SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ADDENDUM TO THE MARCH 2007 FINAL MITIGATED NEGATIVE DECLARATION FOR SOUTHERN CALIFORNIA EDISON: GRAPELAND (FORMERLY NAMED ETIWANDA) PEAKER PROJECT, RANCHO CUCAMONGA

January 2017

State Clearinghouse No: 2006121109

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1.0 INTRODUCTION

Southern California Edison (SCE) is a utility that acts as the Load Serving Entity (LSE) to provide electricity to approximately 15 million people in 180 cities, 15 counties in Southern California, and 4.9 million customer accounts covering 50,000 square miles of service area. SCE owns and operates several generation peaking facilities, commonly referred to as "peaker" units, to provide electricity during periods of peak power demand when the electrical grid system needs additional electric power to be available or when local voltage support is required. A peaker is designed to be started on short notice, and to ramp up or down quickly, to respond to peaks in electricity demand. When more electricity is needed during times of high demand, the California Independent System Operator (CAISO) may dispatch peaker units to provide electricity to the grid that supplies electricity to households and business throughout the service area of SCE. CAISO is a non-profit corporation that keeps power moving to homes, communities and businesses by managing the flow of electricity across the high-voltage, long-distance power lines that make up 80 percent of California's electrical grid.

One of SCE's peaker units, the Grapeland Peaker, is located in Rancho Cucamonga, California and began operating in July 2007. The Grapeland Peaker was initially called the Etiwanda Peaker in the March 2007 Final Mitigated Negative Declaration (MND) but was subsequently renamed Grapeland because there is another electrical generating facility and peaker named Etiwanda in Southern California. In order to avoid confusion for safety reasons, CAISO requires unique names for electric generating facilities. For the purposes of this document the former Etiwanda Peaker will now be referred to as the Grapeland Peaker. Grapeland participates in the CAISO market. Grapeland is a Title V facility (Facility ID# 149620) which is permitted by the South Coast Air Quality Management District (SCAQMD).

The Grapeland Peaker generates electricity through one single natural gas-fired combustion turbine, General Electric (GE) model LM6000, nominally rated at 49 megawatts (MW), and capable of producing up to 45 net MW of electricity for the grid. When CAISO dispatches Grapeland to provide electricity, it takes about 10 minutes for the peaker to ramp up to 100 percent load in order to provide 45 MW of electricity to the grid. It is important to note that CAISO also dispatches power from other electricity providers, including those that provide intermittent renewable energy resources such as solar (available when the sun is shining) and wind power (available when the wind is blowing) in accordance with California's Renewable Portfolio Standard (RPS) goals. Thus, CAISO does not always need Grapeland to provide the maximum amount of electricity when dispatched. Since Grapeland currently does not have the ability to operate at low- or partial loads, CAISO is limited in their ability to dispatch electricity from Grapeland only when the 45 MW of electricity is needed.

To control emissions during electricity generation, the turbine is equipped with an air pollution control system which consists of water injection into the combustor, followed by a selective catalytic reduction (SCR) system with ammonia injection, and an oxidation catalyst. The turbine is also equipped with a continuous emissions monitoring system (CEMS) for monitoring nitrogen oxides (NO_x) and carbon monoxide (CO) emissions. Other equipment that is associated with the turbine includes one 924 brake horsepower (bhp) natural gas-fired black-start emergency generator which is used for reliability to start the gas turbine during power outages on the grid, and one 10,500-gallon aqueous ammonia storage tank which supplies ammonia to the SCR system.

The water injection helps minimize the production of NO_x emissions in the turbine's exhaust stream but does not fully eliminate the NO_x. The exhaust stream is then routed to the SCR which can reduce the NO_x concentrations further to comply with the permit limits. SCE assessed the turbine and the air pollution control system and discovered that the current water-injection rate has caused damage to several components of the turbine and air pollution control system, including the premature degradation of the oxidation catalyst. To repair the damage, to prevent future damage from occurring, and to slow the degradation rate of the oxidation catalyst, SCE is proposing to modify the turbine's air pollution control system to:

- Decrease the water-injection rate into the turbine's combustor by up to 42 percent;
- Replace the oxidation catalyst;
- Replace the SCR catalyst and increase the cross-sectional area (by nearly three times) and the pitch (i.e., angle) of the SCR catalyst beds to maximize the contact area and time the turbine's exhaust gas moves across the catalyst, without increasing the size (outside dimensions) of the SCR enclosure;
- Replace the ammonia injection grid (AIG) to improve the deliverability of ammonia to the catalyst; and,
- Increase the concentration of the aqueous ammonia that is delivered to the facility, stored on-site, and injected into the SCR from 19 percent (%) to 29%[1].

In addition, to increase the operating flexibility of the peaker so that it can provide reliable power to the grid when dispatched by CAISO during peak times when renewable energy resources are not available, SCE is proposing to revise its SCAQMD Title V Operating Permit to allow the turbine to generate power over its full operating range, from less than one MW to full load, while continuing to meet the emission limits in the current permit without increasing:

- Utilization of the Grapeland Peaker for power generation;
- Fuel-input limits, generation capacity, or the heat rate of the turbine; and,
- The potential to emit (PTE) of criteria pollutants, greenhouse gases (GHGs), or toxic air contaminants (TACs).

The proposed project is also referred to as the Emission Control System Enhancements (ECSE) in this document. The proposed modifications to the air pollution control system and Title V permit are described in greater detail in Section 4.0 of this Addendum.

SCE has submitted Application No. 588643 to modify the air pollution control system and the Title V Operating Permit ("Title V Application").

Upon implementation of the proposed modifications, Grapeland will continue to operate within the facility's permitted PTE while providing grid reliability and maintaining maximum flexibility for emergency dispatch by CAISO.

[1] Industry standard for aqueous ammonia at this concentration is 29.4% plus or minus (±) a half percentage point, so a concentration of 29.9% was used in the analyses to represent worst-case conditions.

2.0 CALIFORNIA ENVIRONMENTAL QUALITY ACT

SCAQMD review and approval of the proposed modifications is a discretionary permitting action that requires review pursuant to the California Environmental Quality Act (CEQA). When the Grapeland Peaker Project (formerly Etiwanda) was originally proposed in 2007, the SCAQMD acted as CEQA Lead Agency because it was the public agency that had principal responsibility for carrying out or approving a project which may have a significant effect on the environment (CEQA Guidelines Section 21067). At the time the new peaker facility was proposed, SCAQMD staff evaluated the potential environmental impacts associated with the construction and operation of the new peaker facility and identified potentially significant adverse impacts to the topics of air quality, biological resources, cultural resources, hazards, noise, and traffic and transportation. However, revisions to the project were made such that no significant adverse environmental impacts would remain after mitigation was applied. Thus, the SCAQMD prepared and adopted the Final MND for the SCE Etiwanda[2] Peaker Project in Rancho Cucamonga (State Clearinghouse [SCH] No. 2006121109) on March 1, 2007, referred to herein as the March 2007 Final MND[3]. In addition, mitigation measures were made a condition of project approval and a Mitigation Monitoring and Reporting Plan was adopted for the project. Findings and a Statement of Overriding Considerations were not required since no significant adverse impacts were identified that could not be mitigated to less than significant.

SCE's currently proposed modifications to the air pollution control system and SCAQMD Title V permit for the Grapeland Peaker are considered to be modifications to the previously approved project that was evaluated in the March 2007 Final MND, and are a "project" as defined by CEQA. CEQA requires that the potential adverse environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid identified significant adverse environmental impacts of these projects be identified.

CEQA Guidelines Section 15164(a) allows a lead agency to prepare an Addendum to a previously certified or adopted CEQA document if some changes or additions are necessary but none of the following conditions as described in CEQA Guidelines Section 15162 have occurred:

- Substantial changes which will require major revisions of the previous CEQA document due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
- Substantial changes, with respect to the circumstances under which the project is undertaken, which will require major revisions of the previous CEQA document due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or,
- New information of substantial importance which was not known and could not have been known with the exercise of reasonable diligence at the time the previous CEQA document was certified as complete, such as:

[2] The Peaker at this location was subsequently renamed Grapeland.

[3] SCAQMD, http://www.aqmd.gov/home/library/documents-support-material/lead-agency-permit-projects/permit-project-documents---year-2007/final-mnd-for-edison-etiwanda-peaker.

- The project will have one or more significant effects not discussed in the previous CEQA document;
- Significant effects previously examined will be substantially more severe than shown in the previous CEQA document;
- Identification of mitigation measures or alternatives previously found not to be feasible, but would in fact be feasible, and would substantially reduce one or more significant effects, but the project proponent declines to adopt the mitigation measures or alternatives; or,
- Identification of mitigation measures or alternatives which are considerably different from those analyzed in the previous CEQA document would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

The environmental impacts from installing the turbine and air pollution control system were analyzed in the Final MND that was adopted on March 1, 2007. The currently proposed project will have new environmental impacts associated with construction activities needed to modify the air pollution control system and operation activities associated with the increased concentration of aqueous ammonia that is delivered to the facility, stored on-site, and injected into the SCR (e.g., from 19% to 29%). As explained in authoritative interpretive sources (Kostka and Zischke 2016; Remy et. al 2006), the baseline for purposes of evaluating whether or not modifications to an existing project result in new or more severe significant effects is the effects of the project as initially reviewed and approved:

> "When an agency is evaluating a proposed change to a project that has previously been reviewed under CEQA, the agency must apply CEQA's standards limiting the scope of subsequent environmental review. See CEQA Guidelines §15162. Under these standards, once an EIR has been certified or a negative declaration adopted for a project, further CEQA review is limited. These standards apply whether or not the project has been constructed. *Benton v Board of Supervisors, supra*. In effect, the baseline for purposes of CEQA is adjusted such that the originally approved project is assumed to exist[4]."

> "The approach set forth … is similar to the one applicable where an agency, after completing an EIR or negative declaration and the approval process for a project, is faced with the question of whether to prepare a 'subsequent EIR' or 'supplement to an EIR' due to changes in the project, changed circumstances, or new information. See Pub. Resources Code, § 21166; CEQA Guidelines, §§ 15162, 15163. In such a situation, the agency must treat the impacts of the previously approved project, upon build-out, as the 'baseline' for determining whether newly revealed environmental impacts are sufficiently severe to justify preparing a second round of environmental review. This approach is proper even where the 'existing environment' remains pristine because no physical changes have resulted from the first project approval[5]."

[4] Kostka, Stephen L. and Michael H. Zischke, 2016. Practice Under the California Environmental Quality Act, Section 12.23 5 (2nd edition, updated March 2016).

[5] Remy, Michael H., Tina A. Thomas, James G. Moose, and Whitman C. Manley, 2006. Guide to CEQA, p. 207 (11th edition).

Thus, for the purpose of determining whether or not the conditions described in CEQA Guidelines Section 15162 calling for preparation of a subsequent environmental impact report (EIR) or negative declaration (ND) have occurred, the effects of the project modifications must be evaluated against the effects of the project as initially reviewed and approved. In other words, the "baseline" against which to evaluate the effects of the modifications is the effects of Grapeland operating at the maximum capacity analyzed in the March 2007 Final MND. As demonstrated in Sections 5.0 and 6.0 of this Addendum, when the effects of the proposed project are evaluated against this baseline, they are not significant, and therefore a subsequent EIR or ND is not appropriate.

CEQA Guidelines Section 15164(b) provides: "An addendum to an adopted negative declaration may be prepared if only minor technical changes or additions are necessary **or none of the conditions described in Section 15162 calling for the preparation of a subsequent EIR or negative declaration have occurred**." (emphasis added) Further, CEQA Guidelines Section 15164(e) requires a brief explanation of the decision not to prepare a subsequent EIR pursuant to CEQA Guidelines Section 15162 to be included in the addendum or elsewhere in the record, and the decision must be supported by substantial evidence. Finally, an addendum need not be circulated for public review but can be included in or attached to the final EIR or adopted ND (CEQA Guidelines Section 15164 (c)).

SCAQMD staff's review of the currently proposed project shows that the potential impacts from implementing the currently proposed project are concluded to be within the scope of what was previously analyzed in the March 2007 Final MND. Further, SCAQMD staff concludes that the currently proposed project would not be expected to trigger any conditions identified in CEQA Guidelines Section 15162. Under these circumstances, preparation of a subsequent EIR or ND is not appropriate. Instead, an Addendum is the appropriate CEQA document for evaluating the proposed project. Therefore, the SCAQMD has prepared this Addendum to the March 2007 Final MND for the currently proposed project.

Further, applying the legal standards set forth above, Sections 5.0 and 6.0 of this Addendum to the March 2007 Final MND contain the required substantial evidence that demonstrates that the proposed project does not contain: 1) substantial changes to the Grapeland Peaker that will cause new significant effects or a substantial increase in the severity of previously identified significant effects; 2) a substantial change in the circumstances that will cause new significant effects or a substantial increase in the severity of previously identified significant effects; 3) substantial new information that could not have been known at the time the March 2007 Final MND was adopted that will cause new significant effects or a substantial increase in the severity of previously identified significant effects.

3.0 FACILITY LOCATION

Grapeland is located at 12408 6th Street, on property owned by SCE, in the City of Rancho Cucamonga, CA (see Figure 3-1). The address of this facility was identified as 8996 Etiwanda Avenue in the March 2007 Final MND, which is the address associated with the Etiwanda Substation, but was later changed to the 6th Street address. The project site in relation to these streets is shown in Figure 3-2. The facility site is located on the northwest corner of SCE-owned substation property located near the existing Etiwanda Substation. The facility site is bordered to the east by the existing Etiwanda Generating Station, to the south by the Rancho Vista 500 kilovolt (kV) substation (constructed in 2009), to the west by a railroad right of way and commercial buildings, and to the north by a railroad right of way and heavy industrial buildings.

Aerial photographs of the existing facility are shown in Figure 3-2.

The proposed project will occur completely within the confines of the existing Grapeland facility site.

Figure 3-1: Regional Site Location Map

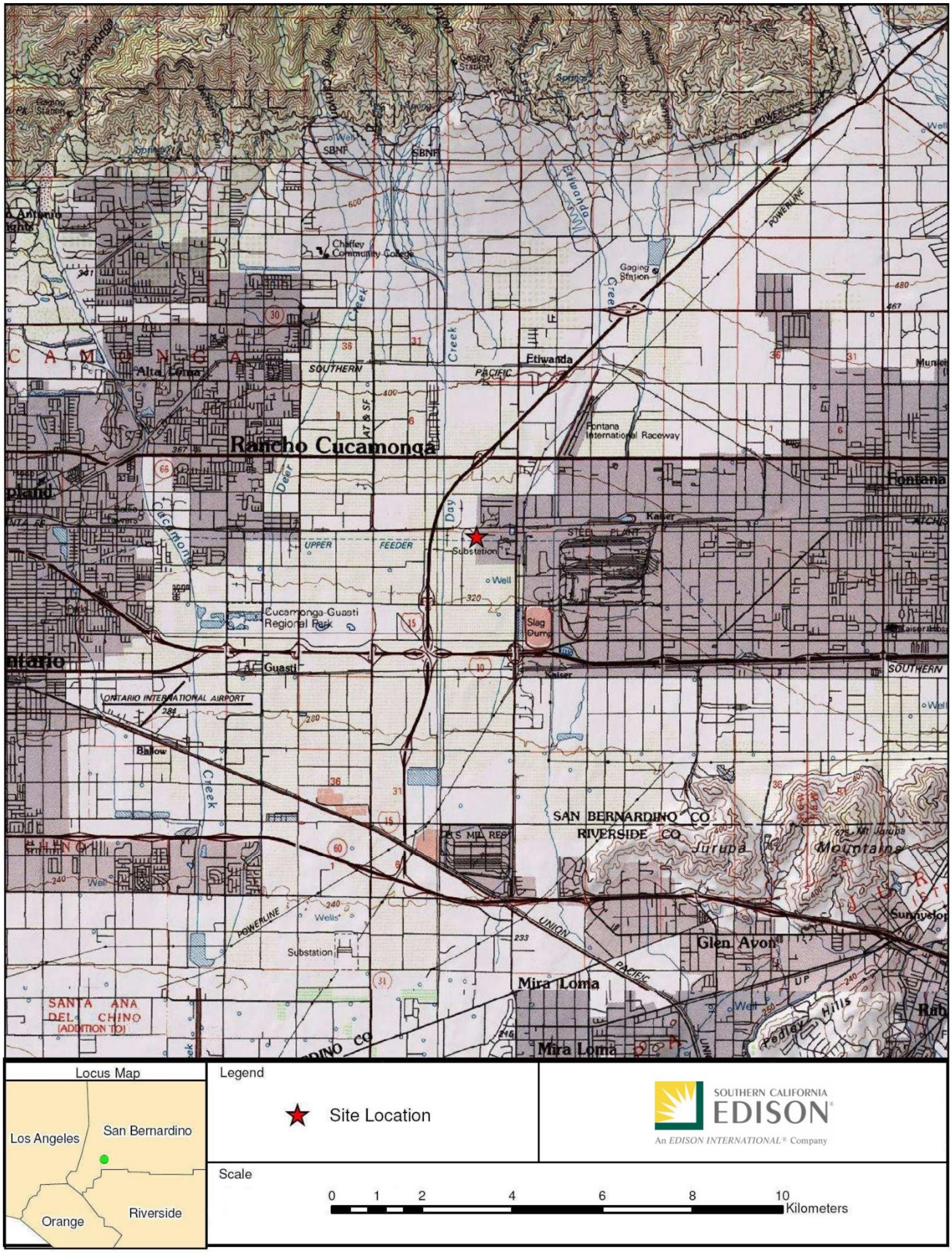

Figure 3-2: Aerial Photographs of the Existing Grapeland Generation Peaking Facility

Regional View

Grapeland Facility View

4.0 PROJECT DESCRIPTION

To provide context, this Section provides background information on the Grapeland Peaker project that was evaluated in the March 2007 Final MND and the proposed changes to the existing facility. The ECSE affect only the SCR and oxidation catalyst emissions control systems, and the concentration of aqueous ammonia to be stored and used on-site, and do not affect any other portion of the Grapeland facility.

4.1 Existing Grapeland Facility

On August 15, 2006, the California Public Utilities Commission (CPUC) issued an Assigned Commissioner's Ruling (ACR) addressing electric reliability needs in Southern California for the summer of 2007 and beyond. The August 15, 2006 ACR included a reference to the CAISO's August 9, 2006 letter to the CPUC that urged the CPUC to direct the state's investor-owned utilities to solicit a combination of quick-start generation and demand response opportunities that could be developed quickly (less than a year) to increase available electrical supply at the peak hours and to enhance grid reliability. To implement this directive, SCE took steps to install five separate peaking generator projects either within or near existing substations at five strategic locations around Southern California. Figure 4-1 shows the relative locations of the five facilities, all of which were constructed and are operating as mandated by the CPUC. Grapeland (shown in the figure as Etiwanda) is one of the five generation peaking facilities developed by SCE.

Figure 4-1: Relative Location of SCE's Five Generation Peaking Plants

Note: The Etiwanda Peaker has been renamed as the Grapeland Peaker.

Grapeland is a generation peaking facility used to generate electricity through the combustion of pipeline quality natural gas (purchased from Southern California Gas Company) in the turbine. The GE LM6000 Enhanced Sprint turbine is a simple cycle unit, and is nominally rated at 505 million British thermal units per hour (MMBtu/hr) input and 49 MW output (45 MW net output). To control emissions during electricity generation, the turbine is equipped with an air pollution control system which consists of water injection into the combustor, followed by a SCR system with ammonia injection, and an oxidation catalyst. The water injection helps minimize the production of NO_x emissions in the turbine's exhaust stream but does not fully eliminate the NO_x emissions. By routing the exhaust stream to the SCR, the NO_x concentrations can be reduced further to comply with the permit limits. Currently, the air pollution control system is designed such that the NO_x concentration of the exhaust downstream of the combustor is approximately 25 parts per million (ppm), which is reduced to less than or equal to (≤) 2.5 ppm (15% oxygen [O_2]) by the SCR unit. CO emissions are controlled to ≤6.0 ppm (15% O_2) via the oxidation catalyst. Ammonia slip emissions are controlled to ≤5 ppm (15% O_2) and volatile organic compound (VOC) emissions are controlled to ≤2.0 ppm (15% O_2).

The turbine is also equipped with CEMS for monitoring NO_x and CO emissions. Other equipment that is associated with the turbine includes one 924 bhp natural gas-fired black-start emergency generator which would be used for starting the gas turbine in the event of a power outage on the grid and one 10,500-gallon aqueous ammonia storage tank which supplies ammonia to the SCR system.

4.2 Proposed Project

SCE assessed the turbine and the air pollution control system and discovered that the current water-injection rate which is necessary to achieve NO_x concentrations of 25 ppm or lower has caused damage to several components of the turbine (downstream of the combustor) and air pollution control system, including the premature degradation of the oxidation catalyst. To repair the damage, to prevent future damage from occurring, and to slow the degradation rate of the oxidation catalyst, SCE is proposing to modify the turbine's air pollution control system to:

- Decrease the water-injection rate into the turbine's combustor by up to 42 percent;
- Replace the oxidation catalyst;
- Replace the SCR catalyst and increase the cross-sectional area (by nearly three times) and the pitch (i.e., angle) of the SCR catalyst beds to maximize the contact area and time the turbine's exhaust gas moves across the catalyst, without increasing the size (outside dimensions) of the SCR enclosure;
- Replace the AIG to improve the deliverability of ammonia to the catalyst; and,
- Increase the concentration of the aqueous ammonia that is delivered to the facility, stored on-site, and injected into the SCR from 19 percent (%) to 29%[6].

In addition, to increase the operating flexibility of the peaker so that it can provide reliable power to the grid when dispatched by CAISO during peak times when renewable energy resources are not available, SCE is proposing to revise its SCAQMD Title V Operating Permit to allow the

[6] Industry standard for aqueous ammonia at this concentration is 29.4% plus or minus (±) a half percentage point, so a concentration of 29.9% was used in the analyses to represent worst-case conditions.

turbine to generate power over its full operating range, from less than one MW to full load, while continuing to meet the emission limits in the current permit without increasing:

- Utilization of the Grapeland Peaker for power generation;
- Fuel-input limits, generation capacity, or the heat rate of the turbine; and,
- The PTE of criteria pollutants, GHGs, or TACs.

In particular, the proposed project involves reconfiguring the SCR emissions control system such that the NO_x concentration from the combustor can range from ~25 ppm to ~43 ppm while continuing to maintain controlled emissions of 2.5 ppm or lower. This enhanced NO_x control will allow the turbine to operate over a wider operating range, reduce the water injection rate at the combustor, prevent damage to the turbine components, and, lower the degradation rate of the oxidation catalyst. The higher concentration of NO_x exiting the combustor will require increases to the catalyst cross-sectional area and pitch of the catalyst beds to provide a larger contact area and time with the catalyst. In addition, the deliverability of ammonia to the catalyst will be improved with changes to the AIG. Finally, the aqueous ammonia concentration will be increased from 19% to 29%. The amount of water injected for controlling NO_x emissions from the combustor will decrease by approximately 42% and save approximately 1.6 to 2.2 million gallons of water per year after implementation of the proposed project. Instead, the ability to control NO_x emissions will rely more on injecting a higher concentration of ammonia in the SCR unit.

The proposed project will consist of the following elements:

- Replacing the oxidation catalyst (like-for-like replacement);
- Replacing the existing SCR NOx catalyst with a more advanced SCR design that fits within the existing enclosure;
- Changing the AIG design and exhaust flow distribution design by:
  - Replacing and/or adding perforated distribution plates in the gas turbine exhaust path;
  - Adding ammonia mixing/distribution plates; and
  - Adding/modifying the AIG ports.
- Improving the SCR ammonia injection tuning;
- Improving the turbine NOx water injection tuning;
- Increasing the aqueous ammonia concentration from 19% to 29%, and;
- Replacing the stainless steel CEMS sample probe[7].

As explained in the Introduction, Grapeland currently has a narrow operating range between its minimum and maximum operating points because of the limitations of the existing SCR system. In particular, the need to limit the NO_x concentration from the combustor to 25 ppm with water injection limits the ability of the turbine to operate over its full operating range. For this reason, SCE proposes to modify its SCAQMD Title V Operating Permit to include limitations during the recommissioning year which will ensure that the current daily, monthly and annual permit limits

[7] The dimensions of the probe will not change, but the probe location may need to change because of modifications to the AIG and exhaust flow distribution system.

which apply to normal (after recommissioning) operations are not exceeded. Specific limits are needed during the initial recommissioning period since otherwise the testing needed during installation could exceed the current permitted PTE. Once installed, the modifications described above will improve SCR efficiency which will allow the turbine to generate power over its full operating range, from less than one MW to full load, while continuing to meet the emission limits in the current Title V Operating Permit.

By implementing these operational changes, the proposed project will improve the flexibility of the gas turbine by greatly expanding the operating range over which Grapeland can remain in compliance with existing air permit emissions limits while also making it possible to have faster ramping capability throughout the operating range. These improvements will provide the CAISO with more options for dispatching Grapeland to meet very specific needs related to grid stability and the integration into the grid of intermittent renewable energy resources (solar and wind). The targeted dispatch and faster ramping are expected to reduce the number of operating hours needed, which would reduce emissions. The partial loading capability for Grapeland will increase electric grid reliability, and support higher penetration of renewable resources, thereby enhancing the ability to meet California's RPS goals.

4.2.1 Construction

The construction activities will involve the replacement and remodel of the turbine's existing air pollution control system that includes removing and replacing the internal, existing SCR catalyst and updating internal SCR catalyst design. As such, a minimum amount of construction equipment will be needed, and this equipment will be placed on the existing paved site. Thus, the replacement and remodel of the turbine's existing air pollution control system would not require grading activities that would cause ground disturbance.

The period to install the new SCR catalyst and implement the proposed project (not including the recommissioning activities) is expected to take approximately seven days over a period of up to three weeks, and involve a peak of up to 10 daily construction workers during this time. Of the proposed enhancements described in Section 4.2, only the replacement of the old SCR catalyst with the new SCR catalyst will require the use of major construction equipment, consisting of a 300 horsepower (hp) crane utilized for up to twenty hours over five days. Since the turbine will be offline and not producing electricity while construction is occurring, other minor equipment typical of a routine outage, such as a forklift, manlift, and welding machines, may also be used. The equipment assumed for purposes of estimating potential emissions during the construction period are shown in Table 4-1.

Table 4-1: Equipment To Be Utilized During Construction of the Proposed Project

Equipment Type	Quantity	Fuel	Size (hp)	Engine Tier	Hours per day	Total days	Notes
Crane	1	Diesel	300	default	4	5	Crane (type Terex, T340-1/T340-1XL or similar. Engine type: 300 hp (224 kW) @ 2,000 rpm) 40 ton
Forklift	1	Diesel	110	4	4	5	Telescoping forklift (type JLG 943 or similar. Engine type: Cummins, QSF3.8L Tier 4 Final, 110 hp)
Aerial Lift (Manlift)	1	Diesel	74	4	2	7	Telescoping man lift (type JLG 1200SJP or similar. Engine type: Deutz TCD2.9L4 Tier 4 Final, 74 hp)
Welding Machines	2	Gasoline	23.5	default	4	5	Welding machine: (type Miller/Bobcat 225/250 Gas Engine Driven or similar, 23.5 hp at 3600 rpm)
Workers (on-road)	10	diesel/ gasoline	default	default	default	7	Default vehicle mix

4.2.2 Proposed Project Attributes

The following discussion provides additional information on the attributes of implementing the proposed project:

- **Increase Operating Flexibility and Integration of Renewable Energy**

  Grapeland participates in the CAISO market. The CAISO manages the flow of electricity across the high-voltage, long-distance power lines that make up 80 percent of California's grid. The ECSE at Grapeland will not change the generation capacity output of the gas turbine, but will improve operational flexibility by allowing Grapeland to operate over a wider range with faster ramping capability throughout its operating range. This wider operating range will provide the CAISO with more options for dispatching Grapeland to meet specific needs for electrical generation.

  Grapeland's current Title V permit does not limit operation of the turbines at partial loads *per se*, and the turbine is allowed to operate anywhere between zero and 100 percent. However, with the current emissions control system, maintaining compliance with a NO_x concentration of $\leq$2.5 ppm effectively limits partial-load operation and narrows the allowable operating range of the turbine. With the current SCR system, the NO_x concentration from the combustor must be maintained at or below a firm 25 ppm to maintain controlled NO_x emissions of 2.5 ppm or lower. After implementation of the ECSE, the NO_x concentration from the combustor (pre-SCR) can increase to an optimal point within the range of ~25 ppm to ~42 ppm, while still maintaining controlled exhaust (post-SCR) emissions of 2.5 ppm or lower. Thus, the ECSE will allow Grapeland to maintain compliance with the existing 2.5 ppm NO_x permit limit across a wider operating range.

Once the ECSE are implemented, Grapeland will be capable of generating power over its full operating range, from less than one megawatt to full load, while meeting the emission limits in the current permit. The ECSE will also make it possible to have faster ramping capability throughout the operating range. These improvements will provide the CAISO with more options for dispatching Grapeland to meet very specific needs related to grid stability and the integration into the grid of intermittent renewable energy resources (solar and wind). This does not mean that Grapeland will be frequently dispatched at low- or partial-loads, as many other factors contribute to that decision, but the point is that Grapeland could operate at partial-loads if the CAISO determines that doing so is necessary or appropriate to balance the instantaneous intermittent renewable generation output to maintain grid stability. Hence, the partial loading capability for Grapeland will increase electric grid reliability, and support higher penetration of renewable resources, thereby enhancing the ability to meet California's RPS goals.

This increased operating flexibility will not come at the expense of increased emissions. The ECSE will not change the fuel-input limits, generation capacity output, or the heat rate of the gas turbine. As detailed in the Title V Application and Section 5.5 of this Addendum, maximum potential annual, monthly and daily emissions following implementation of the ECSE, including the recommissioning testing, will be within the currently permitted PTE for Grapeland. Similarly, the ECSE will not increase the maximum potential emissions of TACs or GHGs. Therefore, maximum facility emissions following the ECSE will not be greater than what was analyzed when Grapeland was initially permitted.

Even though it is necessary for SCE to maintain maximum flexibility to dispatch Grapeland as directed by CAISO, SCE is not proposing to change Grapeland's permitted maximum operating limits or PTE because the ECSE are not expected to result in increased operation of Grapeland. The reason is that SCE's detailed forecasts project that Grapeland's run hours will decrease by 500 to 600 hours per year, relative to historic operating levels, over the next 10 years after the ECSE are installed, with associated decreases in criteria pollutant, TAC and GHG emissions. The basis for the projected decrease in run hours is that currently Grapeland runs for more hours during peak demand than may be necessary to ensure that its electrical generation is readily available should it be needed. Once the ECSE are implemented, the faster start and ramping capability will enable CAISO to better tailor dispatch of Grapeland to meet specific needs when other more efficient or lower cost generation, such as hydroelectric or combined-cycle gas turbines, cannot be dispatched quickly enough. This shift is expected to reduce the system-wide cost of electricity generation for SCE customers, as well as reduce system-wide GHG and criteria pollutant emissions.

- **Reduce Water Consumption**

  Current NO_x emissions control for the turbine is accomplished by a combination of water injection in the combustor and ammonia injection across the SCR device. The water injection first reduces the NO_x emissions to a level from which the SCR can further reduce the NO_x concentrations to comply with the permit limits. As explained above, the ECSE involve reconfiguring the SCR emissions control system to increase the catalyst surface area and improve ammonia distribution to enhance control of NO_x emissions. With implementation of the ECSE, the NO_x concentration from the combustor can increase to an optimal point within the range of ~25 ppm to ~42 ppm, while still maintaining controlled exhaust emissions of 2.5 ppm or lower. Thus, the new configuration does not require as much water injection for the initial control of NO_x from the combustor. The precise water-injection rate for NO_x control will be optimized after implementation of the ECSE.

  The lower water-injection rate in the emissions control systems will mean that less water is consumed, which supports California's goal to reduce water usage. Based on operating forecasts for 2017 to 2026, the lower water-injection rate will reduce overall water consumption at Grapeland by approximately 42% and save approximately 1.6 to 2.2 million gallons of water per year at this facility.

- **Reduce O&M Costs**

  The current water-injection rate has resulted in damage to turbine components and premature degradation of the oxidation catalyst. As explained previously, the ECSE involve reconfiguring the emissions control systems such that the water-injection rate at the turbine can be lowered. In addition to a substantial reduction in water consumption, the ECSE will prevent damage to turbine components and lower the degradation rate of the oxidation catalyst. These changes will reduce the Operations and Maintenance (O&M) costs for Grapeland, which will translate into savings for SCE's customers, and avoid likely solid waste – amongst other environmental impacts – from premature equipment replacement.

5.0 IMPACT ANALYSIS FOR TOPIC AREAS POTENTIALLY AFFECTED BY THE PROPOSED PROJECT

This Section compares the environmental topic areas analyzed in the March 2007 Final MND to the environmental topic areas that are potentially affected by the proposed project. The March 2007 Final MND analyzed and identified the potentially significant adverse impacts to the following six environmental topic areas and concluded that these impacts could be reduced to a level of insignificance after mitigation is implemented: 1) air quality impacts from NOx and VOC emissions during construction; 2) biological resources impacts during construction; 3) cultural resources impacts during construction; 4) hazards and hazardous materials impacts during construction; 5) noise impacts during construction; and 6) traffic and transportation impacts during pipeline construction. In addition, mitigation measures were made a condition of project approval and a Mitigation Monitoring and Reporting Plan was adopted for the project. Impacts to the following environmental topics areas were concluded in the March 2007 Final MND to be less than significant: aesthetics, agricultural resources, energy, geology and soils, hydrology and water quality, land use and planning, mineral resources, population and housing, public services, recreation, and solid and hazardous waste.

The environmental topic areas that are potentially affected by the proposed project include the following:

- Air quality
- Biological resources
- Greenhouse gas emissions
- Hazardous materials storage, handling and transport
- Hydrology and water quality
- Noise
- Solid waste management and disposal
- Traffic and transportation

These topics are discussed further in this Section. The remaining topics that are not expected to be affected by the proposed project are discussed in Section 6.0.

5.1 Air Quality

5.1.1 Summary of Air Quality Analysis in the March 2007 Final MND

Air quality impacts resulting from construction and operation of Grapeland were evaluated in the March 2007 Final MND. Emissions of criteria pollutants (e.g., NO_x, VOC, CO, Sulfur Oxides (SO_x), Particulate Matter with an aerodynamic diameter of 10 microns or less (PM_{10}), and Particulate Matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$)) were analyzed. Potential health risk impacts from TACs were also analyzed.

<u>**Construction**</u>**:** Both on-site and off-site construction equipment and project-related traffic emissions were evaluated, including construction of the power plant and related facilities. The construction was assumed to require grading, painting, paving, and use of cranes and other construction equipment. The construction was expected to require up to 40 daily workers at the peak of the construction and last about four months. The analysis determined that NO_x emissions during peak construction had the potential to exceed the applicable NO_x daily emissions significance threshold of 100 pounds per day (lbs/day). In order to mitigate this potential impact, the project was required to provide Regional Clean Air Incentives Market (RECLAIM) Trading

Credits for NO_x during construction periods when the significance threshold was exceeded. In the March 2007 Final MND, 15 mitigation measures were imposed to reduce the NO_x construction impacts to less than significant levels.

Project-specific construction emissions were also evaluated in the March 2007 Final MND to determine if the proposed project would result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard. The SCAQMD is non-attainment for ozone, a regional pollutant, which could be exacerbated by emissions of NO_x and VOC from Grapeland. Although the VOC emissions during construction of each of the four peaker projects proposed by SCE (as identified in Section 4.1) within the South Coast Air Basin were individually below the SCAQMD's significance threshold for VOC construction emissions, the construction of all four peaker projects was expected to occur within the same timeframe and cumulatively exceed the VOC significance threshold. Therefore, in addition to the NO_x emissions mitigation identified above, the Grapeland project was required to provide Mobile Source Emission Reduction Credits (MSERCs) to mitigate cumulative impacts from VOC emissions during construction of the SCE peaker projects. Construction activities that were evaluated in the March 2007 MND have been completed and the construction emissions are no longer occurring.

Commissioning/Operation: The analysis of operational impacts included an assessment of power plant commissioning, start-up/shutdown and normal maximum operating conditions. Indirect traffic emissions related to ammonia delivery, wastewater removal, and worker traffic were included in the analysis. A comparison of project impacts to emissions significance thresholds and localized significance thresholds (LSTs) was performed. A health risk assessment (HRA) of the potential TAC emissions was also performed. The emissions and results of all impact analyses were concluded to be below the applicable significance thresholds, and no mitigation was required for air quality impacts during commissioning or operation. The commissioning activities that were evaluated in the March 2007 MND have been completed and the operation emissions associated with commissioning are no longer occurring.

5.1.2 Air Quality Impacts Related to the Proposed Project

Construction: The construction equipment and duration projected to be used for ECSE installation are described in Section 4.2. Criteria pollutant emissions related to installation of the ECSE were estimated using CalEEMod™ and are summarized in Table 5-1, with more detailed calculations (model outputs) provided in Appendix A. As shown in the table, total emissions for the expected multiple-day period associated with implementation of the ECSE are well below the SCAQMD maximum daily mass emissions thresholds for construction and hence will not result in a significant impact.

Table 5-1: Comparison of Total ECSE Construction Emissions to SCAQMD's Air Quality Significance Thresholds For Construction

	NO_x	CO	VOC	SO_x	PM_{10}	$PM_{2.5}$
Total ECSE Construction Emissions (lbs)	37.0	33.8	3.9	0.1	2.3	1.6
Daily ECSE Construction Emissions[a] (lbs/day)	5.3	4.8	0.6	0.01	0.3	0.2
Significance Threshold For Construction(lbs/day)	100	550	75	150	150	55
SIGNIFICANT?	NO	NO	NO	NO	NO	NO

Note:

a. Daily ECSE emissions based on total construction emissions divided by 7 days in order to compare to daily thresholds

Because of the minimal construction activities planned, the associated constructions emissions as a result of implementing the proposed project are well below the construction emissions analyzed in the March 2007 Final MND for construction of the entire facility. Further, the construction emissions summarized in Table 5-1 are below the SCAQMD's air quality significance thresholds for construction. Therefore, because the anticipated construction emissions associated with implementing the proposed project are expected to be less than the construction impacts analyzed in the March 2007 Final MND and are independent from the March 2007 Final MND at less than significant levels for all pollutants, and the proposed project will not result in a significant adverse air quality impacts during construction and will not make existing impacts substantially worse.

Recommissioning/Operation: Once implemented, the proposed project will not change the fuel-input limits, generation capacity output, or the heat rate of the gas turbine. As detailed in the Title V Application, maximum potential annual, monthly and daily emissions following implementation of the ECSE will be within the currently permitted PTE for Grapeland. Similarly, the ECSE will not increase the maximum potential emissions of TACs or GHGs. Therefore, maximum facility emissions following implementation of the ECSE will not be greater than what was analyzed when Grapeland was initially permitted.

Upgrading the SCR and oxidation catalyst at Grapeland will require recommissioning of the turbine, which consists of testing and tuning the ammonia and water injection at various loads to optimize the emissions control equipment following installation of the reconfigured/new catalysts. Emissions are higher during this period as the control equipment is being prepared to be fully operational. Commissioning emissions were analyzed in the March 2007 Final MND (see Table 3.8 in the March 2007 Final MND) and determined to be equal to or less than the normal operating emissions and hence result in less than significant air quality impacts during operation. Similarly, the recommissioning emissions associated with implementation of the proposed project have been calculated (and will limited in the Title V permit) to remain within the same PTE as analyzed in the March 2007 Final MND as explained in the discussion and several tables below. To ensure that impacts associated with recommissioning will not result in significant impacts, SCE will offset the recommissioning emissions by decreasing the allowable start-ups and fuel use during the recommissioning year so that the overall PTE of the facility does not increase as a result of recommissioning. The following analysis explains how the offsetting will be accomplished on an annual, monthly and daily basis.

Annual Emissions: SCE submitted Application No. 543407 in 2012 to implement a sliding scale on the number of allowable start-ups and fuel use for the turbine. This application was approved and the new permit was issued on April 30, 2014. Based on the sliding scale allowed in the permit, the highest annual emissions occur at 100 starts per year and a fuel use of 660 million standard cubic feet per year (MMscf/yr) of natural gas. The emissions for this scenario are considered the PTE for the turbine, and include 28 hours for CAISO performance tuning and four hours for black-start generator testing (per the SCAQMD's Engineering Analysis performed for the 2012 application). As part of that application, SCE also requested to cap the emissions for the black-start generator based on maintenance and testing hours only. Therefore, for the facility-wide PTE, the black-start generator emissions are based on 64 hours per year of operation. A summary of the criteria pollutant emissions from the SCAQMD's 2012 engineering evaluation is presented below in Table 5-2.

Table 5-2: Annual Facility PTE (lbs/year)

Pollutant	Turbine	Black-Start Generator	Facility Total
NO_x	7,794.6	162.6	7,957.2
CO	10,185.7	227.8	10,413.5
VOC	1,839.0	58.9	1,897.9
SO_x	411.2	0.24	411.5
PM_{10}[a]	7,397.8	4.1	7,401.9

Note:

a. The SCAQMD did not include $PM_{2.5}$ in its engineering evaluation. However, $PM_{2.5}$ emissions are estimated to be 99.8% of the PM_{10} emissions, and hence would be ~7,387 lbs/year.

The proposed ECSE will affect only the emissions control systems for the gas turbine, and not the black-start generator. As stated above, after implementation of the ECSE, the facility PTE will not increase over the limits in Table 5-2.

SCE's vendor has estimated that recommissioning will require 28 starts and 100 hours of testing/tuning at various loads and conditions over the course of 45 days, and will also incorporate the normal yearly CAISO performance tuning. In other words, for the recommissioning year, there will be no need for the additional 28 hours of CAISO performance tuning outside of recommissioning. Black-start testing will still be needed, and Western Electricity Coordinating Council (WECC) generator modeling[8] is also required to be performed in 2017 (the projected recommissioning year). PTE for the turbine will therefore include emissions from start-ups, shutdowns, normal operation, black-start generator testing, WECC generator modeling, and recommissioning. The detailed emissions estimates are presented in Appendix B.

SCE is projecting a high of 325 starts for the calendar year, which includes recommissioning starts (planned for the 2017 year). Per discussions with the SCAQMD, start-ups solely for the purpose of recommissioning are counted against the yearly start-up limit (but not the yearly fuel use limit). This will effectively reduce the number of allowed starts for the remainder of the recommissioning year by 28, lowering the number from 325 to 297. Grapeland will further reduce its fuel usage by 16 MMscf/yr (down to 472 MMscf/yr). These new operating parameters (472 MMscf/yr, 297 starts of normal operation, and 28 starts for recommissioning) will keep the facility below its existing PTE for all criteria pollutants. These parameters will be included as conditions in the

[8] WECC generator modeling consists of field testing the generator, power system stabilizer and turbine governor for verification of reactive limits, proper performance of the dynamic control systems and validation of the computer models used for stability analysis.

revised Title V Permit to ensure compliance with current permit emission limits during the recommissioning year. A summary of the recommissioning year emissions is shown in Table 5-3. The recommissioning year emissions are compared to the existing facility PTE in Table 5-4. Detailed emission calculations are presented in Appendix B.

As the recommissioning year emissions will remain below the existing annual PTE, which is the baseline for purposes of this analysis, there will be no significant impact based on annual emissions as a result of the proposed ECSE.

Table 5-3: Annual Turbine Emissions Calculations[a] for Recommissioning Year (lbs/year)

Pollutant	Start-up	Shutdown	Normal Operation	Black Start Testing	WECC Generator Modeling	Recommissioning	Turbine Total
NO_x	3,076.9	1,912.7	1,814.6	160.0	138.0	688.0	7,790.2
CO	2,548.3	2,283.9	2,651.2	63.4	158.4	435.0	8,140.1
VOC	398.0	395.0	504.3	4.6	11.5	50.0	1,363.3
SO_x	89.1	89.1	114.6	0.2	0.6	19.3	313.0
PM_{10}	1,606.8	1,606.8	2,066.7	1.9	4.8	348.5	5,635.5
$PM_{2.5}$[b]	1,603.6	1,603.6	2,062.6	1.9	4.8	347.8	5,624.2

Notes:

a. Emission values are based on 325 total start-ups/shutdowns (297 during normal operation and 28 during recommissioning), vendor estimates of the recommissioning emissions, and the remainder of the allowable fuel use (472 MMscf) allocated to normal operation.

b. The SCAQMD permit does not include emissions limits for $PM_{2.5}$, so its PTE is based on an approximation that $PM_{2.5}$ is 99.8% of PM_{10} for these sources.

Table 5-4: Annual Facility PTE Comparison (lbs/year)

Pollutant	Existing Annual Facility PTE	Annual Recommissioning Emissions[a]	Difference
NO_x	7,794.6	7,790.2	-4.5
CO	10,185.7	8,140.1	-2,045.5
VOC	1,839.0	1,363.3	-475.6
SO_x	411.2	313.0	-98.3
PM_{10}	7,397.8	5,635.5	-1,762.3
$PM_{2.5}$	7,383.0	5,624.2	-1,758.8

Note:

a. Annual emissions that occur during the recommissioning year include both the turbine and generators.

Monthly Emissions: Based on the 2012 SCAQMD engineering evaluation, the existing monthly PTE includes 30 start-ups/shutdowns and fuel use of 132.9 MMscf (which is calculated from the 4.43 MMscf daily limit multiplied by 30 days). These emissions are presented below in Table 5-5.

During the recommissioning process, there will be an estimated 28 start-ups/shutdowns and 31.15 MMscf of natural gas fuel used. Recommissioning is scheduled to take place over the course of 45 days. Conservatively assuming the entire recommissioning is performed within one month, the emissions will still be below the existing monthly PTE. Emissions in every other month will be for normal operations, and will be within the existing PTE. Therefore, there will be no increase in monthly PTE as a result of the ECSE, including during recommissioning.

Table 5-5: Monthly Facility PTE Comparison (lbs/month)

Pollutant	Existing Monthly Facility PTE	Monthly[a] Recommissioning Emissions	Difference
NO_x	1,524.51	688	-836.51
CO	1,978.93	435	-1,543.93
VOC	364.07	50	-314.07
SO_x	80.94	19.3	-61.64
PM_{10}	1,460.23	348.5	-1,111.73
$PM_{2.5}$	1,457.31	347.8	-1,109.51

Note:

a. Conservatively assumes that all recommissioning activities will be performed within one month.

Daily Emissions: Based on the 2012 SCAQMD engineering evaluation, calculations of maximum daily emissions for the turbine assume three starts per day and a fuel use of 4.43 MMscf (which is the daily permit limit). Based on the expected testing plan (see Table B-5 in Appendix B), emissions during several of the test runs (i.e., Tests 9, 10, 13, and 14) all have the capability to exceed the existing daily PTE for NO_x [68.06 lbs. per Application No. 543407] if the entire 12 hours of tests were performed in one day. The permit also limits NO_x emissions to 55 lbs/day (with various exemptions for testing/tuning). One of the test runs could exceed this limit if performed entirely in one day (see Test 5 in Table B-5 in Appendix B).

To avoid exceedances of the existing daily PTE and remain below permit limits, recommissioning tests will be performed over multiple days, with tests being performed no more than 8 hours per day. This restriction will ensure that the daily recommissioning emissions will not exceed the daily permit limit, and will not exceed the current daily PTE of 68.06 lbs/day. A summary of the daily emissions is presented in Table 5-6, and more detailed calculations are provided in Appendix B.

Note that the turbine will continue to comply with the 4.43 MMscf daily fuel limit during recommissioning.

In summary, the annual, monthly and daily emissions resulting from implementation of the ECSE, including the recommissioning testing, will be within the permitted PTE for the facility and/or the permitted emissions limits. Therefore, there will be no changes in the facility emissions that will adversely change what was analyzed in the March 2007 Final MND, and no new significant impacts will result.

Table 5-6: Daily Facility PTE Comparison (lbs/day)

Pollutant	Existing Daily Facility PTE	Daily Recommissioning Emissions	Difference
NO_x	68.06	54.00	-14.06
CO	74.62	36.96	-37.66
VOC	12.92	4.29	-8.63
SO_x	2.75	1.71	-1.05
PM_{10}	49.58	30.68	-18.90
$PM_{2.5}$	49.48	30.62	-18.86

5.2 GHG Emissions

5.2.1 Summary of GHG Emissions Analysis in the March 2007 Final MND

In accordance with applicable CEQA checklist and SCAQMD CEQA guidelines at the time of the March 2007 Final MND was adopted, GHG emissions were not required to be specifically analyzed for the Grapeland Peaker Project. However, GHG emissions are indirectly restricted by the permitted limits (i.e., PTE) for the criteria pollutant emissions for this facility because Grapeland was permitted with a fuel use limit of 660 MMscf/yr (based on the 100 starts per year scenario). By limiting the fuel use, the corresponding amount of GHG emissions that are generated during combustion are also limited. Actual GHG emissions from Grapeland are well below the reporting threshold of California's GHG cap-and-trade program of 25,000 metric tons per year (MT/yr) of carbon dioxide equivalent (CO_2e) emissions.

5.2.2 GHG Emissions Impacts Related to the Proposed Project

Under the proposed project, Grapeland's currently permitted fuel use limit of 660 MMscf/yr (based on the 100 starts per year scenario) will change to 490 MMscf (based on up to 325 starts per year) without increasing the amount of total annual fuel that can be used. Also, as explained previously, because criteria pollutant emissions will not exceed the existing facility PTE during recommissioning and operation, the same will be true for GHG emissions. Thus, the proposed ECSE will not increase the amount of GHGs emitted from the facility. Further, the actual GHG emissions from the proposed project are expected to continue to be well below the reporting threshold of California's GHG cap-and-trade program of 25,000 MT/yr of CO_2e.

5.3 Biological Resources

5.3.1 Summary of Biological Resources Analysis in the March 2007 Final MND

Pre-construction biological surveys were performed at the project site and in surrounding areas prior to the original construction. No elements of the construction and operation of the proposed project were expected to substantially affect endangered, threatened, sensitive, or special-status species, as well as riparian habitat, protected wetlands, or other sensitive natural communities. No native resident or migratory fish species or native wildlife nursery sites exist within the proposed project site. Mitigation measures to avoid potential impacts to the Los Angeles pocket mouse and migratory birds reduced potential impacts, and the March 2007 Final MND concluded that significant adverse biological resource impacts were not expected.

5.3.2 Biological Resources Impacts Related to the Proposed Project

The proposed project will be implemented within the existing disturbed footprint of the Grapeland facility. Although there will be no new ground disturbance, there could be the potential for small mammals or nesting birds to use the site during ECSE installation. Therefore, the applicable mitigation measures from the Mitigation Monitoring and Reporting Plan included in the March 2007 Final MND for Los Angeles pocket mouse and migratory birds (BIO-1 and BIO-2) will be implemented during construction of the proposed project to avoid adverse biological resource impacts. Therefore, the proposed project will have a less than significant impact to biological resources.

5.4 Hazards and Hazardous Materials

5.4.1 Summary of Hazardous Materials Analysis in the March 2007 Final MND

The March 2007 Final MND analyzed the potential for impact from potential hazardous materials that could be used during construction and operation of the Grapeland facility. Hazardous materials at this site are stored and handled in accordance with all local, state and federal regulations and codes. The March 2007 Final MND analyzed hazardous materials that would be used during project construction include gasoline, diesel fuel, oil, and lubricants for construction equipment, and small quantities of solvents and paint. The analysis concluded that the most likely incidents involving these hazardous materials would be associated with minor spills or drips. Small spills and drips can be easily cleaned up, so impacts from these minor releases were considered to be less than significant. Although, no significant hazardous material impacts were expected, a mitigation measure (HM-1) was included to ensure that impacts resulting from hazardous materials handling at the facility would be less than significant. This mitigation measure limits the storage of hazardous materials (other than ammonia) to small quantities.

Aqueous ammonia (19% ammonia concentration by weight) was the only chemical identified as being stored in sufficient quantities at the project site to be classified as a regulated substance subject to the requirements of the California Accidental Release Prevention (CalARP) Risk Management Program. The use of 19% aqueous ammonia was the only hazardous material analyzed in detail in the March 2007 Final MND, and the risk analyses for 19% aqueous ammonia are summarized below. There were no specific mitigation measures related to the use of aqueous ammonia identified in the March 2007 Final MND.

5.4.1.1 Summary of Existing Ammonia Storage Facilities

In order to put the risk analyses in context, the existing ammonia facilities are described below.

An SCR system with aqueous ammonia injection is used at Grapeland to control NO_x emissions in the turbine exhaust. Currently, aqueous ammonia of 19% ammonia concentration is used at this facility. The Grapeland aqueous ammonia system consists of a storage tank (pressure vessel), secondary containment, dispensing pumps, distribution piping and vaporization skid. There are numerous safety features built into the existing ammonia system.

The aqueous ammonia storage tank is located adjacent to the aqueous ammonia unloading area. The aqueous ammonia tank is of a single-walled design with a total capacity of 10,500 gallons. The storage tank is constructed of materials that are compatible with aqueous ammonia. The tank meets American Society of Mechanical Engineers (ASME) codes and is equipped with pressure safety valves, a level gauge, a pressure gauge and a vacuum breaker system. The tank is mounted within a concrete containment structure to meet seismic codes (2001 California Building Code).

The secondary containment has been sized to contain 12,500 gallons, or approximately 120% of the storage tank capacity. The secondary containment structure measures 47 feet long by 13 feet wide by 3 feet high. This secondary containment volume can contain the entire capacity of the tank and was designed with an additional allowance for precipitation from a 25-year, 24-hour storm event. The secondary containment is connected to an underground concrete sump via a 7-square-feet drain grating. The drain grating funnels into a 2-foot-diameter drainpipe that allows a catastrophic ammonia spill to be flushed into the sump in approximately one minute. Any liquid collected in the sump is removed manually by an operator using either a portable pump or a vacuum truck. Only trained technicians perform system maintenance and repairs.

Since the start of operation in 2007, 19% aqueous ammonia has been delivered to the facility by tanker truck in up to 7,000-gallon loads, and unloaded into the tank until filled to 85% (8,925 gallons) of capacity. The aqueous ammonia unloading station consists of a sloping concrete pad 36 feet long by 15 feet wide. The pad slopes to drain to the storage tank secondary containment sump. As with the secondary containment drain, the concrete pad is provided with a drain grating and a 7-square-feet opening, which funnels into a 2-foot diameter drainpipe. This design ensures that no pooling occurs in the event of a spill during unloading. Only properly trained personnel conduct the unloading operation. Emergency shut-off valves are located at the ammonia unloading station for emergency isolation of aqueous ammonia in the system. This system prevents backflow of aqueous ammonia from the storage tank. The tanker truck is equipped with a remotely operated emergency shut-off system to stop the ammonia transfer in case of an emergency during unloading operation.

Ammonia leak detection sensors are installed both inside and outside the secondary containment area, which allows rapid detection and quick response to any accidental spill of aqueous ammonia. These sensors activate alarms, horns and strobe lights, whereas the alarms sound both locally and in the control room. A wind banner (sock) is installed to continuously indicate the wind direction. A personal protective shower and eyewash station are located in the immediate vicinity of the ammonia storage tank. SCE staff are trained to appropriately react to emergency and accidental situations.

An automatic shut-off valve (pneumatically controlled) was recently installed on the aqueous ammonia delivery line from the storage tank to the AIG. This valve normally remains open, but will shut off automatically in case of failure of plant air supply or when any one of the three above-ground ammonia sensors installed outside the secondary containment underground sump indicates an on-site ammonia concentration of 250 ppm or higher. This automatic shut-off valve can also be closed remotely by the SCE operator.

5.4.1.2 Ammonia Release Impact Analyses in the March 2007 Final MND

Three accidental ammonia release scenarios were analyzed and discussed in the March 2007 Final MND. These included:

- A catastrophic storage tank failure;
- An ammonia unloading accident; and
- A release during transport of the ammonia to the site.

The shortest distance from a potential on-site ammonia release (ammonia tank/secondary containment sump drain) to the property boundary at Grapeland (where the public could be exposed) was estimated prior to construction of the facility to be 331 feet (101 meters). In the event of a storage tank failure, where the tank was assumed to be filled to 85% of capacity, or 8,925 gallons, the ammonia concentration at this distance was predicted by the Offsite Consequence Analysis (OCA) prepared for the March 2007 Final MND to be 45 ppm for the tank rupture. The concentration at the same point from an unloading accident where the entire contents of a 7,000-gallon tanker truck would be released would be less than the tank rupture accident. The OCA prepared for the March 2007 Final MND was performed using the SCREEN3 model, which was the recommended model at the time. The modeled ammonia concentration of 45 ppm was concluded to be lower than the ammonia toxic endpoint[9] concentration of 200 ppm (0.14 milligrams per liter [mg/l]), as defined by the CalARP Regulations (Title 19, California Code of Regulations [CCR], Division 2, Chapter 4.5, Appendix A [January 1, 2015]), which was the CEQA significance threshold applied in the March 2007 Final MND. The analysis concluded that a catastrophic release of ammonia from either a tank rupture or an unloading accident was not expected to have a significant impact to the public or environment.

With respect to the transport of ammonia, the frequency for serious hazardous material incidents involving large trucks was determined to be approximately 0.0022 per million vehicle miles (United States Department of Transportation [U.S. DOT] 2004). Given this low frequency, and the relatively short distance between the aqueous ammonia supplier and Grapeland, a release of aqueous ammonia from the delivery truck en route to the facility during the lifetime of the facility was concluded in the March 2007 Final MND to be highly unlikely. Because the likelihood of an accident was determined to be so remote, the March 2007 Final MND for Grapeland did not analyze the consequences of a release that might result from an accident during transport.

5.4.2 Hazards and Hazardous Materials Impacts Related to the Proposed Project

As described in Section 4.2, SCE proposes to increase the aqueous ammonia concentration from 19% to 29%. Based on information from the vendor (GE), the enhanced SCR system will operate more efficiently with a higher concentration of ammonia because more of the NO_x emissions will be controlled with the same ammonia injection rate.

Aqueous ammonia will continue to be the only chemical stored in sufficient quantities at the project site to be classified as a regulated substance subject to the CalARP Program and is also the only hazardous material that will be affected by the proposed project. Therefore, the potential for impacts from the use, storage and transport of aqueous ammonia is the only hazardous material discussed in this Section.

This higher concentration aqueous ammonia will be stored on-site in the same 10,500-gallon storage tank that is currently being used for storing 19% aqueous ammonia. No physical changes to the storage tank, containment structures, unloading area, or safety features are needed to make the change to 29% aqueous ammonia. However, to remain below the applicability threshold for federal Risk Management Program requirements of 20,000 pounds of ammonia in solution, the storage tank will be filled to only 84% of its capacity (8,820 gallons). This limit will be

[9] The toxic endpoint is the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious adverse health effects or symptoms that could impair an individual’s ability to take protective action.

implemented through administrative controls consisting of a local alarm (horn) set to indicate when the tank is 83% full, to avoid filling past 84%.

To analyze the potential impacts of the proposed project, risk analyses were performed in accordance with current standards and the scenarios and results are detailed below.

5.4.2.1 Ammonia Tank and Unloading Accident Scenarios

The same release scenarios analyzed in the March 2007 Final MND were assessed for the higher concentration of ammonia (Nand 2016, Appendix C). Per SCAQMD requirements, the AERSCREEN model (rather than SCREEN3) was used to conduct the OCA for the 29% aqueous ammonia worst-case release scenario[10]. The United States Environmental Protection Agency (EPA) developed the AERSCREEN model, which is a screening-level air quality model, for performing air dispersion modeling analysis for neutrally buoyant releases such as ammonia (EPA 2015). The EPA has also developed the Risk Management Program Guidance for Offsite Consequence Analyses (EPA 2009). The guidance contained in this document was followed for estimating evaporation rates from the diked areas and underground sump. The calculation technique for estimating the ammonia emissions and impacts were based on the EPA and SCAQMD guidance and this information, along with the AERSCREEN output, is provided in Appendix C.

Since the time Grapeland was permitted in 2007, development in the area surrounding the facility has resulted in modifications to the perimeter fencing. In consultation with the San Bernardino County Fire Department, the 5-year update of the CalARP Risk Management Plan (RMP) OCA (prepared in 2012) was performed using the distance of 385 feet (117 meters) from the on-site location of a potential ammonia release to the outer perimeter of the facility, which is different from the distance used in the March 2007 Final MND since it is based on the actual as-built layout. The same distance of 385 feet to the closest point of public impact was used for performing the updated OCA of the tank rupture scenario for the storage of 29% aqueous ammonia.

The results of the AERSCREEN analysis for a tank failure, filled to 84% (8,820 gallons)[11] of capacity, indicate that the maximum ammonia concentration at approximately 385 feet (i.e., the closest point from the ammonia tank to the property boundary with unrestricted access) is expected to be 40 ppm. Even though there will be a larger concentration of ammonia in the storage tank, the modeled concentration of 40 ppm is less than the 45 ppm value reported in the March 2007 Final MND due to the greater actual as-built distance between the storage tank and the fenceline, as well as the use of AERSCREEN rather than SCREEN3. As was the case in the March 2007 Final MND, this value is below the significance threshold of 200 ppm (the ammonia toxic endpoint contained in the CalARP regulation). Therefore, a catastrophic release of 29% aqueous ammonia from a tank failure is not expected to have a significant impact to the public or environment. This analysis is very conservative and likely overstates the consequences of the modeled release. Conservative features of the OCA are discussed in more detail in Appendix C.

[10] Industry standard for aqueous ammonia at this concentration is 29.4% plus or minus (±) a half percentage point, so a concentration of 29.9% was used in the analyses to represent worst-case conditions.

[11] As a safety precaution to ensure the tank is not overfilled, alarms will be triggered at 83% capacity. This level ensures that additional federal RMP requirements are not triggered with the larger percentage of ammonia in the tank.

As previously described, the aqueous ammonia unloading area consists of a concrete pad. The pad slopes towards a drain that leads to an underground containment sump that is common to both the ammonia tank storage area and the delivery truck catch basin. This underground sump is large enough to contain the entire contents of the delivery truck, which volume is less than the capacity of the storage tank. Since the delivery truck catch basin surface area (540 square feet) is smaller in comparison to the surface area (611 square feet) for the aqueous ammonia tank containment, and the contents of a tanker truck (≤7,000 gallons)[12] are less than the contents of the aqueous ammonia storage tank (8,820 gallons at 84% capacity), a complete release of a tanker truck's contents would have lower impacts using these modeling techniques. Therefore, additional OCA modeling was not performed. Since the impacts will be less than the 40-ppm level at the property boundary that was estimated for a tank failure, an unloading accident is not expected to have a significant impact to the public or environment.

A more detailed description of the AERSCREEN analysis and the model output for this updated OCA are provided in Appendix C.

5.4.2.2 Aqueous Ammonia Transport Accident Scenario

Potential impacts associated with the transport and potential release of 29% aqueous ammonia are dependent upon three considerations:

- the likelihood of an accident;
- the likelihood of a release in the event of an accident; and
- the consequences of a release.

As noted earlier, the March 2007 Final MND contained an analysis that addressed only the likelihood of an accident; it did not analyze the potential consequences of an accident since the likelihood was so remote. However, this Addendum contains an analysis of all three of these risk considerations. As described in more detail below, evaluation of each of these three considerations leads to the conclusion that the potential impacts associated with the transport and potential release of 29% ammonia will be no greater than those associated with the transport and potential release of 19% ammonia, for the following reasons:

- Safe transport of hazardous materials, such as ammonia, is ensured through extensive regulation at the federal and state levels, making the risk of an accident resulting in a release of ammonia extremely remote;
- The frequency (up to four per year) and approximate distance (12 miles from the current supplier to Grapeland) of ammonia deliveries will remain unchanged from the current situation after implementation of the ECSE, and will continue to be few and relatively short, respectively;

  SCE has contracted with an ammonia supplier that implements transportation safety measures that exceed minimum state and federal requirements to reduce the risk of a release in the event of an accident; and

[12] As discussed further below, SCE will limit the volume of 29% aqueous ammonia delivered at any one time to 4,000 gallons (±10%), which will further reduce the impacts of an accidental release during unloading.

- SCE will restrict the transport of 29% aqueous ammonia to smaller volumes (i.e., 4,000 gallons[13] of 29% aqueous ammonia solution) than currently allowed for the transport of 19% aqueous ammonia, which reduces the impacts of a release should one occur. This requirement is included as a condition of the modified Title V permit.

The likelihood of an accident will continue to be remote, which is the same finding as that associated with transport of 19% ammonia as initially reviewed and approved in the March 2007 Final MND.

Extensive regulations at both the federal and state levels govern the shipment of hazardous materials on California highways to ensure the safe transport of ammonia. The Hazardous Materials Transportation Act (HMTA), enacted in 1975 (see 49 U.S.C. §§ 5101 – 5127), gave the U.S. Secretary of Transportation the regulatory and enforcement authority to provide adequate protection against the risks to life and property inherent in the transportation of hazardous material in commerce. The U.S. DOT oversees the movement of hazardous materials at the federal level (*see* 49 CFR Parts 171-180). U.S. DOT regulations require all tanker truck trailers carrying aqueous ammonia to meet strict requirements for collision and accident prevention, which minimize the likelihood of an accident.

At the time the March 2007 Final MND was approved, it was assumed that 19% aqueous ammonia would be delivered to Grapeland up to four times per year in 7,000-gallon tanker trucks. Thus, the annual quantity of delivered aqueous ammonia evaluated in the March 2007 Final MND was 28,000 gallons. While the concentration of the ammonia will increase after implementation of the ECSE, it is expected to be injected into the SCR system at roughly the same volume of solution. Aqueous ammonia is currently injected at roughly 15 gallons per hour[14] at full load and somewhat less at typical loads, and that injection rate is expected to continue at that level after implementation of the ECSE. The Title V permit contains a limit on the amount of natural gas used per year, which effectively limits the number of operating hours (to about 1,000 hours at full load depending on the number of starts), and hence it also limits the maximum amount of ammonia that can be utilized in any given year. The limits related to fuel use and operation of the gas turbine are not changing. Based on the allowed hours of operation, the amount of ammonia injected is expected to be less than 16,000 gallons per year. Therefore, even with SCE's commitment to limit the volume of ammonia delivered to the site at any one time to approximately 4,000 gallons (discussed further below), the number of deliveries needed at Grapeland will not increase above the four deliveries per year that were analyzed in the March 2007 Final MND. By limiting the amount of 29% aqueous ammonia being transported per trip, as well as no more than four trips per year, no change in accident probability or truck emissions are expected from what was analyzed and disclosed in the previously approved March 2007 Final MND. Ammonia is currently supplied to Grapeland from Airgas in Riverside, which is a distance of approximately 12 miles. SCE expects to continue using an ammonia supplier in the local area after implementation of the proposed project.

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[13] To account for possible variation in the precise amount of ammonia in any one delivery, an amount of 4,000 gallons ±10%, or up to 4,400 gallons, was analyzed. The current vendor, Airgas, generally tracks shipments in terms of pounds of aqueous ammonia solution rather than a number of gallons. Based on information provided by Airgas to SCE, the density of 29% aqueous ammonia is ~7.48 lbs/gallon. Based on a delivery volume of 4,400 gallons, the weight of the solution would be ~32,900 pounds.

[14] Approximately 112 lbs/hr at a density of 7.48 lbs/gallons, although the injection rate can vary up to 140 lbs/hr.

Increasing the ammonia concentration from 19% to 29% does not increase the risk of an accident during transport, which is primarily a function of the number of deliveries and the distance traveled in connection with each delivery. Since the number of deliveries and the distance between Grapeland and the ammonia supplier will not change, implementation of the ECSE will not increase the risk of an accident during ammonia transport. Using the same methodology relied upon in the March 2007 Final MND, an accident resulting in a serious hazardous material incident would be expected to occur approximately once every 9.47 million years. This frequency is based on the probability for serious hazardous material incidents involving large trucks being approximately 0.0022 per million vehicle miles (U.S. DOT 2004), a one-way trip distance of 12 miles, and four tanker truck deliveries per year. Thus, the risk of an accident will continue to be extremely remote, and remain less than significant.

The likelihood of a release of ammonia in the event of an accident will be lower than it was when Grapeland was initially approved because enhanced safety features have been installed on delivery trucks since the publication of the March 2007 Final MND.

The regulations governing shipment of hazardous materials that are described above not only require all tanker truck trailers carrying aqueous ammonia to meet strict requirements for collision and accident prevention, they also require ammonia tanker trucks to be designed to withstand violent accidents without breach of the primary containment. Thus, the existing regulatory regime minimizes both the likelihood of an accident, and the likelihood of a release of ammonia in the event an accident occurs.

Furthermore, the supplier who will deliver ammonia to Grapeland, Airgas, has gone above and beyond the U.S. DOT tanker truck requirements. Since preparation of the March 2007 Final MND, Airgas upgraded its ammonia delivery fleet to include only tanker trucks with recessed valves on the storage vessel and remote control shut-off. The valves are recessed into the tanker vessel, as opposed to protruding outward, to prevent them from shearing off in the event of a truck rollover. Furthermore, the valves are designed to fail in the closed position. Finally, each truck has a remote control shut-off switch that the driver can activate from up to 300 feet away. These safety measures exceed minimum legal and regulatory requirements, and are not necessarily deployed on other vehicles transporting aqueous ammonia throughout Southern California. Because of these enhanced safety measures, the risk of a release in the event of an accident involving transport of ammonia to Grapeland will be lower than the risk of release generally associated with the transport of ammonia using trucks not equipped with these measures. Finally, since these safety measures were implemented after approval of Grapeland and preparation of the March 2007 Final MND, the likelihood of a release in the event of an accident is lower than it was at that time.

As a result of limitations on the total quantity of 29% ammonia to be transported at any one time, the consequences of a release, if one occurs, would be no more significant than those associated with a release of 19% ammonia.

Even though implementation of the ECSE will not increase the likelihood of an accident, and the likelihood of a release in the event of an accident is lower than at the time Grapeland was approved, it is possible that increasing the ammonia concentration from 19% to 29% could increase the impacts associated with a release, if one were to occur. For that reason, additional modeling has been conducted to evaluate the potential consequences of a release of 29% ammonia, relative to the consequences of a release of 19% ammonia.

As explained previously, the March 2007 Final MND did not analyze the potential consequences of a release of 19% ammonia during transport. Nevertheless, those potential consequences existed at the time the March 2007 Final MND was adopted, and they have continued to exist throughout the period of operation of Grapeland. It was certainly known at the time the March 2007 Final MND was adopted that a release of ammonia would have consequences, even though it was determined at the time that the risk of a release was too remote to warrant analysis of the consequences of such a release. Therefore, for purposes of evaluating the consequences of implementing the ECSE, modeling the impacts of a release of the contents of a 7,000-gallon tanker truck of 19% aqueous ammonia was performed in this Addendum to present a comparative basis of the release of 29% aqueous ammonia during transport. The consequences of a release following implementation of the ECSE was determined by modeling the impact of a release of 29% aqueous ammonia. In addition to the change in ammonia concentration, the other important change that affects this analysis is that the 29% ammonia will be delivered in smaller volumes of no more than 4,400 gallons per delivery[15].

Thus, the following two scenarios were modeled to evaluate the consequences of a catastrophic release of aqueous ammonia that might occur during transport:

1) 7,000 gallons of ~19% aqueous ammonia (baseline conditions in the March 2007 Final MND; and
2) 4,400 gallons of ~29% aqueous ammonia (for the proposed project)

The web-based version of the EPA RMP*Comp model was used to determine the distance from the point of the release at which ambient concentrations of ammonia would be less than the toxic endpoint. RMP*Comp is based on the EPA Risk Management Program Guidance for Offsite Consequence Analyses (EPA 2009). Following the Risk Management Program guidance, modeling was conducted to examine a worst-case instantaneous release to the ground of the entire contents of a tanker truck. This approach is consistent procedures followed by SCAQMD staff to assess potential impacts from a release of aqueous ammonia during transport in other recent CEQA documents[16]. In reality, it is extremely unlikely that the entire contents of the tanker truck would be released instantaneously; it is more probable that the contents would be released more slowly, and/or that the release would be stopped before the entire contents of the tanker were released. This is particularly true given current safety measures described earlier, such as remote shut-off capabilities. Thus, the modeled impacts are likely overstated for both scenarios, but the relative impacts are relevant for purposes of this comparison.

The RMP*Comp model was run separately for each scenario, examining 20% and 30% solutions, as this model cannot assess 19% or 29% solutions of aqueous ammonia. Each scenario used default worst-case meteorological parameters of 77 degrees Fahrenheit (°F) air temperature, 1.5 meters per second (m/s) wind speed and stability class F (representing a worst case, very stable

[15] Restrictions on the amount (gallons)/weight per tanker truck load and frequency of ammonia deliveries will be enforceable through a new condition in the Title V Permit to ensure the delivery amount does not exceed 4,400 gallons.

[16] For example, SCAQMD, Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM). November 2015. SCAQMD No. 12052014BAR, State Clearinghouse No: 2014121018.

atmosphere), and urban surface characteristics. It was assumed that there would be no containment of the released ammonia, hence it is considered an unmitigated release in the model.

For Scenario 1, the model predicted that in the event of a catastrophic release of a 7,000-gallon tanker truck of 19% aqueous ammonia, the ambient concentration of ammonia would be less than the toxic endpoint at a distance of 0.4 miles from the point of release. For Scenario 2, involving release of 4,400 gallons of 29% aqueous ammonia, the distance at which the ambient concentration of ammonia would be less than the toxic endpoint was also predicted to be 0.4 miles. Thus, based on these extremely conservative, worst-case analyses, the potential impacts from a catastrophic release of a 7,000-gallon tank of 19% aqueous ammonia would be equivalent to the potential impacts from a catastrophic release of 4,400 gallons of 29% aqueous ammonia. Thus, potential consequences of an aqueous ammonia release during transport is equal to, if not less than, what was approved under the March 2007 Final MND. The RMP*Comp model outputs for these two scenarios are provided in Appendix D.

5.4.3 Conclusion

As discussed in Section 5.4, three types of accidents related to aqueous ammonia storage and transport were addressed, both in the March 2007 Final MND and this Addendum: storage tank rupture, tanker truck unloading accident, and tanker truck accident during transport.

Additionally, the probability of a catastrophic release of aqueous ammonia during SCE operations on-site at the Grapeland facility is very low. The low release probability is the result of many factors, including the stringent design standards for pressurized storage vessels, the presence of oversized containment structures and the secondary underground containment sump, risk management and hazardous materials handling planning, employee training, and ammonia leak detection and alarm systems. The truck drivers who deliver the aqueous ammonia are well trained as required by U.S. DOT regulations. A conservative OCA determined that the risk to the public from an unlikely catastrophic release of 29% aqueous ammonia from a tank failure or unloading accident at Grapeland is less than significant.

The potential impacts associated with the transport of 29% ammonia solution were assessed in absolute terms and relative to the transport of 19% aqueous ammonia.

- As indicated in Section 5.4 above, the probability of an accident during transport is remote, as was the case when the Final MND was approved and Grapeland was permitted. Because the number of tanker truck trips for ammonia deliveries will not increase as a result of the ECSE compared to the trips assumed for the March 2007 Final MND, the probability of an accident will remain less than significant.
- There are stringent U.S. DOT and state regulations related to the transport of hazardous materials such as ammonia. SCE's aqueous ammonia supplier utilizes a fleet of tanker trucks with recessed valves that fail in the closed position and can also be remotely closed, which are safety precautions that go beyond U.S. DOT requirements. Thus, the risk of a release if an accident were to occur is remote, and as a result of the safety measures that have been implemented on the tanker trucks by the supplier that will serve Grapeland, the risk will be lower than it was at the time Grapeland was permitted.
- Finally, SCE has determined that smaller quantities of ammonia solution will be needed than what was originally expected at the time Grapeland was permitted, and has proposed

restrictions to limit the amount of aqueous ammonia delivered to the site in each supply trip. Although not specifically evaluated at the time Grapeland was permitted, the consequences of a release were based on conditions at that time and are equivalent to those that would occur in the event of a release after implementation of the ECSE. This conclusion is based on the fact that the proposed lower volume of ammonia transported at any one time offsets the increased ammonia concentration in terms of the area potentially affected by such a release.

An RMP is required under the CalARP Program for the storage and use of 500 pounds or more of ammonia. SCE, in consultation with the San Bernardino County Fire Department, has prepared a CalARP RMP for Grapeland. An update of the current RMP to allow for the storage and use of 29% aqueous ammonia will be prepared as required. Grapeland will continue to be exempt from federal RMP requirements because the maximum quantity of ammonia proposed to be stored at the facility in each process will be less than the federal threshold quantity of 20,000 pounds of ammonia in the solution (see Attachment 1 in Appendix C).

Based on the foregoing analysis, the change to 29% aqueous ammonia related to the ECSE will not result in any new significant hazards impacts, nor make more severe any previously identified significant impacts, relative to the previously analyzed project characterization in the March 2007 Final MND.

The mitigation measure HM-1 will continue to apply to the proposed project and will ensure that impacts from hazardous materials other than ammonia remain less than significant.

5.5 Hydrology and Water Quality

5.5.1 Summary of Hydrology and Water Quality Analysis in the March 2007 Final MND

The March 2007 Final MND concluded that operation of Grapeland would have a minimal impact on water demand, as it would use less than one percent of the available water supply.

5.5.2 Hydrology and Water Quality Impacts Related to the Proposed Project

As discussed previously, current NO_x emission control at Grapeland is accomplished by a combination of water injection in the combustor and ammonia injection across the SCR device. The water injection first reduces the NO_x emissions to a level from which the SCR can further reduce the NO_x concentrations to comply with the permit limits. The ECSE involve reconfiguring the SCR emissions control system to increase the catalyst surface area and improve ammonia distribution to enhance control of NO_x emissions. With implementation of the ECSE, the NO_x concentration from the combustor can increase to an optimal point within the range of ~25 ppm to ~42 ppm, while still maintaining controlled exhaust emissions of 2.5 ppm or lower. Thus, the new configuration does not require as much water injection for the initial control of NO_x from the combustor. The precise water-injection rate for NO_x control will be optimized after implementation of the ECSE, but based on operating forecasts for 2017 to 2026, the lower water-injection rate will reduce overall water consumption at Grapeland by approximately 42% and save approximately 1.6 to 2.2 million gallons of water per year at this facility. Thus, implementation of the proposed project will result in an environmental benefit to water resources relative to consumption analyzed in the March 2007 Final MND.

5.6 Noise

5.6.1 Summary of Noise Analysis in the March 2007 Final MND

The March 2007 Final MND concluded that temporary project-related construction noise would be considered less than significant. The City of Rancho Cucamonga Municipal Code, Section 17.30.050 exempts noise sources associated with construction, provided said activities do not take place between the hours of 8:00 p.m. and 6:30 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday." The March 2007 Final MND noted that nighttime construction activities may occasionally be required. During those periods, SCE agreed to avoid the use of heavy construction equipment and other activities that produce high noise levels, and avoid all activities that would exceed the standards detailed in the City ordinance.

5.6.2 Noise Impacts Related to the Proposed Project

The construction duration of the proposed project is very short, approximately seven days occurring over three weeks. Construction activities will be limited to the allowable construction hours in accordance with the March 2007 Final MND and Mitigation Monitoring and Reporting Plan, N-1. Therefore, the proposed project will have a less than significant noise impact.

5.7 Solid and Hazardous Waste

5.7.1 Summary of Solid and Hazardous Waste Analysis in the March 2007 Final MND

Solid waste generated from project construction activities may have included scrap lumber, plastic, scrap metal and glass, excess concrete, and empty non-hazardous containers. Management and disposal of these wastes were the responsibility of the construction contractor(s). Non-hazardous solid wastes generated during operation of the power plant includes solid waste from routine maintenance such as used air filters, spent demineralizer resins, and spent softener resins, and other maintenance wastes. Wastes generated during maintenance, including used oil, paper, newsprint, aluminum cans, plastic, and glass containers and other non-hazardous solid waste material, are recycled to the extent practical. Those maintenance-derived wastes that cannot be recycled are transported for disposal at a Class III landfill by a permitted waste hauler for disposal at a Class III landfill. SCE has identified and is committed to comply with all laws ordinances, regulations and statutes related to non-hazardous solid waste management. The law provides a solid waste management system to reduce, recycle, and reuse solid waste generated in the State to the maximum extent feasible in an efficient and cost-effective manner to conserve natural resources, and to protect the environment, and to improve landfill safety. The March 2007 Final MND concluded that there would be no significant impacts associated with management and disposal of either solid or hazardous wastes.

5.7.2 Solid and Hazardous Waste Impacts Related to the Proposed Project

During construction of the proposed project, the CO catalyst that is replaced will be returned to the manufacture for recycling. The SCR catalyst that will be removed during construction and replaced with the upgraded catalyst will be stored in a SCE warehouse for potential reuse at another site. Other wastes generated during construction of the proposed project will be minimal and less than those analyzed and determined insignificant in the March 2007 Final MND.

During operations, although the surface area of the SCR catalyst will be increased from 15.5 cubic meters (m^3) to 19.3 m^3, there will be no increase in the amount of spent catalyst generated because the life of the catalyst depends on the total volume of the catalyst and the fired operating hours.

By increasing the surface area of the catalyst, the estimated life of the catalyst per fired hour will also increase. Thus, less frequent waste disposal. Since the number of fired hours after project implementation will not increase, the amount of spent catalyst per fired hour is expected to decrease. Additionally, the decreased water injection will slow catalyst degradation and thereby reduce the quantity of spent catalyst generated in any given time period. Therefore, the expected decrease in the rate of catalyst use means that there will be no more spent catalyst generated than was evaluated in the March 2007 Final MND. Furthermore, spent catalyst is typically recycled, and hence generally does not end up as solid waste to be disposed of in landfills. The proposed project will have a less than significant impact to solid or hazardous wastes disposal.

5.8 Traffic and Transportation

5.8.1 Summary of Traffic and Transportation Analysis in the March 2007 Final MND

The March 2007 Final MND concluded that construction and operation of Grapeland would not result in significant impacts related to traffic or transportation.

5.8.2 Traffic and Transportation Impacts Related to the Proposed Project

The minimal workforce (up to 10 workers over three weeks) necessary to install the ECSE, and the limited period of installation, will have negligible impacts on traffic and transportation, and will generate far fewer trips than the number analyzed in the March 2007 Final MND, which were determined to be less than significant.

As explained in Section 5.4, even with SCE's commitment to limit the volume of ammonia delivered to the site at any one time to less than ~4,000 gallons, the number of deliveries will not increase above the four deliveries per year that were analyzed in the March 2007 Final MND. In addition, the current source of aqueous ammonia deliveries is Airgas in Riverside, and ammonia will continue to be supplied to Grapeland from a supplier within the local area. As a result, there will be no additional ammonia deliveries, nor any increase in the number of vehicle miles travelled for delivery of ammonia as a result of implementation of the proposed project compared to the approved analysis in the March 2007 Final MND.

As explained in Section 5.7, although the surface area of the SCR catalyst will be increased with implementation of the ECSE, there will be no increase in the amount of spent catalyst generated for transport off-site for recycling or disposal. As a result, there will be no additional trips associated with spent catalyst recycling or disposal as a result of implementation of the ECSE.

As a result of implementation of the ECSE, there will be no new impacts to traffic and transportation relative to what was analyzed in the March 2007 Final MND. Thus, the proposed project would not result in significant impacts related to traffic or transportation.

6.0 TOPIC AREAS NOT AFFECTED BY THE PROPOSED PROJECT

This Section summarizes the remaining environmental topic areas for which there are no impacts if the proposed project is implemented. Table 6-1 provides a summary of the analyses provided in the March 2007 Final MND as well as how that might be affected by the proposed project.

Table 6-1: Environmental Topics Found to be Not Affected by the Proposed Project

Environmental Topic	March 2007 Final MND Analysis	Proposed Project Analysis
Aesthetics	Aesthetics impacts were anticipated to be less than significant, and no mitigation measures were required or proposed. Specifically, the March 2007 Final MND determined the project was not expected to add glare to sensitive receptors and, thus, would have a less than significant impact from new sources of light or glare on daytime or nighttime views in the area.	During the 3-week period of construction, construction equipment may be visible. Nighttime construction activities are not planned; thus, lighting will not be required. The proposed project does not involve the installation of equipment or structures with a different or larger outward appearance or additional lighting than approved in the March 2007 Final MND. Therefore, the proposed project will not have an impact to sensitive receptors from light or glare on daytime or nighttime views in the area.
Agriculture and Forestry Resources	No agriculture and forestry resources impacts were identified; thus, no mitigation was required or proposed.	The proposed project will be implemented within the existing disturbed footprint of the Grapeland facility, therefore there will be no impact to agriculture or forestry resources.
Cultural Resources	The March 2007 Final MND determined the likelihood of encountering cultural resources was low, but there was a potential that additional buried archaeological resources may exist, and such resources conceivably could be adversely affected by ground disturbance associated with construction of the proposed project. Any such impact would have been considered significant, but was reduced to less-than-significant with implementation of mitigation measures for ground disturbing activities.	The proposed project will be implemented within the existing disturbed footprint of the Grapeland facility and do not involve subsurface excavations. As there will not be any ground disturbance associated with the proposed project, there will be no impact to cultural resources.

Table 6-2: Environmental Topics Found to be Not Affected by the Proposed Project (continued

Environmental Topic	March 2007 Final MND Analysis	Proposed Project Analysis
Energy Resources	Energy resources were anticipated to be less than significant, and no mitigation measures were required or proposed. Specifically, the March 2007 Final MND determined the project was not expected to create any significant effects on local or regional energy supplies or on requirements for additional energy or on peak and base period demands for electricity and other forms of energy.	During construction, fuel and electricity may be utilized to operate construction equipment and fuel will be needed to operate vehicles associated with deliveries or haul trips as well as for construction worker vehicles, but since the scale of the construction activities is so much smaller than what was analyzed, no change to the energy impacts analyzed in the March 2007 Final MND are expected. During operation, the proposed project will have no adverse impact on energy resources, but will instead result in benefits to grid reliability (see Section 4.0). The proposed project will not use additional natural gas or generate additional power above that presented in the March 2007 Final MND. As such, the proposed project will have no new impacts to energy resources.
Geology and Soils	Impacts from geology and soils were anticipated to be less than significant, and no mitigation measures were required or proposed. Specifically, the March 2007 Final MND determined the project was not expected to create any significant effects that could expose people or structures to major geologic hazards such as earthquake surface rupture, ground shaking, or could damage facility structures.	The proposed project will be implemented within the existing disturbed footprint of the Grapeland facility and do not involve additional grading or physical alteration of the site or construction of structures. As there will not be any ground disturbance or structure construction associated with the proposed project, there will be no geological or soils impacts.
Land Use and Planning	No impacts from land use and planning were anticipated, thus no mitigation measures were required or proposed.	The proposed project does not involve alteration of the project site, a change in the land use, or require changes to the zoning. Therefore, there will be no impacts to land use and planning from the proposed project.
Mineral Resources	No impacts from mineral resources were anticipated, and no mitigation measures were required or proposed.	The proposed project does not involve construction or any alteration of the project site that would affect mineral resources. Therefore, there will be no impacts to mineral resources from the proposed project.

Table 6-3: Environmental Topics Found to be Not Affected by the Proposed Project (concluded)

Environmental Topic	March 2007 Final MND Analysis	Proposed Project Analysis
Population & Housing	No impacts from population and housing were anticipated, and no mitigation measures were required or proposed.	The proposed project requires no additional operations workers and up to 10 construction workers. The construction activities will be staffed by local construction workers who will commute daily. Therefore, there will be no impacts to population and housing from the proposed project.
Public Services	Impacts to public services were anticipated to be less than significant, and no mitigation measures were required or proposed. Specifically, the March 2007 Final MND determined the project was not expected to add undue burden to fire protection, police protection, parks, schools or other public facilities as a result of construction or operational activities.	The proposed project requires no additional public services. Therefore, there will be no impacts to public services from the proposed project.
Recreation	No impacts from recreation were anticipated, and no mitigation measures were required or proposed.	No recreational facilities are affected by the proposed project. Therefore, there will be no impacts to recreation from the proposed project.

7.0 CONCLUSION

This Addendum contains substantial evidence that demonstrates that the proposed project does not constitute substantial changes to Grapeland that will cause new significant effects or a substantial increase in the severity of previously identified significant effects. Nor has there been a substantial change in the circumstances that will cause new significant effects or a substantial increase in the severity of previously identified significant effects. Finally, there is no substantial new information that could not have been known at the time the March 2007 Final MND was approved that will cause new significant effects or a substantial increase in the severity of previously identified significant effects. The analyses set forth in Sections 5.0 and 6.0 provide substantial evidence in support of these conclusions.

The proposed project is determined to be within the scope of the analysis in the March 2007 Final MND and would not result in creating new significant adverse environmental impacts or in making the existing significant adverse impacts substantially worse for the environmental topic areas of:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality and Greenhouse Gas Emissions
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Solid and Hazardous Waste
- Traffic and Transportation

Thus, an Addendum is the appropriate CEQA document for the proposed project because the proposed project constitutes a change to the previously approved project but the changes do not trigger any conditions identified in CEQA Guidelines Section 15162. In summary, no new significant impacts in any environmental areas were identified, nor would any impacts in any environmental areas be made substantially worse as a result of implementing the proposed project. Thus, no new environmental analysis is required.

8.0 REFERENCES

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9.0 LIST OF ACRONYMS, ABBREVIATIONS AND SYMBOLS

~	Approximately
≤	Less than or equal to
%	Percent
±	Plus or minus
ACR	Assigned Commissioner's Ruling
AIG	Ammonia Injection Grid
ASME	American Society of Mechanical Engineers
bhp	Brake Horsepower
CA	California
CAISO	California Independent System Operator
CalARP	California Accidental Release Prevention (Program)
CCR	California Code of Regulations
CEMS	Continuous Emissions Monitoring System
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalents
CPUC	California Public Utilities Commission
DOT	[United States] Department of Transportation
ECSE	Emission Control System Enhancements
EIR	Environmental Impact Report
EPA	[United States] Environmental Protection Agency
°F	Degrees Fahrenheit
Final MND	Final Mitigated Negative Declaration for the Southern California Edison Etiwanda Peaker Project in Rancho Cucamonga (SCH No. 2006121109), March 2007
ft^3	Cubic foot or cubic feet
gal	Gallon(s)
GE	General Electric
GHG	Greenhouse Gas
HMTA	Hazardous Materials Transportation Act
hp	Horsepower
hr	Hour
HRA	Health Risk Assessment
ID#	Identification number
kV	Kilovolt
kW	Kilowatt
l	Liter(s)
lb(s)	Pound(s)
LSE	Load Serving Entity
LST	Localized Significance Threshold
m	Meter

m^3	Cubic meter
mg/l	Milligrams per liter
MMBtu	Million British thermal units
MMscf	Million standard cubic feet
MND	Mitigated Negative Declaration
MSERCs	Mobile Source Emission Reduction Credits
MT	Metric Tons
MW	Megawatt
ND	Negative Declaration
No.	Number
NO_x	Nitrogen Oxides
O_2	Oxygen
OCA	Offsite Consequence Analysis
O&M	Operations and Maintenance
PM	Particulate Matter
PM_{10}	Respirable Particulate Matter (Less Than 10 Microns in Size)
$PM_{2.5}$	Fine Particulate Matter (Less Than 2.5 Microns in Size)
ppm	Parts per Million
PTE	Potential to Emit
RECLAIM	Regional Clean Air Incentives Market
RMP	Risk Management Plan
RPS	Renewable Portfolio Standard
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
scf	Standard Cubic Foot or Feet
SCH	State Clearinghouse
SCR	Selective Catalytic Reduction
SO_x	Sulfur Oxides
TAC	Toxic Air Contaminant
U.S.	United States
VOC	Volatile Organic Compound
WECC	Western Electricity Coordinating Council
yr	Year

APPENDIX A – ESTIMATED EMISSIONS DURING CONSTRUCTION OF THE PROPOSED PROJECT

SCE Emission Control System Enhancements

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - maintenance outage work

Construction Phase - Maintenance will take 7 days total

Off-road Equipment - Project specific off-road equipment

Trips and VMT - up to 10 workers per day

Construction Off-road Equipment Mitigation - forklifts and aerial lifts will use Tier 4 engines, welders will run on gasoline, but used CalEEMod default of diesel

Off-road Equipment - project specific off-road equipment

Landscape Equipment - landscaping is not part of project

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	100.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	1/18/2017	1/25/2017
tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	HorsePower	231.00	300.00
tblOffRoadEquipment	HorsePower	89.00	110.00
tblOffRoadEquipment	HorsePower	46.00	24.00
tblOffRoadEquipment	HorsePower	63.00	74.00
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblProjectCharacteristics	OperationalYear	2018	2017
tblTripsAndVMT	WorkerTripNumber	0.00	10.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	2.3700e-003	0.0222	0.0169	3.0000e-005	3.8000e-004	1.0900e-003	1.4800e-003	1.0000e-004	1.0200e-003	1.1200e-003	0.0000	2.4039	2.4039	5.7000e-004	0.0000	2.4183
Maximum	**2.3700e-003**	**0.0222**	**0.0169**	**3.0000e-005**	**3.8000e-004**	**1.0900e-003**	**1.4800e-003**	**1.0000e-004**	**1.0200e-003**	**1.1200e-003**	**0.0000**	**2.4039**	**2.4039**	**5.7000e-004**	**0.0000**	**2.4183**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	1.9500e-003	0.0185	0.0169	3.0000e-005	3.8000e-004	7.4000e-004	1.1300e-003	1.0000e-004	7.0000e-004	8.0000e-004	0.0000	2.4039	2.4039	5.7000e-004	0.0000	2.4183
Maximum	**1.9500e-003**	**0.0185**	**0.0169**	**3.0000e-005**	**3.8000e-004**	**7.4000e-004**	**1.1300e-003**	**1.0000e-004**	**7.0000e-004**	**8.0000e-004**	**0.0000**	**2.4039**	**2.4039**	**5.7000e-004**	**0.0000**	**2.4183**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**17.72**	**16.43**	**0.06**	**0.00**	**0.00**	**32.11**	**23.65**	**0.00**	**31.37**	**28.57**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-19-2017**	**4-18-2017**	0.0246	0.0205
		Highest	0.0246	0.0205

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	1/19/2017	1/25/2017	7	7	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Aerial Lifts	1	2.00	74	0.31
Building Construction	Generator Sets	0	0.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Building Construction	Cranes	1	4.00	300	0.29
Building Construction	Forklifts	1	4.00	110	0.20
Building Construction	Welders	2	4.00	24	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction	7	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Clean Paved Roads

3.2 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.1600e-003	0.0220	0.0151	2.0000e-005		1.0900e-003	1.0900e-003		1.0100e-003	1.0100e-003	0.0000	2.0246	2.0246	5.6000e-004	0.0000	2.0385
Total	**2.1600e-003**	**0.0220**	**0.0151**	**2.0000e-005**		**1.0900e-003**	**1.0900e-003**		**1.0100e-003**	**1.0100e-003**	**0.0000**	**2.0246**	**2.0246**	**5.6000e-004**	**0.0000**	**2.0385**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.7000e-004	1.8700e-003	0.0000	3.8000e-004	0.0000	3.9000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3794	0.3794	1.0000e-005	0.0000	0.3797
Total	**2.1000e-004**	**1.7000e-004**	**1.8700e-003**	**0.0000**	**3.8000e-004**	**0.0000**	**3.9000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3794**	**0.3794**	**1.0000e-005**	**0.0000**	**0.3797**

3.2 Building Construction - 2017

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.7400e-003	0.0184	0.0151	2.0000e-005		7.4000e-004	7.4000e-004		7.0000e-004	7.0000e-004	0.0000	2.0246	2.0246	5.6000e-004	0.0000	2.0385
Total	**1.7400e-003**	**0.0184**	**0.0151**	**2.0000e-005**		**7.4000e-004**	**7.4000e-004**		**7.0000e-004**	**7.0000e-004**	**0.0000**	**2.0246**	**2.0246**	**5.6000e-004**	**0.0000**	**2.0385**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.7000e-004	1.8700e-003	0.0000	3.8000e-004	0.0000	3.9000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3794	0.3794	1.0000e-005	0.0000	0.3797
Total	**2.1000e-004**	**1.7000e-004**	**1.8700e-003**	**0.0000**	**3.8000e-004**	**0.0000**	**3.9000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3794**	**0.3794**	**1.0000e-005**	**0.0000**	**0.3797**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.544524	0.045551	0.198447	0.129336	0.019135	0.005878	0.019261	0.027434	0.001914	0.002222	0.004531	0.000699	0.001069

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**					**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**					**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX B – PROPOSED OPERATIONS EMISSIONS CALCULATIONS

Table B-1: Turbine Recommissioning Year Emissions Calculations
Grapeland Peaker
SCAQMD ID# 149620

TURBINE RECOMMISSIONING YEAR CALCULATIONS

Pollutant	Startup	Shutdown	Normal Operation	Black Start Testing	WECC Generator Modeling	Recommissioning	Total
NOx	3,076.9	1,912.7	1,814.6	160.0	138.0	688.0	7,790.2
CO	2,548.3	2,283.9	2,651.2	63.4	158.4	435.0	8,140.1
VOC	398.0	395.0	504.3	4.6	11.5	50.0	1,363.3
PM10	1,606.8	1,606.8	2,066.7	1.9	4.8	348.5	5,635.5
PM2.5	1,603.6	1,603.6	2,062.6	1.9	4.8	347.8	5,624.2
SOx	89.1	89.1	114.6	0.2	0.6	19.3	313.0

EMISSION FACTORS

Pollutant	Startup	Shutdown	Normal Operation		Black Start Testing	WECC Generator Modeling
	lbs/hr	lbs/hr	lbs/hr	lb/MMscf	lbs/hr	lbs/hr
NOx	10.36	6.44	4.75	9.82	40	varies from 6-45
CO	8.58	7.69	6.94	14.35	15.84	15.84
VOC	1.34	1.33	1.32	2.73	1.15	1.15
PM10	5.41	5.41	5.41	11.19	0.48	0.48
PM2.5	5.40	5.40	5.40	11.16	0.48	0.5
SOx	0.3	0.3	0.3	0.62	0.06	0.06

OPERATING PARAMETERS

	Startup	Shutdown	Normal Operation	Total
Hours	297	297	382.01	976.01
Fuel (MMscf)	143.63	143.63	184.74	472.00

RECOMMISSIONING DATA

Pollutant	Starts	Hours	Fuel Used		Total lbs	Notes
			MMBtu	MMscf		
NOx	28	100	32,712	31.15	688.0	Estimate from vendor, see Table B-5
CO	28	100	32,712	31.15	435.0	Estimate from vendor, see Table B-5
VOC	28	100	32,712	31.15	50.0	Estimate from vendor, see Table B-5
PM10	28	100	32,712	31.15	348.5	Calculated from fuel usage and emission factor
PM2.5	28	100	32,712	31.15	347.8	Calculated as a percentage of PM10
SOx	28	100	32,712	31.15	19.3	Calculated from fuel usage and emission factor

Calculation Factors
505.68 MMBtu/hr
1050 MMBtu/MMscf
0.4836 MMscf/hr

Operational Data
325 Total Start Limit
297 Normal Operation Starts
28 Recommissioning Starts
472 MMscf; reduced fuel limit for 325 starts during recommissioning year
4 hours; black start testing
10 hours; WECC Generator Modeling

Example Calculations
NOx startup emissions = 297 startups x 10.36 lb/hr = 3,076.9 lbs
NOx shutdown emissions = 297 shutdowns x 6.44 lb/hr = 1,912.7 lbs
Normal operation fuel = Annual limit - startup fuel - shutdown fuel = 472 MMscf - (297 hrs x 0.4836 MMscf/hr) - (297 hrs x 0.4836 MMscf/hr) = 184.74 MMscf
NOx normal operation emissions = 184.74 MMscf ÷ 0.4836 MMscf/hr x 4.75 lb/hr = 1,814.6 lbs
NOx black start testing emissions = 40 lbs/hr x 4 hours = 160 lbs
NOx WECC Modeling emissions = 6 lbs/hr x 8 hours + 45 lbs/hr x 2 hours = 138 lbs
PM10 recommissioning emissions = 31.15 MMscf x 11.19 lb/MMscf = 348.5 lbs; PM2.5 = 99.8% of PM10

Table B-2: Turbine Current Year PTE Calculations

Grapeland Peaker
SCAQMD ID# 149620

CURRENT YEAR PTE CALCULATIONS (REPRODUCED FROM A/N 543407 ENGINEERING EVALUATION)

Pollutant	Startup	Shutdown	Normal Operation	CAISO Tuning/ Black Start Testing	Total
NOx	1,036.0	644.0	5,532.6	582.0	7,794.6
CO	858.0	769.0	8,083.5	475.2	10,185.7
VOC	134.0	133.0	1,537.5	34.5	1,839.0
PM10	541.0	541.0	6,301.4	14.4	7,397.8
SOx	30.0	30.0	349.4	1.8	411.2

EMISSION FACTORS

Pollutant	Startup	Shutdown	Normal Operation	
	lbs/hr	lbs/hr	lbs/hr	lb/MMscf
NOx	10.36	6.44	4.75	9.82
CO	8.58	7.69	6.94	14.35
VOC	1.34	1.33	1.32	2.73
PM10	5.41	5.41	5.41	11.19
SOx	0.3	0.3	0.3	0.62

OPERATING PARAMETERS

	Startup	Shutdown	Normal Operation	Total
Hours	100	100	1,164.76	1,364.76
Fuel (MMscf)	48.36	48.36	563.28	660.00

CAISO TUNING/BLACK START TESTING DATA

Pollutant	Hours	lbs/hr	Total lbs
NOx	30	varies from 6-50	582.0
CO	30	15.84	475.2
VOC	30	1.15	34.5
PM10	30	0.48	14.4
SOx	30	0.06	1.8

<u>Calculation Factors</u>

505.68	MMBtu/hr
1050	MMBtu/MMscf
0.4836	MMscf/hr

<u>Operational Data</u>

100	Total Start Limit
100	Normal Operation Starts
660	MMscf; corresponding fuel limit for 100 starts

<u>Example Calculations</u>

NOx startup emissions = 100 startups x 10.36 lb/hr = 1,036 lbs
NOx shutdown emissions = 100 shutdowns x 6.44 lb/hr = 644 lbs
Normal operation fuel = Annual limit - startup fuel - shutdown fuel = 660 MMscf - (100 hrs x 0.4836 MMscf/hr) - (100 hrs x 0.4836 MMscf/hr) = 563.28 MMscf
NOx normal operation emissions = 563.28 MMscf ÷ 0.4836 MMscf/hr x 4.75 lb/hr = 5,532.6 lbs
PM10 CAISO emissions = 30 hours x 0.48 lb/hr = 14.4 lbs; Note, PM2.5 not included as it is not included in the permit.

Table B-3: Comparison of Recommissioning vs. Current PTE
Grapeland Peaker
SCAQMD ID# 149620

RECOMMISSIONING ANNUAL EMISSIONS CALCULATIONS (LBS/YR)

Pollutant	Turbine	Black Start Generator	Facility Total
NOx	7,790.2	162.6	7,952.8
CO	8,140.1	227.8	8,367.9
VOC	1,363.3	58.9	1,422.2
PM10	5,635.5	4.1	5,639.6
PM2.5	5,624.2	4.1	5,628.3
SOx	313.0	0.24	313.2

CURRENT ANNUAL PTE (LBS/YR)

Pollutant	Turbine	Black Start Generator	Facility Total
NOx	7,794.6	162.6	7,957.2
CO	10,185.7	227.8	10,413.5
VOC	1,839.0	58.9	1,897.9
PM10	7,397.8	4.1	7,401.9
PM2.5	7,383.0	4.1	7,387.1
SOx	411.2	0.24	411.5

DIFFERENCE OF RECOMMISSIONING VS. CURRENT PTE (LBS/YR)

Pollutant	Turbine	Black Start Generator	Facility Total
NOx	-4.5	0.0	-4.5
CO	-2,045.5	0.0	-2,045.5
VOC	-475.6	0.0	-475.6
PM10	-1,762.3	0.0	-1,762.3
PM2.5	-1,758.8	0.0	-1,758.8
SOx	-98.3	0.0	-98.3

Notes
1. Gas Engine (Black Start) generator emissions are based on 64 hrs/yr, see the previous A/N 543407 engineering evaluation. This will remain the same for both years.
2. PM2.5 wasn't calculated in the SCAQMD evaluation, but it has been added for comparison purposes.

Table B-4: Turbine Recommissioning Daily Emissions Calculations
Grapeland Peaker
SCAQMD ID# 149620

TURBINE RECOMMISSIONING DAILY EMISSIONS CALCULATIONS

Pollutant	Max lb/day	Daily Testing Limit (hr)	Recommissioning (lbs/day)	Current PTE (lbs/day)	Difference (lbs/day)
NOx	77.52	8.00	54.00	68.06	-14.06
CO	55.44	8.00	36.96	74.62	-37.66
VOC	6.43	8.00	4.29	12.92	-8.63
PM10	44.62	8.00	30.68	49.58	-18.90
PM2.5	44.53	8.00	30.62	49.48	-18.86
SOx	2.47	8.00	1.70	2.75	-1.05

*Reference Table B-5 for vendor commissioning tests and estimates

NOx Daily Calculation
Maximum daily emissions (77.52 lbs) occurs during a 12-hour test at 6.46 lbs/hr (test #'s 9,10,13,14). Testing time will be limited to 8 hours/day. New calculation gives 8 hours x 6.46 lbs/hr = 51.68 lbs.
Test #5 is a 9 hour test at 6.46 lbs/hr, resulting in 58.14 lbs. Testing time will be limited to 8 hours/day to remain below 55 lb/day. New calculation gives 8 hours x 6.46 lbs/hr = 51.68 lbs.
Test #2 is a 2 hour test, but the uncontrolled emissions are 27.0 lbs/hr, resulting in 54.0 lbs/day. This is greater than 51.68 lbs and so is the revised maximum daily PTE.
All other tests will be less than 54.0 lb NOx/day.

CO Daily Calculation
Maximum daily emissions (55.44 lbs) occurs during a 12 hour test at 4.62 lbs/hr (test #'s 9,10,13,14). Testing time will be limited to 8 hours/day. New calculation gives 8 hours x 4.62 lb/hr = 36.96 lbs.
All other tests will be less than 36.96 lbs CO/day.

VOC Daily Calculation
Maximum daily emissions (6.43 lbs) occurs during a 12 hour test at 0.54 lbs/hr (test #'s 9,10,13,14). Testing time will be limited to 8 hours/day. New calculation gives 8 hours x 0.54 lb/hr = 4.29 lbs.
All other tests will be less than 4.29 lbs VOC/day

PM10, PM2.5, and SOx Daily Calculations
Maximum daily emissions occur during the highest level of fuel use (4,188 MMBtu, test #'s 9,10,13,14). Testing time will be limited to 8 hours/day. New calculation gives 8 hours x 349 MMBtu/hr = 2,792 MMBtu.
Test #5 is a 9 hour test at 349 MMBtu/hr, resulting in 3,141 MMBtu. Testing time will also be limited to 8 hours/day. New calculation gives 8 hours x 349 MMBtu/hr = 2,792 MMBtu.
Test #8 and #11 are 6 hour tests at 480 MMBtu/hr, resulting in 2,880 MMBtu. This is greater than 2,792 MMBtu and so is the revised maximum daily gas usage.
Converting to gas volume gives 2,880 MMBtu ÷ 1,050 MMBtu/MMscf = 2.74 MMscf.
For PM10, new calculation gives 2.74 MMscf x 11.19 lb/MMscf = 30.68 lbs/day. All other tests will be less than this amount; PM2.5 = 99.8% of PM10
For SOx, new calculation gives 2.74 MMscf x 0.62 lb/MMscf = 1.70 lbs/day. All other tests will be less than this amount.

EMISSION FACTORS

Pollutant	All Operations	
	lbs/hr	lb/MMscf
PM10	5.41	11.19
SOx	0.3	0.62

CALCULATION FACTORS

505	MMBtu/hr
1050	MMBtu/MMscf
0.4836	MMscf/hr

Table B-5: Recommissioning Emissions Estimates
Grapeland Peaker
SCAQMD Facility ID# 149620

LM6000 PC SPRINT Peaker Commissioning Emissions Estimates - SCE Grapeland Peaker
21-Jul-16

	Description	Power Level MW	% Output	Oper-ating Hours	Esti-mated Starts	Fuel Rate MMBtu/hr	Fuel Use MMBtu	NOx ppm Cor 15%	NOx lbs/hr	NOx lbs	CO ppm Cor 15%	CO lbs/hr	CO lbs	VOC lbs/hr	VOC lbs
(1)	**Pre-start turbine crank mechanical and controls integrity checks**	Non-Fired	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(2)	**First Fire - start the unit to Sync Idle for mechanical and controls and integrity checks (sequencing and leaks, etc.)**	Sync Idle	0	2	4	86	172	82.2	27.0	54.0	66.9	13.4	26.8	1.6	3.1
(3)	**Minimum Load - SCR Burnout - Breaker sync ramp min load system checks with WINJ and SCR Ammonia Injection Op Test**	2.8	6%	2	4	103	206	44.5	16.9	33.8	66.9	16.1	32.2	1.9	3.7
(4)	**WINJ Control System Tuning & SCR Ammonia Tuning - WINJ Ramp from Min to Max and Ramp Min (no SPRINT) (includes 2, 32 step, 5 minute step increments of fuel rate)**	1 to 40	2 to 82%	9	2	294	2646	5.0	5.4	48.3	5.9	3.9	35.1	0.5	4.1
(5)	**WINJ Control System Tuning & SCR Ammonia Tuning - WINJ Ramp from Min to Max and Ramp Min (with SPRINT) (includes 2, 32 step, 5 minute step increments of fuel rate)**	1 to 49	2 to 100%	9	2	349	3141	5.0	6.5	58.1	5.9	4.6	41.6	0.5	4.8
(6)	**Full load NH3 control tuning - inlet NOx emissions 25 ppm to 42 ppm**	49	100%	3	1	480	1440	5.0	8.8	26.4	5.9	6.4	19.1	0.7	2.2

(7)	**Final WINJ and NH3 tuning verification test min to max load (25 to 42 ppm)**	1 to 49	2 to 100%	3	1	349	1047	5.0	6.5	19.4	5.9	4.6	13.9	0.5	1.6
(8)	**Stack traverse testing Max Output**	49	100%	6	2	480	2880	2.5	4.4	26.4	1.8	2.0	11.9	0.2	1.4
	Stack traverse testing Min Output	1	2%	6	2	129	774	14.9	7.1	42.4	5.9	1.7	10.3	0.2	1.2
(9)	**NH3 AIG Tuning w/ Catalyst and stack traversing**	1 to 49	2 to 100%	12	2	349	4188	5.0	6.5	77.5	5.9	4.6	55.4	0.5	6.4
(10)	**NH3 AIG Tuning w/ Catalyst and stack traversing**	1 to 49	2 to 100%	12	2	349	4188	5.0	6.5	77.5	5.9	4.6	55.4	0.5	6.4
(11)	**Stack traverse testing Max Output**	49	100%	6	1	480	2880	2.5	4.4	26.4	1.8	2.0	11.9	0.2	1.4
(12)	**Stack traverse testing Min Output**	1	2%	6	1	129	774	14.9	7.1	42.4	5.9	1.7	10.3	0.2	1.2
(13)	**NH3 AIG Tuning w/ Catalyst and stack traversing**	1 to 49	2 to 100%	12	2	349	4188	5.0	6.5	77.5	5.9	4.6	55.4	0.5	6.4
(14)	**NH3 AIG Tuning w/ Catalyst and stack traversing**	1 to 49	2 to 100%	12	2	349	4188	5.0	6.5	77.5	5.9	4.6	55.4	0.5	6.4
	Sum of Recommissioning Emissions			***100***	***28***	***4275***	***32712***			***688***			***435***		***50***

APPENDIX C – OFFSITE CONSEQUENCE ANALYSIS AND AERSCREEN OUTPUT

Offsite Consequence Analysis

for

Storage and Handling of Aqueous Ammonia (≤29.4 ± 0.5% Concentration)

at the

Grapeland Peaker Facility

Prepared for:

Southern California Edison

December 20, 2016

Prepared by:

EMP

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E0360

Introduction

Southern California Edison (SCE) currently operates the Grapeland Peaker in Rancho Cucamonga, California ("Grapeland"). A Selective Catalytic Reduction (SCR) system with aqueous ammonia injection is used to control oxides of nitrogen (NOx) emissions in the turbine exhaust. SCE currently uses aqueous ammonia of 19 percent (%) concentration by weight at Grapeland. SCE is proposing certain enhancements to the emissions control system at Grapeland (referred to herein as the "Emission Control System Enhancements" or "ECSE"), which include use of aqueous ammonia of 29% concentration by weight. Industry standard for aqueous ammonia at this concentration is 29.4% plus or minus (±) a half percentage point, so a concentration of 29.9% was used in this analyses to represent worst-case conditions.

Aqueous ammonia is the only chemical stored in sufficient quantities at Grapeland to be classified as a regulated substance subject to the requirements of the California Accidental Release Prevention (CalARP) regulations (California Code of Regulations, Title 19, Division 2, Chapter 4.5). Grapeland is currently classified as a Program 1 (low risk) facility under the CalARP regulation, and is expected to retain this designation if use of ≤29.9% ammonia solution is allowed by the South Coast Air Quality Management District (SCAQMD) under the facility's Title V permit. Grapeland is currently not subject to, and will continue to not be subject to, federal Risk Management Program (40 CFR 68) requirements even with the use of 29.9% ammonia solution because the maximum quantity of ammonia proposed to be stored at the facility for NOx emission control will be less than the threshold quantity of 20,000 pounds (see Attachment 1).

An Offsite Consequence Analysis (OCA) was performed to assess the potential impacts of a release of the 29.9% ammonia solution at Grapeland. Two possible accidents that would have the potential to release substantial amounts of ammonia were considered: 1) a storage tank failure where the entire contents of the tank would be released; and 2) an accident during the unloading of the tanker truck's contents into the aqueous ammonia storage tank where the entire contents of the tanker truck would be released. The 29.9%-concentration aqueous ammonia will be stored on-site in the same pressure vessel (tank) that is currently being used for storing 19% aqueous ammonia. Pressurized metallic storage tanks have a mean time to catastrophic failure of 0.0109 per million hours of service, or on average, one failure every 10,500 years (Center for Chemical Process Safety, 1989). Thus, failure of a pressurized aqueous ammonia storage tank during the lifetime of the facility is unlikely. Because of the SCE safety programs and other safeguards that are in place at the Grapeland facility, both types of accident are highly unlikely.

Facility Design and Safety Information

The aqueous ammonia system consists of a storage tank, secondary containment, dispensing pumps, distribution piping and vaporization skid. As stated above, the 29.9%-concentration aqueous ammonia will be stored on-site in the same tank that is currently being used for storing 19% aqueous ammonia. The aqueous ammonia tank is of a single-walled design with a total capacity of 10,500 gallons. SCE currently limits storage to 85% of total capacity (8,925 gallons) as a standard safety practice. A local alarm (horn) is set to indicate when the tank is 85% full. Once the ≤29.9% ammonia is utilized, the alarm level (an administrative control) will be reset to

83% capacity and the tank will be filled to no more than 84% capacity (8,820 gallons) to ensure that 20,000-pound federal RMP threshold is not exceeded. The storage tank is constructed of materials that are compatible with 29.9% aqueous ammonia. The tank meets ASME Codes and is equipped with pressure safety valves, a level gauge, pressure gauge and vacuum breaker system. The tank is mounted to meet seismic codes (2001 California Building Code) within a concrete containment structure.

The secondary containment has been sized to contain 12,500 gallons or approximately 120% of the storage tank's capacity. The secondary containment structure measures 47 feet long by 13 feet wide by 3 feet high. This secondary containment volume can contain the entire capacity of the tank plus an additional allowance for precipitation from a 25-year, 24-hour storm event. The secondary containment is connected to an underground concrete sump via a 7-square-feet drain grating. The drain grating funnels into a 2-foot diameter drain pipe that will allow a catastrophic ammonia spill to be flushed into the sump in approximately one minute. Any liquid collected in the sump is removed manually by an operator using either a portable pump or a vacuum truck. Only trained technicians perform system maintenance and repairs.

The storage tank is located adjacent to the aqueous ammonia unloading area. Historically, aqueous ammonia has been delivered to the facility by tanker truck in up to 7,000-gallon loads, although SCE has proposed to limit transport and deliveries to no more than 4,000 gallons ± 10% per each trip if the use of the 29.9% ammonia is approved. The aqueous ammonia unloading station consists of a sloping concrete pad 36 feet long by 15 feet wide. The pad slopes to drain fluids to the secondary containment sump. As with the secondary containment drain, the concrete pad is provided with a drain grating opening of 7 square feet, which funnels into a 2-foot diameter drain pipe. This design ensures that no pooling occurs in the event of a spill during unloading. Emergency shut-off valves are provided at the ammonia unloading station for emergency isolation of aqueous ammonia in the system. This system will prevent back-flow of aqueous ammonia from the storage tank. The tanker truck is equipped with a remotely operated emergency shut-off system to stop the ammonia transfer in case of an emergency during unloading.

An automatic shut-off valve (pneumatically controlled) on the aqueous ammonia delivery line from the storage tank to the ammonia injection grid was recently installed. This valve normally remains open but will shut off in case of failure of plant air supply or when any one of the three above-ground ammonia sensors installed outside the secondary containment underground sump indicates an ammonia concentration of 250 ppm or higher. This automatic shut-off valve can also be closed remotely by the SCE operator.

Ammonia leak sensors are installed both inside and outside the secondary containment area, which will allow rapid detection and quick response to any accidental spill of ammonia. These sensors activate alarms, horns and strobe lights, where the alarms sound both locally and in the control room. A wind banner (sock) is installed to continuously indicate the wind direction. A personal protective shower and eyewash station are located in the immediate vicinity of the ammonia storage tank.

Offsite Consequence Analysis Methodology

The significance criteria, modeling approach, and model inputs, including emissions, meteorological parameters and site characteristics that were used for the OCA for the worst-case scenario are described below.

Toxic Endpoint. The distance from the point of release to a location at which the regulated toxic substance concentration is equal to or greater than a specified concentration (i.e., the toxic endpoint), must be determined to define the vulnerability zone. The toxic endpoint represents the level of a compound below which significant adverse effects are not seen. The CalARP regulations specify the ammonia toxic endpoint[1] for OCAs as 0.14 milligrams per liter (mg/l, or 200 parts per million (ppm)). This level represents the maximum airborne concentration of ammonia below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious adverse health effects or symptoms that could impair an individual's ability to take protective action. This CalARP ammonia toxic endpoint of 0.14 mg/l (200 ppm) was used by SCAQMD as the California Environmental Quality Act (CEQA) significance threshold in recent proposed rule/plan actions (SCAQMD 2015, 2016). Therefore, this value was used as the significance criterion for this OCA.

Grapeland Facility Receptor Distance. Grapeland was permitted in 2007 as a CalARP Program Level 1 facility. At that time, Grapeland was located on empty land surrounded by perimeter fencing which resulted in Program Level 1 designation for the Peaker facility. Since that time, there has been development in the area surrounding Grapeland that has resulted in modifications to the outer fencing. The outer boundary is not continuously fenced, but has signage to warn and deter trespassing onto SCE property. SCE operates the Grapeland site as an Owner Controlled Area where the public does not have free access unless they have a valid, approved reason for entry. The Grapeland site includes other key components of SCE's security plan, including closed circuit security cameras, and SCE employees who are trained to observe all activities on the facility site. The SCE control room is staffed 24-hours a day, 7-days a week, to continuously monitor the facility through the closed-circuit security cameras. This Peaker facility may only be accessed by properly credentialed SCE Employees and is under controlled access. Any person arriving at the Peaker facility entrance must call the control room using on-site equipment to call. The communication equipment includes a camera at this location. This configuration affords the first responder (Rancho Cucamonga Fire District) easier access to the Grapeland Peaker facility site in the event of an emergency, thereby facilitating response efficiency. Therefore, in consultation with the San Bernardino County Fire Department, the five-year update of the CalARP OCA prepared in 2012 used the distance of 385 feet (117 meter) to the facility's outer perimeter. The same distance of 385 feet to the outer perimeter where the public could have access was used for performing this OCA for the storage of 29.9% aqueous ammonia at the Grapeland Peaker facility.

[1] California Code of Regulations, Title 19, Division 2, Chapter 4.5, Appendix A. Note, revisions to these regulations were proposed in July 2016, but no changes to the ammonia toxic endpoint of 0.14 mg/l have been proposed.

AERSCREEN Model. To assess the potential impacts of SCE's proposed ECSE, the SCAQMD requires that the AERSCREEN model be used to perform the OCA for the 29.9% aqueous ammonia worst-case release scenario. The AERSCREEN model was developed by the U. S. Environmental Protection Agency (EPA) as a screening-level air quality model for performing air dispersion modeling analyses for neutrally buoyant releases such as ammonia (EPA 2015). SCAQMD has developed guidance for use of AERMOD (available at: http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/modeling-guidance) that would also be applicable to AERSCREEN. This SCAQMD guidance was followed for performing AERSCREEN modeling for Grapeland.

The AERSCREEN model consists of two main components: (1) the MAKEMET program which generates a site-specific matrix of meteorological conditions, and (2) the AERSCREEN command-prompt interface program. The AERSCREEN model can be used for modeling a rectangular area source (such as the sump opening), in addition to other types of sources. The following inputs are required for performing dispersion modeling for rectangular area sources: (1) source parameters, including the emission rate, release height above ground, long-side length of the area source, short-side length of the area source, and initial vertical dimensions; and (2) MAKEMET parameters, which include ambient minimum and maximum temperature, minimum wind speed and anemometer height, surface characteristics (such as user-defined single values for albedo, Bowen ratio, and surface roughness), maximum downwind distance of receptors, specification of the source location as urban or rural (and population for urban sources), and minimum distance for receptors. In AERSCREEN processing, the wind direction is set to a single direction of 270 degrees. It is important to note that AERSCREEN does not use Pasquill-Gifford (PG) stability categories as used in the EPA's SCREEN3 and ISCST models.

Worst-case Release Model Inputs. The CalARP regulations have defined worst-case and alternative release scenarios for use in OCAs. For aqueous ammonia, CalARP regulations define the worst-case release as the instantaneous release of the entire contents of the storage vessel and the evaporation of ammonia from the surface of the resulting pool of aqueous ammonia. Passive mitigation such as a containment structure may be accounted for in the analysis. EPA has developed the Risk Management Program Guidance for Offsite Consequence Analysis (EPA 2009). This guidance document was used for estimating evaporation rates from the diked areas (pools).

At Grapeland, the ammonia tank containment structure drains into a covered sump capable of containing the tank's entire contents, defined to be 8,820 gallons of aqueous ammonia. Because the secondary containment slopes downward and is designed to drain into the underground sump in one minute, it was assumed that the ammonia evaporation rate will consist of three components:

1) evaporation for one minute from the secondary containment area (611 square feet),
2) evaporation for 60 minutes from the collection drain in the tank's secondary containment (2-foot diameter pipe), and
3) evaporation for 60 minutes from the collection drain in the delivery truck catch basin (2-foot diameter pipe).

Because the selected ammonia threshold (200 ppm) is based on a 1-hour average concentration, ammonia evaporation was evaluated for the first hour from the secondary containment and the drains when the peak emission rate would occur. For estimating the emissions, the vapor pressure is a critical parameter for approximating the evaporation rate of the ammonia from the pool. The ambient temperature is used as a proxy for the temperature of the liquid to determine the vapor pressure. The temperature used for this calculation was assumed to be the highest local temperature in the past three years, as required by the CalARP regulations for the worst-case release scenario.

For the worst-case release scenario analysis, CalARP regulations require use of the highest daily maximum temperature in the previous three years and the average humidity. For identifying the highest daily maximum temperature in the previous three years for this analysis, the Western Regional Climate Center (WRCC) was contacted. WRCC (2016) indicated that the Ontario Airport meteorological station is the nearest station to Grapeland. WRCC (2016) also provided the maximum temperatures recorded at the Ontario Airport station for the years 2013 through 2016 (through November 2016). A review of the temperature data for the last three years as provided by the WRCC indicated that the maximum temperature of 112°F was recorded in June 2016. Therefore, the maximum ambient temperature of 112°F was used for this worst-case release scenario analysis. AERSCREEN also requires an input of the minimum ambient temperature, and a minimum temperature of 25°F was used in the AERSCREEN analysis. The AERSCREEN model does not require relative humidity value as an input; therefore, relative humidity data were not obtained for the OCA of this worst-case release scenario.

Besides the maximum temperature, the meteorological conditions that the CalARP regulations require for the worst-case release are very stable atmospheric dispersion conditions ("F" stability; PG stability classification), which are typical of nighttime conditions, and a wind speed of 1.5 meters per second (m/s). However, the AERSCREEN model does not use PG stability categories for dispersion analysis. EPA was consulted to obtain guidance for performing the worst-case release scenario modeling using AERSCREEN for the above-mentioned combination of meteorological parameters (atmospheric stability "F" and wind speed 1.5 m/s). EPA provided its guidance in three e-mails [e-mails from EPA (James Thurman) to Krishna Nand, Environmental Management Professionals (EMP), dated 8/25/2016, 8/29/2016, and 8/30/2016]. EPA suggested setting the minimum wind speed to 1.5 m/s with the default anemometer height of 10 meters, and the AERSCREEN OCA was performed with these inputs. EPA examined the meteorological parameters generated by MAKEMET and determined that these include a very stable atmospheric representation, which EPA considers to be PG stability "F". Thus, the AERSCREEN modeling was conducted in a manner that fulfilled the conservative CalARP guidance requirements.

CalARP regulations require that either urban or rural topography be used for performing the air dispersion analysis for identified release scenarios. Rural and urban topographical conditions are characterized in the air dispersion models in terms of surface roughness. According to SCAQMD guidance, the dispersion model should be executed using the urban modeling option for all air quality impact analyses within the SCAQMD's jurisdiction. For an urban designation, the population of the County where the project is located should be used. The population of San

Bernardino County where the Grapeland Peaker facility is located is provided in the SCAQMD's guidance (i.e., a population of 2,015,355).

SCAQMD was consulted regarding the selection of surface characteristics for the modeling analysis for Grapeland. SCAQMD staff advised that surface characteristics from the Fontana station would be appropriate for AERSCREEN modeling for the Grapeland Peaker facility [e-mail from Jillian Wong (SCAQMD) to Krishna Nand (EMP) on 8/26/2016]. SCAQMD also provided a table with the surface characteristics (AERMET inputs) for the Fontana station [e-mail from Mohan Balagopalan (SCAQMD) to Krishna Nand (EMP) on 8/18/2016].

All input data used for performing the AERSCREEN modeling analyses are summarized in Table 1. The surface characteristics of the Fontana station are also provided in Table 1, along with the other data required for this modeling.

Table 1
Modeling Parameters used for the Worst-case Release Scenario Modeling Analysis

Parameter	Value
Pollutant	Ammonia
Emission rate	15.25 g/s
Release height above ground	0 meter
Long side of area source	0.76 meter
Short side of area source	0.76 meter
Initial vertical dimension	0 meter
Minimum ambient air temperature	25°F (Ontario Airport, WRCC) [269.3 K]
Maximum ambient temperature	112°F (317.6 K)
Minimum wind speed	1.5 m/s
Anemometer height	10 meter
Rural or Urban	Urban
Population	2,015,355
Albedo	0.19
Bowen Ratio*	1.00
Surface roughness	0.240
Ambient distance	1 meter
Initial probe distance	125 meters
Discrete receptors	1, 60,70, 80, 90,100,110, 117, 120 meters

AERSCREEN Modeling Results.

Tank Failure OCA Results. The results of the OCA for an aqueous ammonia storage tank failure using AERSCREEN provided the maximum ammonia concentration at the distance to the closest point along the property boundary where the public has access from the center point of the ammonia tank/secondary containment area. As discussed above, this closest point at the Grapeland facility is located approximately 385 feet or 117 meters from the tank area. The ammonia concentration at this distance with a wind speed of 1.5 m/s and the other inputs shown in Table 1 was conservatively modeled to be 40 ppm. It is important to note that EPA was consulted again to verify that the modeled result was associated with a very stable atmosphere (i.e., PG stability "F"), as required by the CalARP guidance. James Thurman of EPA confirmed this was the case [e-mail from James Thurman (EPA) to Krishna Nand (EMP), dated 10/25/2016].

The above modeled value of ammonia concentration of 40 ppm is well below the toxic endpoint of 200 ppm in the CalARP regulations. Therefore, a catastrophic release of 29.9% aqueous ammonia is not expected to have a significant impact to the public or environment.

The AERSCREEN dispersion modeling output for this OCA is provided in Attachment 2.

Ammonia Unloading Release. As described above, the aqueous ammonia unloading area consists of a concrete pad. The pad slopes towards a drain that has an opening of 7 square feet that funnels into a 2-foot diameter drain pipe. The drain leads to a covered containment sump that is common to both the secondary containment and the delivery tanker truck catch basin. This underground sump is large enough to contain the entire contents of the delivery truck (4,000 gallons ± 10%). The catch basin surface area (540 square feet) for the delivery truck is smaller in comparison to the surface area (611 square feet) for the secondary containment. Thus, the impact from an unloading accident spilling the entire aqueous ammonia contents from the tanker truck is expected to be lower than the catastrophic failure of the aqueous ammonia storage tank filled to 84% capacity (8,820 gallons). Therefore, the toxic endpoint distance will not extend up to the Grapeland facility property boundary and no additional modeling was performed.

Conservative Assumptions. The federal RMP and CalARP regulations require a very conservative approach to assessing the impacts of a possible release. The conservative features of this OCA are summarized below:

- Given the structural and safety features in place, the assumption that the storage tank will rupture or the entire contents of aqueous ammonia in the tanker truck will be spilled during unloading is highly unlikely and therefore conservative;

- The federal and CalARP regulations require that for the worst-case release scenario analysis, liquids (such as aqueous ammonia) should be assumed to be released at the highest daily maximum temperature from data for the previous three years, or at process temperature if that is higher. In addition, a very stable atmospheric stability class "F" (typical of nighttime conditions), and wind speed of 1.5 m/s are required to be used for air dispersion modeling analysis by the CalARP regulations. It is important to note that the above combination of maximum temperature and "F" atmospheric stability is not realistic. Although these conditions are required for CalARP purposes, CEQA practice does not require use of unrealistic worst case conditions and more realistic conditions could have been assumed, such as use of the mean annual temperature. For example, it may be noted that a temperature of 77°F was used by SCAQMD for performing the ammonia release analysis in a recent CEQA review (SCAQMD 2016);

- The ammonia evaporation rate from the secondary containment was estimated in two steps. In the first step, evaporation at 77°F was estimated using the EPA's OCA guidance document (EPA, 2009) and then multiplied by the temperature correction factor (for the maximum temperature of 112°F) developed by EPA for ammonia solution at the analyzed concentration. The emission rate of ammonia from this hypothetical worst-case release is based on the volatilization rate from the spilled liquid. This rate is dependent upon many factors including the ambient temperature, size of the pool of liquid exposed to the air, and the length of time it takes for the ammonia to volatilize. As required by the EPA OCA guidance, the maximum 112°F temperature from the past three years from the Ontario Airport was used in the emission rate calculation. At this high temperature, the volatilization of the ammonia from the solution will occur rapidly. As explained in the above bullet, the assumption that a volatilization rate for ammonia at this temperature will occur at the same time as the meteorological conditions consistent with a PG stability "F" (i.e., nighttime), is highly conservative. Furthermore, an assumption that the emissions are released at the maximum volatilization rate, along with an unlikely combination of meteorological conditions occurring simultaneously when the accident happens, will overestimate the release rate and hence provide a more conservative toxic endpoint distance; and

- Ammonia evaporation rate and emissions for a duration of 60 minutes from the drains was also estimated in two steps. As noted above, evaporation of ammonia solution at 77°F was estimated using the EPA's OCA guidance document (EPA, 2009) and then multiplied by the temperature correction factor (for a maximum temperature of 112°F) developed by EPA for ammonia solution at the analyzed concentration. For estimating ammonia emissions for a 60-minute duration, the 10-minute average liquid factor from EPA's OCA guidance document was used. Per EPA guidance, if using the RMP*Comp model only the first 10 minutes of evaporation would need to be considered, because the release rate would decrease rapidly as the substance (aqueous ammonia) evaporates and the concentration in the solution decreases. However, when using models such as AERSCREEN, it is appropriate to use hourly emissions. This calculation method will therefore overestimate the ammonia emissions during the 60 minutes and also result in a conservative toxic endpoint distance.

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Attachment 1

CALCULATION OF THE WEIGHT OF AMMONIA STORED ON-SITE

Southern California Edison, Grapeland Peaker Facility
Maximum Quantity of Ammonia Present at the Grapeland Peaker Facility

A. Calculations for the Ammonia Storage Tank		
Capacity of the Ammonia Storage Tank	10,500	gallons
Concentration of Ammonia in the Ammonia Solution	29.9	percent
Specific Gravity of Ammonia Solution (SCE 2016a)	0.8963	
Density (specific weight) of Water	8.34	lbs/gal
Weight (lbs/gal) of 29.9% Ammonia Solution	7.48	lbs/gal
= 0.8963 x 8.34 = 7.48 lbs/gal		
Maximum Level for Filling the Tank	84	%
Ammonia Solution in the Tank	8,820	gallons
= 10,500 x 84/100 = 8,820 gallons		
Ammonia Present in the Storage Tank (8,820 gallons), A	19,726	pounds
= 8,820 x 7.48 x 29.9/100 = 19,726 lb		
B. Calculations for the Pipeline from Storage Tank to the Vaporizer		
Length of the pipe (SCE 2016b)	100	feet
Diameter of the pipe (SCE 2016b)	2	inch
Radius of the pipe	1.00	inch
Volume of the pipe [3.14 x 100 x (1/12 x 1/12)]	2.18	ft^3
Conversion factor from ft^3 to gallon	7.4805	gal/ft^3
Volume of aqueous ammonia in pipe in gallons (B)	16.3	gallons
= 2.18 x 7.4805		
Ammonia Present in the pipe (16.3 gallons), B	36.5	pounds
= 16.3 x 7.48 x 29.9/100 = 36.5 lbs		
C. Calculations for the Pipeline from Storage Tank to the Fill Valve		
Length of the pipe (SCE 2016b)	31	feet
Diameter of the pipe (SCE 2016b)	2	inch
Radius of the pipe	1.00	inch
Volume of the pipe [3.14 x 31 x (1/12 x 1/12)]	0.68	ft^3
Conversion factor from ft^3 to gallon	7.4805	gal/ft^3
Volume of aqueous ammonia in pipe in gallons (C)	5.1	gallons
=0.68 x 7.4805		
Ammonia Present in the pipe (5.1 gallons), C	11.4	pounds
= 5.1 x 7.48 x 29.9/100 = 11.4 lbs		
Total Quantity of Ammonia Present at the Grapeland Peaker Facility		
Total quantity of ammonia present at the facility (A+B+C)	***19,774***	***pounds***

Attachment 2

AERSCREEN DISPERSION MODELING OUTPUT

```
AERSCREEN 15181 / AERMOD 15181                                            12/20/16
                                                                          17:30:21

TITLE: GRAPELAND PEAKER (29.9), FONTANA, 112 F, 1.5 M/S, GR29915


----------------------------------------------------------------------------
******************************  AREA PARAMETERS  ***************************
----------------------------------------------------------------------------

SOURCE EMISSION RATE:          15.2500 g/s              121.032 lb/hr

AREA EMISSION RATE:          0.264E+02 g/(s-m2)       0.210E+03 lb/(hr-m2)
AREA HEIGHT:                      0.00 meters               0.00 feet
AREA SOURCE LONG SIDE:            0.76 meters               2.49 feet
AREA SOURCE SHORT SIDE:           0.76 meters               2.49 feet
INITIAL VERTICAL DIMENSION:       0.00 meters               0.00 feet
RURAL OR URBAN:                  URBAN
POPULATION:                    2015355

INITIAL PROBE DISTANCE =          125. meters               410. feet



----------------------------------------------------------------------------
***********************  BUILDING DOWNWASH PARAMETERS  **********************
----------------------------------------------------------------------------

               BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES



----------------------------------------------------------------------------
**************************  FLOW SECTOR ANALYSIS  ***************************
                 25 meter receptor spacing: 1. meters - 125. meters
----------------------------------------------------------------------------


   MAXIMUM  IMPACT  RECEPTOR

   Zo        SURFACE   1-HR CONC  RADIAL  DIST   TEMPORAL
   SECTOR    ROUGHNESS  (ug/m3)    (deg)   (m)    PERIOD
  ------------------------------------------------------
      1*       0.240    0.2310E+08  45     1.0     ANN
* = worst case diagonal



----------------------------------------------------------------------------
*********************  MAKEMET METEOROLOGY PARAMETERS  *********************
----------------------------------------------------------------------------

MIN/MAX TEMPERATURE:    269.3 / 317.6 (K)

MINIMUM WIND SPEED:       1.5 m/s

ANEMOMETER HEIGHT:     10.000 meters

SURFACE CHARACTERISTICS INPUT: USER ENTERED

ALBEDO:                   0.19
BOWEN RATIO:              1.00
ROUGHNESS LENGTH:        0.240 (meters)
```

```
      METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT
      -------------------------------------------------------------

 YR MO DY JDY HR
 -- -- -- --- --
 10 01 02   2 12

    H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  1.11  0.165  0.300  0.020  801.  155.   -335.4 0.240   1.00   0.19    1.50

    HT  REF TA     HT
- - - - - - - - - - -
  10.0   269.3    2.0



-----------------------------------------------------------------------------
*********************** AERSCREEN AUTOMATED DISTANCES *********************
                OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE
-----------------------------------------------------------------------------


                    MAXIMUM                              MAXIMUM
           DIST     1-HR CONC                   DIST     1-HR CONC
            (m)      (ug/m3)                     (m)      (ug/m3)
         ---------------------               ---------------------
           1.00    0.2310E+08                 90.00    0.4042E+05
          25.00    0.2712E+06                100.00    0.3474E+05
          50.00    0.9526E+05                110.00    0.3031E+05
          60.00    0.7283E+05                117.00    0.2776E+05
          70.00    0.5815E+05                120.00    0.2678E+05
          75.00    0.5260E+05                125.00    0.2527E+05
          80.00    0.4791E+05



-----------------------------------------------------------------------------
*********************  AERSCREEN MAXIMUM IMPACT SUMMARY  ********************
-----------------------------------------------------------------------------

3-hour, 8-hour, and 24-hour scaled
concentrations are equal to the 1-hour concentration as referenced in
SCREENING PROCEDURES FOR ESTIMATING THE AIR QUALITY
IMPACT OF STATIONARY SOURCES, REVISED (Section 4.5.4)
Report number EPA-454/R-92-019
http://www.epa.gov/scram001/guidance_permit.htm
under Screening Guidance

                     MAXIMUM      SCALED      SCALED      SCALED      SCALED
                      1-HOUR      3-HOUR      8-HOUR     24-HOUR      ANNUAL
  CALCULATION          CONC        CONC        CONC        CONC        CONC
   PROCEDURE         (ug/m3)     (ug/m3)     (ug/m3)     (ug/m3)     (ug/m3)
---------------    ----------  ----------  ----------  ----------  ----------
FLAT TERRAIN       0.2310E+08  0.2310E+08  0.2310E+08  0.2310E+08     N/A

DISTANCE FROM SOURCE          1.00 meters



IMPACT AT THE
AMBIENT BOUNDARY   0.2310E+08  0.2310E+08  0.2310E+08  0.2310E+08     N/A

DISTANCE FROM SOURCE          1.00 meters
```

APPENDIX D – AMMONIA TRANSPORT ANALYSIS – RMP*COMP OUTPUT

EPA United States Environmental Protection Agency

RMP*Comp

RMP*Comp

Back

Estimated Distance Calculation

Estimated distance to toxic endpoint: 0.4 miles (0.6 kilometers)

This is the downwind distance to the toxic endpoint specified for this regulated substance under the RMP Rule. Report all distances shorter than 0.1 mile as 0.1 mile, and all distances longer than 25 miles as 25 miles.

Scenario Summary

Chemical: Ammonia (water solution)

Initial concentration: 20 %

CAS number: 7664-41-7

Threat type: Toxic Liquid

Scenario type: Worst-case

Liquid temperature: 77 F

Quantity released: 7000 gallons

Mitigation measures: NONE

Release rate to outside air: 595 pounds per minute

Surrounding terrain type: Urban surroundings (many obstacles in the immediate area)

Toxic endpoint: 0.14 mg/L; basis: ERPG-2

Assumptions about this scenario

Wind speed: 1.5 meters/second (3.4 miles/hour)

Stability class: F

Air temperature: 77 degrees F (25 degrees C)

EPA United States Environmental Protection Agency

RMP*Comp

RMP*Comp

Back

Estimated Distance Calculation

Estimated distance to toxic endpoint: 0.4 miles (0.6 kilometers)

This is the downwind distance to the toxic endpoint specified for this regulated substance under the RMP Rule. Report all distances shorter than 0.1 mile as 0.1 mile, and all distances longer than 25 miles as 25 miles.

Scenario Summary

Chemical:	Ammonia (water solution)
Initial concentration:	30 %
CAS number:	7664-41-7
Threat type:	Toxic Liquid
Scenario type:	Worst-case
Liquid temperature:	77 F
Quantity released:	4400 gallons
Mitigation measures:	NONE
Release rate to outside air:	649 pounds per minute
Surrounding terrain type:	Urban surroundings (many obstacles in the immediate area)
Toxic endpoint:	0.14 mg/L; basis: ERPG-2

Assumptions about this scenario

Wind speed:	1.5 meters/second (3.4 miles/hour)
Stability class:	F
Air temperature:	77 degrees F (25 degrees C)