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RUSSELL CITY ENERGY COMPANY, LLC

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January 13, 2022

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Re: Russell City Energy Center May 27, 2021 Steam Turbine Overspeed Event

Chair Hochschild, President Reynolds, President Mainzer,

In connection with the joint agencies' ongoing planning for summer reliability, we write to provide an update on the status of the Russell City Energy Center (Russell City), which is a nominal 600 MW combined cycle gas turbine power plant located in the City of Hayward that is owned and operated by Russell City Energy Center Company, LLC, a subsidiary of Calpine Corporation (Calpine). We also wish to thank the joint agencies, and your respective staffs, for your hard work and collaboration to conduct a comprehensive review of the steam turbine overspeed event at Russell City last year, to understand the cause of that event, and to ensure that it never happens again at any facility. We acknowledge the seriousness of the event and we are committed to prioritizing the safety of the facility and the well-being of the community. Safety and reliability are of paramount concern to Calpine, and we appreciate this opportunity to update you regarding the Russell City facility.

A. Russell City is a Modern Combined Cycle Plant that Supports Bay Area Electric Reliability.

Russell City was designed, engineered, and constructed by Bechtel, with the CEC's oversight and approvals. The facility met or exceeded applicable design criteria, NERC standards, and code requirements. Russell City began commercial operation in 2013. Russell City is an important component of electric reliability within the Bay Area and beyond. In addition to providing energy and capacity to the grid, it is contracted to serve as a critical "black start" resource to support CAISO emergency restoration operations.

On May 27, 2021, the plant experienced a steam turbine overspeed event and fire that removed Russell City from service for several months (the "May 27 Event"). These types of events are very rare in the Calpine fleet and are taken very seriously by everyone at Calpine from the plant staff to executive management. In response to the incident, we worked closely with regulators and industry experts to bring the plant back online in simple cycle operation on a temporary basis in support of Summer 2021 grid reliability, while we investigated the cause of the incident and implemented appropriate remedial measures. We procured the parts needed to repair the steam turbine and are in the process of executing the repairs to allow for a return to safe and reliable combined cycle operations to provide full output by the summer of 2022.

B. Safety Comes First, and the Well-Trained Emergency Response by the Hayward Fire Department and Plant Staff Helped Minimize the Impact from the May 27 Event.

Safety is a core value at Calpine. The safety of the public, our contractors, and our employees is our priority in everything we do, and is the responsibility of each one of us at Calpine. We are grateful to the expeditious and well-trained emergency response by the Hayward Fire Department and Russell City plant staff, which helped minimize the impact from the May 27 Event.

As discussed below, in partnership with the joint agencies, Calpine undertook a thorough review to identify the cause of the May 27 Event and to safely return the plant to service. We commissioned an independent expert to analyze the root cause of the event and to provide recommended remedial actions to prevent it from ever happening again. Calpine also commissioned an independent expert to analyze whether there was any risk from exposure to toxic materials to onsite personnel, first responders, and the community from the May 27 Event.

C. Russell City Took Steps to Identify the Cause of the May27 Event and Safely Return the Plant to Service.

Following the May 27 Event, in order to safely and reliably return the plant to service, Calpine took the following steps:

1. Notified and conferred with regulatory agencies and the City of Hayward to provide status updates and provide timely information.

2. Conducted structural and integrity inspections on the remaining units and the steam turbine pedestal to ensure no impact from the steam turbine failure or fire.

3. At the request of the CAISO to support critical summer 2021 reliability concerns, obtained regulatory approvals to temporarily return Russell City to safe operation in simple-cycle mode (~300 MW), bypassing the steam turbine.

4. Completed detailed "balance of plant" system and equipment inspections and repairs, including the steam condenser, to ensure system readiness to support simple cycle operation.

5. Obtained an independent expert to analyze the root cause of the incident and recommend remedial actions to prevent similar future events.

6. Conducted a targeted fleet-wide inspection of all of our combined cycle facilities.

7. Conducted a contractual review and confirmed with our insurers that there was no basis to make any third party claims against service providers or equipment vendors.

8. Secured the replacement parts, components, and union labor needed to ensure steam turbine restoration and the safe return to full combined-cycle operation (600 MW) in time to support summer 2022 reliability.

As a result of extraordinary efforts, Russell City was able to return to service safely and provide much needed capacity to the grid for the months of August, September and October 2021. That capacity was particularly important in the fall of 2021 due to drought conditions and the lack of a significant amount of hydroelectric capacity. Russell City was available when called upon to meet system peak demands during that time. It ceased simple-cycle operations at the end of October in order to start the steam turbine restoration efforts.

D. Independent Experts Have Identified the Root Cause of the May 27 Event and Russell City's Restoration Plan Implements the Recommended Measures to Prevent It from Happening Again.

Calpine recognizes the seriousness of the May 27 Event and fully appreciates the need for a thorough review. A third-party root cause analysis (RCA) of the May 27 Event was conducted by an independent industry expert. This independent industry expert, along with Calpine's own engineering experts, have developed remedial measures, including those discussed below, to address certain design characteristics that led to the event and prevent its recurrence.

As summarized in the RCA, the inability to detect and mitigate the presence of excess water under pressure and at high temperature within the facility's reheater system was the root cause of the May 27 Event. This occurred as a result of certain design determinations made with respect to the original configuration of the facility. These decisions were made by our EPC contractor and approved as part of the CEC licensing process. Those design decisions were reasonable, based on historic experience, but did not anticipate the confluence of circumstances that occurred here.

Primarily, the May 27 Event resulted from the accumulation of water in an offline heat recovery steam generator (HRSG) due to the mechanical failure of a gearbox on a valve. The gearbox is a component in the cold reheat stop valve, and when the gearbox failed it prevented the valve from fully closing. The gearbox is fully enclosed, sealed, and filled with oil. Pursuant to the

manufacturer's operating manual and good industry practice, there is no required or recommended periodic maintenance for the gearbox. Typically, if this type of gearbox was not operating properly and the valve was not closing properly, then the limit switches would not match up, which would indicate that some action needed to be taken. Due to the type of failure here, however, the switches in the motor operator showed fully closed even though the gear box did not close the valve. Thus there was no warning regarding the gearbox malfunction, and the set limit points indicated the valve was fully closed on the plant control system, even though it was not fully closed. The Russell City restoration plan modifies the actuator operation to function on torque instead of limit switches, which will ensure full seating of the valve and eliminate similar failures by allowing the valve to fully close.

However, while the gearbox failure was a key contributing factor, the May 27 Event would not have occurred but for certain design features that did not contemplate the potential for water to accumulate in the offline HRSG Reheater system.

The failed gearbox allowed the cold reheat stop valve to remain partially open, even though it was indicating closed, causing steam to pass through the valve and condense in the offline HRSG. Though compliant with applicable industry codes, the facility design did not detect or drain accumulated water in an offline HRSG and therefore allowed the water to accumulate undetected. The specific design features were intended to preserve the stored energy for a shorter, more environmentally efficient start-up, resulting in lower emissions. The facility's restoration plan addresses both of these design features through the following measures: (1) modification of the control systems to detect excess water in an offline HRSG, and (2) modification to ensure the discharge of accumulated water from an offline HRSG. These modifications will not impact the efficient start up or emissions at the facility.

The approved facility design also included manual, rather than motor-operated, stop/check valves for the Reheater Outlet on each of the two HRSGs. Standard operating protocol for such manual stop/check valves is for them to remain in the open position unless the associated HRSG is undergoing required maintenance. The open valve position associated with normal operations allowed the water that accumulated in the HRSG to pass into the steam turbine system. The facility's restoration plan addresses this design feature by modifying the stop/check valves to be electrically operated and automated in order to fully isolate the offline unit during normal operations, preventing water in the offline HRSG from traveling into the steam turbine system.

Finally, as the colder water from the offline HRSG passed through the hot valves feeding the steam turbine, the valve components were thermally distorted (quenched) due to the sudden and extreme temperature differential, preventing their closure. The continued flow of water followed by the flow of steam through the seized valves provided the energy source to accelerate the steam turbine into the overspeed event.

The May 27 Event was not the result of deferred or improper maintenance, nor was it the result of any failure to act on the part of the operator on duty. In the hours prior to the event, a small number of status alarms re-occurred, all during operating load transition periods. These alarms provided no new event-related information to the operator and would not have prompted

operator action. It was not until 29 seconds before the actual overspeed occurred, and after the turbine water ingestion, that the first non-recurring alarms related to the event were triggered. The overspeed that occurred at that time was the final step in the series of events that led to the steam turbine failure. The facility's steam turbine protection systems functioned properly and attempted to prevent the overspeed, but were ineffective due to seizure of the valves. For the same reason, operator intervention at that point would not have prevented the event from occurring.

E. Russell City Continues to Coordinate with the CEC, CPUC, and City of Hayward

Russell City has continued to partner with the CEC and CPUC regarding the May 27 Event, with respect to causal analysis, steps to maximize capacity to the grid, and ensuring the safety of this plant and others in our fleet. We have responded to all information requests, both formal and informal, in a timely fashion. In addition, Russell City has facilitated more than nine separate onsite meetings with CPUC and CEC Commissioners and staff, as well as with the City of Hayward, including several presentations and on-site facility tours.

The relationship with the local community is vital, and Russell City has actively engaged with the City of Hayward in response to the May 27 Event, including the following efforts:

1. Agreeing to provide the full report by the independent expert on the root cause analysis described above, and the restoration plan for the facility, as well as the independent expert report on any risk from exposure to toxic materials.

2. Coordinating with the City to identify and reimburse related physical damage to adjacent property.

3. Offering additional cooperation, communication and coordination efforts to ensure that Russell City understands the City's response plan and expectations for coordination with the facility going forward.

4. Openness to meeting with the Russell City Community Group and provide funds to help elevate knowledge and appreciation of the historic town of Russell City within the community.

F. Conclusion

This unfortunate event impacted and caused concern for Calpine and for all of you and the local community. We have heard and we acknowledge the concerns raised by the joint agencies and the local community. Calpine understands the need to take action to ensure that an event such as this never occurs again at Russell City or any other Calpine facility, and has developed a thorough plan to address the design issues that led to this event. Calpine has worked closely with regulators, the City of Hayward, and industry experts to ensure that the plant will be brought back to combined cycle operations in a safe and reliable manner this summer. We are grateful for the partnerships that made this happen and want to thank the joint agencies and your respective staffs

for their hard work and collaboration. We remain committed to continuing to partner with you, to provide safe and reliable energy in California, and to answer any questions you have.

Sincerely,

DocuSigned by:
Michael Del Casale
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Michael Del Casale
Senior Vice President Operations
Calpine Corporation

cc: Mayor Barbara Halliday, City of Hayward (Barbara.Halliday@hayward-ca.gov)