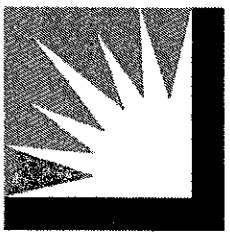
WDT315 [redacted]

TECHNICAL ASSESSMENT III

December 1, 2014



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Generation Interconnection Planning

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Appendices

I. PURPOSE AND INTRODUCTION

[redacted] submitted an interconnection request to the Southern California Edison Company ("SCE") for the interconnection of its [redacted] (Project), pursuant to the Cluster Large Generator Interconnection Procedures under the SCE Wholesale Distribution Access Tariff ("WDAT") as part of the East of Lugo Transition Cluster under both Phase I and Phase II. Since the completion of the Phase II Study, all Transition Cluster projects located north of SCE's Kramer Substation, with the exception of the Project, have since withdrawn their interconnection request and it was determined that the upgrades identified in the Transition Cluster Phase II Study would not all be necessary for the interconnection of the Project.

SCE completed two Technical Assessment Studies (TAS) which evaluated the adequacy of SCE's electric system, including that portion of SCE's electrical system that is part of the CAISO controlled grid, to accommodate the proposed Project. The results of the Technical Assessments were utilized to redefine the appropriate facilities required to interconnect the Project as stipulated in the August 25, 2011 Letter Agreement. The findings were delivered to the Customer and discussed at the TAS II Results Meeting on June 22, 2012. At the TAS II Results Meeting, the Interconnection Customer requested SCE explore more economical alternatives to some of the telecommunication upgrades cited in TAS II.

Since the time of the TAS II Results Meeting, there has been a significant shutdown of existing generation in the North of Kramer area, as well as the withdrawal of the earlier-queued Green Borders (CAISO Queue #58) project. This TAS III reassesses the upgrades necessary for the Project to interconnect with Energy Only Deliverability Status and Full Capacity Deliverability Status at the requested point of interconnection (POI) at SCE's [redacted], taking into account recent generation shutdowns in the North of Kramer area, the withdrawal of CAISO Queue #58, and the use of [redacted] (Digital 395) as a telecom path option.

II. STUDY ASSUMPTIONS AND METHODOLOGY

This assessment was conducted using the applicable reliability criteria to ensure the SCE owned CAISO Controlled Grid is compliant with the North American Electric Reliability Corporation (NERC) Reliability Standards, WECC approved Regional Criteria, and the CAISO Planning Standards.[2] Generation production profiles used in this study were taken from the CAISO's 2014 - 2015 study plan.[3] Peak load assumptions utilized a 1-in-10 year heat adjustment and off-peak load assumptions assumed 60 percent of peak load with a 1-in-2 year heat adjustment. Furthermore, this assessment was performed with the Victor Loop-In Project[4] modeled in the base cases and the assessment also took into account the recent and planned shutdowns of existing generation in the North of Kramer area. SCE's Victor Loop-in Project will loop the existing Kramer-Lugo No.1 & No.2 220 kV lines into Victor Substation by the year 2016, and

[1] http://digital395.com/index.html
[2] http://www.caiso.com/Documents/FinalISOPlanningStandards-September182014_v2.pdf
[3] http://www.caiso.com/Documents/2014-2015FinalStudyPlan.pdf (pp. A-14 to A-16)
[4] http://www.caiso.com/Documents/Board-Approved2013-2014TransmissionPlan_July162014.pdf (p. 116)

the recent and planned generation shutdowns total approximately 196 MW[5].

III.STUDY RESULTS

A. Power Flow Analysis

The recent and planned shutdown of approximately 196 MW of generation in the North of Kramer area created a low voltage issue during the development of the pre-base cases for this TAS III. SCE is currently developing the appropriate mitigation for this pre-Project issue, but for the purposes of this TAS III, two 115 kV capacitor banks were modeled at the Inyokern 115 kV Bus.

The TAS III determined that the addition of the Project results in the thermal overloads depicted in Tables 1 and 2.

[5] The approximate MW was based on the output values noted in the CAISO's 2014-2015 Study Plan located at: http://www.caiso.com/Documents/2014-2015FinalStudyPlan.pdf (pp. A-14 to A-16).

Based on the Power Flow results, the Project will need the following upgrades to mitigate thermal overloads on the

- Upgrade the existing
- Participate in the existing for the following outages:
  - N-1 Control-Coso-Haiwee-Inyokern 115 kV T/L
  - N-1 Control-Haiwee-Inyokern 115 kV T/L
  - N-2 Control-Coso-Haiwee-Inyokern & Control-Haiwee-Inyokern 115 kV T/Ls

The Power Flow Plots are included in Appendix A.

B. Transient Stability Analysis

The existing is designed to prevent transient instability in the area by tripping local generation for either:

- Loss of both the Control-Coso-Haiwee-Inyokern & Control-Haiwee-Inyokern 115 kV T/Ls, or
- Loss of either the Control-Coso-Haiwee-Inyokern 115 kV T/L or the Control-Haiwee-Inyokern 115 kV T/L when the SCE/LADWP Inyo 230 kV Intertie is open.

Because the Project contributes flows on the Control-Coso-Haiwee-Inyokern & Control-Haiwee-Inyokern 115 kV T/Ls, the Project will also be required to participate in the for these outages due to transient stability concerns.

C. Post Transient Voltage Analysis

The post transient analysis focused on evaluating the system after the inclusion of the Project with the use of existing and modified RAS, and assuming all new generation projects meet their power factor requirements. Under such conditions, the post transient results showed acceptable system performance.

D. Short-Circuit Duty

A revised SCD analysis was performed to account for the Project's Point of Interconnection (POI) change, and no SCD issues were identified.

IV. CONCLUSION – COST/SCHEDULE

Consistent with previous study results, the existing SCE transmission facilities are not adequate to accommodate the Project without facility upgrades. The following upgrades are required by the Project for either an Energy Only or a Full Capacity interconnection:

1. Distribution Upgrades for this project include associated substation, telecommunications, environmental and licensing for a new 33kV circuit to interconnect the Project.

2. Network Upgrades for this project includes:

    a. Replacing the [redacted]

    b. Install and perform the necessary telecomm, power system control, and protection requirements to add the Project to the existing [redacted]

    c. Upgrade the [redacted] consistent with WECC requirements.[6]

The cost estimates that have been identified to mitigate planning criteria violations triggered by the Project are provided below in Table 3. Cost estimates identified to upgrade the [redacted] by SCE using Digital 395 as a telecom path are provided in Table 4. All cost estimates are rough order of magnitude estimates and are non-binding.

[6] SCE financial responsibility.

Table 3: Non-binding Cost Estimate for Project Triggered Upgrades, Financial Responsibility of Interconnection Customer

#	Distribution Upgrade	$ in 2014 Dollars[7]
	Subtransmission	
1	33 kV generation tie-line	$3,371,186
	Casa Diablo Substation	
2	Distribution Upgrades for Substation	$2,129,012
3	Install relays for [redacted] at the Casa Diablo Substation	$714,540
	Telecommunication	
4	Install SCADA for Renewable Interconnection telemetry	$346,806
5	Install lightwave and associated equipment to include WDT315 in SCE RAS	$801,179
6	Install fiber optic cable from Digital 395 to Casa Diablo Substation	$1,441,780
	Environmental Health and Safety	
7	Support the generation tie-line	$1,543,308
8	Activities related to Casa Diablo Substation	$91,846
9	Activities related to the fiber optic scope	$609,561
	Licensing	
10	Activities related to Support of the generation tie-line	$18,068
	Real Properties	
11	Retail Meter and Generation Facility	$1,317,458
12	Activities related to the fiber optic scope	$160,909
	Metering Services	
13	Retail Meter and Generation Facility	$40,653
14	**Power System Control**	
15	RTU at Generation Facility	$97,868
16	Two RTU's at Casa Diablo Substation	$198,748
17	SPS Program modification and testing, point addition for the [redacted]	$411,750
	Subtotal =	$13,294,672
#	**Reliability Network Facilities - Interconnection Customer**	**$ in 2014 Dollars[8]**
	Substation	
1	Replace Inyo Phase Shifter and new hybrid circuit breaker	$19,700,806
2	Install (2) pairs of protection relays	$229,754
	Information Technologies	
3	Terminal equipment at Control and Inyo Substations	$507,465
	Corporate Environmental Health & Safety	
4	Activities related to phase shifter transformer and circuit breaker	$64,688
	Subtotal =	$20,502,713
	Total =	**$33,797,385**

[7] Estimated Cost includes Income Tax Component of Contribution (ITCC)
[8] Estimated Cost includes Income Tax Component of Contribution (ITCC)

Table 4: Non-binding Cost Estimate for Participating TO Triggered Upgrades
Financial Responsibility of Participating TO (SCE)

#	Reliability Network Facilities – Participating TO (SCE)	$ in 2014 Dollars
	Digital 395 Backbone	
1	a. Information Technologies: DWDM, lightwave, CRIARS, cross connects and associated equipment at Kramer, Inyokern, Coso, Control, and Skiland Substations. A single fiber optic cable will be installed from SCE/Digital 395 vaults into the communications rooms at Kramer, Inyokern Coso, Control, and Skiland Substations. b. Corporate Environmental Health and Safety: Provide review, survey, licensing, and other activities related to the fiber optic cable taps into Kramer, Inyokern, Coso, Control, and Skiland Substations. c. Real Properties: Acquire land rights for the fiber optic cable taps into Kramer, Inyokern, Coso, Control, and Skiland Substations.	
	Subtotal =	$8,558,186
	[redacted] **Upgrade**	
2	a. Information technologies: Install channel, cross connects, and associated equipment at Control, Inyo, and Inyokern Substations for diversely routed circuits between Control and Inyokern Substations and Control and Inyo Substations. b. Power System Controls: Replace legacy RTU with new RTU at Inyokern Substation. Point additions for existing RTUs at Control and Inyo Substations. SPS Programming and testing will be performed. c. Substations: Install relays/materials as follows: i. Inyo – Two (2) N60 relays, one (1) satellite clock, and one (1) ethernet switch ii. Control – Twelve (12) N60 relays, one (1) satellite clock, and two (2) ethernet switches iii. Inyokern – Two (2) N60 relays, one (1) satellite clock, one (1) ethernet switch, and expand the existing MEER d. Corporate Environmental Health and Safety: Provide review, survey, licensing, and other activities related to the MEER expansion at Inyokern.	
	Subtotal =	$2,849,102
	Total =	**$11,407,288**

A significant amount of facilities are necessary to mitigate project overloads and transient stability issues, which are caused and/or aggravated with the addition of the Project. These upgrades may require licensing with appropriate permitting agencies. As a result, the following timelines are a good faith estimate based on past permitting requirements. Such timelines should be viewed as nonbinding estimates and are not meant to imply that Project approval for these upgrades will be issued by the appropriate permitting agencies.

Non-binding timeline estimate:
a) The time required for the preparation of CEQA and/or NEPA applications, is estimated at 24 months once a complete project scope is defined.

b) The time required for review and approval by permitting agencies is estimated at approximately 36 months once the application submittal is deemed complete by the permitting agencies.

c) The time required to complete final engineering, material procurement, and construction of the proposed scope of work is estimated at approximately 24 months after obtaining project authorization, funding, and receiving all necessary permits and regulatory approvals from the appropriate agencies.

These activities are typically sequential in nature, and therefore, the overall non-binding timeline estimate is approximately 84 months.

Appendix A Power Flow Plots