AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO



March 6, 2008



CHRISTOPER MEYER
PROJECT MANAGER
CALIFORNIA ENERGY COMMISSION
1516 9TH STREET, MS-15
SACRAMENTO CA 95814-5512

**Preliminary Determination of Compliance**
**MMC Chula Vista Power Plant Facility**

Enclosed is the San Diego County Air Pollution Control District (District) Preliminary Determination of Compliance (PDOC) for the MMC Chula Vista Power Plant Facility. The PDOC includes the District's preliminary evaluation of the project's compliance with applicable District rules and regulations, terms and conditions necessary to ensure compliance of the project with District rules and regulations.

The District has determined that the project as proposed will comply with all applicable District rules and regulations if it is constructed and operated in accordance with the information submitted in conjunction with the application(s) for District Authority to Construct and the terms and conditions of the PDOC.

The District appreciates the efforts of the CEC staff to assist the District in understanding the CEC approval process and facilitating gathering of information. If you have any questions concerning the above or the enclosed PDOC, please contact Arthur Carbonell at (858) 586-2741 or John Annicchiarico at (858) 586-2733.

Arthur Carbonell
Associate Air Pollution Control Engineer

cc: Michael Tollstrup, ARB-SSD
Shaheerah Kelly, EPA, Region IX

| | |
|---|---|
| Project Engineer: | Arthur Carbonell |
| Senior Engineers: | John Annicchiarico |
| | |
| Application Number: | 985092-93 |
| Site ID Number: | 7084A |
| Fee Schedule: | 20F |
| BEC: | new |

## I. APPLICATION INFORMATION

| | |
|---|---|
| Owner / Operator: | MMC Chula Vista |
| Mailing Address: | 3497 Main St.<br>Chula Vista CA 91911 |
| Equipment Address: | 3497 Main St.<br>Chula Vista, CA 91911 |
| Contact: | Mark Wellard |
| Position: | Operator |
| Phone Number: | (619) 420-3291 |

## II. EQUIPMENT DESCRIPTION

985092

Gas Turbine Engine Generator #1: General Electric, Model LM-6000, 46.5 MW capacity, 468.8 MMBtu/hr heat input, natural gas fired, simple cycle, S/N TBD, with water injection; a selective catalytic reduction (SCR) system including an automatic ammonia injection control system; an oxidation catalyst; a Continuous Emission Monitoring System (CEMS) for NOx, CO and $O_2$; and a data acquisition and recording system (DAS).

985093

Gas Turbine Engine Generator #2: General Electric, Model LM-6000, 46.5 MW capacity, 468.8 MMBtu/hr heat input, natural gas fired, simple cycle, S/N TBD, with water injection; a selective catalytic reduction (SCR) system including an automatic ammonia injection control system; an oxidation catalyst; a Continuous Emission Monitoring System (CEMS) for NOx, CO and $O_2$; and a data acquisition and recording system (DAS).

## III. PROJECT DESCRIPTION

MMC Chula Vista (applicant) has applied for an Authority to Construct and Permit to Operate two additional gas turbines, each rated at 46.5 MW, to provide power during peak hours as determined by the Public Utilities Commission (PUC). The site has two existing peaker turbines, each rated at 44 MW, permitted under Permit to Operate Nos. 976038 and 976039. The emissions from the new turbines will be controlled through the use of water injection, a Selective Catalytic Reduction (SCR) system and an oxidation catalyst.

Since the increase in power is between 50 MW and100 MW, this project qualifies for a small power plant exemption from the California Energy Commission (CEC). However, the applicant has opted to apply for an Application for Certification (AFC) through the CEC in order to address all permitting concerns through a single agency. The San Diego Air Pollution Control District (District) is considered to be a responsible agency for this certification and is responsible to submit a Preliminary Determination of Compliance (PDOC) and a Final Determination of Compliance (FDOC) to the CEC. The process of evaluating this equipment for the PDOC and FDOC will be functionally equivalent to the District's Authority to Construct review process pursuant to District Rule 20.5.

MMC Chula Vista will limit operation of these turbines to a maximum of 4400 hours per calendar year with the assumption of 4000 hours under normal operating conditions (i.e., base load), 200 hours under cold start conditions, and 200 hours under warm start conditions. The estimated emissions under normal operating conditions are listed in Table 1. These values are based on the equipment complying with Best Available Control Technology (BACT) guidelines. Note that the turbines also utilize fogging technology to increase efficiency, which will slightly increase VOC emissions. However, at no time will the VOC BACT limit be exceeded.

Since the turbines are operated on an "as needed" basis, during the course of the year, the turbines will experience multiple startups and shutdowns. MMC Chula Vista estimates a maximum of 200 hours of cold startup time and 200 hours of hot startup time per year. Note that this implies a total shutdown time of 400 hours per year. The expected emissions when operating under startup and shutdown conditions are listed in Table 2. The maximum duration of each startup will be half an hour and the maximum duration of each shutdown will be 10 minutes. The hourly emission rates listed in Table 2 reflect a full hour of operation under each condition (e.g. each startup emission rate consists of half an hour under startup mode and half an hour under normal operation). For this equipment, BACT is considered to be 2.5 ppm for oxides of nitrogen (NOx) corrected to 15% oxygen and averaged over a 1-hour period, 6.0 ppm for carbon monoxide (CO) corrected to 15% oxygen and averaged over a 3-hour period, and 2.0 ppm for volatile organic compounds (VOC) corrected to 15% oxygen and averaged over a 1-hour period.

This project requires an Air Quality Impact Analysis (AQIA) to satisfy New Source Review (NSR) requirements. Additionally, a Health Risk Assessment (HRA) is required to evaluate the emissions of toxic air contaminants. Ralph DeSiena of the District Meteorology Group has reviewed and approved the air dispersion modeling supporting the AQIA and HRA, and Dick Brightman of the District Toxics Group has reviewed and approved the HRA.

The applicant had initially proposed the added installation of a diesel-fired emergency engine. This proposed engine has since been removed from this project.

## IV. EMISSION ESTIMATES

### Criteria Pollutants:

The following Table 1 is based on information supplied by the applicant and/or required by BACT:

**Table 1 - Maximum Emissions per Turbine Operating Under Normal Conditions**

| Pollutant | Concentration, ppmvd @ 15% O2 | Emission Rate, lbs/hr |
|---|---|---|
| NOx | 2.5 (1-hr avg.) | 4.4 |
| CO | 6.0 (3-hr avg.) | 6.4 |
| VOC | 2.0 (1-hr avg.) | 1.2 |
| $PM_{10}$ | | 3.0 |
| SOx | | 1.1 |

Hourly mass emission rates for NOx, CO, and VOC under normal operating conditions were calculated as follows:

emissions = (concentration, ppm)*(exhaust flow rate, cfh)*(molecular weight/molar volume)
where exhaust flow rate was calculated using EPA Method 19

Hourly mass emission rates for $PM_{10}$ and SOx were supplied by the applicant and based on vendor data.

The following assumptions were made to estimate maximum emissions:

total operating time =4400 hrs/yr
total operating time under cold startup conditions = 200 hrs/yr
total operating time under warm startup conditions = 200 hrs/yr
$PM_{10}$ and SOx emissions are unchanged during startups and shutdowns
maximum of one cold start and one shutdown per day

Therefore, the worst case emissions will be the following:

daily emissions = (base load emissions, lbs/hr)*(22 hrs/day) + (cold start, lbs/hr)*(1 hr/day)
+ (shutdown, lbs/hr)*(1 hr/day)

annual emissions = (base load emissions, lbs/hr)*(4000 hrs/yr) + (cold start, lbs/hr)*(200 hrs/yr)
+ (warm start, lbs/hr)*(200 hrs/yr)

The following Table 2 is based on information supplied by the applicant:

| Table 2 - Maximum Emissions per Turbine During Startup and Shutdown Conditions | | | | |
|---|---|---|---|---|
| **Condition** | **Emissions, lbs/hr** | | | **Duration, hrs** |
| | **NOx** | **CO** | **VOC** | |
| Cold Start | 19.3 | 14.3 | 1.4 | 0.5 |
| Hot Start | 8.8 | 9.2 | 1.4 | 0.5 |
| Warm Start | 12.2 | 10.8 | 1.4 | 0.5 |
| Shutdown | 7.8 | 8.9 | 1.4 | 0.17 (10 min.) |

See attached spreadsheet for full emission calculations.

The following Tables 3a and 3b are a summary of the criteria pollutant emissions calculations:

| Table 3a - Maximum Emissions from Each Turbine | | | |
|---|---|---|---|
| **Pollutant** | **lbs/hr** | **lbs/day** | **tons/yr** |
| NOx | 4.4 | 124.1 | 12.0 |
| CO | 6.4 | 158.4 | 15.4 |
| VOC | 1.2 | 29.5 | 2.7 |
| $PM_{10}$ | 3.0 | 72.0 | 6.6 |
| SOx | 1.1 | 26.4 | 2.2 |

| Table 3b - Maximum Emissions from Both Turbines | | | |
|---|---|---|---|
| **Pollutant** | **lbs/hr** | **lbs/day** | **tons/yr** |
| NOx | 8.8 | 248.1 | 23.9 |
| CO | 12.9 | 316.9 | 30.8 |
| VOC | 2.5 | 59.0 | 5.5 |
| $PM_{10}$ | 6.0 | 144.0 | 13.2 |
| SOx | 2.2 | 52.8 | 4.4 |

## V. RULES ANALYSIS

### Rule 20.1 and 20.2 - New Source Review (Non-Major Stationary Sources):

### Rule 20.2(d)(1) - Best Available Control Technology/Lowest Achievable Emission Rate:

This subsection of the rule requires that Best Available Control Technology (BACT) be installed on a pollutant specific basis if emissions exceed 10 lbs/day for each criteria pollutant (except for CO for which the PSD BACT threshold is 100 tons/yr). Based on emission calculations BACT is triggered for NOx, VOC, SOx, and PM10.

NOx: According to the ARB Guidance for Power Plant Siting and Best Available Control Technology, September 1999 (see www.arb.ca.gov/powerpl/guidocfi.pdf), BACT for this equipment is 2.5 ppm based on a 1-hour averaging period calculated at 15% oxygen. This level of emissions has also been applied so similar peaking turbines licensed in California. No lower BACT limits were found for this type of equipment. This equipment is expected to comply with this limit using water injection and an SCR system. Initial and annual source testing, as well as the installation of CEMS, will be used to confirm compliance with this limit.

CO: According to the ARB Guidance for Power Plant Siting and Best Available Control Technology, September 1999, BACT for CO emissions from this equipment is 6.0 ppm based on a 3-hr averaging period, calculated at 15% oxygen. No lower limits were found by searching RACT/BACT/LAER Clearinghouses. Therefore, the ARB Guidance was accepted as BACT. This equipment is expected to comply with this limit using an SCR system with an oxidation catalyst. Initial and annual source testing, as well as the installation of CEMS, will be used to confirm compliance with this limit.

VOC: From the ARB Guidance for Power Plant Siting and Best Available Control Technology, September 1999, and from searching BACT Clearinghouses, BACT for this equipment is 2.0 ppm @ based on a 1-hour averaging period calculated at 15% oxygen No lower BACT limits were found for this type of equipment. This equipment is expected to comply with this limit using an SCR system with an oxidation catalyst. Initial and annual source testing will be used to confirm compliance with this limit.

$PM_{10}$: From the ARB Guidance for Power Plant Siting and Best Available Control Technology, September 1999, BACT for this equipment is stated to be the use of natural gas which contains less than 1 grain of sulfur compounds per 100 standard cubic feet of natural gas. However, by searching RACT/BACT/LAER Clearinghouses and other air agencies' determinations, BACT for this equipment was determined to be the use of natural gas which contains less than 0.25 grains of sulfur compounds per 100 standard cubic feet of natural gas. The Public Utility Commission (PUC)-quality natural gas sold in San Diego County is expected to comply with this limit. The applicant will be required to maintain documents showing the sulfur content of the natural gas used.

SOx: From the ARB Guidance for Power Plant Siting and Best Available Control Technology, September 1999, BACT for this equipment is stated to be the use of natural gas which contains less than 1 grain of sulfur compounds per 100 cubic feet of natural gas (0.55 ppmvd @ 15% O2). However, by searching RACT/BACT/LAER Clearinghouses and other air agencies' determinations, BACT for this equipment was determined to be the use of natural gas which contains less than 0.25 grains of sulfur compounds per 100 standard cubic feet of natural gas. The Public Utility Commission (PUC)-quality natural gas sold in San Diego County is expected to comply with this limit. The applicant will be required to maintain documents showing the sulfur content of the natural gas used.

**Rule 20.2(d)(2) - Air Quality Impact Analysis (AQIA):**

This part of the rule requires the applicant to conduct an Ambient Air Quality Impact Analysis of the unit's emissions if the emission threshold values are equaled or exceeded for NOx, CO, SOx, or $PM_{10}$. The threshold values for NOx and SOx are 25 lbs/hr, 250 lbs/day or 40 tons/yr. The threshold values for CO are 100 lbs/hr, 550 lbs/day or 100 tons/yr. The threshold values for $PM_{10}$ are 100 lbs/day or 15 tons/yr. An AQIA is triggered for NOx, CO, and PM10.

An AQIA was performed for NOx, CO, $PM_{10}/PM_{2.5}$, and SOx by the applicant. This analysis was reviewed by the District's Monitoring and Technical Services Group. The AQIA was re-done to reflect more recent meteorological data and modeling programs, the deletion of the emergency engine, the revised particulate matter emissions, and revised hours of operation. This analysis was again reviewed by the District's Monitoring and Technical Services Group and determined to be acceptable.

A 30-day Public Notice will be issued for this project.

**Rule 20.2(d)(5) - Emission Offsets:**

This part of the rule requires that emission reduction credits be provided if the emission threshold values are equaled or exceeded for NOx, VOC, SOx, or $PM_{10}$. The threshold value for NOx and VOC is 50 tons/yr. The threshold value for SOx and $PM_{10}$ is 100 tons/yr. Based on emission calculations, emission offsets are not required for this project.

**Rule 20.5 - Power Plants:**

This rule requires that the District submit Preliminary and Final Determination of Compliance reports to the California Energy Commission (CEC) which shall be equivalent to an evaluation for a District Authority to Construct.

This document comprises the PDOC. The District will consider comments received on its proposed action and appropriate analyses of the CEC before making a final determination whether to issue an FDOC.

**Rule 50 - Visible Emissions:**

This rule limits air contaminant emissions into the atmosphere of shade darker than Ringlemann Number 1 (20% opacity) for more than an aggregate of three minutes in any consecutive sixty minute time period.

Based on the equipment and the type of fuel used, no visible emissions at or above this level are expected.

**Rule 51 - Nuisance:**

This rule prohibits the discharge of air contaminants that cause or have a tendency to cause injury, nuisance, annoyance to people and/or the public or damage to any business or property.

No nuisance complaints are expected from this equipment.

**Rule 53 - Specific Air Contaminants:**

This rule limits emissions of sulfur compounds (calculated as $SO_2$) to less than or equal to 0.05%, by volume, on a dry basis. This rule also limits particulate matter emissions from gaseous fuel combustion to less than or equal to 0.1 grains per dry standard cubic foot of exhaust calculated at 12% CO2.

The use of Public Utilities Commission (PUC) quality natural gas sold in San Diego County is expected to comply with the sulfur emission requirements and is expected to have a sulfur fuel content less than 0.25 grains per standard cubic foot (gr/dscf).

Based on an estimated particulate matter emission rate of 3.0 lbs/hr, combustion particulates at maximum load are estimated to be 0.0056 gr/dscf @ 12% $CO_2$ (see attached calculations sheet).

Compliance with this rule is expected.

**Rule 68 - Oxides of Nitrogen from Fuel Burning Equipment:**

This rule limits NOx emissions from any fuel burning equipment to less than 125 ppmv calculated as $NO_2$ at 3% oxygen on a dry basis.

Since this equipment is subject to the requirements of Section (d) of Rule 69.3.1, the equipment is exempt from this rule.

**Rule 69.3 - Stationary Gas Turbines - Reasonably Available Control Technology:**

This rule limits NOx emissions from gas turbines greater than 0.3 MW to 42 ppm at 15% oxygen when fired on natural gas. The rule also specifies specific monitoring and record keeping requirements. Startups, shutdowns, and fuel changes are defined by the rule and excluded from compliance with these limits.

The facility permit will contain conditions to limit emissions below the emission levels specified in Rule 69.3.1 (excluding startups). Therefore, since those limits are more stringent than the 42 ppm limit, compliance with this rule is expected.

**Rule 69.3.1 - Stationary Gas Turbines - Best Available Retrofit Control Technology:**

This rule limits NOx emissions from gas turbines greater than 10 MW to 15x(E/25) ppm when operating uncontrolled and 9x(E/25) ppm at 15% oxygen when operating with controls and averaged over a 1-hour period. E is the thermal efficiency of the unit. The rule also specifies monitoring and record keeping requirements. Startups, shutdowns, and fuel changes are defined by the rule and excluded from compliance with these limits.

BACT sets emission limits of 2.0 ppm for NOx averaged over a 1-hour period and corrected to 15% oxygen. This limit is more stringent than the limit required by this rule. Therefore, compliance is expected. An initial and annual source testing, as well as CEMS data, will confirm compliance.

Emission excursions above these levels during the Commissioning Period are not authorized by this rule. However, the District has adopted a policy to allow up to 200 hours of operation during which the standards of this rule will not apply. This time frame will begin when fuel is first fired to the equipment and will end when the air pollution control equipment is installed and fully functional or operation has exceeded 200 hours, whichever is occurs sooner.

**Rule 1200 - Toxic Air Contaminants, New Source Review:**

This rule requires that a Health Risk Assessment (HRA) be performed if the emissions of toxic air contaminants will increase. A detailed HRA is necessary if toxic emissions exceed District de minimus levels. Toxics Best Available Control Technology (TBACT) must be installed if the HRA shows a cancer risk greater than one in a million. At no time shall the cancer risk exceed ten in a million.

An HRA showing the risks below rule 1200 standards was performed by the applicant. This analysis was reviewed by the Toxics Section and determined to be acceptable. The Toxics Section's report is attached.

**40 CFR Part Subpart KKKK**

This New Source Performance Standard (NSPS) applies to any stationary combustion turbine that commenced construction, modification or reconstruction after February 18, 2005. The District has not been delegated authority by the US Environmental Protection Agency (EPA) to enforce this regulation, however this equipment is expected to comply with the emission standards of this subpart.

## VI. CONCLUSIONS AND RECOMMENDATIONS

A Determination of Compliance shall confer the same rights and privileges as an Authority to Construct only when and if the California Energy Commission (CEC) approves the Application for Certification, and the CEC certificate includes all conditions of the Determination of Compliance as proposed by the Air Pollution Control Officer.

If operated in accordance with the permit conditions specified in this Preliminary Determination of Compliance and Authority to Construct, this equipment is expected to operate in compliance with all Rules and Regulations of the San Diego County Air Pollution Control District.

Project Engineer — Date: 3/6/08

Senior Engineer Approval — Date: 3/6/08

## IX. PROPOSED PERMIT CONDITIONS

1. This equipment shall be properly maintained and kept in good operating condition at all times.

2. This equipment shall be fired on Public Utility Commission (PUC) quality natural gas only.

3. Permittee shall submit a complete Acid Rain permit application prior to commencement of operation in accordance with 40 CFR Part 72 to the District and submit a copy to EPA, Region IX.

4. For this equipment, the applicant shall hold allowances in accordance with 40 CFR 72.9(c)(1).

5. This equipment shall not be operated more than 4400 hours per calendar year.

6. Operation of this equipment under cold startup conditions shall not exceed 200 hours per calendar year.

7. Operation of this equipment under hot or warm startup conditions shall not exceed 200 hours per calendar year.

8. For the purposes of this Authority to Construct, the commissioning period shall be defined as the time beginning from first fuel firing and ending when the emission controls are installed and fully functional, and the owner or operator has provided the District with a Construction Completion Notice, whichever is sooner. The duration of this commissioning period shall not exceed 200 hours. A log of the dates, times and cumulative unit operating hours when fuel is being combusted during the commissioning period shall be maintained by the operator and made available to District personnel upon request. Prior to first fuel firing, the owner or operator shall submit a completed First Fuel Fire Notice Form to the District.

9. For the purposes of this Authority to Construct, startup conditions shall be defined as the time when fuel flow begins until the time that the unit complies with the emission limits specified in this Authority to Construct but in no case exceeding 30 minutes per occurrence. Shutdown conditions shall be defined as the time preceding the moment at which fuel flow ceases and during which the unit does not comply with the emission limits specified in this Authority to Construct but in no case exceeding 30 minutes per occurrence. The Data Acquisition and Recording System (DAS), as required by 40CFR75, shall record these events. This condition may be modified by the District based on field performance of the equipment.

10. Except during the commissioning period, startups and shutdowns, the water injection system, the SCR system and oxidation catalyst control system, including the automatic ammonia injection system serving the turbine, shall be in full operation at all times when the turbine is in operation.

11. In the event of a breakdown in an automatic ammonia injection control system, a trained operator shall operate the system manually and the breakdown shall be reported to the District Compliance Division pursuant to Rule 98(b)(1) and 98(e).

12. Total combined oxides of nitrogen emissions from the turbines described in Application Nos. 985092 and 985093 shall not exceed the major source threshold of 50 tons per calendar year. The daily NOx mass emissions from each turbine shall be recorded daily. The aggregate NOx mass emissions from all turbines for each calendar month, and for each rolling 12-month period, shall be calculated and recorded monthly. In the event that an annual major stationary source threshold is projected to be triggered, the applicant shall submit a complete application to modify this permit at least 6 months prior to the projected date of exceedance demonstrating how compliance with all applicable requirements will be achieved.

13. Emissions of oxides of nitrogen (NOx), calculated as nitrogen dioxide, from the turbine exhaust stack shall not exceed 2.5 parts per million volume on a dry basis (ppmvd) corrected to 15% oxygen and averaged over each 1-hour period. Compliance with this limit shall be demonstrated at the time of the initial compliance test and continuously thereafter. This limit shall not apply during the commissioning period or during startup and shutdown conditions.

14. Total combined Carbon Monoxide (CO) emissions from the turbines described in Application Nos. 985092 and 985093 shall not exceed the Prevention of Significant Deterioration (PSD) threshold of 250 tons per calendar year. The daily CO mass emissions from each unit shall be recorded daily. The aggregate CO mass emissions from all turbines for each calendar month, and for each rolling 12-month period, shall be calculated and recorded monthly. In the event that an annual PSD stationary source threshold is projected to be triggered, the applicant shall submit a complete application to modify this permit at least 6 months prior to the projected date of exceedance demonstrating how compliance with all applicable requirements will be achieved.

15. Emissions of carbon monoxide (CO) from the turbine exhaust stack shall not exceed 6.0 parts per million volume on a dry basis (ppmvd) corrected to 15% oxygen and averaged over each 3-hour period. Compliance with this limit shall be demonstrated at the time of the initial compliance test and

continuously thereafter. This limit shall not apply during the commissioning period or during startup and shutdown conditions.

16. Total combined VOC emissions from the turbines described in Application Nos. 985092 and 985093 shall not exceed the major source threshold of 50 tons per calendar year. The daily VOC emissions from each unit shall be recorded daily. The aggregate VOC mass emissions from all turbines for each calendar month, and for each rolling 12-month period, shall be calculated and recorded monthly. All emission calculations shall be based on fuel usage and emission factors approved by the District. In the event that an annual major stationary source threshold is projected to be triggered, the applicant shall submit a complete application to modify this permit at least 6 months prior to the projected date of exceedance demonstrating how compliance with all applicable requirements will be achieved.

17. Emissions of volatile organic compounds (VOCs), calculated as methane, from the turbine exhaust stack shall not exceed 2.0 parts per million volume on a dry basis (ppmvd) corrected to 15% oxygen and averaged over each 1-hour period. Compliance with this limit shall be demonstrated at the time of the initial compliance test and at least annually thereafter. This limit shall not apply during the commissioning period or during startup and shutdown conditions.

18. Emissions of particulate matter less than 10 microns (PM10), shall not exceed 3.0 pounds per hour. Compliance with this limit shall be demonstrated at the initial compliance test and at least annually thereafter.

19. Ammonia emissions from the gas turbine shall not exceed 5 ppmvd @ 15% oxygen (average of three subtests). Compliance with this limit shall be demonstrated at the initial compliance test and at least annually thereafter.

20. An operating log or Data Acquisition System (DAS) records shall be maintained on site to record actual times and durations of all startups, shutdowns, quantity of each fuel used, hours of daily operation, and total cumulative hours of operation during each calendar year.

21. A Continuous Emission Monitoring System (CEMS) shall be installed and calibrated to measure and record the concentration and hourly mass emission rate of oxides of nitrogen (NOx), the hourly average concentration and daily mass emission rate of carbon monoxide (CO), and the percent oxygen ($O_2$) in the exhaust gas. The CEMS shall be installed and operational prior to first fuel firing.

22. The CEMS shall be installed, certified and maintained in accordance with applicable federal regulations including the requirements of Sections 75.10 and 75.12 of Title 40, Code of Federal Regulations Part 75 (40 CFR 75), the performance specifications of Appendix A of 40 CFR 75, the quality assurance procedures of Appendix B of 40 CFR 75, and a CEMS protocol approved by the District. At least 60 days prior to the operation the CEMS, the applicant shall submit a CEMS operating protocol to the District for written approval.

23. The District shall be notified in writing at least two (2) weeks prior to any changes made in the CEMS software that affect the measurement, calculation or correction of data displayed and/or recorded by the CEMS.

24. On and after initial startup, this equipment shall be equipped with continuous parametric monitors to measure (or calculate) and to record the following operational characteristics:

    a. hours of operation (hours),
    b. natural gas flow rate (scfh),
    c. exhaust gas temperature (°F),
    d. SCR average temperature (°F),
    e. ammonia injection rate (lbs/hr),
    f. water injection rate (lbs/hr) for NOx control,
    g. power output (MW).

    These monitors shall be installed, calibrated, and maintained in accordance with the manufacturer's recommended procedures and a protocol approved by the District. Such protocol shall be submitted to the District for written approval at least 60 days prior to initial startup. This protocol shall include, at a minimum, a description of the equipment used for direct measurement of operating characteristics and the methodology used to calculate the remaining operating characteristics. All monitors shall be in full operation at all times when each respective turbine is in operation.

25. Non-resettable totalizing meters with an accuracy of at least +/-5% shall be installed in the natural gas fuel line to measure volumetric flow rate corrected for temperature and pressure of natural gas.

26. Monthly and annual records of fuel usage shall be maintained and made available to the District upon request.

27. Monthly and annual records shall indicate actual times and duration of all startups, shutdowns, and quantity of fuel used.

28. The ammonia injection flow rate shall be continuously monitored, recorded and controlled. Records of ammonia injection rate and flow rate device calibration shall be maintained and made available to the District upon request.

29. A monitoring plan in conformance with 40 CFR 75.53 shall be submitted to EPA Region 9 and the District at least 45 days prior to the initial source test, as required in 40 CFR 75.62.

30. The exhaust stack shall be equipped with source test ports and platforms to allow for the measurement and collection of stack gas samples consistent with all approved test protocols. The ports and platforms shall be constructed in accordance with San Diego Air Pollution Control District Method 3A, Appendix Figure 2, and approved by the District.

31. No later than 90 days after commencement of commercial operation (40CFR70.4(b)(2)), a Relative Accuracy Test Audit (RATA) and all other required certification tests shall be performed and completed on the permanent CEMS in accordance with 40 CFR Part 75 Appendix A performance specifications. At least 45 days prior to the test date, the applicant shall submit a test protocol to the District for approval. Additionally, the District shall be notified a minimum of 45 days prior to the test so that observers may be present. Within 30 days of completion of this test, a written test report shall be submitted to the District for approval.

32. Within 60 days after the initial startup, an initial source test shall be conducted by an independent, ARB approved tester or the District, at the applicant's expense, to determine initial compliance with the emission standards of this Authority to Construct. A source test protocol shall be submitted to the District for approval at least 30 days prior to the initial source test. The source test protocol shall comply with the following requirements:

    a. Measurements of outlet oxides of nitrogen (NOx), carbon monoxide (CO), and stack gas oxygen content ($O_2$%) shall be conducted in accordance with the District Source Test Method 100, or the Air Resources Board (ARB) Test Method 100 as approved by the U.S. Environmental Protection Agency (EPA).

b. Measurements of outlet non-methane hydrocarbon (NMHC) emissions shall be conducted in accordance with the San Diego Air Pollution Control District Methods 25A and/or 18.

c. Measurements of particulate matter less than 10 microns (PM10) shall be conducted in accordance with the U.S. Environmental Protection Agency (EPA) Test Methods 201A and 202.

d. Measurements of outlet ammonia shall be conducted in accordance with Bay Area Air Quality Management District (BAAQMD) Test Method ST-1B.

e. Source testing shall be performed at no less than 80% of the turbine rated load.

33. Within 30 days after completion of the initial source test, a final test report shall be submitted to the District for review and approval. The testing contractor shall include as part of the test report a certification that to the best of their knowledge the report is a true and accurate representation of the test conducted and the results.

34. In the event the initial source test results do not demonstrate compliance with District Rules and Regulations and emissions standards specified herein, to the satisfaction of the District, the applicant shall take corrective action to meet these standards. Any proposed corrective action that would result in a modification to the equipment shall require an application for a District Authority to Construct for such modification.

35. Source testing shall be performed on this equipment to demonstrate compliance with the NOx, CO, VOC, $PM_{10}$ and ammonia emission standards using District approved test methods. Source testing and the CO RATA test shall be conducted once every four consecutive AQ operating quarters (as defined by 40 CFR 72.2, at least 168 operating hours). No more than eight successive calendar quarters shall elapse following the quarter in which a test was last performed, without a subsequent test having been conducted. If a test has not been completed by the end of the eighth calendar quarter since the quarter of the last test, then the test must be completed within a 30-calendar day grace period. The grace period shall begin with the first calendar day following the end of the eights successive elapsed calendar quarter. A test completed within a period of 30 calendar days after the end of a fourth successive operating quarter or eighth successive calendar quarter in which a test is required shall be considered to have occurred in that quarter.

36. Based on source testing, additional monitoring parameters may be established to ensure compliance. Operating characteristics monitored by continuous parametric monitors may also be restricted to specified

ranges or limits, as determined by the District, based upon manufacturer's recommended operating procedures and initial compliance source test results.

37. All records required by this permit shall be maintained for a minimum of five years and made available to District personnel upon request.

38. Access, facilities, utilities and any necessary safety equipment for source testing and inspections shall be provided upon request of the Air Pollution Control District.

39. The applicant shall, upon determination of applicability and written notification by the District, comply with all applicable requirements of the Air Toxic "Hot Spots" Information and Assessment Act (California Health and Safety Code Section 2230 Et. Seq.).

40. This Air Pollution Control District Authority to Construct does not relieve the holder from obtaining permit or authorizations required by other governmental agencies.

***FROM APPLICATION:***

*Applicant:* MMC Chula Vista *Mailing Address:* 6362 Ferris St., Sam Diego, CA 92121

*Application Number:* 985092-93 *ID Number:* 7084A *Equipment Address:* 3497 Main St., Chula Vista, CA 91911

*Make:* Pratt & Whitney *Model:* FT4/GG4 *S/N:* *Size:* 48.6 MW

*Operating Schedule:* 24 hrs/day days/wk wks/yr days/yr 4000 hrs/yr

---

***EMISSION FACTORS (normal operation):***

| | lbs/MMBtu | ppm | lbs/scf/ppm |
|---|---|---|---|
| NOx | 3.2E-01 | 2.5 | 1.194E-07 |
| CO | 8.2E-02 | 6.0 | 7.270E-08 |
| SOx | 6.0E-04 | | 1.660E-07 |
| VOC | 2.1E-03 | 2.0 | 4.160E-08 |
| PM10 | 6.6E-03 | | |

*Notes:* 1. *concentration limits calculated at 15% oxygen and averaged over a continuous 1-hour period (3-hr period for CO)*
2. *SOx emission factor from 40 CFR 75*
3. *other emission factors from AP-42 (4/00 edition)*
4. *concentration limits based on BACT guidelines*
5. *lbs/scf/ppm conversion factors from EPA Method 19 (CO and VOC factors calculated by ratio of molecular weights)*

---

***GIVEN DATA:***

| | | |
|---|---|---|
| *Heat Input:* | 4.69E+08 | *Btu/hr* |
| *Natural Gas Heating Value:* | 1020 | *Btu/cu.ft.* |
| *Natural Gas Density:* | 0.0416 | *lbs/cu.ft. (16 lbs CH4 per 385 cu.ft.)* |
| *Natural Gas F-Factor:* | 8710 | *cu.ft.$_{(exhaust)}$/MMBtu @ 0% O2* |
| *Exhaust Gas Emission Factor:* | 198.025 | *dscf per pound fuel @ 12% CO2* |
| *Given Natural Gas Usage:* | 468,800 | *cu.ft./hr* |
| *Given Exhaust Gas Flow Rate:* | 583,226 | *acfm* |

*corrected F-Factor =* 8710 cu.ft./MMBtu x 20.9 / (20.9 - 15) = 3.09E+04 cu.ft./MMBtu @ 15% O2

*exhaust flow rate =* 30854 cu.ft./MMBtu x 1020 Btu/cu.ft. x 4.69E+05 cu.ft./hr = 1.48E+07 dscfh @ 15% O2

*exhaust flow rate =* 468,800 cu.ft./hr x 0.0416 dscf/lb x 198.03 dscf/lb = 3.86E+06 dscfh @ 12% CO2

---

***EMISSIONS:***

***Emission Factors:***

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOx = | 3.2E-01 | lbs/MMBtu | x | 4.69E+02 | MMBtu/hr = | 150.02 | lbs/hr | = | 3600.38 | lbs/day | = | 300.03 tons/yr |
| CO = | 8.2E-02 | lbs/MMBtu | x | 4.69E+02 | MMBtu/hr = | 38.44 | lbs/hr | = | 922.60 | lbs/day | = | 76.88 tons/yr |
| SOx* = | 6.0E-04 | lbs/MMBtu | x | 4.69E+02 | MMBtu/hr = | 0.28 | lbs/hr | = | 6.75 | lbs/day | = | 0.56 tons/yr |
| VOC = | 2.1E-03 | lbs/MMBtu | x | 4.69E+02 | MMBtu/hr = | 0.98 | lbs/hr | = | 23.63 | lbs/day | = | 1.97 tons/yr |
| PM10* = | 6.6E-03 | lbs/MMBtu | x | 4.69E+02 | MMBtu/hr = | 3.09 | lbs/hr | = | 74.26 | lbs/day | = | 6.19 tons/yr |

***Concentration:***

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NOx = | 2.5 | ppm | x | 1.48E+07 | dscf/hr | x | 46 lbs NO2/385 dscf | = | 4.41 lbs/hr |
| CO = | 6.0 | ppm | x | 1.48E+07 | dscf/hr | x | 28 lbs CO/385 dscf | = | 6.44 lbs/hr |
| VOC = | 2.0 | ppm | x | 1.48E+07 | dscf/hr | x | 16 lbs CH4/385 dscf | = | 1.23 lbs/hr |

***Grain Loading:***

*PM Concentration =* 3.09 lbs/hr x 7000 grains/lb ÷ 3.86E+06 cu.ft./hr = 0.0056 gr/dscf

---

***EMISSIONS SUMMARY:***

SINGLE TURBINE (normal operation)

| | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| NOx | 4.4 | 105.8 | 8.8 |
| CO | 6.4 | 154.5 | 12.9 |
| SOx* | 1.1 | 26.4 | 2.2 |
| VOC | 1.2 | 29.4 | 2.5 |
| PM10** | 3.0 | 72.0 | 6.0 |

** vendor data has SOx emissions of 1.1 lbs/hr*

*** applicant has agreed to a PM10 limit of 3 lbs/hr*

TWO TURBINES (normal operation)

| | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| NOx | 8.8 | 211.5 | 17.6 |
| CO | 12.9 | 309.0 | 25.8 |
| SOx | 2.2 | 52.8 | 4.4 |
| VOC | 2.5 | 58.9 | 4.9 |
| PM10 | 6.0 | 144.0 | 12.0 |

***FROM APPLICANT:***

| | NOx | CO | VOC |
|---|---|---|---|
| Cold Start, lbs/hr | 19.3 | 14.3 | 1.4 |
| Hot Start, lbs/hr | 8.8 | 9.2 | 1.4 |
| Warm Start, lbs/hr | 12.2 | 10.8 | 1.4 |
| Shutdown, lbs/hr | 7.8 | 8.9 | 1.4 |

Assume:
- 0.5 hours per startup and shutdown
- 400 annual hours of startup and shutdown
- 200 hours of cold start per year
- 200 hours of warm start per year
- 4400 total hours of operation

maximum of 1 cold start and 1 shutdown per day (22 hours of base load operation)
SOx and $PM_{10}$ emissions are unchanged during startups and shutdowns

SINGLE TURBINE (startups and shutdowns)

| | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| NOx | 19.3 | 9.7 | 3.2 |
| CO | 14.3 | 7.2 | 2.5 |
| SOx | 1.1 | 0.6 | 0.0 |
| VOC | 1.4 | 0.7 | 0.3 |
| PM10 | 3.0 | 1.5 | 0.6 |

TWO TURBINES (startups and shutdowns)

| | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| NOx | 38.6 | 19.3 | 6.3 |
| CO | 28.6 | 14.3 | 5.0 |
| SOx | 2.2 | 1.1 | 0.0 |
| VOC | 2.8 | 1.4 | 0.6 |
| PM10 | 6.0 | 3.0 | 1.2 |

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***EMISSIONS SUMMARY (Totals):***

SINGLE TURBINE (total)

| | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| NOx | 19.3 | 124.1 | 12.0 |
| CO | 14.3 | 158.4 | 15.4 |
| SOx | 1.1 | 26.4 | 2.2 |
| VOC | 1.4 | 29.5 | 2.7 |
| PM10 | 3.0 | 72.0 | 6.6 |

TWO TURBINES (total)

| | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| NOx | 38.6 | 248.1 | 23.9 |
| CO | 28.6 | 316.9 | 30.8 |
| SOx | 2.2 | 52.8 | 4.4 |
| VOC | 2.8 | 59.0 | 5.5 |
| PM10 | 6.0 | 144.0 | 13.2 |

# AIR QUALITY IMPACT ANALYSIS

# FINAL REVIEW REPORT

## MMC CHULA VISTA
## APPLICATION 985092 and 985093

**October 2, 2007**

**Prepared For**
**Mechanical Engineering**
**San Diego Air Pollution Control District**
**10124 Old Grove Road**
**San Diego, California 92131**

**Prepared By**
**Ralph DeSiena**
**Monitoring and Technical Services**
**San Diego Air Pollution Control District**
**10124 Old Grove Road**
**San Diego, California 92131**

## 1.0 INTRODUCTION

An Air Quality Impact Analysis (AQIA) was performed for the MMC Chula Vista, LLC (MMC) Facility by Atmospheric Dynamics of Santa Barbara, CA. This report focuses on the AQIA analysis results provided in the original and subsequent analysis performed.

## 2.0 PROJECT DESCRIPTION

MMC is proposing to modify its present power generation facility located at 3497 Main Street, Chula Vista, CA by:

Removing the Pratt and Whitney "twin pack" Model FT4/GG4 (44 MW).

Install two GE LM 6000 turbines rated at 93 MW total and one 550 kW emergency generator.

## 3.0 AIR QUALITY IMPACT ANALYSIS

Dispersion modeling was conducted for operational emissions of $NO_2$, CO, $SO_2$, $PM_{2.5}$ and $PM_{10}$. The applicant and their consultant (Atmospheric Dynamics) worked closely with the District in developing modeling and analysis procedures in support of demonstrating compliance with all applicable NSR requirements.

In addition, during the commissioning and startup periods hourly emissions of CO and $NO_x$ are expected to be much higher since the control system will not yet be optimized during the commissioning phase and not operating at optimum conditions during startups. CO and $NO_x$ emissions were modeled to determine whether emissions during these time periods would impact the State and/or Federal Ambient Air Quality Standards for CO and $NO_2$.

The original results submitted included worst case monitored background data taken from the District's monitoring station at Chula Vista during the years 2003-2005. The results presented here have been updated to reflect the most recent background data years 0f 2004-2006.

These procedures are discussed in the following subsections.

### 3.1 MODELING METHODOLOGIES

EPA's Aermod Prime model (Version 04300) was used to determine maximum predicted $NO_2$, CO, $SO_2$, $PM_{2.5}$ and $PM_{10}$.concentrations in the project vicinity. The modeling was performed in accordance with EPA guidance and District standard procedures. Regulatory default settings were used. The receptor grid was sufficiently dense to identify maximum impacts.

### 3.2 METEOROLOGICAL DATA USED FOR DISPERSION MODELING

Meteorological data used for EPA's Aermod Prime model consisted of the following data for the 2000 through 2002 time period. The data was processed by the District using EPA's Aermet meteorological data processor (Version 04300) to produce Aermod ready files.

- Wind speed, wind direction, standard deviation of the horizontal wind direction and temperature from the District's Chula Vista monitoring station.

- Twice-daily upper-air soundings from Miramar, NAS.

- Cloud height and total opaque cloud amount from Lindbergh Field, San Diego, CA.

- Wind speed, wind direction and temperature data from Lindbergh Field, San Diego, CA for replacement of missing data in the Chula Vista data set.

- Wind speed, wind direction and temperature data with height from the District's wind profiler with Rass located on Point Loma, San Diego, CA.

Monthly values for Albedo, Bowen Ratio and Surface Roughness provided in Table 3-1 were input to the AERMET model. Because of the mainly urban land use surrounding the monitoring site in Chula Vista, we assumed one 360 degree sector with an urban classification.

**Table 3.1 Monthly Input Boundary Layer Parameters to AERMET**

| Month | Albedo | Bowen Ratio | Surface Roughness |
|---|---|---|---|
| Jan | .18 | 1.0 | 1.0 |
| Feb | .18 | 1.0 | 1.0 |
| Mar | .14 | 0.5 | 1.0 |
| Apr | .14 | 1.0 | 1.0 |
| May | .16 | 4.0 | 1.0 |
| Jun | .16 | 4.0 | 1.0 |
| Jul | .16 | 4.0 | 1.0 |
| Aug | .16 | 4.0 | 1.0 |
| Sep | .16 | 4.0 | 1.0 |
| Oct | .16 | 2.0 | 1.0 |
| Nov | .18 | 1.0 | 1.0 |
| Dec | .18 | 1.0 | 1.0 |

The factors are based on Table 4-1, 4-2, and 4-3 of the User's Guide to AERMET. We assumed Nov, Dec, Jan, and Feb were in the "autumn" category, Mar and April were "spring", and May, Jun, July, Aug, and Sep were "summer". San Diego does not have snow cover so there are no months that would be categorized as winter.
For the Bowen ratio we used Table 4-2c for Nov, Dec, Jan, Feb, and Mar. These months are during the rainy season in San Diego so we used the wet conditions table. For April and October we used Table 4-2b for average moisture conditions to represent the transition between the wet and dry season. For the rest of the summer months we used Table 4-2a for dry moisture conditions during the dry season.

## 4.0 AIR QUALITY IMPACT ANALYSIS RESULTS

In accordance with EPA and San Diego Air Pollution Control District New Source Review Guidance and the modeling methodologies described above, maximum predicted concentrations associated with facility operations were determined for each criteria

pollutant and the applicable averaging period during Normal, Startup and Commissioning conditions. The maximum predicted concentrations were added to worst-case background concentrations for comparison to Federal and State Ambient Air Quality Standards. Worst case background concentrations were determined from the review of 3 years (2004-2006) of monitoring data taken from the District's Chula Vista monitoring station, which was deemed to be most representative of air quality in the facility area. Table 5-1 summarizes the worst case background concentrations.

**TABLE 4.1**
**MAXIMUM BACKGROUND CONCENTRATIONS, CHULA VISTA, 2004-2006 (µg/m$^3$)**

| Pollutant | Averaging Time | 2004 | 2005 | 2006 |
|---|---|---|---|---|
| $NO_2$ | 1-hour | 135.5[a] | 133.6 | **139.2** |
| | Annual | 30.1 | 30.1 | **32.0** |
| $SO_2$ | 1-hour | **110.0** | 41.9 | 44.5 |
| | 3-hour | **55.0** | 23.6 | 34.0 |
| | 24-hour | **41.9** | 13.1 | 15.7 |
| | Annual | **7.9** | 7.9 | 7.9 |
| CO | 1-hour | **4785** | 3436 | 3313 |
| | 8-hour | **3043** | 2613 | 2699 |
| $PM_{10}$ | 24-hour | 45 | **53** | 52 |
| | Annual | 26.5 | **27** | 26.3 |
| $PM_{2.5}$ | 24-hour | **35**[b] | 33[b] | 28[b] |
| | Annual | **12.2** | 11.8 | 11.2 |
| | National 3-Year Average [c] | **13** | 12 | 11 |

Source: California Air Quality Data, California Air Resources Board website; EPA AIRData website. Reported values have been rounded to the nearest tenth of a µg/m$^3$ except for $PM_{10}$ which were already rounded to the nearest integer.

Notes:

a. Bolded values are the highest during the three years and are used to represent background concentrations.

b. 24-hour average $PM_{2.5}$ concentrations shown are 3-year Average 98$^{th}$ percentile values rather than highest values because compliance with the ambient air quality standards is based on 98$^{th}$ percentile readings.

c. To attain the annual $PM_{2.5}$ NAAQS, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m$^3$.

Table 4.2 contains emission rates and stack parameters modeled for the facility normal operations as well as for facility startup and shutdown condition modeling.

Table 4.3 provides the summary of project modeled maximum impacts for normal operating conditions, including worst case ambient background concentrations, compared with Federal and California Ambient Air Quality Standards (AAQS).

Table 4.4 provides startup/shutdown emission rates for each turbine.

Table 4.5 provides the summary of project modeled maximum impacts for facility startup and shutdown conditions, including worst case ambient background concentrations, compared with Federal and California Ambient Air Quality Standards (AAQS).

The modeling analysis for startup and shutdown conditions consisted of the maximum short-term $NO_x$ and CO emissions rates. $PM_{2.5}$, $PM_{10}$ and $SO_2$ startup emissions were not modeled since they are not significantly different than during normal operations.

The modeling analysis for the commissioning period conditions consisted of the maximum short-term $NO_x$ and CO emissions rates. $PM_{2.5}$, $PM_{10}$ and $SO_2$ commissioning period emissions were not modeled since they are not significantly different than during normal operations.

Table 4.6 provides commissioning period emission rates for each turbine.

Table 4.7 provides the maximum modeled concentration for applicable pollutants and averaging periods of concern during the commissioning period.

Fumigation analyses with the USEPA Model SCREEN3 (version 96043) were conducted for inversion breakup fumigation impacts (since the MMC site location is greater than 3000 meters from San Diego Bay, shoreline fumigation impacts are not expected to occur based on USEPA guidance given in *"Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised"* (EPA-454/R-92-019)).
Inversion breakup fumigation impacts of 1.085 micrograms/cubic meter (ug/m3) for a unitized emission rate (1 gram/second, g/s) were predicted to occur at 17,892 meters from the two turbines (no inversion breakup fumigation impacts were predicted to occur by SCREEN3 for emissions from the much lower emergency generator stack). These results are predicted to occur by SCREEN3 for rural conditions of F stability and 2.5 m/s wind speeds at the stack release heights. Since the site vicinity is urban in nature, SCREEN3 impacts were evaluated in both rural and urban modes for the turbine stacks at the inversion breakup distance of 17,892 meters for all SCREEN3 meteorological conditions. At this distance, the maximum urban impact was 2.38 times higher than the maximum rural impact (i.e., 1.013 ug/m3 vs. 0.4254 ug/m3 for 1 g/s emissions). Thus, the inversion breakup fumigation impact was adjusted to 2.583 ug/m3 for a unitized emission rate to account for urban dispersion conditions (i.e., 2.38 x 1.085 ug/m3). At the inversion breakup distance of 17,892 meters, the maximum emergency generator impact was 1.682 ug/m3 for a 1 g/s emission rate under urban conditions for all SCREEN3 meteorological conditions.
These unitized impacts were used to calculate 1-hour inversion breakup impacts for all pollutants by multiplying the unitized impacts by the pollutant emission rates (in g/s). The fumigation impacts from the turbines are added to the emergency generator impacts at the same location to obtain combined pollutant impacts for the facility.

| Pollutant /Avg.Time | Impacts (ug/m3) at Inversion Breakup Location | | | Maximum Facility Impacts from AERMOD |
|---|---|---|---|---|
| | Fumigation Impacts for Turbines | Emer.Gen Impacts | Total Impacts | |
| NOx 1-hour | 2.729 | 0.547 | 3.276 | 114.90 |
| SO2 1-hour | 0.718 | 0.035 | 0.753 | 7.35 |
| CO 1-hour | 4.016 | 0.516 | 4.532 | 108.54 |

As shown above, these fumigation impacts are very much less than the maximum facility AERMOD impacts predicted to occur in the immediate vicinity of the project site under normal operating conditions. Similarly, it can be shown that maximum SCREEN3 impacts at all offsite locations under urban conditions are very much higher than the fumigation impacts. Since 1-hour fumigation impacts are less than the maximum overall SCREEN3 and AERMOD 1-hour impacts, no further analysis of additional short-term

averaging times (3-hour, 8-hour, or 24-hour) is required as described in Section 4.5.3 of *"Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised"* (EPA-454/R-92-019).

## 5.0 CONCLUSION

The results of the modeling indicate that the facility commissioning, startup and normal operations will not cause or contribute to an exceedance of the Federal and California Ambient Air Quality Standards for $SO_2$, CO, $PM_{2.5}$ and $NO_2$.

The results also demonstrate that facility operations would not cause or contribute to an exceedance of the $PM_{10}$ Federal Ambient Air Quality. Since the project area is designated non-attainment for the current California Ambient Air Quality Standards for $PM_{10}$ additional modeling was considered in order to determine whether the facility would cause additional violations of the $PM_{10}$ 24 hour standard. No additional analysis was performed with regard to the annual standards.

> It should be noted that predicted concentrations for $PM_{10}$ did not exceed the EPA specified NSR 24-hour or Annual Significant Impact Levels (SIL). Predicted impacts less than SILs are normally considered to not significantly affect compliance with Federal Ambient Air Quality Standards regardless of the background level. Specifically in non-attainment areas, project impacts less than the SILs are deemed to not cause or contribute to violations of the Federal Ambient Air Quality Standard. This can be considered the case for California Ambient Air Quality Standards as well.

Since the initial modeling estimated maximum 24 Hour $PM_{10}$ impacts of approximately 2.87 $\mu g/m^3$, additional AERMOD modeling would be performed for all days in the 2004-2006 period that 24 Hour $PM_{10}$ background concentrations were between 47 $\mu/m^3$ and 50 $\mu g/m^3$ (California Standard) to determine whether additional violations would result from facility operations. There were no monitoring days that concentrations were measured within this range (highest monitored value less than the California Standard was 4 $\mu g/m^3$ and therefore it can be concluded that facility operations would not cause or contribute to additional violations of the California 24 Hour Ambient Air Quality Standard for $PM_{10}$.

| Table 4.2 Stack Parameters and Emission Rates for Refined AERMOD Modeling | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Emission Rates (g/s) | | | |
| | Stack Height (m) | Stack Diam (m) | Stack Temp (deg K) | Exhaust Velocity (m/s) | $NO_X$ | $SO_2$ | CO | $PM_{10/2.5}$ |
| **Averaging Period: 1-hour for Normal Operating Conditions for CO and NOx Emissions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 684.8 | 22.75 | 0.533 | N/A | 0.780 | N/A |
| Emergency Generator | 4.572 | 0.2540 | 787.6 | 60.16 | 0.325 | N/A | 0.307 | N/A |
| **Averaging Period: 1-hour for Normal Operating Conditions for $SO_2$ Emissions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 681.5 | 14.92 | N/A | 0.139 | N/A | N/A |
| Emergency Generator | 4.572 | 0.2540 | 787.6 | 60.16 | N/A | 0.0208 | N/A | N/A |
| **Averaging Period: 3-hours for Normal Operating Conditions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 681.5 | 14.92 | N/A | 0.139 | N/A | N/A |
| Emergency Generator | 4.572 | 0.2540 | 787.6 | 60.16 | N/A | 6.94E-3 | N/A | N/A |
| **Averaging Period: 8-hours for Normal Operating Conditions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 684.8 | 22.75 | N/A | N/A | 0.780 | N/A |
| Emergency Generator | 4.572 | 0.2540 | 787.6 | 60.16 | N/A | N/A | 3.84E-2 | N/A |
| **Averaging Period: 24 hours for Normal Operating Conditions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 681.5 | 14.92 | N/A | 0.139 | N/A | 0.630 |
| Emergency Generator | 4.572 | 0.2540 | 787.6 | 60.16 | N/A | 8.67E-4 | N/A | 7.39E-4 |
| **Averaging Period: Annual for Normal Operating Conditions[1]** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 707.6 | 22.32 | 0.467 | 0.091 | N/A | 0.412 |
| Emergency Generator | 4.572 | 0.2540 | 787.6 | 60.16 | 1.93E-3 | 1.24E-4 | N/A | 1.05E-4 |
| **Averaging Period: 1-hour for Turbine Start-up/Shutdown Conditions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 684.8 | 22.75 | 2.432 | N/A | 1.802 | N/A |
| **Averaging Period: 8-hours for Turbine Start-up/Shutdown Conditions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 684.8 | 22.75 | N/A | N/A | 0.981 | N/A |
| [1]Annual averaging periods include start-up/shutdown emissions, where applicable. | | | | | | | | |

| Table 4.3 Air Quality Impact Summary for Normal Operating Conditions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Ambient Air Quality CAAQS/NAAQS | |
| Pollutant | Avg. Period | Maximum[a] Concentration ($\mu g/m^3$) | Background ($\mu g/m^3$) | Total ($\mu g/m^3$) | Class II Significance Level ($\mu g/m^3$) | SILs ($\mu g/m^3$) | ($\mu g/m^3$) | ($\mu g/m^3$) |
| $NO_2$ | 1-hour | 114.90 | 139.2 | 254.1 | - | 19 | 470 | - |
| | Annual | 0.34 | 32 | 32.34 | 1 | 1 | - | 100 |
| PM10[1] | 24-hour | 2.87 | 53 | 55.87 | 5 | 5 | 50 | 150 |
| | Annual | 0.29 | 27 | 27.29 | 1 | 1 | 20 | 50 |
| PM2.5[1] | 24-hour | 2.87 | 28[a] | 30.87 | 5 | 5 | - | 35 |
| | Annual | 0.29 | 11[b] | 11.29 | 1 | 1 | 12 | 15 |
| CO | 1-hour | 108.54 | 3043 | 3152 | 2000 | 2000 | 23,000 | 40,000 |
| | 8-hour | 8.27 | 4785 | 4793 | 500 | 500 | 10,000 | 10,000 |
| $SO_2$ | 1-hour | 7.35 | 110 | 117 | - | - | 655 | - |
| | 3-hour | 2.42 | 55 | 57.4 | 25 | 25 | 1300 | 1,300 |
| | 24-hour | 0.64 | 41.9 | 42.5 | 5 | 5 | 105 | 365 |
| | Annual | 0.07 | 8 | 8.07 | 1 | 1 | - | 80 |

a. 24-hour average $PM_{2.5}$ concentrations shown are 3-year Average 98th percentile values rather than highest values because compliance with the ambient air quality standards is based on 98th percentile readings.

b. To attain the annual $PM_{2.5}$ NAAQS, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 $\mu g/m^3$.

| Table 4.4 Facility Startup Emission Rates for Each Turbine | | | |
|---|---|---|---|
| **Scenario** | **NOx** | **CO** | **VOC** |
| Cold Start, Lbs/hr | 19.3 | 14.3 | 1.4 |
| Hot Start, Lbs/hr | 8.8 | 9.2 | 1.4 |
| Warm Start, Lbs/hr | 12.2 | 10.8 | 1.4 |
| Shutdown, Lbs/hr | 7.8 | 8.9 | 1.4 |
| All startup sequences are 30 minutes or less. Shutdown is 10 minutes. | | | |

**Table 4.5 Startup and Shutdown Modeling Results**

| Pollutant | Avg. Period | Maximum[a] Concentration ($\mu g/m^3$) | Background ($\mu g/m^3$) | Total ($\mu g/m^3$) | Class II Significance Level ($\mu g/m^3$) | Ambient Air Quality CAAQS/NAAQS ($\mu g/m^3$) | ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|
| $NO_2$ | 1-hour | 37.54 | 139.2 | 176.74 | - | 470 | - |
| CO | 1-hour | 27.81 | 4785 | 4813 | 2000 | 23,000 | 40,000 |
| | 8-hour | 9.09 | 3043 | 3052 | 500 | 10,000 | 10,000 |

**Table 4.6 Commissioning Emissions Used for Modeling Analysis for Each Turbine**

| Pollutant | Emission Rate |
|---|---|
| $NO_x$ 1-hour | 51 lb/hr |
| CO 1-hour | 45 lb/hr |
| CO 8-hour | 360 lbs/8-hours |

**Table 4.7 Commissioning Period Modeling Results**

| Pollutant | Avg. Period | Maximum[a] Concentration ($\mu g/m^3$) | Background ($\mu g/m^3$) | Total ($\mu g/m^3$) | Class II Significance Level ($\mu g/m^3$) | Ambient Air Quality CAAQS/NAAQS ($\mu g/m^3$) | ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|
| $NO_2$ | 1-hour | 99.2 | 139.2 | 238.4 | - | 470 | - |
| CO | 1-hour | 87.5 | 4785 | 4872.5 | 2000 | 23,000 | 40,000 |
| | 8-hour | 52.5 | 3043 | 3095.5 | 500 | 10,000 | 10,000 |

The AERMOD modeling analyses for the MMC Chula Vista Facility were re-analyzed with the following changes:

1. Meteorological data re-processed by the SDAPCD with the most recent version of AERMET (V06341);
2. Receptor grids re-processed with the most recent version of AERMAP (V06341);
3. Impacts re-evaluated with the revised meteorological and the most recent version of AERMOD (V07026);
4. Emergency generator deleted from facility design;
5. Turbine PM emissions revised to 3.0 lbs/hr/turbine; and
6. Annual emissions revised to 3500 hours/year normal operations (fogger off), 500 hours/year with fogger on; 200 hours/year cold starts, and 200 hours/year warm starts.

With the deletion of the emergency generator, the proposed facility now consists of two identical stacks. Therefore, the revised modeling analyses were performed as screening analyses with each stack modeled at 1.0 g/s (i.e., no refined modeling analyses with the emergency generator were required). The resulting unitized concentrations from the revised screening analysis were multiplied by the turbine emission rate (g/s/turbine) to determine maximum facility impacts. The changes to the modeling results are shown below in the revised tables from AFC Section 5.1 and Appendix 5.1.

In addition to the revised impacts shown on the following tables, revised commissioning impacts (not shown in tables previously) were 99.2, 87.5, and 52.4 ug/$m^3$ for 1-hour $NO_2$, 1-hour CO, and 8-hour CO impacts, respectively, nearly identical to the impacts reported previously.

**TABLE 5.1-21**
Stack Parameters and Emission Rates for Worst-Case Source Conditions from Screening AERMOD Modeling

| | Stack Height (m) | Stack Diam (m) | Stack Temp (deg K) | Exhaust Velocity (m/s) | Emission Rates (g/s) $NO_X$ | $SO_2$ | CO | $PM_{10/2.5}$ |
|---|---|---|---|---|---|---|---|---|
| **Averaging Period: 1-hour for Normal Operating Conditions for CO and NOx Emissions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 684.8 | 22.75 | 0.533 | N/A | 0.780 | N/A |
| **Averaging Period: 1-hour for Normal Operating Conditions for $SO_2$ Emissions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 681.5 | 14.92 | N/A | 0.139 | N/A | N/A |
| **Averaging Period: 3-hours for Normal Operating Conditions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 681.5 | 14.92 | N/A | 0.139 | N/A | N/A |
| **Averaging Period: 8-hours for Normal Operating Conditions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 684.8 | 22.75 | N/A | N/A | 0.780 | N/A |
| **Averaging Period: 24 hours for Normal Operating Conditions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 681.5 | 14.92 | N/A | 0.139 | N/A | 0.378 |
| **Averaging Period: Annual for Normal Operating Conditions*** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 707.6 | 22.32 | 0.332 | 0.070 | N/A | 0.190 |
| **Averaging Period: 1-hour for Turbine Start-up/Shutdown Conditions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 684.8 | 22.75 | 2.432 | N/A | 1.802 | N/A |
| **Averaging Period: 8-hours for Turbine Start-up/Shutdown Conditions** | | | | | | | | |
| Turbines (each) | 21.336 | 3.9624 | 684.8 | 22.75 | N/A | N/A | 0.951 | N/A |

* Annual averaging periods include start-up/shutdown emissions, where applicable.

Deleted: Refined
Deleted: **
Deleted: 630
Deleted: 1
Deleted: 467
Deleted: 91
Deleted: 412
Deleted: 81
Deleted: ** Modeled emission rates based on a higher (5000 hours) estimated hours of operation.

**TABLE 5.1-22**
Air Quality Impact Summary for Normal Operating Conditions

| Pollutant | Avg. Period | Maximum Concentration ($\mu g/m^3$) | Background ($\mu g/m^3$) | Total ($\mu g/m^3$) | Class II Significance Level ($\mu g/m^3$) | SIL ($\mu g/m^3$) | Ambient Air Quality CAAQS/NAAQS ($\mu g/m^3$) | ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|---|
| $NO_2$ | 1-hour | 8.2 | 192 | 200 | - | 19 | 470 | - |
| | Annual | 0.23 | 34 | 34.2 | 1 | 1 | - | 100 |
| $PM_{10}$ | 24-hour | 1.71 | 65 | 66.7 | 5 | 5 | 50 | 150 |
| | Annual | 0.13 | 27 | 27.1 | 1 | 1 | 20 | 50 |
| $PM_{2.5}$ | 24-hour | 1.71 | 41 | 42.7 | 5 | 5 | - | 65 |
| | Annual | 0.13 | 14 | 14.1 | 1 | 1 | 12 | 15 |
| CO | 1-hour | 12.04 | 7886 | 7898 | 2000 | 2000 | 23,000 | 40,000 |
| | 8-hour | 7.21 | 6000 | 6007 | 500 | 500 | 10,000 | 10,000 |
| $SO_2$ | 1-hour | 2.84 | 110 | 113 | - | - | 655 | - |
| | 3-hour | 1.93 | 55 | 56.9 | 25 | 25 | 1300 | 1,300 |
| | 24-hour | 0.63 | 39 | 39.6 | 5 | 5 | 105 | 365 |
| | Annual | 0.04 | 11 | 11.04 | 1 | 1 | - | 80 |

**TABLE 5.1-24**
Startup and Shutdown Modeling Results

| Pollutant | Avg. Period | Maximum Concentration ($\mu g/m^3$) | Background ($\mu g/m^3$) | Total ($\mu g/m^3$) | Class II Significance Level ($\mu g/m^3$) | Ambient Air Quality CAAQS/NAAQS ($\mu g/m^3$) | ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|
| $NO_2$ | 1-hour | 37.54 | 192 | 230 | - | 470 | - |
| CO | 1-hour | 27.81 | 7886 | 7914 | 2000 | 23,000 | 40,000 |
| | 8-hour | 3.79 | 6000 | 6009 | 500 | 10,000 | 10,000 |

Deleted: 114.90
Deleted: 307
Deleted: 0.34
Deleted: 34
Deleted: 2.87
Deleted: 7
Deleted: 9
Deleted: 0.29
Deleted: 29
Deleted: 2.87
Deleted: 3
Deleted: 9
Deleted: 0.29
Deleted: 29
Deleted: 108.54
Deleted: 9
Deleted: 5
Deleted: 8.27
Deleted: 8
Deleted: 7.35
Deleted: 7
Deleted: 2.42
Deleted: 7
Deleted: 4
Deleted: 4
Deleted: 7
Deleted: 7
Deleted: 9.09

7084A

# Rule 1200 Health Risk Assessment Review

| | |
|---|---|
| Facility Name: | MMC Chula Vista |
| Facility ID: | 7084A |
| Application(s): | 985092, 985093, 985106 |
| Project Engineer: | Arthur Carbonell |
| Toxics Risk Analyst: | Dick Brightman |
| Date Completed by Toxics: | 11/5/07 |
| HRA Tool Used: | **HARP-ISC (HarpXpress)** |

The following estimated risks are valid only for the input data provided by the facility.

## Estimated Risks for the Project

| | |
|---|---|
| Maximum Offsite Individual Cancer Risk | 1.53 per million LCP |
| Maximum Offsite Chronic Non-Cancer Health Hazard Index | 0.00228 |
| Maximum Offsite Acute Health Hazard Index | 0.0898 |

## Input Data Provided by Project Engineer

| | |
|---|---|
| Type of Source: | 2 natural gas-fired turbines, 1 diesel black start engine |
| Controls Description: | SCR |
| T-BACT: | Yes |

### Process Data for Diesel Engines

| Operation Parameter | Value |
|---|---|
| Diesel particulate emission factor (g/hp-hr) | 0.15 |
| Fuel consumption (gallons/hr) | 48 |
| Engine horsepower (bhp) | 851 |
| Annual hours of operation | 50 |

Note: TACs evaluated are: arsenic, benzene, copper, formaldehyde, hydrochloric acid, mercury, nickel, toluene, xylene, diesel particulate

### Process Data for Gas Turbines

| Operation Parameter | Value |
|---|---|
| Turbine Rating (MMBTU/hr) | 468.8 |
| HHV (BTU/scf) | 1015 |
| Fuel consumption (MMscf/hr) | 0.4619 |
| Annual hours of operation | 4000 |

**Worst Case Potential Emissions:**

**Turbines (each)**

| CHEMICAL NAME | Emission Factor lb/MMscf | Acute Emission Rate lb/hr | Annual Emission Rate lb/yr |
|---|---|---|---|
| ACETALDEHYDE | 4.08E-02 | 1.88E-02 | 7.54E+01 |
| ACROLEIN | 6.50E-03 | 3.00E-03 | 1.20E+01 |
| AMMONIA | 5% slip | 3.16E+00 | 1.26E+04 |
| BENZENE | 1.22E-02 | 5.64E-03 | 2.25E+01 |
| BUTADIENE, 1,3- | 4.00E-04 | 1.85E-04 | 7.39E-01 |
| ETHYL BENZENE | 3.26E-02 | 1.51E-02 | 6.02E+01 |
| FORMALDEHYDE | 7.24E-01 | 3.35E-01 | 1.34E+03 |
| NAPHTHALENE | 1.30E-03 | 6.00E-04 | 2.40E+00 |
| POLYCYCLIC AROM. HC (PAH) | 2.20E-03 | 1.02E-03 | 4.06E+00 |
| TOLUENE | 1.33E-01 | 6.12E-02 | 2.45E+02 |
| XYLENES | 6.53E-02 | 3.02E-02 | 1.21E+02 |

**Diesel Black Start ICE**

| CHEMICAL NAME | Emission Factor lb/1000 gal | Acute Emission Rate lb/hr | Annual Emission Rate lb/yr |
|---|---|---|---|
| DIESEL PARTICULATE (g/hp-hr) | 0.15 g/hp-hr | | 1.41E+01 |
| ACROLEIN | 3.39E-02 | 1.63E-03 | |
| ARSENIC COMPOUNDS | 1.60E-03 | 7.68E-05 | |
| BENZENE | 1.86E-01 | 8.94E-03 | |
| COPPER AND COMPOUNDS | 4.10E-03 | 1.97E-04 | |
| FORMALDEHYDE | 1.73E+00 | 8.29E-02 | |
| HYDROCHLORIC ACID | 1.86E-01 | 8.94E-03 | |
| MERCURY AND COMPOUNDS (INORGANIC) | 2.00E-03 | 9.60E-05 | |
| NICKEL AND NICKEL COMPOUNDS | 3.90E-03 | 1.87E-04 | |
| TOLUENE | 1.05E-01 | 5.06E-03 | |
| XYLENES | 4.24E-02 | 2.04E-03 | |

**Release Parameters:**

**Turbines**

| Stack Release Parameters | Value |
|---|---|
| Stack Height (ft) | 70 |
| Stack Diameter (ft) | 13 |
| Temperature deg F | 814 |
| Vertical Airflow (acfm) | 583226 |

**Diesel Black Start ICE**

| Stack Release Parameters | Value |
|---|---|
| Stack Height (ft) | 15 |
| Stack Diameter (ft) | 0.83 |
| Temperature deg F | 958 |
| Vertical Airflow (acfm) | 6459 |

**Discussion**

The HRA was conducted in accordance with EPA and OEHHA guidance and District standard procedures. Three point sources were modeled with refined air dispersion modeling using EPA's ISC3 and ARB's HARP model (HARP Xpress), actual San Diego Lindbergh Field 1996-1998 meteorology data, and urban dispersion coefficients. Building downwash effects were calculated using the EPA BPIP model. The 50 meter-spacing receptor grid was sufficiently dense to identify maximum impacts. Health impacts were estimated at points of maximum concentration.

The District re-calculated the risk using District default emission factors based on EPA AP-42 for gas turbines instead of the CATEF emission factors in the submitted HRA, and Ventura County (2001) emission factors for speciated diesel exhaust (VOCs and metals) for acute diesel impacts. The District found that the diesel particulate emissions were underestimated in the submitted HRA (14.1 lb/yr vs 0.182 lb/yr in the submitted HRA). The submitted HRA ignored acute diesel impacts, and calculated risk due to turbines and that due to diesel separately. The District remedied this in its re-calculation. The District used a deposition velocity of 0.05 m/s since it is not assured that particulate emissions are controlled. The cancer risk increased by a factor of 10 but is still less than the level of concern for TBACT. Chronic and acute risks were unchanged or less than estimated in the submitted HRA.