

CALIFORNIA PUBLIC UTILITIES COMMISSION
Safety and Enforcement Division
Electric Safety and Reliability Branch

Report Date: December 1, 2020, **updated:** January 13, 2021

Investigator: various

Incident Number: various

Regulated Entity Involved: various

Date and Time of the Incident: August 12 – 20, 2020 and various

Summary of Incident

In mid-August 2020, the State of California experienced an unprecedented and widespread heat storm forcing electrical demand to exceed available resources. The resulting stage 3 power alerts culminated into rolling outages throughout the CAISO control area on August 14th and August 15th and resulted in more than 2,700 MW of derates at electric generating facilities. In response to the situation, the Electric Safety and Reliability Branch (ESRB) of the California Public Utilities Commission's (Commission or CPUC) Safety and Enforcement Division (SED), initiated an investigation into the forced outages that occurred from August 12th – 20th at electric generating facilities throughout the California Independent System Operator's (CAISO) control area.

To understand the causes of the forced outages, ESRB issued a 25-question data request to all Generation Asset Owners (GAOs) operating within the CAISO control area. This data request required all GAOs to submit data and information on their plant's performance from August 12th through August 20th, and report on forced outages greater than 50 MW and of a duration of two (2) hours or longer.

After reviewing the responses received, ESRB staff finalized a short list of forced outages that required additional follow up. From this list, ESRB staff then conducted in-person inspections, issued tabletop investigation exercises or sent supplemental data and document requests to generators to finalize its investigations.

This report summarizes ESRB's investigation into the August 2020 forced outage incidents by providing an overview of each incident that occurred and the technical causes of the forced outages at various facilities and our investigation of these facilities. It concludes with ESRB's planned follow up and action items. The table below summarizes the corrective actions ESRB is pursuing for three of the forced outage incidents that occurred. Each corrective action identified in this table will be discussed in further detail in Section III, ESRB's Investigations.

ESRB Corrective Actions Issued

Incident	Violations Found	Date Issued	Response Due Date
Sutter Energy Center	Three (3) violations of GO 167	October 16, 2020 (NOV) ¹	November 16, 2020
Sunrise Energy Center	Two (2) violations of GO 167 and 1 violation of NFPA	October 22, 2020 (NOV)	January 31, 2021
Mountainview Generating Station	Four (4) violations of GO 167	September 29, 2020 (CAP) ²	October 30, 2020 (originally) – extended to February 26, 2021
Oakland Power Station	Two (2) violations of GO 167	TBD	TBD

General Order (GO) 167 Overview

The purpose of General Order (GO) 167 as stated on GO 167 page on the Commission’s website, is to:

...Implement and enforce standards for the maintenance and operation of electric generating facilities and power plants so as to maintain and protect the public health and safety of California residents and businesses, to ensure that electric generating facilities are effectively and appropriately maintained and efficiently operated, and to ensure electrical service reliability and adequacy. The General Order provides a continuing method to implement and enforce General Duty Standards for Operations and Maintenance, Generator Maintenance Standards (Maintenance Standards), Generator Operation Standards (Operation Standards), and any other standard adopted pursuant to Public Utilities Code § 761.3....³

GO 167 standards focus solely on safety, operational practices and preventative maintenance for maintaining reliability and availability. GO 167 also provides a means to enforce the protocols for the scheduling of power plant outages of the California Independent System Operator. It is imperative to note that while ESRB enforces GO 167, it lacks citation authority to fine generating facilities owners for violations and/or noncompliance with GO 167. ESRB’s current Electric Safety Citation Program, as authorized by Commission Decision (D.)14-12-001, excludes generating facilities owners. Beyond staff issuing notices of violations (NOVs) to incentivize corrective actions and the Commission instituting a formal investigation such as an Order Instituting Investigation (OII), ESRB staff has limited enforcement capabilities when it comes to generating facilities. Although the Operating Standards of GO 167 states, “...behavior that constitutes a violation of another agency’s requirements may also constitute a violation of these operation standards”⁴ there is no mechanism for SED to assess a penalty or issue a citation to a GAO for a violation.

¹ Notice of Violation (NOV).

² Corrective Action Plan (CAP).

³ General Order 167: https://docs.cpuc.ca.gov/PUBLISHED/GENERAL_ORDER/108114.htm#P59_1414.

⁴ Operating Standards and Recommended Guidelines for Generating Asset Owners, October 27, 2004, p. 8, Paragraph 1.

Because GO 167's focus is on electric generating facilities, for this particular series of incidents that occurred in August 2020 and impacted several of California's generating facilities, GO 167 standards served as the guiding parameters for ESRB's investigations.

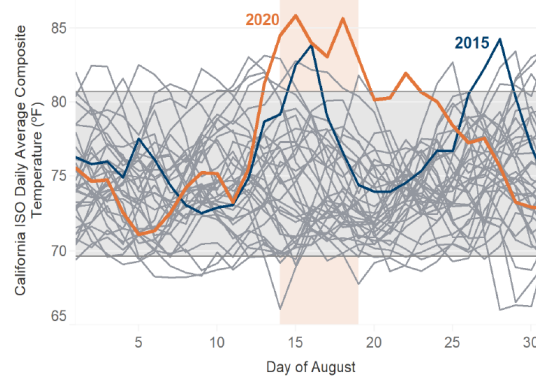
Definitions

1. **Planned Outage:** Planned outages have two definitions. The first type of planned outage is a complete termination of electrical production that is scheduled semi-annually or annually to allow for maintenance of a generating facility. These are scheduled up to a year in advance with CAISO approval. Many ESRB required corrective actions are deferred to this period for implementation if they pose no immediate safety violations or risk to personnel. The second type of planned outage which includes those reported during mid-August, is an outage which is scheduled with the CAISO more than seven (7) days in advance.
2. **Forced Outage:** This is defined as a partial or complete termination of electrical production due to proximal wildfires, electrical transmission congestion, equipment malfunction, equipment failure or human error. By CAISO definition, a forced outage is any outage submitted seven (7) days or less in advance. These outages are sent to CAISO for approval and are only reported to the California Public Utilities Commission (CPUC or Commission) when the forced outage is 50 megawatts (MW) or greater and has a duration of twenty-four (24) hours or longer.
3. **Derate:** This is defined as a situation in which a generator cuts back on generating capacity. Derate can be used interchangeably with "outage". For example, when a turbine generator rated at 500 MW can only produce 200 MW, it is said to be derated 300 MW. There are two main types of derates; ambient derate and equipment derate.
 - a. **Ambient Derate:** Is typically caused by external forces beyond the generator's control. Causes can include but are not limited to:
 - Air temperatures and humidity affecting air density and evaporative cooling
 - To prevent exceeding the plant's permit for air quality emissions, and/or water discharge limitations
 - Ocean or river temperatures effecting water discharge amounts and temperatures
 - Fuel reduction or limited availability
 - Reductions in natural gas fuel supply pressure
 - b. **Equipment Derate:** Is typically caused by equipment failures. Causes can include but are not limited to:
 - Switchgear and/or electrical failures
 - Pumps and/or motor malfunctions
 - Generator failures
 - Boiler tube leaks
 - Pump failures
 - Plant Fires
 - Operational Human Error
 - Plant accidents; injury or death to personnel

I. Overview

In mid-August 2020, the State of California experienced an unprecedented and widespread heat storm forcing electrical demand to exceed available resources. The resulting stage 3 power alerts culminated into rolling outages throughout the CAISO control area on August 14th and August 15th and resulted in more than 2,700 MW of derates at electric generating facilities.⁵ In response to the situation, the CAISO Board of Governors held a meeting on August 17th anticipating further shortfalls of 111 to 4,400 MW.⁶ During the meeting, the CAISO commented that, “Existing resource planning processes are not designed to fully address (such) extreme (conditions as a) heat storm” (see Graph 1), projecting that climate change would make such events worse.⁷ The CAISO reported that on August 14th, forced outages totaled 4.8% of available capacity,⁸ and on August 14th and 15th natural gas plant outages equated to a loss of 1,400 to 2,000 MW.⁹ During this period, California experienced four out of the five hottest August days since 1985. August 14th was the third-hottest August day; August 15th was the hottest.¹⁰ Graph 1 below shows the 1-in-35 year temperatures California experienced during the August 2020 heat wave.

**Graph 1:
August 2020 1-in-35-year Temperatures¹¹**



In response to the events of August 14th and 15th, the Electric Safety and Reliability Branch (ESRB) of the Commission’s Safety and Enforcement Division (SED), initiated an investigation into the forced outages that occurred. To better understand the cause of these forced outages, ESRB issued a data request to all 130 Generation Asset Owners (GAOs) operating within the CAISO’s control area requiring them to submit data and information on their plant’s performance during this time. ESRB issued a 25-question data request to all GAOs regarding any forced outage of two (2) hours or longer and greater than 50 MW that occurred at their facility between August 12th and August 20th. Thirty-one CPUC-jurisdictional power

⁵ ESRB’s calculation of the total MW of derates on August 14th and 15th differs from the CAISO’s as it includes renewable generating facilities in addition to natural gas.

⁶ CAISO Board of Governors (BOG) Meeting Minutes, 8/17/20:

http://www.caiso.com/Documents/FinalBoardofGovernorsGeneralSessionMinutes-Aug17_2020.pdf

⁷ August 17, 2020 CAISO Board of Governors Meeting.

⁸ CAISO, California Energy Commission (CEC), and California Public Utilities Commission, Preliminary Root Cause Analysis, Mid-August 2020 Heat Storm (Preliminary Root Cause Analysis), October 15, 2020, p. 46.

⁹ Ibid, p. 8.

¹⁰ CAISO, California Energy Commission (CEC), and California Public Utilities Commission, Preliminary Root Cause Analysis, Mid-August 2020 Heat Storm (Preliminary Root Cause Analysis), October 15, 2020, p. 4.

¹¹ Source: CAISO Stake Holder Presentation, Primary Root Cause Analysis, October 15, 2020, pp. 4 – 5.

plants experienced outages that were 50 MW or greater and lasted for two (2) hours or longer in duration that were attributed to forced outages, derates for planned outages or ambient outages. Per the requirements of the data request, each GAO was required to submit data and information on their plant's performance during this time. After reviewing the responses received, ESRB staff finalized a short list of forced outage incidents that required additional follow up and calculated that for the two-week period in review the total number of electric generation outages resulted in a combined loss of more than 8,300 MW. From this list of forced outages, ESRB staff then conducted in-person inspections or sent supplemental data and document requests to generators to finalize its investigations. ESRB's data request that was sent to GAOs can be found in Appendix B of this report. Appendix A of this report includes a table summarizing the twelve (12) outages ESRB investigated.

Table 1 below is a snapshot of the responses ESRB received from generators.

**Table 1:
GAO Response Snapshot**

Total Number of GAOs Receiving ESRB's Data Request	130
Total Number of GAO Responses Received	130
Forced Outage	23
Planned Outage	1
Ambient Outage	7
Total Combined Outages	31

Currently, thirty-four percent (34%) of California's electrical production is dependent upon natural gas-fired-generation.¹² These gas-fired plants require large temperature differences to achieve full capacity and are affected by environmental conditions such as air temperature, relative humidity, and ocean water temperature (in the case of once thru cooling). When air temperature is high, for example, a combustion turbine's output is reduced. During the heat storm, seven of the forced outages were due to high environmental temperatures that reduced output capacity. Solar facilities were also affected by reductions of incident light from dense wildfire smoke and wind generation was adversely affected by low wind conditions experienced at that time. Aside from environmental impacts and the inverted application of facilities, no uniform technical causes of the twenty-three (23) forced outages could be found.

ESRB categorized the results that met the specified outage criteria into buckets of outages that should be inspected, possibly be inspected or outages that do not need to be inspected. Table 2 below presents an overview of those generating facilities that experienced outages within the two-week time period identified, and ESRB's categorization of the outage. ESRB divided these outages into three buckets: outages to be inspected (red column), outages that should possibly be inspected (yellow column) and outages that did not need to be inspected (green column). Outages that fell in the red and yellow column required more in-depth follow up from ESRB.

¹² CEC July 1, 2019, "Total Electricity System Power", <https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2019-total-system-electric-generation>.

**Table 2:
Outage Categorization**

Should be Inspected	Possibly Inspect	Do Not Inspect
Bucket 1 / Rationale	Bucket 2 / Rationale	Bucket 3 / Rationale
AltaGas Blythe / though duration was 3 hrs., outage was referenced in CAISO News Release (490 MW out)	Desert Stateline Solar / transformer bushing degradation; component failure	Middle River High Desert / ambient derate; no equipment outage
Dynergy Oakland / peaker plant [REDACTED]	Harbor Cogen / small capacity but one outage involved HP steam leak, which could be deadly	Calpine King City / cogen turned combined-cycle; small facility
NRG Sunrise / Steam Turbine Generator (STG) [REDACTED]	Dynergy Moss Landing / [REDACTED]	PG&E Gateway / ambient derate; no equipment outage
Calpine Sutter / [REDACTED]	AES Alamos / 316 MW out for about 4 hrs. due to condenser tube leak	Calpine Los Esteros / failed thermocouple; but only 81 MW curtailed
[REDACTED]	[REDACTED]	NextEra Golden Hills / just audited & inspected incident
[REDACTED]	[REDACTED]	SDG&E Desert Star / planned outage not a forced
[REDACTED]	[REDACTED]	Calpeak Border small capacity peaker
[REDACTED]	[REDACTED]	NextEra Vasco Wind / wind farm; small capacity

Based on the outages that were categorized as either “should be inspected” and “possibly be inspected”, ESRB assembled a team of engineers tasked with conducting follow up inspections on the shortlisted facilities. Below are the ESRB engineers, supervisors, and specialists assigned to this project:

ESRB Assigned Staff

Name	Title
Banu Acimis	Program and Project Supervisor
Fadi Daye	Program and Project Supervisor
Derek Fong	Senior Utilities Engineer Supervisor
Nathan Sarina	Senior Utilities Engineer Supervisor
Rickey Tse	Senior Utilities Engineer Supervisor
James Cheng	CPUC Utilities Engineer (project lead)
Calvin Choi	CPUC Utilities Engineer
Saimon Islam	CPUC Utilities Engineer
Richard Le	CPUC Utilities Engineer
Stephen Lee	CPUC Utilities Engineer
Stacey Ocampo	CPUC Utilities Engineer
Bryan Pena	CPUC Utilities Engineer
Joceline Periera	CPUC Utilities Engineer

Brandon Vazquez	CPUC Utilities Engineer
Rajan Mutialu	PURA V
Lana Tran	PURA V

II. Evidence

In addition to the initial data request that was sent to all generating facilities operating in California, ESRB also sent additional data and document requests such as evidence of completed tabletop exercises and post-inspection data requests and took photos and notes during in-person inspections at the facilities. The additional evidence collected for each outage is included in the individual outage write up section.

III. ESRB's Investigation

Using Table 2 above as guidance, ESRB staff conducted a total of six on-site investigations at generating facilities, four tabletop exercises, and an additional two records review investigations. All facilities listed in the red and yellow columns were investigated further. The details of each investigation are summarized in a table presented in Appendix A to this report and are briefly described below in this section.

1. Sutter Energy Center: [REDACTED]

a. Overview

[REDACTED]

b. Summary of Incident

[REDACTED]

c. Evidence

[REDACTED]

Source	Description
Calpine (Sutter)	Pre-inspection DR Response
Calpine (Sutter)	Post-inspection DR Response
CPUC	Inspection Photos

d. Observations and Preliminary Findings

At the time of ESRB’s inspection of Sutter Energy Center on September 2, 2020,
[REDACTED]

e. Conclusions

Based on the evidence reviewed, ESRB concluded that Calpine Corporation, the owner of Sutter Energy Center, did not neglect any Preventative Maintenance (PM) for the flange gasket. But Calpine Sutter shall provide work orders for the [REDACTED]
[REDACTED]

ESRB also found Calpine Corporation in violation of GO 167, Section 10.3.6.4. *Information Requirements* for not filing an Outage Report in a timely manner.

ESRB issued a Notice of Violation (NOV) on October 16, 2020 and the plant responded on November 16, 2020. Plant Management has corrected two of the violations and the remaining corrective action is expected to be completed during the spring planned outage.

2. Sutter Energy Center: [REDACTED]

a. Overview

[REDACTED]

b. Summary of Incident

[REDACTED]

c. Evidence

In addition to the initial data request that was sent to all generating facilities operating in California, ESRB collected the following data about the forced outage:

Source	Description
Calpine (Sutter)	Pre-inspection DR Response
Calpine (Sutter)	Post-inspection DR Response
CPUC	Inspection Photos
CPUC	Interview Notes

d. Observations and Findings

ESRB found additional safety issues covered in ESRB’s Outage Report, FOSU202020818. ESRB investigators found evidence that Plant Management failed to provide adequate training support for staff to operate the Plant in 2x1 configuration or at full load.



e. Conclusions

ESRB investigators found Calpine Corporation in violation of General Order 167, Operation Standard (OS) 6: *Training Support* for not having a method for training site specific operation of the Sutter Facility. ESRB Investigators also cited the plant for violation of GO 167, OS 7: *Generator Maintenance Standards*. ESRB Investigators were provided proof of correction for Procedural Violations cited as GO 167, OS 7 effectively closing this issue.

ESRB issued a Notice of Violation (NOV) on October 16, 2020 and the plant responded on November 16, 2020. Plant Management has corrected two of the violations and the remaining corrective action is expected to be completed during the spring planned outage.

3. Redondo Beach

a. Overview

ESRB investigated a series of four forced outages that took place at AES Redondo Beach in Redondo Beach, California starting on August 9th and ending on August 28th. ESRB conducted an in-person inspection of the Redondo Beach Once-Through Cooling (OTC) facility on September 8, 2020.

b. Summary of Incidents

AES Redondo Beach experienced a series of four forced outages that started on August 9th and ended on August 28th. Table C.b below provides an overview of each outage:

**Table C.b:
Redondo Beach Forced Outages August 9th – 28th**

Type of Outage	Date(s) of Outage	MW impacted	Cause
Forced	August 9 th – 12 th	178.87 MW	Control Valve Gasket
Forced	August 13 th – 16 th	178.87 MW	Boiler Leak Tube

Forced	August 16 th – 28 th	73.87 MW	Derate because of Boiler Leak Tube
Forced	August 17 th – 18 th	178.87 MW	Thrust Bearing

c. Evidence

In addition to the initial data request that was sent to all generating facilities operating in California, ESRB collected the following data and information about the forced outage at Redondo Beach:

Source	Description
AES Redondo	Pre-inspection DR Response
AES Redondo	Post-inspection DR Response
CPUC	Inspection Photos
CPUC	Interview Notes

d. Observations and Findings: August 9th Outage

On August 9, 2020, the plant control room got an alarm for high turbine bearing temperature. Upon some inspection and thermographic analysis, Lower Control Valve Gasket Failure was observed (#2 Seal Water Line to steam seals). The plant had performed regular maintenance on the turbine control valve in 2019. The plant replaced the gasket and monitored during the startup and found no issue. The plant also observed other similar gaskets for the problem and found no issues.

e. Observations and Findings: August 17th Outage

On August 17, 2020, the unit 5 turbine tripped because of a thrust alarm. The plant reacted by reducing the load to try to get the thrust out of the alarm range. The turbine tripped again. Operations and Instrument technicians verified the thrust indication failed. The plant performed regular maintenance on the turbine and inspected the thrust bearing and probe in 2019. As per the Operator Rounds submitted to the CPUC, the plant performed regular check-ups of the turbine area. A work order was written to repair during the next planned outage and the thrust trip was bypassed and documented.

f. Conclusions

For the August 9th outage: Based on the evidence ESRB reviewed, ESRB determined that AES Redondo Beach did not neglect any preventative maintenance for the control valve. Therefore, ESRB concluded that the outage was not in violation of GO 167.

For the August 17th outage: Based on the evidence ESRB reviewed, ESRB determined that AES Redondo Beach did not neglect any preventative maintenance for the thrust bearing. Therefore, ESRB concluded that the outage was not in violation of GO 167.

Plant Management agreed to remove the “Emergency Equipment” sign from an abandoned tool shed and to correct issues found in the Hazardous Waste storage Area. Plant Management will forward the work orders showing completion of the work by November 22, 2020.

4. Ormond Beach Generating Station

a. Overview

ESRB investigated two forced outages that took place at Ormond Beach Generating Station in Ormond Beach, California starting on August 17th and ending on September 13th. ESRB conducted an in-person inspection of the Ormond Beach Generating Station on September 10, 2020.

b. Summary of Incidents

Ormond Beach Generating Station experienced two forced outages that occurred between August 17th and September 13th, 2020. The first outage occurred from August 27th – 30th and resulted in a loss of 750 MW. The second outage occurred from August 17th to September 13th and resulted in a loss of 91 MW.

c. Evidence

In addition to the initial data request that was sent to all generating facilities operating in California, ESRB issued multiple follow up data requests specific to the outage that began on August 17th:

Source	Description
CPUC	Interview notes
CPUC	Site visit pictures
Ormond Beach Generating Station	Pre-visit data request
Ormond Beach Generating Station	Post-visit data request 1
Ormond Beach Generating Station	Post-visit data request 2
Ormond Beach Generating Station	Post-visit data request 3
Ormond Beach Generating Station	Post-visit data request 4
Ormond Beach Generating Station	Post-visit data request 5
Tenaska Power Services Corporation	Data Request
CAISO	Email confirming CAISO rule

d. Observations and Findings

For the forced outage that occurred from August 27th through August 30th, ESRB determined that the cause of the outage was a leak in the boiling casing. The forced outage that occurred from August 17th through September 13th was the result of an expansion joint failure. During the on-site inspection, ESRB Investigators observed the walkways around Unit 2 were cluttered with debris from blown-out insulation from an overhead pipe. Plant management stated that the insulation damage occurred due to a Unit 2 casing breach which generated enough force to tear it from the pipe. Plant management has since fixed the casing breach and cleared the walkways. ESRB also learned that during the period in question, the plant utilized multiple CAISO tickets to cover the derate period. Ormond Beach notified its scheduling coordinator, Tenaska Power Service Corporation of the derates and Tenaska submitted the updates to CAISO's OMS. However, due to lag in CAISO's review time, the update was rejected as CAISO's rules prevented the plant from updating the outage end date. ESRB found no evidence to suggest that either Ormond Beach or Tenaska was at fault for the CAISO outage ticket.

e. Conclusions

The August 27 – 30th forced outage investigation has been closed with no findings of GO 167 or PUC violations identified. For the forced outage that occurred from August 17th – September 13th, the CAISO outage ticket issue was also resolved, and no violations were observed.

5. Mountainview Generating Station

a. Overview

ESRB investigated two forced outages that occurred at the Mountainview Generating Station in Redlands, California. One outage occurred on August 12th and a second on September 6th. ESRB conducted an in-person site inspection of the Mountainview Generating Station on October 1, 2020.

b. Summary of Incidents

On August 12th, the digital control system (DCS) on the Mountainview Unit 4B Combustion Turbine (CT) tripped the unit offline following the detection of a high fuel-gas level in the turbine compartment. The unplanned outage resulted in a curtailment of 305 MW. Full capacity is 555 MW for Unit 4B; the Unit 4A CT remained in operation.

On September 6th at 12:30 hours Mountainview Unit 4B was operating at 250 MW when a main steam valve actuator developed a hydraulic leak that caught fire. The Plant safety systems automatically shut Unit 4B down. The fire department was dispatched and extinguished the fire.

c. Evidence

In addition to the initial data request that was sent to all generating facilities operating in California, ESRB issued additional document requests to Mountainview on October 6th, November 4th, and November 12th for the outage that occurred on August 12th.

For the outage that occurred on September 6th, ESRB issued additional document requests on September 29th and October 30th.

d. Observations and Findings

The August 12th valve leak was resolved by tightening the MOOG (trade name) Supply Valve Regulator (SVR). ESRB requested maintenance records for the SVR. Plant Management indicated that they have a service agreement with General Electric (GE) and that they were unaware of any prescribed maintenance for the SVR. ESRB found maintenance requirements for the SVR Valve in the Original Equipment Manufacturer's (OEM) MOOG manual. Although ESRB received confirmation that GE was to supply the required maintenance on the SVR, plant personnel made the repairs themselves for the SVR failure by adjusting the valve packing and notified GE of the repairs. ESRB is awaiting a response from Plant Management regarding corrections to the nomenclature of the SVR on the Piping & Instrumentation Diagram (P&ID) a violation of GO 167-OS 8B.11.

The September 6th fire resulted when leaking hydraulic fluid to the valve actuator spontaneously ignited. ESRB received the completed work order for the main stop and

control valve (MSCV) repairs on Unit 4B. Plant management provided the OEM specifications or recommendations for inspections and preventative maintenance for the MSCV.

During the on-site inspection on October 1st, ESRB noted that Mountainview had missing high voltage signs on transformers. Immediately after the inspection, plant management added high voltage signs on the transformers correcting a violation of GO 167-OS 1.A.

e. Conclusions

Regarding the August 12th valve leak, Plant Management did not have preventative maintenance plans for inspecting the packing on the SVR prior to the outage. ESRB is awaiting a response from Plant Management for a corrective action plan that shows routine maintenance is being performed every 6 months or after the required number of service hours a violation of GO 167 OS-13..

Regarding the September 6th fire, ESRB is now awaiting response and corrective actions from Plant Management. Plant Management will provide the associated corrective action plan by February 26, 2021. Additionally, ESRB is awaiting response from Plant Management regarding corrections to damaged insulation a violation of GO 167-OS 8.A.

6. Sunrise Energy Center

a. Overview

ESRB

[REDACTED]

ESRB conducted an in-person inspection of the Sunrise Energy Center on October 2, 2020.

b. Summary of Incidents

[REDACTED]

[REDACTED]

c. Evidence

In addition to the initial data request that was sent to all generating facilities operating in California, ESRB issued the following document requests for

[REDACTED].

Source	Description
CPUC	Interview notes
CPUC	Site visit pictures
Sunrise Generating Station	Pre-visit data request
Sunrise Generating Station	Post-visit data request 1

d. Observations and Findings

[REDACTED]

During the in-person inspection, ESRB engineers found the following:

- A spill control cabinet that needed replenishing and an inventory sheet added;
- Missing Arc Flash warning labels;
- An outdate Arc Flash Study dated February 14, 2014; and
- Piping and Instrumentation Diagram (P&ID) drawing with unclear nomenclature.

[REDACTED]

e. Conclusions

For the outages, no violations of GO 167 were identified. The Plant has agreed to complete the following corrective actions by January 31, 2021:

- 1) Replenish supplies and add an inventory sheet to the spill control cabinet;
- 2) Deploy all Arc Flash labels indicated in the Parsons Arc Flash Study; and
- 3) Update the February 24, 2014 Arc Flash Study with their consultant Parsons;

7. Oakland Power Station

a. Overview

ESRB investigated [REDACTED] the Oakland Power Station located in Oakland, California. [REDACTED]

[REDACTED] ESRB conducted an in-person inspection on December 16, 2020.

b. Summary of Incidents

The Oakland Power Plant [REDACTED]

Table G.b:
Forced outages at Oakland Power Station: August 14 – 18, 2020

Unit(s)	Derate	Reason	Date	Time/Duration	OMS ticket
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

c. Evidence

In addition to the initial data request that was sent to all generating facilities operating in California, ESRB issued a document request regarding the outages listed in the table above.

d. Observations and Findings

A plant inspection and site visit were planned to take place [REDACTED]. ESRB received clearance to schedule an in-person inspection in early December 2020 and conducted a site visit on December 16, 2020. During the in-person inspection,

[REDACTED]

Based on these findings, ESRB has requested additional documents from Plant Management.

ESRB also discovered that Plant Management disconnected an alarm, overriding a permissive, which forced the turbine to run with bad bearing seals. This resulted in carbon build up and impinged the turbine blades, leading to catastrophic turbine failure. For these actions, ESRB found Oakland Power Station to be in violation of GO 167 OS 8: *Plant Status and Configuration* and GO 167 OS 13.P: *Routine Inspections*.

e. Conclusion

ESRB investigators found Oakland Power Station in violation of General Order 167, Appendix E OS-8: *Plant Status and Configuration* for failing to maintain safe, reliable and efficient operation, and GO 167 Appendix E, OS-13 *Routine Inspections*, for personnel not taking appropriate actions in response to alarms or notices. ESRB plans to issue an NOV for these GO 167 violations. An issued date for the NOV is now pending.

8. Panoche Energy Center (PG&E)

a. Overview

ESRB investigated a derate incident that took place at Panoche Energy Center (PEC) in Firebaugh, California on August 15th that lasted for approximately 26 minutes. ESRB conducted a tabletop exercise investigation for this incident, by issuing a data request to Panoche Energy Center's (PEC) scheduling coordinator, PG&E.

b. Summary of Incident

On August 15, 2020 from 18:14 hours to 18:40 hours, PEC reduced its output from 394 MW to approximately 134 MW, in response to an error in dispatch instructions from PG&E that was meant for another plant. PG&E believed it was relaying the CAISO's instructions to deploy all non-spin to Starwood Midway to ramp up to 134 MW. In error, PG&E instead contacted PEC which was already operating at a higher level at 394 MW, and thus, PEC reduced its generation to meet the dispatch instructions.

PG&E became aware of the error when the CAISO called PG&E at 18:34 hours asking why PEC was producing below schedule. PG&E then phoned PEC at 18:35 hours and realized the mistake. PG&E then instructed PEC to return to schedule and by 18:40 hours PEC reached 394 MW. The CAISO's director of engineering services also emailed PG&E on August 17, 2020 to inquire about the reduction in generation.

This ramp-down in generation was not recorded as an outage in the CAISO's Outage Management System (OMS), but was reported in the news by the SF Chronicle on September 14, 2020: <https://www.sfchronicle.com/business/article/PG-E-error-at-power-plant-may-help-explain-15567028.php>.

c. Evidence

In addition to the initial data request that was sent to all generating facilities operating in California, ESRB conducted a tabletop investigation of PEC via a data request to PG&E, the Scheduling Coordinator, on September 30, 2020. In response to ESRB's data request, PG&E provided:

- PEC Operator Logs from August 14 to August 16, 2020;
- Correspondence between PG&E and PEC on August 15, 2020;
- PEC's meter plot documenting the time and MW capacity of the plant ramp-down on August 15, 2020;
- Email correspondence between PG&E and the CAISO; and
- Description of Corrective Actions.

d. Observations and Findings

The accidental ramp-down of PEC on August 15, 2020 was the result of human errors made by its Scheduling Coordinator, PG&E, which acted on behalf of the plant for generation dispatch, communicated with the CAISO, and ultimately dispatched the plant. The plant's meter plot showed that the reduction of 260 MW lasted approximately 26 minutes, as referenced in Parts (a.) and (b.) above.

PG&E has implemented corrective actions following the incident. PG&E provided coaching to the involved PG&E staff and added an additional real time asset manager for heatwave events. PG&E is considering additional training on human error traps and

reduction, addressing changes to reduce human error, and moving the phone button for the two plants farther apart.

e. Conclusion

The August 15, 2020 ramp-down incident has been closed with no findings of General Order 167 violations.

9. Alamitos

a. Overview

ESRB investigated one forced outage that took place at the Alamitos Plant in Long Beach, California on August 17th for four (4) hours. ESRB conducted a tabletop exercise investigation for this incident by issuing a data request to Alamitos.

b. Summary of Incident

On August 17, 2020 at 11:48 hours, Alamitos notified its scheduling coordinator, EDF, of a saltwater leak in the condenser in Unit 4, and Alamitos restricted the unit to 70 MW on a forced outage. This outage overlapped with a planned outage to repair a turbine blade failure on the low-pressure turbine which started on June 6, 2020 and ended on August 17, 2020 at 11:55 hours, the same day as the forced outage caused by the saltwater leak. The blade failure also affected the thrust bearing pads on the low-pressure turbine and resulted in a condenser tube leak.

c. Evidence

As part of ESRB's tabletop exercise, ESRB issued a data request that was sent to all generating facilities operating in California, including Alamitos.

d. Observations and Findings

From the plant logs, the plant's alarm sounded and plant staff suspected a saltwater leak in the early morning of August 17, 2020, while the plant was still on the planned outage for the turbine blade replacement. Staff inspected the unit and tested chemistry while on the forced outage to confirm the saltwater leak. At 19:58 hours, the plant completed plugging the three saltwater leaks and a couple of previous plugs that had leaked again. The plant started the circulating water pump and notified EDF at 20:31 hours that the plant was available for full load. Two outages appear in the OMS for the saltwater leaks: 9012593 from 11:58 hours until 20:31 hours and 9013870 from 14:33 hours until 20:31 hours, for 265-315 MW. As the outage tickets' start and end differs from what AES reported on the data request, the outage could have been from six to 8.5 hours, rather than four hours as reported by AES.

e. Conclusion

After a review of the documents submitted, ESRB determined that no GO or PUC violations were discovered, thus no further follow up is required.

10. Moss Landing

a. Overview

ESRB investigated [REDACTED]

[REDACTED]. ESRB conducted a tabletop exercise investigation for this incident by issuing a data request to Moss Landing.

b. Summary of Incident

[REDACTED]

Table I.b:

c. Evidence

In addition to the initial data request that was sent to all generating facilities operating in California, ESRB issued a tabletop exercise data request to Moss Landing.

d. Observations and Preliminary Findings

[REDACTED]

e. Conclusion

Based upon ESRB's investigation, no GO or PUC violations were discovered, thus no additional follow up is required.

11. Harbor Cogeneration Facility

a. Overview

ESRB investigated a series of three outages that took the entire Harbor Cogeneration facility in Wilmington, California offline from August 15 – 16, August 16th, and again on August 18th. ESRB was able to obtain adequate information about the outages from the initial data request that was sent out to all generators in California on August 20, 2020.

b. Summary of Incidents

The Harbor Cogeneration Facility experienced a series of three outages from August 15th through August 18th. Table X.b provides an overview of these outages followed by a brief description of each outage:

Table K.b:
Harbor Cogeneration Outages August 15 – 18, 2020

Date	Start/End Time	Duration	Megawatts (MW) Impacted
August 15 – 16, 2020	20:15 hours – 13:50 hours	17hrs 35 mins	80 MW
August 16, 2020	14:30 hours – 16:45 hours	2hrs 15mins	80 MW
August 18, 2020	10:51 hours – 14:00 hours	4hrs 51mins	80 MW

i. August 15 – 16, 2020

This outage occurred while the plant was operating at base load and stable. The operator received an NH₃ flow alarm, identified that the NH₃ block was closed, and attempted to reestablish flow with no success. With no NO_x emissions control the operator shut the plant down.

ii. August 16, 2020

This outage event is related to a delayed start after restoring from the previous outage that began on August 15th.

iii. August 18, 2020

This outage occurred during start up when a high pressure (1250 psi) steam leak was identified on external piping. This leak was a safety concern and could potentially worsen during the run. The decision was made to secure the plant and repair the leak in order to allow the facility to meet its Day Ahead scheduled award and increase reliability during the peak hours of operation.

c. Evidence

As part of their response to the initial data request that was sent to all generating facilities operating in California, Plant Management at the Harbor Cogeneration Facility provided ESRB with the following information:

- i. Ammonia Storage.pdf for the August 15th – 16th outage;
- ii. P&ID HRSG 4.pdf for the August 18th outage; and
- iii. Copies of the logbook entries.

d. Observations and Findings

During the first outage that occurred from August 15 – 16, 2020, a loss of NH₃ flow started at 20:15 hours. The outage was restored on August 16th at 16:45 hours. After troubleshooting, the root cause was identified as a failed thermocouple. The thermocouple monitors HRSG temperatures at the SCR and provides a permissive to allow the NH₃ block valve to open. When the thermocouple failed, the permissive to inject the NH₃ was lost and the block valve closed automatically. The operator attempted to troubleshoot in the moment but found the NH₃ block valve closed and quickly realized that without emissions control the plant would need to be shut down. Once the plant was safely secured, troubleshooting continued and the failed thermocouple was identified. Replacement of this probe requires internal access to the HRSG which would have required a 2-3-day outage given the internal temperatures. To restore availability sooner the valve was modified to be operated manually. These temporary repairs were completed the following day prior to the units Day Ahead scheduled commitment on August 16th.

The second outage that occurred on August 16th was due to a delayed start-up resulting from the previous day's outage.

The third outage that occurred on August 18th was related to a leak on the 1250 psi high pressure steam system. During start up on August 18th at 10:51 hours, a leak on the HP steam system was identified. This outage was restored at 14:00 hours on the same day. After inspection and consideration, the plant was shut down to allow for repair. Quickly shutting down the unit prevented temperatures and pressure from increasing, which allowed for a faster repair. Plant Management was concerned that the leak would worsen and potentially force the plant offline during the peak operating hours for a longer duration. Once secure and the pressure was safely isolated, a weld repair was conducted and the unit was declared available as soon as the work was completed. This was accomplished prior to the unit's Day Ahead scheduled commitment on August 18th.

e. Conclusions

For the outage that occurred from August 15th through August 16th, the plant responded by replacing all similar thermocouples throughout the plant. The NH₃ Valve was being controlled manually until all the thermocouple were replaced. The plant sourced replacement thermocouple and will be adding redundancy. A permanent repair will be made during the next outage that allows access inside of the HRSG.

Regarding the Steam Leak that caused the August 18th outage, ESRB found that Plant Staff acted appropriately. The steam piping was welded and the leak was stopped. A key question remains however regarding how widespread this problem is and whether such pipe failure may occur elsewhere in the plant. The plant has initiated a feasibility study and consideration is being given to replacing piping at other similar elbows.

ESRB is considering a further investigation and document request for the plant's Flow Accelerated Corrosion Report (FAC) and a possible site visit. At this time, no violations of GO 167 have been discovered.

12. Desert Stateline Solar Facility

a. Overview

ESRB investigated one forced outage that took place at the Desert Stateline Solar Facility Plant in San Bernardino County, California, from August 12th through August 17th. ESRB conducted a tabletop exercise investigation for this incident.

b. Summary of Incident

The initial cause of the August 12 – 17, 2020 forced outage was detected on July 31, 2020 when the site received a low voltage bushing power factor alarm on Generator Step-up Unit number 1 (GSU1). GSU1 is a transformer that steps up the voltage from the solar cells to a transmission level voltage in order for the plant to be connected to the transmission system. An engineering review by the Operation & Maintenance team and bushing monitoring system original equipment manufacturer (OEM) recommended continued monitoring over the next several weeks. No improvement was noted. On August 3rd, GSU1 was taken offline for inspection, cleaning and infrared scan. No improvement was noted. Then, on August 5th, GSU1 was taken offline for additional inspections and software updates, however no improvements were noted.

The August 12 – 17, 2020 outage occurred when on August 12th, offline power factor tests were conducted to verify that the defect was still present in the GSU1 low voltage bushings. While still offline, Plant Management decided to replace the suspect faulted equipment. Three (3) low voltage bushings were replaced on GSU1 as well as one (1) high voltage bushing that showed early signs of deterioration.

c. Evidence

As part of ESRB's tabletop exercise, ESRB sent a data request that to all generating facilities operating in California. ESRB reviewed the following information for the Desert Stateline outage: outage details and cause of the outage, the plant control log for the previous 48 hours, maintenance history for the failed equipment, history of similar failures on the same or similar equipment, vendor manuals, and Piping & Instrumentation Diagram (P&ID) of the system.

d. Observations and Findings

ESRB concluded that Desert Stateline Solar Facility followed the recommendations of their O&M team and took progressive and methodical troubleshooting steps to correct the problem. Taking GSU1 out of service for any period of time has the effect of de-rating the solar facility by 150 MW. Desert Stateline indicated that a Root Cause Analysis (RCA) will be done for this outage. They expect the report to be available in late October or early November.

e. Conclusion

ESRB determined that no further action is required for this outage. After a review of the documents submitted, ESRB concluded that there were no violations of GO 167 found or evidence of safety issues at the plant.

13. Blythe Energy Center

a. Overview

ESRB investigated one forced outage that took place at the Blythe Energy Center in Blythe, California on August 14th that was three (3) hours in duration.

b. Summary of Incident

On August 14, 2020, [REDACTED]

c. Evidence

ESRB issued a comprehensive data request on August 20, 2020 to all generating facilities operating in California requesting information on all forced outages that occurred between August 12 – 20, 2020. ESRB reviewed the following information for the August 14, 2020 Blythe outage including the outage details and cause of the outage, the plant control log for the previous 48 hours, maintenance history for the failed equipment, history of similar failures on the same or similar equipment, vendor manuals, and Piping & Instrumentation Diagram (P&ID) of the system.

d. Observations and Findings

Blythe Energy Center determined, and ESRB confirmed via document review, that [REDACTED]

e. Conclusion

ESRB determined that no further action is required for this outage. After a review of the documents submitted, ESRB concluded that there were no violations of GO 167 found or evidence of safety issues at the plant.

IV. Recommendations and Next Steps

As stated earlier in this report, ESRB is pursuing corrective actions for three of the forced outage incidents that occurred. These corrective actions are summarized in Table 3 below.

**Table 3:
Corrective Actions Issued**

Incident	Violations Found	Date Issued	Response Due Date
Sutter Energy Center	Three (3) violations of GO 167	October 16, 2020 (NOV)	November 16, 2020
Sunrise Energy Center	Two (2) violations of GO 167 One (1) violation of NFPA	October 22, 2020	January 31, 2021

Mountainview Generating Station	Four (4) violations of GO 167	September 29, 2020 (CAP)	October 30, 2020 (originally) – extended to February 26, 2021
Oakland Power Station	Two (2) violation of GO 167	TBD	TBD

**Table 4:
GO 167 and Other Violations**

Facility	GO 167 or Other Violations	Status
Sutter Energy Center	<ol style="list-style-type: none"> GO 167, Section 10.3.6.4 GO 167, Operation Standard (OS) 6 GO 167, OS 7 	Closed. NOV response received November 16, 2020. Two (2) violations corrected and one (1) corrective action to be completed during the spring planned outage.
Sunrise Energy Center	<ol style="list-style-type: none"> GO 167, Section 10.3.6.4 GO 167, Sections 7.D2 & 8.B.11 NFPA 79e S.130.5.H 	Closed. NOV response due January 31, 2021. Plant provided appropriate and sufficient evidence that corrections found have been implemented.
Mountainview Generating Station	<ol style="list-style-type: none"> GO 167, OS 1.A GO 167, OS 8.A GO 167, OS 8B.11 GO 167, OS 13 	Open. CAP response due October 30, 2020 (originally) – extended to February 26, 2021.
Oakland Power Station	<ol style="list-style-type: none"> GO 167, Appendix E, OS 8 GO 167, Appendix E, OS 13 	Open. NOV pending.

As part of its ongoing effort to preemptively identify critical outages, ESRB will continue to monitor the daily Power Plant Outage Reports (PPORs) in order to flag any unusual outages reported and follow up on those on a case by case basis. Potential follow up may include data request, tabletop exercise requests and/or in-person inspections as necessary.

In preparation for the Summer of 2021, ESRB recommends that the Commission issue a pre-emptive data request instructing generators to submit derates or outages during the summer months (June-September) to the PPOR web-portal for any outages that meet the same criteria of two (2) hours and longer in duration and 50 MW and greater in derate. ESRB also believes that ongoing coordination between the CAISO and GAOs’ scheduling coordinators can prevent longer catastrophic derates from occurring. ESRB will continue to pursue direct access to CAISO outage management contacts in order to facilitate ESRB’s monitoring of outages.