SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ADDENDUM TO THE APRIL 2007 FINAL MITIGATED NEGATIVE DECLARATION FOR SOUTHERN CALIFORNIA EDISON: BARRE PEAKER PROJECT, STANTON

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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 and 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. Peaker units 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 start on short notice and ramp up or down quickly to respond to peaks in electricity demand. During periods of high electricity demand, the California Independent System Operator (CAISO) may dispatch peaker units to provide electricity to the grid that supplies electricity to households and businesses 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 Barre Peaker, is located in Stanton, California and began operating in July 2007. Barre participates in the CAISO market. Barre is a Title V facility (Facility ID# 051475) which operates pursuant to its permit issued by the South Coast Air Quality Management District (SCAQMD).

The Barre Peaker generates electricity through one natural gas-fired combustion turbine, General Electric (GE) model LM6000, nominally rated at 49 megawatts (MW), and is capable of producing up to 45 net MW of electricity for the grid. When CAISO dispatches Barre to provide electricity, it takes about 10 minutes for the peaker to ramp up to 100 percent load to provide 45 MW of electricity to the grid. 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 Barre to provide the maximum amount of electricity when dispatched. Barre currently cannot operate at low or partial loads and maintain compliance with the emission limits in the SCAQMD permit. Thus, CAISO is limited in its ability to dispatch electricity from Barre when less than 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 (NOx) and carbon monoxide (CO) emissions. Other equipment 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, a 415-horsepower (hp) diesel-fired emergency generator which is available for backup power if needed, and one 10,500-gallon aqueous ammonia storage tank which supplies ammonia to the SCR system.

The water injection helps minimize the production of NOx emissions in the turbine's exhaust stream but does not fully eliminate NOx. The exhaust stream is then routed to the SCR which reduces NOx concentrations further to comply with the emission limits in the permit. 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, prevent future damage from occurring, and 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 54 percent;
- 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 oxidation catalyst with an updated design and higher conversion rate, which provides functionally equivalent emissions control;
- Modify the exhaust flow distribution design and ammonia injection grid (AIG) design to improve the deliverability of ammonia to the catalyst; and,
- Increase the concentration of aqueous ammonia delivered to the facility, stored on-site, and injected into the SCR from 19 percent (%) to 29%[1].

SCE is proposing to revise its SCAQMD Title V Operating Permit to install these new catalysts and make the related enhancements. These changes will allow the turbine to generate power over its full operating range, from less than one MW to full load. The ability to operate over a broader range will increase the operating flexibility of the peaker to provide reliable power to the grid when dispatched by CAISO during peak times when renewable energy resources are not available. These changes can be made while continuing to meet the emission limits in the current permit without increasing:

- Utilization of the Barre Peaker for power generation;
- Fuel-input limits, generation capacity, or the heat rate of the turbine; or,
- 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 Numbers (A/Ns) 594116, 594117, 594118 and 594119 to revise the Title V Operating Permit to reflect modifications to the gas turbine, SCR and oxidation catalyst air pollution control systems and the ammonia tank permit requirements, respectively (collectively referred to as the "Title V Application").

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

[1] Industry standard for aqueous ammonia at this concentration is 29.4% plus or minus (±) a half percentage point. 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 Barre Peaker Project was originally proposed in 2007, the SCAQMD acted as CEQA Lead Agency because it was the public agency that had principal responsibility for approving the project which had the potential to result in a significant effect on the environment (Public Resources Code §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 in the areas 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 Barre Peaker Project in Stanton (State Clearinghouse [SCH] No. 2006121114) on April 3, 2007, referred to herein as the April 2007 Final MND[2]. In addition, mitigation measures were made a condition of project approval and a Mitigation Monitoring and Reporting Plan (MMRP) was adopted for the project. A Statement of Overriding Considerations was 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 systems are considered to be modifications to the previously approved project that was evaluated in the April 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:
  - The project will have one or more significant effects not discussed in the previous CEQA document;

[2] SCAQMD, http://www.aqmd.gov/home/research/documents-reports/lead-agency-permit-projects/permit-project-documents---year-2007/final-mnd-for-edison-barre-peaker

- 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 April 3, 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 (i.e., from 19% to 29%) that is delivered to the facility, stored on-site, and injected into the SCR. 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[3]."

> "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[4]."

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

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

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

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 Barre operating at the maximum capacity analyzed in the April 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 shows that the potential impacts from implementing the currently proposed project are within the scope of what was previously analyzed in the April 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 April 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 April 2007 Final MND contain the required substantial evidence that demonstrates that the proposed project does not contain: 1) substantial changes to the Barre 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; or 3) substantial new information that could not have been known at the time the April 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

The Barre Peaker is located at 10670 Dale Avenue[5], on property owned by SCE, in the City of Stanton, CA (See Figure 3-1). The SCE property is bordered to the north by Cerritos Avenue, to the west by Dale Avenue, and to the south and east by residential land uses. The Barre Peaker facility is located on the southwest corner of this property along Dale Avenue to the west, south of the SCE Barre Substation, and just north of railroad tracks (See Figure 3-2).

Land use along Cerritos Avenue in the project vicinity includes low- and high-density residential and land use along Dale Avenue is a mix of residential and small commercial. Barre Peaker is approximately 180 feet from the nearest residence.

The following schools are located within the area of the Barre Peaker:

1) Robert M. Pyles Elementary School, located on the corner of Cerritos Avenue and Dale Avenue, approximately 1,150 feet from the Barre Peaker;

2) Little Stars Academy, a preschool located on Cerritos Avenue and S. Sherrill Street, approximately 1,400 feet from the Barre Peaker; and

3) Rancho Alamitos High School, located approximately one-half mile (2,500 feet) to the south on Dale Street[6] (which ranges from about 830 feet south of Katella down to Orangewood Avenue).

The peaker's electrical interconnection to the electricity grid is made at the existing SCE Barre Substation, which is located north of the peaker. The existing substation includes capacitors, breakers, transformers, switches, high-voltage buses, transmission poles, and a mechanical electrical equipment room. The mechanical electrical equipment room contains all necessary equipment to provide metering, control, protection, and power distribution for all substation services.

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

The proposed project will occur completely within the confines of the existing Barre Peaker site.

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5 The street address for Barre used in the April 2007 Final MND was 8662 Cerritos Avenue. The site was subsequently assigned the Dale Avenue address by the U.S. Post Office to distinguish it from the Barre Substation on Cerritos Avenue. Both streets are shown on Figure 3-2.

6 Dale is an avenue north of Katella Avenue and is a street south of Katella Avenue.

Figure 3-1: Regional Site Location Map

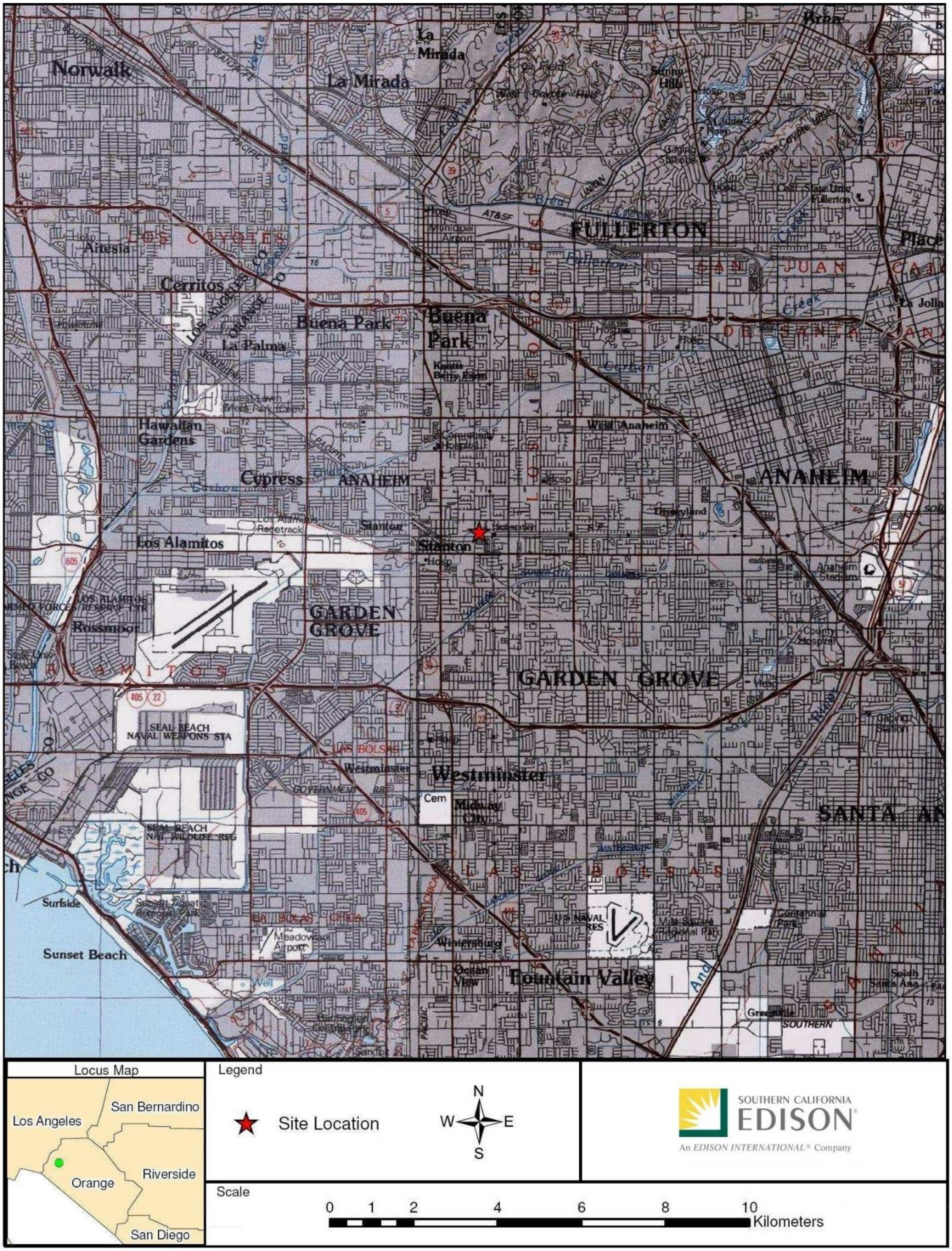

Figure 3-2: Aerial Photographs of the Existing Barre Generation Peaking Facility

Regional View

Barre Facility View

4.0 PROJECT DESCRIPTION

This Section provides background information on the Barre Peaker project evaluated in the April 2007 Final MND and the proposed changes to the existing facility. The ECSE will only affect the SCR and oxidation catalyst air pollution control systems and the concentration of aqueous ammonia to be stored and used on-site, and will not affect any other portion of the Barre Peaker.

4.1 Existing Barre Peaker

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. The Barre Peaker is one of the five generation peaking facilities developed by SCE.

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

The Barre Peaker is 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 522 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 NOx emissions in the turbine's exhaust stream but does not fully eliminate the NOx emissions. By routing the exhaust stream to the SCR, the NOx concentrations are further reduced to comply with the permit limits. Currently, the air pollution control system is designed such that the NOx 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 system. 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 post-control values of 2.5 ppm NOx, 6.0 ppm CO, 2.0 ppm VOC, and 5 ppm ammonia slip (all at 15% O_2) reflect the permit limits.

The turbine is also equipped with CEMS for monitoring NOx 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, a 415-hp diesel-fired emergency generator which is available for backup power if needed, and one 10,500-gallon aqueous ammonia storage tank which supplies ammonia to the SCR system.

4.2 Proposed Project

4.2.1 Proposed Project Description

SCE assessed the turbine and the air pollution control system and discovered that the current water injection rate necessary to achieve NOx 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, prevent future damage from occurring, and 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 54 percent;
- 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 oxidation catalyst with an updated design and higher conversion rate, which provides functionally equivalent emissions control;
- Modify the exhaust flow distribution design and AIG design to improve the deliverability of ammonia to the catalyst; and,

- Increase the concentration of aqueous ammonia delivered to the facility, stored on-site, and injected into the SCR from 19 percent (%) to 29%.[7]

SCE is requesting revisions to its SCAQMD Title V Operating Permit to make the proposed changes. Implementation of the proposed project will allow the turbine to generate power over its full operating range, from less than one MW to full load. When dispatched by CAISO, the peaker's ability to operate over a broader range will increase its operating flexibility to provide reliable power to the grid during peak times when renewable energy resources are not available. The proposed changes can be made while continuing to meet the emission limits in the current permit without increasing:

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

In particular, the proposed project involves reconfiguring the SCR system such that the NOx 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 NOx 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 lessen the degradation rate of the oxidation catalyst. The higher concentration of NOx exiting the combustor will require increases to the catalyst cross-sectional area and an increased pitch of the catalyst beds to provide a larger contact area and longer contact time with the catalyst. The oxidation catalyst will be upgraded with a platinum-based catalyst which will allow the turbine to run over a broader operating range while still meeting the current permitted emission limits. In addition, the deliverability of ammonia to the catalyst will be improved with modifications to the AIG. Finally, the aqueous ammonia concentration will be increased from 19% to 29%. As discussed in Section 5.5, based on actual water usage and forecast of future operation at this site once the proposed project is completed, the amount of water injected for controlling NOx emissions from the combustor will decrease by approximately 54% and save approximately 1.6 to 2.3 million gallons of water per year. Instead of injecting large quantities of water into the turbine's combustor, the ability to control NOx emissions will rely more on injecting a higher concentration of ammonia into the SCR system.

The proposed project will consist of the following elements:

- Replacing the existing SCR NOx catalyst with a more advanced SCR design that fits within the existing enclosure;
- Replacing the oxidation catalyst with an updated design that will fit in the same space, and is a functionally equivalent replacement;
- Modifying 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;

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

- Improving the turbine NOx water injection tuning;
- Increasing the aqueous ammonia concentration from 19% to 29%; and
- Replacing and/or relocating the stainless steel CEMS sample probe, if needed, due to the redesign of the AIG and exhaust flow distribution.

As explained in the Introduction, Barre currently has a narrow operating range between its minimum and maximum operating points due to limitations of the existing SCR system. In particular, the need to limit the NOx concentration from the combustor to 25 ppm with water injection limits the ability of the turbine to operate over its full operating range. Once completed, the proposed modifications will improve SCR and oxidation catalyst efficiency so that the turbine can 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. SCE has provided analyses in its application to modify Barre's SCAQMD Title V Operating Permit that demonstrate that the current daily, monthly and annual permit limits which apply to normal operations will not be exceeded after implementation of the proposed modifications, including those occurring during the recommissioning year.

The modifications will improve flexibility of the gas turbine by expanding the operating range where Barre can remain in compliance with existing air permit emissions limits and allow for faster ramping capability throughout the operating range. These improvements provide the CAISO with additional options to dispatch Barre to meet specific needs related to grid stability and the integration of intermittent renewable energy resources (solar and wind). Due to increased wind and solar generation, and their inherent variability, the existing peaker plants must be modernized to ensure faster start times and lower operating loads during times when wind and solar production is intermittent. 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 Barre will increase electric grid reliability, and support higher penetration of renewable resources, thereby enhancing the ability to meet California's RPS goals.

4.2.2 Proposed Project Construction

The construction activities will involve removing and replacing the internal, existing SCR catalyst and updating the internal SCR catalyst design. The oxidation catalyst will also be replaced with an updated design. A minimum amount of construction equipment will be needed, and this equipment will be placed on the existing paved site. Thus, the replacement of the turbine's existing air pollution control systems will 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 18 working days over a three-week construction period and involve a peak of up to 22 daily construction workers during this time, with a peak of 22 round trips (44 one-way trips) per day over the 18 days. Of the proposed enhancements described in Section 4.2, only the replacement of the old SCR catalyst and oxidation catalyst with the new SCR catalyst and oxidation catalyst will require the use of major construction equipment, consisting of one 300 hp crane estimated to be utilized for up to six hours per day and up to a total of 24 hours for the entire three-week construction period. Other equipment, such as a forklift, man lift, and welding machine, may also be used during construction. The equipment assumed for purposes of estimating potential emissions during the construction period are summarized 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	Peak Hours per Day	Total Days	Notes
Crane	1	diesel	300	default	6	4	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	3	16	Telescoping forklift (type JLG 943 or similar. Engine type: Cummins, QSF3.8L Tier 4 Final, 110 hp)
Aerial Lift (Man Lift)	1	diesel	74	4	4	16	Telescoping man lift (type JLG 1200SJP or similar. Engine type: Deutz TCD2.9L4 Tier 4 Final, 74 hp)
Welding Machine	1	gasoline	23.5	default	6	14	Welding machine (type Miller/Bobcat 225/250 Gas Engine Driven or similar, 23.5 hp at 3600 rpm)
Worker Vehicles (on-road)[a]	Up to 44 trips/day	diesel/ gasoline	default	default	N/A	18	Default vehicle mix
Haul Trucks[b, c]	1-2	diesel	default	default	N/A	4	Default vehicle mix

Notes:

a. Worker vehicles are not used during the construction day but for commuting to and from the site. The calculation of emissions from worker light duty vehicles is based on the maximum number of workers and the CalEEMod-default value for construction worker vehicle miles travelled (VMT) to and from the site.

b. Up to two on-road haul trucks per day are used for delivery of building materials and supplies or removal of construction wastes and are not used as construction equipment during the day. The calculation of emissions from haul trucks is based on the CalEEMod-default VMT of the trucks to and from the site.

c. Haul trucks are required to limit idling to less than five minutes or less pursuant to Title 13 of the California Code of Regulations Sections 2485 and 2449.

4.2.3 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**

  Barre 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 will not change the generation capacity output of the gas turbine but will improve operational flexibility by allowing Barre 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 Barre to meet specific needs for electrical generation.

Barre's current Title V permit does not limit operation of the turbine at partial loads *per se*, and the turbine is allowed to operate anywhere between zero and 100 percent. However, the current air pollution control system limits partial-load operation and narrows the allowable operating range of the turbine to maintain compliance with a NOx concentration of ≤2.5 ppm and a CO concentration of ≤6.0 ppm. The current SCR system's NOx concentration from the combustor must be maintained at or below a firm 25 ppm to maintain controlled NOx emissions of 2.5 ppm or lower. After implementation of the ECSE, the NOx concentration from the combustor (pre-SCR) can increase to an optimal point within the range of ~25 ppm to ~42 ppm, and still maintain a controlled exhaust (post-SCR) emissions of 2.5 ppm or lower, with less water injection. Similarly, the current oxidation catalyst is capable of converting a pre-control CO concentration from 99 ppm to 6.0 ppm. The updated catalyst will be capable of converting a pre-control CO concentration from 180 ppm to 6.0 ppm. Thus, the ECSE will allow Barre to maintain compliance with the existing 2.5 ppm NOx and 6.0 ppm CO permit limits across a wider operating range.

Once the ECSE are implemented, Barre will be capable of generating power over its full operating range, from less than one MW 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 Barre to meet 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 Barre will be frequently dispatched at low or partial loads, as other factors contribute to that decision, but Barre could operate at partial loads if the CAISO determines it is necessary or appropriate to balance the instantaneous intermittent renewable generation output to maintain grid stability. Hence, the partial loading capability for Barre will increase electric grid reliability, support higher penetration of renewable resources, and enhance CAISO's ability to meet California's RPS goals.

Operational flexibility will occur without increasing emissions above the PTE limits established in the current permit. 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 5.1.2 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 Barre. 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 Barre was initially permitted.

SCE is not proposing to change Barre's permitted maximum operating limits or PTE because the ECSE are not expected to result in increased operation of Barre. SCE's detailed forecasts project that Barre'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, Barre 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 tailor dispatch of Barre 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 NOx emissions control for the turbine is accomplished by a combination of water injection in the combustor and ammonia injection across the SCR system. The water injection first reduces the NOx emissions to a level from which the SCR can further reduce the NOx concentrations to comply with the permit limits. As explained earlier, the ECSE involve reconfiguring the SCR design to increase the catalyst surface area and improve ammonia distribution to enhance control of NOx emissions. With implementation of the ECSE, the NOx 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 NOx or lower. Thus, the new configuration with use of ammonia at a higher concentration does not require as much water injection for the initial control of NOx from the combustor. The precise water injection rate for NOx control will be optimized after implementation of the ECSE.

  The lower water injection rate in the air pollution 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 Barre by approximately 54% and save approximately 1.6 to 2.3 million gallons of water per year at this facility. See Section 5.5 for additional detail on water use and estimated water savings.

- **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 air pollution control systems such that the water injection rate at the turbine can be lowered. In addition to achieving a substantial reduction in water consumption, the ECSE will prevent future damage to turbine components and reduce the degradation rate of the oxidation catalyst. These changes will reduce the Operations and Maintenance (O&M) costs for Barre by avoiding potential solid waste from less frequent/premature emissions control equipment replacement and other environmental impacts, such as truck trips and emissions related to more frequent transport of the spent catalyst for regeneration, as well as from premature emissions control equipment replacements. Reduced O&M will also translate into savings for SCE's customers by reducing the frequency, and therefore the cost, of landfilling the material that cannot be recycled.

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

The April 2007 Final MND analyzed and identified the potentially significant adverse impacts in the following six environmental topic areas and concluded that these impacts could be reduced to a level of insignificance after mitigation: 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 operation; and 6) traffic and transportation impacts during pipeline construction. Mitigation measures were made a condition of project approval and a MMRP was adopted for the project. Impacts to the following environmental topics areas were concluded in the April 2007 Final MND to be less than significant without mitigation: 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 and Greenhouse Gas Emissions
- Biological Resources
- Hazards and Hazardous Materials (storage, handling, and transport)
- Hydrology and Water Quality
- Noise
- Solid and Hazardous Waste (waste management and disposal)
- Transportation and Traffic

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

5.1 Air Quality

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

Air quality impacts resulting from construction and operation of Barre were evaluated in the April 2007 Final MND. Emissions of criteria pollutants (i.e., NOx, VOC, CO, Sulfur Oxides (SOx), Particulate Matter with an aerodynamic diameter of 10 microns or less (PM10), and Particulate Matter with an aerodynamic diameter of 2.5 microns or less (PM2.5)) were analyzed. Potential health risk impacts from TACs were also analyzed.

Construction: 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 NOx emissions during peak construction had the potential to exceed the applicable NOx daily emissions significance threshold of 100 pounds per day (lbs/day). In the April 2007 Final MND, 15 mitigation measures were imposed to reduce the NOx construction impacts to less than significant levels, including providing Regional Clean Air Incentives Market (RECLAIM) Trading Credits for NOx during construction periods when the significance threshold was exceeded.

Project-specific construction emissions were also evaluated in the April 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 in nonattainment under an applicable federal or state ambient air quality standard. The SCAQMD is in non-attainment for ozone, a regional pollutant, which could be exacerbated by emissions of NOx and VOC. Although the quantity of VOC emissions from constructing each of the four peaker projects proposed by SCE (as identified in Section 4.1) was individually below the SCAQMD's significance threshold for VOC construction emissions, all four peaker projects were expected to undergo construction within the same timeframe and as such, the combined VOC emissions for the four peaker projects was concluded to cumulatively exceed the VOC significance threshold.[8] Therefore, in addition to the NOx emissions mitigation identified earlier, the Barre project was required to provide Mobile Source Emission Reduction Credits (MSERCs) to mitigate cumulative impacts from VOC emissions during construction of the four SCE peaker projects. Construction activities that were evaluated in the April 2007 Final 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. Vehicle emissions related to ammonia delivery and maintenance worker trips 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 April 2007 Final MND have been completed and the emissions associated with commissioning are no longer occurring.

5.1.2 Air Quality Impacts Related to the Proposed Project

Construction: The construction equipment projected to be used for ECSE installation and the duration of equipment operation are described in Section 4.2.2. 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 for peak daily emissions) provided in Appendix A. For the estimated peak daily emissions, the maximum number of worker trips, haul trucks, and all equipment operating for the total daily hours shown in Table 4-1 were conservatively assumed to occur in the same day. As shown in Table 5-1, the peak daily emissions for the up to 18 working-day construction period for the ECSE are well below the SCAQMD daily mass emissions thresholds for construction and hence will not result in a significant impact.

As shown in Table 5-1, construction emissions associated with implementation of the proposed project are less than the construction emissions analyzed in the April 2007 Final MND for construction of the entire facility due to minimal construction activities planned. Further, the construction emissions summarized in Table 5-1 are below the SCAQMD's CEQA air quality significance thresholds for construction. Since construction of the proposed ECSE project will result in less emissions than the power plant construction emissions analyzed in the April 2007

[8] Although SCE installed five new peaker plants, only four of the five are located in the South Coast Air Basin within SCAQMD's jurisdiction (See Figure 4-1).

Final MND and less than SCAQMD CEQA air quality thresholds, this ECSE construction will not result in significant adverse air quality impacts during construction and will not make existing air quality substantially worse. Because the ECSE construction emissions are less than significant, air quality mitigation measures are not required. Although air quality mitigation measures are not necessary to reduce construction impacts below significance levels, SCE will implement during the ECSE construction period the mitigation measures AQ-9 (Limit equipment idling time) and AQ-10 (Maintain equipment engines in good condition and in proper tune as per manufacturers' specifications) from the MMRP that was adopted with the April 2007 Final MND.

Table 5-1: Comparison of Baseline Peak Daily Emissions Analyzed in the April 2007 Final MND to Peak Daily Construction Emissions for the Proposed Project

	NOx (lbs/day)	CO (lbs/day)	VOC (lbs/day)	SOx (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
April 2007 Final MND Peak Daily Construction Emissions[a]	50.5	29.3	10.1	0.0	4.0	3.2
ECSE Peak Daily Construction Emissions[b]	7.0	7.6	0.8	0.0	0.8	0.4
Significance Thresholds For Construction Peak Daily Emissions	100	550	75	150	150	55
SIGNIFICANT?	NO	NO	NO	NO	NO	NO

Notes:

a. April 2007 Final MND Peak Daily Construction Emissions from Table 3-3 for Power Plant Total On-Site Emissions.

b. ECSE peak daily emissions conservatively assume the 44 worker trips, 2 haul trucks, and all equipment operating for the total daily hours shown in Table 4-1 will occur on the same day.

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 Barre. Similarly, the ECSE will not increase the maximum potential emissions of TACs or GHGs from currently allowed levels. Emissions of TACs and GHGs from the proposed project are compared to the emissions analyzed in the April 2007 Final MND and the currently permitted emissions, provided below on an annual, monthly, and daily basis.

Recommissioning Emissions: Upgrading the SCR and oxidation catalyst at Barre will require recommissioning of the turbine, which consists of testing and tuning the ammonia and water injection at various loads to optimize the air pollution control equipment following installation of the reconfigured/new catalysts. Emissions are higher during this recommissioning period because the air pollution control equipment will not yet be fully operational. A summary of the various tests that are anticipated to occur during Barre recommissioning, along with the NOx, VOC, and CO emissions levels during these tests, is provided in Appendix B, Table B-1. Table 5-2 demonstrates that the peak hourly emissions during recommissioning will be equal to or less than the commissioning emissions levels analyzed in the April 2007 Final MND.

Table 5-2: Comparison of Baseline LM6000 Turbine Peak Uncontrolled Hourly Emissions During Commissioning Analyzed in the April 2007 Final MND with Peak Uncontrolled Hourly Emissions During Proposed Project Recommissioning

Pollutant[a]	Peak Uncontrolled Hourly Emissions During Commissioning (lbs/hr)		
	April 2007 Final MND[b]	ECSE Recommissioning[c]	Difference
NOx	105.9	27.0	-78.9
CO	59.7	16.1	-43.6
VOC	1.96	1.9	-0.1
SOx	0.31	0.31	0.0
PM10	5.28	5.28	0.0

Notes:

a. PM2.5 not analyzed in the April 2007 Final MND but would be equal to or slightly less than PM10.

b. From Table 3-7 in the April 2007 Final MND; SOx and PM10 adjusted slightly to reflect corrected turbine rating.

c. NOx, CO and VOC from Table B-1 in Appendix B of this Addendum. Since there are no add-on air pollution control equipment for SOx and PM10, there would be no change in emissions of these pollutants between prior commissioning and recommissioning.

Annual Emissions: Annual emissions were analyzed in the April 2007 MND for the LM6000 gas turbine and a black-start generator individually, as well as a facility annual PTE. Subsequent to the April 2007 Final MND, there have been some changes to the facility permitted emissions. For instance, a diesel-fired emergency generator was installed in addition to the gas turbine and black-start generator. Also, SCE submitted Application No. (A/N) 535915 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 December 13, 2016. Based on the sliding scale allowed in the permit, the highest annual emissions were shown to occur at 100 starts per year and a natural gas fuel use of 660 million standard cubic feet per year (MMscf/yr). The emissions calculated under this scenario are considered to be the PTE for the gas turbine in the current permit.

The emissions for the peak facility operating scenario, i.e., 100 starts per year and a fuel use of 660 MMscf/yr of natural gas, include 28 hours for CAISO performance tuning plus four hours for black-start generator testing (per the SCAQMD's Engineering Analysis performed for A/N 535915). In the same application, SCE also requested to cap the emissions for the black-start generator and the emergency diesel 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 and the emergency diesel generator emissions are based on 20 hours per year of operation for testing. The PTE for each of the current permitted equipment is shown in Appendix B, Table B-4.

The proposed ECSE will affect only the air pollution control systems for the gas turbine, and not the black-start or emergency generators. 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 and performance tuning will still need to be performed in 2018 (the projected recommissioning year), but Western Electricity Coordinating Council (WECC) generator modeling has already been completed in 2017 and will not be needed again until 2022. Maximum turbine emissions during the recommissioning year (i.e., the 12 months that starts with the recommissioning period) will therefore include emissions from turbine start-ups, shutdowns, and normal operation, as well as turbine operations during black-start generator testing and performance tuning and emissions related to the recommissioning. The detailed annual emissions estimates are presented in Appendix B, Tables B-2, B-3 and B-4.

A comparison of the criteria pollutant emissions for the LM6000 gas turbine analyzed in the April 2007 Final MND, the gas turbine PTE in the SCAQMD's A/N 535915 engineering evaluation for the current permit, and for the proposed project is presented below in Table 5-3. In order to ensure that the emissions during recommissioning stay within the currently permitted PTE, the maximum fuel use will be capped at 600 MMscf/yr with 100 starts, compared to the 660 MMscf/yr during subsequent years. A sliding scale of fuel use vs. number of starts specific to the recommissioning year will be added as a new permit condition. With this fuel use cap, Table 5-3 shows that the emissions for the equipment (i.e., gas turbine and pollution control units) affected by the proposed project will be equal to or less than the baseline emissions and those permitted by SCAQMD in prior permit revisions.

Table 5-3: Comparison of Annual LM6000 Turbine Emissions in the April 2007 Final MND, the Current Facility Permit, and the Proposed Project (tpy)

Pollutant	April 2007 Final MND[a]		Current Permit Limit[b]	Proposed Project	
	Year With Commissioning	Subsequent Years		Year With Recommissioning	Subsequent Years
NOx	3.9	3.9	3.9	3.8	3.9
CO	5.3	5.5	5.0	4.8	5.0
VOC	1.0	1.1	0.9	0.9	0.9
SOx	0.2	0.2	0.2	0.2	0.2
PM10/PM2.5[c]	3.3	3.8	3.5	3.5	3.5

Notes:

a. From Table 3-8 in the April 2007 Final MND

b. From the SCAQMD engineering evaluation for the Barre facility for A/N 535915. Emissions reflect the LM6000 gas turbine only, but include emissions related to testing as well as start-up, shut down and normal operations.

c. The SCAQMD did not include PM2.5 in the April 2007 Final MND, the facility permit, or in prior engineering evaluations for the Barre facility. However, PM2.5 emissions are estimated to be the same or slightly less than the PM10 emissions.

A summary of the facility PTE for all permitted equipment at Barre as analyzed in the April 2007 Final MND, from the SCAQMD's A/N 535915 engineering evaluation for the current permit, and for the proposed project is provided in Table 5-4. As shown in Table 5-4, the NOx emissions analyzed in the April 2007 Final MND are slightly less than the currently permitted or proposed project levels primarily due to addition of the emergency generator and somewhat due to the restructuring of the permit with the sliding scale of allowable fuel use and number of starts. (Note, the contribution of the generator is small relative to the turbine, and NOx emissions remain below the 4.0 tons per year [tpy] offset threshold.) Additional information that includes the breakdown of the emissions for each source is presented in Table B-4 in Appendix B.

Table 5-4: Comparison of Annual Facility PTE in the April 2007 Final MND, the Current Facility Permit, and the Proposed Project (lbs/yr)

Pollutant	April 2007 Final MND[a]		Current Permit Limit[b]	Proposed Project[c]	
	Year With Commissioning	Subsequent Years		Year With Recommissioning	Subsequent Years
NOx	7,816.7	7,816.7	7,988	7,972.1	7,988
CO	10,636.0	10,932.9	10,298	9,885.3	10,298
VOC	1,909.9	2,190.8	1,938	1,825.9	1,938
SOx	386.1	445.6	414	406.4	414
PM10/PM2.5[d]	6,512.3	7,514.9	7,032	6,912.5	7,032

Notes:

a. From Table C-8 in the April 2007 Final MND and includes the gas turbine and black-start generator, but not the emergency diesel generator that was subsequently installed.

b. From the SCAQMD engineering evaluation for the Barre facility for A/N 535915. Emissions reflect the LM6000 gas turbine, black-start generator and emergency generator.

c. From SCAQMD preliminary engineering evaluation for A/N 594117-9 for the Barre facility.

d. The SCAQMD did not include PM2.5 in the April 2007 Final MND, the facility permit, or in prior engineering evaluations for the Barre facility. However, PM2.5 emissions are estimated to be the same or slightly less than the PM10 emissions.

Monthly Emissions: Based on the SCAQMD A/N 535915 engineering evaluation, the existing monthly PTE includes 30 start-ups/shutdowns and natural gas fuel use of 141.0 MMscf (which is calculated from the 4.7 MMscf daily limit multiplied by 30 days). These emissions are presented 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 remain below the existing monthly PTE. Emissions in every other month will be for normal operations, and will remain below the existing PTE. Therefore, there will be no increase in monthly PTE as a result of the ECSE, including during recommissioning.

The facility monthly emissions based on the April 2007 Final MND are included in Table 5-5 for comparison purposes. However, the April 2007 Final MND only provided peak daily and average daily emissions, and did not provide a facility PTE on a monthly basis. The values shown in the table are based on the maximum daily controlled (MDC) emissions values.

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

Pollutant	April 2007 Final MND Monthly Facility Emissions[a]	Existing Monthly Facility PTE	Recommissioning Emissions[b]	Difference Between Existing Monthly PTE and Total Recommissioning Emissions
NOx	1,625	1,584	565	-1,019
CO	2,245	2,068	435	-1,633
VOC	449	398	50	-348
SOx	89	89	20	-69
PM10/PM2.5[c]	1,499	1,499	341	-1,158

Notes:

a. Monthly PTE values for each pollutant were not included in the April 2007 Final MND. Table values are calculated from Table C-7 in the April 2007 Final MND and reflect the Maximum Daily Controlled (MDC) emissions times 30 days. MDC consists of 1 hour of black start engine operation for testing, plus the sum of 1 start-up hour, 1 shutdown hour, and 9 hours of fully controlled turbine operations, but does not include the emergency generator that was subsequently installed.

b. Assumes that total recommissioning emissions will occur within one month, rather than 45 days.

c. The SCAQMD did not include PM2.5 in the April 2007 Final MND, the facility permit, or in prior engineering evaluations for the Barre facility. However, PM2.5 emissions are estimated to be the same or slightly less than the PM10 emissions.

Daily Emissions: Based on the SCAQMD A/N 535915 engineering evaluation, calculations of maximum daily emissions for the turbine assume three starts-ups per day and a natural gas fuel use of 4.7 MMscf (which is the daily permit limit). Per the detailed testing plan in Appendix B and based on the recent commissioning of similar ECSE projects at two other peaker facilities, SCE is able to complete all tests within the daily limit for NOx (i.e., 55 lbs/day), even if an entire 12-hour test is performed in one day. Therefore, SCE will ensure compliance with a maximum of 12 hours of testing per day, and no more than 55 lbs/day of NOx. A comparison of the daily facility PTE in the current permit, the maximum daily controlled emissions from the April 2007 Final MND, and the maximum daily emissions during recommissioning is presented in Table 5-6, and more detailed calculations are provided in Table B-5 in Appendix B.

Note that the turbine will continue to comply with the 4.7 MMscf daily natural gas fuel limit during recommissioning.

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

Pollutant	April 2007 Final MND Daily Facility PTE[a]	Existing Daily Facility PTE	Peak Daily Recommissioning Emissions	Difference Between Existing Daily PTE and Peak Daily Recommissioning Emissions
NOx	54.16	55.0	54.0	-1.0
CO	74.82	71.49	55.4	-16.1
VOC	14.97	13.97	6.4	-7.5
SOx	2.96	2.96	2.5	-0.42
PM10/PM2.5[c]	49.95	49.96	43.7	-6.3

Notes:

a. From Table C-7 in the April 2007 Final MND, MDC emissions consist of 1 hour of black-start generator operation, plus the sum of 1 start-up hour, 1 shutdown hour, and 9 hours of fully controlled turbine operations.

b. The permit contains an additional NOx limit of 55 lbs/day, which reflects the CEQA significance threshold.

c. The SCAQMD did not include PM2.5 in the April 2007 Final MND, the facility permit, or in prior engineering evaluations for the Barre facility. However, PM2.5 emissions are estimated to be the same or slightly less than the PM10 emissions.

In summary, the analysis shown above demonstrates that the emissions related to construction, recommissioning, and operation of the proposed ECSE will be within the construction emissions and annual turbine PTE levels analyzed in the April 2007 Final MND. The NOx daily and annual facility PTE in the current permit is slightly higher than that analyzed in the April 2007 Final MND primarily because an emergency diesel generator was subsequently installed. Revisions will be made to the Barre Title V permit to ensure that 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. Calculations that demonstrate how these emissions will remain consistent with the permitted emissions limits are provided in Appendix B. Although there are some slight changes in the emissions due to the addition of the emergency generator and restructuring of the permit to allow a sliding scale of fuel use vs. number of starts, the proposed project will have nearly the same facility emissions as the project analyzed in the April 2007 Final MND and will remain below applicable offset and significance thresholds, thus, no new significant adverse impacts will result.

5.2 GHG Emissions

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

In accordance with applicable CEQA checklist and SCAQMD CEQA guidance at the time when the April 2007 Final MND was adopted, GHG emissions were not required to be specifically analyzed for the Barre Peaker. However, GHG emissions are indirectly restricted by the permitted limits (i.e., PTE) for the criteria pollutant emissions for this facility because Barre was permitted with a natural gas fuel use limit of 660 MMscf/yr (based on the 100 starts-per-year scenario). By limiting the amount of natural gas fuel use, the corresponding amount of GHG emissions that are generated during combustion are also limited. See Appendix B, Table B-6 for a calculation of GHG PTE for Barre. Actual GHG emissions from Barre 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.[9]

5.2.2 GHG Emissions Impacts Related to the Proposed Project

The Barre permit currently allows a sliding scale of natural gas fuel use depending on the number of starts that occur throughout the year. A specific sliding scale of amount of natural gas fuel use vs. number of starts that applies during the recommissioning year will be added to the permit to ensure that the existing permit levels are not exceeded. 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. Therefore, the GHG PTE related to the proposed project remains unchanged from the baseline and the proposed ECSE will not increase the amount of GHGs emitted by 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.[10]

5.3 Biological Resources

5.3.1 Summary of Biological Resources Analysis in the April 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, nor 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 were imposed to avoid potential impacts to migratory birds, and the April 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 Barre Peaker. There will be no new ground disturbance, grubbing, or grading activity associated with the proposed project. There could be the potential for nesting birds to use the site during ECSE installation. Therefore, the applicable mitigation measure from the MMRP included in the April 2007 Final MND for migratory birds (BIO-2) will be implemented during construction of the proposed project to avoid adverse biological resource impacts. In addition, a preconstruction survey will be performed if construction of the proposed project occurs during the nesting bird season. If a protected active nest is identified during the preconstruction survey or during construction, a qualified biologist will establish an appropriate disturbance-free buffer around the active nest until the nest is no longer active or until construction is complete. The qualified biologist will determine the appropriate buffer based on the species, behavior of the pair, reproductive stage, and site-specific conditions, such as distance to construction, type of

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[9] Actual annual GHG emissions reported to the State of California for the Barre Peaker have been less than 19,000 MT/yr since the start of operation. For instance, the maximum year for which final data have been reported was 2017 at 18,072 MT/yr. The reporting threshold of 25,000 MT/year is given in Title 17, California Code of Regulations (CCR) Section 95812. Inclusion Thresholds for Covered Entities at https://govt.westlaw.com/calregs/Document/IF7506A15411443949D35B6B3E9629D07?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default).

disturbance activity, anticipated duration of disturbance, and microhabitat at the location of the nest that may provide visual and acoustic barriers. 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 April 2007 Final MND

The April 2007 Final MND analyzed the potential for impacts from potential hazardous materials that could be used during construction and operation of the Barre Peaker. Hazardous materials at the site are stored and handled in accordance with all local, state, and federal regulations and codes. The April 2007 Final MND analyzed hazardous materials that would be used during project construction including 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 minor spills or drips. Minor spills or drips can be cleaned up easily, 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. Therefore, use of 19% aqueous ammonia was the only hazardous material analyzed in detail in the April 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 April 2007 Final MND.

5.4.1.1 Summary of Existing Ammonia Storage Facilities

In order to provide context for the risk analyses, the existing ammonia facilities are described below.

An SCR system with 19% aqueous ammonia injection is used at Barre to control NOx emissions in the turbine exhaust. The Barre aqueous ammonia system consists of a storage tank (pressure vessel), secondary containment, dispensing pumps, distribution piping, and vaporization skid. The existing ammonia system includes numerous built-in safety features which are described in the following paragraphs.

The aqueous ammonia storage tank is located adjacent to the aqueous ammonia unloading area. The aqueous ammonia tank is a single-walled design with a total capacity of 10,500 gallons. The storage tank is constructed of materials compatible with aqueous ammonia. The tank meets the 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 a total capacity of 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. The secondary containment is designed to contain the entire capacity of the tank 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-foot 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. 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 until the tank is filled to 85% (8,925 gallons) of capacity. The aqueous ammonia unloading station consists of a sloping concrete pad measuring 36 feet long by 15 feet wide. The pad slopes to drain into 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-foot opening, which funnels into a 2-foot diameter drainpipe. The design of the pad ensures no pooling will occur in the event of a spill during unloading. Only 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. 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 close automatically in case of failure of plant air supply or when any one of the three above-ground ammonia sensors 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 April 2007 Final MND

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

- A catastrophic storage tank failure;
- An ammonia unloading accident; and
- A release during transport of 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 Barre (where the public could be exposed) was estimated prior to construction of the facility to be 266 feet (81 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 determined by the Offsite Consequence Analysis

(OCA) prepared for the April 2007 Final MND to be 66 ppm for the tank rupture scenario. The concentration at the same point from an unloading accident where the entire contents of a 7,000-gallon tanker truck would be released, was determined to be less than the tank rupture scenario. The OCA prepared for the April 2007 Final MND was performed using the SCREEN3 model, which was the recommended model at the time. The modeled ammonia concentration of 66 ppm was concluded to be lower than the ammonia toxic endpoint[10] 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 April 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.

A preschool (Anaheim Child Development Nursery School [subsequently replaced with Little Star Academy]) and an elementary school (Robert M. Pyles) were identified as being within approximately one quarter mile (1,320 feet) of Barre, but both were well outside of the impact zone[11] of a potential tank rupture or unloading accident (see Appendix C for the analysis, there were no significant off-site impacts for this facility, so the impact zone is entirely on-site). The nearest residence is 180 feet from the property boundary.

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 traveled (United States Department of Transportation [U.S. DOT] 2004). Given this low frequency, and the relatively short distance (estimated one-way trip distance of 30 miles) between the aqueous ammonia supplier and Barre, an accident resulting in the release of aqueous ammonia from the delivery truck en route to the facility was determined to be highly unlikely in the April 2007 Final MND. Because the likelihood of an accident was determined to be so remote, the April 2007 Final MND for Barre 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 NOx emissions will be controlled with the same ammonia injection rate.

Mitigation measure HM-1, which limits the storage of hazardous materials (other than ammonia) to small quantities, will continue to apply. 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, aqueous ammonia is the only hazardous material discussed in this Section.

[10] 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.

[11] The impact zone is defined as the distance where off-site impacts are greater than 200 ppm. The maximum off-site impact is 19 ppm, thus the zone of impact is entirely within the SCE property.

The 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 of 20,000 pounds of ammonia in solution for federal Risk Management Program requirements, the storage tank will be filled to only 84% of its capacity (8,820 gallons). This limit will be 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 April 2007 Final MND were assessed for the higher concentration of ammonia (see 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. 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. This information, along with the AERSCREEN output, are provided in Appendix C.

The distance from the center of the ammonia tank to the closest point along the Barre property boundary that the public can access was determined to be approximately 296 feet (90 meters), which is different from the distance used in the April 2007 Final MND since it is based on the actual as-built layout. The results of the AERSCREEN analysis for a tank failure, filled to 84% (8,820 gallons) of capacity, indicate that the maximum ammonia concentration at approximately 296 feet is expected to be 19 ppm. Even though there will be a higher concentration of ammonia in the storage tank, the modeled concentration of 19 ppm is less than the 66 ppm value reported in the April 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 April 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 on the public or environment. This analysis used conservative project parameters to determine the consequences of the modeled release. Conservative features of the OCA are discussed in Appendix C.

The aqueous ammonia unloading area consists of a sloping concrete pad measuring 36 feet long by 15 feet wide. 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 has a volume 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 result in impacts less than the 19-ppm level at the property boundary that was estimated for a tank failure. Therefore, additional OCA modeling was not necessary to determine that 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 during transport 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 April 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 of an accident was so remote. However, this Addendum contains an analysis of all three of these risk considerations. Evaluation of each of these three considerations leads to the conclusion that the potential impacts associated with the potential release of 29% ammonia will be no greater than those associated with the transport 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 (27 miles from the current supplier to Barre) 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
- SCE will restrict the transport of 29% aqueous ammonia to smaller volumes (i.e., 4,000 gallons[13]) than currently allowed for the transport of 19% aqueous ammonia, which reduces

[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.

[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 vendor generally tracks shipments in terms of pounds of aqueous ammonia solution rather than number of gallons. Based on information provided by the vendor 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.

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 April 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 April 2007 Final MND was approved, it was assumed that 19% aqueous ammonia would be delivered to Barre up to four times per year in 7,000-gallon tanker trucks. Thus, the annual quantity of delivered aqueous ammonia evaluated in the April 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 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 Barre will not increase above the four deliveries per year that were analyzed in the April 2007 Final MND.

The risk of an accident during transport is primarily a function of the number of deliveries and the distance traveled in connection with each delivery. Since the ammonia supplier is within the Los Angeles basin and the number of deliveries of aqueous ammonia per year is not expected to change, implementation of the ECSE will not increase the risk of an accident during ammonia transport. Using the same methodology relied upon in the April 2007 Final MND, an accident resulting in release of aqueous ammonia would be expected to occur approximately once every 4.21 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 traveled (U.S. DOT 2004), a one-way trip distance of 27 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.

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

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

Since preparation of the April 2007 Final MND, the suppliers that deliver aqueous ammonia to Barre have upgraded their 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 Barre will be lower than the risk of release generally associated with the transport of ammonia using trucks not equipped with these measures. The likelihood of a release in the event of an accident is low and not expected to change because these safety measures have been in place since 2007.

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 Barre 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.

The April 2007 Final MND did not analyze the potential consequences of a release of 19% ammonia during transport even though potential consequences existed, and have existed throughout Barre’s operation. The risk of an ammonia release was too remote to warrant analysis of the consequences at the time of the April 2007 Final MND. Therefore, to evaluate the consequences of implementing the ECSE, the impacts of a release from a 7,000-gallon tanker truck of 19% aqueous ammonia were modeled to establish a baseline against which to compare the impacts of a release of 4,400 gallons of 29% aqueous ammonia during transport. It is important to note 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 April 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 with 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 very stable 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.

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 of 200 ppm at a distance of 0.4 miles from the point of release. For a 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. The RMP*Comp model outputs for these two scenarios are provided in Appendix D.

[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.

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 April 2007 Final MND and this Addendum: storage tank rupture, tanker truck unloading accident, and tanker truck accident during transport.

The probability of a catastrophic release of aqueous ammonia during storage or tanker truck unloading at the Barre facility is very low. The low release probability is the result of 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. 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 Barre 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 April 2007 Final MND was adopted and Barre was permitted. Because the number and distance of tanker truck trips for ammonia deliveries will not increase as a result of the ECSE compared to the trips assumed for the April 2007 Final MND, the probability of an accident will remain less than significant.
- Stringent U.S. DOT and state regulations address 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 contained in 49 CFR Parts 171-180 which do not require these safety measures. 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 Barre, the risk will be lower than it was at the time Barre was permitted.
- Finally, SCE has determined that smaller quantities of ammonia solution will be needed than what was originally expected at the time Barre was permitted, and has proposed restrictions to limit the amount of aqueous ammonia delivered to the site in each supply trip. As a result, the consequences of a release of ammonia during transport after implementation of the ECSE do not increase because the 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.

A Risk Management Plan (RMP) is required under the CalARP Program for the storage and use of 500 pounds or more of ammonia. SCE, in consultation with the Orange County Fire Authority, has prepared a CalARP RMP for Barre. An update of the current RMP to allow for the storage and use of 29% aqueous ammonia will be prepared as required. Barre 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 project as analyzed in the April 2007 Final MND.

5.5 Hydrology and Water Quality

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

The April 2007 Final MND concluded that operation of Barre would have a minimal impact on water demand, as it would use much less than one percent of the available water supply. The Barre project site is located outside a 100-year flood zone, and approximately eight miles from the Pacific Ocean, thus the potential for flooding at the site was considered to be less than significant.

5.5.2 Hydrology and Water Quality Impacts Related to the Proposed Project

As analyzed in Section 4.2.3, the current air pollution control system at Barre reduces NOx emissions by a combination of water injection in the combustor and ammonia injection across the SCR system. The water injection first reduces the NOx emissions to a level from which the SCR can further reduce the NOx concentrations to comply with the permit limits. The ECSE involve reconfiguring the SCR design to increase the catalyst surface area and improve ammonia distribution to enhance control of NOx emissions. With implementation of the ECSE, the NOx concentration from the combustor can increase to an optimal point within the range of ~25 ppm to ~42 ppm, because a higher concentration of aqueous ammonia is injected into the SCR such that the controlled exhaust emissions at the SCR outlet can meet a concentration of 2.5 ppm NOx or lower. Thus, the new configuration does not require as much water injection for the initial control of NOx from the combustor. The precise water injection rate for NOx 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 Barre by approximately 54% and save approximately 1.6 to 2.3 million gallons of water per year at this facility.[17] Thus, implementation of the proposed project will result in an environmental benefit to water resources relative to consumption analyzed in the April 2007 Final MND.

5.6 Noise

5.6.1 Summary of Noise Analysis in the April 2007 Final MND

The April 2007 Final MND concluded that temporary project-related construction noise would be less than significant. The City of Stanton Noise Control Ordinance, Section 9.28.070 (E) exempts noise sources associated with construction, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m., or anytime on Sunday or a federal holiday. The April 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

[17] Current water usage is about 2.6 million gallons/year. Operating forecasts were made for turbine run hours with and without implementation of the proposed project. The baseline case (without ECSE) was calculated using the projected run hours and current water injection rates. The ECSE project case was calculated using the projected decrease in run hours and decrease in the water injection rate to the combustor. Water usage without the ECSE project is forecast to be about 3.4 million gallons/year over the next 10 years. Due to the projected lower hours of operation and the lower injection rate to the combustor, water usage was estimated to be about 1.6 gallons/year after implementation of the proposed ECSE project. The difference between the two cases of 1.6 to 2.3 million gallons/year equals the water savings.

produce high noise levels and avoid all activities that would exceed the standards detailed in the City ordinance. Due to the proximity of residences to the south and east, a sound wall was required to be constructed along these portions of the property boundary.

5.6.2 Noise Impacts Related to the Proposed Project

The construction duration of the proposed project is very short, lasting up to 18 days. Noise-generating construction activities will not occur during the hours of 8:00 pm to 7:00 am or anytime on Sundays in accordance with mitigation measure N-1 in the MMRP in the April 2007 Final MND. The sound wall required by mitigation measure N-3 remains in place. 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 April 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 by a permitted waste hauler for disposal at a Class III landfill. SCE identified and committed to comply with all laws, ordinances, regulations, and statutes related to non-hazardous solid waste management. This commitment includes compliance with laws that provide 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, protect the environment, and improve landfill safety. The April 2007 Final MND concluded 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 oxidation catalyst control equipment that is replaced with the new equipment will be returned to the manufacturer for recycling or disposed of if necessary. For instance, metals will be recycled, but insulation on old wire harnesses would be sent to a landfill. Similarly, parts of the SCR system that will be removed during construction and replaced with the upgraded SCR system will be recycled if practicable or taken to an appropriate disposal facility. Other wastes generated during construction of the proposed project will be minimal and less than those analyzed and determined insignificant in the April 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. 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. The expected decrease in the rate of catalyst use means that there will be no more spent catalyst generated than was evaluated in the April 2007 Final MND, and therefore, 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 April 2007 Final MND

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

5.8.2 Traffic and Transportation Impacts Related to the Proposed Project

5.8.2.1 Construction Traffic

The minimal workforce (up to a peak of 22 worker vehicles per day or an average of 11 worker vehicles per day over 18 days) necessary to install the ECSE, one or two haul trucks per day on up to four days during the construction period, and the limited period of installation, will have negligible impacts on traffic and transportation. The expected workers during ECSE installation will generate far fewer trips than the number of construction workers analyzed in the April 2007 Final MND, which were determined to be less than significant.

5.8.2.2 Traffic During Proposed Project Operation

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 April 2007 Final MND. In addition, ammonia will continue to be supplied to Barre from a supplier within the Los Angeles basin. As a result, there will be no additional ammonia deliveries, nor any increase in the number of vehicle miles traveled for delivery of ammonia as a result of implementation of the proposed project compared to the approved analysis in the April 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, and the life of the oxidation catalyst will be extended with the reduction of water injection. As a result, there will be no increase in the amount of spent catalyst generated for transport offsite for disposal, and 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 April 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 analyzed in the April 2007 Final MND for which there are no impacts as a result of the proposed project being implemented. Table 6-1 provides a summary of the analyses provided in the April 2007 Final MND, and why the previous analyses are unaffected by the proposed project.

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

Environmental Topic	April 2007 Final MND Analysis	Proposed Project Analysis
Aesthetics	Aesthetics impacts were anticipated to be less than significant, and no mitigation measures were proposed or required. Specifically, the April 2007 Final MND determined the project was not expected to substantially degrade the existing visual character or quality of the site and its surroundings, or add sources of light or glare to sensitive receptors. Thus, the project would have a less than significant impact on daytime and nighttime views in the area.	During the 3-week period of construction, construction equipment may be visible, but impacts will be minimal, and the period of the impact will be short. 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 what was analyzed in the April 2007 Final MND. Therefore, the proposed project will not degrade daytime or nighttime views in the area, or the visual character of the surroundings, or have an impact to sensitive receptors from light or glare.
Agriculture and Forestry Resources	No agriculture or forestry resources impacts were identified; thus, no mitigation was proposed or required.	The proposed project will be implemented within the existing disturbed footprint of the Barre facility, therefore there will be no impact to agriculture or forestry resources.
Cultural Resources	The likelihood of encountering cultural resources was determined to be 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 Barre facility and does 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)

Energy Resources	Energy resources were anticipated to be less than significant, and no mitigation measures were proposed or required. Specifically, the April 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.	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. However, since the scale of the construction activities is notably less than what was previously analyzed, no change to the energy impacts analyzed in the April 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 April 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 proposed or required. Specifically, the April 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 Barre facility and does 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 proposed or required.	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.

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

Mineral Resources	No impacts from mineral resources were anticipated, and no mitigation measures were proposed or required.	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.
Population & Housing	No impacts from population and housing were anticipated, and no mitigation measures were proposed or required.	The proposed project requires up to 22 construction workers per day, and no additional workers during operations. 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 proposed or required. Specifically, the April 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 proposed or required.	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 Barre 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 April 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 effects of the proposed project are within the scope of those analyzed in the April 2007 Final MND. The proposed project would not result in new significant adverse environmental impacts or substantially increase previously identified significant adverse impacts, 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

Under these circumstances, this Addendum to the April 2007 Final MND is the appropriate CEQA document for analyzing the proposed project, which constitutes a change to the previously approved project, but does 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, beyond that contained herein, is required.

8.0 REFERENCES

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9.0 LIST OF ACRONYMS, ABBREVIATIONS AND SYMBOLS

&	And
~	Approximately
°C	Degrees Centigrade
°F	Degrees Fahrenheit
°K	Degrees Kelvin
=	Equals
≤	Less than or equal to
#	Number
%	Percent
±	Plus or minus
ACR	Assigned Commissioner's Ruling
AIG	Ammonia Injection Grid
A/N	Application Number
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
CFR	Code of Federal Regulations
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
Final MND	Final Mitigated Negative Declaration for the Southern California Edison Barre Peaker Project in Stanton (SCH No. 2006121114), April 2007
ft^2	Square foot or square feet
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
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
min	Minute
MMBtu	Million British thermal units
mmHg	Millimeters of mercury
MMRP	Mitigation Monitoring and Reporting Plan
MMscf	Million standard cubic feet
MND	Mitigated Negative Declaration
MSERCs	Mobile Source Emission Reduction Credits
MT	Metric tons
MW	Megawatt
N/A	Not Applicable
ND	Negative Declaration
No.	Number
NOx	Nitrogen Oxides
NWS	National Weather Service
O_2	Oxygen
OCA	Offsite Consequence Analysis
O&M	Operations and Maintenance
PM10	Respirable Particulate Matter (Less Than 10 Microns in Size)
PM2.5	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
rpm	Revolutions per minute
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
SOx	Sulfur Oxides
TAC	Toxic Air Contaminant
tpy	Tons per year
U.S.	United States
VOC	Volatile Organic Compound
WECC	Western Electricity Coordinating Council
yr	Year

APPENDIX A – ESTIMATED PEAK DAILY EMISSIONS DURING CONSTRUCTION OF THE PROPOSED PROJECT

SCE Emission Control System Enhancements - Peak Day

South Coast Air Basin, Summer

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**	2020
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 - For 22 workers

Land Use - Maintenance outage work

Construction Phase - Peak day calculation

Off-road Equipment - Project-specific equipment list

Trips and VMT - Peak day trip counts - 22 workers on-site

Energy Use -

Construction Off-road Equipment Mitigation - Forklift & Aerial Lift will be Tier 4 diesels; Welder will be gasoline but calculated as diesel (CaEEMod default)

Grading - No earthmoving

Demolition - No demolition

On-road Fugitive Dust - No unpaved roads

Architectural Coating - No painting

Road Dust -

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	100.00	1.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/6/2019	10/1/2018
tblConstructionPhase	PhaseStartDate	10/18/2018	10/1/2018
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	1.00
tblOffRoadEquipment	UsageHours	6.00	3.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	0.00	44.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2018	0.8917	7.5588	7.4944	0.0142	0.5046	0.3238	0.8284	0.1341	0.3006	0.4348	0.0000	1,408.2486	1,408.2486	0.2614	0.0000	1,414.7832
Maximum	**0.8917**	**7.5588**	**7.4944**	**0.0142**	**0.5046**	**0.3238**	**0.8284**	**0.1341**	**0.3006**	**0.4348**	**0.0000**	**1,408.2486**	**1,408.2486**	**0.2614**	**0.0000**	**1,414.7832**

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	lb/day										lb/day					
2018	0.8175	7.0037	7.5792	0.0142	0.5046	0.2568	0.7614	0.1341	0.2392	0.3733	0.0000	1,408.2486	1,408.2486	0.2614	0.0000	1,414.7832
Maximum	**0.8175**	**7.0037**	**7.5792**	**0.0142**	**0.5046**	**0.2568**	**0.7614**	**0.1341**	**0.2392**	**0.3733**	**0.0000**	**1,408.2486**	**1,408.2486**	**0.2614**	**0.0000**	**1,414.7832**

	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	**8.32**	**7.34**	**-1.13**	**0.00**	**0.00**	**20.69**	**8.09**	**0.00**	**20.43**	**14.13**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
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
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
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

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	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
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
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
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	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	10/1/2018	10/1/2018	7	1	Peak Day

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	4.00	74	0.31
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Cranes	1	6.00	300	0.29
Building Construction	Forklifts	1	3.00	110	0.20
Building Construction	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Building Construction	Welders	1	6.00	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	4	44.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Building Construction - 2018

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	lb/day										lb/day					
Off-Road	0.6480	7.1463	5.2314	8.3100e-003		0.3181	0.3181		0.2953	0.2953		816.6099	816.6099	0.2392		822.5907
Total	**0.6480**	**7.1463**	**5.2314**	**8.3100e-003**		**0.3181**	**0.3181**		**0.2953**	**0.2953**		**816.6099**	**816.6099**	**0.2392**		**822.5907**

3.2 Building Construction - 2018

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	lb/day										lb/day					
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
Vendor	8.6000e-003	0.2430	0.0617	5.2000e-004	0.0128	1.7800e-003	0.0146	3.6800e-003	1.7000e-003	5.3800e-003		55.4018	55.4018	3.8300e-003		55.4975
Worker	0.2351	0.1695	2.2013	5.3900e-003	0.4918	3.9400e-003	0.4958	0.1304	3.6400e-003	0.1341		536.2368	536.2368	0.0183		536.6950
Total	**0.2437**	**0.4125**	**2.2630**	**5.9100e-003**	**0.5046**	**5.7200e-003**	**0.5103**	**0.1341**	**5.3400e-003**	**0.1395**		**591.6387**	**591.6387**	**0.0222**		**592.1925**

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	lb/day										lb/day					
Off-Road	0.5738	6.5912	5.3162	8.3100e-003		0.2511	0.2511		0.2339	0.2339	0.0000	816.6099	816.6099	0.2392		822.5907
Total	**0.5738**	**6.5912**	**5.3162**	**8.3100e-003**		**0.2511**	**0.2511**		**0.2339**	**0.2339**	**0.0000**	**816.6099**	**816.6099**	**0.2392**		**822.5907**

3.2 Building Construction - 2018

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	lb/day										lb/day					
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
Vendor	8.6000e-003	0.2430	0.0617	5.2000e-004	0.0128	1.7800e-003	0.0146	3.6800e-003	1.7000e-003	5.3800e-003		55.4018	55.4018	3.8300e-003		55.4975
Worker	0.2351	0.1695	2.2013	5.3900e-003	0.4918	3.9400e-003	0.4958	0.1304	3.6400e-003	0.1341		536.2368	536.2368	0.0183		536.6950
Total	**0.2437**	**0.4125**	**2.2630**	**5.9100e-003**	**0.5046**	**5.7200e-003**	**0.5103**	**0.1341**	**5.3400e-003**	**0.1395**		**591.6387**	**591.6387**	**0.0222**		**592.1925**

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	lb/day										lb/day					
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
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

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	0.550339	0.043800	0.200255	0.122233	0.016799	0.005871	0.020633	0.029727	0.002027	0.001932	0.004726	0.000704	0.000955

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	lb/day										lb/day					
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
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

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	lb/day										lb/day					
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
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**

5.2 Energy by Land Use - NaturalGas

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	lb/day										lb/day					
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
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**

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	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

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	lb/day										lb/day					
Architectural Coating	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
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

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	lb/day										lb/day					
Architectural Coating	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
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

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 RECOMMISSIONING EMISSIONS

Table B-1: Recommissioning Emissions Estimates

Barre Peaker

SCAQMD Facility ID# 051475

LM6000 PC SPRINT Peaker Commissioning Emissions Estimates - SCE Barre Peaker

	Description	Power Level MW	% Output	Opera-ting Hours	Esti-mated Starts	Fuel Rate MMBtu /hr	Fuel Use MMBtu	NOx ppm @ 15% O_2	NOx lbs/hr	NOx lbs	CO ppm @ 15% O_2	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	3.4	4.3	38.7	5.9	4.6	41.6	0.5	4.8
(6)	**Full load NH_3 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 NH_3 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)	**NH_3 AIG Tuning w/ Catalyst and stack traversing**	1 to 49	2 to 100%	12	2	349	4188	3.4	4.3	51.6	5.9	4.6	55.4	0.5	6.4
(10)	**NH_3 AIG Tuning w/ Catalyst and stack traversing**	1 to 49	2 to 100%	12	2	349	4188	3.4	4.3	51.6	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)	**NH_3 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)	**NH_3 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***			***565***			***435***		***50***

Table B-2: Turbine Recommissioning Year Emissions Calculations
Barre Peaker
SCAQMD ID# 051475

TURBINE RECOMMISSIONING YEAR CALCULATIONS (LBS/YR)

Pollutant	Start-up	Shutdown	Normal Operation	Black Start Testing/ Performance Tuning	Recommissioning	Total
NOx	1,044	653	4,844.8	582.0	565	7,688.8
CO	874	786	7,070.8	475.2	435	9,641.0
VOC	168	163	1,349.7	34.5	50	1,765.2
PM10/PM2.5	528	528	5,318.2	14.4	518	6,906.6
SOx	31	31	312.2	1.8	30	406.0

EMISSION FACTORS

Pollutant	Start-up	Shutdown	Normal Operation		Black Start Testing/ Performance Tuning
	lbs/hr	lbs/hr	lbs/hr	lbs/MMscf	lbs/hr
NOx	10.44	6.53	4.81	9.68	Varies from 6-50
CO	8.74	7.86	7.02	14.12	15.84
VOC	1.68	1.63	1.34	2.70	1.15
PM10/PM2.5	5.28	5.28	5.28	10.62	0.48
SOx	0.31	0.31	0.31	0.62	0.06

OPERATING PARAMETERS

Parameter	Start-up	Shutdown	Normal Operation	Total
Hours	100	100	1007.2	1207.2
Fuel (MMscf)	49.7	49.7	500.6	600.0

RECOMMISSIONING DATA

Pollutant	Starts	Hours	Fuel Used		Total lbs	Notes
			MMBtu	MMscf		
NOx	28	100	32,712	31.15	565	Estimate from vendor, see Table B-1
CO	28	100	32,712	31.15	435	
VOC	28	100	32,712	31.15	50	
PM10/PM2.5	28	100	32,712	31.15	518	Based on SCAQMD preliminary engineering evaluation for A/N 594117-9
SOx	28	100	32,712	31.15	30	

Calculation Factors

522	MMBtu/hr
1050	MMBtu/MMscf
0.497	MMscf/hr

Operational Data

100	Normal Operation Starts
28	Recommissioning Starts
600	MMscf; reduced fuel limit for 100 normal starts during recommissioning year
4	hours black-start testing
28	hours performance testing/tuning

Example Calculations

Maximum emissions occur with the 100 start-up per year scenario
NOx start-up emissions = 100 start-ups x 10.44 lbs/hr = 1,044 lbs
NOx shutdown emissions = 100 shutdowns x 6.53 lbs/hr = 653 lbs
Normal operation fuel = Annual limit – start-up fuel - shutdown fuel =
600 MMscf - (100 hrs x 0.497 MMscf/hr) - (100 hrs x 0.497 MMscf/hr) = 500.6 MMscf
NOx normal operation emissions = 500.6 MMscf ÷ 0.497 MMscf/hr x 4.81 lbs/hr = 4,844.8 lbs
NOx testing/tuning emissions:

50 lbs/hr x 4 hrs/yr performance tuning	=	200 lbs/yr
45 lbs/hr x 2 hrs/yr performance tuning	=	90 lbs/yr
6 lbs/hr x 22 hrs/yr performance tuning	=	132 lbs/yr
40 lbs/hr x 4 hrs/yr black start testing	=	160 lbs/yr
Total	=	582 lbs/yr

PM2.5 equal or slightly less than PM10

Table B-3: Turbine Current Year PTE Calculations
Barre Peaker
SCAQMD ID# 051475

CURRENT ANNUAL PTE CALCULATIONS (REPRODUCED FROM A/N 535915 ENGINEERING EVALUATION)

Pollutant	Start-up	Shutdown	Normal Operation	CAISO Tuning/ Black Start Testing	Total
NOx	1,044.0	653.0	5,425.5	582.0	7,704.5
CO	874.0	786.0	7,918.3	475.2	10,053.5
VOC	168.0	163.0	1,511.5	34.5	1,877.0
PM10	528.0	528.0	5,955.7	14.4	7,026.1
SOx	31.0	31.0	349.7	1.8	413.5

EMISSION FACTORS

Pollutant	Start-up	Shutdown	Normal Operation	
	lbs/hr	lbs/hr	lbs/hr	lbs/MMscf
NOx	10.44	6.53	4.81	9.68
CO	8.74	7.86	7.02	14.12
VOC	1.68	1.63	1.34	2.70
PM10	5.28	5.28	5.28	10.62
SOx	0.31	0.31	0.31	0.62

OPERATING PARAMETERS

Parameter	Start-up	Shutdown	Normal Operation	Total
Hours	100	100	1,127.97	1,327.97
Fuel (MMscf)	49.7	49.7	560.6	660.0

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

Calculation Factors		Operational Data	
522	MMBtu/hr	100	Total Start Limit
1050	MMBtu/MMscf	100	Normal Operation Starts
0.497	MMscf/hr	660	MMscf; corresponding fuel limit for 100 starts

Example Calculations

Maximum emissions occur with the 100 start-up per year scenario
NOx start-up emissions = 100 start-ups x 10.44 lbs/hr = 1,044 lbs
NOx shutdown emissions = 100 shutdowns x 6.53 lbs/hr = 653 lbs
Normal operation fuel = Annual limit – start-up fuel - shutdown fuel =
660 MMscf - (100 hrs x 0.497 MMscf/hr) - (100 hrs x 0.497 MMscf/hr) = 560.6 MMscf
NOx normal operation emissions = 560.6 MMscf ÷ 0.497 MMscf/hr x 4.81 lbs/hr = 5,425.5 lbs
PM10 CAISO black-start testing emissions = 30 hours x 0.48 lbs/hr = 14.4 lbs;
Note, PM2.5 not included as it is not included in the permit.

Table B-4: Comparison of Recommissioning vs. Current Annual PTE
Barre Peaker
SCAQMD ID# 051475

RECOMMISSIONING ANNUAL EMISSIONS CALCULATIONS (LBS/YR)

Pollutant	Turbine	Black Start Generator	Diesel Generator	Facility Total
NOx	7,688.8	162.6	120.7	7,972.1
CO	9,641.0	227.8	16.5	9,885.3
VOC	1,765.2	58.9	1.8	1,825.9
PM10/PM2.5	6,906.6	4.1	1.8	6,912.5
SOx	406.0	0.24	0.1	406.4

CURRENT ANNUAL PTE (LBS/YR)

Pollutant	Turbine	Black-Start Generator	Diesel Generator	Facility Total
NOx	7,704.5	162.6	120.7	7,987.8
CO	10,053.5	227.8	16.5	10,298
VOC	1,877.0	58.9	1.8	1,937.7
PM10/PM2.5	7,026.1	4.1	1.8	7,032.0
SOx	413.5	0.24	0.1	413.8

DIFFERENCE BETWEEN CURRENT ANNUAL PTE AND RECOMMISSIONING YEAR (LBS/YR)

Pollutant	Turbine	Black-Start Generator	Diesel Generator	Facility Total
NOx	-15.7	0.0	0.0	-15.7
CO	-412.5	0.0	0.0	-412.7
VOC	-111.8	0.0	0.0	-111.8
PM10/PM2.5	-119.5	0.0	0.0	-119.5
SOx	-7.4	0.0	0.0	-7.4

Notes:

1. Natural Gas Engine (Black Start) generator emissions are based on 64 hrs/yr for testing, see the previous A/N 535915 engineering evaluation. This will remain the same for both years.
2. Diesel generator emissions based on 20 hrs/yr for testing, see the previous A/N 535915 engineering evaluation. This will remain the same for both years.
3. PM2.5 wasn't calculated in the SCAQMD permit evaluation, but it would be the same or slightly less than PM10.
4. Slight differences in some numbers due to rounding

Table B-5: Turbine Recommissioning Daily Emissions Calculations
Barre Peaker
SCAQMD ID# 051475

TURBINE RECOMMISSIONING DAILY EMISSIONS CALCULATIONS

Pollutant	Maximum Commissioning (lbs/day)	Daily Testing Limit (hr)	Current PTE (lbs/day)	Difference (lbs/day)
NOx	54.0	12.0	55.0	-1.0
CO	55.4	12.0	71.49	-16.1
VOC	6.4	12.0	13.97	-7.5
PM10/PM2.5	43.65	12.0	49.96	-6.3
SOx	2.54	12.0	2.96	-0.42

*Reference Table B-1 for vendor commissioning tests and estimates

NOx Daily Calculation
Maximum daily emissions (54.0 lbs) occur during a 2-hour test at 27.0 lbs/hr (test # 2). This is less than the 55 lbs/day CEQA limit.
The next highest daily amount (51.6 lbs) occurs during a 12-hour test at 4.3 lbs/hr (test numbers 9, 10, 13, and 14). These tests will be limited to this amount (12 hours/day).
All other tests will be less than 54.0 lbs NOx/day.

CO Daily Calculation
Maximum daily emissions (55.44 lbs) occur during a 12-hour test at 4.62 lbs/hr (test numbers 9, 10, 13, & 14). Testing time will be limited to this amount (12 hours/day).
All other tests will be less than 55.44 lbs CO/day.

VOC Daily Calculation
Maximum daily emissions (6.43 lbs) occur during a 12-hour test at 0.54 lbs/hr (test numbers 9, 10, 13, & 14). Testing time will be limited to this amount (12 hours/day).
All other tests will be less than 6.43 lbs VOC/day

PM10 and SOx Daily Calculations
Maximum daily emissions occur during the highest level of fuel use (4,188 MMBtu, test numbers 9, 10, 13, and 14). Testing time will be limited to this amount (12 hours/day).
Based on normal operation emission factor times 4.11 MMscf/day (highest estimated daily fuel use during any recommissioning activity.
For PM10, commissioning calculation gives 4.11 MMscf x 10.62 lbs/MMscf = 43.65 lbs/day.
All other tests will be less than this amount. PM2.5 equal to or slightly less than PM10.
For SOx, commissioning calculation gives 4.11 MMscf x 0.62 lbs/MMscf = 2.54 lbs/day. All other tests will be less than this amount.

EMISSION FACTORS

Pollutant	All Operations	
	lbs/hr	lbs/MMscf
PM10	5.28	10.62
SOx	0.31	0.62

CALCULATION FACTORS

522	MMBtu/hr
1050	MMBtu/MMscf
0.497	MMscf/hr

Table B-6: Turbine Greenhouse Gas Emissions Calculations
Barre Peaker
SCAQMD ID# 051475

TURBINE ANNUAL GREENHOUSE GAS PTE

GHG	Emissions (MT/yr)	Global Warming Potential (GWP)	GWP Emissions (MT/yr)	Emissions (Short tpy)
CO_2	35,973	1	35,973	39,642
CH_4	0.678	21	14	16
N_2O	0.068	310	21	23
CO_2e	--	--	36,008	39,681

Notes:

1. Annual GHG emissions based on 522 MMBtu/hr and permitted maximum fuel use of 660 MMscf/yr. During the recommissioning year, fuel use will be capped at 600 MMscf/yr, or 32,735 MT/yr of CO_2e.
2. Cap and Trade program threshold is 25,000 MT/yr, but is based on actual emissions rather than PTE. Actual GHG emissions at Barre have been under this threshold since start of operation.
3. GHG emissions based on 40 CFR 98 reporting parameter of 1028 Btu/scf and CARB GWP factors.

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

Barre Peaker Facility

Prepared for:

Southern California Edison

May 20, 2017

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Introduction

Southern California Edison (SCE) currently operates the Barre Peaker in Stanton, California ("Barre"). 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 Barre. SCE is proposing certain enhancements to the air pollution control system at Barre (referred to herein as the "Emission Control System Enhancements" or "ECSE"), which include use of aqueous ammonia of 29%[1] concentration by weight.

Aqueous ammonia is the only chemical stored in sufficient quantities at Barre 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). Barre is currently classified as a Program 1 (low risk) facility under the CalARP regulation, and is expected to retain this designation with use of 29% ammonia solution. The facility will continue to not be subject to, federal Risk Management Program (40 CFR 68) requirements even with the use of 29% ammonia solution because the maximum quantity of ammonia proposed to be stored at the facility for NOx emission control will continue to be less than the federal threshold quantity of 20,000 pounds (see Attachment 1).

An Offsite Consequence Analysis (OCA) was performed to assess the potential impacts of a worst-case release of 29% aqueous ammonia at Barre. Two possible worst-case release scenarios were considered: 1) a catastrophic storage tank failure where the entire contents of the tank would be instantaneously 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 instantaneously released. The 29%-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 Barre facility, both worst-case release scenarios 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% concentration aqueous ammonia will be stored on-site in the same tank that is currently being used to store 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% ammonia is utilized, the alarm level (an administrative control) will be reset to 83% capacity and the tank

[1] Industry standard for aqueous ammonia at this concentration level is 29.4% plus or minus (±) a half percentage point, so a concentration of 29.9% was used in this analysis to represent worst-case conditions. This concentration is referred to as 29% in this document.

will be filled to no more than 84% capacity (8,820 gallons) to ensure that the 20,000-pound federal Risk Management Plan (RMP) threshold is not exceeded. The storage tank is constructed of materials that are compatible with 29% aqueous ammonia. The tank meets ASME Codes and is equipped with pressure safety valves, a level gauge, a pressure gauge and a 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 drain grating opening pf 7 square-feet. 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% (29.4% ± 0.5%) 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 close 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 OCA predicts the distance from the point of release to a location at which the regulated toxic substance concentration has decreased to less than a specified concentration (i.e., the toxic endpoint). 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[2] 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.

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 worst-case aqueous ammonia 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 Barre.

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

[2] 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.

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 Barre, 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 [ft^2]),
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.

The emission rate of the ammonia from the worst-case release is estimated as the rate of evaporation from the exposed surface area of ammonia. EPA's OCA guidance provides the method to calculate the evaporation rate of a liquid from a spilled toxic solution as outlined in Equation D-1. The emission rate used in the OCA was the sum of the ammonia evaporation rate estimated for 1 minute from the secondary containment area (611 ft^2), and for 60 minutes from the two drain holes (6.28 ft^2). Details of the emission calculations are presented in Attachment 2.

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, data were obtained from Weather Underground (2017) for the Orange County John Wayne Airport meteorological station in Santa Ana, CA, the nearest National Weather Service (NWS) station to Barre, for the years 2014 through 2016. Based on these data, the maximum ambient temperature from the last three years of 106°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 36°F also obtained via the Weather Underground website 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. To simulate similar stable atmospheric conditions, the minimum wind speed was set to 1.5 m/s with the default anemometer height of 10 meters. Examination of the resultant peak concentration showed that the meteorological conditions mimicked these stable nighttime conditions, i.e., no convective mixing, small positive Monin-Obuhkov length, and very low friction velocity. 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 Orange County where the Barre Peaker facility is located is provided in the SCAQMD's guidance (i.e., a population of 3,010,759).

The AERSURFACE tool was developed by EPA for obtaining realistic and reproducible surface characteristic values, which include albedo, Bowen ratio, and surface roughness length, based on national land cover data. The AERSURFACE tool was used for obtaining the site-specific surface characteristics for the Barre site.

All input data used for performing the AERSCREEN modeling analyses are summarized in Table 1, including the surface characteristics derived for the Barre site.

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

Parameter	Value
Pollutant	Ammonia
Emission rate	7.189 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	36°F (275.4 K)
Maximum ambient temperature	106°F (314.3 K)
Minimum wind speed	1.5 m/s
Anemometer height	10 meters
Rural or Urban	Urban
Population	3,010,759
Albedo	0.17
Bowen Ratio*	1.08
Surface roughness	0.459

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 fenceline where the public could access from the center point of the ammonia tank/secondary containment area. The closest public access point along the outer SCE property fenceline from the Barre facility (based on Google Earth) is located approximately 296 feet or 90 meters to the south 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 19 ppm.

The above modeled value of ammonia concentration of 19 ppm is well below the toxic endpoint of 200 ppm in the CalARP regulations. Therefore, a catastrophic release of maximum concentration 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 3.

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 under the tank. 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 Barre facility property boundary and no additional modeling was performed.

Conservative Assumptions. The federal Risk Management and CalARP Program 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 based on the volatilization rate from the spilled liquid for the maximum temperature of 106°F for one minute. 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 the pool of liquid is rapidly draining into the underground sump, the surface area available for volatilization will rapidly decrease, although the emission rate calculation did not take this into consideration, thus overestimating the emission rate. As required by the EPA OCA guidance, the maximum 106°F temperature from the past three years from the John Wayne Airport in Santa Ana 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 estimated. For estimating ammonia emissions for a 60-minute duration, the 10-minute average vapor pressure 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, Barre Peaker Facility
Maximum Quantity of Ammonia Present at the Barre Peaker Facility

A. Calculations for the Ammonia Storage Tank		
Capacity of the Ammonia Storage Tank	10,500	gallons
Maximum Concentration of Ammonia in the Ammonia Solution	29.9	percent
Specific Gravity of Ammonia Solution (Airgas 2017)	0.896	
Density (specific weight) of Water	8.34	lbs/gal
Weight (lbs/gal) of 29.9% Ammonia Solution		
= 0.896 x 8.34 =	7.47	lbs/gal
Administrative Control for Filling the Tank	84	%
Ammonia Solution in the Tank		
= 10,500 x 84/100 =	8,820	gallons
Ammonia Present in the Storage Tank, (A)		
= 8,820 x 7.47 x 29.9/100 =	19,707	pounds
B. Calculations for the Pipeline from Storage Tank to the Vaporizer		
Length of the pipe (email SCE 3/3/2017)	82	feet
Diameter of the pipe (email SCE 3/3/2017)	2	inch
Radius of the pipe	1	inch
Volume of the pipe [π x 82 x (1/12 x 1/12)]	1.79	ft^3
Conversion factor from ft^3 to gallon	7.4805	gal/ft^3
Volume of aqueous ammonia in pipe in gal (B)		
= 1.79 x 7.4805	13.38	gallons
Ammonia Present in the pipe, B		
= 13.38 x 7.47 x 29.9/100 =	29.9	pounds
C. Calculations for the Pipeline from Storage Tank to the Fill Valve		
Length of the pipe (email SCE 3/32017)	44	feet
Diameter of the pipe (email SCE 3/3/2017)	2	inch
Radius of the pipe	1	inch
Volume of the pipe [π x 44 x (1/12 x 1/12)]	0.96	ft^3
Conversion factor from ft^3 to gallon	7.4805	gal/ft^3
Volume of aqueous ammonia in pipe in gal (C)		
= 0.96 x 7.4805	7.18	gallons
Ammonia Present in the pipe, C		
= 7.18 x 7.47 x 29.9/100 =	16.0	pounds
Total Quantity of Ammonia Present at the Barre Peaker Facility		
Total quantity of ammonia present at the facility (A+B+C)	***19,753***	***pounds***

Attachment 2

AMMONIA EMISSION RATE CALCULATIONS

Calculation of Model Parameters
29.4% aqueous ammonia

Equation Used to Determine the Emission Rate of Ammonia:

$$QR_c = \frac{0.284U^{0.78}MW^{2/3}A \times VP}{82.05T}$$

where:

QR_c = temperature corrected emission rate of ammonia (pounds per minute)
U = wind speed (meters per second)
MW = molecular weight of ammonia (grams per gram-mole)
A = surface area of spilled liquid pool (square feet)
VP = vapor pressure of ammonia above solution (millimeters of mercury)
T = temperature of liquid (degrees Kelvin)

Worst-Case Scenario:

stability =	F	
U =	1.5	m/s
T =	106	F
MW =	17.03	grams/gram-mol
A =	611.00	ft^2
VP =	577	mm Hg
T =	314.3	K

Spill Surface Area Containment Area

Side length of square drain (beneath tank) = L =	47	ft
=	13	ft
Area of containment (beneath tank) = $A_{contain\text{-}tank}$ =	L x W	
=	611	ft^2

Spill Surface Area Drains

Diameter of round drain = d =	24	in
=	2	ft
Area of round drain = A_{drain} =	$\pi(d/2)^2$	
=	3.14	ft^2
Total AREA of drains = 2 x A_{drain} =	3.14 + 3.14	
	6.28	ft^2
Area	0.584	m2
Effective spill dimensions		
Effective Length	0.76	m
Effective Width	0.76	m

Emission Rate

$QR_{c\ contain\text{-}tank}$ =	35.285	lbs/min
	267	g/s

Emission Rate

$QR_{c\ drain}$ =	0.363	lbs/min
	21.77	lbs/hr
	2.7	g/s

Total QR_c = $QR_{c\ contain\text{-}tank}$ + $QR_{c\ drain}$ =	57.056	lbs/hr
	7.2	g/s

Equation Used to Determine the Emission Rate Per Area:

(parameter required for dispersion model)

where:

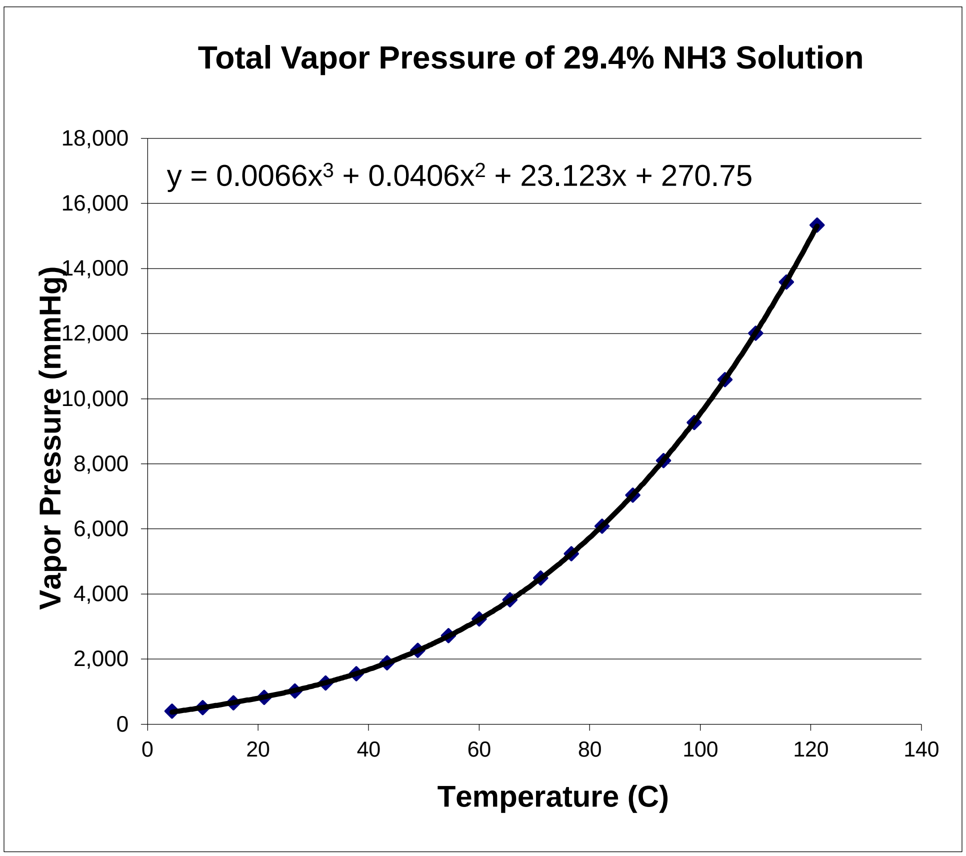
E = emission rate of ammonia (g / s*m^2)

QR_c = temperature corrected emission rate of ammonia (g/s)

A = surface area of spilled liquid pool (m^2)

E = 12.316 g / s*m^2

Reference: Environmental Protection Agency, 2009. Risk Management Program Guidance for Offsite Consequence Analysis, EPA Document No. 550-B-99-009



Vapor Pressure of 29.4% Aqueous Ammonia

From Perry's Chemical Engineering Handbook (5th edition)

Table 3-24: Total Vapor Pressures of Aqueous Solutions of Ammonia (NH_3)

29.4% aqueous solution by wt

	Solution wt (%)				
	28.81	**33.71**	**29.4**		
Temp deg F		VP (lbs/in2)		Temp deg C	VP (mmHg)
40	5.21	8.06	7.7168	4.44	399.08
50	6.75	10.35	9.9165	10.00	512.83
60	8.65	13.22	12.6697	15.56	655.21
70	11.01	16.56	15.8917	21.11	821.84
80	13.86	20.61	19.7972	26.67	1023.81
90	17.23	25.48	24.4866	32.22	1266.32
100	21.32	31.16	29.9752	37.78	1550.16
110	26.07	37.81	36.3964	43.33	1882.24
120	31.69	45.62	43.9427	48.89	2272.49
130	38.25	54.55	52.5873	54.44	2719.55
140	45.73	64.78	62.4862	60.00	3231.47
150	54.43	76.61	73.9393	65.56	3823.77
160	64.25	89.88	86.7939	71.11	4488.54
170	75.55	104.84	101.3132	76.67	5239.41
180	88.17	121.68	117.6451	82.22	6084.01
190	102.56	140.75	136.1516	87.78	7041.07
200	118.68	161.81	156.6168	93.33	8099.43
210	136.42	185.1	179.2385	98.89	9269.31
220	156.41	211.24	204.6380	104.44	10582.84
230	178.28	239.7	232.3045	110.00	12013.61
240	202.74	270.92	262.7106	115.56	13586.06
250	229.62	305.6	296.4514	121.11	15330.96

For a 29.4% solution of aqueous ammonia, the Vapor Pressure (VP) is estimated from the data above from Perry's Chemical Engineering Handbook (5th edition)

Scenario	Temp ^oK	Temp ^oF	Temp ^oC	Estimated VP (mmHg)	10 min average VP from RMP guide (mmHg)	Calculated 10 min average VP (mmHg)
Worst-case	314.26	106	41.11	1611	-	577
Worst-case RMP guidance	298.15	77	25.00	927	332	-

Note the 10-min average vapor pressure (mmHg) from RMP OCA Guideline for 30% ammonia at 1.5 meters per second (m/s) is 332 and 3 m/s is 248 (Table B-3)

Averaging technique per EPA guidance

Attachment 3

AERSCREEN DISPERSION MODELING OUTPUT

```
AERSCREEN 15181 / AERMOD 15181                                        02/28/17
                                                                      16:05:45

TITLE: BARRE

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

SOURCE EMISSION RATE:           7.1890 g/s              57.056 lbs/hr

AREA EMISSION RATE:          0.124E+02 g/(s-m2)       0.988E+02 lbs/(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:                    3010759

INITIAL PROBE DISTANCE =          200. meters              656. feet



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

               BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES


----------------------------------------------------------------------------
**************************  FLOW SECTOR ANALYSIS  **************************
                 25 meter receptor spacing: 1. meters - 200. meters
----------------------------------------------------------------------------


   MAXIMUM  IMPACT  RECEPTOR

   Zo        SURFACE   1-HR CONC  RADIAL  DIST   TEMPORAL
   SECTOR    ROUGHNESS  (ug/m3)    (deg)   (m)    PERIOD
  ----------------------------------------------------------
      1*       0.459    0.7199E+07  45     1.0     ANN
* = worst case diagonal


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

MIN/MAX TEMPERATURE:    275.4 / 314.3 (K)

MINIMUM WIND SPEED:       1.5 m/s

ANEMOMETER HEIGHT:     10.000 meters

SURFACE CHARACTERISTICS INPUT: USER ENTERED

ALBEDO:                  0.17
BOWEN RATIO:             1.08
ROUGHNESS LENGTH:       0.459 (meters)
```

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

 YR MO DY JDY HR
 -- -- -- --- --
 10 01 08   8 01

    H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 -6.96  0.097 -9.000  0.020 -999.   70.     12.8 0.459   1.08   0.17    1.50

    HT  REF TA     HT
- - - - - - - - - - -
  10.0   314.3    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    0.7199E+07                 39.99    0.4339E+05
          10.00    0.3778E+06                 50.00    0.3113E+05
          18.00    0.1477E+06                 75.00    0.1719E+05
          18.24    0.1446E+06                 90.00    0.1321E+05
          18.50    0.1415E+06                100.00    0.1135E+05
          18.75    0.1385E+06                125.00     8256.
          18.99    0.1357E+06                150.00     6376.
          20.00    0.1252E+06                174.99     5129.
          25.00    0.8859E+05                200.00     4251.
          30.00    0.6701E+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       0.7199E+07  0.7199E+07  0.7199E+07  0.7199E+07     N/A

DISTANCE FROM SOURCE          1.00 meters



IMPACT AT THE
AMBIENT BOUNDARY   0.7199E+07  0.7199E+07  0.7199E+07  0.7199E+07     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)

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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)