Bay Area Air Quality Management District

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Permit Evaluation
and
Statement of Basis (12-05-07)
for
RENEWAL of

MAJOR FACILITY REVIEW PERMIT

for

Gas Recovery Systems, Inc
Facility #B1668

Facility Address:
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Menlo Park, CA 94025

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Livermore, CA 94550

Application Engineer: Randy Frazier
Site Engineer: Randy Frazier

Application: 13224

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Title V Statement of Basis

A. Background

The Gas Recovery Systems, Inc facility (AKA GRS-Menlo Park, site #B1668) was issued a Major Facility Operating Permit (Title V Permit) on March 13, 2002, with an expiration date of February 28, 2006. Since the initial Title V issuance, there have been no permit applications. This application is for a permit renewal. Although the current permit has expired before the renewal permit is issued, the existing permit continues in force until the District takes final action on the renewal permit.

The facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Title 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review because it is a major facility as defined by BAAQMD Regulation 2-6-212. It is a major facility because it has the "potential to emit" more than 100 tons per year of a regulated air pollutant (CO). Current databank calculated emissions of CO from the 4 rich burn engines at GRS-Menlo report annual emissions of 164 tpy of CO. The NOx emissions are calculated as over 70 tpy, hence the facility may also conceivably have a potential to emit for NOx of over 100 tpy.

Major Facility Operating permits (Title V permits) must meet specifications contained in 40 CFR Part 70 as contained in BAAQMD Regulation 2, Rule 6. The permits must contain all applicable requirements (as defined in BAAQMD Regulation 2-6-202), monitoring requirements, recordkeeping requirements, and reporting requirements. The permit holders must submit reports of all monitoring at least every six months and compliance certifications at least every year.

In the Bay Area, state and District requirements are also applicable requirements and are included in the permit. These requirements can be federally enforceable or non-federally enforceable. All applicable requirements are contained in Sections I through VI of the permit.

Each facility in the Bay Area is assigned a facility site identifier that consists of a letter and a 4-digit number. This identifier is also considered to be the identifier for the permit. The identifier for this facility is B1668.

GRS-Menlo Park has requested a minor change to their permit that will be discussed herein. All permit revisions are clearly shown in strikeout and underline formatting in the proposed renewal permit.

B. Facility Description

Municipal solid waste landfills generate landfill gas as a byproduct of the biodegradation of organic materials placed in the landfill. Landfill gas contains mainly methane, carbon dioxide,

and small amounts of non-methane organic compounds (<1%) and sulfur compounds (<400 ppmv). Many of the non-methane organic compounds (NMOCs) found in landfill gas are precursor organic compounds (POC), and some NMOCs are hazardous air pollutants (HAP), which must be appropriately dealt with in order to reduce public and atmospheric exposure. The landfill which supplies landfill gas to the GRS-Menlo Park facility is the old Bayfront Park Landfill previously operated by the City of Menlo Park (plant #3499). This landfill accepted municipal waste from 1960 through 1984, when the landfill was officially closed. At the time of closure, it is estimated the landfill contained 5 million tons of waste. Although unknown, the percentage of decomposable waste is estimated to be 100%. Although the landfill gas production rate at the Bayfront Park Landfill is declining, the landfill gas from the City of Menlo Park-Bayfront Park Landfill is being combusted in the 4 rich burn engines S-2, S-3, S-4, and S-5 at GRS-Menlo Park primarily and secondarily at the A-2 landfill gas flare at Bayfront Park. All of these engines are rich burn engines, with CO emissions abated by the thermal oxidizing reactors A-1, A-2, A-3, and A-4, respectively.

C. Permit Content

The legal and factual basis for the permit follows. The permit sections are described in the order that they are presented in the permit. Routine changes to the standard permit text in Sections I "Standard Conditions", III "Generally Applicable Requirements", and X "Glossary" are not considered part of the Title V permit renewal process, but may be made at the discretion of the District during the term of this permit.

I. Standard Conditions

This section contains administrative requirements and conditions that apply to all facilities. Many of these conditions derive from 40 CFR § 70.6, Permit Content, which dictates certain standard conditions that must be placed in the permit. The language that the District has developed for many of these requirements has been adopted into the BAAQMD Manual of Procedures, Volume II, Part 3, Section 4, and therefore must appear in the permit. If the Title IV (Acid Rain) requirements for certain fossil-fuel fired electrical generating facilities or the accidental release (40 CFR § 68) programs apply, the section will contain a standard condition pertaining to these programs. This permit does not include Title IV or accidental release provisions.

The standard conditions also contain references to BAAQMD Regulation 1 and Regulation 2. These are the District's General Provisions and Permitting rules.

<u>Changes to permit:</u>

Condition #338, Parts2, 4, and 5 will be modified administratively to remove expired requirements and to add the combustion temperature surrogate for NMOC destruction requirements. Part 5 of permit condition # 338 limits the total reduced sulfur compounds in the collected landfill gas fed to the engines at 1300 ppmvd. The condition part contains language that allows for a reduction in sulfur (in LFG) monitoring frequency from daily to quarterly if at least one year of consistent data is collected showing continuous compliance with the sulfur content limits.

GRS-Menlo Park has consistently tested to show H2S (sulfur) levels to range from 12 – 15 ppmvd. With these consistently low sulfur levels, and the fact that GRS-Menlo Park is obtaining landfill gas from a landfill which has not accepted any new waste for over 30 years, it is reasonable to expect easy no exceedances of the 1300 ppmvd limit. Hence part 5 of Condition 338 will be changed to address this issue.

II. Equipment

This section of the permit lists all permitted or significant sources. Each source is identified by an S and a number (e.g., S-1).

Permitted sources are those sources that require a BAAQMD operating permit pursuant to BAAQMD Rule 2-1-302. There are 4 permitted sources at this facility.

Significant sources are those sources that are exempt from permitting, but have a potential to emit more than 2 tons of a "regulated air pollutant," as defined in BAAQMD Rule 2-6-222, per year or 400 pounds of a "hazardous air pollutant," as defined in BAAQMD Rule 2-6-210, per year. There are no "significant sources" at this facility.

The permit lists all abatement (control) devices that control permitted or significant sources at the facility. Each abatement device whose primary function is to reduce emissions is identified by an A and a number (e.g., A-1). An abatement device may also be a source (such as a thermal oxidizer that burns fuel) of secondary emissions. If the primary function of a device is to control emissions, it is considered an abatement (or "A") device. If the primary function of a device is a non-control function, the device is considered to be a source (or "S").

The equipment section is considered to be part of the facility description. It contains information that is necessary for applicability determinations, such as fuel types, contents or sizes of tanks, etc. This information is part of the factual basis of the permit.

Each of the permitted sources has previously been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. These permits are issued in accordance with state law and the District's regulations. The capacities in the permitted sources table are the maximum allowable capacities for each source, pursuant to Standard Condition I.J and Regulation 2-1-403.

<u>Changes to permit:</u>
None.

III. Generally Applicable Requirements

This section of the permit lists requirements that generally apply to all sources at a facility including insignificant sources and portable equipment that may not require a District permit. If a generally applicable requirement applies specifically to a source that is permitted or significant, the standard will also appear in Section IV and the monitoring for that requirement

will appear in Sections IV and VII of the permit. Parts of this section apply to all facilities (e.g., particulate, architectural coating, odorous substance, and sandblasting standards). In addition, standards that apply to insignificant or unpermitted sources at a facility (e.g., refrigeration units that use more than 50 pounds of an ozone-depleting compound) are placed in this section.

Changes to permit:
None.

IV. Source-Specific Applicable Requirements

This section of the permit lists the applicable requirements that apply to permitted or significant sources. These applicable requirements are contained in tables that pertain to one or more sources that have the same requirements. The order of the requirements is:

1. District Rules
2. SIP Rules (if any) are listed following the corresponding District rules. SIP rules are District rules that have been approved by EPA for inclusion in the California State Implementation Plan. SIP rules are "federally enforceable" and a "Y" (yes) indication will appear in the "Federally Enforceable" column. If the SIP rule is the current District rule, separate citation of the SIP rule is not necessary and the "Federally Enforceable" column will have a "Y" for "yes". If the SIP rule is not the current District rule, the SIP rule or the necessary portion of the SIP rule is cited separately after the District rule. The SIP portion will be federally enforceable; the non-SIP version will not be federally enforceable, unless EPA has approved it through another program.
3. Other District requirements, such as the Manual of Procedures, as appropriate.
4. Federal requirements (other than SIP provisions)
5. BAAQMD permit conditions. The text of BAAQMD permit conditions is found in Section VI of the permit.
6. Federal permit conditions. The text of Federal permit conditions, if any, is found in Section VI of the permit.

Section IV of the permit contains citations to all of the applicable requirements. The text of the requirements is found in the regulations, which are readily available on the District's or EPA's websites, or in the permit conditions, which are found in Section VI of the permit. All monitoring requirements are cited in Section IV. Section VII is a cross-reference between the limits and monitoring requirements. A discussion of monitoring is included in Section C.VII of this permit evaluation/statement of basis.

Complex Applicability Determinations

The GRS-Menlo Park facility has been in the past subject to Regulation 8-34 since it burns landfill gas and Landfills and landfill gas combustion equipment were typically subject to BAAQMD Regulation 8, Rule 34. This regulation requires landfills with more than 1 million tons of refuse in place to collect and control the landfill gas that is generated by waste decomposition and specifies numerous operating, monitoring, and reporting requirements for subject operations. Regulation 8, Rule 34 has required that the landfill at this site be controlled

by an active landfill gas collection system and a landfill gas control system since 1994. The City of Menlo Park-Bayfron Park landfill has 5 million tons of waste in place at the time of shutdown in 1984. When the initial Title V permit application was issued, the landfill (and by association the GRS-Menlo Park faciit) could not claim any exemption from the requirements of 8-34.

It is now 2007 and has been over 30 years since the landfill was closed. Regulation 8-34-110 states that facilities may be exempted from the requirements of 8-34 if 1) the landfill is closed with no design capacity for further waste deposition and 2) the landfill last received waste over 30 years ago, and 3) the landfill owner/operator has demonstrated that the site does not pose a health risk to human beings or a threat to the environment.

The City of Menlo Park needs to determine the positive and negative implications of requesting exemption from Regulation 8 Rule 34. If the landfill seeks and receives an exemption from 8-34, the GRS-Menlo Park facility will by association be exempt from 8-34. The permit limits may still apply although control and cumulative increase limits were based on the 8-34 limits. This question would need to be considered by the landfill facility owner/operator.

The New Source Performance Standards (NSPS) and Emission Guideline (EG) do not apply because there has been no waste added accepted after November 8, 1987. By extension this applies to the GRS facility.

V. Schedule of Compliance

A schedule of compliance is required in all Title V permits pursuant to BAAQMD Regulation 2-6-409.10 which provides that a major facility review permit shall contain the following information and provisions:

"409.10 A schedule of compliance containing the following elements:

10.1 A statement that the facility shall continue to comply with all applicable requirements with which it is currently in compliance;

10.2 A statement that the facility shall meet all applicable requirements on a timely basis as requirements become effective during the permit term; and

10.3 If the facility is out of compliance with an applicable requirement at the time of issuance, revision, or reopening, the schedule of compliance shall contain a plan by which the facility will achieve compliance. The plan shall contain deadlines for each item in the plan. The schedule of compliance shall also contain a requirement for submission of progress reports by the facility at least every six months. The progress reports shall contain the dates by which each item in the plan was achieved and an explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted."

Since the District has not determined that the facility is out of compliance with an applicable requirement, the schedule of compliance for this permit contains only sections 2-6-409.10.1 and 2-6-409.10.2.

<u>Changes to permit:</u>
None.

VI. Permit Conditions

During the Title V permit development, the District has reviewed the existing permit conditions, deleted the obsolete conditions, and, as appropriate, revised the conditions for clarity and enforceability. Each permit condition is identified with a unique numerical identifier, up to five digits.

When necessary to meet Title V requirements, additional monitoring, recordkeeping, or reporting has been added to the permit.

All changes to existing permit conditions are clearly shown in "strike-out/underline" format in the proposed permit. When the permit is issued, all 'strike-out" language will be deleted; all "underline" language will be retained, subject to consideration of comments received.

The existing permit conditions are derived from previously issued District Authorities to Construct (A/C) or Permits to Operate (P/O). Permit conditions may also be imposed or revised as part of the annual review of the facility by the District pursuant to California Health and Safety Code (H&SC) § 42301(e), through a variance pursuant to H&SC § 42350 et seq., an order of abatement pursuant to H&SC § 42450 et seq., or as an administrative revision initiated by District staff. After issuance of the Title V permit, permit conditions will be revised using the procedures in Regulation 2, Rule 6, Major Facility Review.

The regulatory basis is listed following each condition. The regulatory basis may be a rule or regulation. The District is also using the following terms for regulatory basis:

BACT: This term is used for a condition imposed by the Air Pollution Control Officer (APCO) to ensure compliance with the Best Available Control Technology in Regulation 2-2-301.
Cumulative Increase: This term is used for a condition imposed by the APCO that limits a source's operation to the operation described in the permit application pursuant to BAAQMD Regulation 2-1-403.
Offsets: This term is used for a condition imposed by the APCO to ensure compliance with the use of offsets for the permitting of a source or with the banking of emissions from a source pursuant to Regulation 2, Rules 2 and 4.
PSD: This term is used for a condition imposed by the APCO to ensure compliance with a Prevention of Significant Deterioration permit issued pursuant to Regulation 2, Rule 2.
Toxics: This term is used for a condition imposed by the APCO to ensure compliance with District Toxic NSR pursuant to Regulation 2, Rule 5.

There are a number of administrative changes that need to be applied to Condition 338 for the IC Engines S-2, S-3, S-4, and S-5. These changes include accounting for recent changes to Reg 9 Rule 8, removing references to outdated requirements, and inclusion of the temperature monitoring parameter for NMOC destruction assurance. In addition, as allowed by Part 5 of Condition 338, Gas Recovery Systems, Inc-Menlo Park has requested a modification in the

monitoring frequency for sulfur compounds in the landfill gas. Also, all references to "Permit Holder" will be replaced by current District language "the owner or operator". These changes will be addressed as follows:

Condition 338, Part 2 (Nitrogen Oxides): This part is based on the requirements specified in BAAQMD Regulation 9 Rule, which was revised on July 25, 2007 to establish a future rich-burn engine (waste gas fired) of 70 ppm NOx at 15% O2. The revised condition is as follows:

2. Nitrogen Oxide (NOx) emissions from each internal combustion engine (S-2, S-3, S-4, and S-5) shall not exceed the following levels:
   a. Until December 31, 2011: 210 ppmv, dry basis, corrected to 15% O2 (Basis: BACT and Regulation 9-8-302.2)
   b. Effective January 1, 2012: 7- ppmv, dry basis, corrected to 15% O2. (Basis: Regulation 9-8-302.2)

Condition 338, Part 4 (Source Tests): The references to the initial source test in 2002 shall be removed. In addition, any requirements which had to do with the exemption from 8-34-301.4 as noted in 8-34-114 (valid until July 1, 2002) shall be removed. Requirements to analyze CH4 and THC in the exhaust gas will also be removed, since only NMOC destruction efficiency is monitored from July 1, 2002 on. Part 4 shall be changed as follows:

4. In order to demonstrate compliance with Parts #2 and #3 above; Regulation 8~~, Rule~~ 34~~-~~, ~~Sections 114 and~~ 301.4; Regulation 9~~ Rule~~ 8-302.2 and 302.3~~, Sections 302.2 and 302.3~~; the ~~Permit Holder~~ owner or operator shall ensure that a District-approved source test is conducted annually on each internal combustion engine (S-2, S-3, S-4, and S-5). At a minimum, the annual source tests shall determine the following:

   a. Landfill gas flow rate to each engine (dry basis);
   b. Concentrations (dry basis) of carbon diozide (CO2), Nitrogen (N2), Oxygen (O2), methane (CH4), total Non-Methane organic Compounds (NMOC), ~~and total hydrocarbons (THC)~~ in the landfill gas;
   c. Exhaust gas flow rate from each engine (dry basis);
   d. Concentrations (dry basis) of NOx, CO, ~~CH4,~~ NMOC, ~~THC~~, and O2 in the exhaust gas from each engine;
   e. The ~~CH4,~~ NMOC, ~~and THC~~ destruction efficiency~~ies~~ and exhaust gas NMOC concentration at 3% oxygen achieved by each engine;
   f. The average combustion temperature of each engine during the test period.

~~The first annual source test for each engine shall be conducted by no later than October 1, 2002 or no later than 12 months after the issue date of the NFR Permit, whichever date occurs first. Subsequent~~ Ssource tests for each engine 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 their approval of the source test procedures at least 14 days in advance of each source test. ~~They~~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 within 45 days of the test date. (Basis: BACT, Plant Cumulative Increase, Regulations ~~8-34-114,~~ 8-34-301.4, 9-8-302.2, and 9-8-302.3)

Condition 338, Part 5

5. Surrogate Monitoring

a. Total Reduced Sulfur Compounds: Total reduced sulfur compounds in the collected landfill gas shall be monitored as a surrogate for monitoring sulfur dioxide in the exhaust from the internal combustion engines. The concentration of total reduced sulfur compounds in the collected landfill gas shall not exceed 1300 ppmv, (dry), reported as hydrogen sulfide (H2S). In order to demonstrate compliance with this Part, the ~~Permit Holder~~ owner or operator shall sample the landfill gas at the main landfill gas header and shall measure the total sulfur content in the collected landfill gas ~~on a weekly basis~~ using a Draeger Tube. The ~~Permit Holder~~ owner or operator shall follow the manufacturer's recommended procedures for using the Draeger Tube and interpreting the results. The ~~Permit Holder~~ owner or operator shall conduct the first Draeger Tube test no later than 3 months after the issue date of the renewal MFR Permit and ~~weekly thereafter~~ at a frequency of at least quarterly thereafter. ~~After collecting three months of landfill gas sulfur content data, the Permit Holder may reduce the sulfur content testing frequency to a monthly basis, if all tests indicate compliance with the limit specified above. After collecting one year of sulfur content data, the Permit Holder may reduce the sulfur content testing frequency to a quarterly basis, if all tests indicate compliance with the limit specified above.~~ For the purposes of complying with this part, quarterly means at least one time every three calendar months. (Basis: Regulation 9-1-302)

b. Combustion Temperature Limitations – Minimum Temperature: The minimum combustion temperature for each of the internal combustion engines S-2, S-3, S-4 and S-5 shall be maintained at a minimum of 750 degrees F, averaged over any calendar 3-hour period, as measured at the exhaust manifold. The owner or operator shall monitor this parameter on a continuous basis and shall record the calendar 3 hour average temperatures in a District-approved log.

If a source test demonstrates compliance with all applicable requirements at a lower average temperature, the APCO may revise this minimum temperature limit in accordance with the following procedures. The minimum combustion zone temperature measured during the most recent complying source test minus 50 degrees F, provided that the minimum combustion zone temperature is not less than 700 degrees F.

District's Position-H2S: The facility has requested the reduced total sulfur monitoring frequency inasmuch as the body of testing has shown H2S levels ranging from 12-15 ppmvd. Although GRS received 3 NOVs for missing 3 required H2S monitoring events in the past 5 years (as of the renewal application date August 12, 2005), there is no reason to deny the request for this condition change as the tested H2S levels are significantly below the 1300 ppm limit.

District's Position – Combustion Temperature: Combustion temperature (3-hour average) has been added as a parameter to monitor since the Regulation 8-34-509 requires GRS to develop a key operating parameter to ensure compliance with the NMOC destruction limits. This parameter was developed as 750 degrees F.

The other changes to Condition 338 are to replace the words "Permit Holder" with "owner or operator".

There are no other condition changes recommended.

VII. Applicable Limits and Compliance Monitoring Requirements

This section of the permit is a summary of numerical limits and related monitoring requirements for each source. The summary includes a citation for each monitoring requirement, frequency of monitoring, and type of monitoring. The applicable requirements for monitoring are completely contained in Sections IV, Source-Specific Applicable Requirements, and VI, Permit Conditions, of the permit.

Monitoring decisions are typically the result of a balancing of several different factors including: 1) the likelihood of a violation given the characteristics of normal operation, 2) degree of variability in the operation and in the control device, if there is one, 3) the potential severity of impact of an undetected violation, 4) the technical feasibility and probative value of indicator monitoring, 5) the economic feasibility of indicator monitoring, and 6) whether there is some other factor, such as a different regulatory restriction applicable to the same operation, that also provides some assurance of compliance with the limit in question.

These factors are the same as those historically applied by the District in developing monitoring for applicable requirements**.** It follows that, although Title V calls for a re-examination of all monitoring**,** there is a presumption that these factors have been appropriately balanced and incorporated in the District's prior rule development and/or permit issuance. It is possible that, where a rule or permit requirement has historically had no monitoring associated with it, no monitoring may still be appropriate in the Title V permit if, for instance, there is little likelihood of a violation**.** Compliance behavior and associated costs of compliance are determined in part by the frequency and nature of associated monitoring requirements. As a result, the District will generally revise the nature or frequency of monitoring only when it can support a conclusion that existing monitoring is inadequate**.**

SO_2 Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-2.S-3, S-4, and S-5 Rich Burn Landfill Gas Engines, abated by thermal oxidizing reactors	BAAQMD 9-1-301	Property Line Ground Level Limits: ≤ 0.5 ppm for 3 minutes, AND ≤ 0.25 ppm for 60 minutes, AND ≤0.05 ppm for 24 hours	None

SO_2 Discussion:

Potential to Emit Calculations for the rich burn engines S-2, S-3, S-4, and S-5:

Maximum potential SO_2 emissions are based on the maximum permitted total reduced sulfur compound concentration of 1300 ppmv as H_2S from BAAQMD Condition # 338, Part 5 and the maximum landfill gas usage rate observed during the past 3 years (2005): 400E6 scf LFG/yr. All calculations assume that the landfill gas contains 50% methane with an HHV of 497 BTU/scf LFG and that the standard volume of gas at 70 °F is 387 scf/lbmol. The calculation equations are shown below for the four engines combined.

(400 E6 scf/year)*(1300 scf H_2S/1 E6 scf LFG)/(387 scf H_2S/lbmol H_2S)*
(1 lbmol SO_2/1 lbmol H_2S)*(64.06 pounds SO_2/lbmol SO_2)/(2000 pounds SO_2/ton SO_2)
= 43.04 tons SO_2/year [permitted level, based on maximum annual LFG prod-2005)

Actual: (43.04 ton SO_2/year)[(15 ppm H_2S-actual max observed in LFG)/1300])*(365984/400000) = 0.5 tpy

Since the former landfill at Marsh Road in Menlo Park was shutdown prior to 1987, the landfill gas production rate has peaked and is now decreasing: LFG production has decreased almost 25% during the past 3 years while H2S levels continue to decline, currently ranging from 10 – 15 ppmvd.

BAAQMD Regulation 9-1-301: This facility is subject to federally enforceable limits that will ensure compliance with the Regulation 9-1-302 gas stream emission limit of 300 ppmv of SO_2 in the exhaust from each engine. In order to achieve an exhaust concentration level of 300 ppm SO2, the landfill gas H2S concentration would have to be approximately 1545 ppm H2S (see AN 3926, EBMUD Title V Statement of Basis). Based on modeling analyses conducted at another landfill site, sources complying with the Regulation 9-1-302 limit are not expected to result in an excess of the ground level concentration limits listed in Regulation 9-1-301. Monitoring for ground level SO_2 concentrations in addition to the existing quarterly landfill gas monitoring, annual source testing, and recordkeeping requirements would not be appropriate.

H2S Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-2.S-3, S-4, and S-5 Rich Burn Landfill Gas Engines, abated by thermal oxidizing reactors	BAAQMD 9-2-301	Property Line Ground Level Limits: ≤ 0.06 ppm for 3 minutes AND ≤ 0.03 ppm for 60 minutes	None

H2S Discussion:

Although not a criteria pollutant, H2S emissions are limited by Regulation 9-2 to 0.06 ppm averaged over any 3 minutes and 0.03 ppm averaged over any 1-hour period. We are not recommending any ambient monitoring because we do not believe either of these limits would ever be approached much less exceeded. To support this determination, we have modeled a worst-case landfill gas leak of 10% of the total volume to the engines at the permitted landfill gas H2S limit of 1300 ppmv. This calculation is shown in detail in Appendix 3 and shows that the maximum 1-hour average under these circumstances is estimated to be 0.002 ppm. Since this is based on 1300 ppm H2S in the landfill gas and the current average concentration is less than 20 ppm, no monitoring is recommended.

PM Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-2.S-3, S-4, and S-5 Rich Burn Landfill Gas Engines, abated by thermal oxidizing reactors	BAAQMD 6-301	Ringelman No. 1	None
	BAAQMD 6-310	0.15 grains/dscf	None

PM Discussion:

Regulation 6-301 Visible Emissions

BAAQMD Regulation 6-301 limits visible emissions to a Federally enforceable limit of Ringelmann 1.0 for 3 minutes in any hour. Visible emissions from (landfill gas) gaseous fuel combustion in the engines S-2, S-3, S-4 and S-5 are not expected to exceed this limitation. Since there are no gaseous fuel derived visible emissions expected, periodic monitoring to ensure compliance with Regulation 6-301 from the combustion sources burning landfill gas is not required. No monitoring for visible emissions from the landfill gas combustion is necessary. It

should also be noted that this is a fairly small facility, with little movement of earthen materials and little vehicular traffic over unpaved areas. Therefore we do not expect any PM visible emissions exceeding the Ringelman 1.0 from this facility.

PTE: S-2, S-3, S-4, S-5 Landfill Gas fired engines:

Maximum estimated PM emissions for S-2, S-3, S-4, and S-5 were based on the AP-42 emission factor for landfill gas fired engines (770 kg lbs PM_{10}/MM dscm of methane) coupled with the maximum landfill gas flow rate of the past 3 years (year 2005: 400E6 scf/yr @ 500 Btu/scf).

Converting the AP-42 emission factor to English units at a landfill gas basis gives 24 lb PM/MM scf LFG.

Assuming 0% oxygen (typical O2 in flue gas for rich burn engines is ~ 3%) in the flue gas gives a stiochiometric flue gas factor of 4.7733 scf of flue gas per scf of landfill gas.

Estimated PM concentration = [(24 lb/MM scf LFG)*(0.4 MM scf LFG)*7,000 grain/lb]/(400E3 dscf LFG/yr)*(4.7733 scf FG/scf LFG)] = 0.035 gr/dscf

Converting this factor based on actual estimated excess oxygen in the flue gas gives (0.035)(4.7733/5.5710) = 0.03 gr/dscf (well below the 0.15 gr/dscf standard)

BAAQMD Regulation 6-310: Regulation 6-310 limits filterable particulate (FP) emissions from any source to 0.15 grains per dry standard cubic foot (gr/dscf) of exhaust volume. As shown above in the potential to emit calculations for these sources, the engines will emit less than 0.035 gr/dscf of exhaust at 0% oxygen. The actual engine exhaust will contain at least 3% O_2. The ratio of exhaust volumes for 10% O_2 versus 0% O_2 is 1.913:1. Therefore, the grain loading in the actual flare exhaust will be: (0.0125/1.913) < 0.007 gr/dscf of exhaust at 10% oxygen. The compliance ratio (limit/emissions or 0.15/0.03) for the landfill gas engines is approximately 5 to 1. Since the Regulation 6-310 grain loading limit is far above any expected PM emissions and total potential PM emissions from the flares are fairly low, it would not be appropriate to add periodic monitoring for this standard.

Changes to permit – Table VII - A:

- Landfill Gas Sulfur Content: The landfill gas total sulfur content monitoring frequency will be change from weekly to quarterly as allowed in the current condition.
- Reg 8-34-114 Exemption from 8-34-301.4 (until July 1, 2002): Since July 1, 2002 has passed, the references to Reg 8-34-114 and SIP 8-34-114 should be deleted, since it is no longer applicable.
- Combustion Temperature: This parameter will be added as appropriate to Table VII-A and as required in the original Title V Table VII – A.

VIII. Test Methods

This section of the permit lists test methods that are associated with standards in District or other rules. It is included only for reference. In most cases, the test methods in the rules are source test methods that can be used to determine compliance but are not required on an ongoing basis. The test methods are not applicable requirements unless a rule or permit condition requires ongoing testing, in which case the requirement will also appear in Section IV of the permit.

Changes to permit:
None.

D. Alternate Operating Scenarios:

There are no Alternate Operating Scenarios recommended or considered for this facility.

E. Compliance Status:

Staff reviewed Gas Recovery Systems Annual Compliance Certifications for November 1, 2002 to November 1, 2007 and found no ongoing non-compliance and no recurring pattern of violations.

Staff also reviewed the District compliance records for Gas Recovery Systems for November 1, 2006 through November 1, 2007. During this period Gas Recovery Systems activities known to the District include:

The District did not issue any Notices of Violation.

The District did not receive any air pollution complaints alleging Gas Recovery Systems as the source.

The District did not receive any notifications for Reportable Compliance Activities (RCA).

There are no enforcement agreements, open variances, or open abatement orders for Gas Recovery Systems.

Conclusion

The Compliance and Enforcement Division has made a determination that for the five year period Gas Recovery Systems was in intermittent compliance. There is no evidence of on-going non-compliance and no recurring pattern of violations that would warrant consideration of a Title V permit compliance schedule.

F. Differences between the Application and the Proposed Permit:

Renewal of Title V Permit

The renewal Title V permit application was submitted on August 12, 2005. This version is the basis for constructing the proposed Title V permit.

APPENDIX A

COMPLIANCE REVIEW

COMPLIANCE & ENFORCEMENT DIVISION

Inter-Office Memorandum

November 1, 2007

TO: BRIAN BATEMAN – DIRECTOR OF ENGINEERING

FROM: KELLY WEE – DIRECTOR OF ENFORCEMENT

SUBJECT: REVIEW OF COMPLIANCE RECORD OF:

GAS RECOVERY SYSTEMS, SITE # B1668

Background

This review was initiated as part of the District evaluation of an application by Gas Recovery Systems for a Title V Permit Renewal. It is standard practice of the Compliance and Enforcement Division to undertake a compliance record review in advance of a renewal of a Title V Permit to Operate. The purpose of this review is to assure that any non-compliance problems identified during the prior five-year permit term have been adequately addressed, or, if non-compliance persists, that a schedule of compliance is properly incorporated into the Title V permit compliance schedule. In addition, the review checks for patterns of recurring violation that may be addressed by additional permit terms. Finally, the review is intended to recommend, if necessary, any additional permit conditions and limitations to improve compliance.

Compliance Review

Staff reviewed Gas Recovery Systems Annual Compliance Certifications for November 1, 2002 to November 1, 2007 and found no ongoing non-compliance and no recurring pattern of violations.

Staff also reviewed the District compliance records for Gas Recovery Systems for November 1, 2006 through November 1, 2007. During this period Gas Recovery Systems activities known to the District include:

The District did not issue any Notices of Violation.

The District did not receive any air pollution complaints alleging Gas Recovery Systems as the source.

The District did not receive any notifications for Reportable Compliance Activities (RCA).

There are no enforcement agreements, open variances, or open abatement orders for Gas Recovery Systems.

Conclusion

The Compliance and Enforcement Division has made a determination that for the five year period Gas Recovery Systems was in intermittent compliance. There is no evidence of on-going non-compliance and no recurring pattern of violations that would warrant consideration of a Title V permit compliance schedule.

APPENDIX B

GLOSSARY

ACT
Federal Clean Air Act

APCO
Air Pollution Control Officer

API
American Petroleum Institute

ARB
Air Resources Board

BAAQMD
Bay Area Air Quality Management District

BACT
Best Available Control Technology

BARCT
Best Available Retrofit Control Technology

C5
An Organic chemical compound with five carbon atoms

C6
An Organic chemical compound with six carbon atoms

CAA
The federal Clean Air Act

CAAQS
California Ambient Air Quality Standards

CAPCOA
California Air Pollution Control Officers Association

CEC
California Energy Commission

CEQA
California Environmental Quality Act

CEM
A "continuous emission monitor" is a monitoring device that provides a continuous direct measurement of some pollutant (e.g. NOx concentration) in an exhaust stream.

CFR
The Code of Federal Regulations. 40 CFR contains the implementing regulations for federal environmental statutes such as the Clean Air Act. Parts 50-99 of 40 CFR contain the requirements for air pollution programs.

CO
Carbon Monoxide

CO2
Carbon Dioxide

Cumulative Increase
The sum of permitted emissions from each new or modified source since a specified date. Used to determine whether threshold-based requirements are triggered.

District
The Bay Area Air Quality Management District

dscf
Dry Standard Cubic Feet

dscm
Dry Standard Cubic Meter

E 6, E 9, E 12
Very large or very small number values are commonly expressed in a form called scientific notation, which consists of a decimal part multiplied by 10 raised to some power. For example, 4.53 E 6 equals (4.53) x (10^6) = (4.53) x (10 x 10 x 10 x 10 x 10 x 10) = 4,530,000. Scientific notation is used to express large or small numbers without writing out long strings of zeros.

EGT
Exhaust Gas Temperature

EPA
The federal Environmental Protection Agency.

Excluded
Not subject to any District Regulations.

Federally Enforceable, FE
All limitations and conditions which are enforceable by the Administrator of the EPA including those requirements developed pursuant to 40 CFR Part 51, subpart I (NSR), Part 52.21 (PSD), Part 60, (NSPS), Part 61, (NESHAPS), Part 63 (HAP), and Part 72 (Permits Regulation, Acid Rain), and also including limitations and conditions contained in operating permits issued under an EPA-approved program that has been incorporated into the SIP.

FP
Filterable Particulate as measured by BAAQMD Method ST-15, Particulate.

FR
Federal Register

GDF
Gasoline Dispensing Facility

GLC
Ground level concentration.

GLM
Ground Level Monitor

grains
1/7000 of a pound

HAP
Hazardous Air Pollutant. Any pollutant listed pursuant to Section 112(b) of the Act. Also refers to the program mandated by Title I, Section 112, of the Act and implemented by both 40 CFR Part 63, and District Regulation 2, Rule 5.

H2S
Hydrogen Sulfide

HHV
Higher Heating Value. The quantity of heat evolved as determined by a calorimeter where the combustion products are cooled to 60F and all water vapor is condensed to liquid.

LHV
Lower Heating Value. Similar to the higher heating value (see HHV) except that the water produced by the combustion is not condensed but retained as vapor at 60F.

Major Facility
A facility with potential emissions of regulated air pollutants greater than 100 tons per year, greater than or equal to 10 tons per year of any single hazardous air pollutant, and/or greater than or equal to 25 tons per year of any combination of hazardous air pollutants, or such lesser quantity as determined by the EPA administrator.

MFR
Major Facility Review. The District's term for the federal operating permit program mandated by Title V of the Act and implemented by District Regulation 2, Rule 6.

MOP
The District's Manual of Procedures.

MSDS
Material Safety Data Sheet

MW
Megawatts

NA
Not Applicable

NAAQS
National Ambient Air Quality Standards

NESHAPS
National Emission Standards for Hazardous Air Pollutants. Contained in 40 CFR Part 61.

NMHC
Non-methane Hydrocarbons

NMOC
Non-methane Organic Compounds (Same as NMHC)

NO_X
Oxides of nitrogen.

NSPS
Standards of Performance for New Stationary Sources. Federal standards for emissions from new stationary sources. Mandated by Title I, Section 111 of the Act, and implemented by both 40 CFR Part 60 and District Regulation 10.

NSR
New Source Review. A federal program for preconstruction review and permitting of new and modified sources of air pollutants for which the District is classified "non-attainment". Mandated by Title I of the Clean Air Act and implemented by 40 CFR Parts 51 and 52 as well as District Regulation 2, Rule 2. (Note: There are additional NSR requirements mandated by the California Clean Air Act.)

O2
The chemical name for naturally-occurring oxygen gas.

Offset Requirement
A New Source Review requirement to provide federally enforceable emission offsets at a specified ratio for the emissions from a new or modified source and any pre-existing cumulative increase minus any onsite contemporaneous emission reduction credits. Applies to emissions of POC, NO_X, PM10, and SO_2.

Phase II Acid Rain Facility
A facility that generates electricity for sale through fossil-fuel combustion and by virtue of certain other characteristics (defined in Regulation 2, Rule 6) is subject to Titles IV and V of the Clean Air Act.

POC
Precursor Organic Compounds

PM
Total Particulate Matter

PM10
Particulate matter with aerodynamic equivalent diameter of less than 10 microns

PSD
Prevention of Significant Deterioration. A federal program for permitting new and modified sources of air pollutants for which the District is classified "attainment" of the National Air Ambient Quality Standards. Mandated by Title I of the Act and implemented by both 40 CFR Part 52 and District Regulation 2, Rule 2.

SCR
A "selective catalytic reduction" unit is an abatement device that reduces NOx concentrations in the exhaust stream of a combustion device. SCRs utilize a catalyst, which operates at a specific temperature range, and injected ammonia to promote the conversion of NOx compounds to nitrogen gas.

SIP
State Implementation Plan. State and District programs and regulations approved by EPA and developed in order to attain the National Air Ambient Quality Standards. Mandated by Title I of the Act.

SO2
Sulfur dioxide

SO2 Bubble
An SO2 bubble is an overall cap on the SO2 emissions from a defined group of sources, or from an entire facility. SO2 bubbles are sometimes used at refineries because combustion sources are typically fired entirely or in part by "refinery fuel gas" (RFG), a waste gas product from refining operations. Thus, total SO2 emissions may be conveniently quantified by monitoring the total amount of RFG that is consumed, and the concentration of H2S and other sulfur compounds in the RFG.

SO3
Sulfur trioxide

THC
Total Hydrocarbons (NMHC + Methane)

Therm

100,000 British Thermal Unit

Title V
Title V of the federal Clean Air Act. Requires a federally enforceable operating permit program for major and certain other facilities.

TOC
Total Organic Compounds (NMOC + Methane, Same as THC)

TRMP
Toxic Risk Management Plan

TSP
Total Suspended Particulate

TVP
True Vapor Pressure

VOC
Volatile Organic Compounds

Units of Measure:

bhp	=	brake-horsepower
Btu	=	British Thermal Unit
g	=	grams
gal	=	gallon
hp	=	horsepower
hr	=	hour
lb	=	pound
in	=	inches
max	=	maximum
m^2	=	square meter
min	=	minute
MM	=	million
ppmv	=	parts per million, by volume
ppmw	=	parts per million, by weight
psia	=	pounds per square inch, absolute
psig	=	pounds per square inch, gauge
scfm	=	standard cubic feet per minute
yr	=	year

Symbols:

<	=	less than
>	=	greater than

≤	=	less than or equal to
≥	=	greater than or equal to

APPENDIX C

CALCULATIONS

1. Landfill GasH_2S Concentration required to produce Exceedance of Reg 9-2 1 Hour average

Basis: 1 hour maximum average concentration: 0.03 ppm H2S
3 minute maximum average concentration: 0.06 ppm H2S
MW, H_2S: 34.1
MW, CO_2: 44.01
MW, Ch_4: 16.04
MW, Air: 29.0 g/g-mole
MW, Landfill Gas: 100 g-mole @ 50/50 volume % methane and CO_2
MW = [[(50)(44.01) + (50)(16.04)]/100] = 30 g/g-mole

1 lb-mole = 386 cu ft
1 g-mole = 0.0241 cu m
Total LFG Flow to GRS = [76196E3 cu ft + 76318 + 76338 + 73795] = 302.6 MM scf/yr
Leak estimate +10% of total stream = 30.26 MM scf/yr
LFG Concentration, maximum permitted = 1300 ppm

Q = [30.26E6 scf/yr][yr/8760 hr][hr/60 min] = 58 cu ft LFG/min

M = (58 cu ft LFG/min)(min/60 sec)(1300 cu ft H2S/1E6 cu ft LFG)(lb mole/386 cu ft)(34.1 lb H_2S/mole H_2S)(454 g/lb) = 0.05 g/sec

Generic Modeling Case:

Met Data: Screen3.asc
H2S Exhaust Rate: 0.05 g/sec
Flowrate: 58 cfm @ 5 fps
Source Type: Point source (worst case)

Ambient H2S Concentration (max 1-hr) = 3.5 E-6 g/cu m

Ambient PPM Concentration = [(3.5E-6 g)(g-mole H_2S /34.1 g H_2S)]/[(cu m air)(g-mole air/0.0241 cu m air)/1E6] = 0.002 ppm