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Appendix 5.1F
Evaluation of Best Available Control
Technology

Evaluation of Best Available Control Technology

To evaluate best available control technology (BACT) for the proposed turbines, the guidelines for medium sized simple-cycle gas turbines (~50 MW) as delineated in the District, state, and federal BACT listings were reviewed. The relevant BACT determinations for this analysis are shown in Tables 5.1F-1 and 5.1F-2.

Table 5.1F-1. BACT Data for Simple Cycle Gas Turbines (CARB)

Pollutant	BACT	Typical Technology
Nitrogen oxides (NO _x)	2.5 to 5 ppm dry @ 15% O ₂ , 1 or 3 hour average	SCR + DLN, low NO _x burners (HRSG) or, SCR + water or steam injection, low NO _x burners (HRSG)
Sulfur dioxide (SO ₂)	Natural gas fuel	PUC regulated gas
Carbon monoxide (CO)	2 to 4 ppm dry @ 15% O ₂ , 1 or 3 hour average	Catalytic oxidation
VOC	2 ppm dry @ 15% O ₂	Catalytic oxidation
PM10/2.5	Natural gas fuel	PUC regulated gas

Sources:

CARB Power Plant Guidance for BACT, July 1999.

CARB, Report to the Legislature-Gas-Fired Power Plant NO_x Emission Controls and Related Environmental Impacts, Table II-3, May 2004

Table 5.1F-2. Air District BACT Data for Simple Cycle Gas Turbines

Pollutant	BACT	Typical Technology
Nitrogen oxides (NO _x)	2.5 to 3.5 ppm dry @ 15% O ₂ , 1 or 3 hour average	SCR with dry low NO _x combustors, or SCR with water or steam injection
Sulfur dioxide (SO ₂)	Natural gas fuel	PUC regulated gas
Carbon monoxide (CO)	4.0 to 6.0 ppm dry @ 15% O ₂ , 1 or 3 hour average	Catalytic oxidation
VOC	2.0 ppm dry @ 15% O ₂	Catalytic oxidation
PM10/2.5	Natural gas fuel	PUC regulated gas

Source:

Range of Recent BACT simple cycle decisions by BAAQMD and SCAQMD (website).

BACT limits, in terms of ppm, as derived from the EPA RBLC database for simple cycle turbines > 25 MW showed the following ranges of values for NO_x, CO, VOC, SO_s, and PM10/2.5:

- **NO_x**: 2.5 to 9 ppm
- **CO**: 1.5 to 9 ppm
- **VOC**: 0.7 to 3 ppm
- **PM10/2.5**: Natural gas
- **SO_x**: Natural gas

(Search period was 1/1/2011 to 9/2016.)

BACT limits proposed by the applicant for the turbines are as follows:

- **NO_x**: 2.5 ppm @ 15 percent O₂ – Water injection and SCR
- **CO**: 4.0 ppm @ 15 percent O₂– Oxidation catalyst
- **VOC**: 1.0 ppm @ 15 percent O₂– Oxidation catalyst
- **SO_x**: Natural gas – 0.75 grs S/100 scf (maximum), 0.25 grs S/100 scf (average)
- **PM_{10/2.5}**: Natural gas
- **NH₃ Slip**: 5.0 ppm @ 15 percent O₂

Cooling Tower BACT

No cooling towers are proposed for the SERC facility.

Auxiliary Boiler BACT

No auxiliary boilers are proposed for the SERC facility.

Fire Pump or Emergency Generator Engines BACT

No diesel-fired fire pump or emergency generator engines are proposed for SERC.

GHG BACT

Sulfur Hexafluoride Breakers

Only one breaker is proposed to be located in the outgoing switchyard.

GHG BACT for the proposed SERC Sulfur hexafluoride (SF₆) breaker is proposed as follows:

- Use of enclosed-pressurized circuit breakers.
- Annual SF₆ leak rates shall not exceed 0.5 percent by weight.
- The breaker will be equipped with a 10 percent by weight leak detection system.

Combustion Turbines

GHG BACT for the SERC combustion turbines is proposed as follows:

- Use of clean fuels (firing natural gas exclusively in the turbines).
- Maintain compliance with the NSPS Subpart TTTT emissions limits as specified in 40 CFR 60.5520, Table 2, as applicable.¹
- Maintain heat rates for simple cycle operations at levels equal to or less than 8651 Btu/kW-hr (LHV), based on the averages for 100 percent load for cold, ISO, and hot day performance data.
- Compliance with the Lbs CO₂/MWh (net) and heat rate values will be based on 12-month rolling averages.

Facility-wide CO₂e emissions were rounded upwards and are estimated to be less than or equal to 60,000 tons/yr. This value includes the estimated turbine emissions of 58,324 tons, SF₆ emissions of 2.57 tons, and an added 1,673 tons as a safety margin to account for annual operating differences. The added 1,673 tons represents an approximate 3 percent margin.

Proposed Facility GHG Limit

CO₂e emissions will be less than or equal to 60,000 tons/yr.

¹ The facility turbines are not required to meet the California CPUC CO₂ standards for baseload generation facilities of 1,100 lbs CO₂/Mw-hr.