

CALIFORNIA ENERGY COMMISSION

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DOCKET**98-AFC-1C**DATE May 09 2011RECD. May 09 2011**DATE:** May 9, 2011**TO:** Interested Parties**FROM:** Christine Stora, Compliance Office**SUBJECT: Los Medanos Energy Center (98-AFC-1C) Staff Analysis of Proposed Modification**

On April 19, 2011, Los Medanos Energy Center LLC filed a petition with the California Energy Commission (Energy Commission) requesting to modify the Los Medanos Energy Center. The nominal 500 megawatt (MW) project was certified by the Energy Commission on September 17, 1999, and began commercial operation on July 9, 2001. The facility, formerly known as Pittsburg District Energy Facility, is located in the City of Pittsburg, in eastern Contra Costa County.

Energy Commission staff reviewed the petition. The proposed amendment requests administrative modifications to make efficiency improvements to the Advance Gas Path (AGP) on the existing turbines S-1 and S-3. The firing temperature is proposed to increase to make these improvements. No Conditions of Certification are proposed to change as part of this petition. There is no possibility that the changes will have any effect on the environment or on public health and safety, as the proposed changes will not result in any exceedance of any limits as specified in the Conditions of Certification. Staff notes that the project will remain fully mitigated, and will remain in compliance with all laws, ordinances, regulations, and standards. (Title 20, California Code of Regulations, Section 1769).

The amendment petition and staff's analysis have been posted on the Energy Commission's webpage at:

<http://www.energy.ca.gov/sitingcases/pittsburg/compliance/index.html>

The Energy Commission's Order (if approved) will also be posted on the webpage. Energy Commission staff intends to recommend approval of the petition at the May 18, 2011, Business Meeting of the Energy Commission. If you have comments on this proposed modification, please submit them to me at the address below no later than 5:00 pm on May 17, 2011.

Interested Parties
January 20, 2011
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Christine Stora, Compliance Unit
California Energy Commission
1516 9th Street, MS-2000
Sacramento, CA 95814

Comments and questions may be submitted by fax to (916) 654-4745, or by e-mail to cstora@energy.state.ca.us.

For further information on how to participate in this proceeding, please contact the Energy Commission Public Adviser's Office, at (916) 654-4489, or toll free in California at (800) 822-6228, or by e-mail at publicadviser@energy.state.ca.us. News media inquiries should be directed to the Energy Commission Media Office at (916) 654-4989, or by e-mail at mediaoffice@energy.state.ca.us.

Enclosure: Staff Analysis

LOS MEDANOS (98-AFC-1C)

REQUEST TO MAKE EFFICIENCY IMPROVEMENTS TO THE ADVANCED GAS PATH (AGP)

PROJECT DESCRIPTION

Prepared by Christine Stora

INTRODUCTION

On April 19, 2011, the California Energy Commission (Energy Commission) received a Petition to Amend from Calpine to amend the decision for the Los Medanos Energy Center (LMEC) to make efficiency improvements to the Advance Gas Path (AGP) on the existing turbines S-1 and S-3. The LMEC project, which was originally called the Pittsburg District Energy Facility, was certified by the Energy Commission on August 17, 1999, as a nominal 500 megawatt (MW) combined cycle power plant. The LMEC is located in the City of Pittsburg, in eastern Contra Costa County.

PROJECT DESCRIPTION

As mentioned above, Calpine proposes to make efficiency improvements to the AGP on the existing turbines S-1 and S-3. The efficiency improvements proposed in the Petition to Amend will be obtained by increasing the firing temperature, thereby generating more power from the same amount of fuel. The project will continue to meet all existing heat input and emission limits established in the existing permits for this project. No Conditions of Certification are proposed to change as part of this Petition to Amend. There is no possibility that the changes will have any effect on the environment or on public health and safety, as the proposed changes will not result in any exceedence of any limits as specified in the Conditions of Certification. Staff notes that the project will remain fully mitigated, and will remain in compliance with all laws, ordinances, regulations, and standards.

LOS MEDANOS (98-AFC-1C)

REQUEST TO MAKE EFFICIENCY IMPROVEMENTS TO THE ADVANCED GAS PATH (AGP)

AIR QUALITY STAFF ANALYSIS

Prepared by Jacquelyn Leyva

INTRODUCTION

On April 19, 2011, the Los Medanos Energy Center, LLC (LMEC) filed a petition with the California Energy Commission (Energy Commission) requesting to modify the Los Medanos Energy Center. The nominal 500-megawatt project was certified by the Energy Commission on August 17, 1999. This amendment request proposes to make efficiency improvements to the Advanced Gas Path (AGP) in the existing turbines S-1 and S-3. The efficiency improvements will be obtained by increasing the turbine firing temperature, thereby generating more power from the same amount of fuel. The change out of the hot gas path components will be fabricated from temperature resistant alloys and will be functionally equivalent. The work is scheduled to be completed sometime in the Spring of 2011 after Energy Commission approval of the license amendment. The facility is located south of East 3rd Street between Harbor and Columbia Streets within the corporate boundaries of the City of Pittsburg in eastern Contra Costa County.

The Bay Area Air Quality Management District (BAAQMD) has reviewed the amendment request and has issued a draft Proposed Engineering Evaluation. The draft analysis is favorable to the changes and is considered to be an "alteration" of the LMEC Permit to Operate by the BAAQMD. The alteration of S-1 and S-3 combustion turbines is considered a minor revision by the BAAQMD. The Energy Commission considers this amendment to be minor in nature because no Conditions of Certification will be changing, and because there is no possibility that the changes will have any effect on the environment or on public health and safety. All permit limits will remain the same and LMEC will remain in compliance with all Energy Commission Conditions of Certification and all applicable LORS.

The existing hot gas path components are currently scheduled to be replaced during the next major outage at the end of May 2011. Therefore, this proposed efficiency improvement will occur at the next scheduled major maintenance of the existing turbines. The modification to the Commission Decision will include the following modifications:

- Turbine blades will be fabricated from a new metal alloy that can with stand higher temperatures.
- Nozzles will be fabricated from temperature resistant alloys.
- Reduced clearances between parts in the compressor section of the turbines.
- Installing low pressure drop combustors.

LAWS, ORDINANCES, REGULATION, AND STANDARDS (LORS) - COMPLIANCE

The project's proposed amendment is subject to all the LORS described in the Final Staff Assessment (FSA) (CEC 1999).

The original Energy Commission Decision certifying the LMEC and any and all amendments thereafter ensure that the project will remain in compliance with all applicable laws, ordinances, regulations and standards (LORS). The project, as proposed for modification herein, will be subject to comply with all applicable LORS.

The project owner of S-1 and S-3 combustion turbines shall continue to comply with all applicable District Permit Conditions and Energy Commission Conditions of Certification along with all other applicable requirements.

The alteration of S-1 and S-3 combustion turbines is considered a minor revision under BAAQMD rule 2-6-215. It does not meet the definition of an administrative permit amendment of BAAQMD rule 2-6-201 or a significant permit revision under BAAQMD rule 2-6-226.

SETTING

The project setting has not changed from the original FSA. For convenience, Staff includes a table, **Air Quality Table 1**, which summarizes the area's attainment status for various applicable current state and federal air quality standards.

Air Quality Table 1

BAAQMD Attainment Status

Pollutant	Averaging Time	California Status	Federal Status
Ozone (O ₃)	8 Hour	N/A	Non-attainment
	1 Hour	Non-attainment	N/A
Carbon Monoxide (CO)	8 Hour	Attainment	Attainment
	1 Hour	Attainment	Attainment
Nitrogen Dioxide	Annual	N/A	Attainment

(NO _x)	1 Hour	Attainment	Unclassified
Sulfur Dioxide (SO ₂)	Annual	N/A	Attainment
	24 Hour	Attainment	Attainment
	1 Hour	Attainment	N/A
PM10	Annual	Non-attainment	N/A
	24 Hour	Non-attainment	Unclassified
PM2.5	Annual	Non-attainment	Attainment
	24 Hour	N/A	Non-attainment ^a
Notes: Unclassified means the area is treated as it is attainment N/A= no standard applies or not applicable a The effective date of the designation was December 14, 2009.			

ANALYSIS

PROJECT EMISSION PROFILE CHANGES

The upgrade is expected to improve the turbine efficiency and will reduce the emissions of CO₂ per MW of power output. The facility will continue to comply with all existing heat input and emissions limits. The increase in efficiency will be accomplished by increasing the firing temperature of the turbine, reducing clearances between parts in the compressor section, and by installing low pressure drop combustors. The change out of the hot gas path components such as turbine blades, nozzles, and structural elements is required due to the increased firing temperature and the parts will be fabricated from more temperature resistant alloys. In addition, some of the clearances in the compressor section will be reduced and tightened up in order to reduce leakage losses. The parts are functionally equivalent and the replacement of the hot gas path components is considered an alteration by the BAAQMD.

The increased firing temperature at the gas turbines could potentially raise the unabated NO_x emissions slightly, but the selective catalytic reduction (SCR) system will maintain abated emission below applicable NO_x permit limits for the turbine and Heat Recovery Steam Generator (HRSG) exhaust of 2.5 ppmvd @15% O₂, 0.009 lb/MMBtu, and 20 lb/hr. Abated actual emissions from the turbine and HRSG will remain the same as present day operations required to meet the current NO_x permit limits (BAAQMD 2011).

This permitting action will not require any changes to Condition of Certification AQ-15 for the facility. The existing permit Condition of Certification AQ-15 limits the firing rate of the gas turbine and duct burner combined to 2,225.1 MMBtu/hour.

ANALYSIS OF SPECIFIC CHANGES

As seen in **Air Quality Table 2** no changes will be made to applicable Air Quality Conditions of Certification permitted limits due to the proposed improvements to the AGP. Air Quality Table 2 shows the increase in capacity from the current level of 170 nominal megawatts to the proposed level of 190 nominal megawatts and also the reduction in heat rate from the current level of 6,305 MMBtu/MW-hr to the proposed heat rate of 6,271.2 MMBtu/MW-hr which means the facility would have a higher efficiency in terms of fuel use per MWh at the higher temperature. Neither of these two items have an associated Air Quality Condition. All of the other items in the table have an associated Condition of Certification and none of these items will change.

**Air Quality Table 2
LMEC Advanced Gas Path Values
Current and Proposed**

	GE 7FA.03 turbine (Current)	GE 7FA.04 turbine (Proposed)	Applicable AQ COC
Nominal Megawatt (MW)	170	190	NA
Gas Turbine Heat Rate (mmbtu/MW-hr LHV)*	6,305	6,271.20	NA
Gas Turbine Heat Input (mmbtu/hr)	1929	1929	NA
Gas Turbine/Duct Burner combined Heat Input (mmbtu/hr)*	2,225.1	2,225.1	AQ-15
Facility Heat Input (mmbtu/day)*	50,738.24	50,738.24	AQ-16
Facility Heat Input (mmbtu/year)*	34,010,400	34,010,400	AQ-17
NOx (lb/hr)*	20	20	AQ-21(a)
CO (lb/hr)*	29.2	29.2	AQ-21(b)

*These limits are based on existing permit limits in the LMEC PTO.

NA means there is no existing Condition of Certification associated with the value

CONCLUSIONS AND RECOMMENDATIONS

- Abated actual emissions from the turbine and HRSG will remain the same as currently-approved operations required to meet the current NOx permit limits.
- LMEC will not increase emission rates to the atmosphere, and these changes are not considered a modification under New Source Performance Standards.
- LMEC is currently subject to 40 CFR Part 60 Subpart A, Da, and GG. This permitting action does not change any permit conditions that are required to ensure compliance with these requirements.
- The parts are functionally equivalent and the replacement of the hot gas path components is considered a minor change.
- LMEC will continue to meet all existing heat input and emissions limits established in the final decision and in the existing BAAQMD Permit to Operate.
- The proposed AGP upgrade will have no significant environmental effects and will be in compliance with ALL applicable LORS.

AMENDED AND PROPOSED CONDITIONS OF CERTIFICATION

No Air Quality Conditions of Certification will be changing or needing to be modified for the advanced gas path (AGP) on the existing turbines.

REFERENCES

CEC 1999 - California Energy Commission, Final Staff Assessment of the Pittsburg District Energy Facility (98-AFC-1). August 17, 1999.

BAAQMD 2011 – Bay Area Air Quality Management District, Draft Proposed Engineering Evaluation Los Medanos Energy Center. April 26, 2011.

LMEC 2011 – Los Medanos Energy Center, LLC. Petition to Amend The Commission Decision for the Los Medanos Energy Center Docket NO 98-AFC-1C. Received April 19, 2011.

LOS MEDANOS (98-AFC-1C)

REQUEST TO MAKE EFFICIENCY IMPROVEMENTS TO THE ADVANCED GAS PATH (AGP)

POWER PLANT EFFICIENCY

Perpared by: Shahab Khoshmashrab

BACKGROUND

On April 19, 2011, the California Energy Commission (Energy Commission) received a Petition to Amend from Calpine, to amend the Decision for the Los Medanos Energy Center (LMEC) to make efficiency improvements to the Advance Gas Path on the existing gas turbines S-1 and S-3. LMEC, which was originally called the Pittsburg District Energy Facility, was certified by the Energy Commission on August 17, 1999, as a nominal 500 megawatt (MW) combined cycle power plant. LMEC is located in the City of Pittsburg, in eastern Contra Costa County.

REQUEST

LMEC is requesting to increase the power plant's overall efficiency by increasing the gas turbine's inlet air firing temperature, thereby generating more power from the same amount of fuel.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

There are no LORS that apply to the efficiency of a power plant such as LMEC.

ANALYSIS

PROJECT ENERGY REQUIREMENTS

A comparison of the efficiency figure in the original Decision of 54.1 percent lower heating value (LHV) at base-load (with the duct burners unfired), with an expected base-load efficiency figure of 54.4 percent LHV as a result of this amendment shows only a very slight improvement in the overall plant efficiency.

A comparison of the efficiency figure in the original Decision of 51.5 percent lower heating value (LHV) at peak-load (with the duct burners fired), with the expected base-load efficiency figure of 54.4 percent LHV as a result of this amendment shows a slightly more than marginal improvement in the overall plant efficiency. Staff compares these two figures because the applicant plans to limit firing the duct burners and instead, increase the gas turbines' output in order to balance the plant's overall output (MWs).

Staff believes no additional analysis as related to power plant efficiency is necessary.

CONCLUSIONS

The requested change would result in slightly improved fuel efficiency. From the standpoint of power plant efficiency, staff recommends that the Petition be granted. This recommendation is based on the following:

1. Staff has analyzed the situation from the standpoint of power plant efficiency and concludes that there will be no new or additional efficiency-related significant environmental impacts associated with this action.
2. Staff concludes that the amendment is based on new information that was not available during the licensing proceedings.
3. Staff concludes that the proposed modification retains the intent of the original Commission Decision.