



DATE: November 20, 2023

TO: Interested Parties

FROM: Keith Winstead, Compliance Project Manager

**SUBJECT: Sentinel Energy Center (07-AFC-03C)
CEC Staff Analysis of Petition to Amend the Final Commission
Decision to Add Black Start Capability**

On June 6, 2022, Sentinel Energy Center, LLC (Sentinel) filed a post certification petition (TN# 243444) with the California Energy Commission (CEC) requesting to amend the Sentinel Energy Center (SEC) CEC Final Decision (Decision) to add black start capability to the facility and increase the number of turbine start times. On September 8, 2023, an amended petition was filed (TN# 252184-1 and TN# 252184-2). The CEC staff (staff) has completed its review of all materials received.

The SEC is an 850-megawatt (MW) natural gas-fired, simple-cycle facility located near North Palm Springs, in Riverside County. The project was certified by the CEC on December 1, 2010, and began commercial operation on August 1, 2013.

The SEC consists of eight natural gas-fired General Electric LMS100 combustion turbine generators, selective catalytic reduction and carbon monoxide equipment, and a zero liquid discharge system.

Description of Proposed Change

The project owner seeks approval to add black start capability to the facility. A lithium iron phosphate (LFP) battery system would be used to provide auxiliary power needed to restart equipment and combustion turbines at the facility even if the facility is isolated from the grid ("i.e., black start").

Sentinel is proposing the following modifications:

- Changes to its operational profile (increased annual turbine startups and decreased annual base-load operation) to allow for added flexibility to respond to power demand requests from the California Independent System Operator (California ISO).

- Add a 17.18-MW/34.36 megawatt-hours (MWh) LFP battery-based black start capability to the facility.
- Supporting modifications to the plant control system and electrical distribution system.

The South Coast Air Quality Management District (SCAQMD) issued a draft Permit to Operate (PTO) on July 20, 2023, and the Statement of Basis Analysis for Title V Minor Permit Revision on July 26, 2023, approving the requested modifications. Sentinel would also request modifications to the California ISO Interconnection Agreement to reflect the addition of the battery energy storage system (BESS).

CEC Staff Review and Conclusions

California Code of Regulations, title 20, section 1769 requires a project owner to petition the CEC for the approval of any change the project owner proposes to the project design, operation, or performance requirements of a certified facility.

The purpose of the CEC's review process is to assess whether the project changes proposed in the petition would have a significant impact on the environment or cause the project to not comply with applicable laws, ordinances, regulations or standards (LORS) (California Code of Regulations., title 20, section 1769).

Consistent with the California Code of Regulations, title 20, section 1769, staff has reviewed the petition for potential environmental effects and consistency with LORS. Based on staff's analysis, contained below, staff has concluded that the proposed changes to the SEC would not have a significant effect on the environment, or cause the project to fail to comply with any applicable LORS, with the adoption of new or modified conditions of certification in the areas of Air Quality and Worker Safety and Fire Protection.

Increasing Number of Turbine Starts

Under California Code of Regulations, title 20, section 1769(a)(3)(B), staff is authorized to approve changes to Air Quality conditions of certification if certain requirements are met. For the proposed Air Quality changes increasing the number of turbine starts, staff has determined that the petition meets the criteria for approval by staff, and therefore, submission to the CEC for approval is not required. Specifically, based on the environmental and other analysis, staff has determined the proposed Air Quality changes to increase the number of turbine starts as described in the petition meet the following requirements:

1. There is no possibility that the change may have a significant impact on the environment;
2. The changes would not cause the project to fail to comply with any applicable laws, ordinances, regulations, or standards; and
3. No daily, quarterly, annual, or other emission limit will be increased as a result of the change.

Staff also concludes that none of the findings specified in California Code of Regulations, title 20, section 1748(b) apply to the proposed Air Quality changes and the proposed Air Quality changes do not meet any of the criteria requiring the production of subsequent or supplemental review pursuant to Public Resources Code section 21166 and California Code of Regulations, tit. 20, sections 15162 and 15163.

As set forth in California Code of Regulations, title 20, section 1769(a)(3)(C), CEC staff's approval of the Air Quality changes and increased number of turbine starts, becomes final 14 days from the filing of this assessment unless an objection is filed supported by facts that the staff approval does not meet the above requirements. Speculation, argument, conjecture, and unsupported conclusions or opinions are not sufficient to support an objection to staff's approval. Objections and supporting information may be filed as describe below under public comments.

Addition of the Battery Black Start System

The addition of the battery system will introduce new potential impacts to Worker Safety and Fire Protection that were not previously evaluated in the Final Staff Assessment. Consistent with the CEC's amendment process under California Code of Regulations, title 20, section 1769(a)(4), staff has reviewed the petition for potential environmental effects; consistency with applicable LORS; and existing conditions of certification. Staff concludes that, with the addition of new Worker Safety and Fire Protection conditions of certification (1) there would be no significant impacts with the addition of the battery black start system , and (2) the changes would not cause the project to fail to comply with any applicable LORS. The portion of the petition seeking approval to construct and operate the battery black start system will be considered by the CEC as described below.

Staff concludes that none of the findings specified in California Code of Regulations, title 20, section 1748(b) apply to the proposed changes.

Lastly, staff concludes the proposed changes adding the battery black start system do meet the criteria requiring the production of a supplemental review pursuant to Public Resources Code section 21166 and California Code of Regulations, title 14, section 15163.

Staff intends to recommend approval of the battery black start portion of the petition at the January 24, 2024, Business Meeting of the CEC.

The [CEC's project webpage](https://www.energy.ca.gov/powerplant/simple-cycle/sentinel-energy-center), <https://www.energy.ca.gov/powerplant/simple-cycle/sentinel-energy-center>, has a link to the petition and the Staff Analysis on the right side of the webpage in the box labeled "Compliance Proceeding." Click on the "[Docket Log \(07-AFC-03C\)](#)" option. If approved, the CEC's Order approving this petition will also be available from the same webpage.

This letter has been mailed to the CEC's list of interested parties and property owners of all parcels within 500 feet of any affected project linears and 1,000 feet of the project site. It has also been emailed to the SEC subscription list. The list is an automated the CEC email system by which information about this facility is emailed to parties who have subscribed. To subscribe, go to the [CEC's project webpage](#), cited above, scroll down the right side of the project's webpage to the box labeled "Subscribe," and provide the requested contact information.

Public Comments

Public comments on the Staff Analysis of the battery black start system are due by 5pm on Tuesday January 5, 2024. Those who wish to submit comments on the analysis prior to the CEC Business meeting may do so by using the CEC's electronic commenting feature. Go to the [CEC's project webpage](#) and click on either the "Comment on this Proceeding," or "[Submit e-Comment](#)" link. When your comments are filed, you will receive an email with a link to them.

Written comments may also be submitted by email. Include Docket Number 07-AFC-03C in the subject line and email to docket@energy.ca.gov.

Written comments may also be mailed or hand-delivered to:

California Energy Commission
Docket Unit, MS-4
Docket No. (07-AFC-03C)
715 P Street
Sacramento, CA 95814-5512

Comments on the battery black start system will also be accepted during the scheduled business meeting. All comments and materials filed with the Docket Unit will be added to the facility Docket Log and become publicly accessible on the [CEC's project webpage](#).

If you have questions about this notice, please contact Compliance Project Manager Keith Winstead, Safety and Reliability Office, Compliance Monitoring and Enforcement Unit, at (916) 208-3849 or via e-mail at Keith.Winstead@energy.ca.gov.

For information on public participation, please contact the CEC's Office of Public Advisor, Energy Equity, and Tribal Affairs at (916) 957-7910 or email at publicadvisor@energy.ca.gov.

News media inquiries should be directed to the CEC's Media Office at (916) 654-4989, or by e-mail to mediaoffice@energy.ca.gov.

Mail List: 7204
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Sentinel Energy Center (07-AFC-03C)
Petition to Amend Commission Decision
EXECUTIVE SUMMARY
Keith Winstead

INTRODUCTION

On June 6, 2022, Sentinel filed a post certification petition (TN# 243444) with the CEC requesting to amend the SEC Decision to add black start capability to the facility and increase the number of turbine start times. On September 8, 2023, an amended petition was filed (TN# 252184-1 and TN# 252184-2). Staff has completed its review of all materials received.

The SEC is an 850 MW natural gas-fired, simple-cycle facility located near North Palm Springs, in Riverside County. The project was certified by the CEC on December 1, 2010, and began commercial operation on August 1, 2013.

The SEC consists of eight natural gas-fired General Electric LMS100 combustion turbine generators, selective catalytic reduction and carbon monoxide equipment, and a zero liquid discharge system.

DESCRIPTION OF PROPOSED CHANGE(S)

The project owner seeks approval to add black start capability to the facility. A LFP battery system would be used to provide auxiliary power needed to restart equipment and combustion turbines at the facility even if the facility is isolated from the grid (“i.e., black start”).

Sentinel is proposing the following:

- Changes to its operational profile (increased annual startups and decreased annual base-load operation) to allow for added flexibility to respond to power demand requests from the California Independent System Operator (California ISO).
- Addition of a 17.18 MW/34.36 MWh LFP battery-based black start capability to the facility.
- Supporting modifications to the plant control system and electrical distribution system.
- The SCAQMD issued a draft Permit to Operate (PTO) on July 20, 2023, and the Statement of Basis Analysis for Title V Minor Permit Revision on July 26, 2023, approving the requested modifications. Sentinel would also request modifications

to the California ISO Interconnection Agreement to reflect the addition of the BESS.

The purpose of the CEC’s review process is to assess whether the project changes proposed in the petition would have a significant impact on the environment or cause the project to not comply with applicable laws, ordinances, regulations, and standards (Cal. Code Regs., tit. 20, § 1769).

NECESSITY FOR THE PROPOSED CHANGE(S)

The primary purpose and need for this amendment is to install an LFP system that would be used to provide auxiliary power needed to restart equipment and combustion turbines at the facility even if the facility is isolated from the grid (“i.e., black start”). The petition also increases the number of turbine starts allowed in a year.

CEC STAFF REVIEW AND CONCLUSION

California Code of Regulations, title 20, section 1769 requires a project owner to petition the CEC for the approval of any change the project owner proposes to the project design, operation, or performance requirements of a certified facility.

The purpose of the CEC’s review process is to assess whether the project changes proposed in the petition would have a significant impact on the environment or cause the project to not comply with applicable LORS (California Code of Regulations., title 20, section 1769).

Increasing Number of Turbine Starts

Under California Code of Regulations, title 20, section 1769(a)(3)(B), staff is authorized to approve changes to Air Quality conditions of certification if certain requirements are met. For the proposed Air Quality changes increasing the number of turbine starts, staff has determined that the petition meets the criteria for approval by staff, and therefore, submission to the CEC for approval is not required. Specifically, based on the environmental and other analysis, staff has determined the proposed Air Quality changes described in the petition meet the following requirements:

1. There is no possibility that the change may have a significant impact on the environment;
2. The changes would not cause the project to fail to comply with any applicable laws, ordinances, regulations, or standards; and
3. No daily, quarterly, annual, or other emission limit will be increased as a result of the change.

Staff also concludes that none of the findings specified in California Code of Regulations, title 20, section 1748(b) apply to the proposed Air Quality changes and the proposed Air Quality changes do not meet any of the criteria requiring the production of subsequent or supplemental review pursuant to Public Resources Code section 21166 and California Code of Regulations, tit. 20, sections 15162 and 15163.

Addition of the Battery Black Start System

The addition of the battery system will introduce new potential impacts to Worker Safety and Fire Protection that were not previously evaluated in the Final Staff Assessment during the original proceeding. Consistent with the CEC's amendment process under California Code of Regulations, title 20, section 1769(a)(4), staff has reviewed the petition for potential environmental effects; consistency with applicable LORS; and existing conditions of certification. Staff concludes that, with the addition of new Worker Safety and Fire Protection conditions of certification (1) there would be no significant impacts with the addition of the battery black start system, and (2) the changes would not cause the project to fail to comply with any applicable LORS.

Staff concludes that none of the findings specified in California Code of Regulations, title 20, section 1748(b) apply to the proposed changes.

Lastly, staff concludes the proposed changes adding the battery black start system do meet the criteria requiring the production of a supplemental review pursuant to Public Resources Code section 21166 and California Code of Regulations, title 14, section 15163. The portion of the petition seeking approval to construct and operate the battery black start system will be considered by the CEC at a business meeting.

STAFF'S ASSESSMENT OF THE PROPOSED PETITION

Staff's assessment of the proposed changes considered the potential impacts to the population within the disadvantaged community, including the environmental justice population within a six-mile radius of SEC.

Staff reviewed the petition for potential environmental effects and consistency with applicable LORS. Staff's conclusions for all technical and environmental areas are summarized in **Executive Summary Table 1**.

For the technical areas of Air Quality and Worker Safety and Fire Protection, staff has proposed new COCs. With the addition of COCs, the project would continue to comply with applicable LORS. The proposed project changes would not result in significant impacts to ambient air quality, public health, greenhouse gas emissions or worker safety and fire protection. The details of the proposed additional COCs can be found under the Air Quality and Worker Safety and Fire Protection sections in this Staff Analysis.

For the remaining environmental and technical areas, staff has determined that the modified project would continue to comply with applicable LORS, and the project change would not result in any significant adverse environmental impacts or require a change to any COCs.

The basis for each of staff's conclusions are provided below:

AIR QUALITY

The construction activities and duration of the proposed black start upgrade would be less than what was previously analyzed in the original Application for Certification (AFC). The emissions and air quality impacts during construction would be less than significant with existing COCs **AQ-SC1** to **AQ-SC6**.

Staff proposes to modify COCs **AQ-1, AQ-3, AQ-7, AQ-8, AQ-9, AQ-12, and AQ-15**, and add **AQ-1a, AQ-8a** and **AQ-20** to **AQ-25** to comport with updates to the Air District's permit. With the revised and new COCs, air quality impacts from the evaluated changes would be less than significant. The modified project would continue to comply with all LORS. Please refer to the attached Air Quality analysis for additional information.

BIOLOGICAL RESOURCES

Construction of the proposed changes would be within the existing fenced SEC facility, on the south end. This area was previously disturbed and is currently surfaced with crushed rock. No habitat or vegetation would be disturbed. Excavations would be up to seven feet deep. Potential impacts to wildlife could occur if excavations are left open overnight without being backfilled, covered, or provided with escape ramps.

Implementation of COCs **BIO-5** and **BIO-8** in the Decision would ensure impacts to biological resources would be less than significant and the project's continued compliance with LORS.

CULTURAL RESOURCES

There are no known cultural resources on the project site that could be impacted by the proposed project changes. The area where the battery energy storage system would be installed was previously disturbed and filled to a depth of approximately 20 feet and the maximum anticipated ground disturbance is seven feet; however, new proposed ground

disturbance could still unearth previously unknown buried cultural resources, including fill material obtained from and used elsewhere on the project site. If cultural resources are encountered during the installation of the batteries and the electrical cables, implementation of COCs **CUL-1** through **CUL-8** would mitigate any potentially significant impacts during construction and ensure the treatment of any discovered resources would conform to the standards in Riverside County's General Plan. COCs **CUL-1** through **CUL-8**, applicable to this proposed project change, were developed to ensure that, if cultural resources are encountered during construction, adequate measures are in place to mitigate any project-level impacts to less than significant.

EFFICIENCY

This petition to amend would not impact the thermal efficiency of the power plant.

FACILITY DESIGN

The black start upgrades within the existing project site, which include the addition of a 17.18 MW/34.36 MWh LFP BESS and modifications to the plant control system must be in accordance with the 2022 edition of the California Building Standards Code. Implementations of the existing Facility Design COCs adopted in the Decision and construction oversight by the CEC's Delegate Chief Building Official would ensure continued compliance.

GEOLOGICAL AND PALEONTOLOGICAL RESOURCES

The area where the BESS units, associated transformers, switchgear facility, and underground utilities would be installed is a previously disturbed area at the south end of the facility that was subject to cut and fill operations during the SEC's original grading operations between 2011 and 2012. The area is currently surfaced with crushed rock. The depth of the existing fill where the improvements are planned is approximately twenty feet deep.

The maximum planned depth of excavation during construction of the improvements is seven feet and would take place within the existing fill material. Therefore, no ground disturbance within native soils is anticipated.

For this modification, additional geotechnical investigations should be conducted to gain a better understanding of the fill materials that were used and to finalize the foundation design. This additional information would be collected and included in a final geotechnical report prepared in accordance with the current the California Building Code. No new geotechnical hazards would be expected to be identified or created by this modification.

All soil disturbance is expected to occur in previously placed fill material. Therefore, no significant paleontological resources would be encountered. Additionally, the mitigation measures described within COC **PAL-4** "Worker Environmental Awareness Program" would be implemented for this modification.

Therefore, the impacts of the modification to geological or paleontological resources would be less than significant.

HAZARDOUS MATERIALS MANAGEMENT

The proposed BESS would use LFP batteries. The batteries would be delivered to SEC site via a route approved by the CEC's compliance project manager (CPM) in accordance with existing COC **HAZ-7**. The Hazardous Materials Business Plan and Risk Management Plan would be updated to include the new BESS per COC **HAZ-2**. In addition, the batteries would be included on the list of hazardous materials contained at the site and reported in the annual compliance report per COC **HAZ-1**.

There would be no other changes to the hazardous materials used during operation of SEC. The proposed use, handling, and transportation of the LFP batteries would comply with current LORS. Therefore, the potential hazardous material management impacts would be less than significant with continued implementation of the existing COCs **HAZ-1**, **HAZ-2**, and **HAZ-7**.

LAND USE

Construction work would occur inside the existing power plant site at a location that was previously disturbed during construction of the original project. The BESS would be installed inside the existing facility. The project modifications would not conflict with any adopted land use plan, policy, or regulation, and no impacts on land use would occur.

NOISE AND VIBRATION

Construction associated with this petition to amend would be temporary and would occur during daytime hours that are consistent with Riverside County General Plan. Any noise generated during these activities would result in a less than significant impact with implementation of the existing Noise COCs in the Decision.

The project modifications, which include the addition of a 17.18 MW/34.36 MWh LFP BESS and modifications to the plant control system, would not result in significant changes to the noise emissions during operations. The primary source of noise would be from the cooling system from the BESS units and would be quieter than the existing noise sources on site. The batteries and inverters make very little noise and are fully enclosed. Furthermore, the project would continue to meet operational noise requirements established in the Decision. Therefore, the changes in this petition would create a less-than-significant impact due to operational noise.

PUBLIC HEALTH

The public health impacts during construction would be less than significant due to limited construction activities and lack of nearby receptors. The short-term and long-term toxic air contaminant emissions and impacts are not expected to be greater than

what was previously analyzed and approved. Therefore, the public health impacts during the operation of modified project would also be less than significant.

RELIABILITY

The petition to amend would not impact the reliability of SEC but would increase grid reliability by serving the transmission grid it's connected to, with black start capability.

SOCIOECONOMICS

Installation of the BESS and associated utility infrastructure would involve construction activities for approximately six months. The estimated peak workforce required for construction of the BESS is 40 workers. The new BESS would not require any changes in operations workforce at the SEC. Therefore, construction and operation of the BESS would have a less than significant impact on population and housing, and on public services.

SOIL AND WATER

The BESS would be installed in a previously disturbed area within the facility that was analyzed for the original license and subsequent amendment proceedings and found not to have significant impact in terms of soil and water resources. The area where the batteries would be installed is currently surfaced with crushed rock to allow for storm water to infiltrate to the ground. The small area (about 15,000 sq. ft. total) would be covered with concrete rendering it impervious to rainwater. However, the area constitutes a small portion of the total area available for percolation and, therefore, would not be expected to result in increase in the volume or rate of storm water runoff.

Similarly, nearby areas that were previously disturbed and analyzed within the facility would be used for laydown purposes. Since the total disturbed area for the modification would be less than 1.0 acre, the project owner would not be required to apply for coverage under the National Pollutant Discharge Elimination System construction general permit. The modification would not require any new water to be used. Therefore, the impact of the modification on soil and water resources would be less than significant.

TRAFFIC AND TRANSPORTATION

Vehicle trips generated by the construction of the BESS would consist of a maximum of 40 construction workers who would commute to and from the site, 23 truck trips for construction materials and equipment, and six truck trips for battery components. The temporary construction activities are estimated to take six months to complete. Operations and maintenance of the SEC would remain unchanged.

Construction of the BESS would comply with COC **TRANS-3** "Traffic Control Plan" as applicable, including scheduling deliveries of heavy equipment and BESS components during off-peak hours and obtaining heavy haul permits from the County of Riverside

Transportation and Land Management Agency and Caltrans as required. Other transportation COCs were completed as part of the original project construction or would not be applicable to this project change.

The project change would not conflict with local plans or ordinances addressing circulation; cause a significant increase in vehicle miles travelled in the area; and would not result in a substantial increase in hazards or inadequate emergency access. Therefore, potential transportation impacts associated with the project change would be less than significant.

TRANSMISSION LINE SAFETY AND NUISANCE

The proposed project modifications would not require any upgrades to the offsite existing transmission line. Therefore, the petition would not result in any Transmission Line Safety and Nuisance impacts.

TRANSMISSION SYSTEM ENGINEERING

With the proposed project modifications and addition of the BESS the project would continue to comply with applicable LORS. The addition of battery storage for black start operations to the SEC would not significantly affect the interconnection to the transmission grid. Compliance with existing conditions of certification in conjunction with Delegate Chief Building Official (DCBO) oversight would ensure that any modifications to transmission facilities will be safe and reliable.

VISUAL RESOURCES

The project modifications would include installing a BESS. The foundations for the BESS and switchgear equipment would cover approximately 3,100 square feet on a previously disturbed area within the existing facility. The BESS would be approximately 8.3 feet tall. The new structures would be much less visually prominent compared to existing structures at the power plant site, including tanks, stacks, transformers, and buildings. A total of two new light standards would be installed to illuminate the new facilities on the site for power plant operators. The lighting structures and fixtures would conform to the design requirements contained in COC **VIS-2** "Temporary and Permanent Exterior Lighting." No new visual resources impacts would occur that were not previously analyzed under the original project. With implementation of **VIS-2**, potential impacts of light and glare on areas beyond the project site would be reduced to a less-than-significant level.

WASTE MANAGEMENT

The BESS units would only be used for black start purposes. No waste batteries are expected to be produced. If it becomes necessary to replace a battery module, that scope of work would be performed by the BESS manufacturer, and they would handle recycling of the battery. No new or additional waste streams other than those already

identified in the waste management plan would be generated. Therefore, the impacts of the modification to waste management would be less than significant.

WORKER SAFETY AND FIRE PROTECTION

With the adoption of COCs **WORKER SAFETY-6, WORKER SAFETY-7, and WORKER SAFETY-8** and continued compliance with the existing conditions of certification in the Decision, staff concludes that the proposed modifications would be in compliance with applicable worker safety and fire protection LORS. Please refer to the attached Worker Safety and Fire Protection analysis for additional information.

ENVIRONMENTAL JUSTICE

CALENVIROSCREEN

Staff reviewed CalEnviroScreen 4.0 data to determine whether the United States census tract where the SEC is located (6065044522) is identified as a disadvantaged community. This science-based mapping tool is used by the California Environmental Protection Agency (CalEPA) to identify disadvantaged communities based on geographic, socioeconomic, public health, and environmental hazard criteria pursuant to Health and Safety Code section 39711 as enacted by Senate Bill 535 (De León, Chapter 830, Statutes of 2012). The CalEnviroScreen 4.0 overall percentile score for this census tract is 33 and, thus, is not identified as a disadvantaged community¹.

ENVIRONMENTAL JUSTICE

Environmental Justice Figure 1 shows 2020 census blocks in the six-mile radius of the SEC with a minority population greater than or equal to 50 percent. The population in these census blocks represents an environmental justice (EJ) population based on race and ethnicity as defined in the United States Environmental Protection Agency's *Guidance on Considering Environmental Justice During the Development of Regulatory Actions*. Staff conservatively obtains demographic data within a six-mile radius around a project site based on the parameters for dispersion modeling used in staff's air quality analysis. Air quality impacts are generally the type of project impacts that extend the furthest from a project site. Beyond a six-mile radius, air emissions have either settled out of the air column or mixed with surrounding air to the extent the potential impacts

¹The four categories of geographic areas identified by CalEPA as disadvantaged are: 1) Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0, 2) Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps, but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores, 3) Census tracts identified in the 2017 DAC designation, regardless of their scores in CalEnviroScreen 4.0, and 4) Lands under the control of federally recognized Tribes. Source: CalEPA Final Designation of Disadvantaged Communities: May 2022 <https://calepa.ca.gov/envjustice/ghginvest/>

are less than significant. The area of potential impacts would not extend this far from the project site for most other technical areas included in staff’s EJ analysis.

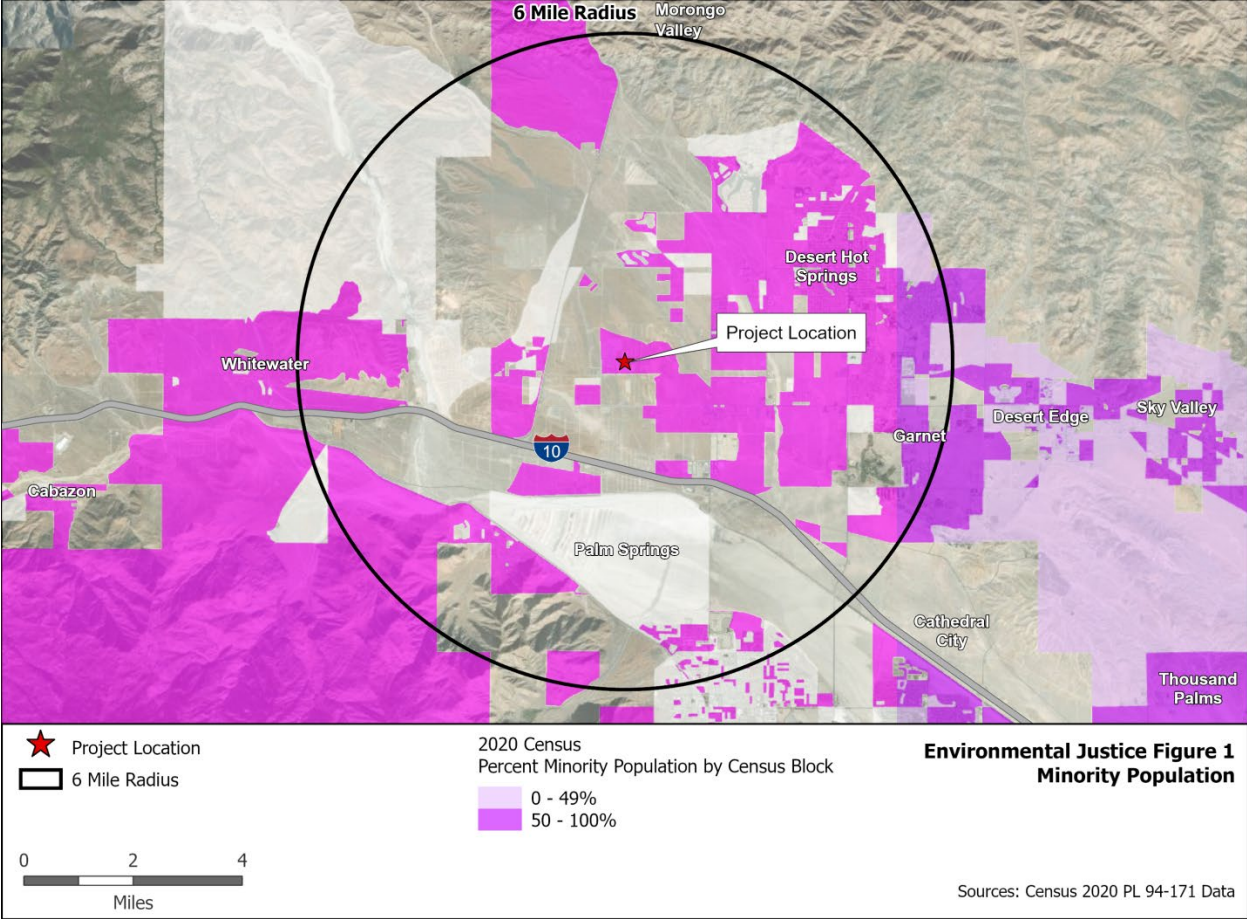
Based on California Department of Education data in the **Environmental Justice Table 1**, staff concluded that the percentage of those living in the Banning Unified and Palm Springs Unified school district (in a six-mile radius of the project site) and enrolled in the free or reduced-price meal program are larger than those in the reference geography. Thus, it is considered an EJ population based on low income as defined in *Guidance on Considering Environmental Justice During the Development of Regulatory Actions*. **Environmental Justice Figure 2** shows where the boundaries of the school district are in relation to the six-mile radius around the SEC site.

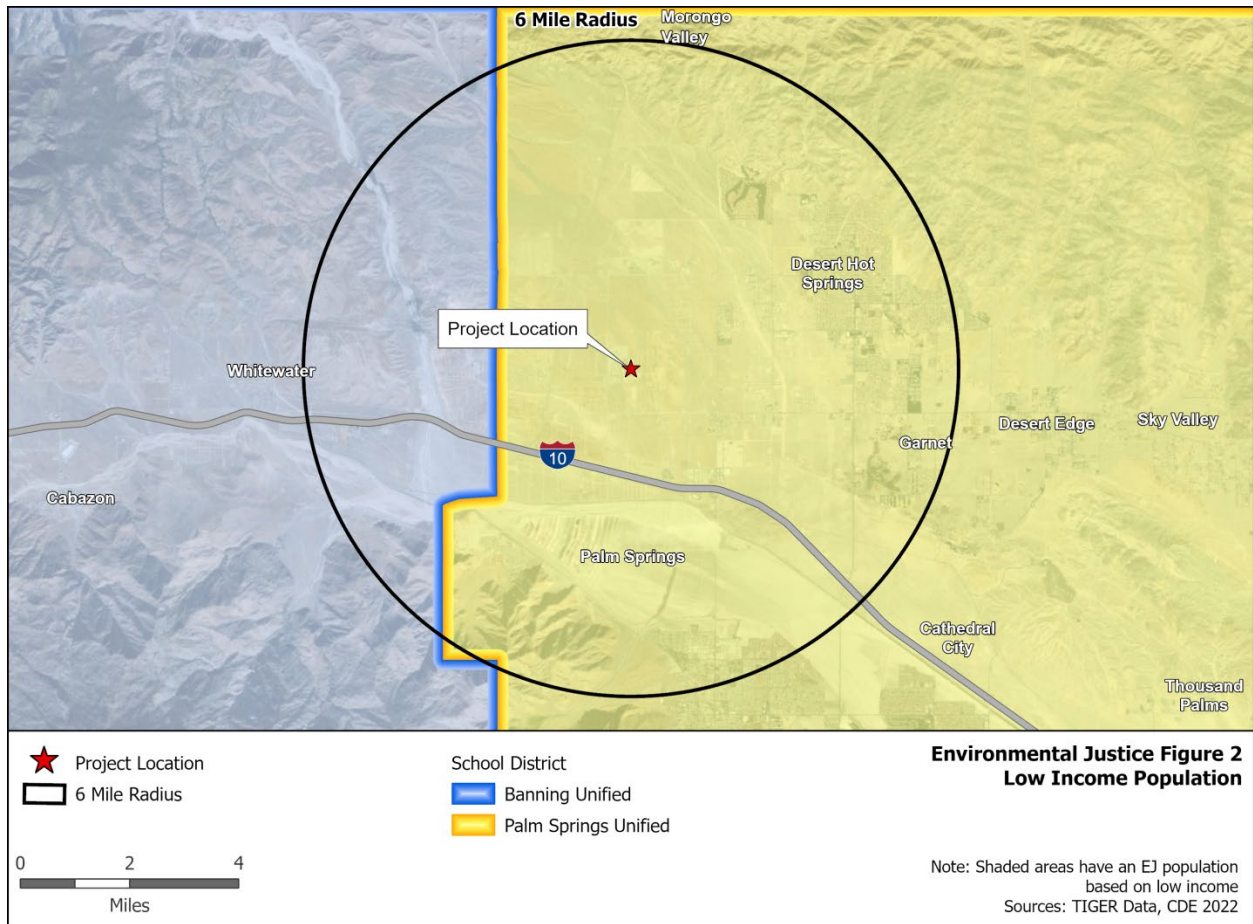
Environmental Justice Table 1

Low Income Data within the Project Area

SCHOOL DISTRICTS IN SIX-MILE RADIUS	Enrollment Used for Meals	Free or Reduced-Price Meals	
Banning Unified	4,430	4,069	91.9%
Palm Springs Unified	21,306	20,469	96.1%
REFERENCE GEOGRAPHY			
Riverside County	420,687	284,807	67.7%
Source: CDE 2022. California Department of Education, DataQuest, Free or Reduced Price Meals, District level data for the year 2021-2022, http://dq.cde.ca.gov/dataquest/ .			

The following technical areas (if affected) consider impacts to EJ populations: Air Quality, Cultural Resources (indigenous people), Hazardous Materials Management, Land Use, Noise and Vibration, Public Health, Socioeconomics, Soil and Water resources, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, Waste Management, and Worker Safety and Fire Protection.





Environmental Justice Conclusions

For the technical areas that address EJ and would be affected by the project change—Air Quality, Cultural Resources, Hazardous Materials Management, Noise and Vibration, Public Health, Socioeconomics, Traffic and Transportation, Visual Resources, Waste Management, and Worker Safety and Fire Protection—staff concludes that impacts would be less than significant, and thus impacts on the EJ population, represented in **Figures 1 and 2**, and **Table 2**, would be less than significant.

In the Air Quality analysis, staff is amending existing COCs and adding new ones to comport with Air District permit updates related to increasing the number of turbine starts ensuring potentially significant impacts are mitigated. In the Worker Safety and Fire Protection analysis, staff is adding new COCs to ensure safety. Staff has determined that by adopting the proposed new and amended COCs, the proposed change would not cause significant impacts for any population in the SEC’s six-mile radius, including the EJ population. The impacts to the EJ population are less than significant.

CEC STAFF RECOMMENDATIONS AND CONCLUSIONS

Consistent with California Code of Regulations, title 20, section 1769, staff has reviewed the petition for potential environmental effects and consistency with applicable LORS. Staff approves the amended and new Air Quality Conditions of Certification supporting the increased number of starts for the turbines because staff finds the proposed changes meet the requirements of California Code of Regulations, title 20, section 1769(a)(3)(B).

For the construction and operation of the battery black start system, staff concludes that the proposed changes to SEC would not have a significant effect on the environment or cause the project to fail to comply with any applicable LORS, with the adoption of new conditions of certification in the area of Worker Safety and Fire Protection.

Staff also concludes the findings specified in California Code of Regulations, title 20, section 1748(b) do not apply to any of the proposed changes.

Staff recommends the CEC approve the petition adding the battery black start system and adopt the related new or modified conditions of certification.

Sentinel Energy Center (07-AFC-03C)
Petition to Amend Commission Decision
AIR QUALITY, PUBLIC HEALTH, AND GREENHOUSE GASES
Tao Jiang, Ph.D., P.E.

INTRODUCTION AND SUMMARY

On September 8, 2023, Sentinel submitted a petition to amend to add a 17.18 megawatt (MW)/34.36 MWh LFP battery-based black start capability to the facility (SEC 2023)². In addition, Sentinel is requesting changes to its operational profile (increased annual startups and decreased annual base-load operation) to allow for added flexibility to respond to power demand requests from the California ISO.

The SEC was certified by the CEC on December 8, 2010 (CEC 2010a) and began commercial operation on August 1, 2013. The SEC is a natural gas peaking power plant located near North Palm Springs, CA. The plant consists of eight (8) General Electric LMS100 gas turbines with a combined net capacity of approximately 850 MW. The plant operates as dispatched by the California ISO to provide quick start electrical energy to support the Southern California Edison (SCE) electrical system.

California ISO issued the “Los Angeles Basin Black Start Service” Request for Proposal in May 2021. The purpose of this Request for Proposal was to secure additional black start capability – generating units that could start by themselves with no off-site source of electricity – to provide power to aid with restoration of the bulk electric system if the system went black, i.e., no electric power. SEC was one of several entities that submitted proposals to California ISO and was selected in December of 2021. California ISO and SCE stated that they only needed black start capability for four of the eight units at SEC. Therefore, the project owner proposes to add 17.18MW/34.36MWH LFP battery-based black start capacity to the facility and allow four of the eight units to be used for black start.

The project owner also submitted an application for modification to the SCAQMD air permit to support black start operation. The SCAQMD issued a draft PTO on July 20, 2023 (SCAQMD 2023a) and the Statement of Basis Analysis for Title V Minor Permit Revision on July 26, 2023 (SCAQMD 2023b). Staff reviewed the project owner’s petition, the associated SCAQMD draft PTO and analysis.

The proposed black start upgrade will maintain current hourly, daily, monthly, and annual mass emission limits. The construction work would all take place within the existing facility in a location that was previously disturbed during cut and fill operations for original construction. In this analysis, staff demonstrates that the air quality, public health, and greenhouse gas impacts of the proposed modification would be less than significant.

² This current petition to amend supersedes the previous petition that was filed on June 6, 2022, that proposed adding an 11.6 MW/23.1 MWh Lithium-ion battery. The revision was made due to vendor supply chain issues.

To incorporate the new SCAQMD PTO conditions for the proposed amendment into the CEC license, staff proposes to modify Conditions of Certification (COC) **AQ-1, AQ-3, AQ-7, AQ-8, AQ-9, AQ-12** and **AQ-15**, and add **AQ-1a, AQ-8a** and **AQ-20** to **AQ-25**.

The modified project would comply with all LORS. Air quality, public health, and greenhouse gas impacts from the evaluated changes would be less than significant, including impacts to environmental justice populations. Therefore, there are no air quality, public health, or greenhouse gas environmental justice issues related to the evaluated facility modifications and no minority or low-income populations would be significantly or adversely impacted.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS COMPLIANCE

SEC is subject to all the LORS described in the Decision for SEC (CEC 2010a) and the subsequent amendments³ (CEC2011a, CEC2011b and CEC2011c). The applicable LORS remain the same as previous analyses. Staff reviewed the petition and the SCAQMD evaluation for consistency with all federal, state, and SCAQMD LORS and determined that with the requested changes, the facility would continue to comply with all LORS.

ANALYSIS

Air Quality

Annual Startups Increase

The project owner proposed to increase the annual startups from 300 to 410 to provide added flexibility to respond to power demand requests from California ISO. The increase in startups and shutdowns are expected to result in no net emissions increase in hourly, daily, or monthly emissions since there are no proposed changes in the startup or shutdown durations and no proposed changes in the number of startups or shutdowns per day or per month.

The proposed project modification would otherwise result in an increase in annual oxides of nitrogen (NO_x), volatile organic compounds (VOC), and carbon monoxide (CO) emissions due to the increase in annual startups/shutdowns (since hourly emissions are higher during startup/shutdown operations compared to base-load, normal operations). However, Sentinel would reduce the number of base-load, normal operating hours to ensure no net emissions increase in annual emissions.

³ On March 17, 2011, CEC approved the modification to the construction laydown area (CEC2011a). On June 29, 2011, CEC approved general arrangement refinements (CEC 2011b). On August 24, 2011, CEC approved another modification to the construction laydown area (CEC 2011c).

The project was originally permitted based on a total of 2,803 hours per year, which included 300 startups and 25 minutes each and 300 shutdowns at 10 minutes each (175 hours total), and the balance (2,628 hours) at normal operation. To increase the annual number of startups and shutdowns to 410 (239.17 hours total), Sentinel intends to reduce total normal operations to comply with annual RTC holding requirements, which is expected to limit annual normal operations to approximately 2,201 hours (about 16.2% reduction). Therefore, the air quality impacts due to the proposed annual startups increase would still be less than significant.

Black Start Capacity

The proposed BESS and associated equipment⁴ would allow the facility to respond to the grid-wide blackout as determined by the California ISO. During grid outages, up to two turbines may be operating at low load for some time to carry house load and prevent depleting the batteries. During this time, the combustion turbine emissions of NOx and CO may be higher than those during the normal operation.

Construction

The construction activities are schedule from April 2024 through October 2024, or approximately 6 months. The current site will be excavated down 6 feet. Existing asphalt road, electrical conduit, water pipe and fire protection pipe will be re-routed around the exterior of the new foundation during the excavation activities. New granular backfill will be compacted below the top of the new concrete foundation and a concrete slab will be placed with knockouts for the embedded conduit for the equipment. Since all areas of the site that will be impacted by the proposed amendment are already disturbed and graded, both the construction equipment intensity and duration of use will be less than what was previously analyzed in the original AFC. The emissions and impacts during construction would be less than significant with existing Conditions of Certification **AQ-SC1** to **AQ-SC6**.

Black Start Operation

The proposed black start upgrade does not add any new combustion sources at Sentinel. During the black start operation, up to two turbines may be operating at Full Speed No Load (FSNL), or low load condition to carry house load and prevent depleting the batteries depending how long the turbines are needed before the units are asked to

⁴ The BESS system would consist of five (5) SMA Sunny Central Storage SCS 3450 UP-XT-US bidirectional power conversion systems (PCSs) with a total nameplate capacity of 17 MVA at 50°C and ten (10) BYD MC Cube 8+1 ESS outdoor batter systems, each with a nameplate capacity of 1718 kW//3436 kWh. There are five (5) BESS blocks with each block consisting of a SMA PCS connected to two (2) battery systems (eight (8) cabinets and one (1) DC Junction Box (DCJB) per string, 16 cabinets and two (2) DCJB's total). Of the five (5) BESS blocks, four (4) BESS blocks are needed to provide the required design basis power and energy for black start. The MC Cube battery modules utilize Lithium Iron Phosphate (LiFePO4) battery chemistry due to their advanced thermal design and other safety features.

begin delivering energy to the grid to assist with system restoration efforts. The amount of time in a hold will be dictated by the California ISO. In this operating condition, emission controls may not be operable or achieving optimal control efficiencies, possibly resulting in emission concentrations for NO_x, CO, and VOC that exceed the currently permitted BACT concentration limits for normal operations. However, black start operating modes would not be considered normal or routine operations.

The project owner expects the black start operation to be most similar to the turbine startups analyzed in the original Final Staff Analysis (FSA) (CEC 2010b). **Air Quality Table 1** shows the estimated maximum emissions during the black start operation.

Air Quality Table 1
SEC, Maximum Emissions during Black Start Operation (lbs/hr)

	NO_x	CO	VOC
Maximum Hourly Emissions (per turbine)	29.54	20.41	5.55

Sources: SEC 2023 and staff analysis.

Black Start operations are short-term in nature. Therefore, **Air Quality Table 1** presents maximum short-term emissions of NO_x, CO and VOC. The project owner proposed to apply the existing permitted hourly startup emissions to this operation condition, which has been approved in the draft district PTO.

PM10 and SO₂ emissions are not included in the table since they are proportional to fuel use, and fuel use (and thus PM10 and SO₂ emissions) during black start operations is equal to or lower than that during full load operations. The project owner does not propose any increase in monthly and annual fuel usage, and thus monthly and annual PM10 and SO₂ emissions.

The addition of black start capability will not affect the normal operation of the gas turbines and normal operations will remain subject to the existing BACT requirements specified in the facility's permit conditions. As a result, there will be no increase in daily, monthly, or annual emissions from the proposed black start operations.

Therefore, the air quality impact for black start operations would be the same as those modeled in the original FSA. The black start operations would not cause new exceedances of any state or federal ambient air quality standard.

Black Start Testing and Commissioning

To ensure availability for black start emergency operations, SEC would perform periodic testing of Black Start readiness for designated black start units, which is approximately one hour every three years. The Draft PTO allows for no more than 4 units in operation simultaneously during black start periodic testing operations. This black start performance testing and adjustment activities may be required at FSNL or low loads, and those activities would also comply with the emission limits for black start operations shown in **Air Quality Table 1**. However, there will be no proposed increase in daily, monthly, or annual emissions from black start testing.

Black start commissioning will last no more than 64 hours. While the Draft PTO allows for all 8 units in operation simultaneously during black start commissioning, the project owner proposed a limitation of no more than 4 units in operation simultaneously, which is the same as black start testing. The existing permitted hourly startup emissions are also applicable to black start commissioning, which is shown in **Air Quality Table 1**.

Since the emissions during black start testing and commissioning are expected to be the same as startup emissions analyzed in the original FSA, the air quality impacts during black start testing and commissioning would be less than significant.

Public Health

As discussed above, the anticipated construction activities only last approximately 6 months. Both the construction equipment intensity and duration of use will be less than what was previously analyzed and approved in the original AFC. The public health impacts during construction would be less than significant due to limited construction activities and lack of nearby receptors.

The project short-term TAC emissions during black start testing, commissioning, and operations are not expected to be greater than what was previously analyzed and approved since no more than four turbines may be in black start testing, commissioning, or operations at any one time. Although turbine operation during black start testing and operation will be at a low load for a short period (no more than 3 hours per turbine), the low emissions associated with the reduced fuel flow, along with the limited number of units that would be permitted to operate, will result in short-term (1-hour) ground level concentrations and associated health risk impacts below what was analyzed in the original AFC. Therefore, short-term (1-hour) TAC emissions and impacts are not expected to be greater than what was previously analyzed and approved.

Long-term TAC emissions will not increase for any of the permitted gas turbines. The existing permitted monthly fuel usage limits will remain in place and is not impacted by the proposed amendment. In addition, total annual hours of operation for black start testing, commissioning, and operations are expected to be significantly less than routine operations. Therefore, long-term (annual) TAC emissions and impacts are not expected to be greater than what was previously analyzed and approved.

Greenhouse Gases

The greenhouse gas (GHG) emissions and impacts during construction would be less than significant due to limited construction activities and short duration.

The annual fuel use and emissions would not change due to the proposed modifications for the black start operation and increased number of startups. Therefore, this

modification will not increase the production of greenhouse gases at SEC. GHG impacts of the proposed project modification would be less than significant.

CONCLUSIONS AND RECOMMENDATIONS

The requested project changes would continue to comply with all applicable federal, state, and district LORS. Therefore, the amended project would not cause any significant adverse impacts to ambient air quality, public health, or greenhouse gases, provided that the following COCs are included. Staff recommends the approval of the revised COCs as shown below.

AMENDED CONDITIONS OF CERTIFICATION

The modifications to the Air Quality conditions of certification are included below. Strikethrough indicates deleted language and **underline and bold** is used for new language.

AQ-1 The project owner shall limit the emissions from each gas fired combustion turbine train exhaust stack as follows:

Units 1 through 8

Contaminant	Emissions Limit
PM10	2,425 lbs in any one month
CO	6,477 lbs in any one month
SOx	293 lbs in any one month
VOC	1,432 lbs in any one month

~~For the purpose of this condition, the limit(s) shall be based on the emissions from a single exhaust stack.~~

The project owner shall calculate the emission limit(s) by using the monthly fuel use data and the following emission factors: PM10: 5.71 lb/mmscf, VOC: 2.189 lb/mmscf & SOx: 0.69 lb/mmscf. **the monthly emissions for VOC, PM10 and SO_x using the equation below and the following emission factors: VOC: 2.52 lb/mmcf; PM10: 5.71 lb/mmcf; and SO_x: 0.69 lb/mmcf.**

Monthly Emissions, lb/month=X(E.F.)

Where X = monthly fuel usage in mmscf/month and E.F. = emission factor indicated above

Compliance with the CO emission limit shall be verified through valid CEMS data.

The project owner shall calculate the emission limit(s) ~~for CO~~ for the purpose of determining compliance with the monthly ~~emission~~**CO** limit in the absence of valid CEMS data by using **the above equation and** the following emission factor(s):

~~A. During the commissioning period and prior to CO catalyst installation: 38.48 lb/mmscf.~~

~~B.~~

~~B. After installation of the CO catalysis but prior to CO CEMS certification testing: 14.38 lb/mmcf the emission rate shall be recalculated in accordance with Condition **AQ-10** if the approved CEMS certification test resulted in emission concentration higher than 4 ppmv.~~

G. **(A)** After CO CEMS certification testing: 14.38 lb/mmcf. After CO CEMS certification test is approved by the AQMD, the emissions monitored by the CEMS and calculated in accordance with Condition **AQ-10** shall be used to calculate emissions.

For the purpose of this condition, the limit(s) shall be based on the emissions from a single turbine. ~~During Commissioning, the CO emissions shall not exceed 11,602 lbs/month and the VOC emissions shall not exceed 620 lbs/month.~~

~~The project owner shall provide the AQMD with written notification of the date of initial CO catalyst use within (7) days of this event.~~

~~For the purpose of this condition the turbine shall not commence with normal operation until the commissioning process has been completed. Normal operations may proceed in the same commissioning month provided the project owner follows the requirements listed below.~~

~~The project owner shall calculate the commissioning emissions for VOC, SOx and PM10) for the commissioning month (beginning of the month to the last day of commissioning) using the equation below and the following emission factors: VOC: 2.06 lb/mmcf; PM10: 2.49 lb/mmcf; and SOx: 0.12 lb/mmcf.~~

~~The commissioning emissions for VOC, SOx, and PM10 shall be subtracted from the monthly emissions limits (listed in the table at the top of this condition) and the revised monthly emission limits will be the maximum emissions allowed for the remaining of the month.~~

For the purpose of this condition, the term "normal operations" is defined as the turbine is able to supply electrical energy to the power grid **as required under contract with SCE or other entity.**

Verification: The project owner shall submit all emission calculations, fuel use, CEM records and a summary demonstrating compliance of all emission limits stated in this Condition for approval to the CPM on a quarterly basis in the quarterly emissions report (**AQ-SC9**).

AQ-1a The project owner shall comply with the terms and conditions set forth below:

<u>Contaminant</u>	<u>Emissions Limit</u>
<u>PM10</u>	<u>118120 lbs in any one year</u>
<u>SOx</u>	<u>13928 lbs in any one year</u>

For purposes of this condition, the annual limit(s) shall be calculated by using annual and monthly fuel use data, and the following emission factors: PM10 5.71 lb/MMSCF; and SOx: 0.69 lb/mmcf. For the purpose of this condition, the yearly emission limit shall be defined as a period of twelve (12) consecutive months determined on a rolling basis with a new 12 month period beginning on the first day of each calendar month.

Verification: The project owner shall submit all emission calculations, fuel use, CEM records and a summary demonstrating compliance of all emission limits stated in this Condition for approval to the CPM on a quarterly basis in the quarterly emissions report (AQ-SC9).

AQ-3 The 2.5 ppm NOx emission limit, the 2.0- ppm VOC limit and the 4.0 ppm CO emission limit shall not apply during turbine commissioning, start-up, and shutdown, California ISO authorized black start emergency operations, black start commissioning event and black start periodic testing operations. The commissioning period shall not exceed 150 operating hours per turbine from the initial start-up. Following commissioning, ~~s~~Start-ups shall not exceed 25 minutes for each startup, and shutdowns Shutdown periods shall not exceed 10 minutes for each shutdown. Written records of commissioning, start-ups, and shutdowns, and all black start operations shall be kept maintained and made available to SCAQMD and submitted to the CPM for approval. Emissions of NOx shall not exceed 29.54 lbs/hr for any hour in which a startup occurs. Units 1 through 8 The turbine shall be limited to a maximum of ~~300~~410 startups per year; The 19 lb/mmscf NOx emission limit(s) shall only apply during interim reporting period during initial turbine commissioning and the 12.26 lbs/mmscf shall apply only during the interim reporting period after the initial turbine commissioning period, to report RECLAIM emissions. The interim period shall not exceed 12 months from the initial start-up date. For the purpose of this condition startup shall be defined as the start up process to bring the turbine in full successful operations. If during startup the process is aborted and the startup is restarted, then the startup and restart is defined as one startup. In this case the startup time shall not exceed 1 hour.

For the purpose of black start commissioning operations the NOx, CO and VOC emission limits shall not apply for up to 600 non-consecutive minutes cumulative amongst the total amount of units operated during said activity.

For the purpose of black start periodic testing operations the NOx, CO and VOC emission limits shall not apply for up to 280 non-consecutive minutes cumulative amongst the total amount of units operated during said activity.

The project owner/operator shall complete construction and the project shall be fully operational within three years of the issuance of the permit to construction from the District.

Verification: The project owner shall provide the SCAQMD and the CPM with the written notification of the initial start-up date no later than 60 days prior to the startup date.

The project owner shall submit, commencing one month from the time of gas turbine first fire, a monthly commissioning status report throughout the duration of the commissioning phase that demonstrates compliance with this condition and the emission limits of Condition **AQ-13**. The monthly commissioning status report shall include criteria pollutant emission estimates for each commissioning activity and total commissioning emission estimates. The monthly commissioning status report shall be submitted to the CPM until the report includes the completion of the initial commissioning activities.

The project owner shall provide start-up and shutdown occurrence and duration data as part of the Quarterly Operation Report (**AQ-SC9**) including records of all aborted turbine startups. The project owner shall make the site available for inspection of the commissioning and startup/shutdown records by representatives of the District, CARB and the Commission.

AQ-7 The project owner shall conduct an initial source test for NO_x, CO, SO_x, VOC, NH₃ and PM₁₀ and periodic source test every three years thereafter for NO_x, CO, SO_x, VOC and PM₁₀ of each gas turbine exhaust stack in accordance with the following requirements:

- The project owner shall submit a source test protocol to the SCAQMD and the CPM 45 days prior to the proposed source test date for approval. The protocol shall include the proposed operating conditions of the gas turbine, the identity of the testing lab, a statement from the lab certifying that it meets the criteria of SCAQMD Rule 304, and a description of all sampling and analytical procedures.
- The initial source test shall be conducted no later than 180 days following the date of first fire or three hundred hours of operations after start-up.
- The SCAQMD and CPM shall be notified at least 10 days prior to the date and time of the source test.
- The source test shall be conducted with the gas turbine operating under maximum, average and minimum loads.
- The source test shall be conducted to determine the oxygen levels in the exhaust.
- The source test shall measure the fuel flow rate, the flue gas flow rate and the turbine generating output in MW.
- The source test shall be conducted for the pollutants listed using the methods, averaging times, and test lo

- ~~ations indicated and as approved by the CPM as follows:-~~

Source Test Requirements

Pollutant	Method	Averaging Time	Test Location
NOx	SCAQMD Method 100.1	1 hour	Outlet of SCR
CO	SCAQMD Method 100.1	1 hour	Outlet of SCR
SOx	District Method 307.91	N/A	Fuel Sample
VOC	District Method 25.3	1 hour	Outlet of SCR
PM10	District Method 5	4 hours	Outlet of SCR
Ammonia	SCAQMD Methods 5.3 and 207.1 or U.S. EPA Method 17	1 hour	Outlet of SCR

~~The source test results shall be submitted to the SCAQMD and the CPM no later than 60 days after the source test was conducted.~~

- ~~All emission data is to be expressed in the following units:-~~
 1. ~~ppmv corrected to 15 percent oxygen dry basis,~~
 2. ~~pounds per hour,~~
 3. ~~pounds per million cubic feet of fuel burned and~~
 4. ~~additionally, for PM10 only, grains per dry standard cubic feet of exhaust flow.~~
- ~~Exhaust flow rate shall be expressed in terms of dry standard cubic feet per minute and dry actual cubic feet per minute.~~
- ~~All moisture concentrations shall be expressed in terms of percent corrected to 15 percent oxygen.~~
- ~~For the purpose of this condition, alternative test methods may be allowed for each of the above pollutants upon concurrence of the AQMD, CARB, EPA and the CEC.~~

Verification: ~~The project owner shall submit the proposed protocol for the initial source tests 45 days prior to the proposed source test date to both the SCAQMD and CPM for approval. The project owner shall submit source test results no later than 60 days following the source test date to both the SCAQMD and CPM.~~

~~The project owner shall notify the SCAQMD and CPM no later than 10 days prior to the proposed initial source test date and time.~~

AQ-8 ~~The project owner shall conduct source testing of each gas turbine exhaust stack in accordance with the following requirements:-~~

- ~~The project owner shall submit a source test protocol to the SCAQMD and the CPM for approval no later than 45 days prior to the proposed source test date. The protocol shall include the proposed operating conditions of the gas turbine, the identity of~~

- ~~the testing lab, a statement from the lab certifying that it meets the criteria of SCAQMD Rule 304, and a description of all sampling and analytical procedures.~~
- ~~Source testing for ammonia slip only shall be conducted quarterly for the first 12 months of operation and annually thereafter.~~
- ~~NOx concentrations as determined by CEMS shall be simultaneously recorded during the ammonia test. If the NOx CEMS is inoperable, a test shall be conducted to determine the NOx emission by using SCAQMD Method 100.1 measured over a 60 minute time period.~~
- ~~Source testing shall be conducted to determine the ammonia emissions from each gas turbine exhaust stack using SCAQMD Method 5.3 and 207.1 or U.S. EPA Method 17 measured over a 1 hour averaging period at the outlet of the SCR.~~
- ~~The SCAQMD and CPM shall be notified of the date and time of the source testing at least 7 days prior to the test.~~
- ~~The source test shall be conducted and the results submitted to the SCAQMD and CPM within 45 days after the test date.~~
- ~~Source testing shall measure the fuel flow rate, the flue gas flow rate and the gas turbine generating output.~~
- ~~The test shall be conducted when the equipment is operating at 80 percent load or greater.~~
- ~~If the turbine is not in operation during one quarter, then no testing is required during that quarter.~~
- ~~All emission data is to be expressed in the following units:~~
 1. ~~ppmv corrected to 15 percent oxygen,~~
 2. ~~pounds per hour,~~
 3. ~~pounds per million cubic feet of fuel burned.~~

Verification: ~~The project owner shall submit the proposed protocol for the source tests 45 days prior to the proposed source test date to both the SCAQMD and CPM for approval.~~

~~The project owner shall notify the SCAQMD and CPM no later than 7 days prior to the proposed source test date and time.~~

~~The project owner shall submit source test results no later than 45 days following the source test date to both the SCAQMD and CPM.~~

AQ-7 The project owner shall conduct source test(s) for the pollutant(s) identified below:

Source Test Requirements

<u>Pollutant(s)</u>	<u>Method</u>	<u>Averaging Time</u>	<u>Test Location</u>
<u>NH₃</u>	<u>District Method 207.1</u>	<u>1 hour</u>	<u>Outlet of SCR</u>

The test shall be conducted and the results submitted to the District within 45 days after the test date. The district and CPM shall be notified of the date and time of the test at least 7 days prior to the test.

The test shall be conducted at least quarterly during the first twelve months of operation of a new catalyst and at least annually thereafter. If an annual source test is failed, four consecutive quarterly source tests must demonstrate compliance with ammonia emission limits prior to resuming annual source tests.

The NOx concentration, as determined by the CEMS, shall be simultaneously recorded during the ammonia slip test. If the CEMS is inoperable, a test shall be conducted to determine the NOx emission using District Method 100.1 measured over a 60 minute averaging time period.

If the turbine is not in operation during one quarter, then no testing is required during that quarter.

The test shall be conducted to demonstrate compliance with the District Rule 1303 BACT concentration limit.

Verification: The project owner shall submit source test results within 45 days following the source test date to both the SCAQMD and CPM. The project owner shall notify the SCAQMD and CPM 7 days prior to the proposed source test date and time.

AQ-8 The project owner shall conduct source test(s) for the pollutant(s) identified below:

Source Test Requirements

<u>Pollutant(s)</u>	<u>Method</u>	<u>Averaging Time</u>	<u>Test Location</u>
<u>SOx</u>	<u>District Method 307-91</u>	<u>N/A</u>	<u>Fuel Sample</u>
<u>VOC</u>	<u>District Method 25.3</u>	<u>1 hour</u>	<u>Outlet of SCR</u>
<u>PM10</u>	<u>District Method 5</u>	<u>4 hours</u>	<u>Outlet of SCR</u>

The test shall be conducted at least once every three years. The test shall be conducted to determine the oxygen level in the exhaust. In addition, the tests shall measure the fuel flow rate (CFH), the flue gas flow rate, and the turbine generating output in MW. The test shall be conducted in accordance with SCAQMD approved test protocol. The protocol shall be submitted to the SCAQMD engineer and CPM no later than 45 days before the proposed test date and shall be approved by the SCAQMD and CPM before the test commences.

The test protocol shall include the proposed operating conditions of the turbine during the tests, the identity of the testing lab, a

statement from the testing lab certifying that it meets the criteria of Rule 304, and a description of all sampling and analytical procedures.

The test shall be conducted when this equipment is operating at maximum, average, and minimum loads.

The test shall be conducted for compliance verification of the BACT VOC 2.0 ppmv limit.

For natural gas fired turbines only, an alternative to AQMD Method 25.3 for the purpose of demonstrating compliance with BACT as determined by CARB and SCAQMD, may be the following:

a) Triplicate stack gas samples are extracted directly into Summa canisters, maintaining a final canister pressure between 400-500 mm Hg absolute,

b) Pressurization of the Summa canisters is done with zero gas analyzed/certified to containing less than 0.05 ppmv total hydrocarbons as carbon,

c) Analysis of Summa canisters is per unmodified EPA Method TO-12 (with preconcentration) or the canister analysis portion of AQMD Method 25.3 with a minimum detection limit of 0.3 ppmvC or less and reported to two significant figures, and

d) The temperature of the Summa canisters when extracting samples for analysis is not to be below 70 F.

The use of this alternative method for VOC compliance determination does not mean that it is more accurate than unmodified AQMD Method 25.3, nor does it mean that it may be used in lieu of AQMD Method 25.3 without prior approval, except for the determination of compliance with the BACT level of 2.0 ppmv VOC calculated as carbon set by CARB for natural gas fired turbines.

For the purpose of this condition, alternative test method may be allowed for each of the above pollutants upon concurrence of SCAQMD, EPA, and CARB.

Verification: The project owner shall submit the proposed protocol for the source tests 45 days prior to the proposed source test date to both the SCAQMD and CPM for approval. The project owner shall notify the SCAQMD and CPM no later than 7 days prior to the proposed source test date and time. The project owner shall submit source test results no later than 45 days following the source test date to both the SCAQMD and CPM.

AQ-8a The project owner shall conduct source test(s) for the pollutant(s) identified below:

Source Test Requirements

<u>Pollutant(s)</u>	<u>Method</u>	<u>Averaging Time</u>	<u>Test Location</u>
<u>NOx</u>	<u>District method 100.1</u>	<u>1 hour</u>	<u>Outlet of SCR</u>
<u>SOx</u>	<u>District Method 100.1</u>	<u>1 hour</u>	<u>Outlet of SCR</u>
<u>VOC</u>	<u>District Method 25.1 or 25.3</u>	<u>1 hour</u>	<u>Outlet of SCR</u>

<u>CO</u>	<u>District Method 100.1 or 10.1</u>	<u>1 hour</u>	<u>Outlet of SCR</u>
<u>PM</u>	<u>Approved District method</u>	<u>District-approved averaging time</u>	<u>Outlet of SCR</u>
<u>PM10</u>	<u>District Method 25.1 or 25.3</u>	<u>District-approved averaging time</u>	<u>Outlet of SCR</u>
<u>Benzene</u>	<u>CARB method 410A or 410B</u>	<u>District-approved averaging time</u>	<u>Outlet of SCR</u>
<u>Acetaldehyde</u>	<u>CARB method 430</u>	<u>District-approved averaging time</u>	<u>Outlet of SCR</u>
<u>Formaldehyde</u>	<u>CARB method 430</u>	<u>District-approved averaging time</u>	<u>Outlet of SCR</u>
<u>Toluene</u>	<u>CARB method 410A or 410B</u>	<u>District-approved averaging time</u>	<u>Outlet of SCR</u>
<u>Ethyl benzene</u>	<u>CARB method 410A or 410B</u>	<u>District-approved averaging time</u>	<u>Outlet of SCR</u>
<u>Xylene</u>	<u>CARB method 410A or 410B</u>	<u>District-approved averaging time</u>	<u>Outlet of SCR</u>

The test shall be conducted within 90 days of the installation and operation of a new catalyst.

The test shall be conducted when the respective turbine is operating at 80 percent or greater of its design capacity. Alternatively, the test may be conducted as prescribed under the condition AQ-8 for periodic monitoring of SOx, VOC and PM10.

The test shall be conducted to determine the concentration and report mass emission rate in pounds per hour of NOx, SOx, VOC, CO, Total PM, Total PM10 and the following compounds: Benzene, Acetaldehyde, Formaldehyde, Toluene, Ethyl Benzene, and Xylene. The test shall be conducted to determine the oxygen concentration, fuel flow rate(CFH) and the electricity generation of the the turbine in MW.

The test shall be conducted to demonstrate equivalency of the replacement catalyst to the catalyst as permitted for the SCR serving the respective turbine. At a minimum, the proposed replacement catalyst shall meet all of the following requirements:

a) NOx concentrations at the outlet of the SCR shall be no more than 2.5 ppmv, averaged over 60 minutes and corrected to 15 percent O₂ dry.

b) Ammonia concentrations at the outlet of the SCR shall be no more than 5 ppmv, averaged over 60 minutes and corrected to 15 percent O₂ dry.

The test shall be conducted and test report submitted to the District and CPM. The district and CPM shall be notified of the date and time of the test at least 10 days prior to the test.

Verification: The project owner shall submit the proposed protocol for the source tests 45 days prior to the proposed source test date to both the SCAQMD and CPM for approval. The project owner shall notify the SCAQMD and CPM at least 10 days prior to the proposed source test date and time. The project owner shall submit source test results no later than 45 days following the source test date to both the SCAQMD and CPM.

AQ-9

The project owner shall install and maintain a CEMS in each exhaust stack of the combustion turbine trains to measure the following parameters:

NOx concentration in ppmv and CO concentration in ppmv.

Concentrations shall be corrected to 15 percent oxygen on a dry basis. The CEMS will convert the actual CO concentrations to mass emission rates (lb/hr) **using the equation below** and record the hourly emission rates on a continuous basis.

CO Emission Rate, lbs/hr = K CcoFd[20.9%-%O₂d]/(Qg*HHV)/1.0⁶],
where

K = 7.267*10⁻⁸ (lb/scf)/ppm

Cco = Average of four consecutive 15 min. ave. CO concentration, ppm

Fd = 8710 dscf/MMBTU natural gas

%O₂ d = Hourly ave. % by vol. O₂ dry, corresponding to Cco

Qg = Fuel gas usage during the hour, scf/hr

HHV = Gross high heating value of fuel gas, BTU/scf

The CEMS shall be installed and operated to measure CO concentration over a 15 minute averaging time period.

The CEMS shall be installed and operated in accordance with an approved SCAQMD Rule 218 CEMS plan application and the requirements of Rule 2012.

~~The CO CEMS shall be installed and operating no later than 90 days after initial start-up of the turbine.~~

~~The NOx CEMS shall be installed and operating no later than 12 months after initial start-up of the turbine.~~

~~During the interim period between the initial start-up and the provisional certification date of the CEMS, the project owner shall comply with the monitoring requirements of Rule 2012 (h)(2) and Rule 2012 (h)(3). Within two weeks of the turbine start-up date, the project owner shall provide written notification to the SCAQMD of the exact date of start-up.~~

Verification: Within 30 days of certification, the project owner shall notify the CPM of the completion of the certification process for the CEMS.

AQ-12

The operator shall install and maintain an ammonia injection flow meter and recorder to accurately indicate and record the ammonia injection flow rate being supplied to each turbine. The device or gauge shall be accurate to within plus or minus 5 percent and shall be calibrated once every twelve months. The ammonia injection system shall be placed in full operation as soon as the minimum temperature is reached. The minimum temperature

is listed as 540 degrees F at the inlet to the SCR reactor. **The maximum aqueous ammonia injection rate shall not exceed 250 lb/hr based on 19% aqueous ammonia.**

Continuously recording is defined for this condition as at least once every hour and is based on the average of the continuous monitoring for that hour.

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The project owner shall submit annual calibration results within 30 days of their successful completion.

AQ-15 The project owner shall limit the operating time of the firewater pump to no more than ~~199.99~~**200** hours per year. **The 200 hour(s) operating time includes no more than the number of hours necessary to comply with the maintenance and testing requirements of the most current edition of the National Fire Protection Association (NFPA) 25 – “Standards for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems”.**
Operating beyond the hours per year necessary to comply with the maintenance and testing requirements of NFPA 25 shall be allowed only in the event of emergency firefighting operation.

~~The firewater pump shall be equipped with a non-resettable elapsed meter to accurately indicate the elapsed operating time of the engine. The firewater pump shall be equipped with a non-resettable totalizing fuel meter to accurately indicate the fuel usage of the engine. The firewater pump shall burn only diesel fuel that contains sulfur compounds less than or equal to 15 ppm by weight.~~

~~An engine operating log shall be kept in writing, listing the date of operation, the elapsed time, in hours, and the reason for operation. The log shall be maintained for a minimum of 5 years and made available to SCAQMD personnel and CPM upon request.~~

~~The project owner shall keep records in a manner approved by the Executive Officer, consisting of emergency use hours of operation, maintenance and testing hours, other operating hours (describe the reason for operation).~~

Verification: ~~The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate devices have been installed and are functioning properly. The project owner shall submit all dates of operation, elapsed time in hours, and the reason for each operation in the Quarterly Operations Report (AQ-SC9).~~

AQ-20 The project owner shall comply at all times with the 2.5 ppm 1-hour BACT limit for NO_x, except as defined in condition AQ-3 and the following scenario:

<u>Operating Scenario</u>	<u>Maximum Hourly Emissions Limit</u>	<u>Operation Limit</u>
<u>Start-up hour</u>	<u>29.54</u>	<u>NO_x emissions not to exceed 29.54 lbs total per hour per turbine in any hour which includes a turbine start-up. Each turbine shall be limited to 410 start-ups per year, with each start-up not to exceed 25 minutes.</u>

Verification: The project owner shall provide start-up occurrence and duration data as part of the Quarterly Operation Report (AQ-SC9). The project owner shall make the site available for inspection of the records by representatives of the District, CARB and the Commission.

AQ-21 The project owner shall comply at all times with the 4 ppm 1-hour BACT limit for CO, except as defined in condition AQ-3 and the following scenario:

<u>Operating Scenario</u>	<u>Maximum Hourly Emissions Limit</u>	<u>Operation Limit</u>
<u>Shutdown hour</u>	<u>171.82 lbs/hr</u>	<u>CO emissions not to exceed 171.82 lbs total per shutdown hour per turbine in any hour which includes a turbine shutdown. Each turbine shall be limited to 410 shutdowns per year, with each shutdown not to exceed 10 minutes.</u>

Verification: The project owner shall provide shutdown occurrence and duration data as part of the Quarterly Operation Report (AQ-SC9). The project owner shall make the site available for inspection of the records by representatives of the District, CARB and the Commission.

AQ-22 The project owner shall comply at all times with the 2.5 ppm 1-hour BACT limit for NO_x, the 4 ppm 1-hour BACT limit for CO, except as defined in condition AQ-3 and the following scenario:

<u>Operating Scenario</u>	<u>Maximum Emission Limit</u>	<u>Operation Limit</u>
<u>Emergency Black Start Operations</u>	<u>NO_x 29.54 lbs/hr, CO 20.41 lbs/hr</u>	<u>NO_x emissions not to exceed 29.54 lbs total per hour of operation per turbine, CO emissions</u>

		<u>not to exceed 20.41 lbs total per hour of operation per turbine during any authorized emergency black start operation</u>
<u>Emergency Black Start Operations</u>	<u>NO_x 181 lbs/day, CO 215 lbs/day</u>	<u>NO_x emissions not to exceed 181 lbs total per day per turbine, CO emissions not to exceed 215 lbs total per day per turbine, during any authorized emergency black start operation</u>
<u>Black Start Commissioning or Periodic Testing Operations</u>	<u>NO_x 29.54 lbs/hr, CO 20.41 lbs/hr</u>	<u>NO_x emissions not to exceed 29.54 lbs total per hour of operation per turbine, CO emissions not to exceed 20.41 lbs total per hour of operation per turbine, during any black start commissioning or periodic testing operations.</u>
<u>Black Start Commissioning Operations</u>	<u>NO_x 181 lbs/day, CO 215 lbs/day</u>	<u>NO_x emissions not to exceed 181 lbs total per day per turbine, CO emissions not to exceed 215 lbs total per day per turbine, during black start commissioning operations.</u>

Black start periodic testing operations may be conducted annually, or as required by a regulatory body. In no case will black start periodic testing exceed two times in any calendar year.

Except during initial black start commissioning activities, no more than four of the devices subject to this condition may be operated during a black start periodic test. As part of initial black start commissioning activities, all eight devices may be tested. Black start commissioning testing operations for the eight units may be conducted for no more than 64 hours combined.

Black start periodic testing exemptions shall be limited to no more than 3 hours of black start testing operations per device as provided in condition AQ-3. The entire black start periodic testing operations shall be limited to 12 combined operating hours and shall be completed in one day. In the case of a failed black start test, the facility will be allowed an additional day within the same year to conduct a black start test.

The facility must notify the SCAQMD and CPM at least 48 hours prior to a scheduled black start commissioning or periodic test.

The facility must notify the SCAQMD and CPM at least 24 hours of a failed black start testing event.

Verification: The project owner shall provide black start events and duration data as part of the Quarterly Operation Report (AQ-SC9). The project owner shall make the site available for inspection of the records by representatives of the District, CARB and the Commission.

AQ-23 The project owner shall not operate the turbine for commercial electrical generation on a day in which the unit has been operated for black start commissioning or a black start periodic test.

Verification: The project owner shall provide black start events and duration data as part of the Quarterly Operation Report (AQ-SC9). The project owner shall make the site available for inspection of the records by representatives of the District, CARB and the Commission.

**AQ-24 The project owner shall only install SCR catalyst that matches the permit description unless prior written approval has been received from the district Executive Officer or designee and CPM. To request written approval for the replacement catalyst, the project owner shall submit a completed 400-E-5-CR form used for collecting data to establish equivalency for replacement catalyst. Once the approved replacement catalyst is installed and used, the project owner shall not install a different catalyst other than the most recently approved catalyst unless prior written approval has been received from the district Executive Officer or designee and CPM. The permit will be updated to reflect the new catalyst and performance criteria as an administrative revision in the next upcoming Title V permit revision or renewal after the completion of satisfactory testing and verification of performance criteria. Source test(s) shall be conducted in accordance with performance test(s) defined in condition(s) AQ-7 and AQ-8a within 90 days of the completion of installation of an approved catalyst. For the purpose of demonstrating equivalency only, source test results shall be used to verify that the replacement catalyst can, at a minimum, meet the following performance criteria:
The NO_x emissions at the outlet of SCR shall be no more than 2.5 PPMV, averaged over 60 minutes and corrected to 15 percent oxygen.
The NH₃ emissions at the outlet of SCR shall be no more than 5 PPMV, averaged over 60 minutes and corrected to 15 percent oxygen.
No increase in toxic air contaminant emissions that will cause any increase in health risk higher than the level the existing catalyst could have caused.**

Verification: The project owner shall make the site available for inspection of the records by representatives of the District, CARB and the Commission.

AQ-25 The project owner shall install and maintain a pressure relief valve with a minimum pressure set at 25 psig for the ammonia storage tanks.

The project owner shall vent the ammonia storage tank, during filling, only to the vessel from which it is being filled.

Verification: The project owner shall make the site available for inspection of the records by representatives of the District, CARB and the Commission.

REFERENCES

CEC 2010a – California Energy Commission (CEC). CPV Sentinel Energy Project Commission Decision (TN 59190), docketed December 8, 2010.

CEC 2010b – California Energy Commission (CEC). CPV Sentinel Energy Project Final Staff Assessment Air Quality Addendum (TN 56243), docketed April 15, 2010.

CEC 2011a – California Energy Commission (CEC). Notice of Determination Petition to Modify the Laydown Area for the CPV Sentinel Project (TN 60030), docketed March 17, 2011.

CEC 2011b – California Energy Commission (CEC). Notice of Determination Petition to Modify the General Arrangement of the Project Site for the CPV Energy Sentinel Project (TN 61239), docketed June 29, 2011.

CEC 2011c – California Energy Commission (CEC). Notice of Determination Petition to Modify the Laydown Area for the CPV Energy Sentinel Project (TN 61991), docketed August 24, 2011.

SCAQMD 2023a – South Coast Air Quality Management District (SCAQMD). Facility Permit to Operate Sentinel Energy Center LLC, dated July 20, 2023.

SCAQMD 2023b – South Coast Air Quality Management District (SCAQMD). Statement of Basis Analysis Sentinel Energy Center LLC, dated July 26, 2023.

SEC 2022 – Sentinel Energy Center, LLC. Sentinel Energy Center Black Start Petition to Amend (TN 243444), docketed June 6, 2022

SEC 2023 – Sentinel Energy Center, LLC. Sentinel Black Start Petition to Amend Revision 1 - Black Start Upgrade (TN 252184-1), docketed September 8, 2023

SENTINEL ENERGY CENTER (07-AFC-3C)
Request to Amend Final Commission Decision
Worker Safety and Fire Protection
Brett Fooks

INTRODUCTION

Sentinel filed a PTA on June 6, 2022, requesting approval to install a BESS to provide black start capability to the SEC (SEC 2022).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS) COMPLIANCE

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Local	
2022 Edition of the California Fire Code (24 CCR Part 9)	The City of Palm Desert currently enforces the 2022 edition of the California Fire Code (CFC).

ANALYSIS

Worker safety and fire protection are regulated through LORS, at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials and may face hazards that can result in accidents and serious injury. Protective measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The construction for the installation of the BESS would comply with worker safety and fire safety measures contained in health and safety plans prepared in accordance with existing Condition of Certification **WORKER SAFETY-1**. During plant operation, the BESS would be operated in compliance with the health and safety plans as required by existing Condition of Certification **WORKER SAFETY-2**. The Operations Fire Prevention Plan, Emergency Action Plan, and Hazardous Materials Management Plan would be updated to include the BESS in accordance with existing Condition of Certification **WORKER SAFETY-2**. The project would also comply with the project Operations and Maintenance Safety and Health Program.

SEC relies on the local fire protection services provided by the Palm Desert Fire Department (PDFD). The BESS like the one that would be installed at SEC are still a new technology for local fire fighters given that the deployment of these projects is still in its infancy. Therefore, staff proposes Condition of Certification **WORKER SAFETY-6**,

under which the project owner would be required to submit the fire protection plans for the BESS to the PDFD for their review and comment before construction could begin.

The CEC staff's evaluation of the safety of lithium-ion batteries determined that large lithium-ion BESS installations pose potential hazards. Because they store large amounts of energy, one of the principal hazards associated with lithium-ion BESSs is fire, which could occur if a charged battery cell was somehow damaged, for example by being opened, punctured, or crushed. A fire could also be caused if a battery cell is short-circuited, overheated, or experiences thermal runaway. After such an event, it may burn rapidly with flare-burning effect and may ignite other battery cells in proximity. The resulting fire would produce corrosive and/or toxic gases including hydrogen chloride, hydrogen fluoride, and carbon monoxide, similar to a fire involving a like-amount of plastics, requiring first responders to wear self-contained breathing apparatus to control the fire safely. Overheating batteries may also produce flammable gases that have, under certain circumstances, lead to an explosion within the BESS container. Due to the potential for fire and explosion, staff concludes that SEC's BESS would present a significant risk that should be mitigated.

The CEC staff has reviewed the current regulatory framework regarding fire and life safety as related to the proposed lithium-ion BESS. While the current regulatory framework is evolving to address the risks involved with lithium-ion BESS installations, there are several current safety standards for BESSs that have been developed by industry standards groups including Underwriters Laboratories (UL) and the National Fire Protection Association (NFPA). One of the newest, issued in 2019 and revised in September 2022, is NFPA 855: Standard for the Installation of Stationary Energy Storage Systems. Others include UL 9540-2020: Energy Storage Systems and Equipment which lists requirements for BESSs supporting the local-area electric power systems or the electrical utility power grid, and UL 9540A-2019: Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems which provides the standard test methodology for determining fire and explosion hazards presented by a given BESS design when undergoing an overheating failure, such as thermal-runaway. The current edition of the California Fire Code (CFC) also contains fire safety requirements for stationary lithium-ion battery energy storage systems. Issuance of these recent standards and codes provide evidence that the regulatory environment is quickly evolving to accommodate new lithium-ion BESS technology and designs as they emerge.

Confirmation of potential hazards posed by BESS installations has been provided through field experience. An explosion in a remote BESS enclosure occurred at the Arizona Public Service (APS) McMicken site in April 2019. There, four first responders were seriously injured upon opening the door to a BESS after a suspected internal fire had subsided. The failure report issued by APS indicated that the suspected fire was an extensive cascading thermal runaway event initiated by an internal failure within one

battery cell of the BESS. The BESS's internal fire suppression system discharged a clean agent preventing the fire from spreading to surrounding battery racks. However, the compromised batteries emitted a mixture of combustible gases, which accumulated inside the BESS container. Although the batteries themselves did not explode, upon opening the container door and admitting air into the BESS, the gas mixture exploded. The fire incident at McMicken demonstrates that flammable gases generated during severe overheating of Li-ion batteries must be adequately managed to protect onsite workers and first responders.

While three years have passed since the McMicken site explosion, most published standards and existing fire codes do not yet explicitly address the explosion hazard of remote outdoor BESS enclosures located away from occupied buildings. To address this risk, staff proposes new COC **WORKER SAFETY-7**, which would require that test results from a BESS hazard mitigation analysis performed using the method prescribed by UL 9540A be submitted by the project owner to the PDFD for review and comment, and to the Compliance Project Manager (CPM) for review and approval. Staff's proposed COC **WORKER SAFETY-7** would ensure adequate protection to on-site workers and to first responders by ensuring that explosion risks posed by the BESS are mitigated by the BESS fire protection plans to a level that is less than significant.

More recently, staff inspected the site of the Tesla Megapack fire that occurred on September 20, 2022, at the Elkhorn Battery Energy Storage Facility near Moss Landing, CA, where one out of a total of 256 Megapacks caught fire. The North County Fire Protection District (NCFPD) responded to the incident and proceeded to let the fire burn itself out per Tesla's emergency action plan for first responders. The fire department used onsite fire water monitors (water cannons) to cool adjacent modules to prevent them from overheating. Staff learned that during project commissioning, the project owner had provided training opportunities to the NCFPD for practicing on how to deal with a fire at the facility. The important takeaway from this incident is that proper training for first responders and the appropriate fire water supply infrastructure are critical for safely limiting damage and controlling the fire. Therefore, the CEC staff proposes new COC **WORKER SAFETY-8** which would require the project owner to provide the appropriate fire water supply infrastructure for the BESS and allow access to information about the facility for training of the local fire department.

CONCLUSIONS AND RECOMMENDATIONS

Based on the information provided in the petition, the CEC staff proposes new COCs **WORKER SAFETY-6**, **WORKER SAFETY-7**, and **WORKER SAFETY-8** which would provide adequate protection to on-site workers and would mitigate the fire risks posed to first responders and the offsite public to a level that is less than significant.

With the adoption of new COCs **WORKER SAFETY-6**, **WORKER SAFETY-7**, and **WORKER SAFETY-8** and continued compliance with the existing conditions of certification in the SEC

decision, staff concludes that the proposed modifications would be in compliance with applicable worker safety and fire protection LORS.

PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

The CEC staff recommends adoption of the following new conditions of certification:

WORKER SAFETY-6 **The project owner shall submit the fire protection plans for the Battery Energy Storage System (BESS) to the Palm Desert Fire Department (PDFD) for review and comment, to the Delegate Chief Building Official (DCBO) for plan check and inspection, and to the Compliance Project Manager (CPM) for review and approval.**

Verification: At least sixty (60) days prior to the start of construction of the BESS project, the project owner shall provide the complete set of BESS fire protection drawings and specifications to the PDFD for review and comment, to the DCBO for plan check approval and construction inspection, and to the CPM for review and approval.

WORKER SAFETY-7 **The project owner shall submit a BESS hazard mitigation analysis per UL 9540A to the PDFD for review and comment, to the DCBO for plan check and inspection, and to the CPM for review and approval. The hazard mitigation analysis shall include consideration of potential thermal runaway fault conditions occurring within a single battery storage rack, cell module or cell array. The analysis shall include mitigations to prevent flammable gases released during fire, battery overcharging, and other abnormal operating conditions within the BESS from creating an explosion hazard that could injure workers or emergency first-responders.**

Verification: At least sixty (60) days prior to the start of construction of the BESS project, the project owner shall provide the hazard mitigation analysis to the PDFD for review and comment, to the DCBO for plan check and inspection and to the CPM for review and approval.

WORKER SAFETY-8 **The project owner shall provide an approved fire water supply for use by first responders when responding to an emergency related to the BESS. The project owner shall also provide access to information and the facility for the local fire department to conduct training.**

Verification: At least sixty (60) days prior to the start of construction of the BESS, the project owner shall:

- a) **Provide the fire water supply plans to the PDFD for review and comment, to the DCBO for plan check and inspection, and to the CPM for review and approval.**
- b) **Provide a copy of a letter from the project owner to the PDFD offering access to information and the facility for training of PDFD personnel for emergencies that could occur at the BESS facility.**

REFERENCES

SEC 2022, Petition to amend – Black Start Upgrade. 6 June 2022, Docket No. 07-AFC-03C (TN#:243444)