
Appendix A – WDT357

[REDACTED]
[REDACTED]
[REDACTED] PHASE II REPORT

November 5, 2012

This study has been completed in coordination with Southern California Edison per CAISO Tariff Appendix Y for Interconnection Requests in a [REDACTED]

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Attachments:

1. Allocation of Network Upgrades for Cost Estimates
2. Short Circuit Calculation Study Results (see Appendix H of the group report)

A. Executive Summary

In accordance with the California Independent System Operator Corporation (CAISO) Tariff Appendix Y Section 8.1 [REDACTED] an Interconnection Customer (IC), has elected the one-time Full Capacity Deliverability status option within the [REDACTED] Application Window for its proposed [REDACTED] (Project).

Previously, the IC submitted a completed Interconnection Request (IR) to Southern California Edison (SCE) for interconnection and distribution service under the terms of SCE's Wholesale Distribution Access Tariff (WDAT) for the Project. The Project is a generation facility consisting of a 20 MW photovoltaic solar power generating facility in [REDACTED], with the project site located at the [REDACTED]. The IC proposes to connect the [REDACTED] to the existing 34.5KV distribution line along [REDACTED] served out of [REDACTED]. The IC requested an In-Service Date of May 1, 2013 and a Commercial Operation Date of July 1, 2013 for the Project. The estimated cost and schedule for the Interconnection Facilities, Distribution Upgrades and Reliability Network Upgrades required to interconnect the Project, under Energy Only Deliverability status have been addressed in SCE's System Impact Study (SIS) report dated November 10, 2011 and SCE's Facilities Study (FS) dated August 9, 2012.

As requested, the Project was included in the [REDACTED] Phase II deliverability assessment for the Full Capacity Deliverability status evaluation.

The report provides the following:

1. Identifies impacts on the CAISO Controlled Grid of the Project associated with the Full Capacity Deliverability status;
2. Identifies all Delivery Networks Upgrades required to provide the Project with Full Capacity Deliverability status;
3. Identifies Reliability Network Upgrades required due to Full Capacity Deliverability status;
4. Identifies Distribution Upgrades required due to Full Capacity Deliverability status
5. Establishes the cost responsibility for Network Upgrades and Distribution Upgrades assigned to the IC due to Full Capacity Deliverability status.

The non-binding cost estimates for the required facilities of the Project to achieve Full Capacity Deliverability status are as follows:

Reliability Network Upgrades	\$ 25,000
Delivery Network Upgrades:	\$ 10,719,000
Distribution Upgrades	\$ 103,127,000

These costs are in addition to what have been established in the interconnection studies for the Energy Only Deliverability status. The non-binding schedule to license, engineer, and construct the Delivery Network Upgrades is approximately 84 months, and the non-binding schedule for the allocated Distribution Upgrades is 84 months. The schedule provided is from the signing of the new/amended Generator Interconnection Agreement receipt of: all required information, funding, and written authorization to proceed from the IC as will be specified in the amended Generator Interconnection Agreement to commence the work.

B. Project and Interconnection Information

For Project description and Project plan of service/point of interconnection discussion please refer to the previously issued report(s) related to the "Energy Only" portion of the Project.

C. Study Assumptions

For detailed assumptions, please refer to the [REDACTED] area group report. Project specific plan of service assumptions remain the same as in the previously issued report(s) related to the "Energy Only" portion of the Project.

D. Power Flow Analysis

Because the power flow reliability impacts of the project have been identified in the Energy Only interconnection study, there were no identified power flow reliability issues associated with the Project changing from Energy Only to Full Capacity Deliverability status.

E. Short Circuit Analysis

The short circuit methodology for [REDACTED] is discussed in the group report. Based on this methodology there are no Short Circuit Duty (SCD) mitigation costs allocated to this project.

F. Reactive Power Deficiency Analysis

Because the post-transient voltage reliability impacts of the project have been identified in the Energy Only interconnection study, there were no identified post-transient voltage reliability issues associated with the Project changing from Energy Only to Full Capacity Deliverability status.

G. Transient Stability Evaluation

Because the transient stability reliability impacts of the project have been identified in the Energy Only interconnection study, there were no identified transient stability reliability issues associated with the Project changing from Energy-Only to Full Capacity Deliverability status.

H. Deliverability Assessment

CAISO performed an On-Peak Deliverability Assessment for generation projects in the SCE Eastern area, the study assumption and detailed results for SCE Eastern area can be found in Section F of the group report.

In the deliverability assessment for SCE's Eastern area, [REDACTED]

[REDACTED]
[REDACTED] within the 5% DFAX circle [REDACTED]
[REDACTED] below.

Contingency	Overloaded Facility	Overload	Generators within 5% DFAX Circle	DFAX
[REDACTED]	[REDACTED] 500 kV	[REDACTED]	WDAT357	11%
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Although as indicated in the group report, the [REDACTED]

[REDACTED] constraint is more a local constraint than an area constraint.

In C3C4 Phase II study, by the methodology explained in the group report, the new 500 kV line from Colorado River to Valley will be removed. All generators, which requested full capacity in SCE Eastern area and are subject to constraints that can be mitigated by the 500 kV line, will be granted full capacity status with the assumption that total generation that will materialize eventually will not exceed a certain level, which is about 4000 MW as indicated in the group report. However, this does not apply to the WDT357 project because the J.Hinds – Mirage constraint is a local constraint that may be triggered when the operation condition changes in the local area, even the overall new generation in the SCE eastern area would still be less than 4000 MW.

A sensitivity study has been performed for this local area. In this study the local pumping loads were modeled at the level of historical summer peak hour, which is 150 MW. As comparison, the SCE Eastern area assessment assumed the local pumping load at the level of 286 MW, which is close to the maximum capacity. SCE's Eastern generation was modeled less than 4000 MW to meet the condition of removing the new 500 kV line upgrade. The study result is shown below.

Contingency	Overloaded Facility	Overload
[REDACTED]	[REDACTED]	[REDACTED]

Although the existing SPS of tripping [REDACTED] would mitigate the overload it also could result in voltage deviation criteria violations and is therefore unacceptable. As a result, any new generation projects in this area would aggravate the overload, would need to be curtailed, and therefore would not be deliverable. Therefore, any new generation projects in this area will not be deliverable without additional upgrades.

As a result of this criteria violation, facility upgrades would be required to relocate the interconnection point for the [REDACTED] to a new distribution system out of Colorado River substation to limit flows on the [REDACTED] line.

I. Environmental Evaluation/Permitting

Please see Section L of the [REDACTED] area group report.

J. Upgrades, Cost Estimates and Construction schedule estimates

The Distribution Provider's allocated Network Upgrades and Distribution Upgrades necessary for the project to achieve Full Capacity Deliverability status described in this section are based on the Distribution Provider's preliminary engineering and design. Such descriptions are subject to modification to reflect the actual facilities constructed and installed following the Distribution Provider's final engineering and design, identification of field conditions, and compliance with applicable environmental and permitting requirements.

1. Network Upgrades.

(a) Stand Alone Network Upgrades - None.

(b) Other Network Upgrades.

(i) Distribution Provider's Reliability Network Upgrades.

1. Expand Colorado River Substation SPS.

Add Project to previously triggered Colorado River Substation SPS as a participant eligible for arming and tripping under loss of one 500/220 kV transformer bank at the Participating TO's Colorado River Substation.

The timing of this SPS is contingent upon the installation of more than one 500/220 kV transformer bank, which is contingent upon the development of generation projects interconnecting to the Participating TO's Colorado River Substation 220 kV bus.

2. Expand Colorado River Corridor SPS.

Add Project to previously triggered Colorado River Corridor SPS as a participant eligible for arming and tripping under loss of 500 kV Transmission lines connecting Colorado River, Red Bluff, Devers and Valley 500 kV substations.

The timing of this SPS is contingent upon the development of queued ahead generation projects interconnecting to the Participating TO's Colorado River, Red Bluff, and Devers Substations.

(ii) **Distribution Provider's Delivery Network Upgrades.**

Eastern Area Delivery Network Upgrades Allocated to Project:

1. Colorado River Substation.

Install a third 500/220 kV transformer bank at Colorado River Substation as follows:

- a. Extend the 220 kV North and South Buses and install the sectionalizing circuit breakers.
- b. Install a 500 kV Double Breaker Bank Position to connect the new 500/220 kV transformer bank.
- c. Install a 220 kV Double Breaker Bank Position to connect the new 500/220 kV transformer bank.
- d. Install the No.3AA 1120 MVA 500/220 kV transformer bank equipped with 873MVA Single Phase Units (Included one Spare unit) and 13.8 kV Tertiary Buses and corresponding Reactors.

Construction of such Delivery Network Upgrades cannot commence until the Participating TO receives all appropriate permitting approvals and licenses.

2. Devers – Red Bluff No.1 500 kV T/L Upgrade.

Eliminate Line Clearances restrictions to upgrade the continuous rating of the line to 3,800A.

Devers 500/220 kV Substation

Replace all equipment on the existing Palo Verde (future Red Bluff No.1) 500 kV Line Position to upgrade the position to 4,000A Rating.

3. Real Properties, Transmission Project Licensing, and Corporate Environmental Services.

Obtain easements and/or acquire land, obtain licensing and permits, and perform all required environmental activities for the installation of Delivery Network Upgrades.

NOTE1: The timing of the Delivery Network Upgrades is contingent upon the development of queued ahead generation projects interconnecting to the Participating TO's Colorado River, Red Bluff, and Devers Substations.

NOTE2: In addition to the Devers - Red Bluff No.1 500 kV T/L upgrade, the Blythe Green I Project will not achieve the requested Full Capacity Deliverability status (as such term is defined in the CAISO Tariff) until completion of the West of Devers project. The West of Devers project (WOD) is generally described in Southern California Edison Company's Petition for Declaratory Order for Incentives Rate Treatment filed and approved by FERC (Docket EL11-10-000).

East of Pisgah Area Delivery Network Upgrades Allocated to Project:

1. Upgrade Eldorado – Lugo 500 kV Transmission Line series capacitors at Eldorado and Lugo to 3,800 Amps.
2. Upgrade Eldorado – Lugo 500 kV Transmission Line terminal equipment at Eldorado and Lugo to 4,000 Amps.
3. Upgrade Lugo – Mohave 500 kV Transmission Line series capacitor at Mohave to 3,800 Amps.
4. Equip Lugo line position at Mohave with 4000 Amps rated equipment.
5. Real Properties, Transmission Project Licensing, and Corporate Environmental Services.

Obtain easements and/or acquire land, obtain licensing and permits, and perform all required environmental activities, as necessary, for the installation of the Participating TO's Delivery Network Upgrades and associated telecommunication equipment.

NOTE: The timing of the Delivery Network Upgrades is contingent upon the development of queued ahead generation projects interconnecting to the East-of-Pisgah area.

2. Distribution Upgrades.

(a) Colorado River [REDACTED]

Install approximately fifteen circuit miles of new 115kV single circuit construction with 954ACSR Conductors and OPGW.

SUBSTATIONS

Colorado River 500/220kV Substation

Install a new 280MVA 220/115kV Transformer Bank with a dedicated 220kV Double Breaker Bank Position and a 115kV Bank / Line Circuit Breaker connecting the bank to a new [REDACTED] getaway [REDACTED]

Install a new 115/33kV Transformer Bank and a 115kV Bank / Line Circuit Breaker connecting the bank to a new Colorado River 115kV Line getaway.

Install one 33kV Service Rack equipped with a Circuit Breaker to connect to the new 115/33kV Transformer Bank and serve the [REDACTED] 33kV Gen Tie.

NOTE: At this time, without completing final engineering, it is estimated [REDACTED] will need to be extended approximately 75 Ft. to the west to create an expansion of 960 Ft. x 75 Ft.

Table K.1: Upgrades, Estimated Costs, and Estimated Time to Construct Summary

Each Upgrade category may contain multiple scope durations. The longest duration is shown under the Estimated Time to Construct.

Type of Upgrade	Upgrade (May include the following)	Description	Estimated Cost x 1,000 Constant Dollar (2012) (Note 3)	Estimated Cost x 1,000 Constant Dollar (OD Year) (Note 3)	Estimated Time to Construct (Months) (Note 2)
Reliability Network Upgrades	Reliability Network Upgrades in the group report	Allocated Network Upgrades needed to maintain system Reliability	\$25	\$27	24
Delivery Network Upgrades	Delivery Network Upgrades in the group report	Network Upgrades needed to support Full/Partial Capacity deliverability status	\$10,719	\$13,192	84
Distribution Upgrades (Note 1)	Distribution Upgrades for SCD Mitigation	Non-CAISO SCE Distribution Facilities	\$103,127	\$126,917	84
Total Cost			\$113,871	\$140,136	84

Note 1: The Interconnection Customer is obligated to fund these upgrades and will not be reimbursed. Allocated costs may change if all projects responsible for these upgrades do not execute an Interconnection Agreement.

Note 2: The estimated licensing cost and durations applied to this project are based on the project scope details presented in this study. These estimates are subject to change as project environmental and real-estate elements are further defined. Upon execution of the Interconnection Agreement, additional evaluation including but not limited to preliminary engineering, environmental surveys, and property-right checks may enable licensing cost and/or duration updates to be provided.

Note 3: SCE's Phase II cost estimating is done in 'constant' dollars 2012 and then escalated to the estimated O.D. year. For the Phase II Study, the estimated O.D. is derived by assuming the duration of the work element will begin in March 2013, which is the CAISO tariff scheduled completion date of the [REDACTED] plus 90 days for the Interconnection Agreement negotiations/execution. For instance, if a work element is estimated to take a total of 24 months (permitting, design, procurement, and construction), then the estimated O.D. would be March 2015. If an IC's requested O.D. (In-Service Date) is beyond the estimated O.D. of a work element, the IC's requested O.D. is used. However, should the Generator Interconnection Agreement not be executed, or the necessary information, funding, and written authorization to proceed is not be provided by the IC, in time for the Participating TO to perform the work within these time frames, the information provided in Table D.1 may be subject to change.

Note 4: Income Tax Component of Contribution. The ITCC included in this cost estimate was computed using a 35% rate.

K. Items Not Covered In This Study

For a list of items not covered in this study, see the [REDACTED] area group report.

**PAGES OMITTED FOR
CEII REGULATIONS**

Attachment 2

Short Circuit Calculation Study Results

Please refer to the Appendix H of the group report.