Bay Area Air Quality Management District

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

Permit Evaluation
and
Statement of Basis
for the
Initial

MAJOR FACILITY REVIEW PERMIT

for

Donald Von Raesfeld Power Plant

Facility #B4991

Facility Address:
850 Duane Avenue
Santa Clara, CA 95050

Mailing Address:
1500 Warburton Avenue
Santa Clara, CA 95050

Application Engineer: Dennis Jang
Site Engineer: Brian Lusher

Application No. 13579

January 2013

TABLE OF CONTENTS

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 100,000 tons per year of greenhouse gases on a CO2 equivalent basis. It is also subject to Title V permitting requirements because it is subject to the Title IV requirements (Acid Rain) of 40 CFR Part 72.

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

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

Each facility in the Bay Area is assigned a facility identifier that consists of a letter and a 4-digit number. This identifier is also considered to be the identifier for the permit. The identifier for this facility is B4991.

This application is for the initial Title V permit. The facility commenced operation in November 2004. This application was submitted to the District on November 14, 2005.

B. Facility Description

The Donald Von Raesfeld Power Plant is a combined-cycle combustion turbine power generation facility with a maximum electrical output of 147-MW. It is composed of two natural gas fired combustion turbine generators (CTG) with a nominal electrical output of 50-MW each and the steam produced by both heat recovery steam generators (HRSGs) will feed to a single steam turbine generator with a nominal electrical output of 47-MW.

The maximum facility emissions are limited by permit condition and are listed below. The GHG emissions shown are based upon the maximum allowable natural gas usage of 8,682,544 MM BTU/year as limited by permit condition.

Pollutant	Maximum Annual Emissions (ton/year)
Nitrogen Oxides	43.3
Carbon Monoxide	48.4
Precursor Organic Compounds (as CH_4)	11.2
PM_{10}	28.1
Sulfur Dioxide	2.93
Greenhouse Gases (CO_2-equivalent basis)	506,886.9

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. Because the Title IV (Acid Rain) requirements for fossil-fuel fired electrical generating facilities apply, this section contains a standard condition for this program. 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.

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.

Significant sources are those sources that have a potential to emit of more than 2 tons per year of a "regulated air pollutant" (as defined in BAAQMD Rule 2-6-222) or 400 pounds per year of a "hazardous air pollutant" (as defined in BAAQMD Rule 2-6-210). There is one significant source at this facility. S-5 Cooling Tower is listed in Table II C because it has maximum annual PM10 emissions of 2.24 tons per year and therefore meets the definition of significant source. However, it is exempt from District permit requirements per Regulation 2-1-128.4 because it is not used for the evaporative cooling of process water. The PM10 emission calculation for S-5 is shown below:

Cooling tower circulation rate: 34,980 gpm
maximum total dissolved solids: 5880 ppm
Drift Rate: 0.0005 %

Water mass flow rate:

(34,980 gal/min)(60 min/hr)(8.34 lb/gal) = 17,503,992 lb/hr

Cooling Tower Drift:

(17,503,992 lb/hr)(0.000005) =87.52 lb/hr

PM_{10} = (5880 ppm)(87.52 lb/hr)/(10^6)
= 0.515 lb/hr
= 12.35 lb/day (24 hr/day operation)
= 4,508 lb/yr (8,760 operating hours per year)
= 2.25 ton/yr

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 controls 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 to be a source (or "S").

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

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

There are no differences between the equipment list in the permit and the equipment list in the original Title V permit application.

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.

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.
- Federal permit conditions. The text of Federal permit conditions, if any, is found in Section VI of the permit.

Section IV of the permit contains citations to all of the applicable requirements. The text of the requirements is found in the regulations, which are readily available on the District 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

CAA Section 112(j)

The facility is not subject to the case-by-case MACT determination requirement in 112(j) of the Clean Air Act because it is not a major facility for hazardous air pollutants (HAPs). The facility's potential to emit for HAPs is shown below. The total combined HAP emissions from the facility are 2.5 tons per year. Therefore, 40 CFR 63, Subpart YYYY, NESHAP for Stationary Combustion Turbines does not apply to S-1 and S-3.

Maximum Facility Hazardous Air Pollutant (HAP) Emissions

Hazardous Air Pollutant	Total Project Emissions[a] (lb/yr)
Acetaldehyde	1,155
Acrolein	159.3
Benzene	112.1
1,3-Butadiene	1.07
Ethylbenzene	150.9
Formaldehyde	2,706[b]
Hexane	2,183
Naphthalene	14.0
PAHs	
Anthracene	.28
Benzo (a) anthracene	.19
Benzo (a) pyrene	.118
Benzo (b) fluoranthene	.096
Benzo (e) pyrene	.0046
Benzo (g,h,i) perylene	.116
Benzo (k) fluoranthene	.092
Chrysene	.212
Dibenz (ah) anthracene	.198
Indeno (1,2,3-cd) pyrene	.198
Propylene Oxide	403.0
Toluene	598.6
Xylenes	220.0
Arsenic	0.0063
Cadmium	0.0027
Trivalent chromium	0.0054
Copper	0.016
Lead	0.0054
Mercury	0.000014
Nickel	0.038
Silver	0.0054
Zinc	0.278
Total:	**4,999 lb/yr (2.5 tons/yr)**

40 CFR Part 60, Subpart Da, "Standards of Performance for Electric Steam Generating Units for Which Construction is Commenced After September 18, 1978"

This regulation does not apply to S-2 and S-4 HRSGs because their maximum heat input is less than 250 MM BTU per hour.

40 CFR Part 60, Subpart Db, "Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units"

This regulation does not apply to S-2 and S-4 HRSGs pursuant to 40 CFR 60.40b(i) because S-2 and S-4 are associated with combined-cycle gas turbines and they meet the applicability requirements of 40 CFR 60, Subpart GG.

40 CFR Part 60, Subpart KKKK, "Standards of Performance for Stationary Gas Turbines"

This regulation does not apply to S-1 and S-3 Gas Turbines because they were constructed prior to 2/18/2005. They commenced operation in November 2004.

40 CFR Part 60, Subpart GG

This regulation applies to S-1 and S-3 Gas Turbines because they each have a rated heat input greater than 10 MM BTU/hour and they were constructed after October 3, 1977.

60.332(a)(1) has a nominal NO_x limit of 75 ppm. S-1 and S-3 Gas Turbines are subject to and comply with a permit limit of 2.0 ppmv, dry @ 15% O_2 and therefore comply with the applicable Subpart GG NO_x limit.

Section 60.333(a) requires an owner/operator of stationary turbines to demonstrate compliance with either one of the following two conditions:

- Discharge SO_2 at less than or equal to 0.015% by volume at 15% oxygen on a dry basis or
- Combust fuel with sulfur content less than or equal to 0.8% by weight (8000 ppmw).

The typical annual average sulfur concentration of the PUC quality natural gas combusted in the turbines is 0.25 grains/100 scf. PG&E natural gas typically has a sulfur concentration of 1 grain/100 scf (See PG&E Gas Rule 21, Section C). The SO_2 content in the natural gas can be compared to Section 60.333(a) as follows:

lb S/MMBtu = (1 grain/100 scf)(lb/7000 grain)(scf/1020 BTU)(1 E06 BTU/MM BTU)

lb S/MMBtu = 1.4 E-03

lb SO_2/MMBtu = (1.4 E-03 lb/MM BTU)((64 lb SO_2/lb-mol)/(32 lb S/lb-mol))

lb SO_2/MMBtu = 2.8 E-03

Gas Turbines and Heat Recovery Steam Generators

SO_2 lb/hour = (2.8 E-03 lb/MM BTU)(473.7 MM BTU/hour) = 1.33

SO_2 ppm = (1.33 lb/hour)(1/64 lb/lb-mol)(386.8 scf/lb-mol)/(8710 dscf/MM BTU)(473.7 MM BTU/hour)((20.95/(20.95 – 15))(1 E06)

SO_2 ppm = 0.6 ppm @ 15% O_2

The calculations demonstrate that the gas turbines at the facility meet Section 60.333(a).

40 CFR Part 72, Acid Rain Program

Part 72, Subpart A, establishes general provisions and operating permit program requirements for sources and affected units under the Acid Rain program, pursuant to Title IV of the Clean Air Act. The gas turbines are affected units subject to the program in accordance with 40 CFR Part 72, Subpart A, Section 72.6(a)(3)(i). The facility continues to meet 72.9 Standard Requirements which requires the submission of a complete acid rain permit application, the possession of a valid acid rain permit, meeting the monitoring requirements of part 75, and holding sufficient allowances, and comply with the acid rain SO_2 limit. The facility must hold sufficient SO_2 allowances by March 1 (February 29 of a leap year) of every year to offset each ton of SO_2 emitted for the previous calendar year. The facility is expected to comply with the excess emissions, recordkeeping and reporting requirements in 72.9(e) and 72.9(f).

Part 72, Subpart C, contains requirements for acid rain permit applications and compliance plans. The facility is expected to continue to meet these requirements.

Part 72, Subpart E, contains the requirements for the acid rain permit which must include all elements of a complete acid rain application.

40 CFR Part 75, Continuous Emission Monitoring

Part 75, Subpart A, contains the applicability criteria, compliance dates, and prohibitions. The emissions units at the facility are subject to Part 72 and are therefore subject to Part 75. The NO_x monitoring is subject to part 75 per 75.2(c). The facility is expected to continue to meet the compliance dates and prohibitions contained in part 75 Subpart A.

Part 75, Subpart B, contains specific monitoring provisions for each pollutant subject to part 75. The emissions units at this facility are required to meet the SO_2, NO_x, CO_2 monitoring requirements contained in 75.10(a)(1), 75.10(a)(2), 75.10(a)(3) Opacity monitoring under 75.10(a)(4) is not required for gas fired units in accordance with 75.14(c). 75.10(b) requires each CEM to meet equipment, installation, and performance specification in part 75 Appendix A and quality assurance/quality control in Appendix B. 75.10(c) requires heat input rate monitoring to meet requirements contained in part 75 Appendix F. The facility is expected to continue to comply with the requirements contained in 75.10(b) and (c).

75.10(d) contains primary equipment hourly operating requirements that require the CEM to monitor emissions when the emissions unit combusts fuel except as specified in 75.11(e) and during periods of calibration, quality assurance, or preventive maintenance, performed pursuant to §75.21 and appendix B of this part, periods of repair, periods of backups of data from the data acquisition and handling system, or recertification performed pursuant to §75.20. This section also contains requirements for calculating hourly averages from four 15-minute periods and validity of data and data substitution. Emission concentrations for a given hour are not considered valid unless it is based on four valid measurements. The data substitution

requirements are contained in Subpart D. The facility is expected to continue to comply with the requirements contained in 75.10(d). 75.10(f) specifies minimum measurement capability requirement for CEMs and 75.10(g) contains the minimum recordkeeping and reporting requirements. The facility is expected to continue to meet 75.10(f) and (g).

75.11 contains specific provisions for SO_2 monitoring. 75.11(d)(2) allows the use of Appendix D to monitor SO_2 emissions from gas fired units. The facility monitors sulfur content of the natural gas to meet Part 75 SO_2 monitoring requirements.

75.12 contains specific provisions for NO_x emission rates. The facility uses a NO_x CEM and an O_2 monitor to meet this requirement.

75.13 contains CO_2 monitoring requirements. The facility monitors CO_2 in accordance with this section using the procedures in part 75 Appendix G.

75.14 contains opacity monitoring requirements. The facility is exempt from opacity monitoring under part 75 per 75.14(c).

Part 75 Subpart C contains operation and maintenance requirements including certification and recertification of the CEMs, quality assurance/quality control requirements, reference test methods, and out-of-control periods and adjustment for system bias. The facility is expected to continue to meet these requirements.

Part 75, Subpart D (75.30 through 75.36) contains Missing Data Substitution Procedures for SO_2, NO_x, flowrate, CO_2, and heat input procedures. The facility is expected to continue to meet these requirements.

Part 75, Subpart F contains the recordkeeping requirements including the contents of a part 75 monitoring plan. This subpart requires the facility to record the operating time, heat input rate, and load for each emissions unit. Additionally, the facility must record emissions data for SO_2, NO_x, CO_2, and O_2 along with quality assurance/quality control information.

Part 75, Subpart G contains the reporting requirements for affected facilities subject to part 75. The facility is expected to continue to meet these requirements.

40 CFR Part 98, Mandatory Greenhouse Gas Reporting

The facility is expected to meet the federal greenhouse gas reporting requirements.

Title 17 California Code of Regulations, Subchapter 10, Article 2

The facility is expected to meet the state greenhouse gas reporting requirements.

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 each for NO_x and CO, prior to abatement. The gas turbines are exempt from

CAM requirements for NO_x per 40 CFR Part 64.2(b)(iii) since the facility is subject to the acid rain permit program. The facility is subject to the Acid Rain program because it is a utility unit that serves a generator with a capacity greater than 25 MW in accordance with 40 CFR Part 72.6. Per 40 CFR 64.2(a), an emission unit is subject to 40 CFR 64, Compliance Assurance Monitoring, if the unit is subject to a federally enforceable requirement for a pollutant, the pollutant is controlled by an abatement device, and the emissions of the pollutant before abatement are more than 100% of the major source thresholds. The CO emissions from each gas turbine/heat recovery steam generator are subject to CAM requirements.

The CO CEM meets the requirement of 40 CFR 64.3(a)(1) to obtain data by directly measuring CO concentrations instead of an indicator of emissions. The monitoring meets 64.3(a)(2) which requires the owner/operator to establish an appropriate range to provide a reasonable assurance of ongoing compliance. The CO CEMs are registered with the District and are subject to Volume V of the District Manual of Procedures. The District source test section reviewed the installation of the CO CEMs including the range of the monitor. The CO CEMs meet the requirements of 64.3(a)(3)(i) by measuring the pollutant directly and not relying on an indicator.

The CO CEM meets the requirement of Section 64.3(b)(1) to obtain representative data because the CO CEMs are registered with the District and are subject to Volume V of the District Manual of Procedures. The District source test section has reviewed the installation of the CO CEMs to ensure that the CO concentration data is representative.

The CO CEMs meet 64.3(b)(2) since the District source test section approved the initial installation of the monitors and because the facility follows the District's verification procedures in the District Manual of Procedures. The facility meets the quality assurance requirements in 64.3(b)(3) by meeting Title V of the District Manual of Procedures and by having the District source test section review the CO CEM data on a monthly basis.

The CO CEMs meet 64(b)(4) by measuring the CO concentration at the exhaust stack at least once every fifteen minutes (excluding normal calibration periods) as required by condition #24252, part 27. The CO concentration measurements are averaged over any rolling 3-hour period per condition #24252, part 20(c). This frequency agrees with the 64(b)(4)(ii) requirement that the owner/operator collect four or more values equally spaced over each hour. The CO monitoring frequency of measuring once every fifteen minutes is adequate to characterize any variability due to the oxidation catalyst. The facility uses a computerized data acquisition system to record the CO concentration data.

The CO CEMs measure the CO concentration at the exhaust stack directly and meet the requirement of 64.3(c). The CO CEM monitoring accounts for process and control device operational variability and documents the actual CO emissions relative to the permit limit.

64.3(d)(1) requires the owner/operator to use a CEM required by the Act, state or local law to satisfy the requirements of part 64. 64.3(d)(2)(vi) states that a CEM that satisfies monitoring requirements and specifications established by the permitting authority shall be deemed to satisfy the general design criteria specified in 64.3(a) and (b).

64.3(d)(3)(i) requires the owner/operator to design the monitoring system subject to 64.3(d) to report exceedances consistent with any period in an underlying requirement. The data acquisition and handling for the CO CEM allows the owner/operator to meet 64.3(d)(3)(i). The owner/operator is required to report any exceedance of permit condition #24252 to the Compliance and Enforcement Division within 96 hours of the violation of the condition.

64.4(a) requires the owner/operator to submit to the permitting authority monitoring that satisfies the design requirements of 64.3. The CO CEM meets 64.4(a)(1) through (4) since the unit directly measures CO concentration, are registered with the District, and are subject to Volume V of the District Manual of Procedures. The District source test section reviewed the installation of the CO CEM to ensure that the CO concentration data is representative. The review included CO monitor ranges. The monitors meet the performance criteria in 64.3(b) since these monitors meet 64.3(d)(2)(vi) which allows the permitting authority to establish monitoring requirements and specifications.

64.4(b) requires the owner/operator to submit a justification for the proposed elements of the monitoring. If the owner/operator relies on a presumptively acceptable monitoring no further justification for the appropriateness of the monitoring should be necessary other than an explanation of the applicability of such monitoring to the unit in question. The use of a CEM is considered presumptively acceptable in accordance with 64.4(b)(2).

64.4(c)(1) requires the owner/operator to collect process and control device data during compliance or performance testing when the facility is justifying or establishing the use of an indicator of emission subject to part 64. 64.4(c)(2) requires the owner/operator must document that no changes to the emissions unit and control device that could result in a significant change in control system performance or the selected ranges or designated conditions for the indicators to be monitored since the performance or compliance tests were conducted. The CO CEMs measure emissions directly and meet the requirements contained in 64.4(c)(1) and (2). Any changes to the emissions unit or control device and the associated impact on CO emissions is quantified on a continuous basis.

64.5(a) requires the owner/operator to submit information required pursuant to 64.4 with the initial Title V permit application (submitted on November 14, 2005). The facility has not submitted a document specifically addressing the information under 64.4, but the CO CEM monitoring information meeting 64.4 was submitted to the District source test section. The installation and operation of the CO CEMs has been approved by the District source test section. The use of a CEM is considered presumptively acceptable in accordance with 64.4(b)(2).

64.6(c) requires the permitting authority to establish permit terms and conditions that specify the required monitoring in accordance with 70.6(a)(3)(i) of this chapter. According to 64.6(c)(1) at a minimum, the permit shall specify: the approved monitoring approach, indicators to be monitored, means or device used to measure the indicators, the performance requirements established by 64.3(b) or (d) as applicable.

Condition #24252 specifies that the CO emissions are monitored with continuous monitors in Part 27(b). Part 41 specifies that the owner/operator shall comply with all applicable testing

requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. These two condition parts meet the requirements of 64.6(c)(1).

64.6(c)(2) specifies the means by which the owner/operator will define an exceedance or excursion for the purposes of reporting exceedances or excursions under 64.7 and 64.8. The permit shall specify the level at which an exceedance or excursion will be deemed to occur, including the appropriate averaging period. Permit condition #24252, part 20, has permit limits for CO in ppm corrected to 15% oxygen averaged over any rolling 3-hour period, lb/MMBtu, and pound per hour. Compliance with these limits is demonstrated with the CO CEM, O_2 monitor, and fuel usage monitoring (part 27). Part 36 requires the owner/operator to submit written notification to the Compliance and Enforcement Division within 96 hours of a violation of the permit conditions.

64.6(c)(3) requires the owner/operator to conduct monitoring and other obligations as required in 64.7 and 64.9. The facility is required to monitor CO concentrations from the affected emission units by permit condition #24252, part 27. The facility has measured CO emissions using District approved CEMs from the two affected emissions units since the start of commercial operation (November 2004). The facility continues to submit monthly CEM summary reports to the District's source test section. The facility continues to operate the CO CEMs in accordance with District requirements and meets District recordkeeping and reporting requirements.

64.6(c)(4) discusses minimum data availability for an given averaging period or for averaging periods for a specific reporting period. Volume V of the District's Manual of Procedures requires the facility to notify the District if one of the CO CEMs is down for over 24 hours and to report any malfunctions on a monthly basis. Downtime in excess of 15 consecutive days may be deemed a failure to monitor unless if adequate proof of expeditious repair is not furnished to the APCO.

64.7(a) requires the owner/operator to conduct monitoring required by part 64 upon issuance of the part 70 or 71 operating permit or by such later date specified in the permit pursuant to 64.6(d). According to 64.6(d) the part 70 permit shall include an enforceable schedule with appropriate milestones for completing such installation, testing, of final verification. The District permit condition #24252, which is part of the part 70 permit, required initial monitoring for CO with a CEM during the commissioning period prior to completing the commissioning period the monitors were required to be certified in accordance with Volume V of the District Manual of Procedures. The facility has operated the CO CEMs in accordance with the Manual of Procedures since that time.

64.7(b) requires the owner/operator to maintain the monitoring equipment at all times. Volume V of the District's Manual of Procedures requires that all monitoring systems shall be maintained in a good state of repair. At the discretion of the APCO, either complete performance specification tests or field accuracy tests may be required after repairs have been made.

64.7(c) requires the owner/operator to conduct monitoring at all times that the emissions unit is operating excluding monitoring malfunctions, associated repairs, and required quality assurance or control activities. Volume V of the District's Manual of Procedures requires the facility to

notify the District if one of the CO CEMs is down for over 24 hours and to report any malfunctions on a monthly basis. Downtime in excess of 15 consecutive days may be deemed a failure to monitor unless if adequate proof of expeditious repair is not furnished to the APCO.

64.7(d) requires the owner/operator to restore operation of the specific emissions unit including the control device to its normal manner of operation as expeditiously as practicable to minimize emissions. Permit condition #24252, part 36, requires the owner/operator to submit written notification to the Compliance and Enforcement Division within 96 hours of a violation of the permit conditions. The facility is required to promptly report deviations from Title V permit requirements and identify the appropriate corrective action.

64.7(e) requires the owner/operator to notify the permitting authority and if necessary submit a proposed modification to the monitoring program if a failure to achieve compliance with an emission limitation or standard is identified while providing valid data for an indicator. The facility measures CO concentration from the affected emissions units directly and it is unlikely that the owner/operator would need to document a need for improved monitoring.

64.8 allows the Administrator or permitting authority to require a facility subject to part 64 to develop and implement a Quality Improvement Plan. The facility continues to comply with Volume V of the District's Manual of Procedures for CEMs and this document contains sufficient quality assurance and quality control requirements.

64.9 describes the recordkeeping and reporting requirements required to meet part 64. The facility submits monthly CEM summaries to the District source test section. The facility is required to submit semiannual compliance certifications in accordance with the Title V permit. The facility is required to promptly report deviations from Title V permit requirements and identify the appropriate corrective action.

64.10 states that compliance with part 64 does not excuse the owner/operator from complying with other applicable requirements, prevent the permitting authority from imposing additional monitoring requirements, and/or restrict the Administrator or permitting authority from taking enforcement action. The facility is subject to this requirement and no additional permit conditions are required.

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.

The compliance report is contained in Appendix A of this permit evaluation and statement of basis.

VI. Permit Conditions

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

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

All changes to existing permit conditions are clearly shown in "strike-out/underline" format in the proposed permit. When the permit is issued, all "strike-out" language will be deleted 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. After issuance of the Title V permit, permit conditions will be revised using the procedures in Regulation 2, Rule 6, Major Facility Review.

Conditions that are obsolete or that have no regulatory basis have been deleted from the permit.

Conditions have also been deleted due to the following:

- Redundancy in recordkeeping requirements.
- Redundancy in other conditions, regulations and rules.
- The condition has been superseded by other regulations and rules.
- The equipment has been taken out of service or is exempt.
- The event has already occurred (i.e. initial or start-up source tests).

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.

Changes to permit conditions:

Permit condition 24252, parts 3, 4, 6, and 7 will be deleted because they are related to the commissioning period for the gas turbines and the commissioning period has been completed.

Permit condition 24252, part 45 has been modified to reflect amendments to 40 CFR 60 Subpart GG that allow the operator of gas turbines fired exclusively on natural gas to provide documentation of the fuel total sulfur content in lieu of fuel sulfur content analysis.

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.

SO_2 Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-1 & S-3 Gas Turbines, S-2 & S-4 HRSGs	BAAQMD 9-1-301	Ground level concentrations of SO2 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 & S-3 Gas Turbines, S-2 & S-4 HRSGs	BAAQMD 9-1-302	300 ppm (dry)	None

SO2 Discussion:

BAAQMD Regulation 9-1-301

Area monitoring to demonstrate compliance with the ground level SO_2 concentration requirements of Regulation 9-1-301 is at the discretion of the APCO (per BAAQMD Regulation 9-1-501). This facility does not have equipment that emits large amounts of SO_2 and therefore is not required to have ground level monitoring by the APCO.

All facility combustion sources are subject to the SO_2 emission limitations in District Regulation 9, Rule 1 (ground-level concentration and emission point concentration). In EPA's June 24, 1999 agreement with CAPCOA and ARB, "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. Therefore, no monitoring is necessary for this requirement.

PM Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-1 & S-3 Gas Turbines, S-2 & S-4 HRSGs	BAAQMD Regulation 6-1-301 and SIP 6-301	Ringelmann 1.0	None
S-1 & S-3 Gas Turbines, S-2 & S-4 HRSGs	BAAQMD Regulation 6-1-310 and SIP 6-310	0.15 gr/dscf	None
S-1 & S-3 Gas Turbines, S-2 & S-4 HRSGs	BAAQMD Regulation 6-1-310.3 and SIP 6-310.3	0.15 gr/dscf at 6% O2	None

PM Discussion:

BAAQMD Regulation 6, Rule 1 "Particulate Matter - General Requirements"

Visible Emissions

BAAQMD Regulation 6-1-301 and SIP 6-301limits visible emissions to no darker than 1.0 on the Ringelmann Chart (except for periods or aggregate periods of less than 3 minutes in any hour). Visible emissions are normally not associated with combustion of gaseous fuels, such as natural gas. Sources 1, 2, 3, and 4 burn natural gas exclusively, 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.

Particulate Weight Limitation

BAAQMD Regulation 6-1-310 and SIP 6-310 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% O_2. These are the "grain loading" standards.

Exceedances of the grain loading standards are normally not associated with combustion of gaseous fuels, such as natural gas. Sources 1, 2, 3, and 4 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.

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.

IX. 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.

This facility has no permit shields.

This permit has no streamlining.

D. Alternate Operating Scenarios:

No alternate operating scenario has been requested for this facility.

E. Compliance Status:

The attached December 3, 2012 inter-office memorandum from the Director of Compliance and Enforcement to the Director of Permit Services presents a review of the compliance record of the Donald Von Raesfeld Power Plant. The Compliance and Enforcement Division staff has reviewed the records for this facility for the period from November 14, 2005 through December 3, 2012. This review was initiated as part of the District evaluation of application #13759 for an initial Title V permit. During the period subject to review, activities known to the District include:

- There were two Notices of Violation issued during this review period.
- The District did not receive any alleged complaints.

- The facility is not operating under a Variance or an Order of Abatement from the District Board.

The Compliance and Enforcement Division concluded that this facility has demonstrated no evidence of ongoing noncompliance and no recurring patterns of violations that warrant consideration of the inclusion of a schedule of compliance in the proposed Title V permit for this facility.

The owner certified that all equipment was operating in compliance on September 12, 2012.

F. Differences between the Application and the Proposed Permit:

The Title V permit application was originally submitted on November 14, 2005. This version is the basis for constructing the proposed Title V permit.

APPENDIX A

BAAQMD COMPLIANCE REPORT

COMPLIANCE & ENFORCEMENT DIVISION

Inter-Office Memorandum

December 3, 2012

TO: JIM KARAS – DIRECTOR OF ENGINEERING

FROM: WAYNE KINO – DIRECTOR OF ENFORCEMENT

SUBJECT: REVIEW OF COMPLIANCE RECORD OF:

SILICON VALLEY POWER VON RAESFELD POWER PLANT; SITE #B4991

Background

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

Silicon Valley Power Von Raesfeld Power Plant is a power generation facility using natural-gas to fire two Gas Turbines with corresponding Heat Recovery Steam Generators. Continuous Emission Monitors (CEM) is in place to measure applicable pollutants.

Compliance Review

Compliance records were reviewed for the time period from November 14, 2005 (the date of initial Title V application) through December 3, 2012. The results of this review are summarized as follows.

1. Violation History

Staff reviewed Silicon Valley Power Von Raesfeld Power Plant Annual Compliance Certifications and found no ongoing non-compliance and no recurring pattern of violations.

Staff also reviewed the District compliance records for the review period. During this period Silicon Valley Power Von Raesfeld Power Plant activities known to the District include:

District-issued 2 Notice of Violations (NOV):

NOV#	Regulation	Date Occur	# of Days	Comments	Disposition
A11795	2-6-307	8/11/07	1	Nitrogen oxide (NOx) excess	Resolved
A51380	2-6-307	3/28/11	1	Carbon monoxide (CO) excess	Pending

2. Complaint History

The District received no air pollution complaints alleging Silicon Valley Power Von Raesfeld Power Plant Valley as the source.

3. Reportable Compliance Activity

RCA, also known as "Episode" reporting, is the reporting of compliance activities involving a facility as outlined in District Regulations and State Law. Reporting covers breakdown requests, indicated monitor excesses, pressure relief device releases, inoperative monitor reports and flare monitoring.

Within the review period, the District received 24 notifications for RCA's and 2 NOV's were issued as a result of these RCA's. 1 of the RCA notifications was for an inoperative monitor and was reported as required by the regulation.

Episode	Date Occur	# of Days	Comments	Disposition
04S04	12/2/05	1	NOx excess	Breakdown relief granted/No Action
04S89	2/24/06	1	NOx excess	No Action/no excess documented
04V24	5/30/06	1	NOx excess	NTC #37331 issued
04W06	7/21/06	1	NOx excess	No Action/no excess documented
04W96	9/26/06	1	NOx excess	No Action/no excess documented

REVIEW OF COMPLIANCE RECORD OF:
SILICON VALLEY POWER VON RAESFELD POWER PLANT – SITE #B4991
December 3, 2012
Page 3 of 4

Episode	Date Occur	# of Days	Comments	Disposition
04W97	9/26/06	1	NOx excess	No Action/no excess documented
04Y52	1/11/07	1	NOx excess	No Action/no excess documented
05A09	4/26/07	1	NOx excess	Breakdown relief granted/No Action
05A97	6/28/07	1	NOx excess	Breakdown relief granted/No Action
05B05	7/5/07	1	NOx excess	Breakdown relief granted/No Action
05B55	8/11/07	1	NOx excess	NOV #A11795
05G26	6/12/08	1	NOx excess	Breakdown relief granted/No Action
05K05	12/1/08	1	NOx excess	No Action/no excess documented
05N52	8/3/09	1	NOx excess	No Action/no excess documented
05N60	8/4/09	1	NOx excess	No Action/no excess documented
05Q88	12/8/09	1	NOx excess	Breakdown relief granted/No Action
05U69	6/23/10	1	NOx excess	Breakdown relief granted/No Action
05U98	7/16/10	1	NOx excess	Breakdown relief granted/No Action
05V19	8/6/10	1	Inoperative monitor	No Action
05X35	12/7/10	1	NOx excess	Breakdown relief granted/No Action
05Y72	2/22/11	1	NOx excess	Breakdown relief granted/No Action
05Z20	3/28/11	1	CO excess	NOV #A51380

Episode	Date Occur	# of Days	Comments	Disposition
06D13	1/15/12	1	NOx excess	No Action/no excess documented
06F16	5/7/12	1	NOx excess	Pending

4. Enforcement Agreements, Variances, or Abatement Orders

There were no enforcement agreements, variances, or abatement orders for Silicon Valley Power Von Raesfeld Power Plant over review period.

Conclusion

Following its review of all available facility and District compliance records from November 14, 2005 (the date of initial Title V application) through December 3, 2012, the District's Compliance and Enforcement Division has determined that Silicon Valley Power Von Raesfeld Power Plant was in intermittent compliance from the initial application date through the present. Silicon Valley Power Von Raesfeld Power Plant has demonstrated no evidence of ongoing noncompliance and no recurring pattern of violations that would warrant consideration of a Title V permit compliance schedule for this facility.

Based on this review and analysis of all the violations for the review period, the District has concluded that no schedule of compliance or change in permit terms is necessary.

APPENDIX B

GLOSSARY

ACT
Federal Clean Air Act

APCO
Air Pollution Control Officer

ARB
Air Resources Board

BAAQMD
Bay Area Air Quality Management District

BACT
Best Available Control Technology

Basis
The underlying regulatory authority that allows the District to impose requirements.

CAA
The federal Clean Air Act

CAAQS
California Ambient Air Quality Standards

CAM
Compliance Assurance Monitoring per 40 CFR Part 64

CAPCOA
California Air Pollution Control Officers Association

CEM
Continuous Emission Monitor

CEQA
California Environmental Quality Act

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

CO
Carbon Monoxide

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). Cumulative increase is used to determine whether threshold-based requirements are triggered.

District
The Bay Area Air Quality Management District

EPA
The federal Environmental Protection Agency.

Excluded
Not subject to any District regulations.

Federally Enforceable, FE
All limitations and conditions which are enforceable by the Administrator of the EPA including those requirements developed pursuant to 40 CFR Part 51, subpart I (NSR), Part 52.21 (PSD), Part 60 (NSPS), Part 61 (NESHAPs), Part 63 (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.

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.

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.

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.

MOP
The District's Manual of Procedures.

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)

NOx

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.)

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, NOx, PM10, and SO2.

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

PTE
Potential to Emit as defined by BAAQMD Regulation 2-6-218

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

SO2
Sulfur dioxide

THC
Total Hydrocarbons (NMHC + Methane)

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

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

TPH
Total Petroleum Hydrocarbons

TSP
Total Suspended Particulate

VOC
Volatile Organic Compounds

Units of Measure:

bhp	=	brake-horsepower
btu	=	British Thermal Unit
cu. ft.	=	cubic foot
cfm	=	cubic feet per minute
dscf	=	dry standard cubic foot
dscfm	=	dry standard cubic foot per minute
g	=	gram
gal	=	gallon
gpm	=	gallons per minute
gr	=	grain
hp	=	horsepower
hr	=	hour
lb	=	pound
in	=	inch
max	=	maximum
m^2	=	square meter
min	=	minute
mm	=	million
MMbtu	=	million btu
MMcf	=	million cubic feet
ppmv	=	parts per million, by volume
ppmw	=	parts per million, by weight
psia	=	pounds per square inch, absolute
psig	=	pounds per square inch, gauge
scfm	=	standard cubic feet per minute
tpy	=	tons per year
yr	=	year