APPENDIX B:
SUPPLEMENTARY INFORMATION ON THE ENVIRONMENTALLY SUPERIOR ALTERNATIVE

ZGLOBAL
Power Engineering & Energy Solutions

--SDG&E Salt Creek Substation Project--

Responses to SDG&E Draft Environmental Impact Report (DEIR) Comments

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Contents

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Background

In SDG&E's Comments to the Draft EIR, they assert (See section I part B. "SDG&E's Objective 2 Should be Retained") that the third 69 kV line is needed to meet both load growth in the region and regulatory reliability requirements. Further SDG&E states that overloads "may" or "could" occur during heavy summer loading conditions due to single line outage (i.e. one of two salt creek – Miguel lines out of service) or longer than expected time to bring Border generation on line.

Additionally, SDG&E comments that they do not have a PPA with Border area generation, but does have an RA contract with Cal Peak Border specifically. SDG&E also expresses concern with the use of Border area generation given its expected life span of roughly 25 to 29 years.

While I appreciate SDG&E concerns, my analysis, as discussed below does not necessarily support the SDG&E position. In the following sections SDG&E comments to the DEIR, as summarized above, are addressed.

Reliability Criteria Assessment

With respect to reliability, SDG&E specifically reference requirements of the North American Electric Reliability Corporation (NERC), Western Electric Coordinating Council (WECC) and the California Independent System Operator (CAISO). The reliability criteria for transmission planning from these three entities is largely the same with key indicators being line loading and voltage deviations during normal (all lines in service) and emergency (line or equipment outage)

conditions. Per the CAISO Planning Standards[1] (See Table 1, Page 4 of CAISO Planning Standards, effective April 1, 2015) voltage deviations under Contingency Conditions are limited to +/- 10% from nominal voltage. Line loading criteria under emergency conditions (i.e. loss of a single element of the bulk electric system such as the one Miguel-Salt Creek line) are provided by NERC[2] (See Table 1, Category B and associated footnote "a"). This criteria states that line loading shall not exceed the applicable Normal and Emergency limits. Standard practice for CAISO planning is to apply Emergency limits for assessment of contingency conditions, which are typically a 30 minute limit for SD&E facilities within the CAISO.

In my assessment of the Salt Creek project, I utilized the SDG&E provided base cases. These models were used "as-is", meaning I made no adjustments to assumed load or configuration beyond what is noted below. The primary model I used was the 2016 case with one line between Salt Creek and Miguel with a 60 MW load at Salt Creek[3]. Using this model, I simulated loss of the one 69 kv line between Salt Creek and Miguel. In doing so, I observed a voltage deviations at Salt Creek to be right at the reliability limit of -10% deviation from nominal. All other voltage deviations remained within the acceptable 10% deviation.

SDG&E asserts that the third line will greatly lessen the possibility of outages that may cause reliability violations. While I do not disagree with this, I point out that the proposed lines will be within a common right of way increasing the risk of a double line outage. This issue lessens the value of the third line from a reliability perspective when considering unplanned outages.

[1] http://www.caiso.com/Documents/FinalISOPlanningStandards-April12015_v2.pdf
[2] http://www.nerc.com/files/tpl-002-0.pdf
[3] Basecase was labeled by SDG&E as "2016_SC_ONE_60" with description "Salt Creek with only ONE Miguel-Salt Creek 69 kV Line – Load 60 MW.

SDG&E Load Forecast

The assessment of reliability impacts discussed above utilized the SDG&E assumed load growth. However, these results reflect a considerably stressed model due to the load forecast assumed by SDG&E. The table below reflects the assumed SDG&E load growth based on response to ED-SDGE-013.

	2014	2015	2016	2017	2018
Telegraph Canyon	21%	10%	8%	5%	5%
Proctor Valley	13%	2%	2%	2%	2%

The California Energy Commission (CEC) data[4] (See Table 3-1 SDG&E Planning Area Forecast Comparison) reflects a maximum load growth estimate of 2.83% to 2.86% for the time period between 2000 and 2015. The CEC estimates the average annual growth rate for SDG&E to be only 1.92% between 2012 and 2024. A simple average of the SDG&E estimated load growth from the table above over a 5 year period results in 7%, slightly more than 5% greater that CEC load forecasts for the SDG&E area.

However, recognizing that load will not materialize all at once, I performed the same simulation of loss of Salt Creek - Miguel 69 kV (using same case as above but with 50 MW load at Salt Creek). In doing so, I found that the voltage deviation was reduced to just 9%, which is within the acceptable planning criterial limits. Per SDG&E[5] the load at Salt Creek is expected to reach 41.7 MW in 2023. SDG&E assumes a growth at Salt Creek of roughly 3.1 MW per year (7% growth rate). This suggests that any potential reliability voltage violations will not materialize until 2025- 2026 timeframe. However, applying a load growth rate of 2% (closer to the CEC

[4] http://www.energy.ca.gov/2013publications/CEC-200-2013-004/CEC-200-2013-004-SD-V2.pdf
[5] See A.13-09-014 SDG&E 7/16/14 Response, Salt Creek Substation Project PTC, ED-SDGE-013

forecasted load growth for SDG&E) the Salt Creek load will not reach 50 MW until 2032 – 2033 timeframe.

Using the same model noted above, I examined area line loading resulting from loss of the one Salt Creek – Miguel 69 kV line. This simulation confirmed SDG&E assessment of overloading on the TL649 line between Otay and Otay Lake Tap with Salt Creek load at 60 MW. Per SDG&E load growth assumptions, the load at Salt Creek should not reach 60 MW until 2030. However, as previously communicated, this overload was mitigated by dispatching Border area generation.

Border Area Generation

With respect to the use of Border area generation, SDG&E asserts that this Generation may not be reliable with respect to start-up orders following an unexpected outage. Further, they state that there will be a need to operate Border generation under all system conditions where an overload on TL 649 may occur. While I agree with this last statement, I believe it is important to quantify the expected use of the Border area generation.

First, in general, the peaking of load in the Otay Ranch area will coincide with the system peak load. This is important to understand, because this is typically when the Border area peaking generation will be on line to support system peak demand. Second, there are three (3) relevant peaking units in the Border Area (Cal Peak, Larkspur 1, and Larkspur 2) all rated at 49 MW. While it is not uncommon for peaking units to experience some start up challenges, these units are designed to provide quick start up and delivery of energy to the electric grid. These units are designed to be on-line at full load in a timeframe of roughly 10 minutes. To address SDG&E concern that Border area generation may not come on line quickly enough, it is important to

understand that the emergency line limits are 30 minute ratings. Even in the event that the first failed to start, there is sufficient time to dispatch a second or possibly a third within the 30 minute window.

While SDG&E does not have a Power Purchase Agreement (PPA is a contract for energy delivery) they do have a Resource Adequacy (RA) contact with Cal Peak Border generation. The RA contact requires that the generation resource be made available to the CAISO for energy dispatch to meet system or local requirements. From a responsibility (or obligation) perspective, the CAISO is responsible for the operation of the SDG&E system, including the 69 kV system at and around the proposed Salt Creek Substation Project. Regardless of SDG&E not directly (via contract) having energy dispatch control over Cal Peak Border, it will be utilized by the CAISO to manage line loading and reliability needs in the SDG&E area. The fact that there is no PPA with SDG&E does not lessen or negate the ability of the Border generation to mitigate near term (next 10 years) loading concerns associated with the Salt Creek Substation Project. SDG&E points out that the Border area generation will reach their designed end of life by 2030[6]. This is reasonable and not in dispute. However, as noted above, my analysis found that Border area generation can be used for as many as 10 years from now (2025) to mitigate possible reliability issues associated with just a single Salt Creek-Miguel 69 kV line.

Summary

To Summarize, SDG&E suggests that a third line (second Salt Creek – Miguel 69 kV) is needed to meet load growth and reliability issues. My assessments does not necessarily conflict with SDG&E assertions, but finds that the third line is not needed for reliability until 2025-2026 timeframe. Moreover, the third line can be further delayed, possibly to 2030, with use of Border area generation. SDG&E can rely on dispatch of these resources in the event of an

[6] Constructed in 2001 with 25 year life. SDG&E assumes an additional 4 years for total life span of 29 years.

unplanned outage and has a total of three (3) resources should one or even two fail to start. Finally, in lieu of the third line, SDG&E could establish an operating procedure to protect against reliability violations, using the existing and available Border area generation. My analysis found that a single border area generator is sufficient to mitigate peak loading reliability issues through 2030. It is my recommendation that the third line can be deferred for possibly 10 years with limited use of border generation. By 2030, it is possible that more extensive use of border area generation may be needed as the Otay Ranch area load increases. By this time, 2030, the third line may become justifiable due to excessive use of Border area generation just for Otay Ranch area loading. However, should the extremely aggressive load forecast for the Otay Ranch area not materialize as rapidly or in the magnitude estimated by SDG&E the Salt Creek Substation Projects second Salt Creek-Miguel 69 kV may not be needed until 2033.