

CALIFORNIA ENERGY COMMISSION1516 NINTH STREET
SACRAMENTO, CA 95814-5512

DATE: December 18, 2003

TO: Interested Parties

FROM: Lance Shaw, Compliance Project Manager

SUBJECT: **Los Esteros Critical Energy Facility Project (01-AFC-12C)
Staff Analysis of Modifications to Temporary
Transmission Line Interconnection**

On June 17, 2003, the California Energy Commission received a petition from Calpine Corporation for its Los Esteros Critical Energy Facility (LECEF) Project requesting approval for a previously completed modification. Specifically, Calpine replaced the original 2000-foot temporary transmission interconnection tap line with a new 150-foot temporary interconnection tap line. On September 5, 2003 Calpine provided Energy Commission staff with additional information in order to complete the petition.

LECEF is a 180 MW natural gas-fired, simple cycle power plant. The project went on line in March 2003. The project is owned and operated by Calpine C* Power, a subsidiary of the Calpine Corporation and is located on 15 acres of a 55 acre tract, owned by Calpine, in north San Jose at 1515 Alviso-Milpitas Road within Santa Clara County. The site is bounded by State Route 237 on the south side, Zanker Road on the west, and Coyote Creek on the east.

The Energy Commission's Decision (Decision) for LECEF specified a 2000-foot temporary transmission tap line interconnection with the nearby Nortech-Trimble transmission line, to be replaced by a permanent interconnection directly with the adjacent PG&E Los Esteros Substation once the new substation was completed. PG&E required that the original 2000-foot temporary interconnection tap line to the Nortech-Trimble transmission line would be removed once the PG&E Los Esteros Substation was energized. However, when the PG&E Los Esteros Substation was energized, Calpine did not install the permanent interconnection, and instead replaced the original 2000-foot temporary transmission tap line with new 150-foot temporary transmission tap line at a different location. The new temporary tap line connects with the Nortech-PG&E Los Esteros Substation 115 kV transmission line that runs adjacent to the power plant. Calpine indicates it will install the specified permanent interconnection with the adjacent Los Esteros Substation when the second phase of the LECEF project (conversion to a combined cycle facility), is completed. Calpine has informed staff that it intends to file an Application for Certification for the combined cycle conversion in February, 2004. Calpine states in its September 5, 2003 filing that it may request to connect to a new Silicon Valley Power Substation to be constructed adjacent to LECEF, rather than to the PG&E Los Esteros Substation. In the mean time, the new temporary interconnection tap line allows Calpine to continue to operate and deliver the facility's output power to the electrical transmission grid.

Staff initially learned of Calpine's modification in May of 2003 when the modification was nearly completed. Staff informed Calpine that the modification was not in conformance with the Commission's Decision, and directed Calpine to file a petition to request formal modification of the project. Staff did not prevent Calpine from completing the installation for the following reasons:

- Staff conducted a preliminary analysis and determined that there were no environmental or health and safety impacts associated with replacing the original 2000-foot interconnection with the new 150-foot interconnection.
- PG&E had already analyzed and approved the new temporary interconnection tap line.
- PG&E had almost completed the new temporary interconnection tap line and was scheduled to energize it within days.
- Cal-ISO indicated that electricity generated by LECEF was needed for the power grid in a continuous manner to avoid potential power shortages.
- Staff informed Calpine that continued longer-term use of the new temporary interconnection tap line was contingent upon Commission approval of its petition to modify the project.

Concurrent with the petition to modify the project, Staff is conducting an investigation concerning the installation of the new temporary transmission tap line which was implemented without prior Commission approval. Staff will recommend what action, if any, should be taken regarding nonconformance with the project's license prior to Commission consideration of the petition.

Staff reviewed the June 17, 2003 petition to modify and the additional information provided by Calpine on September 5, 2003. In addition, staff assessed the modifications' impacts on environmental quality, public health and safety, and the electrical transmission grid. Staff is proposing additional conditions in order to address any possible impacts resulting from the project modifications. It is the staff's opinion that, with the implementation of the additional conditions, the project will remain in compliance with applicable laws, ordinances, regulations, and standards (LORS) and that the proposed modifications will not result in a significant adverse direct or cumulative impact to the environment (Title 20, Calif. Code of Regulations, section 1769).

Staff's review of the petition indicates the only technical area affected is Transmission System Engineering (TSE). Staff's analysis is attached for your information and review. Energy Commission staff intends to recommend approval of the petition at the January 21, 2004 Business Meeting of the Energy Commission. If you have any questions or comments concerning the petition to modify the project, please contact me at California Energy Commission, 1516 9th Street, Sacramento, CA 95814-5514, Mail Stop 2000 prior to January 19, 2004, or call me at (916) 653-1227, or by e-mail at lshaw@energy.state.ca.us

Attachment

cc: Mail Lists 7101, 7102, 7103 & POS

LOS ESTEROS CRITICAL ENERGY FACILITY (LECEF) PROJECT 01-AFC-12C

Request to Approve Modified Project

INTRODUCTION

On June 17, 2003, the California Energy Commission received a petition from Calpine C* Power (Calpine) for its Los Esteros Critical Energy Facility (LECEF) Project requesting approval for a previously completed modification. Specifically, Calpine replaced the original 2000-foot temporary transmission interconnection tap line with a new 150-foot temporary interconnection tap line. Additional information was required in order for staff to fully analyze the petition, and staff issued Information Requests on July 29, 2003. Calpine responded to staff's Information Requests on September 5, 2003.

BACKGROUND

In August 2001, Calpine proposed to construct and operate a 180 MW (simple cycle) natural gas-fired power plant to be located in north San Jose, in Santa Clara County. LECEF was certified in July 2002 and began operations in March 2003. The facility includes four GE LM6000 combustion turbine generators (CTGs) equipped with water injection and spray intercooling injection (SPRINT) to control oxides of nitrogen (NOx) emissions and associated support equipment such as inlet air chillers, fuel gas compression facilities, power generators, selective catalytic reduction (SCR) for emission control, and associated instrumentation.

According to the Decision (Publication # 800-02-005) dated July 2002, the applicant was granted certification for two (sequential) transmission line interconnections. One is a temporary interconnection through a 2000-foot wood pole line between the project switchyard and PG&E's Nortech-Trimble 115 kV line. The other, a permanent interconnection through two underground 115 kV cables (approx. 400 ft. each) between the plant switchyard and the then, proposed, new PG&E Los Esteros 115 kV Substation.

Subsequently, in October and December of 2002 without notifying Energy Commission staff, Calpine requested PG&E study alternative temporary interconnections for LECEF: one to the Nortech-Los Esteros Substation 115 kV line and the other to the Los Esteros Substation-Trimble 115 kV line. PG&E provided to Calpine and the Cal-ISO a System Impact/Facility Study (SI/FS) dated March 24, 2003, which evaluated the two alternative temporary interconnections (Calpine 2003b). A Cal-ISO approval letter dated May 20, 2003 was issued to Calpine for use of either alternative (Cal-ISO 2003a).

The new PG&E Los Esteros Substation was energized on or about May 23, 2003. A new temporary interconnection tap line for LECEF was made by PG&E, at the behest of Calpine, to the Nortech-Los Esteros Substation 115 kV line on or about the same time.

At the insistence of staff, Calpine subsequently filed a petition to amend the project description with the Energy Commission dated June 16, 2003 for the temporary new interconnection (Calpine 2003a). That petition did not fully meet the requirements of Title 20, California Code of Regulations Section 1769 in that additional information was required in the petition. Staff subsequently requested that Calpine provide responses to 35 questions for additional information that were needed to analyze the petition. Calpine responded to Staff's request for additional information on September 5, 2003.

The Energy Commission has permitting jurisdiction over the new temporary interconnection tap line to the point where the circuit from the LECEF switchyard joins the Nortech-Los Esteros Substation circuit. Changing the interconnection point is a modification to the project requiring Commission approval.

ANALYSIS AND IMPACTS

Transmission System Engineering (TSE) Impacts Analysis

Summary of Conclusions

When the adjacent PG&E Los Esteros Substation was completed, Calpine installed the new temporary interconnection tap line, connecting it to an existing Nortech-PG&E Los Esteros substation 115kV transmission line that runs adjacent to the power plant, replacing the original temporary tap line. Installation of the new temporary tap line is not consistent with the Commission Decision. The Decision does not authorize a new alternate temporary interconnection but required that Calpine connect the power plant directly to the PG&E Los Esteros substation via two underground 115kV circuits from the power plant switchyard when the Los Esteros Substation was completed.

Staff's analysis evaluates the impacts and compares the new temporary tap line, to the Commission required permanent interconnection. TSE staff recommends approval of the petition to amend the LECEF project description, and to authorize the changes made by the project owner so the power plant switchyard remains interconnected temporarily to the Nortech-PG&E Los Esteros substation 115kV transmission line via the new temporary overhead tap line. Staff concludes that the new temporary tap line connection complies with General Order (GO) 95, PG&E's construction standards, and it presently complies with system reliability standards. However, to enhance operational reliability, PG&E requires and staff and the Cal-ISO¹ recommend that installation of a disconnect switch be required. Staff also recommends that the permanent interconnection to the PG&E Los Esteros Substation, approved by the Commission (or an alternative connection to Silicon Valley Power) be completed by June 2006

SCOPE OF SYSTEM IMPACT /FACILITY STUDY (SI/FS)

The SI/FS dated March 24, 2003 (Calpine 2003b) was performed by PG&E under two different temporary interconnection scenarios, one for the Nortech-Los Esteros Substation

¹ The Cal-ISO in recommending a disconnect switch calls the switch a selector switch, an alternative name for the same device (Cal-ISO, 2003a).

115 kV line and the other for the Los Esteros Substation-Trimble 115 kV line. The SI/FS evaluated pre- and post-project power flows for 2003 Summer Peak and Summer Partial Peak conditions. The study included relevant planning assumptions and planned transmission facilities within PG&E's San Jose area. These interconnections were considered as alternatives to interconnecting the project directly to the PG&E Los Esteros Substation 115 kV bus.

The study was performed for a maximum output of 195 MW from the LECEF (simple cycle) project which consists of four-gas turbine generators each rated 71.2 MVA nominal. Each generator has its own 13.8/115 kV step-up transformer. A short-circuit analysis was performed to determine the maximum symmetrical three phase and single phase-to-ground fault currents in the substations in the project area.

SI/FS Results and Mitigations

The power flow analysis showed that the LECEF would cause no new overloads under normal conditions or increase any pre-project overloads during 2003 summer peak conditions. Under nine single contingencies for 2003 summer peak conditions, the LECEF would cause new overloads and existing pre-project incremental overloads on the Scott-Kifer 115 kV line up to 120 percent of its emergency rating. For the 2003 summer partial peak conditions, LECEF would not cause any new overloads or increase any pre-project overloads.

Reconductoring the Scott-Kifer 115 kV line with bundle 954 AAC conductor was identified as a measure to mitigate the existing and increased overloads on the line caused by LECEF. Staff was informed recently by Silicon Valley Power (the transmission owner) that reconductoring the Scott-Kifer 115 kV line was completed in February, 2003.

The SI/FS study showed that the short circuit duty increase caused by the LECEF is less than 2% on four (4) 115 kV breakers at the Newark Substation. According to PG&E's existing policy, the project owner is not responsible for replacing the overstressed breakers. Staff considers this acceptable.

System Reliability Comparison

The certified permanent interconnection would consist of two approximately 400 foot 115 kV lines, directly connected to the 115 kV bus at the PG&E Los Esteros Substation from the LECEF switchyard. This permanent interconnection would provide two independent power delivery paths for LECEF generation and thus could operate at full generation capacity even under a single contingency of one of the under ground lines. This method of interconnection would increase the operational reliability to deliver full power directly to the 115 kV bus at the PG&E Los Esteros Substation.

The new temporary transmission tap interconnection being analyzed is only 152 feet in length and connects to the Nortech-PG&E Los Esteros Substation 115 kV line. As a result, this tap line has a very limited exposure to an outage. The power flow from the plant will be subject to outage of the 2-mile long Nortech-Los Esteros Substation 115 kV line. A disconnect/ selector switch is, however, necessary at the point of the interconnection tap to

enhance operational reliability and flexibility. The switch will provide the ability, which presently does not exist, to disconnect the 2-mile 115 kV Nortech circuit from the interconnection tap to Nortech Substation during its forced outage and/or maintenance. Disconnecting the 2 mile circuit will provide the ability for LECEF to send power to the PG&E Los Esteros Substation and thus to the grid.

PG&E in the Generation Facility Interconnection Agreement (GFIA) for LECEF (Calpine 2003b) requires this disconnect switch and the Cal-ISO has recommended it (Cal-ISO 2003a). Staff is recommending a new Condition of Certification to require the disconnect switch. While the disconnect switch will not provide the same level of operational reliability as the Commission required direct connection to the PG&E Los Esteros Substation, some increase in reliability would occur. The new temporary tap interconnection has been built according to CPUC GO 95 and PG&E's line crossing standards. No significant environmental impacts would occur due to installation of the disconnect switch.

Since the surrounding PG&E 115 kV system is overhead and both of the interconnection conductors are short in length, staff considers that from a power flow point of view, system reliability impacts due to the new temporary tap interconnection of LECEF generation project to the Nortech-PG&E Los Esteros Substation 115 kV line are approximately the same at the present stage, when compared to the Commission required permanent interconnection. This occurs because the difference in electrical impedances between the new temporary tap and the direct interconnection is small. However, the new temporary tap must eventually be replaced with a permanent interconnection as required by the Commission Decision. Staff believes the Commission should require the project owner to permanently connect to the PG&E Los Esteros Substation by June 2006. That would provide 12 months to process Calpine's AFC for modifying the project to become a combined cycle facility or to repermit the project to remain a simple cycle facility and 12 months to 18 months to build Phase II (combined cycle). This timeline also corresponds to the time (2004 +) when system reliability overloads may occur due to increases in local loads.

Cost Comparison:

The estimated cost of the new temporary interconnection tap line and the associated protection work for accomplishing that interconnection was \$725,000 (Calpine 2003b, Page 5). Because the majority of the costs were related to the protection provisions associated with this interconnection, that protection equipment may be re-used as a part of the permanent 115 kV interconnection. The cost estimate for the permanent interconnection for two 115 kV underground circuits from the LECEF switchyard to the Los Esteros Substation 115 kV bus is \$3,775,000 (Calpine response dated September 5, 2003b, Page 5), a difference of \$3,050,000.

Cal-ISO Comments:

The Cal-ISO in its May 20, 2003 contingent approval letter (Cal-ISO 2003a) outlined several issues to be considered as listed below, assuming the project remains on the new tap interconnection for an extended period of time:

1. If re-rating of the PG&E Los Esteros Substation–Trimble and the FMC Junction-Kifer 115 kV lines is not achievable, an operating procedure to curtail LECEF generation should be implemented².
2. The loading of the Nortech-PG&E Los Esteros Substation 115kV line, or the PG&E Los Esteros Substation-Trimble 115 kV line, or the PG&E Los Esteros Substation-Montague 115 kV line should be closely monitored due to the San Jose and Santa Clara load growth and timing of the Metcalf Energy Center operation.
3. Selector switches should be installed at the LECEF interconnection for operating flexibility and to realize shorter restoration time for the LECEF facility in case of an outage.
4. From a reliability point of view Cal-ISO recommends the use of a dedicated circuit for the Los Esteros power plant rather than a tap interconnection.

APPLICABLE LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

For applicable LORS, please refer to the Energy Commission’s Final Decision for LECEF (CEC 2002a. Publication # 800-02-005, Appendix A, TSE LORS, Page 47-48).

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. The new temporary tap line from LECEF to the Nortech-PG&E Los Esteros Substation 115 kV line is considered acceptable to PG&E and the Cal ISO as a temporary interconnection. The interconnection was reported as complete on or about May 23, 2003. Staff considers that the new temporary tap interconnection is acceptable in the near term because it complies with LORS and the reliability impacts will remain basically the same at the present stage when compared to a direct connection to the PG&E Los Esteros Substation. The adverse impact on the Scott-Kifer 115 kV line has already been mitigated due to reconductoring the line, and the other mitigation measures including operational reliability and procedures have been implemented to accommodate the temporary interconnection.
2. While the new temporary tap presently complies with system reliability standards, monitoring loads of some transmission lines and additional mitigation measures per Cal-ISO comments above may have to be identified and implemented for operation of LECEF in 2004 and 2005 if it remains connected for that period of time. The identification of additional mitigation measures, if any, can be accomplished in the PG&E/Cal-ISO 5-year planning studies which staff will closely monitor.
3. Staff believes that due to increases in local loading of the 115 kV network the change to a permanent interconnection should be done by June 2006 to meet system reliability standards. This time period is also consistent with an approval and construction schedule

² Staff has been informed that an operating procedure was developed by PG&E and implemented. The operating procedure would allow the system operator to reduce the LECEF generation when the system is under stressed conditions.

for Phase II of the LECEF (combined cycle).

4. The new temporary interconnection tap line is inferior from an operational reliability perspective compared to the permanent interconnection specified in the Decision (a direct connection to the PG&E Los Esteros Substation bus). However, it is acceptable at the present time and it is in accordance with good engineering practices. In order to improve the operational reliability and flexibility of the new temporary tap interconnection, staff recommends that a disconnect/selecter switch be installed at the new temporary interconnection tap point for the Nortech-PG&E Los Esteros Substation 115 kV line.
5. The new temporary tap interconnection is about \$3,050,000 more economical than a direct underground interconnection to the Los Esteros Substation.
6. The new temporary tap is not in conformance with the Commission Decision (project description), which specifies that Calpine connect the LECEF to the PG&E Los Esteros 115/230 kV Substation when the PG&E Los Esteros Substation is constructed.

Recommendations

- o Staff recommends that Calpine be authorized to use the already installed new temporary interconnection tap line until LECEF is converted to a combined cycle, or re-permitted as a simple cycle, or by June 2006, whichever comes first, with the following conditions.

CONDITIONS

TSE-A1 The new temporary tap interconnection shall consist of an approximately 152 foot transmission line under-crossing of the two double circuit PG&E 115 kV steel pole lines (running generally North/South) immediately adjacent to the LECEF power plant switchyard to a hard wire tap of the Nortech-PG&E Los Esteros Substation circuit utilizing three wood poles. The cable size shall be 795 ACSS.

Verification: This configuration has been implemented and conforms to existing LORS.

TSE-A2 To provide adequate operational reliability and flexibility for the new temporary interconnection, a three-phase disconnect/selecter switch shall be installed at the interconnection tap point with the Nortech-PG&E Los Esteros Substation 115 kV line to be coordinated between Calpine and PG&E. At the interconnection tap point the switch is required for the circuit to the Nortech Substation.

Verification: The project owner shall provide to the CPM adequate documentation that a request for PG&E to install the disconnect/selecter switch has been made within 15 days of the Commission's approval of the petition to modify the temporary interconnection tap line. The project owner shall assure that the disconnect/selecter switch is installed within 60 days from the Commission's approval of the Calpine petition to modify the temporary interconnection tap line, or

as determined by the Energy Commission Compliance Project Manager.

REFERENCES

CEC (California Energy Commission) 2002a. Publication # 800-02-005 dated July, 2002- Energy Commission's Final Decision for Los Esteros Critical Energy Facility.

Calpine 2003a. Calpine Petition to Amend temporary transmission line dated June 16, 2003 (tn: 29061).

Calpine 2003b. Calpine letter and responses dated September 5, 2003 (tn: 29844) to CEC letter dated July 29, 2003 regarding Petition for modification. PG&E System Impact/Facility Study Report dated March 24, 2003 for LECEF Alternative Temporary Interconnections.

Cal-ISO (California Independent System Operator) 2003a. Cal-ISO letter dated May 20, 2003-Review of LECEF Alternative Interconnection.