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| **Project Title:** | Marsh Landing Generating Station Compliance |
| **TN #:** | 226487 |
| **Document Title:** | Staff Analysis of Petition to Amend to Add Black Start Capability |
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**DATE:** February 8, 2019

**TO:** Interested Parties

**FROM:** Keith Winstead, Siting Project Manager

**SUBJECT: Marsh Landing Generating Station (08-AFC-03C)**
**Staff Analysis of Petition to Amend to Add Black Start Capability**

On March 26, 2018, NRG Marsh Landing, LLC, filed a Petition to Amend (PTA or petition) with the California Energy Commission requesting to modify the Marsh Landing Generating Station (MLGS) by installing a battery energy storage system (BESS) and associated equipment. The batteries would be used to start the combustion turbine generators to restart the power plant in the event of a blackout to support the California Independent System Operator's (California ISO) directed restoration of the electrical grid in response to an emergency condition (also known as "black start" capability). MLGS is a simple-cycle, natural gas-fired, 760-megawatt (MW) facility, located in the city of Antioch, California. The project was certified by the Energy Commission on August 25, 2010, and began commercial operation on May 1, 2013.

## DESCRIPTION OF PROPOSED MODIFICATIONS

The PTA (TN 223052) is seeking approval to install and operate a BESS to provide black start capability to MLGS. The proposed project consists of installing up to a 7 MW/3.6-megawatt-hour lithium-ion (Li-ion) BESS to provide black start capability to the Unit 3 and 4 combustion turbine generators to be able to respond to a grid-wide blackout. The BESS would consist of seven Li-ion battery banks installed in two metal enclosures. The BESS would connect to the MLGS plant via new switchgear tied into the Unit 3 and Unit 4 bus.

## ENERGY COMMISSION AMENDMENT REVIEW PROCESS

Energy Commission technical staff reviewed the petition for potential environmental effects and consistency with applicable laws, ordinances, regulations, and standards (LORS). Staff recommends approval of the PTA with changes and additions to the air quality conditions of certification – seven new conditions and nine modified conditions – and one new worker safety and fire protection condition.

Staff concluded that all potential impacts associated with the installation of black start capability, as well as the operating and testing scenarios associated with black start capability, would be less than significant with the implementation of the offset mitigation, and, with the new and revised air quality and worker safety and fire protection conditions of certification, the project would remain in compliance with applicable LORS.

For additional information, the Energy Commission's webpage for this facility, http://www.energy.ca.gov/sitingcases/marshlanding/index.html, has a link to the PTA

(TN 223052) accessible through the webpage in the box labeled "Compliance Proceeding." Click on the "Documents for this Proceeding (Docket Log)" option.

This notice is being mailed to the Energy Commission's list of interested parties and property owners adjacent to the site of the facility. It is also available through the MLGS listserv. The listserv is an automated system by which information about the facility is emailed to parties who have subscribed. To subscribe, go to the Energy Commission's webpage for the MLGS, cited above, scroll down the right side of the project webpage to the box labeled "Subscribe," and provide the requested contact information.

Any person may comment on the staff analysis. Those who wish to comment are asked to submit their comments by 5:00 p.m. on Monday, March 11, 2019. This amendment is scheduled for a decision at the March 12, 2019 Energy Commission Business Meeting.

To use the Energy Commission's electronic commenting feature, go to the Energy Commission's webpage for this facility, cited above, click on the "Comment on this Proceeding" or "Submit e-Comment" link, and follow the instructions in the on-line form. Be sure to include the facility name in your comments. Once the Energy Commission Dockets Unit dockets your comments, you will receive an email with a link to them. Written comments may also be mailed or hand-delivered to:

California Energy Commission
Dockets Unit, MS-4
Marsh Landing (08-AFC-03C)
1516 Ninth Street
Sacramento, CA 95814-5512

All comments and materials filed with the Dockets Unit will be added to the facility Docket Log and become publicly accessible on the Energy Commission's webpage for the facility.

For information on participating in the Energy Commission's review of the petition, call the Public Adviser at (800) 822-6228 (toll-free in California) or send an email to publicadviser@energy.ca.gov.

News media inquiries should be directed to the Energy Commission Media Office at (916) 654-4989, or by email to mediaoffice@energy.ca.gov.

If you have questions about this Notice, please contact Keith Winstead, Compliance Project Manager, at (916) 654-5191, or by fax to (916) 654-3882, or via e-mail at: keith.winstead@energy.ca.gov.

Date: 2/8/19

Christine Root

**CHRISTINE ROOT**
Compliance Office Manager
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**Marsh Landing Mail list 7299**
**Marsh Landing listserve**

# STAFF ANALYSIS

## MARSH LANDING GENERATING STATION
## BLACK START CAPABILITY
## (08-AFC-03C)

## PETITION TO AMEND

# MARSH LANDING GENERATION STATION
# (08-AFC-03C)
## PETITION TO AMEND THE COMMISSION DECISION
## STAFF ANALYSIS

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# MARSH LANDING GENERATING STATION (08-AFC-03C)
## Petition to Amend to Add Black Start Capability
## EXECUTIVE SUMMARY
Keith Winstead

## INTRODUCTION

On March 26, 2018, NRG Marsh Landing, LLC, filed a Petition to Amend (PTA) with the California Energy Commission requesting modifications to incorporate a battery energy storage system (BESS) and associated equipment to the Marsh Landing Generating Station (MLGS). The batteries would start the combustion turbine generators to restart the power plant in the event of a blackout to support the California Independent System Operator's (California ISO) directed restoration of the electrical grid in response to an emergency condition (also known as "black start" capability). MLGS is a simple-cycle, natural gas-fired, 760-megawatt facility, located in the city of Antioch, California. The project was certified by the Energy Commission on August 25, 2010, and began commercial operation on May 1, 2013.

The purpose of the Energy Commission's review process is to analyze whether the proposed changes to the project may have a significant effect on the environment or cause the project to not comply with applicable laws, ordinances, regulations, and standards (LORS) (Cal. Code Regs., tit. 20, § 1769).

Energy Commission staff has completed its review of all materials received. The staff analysis below includes staff's independent assessment of the petitioner's proposal to modify the Air Quality conditions of certification for the BESS installation, and to conform with the Bay Area Air Quality Management District (District) air quality permit conditions. Staff is also adding a worker safety and fire protection condition of certification to conform with LORS.

Staff concluded that all potential impacts associated with the installation of black start capability, as well as the operating and testing scenarios associated with black start capability, would be less than significant with the surrender of the offsets and mitigation, and with new and revised air quality and worker safety and fire protection conditions of certification the project would remain in compliance with applicable LORS.

## DESCRIPTION OF PROPOSED MODIFICATIONS

The PTA (TN 223052) is seeking approval to install and operate a BESS to provide black start capability to MLGS. The proposal consists of installing up to 7 MW/3.6-megawatt-hour lithium-ion (Li-ion) BESS to provide black start capability to the Unit 3 and 4 combustion turbine generators. The BESS would consist of seven Li-ion battery banks installed in two metal enclosures. Each battery bank would be electrically connected to a power conversion system consisting of a 1,000-volt direct current to 480-V alternating current (AC) 1.4-kilovolt-ampere (kVA bi-directional inverter and a 480-V/4,160-V 1.4-kVA transformer. The BESS would connect to the MLGS plant via new 4,160-V switchgear tied into the Unit 3 and Unit 4 4,160-V station service bus.

## NECESSITY FOR THE PROPOSED MODIFICATIONS

MLGS was selected by the California ISO to provide black start service. To provide this service, the petitioner is proposing modification of the power plant to install a BESS. The batteries would start one of the combustion turbine generators to restart the power plant in the event of a blackout, to support the California ISO's directed restoration of the electrical grid in response to an emergency condition also known as "black start" capability.

## STAFF'S ASSESSMENT OF THE PROPOSED PROJECT CHANGES

Energy Commission technical staff reviewed the petition for potential environmental effects and consistency with applicable LORS. Staff has determined that all potential impacts associated with the project changes would be less than significant with new and revised air quality conditions, and with the new and revised and worker safety and fire protection conditions of certification the project would remain in compliance with applicable LORS. The resulting project modification would not affect any population, including the environmental justice population, as shown in the **Environmental Justice Population Figure 1**, **Figure 2**, and **Table 1** below.

Staff's conclusions in each technical area are summarized in **Executive Summary Table 1** and discussed in more detail, below.

**Executive Summary Table 1**
**Summary of Impacts to Each Technical Area**

| Technical Areas Reviewed | Technical Area Not Affected | CEQA | | | Conforms with applicable LORS | Revised or New Conditions of Certification requested or recommended |
|---|---|---|---|---|---|---|
| | | Potentially significant impact | Less than significant impact with mitigation | Less than significant impact | | |
| Air Quality | | | X | | X | X |
| Biological Resources | | | | X | X | |
| Cultural Resources | | | | X | X | |
| Efficiency and Reliability | | | | X | N/A | |
| Facility Design | | | | N/A | X | |
| Geological and Paleontological Resources | | | | X | X | |
| Hazardous Materials Management | | | | X | X | |
| Land Use | | | | X | X | |
| Noise and Vibration | | | | X | X | |
| Public Health | | | | X | X | |
| Socioeconomics | | | | X | X | |
| Soil and Water Resources | | | | X | X | |
| Traffic and Transportation | | | | X | X | |
| Transmission Line Safety and Nuisance | | | | X | X | |
| Transmission System Engineering | X | | | | | |
| Visual Resources | | | | X | X | |
| Waste Management | | | | X | X | |
| Worker Safety and Fire Protection | | | | X | X | X |

**Air Quality**. The petitioner proposes to add a definition, modify nine air quality conditions of certification in the Final Commission Decision (Decision) and add seven new conditions (MLGS 2018a) to install a battery system to enable black start capabilities. Staff concludes that with the adoption of the new and revised conditions of certification, the modified MLGS would be offset, and continue to comply with all applicable federal, state, and District air quality LORS.

The amendment adds seven new conditions (**AQ-41** to **AQ-47**) related to the emission limits and operational limits for the combustion turbines during the black start related operations. The amendment also modifies nine conditions (**AQ-14**, **AQ-15**, **AQ-17**, **AQ-18**, **AQ-20** to **AQ-22**, **AQ-24** and **AQ-25**) to exempt the black start-related operations from the normal operation emission limits. In addition to those conditions listed above, several other conditions include minor administrative modification to change condition sequence numbers and change "Commission" to "Energy Commission".

**Biological Resources.** Construction of the proposed modifications would be within the existing MLGS property. The new BESS would be east of Unit 4 and staging and parking would occur on both paved and unpaved portions of the MLGS property. Most construction activities would not occur near biologically sensitive areas such as the row of Tasmanian bluegum (*Eucalyptus globulus*) along the western boundary, the shoreline of the San Joaquin River along the northern boundary, or the detention basin located off site along the southern boundary. However, the excess soil pile on the MLGS property is located near the row of Tasmanian blue gum trees. These trees have sufficient canopies to potentially support nesting raptors and other birds. In addition, potential impacts to wildlife could occur if excavations are left open overnight without being backfilled or provided with escape ramps. Implementation of Conditions of Certification **BIO-1** through **BIO-7** in the Decision would ensure impacts to biological resources would be less than significant.

**Cultural Resources.** There are no known cultural resources on the project site or in the vicinity that could be impacted by the proposed modifications. Conditions of Certification **CUL-1** through **CUL-8** in the Decision were developed to ensure that, if cultural resources are encountered during construction, adequate measures are in place to mitigate any impacts to less than significant. Conditions of Certification **CUL-3**, **CUL-6**, and **CUL-7** would ensure that the project continues to comply with the city of Antioch's General Plan Cultural Resources Objective and Policies.

**Efficiency and Reliability.** The BESS itself would not consume natural gas. Although gas consumption at low loads during black start operations would be less efficient than when the turbines are operating at or near full-load, black start operations would occur infrequently, for a short duration, in an emergency situation or periodic testing. Therefore, the proposed modification would have no significant adverse impacts on natural gas consumption or the project's overall thermal efficiency. The proposed black start capability would provide operating flexibility, particularly during a system emergency that would result in a sudden and widespread loss of grid power, and thus, would improve the project's operational reliability.

**Facility Design**. Installation of the battery system and its related components must comply with the 2016 California Building Code. Implementation of the existing facility design conditions of certification adopted in the Decision would ensure this.

**Geological and Paleontological Resources.** Staff concludes the proposed modifications would not result in additional significant environmental impacts in terms of geologic resources, paleontologic resources, or geologic hazards in comparison with the original analysis for the approved project. The proposed construction would not require any change to the conditions of certification related to geology or geologic hazards adopted by the Energy Commission in its Decision.

**Hazardous Materials Management**. The proposed battery system will use LI-ion batteries. The batteries would be delivered to the MLGS site in U.S. Department of Transportation-certified vehicles via a route approved by the Energy Commission compliance project manager in accordance with Condition of Certification **HAZ-6**. The Hazardous Materials Business Plan would be updated to include the new BESS in accordance with **HAZ-2**. Also,

the batteries would be included on the list of hazardous materials contained at the site and reported in the Annual Compliance Report per **HAZ-1**.

There would be no other changes to the hazardous materials used during operation of the MLGS. The use, handling, storage, and transportation of the LI-ion batteries would be in compliance with all current LORS. Therefore, the potential hazardous materials management impacts are expected to be less than significant with the continued implementation of the Conditions of Certification **HAZ-1, HAZ-2**, and **HAZ-6** adopted in the Decision.

**Land Use**. The proposed modification would have a less than significant land use impact as the associated activities (install a battery energy storage system) would be consistent with the city of Antioch's land use designation and zoning designation for the project site. There were no conditions of certification for land use in the Decision and no conditions of certification would be necessary for the proposed modification.

**Noise and Vibration.** Construction work associated with this petition would be temporary and would occur during the daytime hours. Any noise generated during these activities would result in a less-than-significant impact with implementation of the existing noise conditions of certification in the Decision.

Battery systems do not generate high levels of noise when operating, and thus, no noticeable increase in operational noise would result from this petition. Because the project would continue to meet operational noise requirements established in the Decision, the project would not cause a significant adverse noise impact as the result of this modification.

**Public Health.** The emissions of some TACs (formaldehyde, benzene and specified polycyclic aromatic hydrocarbons [PAHs]) will slightly increase, Air Quality conditions of certification AQ-23 and AQ-30 would also be updated. Please see **Air Quality** section for these revised conditions. Staff's recommended conditions of certification would ensure the modifications would be constructed and operated as proposed and emissions would remain less than significant.

**Socioeconomics.** The proposed modification would have a less than significant socioeconomic impact as the associated activities (install a battery energy storage system) would not require a large construction workforce and no new operations workers. Construction would be approximately five to six months in duration and thus not extensive. The ample labor supply in the local area would meet the needs of the proposed modification. The compliance building official with the city of Antioch does not consider the battery storage containers assessable space for the collection of school impact fees; therefore, Condition of Certification **SOCIO-1** would not apply to this proposed modification.

**Soil and Water.** Based on the information provided by the project owner, staff concludes the proposed modifications would have no significant impact on soil and water resources. The proposed construction would not require any change to the conditions of certification adopted by the Energy Commission in its Decision.

**Traffic and Transportation**. Impacts to the traffic and transportation system from installation of a BESS would be less than significant. Construction traffic would be minimal, and there would be no added traffic from operation. All construction would occur on-site and would not obstruct any part of the transportation network.

**Visual Resources.** Visibility of the proposed modifications would be limited from any offsite locations because views of the BESS would be obscured from offsite locations. There would be less-than-significant impacts to visual resources. Conditions of Certification **VIS-1** and **VIS-3** would apply to the proposed modifications.

**Waste.** Based on the information provided by the project owner, staff concludes the proposed modifications would have no significant impact to the environment based on its waste management activities. The proposed construction would not require any change to the conditions of certification adopted by the Energy Commission in its Decision.

**Worker Safety and Fire Protection**. Staff proposes new Condition of Certification **WORKER SAFETY-8**, which would ensure compliance with LORS to provide adequate protection for on-site workers and first responders. With the adoption of **WORKER SAFETY-8**, staff concludes that the proposed modifications would be in compliance with applicable worker safety and fire protection LORS and conditions of certification adopted by the Energy Commission in its Decision.

## ENVIRONMENTAL JUSTICE

**Environmental Justice Figure 1** shows 2010 census blocks in the six-mile radius of the Marsh Landing Generating Station 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.*

Based on California Department of Education data in the **Environmental Justice Table 1** and presented **Environmental Justice Figure 2**, staff concluded that the percentage of those living in the school districts of Antioch Unified, Oakley Union Elementary, and Pittsburg Unified (in a six-mile radius of the project site) and receiving free or reduced price meals is larger than those in the reference geography, and thus are considered an EJ population based on low income as defined in *Guidance on Considering Environmental Justice During the Development of Regulatory Actions.*

**Environmental Justice Population Table 1**
**Low Income Data within the Project Area**

| SCHOOL DISTRICTS IN SIX-MILE RADIUS | Enrollment Used for Meals | Free or Reduced Price Meals | |
|---|---|---|---|
| | | | |
| Antioch Unified School District | 17,326 | 11,723 | 67.7% |
| Brentwood Union Elementary School District | 8,917 | 2,269 | 25.4% |
| Oakley Union Elementary School District | 5,015 | 2,151 | 42.9% |
| Pittsburg Unified School District | 11,489 | 8,261 | 71.9% |
| REFERENCE GEOGRAPHY | | | |
| Contra Costa County | 177,383 | 69,708 | 39.3% |
| | | | |

**Source:** CDE 2017. California Department of Education, DataQuest, Free or Reduced Price Meals, District level data for the year 2016-2017, <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**, and **Waste Management**.

## ENVIRONMENTAL JUSTICE CONCLUSIONS

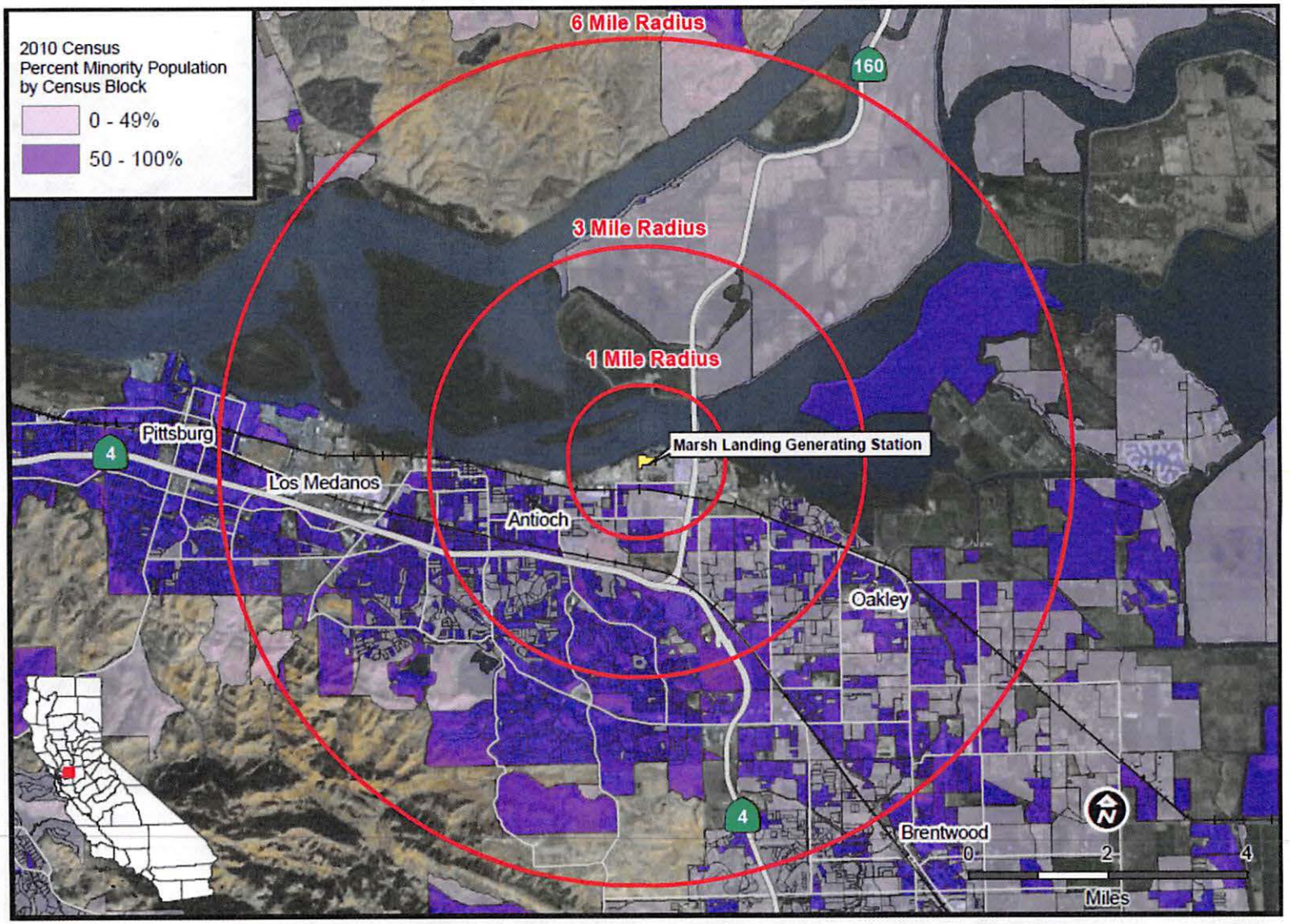
Staff has determined that with the new, modified, and existing conditions of certification, the modified project would not cause significant impacts for any population in the project's six-mile radius, including the EJ population represented in **Environmental Justice – Figure 1**, **Figure 2**, and **Table 1**.

## STAFF RECOMMENDATIONS AND CONCLUSIONS

Staff concludes that the project modification would not result in significant adverse environmental impacts with the implementation of the new conditions, and with new and revised air quality and worker safety and fire protection conditions of certification the project would remain in compliance with all applicable laws, ordinances, regulations, and standards. Staff also concludes that none of the required findings in Title 20, California Code of Regulations, section 1748(b) are applicable to this amendment.

**ENVIRONMENTAL JUSTICE - FIGURE 1**

Marsh Landing Generating Station - Census 2010 Minority Population by Census Block

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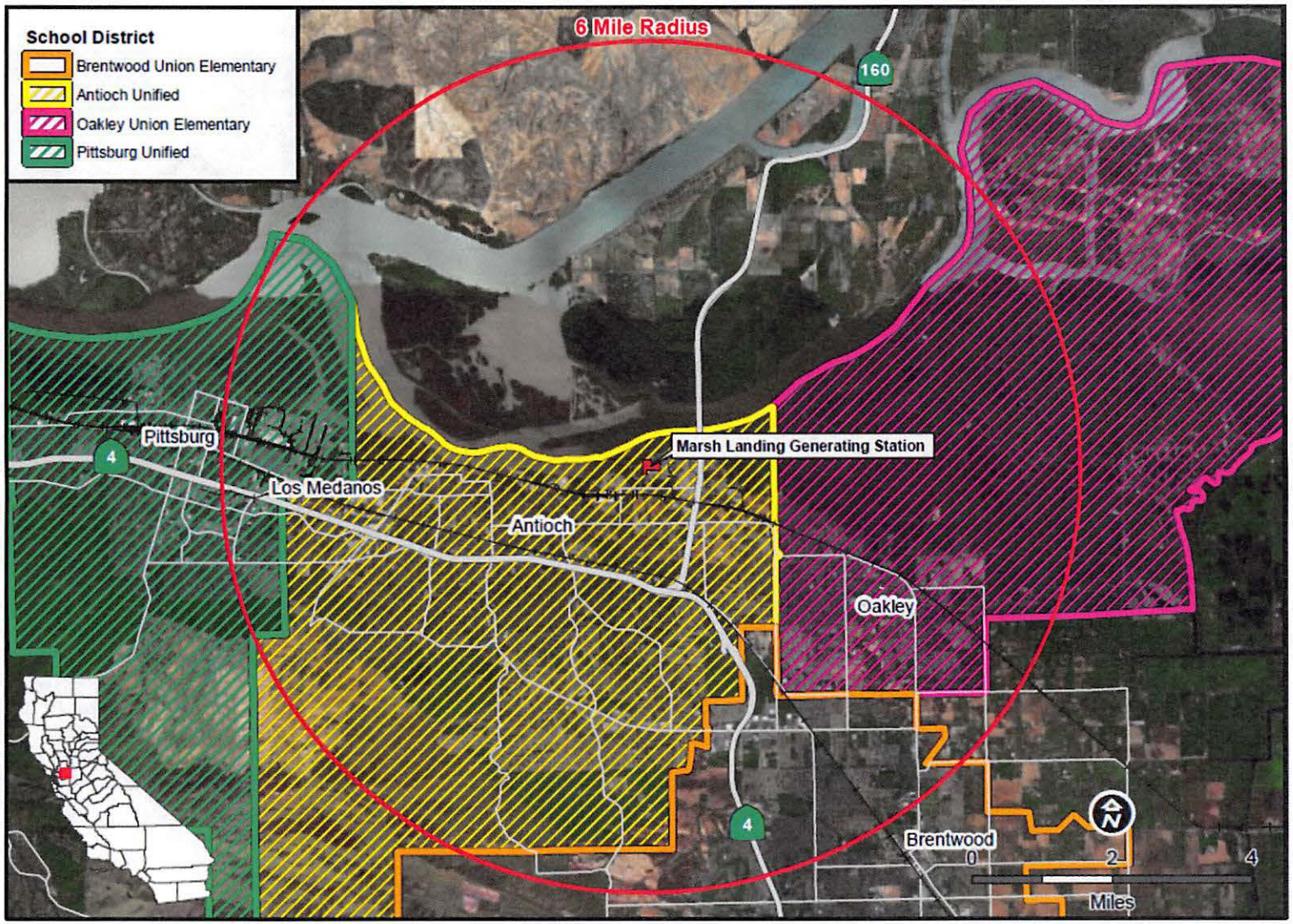
SOURCES: Census 2010 PL 94-171 Data

**ENVIRONMENTAL JUSTICE - FIGURE 2**

Marsh Landing Generating Station - Environmental Justice Population Based on Low Income

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SOURCES: TIGER Data, CA Dept. of Education Dataquest

# MARSH LANDING GENERATING STATION (08-AFC-03C)

**Petition to Amend to Add Black Start Capability**

## AIR QUALITY

Tao Jiang, Ph.D., P.E.

## SUMMARY OF CONCLUSIONS

In this Petition to Amend (PTA) for Black Start Capability Enhancement at Marsh Landing Generating Station (MLGS), the petitioner proposes to revise and add air quality conditions of certification for commissioning, annual testing, and operations for black start capabilities of combustion turbine generator Units 3 and 4 (MLGS 2018a). Staff concludes that with the adoption of the attached conditions of certification, the amended MLGS would not result in significant adverse air quality related impacts, and that the MLGS would continue to comply with all applicable conditions of certification and federal, state, and Bay Area Air Quality Management District (District) air quality laws, ordinances, regulations, and standards (LORS). Black start operations are not expected to change the facility's annual greenhouse gas emissions significantly.

## INTRODUCTION

The Energy Commission certified MLGS in August of 2010 (CEC2010) and the facility commenced commercial operations on May 1, 2013. It is a nominal 760-megawatt, natural gas-fired, simple-cycle power plant located north of the city of Antioch in Contra Costa County. The Energy Commission approved a petition to amend the facility to include certain refinements to several project components on May 15, 2012 (CEC2012). In December 2014, the Energy Commission also approved a petition modifying the fire protection system to be independent of the neighboring Contra Costa Generating Station's fire protection system (CEC2014). The Energy Commission approved additional project modifications to include the addition of a modular building for document storage and staff training purposes in 2015 (CEC2015), and the addition of asphalt paving in 2017 on the access roads within the licensed project boundaries that lead to the MLGS warehouse building (CEC2017).

On December 1, 2017, the California Independent System Operator (California ISO) selected NRG Marsh Landing for adding "black start" capability to Units 3 and 4 of MLGS. On March 26, 2018, NRG Marsh Landing LLC filed a petition to amend with the Energy Commission requesting approval to install and operate a battery energy storage system (BESS) to incorporate black start capability on these two units. Black start capability would entail initial startup of either of the designated combustion turbine generators by the BESS. This would in turn enable MLGS to restore its station power (i.e., house load), startup one or more of the remaining MLGS combustion turbine generators, and support the California ISO's directed restoration of the electrical grid in response to an emergency condition. The energy source to enable black start operations would be a lithium-ion (Li-ion) BESS of up to 7-MW/3.6-megawatt-hour. The BESS would consist of seven Li-ion battery banks installed in two metal enclosures. Each battery bank would be electrically connected to a power conversion system (PCS)

consisting of a 1,000-volt (V) direct current (DC) to 480-V alternating current (AC) 1.4-kilovolt-ampere (kVA bi-directional inverter and a 480-V/4,160-V 1.4-kVA transformer. The MLGS existing diesel backup generator would be operated as already permitted during a system emergency, with the intended purpose of protecting the MLGS units by providing essential power for essential equipment and emergency lighting. Diesel backup generator controls and relay protection schemes may have to be modified to provide the necessary logic to synchronize to the plant station service electric system when operating in *island* mode (i.e, the single combustion turbine generator is carrying all MLGS plant loads at about 4.5 MW).

The proposed modification does not include any new sources of emissions nor modifications to the existing sources of emissions. This amendment modifies and adds corresponding conditions of certification for black start commissioning, annual testing, and operations for combustion turbine generator Units 3 and 4, including modifying two Air Quality conditions related to toxic air contaminants (TACs). The District reviewed the proposed project changes and issued the "Draft Engineering Evaluation – Marsh Landing 'Black Start' Capacity Project", on December 27, 2018 (BAAQMD 2018) for a 30-day comment period. The comment period has closed; the few comments received were minor and did not affect the condition language. A final district engineering evaluation is being prepared.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS COMPLIANCE

MLGS is subject to all the LORS described in the Energy Commission decision for MLGS (CEC 2010) and previous amendments (CEC2012, CEC 2014, CEC2015 and CEC 2017). The applicable LORS remain the same as previous analyses; the requested changes would enable the facility to continue to comply.

## ANALYSIS OF REQUESTED CHANGES

The BESS includes the installation of seven Li-ion battery banks and PCS connected to each battery bank. There are no new emissions sources associated with the BESS.

In order to respond to the grid-wide blackout as determined by the California ISO, the combustion turbine generators may be required to operate within the load range of 2 to 60 percent for some time as the load through the system is balanced. During this time, the combustion turbine emissions may not be compliant with the existing permitted emission limits for oxides of nitrogen (NOx), carbon monoxide (CO) and volatile organic compounds (VOCs), which are also called Precursor Organic Compounds (POCs).

## CONSTRUCTION PHASE IMPACTS

Petitioner estimates that construction would take approximately 5 to 6 months beginning in the second quarter of 2019. Construction associated with the BESS would include site preparation, fill placement and compaction, minimal trenching, and installation of the enclosures and appurtenant facilities. All construction, including laydown and

parking, would only occur within the 27-acre MLGS property. **Air Quality Table 1** shows the maximum monthly and annual construction emissions of NOx, CO, VOC, also called POC, sulfur dioxide ($SO_2$), particulate matter less than or equal to 10 micrometers (PM10) and particulate matter less than or equal to 2.5 micrometers (PM2.5). The emissions during the original facility construction are also included for comparison.

**Air Quality Table 1**
**MLGS, Maximum Emissions Rates during BESS Construction**

| | NOx | VOC | PM10 | PM2.5 | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| **Monthly Construction Emissions (tons/month)** | | | | | | |
| **2008 Facility Construction** | 3.69 | 0.69 | 0.16 | 0.15 | 11.23 | 0.0043 |
| **2019 Black Start System Construction** | 1.07 | 0.20 | 0.05 | 0.04 | 3.25 | 0.0012 |
| **Annual Construction Emissions (tons/year)** | | | | | | |
| **2008 Facility Construction** | 28.7 | 5.33 | 1.25 | 1.14 | 85.02 | 0.034 |
| **2019 Black Start System Construction** | 4.08 | 0.76 | 0.18 | 0.16 | 12.09 | 0.00 |

Source: MLGS 2018b.

All existing AQ construction conditions of certification in the Energy Commission's decision apply to construction of the proposed modifications. As shown in **Air Quality Table 1**, the emissions during the black start system construction would be significantly less than those that occurred during the original facility's construction. Due to the short duration of construction and the limited area of disturbance, staff expects that the air quality impacts associated with emissions during construction activities are less than significant with implementation of the staff conditions adopted in the Energy Commission decision.

## Readiness Testing and Commissioning Phase Impacts

To ensure availability for black start emergency operations, MLGS would perform annual readiness testing of Black Start readiness for designated black start units (i.e., Units 3 and 4). The petitioner assumes that the readiness testing would take 5 hours once each year, during which the two black start units would have overlapping run hours. The testing period would consist of the two units operating during a single hour as follows:

- The first unit would operate 10 minutes of startup, 5 minutes of full speed no load (FSNL[1]), and 30 minutes of island mode (approximately 4.5 MW), then 15 minutes of shutdown. This results in a total of 51 minutes with emissions during the testing hour (i.e., 60 minutes less the last 9 minutes of shutdown, which have no emissions).

[1] The petitioner expects that the MLGS combustion turbine generators would not carry any load during the FSNL operation phase leading to the island mode phase. However, in the recent Russell City Energy Center black start project amendment, FSNL was when the combustion turbine generator was operating at full speed and carrying house load (i.e., island mode). The distinctions between these two project are not important, as each phase during readiness testing are of a short duration. And during an actual black start emergency, all operations would be conducted with the intent to start the facility to then complete a timely directed restart of the electricity grid.

- The second unit would operate 25 minutes on turning gear (no incremental emissions), then 10 minutes of startup, then 10 minutes of FSNL, then 15 minutes of shutdown. This results in a total of 26 minutes with emissions during the testing hour (i.e., 35 minutes of operation, including the last 9 minutes of shutdown that have no emissions).

**Air Quality Table 2** presents the petitioner's estimated maximum emissions during readiness testing. The hourly emissions would consist of the sum of all emissions released during the testing period for both combustoin turbines. The petitioner estimated daily emissions totals by assuming five hours of readiness testing per day that would include Units 3 and 4 operations. The petitioner also estimated annual emissions, which would occur for a maximum of five hours in a year, which therefore are the same as the maximum daily emissions.

**Air Quality Table 2**
**MLGS, Maximum Emissions Rates during Black Start Readiness Testing**

| | NOx | CO | VOC | $SO_2$ | PM10/2.5 |
|---|---|---|---|---|---|
| **Maximum Hourly Emission (2 turbines, lbs/hr)** | 82.8 | 2,587.2 | 202.2 | 2.1 | 3.1 |
| **Maximum Daily Emission (2 turbines, lbs/day)** | 413.9 | 12,935.8 | 1,011 | 10.5 | 15.4 |
| **Maximum Annual Emission (2 turbines, tons/year)** | 0.2 | 6.5 | 0.5 | 0.01 | 0.01 |

Source: MLGS 2018b, BAAQMD 2018.

The commissioning of BESS is required to demonstrate the ability of the battery to initiate startup of either Unit 3 or Unit 4 in the absence of station power and to repeat this function under plant conditions to ensure responsiveness to California ISO-declared black start events. The petitioner calculated hourly emissions of commissioning of black start components using the same assumptions as black start readiness testing. The maximum daily emissions account for up to eight hours of commissioning per day. The petitioner calculated annual emissions for commissioning based on five days of commissioning for the commissioning year (assumed to occur during 2019). The petitioner estimates that the 40-hour commissioning period would occur over a 2-week period. **Air Quality Table 3** presents the petitioner's anticipated maximum commissioning emissions.

**Air Quality Table 3**
**MLGS, Maximum Emissions Rates during Black Start Commissioning**

| | NOx | CO | VOC | $SO_2$ | PM10/2.5 |
|---|---|---|---|---|---|
| **Maximum Hourly Emission (2 turbines, lbs/hr)** | 82.8 | 2,587.2 | 202.2 | 2.1 | 3.1 |
| **Maximum Daily Emission (2 turbines, lbs/day)** | 662.3 | 20,697.2 | 1,617.8 | 16.8 | 24.6 |
| **Maximum Annual Emission (2 turbines, tons/year)** | 1.7 | 51.7 | 4.0 | 0.04 | 0.06 |

Source: MLGS 2018b, BAAQMD 2018.

Staff conducted an independent air quality impact assessment using a computer model to evaluate both readiness testing and commissioning to determine the worst case air quality impacts. Staff determined estimated impacts for 1-hour and 8-hour CO and state 1-hour $NO_2$ impacts. As shown in **Air Quality Table 2** and **3**, the maximum hourly emissions of black start readiness testing and commissioning represent the same operation scenario. Therefore, the short term Impacts for $NO_2$ and CO are the same during both periods. The form of the federal 1-hour $NO_2$ standard is expressed as a 3-year average of the 98th percentile of the daily maximum 1-hour concentration. Since this is a statistically based standard averaged over three years, it is not applicable to the short-duration readiness testing or commissioning periods. Staff does not expect either readiness testing or commissioning activities to have significant impact due to the very limited duration during both periods compared to the 3-year averaging time used for the federal standard. Staff did not further evaluate the annual $NO_2$ impact for the same reason. Impacts due to PM10, PM2.5, and $SO_2$ are directly proportional to fuel use and therefore are always highest at full load, normal operation. Therefore, short-term $SO_2$ and PM10/2.5 emission impacts during both periods will be less than normal operations and not evaluated here.

The ambient air quality monitoring stations closest to the MLGS site are Concord-2975 Treat Blvd and Bethel Island Road. Staff used the highest $NO_2$ and CO concentrations from the last three years (2015-2017) of available data collected from both stations to determine recommended background values. **Air Quality Table 4** shows that the readiness testing and commissioning phase emission impacts, added to background values and totaled, would not cause new exceedances of any state or federal ambient air quality standard.

**Air Quality Table 4**
**MLGS, Black Start Commissioning Phase Maximum Impacts ($\mu g/m^3$)**

| Pollutant | Averaging Time | Modeled Impact | Background | Total | Limiting Standard | Percent of Standard |
|---|---|---|---|---|---|---|
| CO | 1 hour | 648.9 | 2,300 | 2,949 | 23,000 | 13 |
| | 8 hour | 275.9 | 1,495 | 1,771 | 10,000 | 18 |
| $NO_2$ | 1 hour (state) | 20.8 | 77.1 | 98 | 339 | 29 |

Source: MLGS 2018b and independent staff analysis.

## Black Start Emergency Operation Impacts

During normal operations, the combustion turbine generators are programmed to ramp quickly (at 30 MW/min) to 60 percent of full load (i.e., 120 MW referred to as minimum emission compliance load or MECL). During California ISO-declared black start emergency events, which can occur due to a local transmission event or a regional or more widespread emergency conditions, the black start unit(s) would operate at FSNL, island mode (approximately 4.5 MW) at loads below MECL for extended periods of time (assumed to be up to 48 hours). **Air Quality Table 5** describes expected operations of two units during the black start events.

## Air Quality Table 5
## MLGS, Black Start Operation Modes

| | Duration | Operating Condition |
|---|---|---|
| **Primary Unit** | | |
| **First Day** | 10 mins | Start/FSNL |
| | 50 mins | Island Mode (4.5MW) |
| | 10 hrs 45 mins | FSNL (or load condition between FSNL and MECL that maximizes stack emissions) |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| | 10 mins | Start/FSNL |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| | 10 mins | Start/FSNL |
| | 11 hrs 35 mins | FSNL (or load condition between FSNL and MECL that maximizes stack emissions) |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| **Second Day** | 10 mins | Start/FSNL |
| | 11 hrs 35 mins | FSNL (or load condition between FSNL and MECL that maximizes stack emissions) |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| | 10 mins | Start/FSNL |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| | 10 mins | Start/FSNL |
| | 11 hrs 35 mins | FSNL (or load condition between FSNL and MECL that maximizes stack emissions) |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| **Secondary Unit** | | |
| **First Day** | 20 mins | On Turning Gear |
| | 10 mins | Start/Trip from FSNL |
| | 20 mins | Coast to Turning Gear |
| | 10 mins | Start/Trip from FSNL |
| | 10 hrs 45 mins | FSNL (or load condition between FSNL and MECL that maximizes stack emissions) |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| | 10 mins | Start/FSNL |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| | 10 mins | Start/FSNL |
| | 11 hrs 35 mins | FSNL (or load condition between FSNL and MECL that maximizes stack emissions) |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| **Second Day** | 10 mins | Start/FSNL |
| | 11 hrs 35 mins | FSNL (or load condition between FSNL and MECL that maximizes stack emissions) |

| | | |
|---|---|---|
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| | 10 mins | Start/FSNL |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |
| | 10 mins | Start/FSNL |
| | 11 hrs 35 mins | FSNL (or load condition between FSNL and MECL that maximizes stack emissions) |
| | 15 mins | Shutdown (first 6 min) / Shutdown (last 9 min) |

Source: MLGS 2018b.

**Air Quality Table 6** shows the estimated maximum emissions during the emergency operation black start events.

**Air Quality Table 6**
**MLGS, Maximum Emissions Rates during Black Start Emergency Operation**

| | NOx | CO | VOC | $SO_2$ | PM10/2.5 |
|---|---|---|---|---|---|
| **Maximum Hourly Emission (2 turbines, lbs/hr)** | 349.2 | 4,283.2 | 316.0 | 7.5 | 11.0 |
| **Maximum Daily Emission (2 turbines, lbs/day)** | 8,047.9 | 100,672.6 | 7,422 | 174.0 | 254.8 |
| **Maximum Annual Emission (2 turbines, tons/year)** | 7.93 | 99.9 | 7.37 | 0.2 | 0.3 |

Source: MLGS 2018b, BAAQMD 2018.

Staff also conducted an independent modeling analysis for black start events to estimate worst case air quality impacts. Similar to the readiness testing and commissioning, black start events have very short duration (up to 48 hours). Therefore, staff only modeled impacts for 1-hour and 8-hour CO and state 1-hour $NO_2$ impacts. As shown in **Air Quality Table 7**, black start operations would not cause new exceedances of any state or federal ambient air quality standard.

**Air Quality Table 7**
**MLGS, Black Start Emergency Operation Maximum Impacts ($\mu g/m^3$)**

| Pollutant | Averaging Time | Modeled Impact | Background | Total | Limiting Standard | Percent of Standard |
|---|---|---|---|---|---|---|
| CO | 1 hour | 1,085.4 | 2,300 | 3,385 | 23,000 | 15 |
| | 8 hour | 460.4 | 1,495 | 1,955 | 10,000 | 20 |
| $NO_2$ | 1 hour (state) | 71.3 | 77.1 | 148 | 339 | 44 |

Source: MLGS 2018b and independent staff analysis.

## Emission Offsets

BAAQMD Regulation 2-2-302 requires facilities that would have a potential to emit of 10 tons per year or more of NOx or VOC to offset their emissions of those pollutants (emission increases of NOx an VOC, as precursors to ozone, can contribute to the existing non-attainment status for ozone). The regulation requires offsets at a ratio of 1 to 1 (for facilities that would have a potential to emit of more than 10 tons per year but

less than 35 tons per year of NOx or VOC) or 1.15 to 1 (for facilities that would have a potential to emit of more than 35 tons per year of NOx or VOC). At the time of original facility permitting, MLGS provided offsets for the full potential to emit for both NOx and VOC emissions. Additional offsets are now required by BAAQMD for the proposed total annual emission increases in NOx and VOC emissions related to black-start-related operations, which include those due to black start emergency operations and annual readiness testing. This total does not include emissions from commissioning activities because commissioning would only occur during 2019 and it is highly unlikely that a black start emergency would also occur within 12 months of the end of commissioning activities.

The petitioner is proposing to provide NOx offsets using its Banking Certificate 1450. This certificate currently has 224.213 tons per year of NOx credit and 5.290 tons per year of VOC credit. Because the entire facility would have a potential to emit of more than 10 tons per year but less than 35 tons per year of VOC, the BAAQMD's Small Facility Bank would be used to provide 2.585 tons per year of VOC credit for the increased VOC emissions. However, NOx emissions do not qualify for this credit because total facility NOx emissions exceed 35 tons per year. Instead, the petitioner will use Banking Certificate 1450 to offset the incremental NOx emission increase. The Banking Certificate 1450 has been surrendered to the district. The offsets will be subtracted according to the emission limits defined in **AQ-46**. In the event that total emissions from black start related activities exceed these limits, the petitioner will need to submit additional offset as required in **AQ-47**.

MLGS's potential to emit of PM10/ PM2.5 and $SO_2$ each does not exceed 100 tons per year. Therefore, the facility is not subject to offsets requirements for these pollutants under BAAQMD Regulation 2-2-303. **Air Quality Table 8** summarizes BAAQMD offset requirements for this amendment.

**Air Quality Table 8**
**MLGS, BAAQMD Emission Offsets**

| Pollutant | Emission Increase (tons/year) | | | Offset Ratio | Offsets Required (tons/year) |
|---|---|---|---|---|---|
| | Black Start Emergency Operation | Annual Readiness Testing | Total | | |
| $NO_2$ | 7.93 | 0.21 | 8.14 | 1.15 to 1 | 9.36 |
| VOC | 7.37 | 0.51 | 7.88 | 1 to 1 | 7.88 |

Source: BAAQMD 2018.

To mitigate the impacts under California Environmental Quality Act (CEQA), the Energy Commission staff normally recommends mitigation on least a one-to-one ratio applied to emissions of all nonattainment criteria pollutants and their precursors (NOx and VOC for ozone), without a minimum threshold to trigger the need for offsets. Staff's expectation for a project such as this amendment, located in the Bay Area Air Basin, is that the Energy Commission would normally require CEQA mitigation for increases in NOx, and VOC, as ozone precursors, PM10/ PM2.5, and $SO_2$, as a PM precursor.

While the readiness testing would occur annually, the likelihood of emergency operations for an actual black start event is very low. Therefore, staff recommends that the Energy Commission require offsets to mitigate all nonattainment emissions that would occur during only annual readiness testing, but not for emissions that might occur during highly unlikely emergency operations. **Air Quality Table 9** summarizes the Energy Commission staff-recommended offset requirements for this proposed amendment. As shown in **Air Quality Table 9**, the offsets required by rule for incremental emissions of $NO_2$ and VOC would be fully covered by Banking Certificate 1450 and BAAQMD's Small Facility Bank, respectively. Since NOx and SOx are also precursors pollutants of PM10/PM2.5, the reduction of NOx emissions can be equivalent to the reduction in PM10/PM2.5 and $SO_2$ emissions. As shown in **Air Quality Table 9**, the $NO_2$ offset under CEQA requirement (0.21 tons/year) is far below those required by district (8.14 tons/year). Therefore, the extra NOx offsets from district requirement are enough to mitigate PM10/PM2.5 and $SO_2$ emissions to meet CEQA requirements.

**Air Quality Table 9**
**MLGS, Energy Commission Emission Offsets**

| Pollutant | Emission Increase for Annual Readiness Testing (tons/year) | Offset Ratio | Offsets Required (tons/year) |
|---|---|---|---|
| $NO_2$ | 0.21 | 1 to 1 | 0.21 |
| VOC | 0.51 | 1 to 1 | 0.51 |
| PM10/PM2.5 | 0.01 | 1 to 1 | 0.01 |
| $SO_2$ | 0.01 | 1 to 1 | 0.01 |

The installation, commissioning, testing and emergency operation of black start equipment are not expected to change the facility's annual greenhouse gas emissions significantly. It will not affect MLGS's existing mandatory greenhouse gas (GHG) emissions reporting requirement in any way (BAAQMD 2018). Therefore, the modifications would not result in any significant, adverse environmental impact as a result of GHG emissions.

## CONCLUSIONS AND RECOMMENDATIONS

The requested changes would provide District offsets and mitigation, and conform to applicable federal, state, and District LORS. Therefore, the amended facility would not cause any significant adverse air quality impacts, provided that the following conditions of certification are included. Staff recommends that the Energy Commission approve the revised conditions of certification as shown below.

## AMENDED CONDITIONS OF CERTIFICATION

Below is a list of conditions of certification that staff recommends to be revised from those approved in the 2010 Energy Commission Final Decision (CEC 2010) and the 2012 (CEC 2012), 2014 (CEC 2014), 2015 (CEC 2015) and 2017 (CEC 2017) Orders Approving Petitions to Amend. ~~Strikethrough~~ indicates deleted language and **underline and bold** is used for new language.

### BAAQMD CONDITIONS OF CERTIFICATION

Commissioning Activities: All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the MLGS construction contractor to insure safe and reliable steady-state operation of the gas turbines, ~~heat recovery steam generators,~~ steam turbine, and associated electrical delivery systems during the commissioning period **(Separate from Commissioning Activities for Black Start Capability).**

**Black Start Emergency Operation:** **Operation of Gas Turbine S-3 and/or S-4 and associated equipment as directed by the California Independent System Operator (California ISO) and/or Pacific Gas and Electric Company (PG&E) to restore power to the grid in the event of a system outage in accordance with the California ISO's or PG&E's system restoration plan, including operation of a turbine after termination of the Black Start Instruction until either (i) the turbine is shut down (up to a maximum of 30 minutes following termination of the Black Start Instruction) or (ii) the turbine achieves an output of 120 Megawatts (up to a maximum of 60 minutes following termination of the Black Start Instruction).**

**Commissioning Activities for Black Start Capability:** **All performance testing and adjustment activities associated with the initial installation of the battery energy storage system specifically designed for black start capability at MLGS.**

**Readiness Testing for Black Start Capability:** **All testing activities of Gas Turbines S-3 and/or S-4 associated with the battery energy storage system**

**except for Commissioning Activities for Black Start Capability at MLGS.**

**CONDITIONS FOR THE COMMISSIONING PERIOD FOR SGT6-5000F GAS TURBINES**

**AQ-6** The owner/operator shall install, calibrate, and operate the District-approved continuous monitors specified in **AQ-5** prior to first firing of the Gas Turbines (S-1, S-2, S-3 and S-4). After first firing of the turbines, the owner/operator shall adjust the detection range of these continuous emission monitors as necessary to accurately measure the resulting range of CO and NOx emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval. (Basis: Regulation 2, Rule 2, Section 419)

**Verification:** The project owner shall make the site available for inspection by representatives of the District, ARB, and the **Energy** Commission upon request.

**CONDITIONS FOR THE SGT6-5000F SIMPLE-CYCLE GAS TURBINES (S-1, S-2, S-3, AND S-4)**

**AQ-14** The owner/operator shall not operate the units such that the combined cumulative heat input rate for the Gas Turbines (S-1, S-2, S-3, and S-4) exceeds 13,994,976 MMBtu (HHV) per year **but excluding heat input rate during readiness testing for black start capability, commissioning activities for black start capability, and black start emergency operations**. (Basis: Offsets)

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

**AQ-15** The owner operator shall not operate S-1, S-2, S-3, and S-4 such that the combined hours for all four units exceeds 7,008 hours per year (excluding operations necessary for maintenance, tuning, ~~and~~ testing**, readiness testing for black start capability, commissioning activities for black start capability, and black start emergency operations**). (Basis: Offsets, Cumulative Increase)

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

**AQ-16** The owner/operator shall ensure that the each Gas Turbine (S-1, S-2, S-3, S-4) is abated by the properly operated and properly maintained Selective Catalytic Reduction (SCR) System A-2, A-4, A-6 or A-8 and Oxidation Catalyst System A-1, A-3, A-5, or A-7 whenever fuel is combusted at those sources and the corresponding SCR catalyst bed (A-2, A-4, A-6 or A-8) has reached minimum operating temperature. (Basis: BACT for NOx, POC and CO)

**Verification:** The project owner shall make the site available for inspection by representatives of the District, ARB, and the **Energy** Commission upon request. A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

**AQ-17** The owner/operator shall ensure that the Gas Turbines (S-1, S-2, S-3, S-4) comply with requirements (a) through (i). Requirements (a) through (f) do not apply during ~~a~~ gas turbine start-up**s**, combustor tuning operation**s**, ~~or~~ shutdown**s, readiness testing for black start capability, commissioning activities for black start capability, or black start emergency operations**. (Basis: BACT and Regulation 2, Rule 5)

a) Nitrogen oxide mass emissions (calculated as $NO_2$) at each exhaust point P-1, P-2, P-3, and P-4 (exhaust point for S-1, S-2, S-3 and S-4 Gas Turbine after abatement by A-2, A-4, A-6 and A-8 SCR System) shall not exceed 20.83 pounds per hour or 0.00946 lb/MMBtu (HHV) of natural gas fired. Limits are averaged over one hour except during transient hours where a 3-clock hour average is calculated as the average of the transient hour, the clock hour immediately prior to the transient hour and the clock hour immediately following the transient hour. (Basis: BACT for NOx)

b) The nitrogen oxide emission concentration at each exhaust point P-1, P-2, P-3 and P-4 shall not exceed 2.5 ppmv, on a dry basis, corrected to 15% $O_2$, averaged over any one-hour period except during periods with a transient hour. Limits are averaged over one hour except during transient hours where a 3-clock hour average is calculated as the average of the transient hour, the clock hour immediately prior to the transient hour and the clock hour immediately following the transient hour. (Basis: BACT for NOx)

c) Carbon monoxide mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 10.0 pounds per hour or 0.00454 lb/MMBtu of natural gas fired, averaged over any one-hour period. (Basis: BACT for CO)

d) The carbon monoxide emission concentration at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 2.0 ppmv, on a dry basis, corrected to 15% $O_2$ averaged over any 1-hour period. (Basis: BACT for CO)

e) Ammonia ($NH_3$) emission concentrations at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 10 ppmv, on a dry basis, corrected to 15% $O_2$, averaged over any rolling three-hour period. This ammonia emission concentration shall be verified by the continuous recording of the ammonia injection rate to each SCR System A-2, A-4, A-6, and A-8. The correlation between the gas turbine heat input rates, A-2, A-4, A-6, and A-8 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-1, P-2, P-3 and P-4 shall be

determined in accordance with **AQ-27** or District approved alternative method. The APCO may require the installation on one exhaust point (P-1, P-2, P-3, or P-4, at the owner/operator's discretion) of a CEM designed to monitor ammonia concentrations if the APCO determines that a commercially available CEM has been proven to be accurate and reliable and that an adequate Quality Assurance/Quality Control protocol for the CEM has been established. The District or another agency must establish a District approved Quality Assurance/Quality Control protocol prior to the ammonia CEM being a requirement of this part. The ammonia CEM shall be used to demonstrate compliance with the ammonia emission limit contained in this Part for the gas turbine being monitored. The gas turbine with the ammonia CEM shall still be subject to the emission testing requirements in **AQ-27**. (Basis: Regulation 2, Rule 5)

f) Precursor organic compound (POC) mass emissions (as $CH_4$) at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 2.9 pounds per hour or 0.00132 lb/MMBtu of natural gas fired. (Basis: BACT for POC)

g) Sulfur dioxide ($SO_2$) mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 6.21 pounds per hour or 0.0028 lb/MMBtu of natural gas fired. (Basis: BACT for $SO_2$)

h) Particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM10) mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 9.0 pounds per hour. (Basis: BACT for PM10)

i) Total particulate matter mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 9.0 pounds per hour. (Basis: Regulation 2, Rule 2, Section 419)

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

**AQ-18** The owner/operator shall ensure that the regulated air pollutant mass emission rates from each of the Gas Turbines (S-1, S-2, S-3, and S-4) during a start-up or shutdown does not exceed the limits established below. Startups shall not exceed 30 minutes. Shutdowns shall not exceed 15 minutes. **These requirements do not apply during readiness testing for black start capability, commissioning activities for black start capability, or black start emergency operations.** (Basis: BACT Limit for Non-Normal Operation)

| Pollutant | Maximum Emissions Per Startup | Maximum Emissions During Hour Containing a Startup | Maximum Emissions Per Shutdown |
|---|---|---|---|
| | (lb/startup) | (lb/hour) | (lb/shutdown) |
| NOx (as $NO_2$) | 36.4 | 45.1 | 15.1 |
| CO | 216.2 | 541.3 | 111.5 |
| POC (as $CH_4$) | 11.9 | 28.5 | 5.4 |

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

**AQ-20** The owner/operator shall not allow total combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas turbine start-ups, and shutdowns**, but excluding emissions generated during readiness testing for black start capability, commissioning activities for black start capability, and black start emergency operations,** to exceed the following limits during any calendar day (except for days during which combustor tuning events occur, which are subject to Paragraph 21 below):

(a) 2,468 pounds of NOx (as $NO_2$) per day (Basis: Cumulative Increase)

(b) 4,858 pounds of CO per day (Basis: Cumulative Increase)

(c) 476 pounds of POC (as $CH_4$) per day (Basis: Cumulative Increase)

(d) 864 pounds of PM10 per day (Basis: Cumulative Increase)

(e) 596 pounds of $SO_2$ per day (Basis: Cumulative Increase)

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

**AQ-21** The owner/operator shall not allow total combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas turbine start-ups, shutdowns, and combustor tuning events**, but excluding emissions generated during readiness testing for black start capability, commissioning activities for black start capability, and black start emergency operations,** to exceed the following limits during any calendar day on which a tuning event occurs:

(a) 2,941 pounds of NOx (as $NO_2$) per day (Basis: Cumulative Increase)

(b) 8,378 pounds of CO per day (Basis: Cumulative Increase)

(c) 693 pounds of POC (as $CH_4$) per day (Basis: Cumulative Increase)

(d) 864 pounds of PM10 per day (Basis: Cumulative Increase)

(e) 596 pounds of $SO_2$ per day (Basis: Cumulative Increase)

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

**AQ-22** The owner/operator shall not allow cumulative combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas turbine start-ups, combustor tuning, shutdowns, and malfunctions**, but excluding emissions generated during readiness testing for black start capability, commissioning activities for black start capability, and black start emergency operations,** to exceed the following limits during any consecutive twelve-month period:

(a) 78.57 tons of NOx (as NO2) per year (Basis: Offsets)

(b) 138.57 tons of CO per year (Basis: Cumulative Increase)

(c) 14.21 tons of POC (as CH4) per year (Basis: Offsets)

(d) 31.54 tons of PM10 per year (Basis: Cumulative Increase)

(e) 4.94 tons of SO2 per year (Basis: Cumulative Increase)

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

**AQ-23** The owner/operator shall not allow the maximum projected annual toxic air contaminant **emissions** (per **AQ-26**) from the Gas Turbines (S-1, S-2, S-3, S-4) combined to exceed the following limits:

| | |
|---|---|
| – formaldehyde | **8,459**~~7,785~~ pounds per year |
| – benzene | 202**5** pounds per year |
| – Specified polycyclic aromatic hydrocarbons (PAHs) | ~~1.98~~**2.00** pounds per year |

unless the following requirement is satisfied:

The owner/operator shall perform a health risk assessment to determine the total facility risk using the emission rates determined by source testing and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. The owner/operator shall submit the risk analysis to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will not result in a significant cancer risk, the

District and the CEC CPM may, at their discretion, adjust the carcinogenic compound emission limits listed above. (Basis: Regulation 2, Rule 5)

**Verification:** Source test results obtained through compliance with **AQ-26** and **AQ-30** shall confirm the toxic air contaminant emission rates or the project owner shall submit an updated health risk assessment.

**AQ-24** The owner/operator shall demonstrate compliance with **AQ-12** through **AQ-15**, **AQ-17**(a) through **AQ-17**(e), **AQ-18** (NOx, and CO limits), **AQ-19** (NOx and CO limits), **AQ-20**(a), **AQ-20**(b), **AQ-21**(a), **AQ-21**(b), **AQ-22**(a) and **AQ-22**(b)**, AQ-41, AQ-42, AQ-43, AQ-44(a), AQ-44(b), AQ-45(a), and AQ-45(b)** by using properly operated and maintained continuous monitors (during all hours of operation including gas turbine start-up**s**, combustor tuning **operations**, ~~and~~ shutdown**s** ~~periods~~**, readiness testing for black start capability, commissioning activities for black start capability, and black start emergency operations**). The owner/operator shall monitor for all of the following parameters:

(a) Firing Hours and Fuel Flow Rates for each of the following sources: S-1, S-2, S-3, and S-4

(b) Oxygen (O2) concentration, Nitrogen Oxides (NOx) concentration, and carbon monoxide (CO) concentration at exhaust points P-1, P-2, P-3 and P-4.

(c) Ammonia injection rate at A-2, A-4, A-6 and A-8 SCR Systems

The owner/operator shall record all of the above parameters at least every 15 minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each clock hour. For each calendar day, the owner/operator shall calculate and record the total firing hours, the average hourly fuel flow rates, and pollutant emission concentrations.

The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate the following parameters:

(d) Heat Input Rate for each of the following sources: S-1, S-2, S-3, and S-4

(e) Corrected NOx concentration, NOx mass emission rate (as NO2), corrected CO concentration, and CO mass emission rate at each of the following exhaust points: P-1, P-2, P-3 and P-4.

For each source and exhaust point, the owner/operator shall record the parameters specified in **AQ-24**(d) and **AQ-24**(e) at least once every 15 minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:

**[Note: The required data in (f) thru (k) shall exclude any data during readiness testing for black start capability, commissioning activities for black start capability, and black start emergency operations.]**

(f) total Heat Input Rate for every clock hour and the average hourly Heat Input Rate for every rolling 3-hour period.

(g) on an hourly basis, the cumulative total Heat Input Rate for each calendar day for the following: each Gas Turbine and for S-1, S-2, S-3 and S-4 combined.

(h) the average NOx mass emission rate (as NO2), CO mass emission rate, and corrected NOx and CO emission concentrations for every clock hour.

(i) on an hourly basis, the cumulative total NOx mass emissions (as NO2) and the cumulative total CO mass emissions, for each calendar day for the following: each Gas Turbine and for S-1, S-2, S-3 and S-4 combined.

(j) For each calendar day, the average hourly Heat Input Rates, corrected NOx emission concentration, NOx mass emission rate (as NO2), corrected CO emission concentration, and CO mass emission rate for each Gas Turbine.

(k) on a monthly basis, the cumulative total NOx mass emissions (as NO2) and cumulative total CO mass emissions, for the previous consecutive twelve month period for sources S-1, S-2, S-3, and S-4 combined. (Basis: 1-520.1, 9-9-501, BACT, Offsets, NSPS, Cumulative Increase)

**(l) For each calendar day, the average hourly Heat Input Rates, corrected $NO_x$ emission concentration, $NO_x$ mass emission rate (as $NO_2$), corrected CO emission concentration, and CO mass emission rate during readiness testing for black start capability, commissioning activities for black start capability, and black start emergency operations for S-3 and S-4.**

**(m) On a monthly basis, the cumulative total NOx mass emissions (as NO2) and cumulative total CO mass emissions during readiness testing for black start capability, commissioning activities for black start capability, and black start emergency operations, for the previous consecutive twelve-month period for sources S-3 and S-4 combined.**

**Verification:** The project owner shall make the site available for inspection by representatives of the District, ARB and the **Energy** Commission to verify the continuous monitoring and recordkeeping system is properly installed and operational.

**AQ-25** To demonstrate compliance with **AQ-17**(f), **AQ-17**(g), **AQ-17**(h), **AQ-17**(i), **AQ-20**(c), **AQ-20**(d), **AQ-20**(e), **AQ-21**(c), **AQ-21**(d), **AQ-21**(e), **AQ-22**(c), **AQ-22**(d), **AQ-22**(e), **, AQ-41, AQ-42, AQ-43, AQ-44(c), AQ-44(d), AQ-44(e), AQ-45(c), AQ-45(d), and AQ-45(e)** the owner/operator shall calculate and record on a daily basis, the precursor organic compound (POC) mass emissions, fine particulate matter (PM10) mass emissions (including condensable particulate matter), and sulfur dioxide ($SO_2$) mass emissions from each power train. The owner/operator shall use the actual heat input rates measured pursuant to **AQ-24**, actual Gas Turbine start-up times, actual Gas Turbine shutdown times, and CEC and District-approved emission factors developed pursuant to source testing under **AQ-28** to calculate these emissions. The owner/operator shall present the calculated emissions in the following format:

**The emissions calculated in (a) and (b) shall exclude any data during readiness testing for black start capability, commissioning activities for black start capability, and black start emergency operations.**

(a) For each calendar day, POC, PM10, and $SO_2$ emissions, summarized for each power train (Gas Turbine) and S-1, S-2, S-3, and S-4 combined

(b) on a monthly basis, the cumulative total POC, PM10, and $SO_2$ mass emissions, for each year (12-month rolling average) for S-1, S-2, S-3, and S-4 combined.

**(c) For each calendar day, POC, PM10, and $SO_2$ emissions during readiness testing and commissioning activities for black start capability and black start emergency operations, summarized for S-3 and S-4.**

**(d) On a monthly basis, the cumulative total POC, PM10, and $SO_2$ mass emissions during readiness testing and commissioning activities for black start capability and black start emergency operations, for each year (12-month rolling average) for S-3 and S-4 combined.**

(Basis: Offsets, Cumulative Increase)

**Verification:** The project owner shall make the site available for inspection by representatives of the District, ARB and the **Energy** Commission to verify the calculation and recordkeeping system is properly installed and operational.

**AQ-26** To demonstrate compliance with **AQ-23**, the owner/operator shall calculate and record on an annual basis the maximum projected annual emissions of: Formaldehyde, Benzene, and Specified PAHs. The owner/operator shall calculate the maximum projected annual emissions using the maximum annual heat input rate of 13,994,976 MMBtu/year for S-1, S-2, S-3, and S-4 combined and the highest emission factor (pounds of pollutant per MMBtu of heat input) determined by the most recent of any source test of the S-1, S-2,

S-3, or S-4 Gas Turbines. If the highest emission factor for a given pollutant occurs during minimum-load turbine operation, a reduced annual heat input rate may be utilized to calculate the maximum projected annual emissions to reflect the reduced heat input rates during gas turbine start-up and minimum-load operation. The reduced annual heat input rate shall be subject to District review and approval. (Basis: Regulation 2, Rule 5)

**Verification:** The project owner shall make the site available for inspection by representatives of the District, ARB and the **Energy** Commission to verify the calculation and recordkeeping system is properly installed and operational.

**AQ-30** Within 90 days of start-up of the first MLGS SGT6-5000F gas turbine and on a biennial basis (once every two years) thereafter, the owner/operator shall conduct a District-approved source test on one of the following exhaust points P-1, P-2, P-3 or P-4 while the Gas Turbine is operating at maximum allowable operating **rates** to demonstrate compliance with **AQ-23**. The owner/operator shall also test the gas turbine while it is operating at minimum load. If three consecutive biennial source tests demonstrate that the annual emission rates calculated pursuant to **AQ-26** for any of the compounds listed below are less than the BAAQMD trigger levels, pursuant to Regulation 2, Rule 5, shown, then the owner/operator may discontinue future testing for that pollutant:

| | |
|---|---|
| Benzene | ≤ ~~3.8~~**2.9** pounds/year and ~~2.9~~**0.06** pounds/hour |
| Formaldehyde | ≤ ~~18~~**14** pounds/year and 0.12 pounds/hour |
| Specified PAHs | ≤ 0.00~~69~~**33** pounds/year |

(Basis: Regulation 2, Rule 5)

**Verification:** The results and field data collected during source tests shall be submitted to the District and CPM within 60 days of testing and according to a pre-approved protocol (**AQ-29**). Testing for toxic air contaminant emissions shall be conducted upon initial operation and at least once every 24 months.

**AQ-31** The owner/operator shall calculate the sulfuric acid mist (SAM) emission rate using the total heat input for the sources and the highest results of any source testing conducted pursuant to **AQ-32**. If this SAM mass emission limit of **AQ-33** is exceeded, the owner/operator must utilize air dispersion modeling to determine the impact (in $\mu g/m^3$) of the sulfuric acid mist emissions pursuant to Regulation 2, Rule 2, Section 306. (Basis: Regulation 2, Rule 2, Section 306)

**Verification:** The project owner shall make the site available for inspection by representatives of the District, ARB and the **Energy** Commission to verify the calculation and recordkeeping system is properly installed and operational. The quarterly operation report (**AQ-SC8**) shall include a determination of the impact if triggered by this condition.

**AQ-34** The owner/operator shall ensure that the stack height of emission points P-1, P-2, P-3 and P-4 is each at least 165 feet above grade level at the stack base. (Basis: Regulation 2, Rule 5)

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

**AQ-36** The owner/operator of the MLGS shall maintain all records and reports on site for a minimum of five years. These records shall include but are not limited to: continuous monitoring records (firing hours, fuel flows, emission rates, monitor excesses, breakdowns, etc.), source test and analytical records, natural gas sulfur content analysis results, emission calculation records, records of plant upsets and related incidents. The owner/operator shall make all records and reports available to District and the CEC CPM staff upon request. (Basis: Regulation 2, Rule 1, Section 403, Regulation 2, Rule 6, Section 501)

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

**AQ-38** The Owner/Operator of MLGS shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall comply with the District Manual of Procedures, Volume IV, Source Test Policy and Procedures, and shall be subject to BAAQMD review and approval, except that the facility shall provide four sampling ports that are at least 6 inches in diameter in the same plane of each gas turbine stack (P-1, P-2, P-3, P-4). (Basis: Regulation 1, Section 501)

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

**AQ-41 Commissioning Activities for Black Start Capability: The owner/operator shall perform commissioning activities for black start capability at S-3 and S-4 for no more than 64 hours combined. Upon completion of these activities, the owner/operator shall provide written notice to the District Engineering and Enforcement Divisions. (Basis: BACT)**

**Verification: The project owner shall submit to the CPM the commissioning report to demonstrate the compliance of this condition within 30 days from the completion of black start capability commissioning.**

**AQ-42 Emission Limits for Commissioning Activities for Black Start Capability: The owner/ operator shall not operate Gas Turbines S-3 and S-4 in a manner such that the combined pollutant emissions from these sources exceeds the following limits when performing commissioning activities for black start capability.**

**NOx (as NO2).....3,311 pounds;**

**CO.....103,486 pounds;**

**POC (as CH4).....8,089 pounds;**

PM10/PM2.5.....123 pounds;

SO2.....84 pounds.

(Basis: BACT)

Verification: The project owner shall submit to the CPM the commissioning report to demonstrate the compliance of this condition within 30 days from the completion of black start capability commissioning.

AQ-43 When performing any commissioning activities for black start capability at S-3 and S-4, the owner/operator of the MLGS shall demonstrate compliance with conditions AQ-41 and AQ-42 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:

firing hours

fuel flow rates

stack gas nitrogen oxide emission concentrations

stack gas carbon monoxide emission concentrations

stack gas oxygen concentrations.

The owner/operator shall use District-approved methods to calculate heat input rates, nitrogen dioxide mass emission rates, carbon monoxide mass emission rates, and NOx and CO emission concentrations, summarized for each clock hour. The owner/operator shall retain records on site for at least 5 years from the date of entry and make such records available to District personnel upon request. (Basis: BACT)

Verification: The project owner shall submit to the CPM a commissioning report to demonstrate compliance with this condition within 30 days after the completion of black start capability commissioning.

AQ-44 Daily Emission Limits for Black Start Operations: The owner/operator shall not allow total combined emissions from readiness testing for black start capability and black start emergency operations at Gas Turbines S-3 and S-4 to exceed the following limits during any consecutive 24-clock hour period:

(a) NOx (as NO2).....8,048 pounds per day;

(b) CO.....100,673 pounds per day;

(c) POC (as CH4).....7,422 pounds per day;

(d) PM10/PM2.5.....255 pounds per day;

(e) SO2.....174 pounds per day.

(Basis: BACT)

Verification: For days when Black Start Operations or readiness testing occurs, a summary of operation events, operating data and associated monitoring records shall be included in the subsequent quarterly operation report (AQ-SC8).

AQ-45 Annual Emission Limits for Readiness Testing for Black Start Capability: The owner/operator shall not allow emissions from readiness testing for black start capability at Gas Turbines S-3 and S-4 to exceed the following limits during any consecutive twelve-month period:

(a) NOx (as NO2).....414 pounds per year;

(b) CO.....12,936 pounds per year;

(c) POC (as CH4).....1,011 pounds per year;

(d) PM10/PM2.5.....15 pounds per year;

(e) SO2.....10 pounds per year.

(Basis: BACT)

Verification: For days when readiness testing occurs, a summary of operation events, operating data and associated monitoring records shall be included in the subsequent quarterly operation report (AQ-SC8).

AQ-46 Annual Emission Limits for Black Start Operations: The owner/operator shall not allow total combined emissions from readiness testing for black start capability and black start emergency operations at Gas Turbines S-3 and S-4 to exceed the following limits during any consecutive twelve-month period:

(a) NOx (as NO2).....16,283 pounds per year (Basis: BACT; Offsets);

(b) CO.....212,725 pounds per year (Basis: BACT; Cumulative Increase);

(c) POC (as CH4).....15,750 pounds per year (Basis: BACT; Offsets);

(d) PM10/PM2.5.....518 pound per year (Basis: BACT; Cumulative Increase);

**(e) SO2.....354 pounds per year (Basis: BACT; Cumulative Increase)**

**Verification: For days when Black Start Operations or readiness testing occurs, a summary of operation events, operating data and associated monitoring records required shall be included in the subsequent quarterly operation report (AQ-SC8).**

**AQ-47 In the event that total emissions from commissioning activities, readiness testing for black start capability, and black start emergency operations exceed (a) 16,283 pounds of NOx and/or (b) 15,750 pounds of POC during any 12-month period that includes commissioning activities, the owner/operator shall submit additional offset credits for the excess emissions according to the procedures set forth in District Regulation 2-2-302.1 through 302.4. (Basis: Regulation 2-2-302).**

**Verification: If facility operations require additional offset credits to be surrendered to the District, an identification of the specific offset credits surrendered, a summary of operation events, operating data and associated monitoring records shall be included in the subsequent quarterly operation report (AQ-SC8).**

**Conditions for the Emergency Standby Diesel Generator, Caterpillar C15 ATAAC, 779 bhp, 4.9 MMBtu/hour (S-7), and the Diesel Fire Pump, Cummins CFP9E-F20 or equivalent, 299 bhp, 2.1 MMBtu/hour (S-8)**

**AQ-418** The project owner shall not exceed 50 hours per year per engine for reliability-related testing. (Basis: Title 17, California Code of Regulations, Section 93115, ATCM for Stationary CI Engines)

**Verification:** The project owner shall verify compliance with this Condition of Certification in each quarterly report required by Condition of Certification **AQ-SC8**.

**AQ-429** The project owner shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, State or Federal emission limit, or for reliability related activities (maintenance and other testing, but excluding emission testing). Operating while mitigating emergency conditions or while emission testing to show compliance with District, State or Federal emission limits is not limited. (Basis: Title 17, California Code of Regulations, Section 93115, ATCM for Stationary CI Engines)

**Verification:** The project owner shall verify compliance with this Condition of Certification in each quarterly report required by Condition of Certification **AQ-SC8**.

**AQ-4350** The project owner shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained. (Basis: Title 17, California Code of Regulations, Section 93115, ATCM for Stationary CI Engines)

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

**AQ-4451** Records: The project owner shall maintain the following monthly record in a District-approved log for at least 36 months from the date of entry (60 months if the facility has been issued a Title v Major Facility Review Permit or a Synthetic Minor Operating Permit). Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff and CPM upon request.

a) Hours of operation for reliability-related activities (maintenance and testing).

b) Hours of operation for emission testing to show compliance with emission limits.

c) Hours of operation (emergency).

d) For each emergency, the nature of the emergency condition.

e) Fuel usage for each engine(s).

(Basis: Title 17, California Code of Regulations, Section 93115, ATCM for Stationary CI Engines)

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

**AQ-4552** At School and Near-School Operation: If the emergency standby engine is located on school grounds or within 500 feet of any school grounds, the following requirements shall apply:

The project owner shall not operate each stationary emergency standby diesel-fueled engine for non-emergency use, including maintenance and testing, during the following periods:

a) Whenever there is a school sponsored activity (if the engine is located on school grounds).

b) Between 7:30 a.m. and 3:30 p.m. on days when school is in session.

"School" or "School Grounds" means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). "School" or "School Grounds" includes any building or structure, athletic field, or other areas of school property but does not include unimproved school property.

(Basis: Title 17, California Code of Regulations, Section 93115, ATCM for Stationary CI Engines)

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

## REFERENCES


BAAQMD 2018 - Bay Area Air Quality Management District. Draft Engineering Evaluation – Marsh Landing 'Black Start' Capacity Project. December 27, 2018.

CEC 2010 - California Energy Commission (TN 58247). Final Commission Decision Marsh Landing Generating Station (08-AFC-03C). August 31, 2010.

CEC 2012 - California Energy Commission (TN 65221). Order Approving a Petition to Incorporate Design Refinements (08-AFC-03C). May 15, 2012.

CEC 2014 - California Energy Commission (TN 203440). Approving Modifications to Air Quality and Biological Resources Conditions of Certification (08-AFC-03C). December 12, 2014.

CEC 2015 - California Energy Commission (TN 203876). Notice of Determination - Petition to Modify the Project Description for the Marsh Landing Generating Station (08-AFC-03C). March 13, 2015.

CEC 2017 - California Energy Commission (TN 217512). Notice of Determination Petition to Amend Marsh Landing Generating Station (08-AFC-03C). May 9, 2017.

MLGS 2018a - Marsh Landing LLC (TN 223052). Petition to Amend for Black Start Capability Enhancement (08-AFC-03C), March 26, 2018.

MLGS 2018b - Marsh Landing LLC (TN 225750). Response to Data Requests 1-6 (08-AFC-03C), November 1, 2018.

# MARSH LANDING GENERATING STATION (08-AFC-03C)
## Petition to Amend to Add Black Start Capability
## WORKER SAFETY AND FIRE PROTECTION

Brett Fooks

## INTRODUCTION

NRG Marsh Landing, LLC filed a Petition to Amend (PTA) on March 13, 2018 requesting approval to install a battery energy storage system (BESS) to provide black start capability to the Marsh Landing Generating Station (MLGS) (NRG 2018).

## SCOPE OF ANALYSIS

The scope of this analysis is to determine whether construction and operation of the BESS would:

- Comply with worker safety and fire protection laws, ordinances, regulations, and statutes (LORS);
- Protect the workers during construction and operation of the facility;
- Protect against fire;
- Provide adequate emergency response procedures; and
- Whether it is necessary to change, delete, or add any new condition(s) of certification in order to ensure compliance with LORS.

## BACKGROUND

The Project was certified by the Energy Commission in August 2010, as 760-megawatt (MW) natural-gas fueled, peaking power plant, consisting of four Siemens simple-cycle, natural gas fueled, combustion turbine generators (CEC 2010a). MLGS is located at 3201 Wilbur Avenue, Antioch, California.

On December 1, 2017, the California ISO selected NRG Marsh Landing for "black start" capability for MLGS, based on a competitive solicitation (California ISO 2017). Black start capability refers to the ability of a generating unit or facility to begin operating and delivering electric power without external assistance from the electric system. Black start resources are essential to restart other generation and to restore power to the grid in the event of a widespread system outage (California ISO 2017).

The proposed MLGS black start project consists of installing up to a 7-MW/3.6-megawatt-hour (MW-hr) lithium-ion BESS to provide black start capability to the Units 3 and 4 combustion turbine generators (NRG 2018). The BESS consists of seven battery lithium-ion banks installed in two metal enclosures. The batteries would be configured as modules of multiple packages, with each package containing many individual lithium-ion battery cells plus battery protection circuits in a sealed container. The battery enclosures would be kept away from any heat sources.

One combustion turbine generator is required to provide black start service to support recovery from a greater San Francisco Bay Area electrical grid blackout (NRG 2018). Both Units 3 and 4 are being converted to black start capability to provide redundancy if a grid blackout occurs simultaneous with a unit (either Unit 3 or 4) being unavailable due to a planned or forced outage.

The project modifications do not alter the size, configuration, location, or operation of the four simple-cycle units (NRG 2018). No physical or operational changes are being proposed for the diesel backup generator or the natural gas fueled preheaters.

## 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 short duration of 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 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 **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 **WORKER SAFETY-2.** The project would also comply with the project Operations and Maintenance Safety and Health Program.

Staff conducted its own evaluation of the safety of lithium-ion batteries and concluded that lithium-ion batteries would pose a potential fire hazard in addition to the existing hazards already on the site. The principal hazard associated with lithium-ion batteries would be fire, which could occur if a battery casing was opened, punctured or crushed. The fire could also be caused if the battery cell is short circuited or overheated. If a fire ensues after such an event, it may burn rapidly with flare-burning effect and may ignite other batteries in close proximity. The fire can produce corrosive and/or toxic gases including hydrogen chloride, hydrogen fluoride, and carbon monoxide, similar to a fire involving a like amount of plastics.

Staff reviewed the proposed fire protection and life safety systems that the project owner proposed to mitigate the dangers of fire from the BESS. The project owner stated that the enclosures would use of a Novec 1230 (a chemical-based fire suppressant) or equivalent fire suppression system (NRG 2018). The battery enclosures would also have a central alarm panel, smoke and heat detectors, and an audible annunciator and strobe. The new alarm system for each enclosure would be tied into the existing control room fire alarm control panel. The enclosure's equipment maintenance would be conducted from the outside so that people could not enter the enclosure. In addition to the chemical fire suppression and fire alarm, each battery would have its temperature monitored by a battery indication and control system (BICS). The BICS would

continually monitor all temperatures and determine the level of fire prevention response, if any, needed. If any temperature reaches an unacceptable level, portions of, or the entire, battery system could be shut down (NRG 2018).

In addition to the fire protection and life safety systems that the project owner has outlined, the current California Fire Code requires that any prepackaged and pre-engineered station storage battery systems shall be listed in accordance with UL 9540, Energy Storage Systems and Equipment, 2016 edition. The requirements listed in UL 9540 cover energy storage systems that are intended to receive electric energy and then to store the energy so that the BESS can provide electrical energy to loads or the local/area electric power system and to the electrical utility power grid when needed. A UL 9540 certification requires that the BESS meet an array of design requirements, industry standards, and safety codes. The standard also requires that a safety analysis and a fire risk assessment be conducted. This safety analysis would include an assessment of the adequacy of the BESS's control and safety systems. The fire risk assessment would also include an assessment of the adequacy of the fire detection and fire suppression systems. A UL 9540 certification would ensure that both assessments occur, and that any recommended safety and fire protection measures would be included in the final design and installation before the start of commissioning.

Staff proposes Condition of Certification **WORKER SAFETY-8**, which would ensure that the project owner installs the necessary fire protection and life safety for the BESS. With the adoption of **WORKER SAFETY-8**, the BESS would be in compliance with all applicable codes and review of the fire protection measures by the Contra Costa County Fire Protection District would ensure that there would not significant impact due to the addition of the BESS to the MLGS.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the information provided by MLGS, staff proposes Condition of Certification **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 approval of **WORKER SAFETY-8**, staff concludes the proposed modifications would be in compliance with applicable worker safety LORS and conditions of certification adopted by the Energy Commission in their Final Decision on August 31, 2010 (CEC 2010a). The approved conditions of certification in the Final Decision, which include compliance with current worker safety and fire protection LORS, would ensure the risks associated with the BESS would be less than significant.

## PROPOSED CHANGES OR MODIFICATION TO CONDITIONS OF CERTIFICATION

~~Strikethrough~~ indicates deleted language and **underline and bold** is used for new language.

**WORKER SAFETY-8. The project owner shall submit the fire protection drawings and specifications for the Battery Energy Storage System (BESS) to the Contra Costa County Fire Protection District for review and comment, and to the Delegate Chief Building Official (DCBO) for plan check and inspection, and to the 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 Contra Costa County Fire Protection District for review and comment, and to the DCBO for plan check approval and construction inspection, and to the CPM for review and approval.**

## REFERENCES

CEC 2010a, California Energy Commission final decision on the application for certification for the Marsh Landing Generating Station Project, August 31, 2010, Docket No. 80-AFC-03 (CEC Order 10-0825-03) (TN#: 58247).

CEC 2010b, California Energy Commission revised staff assessment for the application for certification for the Marsh Landing Generating Station Project, June 2010, Docket No. 80-AFC-03 (TN#: 57073).

California ISO 2017, California Independent System Operator, Greater San Francisco Bay Area Black Start Resources Selection Report. December 1, 2017.

NRG 2018, Petition to amend – black start capability enhancement. 13 March 2018, Docket No. 08-AFC-3C (TN#: 223052).

UL 2016. Underwriters Labs, *UL 9540 Standard for energy Storage Systems and Equipment*, November 2, 2016.