BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

In the Matter of the Application of San Diego Gas & Electric Company (U902E) for a Certificate of Public Convenience and Necessity for the South Orange County Reliability Enhancement Project.	Application 12-05-020

OPENING BRIEF OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

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I. Introduction

Pursuant to the Administrative Law Judge's direction, the parties to this proceeding have established a common briefing outline to address the issues presented in San Diego Gas & Electric Company's (SDG&E) application for a certificate of public convenience and necessity (CPCN) for the South Orange County Reliability Enhancement Project (SOCRE Project). The procedural schedule adopted for this proceeding established January 11, 2016 as the due date for opening briefs. Consistent with this schedule, the California Independent System Operator Corporation (CAISO) submits its opening brief.

A. The SOCRE Project

The CAISO identified a reliability need in the South Orange County area in its 2010-2011 transmission planning process.[1] The reliability issues were primarily related to the exceedance of applicable ratings during multiple Category C contingencies as defined in the North American Electric Reliability Corporation (NERC) mandatory transmission planning standards.[2] In accordance with the CAISO tariff, SDG&E submitted a potential solution to the reliability concern during the 2010 Request Window.[3] SDG&E also identified the need for extensive capital upgrades at the Capistrano 138 kilovolt (kV) substation necessitating a rebuild of the facility.[4] These projects highlighted both the CAISO-identified reliability concerns and

[1] Exhibit CAISO-500, p. 8.
[2] Id. at p. 9.
[3] Id. at p. 8.
[4] Id. at p. 8.

shortcomings in being able to accommodate planned maintenance and construction outages in the area.

The CAISO analyzed a number of alternatives to address the South Orange County reliability issues, including proposals from SDG&E. The CAISO refined the transmission solution through the planning and consultation process, and ultimately the CAISO's Board of Governors approved it. The SOCRE project SDG&E has presented for approval in this proceeding is materially unchanged from the project the CAISO Board of Governors approved in the 2010-2011 transmission plan.[5]

The SOCRE Project consists of the following:

- Replacing an existing approximately 8-mile, 138 kV transmission line (TL13835) with a new 230 kV double-circuit extension between SDG&E's Capistrano and Talega Substations. One side will form part of a new 230 kV circuit from San Onofre bypassing the Talega substation and connecting to the Capistrano substation, and the other side will extend from the Capistrano substation to tap the existing Talega-Escondido 230 kV line near Talega;
- Looping in two 138 kV transmission lines that currently bypass the existing substation into the Capistrano Substation;
- Building a new 230 kV partially enclosed gas insulated substation at the existing 138/12 kV Capistrano Substation site; and
- Rebuilding and expanding the existing Capistrano Substation 138 kV facility with a new partially enclosed gas insulated substation.[6]

B. Standard of Proof

The applicant for a CPCN "has the burden of affirmatively establishing the reasonableness of all aspects of its application. Intervenors do not have the burden of proving the unreasonableness of [the applicant's] showing."[7] Notably, this standard does not require the applicant to prove the unreasonableness of every alternative proposed by intervenors. The presentation of alternatives by intervening parties does not in itself render an applicant's showing

[5] Id.
[6] Id. at p. 7-8.
[7] Decision 10-12-052, *In the Matter of the Application of the Southern California Edison Company (U 338 E) for a Certificate of Public Convenience and Necessity for the Eldorado-Ivanpah Transmission Project*.

as unreasonable. Rather, the Commission applies the preponderance of evidence standard in determining whether to grant a CPCN.[8] Generally, the phase "preponderance of evidence" is "defined in terms of probability of truth, *e.g.*, such evidence as, when weighed with that opposed to it, has more convincing force and greater probability of truth."[9]

C. Applicable NERC and CAISO Standards

The CAISO plans the transmission system to meet mandatory reliability standards developed by NERC and the Western Electricity Coordinating Council (WECC).[10] In addition, the CAISO has developed its own Planning Standards to "complement [the NERC and WECC reliability standards] where it is in the best interests of the security and reliability of the [CAISO] controlled grid."[11] NERC Standards apply to all elements of the bulk electric system (BES). Furthermore, the CAISO Planning Standards specify that "[t]he [CA]ISO will apply NERC Transmission Planning (TPL) standards,…and the approved WECC Regional Criteria to facilities with voltages levels less than 100 kV or otherwise not covered under the NERC Bulk Electric System definition that have been turned over to the [CA]ISO operational control."[12] The South Orange County transmission system is under CAISO's operational control and, therefore, the CAISO has planned it to meet all NERC transmission planning standards and the CAISO Planning Standards.

D. Project Objectives

The CAISO identified at least four primary project objectives for the SOCRE Project. First, the project should address all reliability concerns identified based on NERC requirements and CAISO Planning Standards.[13] Second, the project should provide a second transmission source to the South Orange County transmission system.[14] Third, the project should not compromise the overall effectiveness or reliability of the bulk electric system in Southern California.[15] Lastly, the project should be designed to enable SDG&E to perform necessary

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[8] *Utility Consumers' Action Network v. Public Utilities Comm'n of California*., 187 Cal.App.4th 688 at 698-699. (2010).
[9] Id. (internal quotations omitted).
[10] Exhibit CAISO-500, p. 3.
[11] Exhibit ORA-227, p. 3.
[12] Id. at p. 4.
[13] Exhibit CAISO-500, p. 9.
[14] Exhibit CAISO-502, p. 12.
[15] Exhibit CAISO-500, p. 11.

equipment replacement without jeopardizing reliability.[16] The SOCRE Project meets each of these objectives in a manner that is superior to any of the alternatives identified in the Environmental Impact Report (EIR) or proposed by intervenors.

II. Project Need

A. The SOCRE Project is Necessary to Comply with NERC Standards and CAISO Planning Standards.

The SOCRE Project is primarily driven by the need to bring the South Orange County system into compliance with mandatory NERC reliability requirements.[17] In its 2010-2011 transmission plan, the CAISO identified numerous Category C contingencies that resulted in exceedance of applicable ratings in the South Orange County area within the ten-year planning horizon.[18] In the NERC reliability standards, a Category C contingency is generally defined as the loss of one system element followed by the loss of a second element.[19] A Category C contingency is also commonly referred to as an "N-1-1" contingency event. NERC standards require corrective action to meet Category C contingency overloads.[20]

The CAISO updated its analysis during the course of this proceeding to determine whether the originally identified reliability concerns continue to exist.[21] The CAISO's analysis shows that significant reliability concerns continue to exist, despite reduction in projected load growth over the 10-year planning horizon.[22] Specifically, the CAISO's updated analysis found 26 thermal overloads on eight distinct facilities that develop over the ten-year planning horizon without the SOCRE Project.[23] The CAISO identified 13 unique contingencies that cause these overloads.[24] The eight distinct facilities and the 13 unique contingencies cannot be addressed through an SPS without violating the CAISO Planning Standards.[25]

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[16] Id. at p. 10.
[17] Id. at p. 9.
[18] Id.
[19] NERC Standards were revised as of January 1, 2016 to delete references to Category A, B, C and D contingencies. Instead, the NERC Standards now refer to contingencies P0 through P7. The contingency events and the required corrective action remain similar. For the purposes of this brief, the CAISO continues to refer to Category C contingencies consistent with the testimony produced in this proceeding. See also Exhibit SDGE-3.2R, p. 13 for a table presenting contingencies under both prior and current NERC standards.
[20] Exhibit ORA-211, p. 4, Section B, R2.7;
[21] Exhibit CAISO-500, p. 10.
[22] Id.
[23] Id.
[24] Id.
[25] Id.

The CAISO also identified numerous reliability concerns that arise during maintenance outages at the Talega Substation.[26] The CAISO, as a Planning Authority, assessed the system reliability performance by including the planned (including maintenance and construction) outage of any bulk electric system element at demand levels for which planned outages are performed.[27] The CAISO identified a total of 57 reliability events that would result in an uncontrolled interruption of service when a maintenance outage at the Talega Substation is followed by a contingency event.[28] Four of these events were the result of Category B contingencies, which are defined as the loss of a single system element.[29] This means that the failure of just a single transformer element could potentially disrupt service to South Orange County customers during a planned maintenance at the Talega Substation.[30] 27 events could disrupt service to all South Orange County customers as a result of identified Category C contingencies.[31] The CAISO also identified 26 events under which planned maintenance followed by a Category C contingency would result in an uncontrolled interruption of service to a significant number of customers.[32]

These circumstances present a clear and critical operational concern because there are no windows for performing necessary maintenance or construction activities without facing unacceptable risk of the loss of *all* load in South Orange County.[33] This would occur because the South Orange County system currently relies primarily on a single power source from the Talega Substation to serve approximately 460 MW of load.[34] Loss of that power source would result in a loss of all load in South Orange County.

In order to comply with NERC long-term transmission planning requirements, the CAISO is obligated to identify a corrective action plan to meet applicable performance requirements and resolve the reliability issues identified above.[35] Only the SOCRE project

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[26] Id.
[27] Exhibit CAISO-500, p. 10; Exhibit ORA-211, p. 2, Section B(R1).
[28] Exhibit CAISO-502, p. 7.
[29] Exhibit ORA-211, p. 8.
[30] Exhibit CAISO-502, p. 8.
[31] Id.
[32] Id.
[33] Id.
[34] Id.
[35] Exhibit ORA-211, p. 4, Section 2.7 ("For planning events shown in Table 1, when the analysis indicates an inability of the System to meet the performance requirements in Table 1, the Planning Assessment shall include Corrective Action Plan(s) addressing how the performance requirements will be met.")

developed by the CAISO, in conjunction with stakeholder consultation, during the transmission planning process, addresses all of these reliability concerns; the other alternatives proposed in the DEIR, RDEIR, and by intervenors do not.

B. The South Orange County Transmission System is not a Local Network.

No party in this proceeding challenges the reliability concerns listed above that the CAISO identified. However, several parties argue that NERC reliability standards are not applicable to the South Orange County system because it is a "local network" that should be excluded from application of some or all NERC planning requirements applicable to the bulk electric system.[36] Specifically, the Office of Ratepayer Advocates (ORA) and Forest Residents Opposing New Transmission Lines (Frontlines) suggest that the South Orange County 138 kV transmission system is excluded from the BES because it is a "local network" as described in NERC's Exclusion E3 to the bulk electric system definition.[37] Exclusion E3 describes a "local network" as "[a] group of contiguous transmission Elements operated at less than 300 kV that distribute power to Load rather than transfer bulk power across the interconnected system."[38] At first glance and without close examination or understanding of the NERC requirements and the CAISO system, this description appears to include systems like the South Orange County 138 kV system; however, this is not a correct application of Exclusion E3 based on a complete understanding of the South Orange County system.

The South Orange County 138 kV system is interconnected to the rest of the CAISO-controlled grid through not only the 230/138 kV facilities at Talega but also the 69 kV facilities from San Luis Rey to Talega which is parallel to the South of San Onofre Nuclear Generating Station (SONGS) transfer path into San Diego.[39] Furthermore, the South Orange County 138 kV system provides reactive support required to support San Diego import transmission, which is identified as an Interconnection Reliability Operating Limit (IROL) due to the post-transient voltage instability concern in the SDG&E and LA Basin areas after the SONGS retirement.[40] A 100 MVAR STATCOM (Dynamic Reactive Power Device) is located at the 138 kV Talega bus,

[36] Exhibit FRONTLINES-400.1-C, p. 6, Exhibit ORA-200, p. 1.
[37] Exhibit FRONTLINES-400.1-C, p. 6.
[38] Exhibit CAISO-503, p. 3.
[39] Id.
[40] Id.

and a 40 MVAR shunt capacitor (Static Reactive Power Device) is located at Capistrano 138 kV bus.[41] Pursuant to NERC's Inclusion I5 to the BES definition, both of these devices are BES elements because they support voltages and transfer capability on the 138 and 230 kV systems.[42] This means that the South Orange County 138 kV system is not a "local network" and should not be excluded from the BES because it transfers bulk power across the interconnected CAISO grid and provides critical reactive power support to voltage and transfer capability in the Southern Orange County and the San Diego import transmission systems.[43]

C. NERC TPL Standards Are Applicable to All Facilities Under CAISO Operational Control.

In any event, whether the facilities are classified as BES or a local network, all facilities under CAISO operational control are subject to the NERC transmission planning standards. In that regard, CAISO Planning Standards require the CAISO to apply NERC TPL standards to "facilities with voltages less than 100 kV or otherwise not covered under the NERC Bulk Electric System definition that have been turned over to the [CA]ISO operational control."[44] The South Orange County 138 kV system has been turned over to the CAISO for operational control therefore the CAISO must apply the NERC transmission planning standards to it.

D. New NERC Transmission Planning Standards Provide Additional Confirmation that Non-Consequential Load Shedding is Not Permitted in Response to a First Contingency Event.

As of January 1, 2016, NERC TPL-001-4 is the enforceable, governing standard for transmission system planning performance requirements. This standard does not allow non-consequential load loss after a single contingency event in the long-term transmission planning horizon. Frontlines contends that "footnote B" to the standard that existed prior to January 1, 2016 "allows for load loss after a single event."[45] Although the CAISO disagrees with this claim because "footnote B" applied to only radial or local network customers, not BES elements such as the South Orange County system, this claim is moot in any case because the prior standard has been entirely replaced by NERC TPL-001-4 and "footnote B" no longer exists.[46]

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[41] Id.
[42] Id at p. 3-4.
[43] Id. at p. 3.
[44] Exhibit ORA-227, p. 4.
[45] Tr. at 1364.
[46] See Exhibit ORA-211 for the currently effective TPL-001-4.

The currently applicable TPL standard clarifies that "an objective of the planning process is to minimize the likelihood and magnitude of Non-Consequential Load Loss following planning events."[47] In footnote 12, which replaces the prior footnote B, the NERC standard notes that non-consequential load loss may be used if it is used only within the "Near-Term Transmission Plan Horizon" (*i.e.*, years one through five) and is vetted through an "open and transparent stakeholder process."[48] The CAISO Planning Standards further clarify that the shedding of non-consequential load is not permitted following the first contingency event to meet performance requirements, though non-consequential load shed may be used in the near-term planning horizon *until long-term mitigation plans are in place.*[49] The SOCRE Project is a long-term mitigation plan designed to address reliability concerns over the 10-year planning horizon. Thus, it is not within the Near-Term Transmission Plan Horizon in which non-consequential load loss may be used.

III. Selection of Alternative / If the Commission selects a Project, which Alternative Should it Select?

A. The SOCRE Project is the Only Alternative that Addresses all Project Objectives.

The SOCRE Project is the only alternative presented in this proceeding that (1) addresses all identified reliability concerns, (2) provides a second transmission source to the South Orange County 138 kV system and (3) does not compromise the overall effectiveness or reliability of the bulk electric system in Southern California.

With the SOCRE Project in place, all thermal overloads related to Category C events and maintenance reliability concerns related to Category B and C outages are mitigated over the long-term planning horizon. The SOCRE Project also mitigates all Category D area blackout events resulting in the loss of Talega Substation.

The SOCRE Project provides a second 230 kV transmission source to the South Orange County system at the Capistrano Substation. A second transmission source at this location provides unique and important benefits because the Capistrano Substation is:

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[47] Exhibit ORA-211, p. 12.
[48] Id. at p. 14.
[49] Exhibit ORA-227, p. 17-18. ("The shedding of Non-Consequential load following P1, P2-1 and P3 contingencies on the Bulk Electric System of the ISO Controlled Grid is not considered appropriate in meeting the performance requirements.")

- Electrically located in the load center of SDG&E's South Orange County service area;
- Within close proximity to a collection of 138 kV substations that serve approximately 375 MW of load, or 82% area peak load;
- Capable of accommodating six 138 kV transmission lines that are within close proximity; and
- Resistant to cascading outages associated with the loss of the existing 138 kV Talega transmission source.[50]

Unlike the alternatives identified in this proceeding, the CAISO has fully vetted the SOCRE Project through its open and transparent stakeholder process. As a result, the SOCRE Project does not negatively affect the South Orange County 138 kV system and/or transfer capabilities on the SDG&E-Southern California Edison Company (SCE) 220 kV transmission corridor.

B. The EIR Alternatives Do Not Meet Project Objectives.

The Draft EIR (DEIR) and the Recirculated DEIR (RDEIR) collectively identified 12 alternatives to the SOCRE Project. In addition, the City of San Juan Capistrano (SJC), Frontlines, and ORA each identified alternatives or variations on EIR alternatives. The CAISO has reviewed each of these alternatives and conducted detailed power flow analyses to determine whether any of the alternatives satisfy the NERC transmission planning standards and the CAISO Planning Standards. The CAISO has determined that none of the alternatives meet all reliability concerns, while some alternatives create additional reliability concerns.[51] In this section, the CAISO discusses each of the proposed alternatives in detail and shows why they are inadequate and fail to meet all of the CAISO's needs and all of the purposes of the project.

1. The RDEIR Alternatives

The RDEIR identified 12 alternatives to the SOCRE project. For the purpose of this brief, the CAISO has classified the 12 alternatives into groups based on common mitigation characteristics and system performance. The No Project alternative is unique because it does not address any of the system performance issues identified by the CAISO and therefore does not propose any mitigation strategies. Alternatives B1, B2, B3, B4, and E, all of which focus on

[50] Exhibit CAISO-502, p. 14.
[51] Exhibit CAISO-502, p. 14-21; Exhibit CAISO-504; Exhibit CAISO-505.

South Orange County 138 kV System improvements, are discussed together. Alternatives C1, C2 and D each one incorporate an element that parallels the South Orange County 138 kV system with the Southern California Electric Company (SCE) 230 kV system. Alternative J also provides a second 230 kV source from SCE, though it is discussed separately because it is electrically distinct. Alternatives F and G provide a second new 230 kV or 138 kV transmission source into the South Orange County service area from a substation other than the Talega Substation and each is discussed separately below.

As discussed in greater detail below, all of the RDEIR alternatives fail to meet the reliability concerns identified by the CAISO. The CAISO identified ongoing reliability concerns for each group of RDEIR alternatives. Only RDEIR alternatives C1, C2, D and J provide a second independent transmission source that is sufficient to maintain reliable network service to all the South Orange County load during maintenance conditions followed by a forced outage at the Talega Substation: however, these alternatives cause negative impacts on transfer capabilities between the SDG&E and SCE transmission systems. RDEIR alternatives A, B1, B2, B3, B4 and E do not improve load serving capability during the maintenance conditions. Alternatives F and G add a second independent transmission source at a suboptimal location, but does not provide adequate load serving capability without additional network upgrades.

i. *RDEIR Alternative A (No Project Alternative)*

As described above, the CAISO's analysis of the existing system has demonstrated numerous reliability concerns in the South Orange County system if no upgrades were made in the planning horizon. If the Commission approves the No Project Alternative it would need undertake the following additional improvements to meet all identified reliability needs:

- Upgrade the existing 138 kV system to upgrade the Capistrano-Trabuco line and re-conductor the Talega-Pico, Pico-Capistrano, Talega Tap-San Mateo-Laguna Niguel, Talega-Pico-San Mateo 138 kV lines; and
- Expand the 230/138 kV Talega Substation by sectioning the 230/138 kV buses, adding at least two more bay positions at both 230 kV and 138 kV voltage sides, and upgrading the two 230/138 kV transformers (Banks #60 and #62).[52]

[52] Exhibit CAISO-502, p. 14-15.

However, SDG&E cannot expand the Talega Substation without shutting down its service depending on the status of the construction and the nature of the forced outage because it is the sole transmission source to the South Orange County system.[53] For this reason, SDG&E considered building a temporary substation configuration to facilitate the construction, but rejected this alternative due to its high estimated cost and the environmental concerns discussed in SDG&E's Proponent's Environmental Assessment (PEA). This minimal work strategy is not cost effective compared with the SOCRE project. The SOCRE project would not only meet the identified reliability needs to address all thermal overloads related to Category C events and maintenance reliability concerns related to Category B and Category C outages, but also eliminate the sole transmission source issue.

ii. RDEIR Alternatives B1, B2, B3, B4, and E

The Group 2 RDEIR alternatives are similar to an alternative configuration the CAISO investigated in its 2010-2011 transmission planning process. As the CAISO's testimony, if all facilities are in-service as a pre-contingency condition, Alternatives B1, B2, B3, B4, and E would address some of the reliability concerns for the Category C events.[54] However, these alternatives would not address the Talega Bank #60 and #62 overload concerns for the overlapping contingency (Category C) of Talega Bank #63 and #61. During a planned maintenance at the Talega Substation, in addition, the RDEIR Alternatives are not adequate to meet Category B and Category C performance requirements because all or a significant amount of customer load in the area would be interrupted with any one of the 4 Category B or the 53 Category C events listed in the CAISO's testimony.[55]

If the Commission approves one of the RDEIR Group 2 alternatives, the following additional improvements will be necessary to meet NERC or CAISO transmission planning standards:

- Upgrading two of the 230/138 kV transformers at Talega Substation, Banks #60 and #62; and

[53] Exhibit SDGE-3.2R, p. 19.
[54] Exhibit CAISO-502, p. 15-16.
[55] Id.

- Rebuilding and extending the existing non-standard substation layout and 230/138 kV buses configurations at the Talega Substation.[56]

As described above, rebuilding and expanding the Talega substation is not feasible without building costly temporary facilities during the construction process in order to ensure service to customers.[57] In addition, as indicated in SDG&E's testimony, the equipment at the Capistrano Substation is inadequate and any alternative without rebuilding the Capistrano Substation is infeasible. Based on these considerations, the Group 2 DEIR alternatives will not be a cost effective means to meet the identified reliability concerns when compared to the SOCRE project.

iii. RDEIR Alternatives C1, C2, and D

The RDEIR alternatives C1, C2 and D meet some, but not all, of the immediate reliability concerns in the South Orange County area, and they are unacceptable because they negatively impact transfer capability on the major transmission corridor between San Diego and the Los Angeles basin. As described in the direct testimony of Neil Millar on behalf of the CAISO, any alternative paralleling SCE 230-kV system with the SDG&E's SOC 138 kV system would materially impact the 220 kV transmission path between SCE's LA Basin and the San Diego area.[58] In approving the SOCRE project, the CAISO ensured that its mitigations for the immediate area reliability issues would not compromise the overall effectiveness or reliability of the bulk electric system in Southern California.[59] The CAISO conducted additional analysis to assess the impact of these alternatives on the transfer capability of the 230 kV corridor. Based on this analysis, the CAISO found numerous overloading concerns under Category B and Category C contingencies in the South Orange County and SCE systems.[60]

The existing 230 kV corridor connecting the LA Basin to the San Diego area previously played a key role in supporting flows southward when the San Onofre Nuclear Generating Station was in service. Now this major transmission link between San Diego and the Los Angeles basin serves as a back up to each area during emergency transmission and resource

[56] Exhibit CAISO-502, p. 16.
[57] Exhibit SDG&E-3.2R, p.
[58] Exhibit CAISO-500, p. 11.
[59] Id. at p. 11-12.
[60] Exhibit CAISO-502, p. 17-18.

conditions. The Commission should not select an alternative that limits the transfer capabilities on an important 230 kV corridor that plays a key role in the reliability of the LA Basin and San Diego in order to address a local reliability issue that can instead be addressed by the SOCRE project.

The CAISO analysis of alternatives C1, C2 and D found numerous overloading concerns under Category B and Category C contingencies in the South Orange County and SCE systems, which would significantly impact transfer capability on the 230 kV corridor under transmission normal and contingency conditions in the Southern Orange County and the rest of Southern California systems. The CAISO identified four thermal overloads for Category B contingencies and 56 thermal overloads for Category C contingencies in the 2024 Summer Off-Peak case.[61] Even for the 2024 Summer Peak case with only about 200 MW flowing northbound between the two areas, there were three thermal overloads identified for Category C contingencies.[62] This indicates that the Alternatives have significant adverse impacts on the transfer capability between the two areas and system operation without further improvement in the South Orange County system.

To maintain transfer capability between the Los Angeles and San Diego bulk electric power supply systems, major portions of the existing 138 kV transmission lines between the Talega Substation and the Capistrano Substation would need to be rebuilt or upgraded.[63] The CAISO would also need to conduct additional detailed analysis to identify whether additional upgrades to transmission facilities in the SCE system would be needed. Given the significant additional costs of including these upgrades in the scope of these alternatives, the CAISO expects that the Group 3 DEIR alternatives would not be cost effective when compared to the SOCRE project.[64]

iv. *RDEIR Alternative F*

Alternative F does not provide an electrically equivalent new 230 kV transmission source in South Orange County when compared to the SOCRE project. In terms of system power flow performance and reliability, the new Rancho Mission Viejo Substation would be inferior to the new Capistrano Substation proposed in the SOCRE project.

[61] Exhibit CAISO-502, p. 17-18.
[62] Id. at p. 18.
[63] Id.
[64] Id.

The Rancho Mission Viejo Substation is an electrically inferior 230 kV transmission source because (1) it is not electrically located in the load center of South Orange County, and (2) there are only two 138 kV lines connected to the existing Rancho Mission Viejo Substation. The limited electrical connectivity between the Rancho Mission Viejo Substation and the rest of the South Orange County system makes it an inferior second transmission source than the Capistrano Substation, as proposed in the SOCRE Project. The six 138 kV connections at the proposed Capistrano Substation make it well designed to address future load growth without requiring additional system improvements, compared to the two 138 kV connections at the Rancho Mission Viejo Substation.

In addition, because the Rancho Mission Viejo Substation is only one bus away from the Talega Substation, cascading impacts can occur at Rancho Mission Viejo Substation during contingencies at the Talega Substation. The loss of the Talega 138 kV substation (Category D event) would also trip one of the two 138 kV lines out of the Rancho Mission Viejo Substation.[65] This would result in cascading outages on the remaining 138 kV line and lead to interruption of all load service in the South Orange County area, except the distribution load served by the Rancho Mission Viejo Substation. The remaining 138 kV line at the Rancho Mission Viejo Substation would be not be able to serve the other substation loads in the area. This is due to the poor location of the new second transmission source and its weak link with the rest of main 138 kV system.

To meet NERC and CAISO planning standards, Alternative F would need to be modified to upgrade the 138 kV line between Talega and Laguna Niguel in addition to the Alternative F improvements.[66] Also, to avoid cascading outages, an additional 138 kV line may be needed between the Rancho Mission Viejo, Margarita or Trabuco Substations because upgrading the existing 138 kV lines out of the Rancho Mission Viejo Substation may not be feasible or adequate to address the identified contingency concerns. More system improvements to address load growth would also likely be necessary in the future because of the inferior locational attributes of the Rancho Mission Viejo Substation.[67]

[65] Exhibit CAISO-502, p. 19 & Appendix A, p. 27.
[66] Exhibit CAISO-502, p. 19 & Appendix A, p. 27.
[67] Id. at p. 20.

v. *RDEIR Alternative G*

RDEIR Alternative G, which includes a new 138-kV San Luis Rey–San Mateo Line and San Luis Rey Substation Expansion will meet the CAISO-identified reliability objectives. However, adding a new long 138-kV San Luis Rey–San Mateo line as the new transmission source into the South Orange County area is a significantly weaker source than any of the 230 kV transmission alternatives. Similar to Alternative F, the new transmission source is not electrically located in the load center. There are only two 138 kV lines out of the existing San Mateo Substation, and it is only one bus away from the Talega Substation, which makes the two transmission sources not fully independent.[68] This concern is discussed in more detail below.

The loss of the Talega 138 kV substation (a Category D event) would trip one of the two 138 kV lines out of the San Mateo Substation. The remaining 138 kV line at the San Mateo Substation would be inadequate to serve the other substation loads in the area, resulting in interruption of all load service in the South Orange County area, except the distribution load served by the San Mateo Substation.[69] This is similar to the poor location issue for Alternative F discussed above.

In addition, if the Commission approves Alternative G improvements would be necessary to meet NERC or CAISO transmission planning standards. Specifically, the 138 kV lines between Talega and Laguna Niguel and between Talega and Pico would need to be upgraded.[70] In addition, as described above, to avoid cascading outages, additional upgrades may be needed at the 230/138 kV San Luis Rey Substation and between San Mateo, Laguna Niguel, and Capistrano.[71] More system improvements to address load growth would also likely be needed in the future due to the inferior locational attributes of a new source at the San Mateo substation.[72] Given the additional costs of including these upgrades in the scope of this alternative, the CAISO expects it would not be cost effective when compared to the SOCRE project.

[68] Exhibit CAISO-502, p. 20.
[69] Exhibit CAISO-502, p. 20 & Appendix A, p. 28.
[70] Id.
[71] Id.
[72] Id. at p. 20-21.

vi. RDEIR Alternative J

The CAISO performed analysis of Alternative J in response to the RDEIR. Based on this analysis, the CAISO found overloads on the single proposed 230/138 kV transformer at Trabuco Substation.[73] Even in event the thermal overload is mitigated by the addition of a second transformer, the CAISO found additional thermal overloads caused by Alternative J.[74] The CAISO reviewed whether an SPS could be put in place to address identified reliability concerns and found that such an SPS would be infeasible as it would trigger an exceedingly complex SPS that would not meet the CAISO Planning Standards.[75] In order to address identified reliability violations and to mitigate negative impact on transfer capability consistent with the SOCRE Project, the following system improvements would be required:

- modify Alternative J to meet industry standards for substation design;
- eliminate aged Bank #60 and #62 transformers at Talega Substation and standardization of the 230/138/69 kV Talega substation;
- add a second 230/138 kV transformer at Trabuco Substation;
- upgrade of TL13835A of the Talega-San Mateo- Laguna Niguel three-terminal-line from Talega Tap to Laguna Niguel;
- upgrade TL13846A of the Talega-San Mateo-Pico three-terminal-line from Talega to Talega Tap33;
- upgrade TL13816 from Pico to Capistrano;
- upgrade TL13836 from Talega to Pico;
- reconfiguring the Trabuco-Capistrano-Pico-Laguna Niguel 138 kV system;
- increase ampacity ratings of the SCE owned Ellis-Santiago 220 kV transmission circuit by replacing terminal equipment at Ellis/Santiago substations and an increase of clearance on transmission spans along the circuit; and
- increase ampacity ratings of the SCE owned Ellis-Johanna 220 kV transmission circuit by replacing terminal equipment at Ellis/Johanna substations and an increase of clearance on transmission spans along the circuit.[76]

[73] Exhibit CAISO-505, p. 4 & Appendix A, p. 8.
[74] Exhibit FRONTLINES-436.
[75] Tr. at 336, ln. 23-26.
[76] Exhibit CAISO-505, p. 5-6.

The upgrades to the SCE owned Ellis-Santiago and Ellis-Johanna lines may be unnecessary if sufficient preferred resources are developed in the area, but when compared to the SOCRE Project, Alternative J will exacerbate the need to upgrade these lines or increase the need for generation and storage resources in the area.[77] Frontlines contends, without any factual context, that there is "nearly identical" overloading in Alternative J and the SOCRE Project.[78] However, the CAISO studies indicate that approximately 100 MW of additional generation or storage resources would be needed in the San Diego area to mitigate the incremental impact of Alternative J.[79]

2. Intervenor Proposed Alternatives

In addition to the RDEIR alternatives, the CAISO reviewed each alternative proposed by intervenors in this proceeding.

i. ORA's Pico and Trabuco Alternatives

ORA proposed two alternatives to the SOCRE Project. The first would interconnect SDG&E's Trabuco Substation to SCE's San Onofre–Santiago transmission line (Trabuco Alternative). This alternative would separate the South Orange County load into two parts by opening some of the 138 kilovolt (kV) circuit breakers without any factual information. In the Trabuco Alternative, the existing Talega Substation would partially supply South Orange County load and an upgraded Trabuco Substation would supply the remainder under normal operating conditions. ORA's second alternative proposes to interconnect SDG&E's Pico substation to one of SCE's 230 kV transmission lines (Pico Alternative). Similar to the Trabuco Alternative, the Pico Alternative would separate South Orange County load into two parts by opening some 138 kV circuit breakers.

Although these alternatives address some of CAISO-identified reliability concerns, they create new reliability concerns. Both alternatives would result in substantial single contingency load dropping in the South Orange County area.[80] Modifying the South Orange County system in a way that causes single contingency load shedding that does not exist today would be a

[77] Id. at p. 5.
[78] Exhibit FRONTLINES-401, p. 7.
[79] Tr. at 392.
[80] Exhibit CAISO-504, p. 2.

degradation of customer service and is not acceptable.[81] ORA does not provide detail on how the South Orange County system would be split, however, for the Trabuco Alternative the CAISO estimates that 245-396 MW of South Orange County load, or about 50%-81% of total area load, would be served by the new Trabuco 230 kV source would be interrupted for an N-1 outage of the Trabuco 230/138 kV transformer (T-1).[82] Similarly, for the Pico Alternative, the CAISO estimates that 205-402 MW South Orange County load, or about 42%-82% of total area load that would be served by the new Pico 230 kV source would be interrupted for an N-1 outage of Pico 230/138 kV transformer (T-1).[83] In addition, both the Trabuco and Pico Alternatives would result in the Margarita, Rancho Mission Viejo, and Laguna Niguel substations being served from a single radial 138 kV transmission line, thereby making it subject to single contingency load dropping.[84]

ORA's proposed separation of the South Orange County transmission system would sacrifice operational reliability and flexibility in the area because the four 138 kV lines between the northern and southern South Orange County area would normally be operated as radial lines. Although the two 230 kV power supplies could back up each other to serve the South Orange County South Orange County load under contingencies, customers would likely experience much more frequent widespread service interruptions.

ii. Frontlines Alternative J Variant

In its rebuttal testimony on the RDEIR alternatives, Frontlines suggests that Alternative J can avoid the CAISO-identified overload of the single 230/138 kV transformer at Trabuco Substation by "simply opening the Trabuco-Santiago circuit in the event of outages on both SONGS-Santiago and SONGS-Trabuco."[85] Frontlines provides no evidentiary support for this solution in the form of actual power flow data. This solution causes other reliability issues as identified in CAISO's response to Frontlines' data request.[86] The CAISO also reviewed whether these issues could be resolved by the institution of an SPS, but found that such an SPS would be

[81] Id. at p. 2-3.
[82] Id. at 3.
[83] Id. at 3.
[84] Id. at 3.
[85] Exhibit FRONTLINES-401, p. 6.
[86] Exhibit FRONTLINES-436. See answer to question 5 which identifies various overloads in the event the overload at the Trabuco 230/138 kV is mitigated.

infeasible as it would trigger an exceedingly complex SPS that would not meet the CAISO Planning Standards.[87] In order to address the identified reliability violations and to mitigate negative impact on transfer capability consistent with the SOCRE Project, the system improvements would be required as the same as what are identified for RDEIR Alternative J.

iii. SJC's Alternative F Variant

SJC proposed a slightly modified variation to the RDEIR's Alternative F that would reconfigure the Talega-Rancho Mission Viejo 138 kV circuit to bypass Talega Substation and directly tie with the Talega-Pico 138 kV line. The CAISO analyzed this modified Alternative F and found five overloads based on Category C contingencies.[88] The CAISO also found one Category D contingency that resulted in cascading outages at Rancho Mission Viejo Substation.[89]

The CAISO also performed a long-term sensitivity case with a very moderate load growth forecast and determined that Category C overloads would increase over time.[90] Based on this sensitivity case, SJC's modified Alternative F would result in 9 thermal overload concerns on five separate elements caused by 6 different contingency combinations.[91] In comparison, based on the same load forecast, the SOCRE Project results in no thermal overloads over the same time frame. In order words, the modified Alternative F could not mitigate the reliability concerns by implementing a SPS as it would trigger an exceedingly complex SPS that would not meet the CAISO Planning Standards. This shows that Alternative F, even as modified by SJC, is a short-term solution that will require more transmission system improvements over a shorter time period than the SOCRE Project.

IV. Environmental Impacts of Project

D. Infeasibility of Mitigation Measures or Project Alternatives

The California Environmental Quality Act (CEQA) defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."[92] The alternatives to

[87] Tr. at 336, ln. 23-26.
[88] Exhibit CAISO-504, p. 4-6.
[89] Id. at p. 7.
[90] Id at. p. 7-11.
[91] Id. at p. 7.
[92] CEQA § 21061.1.

the SOCRE Project are infeasible based on their technological failure to meet the all of the basic project objectives. The CAISO has examined each alternative put forth in this proceeding and has determined — through the use of detailed power flow studies — that each alternative either fails to address all identified reliability concerns or creates additional reliability concerns that cause concern and require additional study.

Because these alternatives only represent partial solutions to the reliability problems identified by the CAISO, they will require additional improvements as detailed in the sections above. Making the additional improvements will increase the costs, thereby making these alternatives increasingly economically infeasible.

IX. Conclusion

The evidence on the record on this proceeding clearly documents the need to address reliability concerns in the South Orange County area. Without action, the transmission system will not be capable of meeting applicable NERC and CAISO planning standards due to the multiple thermal overloads under Category C contingencies. The CAISO, as the NERC registered transmission planner, has an obligation to create a corrective action plan to address these system reliability issues. As a part of the 2010-2011 transmission plan, the CAISO identified the SOCRE Project to mitigate these reliability issues. Based on updated analysis in this proceeding, the CAISO's initially identified reliability concerns will persist if no solution is implemented. The SOCRE Project mitigates all reliability issues and provides a second 230 kV transmission source to the South Orange County transmission system while maintaining transfer capability on the existing 230 kV SCE-SDG&E transmission corridor.

The EIR and intervening parties have put forth alternatives to the SOCRE Project that are also designed to mitigate the reliability issues identified in the South Orange County area. However, all of these alternatives fail to provide the same robust level of service that will be provided by the SOCRE Project. The alternatives suffer from differing shortcomings. In some circumstances, the alternatives fail to meet the identified reliability issues. In others, the alternatives do not provide an adequate second transmission source for the South Orange County system, thereby failing to resolve reliability issues related to maintenance outages and cascading blackout events. Lastly, some alternatives provide a second power source from the SCE system at a cost to transfer capability on the 230 kV network, thereby jeopardizing the long-term value of the 230 kV transmission system to solve a 138 kV system reliability issue.

Based on the foregoing, the Commission should approve SDG&E's request for a certificate of public convenience and necessity for the SOCRE Project as necessary and prudent to meet reliability concerns in South Orange County.

Respectfully submitted

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