

ISO GRID PLANNING REVIEW OF THE PROPOSALS TO PROVIDE SOUTHERN TRI-VALLEY AREA TRANSMISSION EXPANSION ALTERNATIVES

Background

PG&E is planning to construct the Tri-Valley 2002 Capacity Increase Project which is needed to meet the projected electric demand in the cities of Dublin, Livermore, Pleasanton and San Ramon and adjacent parts of Alameda and Contra Costa counties. Unusually high growth of electric demand in this area in the recent years is explained by expansion of the existing development and significant new land development. This growth is forecasted to continue thanks to the favorable land costs and availability, the BART extension and the area's relative proximity to the Bay Area. The Tri-Valley total demand is forecasted to double from today's 450 MW to about 940 MW in the next 15 years.

The area mainly is served off the 60 kV system, which is already constrained. During the peak loading periods in the years 2000 and 2001 until the new project is constructed, the 60 kV system is planned to operate in a radial configuration. The 230/60 kV San Ramon and Las Positas transformers also will experience normal and emergency overloads by the year 2002. If no transmission upgrades are implemented, these transformers will become overloaded as high as 49% and 19%, respectively, under normal system conditions during summer peak of 2002 and up to 96% and 42%, respectively, with outages. 60 kV lines serving Tri-Valley will experience multiple overloads, up to 66% (San Ramon-East Dublin-Radum line) under the normal system conditions in 2002, and up to 98% (the same line) with contingencies. To meet the growing demand, both new distribution and transmission facilities are needed.

Transmission Expansion Project Description

The proposed project planned for the year 2002 operation includes the following transmission and distribution system additions:

Northern Tri-Valley:

- Build two 230/21 kV distribution substations named Dublin Substation and North Livermore Substation. These substations will be dedicated to serve the expected load growth north of Highway 580.
- Construct new 230 kV transmission circuits from the Contra Costa-Newark #2 230 kV transmission line to provide power to the new substations.

Southern Tri-Valley:

- Convert Vineyard Substation from 60/21 kV to 230/21 kV operation. The conversion will enable Vineyard to pick-up additional load in the area and

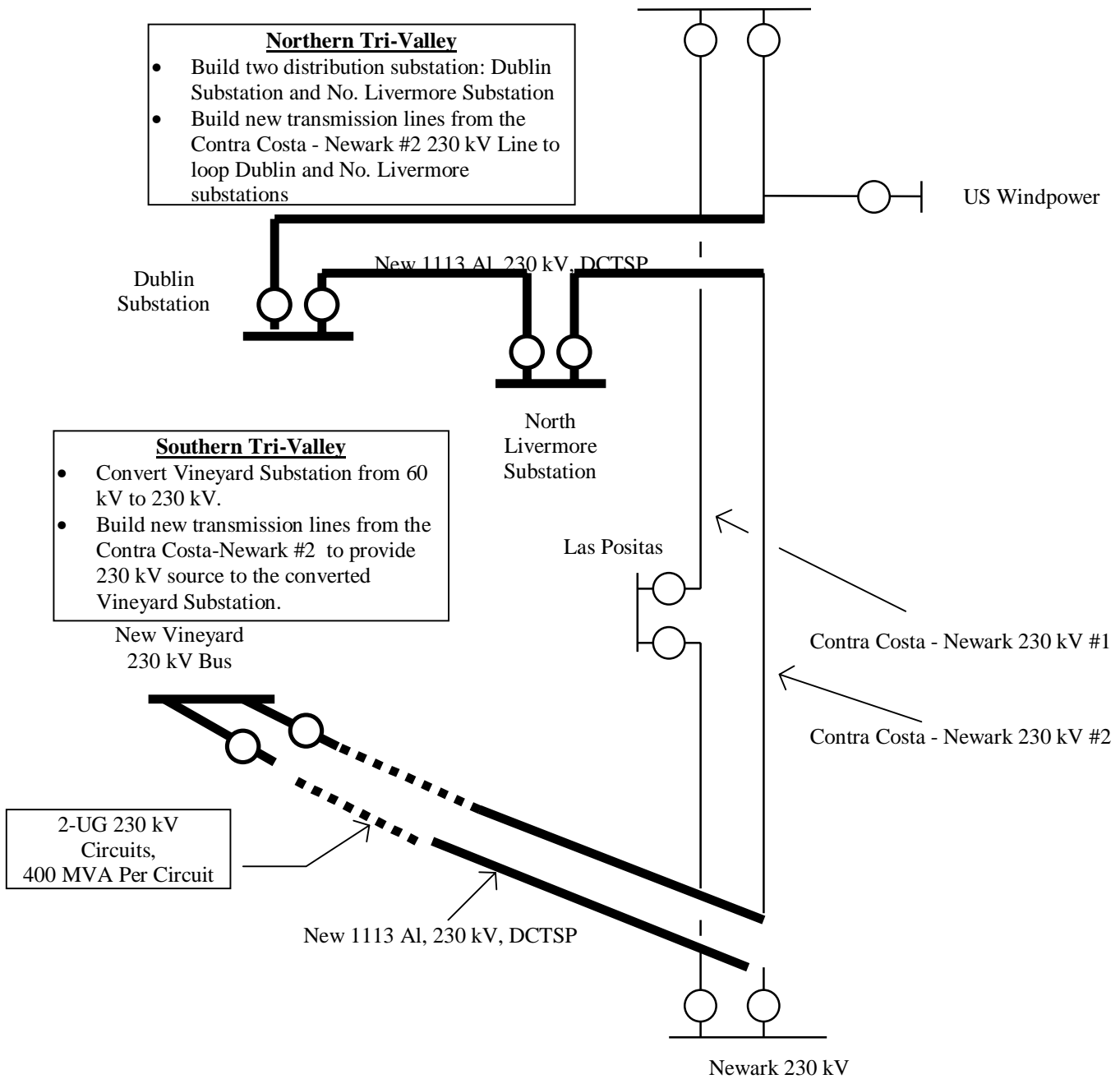
provide relief to the 60 kV system. This will also enable the 60 kV system to operate again in the more reliable network configuration even during peak loading periods.

- Construct new transmission circuits from the Contra Costa-Newark 230 kV line to provide 230 kV source to Vineyard with approximately half the distance to be installed underground.

The diagram of the project is provided in Fig.1.

Cost of the transmission part of the proposed project is estimated as \$39.2 Million: \$12.0 Million for the Northern part and \$27.2 Million for the Southern part. This cost includes only construction of the 230 kV transmission lines. Cost of the distribution part of the project, which includes 230/21 kV substations and distribution feeders was estimated at \$40.5 Million: \$26.8 Million for the Northern part and \$13.7 Million for the Southern part. These costs also include CPCN application and review and rights-of-way acquisition.

Fig. 1. TRI-VALLEY 2002 CAPACITY INCREASE PROJECT



Technical Study of the Proposed Non-Wire Alternatives

The ISO has performed power flow studies for the cases with and without the proposed new generation and load management additions. The base case used for the study was the 2002 Heavy Summer, the same case used by PG&E for the Tri-Valley Project study. It was assumed that the northern part of the Tri-Valley project (new 230 kV Dublin and North Livermore Substations interconnection) is already in service. All single transmission line and transformer outages in the Tri-Valley and surrounding areas were studied.

The study results are summarized in Table 2. In addition to the transmission lines shown in the table, overloading of the Pittsburg – Tassajara 230 kV line was also observed: 7% under the normal system conditions and up to 5% with a single transmission line outage. This overloading occurs whether or not additional generation, load management, or the proposed transmission project are in place. The overloading of the Pittsburg – Tassajara 230 kV line will be solved by reconductoring the line, planned by PG&E to occur in 2001.

175 MW of new generation or load management was requested by the RFP. Therefore, the ISO performed the study with 175 MW of additional resources included. In order to determine the 175 MW, the selected the least expensive resources proposed by respondents. The study showed no overload or low voltage problems for the 2002 Heavy Summer case.

Table 2. Power Flow Study Results			
Overloaded Equipment	Outage	Highest Percent Overload without additions	Overload with all generation and load management projects
S Ramon-E Dublin 60 kV	Normal conditions, all outages	51% normal 73% Livermr-Ls Posits 60 82% Ls Positas 230/60	none
E Dublin-Parks 60 kV	Normal conditions, all outages	40% normal, 63% Livermr-Ls Posits 60 72% Ls Positas 230/60	none
San Ramon230/60 kV	Normal conditions, all outages	35% normal, 72% Livermr-Ls Posits 60 81% Ls Positas 230/60	none
Livermr-Ls Positas 60 kV	Normal conditions, Pitsb-San Ramon230, Radum-Vineyard 60, S.Ramon-Radum 60, Newrk115/60	19% normal 37% S.Ramon-Radum 60	none
Ls Positas 230/60 kV	Normal conditions, Ptsb-S.Ramon 230,Radum-Vineyard 60, S.Ramon-Radum 60, Newrk115/60	13% normal 31% S.Ramon-Radum 60	none
Livermr-Calmatos 60 kV	Normal conditions Radum-Vineyard 60, S.Ramon-Radum 60	6% normal 44% S.Ramon-Radum 60	none
Sunol-Newark 60 kV	Normal conditions, C.Costa-Ls Positas 230 Pitsb-S.Ramon 230, any 60 kV line outage in Tri-Valley, LsPosits 230/60	6% normal 100% Livmre-Vineyrd 60 97% Ls Positas 230/60	none
Parks-Radum 60 kV	Livermr-Ls Positas 60, Livermore-Vineyard 60 , LsPositas 230/60	23% Livermr-LsPosits 60 30% LsPositas 230/60	none
Livermore-Newark 60 kV	Livermr-Ls Positas 60, LsPositas 230/60	56% Livermr-LsPosits 60 72% LsPositas 230/60	none
Vallecitos-Sunol 60 kV	Livermr-Ls Positas 60, Livermore-Vineyard 60, S.Ramon-Radum 60, LsPositas 230/60	64% Livermre-Vineyrd 60 59% LsPositas 230/60	none
Iuka-Vallecitos 60 kV	Livermr-Ls Positas 60, Livermore-Vineyard 60, S.Ramon-Radum 60, LsPositas 230/60	60% Livermre-Vineyrd 60 54% LsPositas 230/60	none
Newark 115/60 kV	Livermr-Ls Positas 60, S.Ramon-Radum 60, LsPositas 230/60	61% Livermr-Ls Positas 75% LsPositas 230/60	none
Kaiser-Calmatos 60 kV	Radum-Vineyard 60, S.Ramon-Radum 60	39% S.Ramon-Radum 60	none
Vineyard-Kaiser 60 kV	S.Ramon-Radum 60	26%	none
Insufficient voltage stability margin	San Ramon 230/60 bank		none

To determine the number of years the proposed generation will satisfy the grid reliability requirements, the ISO performed another study. The base case for that study assumed that the load in the Mission area would grow at a rate of 5% per year, which is consistent with the PG&E analysis. The study showed no system problems would be observed in the year 2005 with the proposed 175 MW of generation and load management additions. However, if the load continues to grow at the same rate, the study indicates that system would experience problems beginning in 2006. At the load levels projected for 2006, the system would experience an emergency overload of the Livermore-Las Positas 60 kV transmission line with an outage of the San Ramon 230/60 kV transformer. With the transmission project in place, no system problems would be expected during this time frame.

Additional Concerns

The California Energy Commission requires that generators 45 MW or greater be at least one mile apart to be considered separate projects. The size of each generation project requested by the Tri-Valley RFP is not supposed to exceed 49 MW in order to simplify the process of project approval at the CEC. If the proposed projects are constructed in less than a one-mile proximity from each other, then the process of their approval and licensing could be complicated and extended. Of the proposed generation projects that are between 45-49 MW, two are planned in the vicinity of the Vineyard substation, another one is planned to be on the Vineyard-Las Positas 60 kV transmission line, and one more 44 MW project is proposed for the year 2003 at the Vineyard substation. The CEC requirements and jurisdiction could even apply in circumstances where the facilities are not owned by the same entity, but utilize common facilities (e.g., transmission line, gas pipeline, etc.)

Conclusions

The ISO technical review of the generation and load management proposals received in response to the Tri-Valley RFP showed that although the proposed projects will achieve the goal of eliminating the overloading and voltage problems in the Tri-Valley area for the next five years, these proposals appeared to be substantially more expensive than the transmission alternative proposed by PG&E. In addition, the transmission alternative provides higher transmission capacity to the system than the generation and load management projects.