

## DOCKETED

<b>Docket Number:</b>	01-AFC-07C
<b>Project Title:</b>	01-AFC-7C Russell City Energy Company
<b>TN #:</b>	222836
<b>Document Title:</b>	Russell City Energy Center Petition for Modification Black Start Capabilities
<b>Description:</b>	N/A
<b>Filer:</b>	Eric Janssen
<b>Organization:</b>	Ellison Schneider Harris & Donlan LLP
<b>Submitter Role:</b>	Applicant Representative
<b>Submission Date:</b>	3/2/2018 4:12:39 PM
<b>Docketed Date:</b>	3/2/2018

# Russell City Energy Company, LLC

717 TEXAS AVENUE  
SUITE 1000  
HOUSTON, TX 77002

March 2, 2018

Eric Veerkamp  
Compliance Project Manager  
Siting, Transmission and  
Environmental Protection (STEP Division)  
California Energy Commission  
1516 Ninth Street, MS-2000  
Sacramento, CA 95814

RE: Docket No. 01-AFC-07C: Petition for Modification

Dear Mr. Veerkamp:

On behalf of the Russell City Energy Center (“Project”), Russell City Energy Company, LLC (“Project Owner”) submits this Petition for Modification.

If you have any questions regarding the proposed modification, please contact Barbara McBride at 925-570-0849 or [Barbara.McBride@calpine.com](mailto:Barbara.McBride@calpine.com).

Sincerely,

/S/

\_\_\_\_\_  
Barbara McBride

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**Petition for Modification**

**Black Start Capabilities**  
**Russell City Energy Center**  
Hayward, California

Submitted to  
**California Energy Commission**

Submitted by  
**Russell City Energy Company, LLC**



March 2018

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## Attachments

List of Property Owners within 1,000 feet (provided under separate cover)

# Executive Summary

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Russell City Energy Company, LLC (hereinafter, "project owner") was selected by the California Independent System Operator (CAISO) to provide Black Start service at its existing Russell City Energy Center facility (RCEC) in Hayward, CA. To provide this service, the project owner is proposing modification of the RCEC to install a Battery Energy Storage System (BESS). The BESS is designed for a duty large enough to start either gas turbines in a 1x0 mode to energize a 230kV bus within three hours of a grid-wide blackout (Black Start event occurrence). This system would play a vital role in restoring power to the grid. Two potential locations for the BESS on the property are shown on Figure 1.

Both locations would utilize lithium-ion as the energy storage technology. The battery will range in size from 6 to 10 MW. Both locations are currently viable and depending on the final engineering and size necessity of the battery, a final site selection will be made.

Section 1.0 provides an overview of the Petition for Modification and a review of the ownership of the project. Section 2.0 provides a complete description of the proposed modifications and the necessity for the proposed changes. Section 3.0 assesses the potential environmental effects of the proposed changes, the project's continued compliance with all applicable laws, ordinances, regulations and standards (LORS), and the consistency of the changes with the Commission Decision certifying the facility. This assessment indicates that adoption of the Petition will not result in any significant, unmitigated adverse environmental impacts. The project will continue to comply with all applicable LORS.

Figure 1



## SECTION 1.0

# Introduction

## 1.1 Overview of the Modification

The RCEC is a natural gas fired power plant located in the City of Hayward. In this Petition, the project owner is proposing modification of the RCEC to include Black Start capabilities through installation of a BESS large enough to start either gas turbines in a 1x0 mode to energize a 230kV bus within three hours of a grid-wide blackout.

This Petition for Modification contains all of the information that is required pursuant to the CEC's Siting Regulations (California Code of Regulations [CCR] Title 20, Section 1769, Post Certification Amendments and Changes). The information necessary to fulfill the requirements of Section 1769 is contained in Sections 1.0 through 6.0, as summarized in Table 1.1-1.

TABLE 1.1-1  
Informational Requirements for Post-Certification Modifications

Section 1769 Requirement	Section of Petition Fulfilling Requirement
(A) A complete description of the proposed modifications, including new language for any conditions that will be affected.	Section 2.0—Proposed modifications Sections 3.1 to 3.15—Proposed changes to Conditions of Certification, if necessary, are located at the end of the technical section
(B) A discussion of the necessity for the proposed modifications.	Section 1.3
(C) If the modification is based on information that was known by the petitioner during the certification proceeding, an explanation why the issue was not raised at that time.	Section 1.3
(D) If the modification is based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision, an explanation of why the change should be permitted.	Sections 1.4, 3.1
(E) An analysis of the impacts the modification may have on the environment and proposed measures to mitigate any significant adverse impacts.	Section 1.5, 3.1
(F) A discussion of the impact of the modification on the facility's ability to comply with applicable laws, ordinances, regulations, and standards.	Section 1.5, 3.1
(G) A discussion of how the modification affects the public.	Section 4.0
(H) A list of property owners potentially affected by the modification.	Section 5.0
(I) A discussion of the potential effect on nearby property owners, the public and the parties in the application proceedings.	Section 6.0

## 1.2 Ownership of the Facility Property

Project owner (Russell City Energy Company, LLC) is 25% owned by ASC and 75% by Calpine Russell City. Calpine Russell City is an indirect wholly owned subsidiary of Calpine Corporation which is an independent power developer, owner, and operator engaged in the business of owning or leasing, operating, and selling energy and capacity from electric power generation facilities.

## 1.3 Necessity of Proposed Changes

The Siting Regulations require a discussion of the necessity for the proposed revision to the RCEC certification and whether the modification is based on information known by the petitioner during the certification proceeding (Title 20, CCR, Sections 1769 (a)(1)(B) and (C)).

The proposed modification is necessary to provide Black Start Capabilities. RCEC was selected by the CAISO to provide Black Start Services in the event that a grid emergency occurs. In order to fulfill these capabilities, the project owner will install a battery capable of starting each gas turbine in the event that there is no power available from the grid.

## 1.4 Consistency of Changes with Certification

The Siting Regulations also require a discussion of the consistency of the proposed project revision with applicable laws, ordinances, regulations, and standards (LORS) and whether the modifications are based on new information that changes or undermines the assumptions, rationale, findings, or other basis of the final decision (Title 20, CCR Section 1769 (a)(1)(D)). If the project is no longer consistent with the certification, the petition must provide an explanation why the modification should be permitted.

The proposed modification is consistent with all applicable LORS. This Petition is not based on new information that changes or undermines any basis for the Final Decision.

## 1.5 Summary of Environmental Impacts

The CEC Siting Regulations require that an analysis be conducted to address the potential impacts the proposed modifications may have on the environment, and proposed measures to mitigate any potentially significant adverse impacts (Title 20, CCR, Section 1769 (a)(1)(E)). The regulations also require a discussion of the impact of the modification on the facility's ability to comply with applicable LORS (Section 1769 (1) (a) (F)). Section 3.0 of this Petition includes a discussion of the potential environmental impacts associated with the modification, as well as a discussion of the consistency of the modification with LORS. Section 3.0 concludes that there will be no significant environmental impacts associated with implementing the actions specified in the Petition and that the project will continue to comply with all applicable LORS.

## SECTION 2.0

# Description of Project Modification

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This section includes a description of the proposed modification, consistent with CEC Siting Regulations (Title 20, CCR, Section 1769 (a) (1) (A)). The BESS will be located on either the Northern Location (Site A) or the Southern Location (Site B) shown on Figure 1. The BESS project includes an installation of a 6 to 10 MW lithium-ion (Li-ion) Battery. This energy storage system is comprised of the storage device, the interconnection and the communication system.

The Northern Location shown in Figure 2 has a footprint of approximately 15,000 square feet and includes a larger battery system than the Southern Location shown on Figure 3. However, both BESS configurations meet the black start system requirements. The BESS will include a combination of battery modules, inverters and transformers. If built at the Southern Location, which is approximately 10,000 square feet, the BESS will have fewer inverters with switched capacitor banks to support the high amount, but short time frame, of reactive power needed to start the large motors associated with startup cycle during a Black Start event.

The BESS will be tied into the power plant's Motor Control Centers (MCC)s. The two primary MCCs will be modified by the inclusion of tie breakers to enable one continuous MCC with a single BESS connection enabling the start of either Gas Turbine. The Turbine controls and facility SCADA will be adjusted to enable operation and control of this new Black Start capability from the existing facility control room.

In addition, the project will include an interconnection of the battery to the existing 4160V auxiliary bus through which energy will flow to and from the grid using existing electrical infrastructure and installation of a new and separate revenue meter for monitoring battery activity.

Figure 2: Northern Location A - North Location BESS General Arrangement

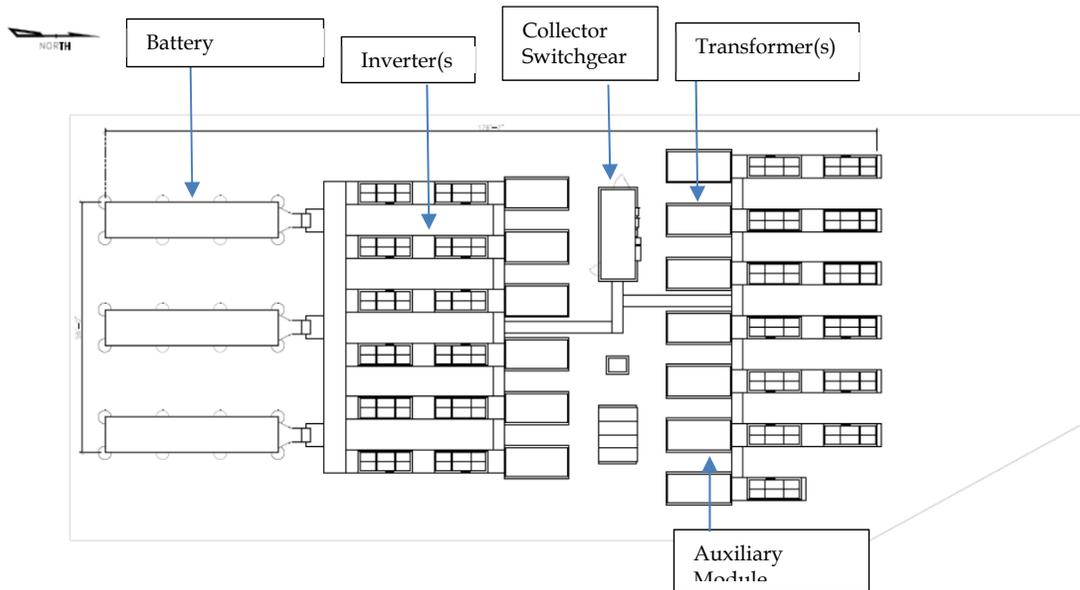
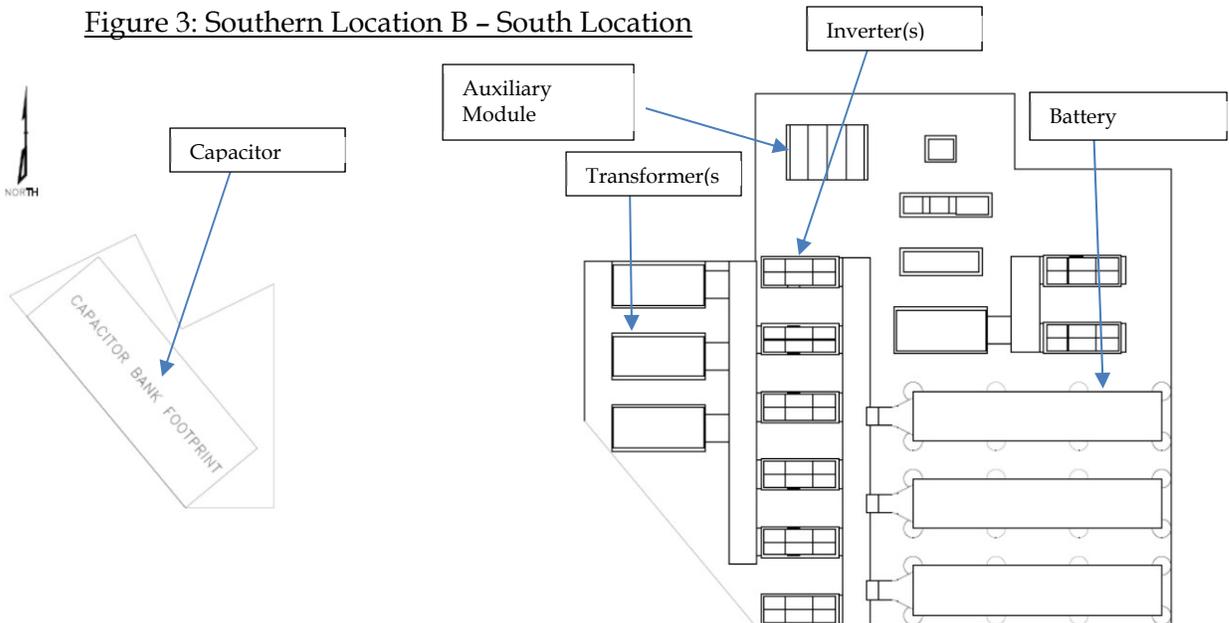


Figure 3: Southern Location B - South Location



Either System would be tied into the power plants Motor Control Centers (MCC

**SECTION 3.0**

# Environmental Analysis of Proposed Project Modification

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The proposed modification will not result in any potentially significant impacts and will comply with all applicable LORS.

## 3.1 Resources

### 3.1.1 Air Quality

The proposed modification will not significantly affect emissions from the BESS project and will support continued safe, reliable and effective operation. There are no new emissions sources associated with the BESS.

In the unlikely event of a Black Out situation of the power grid as determined by CAISO, the RCEC will need to operate at a reduced load while grid operations are restored. During this time, the RCEC will likely not be in compliance with its permitted emissions limits for non-Black Start operations for up to 48 hours while grid stability is restored. The project owner is in discussions with the Bay Area Air Quality Management District (BAAQMD) to facilitate operations in this emergency situation. Any BAAQMD required modifications will be incorporated into this Petition once the appropriate path has been determined.

### 3.1.2 Biological Resources

The proposed modification will occur entirely on site, and will not result in any significant physical modification to the site. No sensitive biological resources or habitats occur on site. Because the entire site is currently developed and used for existing facility operations, the proposed modification will not have a significant impact to biological resources.

### 3.1.3 Cultural Resources

The proposed modification will occur entirely on site, and will not result in any significant impact to cultural resources. The battery will sit on a concrete pad and be approximately 9 feet by 41 feet. The approximate depth of the foundation will be 6 feet at either location. An evaluation will be performed to determine the amount of fill currently present at the chosen location. In consultation with the CEC's Cultural Resources staff, RCEC will determine the amount of fill at the chosen location. If the excavation depth for the concrete pad extends into soils beyond the fill, a cultural monitor will be on site during the excavation.

### **3.1.4 Geology and Paleontology**

The proposed modification will not cause geological hazards, or impacts to paleontological or geological resources beyond those analyzed by the Commission during certification.

### **3.1.5 Hazardous Materials Management**

The proposed modification will add a Li-ion Battery to the RCEC. Li-ion batteries will be added to the Hazardous Materials Business Plan and Annual Compliance Report. The hazardous materials permit with the City of Hayward will be amended to incorporate the BESS. Hazardous materials will be handled and stored in a safe manner, reducing any potential public health or safety hazards. The attached updated table is included for reference.

**Battery chemical inventory**

<b>Trade Name</b>	<b>Chemical Name</b>	<b>CAS Number</b>	<b>Maximum Quantity Onsite</b>	<b>CERCLA SARA RQ<sup>a</sup></b>	<b>RQ of Material as Used Onsite<sup>b</sup></b>	<b>LaFollette Bill TPQ<sup>c</sup></b>	<b>Prop 65</b>
<b>Hazardous Materials</b>							
	Lithium-Ion Battery*	TBD	TBD	d	d	d	Yes
Lithium-Ion Battery							

<sup>a</sup>Reportable quantity for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [Ref. 40 CFR 302, Table 302.4]. Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.

<sup>b</sup> Reportable quantity for materials as used onsite. Since some of the hazardous materials are mixtures that contain only a percentage of a reportable chemical, the reportable quantity of the mixture can be different than for a pure chemical. For example, if a material only contains 10 percent of a reportable chemical and the RQ is 100 lbs., the reportable quantity for that material would be (100 lbs.)/(10%) = 1,000 lbs.

<sup>c</sup> Threshold Planning Quantity [Ref. 40 CFR Part 355, Appendix A]. If quantities of extremely hazardous materials equal to or greater than TPQ are handled or stored, they must be registered with the local Administering Agency.

<sup>d</sup> No reporting requirement. Chemical has no listed RQ or TPQ.

- Lithium- Ion Battery chemical makeup to be determined once vendor is selected.

The Li-ion Battery is a closed cell battery. The system is totally enclosed and exposure to hazardous ingredients is not expected. Li-ion batteries are made with non-toxic, non-hazardous materials. Li-ion batteries carry a very remote fire risk. There is minimal fire hazard when manufacturer's recommendations are followed for proper handling of the battery and its containment. Secondary containment and fire suppression are supplied with the battery package as specified by the battery manufacturer. In addition, each Li-ion cell is continuously monitored and is provided with an automatic shutdown to prevent a runaway thermal condition. Therefore, the proposed modification will not result in any significant impacts from hazardous materials.

### **3.1.6 Land Use**

The proposed modification would not result in any change to the land uses associated with the site, and is consistent with applicable General Plan and zoning ordinance provisions for this industrial use.

### **3.1.7 Noise and Vibration**

The Li-ion battery would add a minimal new source of noise to the site. The source of the noise would be the HVAC system for Li-ion battery. The battery itself is low in noise. Because the RCEC will continue to meet noise requirements established in the Final Decision with the proposed modification, the proposed modification will not cause a significant adverse noise impact.

### **3.1.8 Public Health**

The proposed modification will not have a significant impact on Public Health. There will be no off-site consequences as a result of the installation of the BESS, and no changes to the potential public health impacts analyzed in the Final Decision. Any potential air quality impacts will occur only as the result of emergency operations in the event of a grid emergency as determined by the CAISO. . (See the discussion under Air Quality, Section 3.1.1.)

### **3.1.9 Socioeconomics**

The proposed modification will require construction contractors and labor for the installation of the batteries. At peak construction there will be approximately 25 workers for a 3-6 month period. There will be no increased staff required for the operational phase of the project. Therefore, there will be no potential impacts to utilities and public services or housing needs as a result of the proposed modification, and no significant socioeconomic impacts.

### **3.1.10 Soil and Water Resources**

Construction associated with the foundations needed for installation of the BESS will not result in land disturbance of one acre or more. Therefore a General Storm Water Permit for construction related activities will be not be required. Any excavated soil will be disposed of in accordance with existing soils management plan and final grading will comply with the existing Erosion and Sedimentation Control Plan. The General Storm Water Permit for

operations will be updated upon completion of the BESS. Therefore, there will be no significant impacts to soil and water resources.

### **3.1.11 Traffic and Transportation**

All project deliveries during construction will continue to comply with all applicable Conditions of Certification.

The project owner will ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for construction-related transport of hazardous materials, and that federal and state regulations for the transport of hazardous materials are observed. Therefore, there will be no significant impacts to traffic and transportation.

### **3.1.12 Visual Resources**

The proposed modification will not substantially degrade the existing visual character or quality of the site, or its surrounding. The proposed modification will not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. Therefore, the proposed modification will not have a significant impact to visual resources.

### **3.1.13 Waste Management**

The proposed changes will not change or affect waste management practices or the types or quantities of waste generated by the construction or operation of the project. All waste generated during construction will comply with the facility's existing Waste Management Plan. Therefore, the proposed modification will not have a significant waste management impact.

### **3.1.14 Worker Safety and Fire Protection**

The proposed changes will not modify or increase impacts analyzed by the CEC, and the proposed changes do not affect the Commission Decision's conditions, findings or conclusions regarding worker safety and fire protection. All workers will undergo proper training consistent with the CEC license requirements. Li-ion batteries are supplied with secondary containment and fire suppression, which will automatically activate in the event of an emergency. Further, each Li-ion cell is monitored and can be shut down individually to prevent a runaway thermal condition. Therefore, the proposed modification will not have any significant impacts to worker safety and fire protection.

## **3.2 LORS**

The proposed modification will not impact the facility's ability to comply with applicable laws, ordinances, regulations, and standards ("LORS"), as discussed in each subsection of Section 3.

**SECTION 4.0**

# **Potential Effects on the Public**

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The proposed modification will not adversely affect the public. The modification will occur entirely onsite, and will not negatively impact air quality or public health. Therefore, there are no significant adverse effects on property owners that will result from the proposed modification.

**SECTION 5.0**

# List of Property Owners

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This section lists the property owners in accordance with the CEC Siting Regulations (Title 20, CCR, Section 1769(a)(1)(H)). A list of property owners within 1,000 feet of the proposed facility will be submitted directly to the Compliance Project Manager.

As described in this Petition, there will be no significant adverse environmental impacts from the proposed changes. Therefore, no significant adverse effects on property owners will result from the proposed modification.

SECTION 6.0

## Potential Effects on Property Owners

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This section addresses potential effects of the project changes proposed in this Petition on nearby property owners, the public, and parties in the application proceeding, pursuant to CEC Siting Regulations (Title 20, CCR, Section 1769 (a)(1)(I)).

The project, as modified, will not differ significantly in potential effects on adjacent land owners, compared with the project as previously proposed. The project, therefore, will have no adverse effects on nearby property owners, the public, or other parties in the application proceeding.

**DOCKETED**

<b>Docket Number:</b>	01-AFC-07C
<b>Project Title:</b>	01-AFC-7C Russell City Energy Company
<b>TN #:</b>	226354
<b>Document Title:</b>	Staff Analysis of Petition to Amend to Add Black Start Capability
<b>Description:</b>	N/A
<b>Filer:</b>	Marichka Haws
<b>Organization:</b>	CEC/John Heiser
<b>Submitter Role:</b>	Commission Staff
<b>Submission Date:</b>	1/22/2019 5:05:03 PM
<b>Docketed Date:</b>	1/23/2019

**CALIFORNIA ENERGY COMMISSION**

1516 NINTH STREET  
SACRAMENTO, CA 95814-5512  
www.energy.ca.gov



**DATE:** January 22, 2019

**TO:** Interested Parties

**FROM:** John Heiser, Project Manager

**SUBJECT: Russell City Energy Center (01-AFC-07C)  
Staff Analysis of Petition to Amend to Add Black Start Capability**

On March 2, 2018, Russell City Energy Company, LLC, filed a Petition to Amend (PTA) with the California Energy Commission requesting to modify the Russell City Energy Center (RCEC) by installing a battery energy storage system (BESS) and associated equipment. The batteries would be used to start the gas turbines 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). RCEC is a combined-cycle, natural gas-fired, 600-megawatt (MW) facility, located at the intersection of Enterprise and Whitesell streets in the industrial corridor of the city of Hayward in Alameda County, California. The project was certified by the Energy Commission on October 3, 2007 and began commercial operation on August 8, 2013.

### **DESCRIPTION OF PROPOSED MODIFICATION**

The PTA (TN 222836) is seeking approval to install and operate a BESS to provide black start capability to RCEC. The proposed project consists of installing 6 to 10 MW of lithium-ion batteries to start either RCEC gas turbine to be able to respond to a grid-wide blackout. The project would include interconnecting the BESS to the existing power plant's motor control center and the existing 4160-volt auxiliary bus. The BESS would be contained in three metal enclosures.

### **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 – five new conditions and four 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, 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.

For additional information, the Energy Commission's webpage for this facility, <http://www.energy.ca.gov/sitingcases/russellcity/index.html>, has a link to the PTA (TN 222836) 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 RCEC 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 RCEC, 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, February 18, 2018. This amendment is scheduled for a decision at the February 20, 2018 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 docket 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  
Russell City (01-AFC-07C)  
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](mailto: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](mailto:mediaoffice@energy.ca.gov).

If you have questions about this notice, please contact John Heiser, Project Manager, at (916) 653-8236 or via email at [John.Heiser@energy.ca.gov](mailto:John.Heiser@energy.ca.gov).

Date: 1.22.19



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**CHRIS DAVIS**, Office Manager  
Siting, Transmission, & Environmental Protection  
Division

Mail List # 7078  
Russell City Energy Center listserv

# **STAFF ANALYSIS**

**RUSSELL CITY ENERGY CENTER  
BLACK START CAPABILITY  
(01-AFC-07C)**

**PETITION TO AMEND**

**RUSSELL CITY ENERGY CENTER  
(01-AFC-07C)  
PETITION TO AMEND THE COMMISSION DECISION  
STAFF ANALYSIS**

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**RUSSELL CITY ENERGY CENTER (01-AFC-07C)**  
**Petition to Amend to Add Black Start Capability**  
**EXECUTIVE SUMMARY**

John Heiser, AICP

## **INTRODUCTION**

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On March 2, 2018, Russell City Energy Company, LLC (petitioner), filed a Petition to Amend (PTA) with the California Energy Commission requesting to modify the Russell City Energy Center (RCEC) by installing a battery energy storage system (BESS) and associated equipment. The batteries would start the gas turbines 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). RCEC is a combined-cycle, natural gas-fired, 600-megawatt (MW) facility, located at the intersection of Enterprise and Whitesell streets in the industrial corridor of the city of Hayward in Alameda County, California. The project was certified by the Energy Commission on October 3, 2007 and began commercial operation on August 8, 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 (BAAQMD or District) air quality permit conditions.

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, 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**

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The PTA (TN 222836) is seeking approval to install and operate a BESS to provide black start capability to RCEC. The proposal consists of installing 6 to 10 MW of lithium-ion batteries to start either RCEC gas turbine in order to respond to a grid-wide blackout. The project would include interconnecting the BESS to the existing power plant's motor control center and to the existing 4160-volt auxiliary bus. The BESS would be contained in three metal enclosures. The BESS black start service would start either gas turbine in a 1x0 mode to then be able to re-energize a 230 kilovolt (kV) bus within three hours of a grid-wide blackout.

## **NECESSITY FOR THE PROPOSED MODIFICATIONS**

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RCEC 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 gas turbines 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**

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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, 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. 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 for 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 modify four air quality conditions of certification in the Final Commission Decision (Decision) and add five new conditions (RCEC 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 RCEC would continue to comply with all applicable federal, state, and District air quality LORS.

The amendment adds five new conditions (**AQ-50 to 54**) related to the emission limits and operational limits for the gas turbines during the black start related operations. The amendment also modifies four conditions (**AQ-19, AQ-22, AQ-23 and AQ-26**) to exempt the black start-related operations from the normal operation emission limits.

Several conditions of certification are modified to include PM2.5 in addition to PM10. PM2.5 is considered a subset of PM10. Staff conservatively assumes PM2.5 emissions are equivalent to PM10 emissions from natural gas combustion. This is supported by studies evaluating in-stack testing results. Staff assumes as part of this analysis that all PM10 equals PM2.5. This change does not affect PM10 or PM2.5 emissions. However, the Title V permit conditions from the District now include PM2.5 in addition to PM10 so this analysis incorporates PM2.5 into applicable conditions of certification so that Energy Commission conditions would be consistent with corresponding district permit conditions. In addition, several other conditions include minor modification for consistency with Title V permit changes.

**Biological Resources.** The new BESS equipment, along with construction material staging and worker parking, would be located on land that is fully developed within the RCEC. Therefore, the proposed modification would have no significant impacts on biological resources and would not result in changes to any biological resources conditions of certification. **BIO-1** (Designated Biologist Selection), **BIO-2** (Designated Biologist Duties), **BIO-3** (Designated Biologist Authority), **BIO-4** (Biological Resources Mitigation Implementation and Monitoring Plan), **BIO-5** (Worker Environmental Awareness Program), **BIO-11** (Facility Closure), **BIO-12** (Construction Noise Levels), and **BIO-13** (Bird Flight Diverters) in the Decision would all remain applicable. The RCEC with the proposed modification would be in compliance with all applicable LORS related to biological resources.

**Cultural Resources.** There are no known cultural resources on the project site or in the project vicinity that could be impacted by the proposed modifications. In the event that cultural resources are encountered during the construction of the BESS and related facilities, implementation of existing Conditions of Certification **CUL-1** through **CUL-6** would mitigate any potentially significant impacts and would ensure the project remains in conformance with Hayward Municipal Code, Chapter 10, Article 11.150 regarding treatment of archaeological resources.

**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 Hazards and 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, provided the owner complies with Conditions of Certification **GEO-1**, **GEO-2** and **PAL-1** through **PAL-7**. The proposed construction would not require any change to the conditions of certification related to geology or geologic hazards adopted in the Decision.

**Hazardous Materials Management.** The proposed battery system would use lithium-ion batteries. The batteries would be delivered to the RCEC site in U.S. Department of Transportation-certified vehicles via a route approved by the compliance project manager in accordance with existing Condition of Certification **HAZ-7**. The Hazardous Materials Business Plan would be updated to include the new BESS in accordance with existing Condition of Certification **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 existing Condition of Certification **HAZ-1**.

There would be no other changes to the hazardous materials used during operation of the RCEC. The use, handling, storage, and transportation of the lithium-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 existing Conditions of Certification **HAZ-1**, **HAZ-2** and **HAZ-7** adopted in the Decision.

**Land Use.** The proposed modification to include black start capabilities through installation of a battery energy storage system would have a less than significant land use impact. The proposed modification would be consistent with the city of Hayward's land use and zoning designation for the project site.

**Noise.** 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.

**Socioeconomics.** The proposed modification to include black start capabilities through installation of a BESS would take approximately 3 to 6 months to complete and require approximately 25 workers at peak construction. From a socioeconomics standpoint, the proposed modification would have insignificant workforce-related impacts on housing and community services. It would not affect existing Conditions of Certification **SOCIO-1** (recruit employees and procure materials and supplies within Alameda County) and **SOCIO-2** (school impact fees).

**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.** Impacts to visual resources from installation of a BESS would be less than significant. Structures would be located in a heavily industrial area and would not impact visual character or quality of the site or its surroundings. Structures would not exceed 11 feet in height, and no new source of substantial light or glare would be created.

**Worker Safety and Fire Protection.** Based on the information provided by the petitioner, staff proposes new Condition of Certification **WORKER SAFETY-3**, which would ensure compliance with LORS to provide adequate protection for on-site workers and first responders.

With the adoption of **WORKER SAFETY-3**, 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 Final Decision. The approved conditions of certification in the Decision would include compliance with current worker safety and fire protection LORS.

## **ENVIRONMENTAL JUSTICE**

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**Environmental Justice - Figure 1** shows 2010 census blocks in the six-mile radius of Russell City Energy Center 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 US Environmental Protection Agency's (EPA) *Guidance on Considering Environmental Justice During the Development of Regulatory Actions*.

Based on California Department of Education data in **Environmental Justice - Table 1** and presented in **Environmental Justice - Figure 2**, staff concluded that the percentage of those living in the school districts of Hayward Unified, San Leandro Unified, San Lorenzo Unified, and New Haven 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 EPA's *Guidance on Considering Environmental Justice During the Development of Regulatory Actions*.

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

<b>SCHOOL DISTRICTS IN SIX-MILE RADIUS</b>	<b>Enrollment Used for Meals</b>	<b>Free or Reduced Price Meals</b>	
Hayward Unified School District	22,922	15,671	68.4%
San Leandro Unified School District	8,638	5,234	60.6%
San Lorenzo Unified School District	11,739	7,807	66.5%
New Haven Unified School District	11,893	5,732	48.2%
<b>REFERENCE GEOGRAPHY</b>			
Alameda County	226,916	96,769	44.6%
Source: CDE 2017. California Department of Education, DataQuest, Free or Reduced Price Meals, District level data for the year 2016-2017, < <a href="http://dq.cde.ca.gov/dataquest/">http://dq.cde.ca.gov/dataquest/</a> >.			

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.**

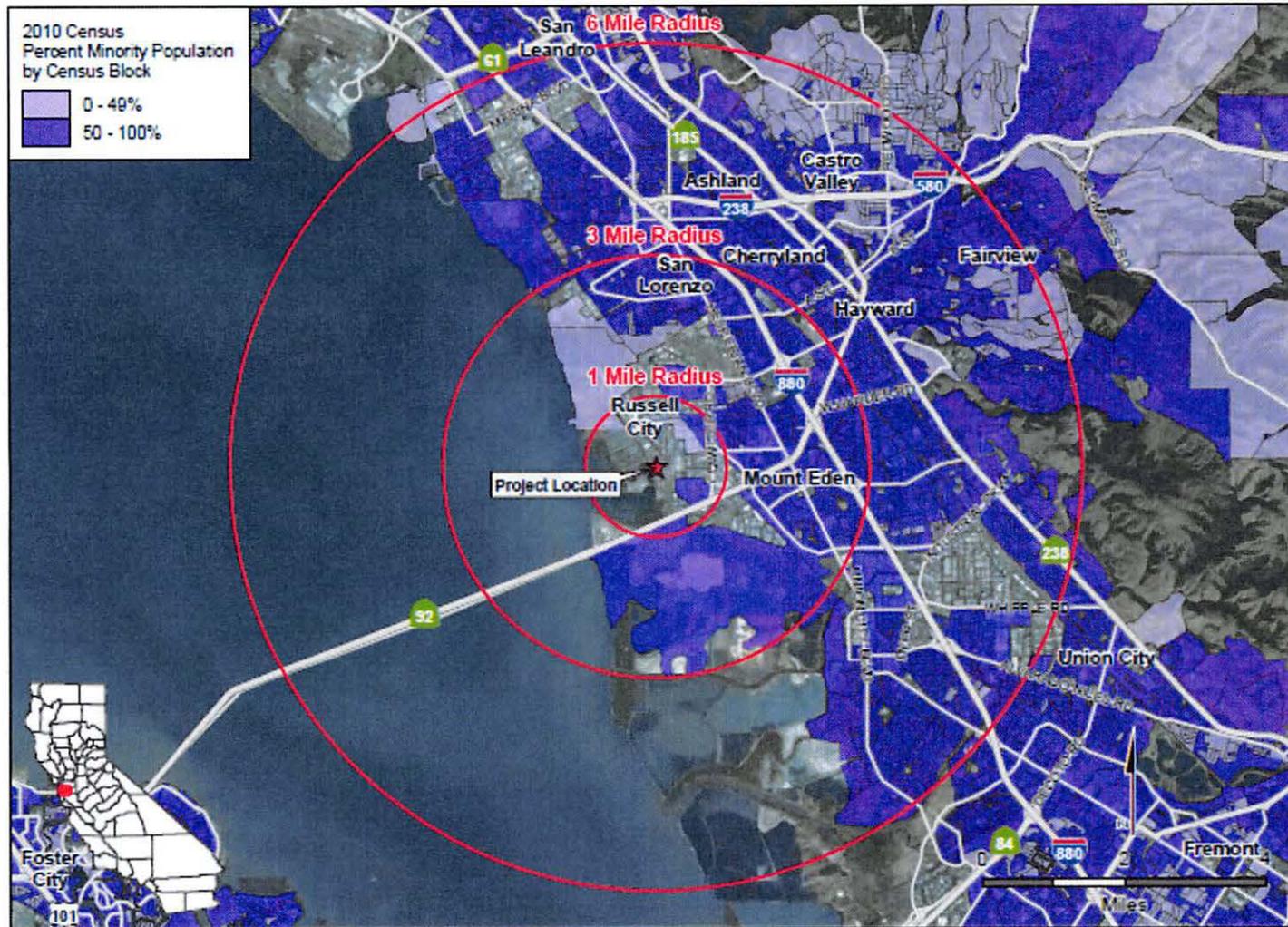
## **ENVIRONMENTAL JUSTICE CONCLUSIONS**

Staff has determined that with the 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**

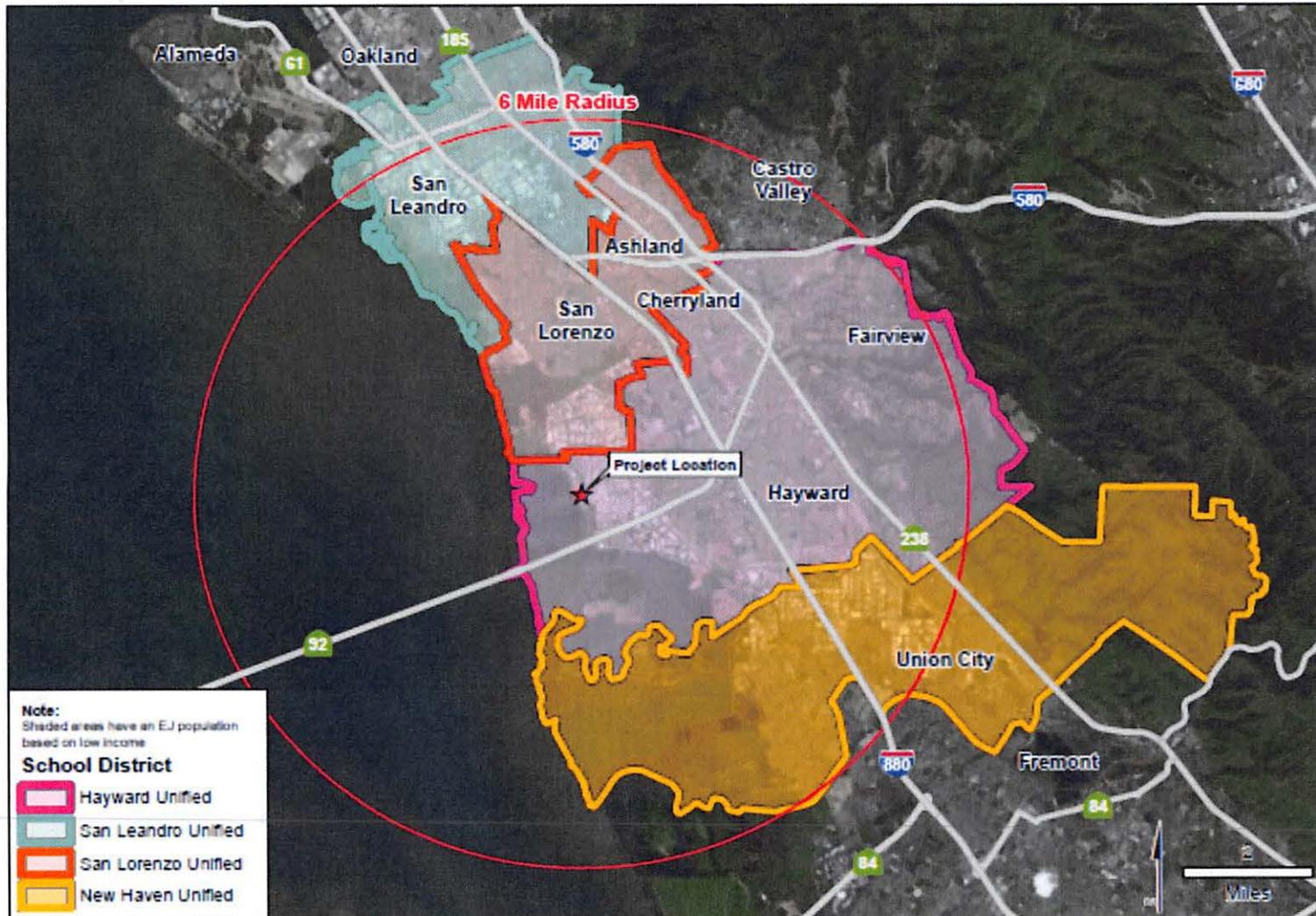
Staff concludes that the project modification would not result in significant adverse environmental impacts, and with new and revised air quality and worker safety and fire protection conditions of certification the project would remain in compliance with all applicable laws, ordinances, regulations, 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**  
 Russell City Energy Center - Census 2010 Minority Population by Census Block



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION  
 SOURCE: Census 2010 PL 94-171 Data

**ENVIRONMENTAL JUSTICE - FIGURE 2**  
 Russell City Energy Center - Environmental Justice Population Based on Low Income



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION  
 SOURCES: TIGER Data, CA Dept. of Education Data Quest

**RUSSELL CITY ENERGY CENTER (01-AFC-07C)**  
**Petition to Amend to Add Black Start Capability**  
**AIR QUALITY**

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

## **SUMMARY OF CONCLUSIONS**

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In this petition for modification of the Russell City Energy Center (RCEC), the petitioner proposes to modify the existing air quality conditions of certification (RCEC 2018a) to install a battery system to enable black start capabilities. Staff concludes, the amended RCEC would not result in significant adverse air quality related impacts, and with the adoption of the attached conditions of certification that the RCEC would continue to comply with all applicable federal, state, and Bay Area Air Quality Management District (BAAQMD or District) air quality laws, ordinances, regulations, and standards (LORS).

## **INTRODUCTION**

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The RCEC was originally certified by the California Energy Commission (Energy Commission) in September 2002 and received an amended approval by the Energy Commission in October 2007. The facility is a nominal 600-megawatt, natural gas-fired, combined-cycle power plant located in the city of Hayward in Alameda County. The Energy Commission approved two petitions to extend commencement of the construction deadline on August 29, 2007 and on July 30, 2008, respectively. On August 11, 2010, the Energy Commission approved an amendment to make modifications to the Air Quality conditions of certification to be consistent with the project's federal Prevention of Significant Deterioration (PSD) permit and enable the renewal of the Authority to Construct (ATC) issued by the District.

Construction of RCEC began in September 2010. On July 1, 2013, the Energy Commission approved an amendment to extend the timing for conducting initial source testing and to make certain non-substantive clarifications and administrative amendments to provisions governing monitoring and initial source testing and to conform with the ATC issued by District. The project commenced operation on August 8, 2013. On August 10, 2016, the Energy Commission approved an amendment to install a new demineralization system designed to produce demineralized water from the recycled water supply which would be used for steam cycle makeup water and combustion turbine inlet air cooling. On November 7, 2017, the Energy Commission approved an amendment to install a 6,667-gallon tank for storage of sodium hydroxide to use in the zero liquid discharge system and for cooling tower acidity (PH) control.

On March 2, 2018, Russell City Energy Company, LLC filed a petition for modification with the Energy Commission requesting to change certain air quality conditions of certification for the RCEC (RCEC 2018a). RCEC had been selected by the California Independent System Operator (California ISO) to provide black start services in the Bay Area. To provide this service, the petitioner requested to include black start capabilities through installation of a battery energy storage system (BESS). The BESS is designed

to be large enough to start either of the two combustion turbines in a 1x0 (no heat recovery) mode to energize a 230kV bus within three hours of a grid-wide blackout (black start event occurrence) and play a vital role in restoring the power grid. The amendment modifies four air quality conditions of certification and adds five new conditions. In addition, several other conditions include minor modification for consistency with Title V permit changes. The District has also reviewed the proposed project changes and issued the "Draft Engineering Evaluation – Russel City 'Black Start' Capacity Project" on December 7, 2018 (BAAQMD 2018) for a 30-day comment period.

## **LAWS, ORDINANCES, REGULATIONS, AND STANDARDS COMPLIANCE**

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RCEC is subject to all the LORS described in the original Decision for RCEC (CEC 2002) and previous amendments (CEC 2007, CEC 2010 and CEC 2013). The applicable LORS remain the same as previous analyses; the requested changes would enable the facility to continue to comply with all applicable LORS.

## **ANALYSIS OF REQUESTED CHANGES**

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The BESS includes an installation of a 6-10 MW lithium-ion (Li-ion) Battery. The final capacity and energy dimensions are still being determined. This energy storage system comprises the storage device, the interconnection and the communication system. 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 turbine in a 1x0 configuration could operate up to 48 hours at full speed no load (FSNL) while grid stability is restored. During this time, the turbine emissions may not be compliant with the existing permitted emission limits for oxides of nitrogen (NO<sub>x</sub>), carbon monoxide (CO) and volatile organic compounds (VOCs), which are also called Precursor Organic Compounds (POCs).

## **CONSTRUCTION PHASE IMPACTS**

Construction of the BESS is expected to last approximately 5 months. The construction includes site preparation, foundation work, construction/installation of structures, and installation of equipment, paving, and painting. The actual disturbance area is approximately 0.34 acres in size and essentially flat, which would require only minimum grading and leveling. **Air Quality Table 1** shows the maximum monthly and annual emissions during the construction period. The maximum daily emissions of NO<sub>x</sub>, CO, sulfur dioxide (SO<sub>2</sub>) and VOC are expected to occur during the middle of the construction schedule during building construction and the installation of the mechanical equipment. The maximum daily emissions of particulate matter less than or equal to 10 micrometers (PM<sub>10</sub>) and particulate matter less than or equal to 2.5 micrometers (PM<sub>2.5</sub>) are estimated by adding the maximum fugitive dust emissions and exhaust emissions, which are expected to occur during different months. Therefore, this estimation is very conservative. Annual emissions are based on the average equipment mix during the 5-month construction period. The estimated emissions for the original

facility construction are also included for comparison. As shown in **Air Quality Table 1**, BESS construction is a very small percentage of original facility construction.

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

	NOx	VOC	PM10	PM2.5	CO	SO <sub>2</sub>
<b>Daily Construction Emissions (lbs/day)</b>						
<b>Original Facility Construction</b>	382.7	82.1	44.7	44.7	813.5	11.5
<b>BESS Construction</b>	14.05	2.2	1.03	0.88	18.14	0.031
<b>Total Construction Emissions (tons/period)</b>						
<b>Original Facility Construction</b>	22.95	6.09	3.10	3.10	63.82	0.58
<b>BESS Construction</b>	0.752	0.118	0.055	0.047	0.97	0.0017

Source: RCEC 2018b.

All Staff Conditions of Certification (COCs) for construction in the Commission Decision remain valid and must be implemented during BESS construction. As shown in **Air Quality Table 1**, the emissions during black start system construction would be significantly less than those during the original facility construction. Due to the short duration of construction and the limited area of disturbance, the air quality impacts associated with emissions for BESS construction activities are expected to be less than significant. Staff recommends continued implementation of the conditions of certification adopted in the original Commission Decision for consistency with previous construction activities.

**Black Start Commissioning, Readiness Testing and Emergency Operation Impacts**

Commissioning of BESS would be conducted in two phases: 1) testing of the BESS itself, and 2) plant performance test of the BESS's ability to initiate a system start. The sequence would need to be performed on both turbines. The commissioning of BESS will not exceed 20 hours in total for both turbines and would be conducted up to 5 hours per day. The emissions during the commissioning activities are based on FSNL operation.

**Air Quality Table 2** presents the petitioner's anticipated maximum commissioning emissions. The current permitted project annual emissions are also included for comparison.

**Air Quality Table 2**  
**RCEC, Maximum Emissions Rates during Black Start Commissioning**

	NOx	CO	VOC	SO <sub>2</sub>	PM10/2.5
<b>Maximum Hourly Emission (lbs/hr)</b>	240	5,700	304.2	6.21	7.5
<b>Maximum Daily Emission (lbs/day)</b>	1,200	28,500	1521	31.05	37.5
<b>Maximum Annual Emission (tons/year)</b>	2.4	57.0	3.04	0.06	0.08
<b>Current Permitted Annual Emission (tons/year)</b>	127	330	28.5	12.2	71.8

Source: RCEC 2018b, BAAQMD 2018.

In addition to commissioning, RCEC would also perform annual readiness testing to ensure availability for black start emergency operations. The readiness testing would be similar to the commissioning but only with very short duration of operation at FSNL. **Air Quality Table 3** presents estimated maximum emissions during readiness testing. Since the readiness testing is expected to be no more than one hour, maximum hourly emissions are presented in the table. However, the petitioner proposes to comply with the existing normal operation emission limits during the readiness testing. At this time staff does not propose new conditions of certification for readiness testing.

**Air Quality Table 3**  
**RCEC, Maximum Emissions Rates during Black Start Readiness Testing**  
**(Assumes One Hour of Readiness Testing)**

	NOx	CO	VOC	SO <sub>2</sub>	PM10/2.5
<b>Maximum Hourly Emission (lbs/hr)</b>	130 <sup>a</sup>	2237.5 <sup>a</sup>	304.2 <sup>b</sup>	6.21 <sup>b</sup>	7.5 <sup>b</sup>

Source:

- a. RCEC 2018b.
- b. Data from staff analysis. emissions are below daily emissions limits for normal operations except that for VOC, which is 298 lbs/day. Data in the table are very conservative and represent an upper bound on emissions. Petitioner indicates they will be able to comply with currently-applicable emissions limits for normal operations.

The proposed operation during a black start event is based on 48 hours of FSNL operation, 18 hours of cold starts and 1.5 hours of shutdowns for a total black start operation of 67.5 hours (Table 1 of Responses to Staff's Data Requests, Set 1, A1 through A15, attachment DR-A3 of RCEC 2018b). The estimated maximum emissions during the black start events are presented in **Air Quality Table 4** below. The maximum hourly emissions are also based on FSNL operation. As shown in **Air Quality Table 4**, the estimated total emissions during the black start operation are considerably less than those permitted during normal project operation.

**Air Quality Table 4**  
**RCEC, Maximum Emissions Rates during Black Start Emergency Operation**

	NOx	CO	VOC	SO <sub>2</sub>	PM10/2.5
<b>Maximum Hourly Emission (lbs/hr)</b>	240	5,700	304.2	6.21	7.5
<b>Maximum Daily Emission (lbs/day)</b>	5,760	131,100	7,300	149	180
<b>Maximum Annual Emission (tons/year)</b>	5.8	68.6	7.3	0.15	0.18
<b>Current Permitted Annual Emission (tons/year)</b>	<b>127</b>	<b>330</b>	<b>28.5</b>	<b>12.2</b>	<b>71.8</b>

Source: RCEC 2018b, BAAQMD 2018.

The petitioner provided a modeling analysis for black start emergency operation to determine the worst case air quality impacts. The petitioner evaluated RCEC's expected black start operation impacts for state and federal 1-hour and 8-hour CO and state 1-hour NO<sub>2</sub> ambient air quality standards. The federal 1-hour NO<sub>2</sub> ambient air quality 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 of emergency black start operations. RCEC would not have a significant impact on the federal 1-hour NO<sub>2</sub> standard due to the very limited duration of black start operations compared to the 3-year averaging time used for the federal standard. Annual NO<sub>2</sub> impacts were also not evaluated further for the same reason.

Impacts due to PM10, PM2.5, and SO<sub>2</sub> are directly proportional to the fuel use and therefore are always highest at full load, normal operation. Therefore, short-term SO<sub>2</sub> and PM10/2.5 impacts during black start operations would be less than normal operations and are not evaluated further here.

During commissioning and readiness testing, maximum emissions occur when the black start unit operates at FSNL condition. Therefore, the short term impacts of NO<sub>2</sub> and CO for both periods can also be conservatively estimated by those emissions during the black start operations.

**Air Quality Table 5** presents the maximum CO and NO<sub>2</sub> impacts during black start operations, commissioning and readiness testing. The background NO<sub>2</sub> and CO concentrations are the highest values during the last three years (2015-2017) from BAAQMD Oakland East monitoring station. As shown in **Air Quality Table 5**, the emissions of the black start unit would not cause new exceedances of any state or federal CO or NO<sub>2</sub> ambient air quality standard.

**Air Quality Table 5**  
**RCEC, Black Start Emergency Operation, Commissioning and Readiness Testing**  
**Maximum Impacts ( $\mu\text{g}/\text{m}^3$ )**

Pollutant	Averaging Time	Modeled Impact	Background	Total	Limiting <sup>a</sup> Standard	Percent of Standard
CO	1 hour	3,983	3,665	7,648	23,000	33
	8 hour	968	2,519	3,487	10,000	35
NO <sub>2</sub>	1 hour (state)	84	122	206	339	61

Source: RCEC 2018b and independent staff analysis.

Note: a. The limiting standards are the most stringent federal or state standards. The 1-hour CO standard represents California state standard. The 8-hour CO standard represents both federal and state standards.

The amendment adds five new conditions of certification (**AQ-50 to 54**) related to the emission limits and operational limits for the gas turbines during the black start related operations. The amendment also modifies four conditions (**AQ-19, AQ-22, AQ-23 and AQ-26**) to exempt the black start-related operations from the normal operation emission limits.

Several conditions are modified to include PM<sub>2.5</sub> in addition to PM<sub>10</sub>. PM<sub>2.5</sub> is considered a subset of PM<sub>10</sub>. Staff conservatively assumes PM<sub>2.5</sub> emissions are equivalent to PM<sub>10</sub> emissions from natural gas combustion. This is supported by studies evaluating in-stack testing results. Staff assumes as part of this analysis that all PM<sub>10</sub> equals PM<sub>2.5</sub>. This change does not affect PM<sub>10</sub> or PM<sub>2.5</sub> emissions. However, the Title V permit conditions from district now include PM<sub>2.5</sub> in addition to PM<sub>10</sub> so this analysis incorporates PM<sub>2.5</sub> into applicable conditions so that Energy Commission conditions of certification would be consistent with corresponding district permit conditions. In addition, several other conditions include minor modification for consistency with Title V permit changes.

## CONCLUSIONS AND RECOMMENDATIONS

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Staff recommends that the revised conditions of certification be approved as shown below. With the recommended changes, RCEC would continue to conform to all applicable federal, state, and District LORS. Staff concludes the amended facility would not cause any significant adverse air quality impacts.

## AMENDED CONDITIONS OF CERTIFICATION

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Below is a list of conditions of certification that staff recommends to be revised from those approved in the 2002 Energy Commission Final Decision (CEC 2002) and the 2007 (CEC 2007), 2010 (CEC 2010) and 2013 (CEC 2013) Orders Approving Petitions to Amend. Staff proposes to modify four COCs and adds five new COCs. In addition, staff proposes minor modification to several other conditions for consistency with Title V permit change. ~~Strikethrough~~ is used to indicate deleted language and **underline and bold** is used for new language.

## **BAAQMD CONDITIONS OF CERTIFICATION**

### **Definitions:**

**Commissioning Activities:** All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the RCEC 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 **(Separated from Commissioning Activities for black start Capability)**.

**CO<sub>2</sub>E:** **Combined emissions of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O, expressed in terms of the amount of CO<sub>2</sub> emissions that would have the equivalent impact on global climate change.**

### **Black Start Emergency**

**Operation:** **Operation of a gas turbine and associated equipment as directed by the California Independent System Operator (CAISO) 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 CAISO's or PG&E's system restoration plan.**

### **Black Start Emergency**

**Event:** **The duration of black start emergency operation from initial ignition of a gas turbine after declaration of a black start emergency by the CAISO or PG&E until conclusion of the emergency as determined by the CAISO or PG&E.**

### **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 RCEC.**

## CONDITIONS FOR COMMISSIONING PERIOD

**AQ-11** No less than ~~420~~90 days after startup, the owner/operator shall conduct District and Energy Commission approved source tests to determine compliance with the emission limitations specified in **AQ-19**. The source tests shall determine NO<sub>x</sub>, CO, and **precursor organic compound (POC)** emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods and shall include at least one cold start, one warm start, and one hot start. ~~Twenty (20)~~Thirty (30) working days before the execution of the source tests, the owner/operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The District and the CPM will notify the owner/operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The owner/operator shall incorporate the District and CPM comments into the test plan. The owner/operator shall notify the District and the CPM within seven (7) working days prior to the planned source testing date. The owner/operator shall submit the source test results to the District and the CPM within ~~450~~60 days of the source testing date.

**Verification:** No later than 30 working days before the commencement of the source tests, the project owner shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The District and the CPM will notify the project owner of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The project owner shall incorporate the District and CPM comments into the test plan. The project owner shall notify the District and the CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within ~~450~~60 days of the initial startup.

## CONDITIONS FOR THE GAS TURBINES (S-1 & S-3) AND THE HRSGS (S-2 & S-4)

**AQ-12** The owner/operator shall fire the gas turbines (S-1 & S-3) and HRSG Duct Burners (S-2 & S-4) exclusively on PUC-regulated natural gas with a maximum sulfur content of 1 grain per 100 standard cubic feet. To demonstrate compliance with this limit, the operator of S-1 through S-4 shall sample and analyze the gas from each supply source at least monthly to determine the sulfur content of the gas. PG&E monthly sulfur data may be used provided that such data can be demonstrated to be representative of the gas delivered to the RCEC. In the event that the rolling 12-month annual average sulfur content exceeds 0.25 grain per 100 standard cubic feet, a reduced annual heat input rate may be utilized to calculate the maximum projected annual emissions. The reduced annual heat input rate shall be subject to District review and approval. (BACT for SO<sub>2</sub> and PM<sub>10</sub>/PM<sub>2.5</sub>)

**Verification:** The project owner shall complete, on a monthly basis, a laboratory analysis showing the sulfur content of natural gas being burned at the facility. The sulfur analysis reports shall be incorporated into the quarterly compliance reports.

**AQ-14** The owner/operator shall not operate the units such that the combined heat input rate to each power train consisting of a gas turbine and its associated HRSG (S-1 & S-2 and S-3 & S-4) exceeds 53,726 MM BTU (HHV) per day. (PSD for PM10/PM2.5)

**Verification:** As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

**AQ-19** The owner/operator shall ensure that the gas turbines (S-1 & S-3) and HRSGs (S-2 & S-4) comply with requirements (a) through (h) under all operating scenarios, including duct burner firing mode. Requirements (a) through (h) do not apply during a-gas turbine start-ups, combustor tuning operations or shutdowns, commissioning activities for black start capability, or black start emergency operations. (BACT, PSD, and Regulation 2, Rule 5)

- (a) Nitrogen oxide mass emissions (calculated as NO<sub>2</sub>) at P-1 (the combined exhaust point for S-1 gas turbine and S-2 HRSG after abatement by A-1 SCR System) shall not exceed 16.5 pounds per hour or 0.00735 lb/MM BTU (HHV) of natural gas fired, averaged over any 1-hour period. Nitrogen oxide mass emissions (calculated as NO<sub>2</sub>) at P-2 (the combined exhaust point for S-3 gas turbine and S-4 HRSG after abatement by A-3 SCR System) shall not exceed 16.5 pounds per hour or 0.00735 lb/MM BTU (HHV) of natural gas fired, averaged over any 1-hour period.
- (b) The nitrogen oxide emission concentration at emission points P-1 and P-2 each shall not exceed 2.0 ppmv, on a dry basis, corrected to 15 percent O<sub>2</sub>, averaged over any 1-hour period. (BACT for NO<sub>x</sub>)
- (c) Carbon monoxide mass emissions at P-1 and P-2 each shall not exceed 10 pounds per hour or 0.0045 lb/MM BTU of natural gas fired, averaged over any 1-hour period. (PSD for CO)
- (d) The carbon monoxide emission concentration at P-1 and P-2 each shall not exceed 2.0 ppmv, on a dry basis, corrected to 15 percent O<sub>2</sub>, averaged over any 1-hour period. (BACT for CO)
- (e) Ammonia (NH<sub>3</sub>) emission concentrations at P-1 and P-2 each shall not exceed 5 ppmv, on a dry basis, corrected to 15 percent O<sub>2</sub>, averaged over any rolling 3-hour period. This ammonia emission concentration shall be verified by the continuous recording of the ammonia injection rate to A-2 and A-4 SCR Systems. The correlation between the gas turbine and HRSG heat input rates, A-2 and A-4 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-1 and

P-2 shall be determined in accordance with permit condition **AQ-29** or District approved alternative method. (Regulation 2-5)

- (f) Precursor organic compound (POC) mass emissions (as CH<sub>4</sub>) at P-1 and P-2 each shall not exceed 2.86 pounds per hour or 0.00128 lb/MM BTU of natural gas fired. (BACT)
- (g) Sulfur dioxide (SO<sub>2</sub>) mass emissions at P-1 & P-2 each shall not exceed 6.21 pounds per hour or 0.0028 lb/MM BTU of natural gas fired. (BACT)
- (h) Particulate matter (PM<sub>10</sub> and **PM<sub>2.5</sub>**) mass emissions at P-1 & P-2 each shall not exceed 7.5 pounds per hour or 0.0036 lb PM<sub>10</sub>/**PM<sub>2.5</sub>** per MM BTU of natural gas fired. (BACT)

**Verification:** The project owner shall submit to the District and CPM, quarterly reports for the proceeding calendar quarter within 30 days from the end of the quarter. The report for the fourth quarter can be an annual compliance summary for the preceding year. The quarterly and annual compliance summary reports shall contain the following information:

- (a) Operating parameters of emission control equipment, including but not limited to ammonia injection rate, NO<sub>x</sub> emission rate and ammonia slip.
- (b) Total plant operation time (hours), number of startups, hours in cold startup, hours in warm startup, hours in hot startup, and hours in shutdown.
- (c) Date and time of the beginning and end of each startup and shutdown period.
- (d) Average plant operation schedule (hours per day, days per week, weeks per year).
- (e) All continuous emissions data reduced and reported in accordance with the District approved CEMS protocol.
- (f) Maximum hourly, maximum daily, total quarterly, and total calendar year emissions of NO<sub>x</sub>, CO, PM<sub>10</sub>, **PM<sub>2.5</sub>**, POC and SO<sub>x</sub> (including calculation protocol).
- (g) Fuel sulfur content (monthly laboratory analyses, monthly natural gas sulfur content reports from the natural gas supplier(s), or the results of a custom fuel monitoring schedule approved by the District.
- (h) A log of all excess emissions, including the information regarding malfunctions/breakdowns.
- (i) Any permanent changes made in the plant process or production, which would affect air pollutant emissions, and indicate when changes were made.
- (j) Any maintenance to any air pollutant control system (recorded on an as performed basis).

In addition, this information shall be maintained on site for a minimum of five (5) years and shall be provided to District personnel on request.

**AQ-22** The owner/operator shall not allow total combined emissions from the gas turbines and HRSGs (S-1, S-2, S-3 & S-4), S-5 Cooling Tower, and S-6 Fire Pump Diesel Engine, including emissions generated during gas turbine start-ups, combustor tuning, and shutdowns to exceed the following limits during any calendar day, except on days when commissioning activities for black start capability or black start emergency operations occur:

- (a) 1,453 pounds of NO<sub>x</sub> (as NO<sub>2</sub>) per day (Cumulative Emissions)
- (b) 1,225 pounds of NO<sub>x</sub> per day during ozone season from June 1 to September 30. (CEC Condition of Certification)
- (c) 7,360 pounds of CO per day (PSD)
- (d) 295 pounds of POC (as CH<sub>4</sub>) per day (Cumulative Emissions)
- (e) 413 pounds of PM<sub>10</sub> per day (PSD)
- (f) 292 pounds of SO<sub>2</sub> per day (BACT)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19**.

**AQ-23** The owner/operator shall not allow cumulative combined emissions from the gas turbines and HRSGs (S-1, S-2, S-3 & S-4), S-5 Cooling Tower, and S-6 Fire Pump Diesel Engine, including emissions generated during gas turbine start-ups, combustor tuning operations, and shutdowns, commissioning activities for black start activities, and black start emergency operations, to exceed the following limits during any consecutive twelve-month period:

- (a) 127 tons of NO<sub>x</sub> (as NO<sub>2</sub>) per year (Offsets, PSD)
- (b) 330 tons of CO per year (Cumulative Increase, PSD)
- (c) 28.5 tons of POC (as CH<sub>4</sub>) per year (Offsets)
- (d) 71.8 tons of PM<sub>10</sub> per year (Cumulative Increase, PSD)
- (e) 12.2 tons of SO<sub>2</sub> per year (Cumulative Increase, PSD)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19**.

**AQ-26** The owner/operator shall demonstrate compliance with **AQ-13** through **AQ-16**, **AQ-19(a)** through **(d)**, **AQ-20**, **AQ-22(a)** and **(b)**, **AQ-23(a)** and **(b)**, **AQ-53** by using properly operated and maintained continuous monitors (during all hours of operation including gas turbine start-up, combustor tuning, and shutdown periods, **and black start emergency operations**) for all of the following parameters:

- (a) Firing Hours and Fuel Flow Rates for each of the following sources: S-1 & S-3 combined, S-2 & S-4 combined.
- (b) Oxygen (O<sub>2</sub>) concentration, Nitrogen Oxides (NO<sub>x</sub>) concentration, and Carbon Monoxide (CO) concentration at exhaust points P-1 and P-2.
- (c) Ammonia injection rate at A-1 and A-3 SCR Systems

The owner/operator shall record all of the above parameters 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-3 combined, S-2 & S-4 combined.
- (e) Corrected NO<sub>x</sub> concentration, NO<sub>x</sub> mass emission rate (as NO<sub>2</sub>), corrected CO concentration, and CO mass emission rate at each of the following exhaust points: P-1 and P-2.

For each source, source grouping, or exhaust point, the owner/operator shall record the parameters specified in **AQ-26(d)** and **(e)** at least once every 15 minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:

- (f) total heat input rate for every clock hour.
- (g) on an hourly basis, the cumulative total heat input rate for each calendar day for the following: each gas turbine and associated HRSG combined and all four sources (S-1, S-2, S-3 and S-4) combined.
- (h) the average NO<sub>x</sub> mass emission rate (as NO<sub>2</sub>), CO mass emission rate, and corrected NO<sub>x</sub> and CO emission concentrations for every clock hour.

- (i) on an hourly basis, the cumulative total NO<sub>x</sub> mass emissions (as NO<sub>2</sub>) and the cumulative total CO mass emissions, for each calendar day for the following: each gas turbine and associated HRSG combined and all four sources (S-1, S-2, S-3 and S-4) combined.
- (j) For each calendar day, the average hourly heat input rates, corrected NO<sub>x</sub> emission concentration, NO<sub>x</sub> mass emission rate (as NO<sub>2</sub>), corrected CO emission concentration, and CO mass emission rate for each gas turbine and associated HRSG combined.
- (k) on a daily basis, the cumulative total NO<sub>x</sub> mass emissions (as NO<sub>2</sub>) and cumulative total CO mass emissions, for the previous consecutive twelve month period for all four sources (S-1, S-2, S-3 and S-4) combined.

(1-520.1, 9-9-501, BACT, Offsets, NSPS, Cumulative Increase)

**Verification:** At least 30 days before first fire, the project owner shall submit to the CPM a plan on how the measurements and recordings required by this condition will be performed.

**AQ-27** To demonstrate compliance with conditions **AQ-19(f), AQ-19(g), AQ-19(h), AQ-22(c), AQ-22(d), AQ-22(e), AQ-22(f), and AQ-23(c), AQ-23(d), AQ-23(e)**, the owner/operator shall calculate and record on a daily basis, the Precursor Organic Compound (POC) mass emissions, Fine Particulate Matter (**PM10 and PM2.5**) mass emissions (including condensable particulate matter), and Sulfur Dioxide (SO<sub>2</sub>) mass emissions from each power train. The owner/operator shall use the actual heat input rates measured pursuant to **AQ-26**, 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-30** to calculate these emissions. The owner/operator shall present the calculated emissions in the following format:

- (a) For each calendar day, POC, **PM10 and PM2.5**, and SO<sub>2</sub> emissions, summarized for each power train (gas turbine and its respective HRSG combined) and all four sources (S-1, S-2, S-3 & S-4) combined
- (b) on a **daily/monthly** basis, the cumulative total POC, PM10, and SO<sub>2</sub> mass emissions, for each year for all four sources (S-1, S-2, S-3 & S-4) combined

(Offsets, PSD, Cumulative Increase)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19**.

**AQ-29** Within ~~420~~**90** days of start-up of the RCEC, the owner/operator shall conduct a District-approved source test on exhaust point P-1 or P-2 to determine the corrected ammonia (NH<sub>3</sub>) emission concentration to determine compliance with **AQ-19(e)**. The source test shall determine the correlation between the heat input rates of the gas turbine and associated HRSG, A-2 or A-4 SCR System

ammonia injection rate, and the corresponding NH<sub>3</sub> emission concentration at emission point P-1 or P-2. The source test shall be conducted over the expected operating range of the turbine and HRSG (including, but not limited to, minimum and full load modes) to establish the range of ammonia injection rates necessary to achieve NO<sub>x</sub> emission reductions while maintaining ammonia slip levels. The owner/operator shall repeat the source testing on an annual basis thereafter. Ongoing compliance with **AQ-19(e)** shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. The owner/operator shall submit the source test results to the District and the CPM, ~~in the case of initial source testing, within 150 days of startup, and for all source testing conducted thereafter, within 60 days of conducting the tests.~~ (Regulation 2, Rule 5)

**Verification:** The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM, ~~in the case of initial source testing, within 150 days of startup, and for all source testing conducted thereafter, within 60 days of the date of the tests.~~

**AQ-30** Within ~~420~~90 days of start-up of the RCEC and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on exhaust points P-1 and P-2 while each gas turbine and associated Heat Recovery Steam Generator are operating at maximum load to determine compliance with **AQ-19(a), (b), (c), (d), (f), (g), and (h)** and while each gas turbine and associated Heat Recovery Steam Generator are operating at minimum load to determine compliance with **AQ-19(c) and (d)**, and to verify the accuracy of the continuous emission monitors required in **AQ-26**. For the purposes of the testing at maximum load only, the owner/operator shall test for (as a minimum): water content, stack gas flow rate, oxygen concentration, precursor organic compound concentration and mass emissions, nitrogen oxide concentration and mass emissions (as NO<sub>2</sub>), carbon monoxide concentration and mass emissions, sulfur dioxide concentration and mass emissions, methane, ethane, and particulate matter (**PM10 and PM2.5**) emissions including condensable particulate matter. The owner/operator shall submit the source test results to the District and the CEC CPM, ~~in the case of initial source testing, within 150 days of startup, and for all source testing conducted thereafter, within 60 days of conducting the tests.~~ (BACT, offsets)

**Verification:** The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM, ~~in the case of initial source testing, within 150 days of startup, and for all source testing conducted thereafter, within 60 days of the date of the tests.~~

**AQ-31** The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section and the CPM prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section and the CPM in writing of the source test protocols and projected test dates at least 7 days prior to the testing date(s). As indicated above, the owner/operator shall measure the contribution of condensable PM (back half) to the total PM10 **and PM2.5** emissions. However, the owner/operator may propose alternative measuring techniques to measure condensable PM such as the use of a dilution tunnel or other appropriate method used to capture semi-volatile organic compounds. The owner/operator shall submit the source test results to the District and the CPM, ~~in the case of initial source testing, within 150 days of startup, and for all source testing conducted thereafter, within 60 days of conducting the tests.~~ (BACT)

**Verification:** Approval of the source test procedures, as required in **AQ-31**, and the source test reports shall be deemed as verification for this condition. The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM, ~~in the case of initial source testing, within 150 days of startup, and for all source testing conducted thereafter, within 60 days of the date of the tests.~~

**AQ-32** Within ~~120~~**90** days of start-up of the RCEC and on a biennial basis (once every two years) thereafter, the owner/operator shall conduct a District-approved source test on exhaust point P-1 or P-2 while the gas turbine and associated Heat Recovery Steam Generator are operating at maximum allowable operating rates to demonstrate compliance with **AQ-25**. 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-25** 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	≤	6.4 pounds/year and 2.9 pounds/hour
Formaldehyde	≤	30 pounds/year and 0.21 pounds/hour
Specified PAHs	≤	0.011 pounds/year

(Regulation 2, Rule 5)

**Verification:** The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM, in the case of initial source testing, within 150 days of startup, and for all source testing conducted thereafter, within 60 days of the date of the tests.

**AQ-34** Within ~~120~~90 days of start-up of the RCEC and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on exhaust points P-1 and P-2 while each gas turbine and HRSG duct burner is operating at maximum heat input rates to demonstrate compliance with the SAM emission rates specified in **AQ-24**. The owner/operator shall test for (as a minimum) SO<sub>2</sub>, SO<sub>3</sub>, and H<sub>2</sub>SO<sub>4</sub>. The owner/operator shall submit the source test results to the District and the CPM, ~~in the case of initial source testing, within 150 days of startup, and for all source testing conducted thereafter, within 60 days of conducting the tests.~~ (PSD)

**Verification:** The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM, ~~in the case of initial source testing, within 150 days of startup, and for all source testing conducted thereafter, within 60 days of the date of the tests.~~

#### **CONDITIONS FOR COOLING TOWERS**

**AQ-45** The owner/operator shall perform a visual inspection of the cooling tower drift eliminators at least once per calendar year, and repair or replace any drift eliminator components which are broken or missing. Prior to the initial operation of the Russell City Energy Center, the owner/operator shall have the cooling tower vendor's field representative inspect the cooling tower drift eliminators and certify that the installation was performed in a satisfactory manner. Within ~~120~~60 days of the initial operation of the cooling tower, the owner/operator shall perform an initial performance source test to determine the PM<sub>10</sub> and PM<sub>2.5</sub> emission rate from the cooling tower to verify compliance with the vendor-guaranteed drift rate specified in **AQ-44**. The CPM may require the owner/operator to perform source tests to verify continued compliance with the vendor-guaranteed drift rate specified in **AQ-44**. (PSD)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19**.

#### **CONDITIONS FOR THE GAS TURBINES (S-1 & S-3) DURING BLACK-START-RELATED OPERATIONS**

**AQ-50 Commissioning Activities for Black Start Capability: The owner/operator shall perform commissioning activities for black start capability at S-1 and S-3 for no more than 20 hours combined. The owner/operator shall not perform these activities at S-1 and S-3 simultaneously. 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-51 Emission Limits for Commissioning Activities for Black Start Capability: The owner/ operator shall not operate the Gas Turbines (S-1 & S-3) in a manner such that the combined pollutant emissions from these sources will exceed the following limits when performing commissioning activities for black start capability.**

- (a) NO<sub>x</sub> (as NO<sub>2</sub>): 4,800 pounds**
- (b) CO: 114,000 pounds**
- (c) POC (as CH<sub>4</sub>): 6,080 pounds**
- (d) PM<sub>10</sub>/PM<sub>2.5</sub>: 150 pounds**
- (e) SO<sub>2</sub>: 124 pounds**
- (f) GHG: 3,298,700 pounds CO<sub>2</sub>E**

**(Basis: BACT)**

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

**AQ-52 Monitoring and Recordkeeping for Commissioning Activities for Black Start Capability: The owner/operator of the RCEC shall demonstrate compliance with AQ-50 and 51 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 NO<sub>x</sub> 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: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA or Energy Commission staff.**

**AQ-53 Daily Emission Limits: The owner/operator shall not allow total combined emissions from the Gas Turbines (S-1 & S-3) to exceed the following limits during any calendar day when commissioning activities for black start capability or black start emergency operations occur:**

(a) **NO<sub>x</sub> (as NO<sub>2</sub>): 5,760 pounds**

(b) **CO: 131,100 pounds**

(c) **POC (as CH<sub>4</sub>): 7,300 pounds**

(d) **PM<sub>10</sub>/PM<sub>2.5</sub>: 360 pounds**

(e) **SO<sub>2</sub>: 292 pounds**

(f) **GHG: 12,786,900 pounds CO<sub>2</sub>E per day**

**(Basis: BACT).**

**Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by AQ-19.**

**AQ-54 Emission Limits for Black Start Emergency Events: The owner/operator shall not allow total combined emissions from the Gas Turbines (S-1 & S-3) to exceed the following limits during a black start emergency event:**

(a) **NO<sub>x</sub> (as NO<sub>2</sub>): 11,520 pounds**

(b) **CO: 137,100 pounds**

(c) **POC (as CH<sub>4</sub>): 14,600 pounds**

(d) **PM<sub>10</sub>/PM<sub>2.5</sub>: 360 pounds**

(e) **SO<sub>2</sub>: 298 pounds**

(f) **GHG: 11,644,500 pounds CO<sub>2</sub>E**

**(Basis: BACT).**

**Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by AQ-19.**

## **REFERENCES**

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**BAAQMD 2018 - Bay Area Air Quality Management District. Draft Engineering Evaluation - Russel City "Black Start" Capacity Project. December 7, 2018.**

**CEC 2002 - California Energy Commission. Commission Decision of Russel City Energy Center (01-AFC-07C). September 12, 2002.**

**CEC 2007 - California Energy Commission, Final Commission Decision Including Adoption Order. October 2, 2007.**

**CEC 2010 - California Energy Commission. Order Amending the Energy Commission Decision. August 11, 2010.**

**CEC 2013 - California Energy Commission. Order Approving a Petition to Amend Air Quality, Hazardous Materials Management, and Visual Resources Conditions of Certification. July 1, 2013.**

**RCEC 2018a - Russell City Energy Company, LLC. Russell City Energy Center Petition for Modification Black Start Capabilities. March 2, 2018.**

**RCEC 2018b - Russell City Energy Company, LLC. Application for Confidential Designation. October 18, 2018.**

**RUSSELL CITY ENERGY CENTER, 01-AFC-07C**  
**Petition to Amend to Add Black Start Capability**  
**WORKER SAFETY AND FIRE PROTECTION**  
Brett Fooks

## **INTRODUCTION**

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Russell City Energy Company, LLC filed a Petition to Amend (PTA) on March 2, 2018 requesting approval to install a battery energy storage system (BESS) to provide black start capability to the Russell City Energy Center (RCEC) (RCEC 2018).

## **SCOPE OF ANALYSIS**

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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; or
- Require the change, deletion, or addition of any new condition(s) of certification in order to ensure compliance with LORS.

## **BACKGROUND**

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The project was certified operational by the Energy Commission in August 2013, as a 600-megawatt (MW) natural gas-fired, wet cooled, combined cycle electric generating facility. RCEC is located at 3862 Depot Road, Hayward California.

On December 1, 2017, the CAISO selected RCEC for “black start” capabilities based on a competitive solicitation (CAISO 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 (CAISO 2017).

The proposed RCEC black start project consists of installing a lithium-ion BESS having anywhere from 6 to 10-MW. The BESS would provide black start capability to the gas turbine (RCEC 2018). The BESS consists of lithium-ion battery banks installed in three 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.

## **ANALYSIS**

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

RCEC relies on local fire protection services provided by the Hayward City Fire Department. Energy storage systems like the one that would be installed at RCEC may still be a relatively new technology for local fire fighters. Therefore, staff proposes Condition of Certification **WORKER SAFETY-3**, under which the project owner would be required to provide necessary system information and opportunities for on-site fire protection training to the Hayward City Fire Department to assist them in updating, if needed, their standard operating procedures for dealing with a potential lithium ion battery fire at the RCEC facility. The project owner would also be required to collaborate with the Hayward City Fire Department in its review and comment on the fire safety provisions to be provided for the BESS.

If adopted, staff's proposed Condition of Certification **WORKER SAFETY-3** would ensure adequate protection to on-site workers and first responders through compliance with existing LORS applicable to the proposed BESS.

## **CONCLUSIONS AND RECOMMENDATIONS**

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Based on the information provided by the petitioner, staff proposes new Condition of Certification **WORKER SAFETY-3**, which would ensure compliance with LORS to provide adequate protection for on-site workers and first responders.

With the adoption of **WORKER SAFETY-3**, 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 Final Decision. The approved conditions of certification in the Final Decision would include compliance with current worker safety and fire protection LORS.

## **PROPOSED CHANGES OR MODIFICATION TO CONDITIONS OF CERTIFICATION**

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Staff recommends adoption of the following new condition of certification in **underline and bold**.

**WORKER SAFETY-3. The project owner shall submit the fire protection drawings and specifications for the Battery Energy Storage System (BESS) to the Hayward City Fire Department for review and comment, to the Delegate Chief Building Official (DCBO) for plan check and inspection, and to the CPM for review and approval. The project owner shall also collaborate with the Hayward City Fire Department to assist in any needed modifications of their standard operating procedures for first responders to implement when confronting a fire occurring within the BESS located on site.**

### **Verification:**

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

- (a) Provide the complete set of BESS fire protection drawings and specifications to the Hayward City Fire Department for review and comment, and to the DCBO for plan check approval and construction inspection, and to the CPM for review and approval, and;**
- (b) Provide a copy of a letter from the project owner to the Hayward City Fire Department offering collaboration and assistance with standard operating procedures for first responders to any fires that might occur within the BESS.**

## REFERENCES

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RCEC 2002a, California Energy Commission final decision on the application for certification for the Russell City Energy Center, September 12, 2002, Docket No. 01-AFC-7 (TN#:26635).

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

RCEC 2018, Petition to amend – black start capability enhancement. 2 March 2018, Docket No. 01-AFC-7C (TN#:222836).

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

**DOCKETED**

<b>Docket Number:</b>	01-AFC-07C
<b>Project Title:</b>	01-AFC-7C Russell City Energy Company
<b>TN #:</b>	226455
<b>Document Title:</b>	Russell City Energy Center Comments on Staff Analysis of Petition to Amend to Add Black Start Capability
<b>Description:</b>	N/A
<b>Filer:</b>	Eric Janssen
<b>Organization:</b>	Ellison Schneider Harris & Donlan LLP
<b>Submitter Role:</b>	Applicant Representative
<b>Submission Date:</b>	2/4/2019 3:19:43 PM
<b>Docketed Date:</b>	2/4/2019



February 4, 2019

John Heiser  
Compliance Project Manager  
California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814-5512

RE: Russell City Energy Center (01-AFC-07C): Comments on the *Staff Analysis of the Petition to Amend to Add Black Start Capability*

Dear Mr. Heiser:

On behalf of the Russell City Energy Center (01-AFC-07C; “RCEC”), Russell City Energy Company, LLC (“Project Owner”) hereby submits these comments on the Conditions of Certification (“Conditions”) proposed by California Energy Commission (“Commission”) Staff relating to the *Petition for Modification: Black Start Capabilities*.<sup>1</sup>

The Project Owner does not object to the proposed modifications to Conditions of Certification (“Conditions”) AQ-19, A-22, AQ-23, and AQ-26<sup>2</sup> or the addition of Conditions AQ-50 to AQ-54.

The Project Owner recommends that Condition Worker Safety-3 be revised as set forth below. Proposed Condition Worker Safety-3 has two components. The first component requires submission of fire protection drawings and specifications for the Battery Energy Storage System (“BESS”) to the Hayward City Fire Department (“HCFD”), to the Delegate Chief Building Official (“DCBO”), and to the Compliance Project Manager (“CPM”). This component will ensure that the BESS and fire suppression system are constructed in compliance with all applicable laws, ordinances, regulations, and standards (“LORS”). The Project Owner does not have any objections to this component.

The second component requires the Project Owner to “collaborate with Hayward City Fire Department to assist in any needed modifications of their [HCFD’s] standard operating procedures for first responders to implement when confronting a fire occurring within the BESS located on site.” As discussed below, this second requirement is not required to ensure compliance with any applicable LORS or to mitigate any potentially significant impact from the proposed modification.

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<sup>1</sup> TN#: 222836.

<sup>2</sup> Proposed by Commission Staff to conform the CEC certification to the facility’s Title V permit.

First, there are no applicable LORS requiring a private entity like RCEC “to assist in any needed modifications” of a duly formed and operating fire department’s “standard operating procedures for first responders.” Requiring the RCEC to “collaborate” on potential modifications to the internal operating procedures of the HCFD is not needed to ensure that the BESS will be constructed and operated in compliance with applicable LORS. As discussed above, LORS compliance during construction and operations will be ensured by HCFD review and CPM approval of the fire protection drawings and specifications for the BESS. Moreover, the language proposed is not designed to address any potentially significant effects from the proposed modification. Thus, the second requirement is not required by either applicable LORS or to mitigate any potential impacts from the proposed modification. (See generally, Public Resources Code §§ 21081, 25523, 25525; 20 C.C.R. § 1748.)

Second, RCEC will, of course, continue to work with HCFD, as it has done so historically. However, RCEC believes this coordination should be done on an informal basis, as determined necessary by HCFD, rather than through a formal condition of certification imposed by the Commission. The HCFD is in the best position to determine its own operational needs. RCEC is concerned that a condition requiring the facility to “collaborate” on modifications to the HCFD’s standard operating procedures interjects the RCEC into the internal working and decision-making processes of HCFD.

Therefore, the Project Owner recommends the following modifications to proposed Condition WORKER SAFETY-3:

**WORKER SAFETY-3. The project owner shall submit the fire protection drawings and specifications for the Battery Energy Storage System (BESS) to the Hayward City Fire Department for review and comment, to the Delegate Chief Building Official (DCBO) for plan check and inspection, and to the CPM for review and approval.**

[Redacted]

**Verification:**

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

**(a) Provide the complete set of BESS fire protection drawings and specifications to the Hayward City Fire Department for review and comment, and to the DCBO for plan check approval and construction inspection, and to the CPM for review and approval, and:**

[Redacted]

These recommended revisions will ensure that the proposed modifications are implemented consistent with applicable LORS, but will avoid interjecting the Project Owner into the internal operating practices of HCFD.

The Project Owner requests that the Commission approve the Petition and adopt the proposed revisions to Condition Worker Safety-3 described above.

Respectfully submitted.

A handwritten signature in blue ink, appearing to read "Jeffery D. Harris", is written over a light blue circular stamp.

Dated: February 4, 2019

Jeffery D. Harris  
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<b>DOCKETED</b>	
<b>Docket Number:</b>	01-AFC-07C
<b>Project Title:</b>	01-AFC-7C Russell City Energy Company
<b>TN #:</b>	226486
<b>Document Title:</b>	Staff Response to Russell City Energy Company, LLC's Comments on Staff Analysis of Petition to Amend
<b>Description:</b>	N/A
<b>Filer:</b>	Raquel Rodriguez
<b>Organization:</b>	California Energy Commission
<b>Submitter Role:</b>	Commission Staff
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1516 NINTH STREET  
SACRAMENTO, CA 95814-5512



**DATE:** February 07, 2019  
**TO:** Interested Parties  
**FROM:** John Heiser, Project Manager

**SUBJECT: Russell City Energy Center (01-AFC-07C)  
Staff Response to Russell City Energy Company, LLC's Comments on  
Staff Analysis of Petition to Amend**

## **RESPONSE TO COMMENTS**

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On February 4, 2019, the petitioner docketed comments (TN 226455) on staff's analysis (TN 226354, January 23, 2019) of the Petition to Amend (PTA). The petitioner suggests that the portion of staff's proposed Condition of Certification **WORKER SAFETY-3** that calls for explicit collaboration with the Hayward City Fire Department (HCFD) in modifying the fire department's standard operating procedures is unnecessary and best done by a non-prescribed, but already existing basis with the fire department. Staff confirmed that there are already ongoing fire protection related visits and communications between Russell City Energy Center (RCEC) and the HCFD, and that the fire protection plans would be required to be provided to the HCFD for review and comment. As the local fire safety and response agency, HCFD already has the jurisdiction to visit, inspect, and train at the facility as they determine the need. Therefore, staff concurs with the proposed change.

This change is acceptable because staff has already conducted its own evaluation of the safety of lithium-ion batteries and concluded that lithium-ion batteries would pose a potential fire hazard that was in addition to the existing hazards already on 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 or foam-padded furniture.

As lithium-ion Battery Energy Storage Systems (BESS) have become commonly installed over the recent few years, consensus-based codes and standards covering fire safety requirements for their safe installation and operation have been adopted into the latest edition of the California Fire Code. Training courses for first responders to potential BESS fires are now widely available. Staff determines that reliance upon

compliance with applicable codes and review of fire protection measures by the local fire department, as was required in the original siting decision, would be adequate to ensure that there would be no significant impact due to the addition of the BESS to the RCEC facility.

Therefore, staff recommends adoption of Condition of Certification **WORKER SAFETY-3**, with modifications. The condition would still require that the petitioner formally notify the HCFD of the addition of a BESS. The condition would still require that the fire system be approved by the Compliance Project Manager.

## **PROPOSED CHANGES OR MODIFICATION TO CONDITIONS OF CERTIFICATION**

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Staff accepts the recommended edits from the petitioner. Therefore, staff recommends that the condition of certification that staff has proposed for adoption in their January 23, 2019 staff analysis (TN 226354) should be modified as follows: ~~Strike through~~ shows text to be deleted.

**WORKER SAFETY-3.** The project owner shall submit the fire protection drawings and specifications for the Battery Energy Storage System (BESS) to the Hayward City Fire Department for review and comment, to the Delegate Chief Building Official (DCBO) for plan check and inspection, and to the CPM for review and approval. ~~The project owner shall also collaborate with the Hayward City Fire Department to assist in any needed modifications of their standard operating procedures for first responders to implement when confronting a fire occurring within the BESS located on site.~~

### **Verification:**

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

(a) Provide the complete set of BESS fire protection drawings and specifications to the Hayward City Fire Department for review and comment, and to the DCBO for plan check approval and construction inspection, and to the CPM for review and approval, and;

~~(b) Provide a copy of a letter from the project owner to the Hayward City Fire Department offering collaboration and assistance with standard operating procedures for first responders to any fires that might occur within the BESS.~~

STATE OF CALIFORNIA

STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION

*In the Matter of:*

Russell City Energy Center

Docket No. 01-AFC-07C

**[PROPOSED] ORDER APPROVING  
PETITION TO AMEND FACILITY  
LICENSE**

I. INTRODUCTION

On March 2, 2018, the Russell City Energy Company, LLC, the owner and operator of the Russell City Energy Center, located in the city of Hayward, in Alameda County, California, filed a petition for modification of the project's Energy Commission license to allow the installation of a battery energy storage system to provide Black Start service in response to a need identified by the California Independent System Operator. The batteries would be used to start the gas turbines to restart the power plant in the event of a blackout to support the restoration of the electrical grid in response to an emergency condition.

Energy Commission staff reviewed all project related information and, on January 23, 2019, issued a staff analysis assessing the impacts on the environment from the project and recommends changes to some conditions of certification to ensure the project remains in compliance with all applicable laws, ordinances, regulations, and standards. The staff analysis concludes that the proposed changes would not result in any significant adverse environmental impacts, and would comply with all applicable laws, ordinances, regulations, and standards with adoption of the staff proposed additions and changes to the conditions of certification. Staff recommends approval of RCEC's petition to modify the Russell City Energy Center, including the modification of 14 existing Air Quality Conditions of Certification, the addition of five new Air Quality Conditions of Certification, and adoption of one new Worker Safety and Fire Protection Condition of Certification.

Russell City Energy Company, LLC submitted comments on the staff analysis on February 4, 2019, agreeing with staff's analysis and the proposed conditions of certification, except for the provision in Worker Safety-3 requiring collaboration with the Hayward City Fire Department.

After reviewing and considering the project owner's comments, Energy Commission staff submitted an analysis on February 8, 2019, concurring with the project owner's proposed changes to Worker Safety-3 and concluding that with this change the project would still comply with all applicable state, local, and federal laws, ordinances, regulations, and standards and would not result in any significant, adverse impacts to the environment.

## **II. FINDINGS**

Based on the entire record of this proceeding, including staff's analysis, and the Russell City Energy Center Commission Decision and the environmental analysis of the project contained therein, the Energy Commission concludes that the proposed modifications will not result in any significant impacts to public health and safety, or to the environment. The Energy Commission finds that:

- The petition meets all the filing criteria of Title 20, section 1769 (a)(1), of the California Code of Regulations, concerning post certification changes in project design, operation, or performance;
- None of the findings specified in Title 20, section 1748(b) are applicable; and
- The modified project would not have a significant impact on the environment.

## **III. CONCLUSION AND ORDER**

The California Energy Commission concludes that the proposed changes to the project and Energy Commission staff's analysis thereof constitute an addendum to the Commission Decision and no subsequent or supplemental EIR-equivalent documentation is required. The California Energy Commission hereby approves Russell City Energy Company, LLC's Petition for Modification, Black Start Capabilities filed on March 2, 2018, and adopts staff's proposed additions and changes to the project's conditions of certification as set forth in the staff analysis published on January 23, 2019, and as amended on February 8, 2019.

**IT IS SO ORDERED.**

### **CERTIFICATION**

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of an Order duly and regularly adopted at a meeting of the California Energy Commission held on February 20, 2019.

AYE:

NAY:

ABSENT:

ABSTAIN:

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Cody Goldthrite

Secretariat