

CALIFORNIA ENERGY COMMISSION

1516 NINTH STREET
SACRAMENTO, CA 95814-5512



DATE: March 5, 2003

TO: Interested Parties

FROM: Donna Stone, Compliance Project Manager

SUBJECT: **Moss Landing Power Project (99-AFC-4C)
Staff Analysis of Proposed Project Modification:
Request to Modify Air Emissions during Shutdown**

On November 12, 2002, the California Energy Commission (Energy Commission) received a petition to amend the Energy Commission Decision for the Moss Landing Power Project (MLPP). MLPP is a nominally-rated 1,206 MW natural gas-fired power plant for which construction has been completed and the units are fully operational. The power plant is located in the town of Moss Landing in Monterey County, California. The requested project modification is to allow for a minor change in the emission limitations during the shutdown of the new combustion turbines.

Energy Commission staff reviewed the petition to assess the impacts of this proposal on environmental quality, public health and safety. Staff has prepared revisions to existing air quality conditions of certification. It is staff's opinion that with the implementation of these conditions, the project will remain in compliance with applicable laws, ordinances, regulations, and standards, and that the modification will not result in any environmental impacts.

The attached staff analysis is provided for your information and review. Energy Commission staff intends to recommend approval of the petition at the April 2, 2003 Business Meeting of the Energy Commission. If you have comments on this proposed project change, please submit them to me at the address above prior to April 1, 2003. If you have any questions, please call me at (916) 654-4745 or e-mail at dstone@energy.state.ca.us.

Attachment

Mailed to: List #703

**MOSS LANDING POWER PLANT (99-AFC-4C)
PETITION TO AMEND AIR QUALITY CONDITIONS:
SHUTDOWN EMISSION LIMITS
Air Quality Staff Analysis
February 7, 2003**

AMENDMENT REQUEST

On November 12, 2002, Duke Energy Moss Landing LLC (Duke) filed a petition (Duke 2002) to amend two air quality conditions for the Moss Landing Power Plant (MLPP). Duke also filed to modify permit conditions with the Monterey Bay Unified Air Pollution Control District (District) on October 28, 2002. The District issued its analysis and approval of the proposed changes on January 10, 2003 (District 2003).

Duke requested to modify the emission limits that apply during shutdown conditions on four new natural gas-fired combustion turbines at MLPP. The daily, quarterly, and annual emission limits that apply to the MLPP would not change, and the new emission limits requested for turbine shutdowns would not exceed emission levels previously analyzed by Energy Commission staff in the Final Staff Assessment (CEC 2000a). The requested modification would add separate mass-based emission limits for turbine shutdowns.

BACKGROUND

In May 1999, Duke proposed construction and operation of a major modernization for the Moss Landing Power Plant in Monterey County. The modernization included a new combined-cycle power plant with four General Electric Model 7FA combustion turbine generators (CTGs), heat recovery steam generators, and two condensing steam generators. The MLPP project was certified by the Energy Commission in its October 2000 decision (CEC 2002b). The power plant is now operational, with construction completed in June 2002. After gaining experience operating the plant, Duke has determined that the combustion turbines cannot comply with the existing hourly mass emission limits during shutdowns.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The California State Health and Safety Code, section 41700, requires that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerate number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.”

ANALYSIS

Startup and shutdown of the combined-cycle power plant are transient conditions that result in higher emissions than normal operation. During startup and shutdown,

combustion temperatures and pressures are rapidly changing, which results in less efficient combustion and higher emissions from the CTGs. The flue gas emission controls, including the selective catalytic reduction system (SCR), operate most efficiently when the turbine operates near or at full load and when the catalysts are at or near their design temperatures. The emission control systems are less effective during the transitory temperature changes that occur during startup and shutdown.

Preliminary startup emissions data were originally used by Duke and staff along with the normal operating data to characterize the air quality impacts from MLPP. Maximum daily emissions were estimated based on the CTGs being in startup mode four hours each day with the remainder of the day in normal operation. Annual emissions were estimated based on 400 hours per turbine per year in a startup mode and 8,000 hours per turbine per year of normal, steady-state operation. Duke believed that normal operating data would adequately reflect shutdown conditions. After gaining operating experience, Duke proposes to characterize shutdown conditions with emissions data that is similar to startup conditions. **AIR QUALITY Table 1** summarizes the proposed shutdown emission rates in a comparison with the established rates for startup and normal operation.

AIR QUALITY Table 1
CTG Emissions (lb/hr or lb/event) per CTG

Operational Profile	NOx	SO2	PM10	VOC	CO
CTG Startup or Shutdown (hourly)	80	1.2	9	16	902
CTG Startup (4-hour event)	320	---	---	64	3,608
CTG Shutdown (2-hour event)	160	---	---	32	1,804
CTG Steady State @ 100% load (hourly)	17.23	1.30	9.0	4.79	37.76

Source: CEC 2000a and Duke 2002.

The present proposal to add separate mass-based emission limits for turbine shutdowns would not change the conclusions of the previous air quality analyses for MLPP. Daily and annual emissions would be unchanged because Duke does not propose to change the number of hours that could be spent daily or annually in the startup, shutdown, or normal operation modes. In the Final Staff Assessment, staff analyzed and demonstrated that emissions during startup and normal operation would be likely to comply with applicable laws, ordinances, regulations, and standards and that the emissions would not cause significant air quality impacts (CEC 2000a, pp. 46 and 58). Because startup emissions were originally characterized on an hourly basis and the proposed shutdown emissions would be identical, the previous analysis for startups adequately characterizes the air quality impacts that would occur during shutdowns within the proposed emission limits. No additional analyses are necessary.

The proposed changes affect only two conditions that currently constrain shutdown emissions (**AQ-15** and **AQ-17**). No changes are proposed for the limits on exhaust concentrations that apply to normal operation of the CTGs (**AQ-16**), and no changes are proposed for the daily limits on combined emissions from the CTGs (**AQ-14**), which presently account for startup and shutdown conditions. General conditions that presently limit quarterly and annual emissions from MLPP (**AQ-28**) would also remain unchanged.

MITIGATION

Duke proposes to amend two conditions to accommodate the proposed emission limits for shutdowns:

- **AQ-15** presently limits emissions during normal operation, excluding startups. This condition would be amended to indicate that the normal operating limits similarly do not apply during shutdowns.
- **AQ-17** presently limits emissions from startups, without separately addressing shutdowns. This condition would be amended to separately limit emissions from shutdowns.

No changes would be necessary for any other conditions.

CONCLUSIONS AND RECOMMENDATIONS

Duke Energy Moss Landing LLC, the owner of the Moss Landing Power Plant, proposes to modify air quality conditions by adding separate mass-based emission limits for shutdown conditions. The proposed changes allow a level of hourly emissions during shutdown that would be identical to those allowed for startup conditions. Because startup conditions were evaluated previously, the proposed changes will not alter the conclusions presented in the Final Staff Assessment (CEC 2000a). The proposed changes do not alter the number of hours that could be spent in startup or shutdown mode, and they do not alter the presently-allowed daily, quarterly, or annual emissions. Therefore, staff recommends the petition to amend be approved and the proposed changes (shown below) to the Conditions of Certification be made to reflect the new emission limits during shutdowns.

PROPOSED REVISIONS TO AIR QUALITY CONDITIONS OF CERTIFICATION

New text is underlined.

AQ-15 The pollutant mass emission rates in the exhaust discharged to the atmosphere from each gas turbine shall not exceed the following limits:

Pollutant	Lbs/Hour	Lbs/Day
Oxides of Nitrogen (NOx)	17.23	413.52
Carbon Monoxide (CO)	37.76	906.24
Particulate Matter <10 microns (PM10)	9.00	216.00
Volatile Organic Compounds (VOC)	4.79	114.96
Ammonia (NH3)	12.75	306.0
Sulfur Dioxide (SO2)	1.30	31.2

Protocol: These limits shall not apply during start-up, which is not to exceed four (4) hours, or during shutdown, which is not to exceed two (2) hours. SCR catalytic controls and good engineering practices shall be used to the fullest extent practical during start-up and shutdown to minimize pollutant emissions.

Verification: See **AQ-38** and **39**.

AQ-17 The pollutant emission rates discharged to atmosphere from each gas turbine during a start-up or shutdown shall not exceed the following limits. These limits apply to any start-up period, which shall not exceed four (4) hours, and to any shutdown, which shall not exceed two (2) hours.

Pollutant	Lbs/Start-Up	<u>Lbs/Shutdown</u>
Oxides of Nitrogen (as NO ₂)	320	<u>160</u>
Carbon Monoxide (CO)	3,608.0	<u>1,804.0</u>
Volatile Organic Compounds (as CH ₄)	64.0	<u>32.0</u>

Verification: See **AQ-38** and **39**.

REFERENCES

California Energy Commission (CEC) 2000a. Final Staff Assessment - Part II, Moss Landing Power Plant Project (Docket No. 99-AFC-4), June 1, 2000.

California Energy Commission (CEC) 2000b. Commission Decision, Moss Landing Power Plant Project (Docket No. 99-AFC-4), October 25, 2000.

Duke Energy Moss Landing LLC (Duke) 2002. Petition to Amend Various Air Quality Conditions. Docket No. 99-AFC-4C. Received in Dockets November 12, 2002.

Monterey Bay Unified Air Pollution Control District (District) 2003. Letter to Mr. Steve Abbott of Duke Energy Moss Landing LLC. Subject: Moss Landing Power Plant Permit Issuance, Authority to Construct 11406 through 11409. January 10, 2003.