California ISO
Shaping a Renewed Future

2010-2011 Transmission Plan

May 18, 2011
Approved by ISO Board of Governors

Table 5.4-8 Portfolio 1 Deliverability Assessment Results

Overloaded Facility	Contingencies	Flow	Undeliverable Zone
N. Gila –Imperial Valley 500kV No. 1	Base Case	109%	Pisgah
			Mountain Pass
	Devers–Red Bluff 500kVNo. 1 & No. 2	118%	Riverside East
			Arizona

The estimated cost of the alternative is about $25million.

5.5 Assessment results and mitigations in SCE areas

5.5.1 MITIGATIONS FOR WESTERN LA BASIN OVERLOADS AND VOLTAGE CONCERNS

The Western LA Basin is a load pocket in the SCE's system along the coast that is enclosed by sixteen 230 kV lines. Inside this load pocket there are four OTC power plants that total 4 ,770 MW capacity and the San Onofre nuclear power plant with 2 ,250 MW capacity. These OTC units, except for the nuclear plant, have relatively high variable operational costs. Therefore, when the economic dispatch to accommodate renewable generation is considered, these units will be shut down first. Although the 33% RPS transmission planning studies did not have particular assumptions about OTC retirements, the OTC units were assumed not to be dispatched because of their relatively high operational costs. However, as discussed above , it is expected that much of the OTC generation will be repowered because of the need for controllable generation. Without sufficient internal generation, this load pocket may have multiple reliability concerns according to previous studies, such as the LCR study. The 33% RPS transmission planning studes identified the same problems in this load pocket.

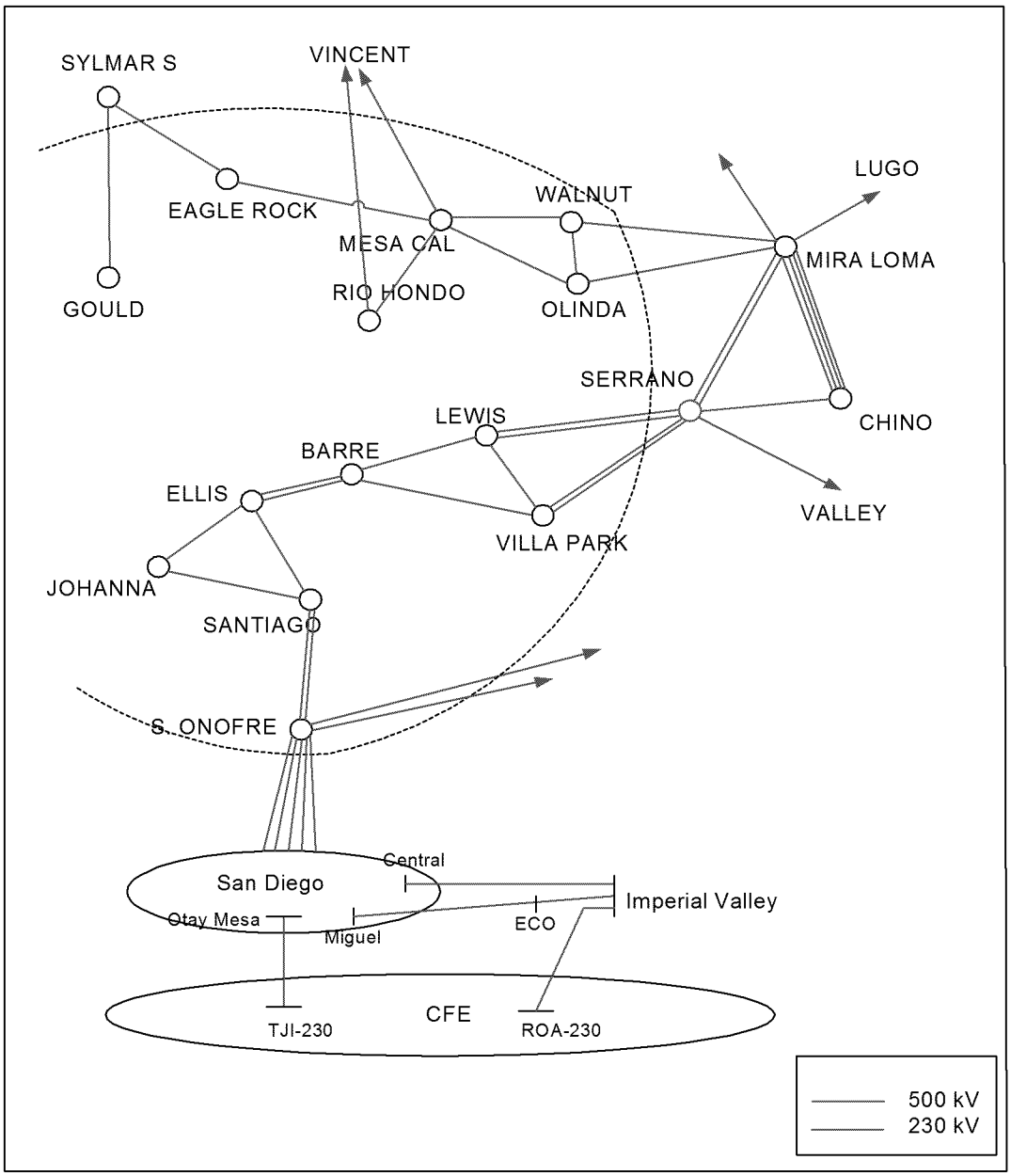
The boundary lines ofthe Western LA Basin are listed below

- SERRANO to LEWIS 230 kV #1
- SERRANO to LEWIS 230 kV #1
- SERRANO to VILLA PK 230 kV #1
- SERRANO to VILLA PK 230 kV #2
- MIRALOMA to WALNUT 230 kV #1
- MIRALOMA to OLINDA 230 kV #1
- VINCENT to MESA 230 kV #1 and #2
- VINCENT to RIOHONDO 230 kV #1
- VINCENT to RIOHONDO 230 kV #2
- SYLMAR to EAGLROCK 230 kV #1

- SYLMAR to GOULD 230kV #1
- S.ONOFRE to TALEGA 230 kV #1
- S.ONOFRE to TALEGA 230 kV #2
- S.ONOFRE to SAN LUIS REY 230 kV #1
- S.ONOFRE to SAN LUIS REY 230 kV #2
- S.ONOFRE to SAN LUIS REY 230 kV #3

The Western LA Basin system configuration is shown in Figure 5.42.

Fig. 5.4-2 Western LA Basin overview



The ISO proposes to maintain the minimum generation dispatch inside the Western LA Basin to mitigate the 230 kV line overloads, as well as the voltage instability under the outage of two SONGS units. It should be noted that San Diego generation also helps to reduce east to west flows into the Western LA Basin and provides voltage support since the Western LA Basin and San Diego area are closely connected to each other electrically. Therefore, the mitigation for the Western LA Basin thermal loading and voltage performance considers the generation dispatch in San Diego. Details of San Diego generation requirements are provided in Section 5.4.

SUMMARY OF ANALYSIS

The study identified multiple contingency overloads on the 230 kV lines inside the LA Basin in portfolios 1, 2 and 4, all in the peak load scenarios. The study also determined that a SONGS G-2 outage causes voltage collapse for the peak load scenarios in all the portfolios.

As discussed earlier in Section 5.2, the base cases for power flow and stability assessment were developed based on the production cost simulation results, which have relatively low dispatch of the conventional thermal generating units inside the load pockets. Such a dispatch caused concerns regarding reliability concerns in the load pockets. A minimum generation dispatch needs to be maintained under the heavy load conditions to mitigate reliability concerns. Alternatively, new transmission facilities would be needed to relax the minimum generation dispatch requirement. Transmission alternatives were considered and compared with the generation solution in the analysis.

Table 5.5-1 below lists all thermal overloads and voltage instability conditions when no mitigation measures are taken.

Table 5.5-1 Power Flow and Post Transient Summary without Mitigation

Overloaded Facility	Worst Contingency	Rating (A)	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case	Portfolio 2 Peak Case
	SONGS G-2		Voltage Collapse	Solved	Voltage Collapse	Solved	Voltage Collapse
LEWIS– VILLA PK 230kV line No. 1	SERRANO– LEWIS 230kV line No. 1 & No. 2	2540	116%	<100%	123%	<100%	111%
SERRANO– LEWIS 230kV line No. 2	SERRANO– VILLA PK 230kV line No. 1 & No. 2	3361	101%	<100%	106%	<100%	<100%
BARRE – LEWIS 230kV line No.1	BARRE– VILLA PK 230kV line No. 1	1494	105%	<100%	114%	<100%	<100%
BARRE – VILLA PK 230kV line No.1	BARRE– LEWIS 230kV line No. 1	1494	<100%	<100%	103%	<100%	<100%
SERRANO –VILLA PK 230kV line No.1	SERRANO –VILLA PK 230kV line No. 2	1518	<100%	<100%	103%	<100%	<100%
SERRANO 500/230kV bank No. 2	SERRANO 500/230kV bank No. 1	1344	<100%	<100%	101%	<100%	<100%

DESCRIPTION AND SCOPE OF PROPOSED MITIGATIONS

Increasing generation in Western LA Basin could mitigate the thermal overloads and voltage instability. In all the portfolios, the peak scenario has low generation dispatched in Western LA Basin. Dispatching peakers and other small generators and potential repower generators of the OTC units in both Western LA Basin and San Diego areas could mitigate all concerns. There is no transmission capital cost for the proposed mitigation.

Table 5.5-2 Power Flow and Post Transient Summary with Recommended Mitigation

Overloaded Facility	Worst Contingency	Rating (A)	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case*	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case *	Portfolio 2 Peak Case
	SONGS G-2		Solved	Solved	Solved	Solved	Solved
LEWIS–VILLA PK 230kV line No. 1	SERRANO–LEWIS 230kV line No. 1 & No. 2	2540	<100%	<100%	<100%	<100%	<100%
BARRE – LEWIS 230kV line No.1	BARRE–VILLA PK 230kV line No. 1	1494	<100%	<100%	<100%	<100%	<100%
BARRE – VILLA PK 230kV line No.1	BARRE–LEWIS 230kV line No. 1	1494	<100%	<100%	<100%	<100%	<100%
SERRANO –VILLA PK 230kV line No.1	SERRANO – VILLA PK 230kV line No. 2	1518	<100%	<100%	<100%	<100%	<100%
SERRANO 500/230kV bank No. 2	SERRANO 500/230kV bank No. 3	1344	<100%	<100%	<100%	<100%	<100%
MIRALOME –OLINDA 230kV line No.1	Barre–Villa Park 230kV line No. 1 & Barre –Lewis 230kV line No. 1	988	<100%	<100%	<100%	<100%	<100%

* No generation re-dispatch is needed for the off-peak cases

The minimum generation requirements are different for each portfolio as shown in Table 5.5.3. Note that the minimum generation requirements for San Diego are also required and modeled to mitigate SCE's LA Basin overloads and voltage instability. The requirements on San Diego internal generation to mitigate San Diego's overloads and instability have been discussed in section 5.4. Also note that Section 5.4 discussed alternative mitigations with phase shifters and series reactors for SDG&E that would reduce the San Diego generation requirement. Table 5.5.3 only considers the expected solution with generation requirements for San Diego.

Table 5.5-3 Minimum generation dispatch for each portfolio

Portfolio	Western LA Basin (MW)	San Diego (MW)
4	6550	2000
1	6700	2550
2	6200	2350

The Western LA Basin minimum generation requirement is driven by the LA Basin overloads. The overloads are more severe when more generation is dispatched in the east and the East of River path flow is higher. Therefore, more generation inside the Western LA Basin is needed for portfolio 1.

DISCUSSION OF OTHER CONSIDERED ALTERNATIVES

Alternative 1: New Mira Loma–Lighthipe 500kV line and dynamic reactive support at Santiago, Eagle Rock, Encina and South Bay (500MVAr at each location)

This alternative solution mitigated all the concerns of reliability concerns except one. Lewis–Villa Park 230kV line was still overloaded under the N-2 contingency of both Serrano–Lewis 230kV lines in Portfolio 1. An SPS would be needed to trip load at Lewis. The study results are shown in Table 5.5-5.

With the alternative mitigations in place and assuming that the proposed SPS trips 100MW load at Lewis, the minimum generation requirements for different portfolios are listed in Table 5.5-4. Under portfolio 2 peak scenario, there was relatively high north to south flow on Path 26. Therefore, the new Mira Loma –Lighthipe 500kV line provided the least relief on the west of Serrano flow. The minimum generation requirement is higher for portfolio 2 than the other two.

Table 5.5-4 Minimum generation dispatch for each portfolio (Alternative 1)

Portfolio	Western LA Basin (MW)	San Diego (MW)
4	4850	2000
1	5250	2550
2	5500	2350

The estimated cost of the alternative is about $500 million.

SUMMARY OF MITIGATIONS

The proposed mitigation, i.e., generation re-dispatch to maintain a minimum generation dispatch in Western LA Basin and SDG&E, is a less expensive solution than the alternative. However, it may result in higher operational cost than Alternative 1. Alternative 1 should be further evaluated in the next cycle of the comprehensive transmission planning study, especially after the OTC repower implementation plans become available.

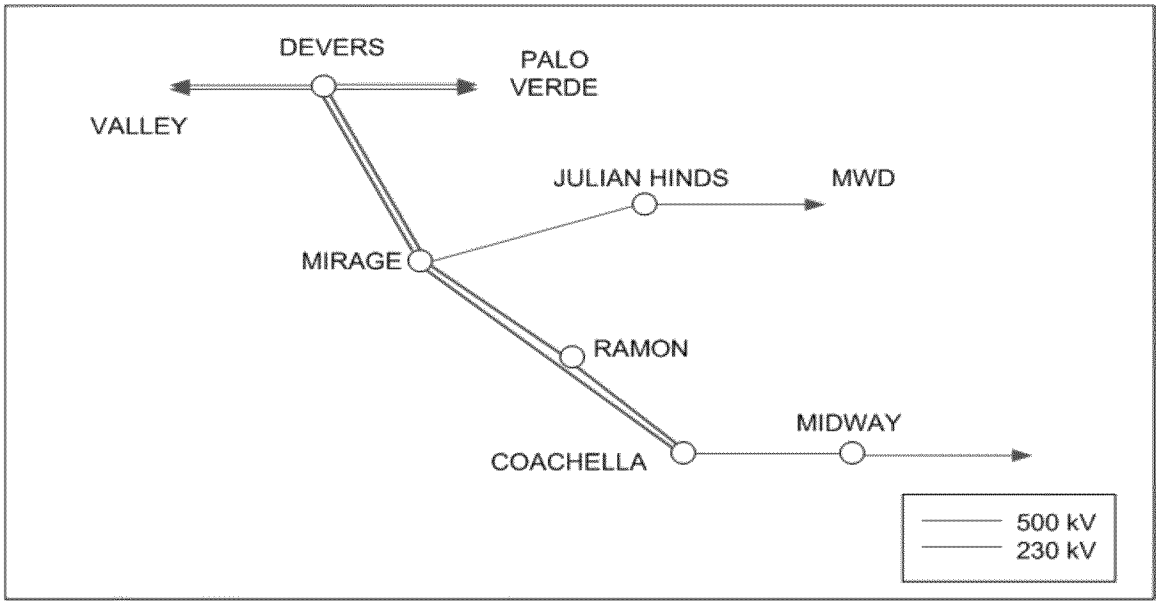
Table 5.5-5 Power Flow and Post Transient Summary with Alternative **1**

Overloaded Facility	Worst Contingency	Rating (A)	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case	Portfolio 2 Peak Case
	SONGS G-2		Solved	Solved	Solved	Solved	Solved
LEWIS–VILLA PK 230kV line No. 1	SERRANO–LEWIS 230kV line No. 1 & No. 2	2540	<100%	<100%	103%	<100%	<100%
BARRE – LEWIS 230kV line No.1	BARRE–VILLA PK 230kV line No. 1	1494	<100%	<100%	<100%	<100%	<100%
BARRE – VILLA PK 230kV line No.1	BARRE–LEWIS 230kV line No. 1	1494	<100%	<100%	<100%	<100%	<100%
SERRANO –VILLA PK 230kV line No.1	SERRANO – VILLA PK 230kV line No. 2	1518	<100%	<100%	<100%	<100%	<100%
SERRANO 500/230kV bank No. 2	SERRANO 500/230kV bank No. 3	1344	<100%	<100%	<100%	<100%	<100%
MIRALOME –OLINDA 230kV line No.1	Barre–Villa Park 230kV line No. 1 & Barre –Lewis 230kV line No. 1	988	<100%	<100%	<100%	<100%	<100%

5.5.2 Path 42 and Mirage-Devers Upgrades

Path 42 (the 230 kV lines between IID's Coachella and SCE's Mirage 230 kV substations) and Mirage – Devers 230 kV lines comprise the critical path to deliver renewable energy from IID to the ISO controlled grid. In the 33% RPS transmission planning studies, the solar, geothermal and biomass resources in Imperial North and South areas that are interconnected to IID's system have been included in all portfolios. The new potential renewable generation plus the existing IID geothermal generation makes the IID system an important renewable energy exporting area, especially during the hours when the IID load is low. Accordingly, the ISO proposes to reconductor Path 42 and Mirage-Devers 230 kV lines.

Figure 5.5-2 Path 42



SUMMARY OF ANALYSIS

The Coachella -Mirage 230kV line, Coachella -Ramon 230kV line and Ramon -Mirage 230kV line were overloaded under category A normal conditions in both peak and off-peak scenarios of portfolio 4. The same three 230kV lines were overloaded under various category B and C outage conditions in both peak and off-peak scenarios in portfolios 1, 2 and 4.

An outage of one of the Devers-Mirage 230kV No. 1 and No. 2 line overloaded the remaining line in both peak and off-peak scenarios of portfolio 4.

Deliverability assessments for portfolio 1 and 4 both identified that the deliverability of Imperial North generation was limited by the contingency condition loading on the Coachella-Ramon 230kV line.

Path 42 flows in different portfolio scenarios are listed in Table 5.5 -6. The study results are summarized in Tables 5.5-7 to Table 5.5-9.

Table 5.5-6 Path 42 Flows

	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case	Portfolio 1 No Solar Case	Portfolio 2 Peak Case
Path 42 Flow (MW)	930	960	550	500	720	500

Table 5.5-7 Power Flow Summary without Mitigation

Overloaded Facility	Worst Contingency	Rating (A)	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case	Portfolio 1 No Solar Case	Portfolio 2 Peak Case
COACHELV –MIRAGE 230kV line No.1	RAMON – MIRAGE 230kV line No.1	986	228%	216%	141%	111%	163%	132%
COACHELV –MIRAGE 230kV line No.1	DEVERS– REDBLUFF 500kV line No. 1 & No. 2 w/ SPS	986	150%	155%	127%	<100%	105%	102%
COACHELV –MIRAGE 230kV line No.1	Base Case	986	132%	117%	<100%	<100%	<100%	<100%
COACHELV– RAMON 230kV line No. 1	COACHELV– MIRAGE 230kV line No. 1	986	252%	200%	140%	110%	150%	130%
COACHELV– RAMON 230kV line No. 1	DEVERS– REDBLUFF 500kV line No. 1 & No. 2 w/ SPS	986	144%	151%	122%	<100%	101%	<100%
COACHELV– RAMON 230kV line No. 1	Base Case	986	127%	113%	<100%	<100%	<100%	<100%
RAMON – MIRAGE 230kV line No.1	COACHELV– MIRAGE 230kV line No. 1	986	243%	224%	135%	117%	169%	124%
RAMON – MIRAGE 230kV line No.1	DEVERS– REDBLUFF 500kV line No. 1 & No. 2 w/ SPS	986	138%	174%	128%	<100%	119%	<100%
RAMON – MIRAGE 230kV line No.1	Base Case	986	106%	128%	<100%	<100%	<100%	<100%
DEVERS – MIRAGE 230kV line	DEVERS – MIRAGE 230kV line	1240	100%	112%	<100%	<100%	<100%	<100%

No.1	No.2							
DEVERS – MIRAGE 230kV line No.2	DEVERS – MIRAGE 230kV line No.1	1240	100%	112%	<100%	<100%	<100%	<100%

Table 5.5-8 Portfolio 4 Deliverability Assessment Result for Path 42 Lines

Overloaded Facility	Contingencies	Flow	Undeliverable Zone
Coachella–Ramon 230kV No. 1	Devers–Red Bluff 500kV No. 1 & No. 2	139%	Imperial North
	Red Bluff–Colorado River 500kVNo. 1 & No. 2	127%	
	Coachella–Mirage 230kV No. 1	114%	

Table 5.5-9 Portfolio 1 Deliverability Assessment Result for Path 42 Lines

Overloaded Facility	Contingencies	Flow	Undeliverable Zone
Coachella–Ramon 230kV No. 1	Devers–Red Bluff 500kV No. 1 & No. 2	105%	Imperial North

DESCRIPTION AND SCOPE OF PROPOSED MITIGATIONS

The proposed mitigation plan for this area includes reconductoring the Coachella-Ramon 230kV line, the Ramon-Mirage 230kV line, the Coachella-Mirage 230kV line, and the Devers-Mirage 230kV No.1 and No.2 lines. This reconductoring plan includes lines owned by IID and therefore will need to be coordinated with IID. The estimated cost is $80million.

Table 5.5-10 Power Flow Summary with Recommended Mitigation

Overloaded Facility	Worst Contingency	Rating (A)	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case	No Solar Case	Portfolio 2 Peak Case
COACHELV –MIRAGE 230kV line No.1	COACHELV– RAMON 230kV line No. 1	2850	<100%	<100%	<100%	<100%	<100%	<100%
COACHELV –MIRAGE 230kV line No.1	DEVERS– REDBLUFF 500kV line No. 1 & No. 2 w/ SPS	2850	<100%	<100%	<100%	<100%	<100%	<100%
COACHELV– RAMON 230kV line No. 1	COACHELV– MIRAGE 230kV line No. 1	2850	<100%	<100%	<100%	<100%	<100%	<100%
COACHELV– RAMON 230kV line No. 1	DEVERS– REDBLUFF 500kV line No. 1 & No. 2 w/ SPS	2850	<100%	<100%	<100%	<100%	<100%	<100%
RAMON – MIRAGE 230kV line No.1	COACHELV– MIRAGE 230kV line No. 1	2850	<100%	<100%	<100%	<100%	<100%	<100%
RAMON – MIRAGE 230kV line No.1	DEVERS– REDBLUFF 500kV line No. 1 & No. 2 w/ SPS	2850	<100%	<100%	<100%	<100%	<100%	<100%
DEVERS – MIRAGE 230kV line No.1	DEVERS – MIRAGE 230kV line No.2	2850	<100%	<100%	<100%	<100%	<100%	<100%
DEVERS – MIRAGE 230kV line No.2	DEVERS – MIRAGE 230kV line No.1	2850	<100%	<100%	<100%	<100%	<100%	<100%

DISCUSSION OF OTHER CONSIDERED ALTERNATIVES

Alternative 1: Reconductoring the three Coachella to Mirage 230kV lines in the IID system and install SPS to trip IID generation under the N1 outages of Devers-Mirage 230kV No. 1 or No. 2 line.

The estimated cost for this alternative is about $40 million.

SUMMARY OF MITIGATIONS

Upgrading Path 42 lines in the IID system has been identified by IID in its generation interconnection studies. Results in the 33% RPS transmission planning studies support the need for the upgrade. Furthermore, it is recommended that the down-stream Devers–Mirage 230kV lines in the SCE system be reconductored to mitigate the overloads identified in Portfolio 4 and to achieve full utilization of the IID upgrades.

Table 5.5-11 Power Flow Summary with Alternative 1

Overloaded Facility	Worst Contingency	Rating (A)	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case	Portfolio 1 No Solar Case	Portfolio 2 Peak Case
COACHELV –MIRAGE 230kV line No.1	COACHELV– RAMON 230kV line No. 1	986	<100%	<100%	<100%	<100%	<100%	<100%
COACHELV –MIRAGE 230kV line No.1	DEVERS– REDBLUFF 500kV line No. 1 & No. 2 w/ SPS	986	<100%	<100%	<100%	<100%	<100%	<100%
COACHELV– RAMON 230kV line No. 1	COACHELV– MIRAGE 230kV line No. 1	986	<100%	<100%	<100%	<100%	<100%	<100%
COACHELV– RAMON 230kV line No. 1	DEVERS– REDBLUFF 500kV line No. 1 & No. 2 w/ SPS	986	<100%	<100%	<100%	<100%	<100%	<100%
RAMON – MIRAGE 230kV line No.1	COACHELV– MIRAGE 230kV line No. 1	986	<100%	<100%	<100%	<100%	<100%	<100%
RAMON – MIRAGE 230kV line No.1	DEVERS– REDBLUFF 500kV line No. 1 & No. 2 w/ SPS	986	<100%	<100%	<100%	<100%	<100%	<100%

5.5.3 ELDORADO–PISGAH 500KV LINE SERIES CAPACITOR UPGRADE

SUMMARY OF ANALYSIS

Overloading on the Eldorado –Pisgah 500kV line was identified under various category B and C outage conditions in the peak scenarios of Portfolio 1 and 4. The rating of the line is limited by the series capacitor. The loadings on the line exceeded the ratin g of the series capacitor, but were lower than the conductor emergency rating. The study results are summarized in Table 5.5-12.

Table 5.5-12 Power Flow Summary without Mitigation

Overloaded Facility	Worst Contingency	Rating (A)	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case	Portfolio 2 Peak Case
Eldorado–Pisgah 500kV line No. 1	McCullough–Victorville 500kV line No.1 & No.2	1600	105%	<100%	120%	<100%	<100%

DESCRIPTION AND SCOPE OF PROPOSED MITIGATIONS

The rating of Eldorado–Pisgah 500kV line is limited by the series capacitor. Upgrading the series capacitor to higher rating (2700A) mitigated the overloads. The upgrade is estimated to cost $25million.

Table 5.5-13 Power Flow Summary with Recommended Mitigation

Overloaded Facility	Worst Contingency	Rating (A)	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case	Portfolio 2 Peak Case
Eldorado–Pisgah 500kV line No. 1	McCullough–Victorville 500kV line No.1 & No.2	2700	<100%	<100%	<100%	<100%	<100%

DESCRIPTION OF OTHER CONSIDERED ALTERNATIVES

Alternative 1: Install SPS to bypass the series capacitor when the loading on the series capacitor approaches its normal rating.

Bypassing the series capacitor on the Eldorado–Pisgah 500kV line mitigated the overloads. The upgrade is estimated to cost less than $1million.

SUMMARY OF MITIGATIONS

Replacing the series capacitor is a relatively low-cost and more robust solution.

5.5.4 West of Devers Upgrades and Short-Term Solution

The West of Devers upgrades, consisting of reconductoring the four 230 kV lines of West of Devers, have been identified in the transition cluster Phase II study and included in the transition cluster project LGIAs. These upgrades were identified as needed in the portfolio development process for this 33% transmission planning study. The West of Devers upgrades, however, are estimated to take about 84 months following LGIA execution by the triggering transition cluster projects. In light of this long lead time, an interim solution for the West of Devers constraint was investigated in this planning study.

SUMMARY OF ANALYSIS OF INTERIM SOLUTIONS

Without the West of Devers upgrades, the four West of Devers 230kV lines would be overloaded under NERC category A, B and C conditions in all portfolios and scenarios. Table 5.5-14 summarizes the study results without the West of Devers upgrades.

Table 5.5-14 Power Flow Summary without West of Devers Upgrades

Overloaded Facility	Worst Contingency	Rating (A)	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case	Portfolio 2 Peak Case
DEVERS – EL CASCO 230kV line No.1	DEVERS– VALLEY 500kV No.1 & No. 2	1150	186%	138%	193%	105%	141%
DEVERS – EL CASCO 230kV line No.1	ALBERHIL – VALLEYSC 500kV line No. 1	1150	162%	124%	166%	115%	117%
DEVERS – EL CASCO 230kV line No.1	Base Case	1150	104%	<100%	112%	<100%	<100%
DEVERS – VSTA 230kV line No.2	DEVERS– VALLEY 500kV No.1 & No. 2	1240	170%	132%	175%	108%	125%
DEVERS – VSTA 230kV line No.2	ALBERHIL – VALLEYSC 500kV line No. 1	1240	146%	118%	150%	118%	102%
SANBRDNO –DEVERS 230kV line No.1	DEVERS– VALLEY 500kV No.1 & No. 2	796	221%	174%	228%	128%	159%
SANBRDNO –DEVERS 230kV line No.1	Base Case	796	111%	<100%	106%	<100%	<100%
SANBRDNO –DEVERS 230kV line No.1	ALBERHIL – VALLEYSC 500kV line No. 1	796	188%	155%	193%	141%	128%
TOT185HS –DEVERS 230kV line No.1	DEVERS– VALLEY 500kV No.1 & No. 2	1150	164%	125%	172%	103%	116%
TOT185HS –DEVERS 230kV line No.1	ALBERHIL – VALLEYSC 500kV line No. 1	1150	139%	111%	146%	114%	<100%

TOT185HS –VSTA 230kV line No.1	DEVERS– VALLEY 500kV No.1 & No. 2	1150	185%	125%	190%	117%	136%
TOT185HS –VSTA 230kV line No.1	ALBERHIL – VALLEYSC 500kV line No. 1	1150	159%	129%	162%	128%	112%
EL CASCO – SANBRDNO 230kV line No. 1	DEVERS– VALLEY 500kV No.1 & No. 2	1150	124%	111%	127%	<100%	<100%

DESCRIPTION AND SCOPE OF INTERIM SOLUTIONS

Interim Solution: Reactors on Devers–San Bernardino 230kV line and Devers–Elcasco 230kV line and SPS to trip generation

Two 10 ohm series reactors were modeled on the Devers–San Bernardino 230kV line and Devers–El Casco 230kV line, respectively. As a result, the overloads on the West of Devers 230kV lines under the normal conditions were mitigated in all scenarios studied.

In addition, an SPS was installed to trip generation and load under the simultaneous outage of Devers–Valley 500kV No.1 and No. 2 lines, and generation under the various single contingencies.

The short-term solution is sufficient to mitigate all overloads identified in Portfolio 2, which has lower renewable generation in the Riverside East area. Although this study focused on the year 2020 and a full 33% RPS build out, it is expected that renewable generation development will occur in the Riverside and Imperial County CREZs, along with Arizona developments, starting immediately and that it will steadily increase between now and 2020. Therefore, it is also expected that this interim plan could accommodate roughly 75% of the generation in Portfolios 1 and 4, which is a reasonable estimate of the amount of renewable generation build out in these areas that would occur over the next 84 months. This will be explored with the affected generation through the LGIP.

The solution is expected to cost less than $50 million.

Table 5.5-15 Power Flow Summary with Alternative 1

Overloaded Facility	Worst Contingency	Rating (A)	Portfolio 4 Peak Case	Portfolio 4 Off-Peak Case	Portfolio 1 Peak Case	Portfolio 1 Off-Peak Case	Portfolio 2 Peak Case
DEVERS – EL CASCO 230kV line No.1	DEVERS– VALLEY 500kV No.1 & No. 2	1150	<100%	<100%	<100%	<100%	<100%
DEVERS – EL CASCO 230kV line No.1	ALBERHIL – VALLEYSC 500kV line No. 1	1150	113%	<100%	117%	<100%	<100%
DEVERS – VSTA 230kV line No.2	DEVERS– VALLEY 500kV No.1 & No. 2	1240	110%	110%	116%	<100%	<100%
DEVERS – VSTA 230kV line No.2	ALBERHIL – VALLEYSC 500kV line No. 1	1240	129%	120%	134%	107%	<100%
SANBRDNO –DEVERS 230kV line No.1	DEVERS– VALLEY 500kV No.1 & No. 2	796	114%	116%	121%	<100%	<100%
SANBRDNO –DEVERS 230kV line No.1	ALBERHIL – VALLEYSC 500kV line No. 1	796	132%	126%	137%	101%	<100%
TOT185HS –DEVERS 230kV line No.1	DEVERS– VALLEY 500kV No.1 & No. 2	1150	102%	103%	111%	<100%	<100%
TOT185HS –DEVERS 230kV line No.1	ALBERHIL – VALLEYSC 500kV line No. 1	1150	122%	113%	129%	102%	<100%
TOT185HS –VSTA 230kV line No.1	DEVERS– VALLEY 500kV No.1 & No. 2	1150	121%	120%	127%	<100%	<100%
TOT185HS –VSTA 230kV line No.1	ALBERHIL – VALLEYSC 500kV line No. 1	1150	141%	131%	145%	116%	<100%