January 7, 2022

Via Electronic Mail

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Re: September 10, 2021 Emergency Order issued under Federal Power Act Section 202(c)

Final Report of the California Independent System Operator Corporation

Dear Mr. Buell and Ms. Speiser:

The California Independent System Operator Corporation (CAISO) submits this final report pursuant to the requirements of ordering paragraphs D and E of the September 10, 2021 Emergency Order issued by the Department of Energy (DOE) under Federal Power Act Section 202(c). DOE's Emergency Order authorized the CAISO to direct operation of specified electric generating facilities (Covered Resources) above permitted limits under certain emergency conditions for the period between September 10, 2021 up and including November 9, 2021.[1] The Emergency Order also

[1] DOE's Emergency Order applied to units at the following Covered Resources: Midway Sunset Cogeneration Facility in Fellows, California; the Alamitos Energy Center in Long Beach, California; the Huntington Beach Energy Project in Huntington Beach, California; the Walnut Creek Energy Park in the City of Industry, California; Greenleaf Unit 1 in Yuba City, California; and the Roseville Energy Park in Roseville, California.

authorized the CAISO to direct limited testing or synchronization of a subset of the Covered Resources. During the period the Emergency Order was in effect, the CAISO did not direct the Covered Resources to operate to meet emergency conditions. The CAISO did direct limited testing activities by the following Covered Resources: Midway Sunset Generating Facility, new units at the Greenleaf unit 1 site, and new units at the Roseville Energy Center.

Consistent with DOE's Emergency Order, the CAISO submitted an interim report to DOE on December 1, 2021 containing various information categories. The owners/operators of Covered Resources have informed the CAISO that they do not have any revisions to the information DOE directed the CAISO to submit. Since the submission of the CAISO's interim report, on December 1, 2021, California Air Resources Board has provided the CAISO with an additional document entitled *Greenleaf 1 Operating Compliance_Emissions Reporting Protocol Final_120121*. CARB received this document from the Feather River Air Quality Management District. A copy of this document is attached hereto.

Please do not hesitate to contact me at 916.673.67797 or aulmer@casio.com with any questions

Respectfully submitted,

/s/ Andrew Ulmer

Assistant General Counsel

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Emissions Reporting Protocol and Compliance Plan

(Completed for Compliance with CEC Emergency License and Condition 40 of FRAQMD Authority to Construct)

Greenleaf I shall utilize the following procedures for estimating criteria pollutant emissions and ensure compliance with emissions standards during the emergency operations on the two (2) General Electric TM2500 natural gas turbines, operated in simple cycle mode.

Plant operational parameters and emission factors will be used to monitor emissions and determine compliance with respective permits. Montrose Air Quality Services (MAQS) performed source testing for NOx, CO, VOC and SOx source tests at the Calpine Green Leaf I site in Yuba City, California on each of the two (2) turbines on September 20 and 21, 2021. The tests were conducted while each gas turbine unit is firing natural gas and operating at full load and the parameters tested are listed in Table 1.

TABLE 1
EMISSION TEST PARAMETERS AND METHODS
Calpine Greenleaf I

EMISSION TEST PARAMETERS AND METHODS CALPINE GREEN LEAF I		
PARAMETER	**REFERENCE METHOD**	**ANALYTICAL APPROACH**
O_2 and CO_2	EPA 3A	Paramagnetic and NDIR analyzers
NO_x	EPA 7E	Chemiluminescent analyzer
CO	EPA 10	NDIR/GFC analyzer
Total Hydrocarbons	EPA 25A	FID analyzer
Sulfur Oxides (SO_X)	From fuel sulfur	Calculation from fuel sulfur content
Fuel Sulfur	ASTM D-5504	GC/MS/FPD
Emission rates, lb/MMBtu, lb/hr	EPA 19	Calculated from fuel flow
Moisture content	EPA 4	Moisture condensation, gravimetry

Process data that was provided by the plant operation staff to MAQS included:

For each gas turbine unit:

- Gross MW produced
- Fuel flow rate

- Turbine water injection rate

The source testing report is attached.

Emission Calculations

The results of the source testing were used to establish fuel-based emission factors for NOx, CO, VOCs and SO_x. For particulate matter (PM10/PM2.5), the applicable emission factor in lb/MMBtu was determined based on the mass permit limit of four (4) lb/hr and the turbine heat input rating of 366.1 MMBtu/hr.

Emission Factors

Parameter	Emission Factor Unit 1 (lb/mmbtu)	Emission Factor Unit 2 (lb/mmbtu)
NO_x	0.082	**0.078**
CO	0.043	**0.029**
Total Hydrocarbons	0.005	**0.003**
Sulfur Oxides (SO_X)	0.000087	**0.000202**
Particulate Matter (PM10/PM2.5)	**0.0109**	**0.0109**

The emission factors listed above will be used to calculate the mass emissions. For each calendar day, Greenleaf will calculate and record:

- Daily total firing hours
- Daily average hourly fuel flow rate
- Daily turbine water injection rate
- Daily MW
- Daily mass emissions of regulated pollutants

Periodic reports will be submitted to the CEC and the FRAQMD as required and will include the total daily, monthly, quarterly and calendar year emissions for each criteria pollutant.

Operating Compliance Plan

Condition 40 of the FRAQMD ATC require the facility's pollution control equipment to be properly operated and properly maintained. Until the SCR and oxidation catalyst are installed, Greenleaf 1 will be relying on water injection to control NOx emissions at the facility. The demineralized water will be injected into the combustion section of the combustion turbine in order to maintain the emissions that were measured during the source testing and the basis of

the emission factors. The turbine water injection rates will be monitored to ensure that compliance with the above emission factors is maintained.

Any time water injection is unavailable, the facility will be shut down until the water injection system is repaired or authorization is given by the FRAQMD.

This plan will be updated when the SCR and oxidation catalyst are installed.