major facility, as defined by Regulation 2-6-212. This facility has the "potential to emit," as defined by Regulation 2-6-218, more than 100 tons per year of a regulated air pollutant, specifically more than 100 tons per year of nitrogen oxides and more than 100 tons/year of carbon monoxide. Therefore, this facility is required to have an MFR permit pursuant to Regulation 2-6-301.

This facility is also subject to the Title V operating permit requirements and Regulation 2, Rule 6, MFR permit requirements, because it is a designated facility as defined by 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 Subpart Cc and that has a design capacity of greater than or equal to 2.5 million megagrams (Mg) and 2.5 million cubic meters (m^3) to obtain an operating permit pursuant to Part 70. The landfill at this facility is subject to 40 CFR, Part 60, Subpart Cc and has design capacities of 45 million m^3 and 43 million Mg. Therefore, this facility is a designated facility and is required to have an MFR permit pursuant to 2-6-304.

The initial MFR Permit for this facility was issued on December 1, 2003 and was revised on February 5, 2004. This application will require a revision of the current MFR permit. Since this application does not result in any emission increases, does not relax monitoring requirements, and does not involve avoidance of a federal requirement, changing a case-by-case limit/standard, changing facility-specific visibility/increments determinations, or the incorporation of a new federal requirement, this application does not require a significant revision, as defined in Regulation 2-6-226. Therefore, this application requires a minor revision of the MFR Permit.

The proposed MFR permit revisions related to this application are described later in this document.

Regulation 8, Rule 34:

The S-6 and S-7 Gas Turbines are subject to Regulation 8, Rule 34 "Solid Waste Disposal Sites". Regulation 8-34-301.4 limits the organic emissions from landfill gas combustion operations (other than flares) and requires S-6 and S-7 to either achieve 98% destruction of non-methane hydrocarbons (NMHC) or to emit no more than 120 ppmv of NMHC, expressed as methane, at 3% oxygen. The outlet concentration limit is also equivalent to 40 ppmv of NMHC expressed as methane at 15% O_2, dry basis, as described in Condition # 18773, Part 3. From the January 2004 source test, these turbines are each emitting <30 ppmv of NMOC, expressed as methane and corrected to 3% O_2 dry basis, and are complying with Regulation 8-34-301.4 and Condition # 18773, Part 3.

Regulation 9, Rule 9:

The S-6 and S-7 Gas Turbines are subject to Regulation 9, Rule 9 "Nitrogen Oxides From Stationary Gas Turbines". Regulation 9-9-301.1 limits NO_x emissions from S-6 and S-7 to 42 ppmv of NO_x, expressed as NO_2, at 15% oxygen, dry basis. This limit is repeated in Condition # 18773, Part 1. From the January 2004 source tests, the emissions from S-6 are 33 ppmv of NO_x at 15% O_2 and from S-7 are 30 ppmv of NO_x at 15% O_2. Therefore, the turbines are complying with Regulation 9-9-301.1 and Condition # 18773, Part 1.

Federal Requirements:

EG for MSW Landfills: The landfill at this facility is subject to the 40 CFR Part 60, Subpart Cc Emission Guidelines (EG) for Municipal Solid Waste (MSW) Landfills. Effective November 19, 2001, the District's Regulation 8, Rule 34 was approved into the State Plan for MSW Landfills (40 CFR 62.1115). Regulation 8, Rule 34 is now the approved method for implementing this federal EG. Since the S-6 and S-7 Gas Turbines are expected to comply with Regulation 8-34-301.4, these turbines will also comply with 40 CFR, Part 60, Subpart Cc and 40 CFR 62.1115.

NSPS for Stationary Gas Turbines: The S-6 and S-7 Gas Turbines are subject to 40 CFR Part 60 Subpart GG (Standards of Performance for Stationary Gas Standards), because the turbines were built after October 3, 1977 and have rated inputs greater than 10 MM BTU/hour (LHV). All applicable requirements are described in the existing MFR permit. Subpart GG limits turbine NO_x emissions to 150 ppmv of NO_x at 15% O_2 (assuming no efficiency adjustments). The January 2004 source test demonstrates that the turbines are meeting this limit as well as the more stringent Regulation 9-9-301.1 limit. Subpart GG also limits the fuel sulfur content to 0.8% by weight. Waste Management has an EPA approved custom fuel sulfur monitoring schedule for these turbines, which requires monthly fuel analysis for total sulfur compounds. All tests show compliance with this fuel sulfur content limit, which is equivalent to an outlet sulfur dioxide concentration of approximately 1070 ppmv of SO_2 at 0% O_2, dry basis. In accordance with the Schedule of Compliance (Part V of the existing MFR Permit), Waste Management is trying to obtain a custom fuel nitrogen monitoring schedule from EPA. Waste Management has submitted a proposed testing protocol for nitrogen content in the landfill gas fuel and is awaiting EPA approval of this protocol.

NESHAPs for MSW Landfills: Any landfills that are subject to the landfill gas collection and control requirements of either the NSPS for MSW Landfills or the EG for MSW Landfills are also subject to the NESHAPs for MSW Landfills (40 CFR, Part 63, Subpart AAAA). This NESHAP requires that subject facilities prepare and implement startup, shutdown, malfunction plans and additional reporting requirements. All applicable requirements are contained in the existing MFR permit, and this facility is expected to comply with these requirements.

NESHAPs for Stationary Combustion Turbines: The NESHAPs for Stationary Combustion Turbines (40 CFR, Part 63, Subpart YYYY) applies to turbines located at major sources of Hazardous Air Pollutants (HAPs). From the District's databank, the highest single HAP is toluene with a current emission rate of

4.38 tons/year. The emissions of all HAPs that are speciated in the databank are 11.87 tons/year. Almost all of these HAP emissions come from the landfill or from landfill gas combustion and are generally proportional to the amount of waste in the landfill. Using a ratio of the landfill's design capacity (47.1 million tons) to the current waste amount (35.5 million tons), the maximum potential HAP emissions for this facility are estimated to be 5.81 tons/year of toluene and 15.75 tons/year of all HAPs combined. Since these projected HAP emissions do not exceed the HAP major facility thresholds (10 tons/year of a single HAP and 25 tons/year combined), this facility is not considered to be a major facility for HAP emissions. Therefore, Subpart YYYY does not apply to these turbines.

B. MFR PERMIT MODIFICATIONS

Section I-V:

No changes are proposed to these sections.

Section VI:

Proposed permit condition revisions (see Part 9) are shown below in strikeout and underline format.

Condition # 18773
FOR: S-6 GAS TURBINE WITH A-6 FOGGING SYSTEM AND
FOR: S-7 GAS TURBINE WITH A-7 FOGGING SYSTEM

1. Nitrogen oxide (NO_x) emissions from each Gas Turbine (S-6 and S-7) shall not exceed 42 ppmv of NO_x, corrected to 15% oxygen, dry basis. (Basis: Regulation 9-9-301.1)

2. Carbon Monoxide (CO) emissions from each Gas Turbine (S-6 and S-7) shall not exceed 128 ppmv of CO, corrected to 15% oxygen, dry basis. (Basis: Cumulative Increase)

3. Non-methane organic compound (NMOC) emissions shall not exceed 120 ppmv of NMOC, expressed as methane, corrected to 3% oxygen, dry basis, which is equivalent to 40 ppmv of NMOC, expressed as methane, corrected to 15% oxygen, dry basis. (Basis: Regulation 8-34-301.4)

4. Each Gas Turbine is equipped with a Fogging System (A-6 or A-7). The A-6 and A-7 Fogging Systems are not required for compliance and may be operated or not operated at the discretion of the Permit Holder. (Basis: Regulation 2-1-301)

5. A District-approved logbook shall be maintained on the number of days each Gas Turbine is operated and the days when each Fogging System is operated. (Basis: Regulation 2-1-301, 8-34-113, 8-34-301.1, and 8-34-501.2)

6. In the event of a Gas Turbine shutdown, all landfill gas normally fired by the non-operating Gas Turbine(s) shall be diverted to one or more of the other approved landfill gas control devices for this facility unless the requirements of Regulation 8-34-113 are being followed. Raw landfill gas shall not be vented to the atmosphere, except for unavoidable landfill gas emissions that occur during control system installation, maintenance, or repair that is performed in compliance with Regulation 8, Rule 34, Sections 113, 116, 117, or 118 and for inadvertent component leaks that do not exceed the limits specified in 8-34-301.2. (Basis: Regulations 8-34-113, 8-34-301 and 8-34-301.1)

7. The time between the Gas Turbine shut-down and the start-up of the alternative control device(s) shall be included in calculating the shutdown exemption under Regulation 8-34-113. (Basis: Regulations 8-34-113 and 8-34-501.2)

8. [reserved for future use]

9. The combustion chamber discharge temperature for each Gas Turbine shall be maintained between ~~1120~~ 855 and 1220 degrees Fahrenheit, averaged over any 3-hour period. If a source test demonstrates compliance with all applicable requirements at different minimum or maximum temperatures, the APCO may revise these temperature limits, in accordance with the procedures identified in Regulation 2-6-414 or 2-6-415, based on the following criteria. The minimum combustion chamber discharge temperature for S-6 and S-7 shall be equal to the average combustion chamber discharge temperature measured during a complying source test (NMHC and CO emission limits were met) minus 50 degrees F. The maximum combustion chamber discharge temperature for S-6 and S-7 shall be equal to the average combustion chamber discharge temperature measured during a complying source test (NOx emission limit was met) plus 50 degrees F. To demonstrate compliance with these temperature limits and Regulations 8-34-501.11 and 509, each Gas Turbine shall be equipped with a continuous temperature monitor and recorder, which will accurately measure the combustion chamber discharge temperature for each Gas Turbine. (Basis: Regulations 8-34-301.4, 8-34-501.11 and 8-34-509)

10. In order to demonstrate compliance with 40 CFR 60.333(b), 60.334(b)(2), and the custom fuel sulfur monitoring schedule approved by EPA on July 6, 1994, the Permit Holder shall measure and record the sulfur content of the landfill gas on a monthly basis in accordance with 40 CFR 60.335(d). This fuel sulfur data shall also be used as a surrogate for demonstrating compliance with the sulfur dioxide emission limits in Regulation 9-1-302 and 40 CFR 60.333(a). (Basis: Regulation 9-1-302 and 40 CFR 60.333(a-b) and 60.334(b)(2))

11. In order to demonstrate compliance with Regulations 8-34-301.4, 8-34-412, 8-34-509, and 9-9-301.1; Parts 1, 2, 3, and 8 above; and 40 CFR 60.332(a)(2) and 60.333(a); the Permit Holder shall ensure that a District approved source test is conducted annually on each Gas Turbine (S-6 and S-7). The annual source test shall determine the following:
    a. landfill gas flow rate to each gas turbine (dry basis);
    b. concentrations (dry basis) of carbon dioxide (CO_2), nitrogen (N_2), oxygen (O_2), methane (CH_4), and total non-methane organic compounds (NMOC) in the landfill gas;
    c. stack gas flow rate from each gas turbine (dry basis);
    d. concentrations (dry basis) of NO_x, CO, NMOC, and O_2 in the stack gas;
    e. NMOC destruction efficiency achieved by each turbine; and
    f. average temperature in the combustion chamber discharge of each gas turbine during the test period.

    Each annual source test shall be conducted no sooner than 9 months and no later than 12 months after the previous source test. 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 Compliance and Enforcement Division and the Source Test Section within 60 days of the test date.
    (Basis: Cumulative Increase, Regulations 2-1-301, 8-34-301.4, 8-34-412, 8-34-509, and 9-9-301.1, and 40 CFR 60.8, 60.332(a)(2) and 60.333(a))

Section VII:

The proposed temperature revision is reflected in Table VII-B. No monitoring changes are proposed. The combustion chamber discharge temperature will be monitored continuously, which is a standard monitoring method for temperature limits.

Table VII – B
Applicable Limits and Compliance Monitoring Requirements
S-6 GAS TURBINE
S-7 GAS TURBINE
A-6 FOGGING SYSTEM
A-7 FOGGING SYSTEM

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
Combus-tion Chamber Discharge Temper-ature (CCDT)	BAAQMD Condition # 18773, Part 9	Y		~~1120~~ 855 °F ≤ CCDT ≤ 1220 °F averaged over any 3-hour period	BAAQMD 8-34-501.11 and 509 and BAAQMD Condition # 18773, Part 9	C	Temperature Sensor and Recorder

Sections VIII-IX:

No changes are proposed to these sections.

Sections X:

This proposed revision will be described in the revision history section as shown below.

X. Revision History

Title V Permit Issuance (Application # 25828): December 1, 2003

Significant Revision (Application # 8324): February 5, 2004

- Modify Permit Condition # 19237, Parts 4, 9, 10, and 11 to revise monitoring procedures for the internal combustion engines (S-23 and S-24).
- Revise Tables IV-D, VII-D, and VIII to reflect revisions to Condition # 19237.
- Make minor corrections to requirements in Tables III, IV-A, IV-B, IV-D, and IV-E.

Minor Revision (Application # 9326): [insert approval date]

- Revised minimum combustion chamber discharge temperature in Condition # 18773, Part 9 and Table VII-B.

Sections XI-XII:

No changes are proposed to these sections.

A. RECOMMENDATION

Issue a Change of Conditions for the following equipment:

S-6 Gas Turbine
S-7 Gas Turbine

	Signed by Carol S. Allen	on 6/21/04
By:	Carol S. Allen	Date
	Senior Air Quality Engineer	