DOCKETED	
Docket Number:	03-AFC-01C
Project Title:	Roseville Energy Park Compliance
TN #:	236223
Document Title:	Roseville Electric Utlity PTA - REP Turbine Upgrade
Description:	N/A
Filer:	Scott Galati
Organization:	DayZenLLC
Submitter Role:	Applicant Representative
Submission Date:	1/5/2021 11:36:58 AM
Docketed Date:	1/5/2021

PETITION TO AMEND

ROSEVILLE ENERGY PARK (03-AFC-1C)

A+ Turbine Upgrade

SUBMITTED TO: CALIFORNIA ENERGY COMMISSION

SUBMITTED BY: **Roseville Electric Utility**

January 2020

DAYZEN LLC

SECTION 1 INTRODUCTION

1.1 INTRODUCTION TO PETITION

Pursuant to Section 1769 of the California Energy Commission (Commission) regulations[1], Roseville Electric Utility[2], files this Petition For Amendment (Petition) with the California Energy Commission (Commission) to modify the existing Roseville Energy Park (REP) Final Decision.[3] The Commission certified the License for the REP on April 13, 2005. The REP was constructed and began commercial operations in October 15, 2007.

This Petition requests three modifications. The first is to install and operate the Siemens A+ turbine upgrade package (A+ Turbine Upgrade) to both combustion turbines to be completed during the scheduled February 2021 outage. The second modification is to install and operate piezo-actuated valves individually for each burner which will allow a more stable combustion process and a more balanced combustion spread (Low Load Turndown). The third modification is to install and operate a control system upgrade that introduces a new function into the existing turbine governor that automatically takes corrective actions in case combustion instabilities (pulsations) are detected in the combustion chamber (Advanced Emissions Tuning or AET).

The remainder of this Section 1 describes the procedural background of the REP and cites the authority for the Commission to process this Petition.

Section 2 of the Petition describes the specific modifications proposed for the REP including an explanation of why the modification is being undertaken and its benefits.

Sections 3, 4, 5 and 6 contain analysis comparing the potential environmental impacts from the modifications to the potential environmental impacts of the REP as approved in the Commission Final Decision, as modified by prior approved amendments. As discussed in these Sections, Roseville Electric Utility does not anticipate any significant environmental impacts from the proposed modifications and does not propose any changes to existing Conditions of Certification contained in the Final Decision. Roseville Electric understands that the Placer County Air Pollution Control District (PCAPCD) will modify its air quality permit but believes the modifications will not require any changes to any air permit condition. Roseville Electric has received a variance from the PCAPCD to install minor modifications to allow low load operations and has filed a

[1] Title 20 CCR Section 1769.

[2] Roseville Electric Utility is a municipal utility and a division of the City of Roseville.

[3] The term Final Decision refers to Roseville Energy Park Final Decision, CEC-800-2005-003, dated August 13, 2005 as amended by subsequent amendments approved by the Commission.

request for modification of the air permit with PCAPCD on December 16, 2020. A copy of the application to PCAPCD is included at Appendix A to this Petition.

Section 7 contains an analysis demonstrating that the modifications do not increase any potential effects on nearby property owners or the public.

1.2 PRIOR PETITIONS FOR AMENDMENT

On January 24, 2008 Roseville Electric filed a Petition For Amendment to amend Conditions of Certification AQ-4 and AQ-7 and the addition of AQ9.5 to allow substitution of Volatile Organic Compounds (VOCs) offsets for oxides of Nitrogen (NOx). The Commission approved the Petition on April 23, 2008.

On March 30, 2011, Roseville Electric a Petition For Amendment to remove the remedial action scheme from service. Staff approved the Petition on May 11, 2011.

On March 28, 2016, Roseville Electric filed a Petition For Amendment to modify the Conditions of Certification to remove references to GE turbines which were not installed, and replace references to Alstom, with Siemens to reflect the change in name of the turbines that were installed. Additionally, the Petition requested the elimination of Certification AQ-13 and to modify Condition of Certification AQ-51 relating to ammonia slip and catalyst replacement and/or reconditioning. The Commission approved the Petition as a Staff-approved amendment on September 22, 2016.

Roseville Electric's most recent Petition For Amendment was filed on June 22, 2016 to modify the REP by replacing an existing ladder and cage access on the belt press structure with a staircase, build an extension of the existing catwalk to Combustion Turbine 2, and add five reinforced cement pads at various locations throughout the facility. The Commission approved the Petition on August 22, 2017.

1.3 SUMMARY OF ENVIRONMENTAL IMPACTS

As described in Sections 3, 4, 5 and 6 of this Petition, the modifications as proposed herein will not result in significant environmental impacts and will comply with all applicable LORS.

1.4 CONSISTENCY OF PROJECT MODIFICATIONS WITH LICENSE

As demonstrated in Sections 3 through 6 the proposed modifications proposed in this Petition do not undermine any of the findings and conclusions contained in the Final Decision. Additionally, the modifications proposed in this Petition do not require modifications of any of the Condition of Certifications.

SECTION 2 DESCRIPTION OF PROJECT AMENDMENT

2.1 NEED FOR THE MODIFICATIONS

2.1.1 A+ Turbine Upgrade

The purpose of the A+ Turbine Upgrade is to increase the gross output of each turbine and increase efficiency. This modification will increase the gross output of each turbine by 2.5 MW, and increase efficiency by 0.55%. Additionally, the new components installed to make this modification will allow the major maintenance intervals to be extended from 20,000 Equivalent Operating Hours (EOH) to 30,000 EOH. The increased power and efficiency will allow more local power to be produced for voltage support in the Sacramento Valley during the peak season without a corresponding increase in fuel use. The major maintenance interval increase reduces Operations and Maintenance costs which saves the rate payers money and increases facility availability.

2.1.2 Low Load Turndown by Individual Burner Trim

The purpose of the Low Load Turndown is to allow operation at lower turbine loads while remaining compliant with permit limitations. This is an addition of piezo-actuated valves installed individually for each burner which will allow a more stable combustion process and a more balanced combustion spread. The valves are controlled by an automated optimization algorithm, continuously operating in the background during GT operation responding to governor parameters at different loads. The addition and fine-tuned control of these 30 valves will support lower NOx emissions at all loads, and allow for lower turbine loads (pMin) while remaining compliant with permit limitations.

2.1.3 Advanced Emissions Tuning (AET)

The purpose of the AET is to upgrade the facility to reduce the need for manual tuning on site and to optimize combustion performance during seasonal changes. This upgrade is a control system upgrade that introduces a new function into the existing turbine governor that automatically takes corrective actions in case combustion instabilities (pulsations) are detected in the combustion chamber due to e.g. site specific variations in operating conditions (e.g. variations in fuel composition or gas pressure).

AET features the following benefits:

- Reduced pulsation levels and increased reliability in case of site specific variations
- Improved stability margins for changes in fuel gas composition, variations in gas supply pressure, handling of fast transients
- Ability to tune for lower NOx emission level
- AET will monitor the combustion performance at optimum pilot split and act on demand, avoiding any other engine limitations
- Reduced need for manual tuning on site
- Optimized combustion performance during seasonal changes

2.2 CURRENT PROJECT DESCRIPTION

The REP is located on a 12-acre site that lies within a 40-acre City of Roseville parcel. The Project site is within the limits of the City of Roseville, adjacent to and north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP).

The REP power train consists of the following:

- two Siemens SGT-800 combustion turbine-generators (CTGs);
- two heat recovery steam generators (HRSGs) with duct burners;
- selective catalytic reduction (SCR) and oxidation catalyst equipment to control NOx and carbon monoxide (CO) emissions, respectively;
- a single condensing steam turbine generator (STG);
- a de-aerating surface condenser;
- a mechanical draft cooling tower using reclaimed water for cooling; and
- associated support equipment.

The existing project is rated at 160MW.

2.3 DETAILED DESCRIPTION OF PROPOSED MODIFICATIONS

2.3.1 A+ Turbine Upgrade

The existing REP turbines were previously designated as Alstom Power Model GTX 100. When the Siemens Power Corporation purchased Alstom Power, the Alstom GTX 100 turbines had their model number re-designated to the SGT-800 to conform to Siemens' naming convention. The A+ Turbine Upgrade will change the nominal turbine

rating from 457.3 to 478.6 MMBtu/hr and will raise the turbines output from 45 to 47.5 MW. The increase in efficiency will result in a two (2) percent decrease in fuel consumption per kWh. There are no proposed changes to the existing HRSGs or the cooling tower design.

The upgrade package will be installed during the period of the normal turbine maintenance and repair, which will occur during the scheduled February 2021 outage. The upgrade package will install the following:

- Replace the Row 1 Compressor Blades with a functionally different design to increase the air flow.

2.3.2 Low Load Turndown by Individual Burner Trim

During the scheduled February 2021 maintenance outage, the piezo-actuated valves will be installed individually for each burner. Ultimately, the valves will be controlled by an automated optimization algorithm, continuously operating in the background during GT operation responding to governor parameters at different loads. The addition and fine-tuned control of these 30 valves will support lower NOx emissions at all loads, and allow for lower turbine loads (pMin) while remaining compliant with permit limitations.

2.3.3 Advanced Emissions Tuning (AET)

This upgrade is a control system upgrade that introduces a new function into the existing turbine governor that automatically takes corrective actions in case combustion instabilities (pulsations) are detected in the combustion chamber due to site specific variations in operating conditions (e.g. variations in fuel composition or gas pressure). It requires no physical changes to facility. This upgrade will be installed during the February 2021 outage.

SECTION 3 ENGINEERING ASSESSMENT

This section contains an evaluation of the modification proposed in this Petition to determine if it would result in modification of the findings, conclusions or conditions of certification for each technical discipline included within the Engineering Assessment section of the Final Decision.

3.1 FACILITY DESIGN

3.1.1 A+ Turbine Upgrade

The A+ Turbine Upgrade will not change the ultimate conclusions contained in the Final Decision related to Facility Design. The A+ turbine upgrade will change the nominal turbine rating from 457.3 to 478.6 MMBtu/hr and will raise the turbines' output from 45 to 47.5 MW. The increase in efficiency will result in a two (2) percent decrease in fuel consumption per kWh. There are no proposed changes to the existing HRSGs or the cooling tower design. Installation of the compressor blades will occur in the same manner as normal maintenance and replacement activities. The existing conditions of certification contained in the CEC Final Decision will ensure that the REP will continue to comply with all applicable laws, ordinances, regulations and standards (LORS) and therefore no modifications to the analysis, findings, conclusions or conditions to the certification contained in the Facility Design section of the CEC Final Decision are necessary.

3.1.2 Low Load Turndown by Individual Burner Trim

The Low Load Turndown will not change the ultimate conclusions contained the Final Decision related to Facility Design. The Low Load Turndown will fine-tuned control of these 30 valves that will support lower NOx emissions at all loads, and allow for lower turbine loads (pMin) while remaining compliant with permit limitations. The existing conditions of certification contained in the CEC Final Decision will ensure that the REP will continue to comply with all applicable laws, ordinances, regulations and standards (LORS) and therefore no modifications to the analysis, findings, conclusions or conditions to the certification contained in the Facility Design section of the CEC Final Decision are necessary.

3.1.3 Advanced Emissions Tuning (AET)

The AET is an upgrade to the control software that allows automatic tuning to address combustion instabilities. This upgrade will not involve any physical changes to the facility and therefore will not require modifications to the analysis, findings, conclusions

or conditions to the certification contained in the Facility Design section of the CEC Final Decision.

3.1.4 Changes in LORS Conformance and Other Permits

There are no changes in Facility Design LORS or required Facility Design related permits necessary for the proposed modifications. The modification of the PCAPCD air permit is discussed in Section 4 of this Petition.

3.1.5 Conditions of Certification

No modifications to any of the existing Facility Design conditions of certification are necessary.

3.2 POWER PLANT EFFICIENCY AND RELIABILITY

The A+ turbine upgrade will increase the power plant efficiency by 2 percent and does not affect the overall power plant reliability of the REP.

3.2.1 Transmission system engineering

The increase in generation output due to additional efficiency will not have any effect on the transmission system as the nominal increase is within the study parameters of the Interconnected Operations Contract with Western Area Power Administration. Therefore, the proposed modification will have no effect on the findings, conclusions or conditions of certification contained in the Transmission System Engineering section of the CEC Final Decision.

3.3 TRANSMISSION LINE SAFETY AND NUISANCE

Since there are no required changes to the switchyard or the transmission line to accommodate the modifications proposed in this Petition, there will be no effect on findings, conclusions or conditions of certification contained in the Transmission Line Safety and Nuisance section of the Final Decision.

SECTION 4 PUBLIC HEALTH AND SAFETY

This section contains an evaluation of the modifications proposed in this Petition to determine if it would result in modification to the findings, conclusions or conditions of certification for each technical discipline included within the Public Health and Safety section of the Final Decision.

4.1 AIR QUALITY, GREENHOUSE GASES AND PUBLIC HEALTH

Please See the Air Quality Technical Analysis and Application to the PCAPCD contained in Appendix A which demonstrates that the proposed modifications do not result in significant environmental impacts, comply with current air quality and public health-related laws, ordinances, regulations and standards, and do not undermine any of the findings and conclusions of the Final Decision. The analysis also demonstrates that no modifications to any Air Quality or Public Health Conditions of Certification are necessary, or proposed.

4.2 HAZARDOUS MATERIALS MANAGEMENT

The modifications proposed in this Petition will not affect the findings and conclusions contained in the Hazardous Materials Management section of the Final Decision as they will not involve the use of any new hazardous materials not already identified in the Final Decision.

4.3 WORKER SAFETY/FIRE PROTECTION

The modifications proposed in this Petition will not expose workers to any additional risks not evaluated in the Worker Safety/Fire Protection section of the CEC Final Decision and encountered during normal authorized maintenance activities. Roseville Electric Utility will require its workers to comply with the various CEC-approved safety plans during installation and operation of the A+ Turbine Upgrade, the Low Load Turndown and the AET. Therefore, the modifications proposed in this Petition will not affect the findings and conclusions of the Final Decision relating to worker safety or fire protection. No modifications to the Worker Safety conditions of certification of the Final Decision are necessary.

SECTION 5 ENVIRONMENTAL ANALYSIS

This section contains an evaluation of the modification proposed in this Petition to determine if it would result in modification to any of the findings, conclusions or conditions of certification for each technical discipline included within the Environmental Assessment section of the Final Decision.

5.1 BIOLOGICAL RESOURCES

The modifications proposed in this Petition will have no biological effects beyond those analyzed in the Final Decision because there will be no additional surface disturbance associated with the upgrade and no impacts to biological resources because there are no increases in emissions. No modifications to the any of the existing Biological Resource conditions of certification are necessary the A+ Turbine Upgrade, the Low Load Turndown, and the AET will not undermine any of the findings and conclusions of the Final Decision.

5.2 SOIL AND WATER RESOURCES

The A+ Turbine Upgrade proposed in this Petition will not change the water balance or modify any existing, or create any additional, liquid waste streams. There are no new Soil and Water Resource-related LORS or required permits for the modifications proposed in this Petition. No modifications to any of the existing Soil and Water Resources conditions of certification are necessary and the modifications proposed in this Petition will not undermine any of the findings and conclusions of the Final Decision.

5.3 CULTURAL RESOURCES

The A+ Turbine Upgrade, Low Load Turndown, and AET will not involve ground disturbance and therefore will have no cultural resources effects. There are no new Cultural Resource LORS or required permits for the modification proposed in this Petition. No modifications to any of the existing Cultural Resource conditions of certification are necessary and the modifications proposed in this Petition will not undermine any of the findings and conclusions of the Final Decision.

5.4 GEOLOGICAL AND PALEONTOLOGICAL RESOURCES

The A+ Turbine Upgrade, Low Load Turndown, and AET will have no effect on Geological and Paleontological Resources because it will not involve new construction or grading. There are no new Geological or Paleontological Resources-related LORS or required permits for the modifications proposed in this Petition. No modifications to any of the existing Geological and Paleontological conditions of certification are

necessary and the modifications will not undermine any of the findings and conclusions of the Final Decision.

5.5 WASTE MANAGEMENT

The A+ Turbine Upgrade, Low Load Turndown, and AET proposed in this Petition will not modify any existing, or create any additional, waste streams. There are no new Waste Management-related LORS or required permits for the modifications proposed in this Petition. No changes to any of the existing Waste Management conditions of certification are necessary and the modifications will not undermine any of the findings and conclusions of the Final Decision.

SECTION 6 LOCAL IMPACT ANALYSIS

This section contains an evaluation of the modifications proposed in this Petition to determine if it would result in modification to any findings, conclusions or conditions of certification for each technical discipline included within the Local Impact Assessment section of the Final Decision.

6.1 LAND USE

The modifications proposed in this Petition will not affect the findings and conclusions contained in the Land Use section of the Final Decision as it will not involve the use of new land areas.

6.2 NOISE AND VIBRATION

The A+ Turbine Upgrade, Low Load Turndown, and AET will not affect the noise output of the plant because the compressor blade replacement is enclosed and will not modify the noise characteristics of the existing combustion turbines. Therefore, operation of the turbines after the upgrade will not modify the overall noise impacts of the REP.

Roseville Electric Utility received a noise complaint related to the REP on September 29, 2020 and filed a report with the CEC Compliance Project Manager (CPM). A noise survey was scheduled and conducted with the draft report being received by the Roseville Electric on November 3, 2020. The draft report does not give any clear indication of the source of the noise that the complaint was based upon. Roseville Electric Project management is still working with the consultant to determine the sound source in order to address the issue. The CPM is being appraised of the situation as it evolves.

The modifications proposed in this Petition will not affect the findings and conclusions, nor require any modifications to the existing conditions of certification, contained in the Noise and Vibration section of the Final Decision.

6.3 SOCIOECONOMICS

The modifications proposed in this Petition will not affect the findings and conclusions, nor require any modifications to the existing conditions of certification, contained in the Socioeconomic Resources section of the Final Decision as none of the modifications will burden existing public services.

6.4 TRAFFIC AND TRANSPORTATION

The A+ Turbine Upgrade, Low Load Turndown, and AET will not result in any significant impacts to traffic and transportation beyond those identified in the Final Decision because the delivery and worker activities are identical to those that take place during normal maintenance activities which are currently authorized by the Final Decision. Specifically, there are three types of normal maintenance outages performed for the REP. There are three types of planned maintenance outages; Levels A through C.

Level A planned maintenance outages are carried out every other year and takes approximately 5 days per turbine and involves 2 workers on-site and delivery of 2 shipments of supplies and tools which includes mobilizations and demobilization.

Level B planned maintenance outages are undertaken out after every 15,000 operating hours and takes approximately 28 days per turbine. Workers on site for this type of maintenance peak at approximately 25 per day during daylight hours and the work is performed in approximately 45 days. Level B work involves approximately 8 deliveries of supplies and tools including mobilization and demobilization to and from the site.

A Level C planned maintenance outage is undertaken after every 30,000 operating hours and takes approximately 33 days per turbine. Workers on site for this type of maintenance peak at approximately 50 per day during daylight hours and the work is performed in approximately 45 days. Level C work involves approximately 12 deliveries of supplies and tools including mobilization and demobilization to and from the site. The work proposed in this Petition is being performed during a Level C planned maintenance outage and will not increase the number of workers or deliveries above those anticipated for Level C work.

According to the City of Roseville Planning Department[4], since the project is an amendment of an existing use and will not increase operational vehicle trips, a Vehicle Miles Traveled (VMT) analysis is not required.

As described in Section 6.5 of this Petition the modifications proposed in this Petition will not affect REP's continued compliance with Condition of Certification **TRANS-7.**

Therefore, no modifications to any Traffic and Transportation Conditions of Certification are necessary. The modifications described in this Petition will not undermine any findings and conclusions of the Final Decision.

[4] General Plan Update, August 2020 Policy 4.3; General Plan Update EIR.

6.5 VISUAL RESOURCES

The A+ Turbine Upgrade, Low Load Turndown and AET will not affect the findings and conclusions, nor require any modifications to the existing conditions of certification, contained in the Visual Resources section of the Final Decision because the modifications, when completed, will not be visible.

Condition of Certification **VIS-2** states:

> **VIS-2** To ensure that the cooling tower is designed, built and operated as presented in this AFC proceeding, the Project owner shall ensure that the cooling tower is designed and operated as follows:
>
> The cooling tower shall be designed and operated so that that the exhaust air flow rate per heat rejection rate:
>
> GTX Configuration
>
> (1) will not be less than 25.4 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are between 41 degrees F and 80 degrees F; (2) will not be less than 19 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are below 41 degrees F (assuming only three cooling tower cells in operation); and (3) will not be less than 13.6 kilograms per second per megawatt when operating with duct firing and the ambient temperatures are below 80 degrees F.
>
> LM6000 Configuration
>
> (1) will not be less than 32.6 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are between 55 degrees F and 80 degrees F; (2) will not be less than 24.5 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are between 41 degrees F and 55 degrees F (assuming only three cooling tower cells in operation); (3) will not be less than 16.1 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are below 41 degrees F (assuming only two cooling tower cells in operation); and (4) will not be less than 14.4

kilograms per second per megawatt when operating with duct firing and the ambient temperatures are below 80 degrees F.

Verification: At least 90 days prior to ordering the cooling tower, the Project owner shall provide to the CPM for review the final design specifications of the cooling tower related to plume formation. The Project owner shall not order the cooling tower until notified by the CPM that the two design requirements above have been satisfied.

The Project owner shall provide written documentation in each Annual Compliance Report to demonstrate that the cooling tower has consistently been operated within the above -specified design parameters, except as necessary to prevent damage to the cooling tower. If determined to be necessary to ensure operational compliance, based on legitimate complaints received or other physical evidence of potential non-compliant operation, the Project owner shall monitor the cooling tower operating parameters in a manner and for a period as specified by the CPM. For each period that the cooling tower operation monitoring is required, the Project owner shall provide to the CPM the cooling tower operating data within 30 days of the end of the monitoring period. The Project owner shall include with this operating data an analysis of compliance and shall provide proposed remedial actions if compliance cannot be demonstrated.

The cooling tower was designed and constructed based on the data presented in the original AFC proceeding such that the exhaust flow heat rejection rate is as follows:

1. Will not be less than 25.4 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are between 41 degrees F and 80 degrees F

2. Will not be less than 19 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are below 41 degrees F (assuming only three cooling tower cells in operation)

3. Will not be less than 13.6 kilograms per second per megawatt when operating with duct firing and the ambient temperatures are below 80 degrees F.

The original cooling tower design included added margin which will more than accommodate the small increase in the thermal load from the A-Plus upgrade without

any physical modifications to the cooling tower design. There will be no changes to the cooling tower leaving air flow and the small changes in tower heat inputs and the resulting exhaust flow (the ratio which is used to calculate the exhaust heat rejection rates limits) will continue to comply with the **VIS-2** requirements. Please see the table included as Appendix B to this Petition.

Condition of Certification **VIS-5** states in part"

> The Project owner shall install landscaping that complies with the West Roseville Specific Plan Design Guidelines for street landscaping for the re-routed Phillip Road and the Blue Oaks extension. The landscaping shall be installed when these respective roadways are constructed.

The referenced street construction is underway and will be completed in the near future. The Roseville Electric Utility is working to draft the required landscaping plans for submission to the CPM and City of Roseville Planning department for review. Once the plans are reviewed and approved the Project will proceed as outlined in Condition of Certification **VIS-5**.

SECTION 7 POTENTIAL EFFECTS ON PROPERTY OWNERS

The Commission's Power Plant Siting Regulations require a Petition For Amendment to include 1) a discussion of how the modification affects the public; 2) a list of property owners potentially affected by the modification; and 3) a discussion of the potential effect on nearby property owners, the public and the parties in the application proceedings.

As described in technical area evaluated in Sections 3, 4, 5 and 6 of this Petition, with implementation of the existing conditions of certification the impacts of the proposed modifications are less than significant and therefore would not affect the public differently than the identified in the Final Decision.

Roseville Electric Utility has conducted a property search and no updates to the existing property list for the 1000 foot notice are required.

APPENDIX A

PCAPCD Permit Application

Roseville Electric Utility – Generation Division Siemens A-Plus Turbine Upgrade Modification

Roseville, California

Prepared for

CITY OF ROSEVILLE CALIFORNIA

Prepared by

Atmospheric Dynamics, Inc.

ATMOSPHERIC DYNAMICS, INC
Meteorological & Air Quality Modeling

December 2020

1.0 Air Quality

1.1.1 Introduction

This document presents the methodology and results of an analysis performed to assess potential impacts of airborne emissions from the modification and subsequent routine operation of the City of Roseville Electric Utility-Roseville Energy Park (REP) turbine upgrade project. Section 1.0 presents the introduction, applicant information, and the basic Placer County Air Pollution Control District (PCAPCD) rules applicable to the turbine project, the project description, both current and proposed, data on the emissions of criteria and air toxic pollutants from the proposed project, discusses the best available control technology evaluation for the project, applicable laws, ordinances, regulations, and standards (LORS), the air quality impact analysis for the proposed turbine replacement project, agency contacts, permit requirements and schedules, and contains references cited or consulted in preparing this section. Section 2.0 presents the methodology and results of a health risk assessment performed to assess potential impacts and public exposure associated with airborne emissions from the routine operation of the Project. Support materials are included in the following attachments:

Attachment 1 – PCAPCD Permit Application Forms

Attachment 2 – Current Title V Permit and District PTO's

Attachment 3 – Emissions Evaluations

Attachment 4 – Turbine Upgrade Performance Data

Attachment 5 – Air Quality Impact Analysis Support Data

Attachment 6 – Health Risk Assessment Support Data

REP is proposing to modify the existing power generation facility as follows:

- Modify the existing turbines with the Siemens SGT-800 A-Plus Upgrade package. The upgrade package improves efficiency through increasing the turbine firing temperature and through the use of redesigned turbine vanes. The existing blades would be replaced. The replacement components are considered to be functionally equivalent. The upgrade would most likely occur in early 2021 during an outage for turbine maintenance and overhaul. Many of the replaced components are part of the normal turbine maintenance cycle.
- There will be no change in emissions of criteria pollutants associated with the upgrade project. The facility short-term, quarterly, and annual potential to emit (PTE) will remain as listed in the current Title V operating permit.

There will be no changes to the size and operations of the duct burners in the heat recovery steam generators or will there be any changes to the cooling tower water usage rates.

The upgrade will change the nominal (average day conditions) turbine rating from 457.3 to 478.6 MMBtu/hr. There are no proposed changes to the existing HRSGs or the cooling tower design or operational parameters. The overall plant power output will increase from 160 MW to 166 MW (2x1, cold day conditions, Case 29).

Based on the performance data provided by Siemens for the A-Plus upgrade, emissions of criteria pollutants are expected to decrease on an hourly basis as compared to the currently permitted

emission limits. The updated Siemens emissions data on the SGT-800 turbine Upgrade is included in Attachments 3 and 4 and does not reflect the use of any additional emissions control strategies over the existing (current) BACT limits. Because the existing project emissions of NO_x, VOC's and PM10/2.5 have been fully offset (CO is attainment so offsets are no longer needed), the applicant proposes to maintain the current hourly, daily, quarterly and annual permitted limits for these pollutants. Review of the actual emissions from REP over many years of operation demonstrate that the increase in turbine performance and any associated small increase in emissions based on the A-Plus upgrade will safely comply with the existing permitted limits. There will be no modifications or changes to the other existing equipment at REP.

Thus, the resulting physical modification of the turbine will not result in any potential increases to the currently permitted limits.

1.1.1.1 Regulatory Items Affecting Modification

Although a regulatory compliance analysis (LORS) is presented in Section 1.1.6, there are several regulations which directly affect the PCAPCD permitting and review process for the proposed addition/modification as follows:

- New Source Review (NSR) Rule 502 will apply to the proposed upgrade project.
- The Applicant must provide all required emissions mitigations prior to the issuance of the authority to construct for the project.
- The Applicant must provide an impact analysis per the NSR regulations noted above.
- The Applicant must demonstrate, prior to the issuance of the Authority to Construct (ATC), that all major stationary sources owned or operated by the Applicant which are subject to emissions limitations, are either in compliance or on a schedule for compliance with all applicable emissions limitations under the Clean Air Act (CAA).

Table 1 presents the major polluting facility emissions thresholds applicable to the project site per Rule 502 (NSR) and Rule 507 (Title V).

TABLE 1 MAJOR POLLUTING FACILITY EMISSIONS THRESHOLDS

Air Contaminant	Emission Rate Rule 502 (tons/year)	Emission Rate Rule 507 (tons/year)
Particulate Matter (PM_{10})	100	100
Oxides of Nitrogen (NO_x)	25	25
Volatile Organic Compounds (VOC)	25	25
Oxides of Sulfur (SO_x)	100	100
Carbon Monoxide (CO)	NA	100
HAPs	10/25[1]	10/25[1]

[1] 10 tpy (tons per year) of any single HAP, or 25 tpy of any combination of HAPs.

All values are for the Sacramento Valley portion of the PCAPCD.

Based on a reading of the regulations noted above, the proposed turbines (and facility) would be classified as a major source for NO_x, and non-major for PM10/2.5, CO, VOC, SO_2, and HAPs, and as such, the rule requirements noted above would be applicable.

1.1.1.2 PCAPCD Permitting Application Forms

The PCAPCD permitting application forms are presented in Attachment 1.

1.1.2 Project Description

1.1.2.1 Current Site

Roseville Electric (the Electric Department of the City of Roseville) owns and operates a natural gas combined cycle power plant at the Roseville Energy Park, located in Roseville, California, at 5120 Phillip Rd, in the City of Roseville, CA. The site is approximately 4.6 miles from the Sutter County line to the west, and 4.4 miles from the Sacramento County line to the south. The proposed site is located in southwestern Placer County, approximately 5 miles northwest of downtown Roseville. The site is adjacent to Phillip Road, an existing, publicly maintained, paved roadway. The City of Roseville's PGWWTP is located on the southern side of Phillip Road across the road from the REP site.

The REP is located in Placer County (south western portion within the Sacramento Valley Air Basin) and is currently permitted under the Placer County Air Pollution Control District (PCAPCD) requirements. Figures 1 and 2 present the location of the existing project.

The power plant commenced operations on October 15, 2007. The plant is rated at 120 MW, with a peaking capacity of 160 MW (cold day condition). The plant includes two (2) natural gas fired combustion turbines, natural gas fired duct burners, and steam turbine. Nitrogen oxide and carbon monoxide emissions are controlled with the use of dry-low-NOx combustors, oxidation catalyst, and selective catalytic reduction.

1.2 Equipment Listing

Existing Site and Facility

The existing REP consists of the following equipment.

- Two (2) Siemens SGT-800 natural gas fired turbine generator, each rated at 457.3 MMBtu/hr
- Two (2) Heat Recovery Steam Generators (HRSG) which contain a natural eight element gas fired duct burner, each rated at 225 MMBtu/hr
- One (1) diesel fired emergency generator engine, rated at 1133 bhp
- One (1) diesel fired fire pump engine, rated at 300 bhp
- One (1) four cell evaporative cooling tower, counter flow design
- One (1) single condensing steam turbine generator (STG)

The REP currently operates under the existing PCAPCD operating permits (valid October 1, 2019 to September 30, 2020. PTO #'s REPR-20-1 and REPR-20-2). See Attachment 2.

Proposed Upgrade

The existing REP turbines were previously designated as Alstom Power Model GTX 100. When the Siemens Power Corporation purchased Alstom Power, the Alstom GTX 100 turbines had their model number re-designated to SGT-800 to conform to Siemens' naming convention. The upgrade will change

the nominal (average day conditions) turbine rating from 457.3 to 478.6 MMBtu/hr. There are no proposed changes to the existing HRSGs or the cooling tower design or operational parameters. The overall plant power output will increase to 166 MW (2x1, cold day conditions, Case 29).

The upgrade package will be installed during the period of the normal turbine maintenance and repair, which will occur during 2021. The upgrade package will install the following:

- Replace the Row 1 Compressor Blades with a functionally different design to increase the air flow

During the installation of the upgrade package, the following components will be replaced which are associated with the normal repair cycle and are of a functionally equivalent like-kind design and include:

- Redesigned Row 1 Turbine Vanes and Blades replacement which will contain a new coating and vent holes to accommodate the changes to heat and air flow from the updated Row 1 compressor blades. Without the upgrade, the vanes and blades would function the same as the current setup.
- Redesigned Row 2 Vanes replacement which will also incorporate a new coating and vent holes to accommodate the heat and air flow changes. Without the upgrade, the vanes and blades would function the same as the current setup.

Based on the Upgrade Package evaluation, there will be no increases in the short-term (hourly) emissions of oxides of nitrogen (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), sulfur dioxide (SO_2), and particulate matter (PM10/2.5). REP is not proposing to modify the existing hourly, daily, quarterly, or annual emissions for any of the criteria pollutants. There will be a short period of commissioning subsequent to the upgrade on each turbine. The commissioning periods will be in compliance with the current PTO conditions. As the commissioning activities associated with the upgrade will only last approximately two weeks (one week per turbine) versus the original new plant schedule, the proposed project will comply with the existing quarterly and annual emission limits in the current PTOs.

The project operates as a base loaded power plant and has emission levels less than Prevention of Significant Deterioration (PSD) thresholds of 100 tons per year. The REP is not expected to have any emission increases which would exceed the Rule 502 significance or offset threshold values. Thus, no new offsets are proposed for the project. The REP design will continue to incorporate the air pollution emission controls designed to meet current PCAPCD BACT/LAER determinations at the following levels (15% O_2):

- NO_x 2 ppm (dry Low-NOx combustors, SCR, natural gas fuel)
- CO 4 ppm (oxidation catalyst, natural gas fuel)
- VOC 2 ppm (oxidation catalyst, natural gas fuel)
- PM10/2.5 4.7 lb/hr (exclusive use of pipeline quality natural gas)
- SO_2 1.0 lb/hr (exclusive use of pipeline quality natural gas)
- NH_3 10 ppm (slip)

All ppm values are ppm_{vd} at 15% O_2 dry.

<u>Proposed</u> equipment specifications are summarized as follows:

Turbines: (subsequent to modification)

- Engine Manufacturer: Siemens (formerly Alstom)
- Engine Model: SGT-800 (GTX 100) with A-Plus Upgrade
- Fuel: natural gas
- Nominal MW rating: <= 46.577 MW (average day conditions)

- Number of turbines and HRSGs: 2
- Nominal 478.6 mmbtu/hr, without duct burners (average day conditions)
- Maximum 503.11 mmbtu/hr, without duct burners (winter day conditions)
- No changes to the HRSG or duct burners

(Average day conditions are defined as: 62° F, RH at 55.6%, atmospheric pressure of 14.67 psia

- Auxiliary Boiler (never installed)
- HRSG Duct Burners (no modifications proposed)
- Diesel Fire Pump and Diesel Emergency Generator (no modifications proposed)
- Four Cell (4) Cooling Tower: (no modifications or changes in operational parameters are proposed)

The only fuel to be combusted on site by the combustion turbines/duct burners is PUC-grade natural gas supplied by PG&E. The gas will have a sulfur content that is not expected to exceed the following short and long term limits, 0.50 grains S/100scf and 0.25 grains S/100scf respectively. Table 2 presents a fuel use summary and comparison for the existing and proposed modified turbines. The existing emergency generator and fire pump engines will continue to be fired on diesel fuel with a sulfur content of 15 ppmw (no modifications to these engines or their operating or emissions limits are proposed as part of this application). Fuel use values are based on the maximum heat rating of each system, fuel specifications, and maximum operational scenarios. It should be noted that the existing HRSGs and duct burners will not be physically modified. The existing steam turbine rated at ~75-87 MW will not be modified.

TABLE 2 FUEL USE SUMMARY FOR EXSITING AND PROPOSED MODIFIED TURBINES/HRSGS

Existing Turbines/HRSGs						
Process	Hot Day w/DBs	Hot Day w/o DBs	Avg Day w/DBs	Avg Day w/o DBs	Cold Day w/DBs	Cold Day w/o DBs
GT Fuel, mmbtu/hr	436.8	436.8	457.3	457.3	480.8	480.8
HRSG Fuel, mmbtu/hr	224.5	0	224.5	0	224.5	0
Total, mmbtu/hr	662.4	436.8	681.8	457.3	705.3	480.8
Modified Turbines/HRSGs						
Process	Hot Day w/DBs	Hot Day w/o DBs	Avg Day w/DBs	Avg Day w/o DBs	Cold Day w/DBs	Cold Day w/o DBs
GT Fuel, mmbtu/hr	453.3	453.3	478.6	478.6	503.1	503.1
HRSG Fuel, mmbtu/hr	225	0	225	0	225	0
Total, mmbtu/hr	678.3	453.3	703.6	478.6	728.1	503.1

Natural gas at 1018.3 btu/scf HHV. DB = duct burners.

Existing process fuel used data derived from REP design data.

Modified process fuel use derived from Siemens/IEC data dated 9/2020.

Figure 1 REP Location Map

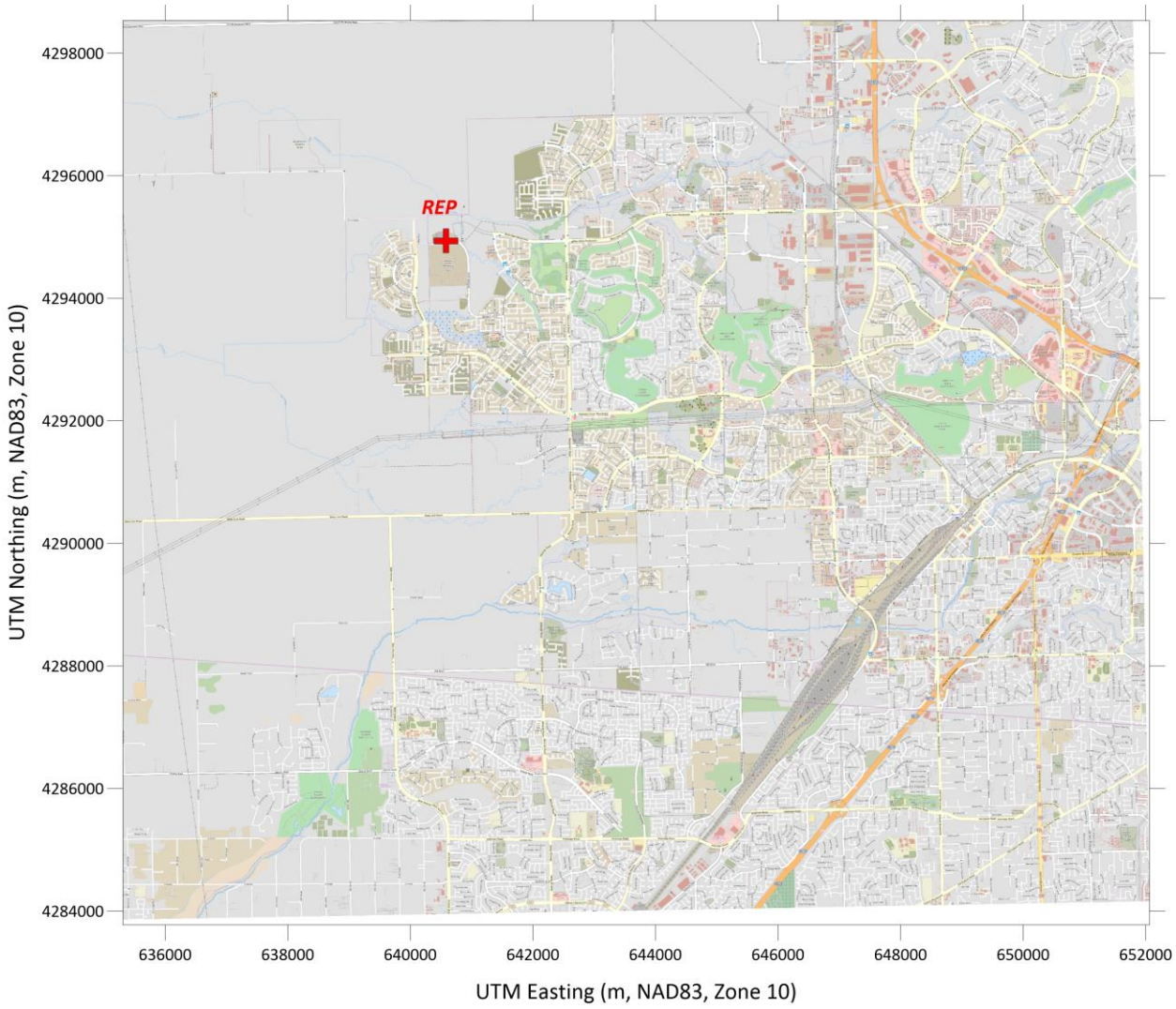
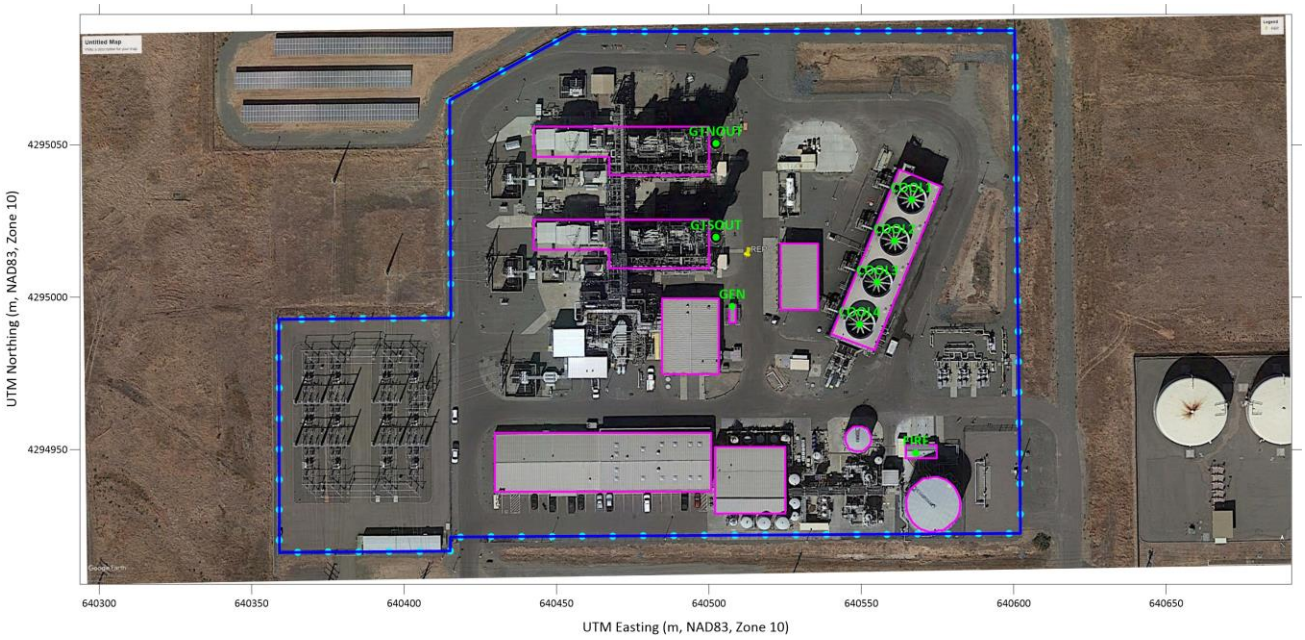


Figure 2 Aerial View



1.1.2.2 Background Air Quality and Applicable Standards

In 1970, the United States Congress instructed the US EPA to establish standards for air pollutants, which were of nationwide concern. This directive resulted from the concern of the effects of air pollutants on the health and welfare of the public. The resulting Clean Air Act (CAA) set forth air quality standards to protect the health and welfare of the public. Two levels of standards were promulgated—primary standards and secondary standards. Primary national ambient air quality standards (NAAQS) are "those which, in the judgment of the administrator [of the USEPA], based on air quality criteria and allowing an adequate margin of safety, are requisite to protect the public health (state of general health of community or population)." The secondary NAAQS are "those which in the judgment of the administrator [of the USEPA], based on air quality criteria, are requisite to protect the public welfare and ecosystems associated with the presence of air pollutants in the ambient air." To date, NAAQS have been established for seven criteria pollutants as follows: sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sub 10-micron particulate matter (PM_{10}), sub 2.5-micron particulate matter ($PM_{2.5}$), and lead (Pb).

The criteria pollutants are those that have been demonstrated historically to be widespread and have a potential to cause adverse health impacts. USEPA developed comprehensive documents detailing the basis of, or criteria for, the standards that limit the ambient concentrations of these pollutants. The State of California has also established ambient air quality standards (AAQS) that further limit the allowable concentrations of certain criteria pollutants. Review of the established air quality standards is undertaken by both USEPA and the State of California on a periodic basis. As a result of the periodic reviews, the standards have been updated, i.e., amended, and additions, and deletions, over the ensuing years to the present.

Table 3 shows the current attainment status for the Placer County APCD (and the project area).

TABLE 3 PCAPCD ATTAINMENT STATUS

Pollutant	Averaging Time	Federal Status	State Status
Ozone	8-hour	Nonattainment	Nonattainment
CO	All	Unclassified/Attainment	Attainment
NO_2	All	Unclassified/Attainment	Attainment
SO_2	All	Unclassified/Attainment	Attainment
PM10	All	Unclassified	Nonattainment
PM2.5	All	Nonattainment	Attainment
Sulfates	24-hour	No NAAQS	Attainment
Lead	All	Unclassified/Attainment	Attainment
H_2S	1-hour	No NAAQS	Unclassified
Visibility Reducing Particles	8-hour	No NAAQS	Unclassified/Attainment

Source: CARB Designation maps. State designations updated 8/2019. Federal designations updated 10/2018.

Each federal or state ambient air quality standard is comprised of two basic elements: (1) a numerical limit expressed as an allowable concentration, and (2) an averaging time which specifies the period over which the concentration value is to be measured. Table 4 presents the current federal and state ambient quality standards.

TABLE 4 STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1-hour	0.09 ppm (180 μg/m^3)	-
	8-hour	0.070 ppm (137 μg/m^3)	0.070 ppm (137 μg/m^3) (3-year average of annual 4th-highest daily maximum)
Carbon monoxide	8-hour	9.0 ppm (10,000 μg/m^3)	9 ppm (10,000 μg/m^3)
	1-hour	20 ppm (23,000 μg/m^3)	35 ppm (40,000 μg/m^3)
Nitrogen dioxide	Annual average	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)
	1-hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3) (3-year average of annual 98th percentile daily maxima)
Sulfur dioxide	Annual average	-	0.030 ppm (80 μg/m^3)[a]
	24-hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)[a]
	3-hour	-	0.5 ppm (1,300 μg/m^3)
	1-hour	0.25 ppm (655 μg/m^3)	0.075 ppm (196 μg/m^3) (3-year average of annual 99th percentile daily maxima)

TABLE 4 STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Respirable particulate matter (10 micron)	24-hour	50 µg/m^3	150 µg/m^3
	Annual arithmetic mean	20 µg/m^3	-
Fine particulate matter (2.5 micron)	Annual arithmetic mean	12 µg/m^3	12.0 µg/m^3 (3-year average)
	24-hour	-	35 µg/m^3 (3-year average of annual 98th percentiles)
Sulfates	24-hour	25 µg/m^3	-
Lead	30-day	1.5 µg/m^3	-
	3-month rolling average	-	0.15 µg/m^3

Source: CARB website 09/2020.

Notes:

The 24-hour and annual 1971 SO_2 NAAQS remain in effect until 1 year after the attainment status is designated by EPA for the 2010 NAAQS (REP project area is still undesignated for the 2010 NAAQS but presumed to be in attainment).

µg/m3 = micrograms per cubic meter

The nearest criteria pollutant air quality monitoring sites to the proposed project site would be the North Sunrise-Roseville and Del Paso-Sacramento stations for the period 2017 through 2019. Ambient monitoring data for these sites for the most recent three-year period is summarized in Table 5. All data was derived from the CARB and EPA AIRS monitoring summaries.

TABLE 5 MEASURED AMBIENT AIR QUALITY CONCENTRATIONS BY YEAR

Pollutant	Units	Averaging Time	Basis of Standard	Site	2017	2018	2019
Ozone	ppm	8-Hr	CAAQS-1st Highs	N. Sunrise	.088	.083	ND
Ozone	ppm	1-Hr	CAAQS-1st High	N. Sunrise	.117	.110	.089
Ozone	ppm	8-Hr	NAAQS-4th Highs	N. Sunrise	.08	.08	.067
NO_2	ppb	1-Hr	CAAQS-1st Highs	N. Sunrise	52	54	ND
NO_2	ppb	1-Hr	NAAQS-98th percentiles	N. Sunrise	40	43	43
NO_2	ppb	Annual	CAAQS/NAAQS-AAM	N. Sunrise	7/7.86	7/7.66	ND/6.63
CO	ppm	1-Hr	CAAQS/NAAQS-1st Highs	Del Paso	1.9	3.9	1.6
CO	ppm	8-Hr	CAAQS/NAAQS-1st Highs	Del Paso	1.8	3.8	1.2
SO_2	ppb	1-Hr	CAAQS-1st Highs	Del Paso	7.3	3.6	4
		1-Hr	NAAQS-99th percentiles	Del Paso	7	2	3
		24-Hr	CAAQS/NAAQS-1st Highs	Del Paso	5.9	1.1	1.1
		Annual	CAAQS/NAAQS-AAM	Del Paso	ND	.37	.38
PM10	ug/m^3	24-Hr	CAAQS-1st Highs	N. Sunrise	65.8	211.3	ND
		24-Hr	NAAQS-2nd Highs	N. Sunrise	64	170	54
		Annual	CAAQS-AAM	N. Sunrise	16.4	22.8	ND
PM2.5	ug/m^3	24-Hr	NAAQS-98th percentiles	N. Sunrise	17	57	20
		Annual	CAAQS/NAAQS-AAM	N. Sunrise	7.4/7.2	12.2/12.2	ND/6.5

Notes: Data sources: CARB ADAM website 9/10/20 and USEPA AIRS website 9/10/20

Table 6 shows the background air quality values based upon the data presented in Table 5. The background values represent the highest values reported for the site during any single year of the most recent three-year period.

TABLE 6 BACKGROUND AIR QUALITY DATA	
Pollutant and Averaging Time	**Background Value (ug/m^3)**
Ozone – 8-hour Maximum CAAQS/ 3-year average 4th High NAAQS	.172.8/149.2
Ozone – 1-hour CAAQS 3 Yr High Value	306
PM10 – 24-hour Maximum CAAQS/ 24-hour High, 2nd High NAAQS	211.3/64
PM10 – Annual Maximum CAAQS	22.8
PM2.5 – 3-Year Average of Annual 24-hour 98th Percentiles NAAQS	31.3
PM2.5 – Annual Maximum CAAQS/ 3-Year Average of Annual Values NAAQS	12.2/8.6
CO – 1-hour Maximum CAAQS/NAAQS	4466/4466
CO – 8-hour Maximum CAAQS/NAAQS	4352/4352
NO_2 – 1-hour Maximum CAAQS/ 3-Year Average of Annual 98th Percentile 1-hour Daily Maxima NAAQS	101.6/79
NO_2 – Annual Maximum CAAQS/NAAQS	13.2/14.5
SO_2 – 1-hour Maximum CAAQS/ 3-Year Average of Annual 99th Percentile 1-hour Daily Maxima NAAQS	19.1/10.5
SO_2 – 3-hour Maximum NAAQS (Not Available - Used 1-hour Maxima)	19.1
SO_2 – 24-hour Maximum CAAQS/NAAQS	15.4/15.4
SO_2 – Annual Maximum NAAQS	1.0
Conversion of ppm/ppb measurements to µg/m^3 concentrations based on: µg/m^3 = ppm x 40.9 x MW, where MW = 48, 28, 46, and 64 for ozone, CO, NO_2, and SO_2, respectively.	

Emissions Evaluation

1.1.3.1 Current Facility Emissions and Permit Limitations

The current facility is subject to two (2) process specific permits to operate (REPR-20-01 and REPR-20-2), issued by the PCAPCD on 10/18/19. A copy of these permits is presented in Attachment 2. Based on a review of these permits, the current (pre-modification) facility and turbine/HRSG PTE values are presented as follows:

Pollutant	Facility PTE, TPY	Turbines/HRSG Only PTE, TPY
NO_x	31.09	30.64
CO	59.86	58.71
VOC	13.42	13.29
SO_x	6.83	6.78
PM10/2.5	35.95	32.67

1.1.2.3 Proposed Facility Emissions

Modification and operation of the proposed combustion turbine upgrades will result in a change in the short term emissions signature for the site. Criteria pollutant emissions from the modified turbines are delineated in the following sections, while emissions of HAPs are delineated in Section 2.0. The existing fire pump, emergency generator, aux boiler, cooling tower, and HRSG duct burners are not being modified, and no changes to the current permit limitations are being requested for these devices. Attachment 4 contains the Siemens brochure data for the upgraded turbines.

The emissions of criteria pollutants are expected to remain below current permit limits on an hourly basis. The updated Siemens emissions data on the SGT-800 turbine Upgrade is in Attachment 3 and does not reflect the use of additional emissions control strategies over the existing BACT limits. Because the existing project emissions of NO_x, VOC's and PM10/2.5 have been fully offset (CO is attainment so offsets are no longer needed), the applicant proposes to maintain the existing hourly, daily, quarterly, and annual permitted limits for these pollutants. The emissions analyses below support the use of the existing permit limits, and that with the proposed upgrade, the project will continue to comply with the current hourly, daily, quarterly, and annual limits for NO_x, CO, VOC's, PM10/2.5 and SO_x.

1.1.2.4 Normal Operations

Operation of the proposed process and equipment systems will result in emissions to the atmosphere of both criteria pollutants and toxic air pollutants. Criteria pollutant emissions will consist primarily of nitrogen oxides, carbon monoxide, volatile organic compounds, sulfur oxides, and particulate matter ($PM_{10}/_{2.5}$). Air toxic pollutants will consist of a combination of toxic gases and toxic particulate matter species. Table 7 delineates the anticipated pollutants to be emitted from the proposed facility.

TABLE 7 CRITERIA AND TOXIC POLLUTANTS EMITTED FROM THE REP FACILITY	
NO_x	Acrolein
CO	Benzene
VOC	1-3 Butadiene
SO_x	Ethylbenzene
PM10/PM2.5	Formaldehyde
Ammonia	Naphthalene
PAHs	Propylene Oxide
Acetaldehyde	Toluene
	Xylene

Tuning Emissions

In addition, the turbines will need periodic combustor tuning which may result in emissions exceeding the permit limits. This will be a regular plant equipment maintenance procedure in which testing, adjustment, tuning, and calibration operations are performed, as recommended by the equipment manufacturer, to insure safe and reliable steady-state operation, and to minimize NO_x and CO emissions. The tuning operation are not expected to exceed six (6) hours per year per turbine. The expected tuning emissions are listed in Table 8.

Table 8

Estimated Single Turbine Maximum Hourly Emissions Rates During Tuning*

		NO_x	**CO**	**VOC**	**PM10/2.5**	**SO_x**
Emission Rate	lb/hr	40	895	19.7	4.7	1.0
	ppm	25	10	10	-	-

* Turbines only
Source: REP, 2020.

1.1.2.5 Criteria Pollutant Emissions

The following tables present data on the criteria pollutant emissions expected from the modified REP turbines under normal and maximum operating scenarios. See Attachment 3 for the detailed emissions evaluations. The emissions were based on the updated Siemens/IEC performance data for the turbines as noted in the tables below and in the detailed emission evaluations in Attachment 3. Table 8 presents a comparison of the current permitted ppm and mass emissions limits and the post-modification proposed limits.

Table 8 Permit Limit Comparison			
Pollutant	Current Permit Limit	Post-Modification Proposed Limit	REP Comments
NO_x	2.0 ppmvd	2.0 ppmvd	**REP is not proposing to change or modify any of these permit limits.**
CO	4 ppmvd	4 ppmvd	
VOC	2 ppmvd	2 ppmvd	
NH_3	10 ppmvd	10 ppmvd	
NO_x	5.1 lbs/hr (1 Hr Avg)	5.1 lbs/hr (1 Hr Avg)	
CO	6.2 lbs/hr (3 Hr rolling avg)	6.2 lbs/hr (3 Hr rolling avg)	
VOC	1.8 lbs/hr	1.8 lbs/hr	
SO_x	1.0 lbs/hr	1.0 lbs/hr	
PM10/2.5	4.7 lbs/hr	4.7 lbs/hr	
All ppmvd values are at 15% O2 dry.			

Table 9 shows the quarterly and annual emissions limits for the existing facility. **REP is not proposing to change or modify any of these limits.**

TABLE 9 QUARTERLY AND ANNUAL EMISSIONS SUMMARY FOR THE FACILITY					
Pollutant	**1st Qtr LBs**	**2nd Qtr LBs**	**3rd Qtr LBs**	**4th Qtr LBs**	**Annual, TPY**
NO_x	15546	13412	17646	15572	31.09
CO	27121	33872	28515	30202	59.86
VOC	5832	7455	6672	6890	13.42
SO_x	3400	2893	3709	3663	6.83
PM10/2.5	17673	15513	19168	19158	35.95
Values derived from Condition 55 on the PTO # REPR-20-01					

Table 10 shows the quarterly and annual emissions limits for the current aux boiler. This boiler was never constructed or installed, but the potential emissions were offset and are included in the facility quarterly and annual limits as noted in Table 9 above. REP is proposing to re-assign these potential emissions to the turbines/HRSGs.

TABLE 10 QUARTERLY AND ANNUAL EMISSIONS SUMMARY FOR THE AUX BOILER					
Pollutant	**1st Qtr LBs**	**2nd Qtr LBs**	**3rd Qtr LBs**	**4th Qtr LBs**	**Annual, TPY**
NO_x	92	372	94	94	0.326
CO	311	1259	317	317	1.102
VOC	36	144	36	36	0.126
SO_x	11	46	12	12	0.0405
PM10/2.5	82	332	84	84	0.291
Values derived from Condition 75 on the PTO # REPR-20-01					

Table 11 shows the quarterly and annual emissions limits for the current turbines/HRSGs with the addition of the emissions re-assigned from the aux boiler as noted above.

TABLE 11 QUARTERLY AND ANNUAL EMISSIONS SUMMARY FOR THE TURBINES/HRSGS					
Pollutant	**1st Qtr LBs**	**2nd Qtr LBs**	**3rd Qtr LBs**	**4th Qtr LBs**	**Annual, TPY***
NO_x	15401	13337	17590	15516	30.92
CO	27098	33849	28492	30179	59.81
VOC	5827	7450	6666	6884	13.41
SO_x	3396	2889	3706	3660	6.82
PM10/2.5	16382	14024	17873	17653	32.97
Values derived from Condition 54 and 75 on the PTO # REPR-20-01. *Annual values are calculated, not derived.					

As noted above, the movement or re-assignment of the aux boiler emissions to the turbines results in no change to the annual facility PTE as follows:

- NO_x PTE 31.09 tons/yr

- CO PTE 59.86 tons/yr
- VOC PTE 13.42 tons/yr
- SO_x PTE 6.83 tons/yr
- PM10/2.5 35.95 tons/yr

The PTE values above represent the current amount of emissions offsets held by REP.

Table 12 presents data on the startup and shutdown emissions for the combustion turbines. This application does not propose any changes to the startup or shutdown time limits or emissions in lbs/event in the current PTO. It should be noted that in the original permitting and licensing analysis shutdown emissions were not specified, i.e., shutdown emissions were assumed to be accounted for in the quarterly and annual emissions limits. For the proposed modification, Siemens/IEC has supplied estimates for shutdown emissions and these values have been incorporated into this analysis. See data in Attachment 3.

TABLE 12 STARTUP AND SHUTDOWN EMISSIONS RATES

Pollutant	Maximum LBs per Start Hour (worst case turbine)[1]	Lbs per Startup (both turbines combined)[2]	Shutdown Lbs/event[3]
NO_x	37.1	122.8	7.5
CO	89.5	204.8	65.6
VOC	19.7	78.6	2.8

[1] values derived from permit condition #51
[2] values derived from permit condition #51
[3] values supplied by Siemens/IEC. These values have been incorporated into the emissions analysis. See Attachment 3.

Table 12 shows the comparison of the pre- and post-facility potential emissions. Detailed emissions data on the proposed facility is presented in Attachment 3. Thus, with the installation of the upgrade package on the turbines, the applicant will maintain the current permitted annual emission limits.

TABLE 12 PRE AND POST-MODIFICATION PTE FOR THE FACILITY

	NO_x	CO	VOC	SO_x	PM10/2.5
Pre-Modification PTE, tons/yr	31.09	59.86	13.42	6.83	35.95
Post-Modification PTE, tons/yr	31.09	59.86	13.42	6.83	35.95
Change in Facility PTE, tons/yr	0	0	0	0	0

To further demonstrate that compliance with the existing permit limits can be achieved with the upgrade package, the 2015 through 2019 source test results for NO_x, CO, PM10, VOC, SO_2, and NH_3 are summarized in Table 13. This data demonstrates that the facility has been, on a ppm and mass basis, always less than the permitted potential to emit levels. The emissions of NO_x and CO, through review of the CEMs data, have also been below permitted levels. These values should be compared to the values presented in Table 14 below.

TABLE 13 SUMMARY OF SOURCE TEST RESULTS FOR 2015 THROUGH 2019

Unit 1				Unit 2			
Pollutant	**Limit**	**Max**	**5 Yr Avg**	**Pollutant**	**Limit**	**Max**	**5 Yr Avg**
NO_x	5.1 lbs/hr	4.3 lbs/hr	3.98 lbs/hr	NOx	5.1 lbs/hr	4.9 lbs/hr	3.92 lbs/hr
CO	6.2 lbs/hr	1.6 lbs/hr	0.67 lbs/hr	CO	6.2 lbs/hr	0.86 lbs/hr	0.6 lbs/hr
VOC	1.8 lbs/hr	0.5 lbs/hr	0.3 lbs/hr	VOC	1.8 lbs/hr	0.5 lbs/hr	0.28 lbs/hr
SO_x	1.0 lbs/hr	0.35 lbs/hr	0.22 lbs/hr	SOx	1.0 lbs/hr	0.3 lbs/hr	0.22 lbs/hr

PM10/2.5	4.7 lbs/hr	2.5 lbs/hr	1.31 lbs/hr	PM10/2.5	4.7 lbs/hr	1.5 lbs/hr	1.15 lbs/hr
NH_3 Slip	10 ppmvd	9.6 ppmvd	4.27 ppmvd	NH3 Slip	10 ppmvd	6.4 ppmvd	3.62 ppmvd
CO_2e	NA	NA	NA	NA	NA	NA	NA
Notes: Max = the max source test (multiple run average) value over the 5 year period 2015 through 2019.							

Table 14 presents a summary of emissions for the three (3) run case scenarios that were identified as producing the highest emissions for the post-modification for the following types of days, i.e., cold day, average day, and hot day. All of the data presented is for the "2 x 1" steady state controlled operational configuration for each day type.

TABLE 14 POST-MODIFICATION RUN CASE EMISSIONS AND SCENARIOS (lbs/hr)

Pollutant/Scenario	Hot Day		Average Day		Cold Day	
	w/DB on	w/DB off	w/DB on	w/DB off	w/DB on	w/DB off
NO_x	4.25	2.45	4.39	2.59	4.52	2.72
CO	5.3	0.8	5.34	0.84	5.38	0.88
VOC	1.13	0.23	1.14	0.24	1.15	0.25
SO_x	0.95	0.63	0.99	0.67	1.0	0.7
PM10/2.5	4.54	3.04	4.71	3.21	4.88	3.37

DB = duct burners

Ammonia slip emissions (NH_3) are not calculated or presented herein because the current permit does not contain any mass emissions limits, only a ppm limit as noted in Table 8. See Section 2.0 for ammonia emissions data.

The predicted emissions for the run cases noted in Table 14 for the post-modification turbines are well within the current permit limits and as such REP is not proposing to change any current mass emissions limits in the permits for NO_x, CO, VOC, PM10, or SO_x.

1.1.2.6 Hazardous Air Pollutants

See Section 2.0 for a detailed discussion and quantification of hazardous air pollutant emissions from the proposed facility.

1.1.2.7 Construction

No construction related emissions are anticipated to occur with respect to the proposed upgrade project. There will be no earthmoving activities, no trenching, no drilling, and no structure erection of any type. The turbines will be removed, upgraded, and re-installed.

1.1.3 BACT Evaluation

1.1.4.1 Current Site Control Technologies

The current devices and processes at the facility already meet BACT, and as such a BACT analysis is not required.

1.1.4.2 Existing and Proposed Facility BACT

Best available control technology for the proposed modified turbines is delineated in Table 14.

TABLE 14 EXISTING AND PROPOSED BACT SUMMARY FOR REP TURBINES			
Pollutant	**Existing/Proposed BACT Emissions Level**	**Existing BACT System(s)**	**Meets Current BACT Requirements**
NO_x	2.0/2.0 ppmvd	DLN with SCR	Yes
CO	4.0/4.0 ppmvd	CO Catalyst and Good Combustion Practices	Yes
VOC	2.0/2.0 ppmvd	Natural Gas, CO Catalyst, Good Combustion Practices	Yes
SO_x	Pipeline quality natural gas	Natural Gas with total S <= 0.25 grs/100scf long term <=0.75 grs/100scf short term	Yes
PM10/ PM2.5	Pipeline quality natural gas	Natural Gas with total S <= 0.25 grs/100scf long term <=0.75 grs/100scf short term	Yes
Ammonia Slip	10 ppmvd	SCR catalyst with ammonia reactant	Yes
Notes:			

1.1.5 Air Quality Impact Analysis

The evaluation of the potential air quality impacts and health risks were based on the estimate of the ambient air concentrations that could result from the REP emission sources. This section discusses the selection of the dispersion model, the data that was used in the dispersion model (pollutants modeled with appropriate averaging times, source characterization, building downwash, terrain, and meteorology), etc.

Assessments of ambient concentrations resulting from pollutant emissions (called air quality impacts) are normally conducted using USEPA-approved air quality dispersion models. These models are based on mathematical descriptions of atmospheric diffusion and dispersion processes in which a pollutant source impact can be calculated over a given area and for a specific period of time (called averaging period). By using mathematical models, the assessment of emissions can be determined for both existing sources as well as future sources not yet in operation. Inputs required by most dispersion models, which must be specified by the user, include the following:

- Model options, such as averaging time to be calculated;
- Meteorological data, used by the model to estimate the dispersion conditions experience by the source emissions;
- Source data, such as source location and characteristics – stack emissions like those considered here are modeled as “point” sources, which require user inputs of the release height, exit temperature and velocity, and stack diameter (used by the dispersion model to estimate the mechanical and buoyant plume rise that will occur due to the release of emissions from a stack); and
- Receptor data, which are the location(s) of the given area where ambient concentrations are to be calculated by the dispersion model.

1.1.5.1 Dispersion Modeling

To estimate ambient air concentrations, the latest version (version19191) of the AERMOD dispersion model was used. AERMOD is appropriate for use in estimating ground-level short-term ambient air concentrations resulting from non-reactive buoyant emissions from sources located in simple, intermediate, and complex terrain. AERMOD is the preferred guideline model recommended by USEPA for these types of assessments and is based on conservative assumptions (i.e., the model tends to over-predict actual impacts by assuming steady state conditions, no pollutant loss through conservation of mass, no chemical reactions, etc.). AERMOD is capable of assessing impacts from a variety of source types such as point, area, line, and volume sources (as noted above, point source types are used to model stack sources like the REP emissions); downwash effects; gradual plume rise as a function of downwind distance; time-dependent exponential decay of pollutants; and can account for settling and dry deposition of particulates. The model is capable of estimating concentrations for a wide range of averaging times (from one hour to the entire period of meteorological data provided).

AERMOD calculates ambient concentrations in areas of simple terrain (receptor base elevations below the stack release heights), intermediate terrain (receptor base elevations between stack release and final plume height), and complex terrain (receptor base elevations above final plume height). AERMOD assesses these impacts for all meteorological conditions, including those that would limit the amount of final plume rise. Plume impaction on elevated terrain, such as on the slope of a nearby hill, can cause high ground level concentrations, especially under stable atmospheric conditions. Due to the relatively flat nature of the project terrain area, including the surrounding properties, plume impaction effects would not be expected to occur. AERMOD also considers receptors located above the receptor base elevation, called flagpole receptors.

Another dispersion condition that can cause high ground level pollutant concentrations is caused by building downwash. Building downwash can occur during high wind speeds or a building or structure is in close proximity to the emission source. This can result in building wake effects where the plume is drawn down toward the ground by the lower pressure region that exists in the lee side (downwind) of the building or structure. This AERMOD feature was also used in modeling the REP emission sources as described later.

TABLE 15 USEPA MODELS AND VERSIONS

USEPA Model	Version
AERMOD	19191
AERMET	19191
AERMINUTE	15272
AERMAP	18081
AERSURFACE	20060
BPIP-PRIME	04274

AERMOD is a steady-state plume dispersion model that simulates transport and dispersion from multiple point, area, or volume sources based on updated characterizations of the atmospheric boundary layer. AERMOD uses Gaussian distributions in the vertical and horizontal for stable conditions, and in the horizontal for convective conditions; the vertical distribution for convective conditions is based on a bi-Gaussian probability density function of the vertical velocity. For elevated terrain AERMOD incorporates the concept of the critical dividing streamline height, in which flow below this height remains horizontal, and flow above this height tends to rise up and over terrain. AERMOD also uses the advanced PRIME algorithm to account for building wake effects.

Regulatory agencies have traditionally applied "significant impact levels" ("SILs") as a *de minimis* value, which represents the offsite concentration predicted to result from a source's emissions that does not warrant additional analysis or mitigation. If a source's modeled impact at any offsite location exceeds the relevant SIL, the source owner may need to assess multi-source or cumulative air quality analysis to determine whether or not the source's emissions will cause or contribute to a violation of the relevant NAAQS or CAAQS. The project utilized the published PCAPCD SILs and included the levels established for PM10 and PM2.5 of 2.5 and 1.0 micrograms/cubic meter, respectively.

The REP impacts were analyzed pursuant to PCAPCD and CEC modeling requirements. The updated PCAPCD modeling requirements were followed, which include:

- Default (DFAULT) model option with the u-star adjustment (ADJ_U*);
- Use of AERMOD meteorological data for the nearest representative site; and
- Receptor grids referenced in NAD83 coordinates, with locations and spacing meeting PCAPCD requirements, and elevations and hill slope factors computed by AERMAP from National Elevation Database (NED) files.
- Rural dispersion option was utilized based on a review of the 3 Km region around the site using the Auer land use procedure.

1.1.5.2 GEP Stack Height Analysis

Good Engineering Practice (GEP) stack height for the turbines and emergency generator was calculated at 43.12 meters (141.5 feet) based on the turbine/HRSG structures and off-site buildings. The fire pump engine GEP was calculated at 30.38m (99.3 ft). The as built design stack height of 36.58 meters (120 feet) is less than GEP stack height, so downwash effects were included in the modeling analysis.

BPIP-PRIME was used to generate the wind direction specific building dimensions for input into AERMOD. Attachment 6 presents the figures which shows the structures used in the BPIP downwash analysis.

1.1.5.3 Receptor Grid Selection and Coverage

Receptor and source base elevations were determined from United States Geological Survey (USGS) National Elevation Dataset (NED) The NED data was processed with the USEPA-model AERMAP for the receptor locations selected. All coordinates (both sources and receptors) were referenced to UTM North American Datum 1983 (NAD83, Zone 10) in accordance with PCAPCD guidance.

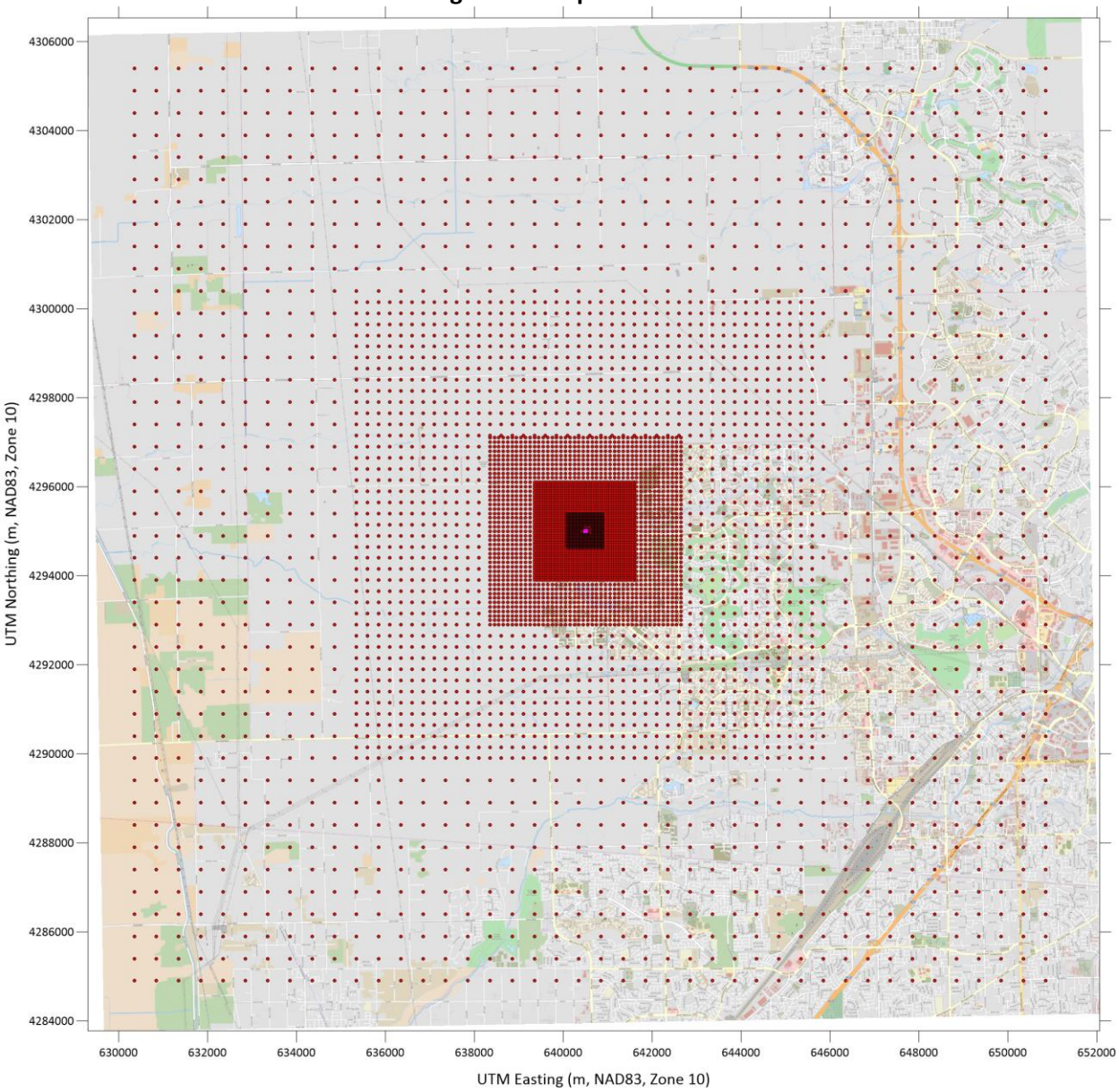
Receptor grids were based on the 1/3-arcsecond (~10 meter) NED data. The NED files were extended beyond the receptor grid boundaries being evaluated as appropriate for the hill slope factors.

Cartesian coordinate receptor grids were used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. For the full impact analyses, a nested grid was developed to fully represent the initial location and extent of significance area(s) and maximum impact area(s). The nested grid was comprised of the following and are presented in Figure 3.

- Receptors were placed along the REP project fence line with a spacing of about 10 meters or less between adjacent receptors.
- The downwash receptor grid with a receptor spacing of 20 meters extended from the project fence line out to 300 meters from the project.

- An intermediate receptor grid with 50-meter receptor spacing extended from the downwash receptor grid out to 1000 meters from the project.
- The first coarse receptor grid with 100-meter receptor spacing was extended from the intermediate receptor grid outwards to two (2) kilometers (km) from the project in all directions.
- The second coarse grid with 250-meter receptor spacing was developed out five (5) km from the project in all directions.
- The third coarse grid with 500 m receptor spacing was developed out to 10 (10) km from the project in all directions.
- Where maximum impacts occur in areas outside the 20-meter spaced receptor grid, additional refined receptor grids were developed with 20-meter resolution and were placed around the maximum impacts and extended as necessary to determine maximum impacts.
- Ambient concentrations within the facility fence line were not calculated.

Figure 3 Receptor Grids



1.1.5.4 Meteorological Data Selection

AERMOD requires a meteorological input file to characterize the transport and dispersion of pollutants in the atmosphere. Surface and upper air meteorological data inputs, along with surface parameter data describing the land use and surface characteristics near a site, are first processed using AERMET, the meteorological preprocessor to AERMOD. The output files generated by AERMET are the surface and upper air meteorological input files required by AERMOD.

AERMOD uses hourly meteorological data to characterize plume dispersion. AERMOD calculates the dispersion conditions for each hour of meteorological data for the emission sources modeled at the user-specific receptor locations. The resulting 1-hour impacts are then averaged by AERMOD for the averaging time(s) specified by the user (accounting for calm winds and missing meteorological data as specified in the model options). Surface ASOS meteorological data from the Sacramento International Airport were processed along with Oakland upper air data for the period of 2015 through 2019. The representativeness of the meteorological data is dependent on the proximity of the meteorological monitoring site to the area under consideration; the complexity of the terrain, the exposure of the meteorological monitoring site, and the period of time during which the data are collected. The data was collected approximately 19 kilometers from the western edge of the REP project boundary and were processed with the u* option and AERMINUTE options as the most appropriate meteorological data for this modeling analysis. The AERMINUTE, AERSURFACE and AERMET programs were used to process the surface and upper air data.

AERSURFACE was used to determine the surface characteristics at the Sacramento International Airport site. Monthly AERSURFACE values were calculated for the following options: surface roughness calculated for an area circumscribed by a one (1) kilometer radius; airport = YES; continuous snow cover = NO; average moisture conditions; arid region = NO; 12 sectors of 30^{o}; and default monthly seasonal assignments to calculate annual average values. The AERSURFACE results are presented in Attachment 6.

1.1.5.5 Turbine Load Screening Analysis

Operational characteristics of the turbine, such as emission rate, exit velocity, and exit temperature vary by operating load and ambient temperature. A screening modeling analysis, using AERMOD was performed for the 40, 50, 75 and 100 percent (base) load conditions with and without evaporative cooling and with/without duct firing in order to determine the turbine operating condition that will result in the highest modeled concentrations for all averaging periods. It should be noted that the 40% case was only assessed for the 62 degree and colder days and that the turbine would not operate at this load point during the hot summer days.

The screening cases also analyzed the cases with the duct burner on for 100 percent load. The ambient conditions considered were four ambient temperature conditions: 29˚F (a cold day), 62˚F (annual average day), and 105˚F (hot day). The evaporative cooling was assumed to be on for all cases but the 29^{o}F day.

The results of the screening analysis are listed in Attachment 6. The screening analysis shows that the worst-case operating and ambient conditions are the 29˚F ambient condition with duct burner on (Case 29a) for all short-term impacts with the exception of CO. For the CO case, the worst-case stack conditions were case 1a (105^{o}F) for both the 1-hour and 8-hour averaging periods. The annual impacts were based on the 62^{o}F case with duct burner on (Case 13a). Startup modeling was based on 29^{o}F (Case 32a) which represented the lowest load point at 40%. The results of the screening analysis were used as the refined analysis results discussed next.

In addition to the turbine load screening analysis, the emergency fire pump and emergency generator were assessed to determine which source, on an hourly basis, would produce the highest short-term impacts for the 1-hour averaging period. Both emergency engines will not be tested during the same one (1) hour time period, so AERMOD was used to determine which engine would be worst-case. Based on the AERMOD analysis, the results of which are provided in Attachment 6, the fire pump was the worst-case source for the 1-hour NO_2 and SO_2 averaging period and the emergency generator was the worst case source for the 1-hour CO averaging period. These results were included in the refined modeling analyses.

1.1.5.6 Refined Analysis

Facility sources were modeled in the analysis for comparisons with Significant Impact Levels (SILs) and California Ambient Air Quality Standards and National Ambient Air Quality Standards (CAAQS/NAAQS), as necessary.

For the turbine, start-up and shutdown emissions were included in the analysis for all long-term (annual) averages in the air quality modeling. Separate start-up and shut-down analyses were performed for the turbine for short-term averaging times as described above. Detailed emission calculations for all averaging periods are included in Attachment 3.

The worst-case modeling input information for each pollutant and averaging period based on the screening analysis results are shown in Table 16 for normal operating conditions and turbine start-up/shutdown conditions. As discussed above, the combustion turbine stack parameters used in modeling the impacts for each pollutant and averaging period reflected the worst case operating condition for that pollutant and averaging period identified in the screening analysis. Since the project consists of the turbines, HRSG's, the emergency fire pump, the emergency generator and the cooling tower, all sources were included in the refined analysis.

TABLE 16 WORST-CASE STACK PARAMETERS AND EMISSION RATES

	Stack Height (m)	Stack Temp. (Kelvin)	Exit Velocity (m/s)	Stack Diameter (m)	Emission Rates (g/s)			
					NO_x	SO_2	CO	PM10/ PM2.5
Averaging Period: 1-hour for Normal Operating Conditions (Case 1a for CO and 29a for everything else)								
Each turbine	36.58	354.82\346.48	14.98\15.83	3.35	6.4260E-01	1.2600E-01	7.8120E-01	-
Averaging Period: 3-hours for Normal Operating Conditions (Case 29a)								
Each turbine	36.58	346.48	15.83	3.35	-	1.26E-01	-	-
Averaging Period: 8-hours for Normal Operating Conditions (Case1a)								
Each turbine	36.58	354.82	14.98	3.35	-	-	7.8120E-01	-
Averaging Period: 24-hours for Normal Operating Conditions (Case 29a)								
Each turbine	36.58	346.48	15.83	3.35	-	1.26E-01	-	5.9220E-01
Averaging Period: Annual (Case 13a)								
Each turbine	36.58	350.93	15.45	3.35	4.4540E-01	9.7511E-02	-	4.6991E-01
Averaging Period: 1-hour for Cold Start-up Periods (Case 32a)								
Two turbines (each)	36.58	339.26	9.06	3.35	4.6746E+00	-	1.1277E+01	-

TABLE 16 WORST-CASE STACK PARAMETERS AND EMISSION RATES								
	Stack Height (m)	Stack Temp. (Kelvin)	Exit Velocity (m/s)	Stack Diameter (m)	Emission Rates (g/s)			
					NO_x	SO_2	CO	PM10/ PM2.5
Averaging Period: 8-hours for Start-up/Shutdown Periods (Case 1a)								
Two turbines (each)	36.58	354.82	14.98	3.35	-	-	3.1160E+00	=

[a] 1-hour NO_2 and SO_2 NAAQS assessment based on annual average emissions per USEPA guidance for intermittent sources.
[b] PM10/PM25 emissions based on permit limit of 32.97 tons/year total for both turbines.

Notes:
g/s = gram(s) per second
m/s = meter(s) per second
m = meter(s)

Based on the results of the screening analyses, modeled impacts were compared with the Significant Impact Levels (SILs) in Table 17 and the CAAQS/NAAQS in Table 18. To determine the magnitude and location of the maximum impacts for each pollutant and averaging period, the AERMOD model was used with all five (5) years of meteorology.

For the 1-hour NO_2 modeling assessments, the EPA Ozone Limiting Method (OLM) was used in the refined modeling analyses with an in-stack NO_2/NO_x ratio of 0.5 for the turbines (EPA default value) and 0.1 (10%) for the fire pump/emergency generator based on a conservative assessment of this type and size of diesel engine in EPA's ISR database. Concurrent hourly ozone data from the PCAPCD North Sunrise monitoring site was used and processed as follows:

- Any period of missing of O_3 data that was missing less or equal to 6 hours was replaced by the maximum O_3 value on either side of the missing period,
- any period of missing of O_3 data that exceeded 6 hours was left as missing, and therefore, AERMOD assumed full NO_x to NO_2 conversion.

Most maximum facility impacts occurred well inside the 20-meter downwash grid or on the 10-meter fence line grid. The 20-meter downwash grid needed to be extended to the north to capture the annual NO_2 and PM impacts. Figure 4 shows the location of the maximum REP impacts for both the SILs and CAAQS/NAAQS assessments.

Table 17 summarizes the facility impacts which are less than the EPA SILs for all pollutants, averaging times, and operating conditions.

TABLE 17 MODELED CONCENTRATIONS AND SILS			
Pollutant	Averaging Period	Maximum Concentration ($\mu g/m^3$)	USEPA-NAAQS Class II SILs ($\mu g/m^3$)
NO_2*	1-hour maximum (CAAQS)	66.39	7.5
	3-year average of daily 1-hour yearly maxima (NAAQS) [a]	4.43	7.5
	Annual maximum (CAAQS/NAAQS)	0.24	1.0
CO	1-hour maximum (NAAQS/CAAQS)	41.50	2,000

TABLE 17 MODELED CONCENTRATIONS AND SILS			
Pollutant	**Averaging Period**	**Maximum Concentration (µg/m³)**	**USEPA-NAAQS Class II SILs (µg/m³)**
	8-hour maximum (NAAQS/CAAQS)	6.97	500
SO_2	1-hour maximum (CAAQS)	2.52	7.8
	3-year average of daily 1-hour yearly maxima (NAAQS) [a]	1.04	7.8
	3-hour maximum (NAAQS)	1.46	25
	24-hour maximum (CAAQS/NAAQS)	0.75	5
	Annual maximum (NAAQS)	0.05	1
PM10	24-hour maximum (CAAQS/NAAQS)	4.09	5.0[a]
	Annual maximum (CAAQS)	0.37	1.0
PM2.5	3-year average of 24-hour yearly maxima (NAAQS) [a]	1.74	1.2
	Annual maximum (CAAQS)	0.37	0.3
	3-year average of annual concentrations (NAAQS) [a]	0.30	0.3
Cold Start-up Periods			
NO_2*	1-hour maximum (CAAQS)	75.90	-
	3-year average of daily 1-hour yearly maxima (NAAQS) [a]	61.47	7.5
CO	1-hour maximum	203.45	2,000
Start-up/Shutdown Periods			
CO	8-hour maximum	26.31	500

*1-hour NO_2 impacts for comparison to CAAQS under Normal Operating Conditions evaluated with the OLM. All turbine load screening NO_2 1-hour and annual impacts evaluated assuming 100% conversion of NO_x to NO_2.

Maximum REP concentrations are compared in Table 18 to the CAAQS and NAAQS. The combined impacts (modeled + background) are less than all the CAAQS and NAAQS except for the 24-hour and annual PM10 CAAQS and the annual PM2.5 CAAQS. The exceedances of the CAAQS for PM10 are due to high background concentrations, which already exceed the CAAQS and NAAQS (the area is already designated as State nonattainment for the PM10 CAAQS and Federal for PM2.5). As the facility is projected to have maximum impacts less than the SILs for the 24-hour PM10 averaging period, REP would not contribute to current exceedances of the PM10 standard.

Start-up and shutdown activities typically affect emissions of NO_x and CO. (During start-up, PM_{10}/$PM_{2.5}$ and SO_2 emissions are expected to be no greater than for full-load operations.) A separate modeling assessment for start-up emissions was made and is presented in Table 18. For all startup modeling scenarios, both turbines were assumed to be in a cold start for the 1 and 8-hour averaging periods. CO and NO_x emissions for 1-hour averaging times were modeled for one cold start-up period, assumed to

occur over three (3) hours with the maximum start hour used to calculate the 1-hour impacts. CO emissions for 8-hour averaging times were modeled assuming one cold start-up (3-hours) and shutdown (1-hour), and the remaining time (4-hours) with full load emissions including the duct burner. These emissions are shown above in Table 16 (emissions were assumed to occur for any of the operating scenarios screened). During a cold start, two (2) turbines would be undergoing the start cycle simultaneously.

TABLE 18 AIR QUALITY IMPACT RESULTS– AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	Maximum Concentration (µg/m³)	Background (µg/m³)	Total (µg/m³)	Ambient Air Quality Standards (µg/m³)	
					CAAQS	NAAQS
Normal Operating Conditions						
NO_2*	1-hour maximum (CAAQS)	66.39	101.6	167.99	339	-
	3-year average of 1-hour yearly 98th % (NAAQS)	4.43	79.00	83.43	-	188
	Annual maximum	0.24	13.20	13.44	57	100
CO	1-hour maximum	41.50	4466	4507.50	23,000	40,000
	8-hour maximum	6.97	4352	4358.97	10,000	10,000
SO_2	1-hour maximum (CAAQS)	2.52	19.1	21.62	655	-
	3-year average of 1-hour yearly 99th % (NAAQS)	1.04	10.5	11.54	-	196
	3-hour maximum	1.46	19.1	20.56	-	1,300
	24-hour maximum	0.75	15.40	16.15	105	365
	Annual maximum	0.05	1.0	1.05	-	80
PM10	24-hour maximum (CAAQS)	4.09	211.3	215.39	50	-
	24-hour 4th highest over 3 years (NAAQS)	3.24	64.00	67.24	-	150
	Annual maximum (CAAQS)	0.37	22.80	23.17	20	-
PM2.5	3-year average of 24-hour yearly 98th %	1.74	31.3	33.04	-	35
	Annual maximum (CAAQS)	0.37	12.20	12.57	12	-
	3-year average of annual concentrations (NAAQS)	0.30	8.60	8.90	-	12.0
Cold Start-up Periods						
NO_2*	1-hour maximum (CAAQS)	75.90	101.6	177.5	339	-
	3-year average of 1-hour yearly 98th % (NAAQS)	61.47	79.00	140.47	-	188
CO	1-hour maximum	203.45	4466	4669.45	23,000	40,000
Start-up/Shutdown Periods						
CO	8-hour maximum	26.31	4352	4378.31	10,000	10,000

*1-hour and annual NO_2 impacts for all operating conditions were evaluated with OLM for CAAQS and NAAQS.

1.1.5.7 Commissioning Impacts Analysis – Turbine

The commissioning activities associated with the upgrade package will occur over a period of two weeks (one week per turbine) rather than over the originally assessed two-month period. There are no proposed changes in the commissioning emissions from the previously assessed project, commissioning impact assessments were not analyzed.

As the exact commissioning schedule is unknown, the original facility commissioning emissions for NO_x and CO were used to assess the maximum potential for impacts to air quality. The expected turbine upgrade emissions from the commissioning activities will be less than the modeled emission rates presented below. During the upgrade commission process,

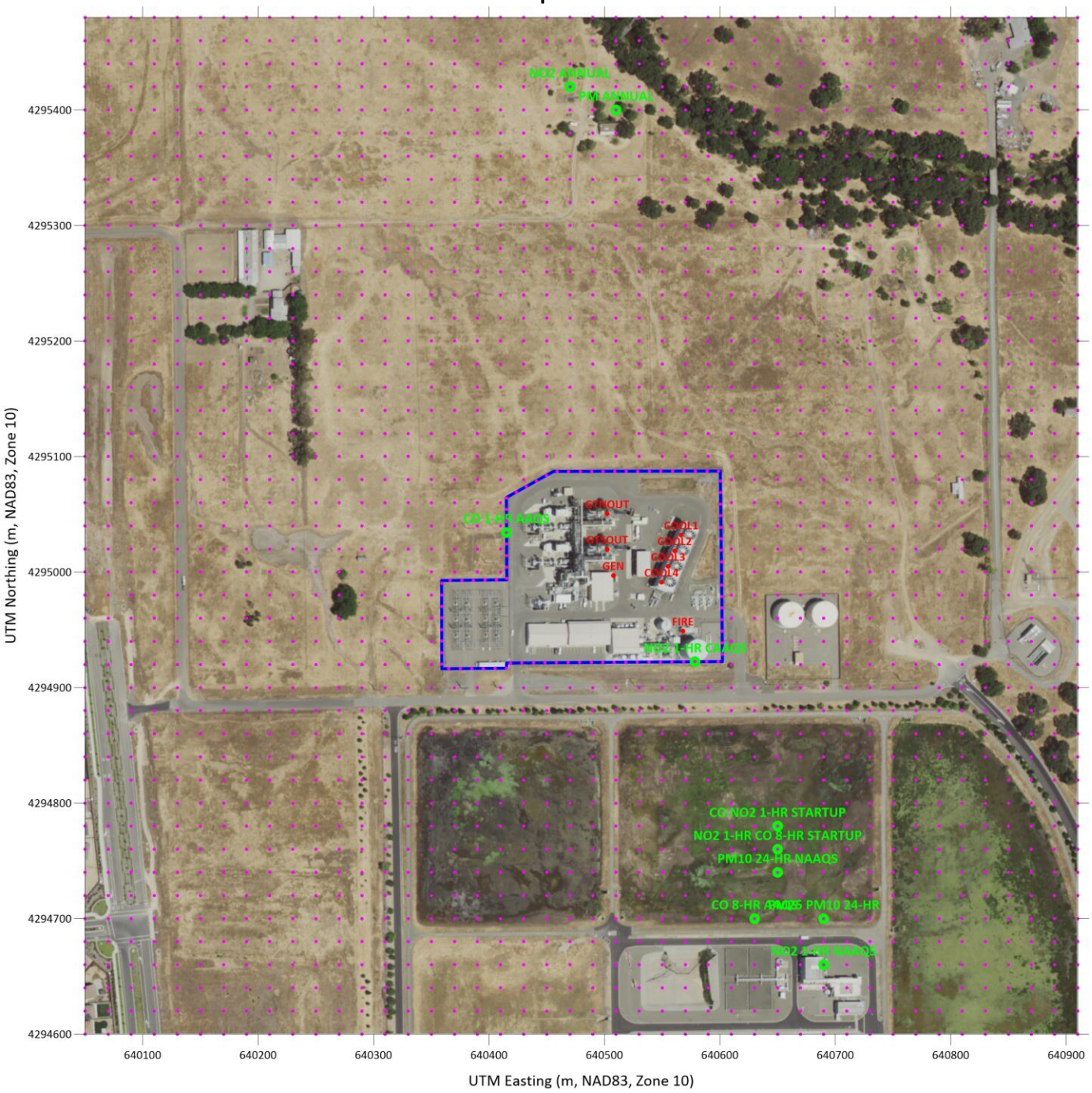
For the Siemens A+ upgrade, the NO_x emissions can be conservatively estimated to be equivalent to the guaranteed turbine-out level of 25 ppmvd @ 15 percent O_2. If operation under this condition were to continue for one-hour, maximum hourly NO_x emissions at 50% load would be (25 ppm) or 40.0 lbs/hr. CO emissions during commissioning periods are currently limited in the permit to no more than 895 lbs/hr with no more than 4 hours of commissioning during any one day. The results of the modeling analysis are presented in Table 19. Note that the 8-hour modeled CO concentration increase does not exceed the 500 *u*g/m^3 offset significance level from, as per PCAPCD Rule 502 (New Source Review 303.9.3) requirements.

TABLE 19 COMMISSIONING AIR QUALITY IMPACT RESULTS – AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	Maximum Concentration (µg/m³)	Background (µg/m³)	Total (µg/m³)	Ambient Air Quality Standards (µg/m³)	
					CAAQS	NAAQS
A+ Upgrade Commissioning						
NO_2*	1-hour maximum (CAAQS)	43.77	101.6	145.37	339	-
	3-year average of 1-hour yearly 98th % (NAAQS)	34.95	79.0	113.95	-	188
CO	1-hour maximum	1026.68	4466	5492.68	23,000	40,000
CO	8-hour maximum	440.94	4352	4792.94	10,000	10,000

*1-hour NO_2 impacts under the Commissioning Operating Conditions were evaluated with OLM for CAAQS and NAAQS.

Figure 4
Maximum Impact Locations



1.1.6 Laws, Ordinances, Regulations, and Statutes (LORS)

Table 19 presents a summary of local, state, and federal LORS deemed applicable to the proposed modification.

TABLE 19 SUMMARY OF APPLICABLE LORS FOR AIR QUALITY	
Regulation Citation	**Compliance Strategy/Determination**
Federal Regulations	
CAAA of 1990, 40 CFR 50	REP operations will not cause violations of state or federal AAQS.
40 CFR 52.21 (PSD)	Impact analysis shows compliance with NAAQS. The current facility is not subject to PSD, and the modification will not trigger the PSD requirements.
40 CFR 72-75 (Acid Rain)	REP will submit updated applications for inclusion to the Acid Rain program and allowance system. Current CEMS meets all 40 CFR 72-75 requirements.
40 CFR 60 (NSPS)	REP will determine subpart applicability and comply with all emissions, monitoring, and reporting requirements. 40 CFR 60, Subpart GG on the turbines. 40 CFR 60 subpart TTTT will not apply to the modified turbines.
40 CFR 70 (Title V)	The approved PTO for the modifications will be incorporated into the existing Title V permit.
40 CFR 63 (RMP)	REP will evaluate and update its existing RMP as required.
40 CFR 64 (CAM Rule)	Facility will be exempt from CAM Rule provisions.
40 CFR 68 (HAPs, MACT)	REP will determine subpart applicability and comply with all emissions, monitoring, and reporting requirements.
State Regulations (CARB)	
CHSC 44300 et seq.	REP will determine applicability, and prepare inventory plans and reports as required.
CHSC 41700	PCAPCD Permit to Construct (PTC) will ensure that no public nuisance results from operation of facility.
Gov. Code 65920 et seq.	Pursuant to the Permit Streamlining Act, the applicant believes the proposed project is a “development project” as defined, and is seeking approvals as applicable under the Act.
Local Regulations (PCAPCD)	
Rule 202	Limits visible emissions. REP will comply with all limits per BACT and clean fuel use.
Rule 205	Prohibits public nuisances. REP is not expected to cause or create any type of public nuisance.
Rule 209	BACT and the use of natural gas will ensure compliance with the emissions limits for SOx, NOX, and combustion contaminants.
Rule 207	The use of natural gas will ensure compliance with the PM limitations in this rule.
Rule 210	The use of natural gas will ensure compliance with the PM limitations in this rule.

TABLE 19 SUMMARY OF APPLICABLE LORS FOR AIR QUALITY	
Regulation Citation	**Compliance Strategy/Determination**
Rule 211	The use of natural gas will ensure compliance with the PM limitations in this rule.
Rule 218	The use of compliant coatings will ensure compliance with the limitations in the rule.
Rule 221	Current source test conditions on the permits ensure compliance with the rule provisions.
Rule 228	The proposed modifications will not involve construction or activities that would generate fugitive dust emissions.
Rule 250	BACT and the use of natural gas ensures compliance with the prohibitory limits in this rule.
Rule 501	The facility is currently in compliance with each of these rules. This application and support data addresses each of these rules as they pertain to reporting and recordkeeping, monitoring, source testing, BACT, offsets, Title V, NSPS, and NESHAPs compliance, etc.
Rule 502	
Ruel 503	
Rule 504	
Rule 507	
Rule 511	
Rule 513	
Notes:	

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

This subpart applies to all turbines with a heat input in excess of 10 MMBTU/Hr that commence construction or modification after February 18, 2005. The construction of the turbines commenced before February 2005, thus the project is subject to 40 CFR 60, Subpart GG. The proposed REP upgrade project on the existing gas turbines would not trigger the requirements of 40 CFR 60, Subpart KKKK as there is no increase in the NOx emission rate based on the physical modification of the turbines. Thus, Subpart GG still applies.

NSPS Part 60 (Subpart TTTT) GHG Standards of Performance for GHG Emissions for New Stationary Sources: Electric Utility Generating Units.

In January, 2014, EPA re-proposed the standards of performance regulating CO_2 emissions from new affected fossil-fuel-fired generating units, pursuant to Section 111(b) of the CAA. These standards were adopted in final form by EPA on August 3, 2015. The new standards would be 1,100 lbs CO_2/MWh (gross energy output on a 12 operating month rolling average basis for base loaded units), while non-base load units would have to meet a clean fuels input-based standard. The determination of base versus non-base load would be on a sliding scale that considers design efficiency and power sales.

Within Subpart TTTT, base load rating is defined as maximum amount of heat input that an Electrical Generating Unit (EGU) can combust on a steady state basis at ISO conditions. For stationary combustion turbines, base load rating includes the heat input from duct burners. Each EGU is subject to the standard if it burns more than 90 percent natural gas on a 12-month rolling basis, and if the EGU supplies more than the design efficiency times the potential electric output as net-electric sales on a 3 year rolling average basis. Affected EGUs supplying equal to or less than the design efficiency times the potential electric output as net electric sales on a 3 year rolling average basis are considered non-base load units and are subject to a heat input limit of 120 lbs CO_2/MMBtu. Each affected 'base load' EGU is subject to the gross energy output standard of 1,000 lbs of CO_2/MWh unless the Administrator approves the EGU being subject to a net energy output standard of 1,030 lbs CO_2/MWh.

<u>REP believes that the turbines are exempt from Subpart TTTT based on the following</u>:

The NSPS general provisions (40 CFR part 60.15, subpart A) provide that an existing source is considered to be a new source if it undertakes a "reconstruction," which is the replacement of components of an existing facility to an extent that (1) the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, and (2) it is technologically and economically feasible to meet the applicable standards.

Per REP, the upgrade cost per turbine is significantly less than the 50% cost threshold noted above, and as such the upgrade is not considered "reconstruction".

40 CFR 60.5509 (b) states that "You are not subject to the requirements of this subpart if your affected EGU meets any of the conditions specified in paragraphs (b)(1) through (b)(8) of this section."

(b)(7) states "Your EGU is a steam generating unit or IGCC that undergoes a modification resulting in an hourly increase in CO_2 emissions (mass per hour) of 10 percent or less (2 significant figures). Modified units that are not subject to the requirements of this subpart pursuant to this subsection continue to be existing units under section 111 with respect to CO_2 emissions standards."

REP believes, based upon a review of current and proposed turbine operations, that the upgraded turbines will not result in an emission increase of CO_2 of greater than 10% (mass emissions per hour). This conclusion is based on a comparison of the pre- versus post-modification heat rates for the cold, average, and hot day scenarios (with and without duct firing). This comparison shows heat rate increases that range from 2.5% to 4.7%. Since CO_2 emissions are based on a fixed emissions factor which is applied in a linear fashion, the heat rate increases will also predict the CO_2 increases, i.e., none of which are in excess of the 10% criteria on an hourly basis.

1.1.7 Agency Jurisdiction and Contacts

Table 20 presents data on the following: (1) air quality agencies which may or will exercise jurisdiction over air quality issues resulting from the proposed power plant, (2) the most appropriate agency contact for the proposed project, (3) contact address and phone information, and (4) the agency involvement in required permits or approvals.

TABLE 20 AGENCIES, CONTACTS, JURISDICTIONAL INVOLVEMENT, REQUIRED PERMITS

Agency	Contact	Jurisdictional Area	Permit Status
Placer County APCD	Eric White, APCO Placer County APCD 110 Maple St. Auburn, CA. 95603 530-745-2330	Issues PCAPCD Permit to Construct and Operate, Primary air regulatory and enforcement agency.	This document serves as the formal PTC application for the project.
California Air Resources Board	Mike Tollstrup Chief, Project Assessment Branch 1001 I St., 6th Floor Sacramento, Ca. 95814 916-322-6026	Oversight of PCAPCD stationary source permitting and enforcement program	CARB staff may provide comments on applicable PTC as appropriate per the PCAPCD NSR rule provisions.
Environmental Protection Agency, Region IX	Gerardo Rios Chief, Permits Section EPA-Region 9 75 Hawthorne St. San Francisco, Ca. 94105 415-947-3974	Oversight of all PCAPCD programs, including permitting and enforcement programs	EPA staff may provide comments on applicable PTC as appropriate per the PCAPCD NSR rule provisions.

1.1.8 Permit Requirements and Schedules

A Permit to Construct application is required in accordance with the PCAPCD rules. This document, and the PCAPCD permit application forms in Attachment 1, fulfills the PTC application requirements.

1.1.9 References

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2.0 Public Health

INTRODUCTION

This section presents the methodology and results of a human health risk assessment performed to assess potential impacts and public exposure associated with airborne emissions from the routine operation of the modified REP project. Section 2.0 describes the affected environment, discusses the environmental consequences from the operation of the power plant and associated facilities, cumulative impacts, mitigation measures, presents applicable laws, ordinances, regulations, and standards (LORS), presents permit requirements and schedules, presents agency contacts, and contains references cited or consulted in preparing this section.

Air will be the dominant pathway for public exposure to chemical substances released by the project. Emissions to the air will consist primarily of combustion by-products produced by the natural gas-fired turbines. Potential health risks from combustion emissions will occur almost entirely by direct inhalation. To be conservative, additional pathways were included in the health risk modeling; however, direct inhalation is considered the most likely exposure pathway. The risk assessment was conducted in accordance with guidance established by the California Office of Environmental Health Hazard Assessment (OEHHA) and the California Air Resources Board.

Combustion byproducts with established CAAQS or NAAQS, including oxides of nitrogen (NO_x), carbon monoxide and fine particulate matter are addressed in the Ambient Air Quality section (see Section 1.0). However, some discussion of the potential health risks associated with these substances is presented in this section.

2.1.1 Affected Environment

According to the Auer land use classification scheme, a 3 km radius boundary around the proposed site yields a predominately “rural” classification. This is consistent with the current land use and zoning designation for the site and surrounding area as residential, future residential development, and open space.

Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure. Schools (public and private), day care facilities, convalescent homes, and hospitals are of particular concern. The nearest sensitive receptors are listed in Table 21. Nearfield residential and worker receptors will be defined by the final modeling grid used in the HRA. Attachment 7 contains support materials for the revised facility health risk assessment, such as; a listing of sensitive receptors within the facility nearfield regional area. HAPs emissions evaluations are presented in Attachment 3.

TABLE 21 SENSITIVE RECEPTORS NEARFIELD OF THE REP SITE (3+ MILE RADIUS)		
	Receptor Type	**UTM NAD83, Zone 10 Coordinates (E/N), meters**
1	School	641505/4293429
2	School	642006/4293353
3	School	644545/4296764
4	School	644643/4295192
5	School	644464/4294448
6	School	644735/4293817
7	Daycare	644664/4293944
8	School	644598/4293022
9	Daycare	644496/4292950
10	School	644816/4291847
11	School	645319/4291338
12	School	643031/4291317
13	School	643196/4291821
14	School	641603/4292684
15	Pre-School	645967/4290732
16	Pre-School	646356/4292745
17	School	646956/4292756
18	School	646304/4291212
All coordinates from Google Earth (center location of each receptor site). These coordinates are from imagery dated 9/12/2019.		

Air quality and health risk data presented by CARB in the 2009 Almanac of Emissions and Air Quality for the state shows that over the period from the mid-1990s through 2009, the average concentrations for the most prominent TACs have been substantially reduced, and the associated health risks for the state are showing a steady downward trend as well. This same trend is expected to have occurred in the PCAPCD. Table 22 shows toxics emissions inventory values for 2010 (latest data available from CARB), as well as the estimated emissions for the post-modification turbines/HRSGs.

TABLE 22 TAC EMISSIONS-PCAPCD			
TAC	**~PCAPCD 2010 Emissions (tpy)**	**Federal HAP**	**REP Turbine/HRSG Estimated Emissions (tpy)**
Acetaldehyde	926.3	Yes	0.0327
Benzene	117.05	Yes	0.0755
1,3 Butadiene	60.4	Yes	0.000315
Acrolein	52.4	Yes	0.0061

TABLE 22 TAC EMISSIONS-PCAPCD			
TAC	**~PCAPCD 2010 Emissions (tpy)**	**Federal HAP**	**REP Turbine/HRSG Estimated Emissions (tpy)**
Ethyl Benzene	57.02	Yes	0.0189
Hexane	107.8	Yes	0.186
Formaldehyde	219.2	Yes	2.290
Naphthalene	12	Yes	0.00101
PAHs	23.3	Yes	0.00165
Toluene	910.9	Yes	0.0688
Propylene	387.3	Yes	0.555
Propylene oxide	0.001	Yes	0.0021
Source: California Toxics Inventory 2010, CARB, website 9/14/2020.			

Environmental Consequences

2.1.1.1 Significance Criteria

2.1.1.1.1 Cancer Risk

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). Carcinogens are not assumed to have a threshold below which there would be no human health impact. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the cancer risk (i.e., a linear, no-threshold model). Under various state and local regulations, an incremental cancer risk greater than 10-in-one million due to a project is considered to be a significant impact on public health. For example, the 10-in-one-million risk level is used by the Air Toxics Hot Spots (AB 2588) program and California's Proposition 65 as the public notification level for air toxic emissions from existing sources.

2.1.1.1.2 Non-Cancer Risk

Non-cancer health effects can be either chronic or acute. In determining potential non-cancer health risks (chronic and acute) from air toxics, it is assumed there is a dose of the chemical of concern below which there would be no impact on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). Non-cancer health risks are measured in terms of a hazard quotient, which is the calculated exposure of each contaminant divided by its REL. Hazard quotients for pollutants affecting the same target organ are typically summed with the resulting totals expressed as hazard indices for each organ system. A hazard index of less than 1.0 is considered to be an insignificant health risk. For this health risk assessment, all hazard quotients were summed regardless of target organ. This method leads to a conservative (upper bound) assessment. RELs used in the hazard index calculations were those published in the CARB/OEHHA listings dated September 2017.

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this

threshold, the body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic hazard index was calculated using the hazard quotients calculated with annual concentrations.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. For most chemicals, the air concentration required to produce acute effects is higher than the level required to produce chronic effects because the duration of exposure is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all hazard quotients are typically summed to calculate the acute hazard index. One-hour average concentrations are divided by acute RELs to obtain a hazard index for health effects caused by relatively high, short-term exposure to air toxics.

2.1.1.2 Construction Phase Impacts

As stated in the air quality section, no construction activities are anticipated to occur as part of the turbine modification project, therefore a construction screening risk assessment for pollutants such as diesel particulate matter is not warranted.

2.1.1.3 Operational Phase Impacts

Environmental consequences potentially associated with the project are potential human exposure to chemical substances emitted into the air. The human health risks potentially associated with these chemical substances were evaluated in a health risk assessment. The chemical substances potentially emitted to the air from the proposed facility include ammonia, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) from the combustion turbine. Although the turbines/HRSGs are the subject of this application, the revised and updated HRA was conducted using emissions from the turbines/HRSGs, IC Engines, and the cooling tower. These chemical substances are listed in Table 23.

TABLE 23 CHEMICAL SUBSTANCES POTENTIALLY EMITTED TO THE AIR FROM REP TURBINES/HRSGS, IC ENGINES, AND COOLING TOWER

Criteria Pollutants	**Non-Criteria Pollutants (cont'd)**
Carbon monoxide	Xylene
Oxides of nitrogen	Ammonia
Particulate matter	Acetaldehyde
Oxides of sulfur	Acrolein
Volatile organic compounds	1,3-Butadiene
Non-Criteria Pollutants	Benzene
Polycyclic aromatic hydrocarbons (PAHs)	Ethylbenzene
Naphthalene	Formaldehyde
Toluene	Propylene oxide
DPM	Aluminum
Copper	Zinc
Manganese	Phosphorus
Silica	

Emissions of criteria pollutants will adhere to NAAQS or CAAQS as discussed in the Ambient Air Quality section (see Section 1.0). The proposed facility also will include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under PCAPCD rules. Finally, air dispersion modeling results (presented in the Ambient Air Quality section, Section 1.0) show that emissions will not result in concentrations of criteria pollutants in air that exceed ambient air quality standards (either NAAQS or CAAQS). These standards are intended to protect the general public with a wide margin of safety. Therefore, the project is not anticipated to have a significant impact on public health from emissions of criteria pollutants.

Potential impacts associated with emissions of toxic pollutants to the air from the proposed modified facility were addressed in a health risk assessment, with support data presented in Attachment 7. The risk assessment was prepared using guidelines developed by OEHHA and CARB, as implemented in the latest version of the HARP model (ADMRT 19121).

2.1.1.4 Public Health Impact Study Methods

Emissions of toxic pollutants potentially associated with the facility were estimated using emission factors approved by CARB, and the U.S. Environmental Protection Agency (USEPA). Concentrations of these pollutants in air potentially associated with the emissions were estimated using the HARP dispersion modeling module. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in a risk assessment, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in air were characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for non-cancer health effects (for non-carcinogenic substances).

The following receptor descriptors are used herein:

- MEIR – Maximum exposed individual residential receptor – this receptor represents the maximum impacted actual residential location on the grid for the analysis under consideration.
- MEIW - Maximum exposed individual worker receptor – this receptor represents the maximum impacted actual worker location on the grid for the analysis under consideration.
- MEIS - Maximum exposed individual sensitive receptor – this receptor represents the maximum impacted actual sensitive location on the grid for the analysis under consideration. This location is a non-residential sensitive receptor, i.e., school, hospital, daycare center, convalescent home, etc.

Health risks potentially associated with concentrations of carcinogenic pollutants in air were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of the concentration in air and a unit risk value. The unit risk value is defined as the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ over a 30-year lifetime. In other words, it represents the increased cancer risk associated with continuous exposure to a concentration in air over a 30-year lifetime. Evaluation of potential non-cancer health effects from exposure to short-term and long-term concentrations in air was performed by comparing modeled concentrations in air with the RELs. An REL is a concentration in air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential non-cancer effects were evaluated by calculating a ratio of the modeled concentration in air and the REL. This ratio is referred to as a hazard quotient. The unit risk values and RELs used to characterize health risks associated with

modeled concentrations in air were obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (CARB, 10/2020), and are presented in Table 24.

TABLE 24 TOXICITY VALUES USED TO CHARACTERIZE HEALTH RISKS

Compound	Unit Risk Factor (µg/m3)-1	Chronic Reference Exposure Level (µg/m3)	Acute Reference Exposure Level (µg/m3)
Acetaldehyde	2.7E-06	9.00E+00	--
Acrolein	--	6.00E-02	1.90E-01
Ammonia	--	2.00E+02	3.2E+03
Benzene	2.9E-05	6.00E+01	1.3E+03
1,3-Butadiene	1.7E-04	--	--
Ethylbenzene	--	2.00E+03	--
Formaldehyde	6.0E-06	3.00E+00	9.4E+01
Naphthalene	3.4E-05	9.00E+00	--
PAHs (as BaP for HRA)	1.3E-03	--	--
Propylene Oxide	3.7E-06	3.0E+01	3.1E+03
Toluene	--	3.00E+02	3.7E+04
Xylene	--	7.00E+02	2.2E+04
DPM	3.0E-04	5.00E+00	-
Copper	-	-	1.0E+02
Manganese	-	9.0E-02	-
Silica	-	3.00E+00	-
Aluminum	-	-	-
Zinc	-	-	-
Phosphorus	-	-	-

Source: CARB/OEHHA, 10/2/2020.

Table 25 delineates the maximum hourly and annual emissions of all identified air toxic pollutants from the modified turbines.

TABLE 25 MAXIMUM REP HOURLY, DAILY, AND ANNUAL AIR TOXIC EMISSIONS				
Gas Turbines (2) and HRSGs				
Toxic	**Emission Factor**	**Max Hour Emissions, lbs**	**Max Daily Emissions, lbs**	**Annual Emissions tons**
Total PAHs w/o Naphthalene	Lb/mmscf	0.000658	0.0158	0.00165
Naphthalene	Lb/mmscf	0.0004	0.00961	0.00101
Ethylbenzene	Lb/mmscf	0.00752	0.181	0.0189
1-3 Butadiene	Lb/mmscf	0.000125	0.00301	0.000315
Acetaldehyde	Lb/mmscf	0.013	0.312	0.0327
Acrolein	Lb/mmscf	0.00243	0.0582	0.0061
Benzene	Lb/mmscf	0.030	0.721	0.0755
Formaldehyde	Lb/mmscf	0.909	2.18	2.29
Toluene	Lb/mmscf	0.0273	0.656	0.0688
Xylenes	Lb/mmscf	0.016	0.384	0.0402
Propylene Oxide	Lb/mmscf	0.000835	0.02	0.0021
Ammonia	10 ppmvd	14.6	350	46.7
Fire Pump Engine				
DPM	g/BHP-Hr	0.03	8.4	0.0042
Emergency Gen Set Engine				
DPM	g/BHP-Hr	0.14	1.8	0.0009
Cooling Tower (total all cells)				
Copper	ppm	0.00000706	0.619	0.00031
Manganese	ppm	0.00000141	0.0124	0.0000062
Silica	ppm	0.00965	84.5	0.0423
Aluminum	ppm	0.0000381	0.334	0.000167
Zinc	ppm	0.0000424	0.371	0.000186
Phosphorus	ppm	0.0028	24.5	0.0123
Turbine/HRSG emissions notes: Max hourly emissions based on Case 29a (cold day, with duct firing) Max daily emissions based on Case 29a (cold day, with duct firing) Annual emissions based on Cases 13a and 13b (Avg day conditions)				

2.1.1.5 Characterization of Risks from Toxic Air Pollutants

The excess lifetime cancer risk associated with concentrations in air estimated for the REP MEIR location is estimated to be 2.599E-6. Excess lifetime cancer risks less than 10×10^{-6}, for sources with T-BACT, are unlikely to represent significant public health impacts that require additional controls of facility emissions. Risks higher than 1×10^{-6} may or may not be of concern, depending upon several factors.

These include the conservatism of assumptions used in risk estimation, size of the potentially exposed population and toxicity of the risk-driving chemicals. Health effects risk thresholds are listed on Table 26. Risks associated with pollutants potentially emitted from the facility are presented in Table 27. The chronic and acute hazard indices for all scenarios are well below 1.0. Further description of the methodology used to calculate health risks associated with emissions to the air can be found in the HARP User's Manual dated 12/2003 and the ADMRT Manual dated 3/2015. As described previously, human health risks associated with emissions from the proposed facility are unlikely to be higher at any other location than at the location of the MEIR. If there is no significant impact associated with concentrations in air at the MEIR location, it is unlikely that there would be significant impacts in any other location in the vicinity of the facility. Figure 5 presents the locations of the results summarized in Table 27.

TABLE 26 HEALTH EFFECTS SIGNIFICANT THRESHOLD LEVELS

	Significance Thresholds	
Agency	**PCAPCD**	**State of California**
Cancer Risk per million	<= 10.0 with T-BACT	<= 10.0 with T-BACT
Acute HI	1.0	1.0
Chronic HI	1.0	1.0
Note: the PCAPCD risk significance thresholds were derived from the PCAPCD 2017 CEQA Guidance, Appendix G. the values above are recommended values for "new sources". The Applicant is applying these thresholds as if the modifications are treated as a new source.		

TABLE 27 REP HEALTH RISK ASSESSMENT SUMMARY

All Sources		
Risk Category	**Facility Values**	**Applicable Significance Threshold**
Residential (MEIR) Results		
Cancer Risk MEIR	2.599E-6 (receptor #899)	<=10 x 10^{-6} with T-BACT
Chronic Hazard Index MEIR	3.542E-3 (receptor #867)	1.0
Acute Hazard Index MEIR	1.247E-2 (receptor #2138)	1.0
Worker (MEIW) Results Pleasant Grove Wastewater		
Cancer Risk MEIW	6.283E-7 (receptor #570)	<=10 x 10^{-6} with T-BACT
Chronic Hazard Index MEIW	2.735E-3 (receptor #570)	1.0
Acute Hazard Index MEIW	1.374E-2 (receptor #570)	1.0
School (MEIS) Results West Park High School		
Cancer Risk MEIS	7.608E-7 (receptor #2283)	<=10 x 10^{-6} with T-BACT
Chronic Hazard Index MEIS	1.115E-3 (receptor #2284)	1.0
Acute Hazard Index MEIS	1.018E-2 (receptor #3231)	1.0
See PCAPCD threshold notes in Table 26.		

Cancer risks potentially associated with facility emissions also were assessed in terms of cancer burden. Cancer burden is a hypothetical upper-bound estimate of the additional number of cancer cases that could be associated with emissions from the facility. Cancer burden is calculated as the worst case product of excess lifetime cancer risk, at the 1×10^{-6} isopleth and the number of individuals at that risk level. The PCAPCD regulations do not require a calculation of cancer burden.

As described previously, human health risks associated with emissions from the proposed facility are unlikely to be higher at any other location than at the location of the MIR. Therefore, the risks for all of these individuals would be lower (and in most cases, substantially lower) than 2.599E-6.

The acute and chronic non-cancer hazard quotients associated with concentrations in air are shown in Table 27. The acute and chronic non-cancer hazard quotients for all target organs fall below 1.0. As described previously, a hazard quotient less than 1.0 is unlikely to represent significant impact to public health. As described previously, human health risks associated with emissions from the proposed facility are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely that there would be significant impacts in any other location in the vicinity of the facility.

Detailed risk and hazard values are provided in the HARP output which will be electronically submitted.

The estimates of excess lifetime cancer risks and non-cancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have estimated such risks by extrapolation from high to low doses. This modeling procedure is designed to provide a highly conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans (i.e., the assumption being that humans are as sensitive as the most sensitive animal species). Therefore, the true risk is not likely to be higher than risks estimated using unit risk factors and is most likely lower, and could even be zero (USEPA, 1986; USEPA, 1996).

An excess lifetime cancer risk of 1×10^{-6} is typically used as a screening threshold of significance for potential exposure to carcinogenic substances in air. The excess cancer risk level of 1×10^{-6}, which has historically been judged to be an acceptable risk, originates from efforts by the Food and Drug Administration (FDA) to use quantitative risk assessment for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt, 1985). The associated dose, known as a "virtually safe dose" (VSD) has become a standard used by many policy makers and the lay public for evaluating cancer risks. However, a study of regulatory actions pertaining to carcinogens found that an acceptable risk level can often be determined on a case-by-case basis. This analysis of 132 regulatory decisions, found that regulatory action was not taken to control estimated risks below 1×10^{-6} (one-in-one million), which are called *de minimis* risks. *De minimis* risks are historically considered risks of no regulatory concern. Chemical exposures with risks above 4×10^{-3} (four-in-ten thousand), called *de manifestis* risks, were consistently regulated. *De manifestis* risks are typically risks of regulatory concern. The risks falling between these two extremes were regulated in some cases, but not in others (Travis et al, 1987).

The estimated lifetime cancer risks to the maximally exposed individual located at the REP MIR are well below the 10×10^{-6} significance level (for TBACT), and the aggregated cancer burden associated this risk level is less than 1.0 excess cancer case (State threshold value). In addition, the cancer burden is less than the Rule 1401 threshold value of 0.5. The acute and chronic hazard index values are also well below the significance threshold of 1.0. These risk estimates were calculated using assumptions that are highly health conservative. Evaluation of the risks associated with the facility emissions should consider that

the conservatism in the assumptions and methods used in risk estimation considerably over-state the risks from facility emissions. Based on the results of this risk assessment, there are no significant public health impacts anticipated from emissions of toxic pollutant to the air from the proposed facility.

2.1.1.6 Hazardous Materials

Hazardous materials are used and stored at the facility. Current use of chemicals at the existing facility is in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, does not pose significant impacts to public health. While mitigation measures are in place to prevent releases, accidental releases that migrate offsite could result in potential impacts to the public.

The California Accidental Release Program regulations (CalARP) and Code of Federal Regulations (CFR) Title 40 Part 68 under the Clean Air Act establish emergency response planning requirements for acutely hazardous materials. These regulations require preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a program listed hazardous material. RMP listed materials proposed to be used at the facility include aqueous ammonia.

The current RMP will be reviewed to ascertain if any changes or updates are required as a result of the proposed turbine modifications. Both the current RMP and the Hazardous Materials Plan are on file with the CUPA (City of Roseville).

2.1.1.7 Operation Odors

Small amounts of ammonia used to control oxides of nitrogen (NO_x) emissions currently escape up the exhaust stack but they do not produce objectionable odors. The expected exhaust gas ammonia concentration, known as ammonia "slip," will be less than 10 parts per million (ppm). After mixing with the atmosphere, the concentration at ground level will be far below the detectable odor threshold of 5 ppm that the Compressed Gas Association has determined to be acceptable, as well as being below the ACGIH TLV and STEL values of 25 and 35 ppm respectively (adopted 2003). Therefore, current and potential ammonia emissions are not expected to create objectionable odors. Other combustion contaminants are not present at concentrations that could produce objectionable odors.

2.1.1.8 Electromagnetic Field Exposure

Because the primary electric transmission line from the site does not travel through residential areas, and based on recent findings of the National Institute of Environmental Health Sciences (NIEHS 1999), electromagnetic field exposures are not expected to result in a significant impact on public health. The NIEH report to the U.S. Congress found that "the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm (NIEH 1999)."

2.1.1.9 Summary of Impacts

Results from an air toxics risk assessment based on emissions modeling indicate that there will be no significant incremental public health risks from the modification and operation of the proposed project. Results from criteria pollutant modeling for routine operations indicate that potential ambient concentrations of NO_2, CO, SO_2, and PM_{10} will not significantly impact air quality (Section 1.0). Potential concentrations are below the federal and California standards established to protect public health, including the more sensitive members of the population.

2.1.2 Cumulative Impacts

The health risk assessment for the proposed project indicates that the maximum cancer risk will be approximately 2.16E-6 (versus a significance threshold of 10 x 10^{-6} with T-BACT) at the point of maximum exposure to air toxics from power plant emissions. This risk level is considered to be insignificant. Non-cancer chronic and acute effects for all scenarios are well below the hazard index significance values.

2.1.3 Mitigation Measures

2.1.3.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the facility. The current BACT systems installed and operated on the turbines/GTSGs already meet the BACT requirements of the PCAPCD. In addition, the use of natural gas as the sole fuel in the turbines/duct burners is also considered BACT.

2.1.3.2 Toxic Pollutants

Emissions of toxic pollutants to the air will be minimized through the use of natural gas in the turbines and duct burners. Emissions from tanks storing liquid organic chemicals (if applicable) will be minimized through the use of one or a combination of the following:

- Use of small capacity fixed roof tanks
- Use of low vapor pressure organic substances
- Use of exempt compounds
- Use of vapor balance and/or vapor recovery systems on a case-by-case basis as deemed appropriate

2.1.3.3 Hazardous Materials

Mitigation measures for hazardous materials are already present and implemented at the facility. Potential public health impacts from the use of hazardous materials are only expected to occur as a result of an accidental release. The plant has many safety features designed to prevent and minimize impacts from the use and accidental release of hazardous materials. The REP plant site currently uses the following design features:

- Curbs, berms, and/or secondary containment structures are provided where accidental release of chemicals may occur.
- A fire protection system is installed to detect, alarm, and suppress a fire, in accordance with the applicable LORS.
- The existing aqueous ammonia storage tank and distribution system will continue to be used. The system and tank currently meets all current design and operational specifications.

A Risk Management Plan (RMP) for the REP facility has been prepared for the facility. The RMP has estimated the impacts presented by handling aqueous ammonia at the facility. The RMP includes a hazard analysis, off-site consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process has accurately identified and implemented adequate mitigation measures to reduce the risk to the lowest possible level.

A safety program has already been implemented and includes safety training programs for contractors and operations personnel, including instructions on: 1) the proper use of personal protective equipment, 2) safety operating procedures, 3) fire safety, and 4) emergency response actions. The safety

program also includes programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for REP personnel include power plant evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials have been paved and bermed. Incompatible materials are stored in separate containment areas. Also, piping and tanks exposed to potential traffic hazards have been additionally protected by traffic barriers.

2.1.4 Laws, Ordinances, Regulations, and Standards

An overview of the regulatory process for public health issues is presented in this section. The relevant LORS that affect public health and are applicable to this project are identified in Table 28. The conformity of the project to each of the LORS applicable to public health is also presented in this table, as well as references to the selection locations within this report where each of these issues is addressed. Table 29 summarizes the primary agencies responsible for public health, as well as the general category of the public health concern regulated by each of these agencies.

TABLE 28 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
Federal Clean Air Act Title III	Public exposure to air pollutants	USEPA Region IX CARB PCAPCD	Based on results of risk assessment as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels. Emissions of criteria pollutants will be minimized by applying BACT and T-BACT to the facility.
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Based on results of risk assessment as per CARB/OEHHA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings.
40 CFR Part 68 (Risk Management Plan) and CalARP Program Title 19	Public exposure to acutely hazardous materials	USEPA Region IX CUPA-City of Roseville	The facility RMP will be updated prior to commencement of facility operations. The RMP will contain a vulnerability analysis to assess potential risks from a spill or rupture of the aqueous ammonia storage tank.
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	CUPA-City of Roseville CARB PCAPCD	A vulnerability analysis will be performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank.

TABLE 28 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS			
LORS	**Public Health Concern**	**Primary Regulatory Agency**	**Project Conformance**
CHSC 25500-25542	Hazmat Inventory	State OES and CUPA-City of Roseville	Prepare all required HazMat plans and inventories, distribute to affected agencies
CHSC 44300 et seq.	AB2588 Air Toxics Program	PCAPCD	Participate in the AB2588 inventory and reporting program at the District level.
PCAPCD Rule 513	Toxics NSR	PCAPCD	Application of BACT and T-BACT, preparation of HRA
CHSC 25249.5	Proposition 65	OEHHA	Comply with all signage and notification requirements.
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB PCAPCD	Based on results of risk assessment as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels.

2.1.5 Permits Required and Schedule

Agency-required permits related to public health include a Risk Management Plan and PCAPCD Permit to Construct/Permit to Operate. These requirements are discussed in detail in 1.0 (Air Quality), respectively.

2.1.6 Agencies Involved and Agency Contacts

Table 29 provides contact information for agencies involved with Public Health.

TABLE 29 Summary of Agency Contacts for Public Health		
Public Health Concern	**Primary Regulatory Agency**	**Regulatory Contact**
Public exposure to air pollutants	USEPA Region IX	Gerardo Rios (415) 947-3974
	CARB	Robert Krieger (916) 323-1202
	PCAPCD	Eric White, APCO 530-745-2330
Public exposure to chemicals known to cause cancer or reproductive toxicity	Office of Environmental Health and Hazard Assessment (OEHHA)	Cynthia Oshita 916-327-8357
Public exposure to acutely hazardous materials	USEPA Region IX	Gerardo Rios (415) 947-3974

TABLE 29 Summary of Agency Contacts for Public Health		
Public Health Concern	**Primary Regulatory Agency**	**Regulatory Contact**
	CUPA-City of Roseville, CA. RMP and HazMat	Jack Harrah Fire Department 916-845-8759

2.1.7 References

California Air Resources Board. (CARB). 2017. Consolidated table of OEHHA/ARB approved risk assessment health values. http://arbis.arb.ca.gov/toxics/healthval/contable.pdf. September.

Cooling Tower Institute (CTI). 2008. Legionellosis-Guideline-Best Practices for Control of Legionella. WTB-148, July.

Hotspots Analysis and Reporting Program. (HARP). 2003. *User Guide, Version 1*. Cal-EPA Air Resources Board, December.

Hotspots Analysis and Reporting Program. (HARP). 2015. *ADMRT User Guide, Version 2*. Cal-EPA Air Resources Board, March.

Hutt. P.B. 1985. "Use of Quantitative Risk Assessment in Regulatory Decision Making Under Federal Health and Safety Statutes." *Risk Quantitation and Regulatory Policy*. Eds. D.G. Hoel, R.A. Merrill and F.P. Perera. Banbury Report 19, Cold Springs Harbor Laboratory.

National Institute of Environmental Health Sciences (NIEHS). 1999. Environmental Health Institute report concludes evidence is 'weak' that EMFs cause cancer. Press release. National Institute of Environmental Health Sciences, National Institutes of Health.

Office of Environmental Health Hazard Assessment/California Air Resources Board. (OEHHA/CARB). 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines, Cal-EPA. February.

South Coast Air Quality Management District. (PCAPCD). 2015. *Multiple Air Toxics Exposure Study in the South Coast Air Basin-MATES IV*. May.

South Coast Air Quality Management District. (PCAPCD). 2005. *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics Hot Spots Information and Assessment Act (AB2588)*. July.

Travis, C.C., E.A.C. Crouch, R. Wilson and E.D. Klema. 1987. "Cancer Risk Management: A Review of 132 Federal Regulatory Cases." *Environ. Sci. Technol.* 21: 415-420.

Risk Science Associates, Inc., 2008. Liberty Energy XXIII-Renewable Energy Power Plant Project, Draft EIR, Public Health Section D.11, Aspen Environmental Group, June.

Bay Area Air Quality Management District. (BAPCAPCD). 2010. Air Toxics NSR Program HRSA Guidelines, Section 2.3. January.

Roseville Energy Park Upgrade Project Team. 2020. Fieldwork, observations, and research.

Attachment 1
PCAPCD Permit Forms

Placer County
AIR POLLUTION CONTROL DISTRICT

110 Maple Street, Auburn, CA 95603 • (530) 745-2330 • Fax (530) 745-2373 • www.placerair.org

Erik C. White, Air Pollution Control Officer

STATIONARY SOURCE APPLICATION INSTRUCTIONS

FEES: **General Applications** - Filing Fee: **See Filing Fees Checklist**. Note: The Engineering Analysis and other fees will be billed after a review is complete.
Gasoline Dispensing Facilities: **See Filing Fees Checklist**

AUTHORITY TO CONSTRUCT: Any person constructing, building, erecting, altering or replacing any article, machine, equipment or other contrivance, the use of which may cause, eliminate, reduce, or control the issuance of air contaminants, shall first obtain authorization for such construction from the Air Pollution Control Officer. An authority to construct shall remain in effect until a permit to operate the equipment is granted or denied or the application is canceled. An authority to construct shall expire no later than two years from the date of issuance, unless an extension is granted. **A filing fee (See Filing Fees Charge Sheet) should accompany each application for an authority to construct and/or operating permit**. **Additional fees will be charged, after upon approval.**

PERMIT TO OPERATE: Any person operating an article, machine, equipment or other contrivance, the use of which may cause, eliminate, reduce or control the issuance of air contaminants, shall first obtain a written permit from the Air Pollution Control Officer. No permit to operate shall be granted either by the Air Pollution Control Officer or the Hearing Board without authorization as required by District Rules and Regulations, until the information required is presented to the Air Pollution Control Officer and the equipment or process is altered, if necessary, and made to conform to the standards set forth in the Rules and Regulations, and in the California Health and Safety Code.

FORM COMPLETION: The Authority to Construct and Permit to Operate Application form must be filled out completely. One form must accompany each application for (1) authority to construct for a new or modified facility; (2) permit to operate a facility for which no application for authority to construct was required or submitted; (3) emission reduction credit due to equipment shutdown, reformulation, or installation of abatement equipment.

INFORMATION REQUIRED: An application for an authority to construct or permit to operate for a new or modified stationary source of air contaminants shall give all the information necessary to enable the Air Pollution Control Officer to make the determination that every article, machine, equipment or other contrivance, the use of which may cause, eliminate, reduce, or control the issuance of air contaminants, is so designed, controlled, and operated with such air pollution control equipment that it may be shown to operate without emitting or without causing to be emitted air contaminants in violation of the District's Rules and Regulations or of such state or federal statutes as may be enforceable by the Air Pollution Control Officer. In addition, the Air Pollution Control Officer may require such information as may be deemed necessary to describe the equipment and/or processes to be permitted.

Applicants are requested to use the Stationary Source Application Checklist to identify forms or instructions which may clarify application requirements for certain processes or category of source.

Placer County
AIR POLLUTION CONTROL DISTRICT

110 Maple Street, Auburn, CA 95603 • (530) 745-2330 • Fax (530) 745-2373 • www.placerair.org

Erik C. White, Air Pollution Control Officer

STATIONARY SOURCE APPLICATION CHECKLIST

The Placer County Air Pollution Control District's "List and Criteria for Required Application Information" gives all the information that may be requested as part of the permit application process. As an aid to applicants, this checklist identifies the minimum that is required for an application to be accepted. If the forms are not completed or the minimum required information is not provided, your application will be returned. Check the items you have completed and/or enclosed as part of the application.

☑ 1. **Fees** submitted with application:

General Applications - Filing Fee: **See Application Filing Fees Checklist** (Note: The Engineering Analysis and other fees will be billed after a review is complete.)

Gasoline Dispensing Facilities: **See Application Filing Fees Checklist** (Sacramento Valley Basin Control Council fee does not apply if West of Range 9E, near Clipper Gap, CA) (Minor Source, one-time charge, for new facilities and does not apply to facilities which have previously paid this fee.)

☑ 2. **Authority to Construct/Permit to Operate Application Form**. Complete each section of the form and sign the application.

☑ 3. **Facility Map**. Blueprints, diagram, or sketch, drawn roughly to scale that locates equipment and emission points on parcel, and the distance of emission sources to the property line and to the nearest off property structures. **Currently on file with District.**

☑ 4. **Flow Diagram.** Blueprint, diagram, or sketch showing the sources of air pollutants, the flow of air pollutants, control devices, and discharges to the atmosphere. (Not Applicable for Boilers, Gasoline Dispensing, Dry Cleaners, Automotive Refinishing, Graphic Arts, Wood Coating, or Engines). **Currently on file with District.**

☐ 5. **Technical Information Forms Required.** Please attach the appropriate Technical Information along with a Description of the Proposed Project. **No forms for combustion turbines available**.

- ☐ A. Automotive Refinishing Form
- ☐ B. Boilers, Steam Generators, Process Heaters, or Kilns Form
- ☐ C. Concrete Batch Plant
- ☐ D. Dry Cleaner Form
- ☐ E. Engine Form
- ☐ F. Gasoline Dispensing Facility (New, Retail, Non-Retail and Existing) Form
- ☐ G. Graphic Arts Operation Form
- ☐ H. Wood Coating Operation Form
- ☐ I. Vapor Vacuum Extraction Form
- ☐ J. For other processes, please contact the District's Permit Engineer at 530-745-2330.

☑ 6. **Air Emission Estimate.** (If your project is not described in 5.A. through 5.I., provide the basis for the air emission estimate in the Authority to Construct application Box 22, and identify any toxic compounds that may be emitted to the atmosphere.)

- ☑ A. Include emission factors, air pollution control device efficiencies, mass balance calculations, raw material/fuel usage, MSDS or raw material specification sheets, etc. that support the estimate of emissions provided.
- ☑ B. For air toxic compounds, identify the compounds, the emission point(s), and maximum quantity discharged per hour.

Please submit this checklist with your application. Your application will not be filed without the fees, forms, and information identified above. Once the application is accepted and filed the District will conduct a technical review of the application for completeness and process it.

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Erik C. White, Air Pollution Control Officer

AUTHORITY TO CONSTRUCT AND PERMIT TO OPERATE APPLICATION

FOR APCD USE ONLY	
Date APCD TO ENTER	Permit No. APCD TO ENTER
	Amt Pd. APCD TO ENTER

COMPANY	Company/Owner (printed or typed) City of Roseville	Company Contact Michelle Bertolino	
	Mailing Address 2090 Hilltop Circle	Title Electric Utility Director	
	City, State & Zip Code Roseville, CA 95747	Phone (916) 774-5602	Email mbertolino@roseville.ca.us
FACILITY	Name of Facility (if different than above): Roseville Energy Park	Facility Contact and Title Matthew Garner	
	Street Address: 5120 Phillip Road	Title Power Generation Superintendent	
	City, State and Zip Code Roseville, CA 95747	Phone (916)746-1691	Email mgarner@roseville.ca.us
PREPARER	Firm Name of Application Preparer Atmospheric Dynamics, Inc.	Name of Preparer Gregory Darvin	
	Mailing Address of Firm P.O. Box 5907	Title Sr. Consultant	
	City, State & Zip Code Carmel By The Sea, CA. 93921	Phone (831)620-0481	Email darvin@atmosphericdynamics.com

APPLICATION TYPE

- ☐ Authority to Construct – New Facility
- ☐ Permit Amendment
- ☑ Title V (Major Source)
- ☑ Authority to Construct – Modified Facility
- ☐ Emission Reduction Credit
- ☐ Synthetic Minor Source Status
- ☐ Authority to Construct – Gasoline Dispensing Facility - Number of Nozzles (Gas Only) _____

Is the location within 1000 feet from the boundary of a K – 12 school? ☐ Yes ☑ No

Brief Description of the Project/Request (attach detailed permit application information)

Turbine upgrade project - see support documents attached.

Schedule of Operation 24 hours/day 7 days/week 52 weeks/year

What is this Facility's SIC (Standard Industrial Classification) Code? 4911

For Authority to Construct applications, complete the following:

Construction Start Date Unk Construction Completion Date Unk Start-up Date Unk

Indicate where the following documents will be mailed:	Company	Facility	Preparer
Authority to Construct (check all that apply)	☐	☑	☐
Permit(s) to Operate (check only one)	☐	☑	☐
Invoice(s) (check only one)	☐	☑	☐

Identify all emissions violations for which a notice of violation was written and a variance was not in effect at any facility owned or operated by the applicant in the state in the last three years prior to the date of application. If no emission violations, check this box ☑ None

Identify prior CEQA review - Please indicate whether or not the subject of this permit has been previously reviewed under the California Environmental Quality Act. ☑ Yes ☐ No If Yes, provide a copy of the environmental documents or indicate the name of the document and which agency approved it.

See prior CEQA documents for 03-AFC-1 on file with the APCD.

Statement of Company's Responsible Person

"I am familiar with the Rules and Regulation of the Placer County Air Pollution Control District and I certify that the information herein and the data submitted with the application is true with regards to the operation of the plant and /or equipment which is the subject of this application and that such operation will comply with said Rules and Regulations."

The applicant/permittee has an obligation to defend and indemnify the District against third party challenges in accordance with District Rule 411, Indemnification of District.

Signature of Company's Responsible Person _____ Title Electric Utility Director

Name (Printed or Typed) Michelle Bertolino Date _____

Attachment 2
Current Title V Permit and District PTOs

Placer County

AIR POLLUTION CONTROL DISTRICT

PLACER COUNTY AIR POLLUTION CONTROL DISTRICT

Roseville Electric – Roseville Energy Park

Title V Operating Permit

Permit Number: REP-001

Issued To:

Roseville Electric
2090 Hilltop Circle
Roseville, CA 95747

Plant Site Location:

Roseville Energy Park
5120 Phillip Road
Roseville, CA 95747

Issued by:

Erik C. White, APCO

2/3/17

Date

Effective Date: February 3, 2017
Expiration Date: February 3, 2022
Nature of Business: Electric Utility

SIC Code: 4911

Responsible Official:

Michelle Bertolino
Electric Utility Director
Phone: (916) 774-5602
Roseville Electric

Facility Contact:

Matt Garner
Plant Superintendent
Phone: (916) 746-1691
Roseville Electric

Roseville Electric – Roseville Energy Park

Title V Operating Permit

Contents

1.0 Facility Description and Equipment Lists

1.1 Description

Roseville Electric (the Electric Department of the City of Roseville) owns and operates a natural gas combined cycle power plant at the Roseville Energy Park, located in Roseville, California, in Township 11 North, Range 5 East, Section 23. The power plant commenced operations on October 15, 2007. The plant is rated at 120 MW, with a peaking capacity of 160 MW. The plant includes two (2) natural gas fired combustion turbines, natural gas fired duct burners, and steam turbine. Nitrogen oxide and carbon monoxide emissions are controlled with the use of dry-low-NOx combustors, oxidation catalyst, and selective catalytic reduction.

1.2 Equipment Listing

1.2.1 Sources

Combustion

Equipment	Description
Combustion Turbine, Unit #1	Siemens SGT-800 natural gas fired turbine generator, rated at 457.3 MMBtu/hr
Combustion Turbine, Unit #2	Siemens SGT-800 natural gas fired turbine generator, rated at 457.3 MMBtu/hr
Duct Burner, Unit #1	Natural gas fired duct burner, 8 element, rated at 225 MMBtu/hr
Duct Burner, Unit #2	Natural gas fired duct burner, 8 element, rated at 225 MMBtu/hr
Emergency Generator	Diesel fired engine, rated at 1133 bhp
Fire Pump	Diesel fired engine, rated at 300 bhp

General

Equipment	Description
Cooling Tower	Evaporative cooler, counter flow design

1.2.2 Emissions Control Equipment

Equipment	Description
SCR, Unit #1	Selective catalytic reduction, reduction catalyst bed, ammonia injection system
SCR, Unit #2	Selective catalytic reduction, reduction catalyst bed, ammonia injection system
Oxidation Catalyst, Unit #1	Oxidation catalyst bed
Oxidation Catalyst, Unit #2	Oxidation catalyst bed

1.3 Insignificant Activities

The following types of activities are exempted from the Title V permit requirements based on U.S. EPA's guidelines of Trivial Activities, and District Rule 507, Federal Operating Permit Program, Appendix I, List of Title V Insignificant Activities:

1. Plant maintenance and upkeep activities, such as painting.
2. Combustion emissions from propulsion of mobile sources, including forklifts.
3. The repair and maintenance shop activities not related to primary business activities.

4. Portable generators, portable steam cleaners, portable pumps, and water heaters/steam cleaners that are exempt from District and State portable equipment regulations.

5. Unheated cleaning equipment and office janitorial activities and equipment and consumer use of janitorial products and consumer use of office equipment and products.

6. Non-electric space heating.

7. Fuel storage tanks (200 gallon capacity) for the emergency generator and fire pump.

8. Oil-containing reservoirs for gas and steam turbines, oil-containing transformers, and used oil tank.

9. Sulfuric acid and ammonia tanks.

10. Natural gas compression and storage equipment.

11. Laboratory fume hoods and vents used for quality control.

12. Welding, soldering, and cutting operations, where hazardous air pollutant emissions are less than 0.5 tons/yr.

13. Surface coating and solvent cleaning, where operations are exempt from District permitting (utilize less than 1 gallon per day of VOC containing materials).

14. Refrigeration units that contain less than 50 lb of refrigerant.

15. Abrasive blasting operations that meet District and State requirements.

2.0 Specific Unit Conditions

2.1 Turbines

2.1.1 Emission rates from each gas turbine and heat recovery steam generator exhaust during startup and shutdown shall not exceed the following:

Combustion Turbine Emission Limitations during Startup and Shutdown		
Pollutant	Maximum Pounds Per Hour (worst-case turbine)	Pounds per Startup or Shutdown (both turbines combined)
NOx	37.1	122.8
CO	89.5	204.8

Origin: Final Determination of Compliance, Condition 55
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.2 Emission rates from each gas turbine and heat recovery steam generator exhaust, except during startup and/or shutdown, or excursions shall not exceed the following:

Combustion Turbine Emission Limitations Per Turbine Excluding Startup And Shutdown	
Pollutant	Pounds/Hour
CO	6.2 (three-hour rolling average)
NOx	5.1 (one-hour average)
PM-10	4.7
SOx	1.0
VOCs	1.8

Origin: FDOC, Condition 57
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.3 Quarterly emissions shall not exceed the levels shown below:

Gas Turbines							
Pollutant	Lbs/hr Max Two Turbine	Lbs/day Max Two Turbines	Quarter 1 (lbs/quarter) Two turbines	Quarter 2 (lbs/quarter) Two Turbines	Quarter 3 (lbs/quarter) Two turbines	Quarter 4 (lbs/quarter) Two Turbines	Tons/ Year Two Turbines
NOx	74.2	406.0	15,399	12,965	17,496	15,422	30.64
CO	179.0	629.5	26,787	32,590	28,175	29,862	58.71
VOCs	39.4	223.1	5,791	7,306	6,630	6,848	13.29
PM-10	6.4	211.8	16,300	13,692	17,789	17,569	32.67
SOx	1.3	44.0	3,385	2,843	3,694	3,648	6.78

Origin: FDOC, Condition 60
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.4 The ammonia slip shall not exceed 10 ppmv @15% O2. Compliance with ammonia slip shall be demonstrated by using the following calculation procedure:

Ammonia slip ppmv @ 15% O2= ((a-(bxc/1,000,000))x1,000,000/b) x d
where
a = ammonia injection rate (lb/hr)/17 (lb/lb.mol.)
b = dry exhaust gas flow rate (lb/hr)/29(lb/lb.mol.)
c = change in measured NOx concentration ppmv at 15% O2 across catalyst

d = correction factor

The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip.

The selective catalytic reduction (SCR) catalyst shall be replaced, repaired or reconditioned within 24 months of an ammonia slip exceeding 7 parts per million (ppm) averaged over a 24 hour period.

Origin: FDOC, Condition 51
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.5 The emissions from the gas turbine after air pollution controls shall not exceed the following:

Gas Turbine PPMV Limitations Excluding Startup, Shutdown and Excursions		
NOx	CO	VOC
2.0 ppmvd @ 15% O_2, 1-hour average	4 ppmvd @ 15% O_2, 3-hour average	2 ppmvd @ 15% O_2, 1-hour average

Origin: FDOC, Condition 52
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.6 The 2.0 ppmvd NOx emission limit is averaged over 1 hour at 15 percent oxygen, dry basis. The limit shall not apply to the first six (6) 1-hour average NOx emissions above 2.0 ppmvd, dry basis at 15% O2, in any calendar quarter period for each combustion gas turbine provided that it meets all of the following requirements:

1. This equipment operates under any one of the qualified conditions described below:
   a. Rapid combustion turbine load changes due to the following conditions:
      i. Load changes initiated by the California ISO or a successor entity when the plant is operating under Automatic Generation Control; or
      ii. Activation of a plant automatic safety or equipment protection system which rapidly decreases turbine load
   b. The first two 1-hour reporting periods following the initiation/shutdown of a fogging system injection pump
   c. The first two 1-hour reporting periods following the initiation/shutdown of combustion turbine water injection
   d. The first two 1-hour reporting periods following the initiation of HRSG duct burners
   e. Events as the result of technological limitations identified by the operator and approved in writing by the District.

2. The 1-hour average NOx emissions above 2.0 ppmv, dry basis at 15% O2, did not occur as a result of operator neglect, improper operation or maintenance, or qualified breakdown under Rule 404, Upset Conditions, Breakdown or Scheduled Maintenance. Notification to the District is required within two hours of a qualified event.

3. The qualified operating conditions described in (A) above are recorded in the plant's operating log within 24 hours of the event, and in the CEMS by 5 p.m. the next business day following the qualified operating condition. The notations in the log and CEMS must describe the date and time of entry into the log/CEMS and the plant operating conditions responsible for NOx emissions exceeding the 2.0 ppmv 1-hour average limit. In addition, these excursions must be identified in the CEMS quarterly reports.

4. The 1-hour average NOx concentration for periods that result from a qualified operating condition does not exceed 25 ppmv, dry basis at 15 percent O2.

5. All NOx emissions during these events shall be included in all calculations of hourly, daily, and annual mass emission rates as required by this permit.

Origin: FDOC, Condition 53
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.7 Startup is defined as the period beginning with turbine light-off (firing) until the unit meets the lb/hr and ppmv emission limits in this permit. Shutdown is defined as the period beginning with initiation of turbine shutdown sequence and ending with cessation of firing of the gas turbine engine. Startup and shutdown durations shall not exceed 3.0 hours and 1 hour, respectively, per occurrence.
Origin: FDOC, Condition 21
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.8 NOx, excluding the thermal stabilization period (i.e. startup period which is not to exceed 3 hours), shall not exceed the following levels under load conditions:

9 x EFF/25 ppm, @ 15% O2, averaged over 15 minutes:

Where: EFF(efficiency) is the higher of the following:

$$EFF_1 = \frac{3412 \times 100\%}{AHR}$$

AHR = Actual Heat Rate at HHV of Fuel (BTU/KW-HR)]

or

$$EFF_2 = \frac{MRE \times LHV}{HHV}$$

MRE = Manufacturer's Rated Efficiency with Air Pollution Equipment at LHV, which is the manufacturer's continuous rated percent efficiency of the gas turbine with air pollution equipment after correction from LHV to HHV of the fuel at peak load for that facility.

Origin: FDOC, Condition 22
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.9 The gas turbines shall be fired exclusively on pipeline grade natural gas.
Origin: FDOC, Condition 10
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.10 Roseville Electric shall install a selective catalytic reduction (SCR) system and an oxidation catalyst on the gas turbine. The SCR and oxidation catalyst equipment shall be operated whenever the gas turbine is operated except during commissioning.
Origin: FDOC, Condition 15
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.11 The gas turbine engine and generator lube oil vents shall be equipped with mist eliminators.
Origin: FDOC, Condition 16
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.12 The gas turbine engines shall be fired exclusively on pipeline quality natural gas with a sulfur content no greater than 0.50 grains of sulfur compounds per 100 dry scf of natural gas.
Origin: FDOC, Condition 20
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.1.13 Daily emissions shall not exceed the following rates:

Facility Daily Emission Limits (lbs)				
Pollutant	Two Turbines	Cooling Tower	Diesel Emergency	Diesel Fire

			Generator	Pump
NOx	406.0	--	4.31	1.72
CO	629.5	--	0.84	0.09
VOC	223.1	--	0.16	0.05
PM-10	226.8	16.3	0.14	0.03
SO2	47.1	--	0.10	0.19

Origin: FDOC, Condition 59
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.2 Cooling Tower

2.2.1 PM-10 emission rate shall not exceed the following:

Cooling Tower Emission Limitations					
Pollutant	Pounds Per Day	Quarter 1 (Pounds/quarter)	Quarter 2 (Pounds/quarter)	Quarter 3 (Pounds/quarter)	Quarter 4 (Pounds/quarter)
PM-10	16.3	1,471	1,487	1,504	1,504

Origin: FDOC, Condition 70
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.2.2 Compliance with the PM-10 emission limit shall be demonstrated as follows: PM-10 = cooling water recirculation rate * total dissolved solids concentration in the blowdown water * design drift rate.
Origin: FDOC, Condition 71
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.2.3 No hexavalent chromium containing compounds shall be added to the cooling water.
Origin: FDOC, Condition 66
Authority: Rule 904, Airborne Toxic Control Measure, Hexavalent Chromium Emissions from Cooling Towers [adopted 05/07/91]
District Only

2.2.4 Drift eliminator drift rate shall not exceed 0.0005% of the circulating water flow.
Origin: FDOC, Condition 67
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.2.5 Daily emissions shall not exceed the following rates:

Facility Daily Emission Limits (lbs)				
Pollutant	Two Turbines	Cooling Tower	Diesel Emergency Generator	Diesel Fire Pump
NOx	406.0	--	4.31	1.72
CO	629.5	--	0.84	0.09
VOC	223.1	--	0.16	0.05
PM-10	226.8	16.3	0.14	0.03
SO2	47.1	--	0.10	0.19

Origin: FDOC, Condition 59
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.3 Fire Pump

2.3.1 The sulfur content of the diesel fuel used shall not exceed 15 ppm by weight.
Origin: FDOC, Condition 88

Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.3.2 Nitrogen oxide emissions from the fire pump diesel engine shall not exceed 6.9 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.
Origin: FDOC, Condition 94
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.3.3 PM-10 emissions from the fire pump diesel engine shall not exceed 0.4 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.
Origin: FDOC, Condition 95
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.3.4 The fire pump diesel engine shall meet the requirements of the California Air Resources Board Airborne Toxic Control Measure for Stationary Compression Ignition Engines when it becomes effective.
Origin: FDOC, Condition 96
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]
District Only

2.3.5 Operation for maintenance and testing of the diesel engine fire pump shall be limited to 30 hours per year.
Origin: FDOC, Condition 86
Authority: Rule 502, New Source Review § 110 [amended 11/03/94]
District Only

2.3.6 Operation for other than maintenance and testing purposes shall be limited to involuntary interruptions of electrical power. Operation shall not exceed 24 hours without prior authorization by the District Air Pollution Control Officer.
Origin: FDOC, Condition 87
Authority: Rule 502, New Source Review § 110 [amended 11/03/94]
District Only

2.3.7 Daily emissions shall not exceed the following rates:

Facility Daily Emission Limits (lbs)				
Pollutant	Two Turbines	Cooling Tower	Diesel Emergency Generator	Diesel Fire Pump
NOx	406.0	--	4.31	1.72
CO	629.5	--	0.84	0.09
VOC	223.1	--	0.16	0.05
PM-10	226.8	16.3	0.14	0.03
SO2	47.1	--	0.10	0.19

Origin: FDOC, Condition 59
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.4 Emergency Generator

2.4.1 The sulfur content of the diesel fuel used shall not exceed 15 ppm by weight.
Origin: FDOC, Condition 101
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.4.2 Nitrogen oxide emissions from the emergency generator diesel engine shall not exceed 6.9 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.
Origin: FDOC, Condition 107
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.4.3 PM-10 emissions from the emergency generator diesel engine shall not exceed 0.4 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.
Origin: FDOC, Condition 108
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.4.4 The engine shall meet the requirements of the California Air Resources Board Airborne Toxic Control Measure for Stationary Compression Ignition Engines when it becomes effective.
Origin: FDOC, Condition 109
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]
District Only

2.4.5 Operation for maintenance and testing of the emergency diesel engine and generator shall be limited to 30 hours per year.
Origin: FDOC, Condition 99
Authority: Rule 502, New Source Review § 110 [amended 11/03/94]
District Only

2.4.6 Operation for other than maintenance and testing purposes shall be limited to involuntary interruptions of electrical power. Operation shall not exceed 24 hours without prior authorization by the District Air Pollution Control Officer.
Origin: FDOC, Condition 100
Authority: Rule 502, New Source Review § 110 [amended 11/03/94]
District Only

2.4.7 Daily emissions shall not exceed the following rates:

Facility Daily Emission Limits (lbs)				
Pollutant	Two Turbines	Cooling Tower	Diesel Emergency Generator	Diesel Fire Pump
NOx	406.0	--	4.31	1.72
CO	629.5	--	0.84	0.09
VOC	223.1	--	0.16	0.05
PM-10	226.8	16.3	0.14	0.03
SO2	47.1	--	0.10	0.19

Origin: FDOC, Condition 59
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

2.5 Facility-Wide Emissions

2.5.1 Total facility emissions shall not exceed the following quarterly emission rates:

Facility Quarterly Emission Limits					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Year (tons/year)
NOx	15,546	13,412	17,646	15,572	31.09
CO	27,121	33,872	28,515	30,202	59.86
VOC	5,832	7,455	6,672	6,890	13.42
PM-10	17,673	15,513	19,168	19,158	35.95
SO2	3,400	2,893	3,709	3,663	6.83

Origin: FDOC, Condition 63
Authority: Rule 502, New Source Review 301 § 302 [amended 11/03/94]

3.0 Facility-Wide Conditions

3.1 Opacity (Rule 202 and 203)

Stack emission opacity as dark or darker than Ringelmann No. 1 (20% opacity) for period or periods aggregating more than three (3) minutes in any one hour is prohibited and is in violation of District Rule 202, Visible Emissions.
Origin: FDOC, Conditions 48, 91 and 104
Authority: Rule 202, Visible Emissions [amended 05/20/85]

3.2 Nuisance (Rule 205)

No emissions are permitted, from any source, which are a nuisance per District Rule 205, Nuisance.
Origin: FDOC, Condition 47, 69, 90 and 103
Authority: Rule 205, Nuisance [amended 05/24/77]
District Only

3.3 PM Limit (Rule 207)

In accordance with District Rule 207, Particulate Matter, Roseville Electric shall not release or discharge from any source or single processing unit, exclusive of sources emitting combustion contaminants only, particulate matter in excess of 0.1 gr/dscf at standard conditions.
Origin: Rule 207, Particulate Matter [amended 10/19/93]
Authority: Rule 207, Particulate Matter [amended 10/19/93]
District Only

3.4 Specific Contaminant Limit (Rule 210)

Particulate matter emissions shall not exceed 0.1 grains per cubic foot of gas calculated at 12 percent CO at standard conditions.
Sulfur compound emissions calculated as SO2 shall not exceed 0.2 percent by volume. (Rule 210).
Origin: FDOC, Conditions 49, 50, 92, 93, 105, and 106
Authority: Rule 210, Specific Contaminants [amended 10/19/93]

3.5 Process PM Limit (Rule 211)

Roseville Electric shall not discharge in any one hour from any source of emissions, solid particulate matter in excess of the amount calculated using the following equations:

For Process rates less than 30 tons per hour:
E = 3.59 P**(0.62)
For Process weight > 30 tons per hour:
E = 17.31 P**(0.16)
Where:
E = Emission limit in pounds per hour
P = Process weight rate in tons per hour

Origin: Rule 211, Process Weight [amended 10/19/93]
Authority: Rule 211, Process Weight [amended 10/19/93]

3.6 Fugitive Dust (Rule 228)

3.6.1 A person shall not cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area (including disturbance as a result of the raising and/or keeping of animals or by vehicle use), such that the presence of such dust remains visible in the atmosphere beyond the boundary line of the emission source.
Origin: Rule 228, Fugitive Dust, Section 301 [amended 04/10/03]
Authority: Rule 228, Fugitive Dust, Section 301 [amended 04/10/03]
District Only

3.6.2 In addition to the requirements of Rule 202, Visible Emissions, a person shall not cause or allow fugitive dust generated by active operations, an open storage pile, or a disturbed surface area, such that the fugitive dust is of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke as dark or darker in shade as that designated as No. 2 on the Ringelmann Chart (i.e. 40% opacity), as published by the United States Bureau of Mines.
Origin: Rule 228, Fugitive Dust, Section 301 [amended 04/10/03]

Authority: Rule 228, Fugitive Dust, Section 302 [amended 04/10/03]
District Only

3.6.3 All service roads and plant areas shall be maintained in a manner that effectively controls fugitive dust and prevents the violations of the California Health and Safety Code Section 41700 and District Rule 205, Nuisance, and District Rule 228, Fugitive Dust.
Origin: Rule 205, Nuisance [amended 05/24/77], and Rule 228, Fugitive Dust [amended 04/10/03]
Authority: Rule 205, Nuisance [amended 05/24/77], and Rule 228, Fugitive Dust [amended 04/10/03]
District Only

3.7 Inspection Authority
The authorized District agents shall have the right of entry to any premises on which an air pollution emission source is located for the purpose of inspecting such source, including securing samples of emissions therefrom, or any records required to be maintained therewith by the District.
Origin: FDOC, Condition 115
Authority: Rule 402, Authority to Inspect [amended 05/24/77]

3.8 Report Upsets (Rule 404)
Roseville Electric shall notify the District within two (2) normal District business hours of detection of any upset conditions, breakdown or scheduled maintenance which cause emissions in excess of limits established by District Rule 404.
Origin: FDOC, Condition 117
Authority: Rule 404, Upset Conditions, Breakdown, or Scheduled Maintenance § B.1 [amended 06/19/79]
District Only

3.9 Source Record Keeping and Reporting (Rule 408)
Upon notification from the District, Roseville Electric shall maintain records of the nature and amounts of emissions from any stationary source and/or any other information as may be deemed necessary by the District to determine whether such source is in compliance with applicable emission limitations or other control measures. The Air Pollution Control Officer may require that such records be certified by a professional engineer, registered in the State of California. Such studies shall be at the expense of the person causing the emissions. The information recorded shall be summarized and reported to the District, on forms or formats as furnished by the District, and shall be submitted within 45 days after the end of the reporting period. Reporting periods are January 1 - June 30 and July 1 - December 31, except that the initial report period shall commence on the date the District issues notification of the record keeping requirements. Information reported by Roseville Electric and copies of the summarizing reports submitted to the District shall be retained by Roseville Electric for 5 years after the date on which the pertinent report is submitted
Origin: Rule 408, Source Record Keeping and Reporting [amended 05/24/77]
Authority: Rule 408, Source Record Keeping and Reporting [amended 05/24/77]

3.10 General District Permit Requirements (Rule 501)

3.10.1 Permit Revision (Rules 501 and 507)

3.10.1.1 Revisions to this Title V Permit to Operate may be requested pursuant to District Rule 501, General Permit Requirements, Section 400 and District Rule 507, Title V Permit to Operate, Sections 302.6 and 302.7.
Origin: Rule 501, General Permit Requirements § 400 [amended 11/03/94]; Rule 507 § 302.6 and § 302.7 [amended 04-17-01]
Authority: Rule 501, General Permit Requirements § 400 [amended 11/03/94]; Rule 507 § 302.6 and § 302.7 [amended 04/17/01]

3.10.1.2 Revisions to this permit may be requested pursuant to District Rule 501, General Permit Requirements, Section 403.
Origin: Rule 501, General Permit Requirements, Section 403
Authority: Rule 501 § 403

3.10.2 Equipment Modification AC Required (Rule 501)

3.10.2.1 Authorization to construct the equipment listed and as prescribed in the approved plans and specifications is hereby granted, subject to the specified permit conditions. The construction and operation of listed equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted in the conditions. Deviation from the approved plans is not permissible without first securing approval for the changes from the District Air Pollution Control Officer.
Origin: FDOC, Condition 112
Authority: Rule 501, General Permit Requirements § 300 [amended 11/03/94]

3.10.2.2 After obtaining any required pre-construction permits, a responsible official shall submit a standard District application for each emissions unit affected by a proposed permit revision that qualifies as a significant permit modification or a minor permit modification.
Origin: Rule 507, Federal Operating Permit Program, § 302.6, § 302.7 [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program [amended 04/17/01]

3.10.2.3 Any alteration of the subject equipment, including a change in the method of operation, shall be reported to the District. Such alternations may require an Authority to Construct Permit.
Origin: FDOC, Condition 118
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

3.10.3 Limit Exceedance Prohibited (Rule 501)

Exceeding any of the limiting condition is prohibited without prior application for, and the subsequent granting of a permit modification pursuant to District Rule 501, General Permit Requirements, Section 400.
Origin: FDOC, Condition 119
Authority: Rule 501, General Permit Requirements § 400 [amended 11/03/94]; Rule 507, Federal Operating Permit Program § 302.6, § 302.7 [amended 04/17/01]

3.10.4 Operating Compliance Plan

Roseville Electric shall maintain an Operating Compliance Plan for the new CTG/HRSG which will assure that the air pollution control equipment will be properly maintained and that necessary operational procedures are in place to continuously achieve compliance with this permit. The Operating Compliance Plan shall include a description of the process monitoring program and devices to be used.

1. The plan shall specify the frequency of surveillance checks that will be made of process monitoring devices and indicators to determine continued operation within permit limits. A record or log of individual surveillance checks shall be kept to document performance of the surveillance.

2. The plan shall include the frequency and methods of calibrating the process monitoring devices.

3. The plan shall specify for each emission control device:

   a. Operation and maintenance procedures that will demonstrate continuous operation of the emission control device during emission producing operations; and

   b. Records that must be kept to document the performance of required periodic maintenance procedures.

4. The plan shall identify what records will be kept to comply with air pollution control requirements and regulations and the specific format of the records. These records shall include at least the Recordkeeping information required by this permit. The information must include emission monitoring evaluations, calibration checks and adjustments, and maintenance performed on such monitoring systems.

5. The plan shall be submitted to the District 30 days prior to startup of the gas turbines. The plan must be implemented upon approval by the District Air Pollution Control Officer.

6. The plan shall be resubmitted to the District for approval upon any changes to compliance procedures described in the plan, or upon the request of the District Air Pollution Control Officer

Origin: FDOC, Condition 11
Authority: Rule 501, General Permit Requirements § 503.c [amended 11/03/94]

3.10.5 Toxics Hot Spots Compliance (Rule 501)
Compliance of the permitted facility is required with the provisions of the "Air Toxics 'Hot Spots' Information and Assessment Act" of 1987 (Health and Safety Code Sections 44300 et seq.).
Origin: FDOC, Condition 121
Authority: HSC § 44300 et seq.; Rule 501, General Permit Requirements § 303.1 [amended 11/03/94]
District Only

3.10.6 Change of Ownership (Rule 501)

3.10.6.1 In the event of a change of ownership, an application must be submitted to the District.
Origin: Rule 501, General Permit Requirements § 303 [amended 11/03/94]
Authority: Rule 501, General Permit Requirements § 303 [amended 11/03/94]

3.10.6.2 Upon any change in control or ownership of facilities constructed, operate, or modified under authority of this Title V Permit to Operate, the requirements contained in this Title V Permit to Operate shall be binding on all subsequent owners and operators.
Origin: FDOC, Condition 120
Authority: Rule 501, General Permit Requirements § 303.1 [amended 11/03/94]

3.10.7 Permit Posting (Rule 501)
This permit shall be maintained on the premises of the subject equipment.
Origin: FDOC, Condition 114
Authority: Rule 501, General Permit Requirements § 303.1 [amended 11/03/94]

3.10.8 Permit Not Permission to Violate Laws (Rule 501)
This Title V Permit to Operate does not authorize the emission of air contaminants in excess of those allowed by Division 26, Part 4, of the Health and Safety Code of the State of California or the Rules and Regulations of the Air Pollution Control District. The permit(s) cannot be considered as permission to violate existing laws, ordinances, regulations or statutes of other governmental agencies.
Origin: Rule 501, General Permit Requirements § 303.6 [amended 11/03/94]
Authority: Rule 501, General Permit Requirements § 303.6 [amended 11/03/94]

3.10.9 Equipment Must Operate as Specified (Rule 501)
Operation of equipment must be conducted in compliance with all data and specifications submitted with the application under which it was originally issued an Authority to Construct or Permit to Operate.
Origin: Rule 501, General Permit Requirements § 303.3 [amended 11/03/94]
Authority: Rule 501, General Permit Requirements § 303.3 [amended 11/03/94]

3.11 New Source Review Requirements (Rule 502)

3.11.1 Violations
In the event of any violation of the District Rules and Regulations, Roseville Electric shall take action to end such violation.
Origin: FDOC, Condition 116
Authority: Rule 502, New Source Review [amended 08/09/01]

3.11.2 Notify District of Facility Modifications
Prior to modification as defined in District Rule 502 Section 227, the plant manager, or designee, shall

report to the District immediately any changes in production rates or operation schedules, changes in operation methods or fuel characteristics, the addition to or removal of permitted equipment, and changes of any facilities or systems installed or used to achieve compliance with the District Rules and Regulations in addition to the terms and conditions of this Title V Permit to Operate.
Origin: Rule 502, New Source Review [amended 08/09/01], Rule 507, Federal Operating Permit Program § 222 and 302.6 Permit Modification [amended 04/17/01]
Authority: Rule 502, New Source Review [amended 08/09/01], Rule 507, Federal Operating Permit Program § 222 and 302.6 Permit Modification [amended 04/17/01]

3.11.3 General Operating Condition
Operation of permitted equipment shall be limited to the maximum rates and schedules of operation, and the specified process materials of approved plans and specifications submitted to the District in application submittals unless otherwise prescribed in these conditions
Origin: Rule 502, New Source Review § 303 [amended 11/03/94]
Authority: Rule 502, New Source Review § 303 [amended 11/03/94]

3.12 Emission Statement (Rule 503)
Roseville Electric shall provide the District with a written emission statement showing actual emissions of volatile organic compounds and oxides of nitrogen. Pursuant to District Rule 503 Roseville Electric shall submit this emission statement on a form or in a format specified by the Air Pollution Control Officer. The statement shall contain the following information:

1. Information contained in the California Air Resources Board's Emission Inventory Turn Around Document as described in Instructions for the Emission Data System Review and Update Report; and
2. Actual emissions of volatile organic compounds and oxides of nitrogen, in tons per year, for the calendar year prior to the preparation of the emission statement; and
3. Information regarding seasonal or diurnal peaks in the emission of affected pollutants; and
4. Certification by a responsible official of Roseville Electric that the information contained in the emission statement is accurate to the best knowledge of the individual certifying the emission statement.

Origin: FDOC Condition 42
Authority: Rule 503, Emission Statement [amended 09/21/93]
District Only

3.13 Transfer of Ownership (Rule 507)
Prior to the transfers of ownership or operational control of a stationary source, the Air Pollution Control Officer must receive a written agreement which specifies a date for the transfer of permit responsibility, coverage, and liability from the current to the prospective owner.
Origin: Rule 507, Federal Operating Permit Program § 202.4 Transfer [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 202.4 Transfer [amended 04/17/01]

3.14 Permit Compliance (Rule 507)
Roseville Electric shall comply with all permit conditions.
Origin: Rule 507, Federal Operating Permit Program § 402.2k [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2k [amended 04/17/01]

3.15 Hexavalent Chromium (Rule 904)
Any use of Hexavalent Chromium in the cooling towers is prohibited per District Rule 904, Airborne Toxic Control Measure, Hexavalent Chromium Emissions from Cooling Towers.
Origin: FDOC, Condition 66
Authority: Rule 904, Airborne Toxic Control Measure, Hexavalent Chromium Emissions from Cooling Towers [adopted 05/07/91]
District Only

3.16 Miscellaneous Federal Requirements

3.16.1 Protection of Stratospheric Ozone
Maintenance, service, repair or disposal of appliances containing ozone depleting compounds as defined in Appendix A and Appendix B to Subpart A of 40 CFR Part 82 shall be performed by persons

certified by a technician certification program approved pursuant to 40 CFR Part 82.161.
Origin: 40 CFR Part 82, Protection of Stratospheric Ozone
Authority: 40 CFR Part 82, Protection of Stratospheric Ozone

3.16.2 Chemical Accident Prevention Provisions
If, as defined in 40 CFR Part 68.3, Roseville Electric becomes subject to 40 CFR Part 68, then Roseville Electric shall submit a risk management plan (RMP) by the date specified in 40 CFR Part 68.10. A certification of compliance with this condition shall be included as part of the annual certification required by this Title V permit to operate.
Origin: 40 CFR Part 68, Chemical Accident Prevention Provisions
Authority: 40 CFR Part 68, Chemical Accident Prevention Provisions

3.16.3 National Emission Standards for Hazardous Air Pollutants, Asbestos
For demolition and renovation projects involving material containing Asbestos, Roseville Electric shall comply with the requirements of 40 CFR 61, National Emission Standards for Hazardous Pollutants, Sections 60.145 through 61.147.
Origin: 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants, Subpart M
Authority: 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants, Subpart M

3.16.4 General Federal Requirement
Roseville Electric shall operate the stationary source in compliance with all other applicable provisions of 40 CFR Parts 52, 60, and 61 and all other applicable federal, state and local air quality regulations.
Origin: 40 CFR § Parts 52, 60, and 61
Authority: 40 CFR § Parts 52, 60, and 61

3.17 Portable Equipment
Any equipment, including portable equipment, shall comply with all applicable requirements while operating at the facility, including District Permit and Prohibitory Regulations, or be State-registered portable equipment. State-registered portable equipment shall comply with State registration requirements. A copy of the State registration shall be readily available whenever the State-registered portable equipment is at the facility.
Origin: FDOC, Condition 110
Authority: Rule 501, General Permit Requirements [amended 11/03/94]; HSC § 41753

3.18 Acid Rain
Roseville Electric shall comply with the Federal Acid Rain Program requirements (Title IV of the Federal Clean Air Act, 40 CFR Parts 72 – 78), including:

1. Sulfur dioxide (SO2) emissions allowances must be obtained, according to procedures established in regulations under Title IV of the Federal Clean Air Act, for SO2 emissions from the natural gas fired turbines.

2. The Acid Rain permit application is incorporated by reference into this permit.

3. This permit does not allow the use of SO2 emission allowances as a defense for noncompliance with any applicable federal or District requirement.

4. This permit does not relieve the permittee of the responsibility to conduct, maintain, and operated in compliance with all applicable Federal or District requirements.

Origin: Rule 507, Federal Operating Permit Program, § 402.2k [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program, § 402.2k [amended 04/17/01]; 40 CFR Part 72 - 78

3.19 Good Operational Practices
All equipment, facilities, and systems installed or used to achieve compliance with the terms and conditions of this Title V permit shall be operated and maintained in good working order, consistent with good air pollution control practices, and be operated as efficiently as possible so as to minimize air

pollutant emissions including during startup, shutdown, and malfunction.
Origin: Rule 507, Federal Operating Permit Program, § 402.2k [amended 04/17/01]
Authority: 40 CFR Part 60, § 60.4333

3.20 New Source Performance Standards, Subpart A and Subpart Db
The boiler must comply with all of the provisions of 40 CFR Part 60, Subpart Db ("Standards of Performance for Industrial, Commercial, Institutional Steam Generation Units), and the general provisions of the 40 CFR Part 60 Subpart A (General Provisions of New Source Performance Standards), including:

1. Utilization of credible evidence or information to determine compliance (40 CFR 60.11(g)).
2. Concealment of emissions (40 CFR 60.12).
3. CEMS data collection procedures and collection frequency (40 CFR 60.13(e).
4. CEMS installation and location procedures (40 CFR 60.13(f)).
5. CEMS data handling procedures (40 CFR 60.13(h)).
6. Alternative monitoring requests (40 CFR 60.13(i) and (j)).
7. General notification and reporting requirements (40 CFR 60.19).

Origin: Rule 507, Federal Operating Permit Program, § 402.2k [amended 04/17/01]
Authority: 40 CFR Part 60, § 60.1-60.19

4.0 Standard Terms and Conditions

4.1 Permit Life/Term and Posting

This Title V Permit to Operate shall expire five years from the time of issuance. Permit expiration terminates Roseville Electric's right to operate unless a timely renewal application is submitted.
Origin: Rule 507, Federal Operating Permit Program § 402.2.p [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.p [amended 04/17/01]

4.2 Payment of Fees

Roseville Electric shall pay all District fees including any supplemental annual fee, as calculated the procedures specified in Section 403 of District Rule 507, on a timely basis. Failure to remit fees on a timely basis shall result in the forfeiture of this Title V Permit to Operate. Operation without a permit subjects the source to potential enforcement action by the District and the U.S. EPA pursuant to § 502(a) of the Clean Air Act.
Origin: Rule 507, Federal Operating Permit Program § 402.2.o [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.o [amended 04/17/01]

4.3 Right of Entry

The Regional Administrator, the Executive Officer of the California Air Resources Board, the Air Pollution Control Officer, or their authorized representatives, upon the presentation of credentials, shall be permitted:

4.3.1 To enter upon the premises where the source is located or in which any records are required to be kept under the terms and conditions of this Title V Permit to Operate; and

4.3.2 At reasonable times to have access to, inspect and copy any records required to be kept under the terms and conditions of this Title V Permit to Operate; and

4.3.3 To inspect any equipment at the stationary source, operation, work practices, emission-related activities or method required in this Title V Permit to Operate; and

4.3.4 To sample emissions from the source or other monitoring activities.
Origin: Rule 507, Federal Operating Permit Program § 402.2.j [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.j [amended 04/17/01]

4.4 Severability

The provisions of this Title V Permit to Operate are severable, and, if any provision of this Title V Permit to Operate is held invalid, the remainder of this Title V Permit to Operate shall not be affected thereby.
Origin: Rule 507, Federal Operating Permit Program § 402.2.m [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.m [amended 04/17/01]

4.5 Need to Halt or Reduce Activity Not a Defense

Roseville Electric shall not use the "need to halt or reduce a permitted activity in order to maintain compliance" as a defence for non-compliance with any permit condition.
Origin: Rule 507, Federal Operating Permit Program § 402.2.k.4 [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.k.4 [amended 04/17/01]

4.6 Modification, Revocation, Reopening for Cause

This Title V Permit to Operate may be modified, revoked, reopened and reissued, or terminated for cause. The filing of a request by Roseville Electric for a permit modification, revocation and re-issuance, or termination, or of a notification of planned changes or anticipated non-compliance does not stay any permit condition.
Origin: Rule 507, Federal Operating Permit Program § 402.2 k.5 [amended 04/17/01]

Authority: Rule 507, Federal Operating Permit Program § 402.2 k.5 [amended 04/17/01]

4.7 Submit Information and Records

Within a reasonable time period, Roseville Electric shall furnish any information requested by the Air Pollution Control Officer, in writing, for the purpose of determining:

4.7.1 Compliance with the permit, or

4.7.2 Whether or not cause exists for a permit or enforcement action.

For information claimed to be confidential, Roseville Electric may furnish such information directly to the Air Pollution Control Officer along with a claim of confidentiality.
Origin: Rule 507, Federal Operating Permit Program § 402.2.k.6 [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.k.6 [amended 04/17/01]

4.8 Duty to Comply

Roseville Electric shall comply with provisions of this Title V Permit to Operate. Any permit noncompliance constitutes grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial for a permit renewal application.
Origin: Rule 507, Federal Operating Permit Program § 402.2 k.1 and 402.2.k.3 [amended 04-/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2 k.1 and 402.2.k.3 [amended 04/17/01]

4.9 Property Rights

This Title V Permit to Operate does not convey property rights or exclusive privilege of any sort.
Origin: Rule 507, Federal Operating Permit Program § 402.2.k.2 [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.k.2 [amended 04/17/01]

4.10 Duty to Apply for Renewal

Roseville Electric shall apply for renewal of this Title V Permit to Operate no earlier than 18 months before the date of expiration nor later than 6 months before the date of expiration.
Origin: Rule 507, Federal Operating Permit Program § 302.4 [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 302.4 [amended 04/17/01]

4.11 Emergency Provisions

4.11.1 Emergency Definition
An "emergency" is any situation arising from a sudden and reasonably unforeseeable event beyond the control of Roseville Electric (e.g., an act of God) which causes the exceedance of a technology-based emission limitation under a permit and requires immediate corrective action to restore compliance. An "emergency" shall not include noncompliance as a result of improperly designed equipment, lack of preventive maintenance, careless or improper operation, or operator error.
Origin: Rule 507, Federal Operating Permit Program § 212 [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 212 [amended 04/17/01]

4.11.2 Effect of an Emergency
An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if the reporting requirements have been met.
Origin: 40 CFR § 70.6(g) (2)
Authority: 40 CFR § 70.6(g) (2)

4.11.3 Affirmative Defense
The affirmative defense of an emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:

1. Roseville Electric complied with the requirements of Rule 404, Upset conditions, Breakdown and

Scheduled Maintenance, and the emergency provisions contained in all applicable federal requirements; and

2. That within two weeks of an emergency event, the responsible official submitted to the District a properly signed, contemporaneous log or other relevant evidence which demonstrates that:
   a. An emergency occurred;
   b. Roseville Electric can identify the cause(s) of the emergency;
   c. The facility was being properly operated at the time of the emergency;
   d. All steps were taken to minimize the emissions resulting from the emergency; and
   e. Within two working days of the emergency event, Roseville Electric provided the District with a description of the emergency and any mitigating or corrective actions taken.

Origin: District Rule 507, Federal Operating Permit Program § 402.2.l [amended 04/17/01]
Authority: District Rule 507, Federal Operating Permit Program § 402.2.l [amended 04/17/01]

4.11.4 Burdens of Proof
In any enforcement proceeding, Roseville Electric has the burden of proof for establishing that an emergency occurred.
Origin: Rule 507, Federal Operating Permit Program § 402.2.l.3 [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.l.3 [amended 04/17/01]

4.12 Voluntary Emissions Caps

To the extent applicable federal requirements provide for averaging emissions increases and decreases within a stationary source without case-by-case approval, a responsible official may request, subject to approval by the Air Pollution Control Officer, to permit one or more emissions unit(s) under a voluntary emissions cap. The permit for each emissions unit shall include federally-enforceable conditions requiring that:

1. All applicable federal requirements, including those authorizing emissions averaging, are complied with;
2. No individual emissions unit shall exceed any emissions limitation, standard, or other requirement;
3. Any emissions limitation, standard, or other requirement shall be enforced through continuous emission monitoring, where applicable; and
4. All affected emissions units under a voluntary emissions cap shall be considered to be operating in violation of the permit, if the voluntary emissions cap is exceeded.

Origin: Rule 507, Federal Operating Permit Program § 402.2.r [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.r [amended 04/17/01]

4.13 Agency Addresses

Notifications or correspondence as required by this Title V Permit to Operate shall be forwarded to the following addresses:

1. Director, Air Division (Attn.: AIR-3)
   U.S. Environmental Protection Agency
   75 Hawthorne Street
   San Francisco, CA 94105

2. Air Pollution Control Officer
   Placer County Air Pollution Control District
   110 Maple Street
   Auburn, CA 95603
   Facsimile: 530-745-2373
   E-Mail: District@placer.ca.gov

Origin: General Information
Authority: General Information

4.14 Reopening Permit for Cause

This Title V Permit to Operate shall be reopened and revised under any of the following circumstances including, but are not limited to, the following:

1. The need to correct a material mistake or inaccurate statement;
2. The need to revise or revoke a permit to operate to assure compliance with applicable federal requirements;
3. The need to incorporate any new, revised, or additional applicable federal requirements, if the remaining authorized life of the permit is 3 years or greater, no later than 18 months after the promulgation of such requirement (where less than 3 years remain in the authorized life of the permit, the Air Pollution Control Officer shall incorporate these requirements into the permit to operate upon renewal).

Origin: Rule 507, Federal Operating Permit Program § 401.8 [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.1.8 [amended 04/17/01]

4.15 Permit Revision Exemption

No permit revision shall be required, under any approved economic incentives, marketable permits, emissions trading and other similar programs or processes for changes that are provided for in this Title V Permit to Operate.
Origin: Rule 507, Federal Operating Permit Program § 402.2.u [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.u [amended 04/17/01]

4.16 Requirement for an Indemnification Agreement

Roseville Electric has an obligation to defend and indemnify the District against third party challenges in accordance with District Rule 411.
Origin: Rule 411, Indemnification of District [adopted 02/14/08]
Authority: Rule 411, Indemnification of District [adopted 02/14/08]
District Only

5.0 Alternative Operating Scenarios

5.1 Upset Conditions

For periods when Roseville Electric operates pursuant to the requirements of the Rule 404 (Upset Conditions, Breakdown or Scheduled Maintenance) and/or the qualified operating conditions for short term NOx excursions per condition 2.1.6 and/or the Emergency Provisions under 40 CFR 70.6(g), Roseville Electric will comply with all the relevant notification, monitoring, reporting and record keeping requirements contained in Rule 404, Rule 502, and 40 CFR 70.6(g).
Origin: Rule 507, Federal Operating Permit Program § 402.2.q [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.q [amended 04/17/01]

6.0 Monitoring, Testing, Recordkeeping, and Reporting

6.1 General Monitoring, Recordkeeping and Reporting and Testing Requirements

6.1.1 The Air Pollution Control Officer, at any time, may require such information, analyses, plans, or specifications which will disclose the nature, extent, quality, or degree of air contaminants which are, or may be, discharged by the source for which the permit was issued or applied. The Air Pollution Control Officer may require that such disclosures be certified by a professional engineer registered in the State of California. A responsible official representing the owner or operator shall certify the truth, accuracy and completeness of disclosures. Studies necessary to provide such information, shall be at the expense of the owner or operator of the source for which a permit was issued or applied.
Origin: Rule 501, General Permit Requirements § 407 [amended 11/03/04]; HSC § 42303
Authority: Rule 501, General Permit Requirements § 407 [amended 11/03/04]; HSC § 42303

6.1.2 40 CFR 60 Subpart GG – Standards of Performance for Stationary Gas Turbines
The gas turbines are required to meet the notification, recordkeeping and performance test requirements of this regulation. Roseville Electric must submit a written quarterly excess emission report to the Administrator.
Origin: FDOC, Condition 64a
Authority: 40 CFR 60

6.2 Monitoring

6.2.1 General

6.2.1.1 Frequency
Monitoring (sampling, testing, recording) shall be performed at a frequency sufficient to yield accurate, reliable and representative data with which the source's compliance with applicable limits or conditions can be demonstrated.
Origin: Rule 501, General Permit Requirements § 503.1, § 503.2 [amended 11/03/04]
Authority: Rule 501, General Permit Requirements § 503.1, § 503.2 [amended 11/03/04]

6.2.1.2 Methods
All monitoring, analytical methods, compliance certification, test methods, equipment management, and statistical procedures shall be consistent with any applicable federal requirement, including those pursuant to Sections 114(a)(3) and 504(b) of the Federal Clean Air Act, and 40 CFR Part 64.
Origin: Rule 501, General Permit Requirements
Authority: Rule 501, General Permit Requirements

6.2.2 Turbines

6.2.2.1 The gas turbines shall be equipped with continuously recording, nonresettable fuel gas flowmeters on each unit.
Origin: FDOC, Condition 17
Authority: Rule 501, General Permit Requirements § 405, § 303 [amended 11/03/94]; HSC § 42301

6.2.3 Emergency Generator

6.2.3.1 A non-resettable hour meter shall be in place on the engine set to record the hours of operation.
Origin: FDOC, Condition 98
Authority: Rule 501, General Permit Requirements [amended 11/03/94]; HSC § 41753; California Code of Regulations, Title 17, § 93115

6.2.3.2 Records of operation and maintenance (for the emergency generator) shall be kept by the Owner or Operator for a period of five years and shall be made available to the District upon request. Information required for reporting to the District includes, but is not limited to:

1. The hours of operation the engine was run for maintenance and testing.
2. The hours of operation the engine was run during interruption of electrical power.

3. Records of the sulfur content of the diesel fuel used.

Origin: FDOC, Condition 102
Authority: Rule 501, General Permit Requirements [amended 11/03/94]; HSC § 41753; California Code of Regulations, Title 17, § 93115

6.2.4 Emergency Fire Pump

6.2.4.1 A non-resettable hour meter shall be in place on the engine set to record the hours of operation.
Origin: FDOC, Condition 85
Authority: Rule 501, General Permit Requirements [amended 11/03/94]; HSC § 41753; California Code of Regulations, Title 17, § 93115

6.2.4.2 Records of operation and maintenance shall be kept by the Owner or Operator for a period of five years and shall be made available to the District upon request. Information required for reporting to the District includes, but is not limited to:

1. The hours of operation the engine was run for maintenance and testing.
2. The hours of operation the engine was run during interruption of electrical power.
3. Records of the sulfur content of the diesel fuel used.

Origin: FDOC, Condition 89
Authority: Rule 501, General Permit Requirements [amended 11/03/94]; HSC § 41753; California Code of Regulations, Title 17, § 93115

6.3 Continuous Emissions Monitoring Systems (CEMS)

6.3.1 Each gas turbine exhaust shall be equipped with continuously recording emissions monitor for NOx, CO, and O2 dedicated to this unit. Continuous emission monitor shall meet the requirements of 40 CFR parts 60 and 75, and shall be capable of monitoring emissions during startups and shutdowns as well as normal operating conditions. The system shall be installed and operational prior to the cessation of commissioning when their operability will be confirmed by source testing.
Origin: FDOC, Condition 18
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.3.2 Valid excess emissions indicated by the CEM system shall be considered violations of the applicable emission limit for the purposes of this Title V Permit to Operate.
Origin: Rule 501, General Permit Requirements [amended 11/03/94]
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.3.3 Roseville Electric shall submit a CEMS QA/QC plan to the District for approval. Approval should also be required for any future changes to the plan.
Origin: FDOC, Condition 28
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.3.4 Roseville Electric shall submit to the District, prior to issuance of a Permit to Operate, information correlating the control system operating parameters to the associated NOx, CO, PM-10, VOC and SOx emissions. This information may be used by the District Air Pollution Control Officer to determine compliance where there is no continuous emission monitoring system available or when the continuous emission monitoring system is not operating properly.
Origin: FDOC, Condition 29
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.3.5 Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District.
Origin: FDOC, Condition 39
Authority: Rule 404, Upset Conditions, Breakdown or Scheduled Maintenance § C [amended 06/19/79]; Rule 501, General Permit Requirements § 303, § 304.2.c [amended 11/03/94]; HSC § 42706, § 42301

6.3.6 Roseville Electric shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F.
Origin: FDOC, Condition 40
Authority: 40 CFR Part 60, Appendix F

6.3.7 CEM Breakdown Procedures
In the event of a breakdown of monitoring equipment, Roseville Electric shall notify the Air Pollution Control Officer and initiate repairs. Roseville Electric shall notify the Air Pollution Control Officer of the intent to shut down any monitoring equipment at least 24 hours prior to the event. A breakdown of monitoring equipment or shutdown for scheduled maintenance which persists longer than ninety-six (96) hours shall constitute a violation of any applicable emission limitation or restriction prescribed by District Rules and Regulations, unless Roseville Electric has obtained an Emergency Variance pursuant to Rule 404.
Origin: Rule 507, Federal Operating Permit Program § 402.2.I [amended 04/17/01]; Rule 404, Upset Conditions, Breakdown or Scheduled Maintenance [amended 06/19/79]; Rule 501, General Permit Requirements § 304.2 [amended 11/03/94]
Authority: Rule 507, Federal Operating Permit Program § 402.2.I [amended 04/17/01]; Rule 404, Upset Conditions, Breakdown or Scheduled Maintenance [amended 06/19/79]; Rule 501, General Permit Requirements § 304.2 [amended 11/03/94]
District Only

6.3.8 CEM Polling

6.3.8.1 Roseville Electric shall install and maintain equipment, facilities, software and systems at the facility and at the District office that will allow the District to poll or receive electronic data from the CEMS. Roseville Electric shall make CEMS data available for automatic polling of the daily records. Roseville Electric shall make hourly records available for manual polling within no more than a one hour delay. The basic elements of this equipment include a telephone line, modem and data logger. Alternatively, an internet based system may be used. The costs of installing and operating this equipment, excluding District costs, shall be borne by Roseville Electric.
Origin: FDOC, Condition 12a
Authority: Rule 404, Upset Conditions, Breakdown or Scheduled Maintenance § C [amended 06/19/79]; Rule 501, General Permit Requirements § 304.2.c [amended 11/03/94]; HSC § 42706

6.3.8.2 Upon notice by the District that the facility's polling system is not operating, Roseville Electric shall provide the data by a District-approved alternative format and method for up to a maximum of 30 days.
The polling data is not a substitute for other required record keeping or reporting.
Origin: FDOC, Condition 12b,c.
Authority: Rule 404, Upset Conditions, Breakdown or Scheduled Maintenance § C [amended 06/19/79]; Rule 501, General Permit Requirements § 304.2.c [amended 11/03/94]; HSC § 42706

6.4 Testing

6.4.1 General

6.4.1.1 The District may require the conduct of emissions testing or analysis deemed necessary to demonstrate compliance with applicable requirements. If the District determines that tests are required, a written notice will be provided to Roseville Electric.
Origin: Rule 501, General Permit Requirements § 303, § 304, § 507 [amended 11/03/94]
Authority: Rule 501, General Permit Requirements § 303, § 304, § 507 [amended 11/03/94]

6.4.1.2 Except as otherwise specified in District rules, regulations, or permit conditions the test methods used for determining compliance with emission limits shall be the appropriate method:

1. Adopted by the California Air Resources Board and cited in Title 17, California Code of Regulations, Division 3, Subchapter 8, Compliance with Non-vehicular Emission Standards; or

2. Identified in 40 CFR part 50, Appendix M, Recommended Test Methods for State Implementation Plans; or
3. Identified in 40 CFR part 60, Appendix A, Test Methods; or
4. Any alternative method approved by the Air Pollution Control Officer.

Note: The Air Pollution Control Officer shall request the review of the alternate test methods by the U.S. Environmental Protection Agency and the California Air Resources Board.
Origin: Rule 501, General Permit Requirements § 501.1 [amended 11/03/94]
Authority: Rule 501, General Permit Requirements § 501.1 [amended 11/03/94]

6.4.1.3 All required testing shall be subject to the following:

1. A written test plan shall be submitted to the Air Pollution Control Officer detailing the sampling methods, analytical methods or detection principles to be used, at least thirty (30) days prior to the actual testing.
2. Independent testing contractors and analytical laboratories shall be California Air Resources Board certified to perform the test or analysis conducted.
3. Emissions limit testing shall be conducted as close as achievable to the full output process rates. RATA testing shall be conducted at 50% of full output or above.
4. The conditions and equipment in operation during testing shall be recorded.
5. Installed instrumentation readings for parameters affecting emission character or extent shall be recorded.
6. The test evaluation results shall be reported to the District within sixty (60) days of testing.

Origin: Rule 501, General Permit Requirements § 307, § 407, § 501.1 [amended 11/03/94]
Authority: Rule 501, General Permit Requirements § 307, § 407, § 501.1 [amended 11/03/94]

6.4.1.4 If the District finds that additional performance tests are required to determine compliance with District Rules and Regulations and conditions of this permit, reasonable written notice shall be provided to Roseville Electric. The performance tests shall be subject to the following restrictions (Rule 501):

1. At least thirty (30) days prior to the actual testing, a written test plan shall be submitted to the District Air Pollution Control Officer detailing the sampling methods, analytical methods or detection principles to be used. The prior written approval of the District Air Pollution Control Officer is required for the use of alternate test methods.
2. The District may require, upon reasonable written notice, the conduct by Roseville Electric of such emissions testing or analysis as may be deemed necessary by the District to demonstrate compliance with District Rules and Regulations and the limiting conditions of this permit.
3. Testing shall be conducted in accordance with 40 CFR 60, Appendix A, Methods, or equivalent methods approved by the State of California Air Resources Board (CARB) by reference in Title 17 of the California Administrative Code, or other methods specified by Roseville Electric and approved in writing by the District Air Pollution Control Officer. Independent testing contractors and analytical laboratories shall be CARB certified for the test or analysis conducted. Particulate matter testing, if requested, shall include both filterable and condensed particulate matter (e.g. Method 5 modified to include impinger catch).
4. A report of the testing shall be submitted to the District no later than sixty (60) days after the source test is performed.

Origin: FDOC, Condition 122
Authority: Rule 501, General Permit Requirements § 307, § 407, and § 501 [amended 11/03/94]

6.4.1.5 The gas turbine exhaust stacks stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods. Access ladders and/or stairs and platforms shall allow easy access to the sampling ports.
Origin: FDOC, Condition 19
Authority: Rule 501, General Permit Requirements § 405, § 303 [amended 11/03/94]; HSC § 42301

6.4.1.6 The District may hire an independent contractor to conduct performance testing on an unannounced basis.
Origin: Rule 501, General Permit Requirements § 407 [amended 11/03/94]; Rule 603, Analysis Feed [amended 08/08/96; HSC § 42303

Authority: Rule 501, General Permit Requirements § 407 [amended 11/03/94]; Rule 603, Analysis Feed [amended 08/08/96; HSC § 42303

6.4.2 Cooling Towers

An analysis of the cooling tower water shall be performed within 180 days of initial operation and annually thereafter.
Origin: FDOC, Condition 68
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.4.3 Turbines

6.4.3.1 A performance test shall be conducted annually for each combustion turbine/heat recovery steam generator unit.
Origin: FDOC, Condition 44
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.4.3.2 Compliance with the cold start NOx, and CO mass emission limits shall be demonstrated for each of the gas turbines by performance testing no later than 180 days after initial operation and at least once every seven years thereafter by an ARB certified independent test firm.
Origin: FDOC, Condition 45
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.4.3.3 The following test methods shall be used PM-10: EPA Method 202 (front half and back half), NOx: EPA Method 20, CO: EPA Method 10, VOC: EPA Method 18 and fuel gas sulfur content: ASTM D3246. Alternative test methods as approved by the District may also be used to address the source testing requirements of this permit.
Origin: FDOC, Condition 46
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.5 Recordkeeping

6.5.1 All records which are required to be maintained by this permit shall be maintained for a period of five years and shall be made readily available for District inspection upon request. Results of continuous emissions monitoring shall be reduced according to the procedure established in 40 CFR, Part 51, Appendix P. paragraphs 5.0 through 5.3.3, or by other methods deemed equivalent by mutual agreement with the District, the CARB, and the EPA.
Origin: FDOC, Condition 35
Authority: 40 CFR, Part 51, Appendix P. paragraphs 5.0 through 5.3.3

6.5.2 A gas turbine operating log shall be kept which includes, on a daily basis; the actual Pacific Standard Time start-up and stop time, total hours of operation, type and quantity of fuel used (liquid/gas). This information shall be available for inspection at any time from the date of entry.
Origin: FDOC, Condition 31
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.5.3 Hourly records of NOx and CO emission concentrations (ppmv @ 15% O2), and hourly, daily, and quarterly records of NOx and CO emissions shall be kept. Ongoing compliance with the CO emission limits during normal operation shall be deemed compliance with the VOC emission limits during normal operation.
Origin: FDOC, Condition 32
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.5.4 Records of SOx lb/hr, lb/day, and lb/quarter emissions shall be kept. SOx emissions shall be based on fuel use records, natural gas sulfur content, and mass balance calculations.
Origin: FDOC, Condition 33
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.5.5 The following records shall be kept: occurrence, duration, and type of any startup, shutdown, or malfunction; performance testing, evaluations, calibrations, checks, adjustments, any period during

which a continuous monitoring system or monitoring device was inoperative, maintenance of any continuous emission monitor emission measurements, total daily and rolling twelve month average hours of operation, hourly quantity of fuel used, and gross three hour average operating load.
Origin: FDOC, Condition 34
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.5.6 The Air Pollution Control Officer may require record keeping to verify or maintain compliance or any exemption.
Origin: Rule 501, General Permit Requirements § 503.1, § 503.2 [amended 11/03/04]
Authority: Rule 501, General Permit Requirements § 503.1, § 503.2 [amended 11/03/04]

6.5.6.1 Roseville Electric shall maintain records of all required monitoring data and support information associated with any applicable federal requirement in a permanent form suitable for inspection including:

1. Date, place, and time of sampling;
2. Operating conditions at the time of sampling;
3. Date, place, and method of analysis; and
4. The company or entity that performed the analyses;
5. Results of the analysis;
6. Copies of all reports as required by applicable federal requirements; and

Origin: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]

6.5.6.2 Roseville Electric shall comply with all record keeping requirements deemed necessary by the Air Pollution Control Officer to ensure compliance with all applicable federal requirements; and
Origin: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]

6.5.6.3 Roseville Electric shall support information which includes information on Continuous Monitoring Equipment operations including:

1. All calibration and maintenance records,
2. All original recordings for continuous monitoring instrumentation, and
3. Performance and all other information required by 40 CFR 60.

Origin: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]

6.5.6.4 All required monitoring data and support information shall be retained for a period of at least 5 years.
Origin: Rule 507, Federal Operating Permit Program § 402.2.f.3 [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.f.3 [amended 04/17/01]

6.5.6.5 All records shall be made available to District inspectors upon request.
Origin: Rule 503, General Permit Requirements § 503.1 [amended 11/03/94]
Authority: Rule 503, General Permit Requirements § 503.1 [amended 11/03/94]

6.6 Reporting and Notifications

6.6.1 Roseville Electric shall promptly report to the Air Pollution Control Officer any deviation from permit requirements, including that attributable to upset conditions (as defined in District Rule 404). All reports of a deviation from permit requirements shall include the probable cause of the deviation and any preventive or corrective action taken. Prompt reporting is as soon as reasonably possible, but no later than two (2) hours after the deviation is detected during normal APCD business hours.
Origin: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.f.3 [amended 04/17/01]
District Only

6.6.2 Roseville Electric shall submit deviation monitoring reports at least every six months. Monitoring reports shall identify any deviation from permit requirements, including those previously reported to the Air Pollution Control Officer as required by this permit. Monitoring reports shall be submitted

within 45 days of the end of the reporting period (Reporting periods are January 1 - June 30 and July 1 - December 31) and each monitoring report shall be accompanied by a written statement from the responsible official which certifies the truth, accuracy, and completeness of the report.
Origin: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]

6.6.3 Roseville Electric shall submit compliance schedule progress reports on any compliance schedule at least semi-annually. Progress reports shall contain:

1. The date when compliance will be achieved;
2. An explanation of why compliance was not, or will not be, achieved by the scheduled date; and
3. A log of any preventive or corrective actions taken.

Origin: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.g [amended 04/17/01]

6.6.4 Roseville Electric shall provide source test information annually regarding the exhaust gas NOx concentration at ISO conditions corrected to 15 percent oxygen on a dry basis, and the demonstrated percent efficiency (EFF) of the turbine unit.
Origin: FDOC, Condition 30
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.6.5 Roseville Electric shall notify the District of any breakdown condition as soon as reasonably possible, but no later than two District business hours after its detection.
Origin: FDOC, Condition 36
Authority: HSC § 42706
District Only

6.6.6 Any violation of any emission standard listed in this permit which is indicated by the CEMS shall be reported to the District no later than 96 hours after such occurrence per California Health and Safety Code 42706.
Origin: FDOC, Condition 37
Authority: California Health and Safety Code 42706
District Only

6.6.7 The District shall be notified in writing within seven calendar days following the correction of any breakdown condition. The breakdown notification shall include a description of the equipment malfunction or failure, the date and cause of the initial failure, the estimated emissions in excess of those allowed, and the methods utilized to restore normal operations.
Origin: FDOC, Condition 38
Authority: Rule 501, General Permit Requirements [amended 11/03/94]
District Only

6.6.8 Any alteration of the subject equipment, including a change in the method of operation, shall be reported to the District. Such alternations may require an Authority to Construct Permit.
Origin: Rule 501, General Permit Requirements [amended 11/03/94]
Authority: Rule 501, General Permit Requirements [amended 11/03/94]

6.6.9 Quarterly Reports -- Excess Emissions and CEM Performance Report
Roseville Electric shall submit a written report to the Air Pollution Control Officer for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions, nature and cause of excess (if known), corrective actions taken and preventive measures adopted; averaging period used for data reporting shall correspond to the averaging period for each respective emission standard; applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred.
Origin: FDOC, Condition 41
Authority: Rule 507, Federal Operating Permit Program [amended 04/17/01]

7.0 Compliance Plan and Certification

7.1 Compliance Plan

Roseville Electric shall implement a compliance plan. A copy of this compliance plan shall be attached and posted along with this Title V Permit to Operate. The compliance plan shall:

1. Describes the compliance status of an emissions unit with respect to each applicable federal requirement;
2. Describes how compliance will be achieved if an emissions unit is not in compliance with an applicable federal requirement at the time of permit issuance;
3. Assures that an emissions unit will continue to comply with those permit conditions with which it is in compliance; and
4. Assures that an emissions unit will comply, on a timely basis, with any applicable federal requirement that will become effective during the permit term.

Origin: Rule 507, Federal Operating Permit Program § 402.2.h [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.h [amended 04/17/01]

7.2 Compliance Certification

Roseville Electric shall submit compliance certification reports to the U.S. EPA and the Air Pollution Control Officer every twelve (12) months. The certification report shall:

1. Identify all permit terms or conditions and the means of monitoring each term or condition.
2. Include the compliance status and method(s) used to determine compliance for the current time period and over the entire reporting period of each term or condition.
3. Include any additional inspection, monitoring, or entry requirement that may be promulgated pursuant to Sections 114(a) and 504(b) of the Federal Clean Air Act between reports.
4. Be submitted on District approved forms for the compliance certification.
5. Be submitted within 45 days after the end of the reporting period of January 1-December 31.

The responsible official will certify in writing the truth, accuracy, and completeness of the certification report.
Origin: Rule 507, Federal Operating Permit Program § 402.2.n [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.n [amended 04/17/01]

7.3 Compliance Schedules

7.3.1 Should any emissions unit in compliance with applicable federal requirements become noncompliant during the certification period, Roseville Electric shall develop and submit to the District a compliance schedule. The compliance schedule shall:

7.3.1.1 Resemble and be at least as stringent as that contained in any judicial consent decree, administrative order, or schedule approved by the District hearing board.

7.3.1.2 Include:

(1) A statement that the emissions unit will continue to comply with those federal requirements with which it is still in compliance;
(2) A statement that the emissions unit will comply, on a timely basis, with any applicable federal requirement that may become effective during the remaining term of this Title V Permit to Operate.
(3) A list of all preventive or corrective actions or activities taken or proposed to be taken, and the dates when these activities have or will be performed and completed.

The compliance schedule, once approved by the District, shall be incorporated into the compliance certification plan and the revised plan affixed to this Title V Permit to Operate.

7.3.2 Roseville Electric shall submit progress reports consistent with the applicable compliance schedule at least semi-annually, or more frequently if specified in the applicable schedule requirements or requested by the District. Progress reports shall include:

1. Dates for achieving the activities, milestones, or compliance required in the schedule of compliance, and; and the date when compliance will be achieved;
2. A log or record of dates when such activities, milestones or compliance was achieved; and
3. 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 or taken.

Origin: Rule 507, Federal Operating Permit Program § 402.2.i [amended 04/17/01]
Authority: Rule 507, Federal Operating Permit Program § 402.2.i [amended 04/17/01]

PLACER COUNTY APCD
110 Maple Street
Auburn, California 95603
(530) 745-2330 - Fax (530) 745-2373

PERMIT TO OPERATE

ISSUED TO:
ROSEVILLE ENERGY PARK
5120 PHILLIP RD
ROSEVILLE, CA 95747

PERMIT NUMBER: REPR-20-01

FACILITY LOCATION:
ROSEVILLE ENERGY PARK
5120 PHILLIP RD
ROSEVILLE, CA 95747

VALID FROM:
10/1/2019 - 9/30/2020

Bruce Springsteen for

Erik C. White
Air Pollution Control Officer

10/18/2019
Issue Date

PROCESS DESCRIPTION: COMBUSTION TURBINE GENERATOR #1

EQUIPMENT

No.	Equipment	Rating
1	Combustion turbine generator #1, natural gas fired, combined cycle with dry low NOx combustors; manufacturer: Siemens, model: SGT800; serial # B005712, heat input rating 457.3 MMBtu/hr; nominal MW rating of 62.5 MW and peak capacity of 80 MW (with duct burner)	MBTU-457300
2	Heat recovery steam generator #1, with duct burner; manufacturer Coen, serial # 40D-14757-1-000; rated 188 MMBtu/hr (LHV) and maximum of 225 MMBtu/hr	MBTU-225000
3	Steam turbine	
4	Selective catalytic reduction (SCR), ammonia injection system within the heat recovery steam generator, make: Peerless, serial# 70373	
5	Carbon Monoxide (CO) catalyst	
6	Continuous emissions monitoring system	

TOTAL RATINGS – MBTU- 682300.

1. If the Siemens SGT800 turbines are selected, emission offsets shall be provided for all calendar quarters for NOx and PM-10 in the following amounts, at the offset ratio specified in the PCAPCD Rule 502, New Source Review (8/01). (Offsets are not required for CO, SOx and VOC emissions under PCAPCD Rules and Regulations.)

SIEMENS SGT800 - OFFSETS REQUIRED					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NOx	15,546	13,412	17,646	15,572	31.09
PM-10	17,673	15,513	19,168	19,158	35.95

2. The ERC certificates to be surrendered if the Alstom Siemens SGT800 turbines are selected shall include the following:

ERCs SIEMENS SGT800						
NOx	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-23 (2004-03)	5,050	5,050	5,050	5,050	10.1
Calpine Corp.	YSAQMD/ EC-209 (EC-238)	0	6,199	0	3,188	4.69
Calpine Corp.	YSAQMD/ EC-210	0	9,558	0	3,973	6.77
Energy 2001 or SMAQMD Bank		5,300	5,300	5,250	4,150	10.00
VOCs for NOx	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
SMUD	2008-02	12,475	12,695	12,573	12,644	24.19
SMUD	2006-09	1,260	1,260	1,260	1,260	2.52
SMUD	2007-03	2,200	470	1,359	924	2.48
SMUD	2007-06	431	557	557	475	1.01
City of Roseville	PCAPCD/ 2001-26	33,512	33,512	33,512	33,512	67.0
PM10	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-24	2,578	20,167	16,085	15,916	27.37
City of Roseville	PCAPCD/ 2001-22	22,680	-	13,440	22,680	29.40
Enron North America	PCAPCD/2 2001-24 (2004-06)	362	-	420	-	0.39

3. The ERC Certificates PCAPCD 2001-23, YSAQMD EC-209 (EC-238), YSAQMD EC-210, PCAPCD 2001-26, PCAPCD 2001-24 and PCAPCD/ 2001-22 shall be submitted to the PCAPCD at least 30 days prior to start of construction. Copies of the ERCs surrendered shall be submitted to the Energy Commission by that date. For the purpose of this condition, start of construction shall be defined as the pouring of foundation on site.

4. ERCs obtained from reductions at Energy 2001 shall be submitted to the PCAPCD at least 30 days prior to commencing operation of any of the stationary source equipment (gas turbines, boiler, emergency fire pump, or emergency generator). Copies of the ERCs surrendered shall be submitted to the Energy Commission by that date. For the purpose of this condition, commencing operation shall be defined as first fire of any of the stationary source equipment listed herein.

5. If the NOx ERCs listed in the Energy 2001 row are alternatively obtained in part at or in whole from the Sacramento Air Quality Management District (SMAQMD) Bank at an offset ratio of 2.1 to 1. The offset ratio of 1.3 to 1 shall apply to Energy 2001 offsets. An offset ratio of 2.1 to 1 shall apply to SMAQMD Bank offsets. The combined quantity shall be sufficient to offset the following NOx emissions:

NOx	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	4,077	4,077	4,038	3,192	7.69

Compliance to be determined by the following :

(NOx ERCs Energy 2001 /1.3) + (NOx ERCs SMAQMD Bank /2.1) = Quarterly requirement.

6. ERCs obtained from the SMAQMD Bank shall be submitted to the PCAPCD at least 30 days prior to commencing operation of any of the stationary source equipment (gas turbines, boiler, emergency fire pump, or emergency generator). Copies of the ERCs surrendered shall be submitted to the Energy Commission by that date. For the purpose of this condition, commencing operation shall be defined as first fire of any of the stationary source equipment listed herein.

7. Prior to the use of ERCs from the SMAQMD Bank, Roseville Electric shall appear before the PCAPCD District Board and gain approval of the transfer of ERCs per Health and Safety Code, Section 40709.6, Offset by reduction to stationary source located in another District.

A. The project owner may, as an alternative to obtaining emission reduction credits (ERCs) from either the Energy 2001 facility or the Sacramento Air Quality Management District, purchase valid VOC ERCs within the Placer County Air Pollution Control District. The project owner must use an interpollutant trading ratio of no less than 2.6 to 1 (VOC to NOx) and a distance offset ratio consistent with Placer County Air Pollution Control District Rule 502. The project owner must surrender the VOC ERCs from AIR QUALITY AQ-9.5 Table 1 sufficient to offset the project NOx emissions in the amounts shown in AIR QUALITY AQ-9.5 Table 2. The project owner may bank any excess VOC ERCs with the Placer County Air Pollution Control District.

AIR QUALITY Placer County Air Pollution Control District VOC Emission Reduction Credits (pounds)					
	1st	2nd	3rd	4th	

	Quarter	Quarter	Quarter	Quarter	Annual
2008-02	9,889	11,493	10,474	8,131	39,987
2006-09	1,260	1,260	1,260	1,260	5,040
2007-03	2,200	470	1,359	924	4,953
2007-06	431	557	557	475	2,020

AIR QUALITY **Required NOx Offsets for Project NOx Emissions**					
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual
Required NOx Offsets	4,077	4,077	4,038	3,192	7.69

8. The gas turbines and auxiliary boiler shall be fired exclusively on pipeline grade natural gas.

9. Roseville Electric shall maintain an Operating Compliance Plan for the new CTG/HRSG which will assure that the air pollution control equipment will be properly maintained and that necessary operational procedures are in place to continuously achieve compliance with this permit. The Operating Compliance Plan shall include a description of the process monitoring program and devices to be used.

   A. The plan shall specify the frequency of surveillance checks that will be made of process monitoring devices and indicators to determine continued operation within permit limits. A record or log of individual surveillance checks shall be kept to document performance of the surveillance.

   B. The plan shall include the frequency and methods of calibrating the process monitoring devices.

   C. The plan shall specify for each emission control device:
      i. Operation and maintenance procedures that will demonstrate continuous operation of the emission control device during emission producing operations; and
      ii. Records that must be kept to document the performance of required periodic maintenance procedures.

   D. The plan shall identify what records will be kept to comply with air pollution control requirements and regulations and the specific format of the records. These records shall include at least the Recordkeeping information required by this permit. The information must include emission monitoring evaluations, calibration checks and adjustments, and maintenance performed on such monitoring systems.

   E. The plan shall be submitted to the PCAPCD 30 days prior to startup of the gas turbines and boiler. The plan must be implemented upon approval by the PCAPCD Air Pollution Control Officer.

F. The plan shall be resubmitted to the PCAPCD for approval upon any changes to compliance procedures described in the plan, or upon the request of the PCAPCD Air Pollution Control Officer

10. CEMS Remote Polling:

F. Roseville Electric shall install and maintain equipment, facilities, software and systems at the facility and at the PCAPCD office that will allow the District to poll or receive electronic data from the CEMS. Roseville Electric shall make CEMS data available for automatic polling of the daily records. Roseville Electric shall make hourly records available for manual polling within no more than a one hour delay. The basic elements of this equipment include a telephone line, modem and datalogger. Alternatively, an internet based system may be used. The costs of installing and operating this equipment, excluding District costs, shall be borne by the REP.

G. Upon notice by the District that the facility's polling system is not operating, the REP shall provide the data by a District-approved alternative format and method for up to a maximum of 30 days.

H. The polling data is not a substitute for other required recordkeeping or reporting. (Rule 404 § C; Rule 501 § 304.2.c; HSC 42706)

OPERATING LIMITATIONS

11. Roseville Electric shall submit design details for the selective catalytic reduction, oxidation catalyst, and continuous emission monitor system to the PCAPCD at least 30 days prior to commencement of construction of these components.

12. Roseville Electric shall install a selective catalytic reduction (SCR) system and an oxidation catalyst on the gas turbine. The SCR and oxidation catalyst equipment shall be operated whenever the gas turbine is operated except during commissioning.

13. The gas turbine engine and generator lube oil vents shall be equipped with mist eliminators.

14. The gas turbines and auxiliary boiler shall be equipped with continuously recording, non-resettable fuel gas flowmeters on each unit.

15. Each gas turbine exhaust shall be equipped with continuously recording emissions monitor for NOx, CO, and 02 dedicated to this unit. Continuous emission monitor shall meet the requirements of 40 CFR parts 60 and 75, and shall be capable of monitoring emissions during startups and shutdowns as well as normal operating conditions. The system shall be installed and operational prior to the cessation of commissioning when their operability will be confirmed by source testing.

16. The gas turbine exhaust stacks and boiler exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test

methods. Access ladders and/or stairs and platforms shall allow easy access to the sampling ports.

17. The gas turbine engine shall be fired exclusively on pipeline quality natural gas with a sulfur content no greater than 0.50 grains of sulfur compounds per 100 dry scf of natural gas.

18. Startup is defined as the period beginning with turbine light-off (firing) until the unit meets the lb/hr and ppmv emission limits in conditions 52, 54 and 55. Shutdown is defined as the period beginning with initiation of turbine shutdown sequence and ending with cessation of firing of the gas turbine engine. Startup and shutdown durations shall not exceed 3.0 hours and 1 hour, respectively, per occurrence.

19. NOx, excluding the thermal stabilization period (i.e. startup period which is not to exceed 3 hours), shall not exceed the following levels under load conditions:

    9 x EFF/25 ppm, @ 15% O2, averaged over 15 minutes:

    Where: EFF(efficiency) is the higher of the following:

    $$EFF1 = \frac{3412 \times 100\%}{AHR}$$

    AHR =Actual Heat Rate at HHV of Fuel (BTU/KW-HR)]

    or

    $$EFF2 = \frac{MRE \times LHV}{HHV}$$

    MRE = Manufacturer's Rated Efficiency with Air Pollution Equipment at LHV, which is the manufacturer's continuous rated percent efficiency of the gas turbine with air pollution equipment after correction from LHV to HHV of the fuel at peak load for that facility.

COMMISSIONING

20. The commissioning period commences when all mechanical and electrical systems are installed and individual startup has been completed or when a gas turbine is first fired whichever comes first. The period ends when the plant has completed performance testing and is available for commercial operation.

21. The gas turbines shall be tuned to minimize the air emissions. At the earliest feasible time, in accordance with the recommendations of the equipment manufacturer and construction contractor, the air pollution control equipment shall be installed, adjusted and operated to minimize emissions from the combustion turbines.

22. The total number of firing hours of each gas turbine without abatement shall not exceed 160 hours during the commissioning period. Such operation shall only be limited to such activities that can only be properly executed without the air pollution control equipment. The total operating days during conditioning shall not exceed 33 calendar days.

23. During the commissioning operations, CO emissions shall not exceed 829 pounds per hour for any one-hour block average. Compliance to be determined by emission factors to be determined prior to startup and approved by the District. (This condition was established to prevent impacts from exceeding 500 ug/m3 over an 8-hour average).

24. The total mass emissions of each regulated pollutant that are emitted during the commissioning period shall not exceed the quarterly emission limits specified in these conditions.

REPORTING AND RECORDKEEPING

25. Roseville Electric shall submit a CEMS QA/QC plan to the PCAPCD for approval. Approval should also be required for any future changes to the plan.

26. Roseville Electric shall submit to the PCAPCD, prior to issuance of a Permit to Operate, information correlating the control system operating parameters to the associated NOx, CO, PM-10, VOC and SOx emissions. This information may be used by the PCAPCD Air Pollution Control Officer to determine compliance where there is no continuous emission monitoring system available or when the continuous emission monitoring system is not operating properly.

27. Provide source test information annually regarding the exhaust gas NOx concentration at ISO conditions corrected to 15 percent oxygen on a dry basis, and the demonstrated percent efficiency (EFF) of the turbine unit.

28. A gas turbine operating log shall be kept which includes, on a daily basis, the actual Pacific Standard Time start-up and stop time, total hours of operation, type and quantity of fuel used (liquid/gas). This information shall be available for inspection at any time from the date of entry.

29. Hourly records of NOx and CO emission concentrations (ppmv @ 15% 02), and hourly, daily, and quarterly records of NOx and CO emissions shall be kept. Ongoing compliance with the CO emission limits during normal operation shall be deemed compliance with the VOC emission limits during normal operation.

30. Records of SOx Ib/hr, lb/day, and Ib/quarter emissions shall be kept. SOx emissions shall be based on fuel use records, natural gas sulfur content, and mass balance calculations.

31. The following records shall be kept: occurrence, duration, and type of any startup, shutdown, or malfunction; performance testing, evaluations, calibrations, checks, adjustments, any period during which a continuous monitoring system or monitoring device was inoperative, maintenance of any continuous emission monitor emission measurements, total daily and rolling twelve month average hours of operation, hourly quantity of fuel used, and gross three hour average operating load.

32. All records which are required to be maintained by this permit shall be maintained for a period of five years and shall be made readily available for District inspection upon request. Results of continuous emissions monitoring shall be reduced according to the procedure established in 40 CFR, Part 51, Appendix P. paragraphs 5.0 through 5.3.3, or

by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA.

33. Roseville Electric shall notify the PCAPCD of any breakdown condition as soon as reasonably possible, but no later than two PCAPCD business hours after its detection.

34. Any violation of any emission standard listed in this permit which is indicated by the CEMS shall be reported to the PCAPCD no later than 96 hours after such occurrence per California Health and Safety Code 42706.

35. The PCAPCD shall be notified in writing within seven calendar days following the correction of any breakdown condition. The breakdown notification shall include a description of the equipment malfunction or failure, the date and cause of the initial failure, the estimated emissions in excess of those allowed, and the methods utilized to restore normal operations.

36. Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The PCAPCD shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the PCAPCD.

37. Roseville Electric shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F.

38. Roseville Electric shall submit a written report to the APCO for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions, nature and cause of excess (if known), corrective actions taken and preventive measures adopted; averaging period used for data reporting shall correspond to the averaging period for each respective emission standard; applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred.

39. Roseville Electric shall provide the PCAPCD with a written emission statement showing actual emissions of volatile organic compounds and oxides of nitrogen. Pursuant to PCAPCD Rule 503 Roseville Electric shall submit this emission statement on a form or in a format specified by the PCAPCD Air Pollution Control Officer. The statement shall contain the following information:
    A. Information contained in the California Air Resources Board's Emission Inventory Turn Around Document as described in Instructions for the Emission Data System Review and Update Report; and
    B. Actual emissions of volatile organic compounds and oxides of nitrogen, in tons per year, for the calendar year prior to the preparation of the emission statement; and
    C. Information regarding seasonal or diurnal peaks in the emission of affected pollutants; and
    D. Certification by a responsible official of Roseville Electric that the information contained in the emission statement is accurate to the best knowledge of the individual certifying the emission statement.

PERFORMANCE TESTING

40. Compliance with the short term emission limits (lb/hr and ppmv @ 15% O2) shall be demonstrated by a performance test conducted within 60 days of reaching maximum production and not later than 180 days after initial startup of each gas turbine engine.

41. A performance test shall be conducted annually for each combustion turbine/heat recovery steam generator unit.

42. Compliance with the cold start NOx, and CO mass emission limits shall be demonstrated for each of the gas turbines by performance testing no later than 180 days after initial operation and at least once every seven years thereafter by an ARB certified independent test firm.

43. The following test methods shall be used PM10: EPA Method 202 (front half and back half), NOx: EPA Method 20, CO: EPA Method 10, VOC: EPA method 18, and fuel gas sulfur content: ASTM D3246. Alternative test methods as approved by the PCAPCD may also be used to address the source testing requirements of this permit.

EMISSION LIMITATIONS

44. No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance. (Rule 205)

45. Stack emission opacity as dark or darker than Ringelmann No. 1 (20% opacity) for period or periods aggregating more than three (3) minutes in any one hour is prohibited and is in violation of PCAPCD Rule 202, Visible Emissions. (Rule 202)

46. Particulate matter emissions shall not exceed 0.1 grains per cubic foot of gas calculated at 12 percent CO at standard conditions. (Rule 210)

47. Sulfur compound emissions calculated as SO2 shall not exceed 0.2 percent by volume. (Rule 210).

48. The ammonia slip shall not exceed 10 ppmv @15% O2. The SCR catalyst shall be replaced, repaired or otherwise reconditioned within 24 months of the ammonia slip exceeding 7 ppm.

    Compliance with ammonia slip shall be demonstrated by using the following calculation procedure:

    Ammonia slip ppmv @ 15% O2= ((a-(bxc/1,000,000))x1,000,000/b) x d.
    where
    a = ammonia injection rate (lb/hr)/17 (lb/lb.mol.),
    b = dry exhaust gas flow rate (lb/hr)/29(lb/lb.mol.),
    c = change in measured NOx concentration ppmv at 15% O2 across catalyst,
    d = correction factor

The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip.

49. The emissions from the gas turbine after air pollution controls shall not exceed the following:

Gas Turbine PPMV Limitations Excluding Startup, Shutdown and Excursions		
NOX	CO	VOC
2.0 ppmvd @ 15% O2, 1-hour average	4 ppmvd @ 15% O2, 3-hour average	2 ppmvd @ 15% O2, 1-hour average

50. The 2.0 ppmvd NOx emission limit is averaged over 1 hour at 15 percent oxygen, dry basis. The limit shall not apply to the first six (6) 1-hour average NOx emissions above 2.0 ppmvd, dry basis at 15% O2, in any calendar quarter period for each combustion gas turbine provided that it meets all of the following requirements:

A. This equipment operates under any one of the qualified conditions ` described below:

1. Rapid combustion turbine load changes due to the following conditions:
   - A. Load changes initiated by the California ISO or a successor entity when the plant is operating under Automatic Generation Control; or
   - B. Activation of a plant automatic safety or equipment protection system which rapidly decreases turbine load
2. The first two 1-hour reporting periods following the initiation/shutdown of a fogging system injection pump
3. The first two 1-hour reporting periods following the initiation/shutdown of combustion turbine water injection
4. The first two 1-hour reporting periods following the initiation of HRSG duct burners

i. Events as the result of technological limitations identified by the operator and approved in writing by the PCAPCD.

B. The 1-hour average NOx emissions above 2.0 ppmv, dry basis at 15% O2, did not occur as a result of operator neglect, improper operation or maintenance, or qualified breakdown under Rule 404, Upset Conditions, Breakdown or Scheduled Maintenance. Notification to the PCAPCD is required within two hours of a qualified event.

C. The qualified operating conditions described in (A) above are recorded in the plant's operating log within 24 hours of the event, and in the CEMS by 5 p.m. the next business day following the qualified operating condition. The notations in the log and CEMS must describe the date and time of entry into the log/CEMS and the plant operating conditions responsible for NOx emissions exceeding the 2.0 ppmv 1-hour average limit. In addition, these excursions must be identified in the CEMS quarterly reports.

D. The 1-hour average NOx concentration for periods that result from a qualified operating condition does not exceed 25 ppmv, dry basis at 15 percent O2.

E. All NOx emissions during these events shall be included in all calculations of hourly, daily, and annual mass emission rates as required by this permit.

51. If the Siemens SGT800 turbines are selected for the project, emission rates from each gas turbine and heat recovery steam generator exhaust during startup and shutdown shall not exceed the following:

Siemens SGT800 Combustion Turbine Emission Limitations during Startup and Shutdown		
Pollutant	Maximum Pounds Per Hour (worst-case turbine)	Pounds per Startup or Shutdown (both turbines combined)
NOx	37.1	122.8
CO	89.5	204.8

52. If the Siemens SGT800 turbines are selected for the project, emission rates from each gas turbine and heat recovery steam generator exhaust, except during startup and/or shutdown, or excursions shall not exceed the following:

Siemens SGT800 - COMBUSTION TURBINE EMISSION LIMITATIONS PER TURBINE EXCLUDING STARTUP AND SHUTDOWN	
POLLUTANT	POUNDS/HOUR
Carbon Monoxide (CO)	6.2 (three-hour rolling average)
Nitrogen Oxides (NOx)	5.1 (one-hour average)
PM-10	4.7
Sulfur Oxides (SOx)	1.0
Volatile Organic Compounds (VOCs)	1.8

53. If the Siemens SGT800 turbines are selected for the project, the daily emissions shall not exceed the following rates:

Siemens SGT800 - FACILITY DAILY EMISSION LIMITS					
POLLUTANT	Two Alstom Turbines	Auxiliary Boiler	Cooling Tower	Diesel Emergency Generator	Diesel Fire Pump
NOx	406.0	16.8	--	4.31	1.72
CO	629.5	52.8	--	0.84	0.09
VOC	223.1	7.2	--	0.16	0.05
PM10	226.8	14.4	16.3	0.14	0.03

SO2	47.1	1.92	--	0.10	0.19

54. If the Siemens SGT800 turbine are selected, the quarterly emissions shall not exceed the levels shown below:

Siemens SGT800 **Gas Turbines**							
Pollutant	Lbs/hr Max Two Turbine	Lbs/day Max Two Turbines	Quarter 1 (lbs/quarter) Two turbines	Quarter 2 (lbs/quarter) Two Turbines	Quarter 3 (lbs/quarter) Two turbines	Quarter 4 (lbs/quarter) Two Turbines	Tons/ Year Two Turbines
NOx	74.2	406.0	15,399	12,965	17,496	15,422	30.64
CO	179.0	629.5	26,787	32,590	28,175	29,862	58.71
VOCs	39.4	223.1	5,791	7,306	6,630	6,848	13.29
PM-10	6.4	211.8	16,300	13,692	17,789	17,569	32.67
SOx	1.3	44.0	3,385	2,843	3,694	3,648	6.78

55. If the Siemens SGT800 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

SIEMENS SGT800 - FACILITY QUARTERLY EMISSION LIMITS					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NOx	15,546	13,412	17,646	15,572	31.09
CO	27,121	33,872	28,515	30,202	59.86
VOC	5,832	7,455	6,672	6,890	13.42
PM10	17,673	15,513	19,168	19,158	35.95
SO2	3,400	2,893	3,709	3,663	6.83

56. 40 CFR 60 Subpart GG – Standards of Performance for Stationary Gas Turbines

The gas turbines are required to meet the notification, recordkeeping and performance test requirements of this regulation. Roseville Electric must submit a written quarterly excess emission report to the Administrator. A performance test is required within 60 days of achieving maximum production or no later than 180 days of initial startup.

COOLING TOWERS
OPERATING LIMITATIONS

57. Permittee shall submit drift eliminator design details at least 30 days prior to commencement of construction of the cooling towers basin.

58. No hexavalent chromium containing compounds shall be added to the cooling water.

59. Drift eliminator drift rate shall not exceed 0.0005% of the circulating water flow.

PERFORMANCE TESTING

60. An analysis of the cooling tower water shall be performed within 180 days of initial operation and annually thereafter.

EMISSION LIMITATIONS

61. No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance. (Rule 205)

62. PM-10 emission rate shall not exceed the following:

COOLING TOWER EMISSION LIMITATIONS					
Pollutant	**POUNDS PER DAY**	**QUARTER 1** (Pounds/quarter)	**QUARTER 2** (Pounds/quarter)	**QUARTER 3** (Pounds/quarter)	**QUARTER 4** (Pounds/quarter)
PM-10	16.3	1,471	1,487	1,504	1,504

63. Compliance with the PM-10 emission limit shall be demonstrated as follows: PM-10 = cooling water recirculation rate * total dissolved solids concentration in the blowdown water * design drift rate.

AUXILLARY BOILER
OPERATING LIMITATIONS

64. An ultra-low NOx burner and flue gas recirculation system shall be installed and operated on the auxillary boiler.

65. A non-resettable fuel meter shall be installed on the gas line serving the boiler.

66. The hours of operation of the auxillary boiler shall not exceed the following:

Table 66 – Boiler Hours of Operation				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Boiler Hours of Operation	140	568	143	143

PERFORMANCE TESTING

67. Compliance with the boiler emission limits on pounds per hour and ppmv emission limits shall be demonstrated by an initial performance test conducted within 60 days of reaching maximum production and not later than 180 days from initial startup.

68. The initial performance test shall be conducted for NOx, VOC, SOx, PM-10, CO, CO2, and O2.

69. Performance tests shall be conducted on the boiler every other calendar year after the initial testing. These tests shall include NOx, CO, CO2, and O2.

70. All boiler source tests shall be made in the as-found operating condition, except that source tests shall include at least one test conducted at the maximum feasible firing rate allowed by the PCAPCD permit. No source test shall be conducted within two hours after a continuous period in which fuel flow to the unit is zero, or shut off, for thirty minutes or longer.

71. At least thirty (30) days prior to the compliance source tests, a written test plan detailing the test methods and procedures to be used shall be submitted for approval by the PCAPCD Air Pollution Control Officer. The plan shall cite the test methods to be used for the determination of compliance with the emission limitations of this rule.

72. A report of the compliance test shall be submitted to the PCAPCD within sixty (60) days of completion of the source test.

EMISSION LIMITATIONS

73. The NOx emissions from the boiler shall not exceed 9.0 ppmv @ 3% O2 on a three hour average.

74. The CO emissions from the boiler shall not exceed 50 ppmv @ 3% O2 on a three hour average.

75. The boiler emissions shall not exceed any of the following:

Table 67 - BOILER EMISSION LIMITATIONS

Pollutant	**POUNDS Per Hour**	**QUARTER 1** (Pounds/quarter)	**QUARTER 2** (Pounds/quarter)	**QUARTER 3** (Pounds/quarter)	**QUARTER 4** (Pounds/quarter)
NOx	0.7	92	372	94	94
CO	2.2	311	1,259	317	317
VOC	0.3	36	144	36	36
PM10	0.6	82	332	84	84
SO2	0.08	11	46	12	12

DIESEL FIRED IC ENGINE POWERING FIRE PUMP
OPERATING LIMITATIONS

76. Permittee shall submit IC engine design details to the PCAPCD at least 30 days prior to commencement of construction of the fire water pump foundation.

77. A non-resettable hour meter shall be installed on each engine/generator set to record the hours of operation.

78. Operation for maintenance and testing of the diesel engine fire pump shall be limited to 30 hours per year.

79. Operation for other than maintenance and testing purposes shall be limited to involuntary interruptions of electrical power.

80. The sulfur content of the diesel fuel used shall not exceed 15 ppm by weight.

REPORTING AND RECORDKEEPING

81. Records of operation and maintenance shall be kept by the Owner or Operator for a period of five years and shall be made available to the PCAPCD upon request. Information required for reporting to the PCAPCD includes, but is not limited to:

    A. The hours of operation the engine was run for maintenance and testing.

    B. The hours of operation the engine was run during interruption of electrical power.

    C. Records of the sulfur content of the diesel fuel used.

EMISSION LIMITATIONS

82. No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance.

83. Stack emission opacity as dark or darker than Ringelmann No. 1 (20% opacity) for period or periods aggregating more than three (3) minutes in any one hour is prohibited and is in violation of PCAPCD Rule 202, Visible Emissions.

84. Particulate matter emissions shall not to exceed 0.1 grains per cubic foot of gas calculated at 12 percent CO at standard conditions.

85. Sulfur compound emissions calculated as SO2 shall not exceed 0.2 percent by volume.

86. Nitrogen oxide emissions from the fire pump diesel engine shall not exceed 6.9 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.

87. PM-10 emissions from the fire pump diesel engine shall not exceed 0.4 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.

88. The fire pump diesel engine shall meet the requirements of the California Air Resources Board Airborne Toxic Control Measure for Stationary Compression Ignition Engines when it becomes effective.

DIESEL IC ENGINE POWERING EMERGENCY GENERATOR

OPERATING LIMITATIONS

89. Permittee shall submit IC engine design details to the PCAPCD at least 30 days prior to commencement of construction of the IC engine foundation.

90. A non-resettable hour meter shall be installed on each engine/generator set to record the hours of operation.

91. Operation for maintenance and testing of the emergency diesel engine and generator shall be limited to 30 hours per year.

92. Operation for other than maintenance and testing purposes shall be limited to involuntary interruptions of electrical power.

93. The sulfur content of the diesel fuel used shall not exceed 15 ppm by weight.

REPORTING AND RECORDKEEPING

94. Records of operation and maintenance shall be kept by the Owner or Operator for a period of five years and shall be made available to the PCAPCD upon request. Information required for reporting to the PCAPCD includes, but is not limited to:

    A. The hours of operation the engine was run for maintenance and testing.

    B. The hours of operation the engine was run during interruption of electrical power.

    C. Records of the sulfur content of the diesel fuel used.

EMISSION LIMITATIONS

95. No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance. (Rule 205)

96. Stack emission opacity as dark or darker than Ringelmann No. 1 (20% opacity) for period or periods aggregating more than three (3) minutes in any one hour is prohibited and is in violation of PCAPCD Rule 202, Visible Emissions. (Rule 202)

97. Particulate matter emissions shall not to exceed 0.1 grains per cubic foot of gas calculated at 12 percent CO at standard conditions. (Rule 210)

98. Sulfur compound emissions calculated as SO2 shall not exceed 0.2 percent by volume. (Rule 210).

99. Nitrogen oxide emissions from the emergency generator diesel engine shall not exceed 6.9 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.

100. PM-10 emissions from the emergency generator diesel engine shall not exceed 0.4 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.

101. The engine shall meet the requirements of the California Air Resources Board Airborne Toxic Control Measure for Stationary Compression Ignition Engines when it becomes effective.

PORTABLE EQUIPMENT

102. Portable equipment shall comply with all applicable requirements while operating at the facility, including PCAPCD Permit and Prohibitory Regulations, or be State-registered portable equipment. State-registered portable equipment shall comply with State registration requirements. A copy of the State registration shall be readily available whenever the State-registered portable equipment is at the facility.

TITLE V CONDITION

103. The Owner/Operator shall file a complete application for a Title V permit pursuant to Rule 507, Federal Operating Permit Program by no later than one year after commencing operation.

PCAPCD GENERAL CONDITIONS

104. Authorization to construct the equipment listed and as prescribed in the approved plans and specifications is hereby granted, subject to the specified permit conditions. The construction and operation of listed equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted in the conditions. Deviation from the approved plans is not permissible without first securing approval for the changes from the PCAPCD Air Pollution Control Officer. (Rule 501)

105. This permit shall be maintained on the premises of the subject equipment. (Rule 501)

106. The authorized PCAPCD agents shall have the right of entry to any premises on which an air pollution emission source is located for the purpose of inspecting such source, including securing samples of emissions therefrom, or any records required to be maintained therewith by the PCAPCD. (Rule 402)

107. In the event of any violation of the PCAPCD Rules and Regulations, Roseville Electric shall take action to end such violation. (Rule 502)

108. Roseville Electric shall notify the PCAPCD within two hours of any upset conditions, breakdown or scheduled maintenance which cause emissions in excess of limits established by PCAPCD Rules and Regulations. (Rule 404)

109. Any alteration of the subject equipment, including a change in the method of operation, shall be reported to the PCAPCD. Such alterations may require an Authority to Construct Permit. (Rule 501)

110. Exceeding any of the limiting condition is prohibited without prior application for, and the subsequent granting of a permit modification pursuant to PCAPCD Rule 501, General Permit Requirements, Section 400.

111. In the event of a change of ownership, an application must be submitted to the PCAPCD. Upon any change in control or ownership of facilities constructed, operated, or modified

under authority of this permit, the requirements contained in this Authority to Construct shall be binding on all subsequent owners and operators. (Rule 501)

112. Compliance of the permitted facility is required with the provisions of the "Air Toxics `Hot Spots' Information and Assessment Act" of 1987 (Health and Safety Code Sections 44300 et seq.).

113. Performance Test Requirements: If the PCAPCD finds that additional performance tests are required to determine compliance with PCAPCD Rules and Regulations and Conditions of this Authority to Construct, reasonable written notice shall be provided to Roseville Electric. The performance tests shall be subject to the following restrictions (Rule 501):
    A. At least thirty (30) days prior to the actual testing, a written test plan shall be submitted to the PCAPCD Air Pollution Control Officer detailing the sampling methods, analytical methods or detection principles to be used. The prior written approval of the PCAPCD Air Pollution Control Officer is required for the use of alternate test methods.
    B. The PCAPCD may require, upon reasonable written notice, the conduct by Roseville Electric of such emissions testing or analysis as may be deemed necessary by the PCAPCD to demonstrate compliance with PCAPCD Rules and Regulations and the limiting conditions of this permit.

    C. Testing shall be conducted in accordance with 40 CFR 60, Appendix A, Methods, or equivalent methods approved by the State of California Air Resources Board (ARB) by reference in Title 17 of the California Administrative Code, or other methods specified by Roseville Electric and approved in writing by the PCAPCD Air Pollution Control Officer. Independent testing contractors and analytical laboratories shall be Air Resources Board certified for the test or analysis conducted. Particulate matter testing, if requested, shall include both filterable and condensed particulate matter (e.g. Method 5 modified to include impinger catch).
    D. A report of the testing shall be submitted to the PCAPCD no later than sixty (60) days after the source test is performed.

PLACER COUNTY APCD
110 Maple Street
Auburn, California 95603
(530) 745-2330 - Fax (530) 745-2373

PERMIT TO OPERATE

ISSUED TO:
ROSEVILLE ENERGY PARK
5120 PHILLIP RD
ROSEVILLE, CA 95747

PERMIT NUMBER: REPR-20-02

FACILITY LOCATION:
ROSEVILLE ENERGY PARK
5120 PHILLIP RD
ROSEVILLE, CA 95747

VALID FROM:
10/1/2019 - 9/30/2020

Bruce Springsteen for

Erik C. White
Air Pollution Control Officer

10/18/2019
Issue Date

PROCESS DESCRIPTION: COMBUSTION TURBINE GENERATOR #2

EQUIPMENT

No.	Equipment	Rating
1	Combustion turbine generator #2, natural gas fired, combined cycle with dry low NOx combustors; manufacturer: Siemens; model: SGT800, serial# B005713; heat input rating 457.3 MMBtu/hr; nominal MW rating of 62.5 MW and peak capacity of 80 MW	MBTU-453600
2	Heat recovery steam generator #2, with duct burner, manufacturer: Coen, serial # 40D-14757-1-000, rated 188 MMBtu/hr (LHV) and maximum 225 MMBtu/hr	MBTU-225000
3	STEAM TURBINE	
4	Selective catalytic reduction (SCR), ammonia injection system within the heat recovery steam generator, make: Peerless, serial# 70373	
5	CARBON MONOXIDE (CO) CATALYST	
6	Continuous emissions monitoring system	

TOTAL RATINGS – MBTU- 678600 .

CONDITIONS

(SEE CONDITIONS IN PERMIT TO OPERATE REPR-20-01)

Attachment 3
Emissions Evaluations

Data provided by Siemens based on Copy of Data request - Siemens_OFFICIAL_200910 spreadsheet **Siemens SGT-800 with A+ Upgrade**

ALL DATA SHOULD BE GIVEN FOR THE STACK OUTLET UNLESS OTHERWISE SPECIFIED	**Siemens Data**	Case 1	Case 2	Case 3	Case 4	Case 13	Case 14	Case 15	Case 16	Case 29	Case 30	Case 31	Case 32
Ambient Dry Bulb (F)		105	105	105	105	62	62	62	62	29	29	29	29
Ambient Wet Bulb (F)		64	64	64	64	51	51	51	51	27	27	27	27
Relative Humidity (%)		17	17	17	17	55.6	55.6	55.6	55.6	85.6	85.6	85.6	85.6
Ambient Pressure (psia)		14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67
Turbine Load		100%	75%	50%	40%	100%	75%	50%	40%	100%	75%	50%	40%
Evap Cooler		On	Off	Off	Off	On	Off	Off	Off	Off	Off	Off	Off
Inlet Conditioning		Evap	None	None	None	Evap	None	None	None				
Inlet Heating (Kbtu/hr)													
Compressor Inlet Temperature (F)		76.0	105.0	105.0	105.0	54.5	62.0	62.0	62.0	29.0	29.0	29.0	29.0
Pressure Losses:													
Inlet System Loss, inH2O		3.99	2.01	1.53	1.38	4.08	2.48	1.69	1.46	4.16	2.53	1.65	1.46
Volute Loss, inH2O													
Exhaust Loss, inH2O		15.54	8.25	6.29	5.63	16.81	10.80	7.55	6.52	18.03	11.62	7.87	6.88
Turbine Fuel Flow Rates lb/hr		19,889	13,578	10,986	9,908	20,997	16,677	13,146	11,715	22,069	17,746	13,904	12,323
GT MMbtu/hr (HHV)		453.4	309.5	250.5	225.9	478.7	380.2	299.7	267.1	503.1	404.6	317.0	280.9
GT MMbtu/hr (LHV)		409.0	279.3	226.0	203.8	431.9	343.0	270.4	240.9	453.9	365.0	286.0	253.4
Turbine Power and Heat Output													
MW (Gross, installed no auxilliaries)		43.39	24.83	16.55	13.24	46.58	34.06	22.71	18.17	49.23	36.92	24.61	19.69
MW(Net, minus auxiallary power)													
BTU/kWh (LHV)		9,427	11,246	13,649	15,386	9,272	10,070	11,908	13,264	9,220	9,885	11,618	12,870
Power Factor		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Turbine Exhaust Gas Parameters @ GT Exhaust													
Exhaust Flow Rate (acfm)		644,690	475,980	414,267	389,700	665,886	541,057	454,641	421,585	685,749	558,054	463,481	430,045
Exhaust Flow Rate (dscfm)	scfm @60°F,	204,727	145,391	127,148	121,018	215,672	168,014	139,064	129,319	225,734	175,833	142,260	134,060
Exhaust Flow Rate (lbs/hr)		1,005,281	707,370	616,231	585,044	1,052,001	818,899	676,033	627,291	1,095,377	854,720	690,306	648,432
Exhaust Flow Rate (dscfm @ 15% O2)	scfm @60°F,	226,547	154,679	125,165	112,888	239,178	189,960	149,756	133,457	251,383	202,133	158,380	140,376
Turbine Exhaust Temperature (F)		1,031	1,112	1,112	1,099	1,018	1,083	1,112	1,112	1,006	1,068	1,112	1,094
Turbine Exhaust Energy (Btu/s- Ref 0 °R)		73,461	55,745	48,432	0	75,347	62,793	53,246	0	77,135	64,368	54,277	0
Cp, Btu/lb-R		0.280	0.281	0.280	0.279	0.278	0.280	0.281	0.280	0.277	0.279	0.280	0.279
H2O, vol %, wet basis		8.9	7.7	7.2	6.9	8.0	7.8	7.5	7.3	7.2	7.4	7.2	6.8
H2O, mass %, wet basis		5.7	4.9	4.6	4.4	5.1	5.0	4.8	4.6	4.6	4.7	4.6	4.3
O2, vol-%, dry basis (calculated)													
CO2, vol-%, dry basis (calculated)													
Excess Air, vol-%													
Mol Wt (wet)		28.28	28.42	28.44	28.46	28.39	28.42	28.43	28.45	28.48	28.47	28.48	28.50

Exh Wght % Wet												
AR	1.24	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
N2	72.96	73.53	73.63	73.70	73.45	73.56	73.62	73.68	73.84	73.80	73.84	73.93
O2	14.80	15.20	15.76	16.12	14.89	14.76	15.14	15.45	14.94	14.69	14.94	15.40
CO2	5.32	5.16	4.79	4.56	5.36	5.47	5.23	5.02	5.41	5.58	5.41	5.11
H20	5.69	4.86	4.57	4.38	5.06	4.96	4.77	4.60	4.56	4.69	4.56	4.31
SO2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO												
HC												
NOX												
Exh Mole % Dry												
AR	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
N2	80.92	80.81	80.61	80.48	80.93	80.98	80.84	80.73	80.94	81.03	80.94	80.77
O2	14.37	14.62	15.09	15.40	14.35	14.22	14.54	14.81	14.32	14.11	14.33	14.72
CO2	3.75	3.61	3.34	3.17	3.76	3.83	3.65	3.50	3.78	3.90	3.77	3.55
H20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO												
HC												
NOX												
Exh Mole % Wet												
AR	0.88	0.89	0.89	0.89	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.89
N2	73.70	74.62	74.80	74.91	74.48	74.65	74.77	74.86	75.11	75.03	75.11	75.26
O2	13.08	13.50	14.00	14.33	13.21	13.11	13.45	13.73	13.29	13.07	13.29	13.72
CO2	3.42	3.33	3.10	2.95	3.46	3.53	3.38	3.25	3.50	3.61	3.50	3.31
H20	8.93	7.66	7.21	6.92	7.97	7.82	7.52	7.27	7.20	7.40	7.20	6.82
SO2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO												
HC												
NOX												
Pollutant Concentrationsat Ref. O2 (15%) @ GT Exhaust												
VOC as CH4, ppmvd	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
CO, ppmvd	4.00	4.00	6.00	10.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
NOx, ppmvd	15.00	15.00	15.00	35.00	15.00	15.00	15.00	20.00	15.00	15.00	15.00	20.00
HC as C3H8, ppmvd	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Total PM10 (gr/dscf)	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
Nox, lb/hr	24.7	16.9	13.6	28.7	26.1	20.7	16.3	19.4	27.4	22.0	17.3	20.4
CO, lb/hr	4.0	2.7	3.3	5.0	4.2	3.4	2.6	2.4	4.4	3.6	2.8	2.5
HC, lb/hr	4.7	3.2	2.6	3.9	5.0	4.0	3.1	2.8	5.3	4.2	3.3	2.9
SOX as SO2, lb/hr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note: This sheet is based on the original plant emission calculation spreadsheet REP Emissions Rev 2 in progress spreadsheet.

Case		Case 1a	Case 1b	Case 2a	Case 3a	Case 13a	Case 13b	Case 14a	Case 15a	Case 16a	Case 29a	Case 29b	Case 30a	Case 31a	Case 32a
Ambient Dry Bulb Temp.	deg. F	105	105	105	105	62	62	62	62	62	29	29	29	29	29
Ambient Wet Bulb Temp.	deg. F	64	64	64	64	51	51	51	51	51	27	27	27	27	27
Relative Humidity	%	17.00	17.00	17.00	17.00	55.60	55.60	55.60	55.60	55.60	85.60	85.60	85.60	85.60	85.60
Elevation	ft	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Ambient Pressure	psia	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67
Combustion Turbines Operating		2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1
Combustion Turbine Load	%	100%	100%	75%	50%	100%	100%	75%	50%	40%	100%	100%	75%	50%	40%
Duct Firing? (On/Off)		On	Off	Off	Off	On	Off	Off	Off	Off	On	Off	Off	Off	Off
Evaporative Cooling? (On/Off)		On	On	Off	Off	On	On	Off	Off	Off	Off	Off	Off	Off	Off
Evaporative Cooling Effectiveness	%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Water Injection (NO_x control &/or SPRINT)? (Yes/No)		No	No	No	No	No	No	No	No	No	No	No	No	No	No
Fuel Input (each turbine)															
GT Fuel (LHV)	MMBtu/hr	409	409	279	226	432	432	343	270	241	454	454	365	286	253
HRSG Fuel (LHV)	MMBtu/hr	203.01	0.00	0.00	0.00	203.01	0.00	0.00	0.00	0.00	203.01	0.00	0.00	0.00	0.00
Total Fuel (LHV)	MMBtu/hr	612.1	409.0	279.3	226.0	634.9	431.9	343.0	270.4	240.9	656.9	453.9	365.0	286.0	253.4
HHV/LHV =	1.1083														
GT Fuel (HHV)	MMBtu/hr	453.3	453.3	309.5	250.4	478.6	478.6	380.1	299.7	267.0	503.1	503.1	404.5	316.9	280.9
HRSG Fuel (HHV)	MMBtu/hr	225.0	0.0	0.0	0.0	225.0	0.0	0.0	0.0	0.0	225.0	0.0	0.0	0.0	0.0
Total Fuel (HHV)	MMBtu/hr	678.3	453.3	309.5	250.4	703.6	478.6	380.1	299.7	267.0	728.1	503.1	404.5	316.9	280.9
GT Fuel	lb/hr	19,889	19,889	13,578	10,986	20,997	20,997	16,677	13,146	11,715	22,069	22,069	17,746	13,904	12,323
HRSG Fuel	lb/hr	9,871	0	0	0	9,871	0	0	0	0	9,871	0	0	0	0
Total Fuel	lb/hr	29,759	19,889	13,578	10,986	30,868	20,997	16,677	13,146	11,715	31,940	22,069	17,746	13,904	12,323
Inlet Air (each turbine)															
N_2	mole % dry	78.04%	78.04%	78.04%	78.04%	78.04%	78.04%	78.04%	78.04%	78.04%	78.04%	78.04%	78.04%	78.04%	78.04%
O_2	mole % dry	20.99%	20.99%	20.99%	20.99%	20.99%	20.99%	20.99%	20.99%	20.99%	20.99%	20.99%	20.99%	20.99%	20.99%
CO_2	mole % dry	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%
Ar	mole % dry	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Molecular Weight, dry air		28.97	28.97	28.97	28.97	28.97	28.97	28.97	28.97	28.97	28.97	28.97	28.97	28.97	28.97
Dry Bulb Temperature	deg. F	70.2	70.2	105.0	105.0	53.0	53.0	62.0	62.0	62.0	29.0	29.0	29.0	29.0	29.0
Moisture Content	lb H_20/lb air	0.0114	0.0114	0.0035	0.0035	0.0075	0.0075	0.0055	0.0055	0.0055	0.0026	0.0026	0.0026	0.0026	0.0026
Moisture Content	moles H_20/mole air	0.018	0.018	0.006	0.006	0.012	0.012	0.009	0.009	0.009	0.004	0.004	0.004	0.004	0.004
N_2	mole %	76.64%	76.64%	77.61%	77.61%	77.11%	77.11%	77.36%	77.36%	77.36%	77.72%	77.72%	77.72%	77.72%	77.72%
O_2	mole %	20.61%	20.61%	20.87%	20.87%	20.74%	20.74%	20.81%	20.81%	20.81%	20.90%	20.90%	20.90%	20.90%	20.90%
CO_2	mole %	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%
H_2O	mole %	1.80%	1.80%	0.55%	0.55%	1.19%	1.19%	0.87%	0.87%	0.87%	0.41%	0.41%	0.41%	0.41%	0.41%
Ar	mole %	0.92%	0.92%	0.93%	0.93%	0.93%	0.93%	0.93%	0.93%	0.93%	0.94%	0.94%	0.94%	0.94%	0.94%
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Molecular Weight		28.77	28.77	28.91	28.91	28.84	28.84	28.87	28.87	28.87	28.92	28.92	28.92	28.92	28.92
Inlet Air Flow	lb/hr	985,392	985,392	693,792	605,245	1,031,004	1,031,004	802,222	662,887	615,576	1,073,308	1,073,308	836,974	676,402	636,109

Note: This sheet is based on the original plant emission calculation spreadsheet REP Emissions Rev 2 in progress spreadsheet.

Case		Case 1a	Case 1b	Case 2a	Case 3a	Case 13a	Case 13b	Case 14a	Case 15a	Case 16a	Case 29a	Case 29b	Case 30a	Case 31a	Case 32a
Total Water Injection (each turbine)															
Water/Fuel Ratio		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Injection Flow	lb/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbine Exhaust (each turbine)															
Excess Combustion Air	%	198.2%	198.2%	210.0%	234.2%	196.7%	196.7%	191.2%	205.3%	218.1%	195.3%	195.3%	186.4%	195.4%	213.4%
N_2	lb/hr	735,747	735,747	522,109	455,455	772,777	772,777	602,528	497,862	462,319	808,459	808,459	630,455	509,493	479,127
O_2	lb/hr	150,150	150,150	108,593	98,007	157,295	157,295	121,475	102,792	97,334	164,168	164,168	125,976	103,473	100,180
CO_2	lb/hr	53,451	53,451	36,505	29,555	56,429	56,429	44,812	35,339	31,502	59,307	59,307	47,678	37,365	33,131
H_2O	lb/hr	53,303	53,303	31,201	25,396	52,234	52,234	39,741	31,494	28,199	49,565	49,565	39,789	31,228	27,769
Ar	lb/hr	12,630	12,630	8,963	7,819	13,266	13,266	10,343	8,547	7,937	13,878	13,878	10,822	8,746	8,225
Total Exhaust Flow	lb/hr	1,005,281	1,005,281	707,370	616,231	1,052,001	1,052,001	818,899	676,033	627,291	1,095,377	1,095,377	854,720	690,306	648,432
Heat Balance Exhaust Flow Per Turbine	lb/hr	1,005,281	1,005,281	707,370	616,231	1,052,001	1,052,001	818,899	676,033	627,291	1,095,377	1,095,377	854,720	690,306	648,432
N_2	mass %	73.19%	73.19%	73.81%	73.91%	73.46%	73.46%	73.58%	73.64%	73.70%	73.81%	73.81%	73.76%	73.81%	73.89%
O_2	mass %	14.94%	14.94%	15.35%	15.90%	14.95%	14.95%	14.83%	15.21%	15.52%	14.99%	14.99%	14.74%	14.99%	15.45%
CO_2	mass %	5.32%	5.32%	5.16%	4.80%	5.36%	5.36%	5.47%	5.23%	5.02%	5.41%	5.41%	5.58%	5.41%	5.11%
H_2O	mass %	5.30%	5.30%	4.41%	4.12%	4.97%	4.97%	4.85%	4.66%	4.50%	4.52%	4.52%	4.66%	4.52%	4.28%
Ar	mass %	1.26%	1.26%	1.27%	1.27%	1.26%	1.26%	1.26%	1.26%	1.27%	1.27%	1.27%	1.27%	1.27%	1.27%
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
N_2	moles/hr	26,264	26,264	18,638	16,258	27,586	27,586	21,509	17,772	16,503	28,860	28,860	22,505	18,187	17,103
O_2	moles/hr	4,692	4,692	3,394	3,063	4,916	4,916	3,796	3,212	3,042	5,130	5,130	3,937	3,234	3,131
CO_2	moles/hr	1,218	1,218	832	673	1,286	1,286	1,021	805	718	1,351	1,351	1,086	851	755
H_2O	moles/hr	2,959	2,959	1,732	1,410	2,899	2,899	2,206	1,748	1,565	2,751	2,751	2,209	1,733	1,541
Ar	moles/hr	316	316	224	196	332	332	259	214	199	347	347	271	219	206
Total	moles/hr	35,449	35,449	24,820	21,600	37,019	37,019	28,791	23,752	22,027	38,440	38,440	30,008	24,225	22,736
N_2	mole %	74.09%	74.09%	75.09%	75.27%	74.52%	74.52%	74.71%	74.82%	74.92%	75.08%	75.08%	75.00%	75.08%	75.23%
O_2	mole %	13.24%	13.24%	13.67%	14.18%	13.28%	13.28%	13.19%	13.52%	13.81%	13.35%	13.35%	13.12%	13.35%	13.77%
CO_2	mole %	3.44%	3.44%	3.35%	3.12%	3.47%	3.47%	3.55%	3.39%	3.26%	3.52%	3.52%	3.62%	3.51%	3.32%
H_2O	mole %	8.35%	8.35%	6.98%	6.53%	7.83%	7.83%	7.66%	7.36%	7.11%	7.16%	7.16%	7.36%	7.16%	6.78%
Ar	mole %	0.89%	0.89%	0.90%	0.91%	0.90%	0.90%	0.90%	0.90%	0.90%	0.90%	0.90%	0.90%	0.90%	0.91%
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Molecular Weight		28.36	28.36	28.50	28.53	28.42	28.42	28.45	28.47	28.48	28.50	28.50	28.49	28.50	28.52

Note: This sheet is based on the original plant emission calculation spreadsheet REP Emissions Rev 2 in progress spreadsheet.

Case		Case 1a	Case 1b	Case 2a	Case 3a	Case 13a	Case 13b	Case 14a	Case 15a	Case 16a	Case 29a	Case 29b	Case 30a	Case 31a	Case 32a
Combustion Turbine Emissions (each turbine) - Expected															
NO_x, @ 15% O_2	ppmvd	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	20.00	15.00	15.00	15.00	15.00	20.00
CO, @15% O_2	ppmvd	4.00	4.00	4.00	6.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
VOC, @15% O_2	ppmvd	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
NO_x, as NO_2	lb/hr	24.5	24.5	16.7	13.5	25.9	25.9	20.6	16.2	19.3	27.2	27.2	21.9	17.2	20.3
CO	lb/hr	4.0	4.0	2.7	3.3	4.2	4.2	3.3	2.6	2.3	4.4	4.4	3.6	2.8	2.5
VOC, as CH_4	lb/hr	1.1	1.1	0.8	0.7	1.2	1.2	0.9	0.8	0.7	1.2	1.2	1.0	0.8	0.7
PM_{10}	lb/hr	3.0	3.0	2.1	1.7	3.2	3.2	2.5	2.0	1.8	3.4	3.4	2.7	2.1	1.9
Portion of PM_{10} from Sulfur Particulates	lb/hr	0.07	0.07	0.05	0.04	0.07	0.07	0.06	0.04	0.04	0.07	0.07	0.06	0.05	0.04
Portion of PM_{10} from Soot/Ash	lb/hr	3.0	3.0	2.0	1.6	3.1	3.1	2.5	2.0	1.8	3.3	3.3	2.7	2.1	1.8
SO_2	lb/hr	0.6	0.6	0.4	0.4	0.7	0.7	0.5	0.4	0.4	0.7	0.7	0.6	0.4	0.4
Duct Burner Emissions (each HRSG)															
NO_x, as NO_2	lb/hr	18.0	0.0	0.0	0.0	18.0	0.0	0.0	0.0	0.0	18.0	0.0	0.0	0.0	0.0
CO	lb/hr	22.5	0.0	0.0	0.0	22.5	0.0	0.0	0.0	0.0	22.5	0.0	0.0	0.0	0.0
VOC, as CH_4	lb/hr	4.5	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0
PM_{10}	lb/hr	3.4	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0
Portion of PM_{10} from Sulfur Particulates	lb/hr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Portion of PM_{10} from Soot/Ash	lb/hr	3.3	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0
SO_2	lb/hr	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Total Emissions Upstream of Catalyst (each HRSG)															
NO_x, as NO_2	lb/hr	42.5	24.5	16.7	13.5	43.9	25.9	20.6	16.2	19.3	45.2	27.2	21.9	17.2	20.3
CO	lb/hr	26.5	4.0	2.7	3.3	26.7	4.2	3.3	2.6	2.3	26.9	4.4	3.6	2.8	2.5
VOC, as CH_4	lb/hr	5.6	1.1	0.8	0.7	5.7	1.2	0.9	0.8	0.7	5.7	1.2	1.0	0.8	0.7
PM_{10}	lb/hr	6.4	3.0	2.1	1.7	6.6	3.2	2.5	2.0	1.8	6.7	3.4	2.7	2.1	1.9
Portion of PM_{10} from Sulfur Particulates	lb/hr	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0
Portion of PM_{10} from Soot/Ash	lb/hr	6.3	3.0	2.0	1.6	6.5	3.1	2.5	2.0	1.8	6.6	3.3	2.7	2.1	1.8
SO_2 Converted to PM_{10} within CTG and HRSG	lb/hr	0.05	0.03	0.02	0.02	0.05	0.03	0.03	0.02	0.02	0.05	0.04	0.03	0.02	0.02
SO_2	lb/hr	0.9	0.6	0.4	0.4	1.0	0.7	0.5	0.4	0.4	1.0	0.7	0.6	0.4	0.4
CO Catalyst Performance (each HRSG)															
Required CO Reduction	lb/hr	20.5	0.0	0.0	1.1	20.5	0.0	0.0	0.0	0.0	20.5	0.0	0.0	0.0	0.0
Required CO Reduction (mass basis)	%	77%	0%	0%	33%	77%	0%	0%	0%	0%	76%	0%	0%	0%	0%
Actual CO Reduction (mass basis)	%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Required VOC Reduction	lb/hr	3.9	0.6	0.4	0.3	3.9	0.6	0.5	0.4	0.4	3.9	0.6	0.5	0.4	0.4
Required VOC Reduction (mass basis)	%	70%	50%	50%	50%	69%	50%	50%	50%	50%	68%	50%	50%	50%	50%
Actual VOC Reduction (mass basis)	%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
PM_{10} Increase from Sulfur Particulates	lb/hr	1.5	1.0	0.7	0.6	1.6	1.1	0.8	0.7	0.6	1.6	1.1	0.9	0.7	0.6
SO_2 Converted to PM_{10} within CO Catalyst	lb/hr	0.72	0.48	0.33	0.27	0.75	0.51	0.40	0.32	0.28	0.77	0.54	0.43	0.34	0.30
NO_x Catalyst Performance (each HRSG, Annual Average)															
Required NO_x Reduction, as NO_2	lb/hr	37.6	21.3	14.5	11.7	38.8	22.5	17.8	14.1	17.3	40.0	23.6	19.0	14.9	18.2
Required NO_x Reduction (mass basis)	%	88%	87%	87%	87%	88%	87%	87%	87%	90%	88%	87%	87%	87%	90%
Actual NO_x Reduction (mass basis)	%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
PM_{10} Increase from Sulfur Particulates	lb/hr	0.04	0.03	0.02	0.01	0.04	0.03	0.02	0.02	0.01	0.04	0.03	0.02	0.02	0.02
NH_3 Slip	lb/hr	9.1	6.1	4.1	3.3	9.4	6.4	5.1	4.0	3.6	9.8	6.7	5.4	4.2	3.7
NH_3 Reacted	lb/hr	14.6	8.3	5.6	4.6	15.1	8.7	6.9	5.5	6.7	15.5	9.2	7.4	5.8	7.1
Total NH_3 Added	lb/hr	23.7	14.3	9.8	7.9	24.5	15.1	12.0	9.5	10.3	25.3	15.9	12.8	10.0	10.8
HRSG Stack Exhaust Analysis (each HRSG)															
N_2	lb/hr	735,967	735,747	522,109	455,455	772,997	772,777	602,528	497,862	462,319	808,679	808,459	630,455	509,493	479,127
O_2	lb/hr	112,550	150,150	108,593	98,007	119,696	157,295	121,475	102,792	97,334	126,569	164,168	125,976	103,473	100,180
CO_2	lb/hr	79,833	53,451	36,505	29,555	82,810	56,429	44,812	35,339	31,502	85,688	59,307	47,678	37,365	33,131
H_2O	lb/hr	74,245	53,303	31,201	25,396	73,176	52,234	39,741	31,494	28,199	70,507	49,565	39,789	31,228	27,769
Ar	lb/hr	12,630	12,630	8,963	7,819	13,266	13,266	10,343	8,547	7,937	13,878	13,878	10,822	8,746	8,225

Note: This sheet is based on the original plant emission calculation spreadsheet REP Emissions Rev 2 in progress spreadsheet.

Case		Case 1a	Case 1b	Case 2a	Case 3a	Case 13a	Case 13b	Case 14a	Case 15a	Case 16a	Case 29a	Case 29b	Case 30a	Case 31a	Case 32a
Total	lb/hr	1,015,225	1,005,281	707,370	616,231	1,061,945	1,052,001	818,899	676,033	627,291	1,105,321	1,095,377	854,720	690,306	648,432
N_2	mass %	72.5%	73.2%	73.8%	73.9%	72.8%	73.5%	73.6%	73.6%	73.7%	73.2%	73.8%	73.8%	73.8%	73.9%
O_2	mass %	11.1%	14.9%	15.4%	15.9%	11.3%	15.0%	14.8%	15.2%	15.5%	11.5%	15.0%	14.7%	15.0%	15.4%
CO_2	mass %	7.9%	5.3%	5.2%	4.8%	7.8%	5.4%	5.5%	5.2%	5.0%	7.8%	5.4%	5.6%	5.4%	5.1%
H_2O	mass %	7.3%	5.3%	4.4%	4.1%	6.9%	5.0%	4.9%	4.7%	4.5%	6.4%	4.5%	4.7%	4.5%	4.3%
Ar	mass %	1.2%	1.3%	1.3%	1.3%	1.2%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
Total	mass %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
N_2	moles/hr	26,268	26,260	18,635	16,256	27,590	27,582	21,505	17,770	16,501	28,863	28,855	22,502	18,185	17,101
O_2	moles/hr	3,517	4,692	3,393	3,062	3,740	4,915	3,796	3,212	3,041	3,955	5,130	3,936	3,233	3,130
CO_2	moles/hr	1,817	1,218	832	673	1,885	1,286	1,021	805	718	1,951	1,351	1,086	851	755
H_2O	moles/hr	4,121	2,958	1,732	1,409	4,061	2,899	2,206	1,748	1,565	3,913	2,751	2,208	1,733	1,541
Ar	moles/hr	316	316	224	196	332	332	259	214	199	347	347	271	219	206
Total	moles/hr	36,039	35,444	24,816	21,597	37,608	37,013	28,786	23,748	22,024	39,029	38,434	30,004	24,221	22,733
N_2	mole%	72.9%	74.1%	75.1%	75.3%	73.4%	74.5%	74.7%	74.8%	74.9%	74.0%	75.1%	75.0%	75.1%	75.2%
O_2	mole%	9.8%	13.2%	13.7%	14.2%	9.9%	13.3%	13.2%	13.5%	13.8%	10.1%	13.3%	13.1%	13.3%	13.8%
CO_2	mole%	5.0%	3.4%	3.4%	3.1%	5.0%	3.5%	3.5%	3.4%	3.3%	5.0%	3.5%	3.6%	3.5%	3.3%
H_2O	mole%	11.4%	8.3%	7.0%	6.5%	10.8%	7.8%	7.7%	7.4%	7.1%	10.0%	7.2%	7.4%	7.2%	6.8%
Ar	mole%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
Total	mole%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Molecular Weight		28.17	28.36	28.50	28.53	28.24	28.42	28.45	28.47	28.48	28.32	28.50	28.49	28.50	28.52
Stack Temperature	deg. F	179	193	172	166	172	190	173	162	159	164	184	167	153	151
Stack Velocity	ft/sec	49.2	49.5	33.5	28.9	50.8	51.4	39.0	31.6	29.1	52.1	52.9	40.2	31.8	29.7
Calculated HRSG Stack Emissions (each HRSG)															
NO_x, @ 15% O_2, Annual Ave. (Using Required % Redu	ppmvd	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NO_x, @ 15% O_2, Maximum (Using Required % Reduct	ppmvd	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NO_x, @ 15% O_2, (Using Actual % Reduction)	ppmvd	1.7	1.5	1.5	1.5	1.7	1.5	1.5	1.5	2.0	1.7	1.5	1.5	1.5	2.0
CO, @ 15% O_2 (Using Required % Reduction)	ppmvd	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
CO, @ 15% O_2 (Using Actual % Reduction)	ppmvd	3.5	0.8	0.8	1.2	3.4	0.8	0.8	0.8	0.8	3.4	0.8	0.8	0.8	0.8
VOC, as CH_4 @ 15% O_2 (Using Required % Reductior	ppmvd	2.0	1.0	1.0	1.1	2.0	1.0	1.0	1.0	1.1	2.0	1.0	0.9	1.0	1.0
VOC, as CH_4 @ 15% O_2 (Using Actual % Reduction)	ppmvd	1.3	0.4	0.4	0.4	1.3	0.4	0.4	0.4	0.4	1.2	0.4	0.4	0.4	0.4
NH_3 slip, @ 15% O_2	ppmvd	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
NOx, as NO_2, Annual Ave. (Using Required % Reducti	lb/hr	4.9	3.3	2.2	1.8	5.1	3.5	2.7	2.2	1.9	5.3	3.6	2.9	2.3	2.0
NOx, as NO_2, Maximum (Using Required % Reduction	lb/hr	4.9	3.3	2.2	1.8	5.1	3.5	2.7	2.2	1.9	5.3	3.6	2.9	2.3	2.0
NOx, as NO_2, (Using Actual % Reduction)	lb/hr	4.3	2.5	1.7	1.4	4.4	2.6	2.1	1.6	1.9	4.5	2.7	2.2	1.7	2.0
CO (Using Required % Reduction)	lb/hr	6.0	4.0	2.7	2.2	6.2	4.2	3.3	2.6	2.3	6.4	4.4	3.6	2.8	2.5
CO (Using Actual % Reduction)	lb/hr	5.3	0.8	0.5	0.7	5.3	0.8	0.7	0.5	0.5	5.4	0.9	0.7	0.6	0.5

Note: This sheet is based on the original plant emission calculation spreadsheet REP Emissions Rev 2 in progress spreadsheet.

Case		Case 1a	Case 1b	Case 2a	Case 3a	Case 13a	Case 13b	Case 14a	Case 15a	Case 16a	Case 29a	Case 29b	Case 30a	Case 31a	Case 32a
VOC, as CH_4 (Using Required % Reduction)	lb/hr	1.7	0.6	0.4	0.3	1.8	0.6	0.5	0.4	0.4	1.8	0.6	0.5	0.4	0.4
VOC, as CH_4 (Using Actual % Reduction)	lb/hr	1.1	0.2	0.2	0.1	1.1	0.2	0.2	0.2	0.1	1.1	0.2	0.2	0.2	0.1
Total PM_{10} from Sulfur Particulates	lb/hr	1.6	1.1	0.7	0.6	1.7	1.1	0.9	0.7	0.6	1.7	1.2	1.0	0.7	0.7
Total PM_{10}	lb/hr	8.0	4.1	2.8	2.2	8.2	4.3	3.4	2.7	2.4	8.4	4.5	3.6	2.8	2.5
NH_3	lb/hr	9.1	6.1	4.1	3.3	9.4	6.4	5.1	4.0	3.6	9.8	6.7	5.4	4.2	3.7
SO_2	lb/hr	0.9	0.6	0.4	0.4	1.0	0.7	0.5	0.4	0.4	1.0	0.7	0.6	0.4	0.4
Permitted HRSG Stack Emissions (each HRSG)															
NO_x, @ 15% O_2, Annual Ave.	ppmvd	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NO_x, @ 15% O_2, Maximum	ppmvd	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
CO, @ 15% O_2	ppmvd	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
VOC, as CH_4 @ 15% O_2	ppmvd	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NH_3 Slip, @ 15% O_2	ppmvd	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
NO_x, as NO_2, Annual Ave.	lb/hr	4.25	2.45	1.67	1.35	4.39	2.59	2.06	1.62	1.93	4.52	2.72	2.19	1.72	2.03
NO_x, as NO_2, Maximum	lb/hr	4.25	2.45	1.67	1.35	4.39	2.59	2.06	1.62	1.93	4.52	2.72	2.19	1.72	2.03
CO	lb/hr	5.30	0.80	0.54	0.66	5.34	0.84	0.67	0.53	0.47	5.38	0.88	0.71	0.56	0.49
VOC, as CH_4	lb/hr	1.13	0.23	0.16	0.14	1.14	0.24	0.18	0.15	0.14	1.15	0.25	0.19	0.16	0.15
Total PM_{10}	lb/hr	4.54	3.04	2.07	1.68	4.71	3.21	2.55	2.01	1.79	4.88	3.37	2.71	2.12	1.88
NH_3	lb/hr	9.10	6.06	4.13	3.34	9.44	6.39	5.08	4.00	3.56	9.77	6.72	5.41	4.23	3.75
SO_2	lb/hr	0.95	0.63	0.43	0.35	0.99	0.67	0.53	0.42	0.37	1.02	0.70	0.57	0.44	0.39
HRSG Stack Emissions at Owner's Risk (each HRSG)															
NO_x, @ 15% O_2, Annual Ave.	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO_x, @ 15% O_2, Maximum	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO, @ 15% O_2	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC, as CH_4 @ 15% O_2	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NH_3 Slip, @ 15% O_2	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO_x, as NO_2, Annual Ave.	lb/hr	0.67	0.82	0.56	0.45	0.71	0.86	0.69	0.54	0.00	0.76	0.91	0.73	0.57	0.00
NO_x, as NO_2, Maximum	lb/hr	0.67	0.82	0.56	0.45	0.71	0.86	0.69	0.54	0.00	0.76	0.91	0.73	0.57	0.00
CO	lb/hr	0.69	3.19	2.17	1.54	0.87	3.37	2.67	2.11	1.88	1.04	3.54	2.85	2.23	1.97
VOC, as CH_4	lb/hr	0.59	0.34	0.24	0.21	0.64	0.36	0.28	0.23	0.21	0.69	0.37	0.29	0.23	0.22
PM_{10}	lb/hr	3.42	1.03	0.71	0.57	3.47	1.09	0.87	0.68	0.61	3.53	1.15	0.92	0.72	0.64
NH_3	lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO_2	lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Fuel Gas Composition (mole %)	Mole % x Molecular Weight	Fuel Gas Composition (mass %)	Molecular Weight	Density (lbs/scf)	Specific Gravity	Heat of Combustion Btu/lb Gross	Heat of Combustion Btu/lb Net	Lb/lb Fuel Required for Combustion N_2	O_2	CO_2	Ar	Dry Air	Lb/lb Fuel Exhaust Products N_2	CO_2	SO_2	H_2O	Ar
Methane	CH_4	94.186%	15.110	89.0335%	16.043	0.0422	0.5558	23,879	21,520	11.56	3.55	0.01	0.20	15.32	11.56	2.45	0.00	2.00	0.20
Ethane	C_2H_6	3.522%	1.059	6.2403%	30.070	0.0792	1.0418	22,320	20,432	0.76	0.23	0.00	0.01	1.00	0.76	0.18	0.00	0.11	0.01
Propane	C_3H_8	0.000%	0.000	0.0000%	44.097	0.1161	1.5277	21,661	19,944	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Butane	C_4H_{10}	0.058%	0.034	0.1986%	58.124	0.1530	2.0137	21,308	19,680	0.02	0.01	0.00	0.00	0.03	0.02	0.01	0.00	0.00	0.00
Isobutane	C_4H_{10}	0.000%	0.000	0.0000%	58.124	0.1530	2.0137	21,257	19,629	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Pentane	C_5H_{12}	0.000%	0.000	0.0000%	72.151	0.1900	2.4997	21,091	19,517	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Isopentane	C_5H_{12}	0.000%	0.000	0.0000%	72.151	0.1900	2.4997	21,052	19,478	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Neopentane	C_5H_{12}	0.000%	0.000	0.0000%	72.151	0.1900	2.4997	20,970	19,396	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Hexane	C_6H_{14}	0.011%	0.009	0.0559%	86.178	0.2269	2.9856	20,940	19,403	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Ethylene	C_2H_4	0.000%	0.000	0.0000%	28.054	0.0739	0.9719	21,644	20,295	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Propylene	C_3H_6	0.188%	0.079	0.4662%	42.081	0.1108	1.4579	21,041	19,691	0.05	0.02	0.00	0.00	0.07	0.05	0.01	0.00	0.01	0.00
n-Butene	C_4H_8	0.000%	0.000	0.0000%	56.108	0.1477	1.9439	20,840	19,496	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Isobutene	C_4H_8	0.000%	0.000	0.0000%	56.108	0.1477	1.9439	20,730	19,382	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Pentene	C_5H_{10}	0.000%	0.000	0.0000%	70.135	0.1847	2.4298	20,712	19,363	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene	C_6H_6	0.000%	0.000	0.0000%	78.115	0.2057	2.7063	18,210	17,480	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Toluene	C_7H_8	0.000%	0.000	0.0000%	92.142	0.2426	3.1922	18,440	17,620	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Xylene	C_8H_{10}	0.000%	0.000	0.0000%	106.169	0.2795	3.6782	18,650	17,760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acetylene	C_2H_2	0.000%	0.000	0.0000%	26.038	0.0686	0.9021	21,500	20,776	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Napthalene	$C_{10}H_8$	0.000%	0.000	0.0000%	128.175	0.3375	4.4406	17,298	16,708	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methly alcohol	CH_3OH	0.000%	0.000	0.0000%	32.042	0.0844	1.1101	10,259	9,078	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethyl alcohol	C_2H_5OH	0.000%	0.000	0.0000%	46.070	0.1213	1.5961	13,161	11,929	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ammonia	NH_3	0.000%	0.000	0.0000%	17.031	0.0448	0.5900	9,668	8,001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrogen	H_2	0.000%	0.000	0.0000%	2.016	0.0053	0.0698	61,100	51,623	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitrogen	N_2	1.349%	0.378	2.2267%	28.013	0.0738	0.9712	0	0	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Carbon Dioxide	CO_2	0.686%	0.302	1.7789%	44.010	0.1159	1.5247	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.02	44.01	0.00	0.00
Total		100.0%		100.0%	16.971	0.0447	0.5884	22,805	20,577	12.40	3.81	0.01	0.21	16.43	12.42	2.67	44.01	2.12	0.21
Sulfur Compounds										N_2	O_2	CO_2	Ar	Dry Air	N_2	CO_2	SO_2	H_2O	Ar
Sulfur	S	0.50 grains/100scf		0.00160%	32.060	N/A	N/A	3,983	3,983	5.2E-05	1.6E-05	3.1E-08	8.9E-07	6.9E-05	5.2E-05	3.1E-08	3.2E-05	0.0E+00	8.9E-07
Hydrogen Sulfide	H_2S	0 ppmv		0.000%	34.076	0.0897	1.1806	7,100	6,545	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total				0.00160%						5.2E-05	1.6E-05	3.1E-08	8.9E-07	6.9E-05	5.2E-05	3.1E-08	3.2E-05	0.0E+00	8.9E-07

Note: This sheet is based on the original plant emission calculation spreadsheet REP Emissions Rev 2 in progress spreadsheet.

Attachment 4
Turbine Upgrade Performance Data

SGT-800 PERFORMANCE ENHANCEMENT

Table of contents

1 GENERAL

1.1 Introduction

The purpose with this Product Information is to provide Siemens sales teams and customers with information about the SGT-800 Performance Enhancement and how it shall be implemented.

1.2 Background

As a planned step in the Siemens strategy for the SGT-800, a new rating was officially launched at the Power Gen conference in Madrid, June 2007. The new rating is 47 MW at 37,5 % efficiency. The combined cycle performance has also improved from 64 MW with an efficiency of 53% to 66 MW with an efficiency of 54% with dual-pressure heat recovery steam generator (HRSG).
For new sales only the 47 MW rating will be offered from now on.

1.3 Definition

A requirement for the development for the new rating was that it should be easy to implement on existing units as an enhancement . As a result the specific components in the gas turbine which are modified are fully interchangeable between the 45 MW and the 47 MW rating. This makes it possible to upgrade existing SGT-800 installations to the new rating. The absolute performance after such an upgrade depends on the status of the engine before.

2 Technical description

The SIT scope of the product is the provision and insertion of enhancement components instead of original components at an engine overhaul. It includes also an engineering study and performance enhancement evaluation.

2.1 Components

The enhancement kit for existing units consists of a new version of

- Compressor blade 1
- Turbine vane 1
- Turbine blade 1
- Turbine vane 2

and minor modifications of the turbine air cooling systems

- Swirl generator dimension
- Orifice dimension in extraction from compressor stage #10

The compressor efficiency has been improved due to increase of the mass flow. Compressor blade 1 has got a slightly opened profile but there is no change of material.

Several improvements have been done on turbine blade #1, new thermal barrier coating (TBC) and optimization of number and positioning of the cooling holes which results in reduced metal temperature
For vane 1 & 2 cooling air consumption has been optimized.
Otherwise there have not been any changes of casting, material or coating.

The enhancement parts are 100% compatible with the old version. It is therefore possible to install the enhancement at, e.g. a C-inspection, by ordering enhancement blading instead of the original design blading. At site the components are swapped as usual. That means the only "extra" hardware for installing the enhancement is the first stage compressor blading.

2.2 Performance

The enhancement, based on the exchanged parts, is the result of

- Increased air mass flow
- Optimised cooling air consumptions of the turbine section

The turbine inlet temperature (TIT) is not increased, thus there is no impact on emission or lifing of combustor or turbine components.

The expected performance increase is 2 MW and the following can in general be expected regarding efficiency and turbine data:

- + 0,4% efficiency (1,4 to 2,8% less fuel consumption/kWh)
- + 7°C exhaust temperature
- + 1,5 kg/s exhaust mass flow

A performance evaluation is done before and after the enhancement to determine the engine performance improvement.

2.3 Limitations

A maximum gas pressure of 30 bar(a) at the terminal point (upstream gas fuel unit 1) at maximum fuel flow is required. As the fuel flow increases due to the enhancement, the recommendation is to use 4" dimension for gas fuel filters (Gas fuel unit 1) and the pipes between the filter unit and the turbine enclosure.
If an existing 3" system will be used the possibility to increase gas pressure from either one gas compressor or reducing station have to be evaluated. The main gas valve has to be checked regarding sufficient opening angle for reduced pressure and increased fuel flow.

The resulting effect on the HRSG and related steam cycle components have to be checked in connection to the enhancement.

The maximum electric power to be transmitted in the gear box is limited to 53,5 MW, this means a flat rating below -17 deg C for a nominal output of 47 MWel at ISO conditions.

3 Installation & Commissioning

As the enhancement involves swapping compressor stage 1 blades it is done most convenient at a C-inspection, but it can also be done at a B-inspection.
If the enhancement will be performed at a B-inspection the downtime increase is 2 working days and additional 2x60 personal x hours.
The scope of work is according to chapter 2 regarding parts and related to the performance test the control system will be adjusted due to optimization of the cooling air to the turbine section.

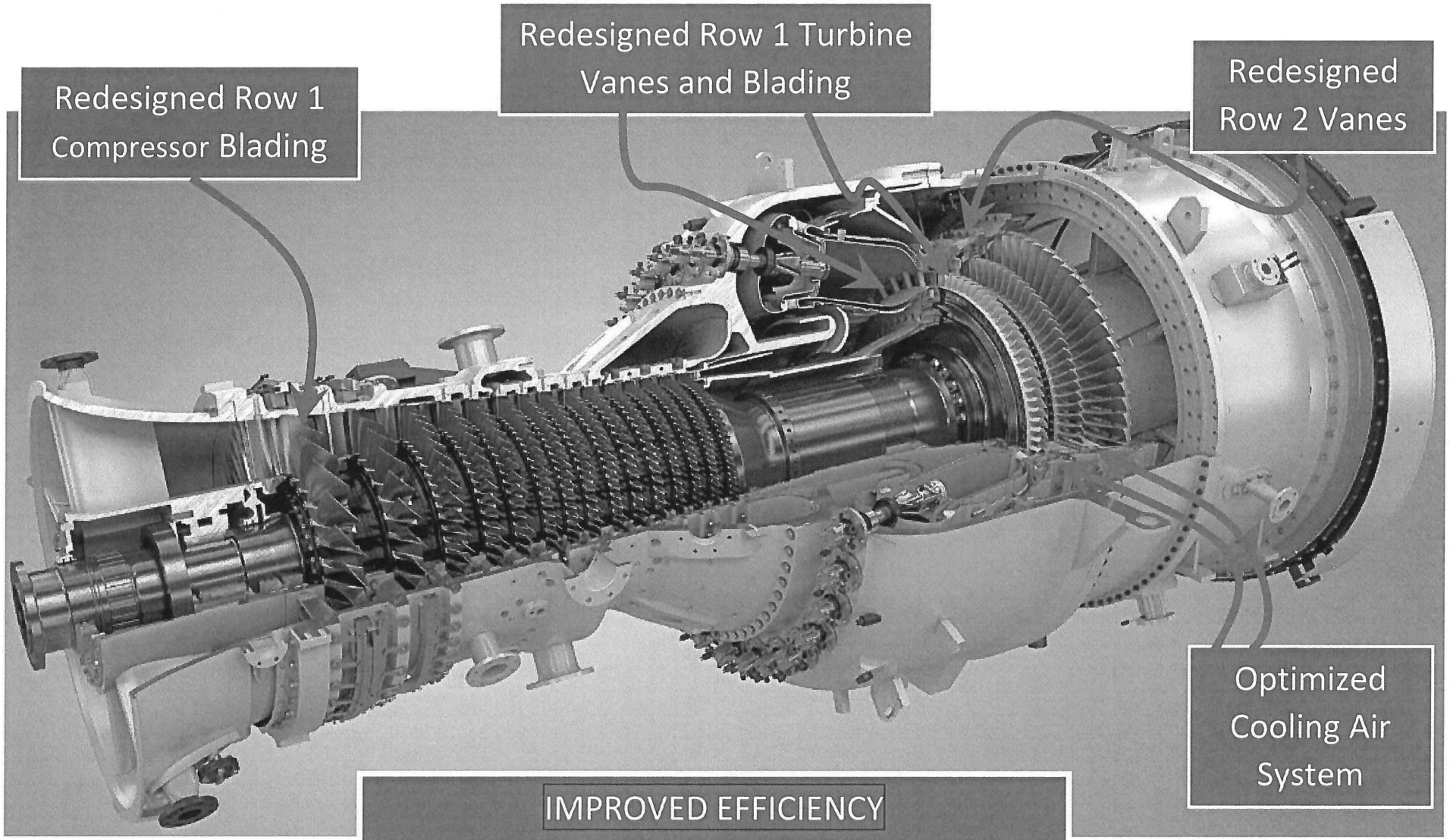
4 Benefits

The customer benefits are basically twofold:

- Increased income due to higher electricity output:
- Savings due to lower heat rate

The final benefit varies obviously with the gas and electricity prices and currency exchange rates at any given time. One should also bear in mind that the price for electricity is strongly varying during the day and seasons and that there may also be local pricing mechanisms. Therefore it will be different for each customer depending on her/his business case.

SIEMENS SGT-800 ~~~ A+ EFFICIENCY IMPROVEMENT



IMPROVED EFFICIENCY

- Compressor – improved pressure ratio
- Turbine - less cooling air needed
- **Overall 0.4% less fuel per MWh**

Rev B, 2016-04-27

Issued by: K.Södergren | Department: SBD | Telephone: +46 122 82350

To: Malburg Generating Station (City of Vernon)

Expected Emissions

The expected emissions and performance for Malburg Generating Station after upgrading of the two Gas Turbine Units with 2 MW at ISO conditions.

System	Expected Emissions after **upgrade without damped combustion chamber**	Remark
Gas Turbines	**Emissions** 70-100 % gas turbine load: NO_X : ≤ 25 ppmv at 15 % O_2 dry CO: ≤ 6 ppmv at 15 % O_2 dry VOC: ≤ 1.2 ppmv at 15 % O_2 dry PM10: ≤ 5 lb/hr for 2 units	

System	Expected Emissions after upgrade **with damped combustion chamber**	Remark
Gas Turbines	**Emissions** 70-100 % gas turbine load: NO_X : ≤ 15 ppmv at 15 % O_2 dry CO: ≤ 5 ppmv at 15 % O_2 dry VOC: ≤ 1.2 ppmv at 15 % O_2 dry PM10: ≤ 5 lb/hr for 2 units	

Attachment 5
Air Quality Impact Analysis Support Data

REP AERMOD Turbine Screening Results

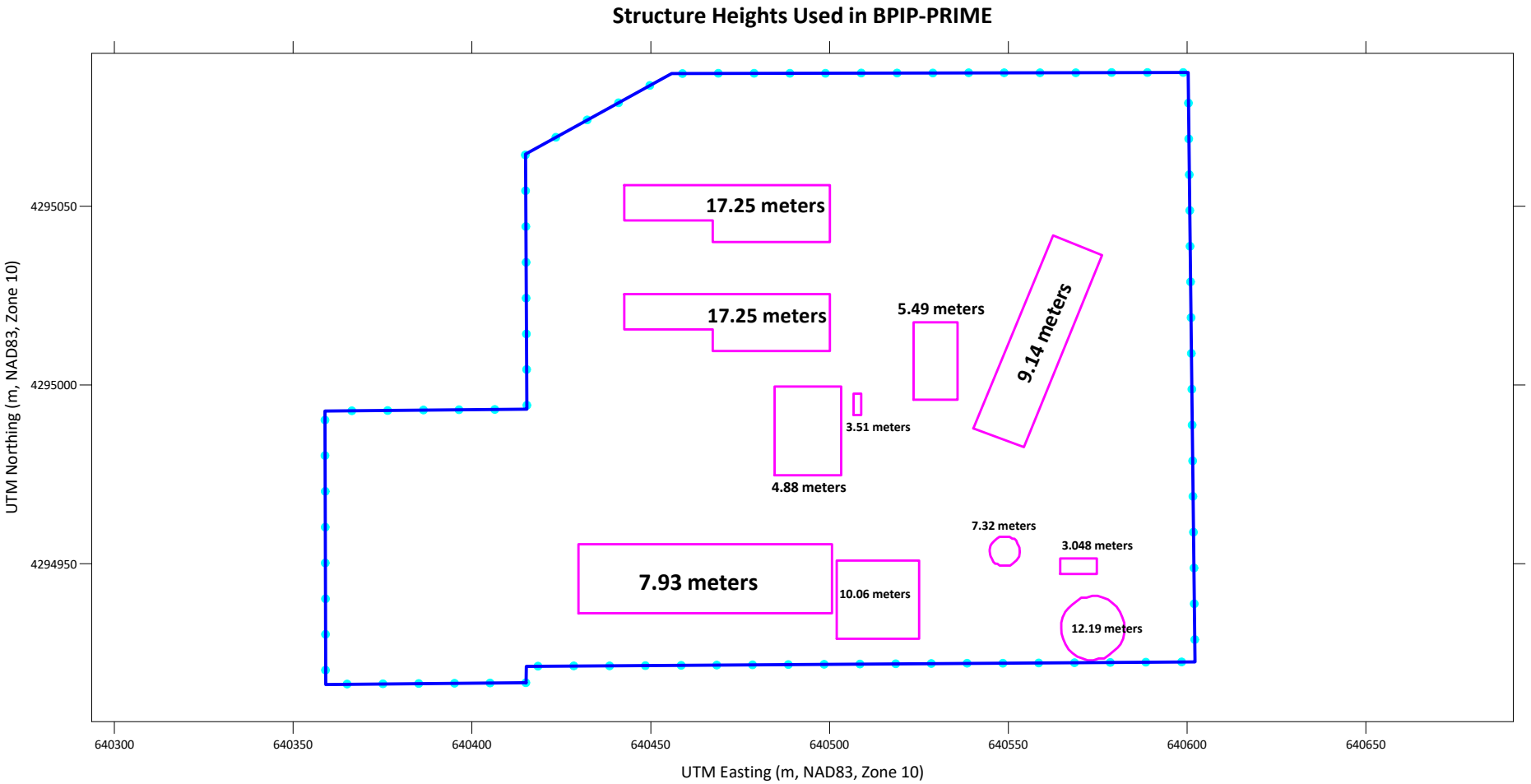
Stack Base Elevation = 28.80 m amsl = 94.49 ft-amsl

120' StkHt Ann.Avg

Emissions Case	1a	1b	2a	3a	13a	13b	14a	15a	16a	20a	29b	30a	31a	32a
Evap.Cooler	On	On	Off	Off	On	On	Off	Off	Off	Off	Off	Off	Off	Off
Duct Burner	On	Off	Off	Off	On	Off	Off	Off	Off	On	Off	Off	Off	Off
Load %	100%	100%	75%	50%	100%	100%	75%	50%	40%	100%	100%	75%	50%	40%
Number of Turbines	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Ambient Temp, °F	105.0	105.0	105.0	105.0	62.0	62.0	62.0	62.0	62.0	29.0	29.0	29.0	29.0	29.0
Stack Exit Temp (deg.F)	179.0	193.0	172.0	166.0	172.0	190.0	173.0	162.0	159.0	164.0	184.0	167.0	153.0	151.0
Volumetric Flowrate ACFM	280,195.82	282,191.52	191,130.73	164,730.51	289,033.91	293,082.32	222,092.54	180,182.91	166,213.03	296,218.42	301,863.39	229,334.06	181,095.22	169,406.14
Stack Velocity (ft/sec)	49.14	49.49	33.52	28.89	50.69	51.40	38.95	31.60	29.15	51.95	52.94	40.22	31.76	29.71
Stack Inside Diameter (ft)	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Stack Height (m)	36.58	36.58	36.58	36.58	36.58	36.58	36.58	36.58	36.58	36.58	36.58	36.58	36.58	36.58
Stack Exit Temp (deg.K)	354.82	362.59	350.93	347.59	350.93	360.93	351.48	345.37	343.71	346.48	357.59	348.15	340.37	339.26
Stack Exit Velocity (m/s)	14.978	15.085	10.217	8.806	15.450	15.667	11.872	9.632	8.885	15.834	16.136	12.259	9.680	9.056
Stack Inside Diameter (m)	3.3528	3.3528	3.3528	3.3528	3.3528	3.3528	3.3528	3.3528	3.3528	3.3528	3.3528	3.3528	3.3528	3.3528
Normal Operations - Short-term Screening Emissions (lb/hr/turbine) and Unitized Screening Impacts (for 1.0 g/s/turbine)														
NOx (lb/hr/turbine)	4.250	2.450	1.670	1.350	4.390	2.590	2.060	1.620	1.930	4.520	2.720	2.190	1.720	2.030
CO (lb/hr/turbine)	5.300	0.800	0.540	0.660	5.340	0.840	0.670	0.530	0.470	5.280	0.880	0.710	0.560	0.490
SO2 (lb/hr/turbine)	0.950	0.630	0.430	0.350	0.990	0.670	0.530	0.420	0.370	1.020	0.700	0.570	0.440	0.290
PM10 (lb/hr/turbine)	4.540	3.040	2.070	1.680	4.710	3.210	2.550	2.010	1.790	4.880	2.270	2.710	2.120	1.880
1-Hr Unitized Conc (ug/m3)	11.72556	11.5211	16.05392	17.96627	11.35632	11.05317	14.43822	17.02568	18.06559	11.1666	10.67623	14.1698	17.09467	18.04374
X(m)	640630	640630	640630	640650	640630	640630	640630	640630	640650	640630	640630	640630	640650	640650
Y(m)	4294760	4294760	4294780	4294800	4294760	4294760	4294760	4294780	4294800	4294760	4294760	4294760	4294780	4294780
Z(m)	28.4	28.4	28.38	28.38	28.4	28.4	28.4	28.38	28.38	28.4	28.4	28.4	28.38	28.38
YYMMDDHH	17121605	17121605	17121606	19102918	17121605	17121605	17121605	17121606	19102918	17121605	17121605	17121605	17121617	17121617
3-Hr Unitized Conc (ug/m3)	10.69826	10.44663	15.92695	17.74285	10.37767	9.97006	13.94609	16.82474	17.74557	10.19626	9.63787	13.60236	16.8148	17.61778
X(m)	640630	640630	640630	640630	640630	640630	640630	640630	640630	640630	640630	640630	640630	640630
Y(m)	4294780	4294780	4294780	4294780	4294760	4294760	4294780	4294780	4294780	4294760	4294760	4294780	4294780	4294780
Z(m)	28.38	28.38	28.38	28.38	28.4	28.4	28.38	28.38	28.38	28.4	28.4	28.38	28.38	28.38
YYMMDDHH	17121606	17121606	17121606	17121606	17121606	17121606	17121606	17121606	17121606	17121606	17121606	17121606	17121606	17121606
8-Hr Unitized Conc (ug/m3)	8.34302	8.15022	13.56277	15.62606	8.10432	7.80115	11.46583	14.61233	15.74036	8.05906	7.60248	11.13397	14.6998	15.59998
X(m)	640650	640650	640650	640650	640650	640650	640650	640650	640650	640650	640650	640650	640650	640650
Y(m)	4294760	4294760	4294780	4294800	4294760	4294760	4294780	4294780	4294780	4294660	4294760	4294780	4294780	4294780
Z(m)	28.42	28.42	28.38	28.38	28.42	28.42	28.38	28.38	28.38	30.21	28.42	28.38	28.38	28.38
YYMMDDHH	19102708	19102708	16013124	16013124	19102708	19102708	16013124	16013124	16013124	18123116	19102708	16013124	16013124	16013124
24-Hr Unitized Conc (ug/m3)	6.07874	5.83276	10.03498	11.68795	5.88837	5.52783	8.46518	10.8692	11.77999	5.78767	5.33869	8.24093	11.00191	11.72693
X(m)	640630	640630	640630	640630	640630	640630	640630	640630	640630	640630	640630	640630	640630	640630
Y(m)	4294780	4294780	4294780	4294780	4294780	4294780	4294780	4294780	4294780	4294780	4294780	4294780	4294780	4294780
Z(m)	28.38	28.38	28.38	28.38	28.38	28.38	28.38	28.38	28.38	28.38	28.38	28.38	28.38	28.38
YYMMDDHH	17121624	17121624	17121624	17121624	17121624	17121624	17121624	17121624	17121624	17121624	17121624	17121624	17121624	17121624
Ann** Unitized Conc (ug/m3)	0.40209	0.37293	0.66194	0.81846	0.40431	0.36443	0.54827	0.75852	0.85108	0.41286	0.36451	0.54719	0.80382	0.8821
X(m)	640500	640500	640470	640450	640500	640500	640470	640470	640450	640500	640500	640470	640470	640450
Y(m)	4295450	4295550	4295400	4295400	4295450	4295550	4295400	4295400	4295400	4295450	4295550	4295400	4295400	4295400
Z(m)	23.55	23.39	25.76	25.63	23.55	23.39	25.76	25.76	25.63	23.55	23.39	25.76	25.76	25.63
Normal Operations - Short-term Pollutant Emissions (g/s/turbine) and Pollutant Screening Impacts														
NOx (g/s/turbine)	**0.5355**	**0.3087**	**0.2104**	**0.1701**	**0.5531**	**0.3263**	**0.2596**	**0.2041**	**0.2432**	**0.5695**	**0.3427**	**0.2759**	**0.2167**	**0.2558**
CO (g/s/turbine)	**0.6678**	**0.1008**	**0.0680**	**0.0832**	**0.6728**	**0.1058**	**0.0844**	**0.0668**	**0.0592**	**0.6653**	**0.1109**	**0.0895**	**0.0706**	**0.0617**
SO2 (g/s/turbine)	**0.1197**	**0.0794**	**0.0542**	**0.0441**	**0.1247**	**0.0844**	**0.0668**	**0.0529**	**0.0466**	**0.1285**	**0.0882**	**0.0718**	**0.0554**	**0.0365**
PM10 (g/s/turbine)	**0.5720**	**0.3830**	**0.2608**	**0.2117**	**0.5935**	**0.4045**	**0.3213**	**0.2533**	**0.2255**	**0.6149**	**0.2860**	**0.3415**	**0.2671**	**0.2369**
1-Hour NOx*** (ug/m3)	**6.279**	3.557	3.378	3.056	6.281	3.607	3.748	3.475	4.394	6.359	3.659	3.909	3.704	4.616
Annual NOx*** (ug/m3)	0.215	0.115	0.139	0.139	0.224	0.119	0.142	0.155	0.207	0.235	0.125	0.151	0.174	0.226
1-Hour CO (ug/m3)	**7.830**	1.161	1.092	1.495	7.641	1.169	1.219	1.137	1.069	7.429	1.184	1.268	1.207	1.113
8-Hour CO (ug/m3)	5.571	0.822	0.922	1.300	5.453	0.825	0.968	0.976	0.932	5.362	0.843	0.996	1.038	0.963
1-Hour SO2 (ug/m3)	1.404	0.915	0.870	0.792	1.416	0.933	0.964	0.901	0.842	1.435	0.942	1.017	0.947	0.659
3-Hour SO2 (ug/m3)	1.281	0.829	0.863	0.782	1.294	0.841	0.932	0.890	0.827	1.310	0.850	0.977	0.932	0.643
24-Hour SO2 (ug/m3)	0.728	0.463	0.544	0.515	0.734	0.467	0.565	0.575	0.549	0.744	0.471	0.592	0.610	0.428
Annual SO2 (ug/m3)	0.048	0.030	0.036	0.036	0.050	0.031	0.037	0.040	0.040	0.053	0.032	0.039	0.045	0.032
24-Hour PM10 (ug/m3)	3.477	2.234	2.617	2.474	3.495	2.236	2.720	2.753	2.656	3.559	1.527	2.814	2.939	2.778
Annual PM10 (ug/m3)	0.230	0.143	0.173	0.173	0.240	0.147	0.176	0.192	0.192	0.254	0.104	0.187	0.215	0.209

Worst-Case Operating Scenarios are **bolded/highlighted**. Worst-Case 50% load condition is also **bolded/highlighted** - used for startup analyses.

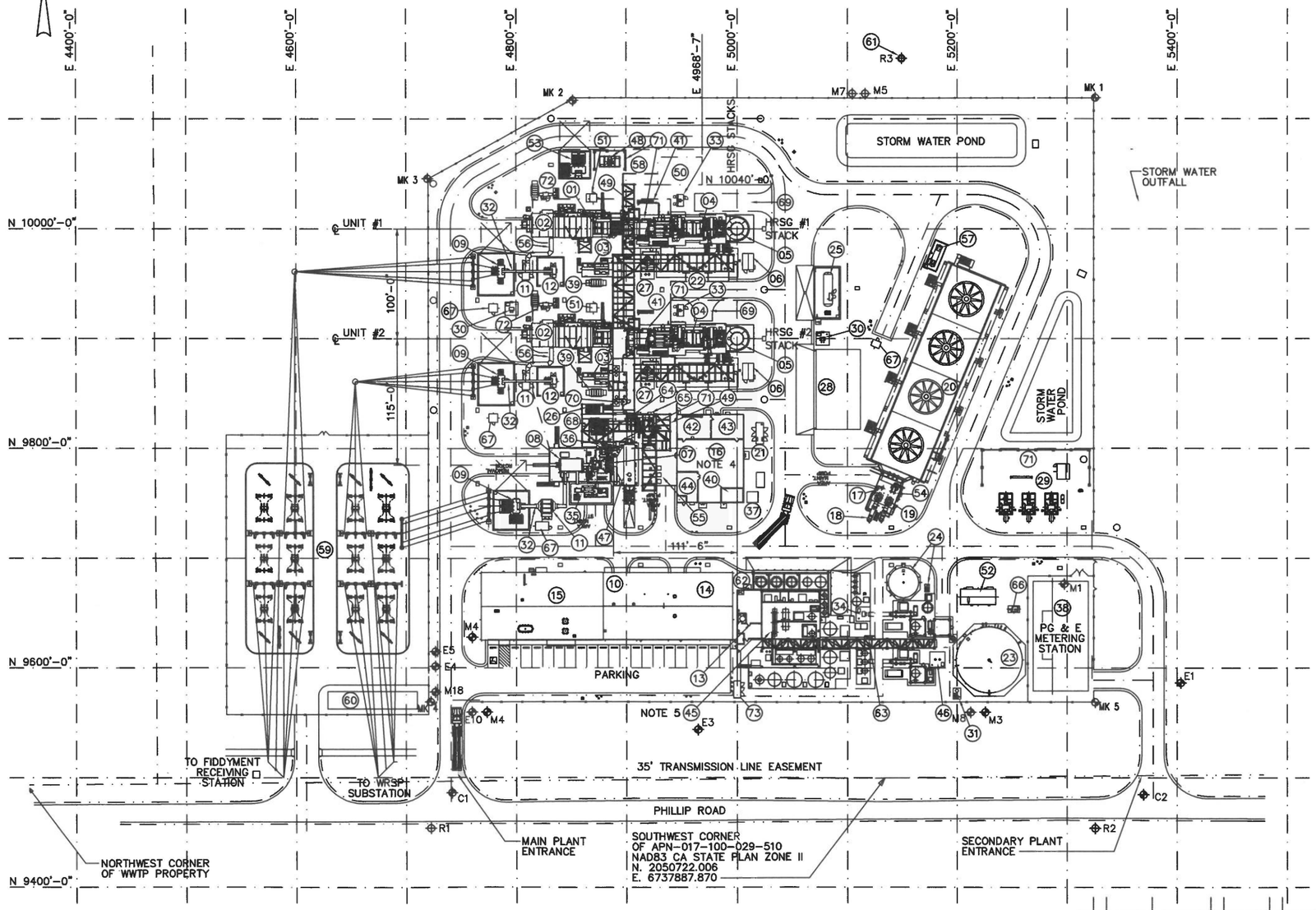
**Annual unitized/pollutant concentrations are the 3-year average of annual impacts, appropriate for PM2.5 NAAQS. Annual NO2/PM10 impacts (for NAAQS) and PSD increments would be slightly higher.


Structure Heights Used in BPIP-PRIME
17.25 meters
17.25 meters
5.49 meters
9.14 meters
3.51 meters
4.88 meters
7.32 meters
3.048 meters
7.93 meters
10.06 meters
12.19 meters
4295050
4295000
4294950
UTM Northing (m, NAD83, Zone 10)
640300
640350
640400
640450
640500
640550
640600
640650
UTM Easting (m, NAD83, Zone 10)

PLANT NORTH

NOTES

1. THIS DRAWING IS BASED ON SIEMENS SUPPLIED CTG, HRSG, STG AND CONDENSER FOOTPRINTS.
2. TERMINAL POINT LOCATIONS: REFER TO SCOPE BOOK SECTION 9.
3. STACK & COOLING TOWER LOCATIONS MAY NOT BE CHANGED FROM THOSE INDICATED IN DRAWING.
4. FOR EQUIPMENT ARRANGEMENT INSIDE PLANT ELECTRICAL/MECHANICAL BUILDING SEE DWG ROSE-1-DW-111-012-014.
5. FOR EQUIPMENT LEGEND AND ARRANGEMENT INSIDE ZERO LIQUID DISCHARGE SYSTEM AREA SEE AQUATECH DWG P-30016-DW-MD-001G-C.
6. TOP OF HRSG FOUNDATION IS 100'-0" WHICH EQUATES TO 96'-0" ACTUAL ELEVATION. THE CENTERLINE OF THE HRSG #1 STACK IS E 5000'-0" AND N 10000'-0" WHICH EQUATES TO E.6737753.765' AND N.2051222.085'.



50 0 50 100 150 200 250 300 350

GRAPHIC SCALE IN FEET

LEGEND

1. COMBUSTION TURBINE (CT)
2. CT GENERATOR
3. CT ELECTRICAL/CONTROL PACKAGE
4. HEAT RECOVERY STEAM GENERATOR (HRSG)
5. HRSG STACK
6. CONTINUOUS EMISSIONS MONITORS (CEMS)
7. STEAM TURBINE
8. ST GENERATOR
9. GENERATOR STEPUP TRANSFORMER (GSU)
10. COMMON SERVICES BUILDING
11. GENERATOR CIRCUIT BREAKER
12. UNIT AUXILIARY TRANSFORMER
13. ELECTRICAL ROOM/LAB/OFFICE (ZLD)
14. WAREHOUSE/MAINTENANCE AREA
15. ADMIN/CONTROL ROOM AREA
16. PLANT ELECTRICAL/MECHANICAL BUILDING
17. AUX COOLING WATER PUMP
18. CIRCULATING WATER PIPING
19. CIRCULATING WATER PUMPS
20. COOLING TOWER
21. STANDBY DIESEL GENERATOR
22. BOILER FEED PUMPS
23. RECYCLED WATER TANK
24. DEMINERALIZED WATER STORAGE TANK & PUMP SKID
25. AMMONIA STORAGE & UNLOADING AREA
26. STAIR TOWER
27. BLOWDOWN TANK & SUMP
28. COOLING TOWER CHEMICAL PAVILION
29. FUEL GAS COMPRESSOR AREA
30. WASTE COLLECTION SUMP & PUMPS
31. POTABLE WATER BOOSTER PUMP SKID
32. NON-SEGREGATED BUS DUCT
33. AMMONIA INJECTION SKID
34. ZLD WASTE WATER SUMP & PUMPS
35. ST LUBE OIL AND EHC EQUIPMENT
36. ST GLAND STEAM CONDENSER & SKID
37. 12KV – 480V TRANSFORMER
38. GAS METERING YARD
39. CT STARTING TRANSFORMER
40. BATTERY ROOM
41. DUCT BURNER SKID
42. CYCLE CHEMICAL FEED AREA
43. SAMPLE PANEL & LAB
44. ELECTRONICS ROOM
45. ZERO LIQUID DISCHARGE SYSTEM AREA
46. CRYSTALLIZER SUMP & PUMPS
47. CONDENSER
48. AIR COMPRESSOR PACKAGE
49. PIPE RACK
50. AUXILIARY BOILER (FUTURE)
51. FUEL GAS FINAL COALESCING FILTER SEPARATOR SKID
52. FIRE PUMP SKID ENCLOSURE
53. SPARE GSU
54. COOLING TOWER BLOWDOWN PUMPS
55. CONDENSATE PUMPS
56. CABLE TRENCH
57. OIL-WATER SEPARATOR
58. FUTURE PIPE RACK
59. ELECTRICAL SWITCHYARD
60. SWITCHYARD CONTROL BUILDING
61. POTABLE WATER WELL
62. DUCTBANK TO ELECTRICAL INTERFACE POINT (ZLD)
63. PIPING INTERFACE POINT (ZLD)
64. CLOSED CYCLE COOLING WATER PUMPS
65. CLOSED CYCLE COOLING WATER HEAT EXCHANGERS
66. RECYCLED WATER PUMP SKID
67. FIRE PROTECTION DELUGE VALVE HOUSE
68. CONDENSER AIR REMOVAL SKID
69. CATALYST REMOVAL AREA
70. STEAM DRAIN TANK
71. SOUND ABSORPTIVE PANEL SYSTEM (FUTURE)
72. CT INLET AIR HEATER, PUMP SKID AND TRANSFORMER
73. OIL & CHEMICAL STORAGE ENCLOSURE

◈ TERMINAL POINT (SEE NOTE 2)

PRELIMINARY STATUS	DATE	REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
LDE L.E. HARVEY	06/29/05	
APPROVED STATUS	DATE	REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
LDE		

ORIGINATING PERSONNEL	PROFESSIONAL ENGINEER'S SEAL
DRAWN BY: RLD	
CHECKED BY:	
LEAD DESIGNER: R.L. DEY	
ENGINEER/TECH SPECIALIST: L.E. HARVEY	
PROJECT ENGINEERING MANAGER: S.Y. MARR	
PROJECT MANAGER: J.D. KADINGO	ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF PE: ___ STATE: ___ LIC. NO.: ___ DATED: ___

WorleyParsons

Gemma Power Systems California, Inc.

Roseville Electric

ROSEVILLE ENERGY PARK

GENERAL ARRANGEMENT SITE PLAN

SCALE: 1" = 50'-0"

WORLEYPARSONS DWG. NO.: ROSE-1-DW-012-002-001 REV: H

REV	DATE	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/ TECH. SPEC.	PROJ ENGR MANAGER	PROJECT MANAGER
A	05/29/06	RLD			LEH		JDK
B	11/07/05	RLD			LEH		JDK
C	11/22/05	RLD			LEH		JDK
D	04/13/06	RLD			LEH		JDK
E	04/28/06	RLD			LEH		JDK
F	10/19/06	RLD			LEH		JDK
G	11/03/06	RLD			LEH		JDK

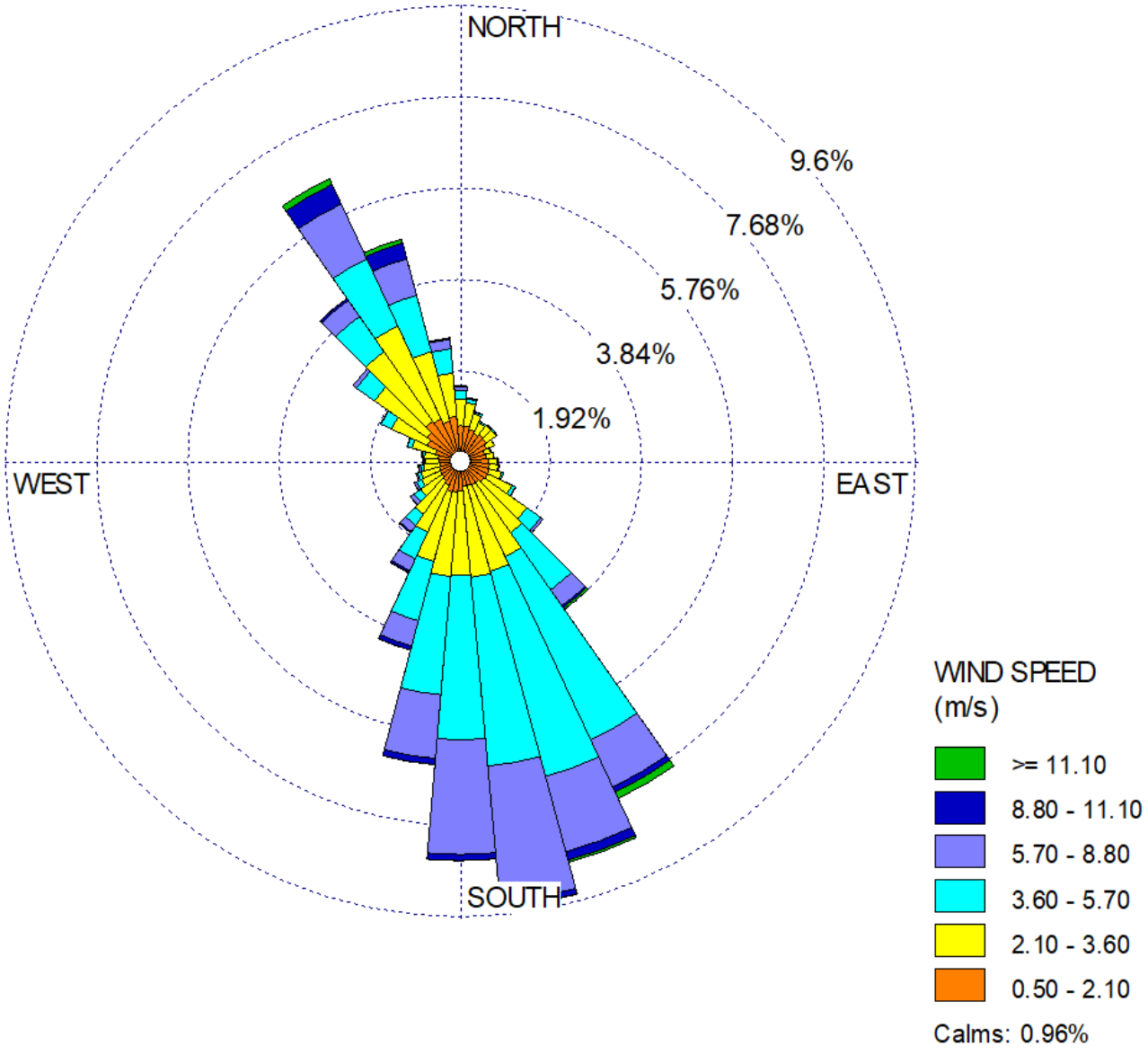
A: ISSUED FOR REVIEW AND COMMENT
B: ISSUED FOR REVIEW AND COMMENT
C: ISSUED FOR REVIEW AND COMMENT
D: ISSUED FOR REVIEW AND COMMENT
E: ISSUED FOR REVIEW AND COMMENT
F: ISSUED FOR REVIEW AND COMMENT
G: GENERAL REVISION ITEMS #23, 28, 30, 34, 46, 67 AND 72.
H: FINAL ISSUE

	FAC	PIPING	I & C	ELECT	MECH	CIVIL	STRUC
A	—	—	—	—	—	—	—
B	—	—	—	—	—	—	—
C	—	—	—	—	—	—	—
D	—	—	—	—	—	—	—
E	—	—	—	—	—	—	—
F	—	—	—	—	—	—	—
G	—	—	—	—	—	—	—
H	—	—	—	—	—	—	—

VHL: Wed May 17 06:40:02 2006

DWG-FILE: 0120020016.dgn
DWG-DATE: 05-Apr-06 09:52

Annual Wind Rose
Sacramento International Airport (2015-2019)



Attachment 6
Health Risk Assessment Support Data

Sensitive Receptors and Distances from Site

(all sites and coordinates from Google Earth unless otherwise noted)

Roseville Energy Park

			Elev, AMSL	Distance from Site		
Receptor ID	UTM Em	UTM Nm	Ft.	meters	feet	miles
Site (approx middle point) *	**640486.00**	**4295001.00**	95	na	na	na
School	641505.00	4293429.00	106	1873.4	6146.6	1.16
School	642006.00	4293353.00	109	2241.9	7355.8	1.39
School	644545.00	4296764.00	122	4425.3	14519.5	2.75
School	644643.00	4295192.00	119	4161.4	13653.5	2.59
School	644464.00	4294448.00	122	4016.3	13177.3	2.50
School	644735.00	4293817.00	129	4410.9	14472.1	2.74
Daycare	644664.00	4293944.00	128	4309.6	14139.9	2.68
School	644598.00	4293022.00	132	4563.4	14972.6	2.84
Daycare	644496.00	4292950.00	126	4504.1	14777.9	2.80
School	644816.00	4291847.00	131	5356.9	17576.1	3.33
School	645319.00	4291338.00	131	6064.3	19896.9	3.77
School	643031.00	4291317.00	130	4477.6	14691.0	2.78
School	643196.00	4291821.00	139	4178.1	13708.3	2.60
School	641603.00	4292684.00	113	2572.2	8439.4	1.60
Pre-school	645967.00	4290732.00	153	6947.4	22794.3	4.32
Pre-school	646356.00	4292745.00	120	6288.6	20632.9	3.91
School	646956.00	4292756.00	127	6848.4	22469.7	4.26
School	646304.00	4291212.00	149	6943.0	22780.1	4.31

Google Image date: 9/12/2019

MEIR, MEIW, and MEIS impacts will be determined from the final modeling grid layout.

HARP Project Summary Report 12/7/2020 4:11:12 PM

PROJECT INFORMATION
HARP Version: 19121
Project Name: REP OPS
Project Output Directory: C:\CLIENT Files\Roseville\GT Mod 2020\HRA Files\REP OPS\REP OPS
HARP Database: NA

FACILITY INFORMATION
Origin
X (m):0
Y (m):0
Zone:1
No. of Sources:0
No. of Buildings:0

EMISSION INVENTORY
No. of Pollutants:54
No. of Background Pollutants:0

Emissions ScrID	StkID	ProID	PolID	PolAbbrev	Multi	Annual Ems (lbs/yr)	MaxHr Ems (lbs/hr)	MWAF
GTN13a	1	1	75070	Acetaldehyde	1	32.7	0.00649	1
GTN13a	1	1	107028	Acrolein	1	6.1	0.00121	1
GTN13a	1	1	7664417	NH3	1	46700	7.3	1
GTN13a	1	1	71432	Benzene	1	75.5	0.015	1
GTN13a	1	1	106990	1,3-Butadiene	1	0.315	6.26E-05	1

GTN13a	1	1	100414	Ethyl Benzene	1	18.9
0.00376	1					
GTN13a	1	1	50000	Formaldehyde	1	2290
0.455	1					
GTN13a	1	1	110543	Hexane	1	186
0.037	1					
GTN13a	1	1	91203	Naphthalene	1	1.01
0.0002	1					
GTN13a	1	1	1151	PAHs-w/o	1	1.65
0.000329	1					
GTN13a	1	1	115071	Propylene	1	555
0.11	1					
GTN13a	1	1	75569	Propylene Oxide	1	2.1
0.000418	1					
GTN13a	1	1	108883	Toluene	1	68.8
0.0137	1					
GTN13a	1	1	1330207	Xylenes	1	40.2
0.00799	1					
GTS13a	2	1	75070	Acetaldehyde	1	32.7
0.00649	1					
GTS13a	2	1	107028	Acrolein	1	6.1
0.00121	1					
GTS13a	2	1	7664417	NH3	1	46700
7.3	1					
GTS13a	2	1	71432	Benzene	1	75.5
0.015	1					
GTS13a	2	1	106990	1,3-Butadiene	1	0.315
6.26E-05	1					
GTS13a	2	1	100414	Ethyl Benzene	1	18.9
0.00376	1					
GTS13a	2	1	50000	Formaldehyde	1	2290
0.455	1					
GTS13a	2	1	110543	Hexane	1	186
0.037	1					
GTS13a	2	1	91203	Naphthalene	1	1.01
0.0002	1					
GTS13a	2	1	1151	PAHs-w/o	1	1.65
0.000329	1					

GTS13a	2	1	115071	Propylene	1	555
0.11	1					
GTS13a	2	1	75569	Propylene Oxide	1	2.1
0.000418	1					
GTS13a	2	1	108883	Toluene	1	68.8
0.0137	1					
GTS13a	2	1	1330207	Xylenes	1	40.2
0.00799	1					
GEN	3	1	9901	DieselExhPM	1	1.8
0.14	1					
Fire	4	1	9901	DieselExhPM	1	8.4
0.03	1					
Cool1	5	1	7440508	Copper	1	0.0155
1.77E-06	1					
Cool1	5	1	7439965	Manganese	1	
0.00309	3.53E-07	1				
Cool1	5	1	1175	Silica, Crystln	1	21.1
0.00241	1					
Cool1	5	1	7440666	Zinc	1	0.0928
1.06E-05	1					
Cool1	5	1	7429905	Aluminum	1	0.0835
9.54E-06	1					
Cool1	5	1	7723140	Phosphorus	1	6.13
0.000699	1					
Cool2	5	2	7440508	Copper	1	0.0155
1.77E-06	1					
Cool2	5	2	7439965	Manganese	1	
0.00309	3.53E-07	1				
Cool2	5	2	1175	Silica, Crystln	1	21.1
0.00241	1					
Cool2	5	2	7440666	Zinc	1	0.0928
1.06E-05	1					
Cool2	5	2	7429905	Aluminum	1	0.0835
9.54E-06	1					
Cool2	5	2	7723140	Phosphorus	1	6.13
0.000699	1					
Cool3	5	3	7440508	Copper	1	0.0155
1.77E-06	1					

Cool3	5	3	7439965	Manganese	1		
0.00309	3.53E-07	1					
Cool3	5	3	1175	Silica, Crystln	1		21.1
0.00241	1						
Cool3	5	3	7440666	Zinc	1		0.0928
1.06E-05	1						
Cool3	5	3	7429905	Aluminum	1		0.0835
9.54E-06	1						
Cool3	5	3	7723140	Phosphorus	1		6.13
0.000699	1						
Cool4	5	4	7440508	Copper	1		0.0155
1.77E-06	1						
Cool4	5	4	7439965	Manganese	1		
0.00309	3.53E-07	1					
Cool4	5	4	1175	Silica, Crystln	1		21.1
0.00241	1						
Cool4	5	4	7440666	Zinc	1		0.0928
1.06E-05	1						
Cool4	5	4	7429905	Aluminum	1		0.0835
9.54E-06	1						
Cool4	5	4	7723140	Phosphorus	1		6.13
0.000699	1						

Background

PolID	PolAbbrev	Conc (ug/m^3)	MWAF

Ground level concentration files (\glc\)

100414MAXHR.txt
100414PER.txt
106990MAXHR.txt
106990PER.txt
107028MAXHR.txt
107028PER.txt
108883MAXHR.txt
108883PER.txt
110543MAXHR.txt

110543PER.txt
115071MAXHR.txt
115071PER.txt
1151MAXHR.txt
1151PER.txt
1175MAXHR.txt
1175PER.txt
1330207MAXHR.txt
1330207PER.txt
50000MAXHR.txt
50000PER.txt
71432MAXHR.txt
71432PER.txt
7429905MAXHR.txt
7429905PER.txt
7439965MAXHR.txt
7439965PER.txt
7440508MAXHR.txt
7440508PER.txt
7440666MAXHR.txt
7440666PER.txt
75070MAXHR.txt
75070PER.txt
75569MAXHR.txt
75569PER.txt
7664417MAXHR.txt
7664417PER.txt
7723140MAXHR.txt
7723140PER.txt
91203MAXHR.txt
91203PER.txt
9901MAXHR.txt
9901PER.txt

POLLUTANT HEALTH INFORMATION
Health Database: C:\HARP2\Tables\HEALTH17320.mdb
Health Table Version: HEALTH20276
Official: True

PolID	PolAbbrev	InhCancer	OralCancer	AcuteREL	InhChronicREL	OralChronicREL	InhChronic8HRREL
75070	Acetaldehyde	0.01		470	140	300	
107028	Acrolein			2.5	0.35	0.7	
7664417	NH3			3200	200		
71432	Benzene	0.1		27	3	3	
106990	1,3-Butadiene	0.6		660	2	9	
100414	Ethyl Benzene	0.0087			2000		
50000	Formaldehyde	0.021		55	9	9	
110543	Hexane				7000		
91203	Naphthalene	0.12			9		
1151	PAHs-w/o	3.9	12				
115071	Propylene				3000		
75569	Propylene Oxide	0.013		3100	30		
108883	Toluene			5000	420	830	
1330207	Xylenes			22000	700		
9901	DieselExhPM	1.1			5		
7440508	Copper			100			
7439965	Manganese				0.09	0.17	
1175	Silica, Crystln				3		
7440666	Zinc						
7429905	Aluminum						
7723140	Phosphorus						

AIR DISPERSION MODELING INFORMATION
Versions used in HARP. All executables were obtained from USEPA's Support Center for Regulatory Atmospheric Modeling website (http://www.epa.gov/scram001/)
AERMOD: 18081

AERMAP: 18081
BPIPPRM: 04274
AERPLOT: 13329

METEOROLOGICAL INFORMATION
Version:
Surface File:
Profile File:
Surface Station:
Upper Station:
On-Site Station:

LIST OF AIR DISPERSION FILES
AERMOD Input File:
AERMOD Output File:
AERMOD Error File:
Plotfile list
_____

LIST OF RISK ASSESSMENT FILES
Health risk analysis files (\hra\)

_____
OPSRESCancerRisk.csv
OPSRESCancerRiskSumByRec.csv
OPSRESGLCList.csv
OPSRESHRAInput.hra
OPSRESNCAcuteRisk.csv
OPSRESNCAcuteRiskSumByRec.csv
OPSRESNCChronicRisk.csv
OPSRESNCChronicRiskSumByRec.csv
OPSRESOutput.txt
OPSRESPathwayRec.csv
OPSRESPolDB.csv

Spatial averaging files (\sa\)
_____

HARP Project Summary Report 12/7/2020 4:13:36 PM

PROJECT INFORMATION
HARP Version: 19121
Project Name: REP OPS
Project Output Directory: C:\CLIENT Files\Roseville\GT Mod 2020\HRA Files\REP OPS\REP OPS
HARP Database: NA

FACILITY INFORMATION
Origin
X (m):0
Y (m):0
Zone:1
No. of Sources:0
No. of Buildings:0

EMISSION INVENTORY
No. of Pollutants:54
No. of Background Pollutants:0

Emissions ScrID	StkID	ProID	PolID	PolAbbrev	Multi	Annual Ems (lbs/yr)	MaxHr Ems (lbs/hr)	MWAF
GTN13a	1	1	75070	Acetaldehyde	1	32.7	0.00649	1
GTN13a	1	1	107028	Acrolein	1	6.1	0.00121	1
GTN13a	1	1	7664417	NH3	1	46700	7.3	1
GTN13a	1	1	71432	Benzene	1	75.5	0.015	1
GTN13a	1	1	106990	1,3-Butadiene	1	0.315	6.26E-05	1

GTN13a	1	1	100414	Ethyl Benzene	1	18.9
0.00376	1					
GTN13a	1	1	50000	Formaldehyde	1	2290
0.455	1					
GTN13a	1	1	110543	Hexane	1	186
0.037	1					
GTN13a	1	1	91203	Naphthalene	1	1.01
0.0002	1					
GTN13a	1	1	1151	PAHs-w/o	1	1.65
0.000329	1					
GTN13a	1	1	115071	Propylene	1	555
0.11	1					
GTN13a	1	1	75569	Propylene Oxide	1	2.1
0.000418	1					
GTN13a	1	1	108883	Toluene	1	68.8
0.0137	1					
GTN13a	1	1	1330207	Xylenes	1	40.2
0.00799	1					
GTS13a	2	1	75070	Acetaldehyde	1	32.7
0.00649	1					
GTS13a	2	1	107028	Acrolein	1	6.1
0.00121	1					
GTS13a	2	1	7664417	NH3	1	46700
7.3	1					
GTS13a	2	1	71432	Benzene	1	75.5
0.015	1					
GTS13a	2	1	106990	1,3-Butadiene	1	0.315
6.26E-05	1					
GTS13a	2	1	100414	Ethyl Benzene	1	18.9
0.00376	1					
GTS13a	2	1	50000	Formaldehyde	1	2290
0.455	1					
GTS13a	2	1	110543	Hexane	1	186
0.037	1					
GTS13a	2	1	91203	Naphthalene	1	1.01
0.0002	1					
GTS13a	2	1	1151	PAHs-w/o	1	1.65
0.000329	1					

GTS13a	2	1	115071	Propylene	1	555
0.11	1					
GTS13a	2	1	75569	Propylene Oxide	1	2.1
0.000418	1					
GTS13a	2	1	108883	Toluene	1	68.8
0.0137	1					
GTS13a	2	1	1330207	Xylenes	1	40.2
0.00799	1					
GEN	3	1	9901	DieselExhPM	1	1.8
0.14	1					
Fire	4	1	9901	DieselExhPM	1	8.4
0.03	1					
Cool1	5	1	7440508	Copper	1	0.0155
1.77E-06	1					
Cool1	5	1	7439965	Manganese	1	
0.00309	3.53E-07	1				
Cool1	5	1	1175	Silica, Crystln	1	21.1
0.00241	1					
Cool1	5	1	7440666	Zinc	1	0.0928
1.06E-05	1					
Cool1	5	1	7429905	Aluminum	1	0.0835
9.54E-06	1					
Cool1	5	1	7723140	Phosphorus	1	6.13
0.000699	1					
Cool2	5	2	7440508	Copper	1	0.0155
1.77E-06	1					
Cool2	5	2	7439965	Manganese	1	
0.00309	3.53E-07	1				
Cool2	5	2	1175	Silica, Crystln	1	21.1
0.00241	1					
Cool2	5	2	7440666	Zinc	1	0.0928
1.06E-05	1					
Cool2	5	2	7429905	Aluminum	1	0.0835
9.54E-06	1					
Cool2	5	2	7723140	Phosphorus	1	6.13
0.000699	1					
Cool3	5	3	7440508	Copper	1	0.0155
1.77E-06	1					

Cool3	5	3	7439965	Manganese	1		
0.00309	3.53E-07	1					
Cool3	5	3	1175	Silica, Crystln	1		21.1
0.00241	1						
Cool3	5	3	7440666	Zinc	1		0.0928
1.06E-05	1						
Cool3	5	3	7429905	Aluminum	1		0.0835
9.54E-06	1						
Cool3	5	3	7723140	Phosphorus	1		6.13
0.000699	1						
Cool4	5	4	7440508	Copper	1		0.0155
1.77E-06	1						
Cool4	5	4	7439965	Manganese	1		
0.00309	3.53E-07	1					
Cool4	5	4	1175	Silica, Crystln	1		21.1
0.00241	1						
Cool4	5	4	7440666	Zinc	1		0.0928
1.06E-05	1						
Cool4	5	4	7429905	Aluminum	1		0.0835
9.54E-06	1						
Cool4	5	4	7723140	Phosphorus	1		6.13
0.000699	1						

Background

PolID	PolAbbrev	Conc (ug/m^3)	MWAF

Ground level concentration files (\glc\)

100414MAXHR.txt
100414PER.txt
106990MAXHR.txt
106990PER.txt
107028MAXHR.txt
107028PER.txt
108883MAXHR.txt
108883PER.txt
110543MAXHR.txt

110543PER.txt
115071MAXHR.txt
115071PER.txt
1151MAXHR.txt
1151PER.txt
1175MAXHR.txt
1175PER.txt
1330207MAXHR.txt
1330207PER.txt
50000MAXHR.txt
50000PER.txt
71432MAXHR.txt
71432PER.txt
7429905MAXHR.txt
7429905PER.txt
7439965MAXHR.txt
7439965PER.txt
7440508MAXHR.txt
7440508PER.txt
7440666MAXHR.txt
7440666PER.txt
75070MAXHR.txt
75070PER.txt
75569MAXHR.txt
75569PER.txt
7664417MAXHR.txt
7664417PER.txt
7723140MAXHR.txt
7723140PER.txt
91203MAXHR.txt
91203PER.txt
9901MAXHR.txt
9901PER.txt

POLLUTANT HEALTH INFORMATION
Health Database: C:\HARP2\Tables\HEALTH17320.mdb
Health Table Version: HEALTH20276
Official: True

PolID	PolAbbrev	InhCancer	OralCancer	AcuteREL	InhChronicREL	OralChronicREL	InhChronic8HRREL
75070	Acetaldehyde	0.01		470	140	300	
107028	Acrolein			2.5	0.35	0.7	
7664417	NH3			3200	200		
71432	Benzene	0.1		27	3	3	
106990	1,3-Butadiene	0.6		660	2	9	
100414	Ethyl Benzene	0.0087			2000		
50000	Formaldehyde	0.021		55	9	9	
110543	Hexane				7000		
91203	Naphthalene	0.12			9		
1151	PAHs-w/o	3.9	12				
115071	Propylene				3000		
75569	Propylene Oxide	0.013		3100	30		
108883	Toluene			5000	420	830	
1330207	Xylenes			22000	700		
9901	DieselExhPM	1.1			5		
7440508	Copper			100			
7439965	Manganese				0.09	0.17	
1175	Silica, Crystln				3		
7440666	Zinc						
7429905	Aluminum						
7723140	Phosphorus						

AIR DISPERSION MODELING INFORMATION
Versions used in HARP. All executables were obtained from USEPA's Support Center for Regulatory Atmospheric Modeling website (http://www.epa.gov/scram001/)
AERMOD: 18081

AERMAP: 18081
BPIPPRM: 04274
AERPLOT: 13329

METEOROLOGICAL INFORMATION
Version:
Surface File:
Profile File:
Surface Station:
Upper Station:
On-Site Station:

LIST OF AIR DISPERSION FILES
AERMOD Input File:
AERMOD Output File:
AERMOD Error File:
Plotfile list
_____

LIST OF RISK ASSESSMENT FILES
Health risk analysis files (\hra\)

_____
OPSRESCancerRisk.csv
OPSRESCancerRiskSumByRec.csv
OPSRESGLCList.csv
OPSRESHRAInput.hra
OPSRESNCAcuteRisk.csv
OPSRESNCAcuteRiskSumByRec.csv
OPSRESNCChronicRisk.csv
OPSRESNCChronicRiskSumByRec.csv
OPSRESOutput.txt
OPSRESPathwayRec.csv
OPSRESPolDB.csv
OPSWRKCancerRisk.csv
OPSWRKCancerRiskSumByRec.csv
OPSWRKGLCList.csv
OPSWRKHRAInput.hra
OPSWRKNCAcuteRisk.csv

OPSWRKNCAcuteRiskSumByRec.csv
OPSWRKNCChronicRisk.csv
OPSWRKNCChronicRiskSumByRec.csv
OPSWRKOutput.txt
OPSWRKPathwayRec.csv
OPSWRKPolDB.csv

Spatial averaging files (\sa\)

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HARP Project Summary Report 12/10/2020 10:28:53 AM

PROJECT INFORMATION
HARP Version: 19121
Project Name: FLAGPOLE
Project Output Directory: C:\CLIENT Files\Roseville\GT Mod 2020\HRA Files\Flagpole\FLAGPOLE
HARP Database: NA

FACILITY INFORMATION
Origin
X (m):0
Y (m):0
Zone:1
No. of Sources:0
No. of Buildings:0

EMISSION INVENTORY
No. of Pollutants:54
No. of Background Pollutants:0

ScrID	StkID	ProID	PolID	PolAbbrev	Multi	Annual Ems (lbs/yr)	MaxHr Ems (lbs/hr)	MWAF
GTN13a	1	1	75070	Acetaldehyde	1	32.7	0.00649	1
GTN13a	1	1	107028	Acrolein	1	6.1	0.00121	1
GTN13a	1	1	7664417	NH3	1	46700	7.3	1
GTN13a	1	1	71432	Benzene	1	75.5	0.015	1
GTN13a	1	1	106990	1,3-Butadiene	1	0.315	6.26E-05	1

GTN13a	1	1	100414	Ethyl Benzene	1	18.9
0.00376	1					
GTN13a	1	1	50000	Formaldehyde	1	2290
0.455	1					
GTN13a	1	1	110543	Hexane	1	186
0.037	1					
GTN13a	1	1	91203	Naphthalene	1	1.01
0.0002	1					
GTN13a	1	1	1151	PAHs-w/o	1	1.65
0.000329	1					
GTN13a	1	1	115071	Propylene	1	555
0.11	1					
GTN13a	1	1	75569	Propylene Oxide	1	2.1
0.000418	1					
GTN13a	1	1	108883	Toluene	1	68.8
0.0137	1					
GTN13a	1	1	1330207	Xylenes	1	40.2
0.00799	1					
GTS13a	2	1	75070	Acetaldehyde	1	32.7
0.00649	1					
GTS13a	2	1	107028	Acrolein	1	6.1
0.00121	1					
GTS13a	2	1	7664417	NH3	1	46700
7.3	1					
GTS13a	2	1	71432	Benzene	1	75.5
0.015	1					
GTS13a	2	1	106990	1,3-Butadiene	1	0.315
6.26E-05	1					
GTS13a	2	1	100414	Ethyl Benzene	1	18.9
0.00376	1					
GTS13a	2	1	50000	Formaldehyde	1	2290
0.455	1					
GTS13a	2	1	110543	Hexane	1	186
0.037	1					
GTS13a	2	1	91203	Naphthalene	1	1.01
0.0002	1					
GTS13a	2	1	1151	PAHs-w/o	1	1.65
0.000329	1					

GTS13a	2	1	115071	Propylene	1	555
0.11	1					
GTS13a	2	1	75569	Propylene Oxide	1	2.1
0.000418	1					
GTS13a	2	1	108883	Toluene	1	68.8
0.0137	1					
GTS13a	2	1	1330207	Xylenes	1	40.2
0.00799	1					
GEN	3	1	9901	DieselExhPM	1	1.8
0.14	1					
Fire	4	1	9901	DieselExhPM	1	8.4
0.03	1					
Cool1	5	1	7440508	Copper	1	0.0155
1.77E-06	1					
Cool1	5	1	7439965	Manganese	1	
0.00309	3.53E-07	1				
Cool1	5	1	1175	Silica, Crystln	1	21.1
0.00241	1					
Cool1	5	1	7440666	Zinc	1	0.0928
1.06E-05	1					
Cool1	5	1	7429905	Aluminum	1	0.0835
9.54E-06	1					
Cool1	5	1	7723140	Phosphorus	1	6.13
0.000699	1					
Cool2	5	2	7440508	Copper	1	0.0155
1.77E-06	1					
Cool2	5	2	7439965	Manganese	1	
0.00309	3.53E-07	1				
Cool2	5	2	1175	Silica, Crystln	1	21.1
0.00241	1					
Cool2	5	2	7440666	Zinc	1	0.0928
1.06E-05	1					
Cool2	5	2	7429905	Aluminum	1	0.0835
9.54E-06	1					
Cool2	5	2	7723140	Phosphorus	1	6.13
0.000699	1					
Cool3	5	3	7440508	Copper	1	0.0155
1.77E-06	1					

Cool3	5	3	7439965	Manganese	1		
0.00309	3.53E-07	1					
Cool3	5	3	1175	Silica, Crystln	1		21.1
0.00241	1						
Cool3	5	3	7440666	Zinc	1		0.0928
1.06E-05	1						
Cool3	5	3	7429905	Aluminum	1		0.0835
9.54E-06	1						
Cool3	5	3	7723140	Phosphorus	1		6.13
0.000699	1						
Cool4	5	4	7440508	Copper	1		0.0155
1.77E-06	1						
Cool4	5	4	7439965	Manganese	1		
0.00309	3.53E-07	1					
Cool4	5	4	1175	Silica, Crystln	1		21.1
0.00241	1						
Cool4	5	4	7440666	Zinc	1		0.0928
1.06E-05	1						
Cool4	5	4	7429905	Aluminum	1		0.0835
9.54E-06	1						
Cool4	5	4	7723140	Phosphorus	1		6.13
0.000699	1						

Background

PolID	PolAbbrev	Conc (ug/m^3)	MWAF

Ground level concentration files (\glc\)

100414MAXHR.txt
100414PER.txt
106990MAXHR.txt
106990PER.txt
107028MAXHR.txt
107028PER.txt
108883MAXHR.txt
108883PER.txt
110543MAXHR.txt

110543PER.txt
115071MAXHR.txt
115071PER.txt
1151MAXHR.txt
1151PER.txt
1175MAXHR.txt
1175PER.txt
1330207MAXHR.txt
1330207PER.txt
50000MAXHR.txt
50000PER.txt
71432MAXHR.txt
71432PER.txt
7429905MAXHR.txt
7429905PER.txt
7439965MAXHR.txt
7439965PER.txt
7440508MAXHR.txt
7440508PER.txt
7440666MAXHR.txt
7440666PER.txt
75070MAXHR.txt
75070PER.txt
75569MAXHR.txt
75569PER.txt
7664417MAXHR.txt
7664417PER.txt
7723140MAXHR.txt
7723140PER.txt
91203MAXHR.txt
91203PER.txt
9901MAXHR.txt
9901PER.txt

POLLUTANT HEALTH INFORMATION
Health Database: C:\HARP2\Tables\HEALTH17320.mdb
Health Table Version: HEALTH20276
Official: True

PolID	PolAbbrev	InhCancer	OralCancer	AcuteREL	InhChronicREL	OralChronicREL	InhChronic8HRREL
75070	Acetaldehyde	0.01		470	140	300	
107028	Acrolein			2.5	0.35	0.7	
7664417	NH3			3200	200		
71432	Benzene	0.1		27	3	3	
106990	1,3-Butadiene	0.6		660	2	9	
100414	Ethyl Benzene	0.0087			2000		
50000	Formaldehyde	0.021		55	9	9	
110543	Hexane				7000		
91203	Naphthalene	0.12			9		
1151	PAHs-w/o	3.9	12				
115071	Propylene				3000		
75569	Propylene Oxide	0.013		3100	30		
108883	Toluene			5000	420	830	
1330207	Xylenes			22000	700		
9901	DieselExhPM	1.1			5		
7440508	Copper			100			
7439965	Manganese				0.09	0.17	
1175	Silica, Crystln				3		
7440666	Zinc						
7429905	Aluminum						
7723140	Phosphorus						

AIR DISPERSION MODELING INFORMATION
Versions used in HARP. All executables were obtained from USEPA's Support Center for Regulatory Atmospheric Modeling website (http://www.epa.gov/scram001/)
AERMOD: 18081

AERMAP: 18081
BPIPPRM: 04274
AERPLOT: 13329

METEOROLOGICAL INFORMATION
Version:
Surface File:
Profile File:
Surface Station:
Upper Station:
On-Site Station:

LIST OF AIR DISPERSION FILES
AERMOD Input File:
AERMOD Output File:
AERMOD Error File:
Plotfile list
_____

LIST OF RISK ASSESSMENT FILES
Health risk analysis files (\hra\)

_____
flagCancerRisk.csv
flagCancerRiskSumByRec.csv
flagGLCList.csv
flagHRAInput.hra
flagNCAcuteRisk.csv
flagNCAcuteRiskSumByRec.csv
flagNCChronicRisk.csv
flagNCChronicRiskSumByRec.csv
flagOutput.txt
flagPathwayRec.csv
flagPolDB.csv

Spatial averaging files (\sa\)
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APPENDIX B

Note: This sheet is based on the original plant emission calculation spreadsheet REP Emissions Rev 2 in progress spreadsheet.						
Case	**Case 1a**	**Case 1b**	**Case 13a**	**Case 13b**	**Case 29a**	
Design Case						
Dry Bulb Temperature, deg. F	105	105	62	62	29	
Wet Bulb Temperature, deg. F	64	64	51	51	27	
Number of Combustion Turbines Operating	2x1	2x1	2x1	2x1	2x1	
Combustion Turbine Load, %	100%	100%	100%	100%	100%	
Duct Burning (Yes/No?)	On	Off	On	Off	On	
Site Altitude, ft	100	100	100	100	100	
Barometric Pressure, psia	14.67	14.67	14.67	14.67	14.67	
Cooling Tower Data						
Allowance to WB Temp to Account for Recirculation, deg. F	2	2	2	2	-	
Cooling Tower Design Wet Bulb Temperature, deg. F	66	66	53	53	27	
Number of Cells	4	4	4	4	4	
Number of Fans Operating	4	4	4	4	4	
Leaving Air Flow/Cell, cfm	1,309,000	1,309,000	1,309,000	1,309,000	1,309,000	
Total Leaving Air Flow, cfm	5,236,000	5,236,000	5,236,000	5,236,000	5,236,000	
Temperature of Leaving Air, deg. F	89.6	81.3	82.0	72.6	68.9	
Heat Rejected from CW, MMBtu/hr	521	313	519	320	530	
Density of Leaving Air, lbs/cf	0.0707	0.0721	0.0719	0.0735	0.0741	
Exhaust Flow/Cell, lbs/min	92,504	94,318	94,162	96,209	96,999	
Exhaust Flow/Cell, kg/sec	699	713	712	727	733	
Margined Exhaust Flow, kg/sec	629	642	641	655	660	
Tower Heat Input, MMBtu/hr	521	313	519	320	530	
Tower Heat Input, MW	153	92	152	94	155	
Heat Input/Cell, MW	38.2	22.9	38.1	23.4	38.8	
Margined Heat Input, MW	42.0	25.2	41.9	25.8	42.7	
Factor, kg/sec-MW	18.3	31.1	18.7	31.1	18.9	
Margined Factor, kg/sec-MW	15.0	25.5	15.3	25.4	15.5	
CEC Limit kg/sec-MW	-	-	<13.6	<25.4	-	