

Memorandum

To: ISO Board of Governors

From: Keith Casey, Vice President of Market & Infrastructure Development

Date: March 17, 2010

Re: **Decision on Fresno Reliability Transmission Projects**

This memorandum requires Board action

EXECUTIVE SUMMARY

This memorandum requests ISO Board of Governors approval of several individual transmission projects needed to maintain reliability in the greater Fresno area. The recommended upgrades result from extensive studies performed by the ISO in collaboration with PG&E. These studies have identified the need for several different transmission upgrades, including 6 reconductoring projects, 7 new interim temperature adjusted line ratings, modifications to the Helms pump dropping special protection systems (SPS), 1 terminal equipment upgrade, and 2 firm load dropping SPS. All but two of these upgrades need to be in service by 2014 in order to meet reliability requirements, with the remaining two reconductoring projects needed by 2015. The total estimated cost of these projects is \$127.5 million.

To assess the minimum reliability requirements in Fresno, the ISO and PG&E performed a need analysis of Fresno loads and resources. Given expected load growth in Fresno, that analysis identified 2014 as the year in which Fresno load would be expected to be curtailed under drought hydro conditions if there are no further transmission upgrades or generator additions in the area. In addition, the ISO has concluded, based on its analysis of potential upgrades, that the reliability projects identified in this plan constitute the most cost-effective, feasible solutions. Hence, given Fresno's various reliability needs, Management recommends approval of each of the transmission projects summarized above and discussed in greater detail in the body of this memo.

Management recommends that the Board approve the projects and direct PG&E to proceed with the necessary permitting, engineering, and construction:

Moved, that the ISO Board of Governors finds that the Fresno reliability transmission projects, as described in the memorandum dated March 17, 2010, are necessary and cost-effective transmission upgrades to the ISO controlled grid; and

Moved, that the ISO Board of Governors directs Pacific Gas & Electric Company to continue with the necessary permitting, engineering, and construction of these projects.

PROCESS FOR DEVELOPING RECOMMENDATION

Beginning as early as the 2005 ISO Transmission Plan, the ISO identified a need in the Fresno area for transmission upgrades. In addition, previous and current ISO planning studies and studies performed in the Central California Clean Energy Transmission Project (C3ET project) evaluation process identified a need for upgrades as early as 2014 in order to meet NERC Planning Standards and reliably serve Fresno area load. PG&E proposed the C3ET project to address these reliability needs (as well as to provide economic benefits, facilitate access to renewables and support renewable integration with minimal greenhouse gas emissions; see Section 7.6 of the 2010 ISO Transmission Plan). In addition to serving Fresno area load growth, there are also transmission constraints limiting the ability to utilize the Helms pump storage project¹ and limiting power transfers from Southern California to Northern California.

The C3ET project studies performed by PG&E and the ISO provide substantial evidence that the most effective method for restoring the capability of all three Helms pumps and ensuring reliable operations is construction of a new 500 kV transmission line into the Gregg substation. However, whether such a project is ultimately the best solution depends on what other bulk transmission elements are needed to support a 33% RPS goal by 2020. Moreover, preliminary analysis of the economic benefit of installing such a line indicated that the benefits in the 2014 time frame are insufficient. In addition, the line most likely cannot be placed in service prior to the year 2017. Given this, the ISO has decided to further evaluate the need for this 500 kV option through an ongoing comprehensive transmission planning effort for achieving a 33% RPS by 2020.

While it is important to develop a comprehensive transmission plan and ensure that the C3ET project is appropriately considered within that overall coordinated effort, it is also important to recognize that the availability of Helms to pump will be adversely impacted until an overall 500kV solution for the Fresno area is developed. As load continues to grow in the Fresno area, the time period in the daily load cycle when there is sufficient transmission capability to pump with Helms is expected to shrink. Unless transmission upgrades are installed in the near term, it is expected that under a 2014 drought scenario the upper Helms reservoir could be drained and Helms generation would not be available. As a result, Fresno load shedding would be necessary.

¹ Helms pump storage project has three units with a total capacity of 1212 MW in the generation mode and 900 MW in the pumping mode.

Given these issues, the ISO performed an in-depth Fresno area transmission planning assessment focused on the interim period between 2014 and until at least 2018 to identify the necessary individual transmission upgrades in order to serve the Fresno area load reliably. The purpose of this analysis is to identify the minimum upgrades needed during this time frame to preserve reliability, while further consideration is undertaken in the context of a comprehensive plan to identify, inter alia, other, potentially larger-scale transmission projects in the area that can be justified by the State's renewables and greenhouse gas policy goals.

Out of the six reconductoring projects that were identified as required during the interim period, all of them could be characterized as "no regrets projects". Four of them were preliminarily identified as eventually needed even with a 500 kV line constructed into Gregg substation. The remaining two have an estimated cost of \$33 million, and the preliminary analysis indicated that building these projects and deferring the need for the 500 kV line would result in lower costs to customers.

TRANSMISSION ASSESSMENT METHODOLOGY FOR THIS PROJECT

Under the direction of the ISO, a Helms reliability dispatch model was developed to estimate the future date when the pumping capability of Helms would be degraded and the generating demands on Helms would increase to a point where the Helms water reservoir would be depleted before the end of the summer season, under 2007 dry hydro conditions. In such a scenario, Helms would not be available to serve local load. The model identified 2014 as the reliability need date. Once this 2014 need date was established, the ISO used various powerflow scenario models with fully detailed transmission modeling to determine the precise set of minimum transmission projects that would be needed to maintain reliability.

Whereas most areas of the ISO are limited by the amount of transmission and generation capacity available during the maximum summer peak load hour, Fresno is a unique area that is limited by energy available from the Helms and the Kings, San Joaquin and Merced River hydro systems. Because of the energy-limited characteristics of these resources, various load and generation levels must be analyzed, including low hydro conditions, in order to adequately assess the transmission upgrade requirements for the area. The ISO analyzed off peak load scenarios with 1 and 2 Helms pumps on-line. In addition, the ISO analyzed several on-peak load scenarios at various points on the load duration curve with increasing Helms generation output determined to be needed for local reliability.

STAKEHOLDER PROCESS

The ISO evaluation of the 500 kV C3ET Project option was the subject of a stakeholder process initiated in January, 2008. The ISO posted a report containing the details of the Fresno Reliability Projects on February 19, 2010 and on February 25, 2010, the ISO hosted a stakeholder conference call to discuss these Projects with participants in the C3ET Project stakeholder process. No comments were received from stakeholders expressing opposition to ISO Board approval of the Fresno Reliability Projects.

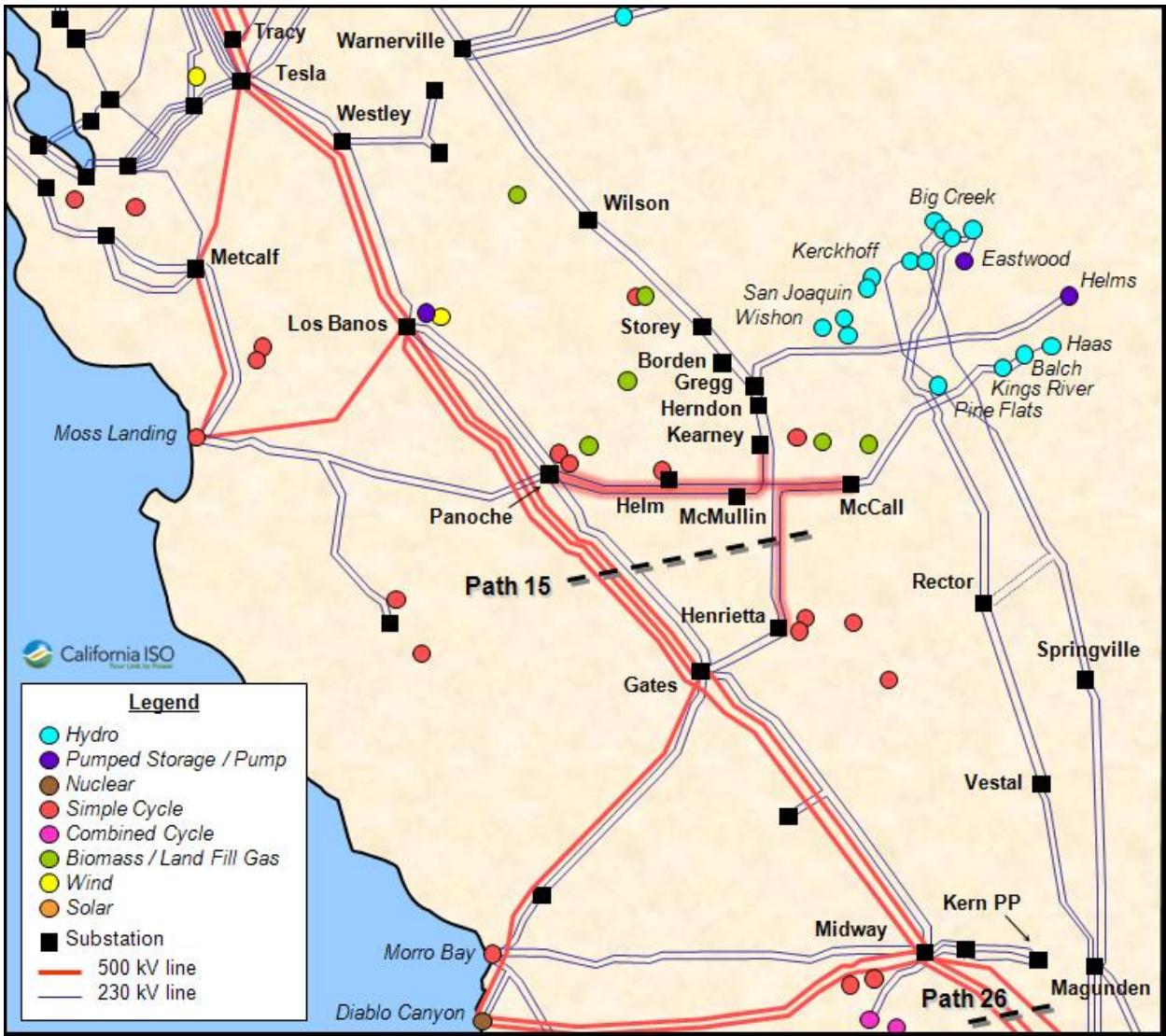
PROJECTS NEEDED FOR RELIABILITY

To meet reliability criteria, loadings on all facilities must be within their applicable ratings, and the system must maintain transient dynamic and post-transient voltage stability. Power flow study results of the off-peak and on-peak load scenarios identified numerous transmission line and transformer loadings that exceeded their rated capabilities. Transient dynamic and post-transient voltage stability studies of these scenarios did not identify any voltage or stability concerns. The general approach for considering corrective actions to mitigate these overloads was to select the lowest cost feasible solution. For example, if night-time temperature adjusted line rating would provide enough line capability to handle a multiple element contingency overload, then that would be selected as the solution. If not, then a pump dropping special protection system would be considered. Then if neither of these options were sufficient, a reconductoring project would be considered. PG&E performed feasibility assessments pursuant to ISO requests. After following this general process, the upgrade projects listed in Table 1 were determined to be the most cost-effective, feasible set of solutions to meet the minimum reliability needs of the Fresno area through 2019.

Table 1: Summary of Projects Needed to Meet Fresno Reliability Requirements

Description of Individual Upgrade Project	Estimated Cost (million)	Required In-Service Date
Reconductor Panoche-McMullin 230 kV line to mitigate 14 off-peak and 2 on-peak contingency overloads	\$14	May 2014
Reconductor Panoche-Helm 230 kV line to mitigate 3 off-peak and 1 on-peak contingency overloads	\$35	May 2014
Reconductor Helm-McCall 230 kV line to mitigate 3 off-peak and 1 on-peak contingency overloads		
Reconductor McMullin-Kearney 230 kV line to mitigate 9 off-peak contingency overloads	\$10	May 2015
Reconductor McCall-Henrietta 230 kV line section to mitigate 10 off-peak contingency overloads	\$20	May 2014
Reconductor Certainteed-Legrand 115 kV line section to mitigate 3 off-peak contingency overloads	\$13	May 2015
Replace terminal equipment on Henrietta-Gates 230 kV line section (of Gates-McCall) to mitigate 4 off-peak contingency overloads	\$2	May 2014
Replace wave traps and obtain interim 884 Amp temperature adjusted summer emergency rating for Panoche-Gates 1 & 2 230 kV lines to mitigate off-peak overloads	\$1	May 2014
Modifications to the Helms pump dropping SPS.	\$13	May 2014
Obtain interim night time temperature adjusted ratings on 7 transmission lines	\$13	May 2014
Install local SPS to trip McCall 115 kV firm load for the Helm-McCall 230 kV Gates-McCall 230 kV DCTL contingency to mitigate off-peak overloads	\$0.5	May 2014
Install SPS to trip firm load for the Helms-Gregg #1 and #2 230 kV DCTL contingency to mitigate 1 on-peak overload	\$6	May 2014
Total	\$127.5	

Figure 1: Network Topology – Fresno and Surrounding Areas



MANAGEMENT RECOMMENDATION

Based on the ISO staff findings that each of the Fresno reliability projects listed in Table 1 are needed and are the most cost-effective, feasible solutions to meet the identified needs for serving load growth throughout the Fresno area, ISO Management recommends that the Board approve each of these projects as necessary upgrades to the ISO controlled grid. In addition, PG&E should be directed to proceed with necessary permitting, engineering and construction of each of these projects individually, with planned operational dates on or before the dates shown in Table 1.