

## 2013/2014 ISO Reliability Assessment - Preliminary Study Results

Study Area: **SCE North of Lugo - Summer Peak**

### Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
NOL-SP-T-1	24602 VICTOR 115 - 24702 KRAMER 115 - Ckt 1	Line ROADWAY 115.0 to KRAMER _Line KRAMER 230.0 to LUGO #1	C	N-1-1	120%	82%	100%	Curtail gen after the first contingency
NOL-SP-T-2	24602 VICTOR 115 - 24702 KRAMER 115 - Ckt 1	Line ROADWAY 115.0 to KRAMER _Line KRAMER 230.0 to LUGO #2	C	N-1-1	120%	82%	100%	Curtail gen after the first contingency
NOL-SP-T-3	24602 VICTOR 115 - 24702 KRAMER 115 - Ckt 1	Line KRAMER 230.0 to LUGO #1 _Line COLWATER 230.0 to JASPER	C	N-1-1	NA	86%	104%	Curtail gen after the first contingency
NOL-SP-T-4	24602 VICTOR 115 - 24702 KRAMER 115 - Ckt 1	Line KRAMER 230.0 to LUGO #2 _Line COLWATER 230.0 to JASPER	C	N-1-1	NA	86%	104%	Curtail gen after the first contingency
NOL-SP-T-5	24607 ROADWAY 115 - 24702 KRAMER 115 - Ckt 1	Line VICTOR 115.0 to KRAMER _Line KRAMER 230.0 to LUGO #1	C	N-1-1	122%	84%	102%	Curtail gen after the first contingency
NOL-SP-T-6	24607 ROADWAY 115 - 24702 KRAMER 115 - Ckt 1	Line VICTOR 115.0 to KRAMER _Line KRAMER 230.0 to LUGO #2	C	N-1-1	122%	84%	102%	Curtail gen after the first contingency
NOL-SP-T-7	24607 ROADWAY 115 - 24702 KRAMER 115 - Ckt 1	Line KRAMER 230.0 to LUGO _Line COLWATER 230.0 to JASPER	C	N-1-1	NA	89%	108%	Curtail gen after the first contingency
NOL-SP-T-8	24607 ROADWAY 115 - 24702 KRAMER 115 - Ckt 1	Line KRAMER 230.0 to LUGO #1 _Line COLWATER 230.0 to JASPER	C	N-1-1	NA	89%	108%	Curtail gen after the first contingency
NOL-SP-T-9	24701 KRAMER 230 - 24085 LUGO 230 - Ckt 1	Line KRAMER 230.0 to LUGO #2 _Line COLWATER 230.0 to JASPER	C	N-1-1	NA	94%	108%	Curtail gen after the first contingency
NOL-SP-T-10	24701 KRAMER 230 - 24085 LUGO 230 - Ckt 2	Line KRAMER 230.0 to LUGO _Line COLWATER 230.0 to JASPER	C	N-1-1	NA	94%	108%	Curtail gen after the first contingency

San Onofre Nuclear Generation Station was retired on June 7, 2013 and therefore was removed from the base cases used for the 2013/14 ISO transmission planning process.

# 2013/2014 ISO Reliability Assessment - Preliminary Study Results

Study Area: **SCE North of Lugo - Summer Off-Peak & Summer Light Load**



## Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	N/A	
X-NP-T-1	24731 INYOKERN 115 - 24702 KRAMER 115 - Ckt 1	line KRAMER-INYOKERN-RANDB 115 ck 1	B	N-1	102%	14%		Re-adjust generation pre-contingency (Congestion management ) OR Modify Kramer N-1 RAS to protect for both Kramer-Inyoker-Randsberg conitngencies

**Voltage Deviations**

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
NOL-SP-VD-1	24731 INYOKERN 115 kV	Line INYOKERN 115.0 to KRAMER 115.0 ck 1	B	N-1	-4%	-4%	-5%	Modify the RAS to trip Bishop Hydro or Control area gen. (Including the new RPS gen) OR an exception
NOL-SP-VD-2	24768 RANDSBURG 115 kV	Line INYOKERN 115.0 to KRAMER 115.0 ck 1	B	N-1	-5%	-5%	-6%	Modify the RAS to trip Bishop Hydro or Control area gen. (Including the new RPS gen) OR an exception
NOL-SP-VD-3	24792 DOWNS 115 kV	line DOWNS-SEARLES-MCGEN 115 ck 1	B	N-1	-4%	-5%	-5%	Modify the RAS to trip Bishop Hydro or Control area gen. (Including the new RPS gen) OR an exception
NOL-SP-VD-4	24731 INYOKERN 115 kV	Line CONTROL 115.0 to INYO _Line INYOKERN 115.0 to KRAMER	C	N-1-1	-6%	-5%	-16%	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area
NOL-SP-VD-5	24768 RANDSBURG 115 kV	Line CONTROL 115.0 to INYO _Line INYOKERN 115.0 to KRAMER	C	N-1-1	-6%	-5%	-13%	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area
NOL-SP-VD-6	24790 COSO 115 kV	Line CONTROL 115.0 to INYO _Line INYOKERN 115.0 to KRAMER	C	N-1-1	-5%	-4%	-16%	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area
NOL-SP-VD-7	24792 DOWNS 115 kV	Line CONTROL 115.0 to INYO _Line INYOKERN 115.0 to KRAMER	C	N-1-1	-5%	-5%	-14%	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area
NOL-SP-VD-8	24731 INYOKERN 115 kV	Line INYOKERN 115.0 to KRAMER _line DOWNS-SEARLES-MCGEN 115 ck 1	C	N-1-1	-8%	-9%	-12%	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area

2013/2014 ISO Reliability Assessment - Preliminary Study Results

Study Area: **SCE North of Lugo - Summer Peak**



**Voltage Deviations**

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
NOL-SP-VD-9	24792 DOWNS 115 kV	Line INYOKERN 115.0 to KRAMER _line DOWNS-SEARLES-MCGEN 115 ck 1	C	N-1-1	-11%	-11%	-15%	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area

**Voltage Deviations**

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	N/A	
NOL-NP-VD-1	24728 INYO 115 kV	Line CONTROL 115.0 to INYO 115.0 ck 1	B	N-1	2%	6%		Dynamic reactive support OR an exception
NOL-NP-VD-2	24731 INYOKERN 115 kV	Line INYOKERN 115.0 to KRAMER 115.0 ck 1	B	N-1	-5%	-2%		Modify Kramer RAS to drop generation in Control area or an exception
NOL-NP-VD-3	24768 RANDSBURG 115 kV	Line INYOKERN 115.0 to KRAMER 115.0 ck 1	B	N-1	-6%	-1%		Modify Kramer RAS to drop generation in Control area or an exception
NOL-NP-VD-4	24792 DOWNS 115 kV	Line INYOKERN 115.0 to KRAMER 115.0 ck 1	B	N-1	-5%	-2%		Modify Kramer RAS to drop generation in Control area or an exception
NOL-NP-VD-5	24731 INYOKERN 115 kV	Line CONTROL 115.0 to INYO _Line INYOKERN 115.0 to KRAMER	C	N-1-1	-12%	0%		Curtail Control area gen after the first contingency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area
NOL-NP-VD-6	24768 RANDSBURG 115 kV	Line CONTROL 115.0 to INYO _Line INYOKERN 115.0 to KRAMER	C	N-1-1	-12%	0%		Curtail Control area gen after the first contingency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area
NOL-NP-VD-7	24723 CONTROL 115 kV	Line CONTROL 115.0 to INYOKERN _Tran INYO 115.00 to INYO PS	C	N-1-1	-3%	-10%		Adjust shunt reactors and other reactive devices in the area after the first contingency and curtail generation North of Control OR under light load condition, instead of tripping BS Hydro, bring one unit online after the first contingency OR add reactive support
NOL-NP-VD-8	24724 OXBOW B 115 kV	Line CONTROL 115.0 to INYOKERN _Tran INYO 115.00 to INYO PS	C	N-1-1	-3%	-10%		Adjust shunt reactors and other reactive devices in the area after the first contingency and curtail generation North of Control OR under light load condition, instead of tripping BS Hydro, bring one unit online after the first contingency OR add reactive support

**Voltage Deviations**

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	N/A	
NOL-NP-VD-9	24731 INYOKERN 115 kV	Line INYOKERN 115.0 to KRAMER _line DOWNS-SEARLES-MCGEN 115 ck 1	C	N-1-1	-10%	-3%		Existing Kramer N-1 RAS drops McGen and/or CalGen and makes this problem worse. Modify Kramer RAS to drop generation in Control area or Curtail Control area gen after the first conitngency. (including the new RPS generation in the area)
NOL-NP-VD-10	24792 DOWNS 115 kV	Line INYOKERN 115.0 to KRAMER _line DOWNS-SEARLES-MCGEN 115 ck 1	C	N-1-1	-12%	-3%		Existing Kramer N-1 RAS drops McGen and/or CalGen and makes this problem worse. Modify Kramer RAS to drop generation in Control area or Curtail Control area gen after the first conitngency. (including the new RPS generation in the area)
NOL-NP-VD-11	24702 KRAMER 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-2%	-13%		In 2023, Kramer RAS - OP proc 6.6.1 In 2018, Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-12	24716 COLWATER 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-1%	-11%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-13	24727 HOLGATE 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-1%	-13%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-14	24731 INYOKERN 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-1%	-12%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-15	24749 SEARLES 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	0%	-12%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)

**Voltage Deviations**

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	N/A	
NOL-NP-VD-16	24759 TORTILLA 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-1%	-11%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-17	24767 ROCKET 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-2%	-13%		In 2023, Kramer RAS - OP proc 6.6.1 In 2018, Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-18	24768 RANDSBRG 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-1%	-12%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-19	24769 EDWARDS 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-1%	-14%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-20	24770 SOUTHBAS 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-1%	-14%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-21	24771 GALE 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-1%	-10%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-22	24773 TIEFORT 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-1%	-11%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-VD-23	24792 DOWNS 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	-1%	-12%		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)

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Study Area: **SCE North of Lugo - Summer Peak**

## High/Low Voltage

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
NOL-SP-VD-1	24043 ELDORDO 115 kV	Base system (n-0)	A	N-0	0.93	0.92	0.92	Tap adjustment on Eldorado 230/115kV transformer
NOL-SP-VD-2	24646 ELDORDO2 230 kV	Base system (n-0)	A	N-0	1.06	1.02	1.01	Tap adjustment on Eldorado 500/230kV and Ivanpah 230/115kV transformers
NOL-SP-VD-3	24647 IVANPAH 230 kV	Base system (n-0)	A	N-0	1.06	1.03	1.02	Tap adjustment on Eldorado 500/230kV and Ivanpah 230/115kV transformers
NOL-SP-VD-4	24774 DUNNSIDE 115 kV	Base system (n-0)	A	N-0	1.03	1.02	1.05	Tap adjustment on Eldorado 500/230kV and Ivanpah 230/115kV transformers
NOL-SP-VD-5	24790 COSO 115 kV	Base system (n-0)	A	N-0	0.98	0.97	0.93	Boost voltage setpoints of generators connected to Inyokern
NOL-SP-VD-6	94414 RPSC0015 115 kV	Base system (n-0)	A	N-0	NA	NA	1.06	RPS gen to provide +/- 0.95 PF
NOL-SP-VD-7	94157 RPSC0016 115 kV	Base system (n-0)	A	N-0	NA	NA	1.07	RPS gen to provide +/- 0.95 PF
NOL-SP-VD-8	24790 COSO 115 kV	Line CONTROL 115.0 to INYO 115.0 ck 1	B	N-1	0.98	0.97	0.89	Boost voltage setpoints of generators connected to Inyokern
NOL-SP-VD-9	24731 INYOKERN 115 kV	Line INYOKERN 115.0 to KRAMER _line DOWNS-SEARLES-MCGEN 115 ck 1	C	N-1-1	0.90	0.89	0.84	Modify the existing operating procedure to maintain McGen dispatch pre-contingency and/or add reactive support. Existing Kramer N-1 RAS drops McGen and/or CalGen and makes this problem worse. Review the RAS for long-term study horizon.

**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
NOL-SP-VD-10	24768 RANDSBRG 115 kV	Line INYOKERN 115.0 to KRAMER _line DOWNS-SEARLES-MCGEN 115 ck 1	C	N-1-1	0.92	0.92	0.89	Modify the existing operating procedure to maintain McGen dispatch pre-contingency and/or add reactive support. Existing Kramer N-1 RAS drops McGen and/or CalGen and makes this problem worse. Review the RAS for long-term study horizon.
NOL-SP-VD-11	24792 DOWNS 115 kV	Line INYOKERN 115.0 to KRAMER _line DOWNS-SEARLES-MCGEN 115 ck 1	C	N-1-1	0.88	0.87	0.82	Modify the existing operating procedure to maintain McGen dispatch pre-contingency and/or add reactive support. Existing Kramer N-1 RAS drops McGen and/or CalGen and makes this problem worse. Review the RAS for long-term study horizon.
NOL-SP-VD-12	24768 RANDSBRG 115 kV	Line INYOKERN 115.0 to KRAMER _line INYOKERN-SEARLES-MCGEN 115 ck 1	C	N-1-1	0.93	0.92	0.90	Modify the existing operating procedure to maintain McGen dispatch pre-contingency and/or add reactive support. Existing Kramer N-1 RAS drops McGen and/or CalGen and makes this problem worse. Review the RAS for long-term study horizon.
NOL-SP-VD-13	24792 DOWNS 115 kV	Line INYOKERN 115.0 to KRAMER _line INYOKERN-SEARLES-MCGEN 115 ck 1	C	N-1-1	0.92	0.92	0.88	Modify the existing operating procedure to maintain McGen dispatch pre-contingency and/or add reactive support. Existing Kramer N-1 RAS drops McGen and/or CalGen and makes this problem worse. Review the RAS for long-term study horizon.

**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
NOL-SP-VD-14	24792 DOWNS 115 kV	Line INYOKERN 115.0 to KRAMER _Tran INYO 115.00 to INYO PS	C	N-1-1	0.93	0.93	0.85	Modify the existing operating procedure to maintain McGen dispatch pre-contingency and/or add reactive support. Existing Kramer N-1 RAS drops McGen and/or CalGen and makes this problem worse. Review the RAS for long-term study horizon.
NOL-SP-VD-15	24792 DOWNS 115 kV	Line CONTROL 115.0 to INYO _line DOWNS-SEARLES-MCGEN 115 ck 1	C	N-1-1	0.94	0.94	0.89	Modify the existing operating procedure to maintain McGen dispatch pre-contingency and/or add reactive support.
NOL-SP-VD-16	24792 DOWNS 115 kV	line DOWNS-SEARLES-MCGEN 115 ck 1 _line CAL GEN to INYOKERN 115 ck 1	C	N-1-1	0.93	0.92	0.90	Modify the existing operating procedure to maintain McGen dispatch pre-contingency and/or add reactive support.
NOL-SP-VD-17	24792 DOWNS 115 kV	line DOWNS-SEARLES-MCGEN 115 ck 1 _Tran INYO 115.00 to INYO PS	C	N-1-1	0.94	0.94	0.90	Modify the existing operating procedure to maintain McGen dispatch pre-contingency and/or add reactive support.
NOL-SP-VD-18	24792 DOWNS 115 kV	Line CONTROL 115.0 to INYO _Line INYOKERN 115.0 to KRAMER	C	N-1-1	0.93	0.93	0.83	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area.
NOL-SP-VD-19	24731 INYOKERN 115 kV	Line INYOKERN 115.0 to KRAMER _Line INYOKERN 115.0 to DOWNS	C	N-1-1	0.93	0.92	0.89	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area.

**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
NOL-SP-VD-20	24731 INYOKERN 115 kV	Line INYOKERN 115.0 to KRAMER _line INYOKERN-SEARLES-MCGEN 115 ck 1	C	N-1-1	0.91	0.90	0.86	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area.
NOL-SP-VD-21	24731 INYOKERN 115 kV	Line INYOKERN 115.0 to KRAMER _Tran INYO 115.00 to INYO PS	C	N-1-1	0.92	0.92	0.83	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area.
NOL-SP-VD-22	24731 INYOKERN 115 kV	Line INYOKERN 115.0 to KRAMER _Tran INYO 230.00 to INYO PS	C	N-1-1	0.94	0.93	0.90	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area.
NOL-SP-VD-23	24731 INYOKERN 115 kV	Line CONTROL 115.0 to INYO _Line INYOKERN 115.0 to KRAMER	C	N-1-1	0.92	0.92	0.81	Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area.

**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	N/A	
NOL-NP-V-1	24647 IVANPAH 230 kV	Base system (n-0)	A	N-0	1.02	1.05		Tap adjustment on Eldorado and Ivanpah transformers.
NOL-NP-V-2	24731 INYOKERN 115 kV	Line INYOKERN 115.0 to KRAMER 115.0 ck 1	B	N-1	0.93	0.98		Modify Kramer RAS to drop generation in Control area.. (including the new RPS generation in the area)
NOL-NP-V-3	24768 RANDSBRG 115 kV	Line INYOKERN 115.0 to KRAMER 115.0 ck 1	B	N-1	0.92	0.99		Modify Kramer RAS to drop generation in Control area.. (including the new RPS generation in the area)
NOL-NP-V-4	24772 SHERWIN 115 kV	Line CONTROL 115.0 to INYO _Line CONTROL 115.0 to INYOKERN	C	N-1-1	0.98	0.89		Adjust shunt reactors and other reactive devices in the area after the first contingency. OR under light load condition, instead of tripping BS Hydro, bring one unit online after the first contingency OR Curtail Control area generation after the first contingency
NOL-NP-V-5	24772 SHERWIN 115 kV	Line CONTROL 115.0 to INYO _line CONTROL-COSO-INYOKERN 115 ck 2	C	N-1-1	0.98	0.90		Adjust shunt reactors and other reactive devices in the area after the first contingency. OR under light load condition, instead of tripping BS Hydro, bring one unit online after the first contingency OR Curtail Control area generation after the first contingency
NOL-NP-V-6	24772 SHERWIN 115 kV	Line CONTROL 115.0 to INYOKERN _Tran INYO 115.00 to INYO PS	C	N-1-1	0.98	0.90		Adjust shunt reactors and other reactive devices in the area after the first contingency. OR under light load condition, instead of tripping BS Hydro, bring one unit online after the first contingency OR Curtail Control area generation after the first contingency

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	N/A	
NOL-NP-V-7	24772 SHERWIN 115 kV	line CONTROL-COSO-INYOKERN 115 ck 2 _Tran INYO 115.00 to INYO PS	C	N-1-1	0.98	0.90		Adjust shunt reactors and other reactive devices in the area after the first contingency. OR under light load condition, instead of tripping BS Hydro, bring one unit online after the first contingency OR Curtail Control area generation after the first contingency
NOL-NP-V-8	24792 DOWNS 115 kV	Line INYOKERN 115.0 to KRAMER _line DOWNS-SEARLES-MCGEN 115 ck 1	C	N-1-1	0.87	0.97		Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area
NOL-NP-V-9	24792 DOWNS 115 kV	Line INYOKERN 115.0 to KRAMER _line INYOKERN-SEARLES-MCGEN 115 ck 1	C	N-1-1	0.91	0.98		Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area
NOL-NP-V-10	24792 DOWNS 115 kV	Line INYOKERN 115.0 to KRAMER _Tran INYO 115.00 to INYO PS	C	N-1-1	0.89	1.00		Curtail Control area gen after the first conitngency. (including the new RPS generation in the area) OR Modify Kramer RAS to drop generation in Control area
NOL-NP-V-11	24727 HOLGATE 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	1.01	0.86		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-12	24731 INYOKERN 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	0.97	0.88		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-13	24767 ROCKET 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	0.98	0.87		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)

**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2015 Summer Off-Peak	2018 Summer Light Load	N/A	
NOL-NP-V-14	24769 EDWARDS 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	0.99	0.84		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-15	24770 SOUTHBAS 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	0.99	0.84		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-16	24771 GALE 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	1.00	0.90		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-17	24773 TIEFORT 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	0.98	0.89		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-18	24790 COSO 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	0.97	0.90		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-19	24716 COLWATER 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	1.00	0.90		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-20	24749 SEARLES 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	1.03	0.89		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-21	24792 DOWNS 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	0.98	0.88		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-22	24759 TORTILLA 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	0.99	0.89		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)
NOL-NP-V-23	24768 RANDSBRG 115 kV	Tran KRAMER 230.00 to KRAMER _Tran KRAMER 230.00 to KRAMER	C	N-1-1	0.97	0.88		Reactive device adjustments (switch in caps at Kramer and Tortilla after the first contingency)

**Transient Stability**

ID	Contingency	Category	Category Description	Transient Stability Performance			Potential Mitigation Solutions
				2015 Summer Peak	2018 Summer Peak	2023 Summer Peak	
NOL-SP-TS-1	Lugo - Victor N-2	C5	N-2	Voltage dip below 0.7 pu and no recovery in Kramer 115kV area	Voltage dip below 0.7 pu and no recovery in Kramer 115kV area	Voltage dip below 0.7 pu and no recovery in Kramer 115kV area	Victor Loop in Kramer-Lugo OR Modify existing HDPP RAS to drop load

## 2013/2014 ISO Reliability Assessment - Preliminary Study Results

Study Area: **SCE North of Lugo - Summer Peak**



### Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				Select..	Select..	Select..	

No single contingency resulted in total load drop of more than 250 MW.

Study Area: **SCE North of Lugo - Summer Off-Peak & Summer Light Load**



**Single Contingency Load Drop**

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				Select..	Select..	Select..	

No single contingency resulted in total load drop of more than 250 MW.

## 2013/2014 ISO Reliability Assessment - Preliminary Study Results

Study Area: **SCE North of Lugo - Summer Peak**

**Single Source Substation with more than 100 MW Load**



ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		Select..	Select..	Select..	

No single source substation with more than 100 MW Load

## 2013/2014 ISO Reliability Assessment - Preliminary Study Results

Study Area: **SCE North of Lugo - Summer Off-Peak & Summer Light Load**



***Single Source Substation with more than 100 MW Load***

ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		Select..	Select..	Select..	

No single source substation with more than 100 MW Load