

Bay Area Air Quality Management District

939 Ellis Street
San Francisco, CA 94109
(415) 771-6000

Final

MAJOR FACILITY REVIEW PERMIT

Issued To:
Ameresco Keller Canyon, LLC
Facility # B7667

Facility Address:
901 Bailey Road
Pittsburg, CA 94565

Mailing Address:
111 Speen Street, Suite 410
Framingham, MA 01710

Responsible Official
Nathan W. Hall, Director, Plant Operations
508-598-4374

Facility Contact
Stephen Simmons, Manager, Plant Operations
831-970-1026

Type of Facility: Landfill Gas Combustion
Primary SIC: 4931
Product: Electrical Generation

BAAQMD Engineering Division Contact:
Carol Allen

ISSUED BY THE BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Signed by Jeff McKay for Jack P. Broadbent
Jack P. Broadbent, Executive Officer/Air Pollution Control Officer

February 9, 2015
Date

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I. STANDARD CONDITIONS

A. Administrative Requirements

The permit holder shall comply with all applicable requirements in the following regulations:

- BAAQMD Regulation 1 - General Provisions and Definitions
(as amended by the District Board on 5/4/11);
- SIP Regulation 1 - General Provisions and Definitions
(as approved by EPA through 6/28/99);
- BAAQMD Regulation 2, Rule 1 - Permits, General Requirements
(as amended by the District Board on 4/18/12);
- SIP Regulation 2, Rule 1 - Permits, General Requirements
(as approved by EPA through 1/26/99);
- BAAQMD Regulation 2, Rule 2 - Permits, New Source Review
(as amended by the District Board on 6/15/05);
- SIP Regulation 2, Rule 2 - Permits, New Source Review and Prevention of Significant Deterioration
(as approved by EPA through 1/26/99);
- BAAQMD Regulation 2, Rule 4 - Permits, Emissions Banking
(as amended by the District Board on 12/19/12);
- SIP Regulation 2, Rule 4 - Permits, Emissions Banking
(as approved by EPA through 1/26/99);
- BAAQMD Regulation 2, Rule 5 – New Source Review of Toxic Air Contaminants
(as amended by the District Board on 1/6/10);
- BAAQMD Regulation 2, Rule 6 - Permits, Major Facility Review
(as amended by the District Board on 4/16/03); and
- SIP Regulation 2, Rule 6 – Permits, Major Facility Review
(as approved by EPA through 6/23/95)

B. Conditions to Implement Regulation 2, Rule 6, Major Facility Review

1. This Major Facility Review Permit was issued on February 9, 2015 and expires on February 8, 2020. The permit holder shall submit a complete application for renewal of this Major Facility Review Permit no later than August 8, 2019 and no earlier than February 8, 2019. **If a complete application for renewal has not been submitted in accordance with this deadline, the facility may not operate after February 8, 2020.** If the permit renewal has not been issued by February 8, 2020, but a complete application for renewal has been submitted in accordance with the above deadlines, the existing permit will continue in force until the District takes final action on the renewal application. (Regulation 2-6-307, 404.2, 407, & 409.6; MOP Volume II, Part 3, §4.2)
2. The permit holder shall comply with all conditions of this permit. The permit consists of this document and all appendices. Any non-compliance with the terms

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and conditions of this permit will constitute a violation of the law and will be grounds for enforcement action; permit termination, revocation and re-issuance, or modification; or denial of a permit renewal application. (Regulation 2-6-307; MOP Volume II, Part 3, §4.11)

3. In the event any enforcement action is brought as a result of a violation of any term or condition of this permit, the fact that it would have been necessary for the permittee to halt or reduce the permitted activity in order to maintain compliance with such term or condition shall not be a defense to such enforcement action. (MOP Volume II, Part 3, §4.11)
4. This permit may be modified, revoked, reopened and reissued, or terminated for cause. (Regulation 2-6-307, 409.8, 415; MOP Volume II, Part 3, §4.11)
5. The filing of a request by the facility for a permit modification, revocation and re-issuance, or termination, or the filing of a notification of planned changes or anticipated non-compliance does not stay the applicability of any permit condition. (Regulation 2-6-409.7; MOP Volume II, Part 3, §4.11)
6. This permit does not convey any property rights of any sort, or any exclusive privilege. (Regulation 2-6-409.7; MOP Volume II, Part 3, §4.11)
7. The permit holder shall supply within 30 days any information that the District requests in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit. (Regulation 1-441, Regulation 2-6-409.4 & 501; MOP Volume II, Part 3, §4.11)
8. Any records required to be maintained pursuant to this permit which the permittee considers to contain proprietary or trade secret information shall be prominently designated as such. Copies of any such proprietary or trade secret information which are provided to the District shall be maintained by the District in a locked confidential file, provided, however, that requests from the public for the review of any such information shall be handled in accordance with the District's procedures set forth in Section 11 of the District's Administrative Code. (Regulation 2-6-419; MOP Volume II, Part 3, §4.11)
9. Proprietary or trade secret information provided to EPA will be subject to the requirements of 40 CFR Part 2, Subpart B - Public Information, Confidentiality of Business Information. (40 CFR Part 2)
10. The emissions inventory submitted with the application for this Major Facility Review Permit is an estimate of actual emissions or the potential to emit for the time period stated and is included only as one means of determining applicable requirements for emission sources. It does not establish, or constitute a basis for establishing, any new emission limitations. (MOP Volume II, Part 3, §4.11)

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11. The responsible official shall certify all documents submitted by the facility pursuant to the major facility review permit. The certification shall state that based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. The certifications shall be signed by a responsible official for the facility. (Regulation 2-6-409.20, MOP Volume II, Part 3, §4.11)
12. The permit holder is responsible for compliance, and certification of compliance, with all conditions of the permit, regardless whether it acts through employees, agents, contractors, or subcontractors. (Regulation 2-6-307)

C. Requirement to Pay Fees

The permit holder shall pay annual fees in accordance with District Regulation 3, including Schedule P. (Regulation 2-6-402 & 409.13, Regulation 3; MOP Volume II, Part 3, §4.12)

D. Inspection and Entry

Access to Facility: The permit holder shall provide reasonable access to the facility and equipment which is subject to this permit to the APCO and/or to his or her designee. (Regulation 1-440, Regulation 2-6-409.3; MOP Volume II, Part 3, §4.14)

E. Records

1. The permit holder must provide any information, records, and reports requested or specified by the APCO. (Regulation 1-441, Regulation 2-6-409.4)
2. Notwithstanding the specific wording in any requirement, all records for federally enforceable requirements shall be maintained for at least five years from the date of creation of the record. (Regulation 2-6-501, MOP Volume II, Part 3, §4.7)

F. Monitoring Reports

Reports of all required monitoring must be submitted to the District at least once every six months, except where an applicable requirement specifies more frequent reporting. The first reporting period for this permit shall be February 9, 2015 to June 30, 2015. The report shall be submitted by July 31, 2015. Subsequent reports shall be for the following periods: January 1st through June 30th and July 1st through December 31st, and are due on the last day of the month after the end of the reporting period. All instances of non-compliance shall be clearly identified in these reports. The reports shall be certified by the responsible official as true, accurate, and complete. In addition, all instances of non-compliance with the permit shall be reported in writing to the District's Compliance and Enforcement Division within 10

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calendar days of the discovery of the incident. Within 30 calendar days of the discovery of any incident of non-compliance, the facility shall submit a written report including the probable cause of non-compliance and any corrective or preventative actions. The reports shall be sent to the following address:

Director of Compliance and Enforcement
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
Attn: Title V Reports

(Regulation 2-6-502, MOP Volume II, Part 3, §4.7)

G. Compliance Certification

Compliance certifications shall be submitted annually by the responsible official of this facility to the Bay Area Air Quality Management District and to the Environmental Protection Agency. The first certification period will be: February 9, 2015 through December 31, 2015. Subsequent certification periods will be January 1st through December 31st each year. The certification shall be submitted by January 31st of each year. The certification must list each applicable requirement, the compliance status, whether compliance was continuous or intermittent, the method used to determine compliance, and any other specific information required by the permit. The certification should be directed to the District's Compliance and Enforcement Division at the address above, and a copy of the certification shall be sent to the Environmental Protection Agency at the following address:

Director of the Air Division
USEPA, Region IX
75 Hawthorne Street
San Francisco, CA 94105
Attention: Air-3

(MOP Volume II, Part 3, §4.5 and 4.15)

H. Emergency Provisions

1. The permit holder may seek relief from enforcement action in the event of a breakdown, as defined by Regulation 1-208 of the District's Rules and Regulations, by following the procedures contained in Regulations 1-431 and 1-432. The District will thereafter determine whether breakdown relief will be granted in accordance with Regulation 1-433. (MOP Volume II, Part 3, §4.8)
2. The permit holder may seek relief from enforcement action for a violation of any of the terms and conditions of this permit by applying to the District's Hearing

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Board for a variance pursuant to Health and Safety Code Section 42350. The Hearing Board will determine after notice and hearing whether variance relief should be granted in accordance with the procedures and standards set forth in Health and Safety Code Section 42350 et seq. (MOP Volume II, Part 3, §4.8)

3. The granting by the District of breakdown relief or the issuance by the Hearing Board of a variance will not provide relief from federal enforcement. (MOP Volume II, Part 3, §4.8)

I. Severability

In the event that any provision of this permit is invalidated by a court or tribunal of competent jurisdiction, or by the Administrator of the EPA, all remaining portions of the permit shall remain in full force and effect. (Regulation 2-6-409.5; MOP Volume II, Part 3, §4.10)

J. Miscellaneous Conditions

1. The maximum capacity for each source as shown in Table II-A is the maximum allowable capacity. Exceedance of the maximum allowable capacity for any source is a violation of Regulation 2, Rule 1, Section 301. (Regulation 2-1-301)

II. EQUIPMENT

A. Permitted Source List

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities for each source, pursuant to Standard Condition I.J and Regulation 2-1-301.

**Table II – A
Permitted Sources**

S-#	Description	Make or Type	Model	Capacity
S-1	LFG-Fired Internal Combustion Engine and Genset	GE Jenbacher, 4 stroke, 16 cylinder	JGS 616 GS L.L	2677 bhp, 6090 in ³ , 19.733 MM BTU/hour 1.914 MW (nominal)
S-2	LFG-Fired Internal Combustion Engine and Genset	GE Jenbacher, 4 stroke, 16 cylinder	JGS 616 GS L.L	2677 bhp, 6090 in ³ , 19.733 MM BTU/hour 1.914 MW (nominal)
S-3	Temperature Swing Adsorption Gas Cleaning System	GE Jenbacher	M4 TSA	Carbon Vessel Configuration: 4 X 2, Carbon Weight Per Vessel: 2580 pounds

B. Abatement Device List

**Table II – B
Abatement Devices**

A-#	Description	Source(s) Controlled	Applicable Requirement	Operating Parameters	Limit or Efficiency
A-1	TSA Waste Gas Flare; John Zink Company, ZTOF Enclosed, 198 MM BTU/day,	S-3	BAAQMD 8-34-301.3, see also Table IV-B	Minimum combustion zone temperature of: 1400 °F, see also Table VII-B	Either 98% destruction of NMOC or < 30 ppmv of NMOC, as CH ₄ , at 3% O ₂ , dry

III. GENERALLY APPLICABLE REQUIREMENTS

The permit holder shall comply with all applicable requirements, including those specified in the BAAQMD and SIP rules and regulations and other federal requirements cited below. These requirements apply in a general manner to the facility and/or to sources exempt from the requirement to obtain a District Permit to Operate. The District has determined that these requirements will not be violated under normal, routine operations, and that no additional periodic monitoring or reporting to demonstrate compliance is warranted. In cases where a requirement, in addition to being generally applicable, is also specifically applicable to one or more sources, the requirement and the source are also included in Section IV, Source-Specific Applicable Requirements, of this permit. This section also contains provisions that may apply to temporary sources.

The dates in parentheses in the Title column identify the versions of the regulations being cited and are, as applicable:

1. BAAQMD regulation(s): The date(s) of adoption or most recent amendment of the regulation by the District Board of Directors
2. Any federal requirement, including a version of a District regulation that has been approved into the SIP: The most recent date of EPA approval of any portion of the rule, encompassing all actions on the rule through that date

The full language of SIP requirements is on EPA Region 9’s website. The address is <http://yosemite.epa.gov/r9/r9sips.nsf/Agency?ReadForm&count=500&state=California&cat=Bay+Area+Air+Quality+Management+District-Agency-Wide+Provisions>.

NOTE:

There are differences between the current BAAQMD rules and the versions of the rules in the SIP. All sources must comply with both versions of a rule until US EPA has reviewed and approved the District’s revision of the regulation.

**Table III
 Generally Applicable Requirements**

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)
BAAQMD Regulation 1	General Provisions and Definitions (5/4/11)	N
SIP Regulation 1	General Provisions and Definitions (6/28/99)	Y
BAAQMD Regulation 2, Rule 1	Permits – General Requirements (4/8/12)	N
SIP Regulation 2, Rule 1	Permits – General Requirements (1/26/99)	Y
BAAQMD 2-1-429	Federal Emissions Statement (12/21/04)	N
SIP 2-1-429	Federal Emissions Statement (4/3/95)	Y
BAAQMD Regulation 2, Rule 5	Permits – New Source Review of Toxic Air Contaminants (1/6/10)	N

III. Generally Applicable Requirements

Table III
Generally Applicable Requirements

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)
BAAQMD Regulation 4	Air Pollution Episode Plan (3/20/91)	N
SIP Regulation 4	Air Pollution Episode Plan (8/6/90)	Y
BAAQMD Regulation 5	Open Burning (7/9/08)	N
SIP Regulation 5	Open Burning (9/4/98)	Y
BAAQMD Regulation 6, Rule 1	Particulate Matter – General Requirements (12/5/07)	N
SIP Regulation 6	Particulate Matter (9/4/98)	Y
BAAQMD Regulation 7	Odorous Substances (3/17/82)	N
BAAQMD Regulation 8, Rule 1	Organic Compounds – General Provisions (6/15/94)	Y
BAAQMD Regulation 8, Rule 2	Organic Compounds – Miscellaneous Operations (7/20/05)	N
SIP Regulation 8, Rule 2	Organic Compounds – Miscellaneous Operations (3/22/95)	Y
BAAQMD Regulation 8, Rule 3	Organic Compounds – Architectural Coatings (7/1/09)	N
SIP Regulation 8, Rule 3	Organic Compounds – Architectural Coatings (1/2/04)	Y
BAAQMD Regulation 8, Rule 4	Organic Compounds – General Solvent and Surface Coating Operations (10/16/02)	Y
BAAQMD Regulation 8, Rule 15	Organic Compounds – Emulsified and Liquid Asphalts (6/1/94)	Y
BAAQMD Regulation 8, Rule 16	Organic Compounds – Solvent Cleaning Operations (10/16/02)	Y
BAAQMD Regulation 8, Rule 40	Organic Compounds – Aeration of Contaminated Soil and Removal of Underground Storage Tanks (6/15/05)	N
SIP Regulation 8, Rule 40	Organic Compounds – Aeration of Contaminated Soil and Removal of Underground Storage Tanks (4/19/01)	Y
BAAQMD Regulation 8, Rule 47	Organic Compounds – Air Stripping and Soil Vapor Extraction Operations (6/15/05)	N
SIP Regulation 8, Rule 47	Organic Compounds – Air Stripping and Soil Vapor Extraction Operations (4/26/95)	Y
BAAQMD Regulation 8, Rule 49	Organic Compounds – Aerosol Paint Products (12/20/95)	N
SIP Regulation 8, Rule 49	Organic Compounds – Aerosol Paint Products (3/22/95)	Y
BAAQMD Regulation 8, Rule 51	Organic Compounds – Adhesive and Sealant Products (7/17/02)	N
SIP Regulation 8, Rule 51	Organic Compounds – Adhesive and Sealant Products (2/26/02)	Y
BAAQMD Regulation 9, Rule 1	Inorganic Gaseous Pollutants – Sulfur Dioxide (3/15/95)	N
SIP Regulation 9, Rule 1	Inorganic Gaseous Pollutants – Sulfur Dioxide (6/8/99)	Y
BAAQMD Regulation 9, Rule 2	Inorganic Gaseous Pollutants – Hydrogen Sulfide (10/6/99)	N

III. Generally Applicable Requirements

Table III
Generally Applicable Requirements

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)
BAAQMD Regulation 11, Rule 2	Hazardous Pollutants – Asbestos Demolition, Renovation and Manufacturing (10/7/98)	N
BAAQMD Regulation 11, Rule 14	Hazardous Pollutants – Asbestos Containing Serpentine (7/17/91)	N
BAAQMD Regulation 12, Rule 4	Miscellaneous Standards of Performance – Sandblasting (7/11/90)	N
SIP Regulation 12, Rule 4	Miscellaneous Standards of Performance – Sandblasting (9/2/81)	Y
California Health and Safety Code Section 41750 et seq.	Portable Equipment	N
California Health and Safety Code Section 44300 et seq.	Air Toxics “Hot Spots” Information and Assessment Act of 1987	N
California Health and Safety Code, Title 17, Section 93116	Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines Rated at 50 Horsepower and Greater (9/12/07)	N
40 CFR Part 61, Subpart A	National Emission Standards for Hazardous Air Pollutants – General Provisions (9/13/10)	Y
40 CFR Part 61, Subpart M	National Emission Standards for Hazardous Air Pollutants – National Emission Standard for Asbestos (7/20/04)	Y

IV. SOURCE-SPECIFIC APPLICABLE REQUIREMENTS

The permit holder shall comply with all applicable requirements, including those specified in the BAAQMD and SIP rules and regulations and other federal requirements cited below. The requirements cited in the following tables apply in a specific manner to the indicated source(s).

The dates in parentheses in the Title column identify the versions of the regulations being cited and are, as applicable:

1. BAAQMD regulation(s): The date(s) of adoption or most recent amendment of the regulation by the District Board of Directors
2. Any federal requirement, including a version of a District regulation that has been approved into the SIP: The most recent date of EPA approval of any portion of the rule, encompassing all actions on the rule through that date

The full text of each permit condition cited is included in Section VI, Permit Conditions, of this permit. The full language of SIP requirements is on EPA Region 9's website. The address is:

<http://yosemite.epa.gov/r9/r9sips.nsf/Agency?ReadForm&count=500&state=California&cat=Bay+Area+Air+Quality+Management+District-Agency-Wide+Provisions>

All other text may be found in the regulations themselves.

Table IV – A
Source-Specific Applicable Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
BAAQMD Regulation 1	General Provisions and Definitions (5/4/11)		
1-523	Parametric Monitoring and Recordkeeping Procedures	N	
1-523.1	Reporting requirement for periods of inoperation > 24 hours	Y	
1-523.2	Limit on duration of inoperation	Y	
1-523.3	Reporting requirement for violations of any applicable limits	N	
1-523.4	Records of inoperation, tests, calibrations, adjustments, & maintenance	Y	
1-523.5	Maintenance and calibration	N	
SIP Regulation 1	General Provisions and Definitions (6/28/99)		
1-523	Parametric Monitoring and Recordkeeping Procedures	Y	

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Table IV – A
Source-Specific Applicable Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
1-523.3	Reports of Violations	Y	
BAAQMD Regulation 6, Rule 1	Particulate Matter – General Requirements (12/5/07)		
6-1-301	Ringelmann No. 1 Limitation	N	
6-1-305	Visible Particles	N	
6-1-310	Particle Weight Limitation	N	
6-1-401	Appearance of Emissions	N	
SIP Regulation 6	Particulate Matter and Visible Emissions (9/4/98)		
6-301	Ringelmann No. 1 Limitation	Y	
6-305	Visible Particles	Y	
6-310	Particle Weight Limitation	Y	
6-401	Appearance of Emissions	Y	
BAAQMD Regulation 8, Rule 34	Organic Compounds – Solid Waste Disposal Sites (6/15/05)		
8-34-301	Landfill Gas Collection and Emission Control System Requirements	Y	
8-34-301.2	Collection and Control Systems Leak Limitations	Y	
8-34-301.4	Limits for Other Emission Control Systems	Y	
8-34-412	Compliance Demonstration Tests	Y	
8-34-413	Performance Test Report	Y	
8-34-501	Operating Records	Y	
8-34-501.2	Emission Control System Downtime	Y	
8-34-501.4	Testing	Y	
8-34-501.6	Leak Discovery and Repair Records	Y	
8-34-501.10	Gas Flow Rate Records for All Emission Control Systems	Y	
8-34-501.11	Records of Key Emission Control System Operating Parameters	Y	
8-34-501.12	Records Retention for 5 Years	Y	
8-34-503	Landfill Gas Collection and Emission Control System Leak Testing	Y	
8-34-504	Portable Hydrocarbon Detector	Y	
8-34-508	Gas Flow Meter	Y	
8-34-509	Key emission control system operating parameters	Y	

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Table IV – A
Source-Specific Applicable Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
BAAQMD Regulation 9, Rule 1	Inorganic Gaseous Pollutants – Sulfur Dioxide (3/15/95)		
9-1-301	Limitations on Ground Level Concentrations	Y	
9-1-302	General Emission Limitations	Y	
BAAQMD Regulation 9, Rule 2	Inorganic Gaseous Pollutants – Hydrogen Sulfide (10/6/99)		
9-2-301	Limitations on Hydrogen Sulfide	N	
BAAQMD Regulation 9 Rule 8	Inorganic Gaseous Pollutants – Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines (7/25/07)		
9-8-302	Emission Limits – Waste Derived Fuel Gas	N	
9-8-302.1	Lean-Burn Engines: NOx Emission Limit	N	
9-8-302.3	CO Emission Limit	N	
9-8-501	Initial Demonstration of Compliance	N	
9-8-502	Recordkeeping	N	
9-8-502.3	Records of Compliance Demonstration Tests	N	
9-8-503	Quarterly Demonstration of Compliance	N	
SIP Regulation 9 Rule 8	Inorganic Gaseous Pollutants – Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines (12/15/97)		
9-8-302	Emission Limits – Waste Derived Fuel Gas	Y	
9-8-302.1	Lean-Burn Engines: NOx Emission Limit	Y	
9-8-302.3	CO Emission Limit	Y	
40 CFR Part 60, Subpart A	Standards of Performance for New Stationary Sources – General Provisions (9/13/10)		
60.4	Address	Y	
60.4(b)	Requires Submission of Requests, Reports, Applications, and Other Correspondence to the Administrator	Y	
60.7	Notification and Record Keeping	Y	
60.8	Performance Tests	Y	

IV. Source Specific Applicable Requirements

Table IV – A
Source-Specific Applicable Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
60.11	Compliance with Standards and Maintenance Requirements	Y	
60.11(a)	Compliance determined by performance tests	Y	
60.11(d)	Good air pollution control practice	Y	
60.12	Circumvention	Y	
60.13	Monitoring Requirements	Y	
60.13(a)	Applies to all continuous monitoring systems	Y	
60.13(b)	Monitors shall be installed and operation before performing performance tests	Y	
60.13(e)	Continuous monitors shall operate continuously	Y	
60.13(f)	Monitors shall be installed in proper locations	Y	
60.13(g)	Requires multiple monitors for multiple stacks	Y	
60.14	Modification	Y	
60.15	Reconstruction	Y	
60.19	General Notification and Reporting Requirements	Y	
40 CFR Part 60, Subpart JJJJ	Standards of Performance for New Stationary Sources – Standards of Performance for Stationary Spark ignition Internal Combustion Engines (1/18/08)		
60.4230	Am I subject to this subpart?	Y	
60.4230(a)	Provisions apply to manufacturers, owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE).	Y	
60.4230(a)(4)	Owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:	Y	
60.4230(a)(4)(i)	On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP.	Y	
60.4233	What emission standards must I meet if I am an owner or operator of a stationary SI internal combustion engine?	Y	
60.4233(e)	Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) must comply with the emission standards in Table I.	Y	

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Table IV – A
Source-Specific Applicable Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
60.4234	Owners and operators of stationary SI ICE must operate and maintain stationary SI ICE that achieve the emission standards as required in 60.4233 over the entire life of the engine.	Y	
60.4236	What is the deadline for importing or installing stationary SI ICE produced in the previous model year?	Y	
60.4236(b)	After July 1, 2009, owners and operators may not install stationary SI ICE with a maximum engine power greater than or equal to 500 HP that do not meet the applicable requirements of 60.4233.	Y	
60.4243	What are my compliance requirements if I am an owner or operator of a stationary SI internal combustion engine?	Y	
60.4243(b)	If you are an owner or operator of a stationary SI ICE and must comply with the emission standards specified in 60.4233(d or e), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1 or 2) of this section.	Y	
60.4243(b)(2)	Purchasing a non-certified engine and demonstrating compliance with the emission standards specified in 60.4233(d or e) according to the requirements specified in 60.4244, as applicable, and according to paragraphs (b)(2)(i and ii) of this section.	Y	
60.4243(b)(2)(ii)	For stationary SI ICE > 500 HP, keep a maintenance plan and records of conducted maintenance, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions, conduct an initial performance test, and conduct subsequent performance testing every 8760 hours or every 3 years, whichever comes first.	Y	
60.4244	Owners and operators of stationary SI ICE who conduct performance test must follow the procedures in paragraphs (a) through (f) of this section.	Y	
60.4245	Owners or operators of stationary SI ICE must meet the following notification, reporting and record keeping requirements.	Y	
60.4245(a)	Owners and operators of all stationary SI ICE must keep records of the information in paragraphs (a)(1-4) of this section.	Y	

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Table IV – A
Source-Specific Applicable Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
60.4245(a)(1)	All notifications submitted to comply with this subpart and supporting documentation.	Y	
60.4245(a)(2)	Maintenance conduction on the engine.	Y	
60.4245(a)(3)	If the stationary SI ICE is a certified engine, documentation from the manufacturer that the engine is certified to meet the applicable emission standards and other information as required by 40 CFR Parts 90, 1048, 1054, and 1060.	Y	
60.4245(a)(4)	If the stationary SI ICE is not a certified engine or is operating in a non-certified manner, documentation that the engine meets the emission standards.	Y	
60.4245(c)	Owners and operators of stationary SI ICE greater than 500 HP that have not been certified by an engine manufacturer to meet the emission standards of 60.4231 must submit an initial notification as required by 60.7(a)(1). This notification must include all information required by (c)(1-5) of this section.	Y	
60.4245(d)	Owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each test as conducted within 60 days after the test has been completed.	Y	
Table 1	Meet the Applicable Standards for the Following Engines: Landfill/Digester Gas, HP _≥ 500, Manufacture Date 7/1/2007	Y	
40 CFR Part 63 Subpart ZZZZ	National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (3/9/11)		
63.6585	Am I subject to this subpart?	Y	
63.6585(a)	A stationary reciprocating internal combustion engine (RICE) is not a non-road engine and is not used to propel a motor vehicle.	Y	
63.6585(b)	A major source of HAPs is a plant that emits or has the potential to emit 10 tons/year or more of any single HAP or 25 tons/year of more of all HAPs combined.	Y	
63.6585(c)	An area source of HAP emissions is a source that is not a major source.	Y	
63.6590	What parts of my plant does this subpart cover?	Y	
63.6590(a)	Affected Source	Y	

IV. Source Specific Applicable Requirements

Table IV – A
Source-Specific Applicable Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
63.6590(a)(2)	New Stationary RICE	Y	
63.6590(a)(2)(iii)	A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.	Y	
63.6590(c)	Stationary RICE subject to Regulations under 40 CFR Part 60: An affected source that meets any of the criteria in c(1-7) must meet the requirements of this part by meeting the requirements of 40 CFR Part 60 Subpart IIII or Subpart JJJJ, as applicable.	Y	
63.6590(c)(1)	A new or reconstructed RICE located at an area source	Y	
BAAQMD Condition # 23400			
Part 1	Fuel Restrictions and Bypass Event Limitations (Cumulative Increase and Regulation 2-5-302)	Y	
Part 2	Heat Input Limits and Monitoring Requirements (Offsets and Cumulative Increase)	Y	
Part 3	CO Emission Limits (BACT and Cumulative Increase)	Y	
Part 4	NOx Emission Limits (BACT and Offsets)	Y	
Part 5	NMOC Emission Limits (Regulations 2-5-302 and 8-34-301.4, BACT, TBACT, and Offsets)	Y	
Part 6	Key Emission Control System Operating Parameter Limits and Monitoring Requirements (Regulation 8-34-501.11 and 8-34-509)	Y	
Part 7	SO2 Emission Limits, Landfill Gas TRS Content Limits and Monitoring Procedures (BACT and Cumulative Increase)	Y	
Part 8	Formaldehyde Emissions Limit (Regulation 2-5-302.1&3)	N	
Part 9	Annual Source Testing Requirements (BACT, TBACT, Offsets, and Cumulative Increase, and Regulations 2-5-302, 2-6-423.2.1, 8-34-301.4, 8-34-412, 9-1-302, 9-8-302.1, and 9-8-302.3, 40 CFR 60.4233(e), and 40 CFR 60.4243(b)(2)(ii))	Y	

IV. Source Specific Applicable Requirements

Table IV – B
Source-Specific Applicable Requirements
S-3 TEMPERATURE SWING ADSORPTION GAS CLEANING SYSTEM
A-1 TSA WASTE GAS FLARE

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
BAAQMD Regulation 1	General Provisions and Definitions (5/4/11)		
1-523	Parametric Monitoring and Recordkeeping Procedures	N	
1-523.1	Reporting requirement for periods of inoperation > 24 hours	Y	
1-523.2	Limit on duration of inoperation	Y	
1-523.3	Reporting requirement for violations of any applicable limits	N	
1-523.4	Records of inoperation, tests, calibrations, adjustments, & maintenance	Y	
1-523.5	Maintenance and calibration	N	
SIP Regulation 1	General Provisions and Definitions (6/28/99)		
1-523	Parametric Monitoring and Recordkeeping Procedures	Y	
1-523.3	Reports of Violations	Y	
BAAQMD Regulation 6, Rule 1	Particulate Matter – General Requirements (12/5/07)		
6-1-301	Ringelmann No. 1 Limitation (applies to A-1 only)	N	
6-1-305	Visible Particles (applies to A-1 only)	N	
6-1-310	Particle Weight Limitation (applies to A-1 only)	N	
6-1-401	Appearance of Emissions (applies to A-1 only)	N	
SIP Regulation 6	Particulate Matter and Visible Emissions (9/4/98)		
6-301	Ringelmann No. 1 Limitation (applies to A-1 only)	Y	
6-305	Visible Particles (applies to A-1 only)	Y	
6-310	Particle Weight Limitation (applies to A-1 only)	Y	
6-401	Appearance of Emissions (applies to A-1 only)	Y	
BAAQMD Regulation 8, Rule 34	Organic Compounds – Solid Waste Disposal Sites (6/15/05)		
8-34-301	Landfill Gas Collection and Emission Control System Requirements	Y	
8-34-301.2	Collection and Control Systems Leak Limitations	Y	
8-34-301.3	Limits for Enclosed Flares (applies to A-1 only)	Y	

IV. Source Specific Applicable Requirements

Table IV – B
Source-Specific Applicable Requirements
S-3 TEMPERATURE SWING ADSORPTION GAS CLEANING SYSTEM
A-1 TSA WASTE GAS FLARE

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
8-34-412	Compliance Demonstration Tests (applies to A-1 only)	Y	
8-34-413	Performance Test Report (applies to A-1 only)	Y	
8-34-501	Operating Records	Y	
8-34-501.2	Emission Control System Downtime	Y	
8-34-501.3	Continuous Temperature Records for Enclosed Combustors (applies to A-1 only)	Y	
8-34-501.4	Testing	Y	
8-34-501.6	Leak Discovery and Repair Records	Y	
8-34-501.10	Gas Flow Rate Records for All Emission Control Systems	Y	
8-34-501.12	Records Retention for 5 Years	Y	
8-34-503	Landfill Gas Collection and Emission Control System Leak Testing	Y	
8-34-504	Portable Hydrocarbon Detector	Y	
8-34-507	Continuous Temperature Monitor and Recorder (applies to A-1 only)	Y	
8-34-508	Gas Flow Meter	Y	
BAAQMD Regulation 9, Rule 1	Inorganic Gaseous Pollutants – Sulfur Dioxide (3/15/95)		
9-1-301	Limitations on Ground Level Concentrations	Y	
9-1-302	General Emission Limitations (applies to A-1 only)	Y	
BAAQMD Regulation 9, Rule 2	Inorganic Gaseous Pollutants – Hydrogen Sulfide (10/6/99)		
9-2-301	Limitations on Hydrogen Sulfide	N	
BAAQMD Condition # 23962			
Part 1	Waste Gas Abatement Requirement (Regulation 8-34-301 and BACT)	Y	
Part 2	Heat Input Limit for Flare, Gas Flow Rate Monitoring Requirement, and Records (Regulations 8-34-501.10 and 8-34-508, Offsets, and Cumulative Increase)	Y	
Part 3	NMOC Emission Limits for Flare (Regulation 8-34-301.3 and BACT)	Y	

IV. Source Specific Applicable Requirements

Table IV – B
Source-Specific Applicable Requirements
S-3 TEMPERATURE SWING ADSORPTION GAS CLEANING SYSTEM
A-1 TSA WASTE GAS FLARE

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
Part 4	Combustion Zone Temperature Limit for Flare, Temperature Monitoring Requirements, and Records (Regulations 8-34-501.3 and 8-34-507, BACT, and TBACT)	Y	
Part 5	NO _x Emissions Limits for Flare (RACT)	Y	
Part 6	CO Emissions Limits for Flare (RACT)	Y	
Part 7	SO ₂ Emission Limits and Monitoring Procedures for Flare (RACT, Cumulative Increase and Regulation 9-1-302)	Y	
Part 8	Formaldehyde Emission Limit for Flare (Regulation 2-5-302)	N	
Part 9	TAC Concentration Limits for Landfill Gas at the Flare Inlet and Alternative TAC Emission Limits (Regulation 2-5-302)	N	
Part 10	Alarms and Automatic Controls for Flare (Regulation 8-34-301 and BACT)	Y	
Part 11	Annual Source Testing Requirements for Flare (Regulations 2-5-302, 8-34-301.3, 8-34-412, and 9-1-302, RACT, BACT, and TBACT)	Y	
Part 12	Annual Landfill Gas Characterization Analyses (Regulation 2-5-501 and Cumulative Increase)	Y	

V. SCHEDULE OF COMPLIANCE

The permit holder shall comply with all applicable requirements cited in this permit. The permit holder shall also comply with applicable requirements that become effective during the term of this permit on a timely basis.

VI. PERMIT CONDITIONS

Any condition that is preceded by an asterisk is not federally enforceable.

Condition # 23400

FOR S-1 AND S-2 LFG-FIRED INTERNAL COMBUSTION ENGINES AND GENSETS:

1. The S-1 and S-2 Internal Combustion (IC) Engines shall be fired on treated landfill gas that has been processed through the S-3 TSA Gas Cleaning System, except during start-up and shut-down of S-1, S-2, or S-3. During start-up and shut-down events, the S-1 and S-2 Engines may also be fired on: (a) minimally treated landfill gas delivered from Keller Canyon Landfill (that has undergone filtering and dewatering only), (b) partially treated gas that has bypassed one or more processes in the S-3 TSA Gas Cleaning System, (c) pilot fuel gas, or (d) a combination of these gases; for short periods of time as needed to clear piping and to safely start-up or shut-down S-1, S-2, or S-3. (Basis: Cumulative Increase and Regulation 2-5-302)
2. The heat input to each IC Engine (S-1 and S-2) shall not exceed 172,861 MM BTU (HHV) during any consecutive 12-month period. This limit is based on the full rated input capacity for each IC engine operating continuously. The Permit Holder shall demonstrate compliance with this limit by maintaining records of the heat input to each engine for each day, for each calendar month, and for each rolling 12-month period. Heat input shall be calculated using District approved procedures based on measured landfill gas flow rate data and measured landfill gas methane concentration data. The calculated heat input rates shall be recorded in a data acquisition system or electronic spreadsheet. The landfill gas flow rate to each engine shall be monitored and recorded continuously in accordance with Regulation 8-34-508. The landfill gas methane content supplied to either engine shall be monitored and recorded continuously using a gas chromatograph or other District approved device. The flow meters and methane sensor shall be installed and properly calibrated prior to any engine operation and shall be maintained in good working condition. (Basis: Regulations 8-34-501.10 and 8-34-508, Offsets, and Cumulative Increase)

VI. Permit Conditions

Condition # 23400

FOR S-1 AND S-2 LFG-FIRED INTERNAL COMBUSTION ENGINES AND GENSETS:

3. Carbon Monoxide (CO) emissions from each IC Engine (S-1 and S-2) shall not exceed 2.1 grams of CO per brake-horsepower-hour. The Permit Holder may demonstrate compliance with this emission rate limit by having a carbon monoxide concentration in the engine exhaust of no more than 257 ppmv of CO, corrected to 15% oxygen, dry basis. An exhaust concentration measurement of more than 257 ppmv of CO shall not be deemed a violation of this part, if the Permit Holder can demonstrate that CO emissions did not exceed 2.1 g/bhp-hour during the test period. (Basis: BACT and Cumulative Increase)
4. Nitrogen Oxide (NO_x) emissions from each IC Engine (S-1 and S-2) shall not exceed 0.6 grams of NO_x (calculated as NO₂) per brake-horsepower-hour. The Permit Holder may demonstrate compliance with this emission rate limit by having a nitrogen oxide concentration in the engine exhaust of no more than 45 ppmv of NO_x, corrected to 15% oxygen, dry basis. An exhaust concentration measurement of more than 45 ppmv of NO_x shall not be deemed a violation of this part, if the Permit Holder can demonstrate that NO_x emissions did not exceed 0.6 g/bhp-hour during the test period. (Basis: BACT and Offsets)
5. Each IC Engine (S-1 and S-2) shall comply with either the destruction efficiency requirements or the non-methane organic compound (NMOC) outlet concentration limit specified in Regulation 8-34-301.4. (Basis: Regulations 2-5-302 and 8-34-301.4, BACT, TBACT, and Offsets)
6. In order to demonstrate on-going compliance with Part 5 and Regulation 8-34-509, the Permit Holder shall use average engine cylinder temperature as the key emission control system operating parameter for these engines, and the Permit Holder shall comply with the following limits and procedures. (Basis: Regulations 8-34-501.11 and 8-34-509)
 - a. For S-1, the average engine cylinder temperature shall be maintained at a minimum of 927 degrees F, averaged over each rolling 3-hour operating period, excluding start-up and shut-down periods.
 - b. For S-2, the average engine cylinder temperature shall be maintained at a minimum of 927 degrees F, averaged over each rolling 3-hour operating period, excluding start-up and shut-down periods.
 - c. For each engine (S-1 and S-2), each cylinder shall be equipped with a manufacturer's thermocouple that continuously and accurately reads the cylinder temperature. The average temperature for all the cylinders in the engine, shall be recorded at least once every 15 minutes of operation.
 - d. These temperature records shall be used to compute and record the rolling 3-hour average engine cylinder temperature for each engine.

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Condition # 23400

FOR S-1 AND S-2 LFG-FIRED INTERNAL COMBUSTION ENGINES AND GENSETS:

- e. For each engine, the rolling 3-hour average engine cylinder temperature shall be compared to the limits in Parts 6a and 6b to assess compliance with this part. The permit holder shall identify and record any rolling 3-hour periods (excluding start-up and shut-down periods) when the average engine cylinder temperature exceeds a limit, and the permit holder shall notify the District of each deviation.
7. Sulfur Dioxide (SO₂) emissions from each IC Engine (S-1 and S-2) shall not exceed 42.6 pounds of SO₂ per day. In addition, the emissions from S-1 and S-2 combined shall not exceed 8.64 tons of SO₂ during any consecutive 12-month period. The Permit Holder shall demonstrate compliance with these SO₂ emission limits by complying with the landfill gas concentration limits, monitoring and record keeping requirements identified in Parts 7a-e below. (Basis: BACT and Cumulative Increase)
 - a. The concentration of total reduced sulfur (TRS) compounds in the treated landfill gas burned in the engines shall not exceed 600 ppmv of TRS, expressed as hydrogen sulfide (H₂S) and corrected to a landfill gas methane concentration of 50% by volume, based on any individual source test or measurement.
 - b. On a monthly basis, the Permit Holder shall use either a District approved portable hydrogen sulfide monitor or a District laboratory analysis method to determine the concentration of TRS (measured as H₂S and corrected to 50% methane) in the treated landfill gas that is delivered to S-1 or S-2. Methane concentrations measured pursuant to Part 2 shall be used to correct the calculated TRS concentrations to a landfill gas methane concentration of 50% by volume (corrected TRS = measured TRS / measured % CH₄ * 50). The sampling dates and results shall be recorded in a District approved log.
 - i. If the portable H₂S analysis method is used, the TRS concentration shall be calculated by multiplying the measured H₂S concentration by 1.2 (TRS = 1.2 * H₂S).
 - ii. If a laboratory analysis method is used, the TRS concentration shall be calculated as the sum of the measured concentrations for the individual sulfur compounds, expressed as H₂S.
 - c. If the corrected TRS concentration determined pursuant to Part 7b is 150 ppmv of TRS or less for each monthly measurement during a rolling 12 month period, no additional calculations are required to verify compliance with the SO₂ emission limits identified above in Part 7. If any corrected TRS concentration measurement is greater than 150 ppmv of TRS during a rolling 12 month period, the Permit Holder shall use the calculation procedures in Parts 7d and 7e to demonstrate compliance with the daily and annual SO₂ emission limits above.

VI. Permit Conditions

Condition # 23400

FOR S-1 AND S-2 LFG-FIRED INTERNAL COMBUSTION ENGINES AND GENSETS:

- d. Daily SO₂ emission calculation are not required if the corrected TRS concentration is 270 ppmv of TRS or less. For each month when the TRS concentration measured pursuant to Part 7b is greater than 270 ppmv of TRS, the Permit Holder shall determine the maximum daily SO₂ emission rate (DE_SO₂, pounds/day) using the following equation:
$$DE_SO2 = Q_d * C_TRS * 1.66E-7, \text{ pounds/day, where:}$$

Q_d is the maximum daily landfill gas flow rate (scf/day) to any single engine during the month under evaluation and is determined based on the landfill gas flow rate data recorded pursuant to Part 2,
C_TRS is the corrected concentration of TRS (ppmv of TRS expressed as H₂S and corrected to a landfill gas methane concentration of 50% by volume) measured pursuant to Part 7b for the month under evaluation.
- e. Annual SO₂ emission calculations shall be conducted for each rolling 12 month period, if any Part 7b corrected TRS concentration measurements are greater than 150 ppmv of TRS during that period. For each rolling 12-month period, the Permit Holder shall determine the annual emission rate to the two engines combined (AE_SO₂, tons/year) using the following equations:
$$AE_SO2 = \text{sum of all ME_SO2 for the rolling 12 month period under evaluation, tons/year, and}$$

$$ME_SO2 = Q_m * C_TRS * 8.28E-11, \text{ tons/month, where:}$$

Q_m is the total combined landfill gas flow rate (scf/month) to the two engines combined during the month under evaluation and is determined based on the landfill gas flow rate data recorded pursuant to Part 2,
C_TRS is the corrected concentration of TRS (ppmv of TRS expressed as H₂S and corrected to a landfill gas methane concentration of 50% by volume) measured pursuant to Part 7b for the month under evaluation.
- *8. Formaldehyde emissions from each IC Engine (S-1 and S-2) shall not exceed 0.73 pounds per hour per engine. (Basis: Regulation 2-5-302.1&3)

VI. Permit Conditions

Condition # 23400

FOR S-1 AND S-2 LFG-FIRED INTERNAL COMBUSTION ENGINES AND GENSETS:

9. In order to demonstrate compliance with Parts 3, 4, 5, 7, and 8 above, Regulations 8-34-301.4, 9-1-302, 9-8-302.1, and 9-8-302.3; and 40 CFR Part 60, Subpart JJJJ, Section 60.4233(e) and Table 1, the Permit Holder shall ensure that a District approved source test is conducted within 12 months of the previous source test. This source test shall be conducted while the engine is operating at or near the maximum operating rate and shall determine all items identified in Parts 9a-m below. 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 reports shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 60 days of the test date. (Basis: BACT, TBACT, Offsets, Cumulative Increase, and Regulations 2-5-302, 8-34-301.4, 8-34-412, 9-1-302, 9-8-302.1, and 9-8-302.3, 40 CFR 60.4233(e), and 40 CFR 60.4243(b)(2)(ii))
 - a. Operating rate for each engine during the test period (bhp);
 - b. Total flow rate of all gaseous fuel to each engine (dry basis, sdcfm);
 - c. Concentrations (dry basis) of carbon dioxide (CO₂), nitrogen (N₂), oxygen (O₂), methane (CH₄), total non-methane organic compounds (NMOC), hydrogen sulfide (H₂S), and total reduced sulfur compounds (TRS) in the gaseous fuel burned in the engines (percent by volume or ppmv);
 - d. High heating value for the landfill gas (BTU/scf);
 - e. Heat input rate to each engine averaged over the test period (BTU/hour);
 - f. Exhaust gas flow rate from each engine based on EPA Method 19 (dry basis, sdcfm);
 - g. Concentrations (dry basis) of NO_x, CO, CH₄, NMOC, SO₂, and O₂ in the exhaust gas from each engine (ppmv or percent by volume);
 - h. NO_x and CO concentrations corrected to 15% O₂ in the exhaust gas from each engine (ppmv);
 - i. NO_x and CO emission rates from each engine (grams/bhp-hour);
 - j. NMOC concentrations corrected to 3% O₂ in the exhaust gas from each engine (ppmv);
 - k. NMOC and methane destruction efficiencies achieved by each engine (weight percent);
 - l. Formaldehyde emission rate from each engine (pounds/hour);
 - m. Average engine cylinder temperature for each engine, averaged over the test period, with average cylinder temperatures recorded at least once every 15 minutes as required in Part 6c.

VI. Permit Conditions

Condition # 23962

FOR S-3 TSA GAS CLEANING SYSTEM AND A-1 TSA WASTE GAS FLARE:

1. All waste flush gas generated by the carbon desorption cycle at S-3 shall be vented to the A-1 TSA Waste Gas Flare. Landfill gas delivered from Keller Canyon Landfill may be burned in A-1 or blended with the flush gas prior to combustion in A-1, if the use of this supplemental landfill gas is necessary to ensure proper operation of A-1. The A-1 flare shall be operated continuously during any time that gas is being vented to this flare. (Basis: Regulation 8-34-301 and BACT)
2. The heat input rate to the A-1 Flare shall not exceed 72,270 million BTU (HHV) during any consecutive 12-month period. This limit is based on the full rated input capacity for the flare operating continuously. In order to demonstrate compliance with this part, the A-1 flare shall be equipped with a continuous gas flow meter and recorder, and the owner/operator shall maintain records of the heat input to A-1 for each day, for each calendar month, and for each rolling 12-month period. Heat input shall be calculated using District approved procedures based on measured landfill gas flow rate data and measured landfill gas methane concentration data. The calculated heat input rates shall be recorded in a data acquisition system or electronic spreadsheet. The methane content in the inlet gas shall be monitored and recorded continuously using a gas chromatograph or other District approved device. The flow meters and methane sensor shall be installed and properly calibrated prior to initial operation of A-1 and shall be maintained in good working condition. (Basis: Regulation 8-34-501.10 and 8-34-508, Offsets, and Cumulative Increase)
3. The A-1 Flare shall either achieve 98% by weight destruction of the total non-methane organic compounds (NMOC) in the inlet gas or shall emit no more than 30 ppmv of NMOC, expressed as methane and corrected to 3% oxygen, in the exhaust gas from A-1. (Basis: Regulation 8-34-301.3 and BACT)
4. In order to ensure compliance with Part 3 and to ensure adequate destruction of the toxic air contaminants present in the inlet gas, the owner/operator shall maintain the combustion zone temperature of the A-1 Flare at a minimum temperature of 1474 degrees F, averaged over any 3-hour period. If a source test demonstrates compliance with all applicable requirements at a different temperature, the APCO may revise this minimum temperature requirement in accordance with the procedures identified in Regulation 2-6-414 or 2-6-415 and the following criteria. The minimum combustion zone temperature for the flare shall be equal to the average combustion zone temperature determined during the most recent complying source test minus 50 degrees F, provided that the minimum combustion zone temperature is not less than 1400 degrees F. To demonstrate compliance with this part, the A-1 flare shall be equipped with a temperature monitor with readout display and continuous recorder. One or more thermocouples shall be placed in the primary combustion zone of the flare and these thermocouples shall accurately indicate the combustion zone temperature at all times. (Basis: Regulations 8-34-501.3 and 8-34-507, BACT, and TBACT)

VI. Permit Conditions

Condition # 23962

FOR S-3 TSA GAS CLEANING SYSTEM AND A-1 TSA WASTE GAS FLARE:

5. Nitrogen oxide (NO_x) emissions from the A-1 flare shall not exceed 0.06 pounds of NO_x, expressed as NO₂, per million BTU of heat input. Compliance with this emission limit may be demonstrated by not exceeding the following exhaust gas concentration limit: 15 ppmv of NO_x, expressed as NO₂ at 15% oxygen on a dry basis. (Basis: RACT)
6. Carbon monoxide (CO) emissions from the A-1 flare shall not exceed 0.20 pounds of CO per million BTU of heat input. Compliance with this emission limit may be demonstrated by not exceeding the following exhaust gas concentration limit: 81 ppmv of CO at 15% oxygen on a dry basis. (Basis: RACT)
7. Sulfur dioxide (SO₂) emissions from the A-1 flare shall not exceed the following limits:
 - a. The SO₂ emission rate from A-1 shall not exceed 13.9 pounds per hour; and (Basis: RACT)
 - b. The outlet SO₂ concentration in the stack from A-1 shall not exceed the Regulation 9-1-302 outlet SO₂ concentration limit (at the as-found oxygen concentration); and (Basis: Regulation 9-1-302)
 - c. The SO₂ emissions from A-1, S-1, and S-2 combined shall not exceed 20.9 tons of SO₂ during any consecutive 12-month period. The owner/operator shall demonstrate compliance with this emission rate limit by complying with the heat input limits and monitoring procedures in Condition # 23962, Part 2 and in Condition # 23400, Part 2 and by demonstrating that the landfill delivered to this facility from Keller Canyon Landfill (Plant #4618) contains no more than 300 ppmv of total reduced sulfur compounds (dry basis), expressed as H₂S and averaged over any consecutive rolling 12-month period; and (Basis: Cumulative Increase)
 - d. To demonstrate compliance with the Condition # 23962, Part 7c average landfill gas sulfur content level, the owner/operator shall conduct monthly measurements on the untreated landfill gas delivered to this site from Plant # 4618, concurrent with the monthly measurements of treated landfill gas required by Condition # 23400, Part 7b. The owner/operator shall use either a District approved portable hydrogen sulfide monitor or a District laboratory analysis method to determine the concentration of total reduced sulfur compounds (expressed as H₂S) in the untreated landfill gas that is delivered to this facility; and (Basis: Cumulative Increase)
 - i. If the portable H₂S analysis method is used, the TRS concentration shall be calculated by multiplying the measured H₂S concentration by 1.2 (TRS = 1.2 * H₂S).
 - ii. If a laboratory analysis method is used, the TRS concentration shall be calculated as the sum of the measured concentrations for the individual sulfur compounds, expressed as H₂S.

VI. Permit Conditions

Condition # 23962

FOR S-3 TSA GAS CLEANING SYSTEM AND A-1 TSA WASTE GAS FLARE:

- e. The owner/operator shall record the sampling dates, measurement results, and TRS calculations in a District approved log. The owner/operator shall calculate and record the average TRS content in the untreated landfill gas for each consecutive rolling 12-month period and shall compare this average to the limit in Part 7c.
 (Basis: Cumulative Increase)
- *8. Formaldehyde emissions from the flare (A-1) shall not exceed 1.0E-3 pounds per hour.
 (Basis: Regulation 2-5-302)
- *9. The concentration of toxic air contaminants (TACs) in the inlet gas to the A-1 Flare shall not exceed any of the levels listed below, unless the owner/operator can demonstrate to the APCO's satisfaction that flare emissions have not exceeded the emission rate specified below. This demonstration shall be made using District approved calculation procedures within 60 days of receiving test results. (Basis: Regulation 2-5-302)
- | <u>Compound</u> | <u>Concentration
(ppmv, dry)</u> | <u>Emissions
pounds/year</u> |
|---------------------|--------------------------------------|----------------------------------|
| Benzene | 100 | 44.0 |
| Ethyl Benzene | 200 | 119.7 |
| Ethylene Dichloride | 10 | 5.6 |
| Methylene Chloride | 10 | 4.8 |
| Perchloroethylene | 15 | 14.0 |
| Trichloroethylene | 10 | 7.4 |
| Vinyl Chloride | 0.5 | 0.2 |
10. The A-1 flare shall be equipped with both local and remote alarms, automatic combustion air control, automatic gas shutoff valves, and automatic start/restart system.
 (Basis: Regulation 8-34-301 and BACT)
11. In order to demonstrate compliance with Parts 3 through 8 above, the owner/operator shall conduct an annual compliance demonstration source test at the A-1 TSA Waste Gas Flare within 12 months of the previous test date. 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 60 days of the test date. Each annual source test shall measure or determine the criteria in subparts a-i below. (Basis: RACT, BACT, TBACT, and Regulations 2-5-302, 8-34-301.3, 8-34-412, and 9-1-302)
- inlet gas flow rate for each gas delivered to the flare (scfm, dry basis);
 - concentrations (dry basis) of carbon dioxide (CO₂), nitrogen (N₂), oxygen (O₂), methane (CH₄), and total non-methane organic compounds (NMOC) in each inlet gas to the flare;

VI. Permit Conditions

Condition # 23962

FOR S-3 TSA GAS CLEANING SYSTEM AND A-1 TSA WASTE GAS FLARE:

- c. total inlet heat input rate to the flare in units of MM BTU (HHV) per hour;
 - d. stack gas flow rate from the flare (scfm, dry basis);
 - e. concentrations (dry basis) of CH₄, NMOC, NO_x, CO, SO₂, and O₂ (and concentrations of organic compounds listed in Part 12, if required), in the flare stack gas;
 - f. NMOC and CH₄ destruction efficiencies achieved by the flare (by weight);
 - g. average combustion zone temperature in the flare during the test period;
 - h. NO_x, CO, and SO₂ concentrations corrected to 15% O₂ (dry basis), and NO_x, CO, and SO₂ emission rates from the flare in units of pounds per hour and pounds per MM BTU,
 - i. formaldehyde emissions from the flare in units of pounds per hour.
12. In order to demonstrate compliance with Parts 7c and 9, the owner/operator shall conduct a characterization of the flare inlet gas concurrent with the annual source test required by Part 11 above. In addition to the compounds listed in Part 11b, the flare inlet gas shall be analyzed for, as a minimum, the organic compounds listed below. If the owner/operator is electing to demonstrate compliance with Part 7 using the methods in Part 7c instead of Parts 7a or 7b, the permit holder shall analyze the flare inlet gas for, as a minimum, the sulfur compounds listed below, and the owner/operator does not need to conduct the SO₂ analysis or calculations in Parts 11e and 11h. All concentrations shall be reported on a dry basis. The test report shall be submitted to the Compliance and Enforcement Division and Source Test Section within 60 days of the test date. (Basis: Regulation 2-5-501 and Cumulative Increase)
- Organic Compounds
- Benzene
 - Ethyl Benzene
 - Ethylene Dichloride
 - Methylene Chloride
 - Perchloroethylene
 - Trichloroethylene
 - Vinyl Chloride
- Sulfur Compounds
- Carbon Disulfide
 - Carbonyl Sulfide
 - Dimethyl Sulfide
 - Ethyl Mercaptan
 - Hydrogen Sulfide
 - Methyl Mercaptan

VII. APPLICABLE LIMITS AND COMPLIANCE MONITORING REQUIREMENTS

This section has been included to summarize the applicable emission limits contained in Section IV, Source-Specific Applicable Requirements, of this permit. The following tables show the relationship between each emission limit and the associated compliance monitoring provisions, if any. The monitoring frequency column indicates whether periodic (P) or continuous (C) monitoring is required. For periodic monitoring, the frequency of the monitoring has also been shown using the following codes: annual (A), quarterly (Q), monthly (M), weekly (W), daily (D), hourly (H), or on an event basis (E). No monitoring (N) has been required if the current applicable rule or regulation does not require monitoring, and the operation is unlikely to deviate from the applicable emission limit based upon the nature of the operation.

This section is only a summary of the limits and monitoring requirements. In the case of a conflict with any requirement in Sections I-VI, the preceding sections take precedence over Section VII.

Table VII – A
Applicable Limits and Compliance Monitoring Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
Periods of Inoperation for Parametric Monitors	BAAQMD 1-523.2	Y		≤ 15 consecutive days per incident and ≤ 30 calendar days per 12 month period	BAAQMD 1-523.4	P/D	Operating Records for All Parametric Monitors
Continuous Monitors	40 CFR 60.13(e)	Y		Requires Continuous Operation except for breakdowns, repairs, calibration, and required span adjustments	40 CFR 60.7(b)	P/D	Operating Records for All Continuous Monitors

VII. Applicable Limits and Compliance Monitoring Requirements

Table VII – A
Applicable Limits and Compliance Monitoring Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
TOC (Total Organic Compounds Plus Methane)	BAAQMD 8-34-301.2	Y		Component Leak Limit: ≤ 1000 ppmv as methane	BAAQMD 8-34-501.6 and 503	P/Q	Inspection of Control System Components with Portable Analyzer and Records
Volatile Organic Compounds (VOC)	40 CFR, Part 60.4233(e) and Table 1 of Subpart JJJJ	Y		≤ 80 ppmv, dry basis @ 15% O ₂ , expressed as propane, Or ≤ 1.0 grams/bhp-hour, calculated as C ₃ H ₈ (both limits exclude formaldehyde emissions)	40 CFR Part 60.4243 (b)(2)(ii) and BAAQMD Condition # 23400, Part 9m-n	P/A or every 8760 hours, or every 3 years, whichever occurs first	Maintenance Plan, Maintenance Records, Source Tests, and Records
Non-Methane Organic Compounds (NMOC)	BAAQMD 8-34-301.4 and BAAQMD Condition # 23400, Part 5	Y		≥ 98% removal by weight OR < 120 ppmv, dry basis @ 3% O ₂ , expressed as methane	BAAQMD 8-34-412 and 501.4 and BAAQMD Condition # 23400, Part 9j-k	P/A	Source Tests and Records
Key Emission Control System Operating Parameter	BAAQMD 8-34-509 and BAAQMD Condition # 23400, Part 6	Y		Average Engine Cylinder Temperature: For S-1: ≥ 927 °F For S-2: ≥ 927 °F	BAAQMD 8-34-501.11 and 509 and BAAQMD Condition # 23400, Parts 6c-e and 9m	C	Thermocouple and Records
Opacity	BAAQMD 6-301	Y		No darker than: Ringelmann No. 1 for < 3 minutes/hour	None	N	NA

VII. Applicable Limits and Compliance Monitoring Requirements

Table VII – A
Applicable Limits and Compliance Monitoring Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
FP	BAAQMD 6-310	Y		≤ 0.15 grains/dscf	None	N	NA
SO ₂	BAAQMD 9-1-301	Y		Property Line Ground Level Limits: ≤ 0.5 ppm for 3 minutes and ≤ 0.25 ppm for 60 min. and ≤ 0.05 ppm for 24 hours	None	N	NA
SO ₂	BAAQMD 9-1-302	Y		≤ 300 ppm (dry basis)	BAAQMD Condition # 23400 Part 9g	P/A	Source Test and Records
SO ₂	BAAQMD Condition # 23400, Part 7	Y		≤ 42.6 pounds/day per engine and ≤ 8.64 tons/year, from S-1 and S-2 combined	BAAQMD Condition # 23400 Parts 2, 7b-e, and 9g	P/C and P/M and P/A	Gas Flow Meter, Sulfur Analysis of Landfill Gas, Source Tests, Calculations, and Records
Total Reduced Sulfur (TRS) in Landfill Gas	BAAQMD Condition # 23400, Part 7a	Y		≤ 600 ppmv, expressed as H ₂ S, corrected to 50% methane in LFG	BAAQMD Condition # 23400 Part 7b-e	P/M	Sulfur Analysis of Landfill Gas and Records
H ₂ S	BAAQMD 9-2-301	N		Property Line Ground Level Limits: ≤ 0.06 ppm, averaged over 3 minutes and ≤ 0.03 ppm, averaged over 60 minutes	None	N	NA

VII. Applicable Limits and Compliance Monitoring Requirements

Table VII – A
Applicable Limits and Compliance Monitoring Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
NO _x	BAAQMD 9-8-302.1	Y		Waste Fuel Gas, Lean-Burn ≤ 70 ppmv, dry basis @ 15% O ₂	BAAQMD Condition # 23400, Part 9h	P/A	Source Tests and Records
NO _x	40 CFR, Part 60.4233(e) and Table 1 of Subpart JJJ	Y		≤ 220 ppmv, dry basis @ 15% O ₂ Or ≤ 3.0 grams/bhp-hour, calculated as NO ₂	40 CFR Part 60.4243 (b)(2)(ii) and BAAQMD Condition # 23400, Parts 9h-i	P/A or every 8760 hours, or every 3 years, whichever occurs first	Maintenance Plan, Maintenance Records, Source Tests, and Records
NO _x	BAAQMD Condition # 23400, Part 4	Y		≤ 45 ppmv, dry basis @ 15% O ₂ , unless emissions ≤ 0.6 grams/bhp-hour, calculated as NO ₂	BAAQMD Condition # 23400, Part 9h-i	P/A	Source Tests and Records
CO	BAAQMD 9-8-302.3	Y		Waste Fuel Gas: ≤ 2000 ppmv, dry basis @ 15% O ₂	BAAQMD Condition # 23400, Part 9h	P/A	Source Tests and Records
CO	40 CFR, Part 60.4233(e) and Table 1 of Subpart JJJ	Y		≤ 610 ppmv, dry basis @ 15% O ₂ Or ≤ 5.0 grams/bhp-hour	40 CFR Part 60.4243 (b)(2)(ii) and BAAQMD Condition # 23400, Parts 9h-i	P/A or every 8760 hours, or every 3 years, whichever occurs first	Maintenance Plan, Maintenance Records, Source Tests, and Records
CO	BAAQMD Condition # 23400, Part 3	Y		≤ 257 ppmv, dry basis @ 15% O ₂ , unless emissions ≤ 2.1 grams/bhp-hour	BAAQMD Condition # 23400, Part 9h-i	P/A	Source Tests and Records

VII. Applicable Limits and Compliance Monitoring Requirements

Table VII – A
Applicable Limits and Compliance Monitoring Requirements
S-1 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET
S-2 LFG-FIRED INTERNAL COMBUSTION ENGINE AND GENSET

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
Operating Time	BAAQMD Condition # 23400, Part 1	N		Operating Time Limit for S-3 Bypass Events (during which S-1 and S-2 are fired on minimally treated landfill gas that has bypassed S-3): ≤ 130 hour Per 12-month period	BAAQMD Condition # 23400, Part 1	P/E	Records
Heat Input	BAAQMD Condition # 23400, Part 2	Y		To Each Engine: $\leq 172,861$ MM BTU Per 12-month period	BAAQMD 8-34-501.10 and 508 and BAAQMD Condition # 23400, Part 2	C and P/D, M	Gas Flow Meter and Recorder, Methane Measurements, Calculations, and Records
Formaldehyde	BAAQMD Condition # 23400, Part 8	N		≤ 0.73 pounds/hour per engine	BAAQMD Condition # 23400, Part 91	P/A	Source Tests and Records

VII. Applicable Limits and Compliance Monitoring Requirements

Table VII – B
Applicable Limits and Compliance Monitoring Requirements
S-3 TEMPERATURE SWING ADSORPTION GAS CLEANING SYSTEM
A-1 TSA WASTE GAS FLARE

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
Periods of Inoperation for Parametric Monitors	BAAQMD 1-523.2	Y		≤ 15 consecutive days per incident and ≤ 30 calendar days per 12 month period	BAAQMD 1-523.4	P/D	Operating Records for All Parametric Monitors
Continuous Monitors	40 CFR 60.13(e)	Y		Requires Continuous Operation except for breakdowns, repairs, calibration, and required span adjustments	40 CFR 60.7(b)	P/D	Operating Records for All Continuous Monitors
TOC (Total Organic Compounds Plus Methane)	BAAQMD 8-34-301.2	Y		Component Leak Limit: ≤ 1000 ppmv as methane	BAAQMD 8-34-501.6 and 503	P/Q	Inspection of Components Containing LFG with Portable Analyzer and Records
Non-Methane Organic Compounds (NMOC)	BAAQMD 8-34-301.3 and BAAQMD Condition # 23962, Part 3	Y		For A-1 Flare: ≥ 98% removal by weight OR < 30 ppmv, dry basis @ 3% O ₂ , expressed as methane	BAAQMD 8-34-412 and 8-34-501.4 and BAAQMD Condition # 23962, Parts 11e-f	P/A	Source Tests and Records

VII. Applicable Limits and Compliance Monitoring Requirements

Table VII – B
Applicable Limits and Compliance Monitoring Requirements
S-3 TEMPERATURE SWING ADSORPTION GAS CLEANING SYSTEM
A-1 TSA WASTE GAS FLARE

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
Temperature of Combustion Zone (CT)	BAAQMD Condition # 23962, Part 4	Y		For A-1 Flare: CT \geq 1474 °F, averaged over any 3-hour period	BAAQMD 8-34-501.3 and 507 and BAAQMD Condition # 23962, Part 4	C	Temperature Sensor and Recorder
Opacity	BAAQMD 6-1-301	Y		For A-1 Flare: No Darker Than: Ringelmann No. 1 for < 3 minutes/hour	None	N	N/A
FP	BAAQMD 6-1-310	Y		For A-1 Flare: \leq 0.15 grains/dscf	None	N	N/A
SO ₂	BAAQMD 9-1-301	Y		Property Line Ground Level Limits: \leq 0.5 ppm for 3 minutes and \leq 0.25 ppm for 60 min. and \leq 0.05 ppm for 24 hours	None	N	N/A
SO ₂	BAAQMD Regulation 9-1-302	Y		For A-1 Flare: \leq 300 ppm (dry basis)	BAAQMD Condition # 23962, Part 11e	P/A	Flare Source Test and Records; or Sulfur Analysis of Landfill Gas and Records
SO ₂	BAAQMD Condition # 23962, Part 7a	Y		Emissions of SO ₂ from A-1 Flare: \leq 13.9 pounds/hour	BAAQMD Condition # 23962, Parts 11-12	P/A	Flare Source Test and Records; and Sulfur Analysis of Landfill Gas and Records

VII. Applicable Limits and Compliance Monitoring Requirements

Table VII – B
Applicable Limits and Compliance Monitoring Requirements
S-3 TEMPERATURE SWING ADSORPTION GAS CLEANING SYSTEM
A-1 TSA WASTE GAS FLARE

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
SO ₂	BAAQMD Condition # 23962, Part 7c	Y		Emissions of SO ₂ from A-1, S-1, and S-2 Combined: ≤ 20.9 tons during any consecutive 12-month period	BAAQMD Condition # 23962, Parts 2, 7c-e, 11, and 12 and BAAQMD Condition # 23400, Part 2	P/A	Flare Source Test, Sulfur Analysis of Treated and Untreated Landfill Gas, Calculations and Records
TRS	BAAQMD Condition # 23962, Part 7d	Y		Concentration of TRS in Untreated LFG Received from Keller Canyon Landfill: ≤ 300 ppmv of TRS, expressed as H ₂ S and averaged over each consecutive rolling 12-month period	BAAQMD Condition # 23962, Parts 7d-e, and 12	P/A	Sulfur Analysis of Landfill Gas, Calculations and Records
H ₂ S	BAAQMD 9-2-301	N		Property Line Ground Level Limits: ≤ 0.06 ppm, averaged over 3 minutes and ≤ 0.03 ppm, averaged over 60 minutes	None	N	N/A
Heat Input	BAAQMD Condition # 23962, Part 2	Y		For A-1 Flare: ≤ 72,270 MM BTU per 12-month period	BAAQMD Condition # 23962, Part 2	P/C, M	Gas Flow Meter, Methane Measurements, Calculations, and Records

VII. Applicable Limits and Compliance Monitoring Requirements

Table VII – B
Applicable Limits and Compliance Monitoring Requirements
S-3 TEMPERATURE SWING ADSORPTION GAS CLEANING SYSTEM
A-1 TSA WASTE GAS FLARE

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
NO _x	BAAQMD Condition # 23962, Part 5	Y		For A-1 Flare: ≤ 15 ppmv, dry basis @ 15% O ₂ Or ≤ 0.06 pounds/MM BTU, calculated as NO ₂	BAAQMD Condition # 23962, Part 11e,h	P/A	Flare Source Tests and Records
CO	BAAQMD Condition # 23962, Part 6	Y		For A-1 Flare: ≤ 81 ppmv, dry basis @ 15% O ₂ Or ≤ 0.20 pounds/MM BTU	BAAQMD Condition # 23962, Part 11e,h	P/A	Flare Source Tests and Records
Formaldehyde	BAAQMD Condition # 23962, Part 8	N		For A-1 Flare: ≤ 1.0E-3 pounds/hour	BAAQMD Condition # 23962, Part 11i	P/A	Flare Source Test and Records
Toxic Air Contaminant (TAC) Concentrations in Landfill Gas	BAAQMD Condition # 23962, Part 9	N		LFG TAC Concentration Limits (ppmv, dry): Benzene ≤ 100 Ethyl Benzene ≤ 200 Ethylene Dichloride ≤ 10 Methylene Chloride ≤ 10 Perchloroethylene ≤ 15 Trichloroethylene ≤ 10 Vinyl Chloride ≤ 0.5	BAAQMD Condition # 23962, Part 12	P/A	Landfill Gas Analysis and Records
TAC Emission Limits	BAAQMD Condition # 23962, Part 9	N		TAC Emission Limits (pounds/year) From A-1: Benzene < 44.0 Ethyl Benzene < 119.7 Ethylene Dichloride < 5.6 Methylene Chloride < 4.8 Perchloroethylene < 14.0 Trichloroethylene < 7.4 Vinyl Chloride < 0.2	BAAQMD Condition # 23962, Part 11e	P/A	Flare Source Test, Calculations and Records

VIII. TEST METHODS

The test methods associated with the emission limit of a District regulation are generally found in Section 600 et seq. of the regulation. The following table indicates only the test methods associated with the emission limits included in Section VII, Applicable Limits and Compliance Monitoring Requirements, of this permit.

**Table VIII
 Test Methods**

Applicable Requirement	Description of Requirement	Acceptable Test Methods
BAAQMD 6-1-301 and SIP 6-301	Ringelmann No. 1 Limitation	Manual of Procedures, Volume I, Evaluation of Visible Emissions; or US EPA Reference Method 9, Visual Determination of the Opacity of Emissions from Stationary Sources
BAAQMD 6-1-310 and SIP 6-303	Particulate Weight Limitation	Manual of Procedures, Volume IV, ST-15, Particulates Sampling; or US EPA Reference Method 5, Determination of Particulate Matter Emissions from Stationary Sources
BAAQMD 8-34-301.2	Collection and Control System Leak Limitations	US EPA Reference Method 21, Determination of Volatile Organic Compound Leaks
BAAQMD 8-34-301.3	Limits for Flares	Manual of Procedures, Volume IV, ST-7, Organic Compounds and ST-14, Oxygen continuous Sampling; or US EPA Reference Methods 18, 25, 25A, or 25C and Methods 3, 3A, or 3B
BAAQMD 8-34-301.4	Limits for Other Emission Control Systems	Manual of Procedures, Volume IV, ST-7, Organic Compounds and ST-14, Oxygen continuous Sampling; or US EPA Reference Methods 18, 25, 25A, or 25C and Methods 3, 3A, or 3B

VIII. Test Methods

Table VIII
Test Methods

Applicable Requirement	Description of Requirement	Acceptable Test Methods
BAAQMD 8-34-412	Compliance Demonstration Test	Manual of Procedures, Volume IV, ST-7, Organic Compounds and ST-14, Oxygen, Continuous Sampling, ST-17, Stack Gas Velocity and Volumetric Flow Rate, ST-18, Stack Traverse Point Determination; ST-23, Water Vapor; or US EPA Reference Method 18, Measurement of Gaseous Organic Compound Emissions by Gas Chromatography, Method 25, Determination of Total Gaseous Nonmethane Organic Emissions as Carbon, Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer, or Method 25C, Determination of Nonmethane Organic Compounds (NMO) in MSW Landfill Gases; and EPA Reference Method 3, Gas Analysis for the Determination of Dry Molecular Weight, Method 3A, Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure), or Method 3B, Gas Analysis for the Determination of Emission Rate Correction Factor or Excess Air
BAAQMD 9-1-301	Limitations on Ground Level Concentrations (SO ₂)	Manual of Procedures, Volume VI, Part 1, Ground Level Monitoring for Hydrogen Sulfide and Sulfur Dioxide
BAAQMD 9-1-302	General Emission Limitation (SO ₂)	Manual of Procedures, Volume IV, ST-19A, Sulfur Dioxide, Continuous Sampling
BAAQMD 9-2-301	Limitations on Hydrogen Sulfide	Manual of Procedures, Volume VI, Part 1, Ground Level Monitoring for Hydrogen Sulfide and Sulfur Dioxide
BAAQMD 9-8-302.1	NO _x Emission Limit for Engines	Manual of Procedures, Volume IV, ST-13A, Oxides of Nitrogen, Continuous Sampling and ST-14, Oxygen, Continuous Sampling
BAAQMD 9-8-302.3	CO Emission Limit for Engines	Manual of Procedures, Volume IV, ST-6, Carbon Monoxide, Continuous Sampling and ST-14, Oxygen, Continuous Sampling

VIII. Test Methods

Table VIII
Test Methods

Applicable Requirement	Description of Requirement	Acceptable Test Methods
40 CFR 60.8	Performance Tests	US EPA Reference Method 1, Sample and Velocity Traverses for Stationary Sources, or Method 1A, Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts; Method 2, Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube); Method 3, Gas Analysis for the Determination of Dry Molecular Weight, Method 3A, Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure), or Method 3B, Gas Analysis for the Determination of Emission Rate Correction Factor or Excess Air; or Method 3C, Determination of Carbon Dioxide, Methane, Nitrogen, and Oxygen from Stationary Sources; Method 4, Determination of Moisture in Stack Gases; Method 5, Determination of Particulate Matter Emissions from Stationary Sources; Method 6, Determination of Sulfur Dioxide Emissions from Stationary Sources, or Method 6C, Determination of Sulfur Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure); Method 7E, Determination of Nitrogen Oxide Emissions from Stationary Sources (Instrumental Analyzer Procedure); Method 10, Determination of Carbon Monoxide Emissions from Stationary Sources; Method 18, Measurement of Gaseous Organic Compound Emissions by Gas Chromatography; Method 19, Determination of Sulfur Dioxide Removal Efficiency and Particulate, Sulfur Dioxide, and Nitrogen Oxide Emission Rates; Method 20, Determination of Nitrogen Oxides, Sulfur Dioxide, and Diluent Emissions from Stationary Gas Turbines; Method 25, Determination of Total Gaseous Nonmethane Organic Emissions as Carbon, Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer, or Method 25C, Determination of Nonmethane Organic Compounds (NMOC) in MSW Landfill Gases; And ASTM D1072-80 or 90, D3246-81, 92, or 96, D4084-82 or 94, D4468-85, D5504-01, or D6228-98
40 CFR 60.4233(e) and Table 1 of Subpart JJJ	NO _x , CO, and VOC Emission Standards for Stationary Non-Emergency Spark-Ignited Engines	EPA Reference Method 1; Methods 3, 3A, or 3B; Methods 2 or 19; Method 4; Method 7E; Method 10; Methods 18 or 25A; and Calculation Procedures in 40 CFR 60.4244

VIII. Test Methods

**Table VIII
 Test Methods**

Applicable Requirement	Description of Requirement	Acceptable Test Methods
BAAQMD Condition # 23400, Part 2	Heat Input Limits for Engines	APCO approved gas flow meter; EPA Reference Method 3C; and APCO approved calculation procedure described in BAAQMD Condition # 23400, Part 2
BAAQMD Condition # 23400, Part 3	CO Emission Limit for Engines	Manual of Procedures, Volume IV, ST-6 and ST-14; or US EPA Reference Method 10 and Method 3A
BAAQMD Condition # 23400, Part 4	NO _x Emission Limit for Engines	Manual of Procedures, Volume IV, ST-13A and ST-14; or US EPA Reference Method 7E and Method 3A
BAAQMD Condition # 23400, Part 5	NMOC Emission Limits for Engines	Manual of Procedures, Volume IV, ST-7 and ST-14; or US EPA Reference Methods 18, 25, 25A, or 25C and Method 3A
BAAQMD Condition # 23400, Part 7	SO ₂ Emission Limit for Engines	Emission Calculation Procedures Described in Condition # 23400, Part 7b-e
BAAQMD Condition # 23400, Parts 7a-c	Sulfur Content Limits for Treated Landfill Gas	Manual of Procedures, Volume III, Method 5 Determination of Total Mercaptans in Effluents and Method 25 Determination of Hydrogen Sulfide in Effluents, or Method 44 Determination of Reduced Sulfur Gases and Sulfur Dioxide in Effluent Samples by Gas Chromatographic Methods
BAAQMD Condition # 23400, Part 8	Formaldehyde Emission Limit for Engines	CARB Test Method 430, Determination of Formaldehyde and Acetaldehyde in Emissions from Stationary Sources
BAAQMD Condition # 23400, Part 9	Compliance Demonstration Test for Engines	Manual of Procedures, Volume IV, ST-6, ST-7, ST-13A, ST-14, ST-17, ST-18, and 19A; or EPA Reference Method 1; Method 3, 3A, or 3B; Method 2 or 19; Method 4; Method 7E; Method 10; Method 18 or 25A; Calculation Procedures in 40 CFR 60.4244; and CARB TM 430

VIII. Test Methods

Table VIII
Test Methods

Applicable Requirement	Description of Requirement	Acceptable Test Methods
BAAQMD Condition # 23962, Part 2	Heat Input Limit for Flare	APCO approved gas flow meter; EPA Reference Method 3C; and APCO approved calculation procedure described in BAAQMD Condition # 23962, Part 2
BAAQMD Condition # 23962, Part 3	NMOC Emission Limit for Flare	Manual of Procedures, Volume IV, ST-7 and ST-14; or US EPA Reference Methods 18, 25, 25A, or 25C and Methods 3, 3A, or 3B
BAAQMD Condition # 23962, Part 4	Combustion Zone Temperature Limit for Flare	APCO Approved Device
BAAQMD Condition # 23962, Part 5	NO _x Emission Limit for Flare	Manual of Procedures, Volume IV, ST-13A and ST-14; or US EPA Reference Method 20 and Methods 3, 3A, or 3B
BAAQMD Condition # 23962, Part 6	CO Emission Limit for Flare	Manual of Procedures, Volume IV, ST-6 and ST-14; or US EPA Reference Method 10 and Methods 3, 3A, or 3B
BAAQMD Condition # 23962, Part 7a-c	SO ₂ Emission Limit for Flare	Manual of Procedures, Volume IV, ST-19A and ST-14; or US EPA Reference Methods 6 or 6C and Methods 3, 3A, or 3B
BAAQMD Condition # 23962, Part 7d	Landfill Gas Sulfur Content Limit	Manual of Procedures, Volume III, Method 5 Determination of Total Mercaptans in Effluents and Method 25 Determination of Hydrogen Sulfide in Effluents, or Method 44 Determination of Reduced Sulfur Gases and Sulfur Dioxide in Effluent Samples by Gas Chromatographic Methods
BAAQMD Condition # 23962, Part 8	Formaldehyde Emission Limit for Flare	CARB Test Method 430, Determination of Formaldehyde and Acetaldehyde in Emissions from Stationary Sources
BAAQMD Condition # 23962, Part 9	Landfill Gas TAC Concentration Limits	Analysis of Landfill Gas Samples by Gas Chromatography for Compounds Identified in Condition # 23962, Part 9; or EPA Reference Method 18

VIII. Test Methods

Table VIII
Test Methods

Applicable Requirement	Description of Requirement	Acceptable Test Methods
BAAQMD Condition # 23962, Part 11	Compliance Demonstration Test for Flare	Manual of Procedures, Volume IV, ST-6, ST-7, ST-13A, ST-14, ST-17, ST-18, and 19A; or US EPA Reference Method 1; Method 3, 3A, or 3B; Method 2 or 19; Method 4; Methods 6 or 6C; Method 10; Method 18 or 25A; and Method 20; Calculation Procedures in 40 CFR 60.4244; and CARB TM 430
BAAQMD Condition # 23962, Part 12	Landfill Gas Analysis Procedures	Analysis of Landfill Gas Samples by Gas Chromatography for Compounds Identified in Condition # 23962, Part 12; or EPA Reference Method 18

IX. PERMIT SHIELD

Not Applicable

X. REVISION HISTORY

Title V Permit Issuance (Application # 17615):

February 9, 2015

- Clarify allowable fuels for the IC engines in Condition # 23400, Part 1.
- Correct bases for several parts of Conditions # 23400 and # 23962.

XI. GLOSSARY

ACT

Federal Clean Air Act

AP-42

An EPA Document “Compilation of Air Pollution Emission Factors” that is used to estimate emissions from numerous source types. It is available electronically from EPA’s web site at: <http://www.epa.gov/ttn/chief/ap42/index.html>

APCO

Air Pollution Control Officer: Head of Bay Area Air Quality Management District

API

American Petroleum Institute

ARB

Air Resources Board

ASTM

American Society for Testing and Materials

ATC

Authority to Construct

ATCM

Airborne Toxic Control Measure

BAAQMD

Bay Area Air Quality Management District

BACT

Best Available Control Technology

BARCT

Best Available Retrofit Control Technology

Basis

The underlying authority that allows the District to impose requirements.

C1

An organic chemical compound with one carbon atom, for example: methane

C3

An organic chemical compound with three carbon atoms, for example: propane

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C5

An organic chemical compound with five carbon atoms, for example: pentane

C6

An organic chemical compound with six carbon atoms, for example: hexane

CAA

The federal Clean Air Act

CAAQS

California Ambient Air Quality Standards

CAPCOA

California Air Pollution Control Officers Association

CARB

California Air Resources Board (same as ARB)

CCR

California Code of Regulations

CEC

California Energy Commission

CEQA

California Environmental Quality Act

CEM

A “continuous emissions monitor” is a monitoring device that provides a continuous direct measurement of some pollutant (e.g. NO_x 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.

CH₄ or CH₄

Methane

CI

Compression Ignition

CIWMB

California Integrated Waste Management Board

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CO

Carbon Monoxide

CO₂ or CO₂

Carbon Dioxide

CO₂e

Carbon Dioxide Equivalent. A carbon dioxide equivalent emission rate is the emission rate of a greenhouse gas compound that has been adjusted by multiplying the mass emission rate by the global warming potential of the greenhouse gas compound. These adjusted emission rates for individual compounds are typically summed together, and the total is also referred to as the carbon dioxide equivalent (CO₂e) emission rate.

CT

Combustion Zone Temperature

Cumulative Increase

The sum of permitted emissions from each new or modified source since a specified date pursuant to BAAQMD Rule 2-1-403, Permit Conditions (as amended by the District Board on 7/17/91) and SIP Rule 2-1-403, Permit Conditions (as approved by EPA on 6/23/95). Used to determine whether threshold-based requirements are triggered.

District

The Bay Area Air Quality Management District

E6, E9, E12

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 E6 equals $(4.53) \times (10^6) = (4.53) \times (10 \times 10 \times 10 \times 10 \times 10 \times 10) = 4,530,000$. Scientific notation is used to express large or small numbers without writing out long strings of zeros.

EG

Emission Guidelines

EO

Executive Order

EPA

The federal Environmental Protection Agency.

ETP

Effluent Treatment Plant

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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 (MACT), and Part 72 (Permits Regulation, Acid Rain), 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

GHG

Greenhouse Gas

GLM

Ground Level Monitor

grains

1/7000 of a pound

GWP

Global Warming Potential. A comparison of the ability of each greenhouse gas to trap heat in the atmosphere relative to that of carbon dioxide over a specific time period.

H₂S or H₂S

Hydrogen Sulfide

H₂SO₄ or H₂SO₄

Sulfuric Acid

H&SC

Health and Safety Code

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 40 CFR Part 63.

XI. Glossary

Hg

Mercury

HHV

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

IC

Internal Combustion

LEA

Local Enforcement Agency

LFG

Landfill gas

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 60 °F.

Long ton

2200 pounds

Major Facility

A facility with potential emissions of: (1) at least 100 tons per year of regulated air pollutants, (2) at least 10 tons per year of any single hazardous air pollutant, and/or (3) at least 25 tons per year of any combination of hazardous air pollutants, or such lesser quantity of hazardous air pollutants as determined by the EPA administrator.

MAX or Max.

Maximum

MFR

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

MIN or Min.

Minimum

MOP

The District's Manual of Procedures.

MSDS

Material Safety Data Sheet

XI. Glossary

MSW

Municipal solid waste

MTBE

methyl tertiary-butyl ether

MW

Molecular weight

N2 or N₂

Nitrogen

NA

Not Applicable

NAAQS

National Ambient Air Quality Standards

NESHAPS

National Emission Standards for Hazardous Air Pollutants. See in 40 CFR Parts 61 and 63.

NMHC

Non-methane Hydrocarbons (Same as NMOC)

NMOC

Non-methane Organic Compounds (Same as NMHC)

NO₂ or NO₂

Nitrogen Dioxide

NO_x or 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 Federal Clean Air Act, and implemented by 40 CFR Part 60 and District Regulation 10.

NSR

New Source Review. A federal program for pre-construction review and permitting of new and modified sources of pollutants for which criteria have been established in accordance with Section 108 of the Federal Clean Air Act. Mandated by Title I of the Federal Clean Air Act and implemented by 40 CFR Parts 51 and 52 and District Regulation 2, Rule 2. (Note: There are additional NSR requirements mandated by the California Clean Air Act.)

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O₂ or O₂
Oxygen

Offset Requirement

A New Source Review requirement to provide federally enforceable emission offsets for the emissions from a new or modified source. Applies to emissions of POC, NO_x, PM₁₀, and SO₂.

PERP

Portable Equipment Registration Program

Phase II Acid Rain Facility

A facility that generates electricity for sale through fossil-fuel combustion and is not exempted by 40 CFR 72 from Titles IV and V of the Clean Air Act.

POC

Precursor Organic Compounds

PM

Particulate Matter

PM₁₀ or PM₁₀

Particulate matter with aerodynamic equivalent diameter of less than or equal to 10 microns

PM_{2.5} or PM_{2.5}

Particulate matter with aerodynamic equivalent diameter of less than or equal to 2.5 microns

PSD

Prevention of Significant Deterioration. A federal program for permitting new and modified sources of those 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.

PTO

Permit to Operate

PV or P/V Valve

Pressure/Vacuum Valve

Regulated Organic Liquid

"Regulated organic liquids" are those liquids which require permits, or which are subject to some regulation, when processed at a liquid-handling operation. For example, for refinery marine terminals, regulated organic liquids are defined as "organic liquids" in Regulation 8, Rule 44.

RICE

Reciprocating Internal Combustion Engine

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RMP

Risk Management Plan

RWQCB

Regional Water Quality Control Board

S

Sulfur

SCR

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

Short ton

2000 pounds

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 or SO₂

Sulfur dioxide

SO₃ or SO₃

Sulfur trioxide

SSM

Startup, Shutdown, or Malfunction

SSM Plan

A plan, which states the procedures that will be followed during a startup, shutdown, or malfunction, that is prepared in accordance with the general NESHAP provisions (40 CFR Part 63, Subpart A) and maintained on site at the facility.

TAC

Toxic Air Contaminant (as identified by CARB)

TBACT

Best Available Control Technology for Toxics

XI. Glossary

THC

Total Hydrocarbons includes all NMHC plus methane (same as TOC).

therm

100,000 British Thermal Units

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 includes all NMOC plus methane (same as THC).

TPH

Total Petroleum Hydrocarbons

TRMP

Toxic Risk Management Policy

TRS

Total Reduced Sulfur, which is a measure of the amount of sulfur-containing compounds in a gas stream, typically a fuel gas stream, including, but not limited to, hydrogen sulfide. The TRS content of a fuel gas determines the concentration of SO₂ that will be present in the combusted fuel gas, since sulfur compounds are converted to SO₂ by the combustion process.

TSP

Total Suspended Particulate

TVP

True Vapor Pressure

VMT

Vehicle Miles Traveled

VOC

Volatile Organic Compounds

Symbols:

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

XI. Glossary

Units of Measure:

atm	=	atmospheres
bbl	=	barrel of liquid (42 gallons)
bhp	=	brake-horsepower
btu	=	British Thermal Unit
BTU	=	British Thermal Unit
°C	=	degrees Centigrade
cfm	=	cubic feet per minute
dscf	=	dry standard cubic feet
°F	=	degrees Fahrenheit
ft ³	=	cubic feet
g	=	grams
gal	=	gallon
gpm	=	gallons per minute
gr	=	grains
hp	=	horsepower
hr	=	hour
in	=	inches
kW	=	kilowatts
lb	=	pound
lbmol	=	pound-mole
m ²	=	square meter
m ³	=	cubic meters
Mg	=	mega grams
min	=	minute
mm	=	millimeter
MM	=	million
MM BTU	=	million BTU
M cf	=	one thousand cubic feet
MM cf	=	one million cubic feet
MW	=	megawatts
ppb	=	parts per billion
ppbv	=	parts per billion, by volume
ppm	=	parts per 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
scf	=	standard cubic feet
scfm	=	standard cubic feet per minute
sdcf	=	standard dry cubic feet
sdcfm	=	standard dry cubic feet per minute
yd	=	yard
yd ³	=	cubic yards
yr	=	year