AMENDMENT TO PERMIT TO CONSTRUCT/PERMIT TO OPERATE APPLICATION FOR THE CPV SENTINEL ENERGY PROJECT

Prepared for

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

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URS

1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4314
619.294.9400 Fax: 619.293.7920

TABLE OF CONTENTS

Tables

Figures

Appendices

SECTION 1 INTRODUCTION

On July 25, 2007 CPV Sentinel, LLC filed an application to SCAQMD for a Permit to Construct/Permit to Operate for the CPV Sentinel Energy Project, an 800 MW peaking power generation facility (CPVS or proposed project). SCAQMD issued a Preliminary Determination of Compliance for the CPVS on May 7, 2008 and a Final Determination of Compliance on August 29, 2008.

The Applicant has also been working through the California Energy Commission (CEC) process to secure a license for the CPVS, which incorporates the SCAQMD Determination of Compliance. On November 3, 2008 the CEC held an evidentiary hearing on the proposed project covering all topics except air quality. The CEC ordered that the evidentiary record on all topics except air quality be closed on December 5, 2008. An evidentiary hearing on air quality is expected to be held in the near future now that an acceptable emission offset strategy has been identified for the proposed project, as described further below.

In addition to a revised emission offset strategy, the Applicant has recently identified a number of project design refinements that it believes will improve the overall performance of the proposed project. These design refinements were submitted for consideration by CEC staff in November 2008. Since the refinements will result in minor changes to the project's emissions sources, this document has been prepared to submit information on these changes to SCAQMD as well.

This submittal describes the proposed project design refinements and provides specific information on those elements that will change the locations or magnitudes of pollutant emissions from the CPVS. As demonstrated in the following sections, the result of these changes will be reductions in the air pollutant emissions from the facility. However, because the facility modifications will involve relocation of some emission sources within the project site and change the relative locations of some sources with respect to buildings on the site, we have conducted a revised dispersion modeling analysis to demonstrate that the project impacts to air quality will remain within acceptable levels.

The proposed project refinements will in no way change the nature of the project's permitting requirements. Language changes will need to be made to specific permit conditions in order to reflect, for example, minor reductions to equipment operating hours, and the project emissions offset requirements will decrease from the previous estimates. Our suggested permit changes in this regard are presented in Section 6. The SCAQMD forms that required slight revisions for this amendment are presented in Appendix A (Revised).

Refinements to the CPVS general arrangement presented in the original PTC/PTO application are listed below. These refinements would all be within the original 37-acre project site and do not result in any additional disturbed areas beyond the site that was previously evaluated. Tables 2-1(Revised) and 2-2 (New)[1] show the proposed changes to the facility equipment list and to the major facility structure heights and dimensions, respectively. Figure 2-1 (Revised) show the revised facility plot plan. The specific CPVS changes that are the subject of this submittal are:

[1] Table and figure numbers in this submittal are numbered according to the numbering system used in the original PTC/PTO application. Replacement tables have the same numbers followed by "(Revised)". New figures or tables that were not included in the original application have been given new numbers corresponding to the appropriate sections of the application.

- Renumbering Units 1 through 8 from south to north (rather than north to south, as presented in the PTC/PTO application (although the modeling files still have the units numbered from north to south, the results presented reflect the new numbering system));
- The annual operating schedule of the combustion turbine generators previously labeled CTGs 6 through 8 (now CTGs 1 through 3) is changed to 2,628 normal operating hours and 300 startup/shutdown cycles, thus matching the schedule for the other five CTGs;
- The diesel blackstart engine is eliminated;
- The 3-cell and 5-cell cooling towers identified in the application at the southern and northern ends of the plant area, respectively, will be replaced with single-cell cooling towers located next to each turbine unit (eight total cooling towers) and the corresponding emissions of particulate matter will be reduced by roughly 40 percent relative to the level reported in the original application;
- The fire water pump and associated enclosure will be relocated;
- A gas metering station, anode bed, and conduit will be added at the southeastern section of the project site;
- The septic system will be relocated further north to accommodate the gas metering station;
- One electric gas compressor will be eliminated, and the six remaining gas compressors will be relocated to the eastern side of the plant, within a sound wall enclosure, rather than a building;
- One of the two raw water tanks will be eliminated, and the remaining water tank and fire protection pump skid will be relocated to the southeastern portion of the plant site;
- The operations building previously located on the southern portion of the site will be eliminated;
- The warehouse building previously located on the northern portion of the site will be eliminated, and the warehouse building that was located to the south of the switchyard area will be relocated further east;
- The oily water separator and drain sump will be relocated further west within the project site;
- The internal plant road will be relocated to the eastern side of the project site;
- The switchgear building and auxiliary power transformers will be relocated from between Unit 3 and Unit 4 to between Unit 4 and Unit 5; and
- The treated water storage tanks, water pumping skids, and water treatment trailer parking will be relocated to the southeast end of the plant site north of the raw water storage tank.

SECTION 2 OPERATIONAL CPVS EMISSIONS

The CPVS will entail the installation of eight (8) GE LMS100 peaking combustion turbines that will exclusively use pipeline-quality natural gas fuel. Equipment changes and minor refinement of the turbines' operating profiles required reassessment of the operational emissions presented in Section 3.0 of the original PTC/PTO application[2]. In addition, the most recent performance data provided by the CTG vendor for different loads and ambient temperature conditions indicates some very minor changes from the mass emission rates that were presented in the original application. Overall project emissions will decrease from the levels previously analyzed because of the reduced operating hours for three of the CTGs and the elimination of the diesel blackstart engine. In addition, the CTG manufacturer has agreed to guarantee a lower emission rate for PM_{10} of 5 lb/hr/turbine, instead of 6 lb/hour/turbine which was presented in the original application. Revised operational emission estimates reflecting these changes and the associated calculations are included as Appendix B (Revised). With the exception of PM_{10} (see Section 2.1) emissions during turbine commissioning will not change; thus, no additional analysis of turbine commissioning scenarios is presented in this revision.

2.1 NORMAL TURBINE OPERATING EMISSIONS

The most important emission sources of the CPVS would be the CTG trains. Maximum short-term operational emissions from the CTGs were determined from a comparative evaluation of potential emissions corresponding to normal CTG operations, and CTG startup/shutdown conditions. The annual operational emissions from the CTGs were estimated by summing the emissions contributions from normal operations and CTG startup/shutdown conditions over a one-year period. The annual emissions of air pollutants for the CTGs have been calculated based on the expected operating schedule for the CTGs and are presented in Table 3-1 (Revised). As identified in Section 2.2, the operating hours and annual startup/shutdown cycles for Units 1 through 3 (formerly Units 6 through 8) have been changed to match the original operating profile of Units 4 through 8 (formerly Units 1 through 5).

Consistent with the original application, each turbine unit will be equipped with a stack with the following dimensions:

- Height – 90 feet
- Diameter – 13.5 feet

The criteria pollutant emission rates and stack parameters provided by the CTG vendors for three load conditions (50 percent, 75 percent, and 100 percent) at three ambient temperatures (17 F, 72 °F, and 107 F) are presented in Table 3-2 (Revised). These cases encompass CTG operations with and without evaporative cooling of the inlet air to the turbines. The combined scenarios presented in this table bound the expected normal operating range of each proposed CTG. Note that the mass emission rates (pound-per-hour) corresponding to the ppmv levels for certain ambient temperature and load conditions in Table 3-2 (Revised) are changed from the values used in the original application, based on the most recent performance data provided by the turbine supplier. Except for PM_{10}, the magnitudes of these changes are at most a few hundredths of a pound per hour. In the case of PM_{10}, the CTG vendor General Electric has

[2] The final emissions evaluated by SCAQMD for the PDOC and FDOC included some minor changes from the original PTC/PTO application that were determined to be necessary during the subsequent review by the SCAQMD.

very recently agreed to guarantee that emissions of this pollutant will not exceed 5 lb/hour/turbine, a 16.67% reduction compared with the previous guarantee of 6 lb/hour/turbine. The revised guarantee from GE is included in Appendix B (Revised). Another important modification of the CPVS is a reduction in the requested maximum annual hours of operation for three CTGs from 3,200 hours plus 350 startups and shutdowns to 2,628 hours plus 300 startups and shutdowns. This change reduces annual emissions of all pollutants but does not affect the peak emission rates for shorter averaging times. It also eliminates the need to include separate permit conditions for two groups of CTGs.

2.2 TURBINE STARTUP AND SHUTDOWN EMISSIONS

The expected emissions and durations associated with CTG startup and shutdown events are summarized in Table 3-3 (Revised). Because hours that include startup and shutdown events would have higher nitrogen oxide (NO_x), carbon monoxide (CO), and reactive organic compounds (ROC) emissions than the normal operating condition with fully functioning selective catalytic reduction (SCR) and CO oxidation catalyst, they were incorporated (as applicable) into the worst-case short- and long-term emissions estimates in the air quality dispersion modeling simulations for these pollutants. However, continuous, full-load normal operations generally lead to the highest average rates of emissions for sulfur oxides (SO_x), particulate matter less than 10 microns in diameter (PM_{10}), and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). These pollutants are emitted in proportion to the fuel combustion rate and are not affected by the operating status of post-combustion controls.

2.3 MODIFICATION OF OTHER EMISSION SOURCES

The diesel blackstart generator engine described in the original application has been removed from the project equipment list. The amended project will still include an emergency fire pump engine powered by diesel fuel. This engine will be relocated within the CPVS facility, as shown in Figure 2-1 (Revised). As stated in the original application, this fire pump engine will be rated at approximately 240 horsepower and will be tested 50 hours per year. Hourly and annual emissions from engine testing and stack parameters are provided in Table 3-4 (Revised). Emission rates shown in this table are based on vendor-supplied emission factors and conform to federal Tier 2 emission limits for non-road diesel engines. Fuel for this engine will be ultra-low sulfur diesel containing a maximum of 15 parts per million sulfur by weight.

The proposed project will also include eight single-cell mechanical draft evaporative cooling towers (i.e., one for each CTG). These smaller single-cell cooling towers replace the 5-cell and 3-cell towers that were originally located at the northern and southern ends of the project site, respectively. The locations of the new cooling towers adjacent to the associated CTGs are shown in revised Figure 2-1. Detailed emissions calculations for all operational equipment for the CPVS are presented in Appendix B (Revised). Parameter values used to develop the combined PM_{10} emission estimates for the eight units include a total circulating water rate of 55,200 gallons per minute, a total dissolved concentration in the circulating water of 3,774 milligrams per liter and a drift eliminator system capable of preventing drift emissions from exceeding 0.0005 percent of the circulating water over any time period. The cooling towers were assumed to operate the same number of hours per year as the CTGs, and their total annual emissions of PM_{10} are estimated to be roughly 40% less than the original two-tower configuration.

2.4 COMBINED ANNUAL PROJECT EMISSIONS

The estimated total combined annual emissions from all sources of the proposed project are shown in Table 3-6 (Revised), including the eight CTG units, the firewater pump engine, and the eight cooling towers. Annual emissions of all pollutants were calculated assuming the CTG annual hours of operation described previously and the corresponding hours of cooling tower operation. Testing of the firewater pump engine was assumed for 50 hours per year.

SECTION 3 CRITERIA POLLUTANTS IMPACTS ANALYSIS

The purpose of the air quality impact analyses is to evaluate whether criteria pollutant emissions resulting from the CPVS would cause or contribute significantly to a violation of a California ambient air quality standard (CAAQS) or national ambient air quality standard (NAAQS). Mathematical models designed to simulate the atmospheric transport and dispersion of airborne pollutants were used to quantify the maximum expected impacts of project emissions for comparison with applicable regulatory criteria. Potential health impacts of TAC emissions from the proposed project are evaluated in Section 4.0, Air Toxics Health Risk Assessment.

The air quality modeling methodology described in this section followed the same procedures defined in the original PTC/PTO application, which in turn was based on a formal modeling protocol that was submitted for comments to the CEC and the SCAQMD. A brief review of the modeling approaches used to assess various aspects of the modified project's potential impacts to air quality is presented in the following subsections.

3.1 MODEL AND MODEL OPTION SELECTIONS

Similar to the air quality analyses reported for the original application, the potential impacts of the amended project on ambient criteria pollutant levels were evaluated using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) (version 07026). AERMOD is appropriate in this instance because it has the ability to assess dispersion of emission plumes from multiple point, area, or volume sources in flat, simple, and complex terrain and to use sequential hourly meteorological input data. The regulatory default options were used, including building and stack tip downwash, default wind speed profiles, exclusion of deposition and gravitational settling, consideration of buoyant plume rise, and complex terrain.

The ozone-limiting method (OLM) option of the AERMOD model was used to take into account the role of ambient ozone in limiting the conversion of emitted NO_X (which occurs mostly in the form of NO) to NO_2, the pollutant regulated by ambient standards. The input data to the AERMOD-OLM model includes representative hourly ozone monitoring data collected at the SCAQMD Palm Springs-Fire Station monitoring site for the years 1988- 1991, which are the same years corresponding to the meteorological model input record. The rural option of the model was selected based on the types of land uses surrounding the facility site, and this information was used to develop appropriate land use parameter values for use in processing the meteorological input data.

3.2 EMISSIONS SCENARIOS FOR MODELING

As described in Section 2, the nature of the proposed project refinements will lead to a decrease in the emissions of air pollutants from the CTGs, diesel engines and cooling towers, compared with levels indicated in the original application. The primary reason for revising the previous air quality impact analysis was then to ensure that proposed changes in the locations of certain project emissions sources and changes to the dimensions and locations of other buildings and structures on the site would not cause stack plume downwash conditions that would lead to higher offsite pollutant concentrations than were presented in previous submittals to SCAQMD.

In the same manner described in Section 4.2 of the PTC/PTO application, reasonable worst-case project emissions scenarios were developed for each combination of pollutant and averaging time for which modeling is required. These scenarios were selected expressly to ensure that the proposed project's maximum potential impacts on air quality would be evaluated versus applicable ambient air quality standards. Table 4-2 (Revised) presents the worst-case modeling scenarios selected for each pollutant and averaging time. The reasoning behind selection of the modeling scenarios was described in Section 4.2 of the original application. Depending on the pollutant under consideration, the maximum facility-wide scenario for a given averaging time between 1 and 24 hours was determined to be either continuous full-load operation of all CTGs or a combination of full-load operation and turbine startup and shutdowns. Annual emissions for the turbines were calculated using the maximum requested turbine operating hours (2,628) with 300 startups and shutdowns per CTG. Cooling towers were assumed to operate the same number of hours as the CTGs and the firewater pump emissions were based on a maximum of 50 operating hours per year. These scenarios form the basis for the refined air dispersion modeling analyses described later in Section 3.5.

Note that the previous modeling analysis to evaluate short-term turbine commissioning impacts remains valid for the amended project and has not been redone. Although the Applicant requested (and SCAQMD has agreed to) an increase in the overall duration of commissioning tests for each turbine from 104 hours to 150 hours during the previous FDOC review, this change does not affect the modeling analysis to evaluate peak 1--hour nitrogen dioxide (NO_2) and CO impacts and 8-hour CO impacts during the commissioning period.

Finally, the dispersion modeling results presented in Sections 3.4 and 3.5 for PM_{10} and $PM_{2.5}$ incorporate an assumed CTG emission rate of 6 lb/hour/turbine during all hours of operation, i.e., the recent improvement in the General Electric guaranteed rate for this pollutant of 5 lb/hour/turbine is not reflected. Remodeling with the lower emission rate was deemed unnecessary in that the results obtained for the 6 lb/hr rate indicate compliance with all applicable standards. Impacts from the CTGs with the revised emission rate would be proportionally lower than the results presented in this section.

3.3 MODEL INPUT DATA

3.3.1 Building Wake Effects

The effects of building wakes (i.e., downwash) on the plumes from the proposed project's CTGs were evaluated in the modeling for operational emissions, in accordance with U.S. Environmental Protection Agency (U.S. EPA) guidance (U.S. EPA, 1985). Data on the buildings within the project site that could potentially cause stack plume downwash effects were determined for different wind directions using the U.S. EPA Building Profile Input Program – Prime (BPIP-Prime) (Version 98086) (U.S. EPA, 1995). For the amended project, 36 buildings/structures and three tanks were identified within the CPVS site to be included in the downwash analysis:

- Cooling towers 1 through 8;
- CTG 1 through CTG 8;
- SCR 1 through SCR 8;

- Control room 1 through 8;
- Treated water tank 1;
- Treated water tank 2;
- Raw water tank; and
- Four miscellaneous buildings.

The results of the BPIP-Prime analysis were included in the AERMOD input files to enable simulation of downwash effects for the plumes from project emission sources. Input and output electronic files for the BPIP-Prime analysis are included with those from all other new dispersion modeling analyses on the digital versatile disc (DVD) that is being submitted with this proposed amendment.

3.3.2 Meteorological Data

The meteorological input data sets used in the current modeling to evaluate impacts associated with the modifications to the CPVS are identical to those used for the previous air quality analysis that was reviewed by SCAQMD. These included records of surface measurements in the adjacent Wintec wind energy facility, supplemented by National Weather Service surface and upper air data as required to construct the input information required for application of the AERMOD dispersion model. Detailed information on the origins and representativeness of these data to reflect conditions affecting transport and dispersion of air pollutants emitted by the CPVS is provided in Section 4.3.2 of the original PTC/PTO application.

3.3.3 Receptor Locations

The receptor grids used in the AERMOD modeling analyses for operational sources were the same as those presented in Section 4.3.3 of the original PTC/PTO application. When the maximum predicted concentration for a particular pollutant and averaging time was located within the portion of the receptor grid with spacing greater than 25 meters, a supplemental dense receptor grid with 25-meter spacing was placed around the original maximum concentration point and the model was rerun to ensure that worst-case impacts would be evaluated.

3.4 TURBINE IMPACT SCREENING MODELING

A screening modeling analysis was performed to determine which CTG operating mode and stack parameters would produce worst-case offsite impacts (i.e., maximum ground-level concentrations for each pollutant and averaging time). Only the emissions from the CTGs were considered in this preliminary modeling step. Note that the configuration and locations of the proposed turbines are unchanged and the operational emissions have changed by a small percentage in the most recent vendor performance data. Thus, the previous turbine screening modeling was repeated primarily to incorporate changes in the locations of other project structures that could potentially alter the effects of these structures on downwash of CTG emission plumes. The screening modeling analysis used the AERMOD dispersion model with the same receptor array and meteorological input data described in previous sections.

The AERMOD model simulated the dispersion of natural gas combustion emissions from the eight 13.5-foot-diameter (4.15 meters), 90-foot-tall (27.43 meters) stacks of the CTG units. The stacks were modeled as point sources at their proposed locations within the CPVS site. Table 4-4 (Revised) summarizes the CTG screening results for the different CTG operating loads and ambient temperature conditions. First, the model was run with unit emissions (1.0 grams per second) from each stack to obtain normalized concentrations that are not specific to any pollutant. CTG and control equipment vendor data used to derive the stack parameters for the different operating conditions evaluated in this screening analysis are included in Appendix B (Revised). The maximum ground-level concentrations predicted to occur offsite based on unit turbine emission rates for each of the 11 operating conditions shown in Table 4-4 (Revised) were then multiplied by the corresponding turbine emission rates for specific pollutants. The highest resulting concentration values for each pollutant and averaging time were then identified (see bolded values in the bottom section of this table).

The principal purpose of the turbine screening modeling analysis is to select stack parameters for use in subsequent refined modeling of CTG emissions. Specifically, the stack parameters associated with the maximum predicted impacts for each pollutant and averaging time were used in all simulations of the refined AERMOD analyses, which are described in the next subsection. Note that the lower exhaust temperatures and flow rates at reduced turbine loads correspond to reduced plume rise, in some cases resulting in higher offsite pollutant concentrations at ground level than the higher baseload emissions (e.g., this is the case with 24-hour and annual PM_{10} impacts, for which peak ground-level concentrations are predicted with the stack parameters corresponding to 50 percent load; see Table 4.4 (Revised)). Model input and output files for the screening modeling analysis and those from all other modeling tasks can be found on the Air Quality and Public Health Modeling DVD that is included with this submittal.

3.5 REFINED MODELING

The refined modeling analysis performed for the original PTC/PTO application to estimate offsite criteria pollutant impacts from operational emissions of the CPVS has been repeated to accommodate the refinements discussed in Section 1.0. The primary reason for remodeling the operational impacts was to confirm that the following changes would not affect the project's compliance with applicable ambient standards.

- The reduction of the maximum requested annual operating hours for three of the CTGs from 3,200 to 2,628 hours (that is, the same as for the other five CTGs);
- Reduction in the maximum annual startups and shutdowns for three of the CTGs from 350 to 300 per year (that is, the same as for the other five CTGs);
- Elimination of the diesel blackstart engine;
- Relocation of the firewater pump engine;
- Replacement of the previous 5-cell and 3-cell cooling towers at the north and south ends of the site, respectively, with single-cell cooling towers located adjacent to each of the eight CTGs; and
- Modifications to the dimensions and locations of facility structures and tanks that may change the potential for aerodynamic downwash for individual sources (see Table 2-1 (Revised) and Table 2-2 (New)).

As described above, the most recent turbine performance data provided by GE indicates mass emission rates that are slightly changed from the levels presented in the original application. These changes alone, which are on the order of hundredths of pounds per hour per turbine, were not large enough to justify remodeling. They have, however, been incorporated in the new modeling with the modifications listed above to ensure all of the most recent data are used. The only exception to this statement is a very recent reduction in the manufacturer-guarantee CTG emission rate for PM_{10} from 6 lb/hour/turbine to 5 lb/hour/turbine. Remodeling to incorporate this change was considered unnecessary given that full compliance with all applicable air quality standards was demonstrated when the higher emission rate was assumed.

The modeling was performed as described in the previous sections, using 4 years of hourly meteorological input data (1988 through 1991). Impacts for each pollutant due to the eight CTGs were modeled assuming the worst-case emissions corresponding to each averaging time and the turbine stack parameters that were determined in the turbine screening analysis (see previous subsection), as well as the maximum contributions from other operational equipment of the CPVS. The maximum mass emission rates that would occur over each averaging time, whether due to turbine startups, normal operations, turbine shutdowns, or a plausible combination of these activities, were used in all refined modeling analyses. Emission rate calculations and assumptions used for all pollutants and averaging times are documented in Appendix B (Revised).

3.6 MODELING RESULTS – COMPLIANCE WITH AMBIENT AIR QUALITY STANDARDS

Air dispersion modeling was performed according to the methodology described in Section 3 to evaluate the maximum increase in ground-level pollutant concentrations resulting from CPVS emissions, and to compare the maximum predicted impacts, including background pollutant levels, with applicable short-term and long-term CAAQS and NAAQS.

In evaluating operational impacts, the AERMOD model was used to predict the increases in criteria pollutant concentrations at all receptor concentrations due to CPVS emissions only. Next, the maximum modeled incremental increases for each pollutant and averaging time were added to the maximum background concentrations, based on air quality data collected at the most representative monitoring stations during the last 3 years (i.e., 2004 through 2006). These background concentrations are presented and discussed in Section 4.4 of the PTC/PTO application. The resulting total pollutant concentrations were then compared with the most stringent CAAQS or NAAQS.

Note that turbine commissioning impacts, which would occur on a temporary, one-time basis and would not be representative of normal operations, have not been remodeled, because the higher short-term NO_x and CO emissions that may occur during some portions of this project phase are not expected to change from the scenarios that were described in the original application. For this reason, additional modeling has been conducted only for normal, post-commissioning operations of the CPVS.

3.6.1 Normal Operational Impacts

As described above, the emissions and stack parameters used in the AERMOD simulations for the operation of the CPVS were selected to ensure that the maximum potential impacts would be addressed for each pollutant and averaging time corresponding to an ambient air quality standard. This subsection describes the maximum predicted operational impacts of the CPVS for normal combined cycle operating conditions.

Table 4-5 (Revised) summarizes the maximum predicted criteria pollutant concentrations due to all emission sources of the operational CPVS. These results show that the maximum modeled impacts due to the project emissions, in combination with conservative background concentrations, would not cause a violation of any NAAQS or CAAQS and would not significantly contribute to the existing violations of the federal and state PM_{10} standards. In addition, as described later, all of the proposed project's operational emissions of non-attainment pollutants and their precursors will be offset to ensure a net air quality benefit.

SCAQMD regulations require that information be provided on the modeled impacts of individual project sources. These results are provided in Tables 4-6a (New), Table 4-6b (New), and Table 4-6c (New). Individual sources of non-attainment pollutants must not cause incremental pollutant concentrations above specified limits. For 24-hour and annual PM_{10}, the permissible impact levels are 2.5 micrograms per cubic meter ($\mu g/m^3$) and 1 $\mu g/m^3$, respectively. For attainment pollutants (NO_2, CO, SO_2), it is only necessary to show that facility impacts plus background will not cause an exceedance of an applicable ambient standards.

Modeling results in Table 4-6c (New) indicate that the highest 24-hour offsite concentration of PM_{10} due to any of the eight individual CTGs range from a low of 1.38 $\mu g/m^3$ to a high of 1.66 $\mu g/m^3$ (Unit 8). These values are all below the SCAQMD 24-hour PM_{10} limit of 2.5 $\mu g/m^3$. The maximum annual PM_{10} value for any of the eight CTGs is also below the SCAQMD annual PM_{10} limit of 1 $\mu g/m^3$.

The locations of predicted maximum impacts would vary by pollutant and averaging time, but in all cases would be within 700 meters from the CPVS property line. The peak annual NO_2 impact and the annual maxima for SO_2 are predicted to occur approximately 700 meters east of the CPVS, roughly even with Unit 2 (formerly CTG 7) in a north-south sense. The peak annual PM_{10} impact is predicted to occur approximately 575 meters east of the eastern CPVS property line, also even with Unit 2 (formerly CTG 7). Short-term (1-hour) maxima for NO_2 and SO_2 are predicted to occur at the eastern property line of the CPVS even with Unit 3 (formerly CTG 6). Short-term (3-hour and 24-hour) maxima for SO_2 are predicted at the property line along the southeastern plant property boundary. The short-term (1-hour) maximum concentration for CO is predicted at the northwest corner of the facility property line. Maximum 24-hour PM_{10} and 8-hour CO impacts are predicted to occur approximately 450 meters south of the CPVS in line with the CTGs. Figure 4-4 (Revised) shows the locations of the maximum predicted operational impacts for all pollutants and averaging times.

3.6.2 Other Impacts

Section 4.8 of the original PTC/PTO application presented additional modeling conducted to determine potential impacts of CPVS emission plumes on visibility in the nearest Class I areas. That analysis has

not been repeated because maximum short-term emissions for the sources of the amended project are expected to be the same or lower than the levels presented in the original analysis. Specifically, maximum 24-hour turbine emissions of NO_x and SO_X are virtually unchanged and the PM_{10} emissions are reduced from the values assumed in the previous PLUVUE II plume modeling analysis, and the second largest project source of combustion pollutant emissions, the diesel blackstart engine, has been eliminated. Additionally, emissions of PM_{10} from the cooling towers are about 40 percent lower than the estimate in the original application. For this reason, the PLUVUE II results provided in the original application accurately characterize potential plume visibility impacts in the nearest Class I areas. As annual project emissions will continue to be less than 250 tons per year for all pollutants, the CPVS is not subject to the additional visibility modeling requirements under the federal Prevention of Significant Deterioration regulations.

3.6.3 Conclusions

Even though project emissions of air pollutants will be generally decreased by the proposed modifications, reanalysis of the project's impacts to air quality was conducted to ensure that the modified relationships between CPVS emission sources and on-site structures would not inadvertently result in increased pollutant concentrations compared with those presented in the PTC/PTO Application. The results of the revised analysis demonstrate that air quality impacts associated with CPVS construction and operation will continue to comply with all applicable ambient standards and SCAQMD permitting requirements.

SECTION 4 AIR TOXICS HEALTH RISK ASSESSMENT

Portions of the air toxics health risk analysis presented in Section 5 of the original PTC/PTO application have been updated to reflect the modifications to the CPVS that constitute the basis for this amendment. Specifically, the health risk assessment (HRA) modeling presented in the original application has been remodeled to reflect changes that affect the locations and magnitudes of specific project sources of TACs, as well as the relocation of other facility structures that may affect downwash of the plumes from such sources, thus altering the predicted health risks.

The HRA performed for the PTC/PTO application to estimate offsite impacts to human health from CPVS operational emissions of TACs has been remodeled to reflect the modifications to the project. The primary reason for remodeling the operational impacts was to confirm that the following changes would not affect the project's compliance with applicable ambient standards.

- Reduction of the maximum requested annual operating hours for CTGs 6 through 8 (now CTGS 1 through 3) from 3,200 to 2,628 hours (i.e., the same as requested for the other five CTGs);
- Reduction in the maximum annual startups and shutdowns for CTGs 6 through 8 (now CTGS 1 through 3) from 350 to 300 per year (i.e., the same as requested for the other five CTGs);
- Elimination of the diesel blackstart engine;
- Relocation of the diesel firewater pump engine;
- Substitution of the previous 5-cell and 3-cell cooling towers at the north and south ends of the project site, respectively, with single-cell cooling towers located adjacent to each of the eight CTGs;
- Modifications to the dimensions and locations of facility structures and tanks that may change the potential for aerodynamic downwash for individual sources of TACs; and
- Performance data for operation of the LMS100 CTGs under conditions at the CPVS site has been updated by GE, resulting in slight changes to the expected turbine heat rate and emissions (see Section 2.1).

While the overall project emissions of TACs will be lower as a result of these modifications and the stack exhaust parameters from most individual project sources are unchanged, the potential health risk effects of moving the cooling towers and other structures could not be accurately understood without remodeling. Accordingly, the HRA was remodeled to reflect all of the modifications listed above.

4.1 TAC SOURCES AND EMISSIONS

Normal emissions of toxic air contaminants (TAC) from operation of the eight gas turbines of the amended project would be slightly changed from the values used in the original application for the same reasons described for criteria pollutants in Section 2.1. Specifically, the total requested operating hours for all eight is now 2,803 hours per year; that is, 2,628 hours of normal operation plus 300 turbine startups of 25 minutes duration each and 300 shutdowns of 10 minutes duration each. The additional operating hours for Units 6, 7 and 8 in the original application have been eliminated. Table 3-8 (Revised) presents the resulting emissions,

which are based on the same U.S. EPA- and California Air Resources Board-approved emission factors that were used for the estimates presented in the original application.

The 5-cell and 3-cell mechanical draft evaporative cooling towers that were proposed in the original application have been replaced by single-cell cooling towers that will be located adjacent to each of the eight CTGs. The emissions of droplets (drift) resulting from operation of these towers are assumed to contain TACs in the same concentrations found in the cooling system circulating water, which are estimated from chemical analysis of the makeup water and the planned cycles of concentration. The resulting estimated emissions of TACs from each individual cooling tower are shown in Table 3-9 (Revised).

Estimated emissions of diesel particulate matter (DPM) from the 240-horsepower diesel firewater pump engine are unchanged from the levels indicated in Table 3-10 of the original application. However, the emissions that were presented in the same table for the much larger diesel blackstart engine are now eliminated, due to the removal of that engine from the amended project's equipment list.

4.2 CALCULATED HEALTH RISKS

The modeling methodology used in this amendment for estimating potential cancer and non-cancer health risks due to CPVS emissions of TACs is identical to that reported in Section 5 of the original PTC/PTO application. This includes the same meteorological input data and the same receptor package used for the previous analysis. Input information for characterizing the locations, magnitudes, and release characteristics of specific emission sources and other structures within the site have been updated based on the proposed changes to the facility design and operating profile. A list of these changes and a revised facility plot plan showing the locations of all emission sources and major project structures are provided in Section 1.

Per SCAQMD Rule 1402, a project is considered to pose a potentially significant health risk if the maximum calculated cancer risk at any receptor location exceeds 10 in one million ($1.0 \times 10\text{-}^{5}$). An exposure that affects each target organ is considered potentially significant if the calculated total hazard index (THI) for either chronic or acute exposures exceeds a value of 1.0.

The results of the revised HRA are presented in Table 5-1 (Revised). The maximum incremental cancer risk resulting from emissions of the amended project is estimated to be 0.472 in 1 million, at a location on the eastern CPVS property boundary. The highest cancer risk predicted to occur at a sensitive receptor is 0.283 in 1 million, at a residence approximately 100 feet east of the CPVS site property boundary. The cancer burden is zero, because this parameter represents the integrated cancer risk over all individuals with an exposure greater than 1 in 1 million. Since maximum predicted cancer risks at all receptors are well below the significance criterion of 10 in 1 million, the emissions of TACs from the operational CPVS are expected to cause a less-than-significant increase in carcinogenic health risk.

The modeling results for non-cancer chronic and acute health risks are also provided in Table 5-1 (Revised). The maximum predicted chronic total THI due to the amended project's emissions of TAC over all receptors included in the HRA modeling is estimated to be 0.008, at a location about 330 feet east of the eastern CPVS property boundary. The highest chronic THI at a sensitive receptor is estimated to be 0.003, at a farm and possible residence located approximately 750 feet east of the same property boundary. Since

the peak chronic THI values at all receptors are less than 1 percent of the significance criterion of 1.0, it is concluded that chronic non-cancer health risks due to CPVS project emissions will be less than significant.

Finally, the maximum predicted acute THI at any receptor as a result of CPVS emissions of toxic contaminants is 0.118, at a location about 2.2 miles west northwest of the CPVS. The highest acute THI at a sensitive receptor is 0.055, at St John's School about 4.3 miles to the west northwest. Because the predicted acute THI values at all receptors are well below the significance criterion of 1.0, it is concluded that acute non-cancer health risks resulting from CPVS operational emissions will be below a level of significance.

Pursuant to SCAQMD Rule 1401, it is necessary to demonstrate that maximum cancer risk, chronic THI, and acute THI values per permit unit are below the significance criteria described previously. Table 5-2 (New) provides information on the maximum cancer risk, chronic non-cancer total hazard index and acute non-cancer total hazard index associated with the emissions from each permit emission source separately.

SECTION 5 EMISSIONS OFFSETS AND PROJECT MITIGATION STRATEGIES

The emission offset program described in the SCAQMD Rules and Regulations was developed to facilitate net air quality improvement when new sources locate within the SCAQMD. Maximum potential project impacts of non-attainment pollutants (PM_{10} and ozone) and their precursors (NO_x, SO_2, and ROC) will be fully mitigated by emission offsets. The emission reductions associated with these offsets have not been accounted for in the modeled impacts described in Section 4. Thus, the impacts indicated in the presentation of model results for the proposed project are considered to be somewhat overestimated.

Table 7-1 (Revised) provides the basis for estimating project emissions offset requirements. For NO_x only, offsets will be obtained in the form of NO_x RECLAIM credits that will be purchased on a 1-to-1 basis based on annual emissions. For SO_x, ROG, and PM_{10}, the basis for offset requirements will be the average daily emissions of the month with highest expected emissions. The Applicant anticipates that the power generation requirements under the Power Purchase Agreement with SCE will require sufficient credits to cover 15 hours of normal operation per day plus two startups and shutdowns per day for all eight turbines, in addition to a 1-hour firewater pump engine test. Emission offset requirements for these pollutants will be calculated as 1.2 times the daily emissions of each pollutant. Table 7 -2 (Revised) shows the resulting emissions offset requirements for the entire project. Separate offset calculations have been prepared for the first year of operations, which includes commissioning and for subsequent years of operation. The commissioning year emissions are unchanged from the original application except for a reduction in PM_{10} emissions to reflect the revised CTG vendor emission guarantee of this pollutant, as discussed in previous sections. Detailed calculations showing the derivation of the revised emissions offset calculations are presented in Appendix B (Revised).

The Applicant will obtain sufficient RECLAIM Trading Credits to offset project emissions of NO_x. Emissions of ROG will be offset with emission reduction credits acquired on the open market. Emissions of SO_x, and PM_{10} will be offset pursuant to California Health and Safety Code Section 40440.14 enacted by the legislature (AB1318) on September 11, 2009, and signed into law on October 11, 2009.

SECTION 6 SUGGESTED CHANGES TO AQMD PERMIT CONDITIONS

The permit conditions in the FDOC prepared by SCAQMD would need to be modified to accommodate the project refinements described in this document. Specific conditions requiring changes in this regard would be:

- Removal of the separate permit conditions that were previously provided for CTGS 6 through 8, since all eight CTGS would now be permitted to operate on the same schedule of 2,628 normal hours plus 300 startup/shutdown cycles. (Eliminate Conditions A63.2, A99.2, A99.4, A99.10, A433.2, C1.2, C1.7, I296.2 and adjust the language of the corresponding conditions for Turbines 1 through 5 to be applicable to all turbines).
- The reduction in operating hours for CTGS 6-8 and the revised vendor guarantee for PM_{10} emissions from all pollutants will also change facility offset requirements. (Revise Condition I296.1). The applicant's offset estimates for the revised offset requirements for the CPVS are provided in Table 7-2 (Revised).
- Any condition pertaining to the blackstart engine should be deleted, since that equipment is no longer part of the project (Eliminate Conditions B61.2, C1.5, D12.5, E193.1, E193.5, I296.4, K67.4).

Table 2-1 (Revised)
Major Equipment List

Quantity	Description	Size/Capacity[1]	Remarks
8	Combustion Turbine	100+ MW	Water Injected for NO_X control
8	Generators	155 MVA	Included with Combustion Turbine
8	Combustion Turbine Inlet Air Cooling	85%+ Effective	Evaporative Cooling~~/Inlet Fog System~~
6	Fuel Gas Compressors	905 ~~950~~ psi discharge	
8	SCR/COcat Emissions Control Systems	BACT	
~~1~~	~~Black Start Generator~~	~~2,206 HP~~	
1 ~~2~~	Raw Water Storage Tanks	2,300,000 ~~1,128,000~~ gal	~~One i~~ Includes fire water reserve
2	Treated Water Storage Tanks	864,000 gal	
8 ~~1~~	Cooling Towers	135 ~~675~~ MMBtu/hr	Single ~~Five~~ Cell
~~1~~	~~Cooling Tower~~	~~405 MMBtu/hr~~	~~Three Cell~~
1	Fire Water Pump Skid	2,000 gpm	Jockey; Motor; and Diesel-Driven Pump
8 ~~3~~	Cooling Water Pumps	6,900 ~~19,650~~ gpm	
~~3~~	~~Cooling Water (CWP) Pumps~~	~~11,790 gpm~~	
3 ~~5~~	Plant Air Compressors and Dryers	1,500 SCFM	
8	Step-up Transformers	13.8/220 kV	To electrical grid

Notes:

Strike out text indicates major equipment as presented in the July 2009 application for comparison.

[1] Approximate size/capacity for each piece of equipment. Final sizing and configuration will be determined during detailed design.

BACT = Best Available Control Technologies

gpm – gallons per minute

kV = kilovolt

MMBtu/hr = million British thermal units per hour

MW = megawatts

NO_X = nitrogen oxide

psi = pounds per square inch

SCFM = standard cubic feet per minute

SCR = selective catalytic reduction

Table 2-2 (New)
Significant Structures and Equipment

Quantity	Description	Dimensions		
		Length (feet)	Width (feet)	Height (feet)
8	Combustion Turbine Generators (CTG)	130	90	40 (55 for VBV Duct)
8	CTG Simple Cycle SCR/COcat/Stack	67	30 (stack 13.5 in diameter)	90
8 ~~1~~	Cooling Towers	42 ~~211~~	42 ~~55~~	40 ~~36 (46-foot stacks)~~
~~1~~	~~Cooling Tower~~	~~127~~	~~55~~	~~36 (46-foot stacks)~~
1 ~~2~~	~~Cooling Tower Building/~~Warehouse	110 ~~125~~	50 ~~60~~	20-foot eave
1 ~~2~~	Operations Building	130	70	20-foot eave
1 ~~1~~	~~Gas Compression Building~~ Sound Wall Enclosure	~~120~~	~~60~~	~~20-foot eave~~ 14
~~1~~	~~Gas Compression Building~~	~~90~~	~~60~~	~~20-foot eave~~
8	Transformer Vaults with GSU	32	24	24
8	Unit Control Building	40	20	12-foot eave
1 ~~2~~	Raw Water Storage Tank	–	110 ~~80~~ dia.	64 ~~36~~
2	Treated Water Storage Tank	–	70 dia.	36
1	Fire Water Pump Enclosure	30	11	12
1	Switchyard, Buses, and Towers	1,275	100	90-foot poles
1 ~~2~~	Switchyard Building	100 ~~60~~	30 ~~25~~	9 ~~16~~-foot eave

Notes:

Strike out text indicates structures and equipment as presented in the July 2009 application for comparison.

1 Final equipment sizing will be determined during the project detail design phase.

CTG = combustion turbine generators

GSU = gas service unit

SCR = selective catalytic reduction

Table 3-1 (Revised)
Proposed Maximum CTG Operating Schedules

Operating Conditions (CTGs 1 through 8)	Annual Numbers
Number of Startups/Shutdown Cycles per CTG	300
Total Startup and Shutdown Time per CTG (hours)	175
Normal Operating Hours per CTG	2,628
Total Operating Hours per CTG	2,803

Note:

CTG = combustion turbine generators

Table 3-2 (Revised)
1-Hour Operating Emission Rates and Stack Parameters for CTG Operating Load Scenarios

Case No.	100	101	102	103	104	105	106	107	108	109	110
Ambient Temperature (°F)	17	17	17	72	72	72	72	107	107	107	107
Stack Diameter (feet)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Exhaust Flow (lb/hr)	1,704,762	1,438,475	1,138,319	1,641,406	1,605,189	1,376,241	1,092,909	1,561,119	1,484,727	1,278,007	1,020,221
CTG Load Level (percent)	100	75	50	100	100	75	50	100	100	75	50
Evaporative Cooler	NONE	NONE	NONE	YES	NONE	NONE	NONE	YES	NONE	NONE	NONE
Exhaust Temperature (°F)	742.6	743.7	761.6	785.1	791.0	770.2	785.6	798.9	812.6	790.8	804.9
Exit Velocity, feet/minute	6,026.5	5,089.8	4,087.7	6,007.6	5,902.9	4,976.8	4,001.7	5,777.1	5,554.2	4,699.0	3,793.5
NO_X Emissions per Turbine Unit											
ppmvd at 15% O_2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
lb/hr	7.91	6.25	4.59	7.95	7.78	6.09	4.48	7.55	7.18	5.65	4.17
CO Emissions per Turbine Unit											
ppmvd at 15% O_2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
lb/hr	11.56	9.13	6.70	11.62	11.36	8.91	6.55	11.03	10.49	8.25	6.10
VOC Emissions per Turbine Unit											
ppmvd at 15% O_2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
lb/hr as methane	2.21	1.74	1.28	2.22	2.17	1.70	1.25	2.11	2.00	1.58	1.16
PM_{10} Emissions per Turbine Unit											
lb/hr	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
SO_X Emissions per Turbine Unit											
lb/hr	0.623	0.492	0.361	0.626	0.612	0.480	0.353	0.594	0.565	0.444	0.328

Notes:
A natural gas fuel sulfur content of 0.25 grains per 100 dry standard cubic feet was used to estimate CTG emissions of SO_2.

CO = carbon monoxide
CTG = combustion turbine generator
°F = degrees Fahrenheit
lb/hr = pounds per hour
NO_X = nitrogen oxide
O_2 = oxygen
PM_{10} = particulate matter 10 microns in diameter
ppmvd = parts per million by volume, dry
SO_X = sulfur oxides
VOC = volatile organic compounds

Table 3-3 (Revised)
Criteria Pollutant Emission Rates During CTG Startup and Shutdown (per turbine)

Pollutant	Startup (25 minutes duration)		Shutdown (10 minutes duration)	
	Maximum Instantaneous Emission Rate (lb/hr)	Total Emissions (lb/event)	Maximum Instantaneous Emissions Rate (lb/hr)	Total Emissions (lb/event)
NO_X	59.65	24.86	34.95	6.00
CO	40.55	16.89	203.88	35.00
VOC	10.21	4.26	17.48	3.00
SO_2	0.42	0.17	0.12	0.02
PM_{10}	5.00	2.08	5.00	0.86

Notes:

CO = carbon monoxide

CTG = combustion turbine generators

lb/hr = pounds per hour

NO_X = nitrogen oxide

PM_{10} = particulate matter 10 microns in diameter

SO_2 = sulfur dioxide

VOC = volatile organic compounds

Table 3-4 (Revised)
Emergency Fire Pump Engine Emissions

Pollutant	lb/hr	lb/yr
NO_X	2.54	126.99
CO	0.31	15.61
VOC	0.05	2.65
SO_x	0.001	0.05
PM_{10}	0.07	3.70
Source Parameters	Annual emissions based on 50 hours of operation Stack height: 50 feet (12 ft building + 38 ft stack) Stack Diameter: 0.375 feet Stack exhaust flow rate at full firing: 1,227 ACFM Stack exhaust temperature at full firing: 891 ºF	

Notes:

CO = carbon monoxide

CTG = combustion turbine generators

lb/hr = pounds per hour

lb/yr = pounds per year

NO_X = nitrogen oxide

PM_{10} = particulate matter 10 microns in diameter

SO_2 = sulfur dioxide

VOC = volatile organic compounds

Table 3-6 (Revised)
Estimated Total Project Annual Emissions of Criteria

Pollutant	Emissions (tons/year)[1,2]
SO_2	6.78
NO_x	120.67
ROC	32.02
PM_{10}[3]	56.82
CO	184.41
Lead[4]	<0.6

Notes:

[1] Includes emissions from the eight CTG units, the eight cooling towers and the firewater pump.

[2] CTG emissions based on 2,805 hours of operation (2,628 hours normal operation), plus 300 startups and 300 shutdowns.

[3] PM_{10} emissions include both filterable (front-half) and condensable (back-half) particulates.

[4] Lead emissions are 'non-detect' from AP-42 for CTGs firing natural gas.

CO = carbon monoxide

NO_x = nitrogen oxides

PM_{10} = particulate matter less than 10 micrometers in diameter

ROC = reactive organic compounds

SO_2 = sulfur dioxide

Table 3-8 (Revised)
Toxic Air Contaminant Emissions from Operation of Each of Eight Natural Gas Fired Combustion Turbine

Chemical Species	Emission Factor (lb/MMBtu) [1]	Hourly Emission Rate (lb/hr)[2]	Annual Emission Rate (lb/yr)[3]
Ammonia [4]	5 ppm [5]	5.89	1.65E+04
1,3-Butadiene	4.30E-07	3.83E-04	1.07E+00
Acetaldehyde	4.00E-05	3.57E-02	1.00E+02
Acrolein	3.62E-06	3.23E-03	9.05E+00
Benzene	3.26E-06	2.91E-03	8.15E+00
Ethylbenzene	3.20E-05	2.85E-02	8.00E+01
Formaldehyde	3.60E-04	3.21E-01	9.00E+02
Propylene Oxide	2.90E-05	2.59E-02	7.25E+01
Toluene	1.30E-04	1.16E-01	3.25E+02
Xylenes	6.40E-05	5.71E-02	1.60E+02
Polycyclic Aromatic Hydrocarbons			
Benzo(a)anthracene	2.22E-08	1.98E-05	5.55E-02
Benzo(a)pyrene	1.37E-08	1.22E-05	1.32E-01
Benzo(b)fluoranthene	1.11E-08	9.90E-06	2.77E-02
Benzo(k)fluoranthene	1.08E-08	9.64E-06	2.70E-02
Chrysene	2.48E-08	2.21E-05	6.19E-02
Dibenz(a,h)anthracene	2.31E-08	2.06E-05	5.77E-02
Indeno(1,2,3-cd)pyrene	2.31E-08	2.06E-05	5.77E-02
Naphthalene	1.63E-06	1.45E-03	4.08E+00

Notes:

1 Emission factors obtained from U.S. EPA AP-42 Table 3.1-3 for uncontrolled natural-gas–fired stationary turbines. Formaldehyde, Benzene, and Acrolein emission factors are from the background document for AP-42 Section 3.1, Table 3.4-1 for a natural-gas–fired combustion turbine with a carbon monoxide catalyst. Polycyclic aromatic hydrocarbon emission factors obtained from the CATEF database for natural-gas–fired combustion turbines with selective catalytic reduction and carbon monoxide catalyst. Used a natural gas fuel higher heating value of 1,018 British thermal units/standard cubic foot.

2 Turbine maximum fuel energy consumption rate higher hearting value per turbine is 891.7 million British thermal units per hour (based on 100% load with evaporative cooling at 72 °F ambient temperature.

3 Annual emissions based on 2,803 hours per year (2,628 hours of normal operation plus 300 startups and shutdowns).

4 Not a Clean Air Act Section 112 Hazardous Air Pollutant.

5 Ammonia emission rate based on an exhaust ammonia limit of 5 parts per million by volume, dry at 15% oxygen provided by the turbine vendor.

lb/hr = pounds per hour

lb/MMBtu = pounds per million British thermal units

lb/yr = pounds per year

ppm = parts per million

Table 3-9 (Revised)
Toxic Air Contaminant Emission Rates
From Operation of Each of Eight One-Cell Cooling Towers

Toxic Air Contaminant	TAC Concentration in Source Water[1]		Single tower emissions	
	µg/liter	lb/(1,000 gallon)	lb/hr[2]	lb/yr[3]
Antimony[4]	0.34	0.000003	3.99E-08	1.12E-04
Arsenic	2.3	0.000019	2.70E-07	7.57E-04
Chlorine	27,000	0.225299	3.17E-03	8.89E+00
Chromium	0.91	0.000008	1.07E-07	3.00E-04
Copper [5]	0.85	0.000007	9.98E-08	2.80E-04
Fluoride [5]	570	0.004756	6.69E-05	1.88E-01
Lead	0.21	0.000002	2.47E-08	6.91E-05
Selenium	1.3	0.000011	1.53E-07	4.28E-04
Silica [5]	11,000	0.091789	1.29E-03	3.62E+00
Sulfate [5]	8,300	0.069259	9.75E-04	2.73E+00
Vanadium [5]	38.3	0.000320	4.50E-06	1.26E-02

Notes:

1 TAC concentrations in source water determined by chemical analysis of water from an onsite well.

2 Mass emission rates based on circulating water rate for each tower of 6,900 gallons per minute, 6.8 cycles of concentration in the cooling water system and a drift elimination efficiency that reduces drift to less than 0.0005% of the circulating water rate.

3 Annual emissions are estimated based on a maximum of 2,803 hours of cooling tower operation.

4 Not a TAC for HRA purposes.

5 Not a Clean Air Act Section 112 Hazardous Air Pollutant.

lb/hr = pounds per hour

lb/yr = pounds per year

µg/Liter = micrograms per Liter

TAC = toxic air contaminant

Table 4-2 (Revised)
Criteria Pollutant Sources and Emission Totals for the Worst-Case Project Emissions Scenarios for All Averaging Times

Averaging Time	Operating Equipment	Pollutant	Emissions in pounds – Entire Period		
			Eight CTGs	Fire Water Pump	Cooling Tower (8 cells)
1-hour	NO_X: One startup (all turbines) with remainder at normal operations (100% load, 72ºF); CO: One shutdown (all turbines) with remainder at normal operations (100% load, 72ºF); SO_2: Full-load turbine operation at 72ºF ambient temperature. All: includes test of fire pump.	NO_X	235.9	2.54	-
		CO	357.0	0.31	-
		SO_2*	5.0/19.9	0.49	-
3-hour	SO_2: Continuous full-load (all turbines) at 72ºF ambient temperature, plus test of fire pump.	SO_2*	14.95/59.8	0.001	-
8-hour	CO: One startup, one shutdown (all turbines) with remainder at normal operations (100% load, 72ºF), plus test of fire pump.	CO	1,104.0	0.31	-
24-hour	NO_X: Two startups, two shutdowns (all turbines) with remainder at normal operations (100% load, 72ºF). SO_2 Continuous full-load (all turbines) at 72ºF ambient temperature. PM_{10}: Two startups, two shutdowns (all turbines) with remainder at normal operations (50% load, 107ºF). All: includes test of fire pump.	NO_X	1,945.0	2.06	-
		SO_2*	119.5/ 478.1	0.49	-
		PM_{10}	960	0.07	12.5
Annual	All: 2,628 hours of normal operation at 100% load and 300 startup/shutdown cycles; cooling tower operation during all hours of CTG operation and 50 hours per year of fire pump testing.	NO_x	241,206	127.0	
		SO_2	13,563	0.05	
		PM_{10}	112,180	3.70	1462.6

Notes: Based on a CEC data request, emissions of SO_x for averaging times of 1 to 24 hours were modeled with values corresponding to both the expected maximum natural gas sulfur content of 0.25 grain per 100 standard dry cubic feet (gr/100 dscf) and for the hypothetical maximum sulfur content allowed under the Southern California Gas Company tariff of 1.0 gr/100 dscf.

CO = carbon monoxide
CTG = combustion turbine generators
°F = degrees Fahrenheit
NO_X = nitrogen oxide
PM_{10} = particulate matter 10 microns in diameter
SO_2 = sulfur dioxide
VOC = volatile organic compounds

Table 4-4 (Revised)
Turbine Screening Modeling Results

Stack Parameters Normal and Operational Emissions per Turbine											
Case	Case 100	Case 101	Case 102	Case 103	Case 104	Case 105	Case 106	Case 107	Case 108	Case 109	Case 110
Ambient Temperature	17 °F – 80% RH			72 °F – 40% RH				107 °F – 18% RH			
CTG Load Level	100%	75%	50%	100%	100%	75%	50%	100%	100%	75%	50%
Evaporative Cooler Status	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
Stack Outlet Temperature (°F)	742.6	743.7	761.6	785.1	791.0	770.2	785.6	798.9	812.6	790.8	804.9
Stack Exit Velocity (ft/second)	100.44	84.83	68.13	100.13	98.38	82.95	66.70	96.29	92.57	78.32	63.23
Stack Outlet Temperature (°K)	667.9	668.5	678.5	691.5	694.8	683.3	691.8	699.2	706.8	694.7	702.5
Stack Exit Velocity (m/s)	30.61	25.9	20.8	30.52	29.99	25.3	20.3	29.35	28.22	23.9	19.3
Emission Per Turbine											
NO_X (lb/hr)	7.91	6.25	4.59	7.95	7.78	6.09	4.48	7.55	7.18	5.65	4.17
CO (lb/hr)	11.56	9.13	6.70	11.62	11.36	8.91	6.55	11.03	10.49	8.25	6.10
SO_2 (lb/hr)	0.623	0.492	0.361	0.626	0.612	0.480	0.353	0.594	0.565	0.444	0.328
PM_{10} (lb/hr)*	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
NO_X (g/s)	1.0	0.79	0.58	1.00	0.98	0.77	0.56	0.95	0.90	0.71	0.53
CO (g/s)	1.46	1.15	.084	1.46	1.43	1.12	0.83	1.39	1.32	1.04	0.77
SO_2 (g/s)	0.08	0.06	0.04	0.08	0.08	0.06	0.04	0.07	0.07	0.06	0.04
PM_{10} (g/s)*	0.756	0.756	0.756	0.756	0.756	0.756	0.756	0.756	0.756	0.756	0.756

Table 4-4 (Revised)
Turbine Screening Modeling Results
(Continued)

Stack Parameters Normal and Operational Emissions per Turbine												
Case		Case 100	Case 101	Case 102	Case 103	Case 104	Case 105	Case 106	Case 107	Case 108	Case 109	Case 110
Screening Model Results – Maximum X/Q concentrations (µg/m³/(g/s)) predicted from AERMOD												
1 hour		22.1	24.47	27.68	21.79	21.98	24.56	27.75	22.22	22.65	25.23	28.93
3 hour		14.21	18.51	25.03	13.57	13.91	18.62	25.44	14.33	15.11	19.75	27.18
8 hour		10.91	13.06	18.31	10.70	10.85	13.13	18.61	11.03	11.37	14.07	20.19
24 hour		8.05	10.12	13.35	7.79	7.95	10.20	13.48	8.14	8.50	10.82	14.29
Annual		1.10	1.29	1.60	1.07	1.09	1.30	1.62	1.11	1.14	1.36	1.70
Maximum predicted offsite pollutant concentrations due to eight turbine emissions for each averaging time												
NO_2	1 hour	22.069	19.272	16.007	21.389	21.577	18.878	15.700	21.190	20.521	17.993	15.235
	annual	1.096	1.017	0.928	1.053	1.069	1.000	0.917	1.057	1.035	0.972	0.896
CO	1 hour	32.238	28.184	23.366	31.246	31.521	27.605	22.903	30.931	29.997	26.258	22.233
	8 hour	15.916	15.036	15.458	15.345	15.550	14.760	15.356	15.351	15.056	14.643	15.517
SO_2	1 hour	1.726	1.511	1.255	1.672	1.687	1.485	1.224	1.657	1.604	1.399	1.203
	3 hour	1.110	1.143	1.135	1.041	1.068	1.126	1.122	1.069	1.070	1.095	1.130
	24 hour	0.629	0.625	0.605	0.598	0.610	0.617	0.594	0.607	0.602	0.600	0.594
	Annual	0.086	0.080	0.073	0.082	0.084	0.079	0.071	0.083	0.081	0.076	0.071

Table 4-4 (Revised)
Turbine Screening Modeling Results
(Continued)

Stack Parameters Normal and Operational Emissions per Turbine												
Case		Case 100	Case 101	Case 102	Case 103	Case 104	Case 105	Case 106	Case 107	Case 108	Case 109	Case 110
PM_{10}	24 hour*	6.085	7.653	10.089	5.891	6.008	7.709	10.191	6.152	6.425	8.176	10.806
	Annual*	0.829	0.977	1.213	0.811	0.823	0.984	1.225	0.838	0.864	1.030	1.286

Notes:

*PM_{10} modeling results reflect a CTG emission rate of 6 lb/hour/turbine, although the manufacturer has recently agreed to a reduced guaranteed rate of 5 lb/hour/turbine.

Bold = highest concentration for that pollutant and averaging time.

All particulate matter emissions from CTGs are assumed to be both PM_{10} and $PM_{2.5}$.

% = percent

CO = carbon monoxide

CTG = combustion turbine generators

g/s = grams per second

$\mu g/m^3$ = micrograms per cubic meter

NO_X = nitrogen oxide(s)

ºF = degrees Fahrenheit

$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

PM_{10} = particulate matter less than 10 microns in diameter

RH = relative humidity

SO_2 = sulfur dioxide

Table 4-5 (Revised)
AERMOD Refined Modeling Results for the Operational Project (All Sources)

Pollutant	Averaging Period	Maximum Predicted Impact (µg/m³)	PSD Class II Significance Level (µg/m³)	SCAQMD Significant Change (µg/m³)	Background Concentration (µg/m³) [1]	Total Concentration (µg/m³)	NAAQS (µg/m³)	CAAQS (µg/m³)	Maximum UTMX NAD27 (m)	Maximum UTMY NAD27 (m)
NO_2	1-hour Normal[2]	139.6	NA	20	174.8	314.4	NA	339	539,712	3,754,952
	1-hour Startup[2]	139.7	NA	20	174.8	314.5	NA	339	539,712	3,754,952
	Annual[2]	0.46	1	1	24.5	25.0	100	57	540,500	3,754,900
SO_2	1-hour	33.2	NA	NA	62.9	96.1	NA	655	539,712	3,754,952
	3-hour	23.5	25	NA	41.6	65.1	1300	NA	539,732	3,754,750
	24-hour	11.0	5	NA	39.4	50.4	365	105	539,732	3,754,750
	Annual	0.03	1	NA	10.7	10.7	80	NA	540,500	3,754,900
CO	1-hour Normal	32.0	2,000	1,100	2,645	2,677	40,000	23,000	539,490	3,754,314
	1-hour Startup	163.5	2,000	1,100	2,645	2,809	40,000	23,000	539,490	3,754,314
	8-hour Normal	15.7	500	500	944.4	960.1	10,000	10,000	539,625	3,754,250
PM_{10}	24-hour[3,4]	10.6	5	2.5	161	171.6	150	50	539,625	3,754,250
	Annual[3,4]	0.43	1	1	54.9	55.3	NA	20	540,375	3,754,900
$PM_{2.5}$	24-hour	10.6	NA	NA	44.3	54.9	35	NA	539,625	3,754,250
	Annual	0.43	NA	NA	10.8	11.2	15	12	540,375	3,754,900

Notes:

1 Background represents the maximum values measured at the monitoring stations identified in original PTC/PTO application.

2 Results for NO_2 during operations used ozone limiting method with ambient ozone data collected at the Palm Spring Fire Station monitoring station for the years 1988 through 1991.

3 PM_{10} background levels exceed ambient standards.

4 All PM_{10} emissions from project sources were also considered to be PM.2.5. Also, PM_{10} and $PM_{2.5}$ modeling results reflect a CTG emission rate of 6 lb/hour/turbine, although the manufacturer has recently agreed to a reduced guaranteed rate of 5 lb/hour/turbine.

Table 4-5 (Revised)
AERMOD Refined Modeling Results for the Operational Project (All Sources)
(Continued)

Pollutant	Averaging Period	Maximum Predicted Impact (µg/m³)	PSD Class II Significance Level (µg/m³)	SCAQMD Significant Change (µg/m³)	Background Concentration (µg/m³) [1]	Total Concentration (µg/m³)	NAAQS (µg/m³)	CAAQS (µg/m³)	Maximum UTMX NAD27 (m)	Maximum UTMY NAD27 (m)

CO = carbon monoxide

CAAQS = California Ambient Air Quality Standards

m = meters

µg/m³ = micrograms per cubic meter

NAAQS = National Ambient Air Quality Standards

NO_2 = nitrogen dioxide

$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

PM_{10} = particulate matter less than 10 microns in diameter

PSD = Prevention of Significant Deterioration

SO_2 = sulfur dioxide

Table 4-6a (New)
CO and NO_2 Modeling Results for Individual Project Emission Sources for Maximum Normal Operations Emission Rates
(All values in micrograms per cubic meter – µg/m^3)

Pollutant	CO		NO_2	
Averaging Time	1-Hour	8-Hour	1-Hour	Annual
Unit 1	6.47	3.14	4.49	0.074
Unit 2	6.37	3.94	4.42	0.071
Unit 3	6.33	3.59	4.39	0.075
Unit 4	6.34	3.97	4.4	0.075
Unit 5	6.68	3.89	4.64	0.075
Unit 6	6.69	4.34	4.64	0.072
Unit 7	6.69	4.32	4.64	0.070
Unit 8	6.72	4.46	4.67	0.066
Fire Pump	21.01	10.19	139.63	0.049
All Eight Turbines Only	31.90	15.66	22.19	0.460
All Project Sources	32.03	15.67	139.64	0.462

Notes:

Numbering of CTGs in this table of results proceeds from south to north, although in the model runs the units were labeled from north to south.

CO = carbon monoxide

µg/m^3 = micrograms per cubic meter

NO_2 – nitrogen dioxide

Table 4-6b (New)
CO and NO_2 Modeling Results for Individual Project Emission Sources for Worst-Case Startup Emission Rates
(All values in micrograms per cubic meter – µg/m^3)

Pollutant	CO		NO_2
Averaging Time	1-Hour	8-Hour	1-Hour
Unit 1	32.27	4.66	21.33
Unit 2	31.18	5.84	20.61
Unit 3	30.93	5.33	20.44
Unit 4	33.51	5.89	22.15
Unit 5	33.63	5.77	22.23
Unit 6	33.97	6.45	22.45
Unit 7	33.58	6.42	22.2
Unit 8	34.04	6.62	22.5
Fire Pump	21.01	10.19	139.63
All Eight Turbines Only	163.32	23.26	107.94
All Project Sources	163.45	23.26	139.68

Notes:

Numbering of CTGs in this table of results proceeds from south to north, although in the model runs the units were labeled from north to south.

CO = carbon monoxide

µg/m^3 = micrograms per cubic meter

NO_2 – nitrogen dioxide

Table 4-6c (New)
PM_{10} and SO_2 Modeling Results for Individual Project Emission Sources for Worst-Case Normal Operations Emission Rates
(All values in micrograms per cubic meter – µg/m3)

Pollutant	PM_{10}		SO_2			
Averaging Time	24-Hour	Annual	1-Hour	3-Hour	24-Hour	Annual
Unit 1	1.39	0.061	1.39	0.75	0.082	0.004
Unit 2	1.51	0.065	1.36	0.89	0.084	0.004
Unit 3	1.38	0.067	1.36	0.81	0.087	0.004
Unit 4	1.58	0.070	1.36	0.93	0.092	0.004
Unit 5	1.48	0.072	1.43	0.88	0.094	0.004
Unit 6	1.64	0.073	1.43	0.99	0.096	0.004
Unit 7	1.64	0.072	1.43	0.99	0.094	0.004
Unit 8	1.66	0.073	1.44	1.02	0.958	0.004
Fire Pump	0.07	0.002	33.21	23.44	10.950	0.012
All Eight Turbines	10.57	0.412	6.84	4.26	0.638	0.026
Cooling Tower 1	0.14	0.012	-	-	-	-
Cooling Tower 2	0.21	0.016	-	-	-	-
Cooling Tower 3	0.23	0.023	-	-	-	-
Cooling Tower 4	0.24	0.022	-	-	-	-
Cooling Tower 5	0.25	0.023	-	-	-	-
Cooling Tower 6	0.28	0.021	-	-	-	-
Cooling Tower 7	0.34	0.024	-	-	-	-
Cooling Tower 8	0.53	0.008	-	-	-	-
All 8 Cooling Towers	0.75	0.034	-	-	-	-
All Project Sources	10.60	0.429	33.22	23.46	10.953	0.026

Notes:

Numbering of CTGs in this table of results is from south to north, although in the model runs the units were labeled from north to south.

PM_{10} and $PM_{2.5}$ modeling results reflect a CTG emission rate of 6 lb/hour/turbine, although the manufacturer has recently agreed to a reduced guaranteed rate of 5 lb/hour/turbine.

µg/m^3 = micrograms per cubic meter

PM_{10} = particulate matter less than 10 microns in diameter

SO_2 = sulfur dioxide

Table 5-1 (Revised)
Estimated Maximum Cancer Risk and Acute and Chronic Non-cancer Total Hazard Indices due to CPVS Operational Emissions

Receptor Type	Risk Type	Estimated Maximum Risk	Receptor Description/Location
Point of Maximum Impact	Cancer	0.472 in 1 million	On eastern property boundary near firewater pump
	Chronic THI	0.008	~330 feet east of the eastern CPVS property boundary
	Acute THI	0.118	~2.2 miles west northwest of project site
Sensitive/ Residential Receptors	Cancer	0.283 in 1 million	Mundhenk Residence ~100 feet east of the CPVS eastern property boundary
	Chronic THI	0.003	Farm/possible residence ~750 feet east of the eastern CPVS property boundary
	Acute THI	0.055	St John's School ~4.3 miles west northwest of CPVS site

Note:
THI = total hazard index

Table 5-2 (New)
Maximum Cancer Risk and Acute and Chronic Non-cancer
Total Hazard Indices Predicted per Permit Unit

Permit Unit	Cancer Risk (excess risk in 1 million)	UTM Easting (m)	UTM Northing (m)	Cancer burden (in 1 million)	Cancer burden (in 10 million)	Chronic Hazard Index	UTM Easting (m)	UTM Northing (m)	Acute Risk Hazard Index	UTM Easting (m)	UTM Northing (m)
Turbine 1	0.00514	539411	3745110	0	0	0.00016	539411	3745110	0.0147	536311	3756610
Turbine 2	0.00509	539411	3745110	0	0	0.00016	539411	3745110	0.0148	536311	3756610
Turbine 3	0.00505	539411	3745110	0	0	0.00015	539411	3745110	0.0149	536311	3756610
Turbine 4	0.00504	537111	3758610	0	0	0.00015	537111	3758610	0.0148	536311	3756710
Turbine 5	0.00506	537211	3758510	0	0	0.00015	537211	3758510	0.0148	536311	3756710
Turbine 6	0.00512	537311	3758410	0	0	0.00016	537311	3758410	0.0146	536211	3756410
Turbine 7	0.00510	537311	3758510	0	0	0.00016	537311	3758510	0.0146	536211	3756410
Turbine 8	0.00509	537211	3758310	0	0	0.00016	537211	3758310	0.0147	536211	3756410
Cooling Towers*	0.00957	540311	3755210	0	0	0.0071	540311	3755210	0.0018	539613	3755428
Fire Pump	0.46990	539714	3755049	0	0.000	0.0003	539714	3755049	NA	NA	NA

Note:

*The indicated value is the predicted combined cancer risk due to TAC emissions from all eight cooling towers. The combined risk is more than two orders of magnitude less than the threshold of one in a million. Thus, presentation of the cancer risks due to emissions from individual cooling towers, which must be no higher than the combined risk, was deemed unnecessary.

m = meters

Table 7-1 (Revised)
Basis for Estimating Emission Credit Requirements
to Offset Proposed Project Emissions

Emission Source[4]	Annual Operating Hours at 100% Capacity	Annual Startups and Shutdowns (CTGs only)	Daily Operating Hours at 100% Capacity for Worst Month	Daily Startups/Shutdowns for Worst Month (CTGs only)
CTGs 1-8	2,628	300	15	2
Firewater Pump Engine	50		One 1-hour test	

Note:
CTG = combustion turbine generator

Table 7-2 (Revised)
Estimated Emission Offset Requirements for the Proposed Project Emissions

Pollutant	CTG Emissions (all 8 turbines)	Firewater Pump Engine Emissions	Total Emission Credits Required	Note
NO_x (lb/year) –First year including commissioning	287,029	127	287,156	1:1 If RECLAIM
NO_x (lb/year) – All subsequent years	241,205	127	241,332	1:1 If RECLAIM
NO_x (lb/day)	1,448	3	1,740	1.2: 1 If ERCs
VOC(lb/day)	368	1	442	1.2:1 ERCs
PM_{10} (lb/day)	624	1	749	1.2:1 ERCs
SO_X (lb/day)	72	0	86	1.2:1 ERCs

Notes:

Annual emissions for NO_X based on 2,628 hours of normal operation plus 300 startup/shutdown cycles. RECLAIM credits calculated on a 1-to-1 basis.

Emissions for average day of the worst month calculated based on 15 hours per day normal operating hours plus two startup/shutdown cycles.

ERC requirements based on daily emissions as described in previous note times offset factor of 1.2-to-1.

CTG = combustion turbine generator

ERCs = emission reduction credits

lb/day = pounds per day

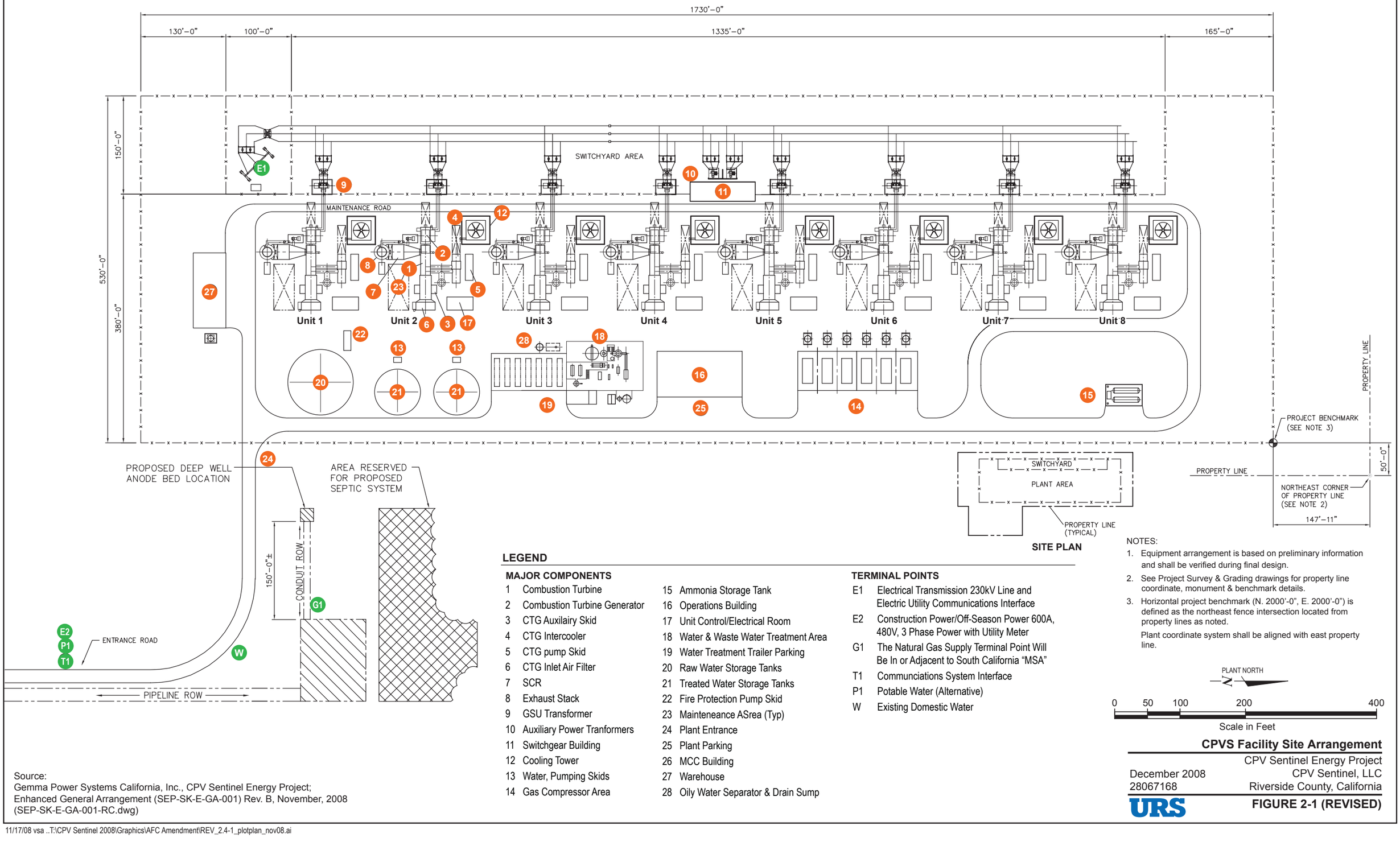
lb/year = pounds per year

NO_X = oxides of nitrogen

PM_{10} = particulate matter less than or equal to 10 microns in diameter

SO_X = oxides of sulfur

VOC = volatile organic compound



SITE PLAN

LEGEND

MAJOR COMPONENTS

1 Combustion Turbine
2 Combustion Turbine Generator
3 CTG Auxilairy Skid
4 CTG Intercooler
5 CTG pump Skid
6 CTG Inlet Air Filter
7 SCR
8 Exhaust Stack
9 GSU Transformer
10 Auxiliary Power Tranformers
11 Switchgear Building
12 Cooling Tower
13 Water, Pumping Skids
14 Gas Compressor Area
15 Ammonia Storage Tank
16 Operations Building
17 Unit Control/Electrical Room
18 Water & Waste Water Treatment Area
19 Water Treatment Trailer Parking
20 Raw Water Storage Tanks
21 Treated Water Storage Tanks
22 Fire Protection Pump Skid
23 Mainteneance ASrea (Typ)
24 Plant Entrance
25 Plant Parking
26 MCC Building
27 Warehouse
28 Oily Water Separator & Drain Sump

TERMINAL POINTS

E1 Electrical Transmission 230kV Line and Electric Utility Communications Interface
E2 Construction Power/Off-Season Power 600A, 480V, 3 Phase Power with Utility Meter
G1 The Natural Gas Supply Terminal Point Will Be In or Adjacent to South California "MSA"
T1 Communciations System Interface
P1 Potable Water (Alternative)
W Existing Domestic Water

NOTES:

1. Equipment arrangement is based on preliminary information and shall be verified during final design.
2. See Project Survey & Grading drawings for property line coordinate, monument & benchmark details.
3. Horizontal project benchmark (N. 2000'-0", E. 2000'-0") is defined as the northeast fence intersection located from property lines as noted.

   Plant coordinate system shall be aligned with east property line.

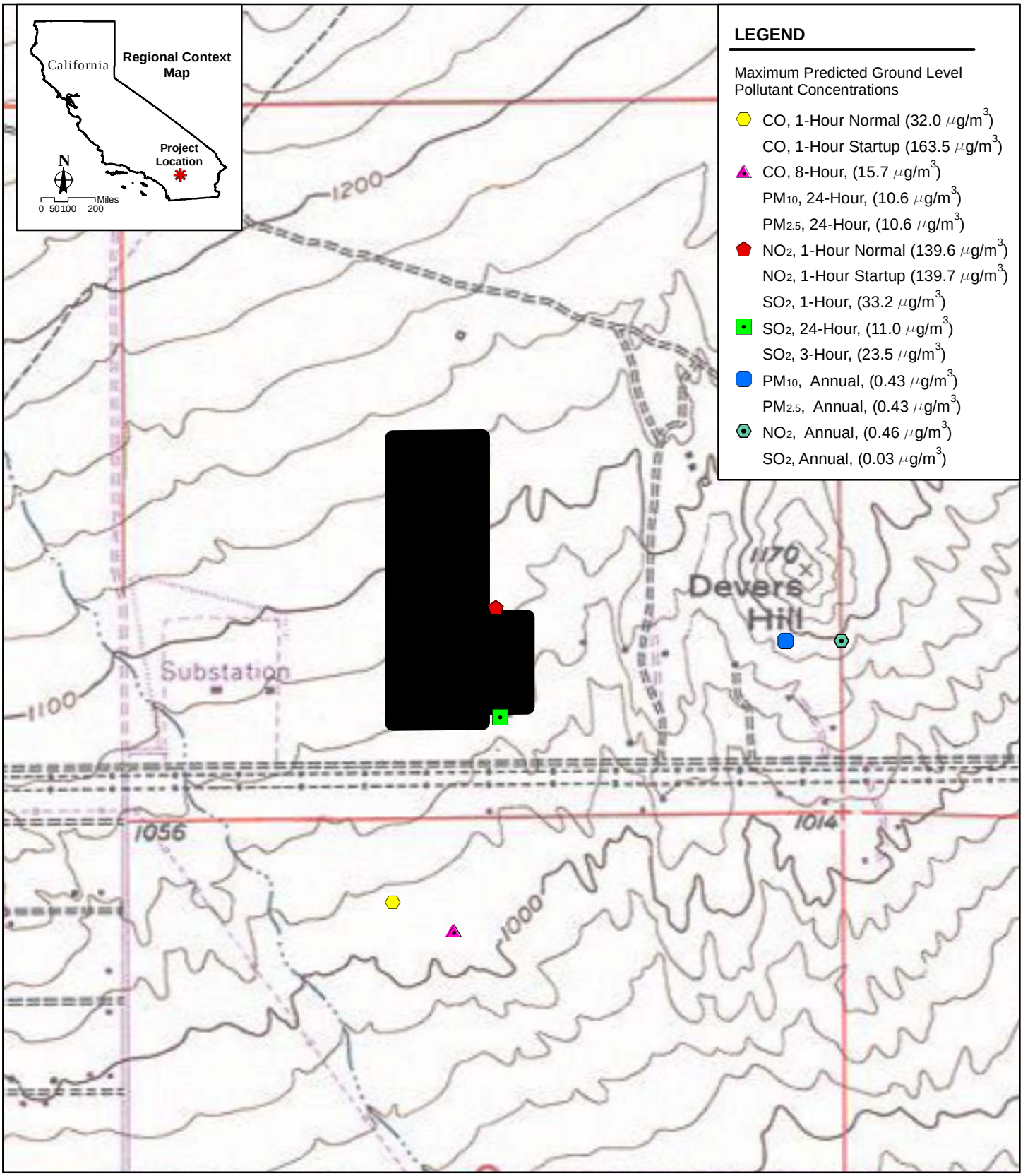
Source:
Gemma Power Systems California, Inc., CPV Sentinel Energy Project;
Enhanced General Arrangement (SEP-SK-E-GA-001) Rev. B, November, 2008
(SEP-SK-E-GA-001-RC.dwg)

CPVS Facility Site Arrangement

CPV Sentinel Energy Project
December 2008 — CPV Sentinel, LLC
28067168 — Riverside County, California

URS

FIGURE 2-1 (REVISED)



N

0 500 1,000

Scale in Feet
1:12,000

Source: USGS TOPO!
(Desert Hot Springs quad 1978).

LOCATIONS OF MAXIMUM PREDICTED AIR QUALITY IMPACTS DUE TO CPVS OPERATIONAL EMISSIONS

December 2008
28067168

CPV Sentinel Energy Project
CPV Sentinel, LLC
Riverside County, California

URS

FIGURE 4-4 (REVISED)

G:/GIS/projects/1577/28067168/mxd/aq_max_pollutant.mxd

AQMD FORMS MODIFIED FOR THIS AMENDMENT

CTG 1: Form 400-E-12, Gas Turbine

CTG 2: Form 400-E-12, Gas Turbine

CTG 3: Form 400-E-12, Gas Turbine

CTG 4: Form 400-E-12, Gas Turbine

CTG 5: Form 400-E-12, Gas Turbine

CTG 6: Form 400-E-12, Gas Turbine

CTG 7: Form 400-E-12, Gas Turbine

CTG 8: Form 400-E-12, Gas Turbine

Cooling Tower: Form 400-A, Application for Permit to Construct and Permit to Operate

A modified attachment for each Form 400-PS, Plot Plan and Stack Information Form

The following AQMD forms are eliminated from the application:

Black Start Generator

Form 400-A, Application for Permit to Construct and Permit to Operate
Form 400-E-13a, Internal Combustion Engine: Boiler
Form 400-PS, Plot Plan and Stack Information Form

South Cooling Tower

Form 400-A, Application for Permit to Construct and Permit to Operate

South Coast Air Quality Management District

FORM 400-E-12
GAS TURBINE

Mail Application To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765

Tel: (909) 396-3385
www.aqmd.gov

This form must be accompanied by a completed Application for a Permit to Construct/Operate -Form 400A, Form CEQA, Plot Plan and Stack Form

Permit to be issued to (Business name of operator to appear on permit):
CPV Sentinel, LLC

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site):
62575 power Line Rd , Desert Hot Springs, CA 92240 (●) Fixed Location ( ) Various Locations

SECTION A: EQUIPMENT INFORMATION

Turbine

Manufacturer: General Electric

Model No.: LMS 100

Serial No.:

Size (based on Higher Heating Value - HHV):

Manufacturer Maximum Input Rating: _____ MMBTU/hr _____ kWh

Manufacturer Maximum Output Rating: _____ MMBTU/hr _____ kWh

Function (Check all that apply)

[x] Electrical Generation [ ] Driving Pump/Compressor [ ] Emergency Peaking Unit
[ ] Steam Generation [ ] Exhaust Gas Recovery [ ] Other (specify): _____

Cycle Type

(●) Simple Cycle ( ) Regenerative Cycle
( ) Combined Cycle ( ) Other (specify): _____

Combustion Type

( ) Tubular ( ) Can-Annular ( ) Annular

Fuel (Turbine)

(●) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Landfill Gas* ( ) Propane ( ) Refinery Gas* ( ) Other* : _____

* (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Heat Recovery Steam Generator (HRSG)

Steam Turbine Capacity _____ MW

Low Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

High Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

Superheated Steam Output Capacity: _____ lb/hr @ _____ °F

Duct Burner

Manufacturer: Model:

Number of burners: Rating of each burner (HHV):

Type: ( ) Low NOx (please attach manufacturer's specifications)
( ) Other: _____
Show all heat transfer surface locations with the HRSG and temperature profile

Fuel (Duct Burner)

( ) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Refinery Gas* ( ) Landfill Gas* ( ) Propane ( ) Other* : _____

*(If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Air Pollution Control

- (●) Selective Catalytic Reduction (SCR)*
- ( ) Selective Non-catalytic Reduction (SNCR)*
- ( ) Oxidation Catalyst*
- ( ) Other (specify)*
- ( ) Steam/Water Injection:
  Injection Rate: ____ lbs. water/lbs. fuel, or ____ mole water/mole fuel

* Separate application is required.

Capital Cost:	Installation Cost:	Annual Operating Cost:

Oxidation Catalyst Data (If Applicable)

Manufacturer:	Model:

Catalyst Dimensions: Length: ____ ft. ____ in. Width: ____ ft. ____ in. Height: ____ ft. ____ in.

Catalyst Cell Density: ____ cells/sq. in.	Pressure Drop Across Catalyst: ____

Manufacturer's Guarantee — CO Control Efficiency: 90.00 % Catalyst Life: ____ yrs. VOC Control Efficiency: 30.00 % Operating Temp. Range: ____ °F

Space Velocity (gas flow rate/catalyst volume):	Area Velocity (gas flow/wetted catalyst surface area):

VOC Concentration into Catalyst: 5.000 PPMVD @ 15 % O_2 CO Concentration into Catalyst: 111.0 PPMVD @ 15 % O_2

SECTION B: OPERATION INFORMATION

On-line Emissions Data

Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
ROG	5.000	5.110	2.000	2.218
NOx	25.000	79.680	2.500	7.951
CO	111.000	213.450	6.000	11.618
PM10		5.000		5.000
SOx				0.626
NH3			5.000	5.900

* Based on temperature, fuel consumption, and MW output

Reference (attach data):

- [x] Manufacturer Emission Data
- [ ] EPA Emission Factors
- [ ] AQMD Emission Factors
- [ ] Source Test

Stack or Vent Data

Stack Height: 90 ft. 0.000 in. Stack Diameter: 13 ft. 6.000 in.

Exhaust Temperature: 742.60 °F Exhaust Pressure: ____ inches water column

Exhaust Flow Rate: 862625.0 CFM Oxygen Level: 15.00 %

Operating Schedule

Normal: 24 hours/day 7 days/week ____ weeks/yr

Maximum: 24 hours/day 7 days/week ____ weeks/yr

Serial Number

Startup Data	No. of Startups per day: ____ No. of Startups per year: 300 Duration of each startup: 0.5 hours
Shutdown Data	No. of Shutdowns per day: ____ No. of Shutdowns per year: 300 Duration of each shutdown: 0.2 hours

Startup and Shutdown Emissions Data

Pollutants	Startup Emissions		Shutdown Emissions	
	PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
ROG		10.120		17.480
NOx		59.650		34.950
CO		40.550		203.880
PM10		5.000		5.000
SOx		0.420		0.120
NH3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS)

CEMS Make: ____

CEMS Model: ____

Will the CEMS be used to measure both on-line and startup/shutdown emissions? (•) Yes ( ) No

The following parameters will be continuously monitored:

[x] NOx [x] CO [x] O_2

[ ] Fuel Flow Rate [ ] Ammonia Injection Rate [ ] Other (specify) ____

[ ] Ammonia Stack Concentration: Ammonia CEMS Model ____

Ammonia CEMS Make ____

SECTION G: APPLICANT CERTIFICATION STATEMENT

I hereby certify that all information contained herein and information submitted with this application is true and correct.

SIGNATURE OF PREPARER:	TITLE OF PREPARER:	PREPARER'S TELEPHONE NUMBER: (619) 243-2823
	Sen. AQ Consultant	PREPARER'S E-MAIL ADDRESS: john_lague@urscorp/com

CONTACT PERSON FOR INFORMATION ON THIS EQUIPMENT:	CONTACT PERSON'S	DATE SIGNED:
Mark Turner	TELEPHONE NUMBER: (415) 293-1463	10/15/09
E-MAIL ADDRESS: mturner@cpv.com	FAX NUMBER: (415) 957-9886	

CONFIDENTIAL INFORMATION

Under the California Public Records Act, all information in your permit application will be considered a matter of public record and may be disclosed to a third party. If you wish to keep certain items as confidential, please complete the following steps:

(a) Make a copy of any page containing confidential information blanked out. Label this page "public copy."
(b) Label the original page "confidential." Circle all confidential items on the page.
(c) Prepare a written justification for the confidentiality of each confidential item. Append this to the confidential copy.

Serial Number

South Coast Air Quality Management District

FORM 400-E-12
GAS TURBINE

Mail Application To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765

Tel: (909) 396-3385
www.aqmd.gov

This form must be accompanied by a completed Application for a Permit to Construct/Operate -Form 400A, Form CEQA, Plot Plan and Stack Form

Permit to be issued to (Business name of operator to appear on permit):
CPV Sentinel, LLC

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site):
62575 power Line Rd , Desert Hot Springs, CA 92240 (●) Fixed Location ( ) Various Locations

SECTION A: EQUIPMENT INFORMATION

Turbine

Manufacturer: General Electric

Model No.: LMS 100

Serial No.:

Size (based on Higher Heating Value - HHV):

Manufacturer Maximum Input Rating: _____ MMBTU/hr _____ kWh

Manufacturer Maximum Output Rating: _____ MMBTU/hr _____ kWh

Function (Check all that apply)

[x] Electrical Generation [ ] Driving Pump/Compressor [ ] Emergency Peaking Unit
[ ] Steam Generation [ ] Exhaust Gas Recovery [ ] Other (specify): _____

Cycle Type

(●) Simple Cycle ( ) Regenerative Cycle
( ) Combined Cycle ( ) Other (specify): _____

Combustion Type

( ) Tubular ( ) Can-Annular ( ) Annular

Fuel (Turbine)

(●) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Landfill Gas* ( ) Propane ( ) Refinery Gas* ( ) Other* : _____

* (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Heat Recovery Steam Generator (HRSG)

Steam Turbine Capacity _____ MW

Low Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

High Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

Superheated Steam Output Capacity: _____ lb/hr @ _____ °F

Duct Burner

Manufacturer: Model:

Number of burners: Rating of each burner (HHV):

( ) Low NOx (please attach manufacturer's specifications)

Type: ( ) Other: _____

Show all heat transfer surface locations with the HRSG and temperature profile

Fuel (Duct Burner)

( ) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Refinery Gas* ( ) Landfill Gas* ( ) Propane ( ) Other* : _____

*(If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Air Pollution Control

- (●) Selective Catalytic Reduction (SCR)*
- ( ) Selective Non-catalytic Reduction (SNCR)*
- ( ) Oxidation Catalyst*
- ( ) Other (specify)*
- ( ) Steam/Water Injection:
  Injection Rate: _____ lbs. water/lbs. fuel, or _____ mole water/mole fuel

* Separate application is required.

Capital Cost:	Installation Cost:	Annual Operating Cost:

Oxidation Catalyst Data (If Applicable)

Manufacturer:	Model:

Catalyst Dimensions: Length: ____ ft. ____ in. Width: ____ ft. ____ in. Height: ____ ft. ____ in.

Catalyst Cell Density: _____ cells/sq. in.	Pressure Drop Across Catalyst: _____

Manufacturer's Guarantee — CO Control Efficiency: 90.00 % Catalyst Life: _____ yrs.
VOC Control Efficiency: 30.00 % Operating Temp. Range: _____ °F

Space Velocity (gas flow rate/catalyst volume):	Area Velocity (gas flow/wetted catalyst surface area):

VOC Concentration into Catalyst: 5.000 PPMVD @ 15 % O_2 CO Concentration into Catalyst: 111.0 PPMVD @ 15 % O_2

SECTION B: OPERATION INFORMATION

On-line Emissions Data

Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
ROG	5.000	5.110	2.000	2.218
NOx	25.000	79.680	2.500	7.951
CO	111.000	213.450	6.000	11.618
PM10		5.000		5.000
SOx				0.626
NH3			5.000	5.900

* Based on temperature, fuel consumption, and MW output

Reference (attach data):
[X] Manufacturer Emission Data [ ] EPA Emission Factors [ ] AQMD Emission Factors [ ] Source Test

Stack or Vent Data

Stack Height: 90 ft. 0.000 in. Stack Diameter: 13 ft. 6.000 in.
Exhaust Temperature: 742.60 °F Exhaust Pressure: _____ inches water column
Exhaust Flow Rate: 862625.0 CFM Oxygen Level: 15.00 %

Operating Schedule

Normal: 24 hours/day 7 days/week _____ weeks/yr
Maximum: 24 hours/day 7 days/week _____ weeks/yr

Serial Number

Startup Data	No. of Startups per day: _____	No. of Startups per year: 300		Duration of each startup: 0.5 hours	
Shutdown Data	No. of Shutdowns per day: _____	No. of Shutdowns per year: 300		Duration of each shutdown: 0.2 hours	
Startup and Shutdown Emissions Data	**Pollutants**	**Startup Emissions**		**Shutdown Emissions**	
		PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
	ROG		10.120		17.480
	NOx		59.650		34.950
	CO		40.550		203.880
	PM10		5.000		5.000
	SOx		0.420		0.120
	NH3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS)

CEMS Make: _____

CEMS Model: _____

Will the CEMS be used to measure both on-line and startup/shutdown emissions? (•) Yes ( ) No

The following parameters will be continuously monitored:

[x] NOx [x] CO [x] O_2

[ ] Fuel Flow Rate [ ] Ammonia Injection Rate [ ] Other (specify) _____

[ ] Ammonia Stack Concentration: Ammonia CEMS Model _____

Ammonia CEMS Make _____

SECTION C: APPLICANT CERTIFICATION STATEMENT

I hereby certify that all information contained herein and information submitted with this application is true and correct.

SIGNATURE OF PREPARER:	TITLE OF PREPARER:	PREPARER'S TELEPHONE NUMBER: (619) 243-2823
	Sen. AQ Consultant	PREPARER'S E-MAIL ADDRESS: john_lague@urscorp/com

CONTACT PERSON FOR INFORMATION ON THIS EQUIPMENT:	CONTACT PERSON'S	DATE SIGNED:
Mark Turner	TELEPHONE NUMBER: (415) 293-1463	
E-MAIL ADDRESS: mturner@cpv.com	FAX NUMBER: (415) 957-9886	

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Serial Number

South Coast Air Quality Management District

FORM 400-E-12
GAS TURBINE

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SECTION A: EQUIPMENT INFORMATION

Turbine

Manufacturer: General Electric

Model No.: LMS 100

Serial No.:

Size (based on Higher Heating Value - HHV):

Manufacturer Maximum Input Rating: _____ MMBTU/hr _____ kWh

Manufacturer Maximum Output Rating: _____ MMBTU/hr _____ kWh

Function (Check all that apply)

☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit
☐ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): _____

Cycle Type

◉ Simple Cycle ( ) Regenerative Cycle
( ) Combined Cycle ( ) Other (specify): _____

Combustion Type

( ) Tubular ( ) Can-Annular ( ) Annular

Fuel (Turbine)

◉ Natural Gas ( ) LPG ( ) Digester Gas*
( ) Landfill Gas* ( ) Propane ( ) Refinery Gas* ( ) Other* : _____

* (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Heat Recovery Steam Generator (HRSG)

Steam Turbine Capacity _____ MW

Low Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

High Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

Superheated Steam Output Capacity: _____ lb/hr @ _____ °F

Duct Burner

Manufacturer: Model:

Number of burners: Rating of each burner (HHV):

( ) Low NOx (please attach manufacturer's specifications)

Type: ( ) Other: _____

Show all heat transfer surface locations with the HRSG and temperature profile

Fuel (Duct Burner)

( ) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Refinery Gas* ( ) Landfill Gas* ( ) Propane ( ) Other* : _____

*(If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Air Pollution Control	(●) Selective Catalytic Reduction (SCR)* ( ) Selective Non-catalytic Reduction (SNCR)* ( ) Oxidation Catalyst* ( ) Other (specify)* ( ) Steam/Water Injection: Injection Rate: ____ lbs. water/lbs. fuel, or ____ mole water/mole fuel * Separate application is required.
	Capital Cost: ____ Installation Cost: ____ Annual Operating Cost: ____
Oxidation Catalyst Data (If Applicable)	Manufacturer: ____ Model: ____
	Catalyst Dimensions: Length: ____ ft. ____ in. Width: ____ ft. ____ in. Height: ____ ft. ____ in.
	Catalyst Cell Density: ____ cells/sq. in. Pressure Drop Across Catalyst: ____
	Manufacturer's Guarantee: CO Control Efficiency: 90.00 % Catalyst Life: ____ yrs. VOC Control Efficiency: 30.00 % Operating Temp. Range: ____ °F
	Space Velocity (gas flow rate/catalyst volume): ____ Area Velocity (gas flow/wetted catalyst surface area): ____
	VOC Concentration into Catalyst: 5.000 PPMVD @ 15 % O_2 CO Concentration into Catalyst: 111.000 PPMVD @ 15 % O_2

SECTION B: OPERATION INFORMATION

On-line Emissions Data

Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
ROG	5.000	5.110	2.000	2.218
NOx	25.000	79.680	2.500	7.951
CO	111.000	213.450	6.000	11.618
PM10		5.000		5.000
SOx				0.626
NH3			5.000	5.900

* Based on temperature, fuel consumption, and MW output

Reference (attach data):
[X] Manufacturer Emission Data [ ] EPA Emission Factors [ ] AQMD Emission Factors [ ] Source Test

Stack or Vent Data

Stack Height: 90 ft. 0.000 in. Stack Diameter: 13 ft. 6.000 in.
Exhaust Temperature: 742.60 °F Exhaust Pressure: ____ inches water column
Exhaust Flow Rate: 862625.0 CFM Oxygen Level: 15.00 %

Operating Schedule

Normal: 24 hours/day 7 days/week ____ weeks/yr
Maximum: 24 hours/day 7 days/week ____ weeks/yr

Serial Number

Startup Data	No. of Startups per day:		No. of Startups per year: 300	Duration of each startup: 0.5 hours	
Shutdown Data	No. of Shutdowns per day:		No. of Shutdowns per year: 300	Duration of each shutdown: 0.2 hours	
Startup and Shutdown Emissions Data	Pollutants	Startup Emissions		Shutdown Emissions	
		PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
	ROG		10.120		17.480
	NOx		59.650		34.950
	CO		40.550		203.880
	PM10		5.000		5.000
	SOx		0.420		0.120
	NH3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS)

CEMS Make:

CEMS Model:

Will the CEMS be used to measure both on-line and startup/shutdown emissions? (•) Yes ( ) No

The following parameters will be continuously monitored:

[X] NOx [X] CO [X] O_2

[ ] Fuel Flow Rate [ ] Ammonia Injection Rate [ ] Other (specify)

[ ] Ammonia Stack Concentration: Ammonia CEMS Model

Ammonia CEMS Make

SECTION C: APPLICANT CERTIFICATION STATEMENT

I hereby certify that all information contained herein and information submitted with this application is true and correct.

SIGNATURE OF PREPARER:	TITLE OF PREPARER:	PREPARER'S TELEPHONE NUMBER: (619) 243-2823
	Sen. AQ Consultant	PREPARER'S E-MAIL ADDRESS: john_lague@urscorp/com

CONTACT PERSON FOR INFORMATION ON THIS EQUIPMENT:	CONTACT PERSON'S	DATE SIGNED:
Mark Turner	TELEPHONE NUMBER: (415) 293-1463	
E-MAIL ADDRESS: mturner@cpv.com	FAX NUMBER: (415) 957-9886	

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GAS TURBINE

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SECTION A: EQUIPMENT INFORMATION

Turbine

Manufacturer: General Electric

Model No.: LMS 100

Serial No.:

Size (based on Higher Heating Value - HHV):

Manufacturer Maximum Input Rating: _____ MMBTU/hr _____ kWh

Manufacturer Maximum Output Rating: _____ MMBTU/hr _____ kWh

Function (Check all that apply)

☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit
☐ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): _____

Cycle Type

◉ Simple Cycle ( ) Regenerative Cycle
( ) Combined Cycle ( ) Other (specify): _____

Combustion Type

( ) Tubular ( ) Can-Annular ( ) Annular

Fuel (Turbine)

◉ Natural Gas ( ) LPG ( ) Digester Gas*
( ) Landfill Gas* ( ) Propane ( ) Refinery Gas* ( ) Other* : _____

* (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Heat Recovery Steam Generator (HRSG)

Steam Turbine Capacity _____ MW

Low Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

High Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

Superheated Steam Output Capacity: _____ lb/hr @ _____ °F

Duct Burner

Manufacturer: | Model:

Number of burners: | Rating of each burner (HHV):

( ) Low NOx (please attach manufacturer's specifications)

Type: ( ) Other: _____

Show all heat transfer surface locations with the HRSG and temperature profile

Fuel (Duct Burner)

( ) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Refinery Gas* ( ) Landfill Gas* ( ) Propane ( ) Other* : _____

*(If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Air Pollution Control

- (●) Selective Catalytic Reduction (SCR)*
- ( ) Selective Non-catalytic Reduction (SNCR)*
- ( ) Oxidation Catalyst*
- ( ) Other (specify)*
- ( ) Steam/Water Injection:
  Injection Rate: _____ lbs. water/lbs. fuel, or _____ mole water/mole fuel

* Separate application is required.

Capital Cost:	Installation Cost:	Annual Operating Cost:

Oxidation Catalyst Data (If Applicable)

Manufacturer: | Model:

Catalyst Dimensions: Length: ____ ft. ____ in. Width: ____ ft. ____ in. Height: ____ ft. ____ in.

Catalyst Cell Density: ____ cells/sq. in. | Pressure Drop Across Catalyst: ____

Manufacturer's Guarantee — CO Control Efficiency: 90.00 % Catalyst Life: ____ yrs.
VOC Control Efficiency: 30.00 % Operating Temp. Range: ____ °F

Space Velocity (gas flow rate/catalyst volume): | Area Velocity (gas flow/wetted catalyst surface area):

VOC Concentration into Catalyst: 5.000 PPMVD @ 15 % O_2 | CO Concentration into Catalyst: 111.0 PPMVD @ 15 % O_2

SECTION B: OPERATION INFORMATION

On-line Emissions Data

Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
ROG	5.000	5.110	2.000	2.218
NOx	25.000	79.680	2.500	7.951
CO	111.000	213.450	6.000	11.618
PM10		5.000		5.000
SOx				0.626
NH3			5.000	5.900

* Based on temperature, fuel consumption, and MW output

Reference (attach data):
[X] Manufacturer Emission Data [ ] EPA Emission Factors [ ] AQMD Emission Factors [ ] Source Test

Stack or Vent Data

Stack Height: 90 ft. 0.000 in. Stack Diameter: 13 ft. 6.000 in.
Exhaust Temperature: 742.60 °F Exhaust Pressure: ____ inches water column
Exhaust Flow Rate: 862625.0 CFM Oxygen Level: 15.00 %

Operating Schedule

Normal: 24 hours/day 7 days/week ____ weeks/yr
Maximum: 24 hours/day 7 days/week ____ weeks/yr

Serial Number

Startup Data	No. of Startups per day:		No. of Startups per year: 300		Duration of each startup: 0.5 hours
Shutdown Data	No. of Shutdowns per day:		No. of Shutdowns per year: 300		Duration of each shutdown: 0.2 hours

Startup and Shutdown Emissions Data

Pollutants	Startup Emissions		Shutdown Emissions	
	PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
ROG		10.120		17.480
NOx		59.650		34.950
CO		40.550		203.880
PM10		5.000		5.000
SOx		0.420		0.120
NH3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS)

CEMS Make:

CEMS Model:

Will the CEMS be used to measure both on-line and startup/shutdown emissions? (•) Yes ( ) No

The following parameters will be continuously monitored:

[x] NOx [x] CO [x] O_2

[ ] Fuel Flow Rate [ ] Ammonia Injection Rate [ ] Other (specify)

[ ] Ammonia Stack Concentration: Ammonia CEMS Model

Ammonia CEMS Make

SECTION C: APPLICANT CERTIFICATION STATEMENT

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	Sen. AQ Consultant	PREPARER'S E-MAIL ADDRESS: john_lague@urscorp/com

CONTACT PERSON FOR INFORMATION ON THIS EQUIPMENT:	CONTACT PERSON'S	DATE SIGNED:
Mark Turner	TELEPHONE NUMBER: (415) 293-1463	10/15/09
E-MAIL ADDRESS: mturner@cpv.com	FAX NUMBER: (415) 957-9886	

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Model No.: LMS 100

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Manufacturer Maximum Output Rating: _____ MMBTU/hr _____ kWh

Function (Check all that apply)

☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit
☐ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): _____

Cycle Type

◉ Simple Cycle ( ) Regenerative Cycle
( ) Combined Cycle ( ) Other (specify): _____

Combustion Type

( ) Tubular ( ) Can-Annular ( ) Annular

Fuel (Turbine)

◉ Natural Gas ( ) LPG ( ) Digester Gas*
( ) Landfill Gas* ( ) Propane ( ) Refinery Gas* ( ) Other* : _____

* (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Heat Recovery Steam Generator (HRSG)

Steam Turbine Capacity _____ MW

Low Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

High Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

Superheated Steam Output Capacity: _____ lb/hr @ _____ °F

Duct Burner

Manufacturer: Model:

Number of burners: Rating of each burner (HHV):

( ) Low NOx (please attach manufacturer's specifications)

Type: ( ) Other: _____

Show all heat transfer surface locations with the HRSG and temperature profile

Fuel (Duct Burner)

( ) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Refinery Gas* ( ) Landfill Gas* ( ) Propane ( ) Other* : _____

*(If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Air Pollution Control	(●) Selective Catalytic Reduction (SCR)* ( ) Selective Non-catalytic Reduction (SNCR)* ( ) Oxidation Catalyst* ( ) Other (specify)* ( ) Steam/Water Injection: Injection Rate: ____ lbs. water/lbs. fuel, or ____ mole water/mole fuel * Separate application is required.
	Capital Cost: ____ **Installation Cost:** ____ **Annual Operating Cost:** ____
Oxidation Catalyst Data (If Applicable)	**Manufacturer:** ____ **Model:** ____
	Catalyst Dimensions: **Length:** ____ ft. ____ in. **Width:** ____ ft. ____ in. **Height:** ____ ft. ____ in.
	Catalyst Cell Density: ____ cells/sq. in. **Pressure Drop Across Catalyst:** ____
	Manufacturer's Guarantee **CO Control Efficiency:** 90.00 % **Catalyst Life:** ____ yrs. **VOC Control Efficiency:** 30.00 % **Operating Temp. Range:** ____ °F
	Space Velocity (gas flow rate/catalyst volume): ____ **Area Velocity (gas flow/wetted catalyst surface area):** ____
	VOC Concentration into Catalyst: 5.000 PPMVD @ 15 % O_2 **CO Concentration into Catalyst:** 111.0 PPMVD @ 15 % O_2

SECTION B: OPERATION INFORMATION

	Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
		PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
On-line Emissions Data	ROG	5.000	5.110	2.000	2.218
	NOx	25.000	79.680	2.500	7.951
	CO	111.000	213.450	6.000	11.618
	PM10		5.000		5.000
	SOx				0.626
	NH3			5.000	5.900

* Based on temperature, fuel consumption, and MW output

Reference (attach data):
[X] Manufacturer Emission Data [ ] EPA Emission Factors [ ] AQMD Emission Factors [ ] Source Test

Stack or Vent Data	**Stack Height:** 90 ft. 0.000 in. **Stack Diameter:** 13 ft. 6.000 in. **Exhaust Temperature:** 742.60 °F **Exhaust Pressure:** ____ inches water column **Exhaust Flow Rate:** 862625.0 CFM **OxygerLevel:** 15.00 %
Operating Schedule	**Normal:** 24 hours/day 7 days/week ____ weeks/yr **Maximum:** 24 hours/day 7 days/week ____ weeks/yr

Serial Number

Startup Data	No. of Startups per day:		No. of Startups per year: 300		Duration of each startup: 0.5 hours
Shutdown Data	No. of Shutdowns per day:		No. of Shutdowns per year: 300		Duration of each shutdown: 0.2 hours
Startup and Shutdown Emissions Data	Pollutants	Startup Emissions		Shutdown Emissions	
		PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
	ROG		10.120		17.480
	NOx		59.650		34.950
	CO		40.550		203.880
	PM10		5.000		5.000
	SOx		0.420		0.120
	NH3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS)

CEMS Make:

CEMS Model:

Will the CEMS be used to measure both on-line and startup/shutdown emissions? (•) Yes ( ) No

The following parameters will be continuously monitored:

[x] NOx [x] CO [x] O_2

[ ] Fuel Flow Rate [ ] Ammonia Injection Rate [ ] Other (specify)

[ ] Ammonia Stack Concentration: Ammonia CEMS Model

Ammonia CEMS Make

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Tel: (909) 396-3385
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This form must be accompanied by a completed Application for a Permit to Construct/Operate -Form 400A, Form CEQA, Plot Plan and Stack Form

Permit to be issued to (Business name of operator to appear on permit):
CPV Sentinel, LLC

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site):
62575 power Line Rd , Desert Hot Springs, CA 92240 ◉ Fixed Location ○ Various Locations

SECTION A: EQUIPMENT INFORMATION

Turbine

Manufacturer: General Electric

Model No.: LMS 100

Serial No.:

Size (based on Higher Heating Value - HHV):

Manufacturer Maximum Input Rating: _____ MMBTU/hr _____ kWh

Manufacturer Maximum Output Rating: _____ MMBTU/hr _____ kWh

Function (Check all that apply)

☒ Electrical Generation ☐ Driving Pump/Compressor ☐ Emergency Peaking Unit
☐ Steam Generation ☐ Exhaust Gas Recovery ☐ Other (specify): _____

Cycle Type

◉ Simple Cycle ○ Regenerative Cycle
○ Combined Cycle ○ Other (specify): _____

Combustion Type

○ Tubular ○ Can-Annular ○ Annular

Fuel (Turbine)

◉ Natural Gas ○ LPG ○ Digester Gas*
○ Landfill Gas* ○ Propane ○ Refinery Gas* ○ Other* : _____

* (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Heat Recovery Steam Generator (HRSG)

Steam Turbine Capacity _____ MW

Low Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

High Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

Superheated Steam Output Capacity: _____ lb/hr @ _____ °F

Duct Burner

Manufacturer: Model:

Number of burners: Rating of each burner (HHV):

Type: ○ Low NOx (please attach manufacturer's specifications)
○ Other: _____
Show all heat transfer surface locations with the HRSG and temperature profile

Fuel (Duct Burner)

○ Natural Gas ○ LPG ○ Digester Gas*
○ Refinery Gas* ○ Landfill Gas* ○ Propane ○ Other* : _____

*(If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Air Pollution Control	(●) Selective Catalytic Reduction (SCR)* ( ) Selective Non-catalytic Reduction (SNCR)* ( ) Oxidation Catalyst* ( ) Other (specify)* _____ ( ) Steam/Water Injection: Injection Rate: _____ lbs. water/lbs. fuel, or _____ mole water/mole fuel * Separate application is required.
	Capital Cost: _____ Installation Cost: _____ Annual Operating Cost: _____
Oxidation Catalyst Data (If Applicable)	Manufacturer: _____ Model: _____
	Catalyst Dimensions: Length: _____ ft. _____ in. Width: _____ ft. _____ in. Height: _____ ft. _____ in.
	Catalyst Cell Density: _____ cells/sq. in. Pressure Drop Across Catalyst: _____
	Manufacturer's Guarantee — CO Control Efficiency: 90.00 % Catalyst Life: _____ yrs. VOC Control Efficiency: 30.00 % Operating Temp. Range: _____ °F
	Space Velocity (gas flow rate/catalyst volume): _____ Area Velocity (gas flow/wetted catalyst surface area): _____
	VOC Concentration into Catalyst: 5.000 PPMVD @ 15 % O_2 CO Concentration into Catalyst: 111.000 PPMVD @ 15 % O_2

SECTION B: OPERATION INFORMATION

On-line Emissions Data

Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
ROG	5.000	5.110	2.000	2.218
NOx	25.000	79.680	2.500	7.951
CO	111.000	213.450	6.000	11.618
PM10		5.000		5.000
SOx				0.626
NH3			5.000	5.900

* Based on temperature, fuel consumption, and MW output

Reference (attach data):
[X] Manufacturer Emission Data [ ] EPA Emission Factors [ ] AQMD Emission Factors [ ] Source Test

Stack or Vent Data

Stack Height: 90 ft. 0.000 in. Stack Diameter: 13 ft. 6.000 in.
Exhaust Temperature: 742.60 °F Exhaust Pressure: _____ inches water column
Exhaust Flow Rate: 862625.0 CFM OxygerLevel: 15.00 %

Operating Schedule

Normal: 24 hours/day 7 days/week _____ weeks/yr
Maximum: 24 hours/day 7 days/week _____ weeks/yr

Serial Number

Startup Data	No. of Startups per day:		No. of Startups per year: 300	Duration of each startup: 0.5 hours	
Shutdown Data	No. of Shutdowns per day:		No. of Shutdowns per year: 300	Duration of each shutdown: 0.2 hours	
Startup and Shutdown Emissions Data	**Pollutants**	**Startup Emissions**		**Shutdown Emissions**	
		PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
	ROG		10.120		17.480
	NOx		59.650		34.950
	CO		40.550		203.880
	PM10		5.000		5.000
	SOx		0.420		0.120
	NH3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS)

CEMS Make:

CEMS Model:

Will the CEMS be used to measure both on-line and startup/shutdown emissions? (•) Yes ( ) No

The following parameters will be continuously monitored:

[x] NOx [x] CO [x] O_2

[ ] Fuel Flow Rate [ ] Ammonia Injection Rate [ ] Other (specify)

[ ] Ammonia Stack Concentration: Ammonia CEMS Model

Ammonia CEMS Make

SECTION C: APPLICANT CERTIFICATION STATEMENT

I hereby certify that all information contained herein and information submitted with this application is true and correct.

SIGNATURE OF PREPARER:	TITLE OF PREPARER:	PREPARER'S TELEPHONE NUMBER: (619) 243-2823
	Sen. AQ Consultant	PREPARER'S E-MAIL ADDRESS: john_lague@urscorp/com

CONTACT PERSON FOR INFORMATION ON THIS EQUIPMENT:	CONTACT PERSON'S	DATE SIGNED:
Mark Turner	TELEPHONE NUMBER: (415) 293-1463	10/15/04
E-MAIL ADDRESS: mturner@cpv.com	FAX NUMBER: (415) 957-9886	

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Serial Number

South Coast Air Quality Management District

FORM 400-E-12
GAS TURBINE

Mail Application To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765

Tel: (909) 396-3385
www.aqmd.gov

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62575 power Line Rd , Desert Hot Springs, CA 92240 (•) Fixed Location ( ) Various Locations

SECTION A: EQUIPMENT INFORMATION

Turbine

Manufacturer: General Electric

Model No.: LMS 100

Serial No.:

Size (based on Higher Heating Value - HHV):

Manufacturer Maximum Input Rating: _____ MMBTU/hr _____ kWh

Manufacturer Maximum Output Rating: _____ MMBTU/hr _____ kWh

Function (Check all that apply)

[x] Electrical Generation [ ] Driving Pump/Compressor [ ] Emergency Peaking Unit
[ ] Steam Generation [ ] Exhaust Gas Recovery [ ] Other (specify): _____

Cycle Type

(•) Simple Cycle ( ) Regenerative Cycle
( ) Combined Cycle ( ) Other (specify): _____

Combustion Type

( ) Tubular ( ) Can-Annular ( ) Annular

Fuel (Turbine)

(•) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Landfill Gas* ( ) Propane ( ) Refinery Gas* ( ) Other* : _____

* (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Heat Recovery Steam Generator (HRSG)

Steam Turbine Capacity _____ MW

Low Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

High Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

Superheated Steam Output Capacity: _____ lb/hr @ _____ °F

Duct Burner

Manufacturer: Model:

Number of burners: Rating of each burner (HHV):

( ) Low NOx (please attach manufacturer's specifications)

Type: ( ) Other: _____

Show all heat transfer surface locations with the HRSG and temperature profile

Fuel (Duct Burner)

( ) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Refinery Gas* ( ) Landfill Gas* ( ) Propane ( ) Other* : _____

*(If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Air Pollution Control	(●) Selective Catalytic Reduction (SCR)* ( ) Selective Non-catalytic Reduction (SNCR)* ( ) Oxidation Catalyst* ( ) Other (specify)* _____ ( ) Steam/Water Injection: Injection Rate: _____ lbs. water/lbs. fuel, or _____ mole water/mole fuel * Separate application is required. Capital Cost: _____ Installation Cost: _____ Annual Operating Cost: _____
Oxidation Catalyst Data (If Applicable)	Manufacturer: _____ Model: _____ Catalyst Dimensions: Length: _____ ft. _____ in. Width: _____ ft. _____ in. Height: _____ ft. _____ in. Catalyst Cell Density: _____ cells/sq. in. Pressure Drop Across Catalyst: _____ Manufacturer's Guarantee — CO Control Efficiency: 90.00 % Catalyst Life: _____ yrs. VOC Control Efficiency: 30.00 % Operating Temp. Range: _____ °F Space Velocity (gas flow rate/catalyst volume): _____ Area Velocity (gas flow/wetted catalyst surface area): _____ VOC Concentration into Catalyst: 5.000 PPMVD @ 15 % O_2 CO Concentration into Catalyst: 111.000 PPMVD @ 15 % O_2

SECTION B: OPERATION INFORMATION

On-line Emissions Data

Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
ROG	5.000	5.110	2.000	2.218
NOx	25.000	79.680	2.500	7.951
CO	111.000	213.450	6.000	11.618
PM10		5.000		5.000
SOx				0.626
NH3			5.000	5.900

* Based on temperature, fuel consumption, and MW output

Reference (attach data):
[X] Manufacturer Emission Data [ ] EPA Emission Factors [ ] AQMD Emission Factors [ ] Source Test

Stack or Vent Data

Stack Height: 90 ft. 0.000 in. Stack Diameter: 13 ft. 6.000 in.
Exhaust Temperature: 742.60 °F Exhaust Pressure: _____ inches water column
Exhaust Flow Rate: 862625.0 CFM Oxygen Level: 15.00 %

Operating Schedule

Normal: 24 hours/day 7 days/week _____ weeks/yr
Maximum: 24 hours/day 7 days/week _____ weeks/yr

Startup Data	No. of Startups per day:		No. of Startups per year: 300	Duration of each startup: 0.5 hours	
Shutdown Data	No. of Shutdowns per day:		No. of Shutdowns per year: 300	Duration of each shutdown: 0.2 hours	
Startup and Shutdown Emissions Data	Pollutants	Startup Emissions		Shutdown Emissions	
		PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
	ROG		10.120		17.480
	NOx		59.650		34.950
	CO		40.550		203.880
	PM10		5.000		5.000
	SOx		0.420		0.120
	NH3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS)

CEMS Make:

CEMS Model:

Will the CEMS be used to measure both on-line and startup/shutdown emissions? (•) Yes ( ) No

The following parameters will be continuously monitored:

[x] NOx [x] CO [x] O_2

[ ] Fuel Flow Rate [ ] Ammonia Injection Rate [ ] Other (specify)

[ ] Ammonia Stack Concentration: Ammonia CEMS Model

Ammonia CEMS Make

SECTION C: APPLICANT CERTIFICATION STATEMENT

I hereby certify that all information contained herein and information submitted with this application is true and correct.

SIGNATURE OF PREPARER:	TITLE OF PREPARER:	PREPARER'S TELEPHONE NUMBER: (619) 243-2823
	Sen. AQ Consultant	PREPARER'S E-MAIL ADDRESS: john_lague@urscorp/com

CONTACT PERSON FOR INFORMATION ON THIS EQUIPMENT:	CONTACT PERSON'S	DATE SIGNED:
Mark Turner	TELEPHONE NUMBER: (415) 293-1463	10/15/07
E-MAIL ADDRESS: mturner@cpv.com	FAX NUMBER: (415) 957-9886	

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Serial Number

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FORM 400-E-12
GAS TURBINE

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P.O. Box 4944
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Manufacturer: General Electric

Model No.: LMS 100

Serial No.:

Size (based on Higher Heating Value - HHV):

Manufacturer Maximum Input Rating: _____ MMBTU/hr _____ kWh

Manufacturer Maximum Output Rating: _____ MMBTU/hr _____ kWh

Function (Check all that apply)

[x] Electrical Generation [ ] Driving Pump/Compressor [ ] Emergency Peaking Unit
[ ] Steam Generation [ ] Exhaust Gas Recovery [ ] Other (specify): _____

Cycle Type

(•) Simple Cycle ( ) Regenerative Cycle
( ) Combined Cycle ( ) Other (specify): _____

Combustion Type

( ) Tubular ( ) Can-Annular ( ) Annular

Fuel (Turbine)

(•) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Landfill Gas* ( ) Propane ( ) Refinery Gas* ( ) Other* : _____

* (If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Heat Recovery Steam Generator (HRSG)

Steam Turbine Capacity _____ MW

Low Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

High Pressure Steam Output Capacity: _____ lb/hr @ _____ °F

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Duct Burner

Manufacturer: Model:

Number of burners: Rating of each burner (HHV):

( ) Low NOx (please attach manufacturer's specifications)

Type: ( ) Other: _____

Show all heat transfer surface locations with the HRSG and temperature profile

Fuel (Duct Burner)

( ) Natural Gas ( ) LPG ( ) Digester Gas*
( ) Refinery Gas* ( ) Landfill Gas* ( ) Propane ( ) Other* : _____

*(If Digester Gas, Landfill Gas, Refinery Gas, and/or Other are checked, attach fuel analysis indicating higher heating value and sulfur content).

Air Pollution Control

- (●) Selective Catalytic Reduction (SCR)*
- ( ) Selective Non-catalytic Reduction (SNCR)*
- ( ) Oxidation Catalyst*
- ( ) Other (specify)*
- ( ) Steam/Water Injection:
  Injection Rate: ____ lbs. water/lbs. fuel, or ____ mole water/mole fuel

* Separate application is required.

Capital Cost:	Installation Cost:	Annual Operating Cost:

Oxidation Catalyst Data (If Applicable)

Manufacturer:	Model:

Catalyst Dimensions: Length: ____ ft. ____ in. Width: ____ ft. ____ in. Height: ____ ft. ____ in.

Catalyst Cell Density: ____ cells/sq. in.	Pressure Drop Across Catalyst: ____

Manufacturer's Guarantee: CO Control Efficiency: 90.00 % Catalyst Life: ____ yrs.
VOC Control Efficiency: 30.00 % Operating Temp. Range: ____ °F

Space Velocity (gas flow rate/catalyst volume):	Area Velocity (gas flow/wetted catalyst surface area):

VOC Concentration into Catalyst: 5.000 PPMVD @ 15 % O_2	CO Concentration into Catalyst: 111.000 PPMVD @ 15 % O_2

SECTION B: OPERATION INFORMATION

On-line Emissions Data

Pollutants	Maximum Emissions Before Control*		Maximum Emissions After Control	
	PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
ROG	5.000	5.110	2.000	2.218
NOx	25.000	79.680	2.500	7.951
CO	111.000	213.450	6.000	11.618
PM10		5.000		5.000
SOx				0.626
NH3			5.000	5.900

* Based on temperature, fuel consumption, and MW output

Reference (attach data):
- [x] Manufacturer Emission Data
- [ ] EPA Emission Factors
- [ ] AQMD Emission Factors
- [ ] Source Test

Stack or Vent Data

Stack Height: 90 ft. 0.000 in. Stack Diameter: 13 ft. 6.000 in.
Exhaust Temperature: 742.60 °F Exhaust Pressure: ____ inches water column
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Operating Schedule

Normal: 24 hours/day 7 days/week ____ weeks/yr
Maximum: 24 hours/day 7 days/week ____ weeks/yr

Serial Number

Startup Data	No. of Startups per day:		No. of Startups per year: 300		Duration of each startup: 0.5 hours
Shutdown Data	No. of Shutdowns per day:		No. of Shutdowns per year: 300		Duration of each shutdown: 0.2 hours

Startup and Shutdown Emissions Data	Pollutants	Startup Emissions		Shutdown Emissions	
		PPM@15% O_2, dry	lb/Hour	PPM@15% O_2, dry	lb/Hour
	ROG		10.120		17.480
	NOx		59.650		34.950
	CO		40.550		203.880
	PM10		5.000		5.000
	SOx		0.420		0.120
	NH3				

Monitoring and Reporting

Continuous Emission Monitoring System (CEMS)

CEMS Make:

CEMS Model:

Will the CEMS be used to measure both on-line and startup/shutdown emissions? (•) Yes ( ) No

The following parameters will be continuously monitored:

[x] NOx [x] CO [x] O_2

[ ] Fuel Flow Rate [ ] Ammonia Injection Rate [ ] Other (specify)

[ ] Ammonia Stack Concentration: Ammonia CEMS Model

Ammonia CEMS Make

SECTION C: APPLICANT CERTIFICATION STATEMENT

I hereby certify that all information contained herein and information submitted with this application is true and correct.

SIGNATURE OF PREPARER:	TITLE OF PREPARER: Sen. AQ Consultant	PREPARER'S TELEPHONE NUMBER: (619) 243-2823 PREPARER'S E-MAIL ADDRESS: john_lague@urscorp/com

CONTACT PERSON FOR INFORMATION ON THIS EQUIPMENT: Mark Turner E-MAIL ADDRESS: mturner@cpv.com	CONTACT PERSON'S TELEPHONE NUMBER: (415) 293-1463 FAX NUMBER: (415) 957-9886	DATE SIGNED:

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(c) Prepare a written justification for the confidentiality of each confidential item. Append this to the confidential copy.

South Coast Air Quality Management District

Form 400-A

Application For Permit To Construct and Permit To Operate

Mail Application To:
P.O. Box 4944
Diamond Bar, CA 91765

Tel: (909) 396-3385
www.aqmd.gov

Section A: Operator Information

1. Business Name of Operator To Appear On The Permit: CPV Sentinel, LLC

2. Valid AQMD Facility ID (Available on Permit or Invoice issued by AQMD):

3. Owner's Business Name (only if different from Business Name of Operator):

Section B: Equipment Location

4. Equipment Location Address:
For equipment operated at various locations in AQMD's jurisdiction, provide address of initial site

62575 Power Line Rd.
Street Address

Desert Hot Springs, CA, 92240
City State Zip Code

County: ○ Los Angeles ○ Orange ○ San Bernardino ◉ Riverside

Contact Name: Mark Turner

Contact Title: Project Manager Phone: (415) 293-1463

Fax: (415) 957-9886 E-Mail: mturner@cpv.com

Section C: Permit Mailing Address

5. Permit and Correspondence Information:
☐ Check here if same as equipment location address

55 Second Street, Suite 525
Street Address

San Francisco, CA, 94105
City State Zip Code

Contact Name: Mark Turner

Contact Title: Project Manager Phone: (415) 293-1463

Fax: (415) 957-9886 E-Mail: mturner@cpv.com

Section D: Application Type

The facility is in ○ RECLAIM ◉ Title V ○ RECLAIM & Title V Program (please check if applicable)

6. Reason for Submitting Application (Select only ONE):

- ◉ New Construction (Permit to Construct)
- ○ Equipment Operating Without A Permit or Expired Permit*
- ○ Administrative Change
- ○ Equipment On-Site But Not Constructed or Operational
- ○ Title V Application (Initial, Revisions, Modifications, etc.)
- ○ Compliance Plan
- ○ Facility Permit Amendment
- ○ Registration/Certification
- ○ Streamlined Standard Permit
- ○ Permitted Equipment Altered/ Modified Without Permit Approval*
- ○ Proposed Alteration/Modification to Permitted Equipment
- ○ Change of Condition For Permit To Operate
- ○ Change of Condition For Permit To Construct
- ○ Change of Location—Moving to New Site

Existing Or Previous Permit/Application Number:
(If you checked any of the items in this column, you MUST provide a existing Permit/ Application Number)

* A Higher Permit Processing Fee applies to those items with an asterisk (Rule 301 (c) (1) (D)

7. Estimated Start Date of Operation/Construction (MM/DD/YYYY): 06/01/2010

8. Description of Equipment:
Cooling Water Tower - single cell mechanical draft evaporative cooling tower to provide cooling for one CTG. Eight identical cooling towers (total) are included at CPVS.

9. Is this equipment portable AND will it be operated at different locations within AQMD's jurisdiction? ◉ No ○ Yes

10. For Identical equipment, how many additional applications are being submitted with this application? (Form 400-A required for each) 0

11. Are you a Small Business as per AQMD's Rule 102 definition? (10 employees or less and total gross receipts are $500,000 or less, or a not-for-profit training center?) ◉ No ○ Yes

12. Has a Notice of Violation (NOV) or a Notice To Comply (NC) been issued for this equipment?
◉ No ○ Yes If yes, provide NOV/NC #:

Section E: Facility Business Information

13. What type of business is being conducted at this equipment location? Power generation

14. What is your businesses primary NAICS Code (North American Industrial Classification System)? 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? ◉ No ○ Yes

16. Are there any schools (K-12) within a 1000-ft. radius of the equipment physical location? ◉ No ○ Yes

Section F: Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application is true and correct.

17. Signature of Responsible Official:

18. Title: Project Manager

19. Print Name: Mark Turner

20. Date: Oct. 15, 2009

Check List

- ☐ Form(s) signed and dated by authorized official
- ☐ Supplemental Equipment Form (400-E-XX or 400-E-GEN)
- ☐ CEQA Form (400-CEQA) attached
- ☐ Payment for permit processing fee attached

Your application will be rejected if any of the above items are missing.

AQMD USE ONLY	APPLICATION/TRACKING #	TYPE B C D	EQUIPMENT CATEGORY CODE:	FEE SCHEDULE: $	VALIDATION
ENG. A R DATE	ENG. A R DATE	CLASS I III IV	ASSIGNMENT Unit Engineer	CHECK/MONEY ORDER #	AMOUNT $	Tracking #

CVP Sentinel Energy Project

AQMD Form 400-PS Attachment

Building data for buildings near SCR Exhaust Stacks:

Building Name	Height*	Width*	Length*
Warehouse	24	53	115
CTG 1	40	33	131
SCR 1	40	26	52
Cooling Tower 1	35	46	46
Control Room 1	12	20	40
CTG 2	40	33	131
SCR 2	40	26	52
Cooling Tower 2	35	46	46
Control Room 2	12	20	40
CTG 3	40	33	131
SCR 3	40	26	52
Cooling Tower 3	35	46	46
Control Room 3	12	20	40
CTG 4	40	33	131
SCR 4	40	26	52
Cooling Tower 4	35	46	46
Control Room 4	12	20	40
CTG 5	40	33	131
SCR 5	40	26	52
Cooling Tower 5	35	46	46
Control Room 5	12	20	40
CTG 6	40	33	131
SCR 6	40	26	52
Cooling Tower 6	35	46	46
Control Room 6	12	20	40
CTG 7	40	33	131
SCR 7	40	26	52
Cooling Tower 7	35	46	46
Control Room 7	12	20	40
CTG 8	40	33	131
SCR 8	40	26	52
Cooling Tower 8	35	46	46
Control Room 8	12	20	40

*All dimensions given are in feet.

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: **Daniele Marcucci**
Project Info: **CPV Sentinel Project**

Engine: **LMS100 PA**
Deck Info: **G0179C - 87o.scp**
Generator: **BDAX 82-445ER 60Hz, 13.8kV, 0.9PF (35404)**
Fuel: **Site Gas Fuel#900-1837, 20600 Btu/lb,LHV**

Date: **05/15/2008**
Time: **1:39:06 PM**
Version: **3.7.0**

Case #	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**110**
Ambient Conditions											
Dry Bulb, °F	17.0	17.0	17.0	72.0	72.0	72.0	72.0	107.0	107.0	107.0	107.0
Wet Bulb, °F	15.8	15.8	15.8	57.1	57.1	57.1	57.1	72.2	72.2	72.2	72.2
RH, %	80.0	80.0	80.0	40.0	40.0	40.0	40.0	18.4	18.4	18.4	18.4
Altitude, ft	1080.0	1080.0	1080.0	1080.0	1080.0	1080.0	1080.0	1080.0	1080.0	1080.0	1080.0
Ambient Pressure, psia	14.132	14.131	14.131	14.132	14.132	14.131	14.131	14.132	14.132	14.131	14.131
Engine Inlet											
Comp Inlet Temp, °F	16.0	17.0	17.0	59.3	72.0	72.0	72.0	77.4	107.0	107.0	107.0
RH, %	96.9	80.0	80.0	87.8	40.0	40.0	40.0	78.3	18.4	18.4	18.4
Conditioning	NONE	NONE	NONE	EVAP	NONE	NONE	NONE	EVAP	NONE	NONE	NONE
Tons or kBtu/hr	0	0	0	0	0	0	0	0	0	0	0
Pressure Losses											
Inlet Loss, inH20	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Exhaust Loss, inH20	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Partload %	**100**	**75**	**50**	**EVAP-100**	**100**	**75**	**50**	**EVAP-100**	**100**	**75**	**50**
kW, Gen Terms	**102548**	**76927**	**51295**	**101279**	**98109**	**73597**	**49080**	**94674**	**88141**	**66119**	**44098**
Est. Btu/kW-hr, LHV	**7806**	**8213**	**9043**	**7939**	**8015**	**8375**	**9232**	**8066**	**8236**	**8638**	**9569**
Guar. Btu/kW-hr, LHV	**8006**	**8424**	**9275**	**8143**	**8221**	**8590**	**9469**	**8273**	**8447**	**8859**	**9814**
Fuel Flow											
MMBtu/hr, LHV	800.5	631.8	463.8	804.1	786.4	616.4	453.1	763.6	725.9	571.1	422.0
lb/hr	38859	30671	22517	39034	38174	29922	21996	37070	35239	27724	20483
NOx Control	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Water Injection											
lb/hr	30395	21745	13881	28181	28551	19663	12359	25338	24790	16970	10602
Temperature, °F	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0
Intercooler	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**
Humidification	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
IC Heat Extraction, btu/s	24794	18075	11097	30778	31642	24981	16657	33611	33375	26831	18472
KOD Water Extraction, lb/s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0
Control Parameters											
HP Speed, RPM	9245	9095	8925	9354	9350	9142	8959	9358	9352	9136	8952
LP Speed, RPM	5061	4726	4507	5321	5293	4942	4715	5274	5295	5027	4801
PT Speed, RPM	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
PS3 - CDP, psia	567.0	468.9	362.9	554.7	542.2	452.0	350.7	527.9	501.9	419.9	327.4
T23 - Intcrl Inlet Temp, °F	284.6	258.9	222.8	336.1	348.9	327.9	290.6	350.5	382.4	362.3	325.4
P23 - Intcrl Inlet Pressure, psia	57.2	50.8	42.8	54.1	52.8	48.3	41.0	51.6	49.1	45.2	38.6
W23 - Intcrl Inlet Flow, lb/s	455.8	401.5	351.7	438.8	428.8	369.9	323.3	419.5	397.1	344.0	301.4
T25 - HPC Inlet Temp, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
T3CRF - CDT, °F	713	687	658	724	724	688	659	721	720	685	657
T48IN, °R	1984	1924	1856	2031	2031	1943	1875	2031	2031	1942	1874
T48IN, °F	1524	1464	1397	1571	1571	1483	1416	1572	1571	1482	1414

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: **Daniele Marcucci**
Project Info: **CPV Sentinel Project**

Engine: **LMS100 PA**
Deck Info: **G0179C - 87o.scp**
Generator: **BDAX 82-445ER 60Hz, 13.8kV, 0.9PF (35404)**
Fuel: **Site Gas Fuel#900-1837, 20600 Btu/lb,LHV**
Date: **05/15/2008**
Time: **1:39:06 PM**
Version: **3.7.0**

Case #	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**110**
Exhaust Parameters											
Temperature, °F	742.6	743.7	761.6	785.1	791.0	770.2	785.6	798.9	812.6	790.8	804.9
lb/sec	473.5	399.6	316.2	455.9	445.9	382.3	303.6	433.6	412.4	355.0	283.4
lb/hr	1704762	1438475	1138319	1641406	1605189	1376241	1092909	1561119	1484727	1278007	1020221
Energy, Btu/s- Ref 0 °R	146365	123005	98361	147293	144535	120934	96786	141887	136292	114421	91952
Cp, Btu/lb-R	0.2729	0.2714	0.2703	0.2767	0.2764	0.2735	0.2724	0.2775	0.2775	0.2746	0.2734
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)											
NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25	25	25	25
NOx as NO2, lb/hr	79	63	46	80	78	61	45	76	72	57	42
CO ppmvd Ref 15% O2	155	155	137	126	133	132	113	117	122	118	99
CO, lb/hr	299.01	236.60	153.30	245.34	252.72	195.64	123.76	215.76	213.45	162.83	100.47
CO2, lb/hr	102637.70	81056.25	59580.86	103154.90	100862.70	79119.49	58235.85	97992.56	93140.53	73338.89	54256.38
HC ppmvd Ref 15% O2	8	8	6	6	6	6	5	5	5	5	4
HC, lb/hr	8.49	6.73	4.06	6.17	6.58	5.05	2.85	5.12	5.22	3.89	2.02
SOX as SO2, lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum Emissions											
NOx ppmvd Ref 15% O2	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**
NOx as NO2, lb/hr	**79.270**	**62.54**	**45.89**	**79.68**	**77.92**	**61.03**	**44.85**	**75.69**	**71.93**	**56.56**	**41.77**
CO ppmvd Ref 15% O2	**110.60**	**110.60**	**110.60**	**92.40**	**77.70**	**77.70**	**77.70**	**73.30**	**68.30**	**68.30**	**68.30**
CO, lb/hr	**213.45**	**168.39**	**123.57**	**179.23**	**147.39**	**115.45**	**84.83**	**135.04**	**119.61**	**94.04**	**69.45**
HC ppmvd Ref 15% O2	**23.20**	**23.30**	**19.20**	**16.80**	**18.30**	**17.90**	**13.80**	**14.60**	**15.70**	**14.90**	**10.50**
HC, lb/hr	**25.57**	**20.26**	**12.24**	**18.58**	**19.82**	**15.22**	**8.59**	**15.41**	**15.73**	**11.72**	**6.09**
VOC ppmvd Ref 15% O2	**4.60**	**4.70**	**3.80**	**3.40**	**3.70**	**3.60**	**2.80**	**2.90**	**3.10**	**3.00**	**2.10**
VOC, lb/hr	**5.11**	**4.05**	**2.45**	**3.72**	**3.96**	**3.04**	**1.72**	**3.08**	**3.15**	**2.34**	**1.22**
PM10, lb/hr	**5.00**	**5.00**	**5.00**	**5.00**	**5.00**	**5.00**	**5.00**	**5.00**	**5.00**	**5.00**	**5.00**
Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)											
AR	1.2309	1.2368	1.2430	1.2207	1.2233	1.2310	1.2374	1.2191	1.2217	1.2292	1.2355
N2	72.1947	72.5352	72.8988	71.5984	71.7512	72.1985	72.5704	71.5046	71.6562	72.0954	72.4585
O2	13.5620	14.2193	14.9082	13.0063	13.0533	13.9566	14.6761	12.9900	13.0411	13.9423	14.6590
CO2	6.0206	5.6349	5.2341	6.2845	6.2835	5.7490	5.3285	6.2771	6.2732	5.7385	5.3181
H20	6.9705	6.3539	5.6993	7.8714	7.6691	6.8473	6.1733	7.9917	7.7897	6.9784	6.3160
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0175	0.0164	0.0135	0.0149	0.0157	0.0142	0.0113	0.0138	0.0144	0.0127	0.0098
HC	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0003	0.0003	0.0004	0.0003	0.0002
NOX	0.0032	0.0030	0.0028	0.0033	0.0033	0.0030	0.0028	0.0033	0.0033	0.0030	0.0028
Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)											
AR	0.9722	0.9695	0.9667	0.9743	0.9742	0.9704	0.9674	0.9743	0.9742	0.9704	0.9674
N2	81.3140	81.0828	80.8452	81.4911	81.4832	81.1604	80.9097	81.4912	81.4816	81.1587	80.9080
O2	13.3732	13.9158	14.4748	12.9602	12.9782	13.7357	14.3253	12.9610	12.9829	13.7409	14.3304
CO2	4.3165	4.0096	3.6950	4.5532	4.5423	4.1138	3.7817	4.5537	4.5408	4.1121	3.7800
H20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0198	0.0184	0.0149	0.0170	0.0179	0.0160	0.0126	0.0158	0.0164	0.0143	0.0110
HC	0.0010	0.0009	0.0007	0.0008	0.0008	0.0007	0.0005	0.0007	0.0007	0.0006	0.0004
NOX	0.0032	0.0030	0.0027	0.0034	0.0034	0.0030	0.0028	0.0034	0.0034	0.0030	0.0028

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: **Daniele Marcucci**
Project Info: **CPV Sentinel Project**

Engine: **LMS100 PA**
Deck Info: **G0179C - 87o.scp**
Generator: **BDAX 82-445ER 60Hz, 13.8kV, 0.9PF (35404)**
Fuel: **Site Gas Fuel#900-1837, 20600 Btu/lb,LHV**

Date: **05/15/2008**
Time: **1:39:06 PM**
Version: **3.7.0**

Case #	100	101	102	103	104	105	106	107	108	109	110
Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)											
AR	0.8665	0.8731	0.8802	0.8552	0.8580	0.8667	0.8739	0.8535	0.8563	0.8648	0.8718
N2	72.4669	73.0180	73.6103	71.5264	71.7640	72.4844	73.0873	71.3814	71.6170	72.3237	72.9118
O2	11.9182	12.5317	13.1794	11.3755	11.4301	12.2673	12.9403	11.3530	11.4112	12.2450	12.9141
CO2	3.8469	3.6108	3.3643	3.9964	4.0005	3.6740	3.4160	3.9888	3.9911	3.6644	3.4064
H20	10.8802	9.9464	8.9491	12.2279	11.9279	10.6899	9.6680	12.4060	12.1066	10.8861	9.8831
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0176	0.0166	0.0136	0.0149	0.0157	0.0143	0.0114	0.0138	0.0144	0.0128	0.0099
HC	0.0009	0.0008	0.0006	0.0007	0.0007	0.0006	0.0005	0.0006	0.0006	0.0005	0.0004
NOX	0.0028	0.0027	0.0025	0.0030	0.0030	0.0027	0.0025	0.0029	0.0029	0.0027	0.0025
O2 Correction Factor	0.7853	0.8459	0.9189	0.7447	0.7464	0.8248	0.8982	0.7448	0.7468	0.8253	0.8988
Exhaust Molecular Weight	28.120	28.201	28.288	27.986	28.019	28.125	28.214	27.966	27.999	28.103	28.189
Stack Emissions (after SCR/oxcat)											
NOx ppmvd Ref 15% O2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
CO ppmvd Ref 15% O2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
VOC ppmvd Ref 15% O2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NH3 ppmvd Ref 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
NOx as NO2, lb/hr	7.913	6.246	4.586	7.951	7.775	6.094	4.481	7.551	7.178	5.647	4.173
CO, lb/hr	11.563	9.127	6.701	11.618	11.361	8.905	6.548	11.034	10.489	8.252	6.098
VOC, lb/hr	2.208	1.742	1.279	2.218	2.169	1.700	1.250	2.107	2.002	1.575	1.164
NH3, lb/hr	5.858	4.624	3.395	5.886	5.756	4.512	3.317	5.590	5.314	4.181	3.090
SOX, lb/hr (based on 0.25 gr/SCF)	0.623	0.492	0.361	0.626	0.612	0.480	0.353	0.594	0.565	0.444	0.328
PM10, lb/hr	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000

Aero Energy Fuel Number	**900-1837 (CPV Sentinel 150)**	
	Volume %	**Weight %**
Hydrogen	0.0000	0.0000
Methane	95.9992	91.2962
Ethane	1.7359	3.0943
Ethylene	0.0000	0.0000
Propane	0.3325	0.8692
Propylene	0.0000	0.0000
Butane	0.1224	0.4217
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.0343	0.1467
Cyclopentane	0.0000	0.0000
Hexane	0.0258	0.1318
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	1.1961	3.1207
Nitrogen	0.5537	0.9195
Water Vapor	0.0000	0.0000
Oxygen	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000
Ammonia	0.0000	0.0000

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: **Daniele Marcucci**
Project Info: **CPV Sentinel Project**

Engine: **LMS100 PA**
Deck Info: **G0179C - 87o.scp**
Generator: **BDAX 82-445ER 60Hz, 13.8kV, 0.9PF (35404)**
Fuel: **Site Gas Fuel#900-1837, 20600 Btu/lb,LHV**

Date: **05/15/2008**
Time: **1:39:06 PM**
Version: **3.7.0**

Case #	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**110**
Btu/lb, LHV	20600										
Btu/scf, LHV	918										
Btu/scf, HHV	1018										
Btu/lb, HHV	22838										
Fuel Temp, °F	150.0										
NOx Scalar	1.010										
Specific Gravity	0.58										
Engine Exhaust											
Exhaust Avg. Mol. Wt., Wet Basis	28.1	28.2	28.3	28.0	28.0	28.1	28.2	28.0	28.0	28.1	28.2
Exhaust Flow, ACFM	894504	753259	603127	895913	879274	738571	591977	862163	827947	697845	561667
Exhaust Flow, SCFM	367501	309207	243935	355534	347278	296624	234817	338387	321449	275669	219389
Exhaust Flow, Btu/lb	309	308	311	323	324	316	319	327	330	322	324
Exhaust Flow, Calories/s	36884055	30997382	24786986	37117903	36422789	30475394	24390035	35755485	34345549	28834163	23171811
Inlet Flow Wet, pps	456.1	401.7	351.9	439.0	429.0	370.1	323.4	419.7	397.3	344.1	301.6
Inlet Flow Dry, pps	455.2	401.1	351.4	434.7	426.0	367.6	321.2	412.8	393.5	340.8	298.7
Shaft HP	139415	104838	70313	137704	133421	100351	67325	128789	119974	90274	60621

Transient Emissions Summary

LMS100 PA Estimated Startup / Shutdown Emissions at Package Exit

T2 (°F / °C)		CO (lb)*	NOx (lb)*	VOC (lb)*	PM10 (lb)*
-30 / -34.4	Start	15	5	3	11
	Shutdown	59	6	3	11
59 / 15	Start	13	5	3	11
	Shutdown	35	6	3	11
78 / 25.5	Start	13	5	3	11
	Shutdown	29	6	3	11
90 / 32.2	Start	13	5	3	11
	Shutdown	29	6	3	11

* Margined average engine emissions - NOT A GUARANTEE

Assumptions: Natural gas, sea level, 4"/6" losses, water injection to 25 PPM NOx @ 15% O2

May 22, 2006

Notes: The table shown above was provided by GE (and confirmed on 4/27/07).
Based on the table, the cold start CO used is 14 lb.
All other startup values at all other ambients are a constant.
PM10 emissions are limited to 6 pounds per hour, not 11 as presented in the table.

Complete Start (Ignition to full compliance)		CO lb	NOx lb	VOC lb	PM10 lb	Fuel MMBtu	SO2** lb
Cold Day (17°F)	Initial 10 minutes	14.0	5.0	3.0	0.8	26.0	0.02
	Final 15 minutes *	2.9	19.8	1.3	1.3	197.5	0.15
	Total	16.9	24.8	4.3	2.1	223.5	0.17
Avg Day (72°F)	Initial 10 minutes	13.0	5.0	3.0	0.8	26.0	0.02
	Final 15 minutes *	2.9	19.9	1.0	1.3	197.4	0.15
	Total	15.9	24.9	4.0	2.1	223.4	0.17
Hot Day (107°F)	Initial 10 minutes	13.0	5.0	3.0	0.8	26.0	0.02
	Final 15 minutes *	2.7	18.9	0.8	1.3	187.5	0.15
	Total	15.7	23.9	3.8	2.1	213.5	0.17

Notes: * Oxidation catalyst expected to be fully effective at end of GE 10 minute start interval.
Other emissions during start-up and all emissions during transient assumed to be unabated.

Cold Day	59	6	3	1.03	26	0.02
Average Day	35	6	3	1.03		
Hot day	29	6	3	1.03		

Commissioning Emissions

Description	Power Level	Corrected Operating Hrs	Estimated Fuel Rate	Total Estimated Emission per Event)				
				NOX	CO	VOC	PM10	SOX
			(MMBtu/hr)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)
* First fire the unit & then shutdown to check for leaks, etc								
	Core/Sync Idle	23.1	73.5	256.7	1048.6	26.7	138.5	1.2
* Synch & Check E-stop								
	Sync Idle	17.3	73.5	191.8	786.1	20.0	103.8	0.9
* Additional AVR Commissioning								
	0.05	17.3	92.8	362.0	523.6	12.5	103.8	1.1
* Break-in Run								
	0.05	11.5	92.8	240.9	349.0	8.4	69.2	0.7
* Dynamic Commissioning of AVR & Commission Water								
Load Step 1	0.1	5.8	166	96.3	399.5	30.3	34.6	0.7
Load Step 2	0.2	5.8	246	142.2	261.1	15.0	34.6	1.0
Load Step 3	0.3	5.8	319	184.6	261.1	15.3	34.6	1.3
Load Step 4	0.4	5.8	389	225.0	230.8	15.4	34.6	1.6
Load Step 5	0.5	5.8	457	265.4	190.4	16.3	34.6	1.8
Load Step 6	0.6	5.8	525	304.3	259.6	19.5	34.6	2.1
Load Step 7	0.7	5.8	591	341.8	356.3	23.5	34.6	2.4
Load Step 8	0.8	5.8	659	382.2	503.4	29.9	34.6	2.7
Load Step 9	0.9	5.8	728	421.2	744.2	42.5	34.6	2.9
Load Step 10	1	5.8	798	463.0	1138.0	69.1	34.6	3.2
Subtoal		57.7		2826.1	4344.2	276.8	346.2	19.7
* Base load AVR Commissioning								
	1	23.1	798	1850.5	4550.5	275.5	138.5	12.9
COMPLETE - TOTAL ESTIMATED FIRED HOURS								
		150		5728.8	11603.4	620.2	900.0	36.6

COMMISSIONSING Emissions per Turbine

	hrs	NOx lb/hr	CO lb/hr	VOC lb/hr	PM10 lb/hr	SOx lb/hr
First fire	40.38	11.11	45.43	1.16	6.00	0.05
controlled break in	28.85	20.90	30.25	0.73	6.00	0.06
Dynamic AVR	57.69	48.99	75.30	4.80	6.00	0.34
Base laod AVR	23.08	80.19	197.19	11.94	6.00	0.56
total hr	**150.00**					

Worst-Case 1-Hour Emissions per Turbine

Worst-Case 1-Hour Emissions are equal to the maximum commissioning emission rates, except for SO_2 and PM_{10} which have worst-case emissions during normal operations.

Emissions per tur	**lb/hr**								**g/s**
NO_2	80.19								10.10
CO	197.19								24.85
VOC	11.94								1.50
SO_2	0.00								0.00
PM_{10}	5.00								0.63

Total Commissioning Emissions (taken from FDOC dated 9/02/08, except PM10 is scaled from 6 lb/hr/turbine to 5 lb/hr/turbine)

Total Turbine monthly emissions (commissioning month-lb/month)

FDOC page 26, 27 of 72

	CO	NOX	VOC	PM10	SOx
Turbine	lb/mon	lb/mon	lb/mon	lb/mon	lb/mon
Unit 1	11,602	5,728	620	750	37
Unit 2	11,602	5,728	620	750	37
Unit 3	11,602	5,728	620	750	37
Unit 4	11,602	5,728	620	750	37
Unit 5	11,602	5,728	620	750	37
Unit 6	11,602	5,728	620	750	37
Unit 7	11,602	5,728	620	750	37
Unit 8	11,602	5,728	620	750	37
Total	**92,815**	**45,824**	**4959**	**6000**	**292**

1-Hour Normal Emission Scenario (no startups or shutdowns) for Sentinel

Only NO_2, CO and SO_2 are considered for the 1-hour Ambient Air Quality Standard.

Normal 1-Hour Scenario for NO_2 and CO includes turbines operating at highest normal operating rate.

Fire Pump operates 1 hour per week.

Emissions per turbine	**lb/hr**	**g/s**
NO_2	7.95	1.00
CO	11.62	1.46
SO_2	2.49	0.31
Emissions from Fire Pump		
NO_2	2.54	0.32
CO	0.31	0.04
SO_2	0.00	1.38E-04

1-Hour Emission Scenario (including startups and/or shutdowns) for Sentinel

Only NO_2, CO and SO_2 are considered for the 1-hour Ambient Air Quality Standard.

1-Hour Scenario for NO_2 , CO uses turbines operating with 1startup or shutdown and remaining time at

Fire Pump operates 1 hour per week.

Emissions per turbine	**lb/hr**	**g/s**
NO_2	29.49	3.72
CO	44.62	5.62
SO_2	2.49	0.31
Emissions from Fire Pump		
NO_2	2.54	0.32
CO	0.31	0.04
SO_2	0.00	1.38E-04

3 Hour Emissions Scenarios for Sentinel

Only SO_2 is considered for an average 3-hour Ambient Air Quality Standard.

The worst-case 3-hour emission rate is the max SO_2 rate for 100% load, normal operating case (72°F;

Fire Pump operates 1 hour per week.

Emissions per turbine	**lb/hr**	**g/s**
SO_2	2.49	0.31
Emissions from Fire Pump		
SO_2	0.001	0.00

8-Hour Normal Emissions Scenarios for Sentinel

Only CO is considered for an average 8-hour Ambient Air Quality Standard.

Worst-case 8-Hour Normal Scenario includes 1 Startups, 1 Shutdowns, and remaining time at normal r

Fire Pump operates 1 hour per week.

Emissions per turbine	**lb/hr**	**g/s**
CO	17.25	2.17
Emissions from Fire Pump		
CO	0.31	3.93E-02

24-Hour Emissions Scenarios for Sentinel

Only SO_2 and PM_{10} are considered for an average 24-hour Ambient Air Quality Standard.

Worst-case 24-hour scenario for SO_2 amd PM10 uses normal operations.

Fire Pump operates 50 hours per year.

Emissions per turbine	**lb/hr**	**g/s**
NO_2	10.13	1.28
CO	15.37	1.94
VOC	2.71	0.34
SO_2	2.49	0.31
PM_{10}	5.00	0.63
Emissions from Cooling Tower per Cell (8)	**lb/hr**	**g/s**
PM_{10}	0.065	0.008
Emissions from Fire Pump		
SO_2	4.57E-05	5.76E-06
PM_{10}	3.09E-03	3.89E-04

Average Annual Emissions for Sentinel

Average Operation Emission Rates are based on the annual operation scenarios for 2,628 hours plus 300 startup/warmup events and 300 shutdown events.
Fire Pump operates 50 hours per year. Cooling tower operates 2,628 hours per year.
Annual SO_2 assumes 0.25 grains S/scf of natural gas.

Emissions per turbine	**lb/hr**	**g/s**
NO_X	3.44	0.43
CO	5.26	0.66
VOC	0.91	0.12
SO_2	0.19	0.02
PM_{10}	1.60	0.202
Emissions from Cooling Tower per Cell		
PM_{10}	0.021	2.63E-03
Emissions from Fire Pump		
NO_2	1.45E-02	1.83E-03
CO	1.78E-03	2.25E-04
VOC	3.02E-04	3.81E-05
SO_2	6.26E-06	7.89E-07
PM_{10}	4.23E-04	5.33E-05

Note: Worst-case annual lb/hr is the total emissions (lbs) over 8,760 hours/year

Worst case Scenarios including Commissioning:

1-Hour Worst-Case Emission Scenario for Sentinel

Only NO_2, CO and SO_2 are considered for the 1-hour Ambient Air Quality Standard.

Worst-case 1-Hour Scenario for NO_2 and CO includes new turbines operating for 1 hour at highest cor

Worst-case 1-Hour Scenario for SO_2 includes new turbines operating for 1 hour at normal rate.

Fire Pump operates 1 hour per week.

Emissions per turbine	**lb/hr**	**g/s**
NO_2	80.19	10.10
CO	197.19	24.85
SO_2	0.00	0.00
Emissions from Fire Pump		
NO_2	2.54	0.32
CO	0.31	0.04
SO_2	0.00	1.38E-04

8-Hour Emissions Scenarios for Sentinel

Only CO is considered for an average 8-hour Ambient Air Quality Standard.

Worst-case 8-Hour Scenario includes 8 hours of commissioning.

Fire Pump operates 1 hour per week.

Emissions per turbine	**lb/hr**	**g/s**
CO	197.19	24.85
Emissions from Fire Pump		
CO	0.04	4.92E-03

Turbine Operating Scenarios

Case	100	101	102	103	104	105	106	107	108	109	110
Ambient Temperature (°F)	17	17	17	72	72	72	72	107	107	107	107
Stack Diameter (ft)	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5
Exhaust Flow (lb/hr)	1704762	1438475	1138319	1641406	1605189	1376241	1092909	1561119	1484727	1278007	1020221
CTG Load Level	**100**	**75**	**50**	**EVAP-100**	**100**	**75**	**50**	**EVAP-100**	**100**	**75**	**50**
Evap. Cooler	NONE	NONE	NONE	EVAP	NONE	NONE	NONE	EVAP	NONE	NONE	NONE

Data from Vendor Area = 143.14 ft^2

Expected Operation of Each Gas Turbine - Normal Operation

(Reference: CPV Sentinel Project 5/15/08 GE LMS100 PA Turbine/Site Specific (1080.0 ft elev) Information)

Heat Consumed (MMBTU/hr) - LH	800.5	631.8	463.8	804.1	786.4	616.4	453.1	763.6	725.9	571.1	422.0
Turbine Outlet Temperature (°F)	742.6	743.7	761.6	785.1	791.0	770.2	785.6	798.9	812.6	790.8	804.9
Turbine Outlet Temperature (°K)	667.9	668.5	678.5	691.5	694.8	683.3	691.8	699.2	706.8	694.7	702.5
Exhaust Flow (acfm)	862625	728547	585102	859926	844938	712377	572801	826931	795027	672609	542992
Stack Exit Velocity, ft/m	6026.5	5089.8	4087.7	6007.6	5902.9	4976.8	4001.7	5777.1	5554.2	4699.0	3793.5
Stack Exit Velocity, m/s	30.61	25.86	20.77	30.52	29.99	25.28	20.33	29.35	28.22	23.87	19.27
Nitrogen, % Vol	72.47	73.02	73.61	71.53	71.76	72.48	73.09	71.38	71.62	72.32	72.91
Oxygen, % Vol	11.92	12.53	13.18	11.38	11.43	12.27	12.94	11.35	11.41	12.25	12.91
Carbon Dioxide, % Vol	3.85	3.61	3.36	4.00	4.00	3.67	3.42	3.99	3.99	3.66	3.41
Argon, % Vol	0.87	0.87	0.88	0.86	0.86	0.87	0.87	0.85	0.86	0.86	0.87
Water Vapor, % Vol	10.88	9.95	8.95	12.23	11.93	10.69	9.67	12.41	12.11	10.89	9.88
Molecular Weight	28.12	28.20	28.29	27.99	28.02	28.13	28.21	27.97	28.00	28.10	28.19

Data from Vendor

Average Emission Rates from Each Gas Turbine (lbs/hr) - Normal Operations

NO_X at 25 ppmvd pre-BACT level	79.27	62.54	45.89	79.68	77.92	61.03	44.85	75.69	71.93	56.56	41.77
NO_X at 2.5 ppmvd BACT level	7.913	6.246	4.586	7.951	7.775	6.094	4.481	7.551	7.178	5.647	4.173
CO at pre BACT level	213.45	168.39	123.57	179.23	147.39	115.45	84.83	135.04	119.61	94.04	69.45
CO at 6.0 ppmvd BACT level	11.56	9.13	6.70	11.62	11.36	8.91	6.55	11.03	10.49	8.25	6.10
UHC at pre-BACT level	25.57	20.26	12.24	18.58	19.82	15.22	8.59	15.41	15.73	11.72	6.09
VOC at 2.0 ppmvd BACT level	2.21	1.74	1.28	2.22	2.17	1.70	1.25	2.11	2.00	1.58	1.16
SO_2 short-term rate	2.481	1.958	1.437	2.492	2.437	1.910	1.404	2.366	2.249	1.770	1.308
SO_2 long-term rate	0.620	0.489	0.359	0.623	0.609	0.478	0.351	0.592	0.562	0.442	0.327
PM_{10}	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
NH_3 at 5 ppmvd BACT level	5.86	4.62	3.40	5.89	5.76	4.51	3.32	5.59	5.31	4.18	3.09

Sulfur content in fuel basis for above: 1 grain total S/100 scf short-term; 0.25 grain total S/100 scf long-term

Data from Vendor Higher sulfur content of 1 gr/100 dscf should be used for averaging times of 1 to 24 hours

Startup / Shutdown Emissions from Turbine

Startup

duration in minutes	10	15	25	35		
	Startup	SCR Warmup	Total Startup	Normal	1 hour With Start up and Normal Operation	Emissions if starting up for an entire hour
	Emissions	Emissions	Emissions	Emissions		
	lb/event	**lb/event**	**lb/event**	lb/hour	lb/hour	lb/hour
NO_X	5.00	19.86	24.86	7.95	29.49	59.65
CO	14.00	2.89	16.89	11.62	23.67	40.55
VOC	3.00	1.26	4.26	2.22	5.55	10.21
SO_2	0.02	0.15	0.17	2.49	1.63	0.42
PM_{10}	0.83	1.25	2.08	5.00	5.00	5.00

Assumptions:

Startup Emissions for CO, NO_2, PM_{10}, and VOC integrated from data provided by GE.

Startup emissions are highest of three temperatures, all for cold day 17 degrees F.

SO_2 emissions assume complete conversion of all sulfur to SO_2.

Normal emissions are highest of five operating cases listed above (case 103).

Shutdown

duration in minutes	10.3	49.7		1 hour of
	Shutdown	Normal	Total Shutdown	Shutdown
	Emissions	Emissions	Emissions	Emissions
	lb/event	lb/hour	lb/hr	lb/hour
NO_X	6.00	7.95	12.59	34.95
CO	35.00	11.62	44.62	203.88
VOC	3.00	2.22	4.84	17.48
SO_2	0.02	2.49	2.08	0.12
PM_{10}	0.86	5.00	5.00	5.00

Assumptions:

Shutdown Emissions for CO, NO_2, PM_{10}, and VOC integrated from data provided by GE.

SO_2 emissions assume complete conversion of all sulfur to SO_2.

Normal emissions are highest of five operating cases listed above (case 103).

Worst-Case 1-Hour Normal Operations Emissions per Turbine

Worst-Case (non-commissioning) 1-Hour Emissions are the maximum of an hour with 1 startup & normal operations; an hour with 1 shutdown and normal operations; or normal operations.

Comparison of normal, startup and shutdown emissions presented below.

	Worst-case Total	Startup /Warmup	Shutdown	Normal Operations	Total	Startup /Warmup	Shutdown	Normal Operations	Worst-case Total
Emissions per turbine	**lb/hr**				**Total lbs**				**g/s**
NO_2	29.49	29.49	12.59	7.95	7.95			7.95	3.72
CO	44.62	23.67	44.62	11.62	11.62			11.62	5.62
VOC	5.55	5.55	4.84	2.22	2.22			2.22	0.70
SO_2	2.49	1.63	2.08	2.49	2.49			2.49	0.31
PM_{10}	5.00	5.00	5.00	5.00	5.00			5.00	0.63

Worst-Case 3 Hour Emission Rate per Turbine

Only SO_2 is considered for an average 3-hour Ambient Air Quality Standard.

Worst-case 3-Hour Scenario are equal to 3 hours at normal rate.

	Worst-case Total	Startup /Warmup	Shutdown	Normal Operations	Total	Startup /Warmup	Shutdown	Normal Operations	Worst-case Total
Emissions per turbine	**lb/hr**				**Total lbs**				**g/s**
Total Hours of Operation	3			3				3	
SO_2	2.49			2.49	7.48			7.48	0.31

Worst-Case 8-Hour Normal Operations Emission Rates

Only CO is considered for an average 8-hour Ambient Air Quality Standard.

8-Hour Normal Operations Scenario includes 1 Startups, 1 Shutdown, and remaining time at Normal rate.

	Worst-case Total	Startup /Warmup	Shutdown	Normal Operations	Worst-case Total	Startup /Warmup	Shutdown	Commissioning	Normal Operations	Worst-case Total
Emissions per turbine	**lb/hr**				**Total lbs**					**g/s**
Total Hours of Operation	8	0.42	0.172	7.41		0.42	0.17		7.41	
CO	17.25	40.55	203.88	11.62	138.00	16.89	35.00		86.11	2.17

Worst-Case 24 Hour Emission Rate

Only SO_2 and PM_{10} are considered for an average 24-hour Ambient Air Quality Standard.

Worst-case 24-hour scenario for SO_2 amd PM10 uses normal operations.

Emissions per turbine	Worst-case Total	Startup /Warmup	Shutdown	Normal Operations	Total	Startup /Warmup	Shutdown	Normal Operations	Worst-case Total
	lb/hr				Total lbs				g/s
Total Hours of Operation	24	0.83	0.34	22.82		0.83	0.34	22.82	
NO_X	10.13	59.65	34.95	7.95	243.17	49.71	12.00	181.46	1.28
CO	15.37	40.55	203.88	11.62	368.95	33.79	70.00	265.16	1.94
VOC	2.71	10.21	17.48	2.22	65.13	8.51	6.00	50.62	0.34
SO_2	2.49			2.49	59.80			59.80	0.31
PM_{10}	5.00			5.00	120.00			120.00	0.63

Average Annual Emissions

Average Operation lb/hr Emission Rates presented below for normal operations are based on normal operation scenario (max emissions) for 2,628 total operating hours, plus 300 startup/warmup events and 300 shutdown events.

Emissions per turbine	Worst-case Total	Startup /Warmup	Shutdown	Normal Operations	Total	Startup /Warmup	Shutdown	Normal Operations	Worst-case Total
	lb/hr				Total lbs				g/s
Total Hours of Operation	2805	125.00	51.50	2628	2804.50				
Number per Scenario		300	300						
Duration of Event (min)		25	10.3	60					
NO_X	3.44	59.65	34.95	7.95	30150.70	7456.5	1800.0	20894.2	0.43
CO	5.26	40.55	203.88	11.62	46100.02	5068.5	10500.0	30531.5	0.66
VOC	0.91	10.21	17.48	2.22	8005.48	1276.5	900.0	5829.0	0.12
SO_2	0.19	0.42	0.12	0.62	1695.32	52.1	6.1	1637.1	0.02
PM_{10}	1.60	5.00	5.00	5.00	14022.50	625.0	257.5	13140.0	0.20

Note: Worst-case lb/hr is the total emissions (lbs) over 8,760 hours/year

timated annual normal operating hou	2628				turbines +		
ANNUAL TOTALS	1 unit	8 units		turbines + fire pump	cooling tower + fire pump		
NO_X	15.08	120.60	tpy	120.67	120.67	tpy	241,206
CO	23.05	184.40	tpy	184.41	184.41	tpy	368,800
VOC	4.00	32.02	tpy	32.02	32.02	tpy	64,044
SO_2	0.85	6.78	tpy	6.78	6.78	tpy	13,563
PM_{10}	7.01	56.09	tpy	56.09	56.82	tpy	112,180

Emissions from Emergency Diesel Firewater Pump

Rated Horsepower	**240**	**BHP**	
Testing duration	**60**	**min/week**	
Yearly testing	**52**	**week/year**	
Expected non-emergency usage	**50**	**hr/yr**	
Diesel Fired	Emision Factor	Emission Rate per Testing	Yearly Emission Rate
	g/HP/Hr	lb/hr	lb/yr
NO_X	4.80	2.54	126.99
CO	0.59	0.31	15.61
VOC (Total Hydrocarbons)	0.10	0.05	2.65
SO_X		0.001	0.05
PM_{10}	0.14	0.074	3.70

Note: SO_2 emission factor from EPA AP-42 Table 3.3-1 for diesel fuel Industrial Engines (lb/hp-hr)

Engine parameters

Exhaust Flow Rate (acfm)	1227	
Exhaust Temp (degrees F)	891	
Stack Diameter (feet)	0.373	
Stack height (feet)	50	(12 ft building + 38 ft stack)
fuel usage (gph)	10.3	
diesel density (lb/gal)	7.1	

MNHC+NOx emission factor = 4.90
Sulfur content 15 ppm in fuel

Data from Vendor

Cooling Tower Drift Calculation

8 1-cell towers

Cooling Tower

design circulating water rate		55,200	gallons/min	(total flow for all towers)	
cycles of concentration		6.8			
TDS		555	mg/liter	(555 ppm)	
		4.63	lb/1000 gallons		
Drift Eliminator Control		0.000005		BACT=0.0005%	
Operating hours per year		2805			
Number of cooling towers/cells		8			
Drift PM emissions	total	0.52	lb/hr	0.065 lb/hr	per cell
		1462.6	lb/yr	182.820 lb/yr	per cell
		0.73	**tpy**		

(Revised)Table 7-1
Basis for Estimating Emission Credit Requirements to Offset Proposed Project Emissions

Emission Source[4]	Annual Operating Hours @`100% Capacity	Annual Startups and Shutdowns (CTGs only)	Daily Operating Hours at 100% Capacity for Worst Month	Daily Startups/Shutdowns for Worst Month (CTGs only)
CTGs 1-8	2628	300	15	2
Cooling Tower for CTGs 1-8	2628	300	15	2
Firewater Pump Engine	50		Approximately one 1hour test each week	

Sentinel- Maximum Short Term Pollution Emission Rates

	Turbine			Cooling Tower Contribution	Fire Pump Engine Contribution
Pollutant	**lb/hr/turbine**	**lbs/start**	**lbs / shutdown**	**lb/hr/ct**	**lb/hr**
NOX	7.95	24.86	6.00		2.54
VOC	2.22	4.26	3.00		0.05
PM10	5.00	2.08	0.86	0.07	0.07
SOX	0.62	0.17	0.02		0.00
CO	11.62	16.89	35.00		0.31
NH3	5.86				

offset calculations

Total Emissions

Pollutant	Turbine		Cooling Tower Contribution		Fire Pump Engine Contribution	
	lbs/day for worst month	lbs/year	lbs/day	lbs/year	lbs/day	lbs/year
NOX	1,448	241,205			2.54	127.00
VOC	383				0.05	
PM10	647		10.64		0.07	
SOX	77				0.00	
CO	2,225				0.31	

(Revised)Table 7-2
Estimated Emission Offset Requirements for the Proposed Project Emissions

Pollutant	CTGs	Fire Water Engine	Emission Reduction Credits		Note
			offset ratio	Total ERC Required	
NOX (lb/yr) commissioning year	287,029				
NOX (lbs/year)	241,205	127	1.0	241,332	If RECLAIM
NOx (lbs/day)	1,448	3	1.2	1,740	If ERCs
VOC(lbs/day)	383	0	1.2	459	ERCs
PM10 (lbs/day)	647	0	1.2	777	Priority Reserve
SOX (lbs/day)	77	0	1.2	93	Priority Reserve

offset calculations

Revised Turbine emissions (different format)
Per Turbine (1 through 8)
District table 1

	lb/dy	lb/mon	30day ave (based on 31 days)	PTE using 30 day ave. (lb/yr)
VOC	**47.82**	1434.6	**46**	
PM10	**80.88**	2426.4	**78**	
SOx	**9.68**	290.4	**9**	

total emissions for turbines 1 -though 8
District table 2

	lb/dy	lb/mon
VOC	382.56	11476.8
PM10	647.04	19411.2
SOx	77.44	2323.2

total emissions for turbines 1 though 8
District table 5

	lb/dy	lb/mon
VOC	382.56	11476.8
PM10	647.04	19411.2
SOx	77.44	2323.2

offset calculations

Turbine 30 day ave per permit unit

District table 6

	VOC	PM10	SOX
Turbine	30 dy ave	30 dy ave	30 dy ave
1	46	78	9
2	46	78	9
3	46	78	9
4	46	78	9
5	46	78	9
6	46	78	9
7	46	78	9
8	46	78	9
total turbines	**368**	**624**	**72**
Fire water	**0**	**0**	**0**
off set ratio	1.2	1.2	1.2
Reclaim ratio			
TURBINE ERCS	442	749	86
TOTAL ERCs	**442**	**749**	**86**

PTE is determined using the 30 day ave. This is done
per permit unit and the value is rounded to the nearest whole number in the NSR program, ex if VOC 30 day ave is "47.75", the system rounds to "48".

STATE OF CALIFORNIA
ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of:	)	Docket No. 07-AFC-3
	)	
Application for Certification,	)	**PROOF OF SERVICE**
for the CPV SENTINEL ENERGY PROJECT	)	
	)	(February 26, 2009]
	)	
	)	

APPLICANT

Mark Turner
Project Manager
CPV Sentinel, LLC
55 Second Street, Suite 525
San Francisco, California 94105
mturner@cpv.com

Dale Shileikis
Vice President
URS Corporation
221 Main Street, Suite 600
San Francisco, CA 94105-1917
dale_shileikis@urscorp.com

INTERESTED AGENCIES

California ISO
P.O. Box 639014
Folsom, CA 95763-9014
e-recipient@caiso.com

Mohsen Nazemi
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, California 91765-4178
mnazemi@aqmd.gov

ENERGY COMMISSION

James D. Boyd
Vice Chair and Presiding Member
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
jboyd@energy.state.ca.us

Julia Levin
Commissioner and Associate Member
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
jlevin@energy.state.ca.us

Kenneth Celli
Hearing Officer
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
kcelli@energy.state.ca.us

John Kessler
Project Manager
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
jkessler@energy.state.ca.us

Caryn Holmes
Staff Counsel
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
cholmes@energy.state.ca.us

Elena Miller
Public Adviser
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
Publicadviser@energy.state.ca.us

CPV SENTINEL ENERGY PROJECT
CEC Docket No. 07-AFC-3

DECLARATION OF SERVICE

I, Paul Kihm, declare that on October 30, 2009, I served and filed copies of the attached:

APPLICANT'S AMENDMENT TO PERMIT TO CONSTRUCT/PERMIT TO OPERATE APPLICATION

to all parties identified on the Proof of Service List above in the following manner:

California Energy Commission Docket Unit

☒ Transmission via electronic mail to the following:

CALIFORNIA ENERGY COMMISSION
Attn: DOCKET NO. 07-AFC-3
1516 Ninth Street, MS-4
Sacramento, California 95814-5512
docket@energy.state.ca.us

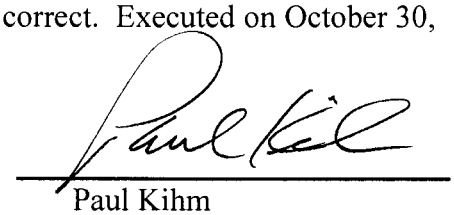
For Service to All Other Parties

☒ Transmission via electronic mail to all email addresses on the Proof of Service list; and

☐ by depositing one paper copy with the United States Postal Service via first-class mail at Costa Mesa, California, with postage fees thereon fully prepaid and addressed as provided on the Proof of Service list to those addresses **NOT** marked "email preferred."

I further declare that transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 30, 2009, at Costa Mesa, California.



Paul Kihm

STATE OF CALIFORNIA
ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of:	)	Docket No. 07-AFC-3
	)	
Application for Certification,	)	**PROOF OF SERVICE**
for the CPV SENTINEL ENERGY PROJECT	)	
	)	(February 26, 2009]
	)	
_____	)	

APPLICANT

Mark Turner
Project Manager
CPV Sentinel, LLC
55 Second Street, Suite 525
San Francisco, California 94105
mturner@cpv.com

Dale Shileikis
Vice President
URS Corporation
221 Main Street, Suite 600
San Francisco, CA 94105-1917
dale_shileikis@urscorp.com

INTERESTED AGENCIES

California ISO
P.O. Box 639014
Folsom, CA 95763-9014
e-recipient@caiso.com

Mohsen Nazemi
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, California 91765-4178
mnazemi@aqmd.gov

ENERGY COMMISSION

James D. Boyd
Vice Chair and Presiding Member
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
jboyd@energy.state.ca.us

Julia Levin
Commissioner and Associate Member
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
jlevin@energy.state.ca.us

Kenneth Celli
Hearing Officer
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
kcelli@energy.state.ca.us

John Kessler
Project Manager
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
jkessler@energy.state.ca.us

Caryn Holmes
Staff Counsel
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
cholmes@energy.state.ca.us

Elena Miller
Public Adviser
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-5512
Publicadviser@energy.state.ca.us

CPV SENTINEL ENERGY PROJECT
CEC Docket No. 07-AFC-3

DECLARATION OF SERVICE

I, Anne Runnalls, declare that on October 30, 2009, I served and filed copies of the attached:

APPLICANT'S AMENDMENT TO PERMIT TO CONSTRUCT/PERMIT TO OPERATE APPLICATION

to all parties identified on the Proof of Service List above in the following manner:

California Energy Commission Docket Unit

☒ Transmission by depositing one original paper copy (with DVD of modeling data) with FedEx overnight mail delivery service at San Diego, California, with delivery fees thereon fully prepaid and addressed to the following:

CALIFORNIA ENERGY COMMISSION
Attn: DOCKET NO. 07-AFC-3
1516 Ninth Street, MS-4
Sacramento, California 95814-5512
docket@energy.state.ca.us

For Service to All Other Parties

☐ Transmission via electronic mail to all email addresses on the Proof of Service list; and

☒ by depositing one paper copy with the United States Postal Service (with DVD of modeling data) via first-class mail at San Diego, California, with postage fees thereon fully prepaid and addressed as provided on the Proof of Service list to those addresses **NOT** marked "email preferred."

I further declare that transmission via U.S. Mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 30, 2009, at San Diego, California.

Anne Runnalls