

Bay Area Air Quality Management District

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Permit Evaluation and Statement of Basis for the Renewal of the MAJOR FACILITY REVIEW PERMIT

**for
Metcalf Energy Center, LLC
Facility #B2183**

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Application 27685

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Title V Statement of Basis

A. Background

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Title 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review because it is a major facility as defined by BAAQMD Regulation 2-6-212. It is a major facility because it has the “potential to emit” (as defined by BAAQMD Regulation 2-6-218) more than 100 tons per year of the regulated air pollutants nitrogen oxides and carbon monoxide. This facility is also subject to the Title IV (Acid Rain) requirements of 40 CFR Part 72 because it will include gas turbines that are new affected utility units per 40 CFR Part 72.6(a) because they each serve a generator with a capacity greater than 25 MW.

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

Pursuant to Regulation 2, Rule 6, section 416, the District has reviewed the terms and conditions of this Major Facility Review permit and determined that they are valid and correct. This review included an analysis of applicability determinations for all sources, including those that have been modified or permitted since the application for the initial Major Facility Review Permit was submitted to the District. The review also included an assessment of all monitoring in the permit for sufficiency to determine compliance.

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

Each facility in the Bay Area is assigned a facility identifier that consists of a letter and a 4-digit number. This identifier is also considered to be the identifier for the permit. The identifier for the Metcalf Energy Center, LLC is B2183.

This application is for the first renewal Major Facility Review permit for the Metcalf Energy Center, LLC. It was submitted to the District on January 7, 2016. Although the current permit expired on July 7, 2016, it continues in force until the District takes final action on the permit renewal because the applicant submitted a complete Title V renewal application at least six months prior to the expiration date. The proposed permit shows all changes to the permit in strikeout/underline format.

District new source review and Title V applications included in the draft permit:

None

B. Facility Description

The Metcalf Energy Center is a 600 MW natural gas-fired, combined-cycle power plant located in the Coyote Valley area of southern San Jose, California, on a site that lies partially in the City of San Jose and partially in the County of Santa Clara. The facility applied for certification with the California Energy Commission in April 1999. The CEC approved a license for the facility in 2001, after a two-and-one-half year review process that included more than 50 public hearings.¹ The facility was constructed by Bechtel Enterprises Inc. from 2002-2005 and has been operated by Calpine Corporation since May 27th of 2005. The Metcalf Energy Center is considered a “merchant” power plant because it sells the electricity that it generates to the power grid.

The Metcalf Energy Center generates electricity using a “combined cycle” system comprising two combustion turbine generators (CTGs) that work in concert with two heat recovery steam generators (HRSGs) and a steam turbine generator (STG). The CTGs generate electricity by burning natural gas, which drives combustion turbine compressors and electric generators. Instead of being vented (and wasted), the exhaust steam from the CTGs is routed to the HRSGs to produce steam to power the STG to generate additional electricity. By operating the two cycles in tandem, the facility is more efficient and uses approximately 30% less fuel to generate the same amount of energy as an older plant.

C. Permit Content

The legal and factual basis for the permit follows. The permit sections are described in the order presented in the permit.

I. Standard Conditions

This section contains administrative requirements and conditions that apply to all facilities. If the Title IV (Acid Rain) requirements for certain fossil-fuel fired electrical generating facilities or the accidental release (40 CFR § 68) programs apply, the section will contain a standard condition pertaining to these programs. Many of these conditions derive from 40 CFR § 70.6, Permit Content, which dictates certain standard conditions that must be placed in the permit. The language that the District has developed for many of these requirements has been adopted into the BAAQMD Manual of Procedures, Volume II, Part 3, Section 4, and therefore must appear in the permit.

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

Changes to permit

The dates of regulations contained in 1.A were updated.

¹ The CEC’s final Commission Decision document, which chronicles in detail the CEC review process for this facility, is available at: http://www.energy.ca.gov/sitingcases/metcalf/documents/2001-10-05.COMMISSION_DECIS.PDF.

The mailing addresses of BAAQMD and EPA were updated and the email address for each agency was included to allow for electronic submission of documents.

II. Equipment

This section of the permit lists all permitted or significant sources. Each source is identified by an S and a number (e.g., S24).

Permitted sources are those sources that require a BAAQMD operating permit pursuant to BAAQMD Rule 2-1-302.

Pursuant to BAAQMD Regulation 2-6-239, significant sources are defined as those sources that have a potential to emit of more than 2 tons per year of a “regulated air pollutant” as defined by BAAQMD Regulation 2-6-222 or 400 pounds per year of a “hazardous air pollutant” as defined by BAAQMD Regulation 2-6-210.

All abatement (control) devices that control permitted or significant sources are listed. Each abatement device whose primary function is to reduce emissions is identified by an A and a number (e.g., A-24). If a source is also an abatement device, such as when an engine abates VOC emissions, it will be listed in the abatement device table but will have an “S” number. An abatement device may also be a source (such as a thermal oxidizer that burns fuel) of secondary emissions. If the primary function of a device is to control emissions, it is considered an abatement (or “A”) device. If the primary function of a device is a non-control function, the device is considered a source (or “S”). The Metcalf Energy Center has four abatement devices (A-1 through A-4) that control emissions from the facility’s two combustion gas turbines (CTGs S-1 and S-3) and two heat recovery steam generators (HRSGs S-2 and S-4). The abatement devices are listed in Table II B.

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

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

Changes to the permit

The nominal megawatt rating for each gas turbine was moved from the capacity column to the source description column in response to a request from the facility.

III. Generally Applicable Requirements

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

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

Unpermitted sources are exempt from normal District permits pursuant to an exemption in BAAQMD Regulation 2, Rule 1. They may, however, be specifically described in a Title V permit if they are considered “significant sources” as defined in BAAQMD Rule 2-6-239.

Changes to the permit

The website address for the EPA webpage that lists the current District SIP regulations has been updated.

The adoption dates for District regulations and federal register notice dates for federal registrations were updated in Table III of the draft permit. District regulations and SIP versions of the rule were updated as necessary.

EPA Regulation 40 CFR Part 98 will be deleted from Table III because the District does not have the authority to enforce the regulation.

Regulation 11, Rule 8 Reduction of Risk from Air Toxic Emissions at Existing Facilities has been added to Table III.

Regulation 14, Rule 1 Mobile Source Emission Reduction Methods – Bay Area Commuter Benefits Program has been added to Table III.

SIP Regulation 8, Rule 3 has been added to Table III.

SIP Regulation 4, Table 1 has been added to Table III because it has a different SIP approval date than the rest of SIP Regulation 4.

Regulations that are listed in Section I.A. have been deleted from Table III.

Regulation 3 has been deleted from Table III because it is not considered a generally applicable requirement that should be listed in Table III.

IV. Source-Specific Applicable Requirements

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

- District Rules
- SIP Rules (if any) are listed following the corresponding District rules. SIP rules are District rules that have been approved by EPA for inclusion in the California State Implementation Plan. SIP rules are “federally enforceable” and a “Y” (yes) indication will appear in the “Federally Enforceable” column. If the SIP rule is the current District rule, separate citation

of the SIP rule is not necessary and the “Federally Enforceable” column will have a “Y” for “yes”. If the SIP rule is not the current District rule, the SIP rule or the necessary portion of the SIP rule is cited separately after the District rule. The SIP portion will be federally enforceable; the non-SIP version will not be federally enforceable, unless EPA has approved it through another program.

- Other District requirements, such as the Manual of Procedures, as appropriate.
- Federal requirements (other than SIP provisions)
- BAAQMD permit conditions. The text of BAAQMD permit conditions is found in Section VI of the permit.

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

Complex Applicability Determinations

Title IV, Acid Rain 40 CFR Part 72

This facility is subject to the Acid Rain requirements of 40 CFR Part 72, because it employs gas turbines that are utility units that each serve a generator with a capacity greater than 25 MW pursuant to 40 CFR Part 72.6.

Compliance Assurance Monitoring (CAM) – 40 CFR Part 64

The potential to emit for the gas turbines and heat recovery steam generators combined is greater than 100 tons/year for NO_x and CO. The gas turbines are exempt from CAM requirements for NO_x per 40 CFR Part 64.2(b)(iii), and 40 CFR Part 64.2(b)(vi). The gas turbines are exempt from CAM requirements for CO per 40 CFR Part 64.2(b)(vi). The NO_x and CO CEMs meet the requirements for a continuous compliance determination method contained in 40 CFR Part 64.1. The NO_x and CO CEMs are a required monitoring method by the Part 70 (Title V) operating permit.

112(j)

This facility is not subject to section 112(j) of the Clean Air Act since it is not a major source for hazardous air pollutants (HAP) as defined by 112(a)(1) and 112(b)(1). The HAP emission calculations for the MEC are listed in the Final Determination of Compliance that can be viewed on the California Energy Commission website as described earlier in this document.

Changes to the permit

The website address for the EPA webpage that lists the current District SIP regulations has been updated.

Tables IV-A for the gas turbines and Table IV-B for the heat recovery steam generators were combined and are now in Table IV-A. Table IV-B will be deleted from the permit.

The citations for BAAQMD Regulation 6, Rule 1 have been revised to reflect the latest amendment to the regulation that was approved on 8/1/18.

The adoption dates for District regulations and the federal register notice date for federal regulations were updated in all tables in Section IV.

SIP Regulation 9, Rule 1 and SIP Regulation 9, Rule 3 were added to Table IV-A.

40 CFR Part 64 Compliance Assurance Monitoring requirements were removed from Table IV-A since this standard does not apply to these sources. See discussion in complex applicability determination section.

The GHG mandatory reporting requirements in 40 CFR Part 98 and in the CARB Mandatory GH Reporting Rule were removed from Table IV-A. EPA has stated in pages 56287 and 56288 of the federal register notice of October 30, 2009 that promulgated requirements for GHG reporting do not meet the definition of an applicable requirement in 40 CFR 70.2 and 71.2. The District legal staff has determined that because the District does not have the authority to enforce the CARB GHG Reporting Rule or 40 CFR Part 98, neither regulation should be included in a Title V permit issued by the District.

Table IV-C was revised to add 40 CFR Part 63 Subpart A, and 40 CFR Part 63 Subpart ZZZZ requirements. Table IV-C was renamed IV-B due to the deletion of Table IV-B.

Table IV-D was revised to add 40 CFR Part 63 Subpart A and 40 CFR Part 63 Subpart ZZZZ requirements. The citations for the Stationary Diesel Engine ATCM were also updated in Table IV-D. Table IV-D was renamed IV-C due to the deletion of Table IV-B.

Table IV-E was renamed IV-D due to the deletion of Table IV-B. The citations for permit condition #21917 in Table IV-E were revised to reflect the current version of the condition in the District data bank.

V. Schedule of Compliance

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

“409.10 A schedule of compliance containing the following elements:

- 10.1 A statement that the facility shall continue to comply with all applicable requirements with which it is currently in compliance;
- 10.2 A statement that the facility shall meet all applicable requirements on a timely basis as requirements become effective during the permit term; and
- 10.3 If the facility is out of compliance with an applicable requirement at the time of issuance, revision, or reopening, the schedule of compliance shall contain a plan by which the facility will achieve compliance. The plan shall contain deadlines for each item in the plan. The schedule of compliance shall also contain a requirement for submission of progress reports by the facility at least every six months. The progress reports shall contain the dates by which each item in the plan was achieved

and an explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted.”

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

VI. Permit Conditions

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

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

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

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

Changes to permit:

Condition #18310 for S-1 & S-3 Gas Turbines, S-2 & S-4 HRSGs and S-5 Cooling Tower

The following non-substantive changes will be made to condition #18310. They involve the clarification of existing reporting requirements or deletion of lapsed requirements and/or one-time requirements that have already been satisfied. There are no substantive changes in monitoring requirements or any relaxations in monitoring. Metcalf Energy Center has submitted NSR application #27888 for a permit condition change related to SO₂ monitoring and a

corresponding Title V revision application #27890. The Title V permit will be revised in the future after the NSR application has been processed.

Permit Condition Revisions

Condition Part#	Revision	Justification
Add Definition of Annual	Define the term annual as occurring within a calendar year	The permit does not define the term “annual” that is used in permit conditions requiring source testing on an “annual” basis. The proposed clarification specifies that annual means within a calendar year.
Revised Definition of Clock Hour	Add statement that any reference to the word hour is a clock hour beginning at the top of the hour	Clarifies that the permit conditions with hourly limits do not require rolling 60-minute averages and that all references to the word hour are clock hours
Definition of Commissioning Activities	Delete definition.	Commissioning activities have been completed
Definition of Commissioning Period	Delete definition	Commissioning period has ended
30. 1 st Sentence	Delete Startup Deadline	Facility has completed startup
31. 1 st Sentence	Delete Startup Deadline	Facility has completed startup
31. 1 st Sentence	Remove language regarding verification of accuracy of continuous emission monitors	The continuous emission monitors are required to verify accuracy under District Manual of Procedures Volume V Continuous Emission Monitoring, 40 CFR Part 60 requirements, and 40 CFR Part 75 requirements. The condition text is unnecessary. The source test results to demonstrate compliance with emission limits may be used as a portion of the data required to perform a Field Accuracy Test (District) or a Relative Accuracy Test Audit (Federal).
33. 1 st Sentence	Delete Startup Deadline	Facility has completed startup
36. 3 rd Sentence	Clarify that the 96-hour deadline applies to emissions exceedances indicated by a monitor	District Manual of Procedures Volume V Continuous Emission Monitoring requires emissions exceedances indicated by a monitor to be reported within 96 hours after such occurrence. This requirement does not apply to all potential violations of permit conditions.
36. 4 th Sentence	Add a sentence to clarify that Title V deviations must be	Standard condition 1.F. in the Title V permit contains this requirement. This sentence clarifies that deviations must be reported in 10 calendar

Condition Part#	Revision	Justification
	reported within 10 calendar days	days and not 96 hours as the original condition text read.
39. 1 st Sentence	Delete sentence regarding pre-approval of monitors, ports, platforms, and source tests required after Authority to Construct issuance	These activities have been completed. All changes to monitors, ports, and platforms require District approval. All source testing requires the submission of a protocol and District approval of the source test results.
47. 2 nd Sentence	Delete 2 nd Sentence	The activities described have been completed.
47. 3 rd Sentence	Delete first portion of 3 rd Sentence	The initial test required within 90 days of initial operation has been completed.

Condition #21917 for S-7 Fire Pump Diesel Engine

The condition has been revised to agree with the current version in the District data bank. It is a standard condition that applies to numerous fire pump diesel engines permitted in the BAAQMD.

VII. Applicable Limits and Compliance Monitoring Requirements

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

The District has reviewed all monitoring and has determined the existing monitoring is adequate with the following exceptions.

The tables below contain only the limits for which there is no monitoring or inadequate monitoring in the applicable requirements. The District has examined the monitoring for other limits and has determined that monitoring is adequate to provide a reasonable assurance of compliance. Calculations for potential to emit will be provided in the discussion when no monitoring is proposed due to the size of a source.

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

These factors are the same as those historically applied by the District in developing monitoring for applicable requirements. It follows that, although Title V calls for a re-examination of all

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

SO₂ Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-1 Gas Turbine #1, S-2 Heat Recovery Steam Generator #1, S-3 Gas Turbine #2, S-4 Heat Recovery Steam Generator #2, S-6 Standby Generator, S-7 Fire Pump Diesel Engine	BAAQMD 9-1-301	Ground level concentrations of SO ₂ shall not exceed: 0.5 ppm for 3 consecutive minutes AND 0.25 ppm averaged over 60 consecutive minutes AND 0.05 ppm averaged over 24 hours	None
S-1 Gas Turbine #1, S-2 Heat Recovery Steam Generator #1, S-3 Gas Turbine #2, S-4 Heat Recovery Steam Generator #2, S-6 Standby Generator	BAAQMD 9-1-302	300 ppm (dry)	None
S-7 Fire Pump Diesel Engine	BAAQMD 9-1-304	Sulfur content of fuel < 0.5% by weight	None

SO₂ Discussion:

BAAQMD Regulation 9-1-301

Area monitoring to demonstrate compliance with the ground level SO₂ concentration requirements of Regulation 9-1-301 is at the discretion of the APCO pursuant to BAAQMD Regulation 9-1-501. The primary sources of SO₂ at the MEC are the gas turbines and heat recovery steam generators. These sources emit SO₂ at low concentrations through 120-foot tall stacks. Therefore, it is unlikely that it will cause or contribute to ground level SO₂ concentrations that exceed the limits specified in Regulation 9-1-301. Therefore, no monitoring is necessary for this emission limit.

S-6 Standby Generator is fired on natural gas and is not expected to result in ground level SO₂ concentrations that exceed the limits of 9-1-301. Therefore, no monitoring is necessary for this emission limit.

S-7 Fire Pump Diesel Engine burns California low-sulfur diesel with a maximum sulfur content of 15 ppmw. Therefore, its operation is not expected to result in ground-level concentrations that exceed the limits of regulation 9-1-301. Therefore, monitoring is not necessary for this source for this limit.

BAAQMD Regulation 9-1-302

All facility combustion sources are subject to the SO₂ emission limitations in District Regulation 9, Rule 1 (ground-level concentration and emission point concentration). In EPA’s June 24, 1999 agreement with the California Air Pollution Control Officers Association (CAPCOA) and the California Air Resources Board (ARB) entitled, “Periodic Monitoring Recommendations for Generally Applicable Requirements in SIP,” EPA has agreed that natural-gas-fired combustion sources do not need additional monitoring to verify compliance with Regulation 9, Rule 1, since violations of the regulation are unlikely. Sources S-1, S-2, S-3, S-4, and S-6 are fired exclusively on natural gas and therefore fall within this category.

S-7, the Fire Pump Diesel Engine is not subject to Regulation 9-1-302 because it is fired on liquid fuel and is therefore subject to Regulation 9-1-304.

BAAQMD Regulation 9-1-304

S-7, the Fire Pump Diesel Engine, will be fired on California-spec ultra-low sulfur diesel fuel with a maximum sulfur content of 15 ppmw, which is equal to 0.0015% by weight. Therefore, S-7 will not violate the fuel sulfur content limit of 0.5% by weight. Therefore, monitoring is not necessary for this source for this limit.

PM Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-1 Gas Turbine #1, S-2 Heat Recovery Steam Generator #1, S-3 Gas Turbine #2, S-4 Heat Recovery Steam Generator #2, S-5 Cooling Tower, S-6 Standby Generator, S-7 Fire Pump Diesel Engine	Regulation 6-1-301 and SIP Regulation 6-301	Ringelmann 1.0	None
S-5 Cooling Tower	Regulation 6-1-310 and SIP Regulation 6-310	0.15 gr/dscf	None

PM Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-1 Gas Turbine #1, S-2 Heat Recovery Steam Generator #1, S-3 Gas Turbine #2, S-4 Heat Recovery Steam Generator #2, S-6 Standby Generator, S-7 Fire Pump Diesel Engine	Regulation 6-1-310.3 and SIP Regulation 6- 310.3	0.15 gr/dscf at 6% O ₂	None

PM Discussion:

BAAQMD Regulation 6, Rule 1 “Particulate Matter, General Requirements” and SIP Regulation 6 “Particulate Matter and Visible Emissions”

Visible Emissions

BAAQMD Regulation 6-1-301 limits visible emissions to no darker than 1.0 on the Ringelmann Chart (except for periods or aggregate periods less than 3 minutes in any hour). Visible emissions are normally not associated with combustion of gaseous fuels, such as natural gas. Sources S-1, S-2, S-3, S-4 and S-6 burn exclusively natural gas, therefore, per the EPA’s June 24, 1999 agreement with CAPCOA and ARB titled “Summary of Periodic Monitoring Recommendations for Generally Applicable Requirements in SIP”, no monitoring is required to assure compliance with this limit for these sources.

The S-7 Fire Pump Diesel Engine model has been certified by the California Air Resources Board at a particulate emission rate of 0.24 g/kw-hr. Using the engine specifications, this equals $(0.24 \text{ g/kw-hr})(268.6 \text{ kw})(\text{lb}/450 \text{ g}) = 0.14 \text{ lb/hr}$. Diesel fuel sulfur content has been identified as a major contributor to diesel particulate matter emissions. Because the S-7 Fire Pump Diesel Engine is fired exclusively on California ultra-low sulfur diesel fuel with a maximum sulfur content of 0.0015% by weight, a violation of the visible emissions limit of Ringelmann No. 1 is not expected. The fire pump’s infrequent operation (during emergencies only and for a maximum of 30 hours per year for reliability-related activities) further supports the District’s conclusion that additional monitoring is not warranted to insure compliance with this regulation.

Particulate Weight Limitation

BAAQMD Regulation 6-1-310 limits filterable particulate (FP) emissions from any source to 0.15 grains per dry standard cubic foot (gr/dscf) of exhaust volume. Section 310.3 limits filterable particulate emissions from “heat transfer operations” to 0.15 gr/dscf @ 6% O₂. These are referred to as “grain loading” standards.

Exceedances of the grain loading standards are normally not associated with combustion of gaseous fuels, such as natural gas. Sources S-1, S-2, S-3, S-4 and S-6 burn natural gas exclusively, therefore, per the EPA's July 2001 agreement with CAPCOA and ARB entitled "CAPCOA/CARB/EPA Region IX Recommended Periodic Monitoring for Generally Applicable Grain Loading Standards in the SIP: Combustion Sources: Summary of Periodic Monitoring Recommendations for Generally Applicable Requirements in SIP", no monitoring is required to assure compliance with this limit for these sources.

Because S-7, the Fire Pump Diesel Engine, is fired exclusively on diesel fuel with a maximum sulfur content of 0.0015% by weight, a violation of the particulate weight limitation of Regulation 6-310.3 is not expected. The fire pump's infrequent operation (during emergencies only and for a maximum of 30 hours per year for reliability-related activities) further supports the District's conclusion that additional monitoring is not warranted to insure compliance with this regulation.

Emission Calculations:

Regulation 6-1-310.3 allows 0.15 grains PM/dscf @ 6% O₂. As shown below, combined gas turbine (CTG) and HRSG emissions are expected to be well below the limit (at approximately 0.04 gr/dscf @ 6% O₂). Accordingly, monitoring is not warranted to insure compliance by the CTGs and HRSGs with this regulation.

S-1 & S-3 Gas Turbines and S-2 & S-4 HRSG Duct Burners

Gas Turbine Emissions:

The gas turbines are limited by permit condition to a PM₁₀ emission rate of 9 lb/hr. Source testing has shown that the gas turbines have met this limit by a comfortable margin. Therefore, the following calculation is conservative.

The corresponding PM₁₀ emission factor is therefore:

$$(9 \text{ lb PM}_{10}/\text{hr})/(1,990.5 \text{ MM BTU}/\text{hr}) = \mathbf{0.00452 \text{ lb PM}_{10}/\text{MM BTU}}$$

The following stack data will be used to calculate the grain loading at standard conditions for full load gas turbine operation without duct burner firing to determine compliance with BAAQMD Regulation 6-310.3.

PM ₁₀ mass emission rate:	9 lb/hr
flow rate:	1,021,265 dscfm @ 15% O ₂ and 210°F
moisture content:	11% by volume

Converting to grains/dscf:

$$(9 \text{ lb PM}_{10}/\text{hr})(1 \text{ hr}/60 \text{ min})(7000 \text{ gr}/\text{lb})/(1,021,265 \text{ dscfm}) = 0.00103 \text{ gr}/\text{dscf}$$

Converting to 6% O₂ basis:

$$(0.00103\text{gr/dscf})[(20.95 - 6)/(20.95 - 15)] = 0.0026 \text{ gr/dscf @ 6\% O}_2$$

Gas Turbine and HRSG Combined Emissions:

The PM₁₀ emission factor is based upon the Westinghouse vendor guarantee of 12 lb/hr at the maximum combined firing rate of 2,124 MM BTU/hr during duct burner firing and steam injection power augmentation. Each gas turbine and HRSG pair is limited by permit condition to the PM₁₀ emission rate of 12 lb/hr.

The corresponding PM₁₀ emission factor is therefore:

$$(12 \text{ lb PM}_{10}/\text{hr})/(2,124 \text{ MM BTU/hr}) = \mathbf{0.00565 \text{ lb PM}_{10}/\text{MM BTU}}$$

The following stack data will be used to calculate the grain loading for simultaneous CTG and HRSG operation at standard conditions to determine compliance with BAAQMD Regulation 6-310.3.

PM ₁₀ mass emission rate:	12 lb/hr
typical flow rate:	1,089,760 dscfm @ 15% O ₂ and 210°F
typical moisture content:	8.5% by volume

Converting to grains/dscf:

$$(12 \text{ lb PM}_{10}/\text{hr})(1 \text{ hr}/60 \text{ min})(7000 \text{ gr/lb})/(1,089,760 \text{ dscfm}) = 0.0013 \text{ gr/dscf}$$

Converting to 6% O₂ basis:

$$(0.0013 \text{ gr/dscf})[(20.95 - 6)/(20.95 - 15)] = 0.0033 \text{ gr/dscf @ 6\% O}_2$$

Changes to the Permit

Table VII-A for the gas turbines and Table VII-B for the heat recovery steam generators were combined and are now in Table IV-A. Table VII-B will be deleted.

Table VII-C was renamed VII-B due to the deletion of Table VII-B.

Table VII-D was renamed VII-C due to the deletion of Table VII-B.

Table VII-E was renamed VII-D due to the deletion of Table VII-B.

VIII. Test Methods

This section of the permit lists test methods that are associated with standards in District or other rules. It is included only for reference. In most cases, the test methods in the rules are source test methods that can be used to determine compliance but are not required on an ongoing basis. They are not “applicable requirements” as defined by Regulation 2-6-202.

If a rule or permit condition requires ongoing testing, the requirement will also appear in Section IV of the permit.

Changes to permit

A sentence was added to the section to clarify that other test methods may be used with District approval.

Added ASTM D-5504 test method to measure fuel gas sulfur content.

Added EPA Method TO-12 test method to measure NMOC in gas turbine/heat recovery steam generator exhaust.

IX. Title IV Acid Rain Permit

The applicant submitted a complete Acid Rain Permit Application dated January 5, 2016. The application is attached to the Title V permit as Appendix A. The District is issuing a renewed Acid Rain Permit with the Title V permit. The facility is required to hold sufficient SO₂ allowances for each operating year on March 1st (or February 29th in a leap year) of the following year.

Changes to permit

The permit has been revised to conform to the current format as reviewed and approved by BAAQMD legal staff.

The SIC code was changed from 4913 to 4911. 4913 was listed in error. 4911 is for Electrical Services and is appropriate for power plants.

X. Permit Shield

The District rules allow two types of permit shields. The permit shield types are defined as follows: (1) A provision in a major facility review permit explaining that specific federally enforceable regulations and standards do not apply to a source or group of sources, or (2) A provision in a major facility review permit explaining that specific federally enforceable applicable requirements for monitoring, recordkeeping and/or reporting are subsumed because other applicable requirements for monitoring, recordkeeping, and reporting in the permit will assure compliance with all emission limits.

The second type of permit shield is allowed by EPA's "White Paper 2 for Improved Implementation of the Part 70 Operating Permits Program." The District uses the second type of permit shield for all streamlining of monitoring, recordkeeping, and reporting requirements in Title V permits. The District's program does not allow other types of streamlining in Title V permits. Streamlining is the practice of employing the most stringent monitoring, recordkeeping, or reporting requirement when multiple requirements apply to a given source.

This facility has no permit shields.

This permit has no streamlining.

XI. Revision History

The revision history has been updated to reflect the current permit renewal.

XII. Glossary

The terms and definitions have been corrected as necessary.

D. Alternate Operating Scenarios:

No alternate operating scenario has been requested for this facility.